

Curriculum Vitae

Mark Alcock

Date of Birth 18 May 1967

Citizenship Australian

Education

2000-2004: **Graduate Diploma Legal Studies (Environmental Law)**
Australian National University

1988-1991: **Bachelor of Applied Science (Geology)**
University of Canberra

Professional Interests

- The interface between science, technology law and society
- Marine planning / Blue Economy
- Effective regulation and appropriate environmental protections in the Mining Code for Deep Sea Mining
- Legal certainty for international and domestic maritime boundaries
- Climate change impacts on coastlines, reefs and cays.

Member of the Legal and Technical Commission (LTC) of the International Seabed Authority

Term 1: January 2017 to 31 December 2022, eligible for re-election.

- Since 2017, Mark has been an active member of the LTC, taking particular interest in the integrity of the regulatory framework and the likely effectiveness of the regulations within the capabilities of the ISA. Mark led the development of the Draft Guidelines for the preparation of an environmental management and monitoring plan, the preparation and assessment of an application, and for the approval of a Plan of Work for exploitation. He also participated in the development of other guidelines. He has a professional interest in the data management systems of the Authority, especially for geophysical information and the management of titles.

Current Position, Geoscience Australia, Australian Government

Director of Georegulation/Senior Advisor for Georegulation and Law of the Sea, Geoscience Australia.

In this role, Mark has since 2008:

- Led the Australian Government program responsible for the scientific and technical framework that establishes Australia's international and domestic offshore boundaries. This program includes coordination between maritime agencies to improve maritime planning and supporting enforcement and prosecutions.
- Conceived and established a program at the University of Sydney to investigate the impacts of climate change on cays and reefs, particularly mechanisms that make cays vulnerable to climate change, likely timelines of vulnerability, and signs of accelerated decline that will assist communities to plan for impacts.
- Developed a range of Government-University partnerships to explore emerging policy challenges.
- As part of Australia's partnership with Pacific Island States and regional organisations, trained and advised 14 Pacific Island states over a period of 18 years to secure their maritime entitlements and improve ocean governance.
- Advised foreign governments to improve management of their maritime resources, including establishing marine protected areas and managing non-living resources.
- Contributed to Compulsory Conciliation proceedings between The Democratic Republic of Timor-Leste and The Commonwealth of Australia between 2016 and 2018 as a member of Australia's delegation.
- Provided advice on the establishment of Australia's marine reserve system.
- Contributed to the development of the Australian Government Civil Maritime Security Strategy (2022).
- Chaired the International Hydrographic Organisation S-121 Maritime Limits and Boundaries Project team establishing a standard for the electronic exchange of maritime boundary information.
- Appointed to the International Hydrographic Organisation's List of Experts on the Law of the Sea (one of three Australian experts).

Geoscience Australia Roles before 2008

- Director – Law of the Sea Program (2005-2008)
- Co-Director – Coastal Inundation Bathymetry Collation Project (2005-2008)
- Senior Agency Advisor for Bathymetry (2005-2008)
- Field Geophysicist, Quality Control and Systems Development Scientist Marine Operations (1992-1998)
 - Before taking responsibility for Australia's Georegulation and Law of the Sea Program, Mark worked as a project scientist preparing Australia's article 76 submission and head of the technical component of the delegation defending Australia's submission to the Commission on the Limits of the Continental shelf. This included undertaking relevant surveys, data interpretation, developing submissions strategies and preparing submission materials.
 - Since 2006, Mark has provided advice to neighbouring States on the preparation and defence of their continental shelf submissions.
 - Mark contributed to development of acquisition and quality control systems for geophysical and geological data acquisition and undertook more than 40 marine surveys over Australia's offshore jurisdiction, Asia and the Antarctic.

NOORAH ALGETHAMI



OBJECTIVE

Through my education and experiences, I gained strong knowledge and experience of Constitutional Law, Contract Law, International Law, Environmental law, International Environmental treaties, Legal research and writings, International Relations, International Financial Regulations and Legal compliance. I have studied law for many years, and I have developed a pragmatic approach to complex legal issues, ultimately benefitting my clients or any organization that I would be working at, with accurate and up-to-date advice.

I am looking for a position that will combine my backgrounds, studies and passion. I am confident that I will be a value added to any organizations on those areas listed and more.



EDUCATION

MA International Relations | DCU Dublin City University, Ireland

SEP 2017 – OCT 2018

PGD Post Graduate Diploma in International Financial Regulation and Corporate Law | Brunel University, London UK

JAN 2015 – AUG 2016

Bachelor of Law LLB | Anglia Ruskin University, Cambridge UK

JAN 2010 – MAR 2014



EXPERIENCE

GM of International Treaties DEP. | National Centre for Environmental Compliance (NCEC), Jeddah KSA

JAN 2021 – CURRENT

- Supervising and managing daily tasks.
- Developing and implementing a compliance model for international treaties.
- Evaluating performance.

Legal Consultant and Manager of Legal Compliance. | General Authority of Meteorology and Environmental Protection (GAMEP), Jeddah KSA

DEC 2018 – JAN 2021

I have started my experience as a Legal and Compliance consultant, who is reviewing, analysing, and advising on quality assurance of compliance with GAMEP inquiries. Responsible for the examination of information concerning, but not limited to:

- Revising Contracts, analyzing legal documents and coordinating other legal staff.
- Drafting and Issuing Memorandums of Understanding and GAMEP's Initiatives Legal Terms.
- Advising and working on the Environmental Treaties.
- Attending and preparing reports on the International Environmental Conventions.
- Provide advice to GAMEP based on their particular situations.
- Facilitate dispute resolution by negotiating settlement agreements.
- Analyze documents for potential compliance issues.
- Assist with completion of compliance log.
- Draft and analyze agreements protecting GAMEP's intellectual property, mainly while drafting MOU.

Legal Advisor. | In House

MAY 2014 – AUG 2017 (OVER PHONE, EMAIL AND FACE TO FACE WHENEVER IS NECESSARILY)

- Revising Financial Reports.
- Advising Administration on Legal Compliance.
- Editing Contracts.
- Providing legal consultation on fixed incomes, primarily in workers regulations.

Assistance Library Secretariat. | Brunel University, London

MARCH 2015 – OCT 2015 (PART TIME/VOLUNTEERING)

- Responding to all correspondents through phone, email and face to face.
- Ensuring all records are kept up to date and confidential.
- Carrying out general admin work within an office environment.
- Coordinated with employees and managerial staff.

Trainee. | Taif Chamber for Commerce

APR 2012 – SEP 2012 (PART TIME/VOLUNTEERING)

- Advising of related legal matters.
- Desk research.
- Drafting Documents.
- Formulated business proposals and presentations.



SKILLS

- Negotiation Skills.
- Legal Research and Writings.
- Experience working in legal and regulatory environment.

- Ability to use Microsoft Office – Outlook, Word, Excel, PowerPoint and Google Suite.
- Superior organizational, time management and management skills.

LANGAUGE

Arabic: Native

English: Fluent

German and Spanish: Beginner

ACTIVITIES

Attended Programs;

- Legal Consulting Methods, November 2020, Online.
- Administrative Investigation course, July 2020, Online.
- Arbitration in Maritime Disputes, June 2020, Online.
- Litigation Procedures, May 2020, Online.
- Labor rights according to the Saudi Labor Regulation, May 2020, Online.
- Advocacy Skills, October 2019, Jeddah KSA.
- Negotiations Skills, December 2018, Jeddah KSA.
- Pathways to Success Program, March 2018, Dublin Ireland.
- Formulation of Regulations and Preparation of Legal Memoranda, 6-8 March 2017, Jeddah KSA.
- How to Protect your Financial and Commercial Rights, 24-25 Feb 2017, Jeddah KSA.
- Crimes of Self-Abuse, 18-19 March 2017, Jeddah KSA.
- Six Thinking Hats, 24-15 Nov 2008, Jeddah KSA.
- Sign Language Unified Arabic Dictionary, 24-28 March 2007, Jeddah KSA.
- Use of Computers in Office Work, 17 March – 19 May 2007, Jeddah KSA.

Certifications and Clubs;



- CLC, Certificate of Legal Compliance, Sept 2020, Online.
- CUS Cambridge Union Society, 2011-Current.
- Higher Diploma in Paralegal Practice, NALP 2014- Current.
- LSC Law Society Club, Anglia Ruskin University, 2011-2014.

Volunteer Activities;

- Actively involved Student Unions and Libraries.
- Raising Funds for charities.
- Managing events for disabled and people in needs.

Achievements;

- Contributing as a speaker with LexisNexis to deliver the webinar of 'Coronavirus middle east updates- Saudi Arabia' 2020.
- Contributing Author at LexisNexis Platform. 2019 – Current
- Planed for an awareness campaign to reduce the use of plastic bags 2019.

- 
- 
- Associate member at the 'Protecting Vulnerable Witnesses Program' Jun 2015 – Sep 2015.
 - University Mooting Campaign, 2013.
 - Student Ambassador, 2013.

Professeur Niki ALOUPI

Candidate de la France comme membre de la Commission juridique et technique de l'Autorité internationale des Fonds Marins (AIFM)

Professeur agrégée de droit public à l'Université Paris 2 Panthéon-Assas

Juge assesseur représentant du HCR auprès de la Cour Nationale du droit d'asile



CARRIERE UNIVERSITAIRE

- depuis sept. 2018 **Université Paris 2 Panthéon-Assas : Professeur de droit public**
Responsable du Master 2 Administration internationale
Membre du Conseil des études et de la vie étudiante
- sept.2012-août 2018 **Université de Strasbourg : Professeur de droit public**
Responsable du Master 2 Droit international public et **coresponsable** du Diplôme Universitaire (DU) Clinique de droit international des droits de l'homme à Strasbourg (depuis 2013)
Présidente de la Section 02 (2014-2018)
Vice directrice du Centre d'Etudes Internationales et Européennes CEIE responsable de l'axe « droit international » (2014-2017)

FORMATION ET TITRES UNIVERSITAIRES

- juin 2012 **Admise au 1^{er} concours national d'agrégation de droit public** (rang 3^{ème})
- mars 2012 **Qualifiée aux fonctions de maître de conférences** – Section 02
- avril 2011 **Thèse en droit public sous la direction du Professeur J. Verhoeven** : « Le rattachement des engins à l'Etat en droit international public (navires, aéronefs, objets spatiaux) »
Mention très honorable avec les félicitations du jury. Mention Paris II, lettre de félicitations Prix Daveluy.
- sept.2003-sept.2004 **Diplôme d'études approfondies en droit international public (D.E.A.)**, Université Paris 2 Panthéon-Assas

RESPONSABILITES NATIONALES OU INTERNATIONALES (SELECTION)

- depuis sept.2013 **Juge-assesseur** représentant du Haut-commissariat des Nations Unies pour les réfugiés (HCR) auprès de la Cour nationale du droit d'asile (CNDA)
- nov. 2015-nov. 2019 **Membre élu** du Conseil national des universités (CNU)
- Sept.2011-sept. 2021 **Participation** aux 75^{ème} (Rhodes), 76^{ème} (Tokyo/Kyoto), 77^{ème} (Tallinn), 79^{ème} (La Haye) et 80^{ème} (présidence chinoise, en ligne) sessions de l'Institut de Droit International. Secrétaire-rédacteur

RESPONSABILITES SCIENTIFIQUES ET COLLECTIVES (SELECTION)

- 2021-2023 **Co-coordinatrice** (avec Gabriele Wanli) du Livre Blanc sur Les Océans, pour le 150^{ème} anniversaire de l'ILA
- 2021 **Membre du jury** du prix de thèse « Suzanne Bastid » de la SFDI

depuis sept. 2020	Membre du Conseil éditorial de l'Annuaire français de relations internationales, co-responsable (avec J-P. Pancrazio) de la rubriques « Espaces internationaux »
depuis 2020	Membre du jury du prix de thèse « Georgette Mariani » en droit de la mer de la Chancellerie
depuis juin 2018	Membre du Conseil de la Société française pour le droit international (SFDI)
2016 - 2018	Membre du jury du 3 ^{ème} concours d'entrée à l'ENA, droit public
depuis févr. 2017	Membre du Comité de rédaction de la <i>Revue générale de droit international public</i>
depuis sept. 2015	Co-directrice (avec P.-F. Laval) de la chronique trimestrielle de jurisprudence internationale de la <i>Revue générale de droit international public</i>

SOCIETES SAVANTES ET ASSOCIATIONS

- **Membre** du Conseil et de la Société pour le droit international (SFDI)
- **Membre** de la European Society of International Law (ESIL)
- **Membre** de l'Association de droit international / International Law Association (ILA)
- **Membre** de l'Institut international des droits de l'homme, Fondation René Cassin (IIDH)
- **Membre** de l'Institut des hautes études internationales, Paris 2 Panthéon-Assas (IHEI)

ENSEIGNEMENTS ET RECHERCHE DANS D'AUTRES ETABLISSEMENTS ET A L'ETRANGER (SELECTION)

janv. 2025	Cours spécial, Académie de droit international de La Haye , <i>session de droit international de l'hiver</i>
juin 2022	ESADE – Sciences Po Paris, Law and Global Governance Summer School , <i>cours Public International Law</i> , 18 heures
mai 2022	Professeur invitée au sein d'un programme de recherche, Univeristé de Roma Sapienza , <i>recherche avec le Professeur Béatrice Bonafé</i>
mai 2019	Invitée par l'Université de Padoue, Italie, L2 et L3 double diplôme franco-italien , <i>Cours d'introduction au droit public français</i> (14 heures)
2019	Sciences Po Paris, Global Governance Studies , 2 ^{ème} année, <i>Droit de la mer</i> (24 heures)
juin 2018	Fondation René Cassin, Institut International des Droits de l'Homme , 21 ^{ème} formation intensive sur le droit des réfugiés, <i>Le principe de non-refoulement et le droit des réfugiés</i> (2 heures)
mai 2018	Comité contre la torture, ONU, Genève , Présentation du Règlement Dublin (3 heures)
nov. 2016	Fondation René Cassin, Institut International des Droits de l'Homme , 4 ^{ème} session de formation en droit international humanitaire, Abidjan, Côte d'Ivoire, <i>Droits des réfugiés</i> (6 heures)
sept. 2016	Parlement européen , réunion de la délégation pour les relations avec les pays de l'Asie du Sud-Est et l'Association des nations de l'Asie du Sud-Est, <i>Sentence de la CPA du 12 juillet 2016 dans l'affaire de la mer de Chine méridionale</i> (1 heure)

PUBLICATIONS

Ouvrages

- *La nationalité des véhicules en droit international public*, Pedone, Paris, 2020, 536 p. ; prix Choucri Cardahi de l'Académie des sciences morales et politiques
- *Les droits humains comparés / Comparative human rights*, Pedone, Paris, 2019, 168 p. (co-dir. avec D. Fernandez-Arroyo, C. Kleiner, L-A. Sicilianos et S. Touzé)
- *Le précédent en droit international, Colloque SFDI, Colloque de Strasbourg*, Pedone, Paris, 2016, 497 p. (co-dir. avec C. Kleiner)

Articles, chapitres et contributions dans des ouvrages collectifs (sélection)

EN DROIT DE LA MER

- « Le contentieux maritime grecoturc », in L. Savadogo (dir.), *Mélanges d'études de droit international et de droit interne en hommage au juge Tafsir M. Ndiaye*, Brill, 2022, à paraître, 15 p.
- « Les conséquences de l'élévation du niveau de la mer sur les délimitations maritimes », in V. Boré-Eveno (dir.), *Elévation du niveau de la mer et droit international*, Pedone, Paris, 2022, à paraître, 13 p.
- « Multilatéralisme et régulation des espaces », in C. Bayet, J. Fernandez & J-V. Holeindre, *Nations désunies? La crise du multilatéralisme dans les relations internationales*, CNRS, coll. Biblis, 2022, pp. 137-151
- « Algerian Exclusive Economic Zone Proclamation – French Perspectives », *QIL, Zoom out*, vol. 88, 2021, pp. 57-66
- « Les Etats et les espaces maritimes », *Questions internationales, Géopolitique des océans*, n° 107-108, mai-août 2021, pp. 19-25
- « Les régimes de navigation dans le traité de Versailles de 1919 », *AFRI*, 2021, pp. 685-694
- « La nature de la protection contentieuse de l'équipage et des autres acteurs du droit de la mer », in H. Raspail (dir.), colloque annuel de l'Institut international des droits de l'Homme, colloque du Mans, Pedone, 2020, 20 p.
- « La naissance des îles », in J-L. Iten (dir.), *Journée d'études de la SFDI, Les îles et le droit international*, Pedone, 2020, pp. 19-28
- « ITLOS procedural rules : between change and stability », *QIL*, vo. 61, 2019, pp. 21-37
- « La nationalité des véhicules », in B. Bertrand, S. Cassella, C. Rapoport (dir.), *La nationalité au carrefour des droits, Colloque de Rennes*, 2019, pp. 223-236
- « Nouvelles technologies et biodiversité marine : impacts sur la santé humaine », in G. Le Floch et Th. Fleury-Graff (dir.), *Colloque SFDI, Colloque de Rennes, La santé*, Pedone, Paris, 2019, pp. 335-342
- « Le rattachement des véhicules à l'ordre juridique français », in G. Cahin, S. Szurek (dir.), *cycle La France et la condition internationale des personnes et des biens*, journée d'études sur « Le rattachement des personnes et des biens à l'ordre juridique français », *La France et le droit international*, Université Paris 2 Panthéon-Assas, IHEI et Université Paris-Sud, Paris, Pedone, 2019, pp. 59-80
- « Les frontières maritimes russes », *RGDIP*, 2019-1, pp. 171-181
- « Transports et compétences étatiques : les critères de rattachement à l'Etat », in S. El Boudhoui (dir.), *Les transports au prisme du droit international public*, Pedone, 2019, pp. 25-36
- « Les continuités et discontinuités territoriales en droit de la mer », in A. Farinetti (dir.), *Les continuités et discontinuités territoriales*, Mare et Martin 2019, pp. 265-277
- « Que reste-t-il de la liberté des mers de Grotius ? », in *Les grandes pages du droit international, 4^{ème} journée de l'IHEI, Les espaces*, Pedone, 2017, pp. 185-204

- « La jurisprudence du TIDM sur l'Etat du pavillon », in G. Le Floch (dir.), *Les 20 ans du Tribunal international du droit de la mer, Colloque de Rennes*, Pedone, 2017, pp. 219-240
- « La mise en œuvre du pouvoir de police », in M. Forteau, D. Müller, A. Pellet et J-M. Thouvenin (dir.), *Traité de droit international de la mer*, CEDIN, 2017, pp. 935-961
- « Les motifs non juridiques en droit de la mer », in R. Nollez-Goldbach et F. Couveinhes (dir.), *Les motifs non-juridiques dans les jugements internationaux*, actes du colloque de l'Ecole Normale Supérieure, Pedone, 2017, pp. 98-112
- « Retour sur un classique : *Sovereignty over submarine areas*, Sir Hersch Lauterpacht », *Revue générale de droit international public*, 2014-1, pp. 308-316
- « Les influences réciproques entre les statuts des espaces maritimes et les statuts des ressources marines », *Annales des Mines, Responsabilité et environnement, La mer et les ressources marines*, avril 2013, n° 70, pp. 65-71
- « Les pays en développement et l'institution de la zone économique exclusive », *Annuaire Africain de Droit International/African Yearbook of International Law, numéro spécial Le Tiers Monde et Le Droit International*, 2013, pp. 185-221
- « L'invocation d'une règle conventionnelle de répartition des compétences juridictionnelles devant le juge judiciaire français (Réflexions sur les affaires *Trans Arctic*, *Fast Independence* et *Vytautas*) », *Revue générale de droit international public*, 2012-2, pp. 321-352

EN DROIT INTERNATIONAL PUBLIC ET DROIT EUROPEEN (sélection)

- « Article 15 » (avec J-F. Marchi), in O. Corten, P. Klein, V. Koutroulis, A. Lagerwall (ed.), *The Vienna Conventions on the Law of Treaties – A Commentary*, 2nd ed., 2022, à paraître, 32 p.
- « L'immatriculation des engins spatiaux », in A. Bencheneb, G. Burdeau, Ph. Clerc, C. Kessedjian, E. Loquin, A. Martin-Serf, C. Nourissat et H. Cherief (dir.), *Mélanges Laurence Ravillon*, Pedone, Paris, 2022, à paraître, 20 p.
- « Catégories de migrants et droit international. Origines et enjeux actuels » (avec S. Gakis), in P. Jacob & T. Fleury-Graff (dir.), *Colloque SFDI, Colloque de l'Université Paris-Saclay, Migrations et droit international*, Pedone, Paris, 2022, à paraître, 23 p.
- « Arbitrage interétatique et revirement de jurisprudence », in G. Le Floch (dir.), *Le revirement de jurisprudence en droit international*, Pedone, 2021, pp. 63-78
- « La régularisation en droit international public », in A. Perrin (dir.), *La régularisation*, Mare et Martin, 2019, pp. 195-215
- « N. Politis, *La justice internationale* (1924) : aspects procéduraux », in *Les grandes pages du droit international, 5^{ème} journée de l'IHEI, La Justice*, Pedone, 2019, pp. 179-194
- « Le précédent en droit international : technique pré-normative ou acte normatif ? Rapport introductif », in N. Aloupi et C. Kleiner (dir.), *Colloque SFDI, Colloque de Strasbourg, Le précédent en droit international*, Pedone, Paris, 2016, pp. 15-46 (co-écrit avec C. Kleiner)
- « Right to non-interference/non-intervention », in Daniel H. Joyner & Marco Roscini (dir.), *The Fundamental Rights of States, Cambridge Journal of International and Comparative Law*, 2016, pp. 566-587

Notes de jurisprudence et chronique des faits internationaux (sélection)

EN DROIT DE LA MER

- CIJ, *Délimitation maritime dans l'Océan indien (Somalie c. Kenya)*, arrêt du 12 octobre 2021, fond, RGDIP, 2021-4 (9 p.)
- CPA, *Affaire de l'incident de l'« Enrica Lexie » (Italie c. Inde)*, sentence du 21 mai 2020, RGDIP, 2020-3/4 (9 p.)

- CPA, *Affaire relative aux droits des Etats côtiers dans la mer Noire, la mer d'Azov et le détroit de Kertch (Ukraine c. Fédération de la Russie)*, sentence sur les exceptions préliminaires du 21 février 2020, *RGDIP*, 2020-2 (7 p.)
- Incidents dans le détroit d'Ormuz et escalade des tensions entre Etats-Unis/Royaume-Uni et Iran, *RGDIP*, 2019-4 (5 p.)
- Tensions entre la France et la Chine à la suite du passage du « Vendémiaire » dans le détroit de Taïwan, *RGDIP*, 2019-3 (3 p.)
- TIDM, *Affaire relative à l'immobilisation de trois navires militaires ukrainiens (Ukraine c. Fédération de Russie)*, mesures conservatoires, ordonnance du 25 mai 2019, *RGDIP*, 2019-3 (5 p.)
- TIDM, *Affaire du navire « Norstar » (Panama c. Italie)*, arrêt du 10 avril 2019, *RGDIP*, 2019-2 (5 p.)
- CIJ, *Affaire de l'obligation de négocier un accès à l'océan pacifique (Bolivie c. Chili)*, *RGDIP*, 2018-4 (5 p.)
- Traité international se rapportant à la Convention des Nations unies sur le droit de la mer et portant sur la biodiversité marine, *RGDIP*, 2018-2 (7 p.)
- CIJ, *Délimitation maritime dans la mer des Caraïbes et l'océan Pacifique (Costa Rica c. Nicaragua)*, arrêt du 2 février 2018, *RGDIP*, 2018-2 (7 p.)
- CPA, *Affaire de l'arbitrage sur le fondement de l'accord d'arbitrage signé le 4 novembre 2009 entre le gouvernement de la République de la Croatie et le gouvernement de la République de la Slovénie, (Croatie / Slovénie)*, sentence arbitrale du 29 juin 2017, *RGDIP*, 2017-4 (7 p.)
- TIDM, *Différend relatif à la délimitation de la frontière maritime entre le Ghana et la Côte d'Ivoire dans l'océan Atlantique, (Ghana / Côte d'Ivoire)*, arrêt du 23 septembre 2017, *RGDIP*, 2017-4 (7 p.)
- CPA, *Arbitrage relatif à la mer de Chine méridionale (La République des Philippines c. La République populaire de Chine)*, sentence sur le fond du 12 juillet 2016, *RGDIP*, 2016-4 (7 p.)
- CIJ, *Question de la délimitation du plateau continental entre le Nicaragua et la Colombie au-delà des 200 milles marins de la cote nicaraguayenne (Nicaragua c. Colombie)*, exceptions préliminaires, arrêt du 17 mars 2016, *RGDIP*, 2016-2 (5 p.)
- CPA, *Affaire de l'« Arctic Sunrise » (Pays Bas c. Russie)*, sentence arbitrale sur le fond, sentence du 14 août 2015, n° 2014-02, *RGDIP*, 2016-1 (3 p.)

COMMUNICATIONS COLLOQUES (SELECTION)

nov. 2022	Colloque annuel de la Société française de droit international « Migrations et droit international » , Université Paris-Saclay ; Communication sur les catégories des migrants
juin 2021	Elévation du niveau de la mer et droit international , Université de Nantes ; Communication sur élévation du niveau de la mer et délimitation maritime
déc. 2020	La question énergétique en Méditerranée orientale , Université de Thessalonique et Ecole de Guerre de la Grèce ; Communication sur la délimitation greco-turque
oct. 2019	Journée hommage à Prosper Weil , Paris 2 Panthéon-Assas ; Communication sur la délimitation maritime
sept. 2019	Journée d'études annuelle de la SFDI « Les îles et le droit international » , Paris 8 ; Contribution sur la naissance des îles
sept. 2019	Colloque annuel de l'ESIL, « Sovereignty: A Concept in a State of Flux? Souveraineté : Un concept en mouvement ? » , Athènes ; Chair de Agora V : Questioning Sovereignty : The Rôle of Non-State Actors (sélection de 3 contributions parmi les 164 envoyées et rapport introductif)

mai 2019	Conférence internationale « Procedural Rules of International Courts and Tribunals: Between Change and Stability », Rome, Sapienza ; Rapport general sur le TIDM
sept. 2018	Journées franco-allemandes SFDI, Le Traité de Versailles : regards franco-allemands en droit international à l'occasion du centenaire, Strasbourg ; Communication sur le régime de navigation
juillet 2018	Congrès général de l'Académie internationale de droit comparé, Fukuoka Japon ; Communication sur l'admission des réfugiés et les systèmes juridiques nationaux
mai 2018	Colloque annuel de l'Institut International des droits de l'homme-Fondation René Cassin « Les droits de l'homme et la mer », Le Mans Université ; Communication sur la nature de la protection contentieuse de l'équipage et des autres acteurs privés
nov. 2017	Colloque « La Russie face au droit international », Université de Bordeaux ; Communication sur les frontières maritimes russes
juin 2017	Seminar General Principles as Applied by International Courts and Tribunals and the Coherence of International Law, Pluricourts, Centre Universitaire de Norvège à Paris ; Communication sur General Principles and Conflict of Jurisdictions: Lessons from the <i>Mox Plant Case and Other Similar Cases</i>
févr. 2017	Journée d'études « Les grandes pages du droit international : Les espaces », Université Paris 2 Panthéon-Assas, IHEI ; Communication sur la liberté de la haute mer (Grotius)
juin 2016	Colloque « Les 20 ans du Tribunal international du droit de la mer », Université de Rennes ; Communication sur l'Etat du pavillon
avril 2015	Participation au Workshop « The Fundamental Rights of States » organisé par Jean d'Aspremont, Daniel H. Joyner et Marco Roscini, Université d'Alabama, Tuscaloosa, présentations sur « The right of non-interference/non-intervention » et sur « Rights of States and Responsibility to Protect »

THESES

Direction de thèses (sélection)

- LE MAOUT Carl, *L'exploitation des ressources naturelles des fonds marins dans les zones sous juridiction nationale et au-delà* (2020-)
- DEKKICHE Yannis, *Les détroits internationaux* (2019-)
- EJREISS Joelle, *Le régime juridique des eaux souterraines en droit international public* (2019-)
- RAYENI Ali Sharifi, *La responsabilité objective en droit international* (2017 -),
- POGNONEC Alexia, *Les régimes de responsabilité du fait des activités menées dans la Zone*, (2014 -)

LANGUES

Grec	langue maternelle
Français	bilingue
Anglais	diplôme Proficiency Certificate in English, Université de Cambridge
Espagnol	diplôme Basico, Université de Salamanca, préparation pour Superiore
Italien	diplôme CELI III, Scuola Italiana

ABRIDGED CV

MARIO JUAN A. AURELIO

B.Sc. Geology

M.Sc. Geodynamics of Oceans and Continents

Ph.D. Structural Geology and Tectonics

Post Doc1 Deep Offshore Tectonic Studies

Post Doc2 Geodynamics by Space Geodesy and Seismotectonics

AWARDS

- *2006 Professional Geologist of the Year, Professional Regulation Commission*
- *2005 Outstanding Young Scientist, National Academy of Science and Technology*
- *1999 Achievement Award, National Research Council of the Philippines*
- *1992 Special Distinction Award (PhD Dissertation), Centre National de Recherches Scientifiques, France*
- *1985 Leopoldo Faustino Award (Geology Board Exam First Placer)*

UN-AFFILIATED ENGAGEMENTS

- *Member, Legal and Technical Commission of the International Seabed Authority, January 2017 – December 2022*
- *Adviser, Philippine Delegation to the 21st Annual Assembly of the International Seabed Authority, Kingston, Jamaica, July - August 2015*
- *Member, Philippine Delegation to the 20th Annual Assembly of the International Seabed Authority, Kingston, Jamaica, July 2014*
- *Philippine Candidate: Commission on the Limits of the Continental Shelf UN-HQ, New York (2012-2017 Term)*
- *Philippine Representative, Commission on the Geological Map of the World – CGMW, under the auspices of UNESCO in Paris, France (2005 – Present)*
- *Philippine Representative, Sub-Commission for Asia, CGMW-UNESCO, Beijing, China (2005-Present)*
- *Co-author, 1:5M International Geological Map of Asia, under CGMW Sub-commission for Asia*
- *Co-author, Structural Map of the South China Sea, under CGMW-UNESCO, Paris*
- *Scholar/Fellow, International Atomic Energy Agency (2005 Hungary, 2008 Czech Republic, 2009 S. Korea)*
- *Philippine Representative, International Union of Geological Sciences – IUGS (2004 – Present)*
- *Member, Philippine Extended Continental Shelf Technical Working Group, for the Commission on the Limits of the Continental Shelf (2001-Present)*

Brief Career Background

Education, Training and Teaching

Dr. Mario Juan A. Aurelio is a Member of the Legal and Technical Commission (LTC) of the International Seabed Authority (ISA) from January 2017 to December 2022. He was an Adviser of the Philippine Delegation to the Annual Assembly of the International Seabed Authority prior to his election in the LTC. He is a member of the Philippine Extended Continental Shelf Technical Working Group. A Professor at the National Institute of Geological Sciences, University of the Philippines (UP-NIGS), Dr. Aurelio is an example of a versatile geoscientist, who has already accomplished a distinction in his field early in his career. He

obtained a B.Sc. Geology degree from the University of the Philippines in 1985 and garnered 1st Place in the Geology Licensure Exam (Leopoldo Faustino Award) given in the same year. Dr. Aurelio went on to obtain an M.Sc. in Geodynamics of Oceans and Continents in 1989 and a Ph.D. in Structural Geology and Tectonics in 1992, both from the *Université Pierre et Marie Curie* in Paris, France. His doctorate dissertation was accorded a grade of *Très Honorable avec Félicitations du Jury*, an excellent citation for a French Ph.D. dissertation, paving the way for a Special Distinction Award in the form of a research fellowship grant given by the *Centre National de Recherches Scientifiques*. He was thus awarded a Post Doctorate fellowship on Geodynamics through Space Geodesy and Seismotectonics at the *Université Pierre et Marie Curie* in Paris, France and *Institut für Angewandte Geodäsie*, Frankfurt, Germany (1994-95), and later also undertook Post Doctorate studies in Deep Offshore Tectonic Studies at the *Ecole Normale Supérieure de Paris*, France (2000). He has been a scholar/fellow of the International Atomic Energy Agency (IAEA) in several occasions (Hungary 2005, Czech Republic 2008, S. Korea 2009). Dr. Aurelio has been a Visiting Professor/Scientist at the *Ecole Normale Supérieure de Paris*, France (2000) and *Universiti Brunei Darussalam, Department of Petroleum Geoscience*, Brunei (2010).

Awards and Publications

In the Philippines, Dr. Aurelio was accorded distinguished awards including, at a young age of 34, the 1999 Achievement Award of the National Research Council of the Philippines; the 2005 Outstanding Young Scientist by the National Academy of Science and Technology; and the 2006 Professional Geologist of the Year by the Professional Regulation Commission. In his pursuit of excellence in research and teaching, Dr. Aurelio has written over 250 international and local scientific publications and technical reports and has presented over 200 papers in conferences, seminars and workshops in over 20 countries. He has co-edited and co-written a book entitled: "Geology of the Philippines. 2nd Edition" published in 2010, and is a co-author of the International Geological Map of Asia 1:5M (IGMA5000) published in 2013 by the Sub-Commission for Asia of the Commission on Geological Map of the World (CGMW) under the United Nations Educational, Scientific and Cultural Organization (UNESCO), and of the Structural Map of the South China Sea under CGMW-UNESCO in 2017.

Research in Offshore Areas and Mineral Exploration

Dr. Aurelio's works cover areas in Southeast Asia (Philippines, Indonesia), Africa (Madagascar, Sierra Leone) and Europe (French Alps). Among his research interests are offshore studies in the South China Sea (West Philippine Sea) and surroundings, Indian Ocean and Mozambique Strait (offshore Madagascar) and Central-Eastern Atlantic (offshore Sierra Leone). He has held a Professorial Chair in Petroleum Energy Research at UP-NIGS (2010-11) where he used marine geophysical data (2-D and 3-D seismics, bathymetry, gravity, magnetics). He collaborates closely with petroleum exploration organizations in carrying out his research in offshore areas. In collaboration with the *Ecole Normale Supérieure de Paris*, France and the *Bundesanstalt für Geowissenschaften und Rohstoffe*, Hannover, Germany, Dr. Aurelio led from 2010 to 2013 the Philippine scientific contingent of a petroleum company-funded international scientific research collaboration for the tectonic and geodynamic synthesis of the South China Sea (West Philippine Sea). He recently (2020-2021) led an Energy Research project funded by the Senate of the Philippines, aimed at searching for petroleum plays in the NW Palawan offshore area in the West Philippine Sea.

Prior to joining the academe, Dr. Aurelio worked for 20 years as a geologist at the Mines and Geosciences Bureau (MGB), allowing him to gain extensive experience in mineral exploration and development. He continues to actively engage in mineral resource studies through his research in the university in collaboration with mineral exploration companies involved in the exploration and development of gold, copper, nickel and other precious metals. Combining his more than 20-year experience in the mineral industry with his aptitude in offshore geophysical research, Dr. Aurelio possesses the perfect mix of knowledge to undertake studies in the exploration and development of mineral resources in offshore areas.

Professional Societies and Journal Editorship

Dr. Aurelio is a member/associate member of international societies including the Association of American Petroleum Geologists (AAPG), Society of Economic Geologists (SEG) and the *Société Géologique de France* (SGF). Dr. Aurelio has served as officer and remains an active member of local professional societies including the Geological Society of the Philippines - GSP (President 2002, Director 1993-2008, 2011-13) and the UP Geology Alumni Association of the Philippines - UPGAA (Vice-President 2003, 2016-2022, Director 2002). He serves/has served in several international and local journals variably as Editor-In-Chief, Special Issue Editor or as member of the Editorial Board. He holds the rank of Lieutenant Commander in the Philippine Coast Guard Auxiliary.

Participation in UN-Affiliated Commissions/Unions

Dr. Aurelio is an active participant in several United Nations affiliated commissions and authorities. He is an elected member of the Legal and Technical Commission (LTC) of the International Seabed Authority (ISA) for the term 2017-2022. Prior to his election in the LTC-ISA, he was an adviser of the Philippine Delegation attending the annual assemblies of the ISA held in Kingston, Jamaica. Dr. Aurelio also participates in the activities of other UN-affiliated organizations, such as the Commission on the Geological Map of the World - CGMW under the United Nations Educational, Scientific and Cultural Organization - UNESCO (Philippine Representative 2005 - Present), the Sub-commission for Asia CGMW-UNESCO (Philippine Representative 2005 - Present), and the International Union of Geological Sciences - IUGS (Philippine Representative 2004 - Present). He was the Philippine Candidate to the Commission on the Limits of the Continental Shelf (CLCS) for the term 2012-2017.

UN Language Proficiency

Having been educated in France, Dr. Aurelio is fluent in French. He therefore disposes fluency in both English and French, two of the most important languages of the United Nations. He is a member of the Philippine Delegation that successfully presented and defended the Benham Rise submission to the CLCS in New York in 2009 and 2011 respectively. Being a member of the Philippine Extended Continental Shelf Technical Working Group since its inception in 2001, Dr. Aurelio has been a resource person for lectures and seminars on the Scientific and Technical Guidelines of the Commission on the Limits of the Continental Shelf (STG-CLCS/11). In the Philippines, he is a frequent resource speaker in discussions on issues and concerns relevant to the International Seabed Authority.

Employment

Professor

National Institute of Geological Sciences
College of Science
University of the Philippines
Diliman, Quezon City 1101
PHILIPPINES

Laboratory Function:

Head, Structural Geology and Tectonics Laboratory

Administrative Function:

OIC-Deputy Director for Research and Development

Email: maurelio@nigs.upd.edu.ph, maurelio@up.edu.ph

Personal Details

Civil Status:

Married with 2 children

Languages:

English, French, Filipino – fluent (spoken/written)
Spanish – basic knowledge

Education and Training

- | | |
|-----------|--|
| 2009 | International Atomic Energy Agency Fellow
<i>Granting Agency: International Atomic Energy Agency (IAEA), Vienna, Austria</i>
<i>School: International Nuclear Safety School, Korea Institute of Nuclear Safety</i>
<u>Field:</u> Safety assessment for radioactive waste disposal facilities |
| 2008 | International Atomic Energy Agency Fellow
<i>Granting Agency: International Atomic Energy Agency (IAEA), Vienna, Austria</i>
<i>Training Agency: Czech University of Life Sciences, Prague</i>
<u>Field:</u> Solute transport / fluid flow modelling by HYDRUS |
| 2005 | International Atomic Energy Agency Fellow
<i>Granting Agency: International Atomic Energy Agency (IAEA), Vienna, Austria</i>
<i>Training Agency: Hungarian Atomic Energy Agency, Hungary</i>
<u>Field:</u> Radioactive Waste Management Geotechnologies |
| 2000 | Visiting Scientist/Professor (European Union Fellow)
<i>Ecole Normale Supérieure de Paris</i>
<i>Paris, France</i>
<u>Program:</u> DOTS-SEA Deep Offshore Tectonic Studies in Southeast Asia |
| 1994-1995 | Post-Doctoral Fellowship Grant (European Union Fellow) |

- 1989-1992 *Université Pierre et Marie Curie, Paris France and Institut für Angewandte Geodäsie, Frankfurt, Germany*
Specialization: Geodynamics through Space Geodesy and Seismotectonics
Ph.D. in Structural Geology and Tectonics
Université Pierre et Marie Curie, Paris, France
Dissertation: Tectonique du segment central de la faille philippine: étude structurale, cinématique et évolution géodynamique
- 1988-1989 **DEA (M.Sc.)** in Geodynamics of Oceans and Continents
Université Pierre et Marie Curie, Paris, France
Work Area: French Alpine region
Thesis: La faille philippine: un exemple de décrochement à l'arrière d'une zone de subduction.
- 1985 **Philippine Geology Board Exam 1st Placer**
Professional Regulation Commission, Manila
- 1981-1985 **B.Sc. Geology**
University of the Philippines, Diliman, Quezon City, Philippines

Teaching

- 2015 – Present **Professor**
 (Associate Professor)
National Institute of Geological Sciences
University of the Philippines, Diliman, Quezon City
- 2007 – 2015
- Oct. – Nov. 2010 **Visiting Academic (Professor)**
Petroleum Geoscience Program
Faculty of Science
Universiti Brunei Darussalam
- May-June 2000 **Visiting Scientist/Professor (EU Fellow)**
Ecole Normale Supérieure de Paris
Paris, France
- 1992 – 2006 **Professorial Lecturer II to III**
National Institute of Geological Sciences
University of the Philippines, Diliman, Quezon City
- 1999 – 2006 **Professor 2 (Part Time)**
School of Graduate Studies and School of Earth and Materials Science and Engineering
Mapua Institute of Technology, Manila

Honors, Prizes & Awards

- | | |
|---|---|
| <i>Professional Geologist of the Year, 2006</i> | Professional Regulation Commission |
| <i>Outstanding Young Scientist Award 2005</i> | National Academy of Science and Technology |
| <i>Achievement Award 1999</i> | National Research Council of the Philippines |
| <i>Outstanding Laoageño Award 1998</i> | City Government of Laoag, Philippines |
| <i>Special Distinction Award 1992</i> | Centre National de Recherches Scientifiques, France |
| <i>Très Honorable 1992</i> | Highest citation in a Ph.D. dissertation: |
| <i>avec Felicitations du Jury</i> | Université Pierre et Marie Curie, Paris, France |
| <i>Leopoldo Faustino Award 1985</i> | Professional Regulations Commission, Manila |
| <i>Board Exam Topnotcher</i> | and Geological Society of the Philippines |
| <i>Best Paper 2009 (One of 3)</i> | Geological Society of the Philippines (GEOCON2009) |
| <i>Best Paper 1999, 1998, 1994</i> | Geological Society of the Philippines (GEOCON99) |
| <i>Special Paper 2002</i> | Mines and Geosciences Bureau Technical Seminar |
| <i>Best Paper in Geology 2000, 1993, 1990</i> | Mines and Geosciences Bureau Technical Seminar |

Office/Membership in Professional Societies

<i>Member, IBA Head Judge, Judge</i>	Association of American Petroleum Geologists (AAPG)
<i>Associate Member (since 1992)</i>	Société Géologique de France (SGF)
<i>Member (since 2007)</i>	Society of Economic Geologists (SEG)
<i>Member (since 2005)</i>	Outstanding Young Scientists, Inc. (NAST)
<i>Ex-Officio Director (2003)</i>	Geological Society of the Philippines (GSP)
<i>Vice-President (2003, 2016-Present)</i>	University of the Philippines Geology Alumni Association (UPGAA)
<i>President (2002)</i>	Geological Society of the Philippines (GSP)
<i>Director (2002)</i>	University of the Philippines Geology Alumni Association (UPGAA)
<i>Vice-President (2001)</i>	Geological Society of the Philippines (GSP)
<i>Director (1993-97, 1999-2000, 2007-2008)</i>	Geological Society of the Philippines (GSP)
<i>Member (since 1993) –Awardee (1999)</i>	National Research Council of the Philippines (NRCF)
<i>Founding Member (since 2001)</i>	Philippines-France Professionals Association (PFPA)
<i>Lieutenant Commander (Since 1999)</i>	Philippine Coast Guard Auxiliary (PCGA)
<i>Member (since 1985)</i>	University of the Philippines Alumni Association (UPAA)
<i>Member (since 1985)</i>	University of the Philippines Geology Alumni Association (UPGAA)
<i>Reviewer (since 1998)</i>	Philippine Environmental Impact Assessment System (DENR)
<i>Preparer (since 1998)</i>	Environmental Impact Assessment
<i>Reviewer (2000 - 2007)</i>	Philippine Engineering Geological and Geohazard Assessment System
<i>Preparer (since 2000)</i>	Philippine Engineering Geological and Geohazard Assessment Report

Fellowships, Grants & Scholarships

<i>Research Grant in Geohazards Studies in Cement Industry (2022)</i>	Geoscience Foundation, Inc.
<i>Research Grant in Petroleum Exploration (2020-2021)</i>	University of the Philippines / Senate of the Philippines
<i>Research Grant in Hydro-electric Dam Geohazard Studies (2020-21)</i>	Geoscience Foundation, Inc.
<i>Research Grant in Wind Energy Geohazards Research (2018)</i>	University of the Philippines Foundation, Inc.
<i>Research Grant in Geothermal Energy Research (2016)</i>	University of the Philippines Foundation, Inc.
<i>Research Grant in Active Faults (Mindoro) 2015</i>	University of the Philippines Foundation, Inc.
<i>Research Grant in Geothermal Energy Research 2015</i>	University of the Philippines Foundation, Inc.
<i>Research Grant in Earthquake Studies (Bohol) 2013</i>	University of the Philippines, Diliman
<i>Professorial Chair Grant in Petroleum Energy Research 2010</i>	Pearl Energy Limited (Singapore)
<i>Professorial Chair Grant in Petroleum Energy Research 2009</i>	Pearl Energy Limited (Singapore)
<i>Fellowship Award in Nuclear Energy Studies 2009</i> (Safety Assessment in Radioactive Waste Repositories)	International Atomic Energy Agency, Vienna, Austria (S. Korea)
<i>Fellowship Award in Nuclear Energy Studies 2008</i> (Groundwater Modeling for Radioactive Waste Repositories)	International Atomic Energy Agency, Vienna, Austria (Czech Republic)
<i>Fellowship Award in Nuclear Energy Studies 2005</i> (Geotechnics for Radioactive Waste Repositories)	International Atomic Energy Agency, Vienna, Austria (Hungary)
<i>Post Doctorate Fellowship Award in Deep Offshore Tectonics Studies 2000</i>	Ecole Normale Supérieure de Paris, France
<i>Post Doctorate Fellowship Award in Space Geodesy and Seismotectonics 1994</i>	European Union DG XII, Brussels, Belgium
<i>Doctorate Scholarship Award in Structural Geology and Tectonics 1989</i>	Université Pierre et Marie Curie, Université de Paris, France
<i>Master's Scholarship Award in Geodynamics of Continents and Oceans 1988</i>	Université Pierre et Marie Curie, Université de Paris, France

Editorial Work

<i>Special Issue Editor (2021–Present)</i>	Frontiers in Earth Science
<i>Associate Editor (2011 – 2013)</i>	Science Diliman
<i>Editor-in-Chief (1999 – 2003)</i>	Journal of the Geological Society of the Philippines (JGSP)
<i>Guest Editor (1997)</i>	Journal of Southeast Asian Earth Sciences (Pergamon Press - ISI)
<i>Editorial Board (1999 - 2007)</i>	SYLVATROP: Technical Journal of Philippine Ecosystems and Natural Resources
<i>Associate Editor (2001-Present)</i>	L'Association (Newsletter of the Philippines-France Professionals Association)

Work/Research Experience in Petroleum, Energy and Mineral Resources Exploration

University of the Philippines / Senate of the Philippines – In search of pre-Nido Limestone petroleum plays in NW Palawan Basin

Pitkin Petroleum Plc (UK- Philippines) – Structural geology of service contracts in offshore Palawan

Pearl Energy Ltd. (Singapore) – Structural geology and tectonics of Ragay Gulf and Bondoc Peninsula, Philippines

Total (France) – Structural geological and tectonic synthesis of Palawan and east shelf of South China Sea (with ENS Ecole Normale Supérieure de Paris, France and BGR Bundesanstalt für Geowissenschaften und Rohstoffe, Hannover, Germany)

Forum Energy Plc (UK) – Preliminary evaluation of petroleum prospects in offshore Sierra Leone, W. Africa

Monte Oro Resources and Energy, Inc. (Philippines) – Preliminary evaluation of offshore petroleum prospects in Madagascar, S. Africa.

Conoco-Exxon-Elf-Total-Unocal (Consortium) – Deep offshore tectonic studies of Southeast Asia (with ENS Ecole Normale Supérieure de Paris, France)

Alcorn Petroleum and Minerals Corp. (Philippines) – Structural geological analysis of Linapacan oil field, W. Palawan

Trans-Asia Oil and Mineral Co. (Philippines) – Structural geological analysis of Calubian Peninsula and offshore Villaba, Leyte.

Philippine National Oil Company – Exploration Corporation (Philippines) – Structural geological study of coal deposits in Boljoon, S. Cebu

Unocal (Philippine Geothermal Inc.) – Structural geological and tectonics analysis (with training) of geothermal fields

Philippine National Oil Company – Energy Development Corporation (Philippines) – Structural geological and tectonic analysis (with training) of the Tongonan geothermal field, Ormoc, Leyte.

Metal Mining Agency of Japan – Japan International Cooperation Agency (MMAJ-JICA) – Mineral exploration of the islands of Palawan, Samar, Panay

Metal Mining Agency of Japan – Japan International Cooperation Agency (MMAJ-JICA) – Mineral exploration of Northern Sierra Madre, Luzon; Antique Province, Panay Island; Samar Island; Palawan Island.

Philex Mining Corporation (Philippines) – Structural studies on the Sto. Tomas II copper-gold ore body and surrounding prospects

Philex Mining Corporation (Madagascar) – Assessment of copper-gold prospects in Madagascar (prospects in Maevatanana, Ambositra, Mananjary)

Silangan Mining Corporation (Philippines) – Structural and resource studies in the Boyongan-Bayugo copper-gold deposit, Surigao Del Norte

Apex Mining Corporation (Philippines): – Structural and resource studies in the Maco epithermal gold deposit, Davao De Oro, Mindanao

Western Mining Corporation (Philippines) – Structural and resource studies in the Tampakan porphyry copper deposit, South Cotabato, Mindanao

Sagittarius Mines, Inc. (Philippines) – Structural and resource studies in the Tampakan porphyry copper deposit, South Cotabato, Mindanao

Monte Oro Resources and Energy, Inc. (Sierra Leone, W. Africa) – Assessment of copper-gold prospects in Sierra Leone (prospects in Bo, Kenema and Koidu Provinces)

Publications

Over 250 scientific papers published (books, theses, dissertations, articles) and reports written (list on request)

Conference Presentations

Over 200 papers presented in conferences, seminars, workshops in over 20 countries (list on request)

Andrés Camaño Moreno

SUMMARY

Professional with more than 30 years of experience in the area of management, control of Environmental, Legal, Safety, Occupational Health, Community, Communications and Operational Risks. Development and management of high performance work teams in the administration and operation of integrated management systems (ISO 14001, OSHAS 18001). Experience in the direction and development of numerous Studies and Declarations of environmental impacts of mining megaprojects, energy, cellulose. Management of crisis situations with high social, environmental and media impact, as well as the development of strategies to avoid and face environmental conflicts. Responsible for the design of monitoring programs. In the environmental area, he has led the implementation of management systems to ensure the regularization of environmental permits and commitments and has prepared manuals for compliance with environmental regulations for different industrial processes. In the area of communities, he has developed community relationship management strategies and shared value projects that allow the joint growth of the industry and the communities where they operate. He has participated in the formation of working groups for the prevention and resolution of conflicts with different community groups and maintains a network of contacts with national and international NGOs, Government, Universities and international organizations.

He has contributed to various Committees for the development of Government Standards as support to the Environment Secretariat of the Ministry of Foreign Affairs in instances such as the Basel and RAMSAR Conventions, and at the national level in the Regulation of Closure and Abandonment of Mining Sites (COCHILCO), DS 90, MAPS Chile and recently in the Green Mining initiative led by the National Congress. He was a member of the International Copper Association (ICA), National Mining Society, Mining Council where he actively participated in environmental issues.

EMPLOYMENT CAREER

SOCIOECOLOGICAL SYSTEMS (2019 to date): General Manager. He strategically advises on socio-environmental issues to mining, energy, pulp and port companies through strategic studies.

ERM CHILE (2016 – 2019): General Manager. He participated in the elaboration and review of EIA for mining, energy, strategic advice for mining developments, compliance audits, review of monitoring programs, phase 1 and 2 for contaminated sites, REP auditoriums. He also provided advice to energy companies in community resettlement programs, plans for dismantling thermoelectric plants, food, chemical, agro-industrial and worked with the IDB for the Agua Negra Tunnel project.

GOLDER ASOCIADOS (2013 - 2016): Responsible for preparing and reviewing Environmental Impact Studies for mining projects (Spence, Minera Escondida, COPEC), social closure of mining operations. He participated in processes for the purchase of energy projects and remediation processes for contaminated sites for alternative uses such as real estate or commercial (Salinas). He participated in compliance audits for investment projects, mergers and/or acquisitions.

ARAUCO (2006- 2013): Corporate Risk, Environment, Safety and Occupational Health Manager for Chile, Argentina and Brazil. Responsible for ensuring the identification and control of risks that could compromise legal compliance or the environmental operating license, as well as the identification and control of occupational safety, health and hygiene risks that could cause accidents. He led the integral management of the control of the operational risks of the business and the generation of Business Continuity Plans for all the operational areas of Arauco.

He developed corporate standards for Occupational Health and Safety, Environment and Operational Control. Management of the environmental crisis of the Pulp Mill in Valdivia and Liancel. He negotiated an agreement with the State Defense Council for the final sentence to Arauco for the Valdivia case and was part of the implementation group of this through the Social Scientific Council. Implemented a program to ensure compliance with permits and other legal requirements and commitments associated with Environmental Qualification Resolutions and thereby minimize future sanctions by the SMA.

Responsible for the preparation and approval of Environmental Impact Studies for Nueva Aldea, Valdivia Plant, MAPA Project. Responsible for the elaboration of Monitoring and Research Programs in the marine and terrestrial part.

MINERA ESCONDIDA LTDA (1990- 2006): Environment and Environmental Affairs Manager. Participated and facilitated the management of work teams that identified, evaluated and managed the business risks associated with environmental, community and legal issues, among them the water supply and operational risks of the Los Colorados Concentrator Plant, Oxido Coloso-Mine, Phase IV and Desalination Plant. He is responsible for the preparation of the First Closure and Abandonment Plan and its subsequent updates. Responsible for the implementation and ISO 14001 certification of the first mining operation in the country (Puerto de Coloso) and later the mine operations, becoming a standard for BHP mining operations. Management of environmental issues in the construction of megaprojects (Oxide Plant, phase 3.5 of expansion of the concentrator, phase 4 of construction of a new concentrator plant and a tailings dam) in order to verify compliance with the commitments associated with the EIAs and DIAs and the environmental control of the contractor companies associated with their construction. Direction and Coordination in the preparation and approval of 4 Environmental Impact Studies and 5 Environmental Impact Statements for concentrator plants, of leaching, solvent extraction and electro winning, seawater processing plant, aqueducts, mineral pipelines and desalination plants.

STUDIES AND RELEVANT COMPETENCES

Marine Biology

University of Concepcion, 1984

Diploma in Environmental Engineering

University of Concepcion, 1999

Diploma in comprehensive operational risk management

Federico Santa Maria University, 1998

Postgraduate Metallurgical Processes Department of Metallurgical Engineering

North Catholic University. 1994

PUBLICATIONS AND BOOKS

More than 30 scientific publications and editor and co-editor of five books. A few of them are:

Camaño, A., J.C. Castilla & J. Simonetti 2006 (Eds). Mining and Biodiversity. SONAMI – Chile. Quebecor World Chile S.A., Santiago, Chile 103 pp.

Jose Miguel Fariña, Andrés Camaño. The Ecology and Natural History of Chilean Saltmarshes Springer Link 12/22/17, 17:37

A.Camaño Forest restoration 2021: Lessons and challenges in a changing world. Editorial U of Chile.

PUBLICATIONS

Peterson, WT. Arcos, D.F. Mc Mannus, G. Dam, H. Bellantoni, D. Jhonson, T. Tisellius, P. Camaño A. Ecological Studies of Coastal Upwelling at Dichato ESCUDO, Experimental National Science Foundation (USA). Report to the National Science Foundation, 1986.

Camaño A., Silva E. The Management of Minera Escondida Limitada in the Coastal Sector of Coloso, In "Management of Water Resources of the Bío Bío River Basin and the Adjacent Coastal Marine Area", Editors: Francesco Faranda, Oscar Parra. Series Planning Proposals, Vol.7, pp. 105 – 125 Eula Chile Center University of Concepción. 1991

Camaño, A, Ojeda J., Castilla J.C., Ahumada R. Experience and Environmental Protection Actions of Minera Escondida Limitada in the Port of Coloso, Antofagasta: An Updated Review. Marine Science and Technology Magazine. Pages 101-111. 1993

Camaño A, Silva E. Minera Escondida's Environmental Management in the Coastal Area at Coloso. In: Coastal Ocean Space Utilization III Edited by: Norberto Della Croce, Shirley Connell and Robert Abel. Pages 153 – 171. IN SPON, UK.1994.

Camaño, A. The Management of Minera Escondida and its Impact on the Coastal Zone, In: The Coastal Zone of Chile. Present and future. Edited by: Adolfo Alvial M. and Juan Luis Orellana. Pages 110-127. 1995

Camaño, A. Treatment of Industrial Waste from the Minera Escondida Processes in Puerto de Coloso. In: D. Arcos (Ed), Copper Mining, Ecology and Coastal Environment, Editora Aníbal Pinto S.A. Chile, pp. 453-74.1996

Riveros A., M. Zuñiga, A. Hernández., A. Camaño. Cellular Biomarkers in Native and Transplanted Populations of the Mussel *Perumytilus purpuratus* in the Intertidal Zones of San Jorge Bay, Antofagasta, Chile. Arch.Environ. Contam.Toxicol.42, 303-312. 2002

Camaño A. Strategic Environmental Assessment in Mining: A Necessary Tool? In: Casa de La Paz Foundation, Center for Development Studies and National Environment Commission (Ed), Strategic Environmental Assessment: Applications and Potential for Chile, pgs. 115-121

Camaño A, J C Castilla. The Punta Coloso Marine Reserve Located in the Bay of Antofagasta. Integrating Mining and Biodiversity Conservation. Case studies from around the world.

International Union for Conservation of Nature and Natural Resources and International Council on Mining and Metals IUCN and ICMM (2004). 48pp.

Camaño, A., J.C. Castilla & J. Simonetti (Eds.). Mining and Biodiversity. SONAMI Chile. Quebecor World Chile S.A., Santiago, Chile 103 pp. 2006

Andrés O. Angulo, Andres Camaño & Gino A. Angulo. From Freeze with Moths: First Discovery of a Habitat in Andean Salars for Noctuid Moths. Neotropical Entomology 35(4): 556 -557 pp. 2006

A. Godoy Faundez, Blanca A Ladislao, Lorenzo Reyes, A Camaño, Cesar Saez. Bioremediation of contaminated mixtures of desert mining soil and sawdust with fuel oil by aerated in-vessel composting in the Atacama Región (Chile). Journal Hazardous Materials. 9pp. 2007

Estades, C. F., Aguirre and Camaño A. Chilean Flamingos (*Phoenicopterus chilensis*) in estuaries of Central Chile. Bulletin of the IUCN-SSC/Wetlands International Flamingo Specialist Group Number 16 December 2008. Wildfow & Wetlands Trust, Slimbridge UK.

Juan Carlos Castilla, Patricio H. Manríquez, Andrés Camaño. Effects of rocky shore coseismic uplift and the 2010 Chilean mega-earthquake on intertidal biomarker species. Marine Ecology Progress Series. Vol. 418: 17-23. 2010

Stefan Gelcich, Leonardo Peralta, Catherine González, Andrés Camaño, Miriam Fernández y Juan Carlos Castilla. Scaling up Marine Coastal Biodiversity Conservation in Chile. A Call to Support and Develop Ancillary Measures and Innovative Financing Approaches in Biodiversity Conservation in the Americas: Lessons and Policy Recommendations. Ed: Eugenio Figueroa B. 2012

Patricio H. Manríquez, Alejandra Llanos-Rivera, Sylvana Galaz &, Andrés Camaño. Ecotoxicological studies with newly hatched larvae of *Concholepas concholepas* (Mollusca, Gastropoda): bioassay with secondary treated kraft pulp mill effluents. Ecotoxicology and Environmental Safety 98 110–118 pp. 2013

LANGUAGE

Spanish
English

MENTIONS AND AFFILIATIONS

Award to the best professional Marine Biologist private area University of Concepción.

President of the Marine Pollution Group of the National Oceanographic Committee (CONA). He led the recent update of the guide for the evaluation of desalination plants.

CURRICULUM VITAE

LUÍSA JOUBERT CHAVES PINTO RIBEIRO, PORTUGAL

General information

Date and place of birth: 19 October 1973, Lisbon (Portugal).

Languages: Portuguese (native), English and Spanish (fluent, spoken and written).



Education

2011 PhD in Geosciences – University of Aveiro, Portugal.

2001 Master in Dynamic Geology (Petrology and Geochemistry) – University of Lisbon.

1997 Degree in Geology – University of Lisbon.

Current professional activity and experience

Since 2005 – Geology Advisor at the Task Group for the Extension of the Continental Shelf (EMEPC):

- Member of the Portuguese Delegation to interact with the Subcommittee established to consider the Portuguese Submission (since 2017).
- EMEPC's delegate within the governmental Follow up Group for Extension of The Continental Shelf Project (since 2017).
- Member of the Scientific and Technical Department of EMEPC that prepared and delivered the Portuguese Submission and the Addendum for the Extension of The Continental Shelf beyond the 200 nautical miles, in accordance with Article 76 of United Nations Convention on the Law of the Sea.
- Participation and planning of oceanographic campaigns to collect geological, geophysical and hydrographic data.
- Participation in conferences, lectures, classes and outreach activities in behalf of EMEPC, regarding subjects as the Extension of the Continental Shelf and scientific research, particularly on petrological and geochemical studies of magmatic processes within the Atlantic basin and the formation of marine mineral deposits.

Research activities

The main research field is Igneous Petrology and Geochemistry focused on oceanic volcanism, on seamounts and islands edification, and on geological processes that may assist the formation of marine mineral deposits.

Other Professional Activity

Other professional activities are mainly related to teaching:

- 2013-2014 Invited Auxiliary Professor at the Department of Geology, Faculty of Science of the University of Lisbon.
- 2004-2005 Assistant at the Department of Geosciences of the University of Aveiro.
- 2003-2005 Assistant at the Pedagogic Department at the National Museum of Natural History, Lisbon.
- 2001-2003 Assistant at the Department of Geosciences of the University of Évora.
- 1999-2004 Assistant at the Department of Civil Engineering of Moderna University, Portugal.
- 1998-1999 Teacher of Biology at a Secondary School, Portugal.

Training and short courses

- Geocap Program: Shelf, Delimitation of the Continental Shelf.
- ArcGis: Introduction (level 1 and 2), Spatial Analyst, 3D Analyst, Performing Analysis.
- Volcanology field Course, University of New Mexico, USA.

Oceanographic campaigns

- 2021 iMirabilis2 – Exploration of a seamount on the Azores Biscay Rise, North Atlantic.
- 2019 EXPLOSEA-2 – Exploration for hydrothermal vents of the North-Atlantic Mid-Ocean Ridge including the Moytirra Vent Field.
- 2016 EMEPC/PEPC/LUSO/2016 – Hayes Fracture Zone at the Mid-Atlantic Ridge.
- 2015 EMEPC/PEPC/LUSO/2015 – Cascais Canyon and Geological Continental Shelf.
- 2013 EMEPC/PEPC/LUSO/2013 – King's Trough Macrostructure, North Atlantic.
- 2012 EMEPC/PEPC/LUSO/2012 – Hayes Fracture Zone at the Mid-Atlantic Ridge and Madeira-Tore Rise.
- 2009 EMEPC/Açores/G3/Luso/2009 – Gorringe Bank, Azores Plateau and the Mid-Atlantic Ridge.
- 2008 EMEPC/Açores/G3/Luso/2008 – Azores Plateau and the Southern Azores Seamount Chain (e.g. Great Meteor Smt.).
- 2007 EMEPC/Açores/G3/2007 – Azores Plateau and the Southern Azores Seamount Chain.

Publications (ORCID ID: 0000-0001-6529-9988)

Recent papers in international scientific periodicals with referees

Marques, A.F.A., Madureira, P., Zajacz, Z., Hu, S., **Ribeiro, L.P.** (submitted) – Deep sourced magma and shallow mixing in the D. João de Castro submarine volcano (Azores): a mineral chemistry and melt inclusion study. *Chemical Geology*.

Somoza L., Medialdea T., González F.J., Machancoses S., Candón J.A., Cid C., António Calado Calado A., Afonso A., **Ribeiro L.P.**, Blasco I., Albuquerque M., Asensio-Ramos M., Bettencourt R., De Ignacio C., López-Pamo E., Ramos B., Rincón-Tomás B., Santofimia E., Souto M., Tojeira I., Viegas C., Madureira P. (2021) – High-resolution multibeam bathymetry of the northern Mid-Atlantic Ridge at 45–46° N: the Moytirra hydrothermal field. *Journal of Maps* 17, vol.2.

Somoza L., Medialdea T., González F.J., Calado A., Afonso A., Albuquerque M., Asensio-Ramos M., Bettencourt R., Blasco I., Candón J.Á., Carreiro-Silva M., Cid C., De Ignacio C., López-Pamo E., Machancoses S., Ramos B., **Ribeiro L.P.**, Rincón-Tomás B., Santofimia E., Souto M., Tojeira I., Viegas C., Madureira P. (2020) - Multidisciplinary Scientific Cruise to the Northern Mid-Atlantic Ridge and Azores Archipelago. *Front. Mar. Sci.* 7:568035.

Ribeiro, L.P., Martins, S., Hildenbrand, A., Madureira, P., Mata, J. (2017) – The genetic link between the Azores Archipelago and the Southern Azores Seamount Chain (SASC): The elemental, isotopic and chronological evidences. *Lithos, Volumes 294-295*, 133-146.

Book chapters

Ribeiro, L.P. (2008) – Aspectos Geológicos sobre a ilha de São Jorge. Sismo 1998 – Açores; Uma década depois. In: *Sismo 1998 Açores. Uma década depois*, Oliveira, C.S., Costa, A. & Nunes, J.C. (Eds.) Cap 15, pp 211-220.

Recent conference proceedings

Ribeiro L., Madureira P., Mata J. (2020) Hyeres Seamount – A New Insight into the Southern Azores Seamount Chain and the Azores Region. *Goldschmidt Abstracts*, 2020.

Dias Á.A., Costa P., Marques A.F., Ribeiro L., Madureira P., Calado A., Gonçalves E., Morato T. (2019) – Geochemistry of Fe-Si-(Mn) chimneys from Luso vent field, MAR. *Goldschmidt Abstracts*, 2019.

Rosa A.R., **Ribeiro L.P.**, Madureira P., Mata J. (2019) – Post-rifting ridge-“plume” interaction: The case of Madeira-Tore Rise. *Interridge Conference, Lisbon*.

Ribeiro, L.P., Madureira, P., Martins, S., Mata J., Hildenbrand, A. (2018) – The importance of geochemistry in the Project for the Extension of the Continental Shelf of Portugal: The Case of the Southern Azores Seamount Chain. *XIV CGPLP*.

Ribeiro, L.P., Marques, A. F., Martins, S., Zajacz Z., Madureira, P., Mata, J. (2018) – Hirondele Basin and Dom João de Castro Seamount in the light of the Azores isotopic zoo (Sr-Nd-Pb-Hf). *GRA Vol. 20, EGU2018-17336*.

Ribeiro L.P., Madureira, P., Hildenbrand, A., Martins, S., Mata, J. (2017) – The Azores plume influence on the SASC-Great Meteor and MAR: the importance for the Portuguese Extension of the Continental Shelf Project. *GRA, Vol. 19, EGU 2017, 15898-1*.

Madureira, P., **Ribeiro, L.P.**, Roque, C., Henriques, G., Brandão, F., Dias, F., Simões, M., Neves, M., Conceição, P., Leal, I.B., EMEPC (2017) – The Project for the Extension of the Continental Shelf - the Portuguese experience. *Vol. 19, EGU 2017, 18369*.

Georgy Cherkashov

Date of birth: 26.09.1957

Deputy director of the Institute for Geology and Mineral Resources of the Ocean (VNIIOkeangeologia, St. Petersburg, Russia). Dr. Sci. for research of seafloor massive sulfide (SMS) deposits of the Mid-Atlantic Ridge (2004). Chief scientist of 13 ocean-going expeditions for prospecting of SMS deposits (1983-2007) including diving missions on MIR and other submersibles. President/President Emeritus of International Marine Minerals Society (since 2011). Member of the Legal and Technical Commission of the International Seabed Authority (since 2012). Professor of St. Petersburg State University (Marine Geology, since 2005). Co-chair of the InterRidge Sulfide Resources Working Group. Published more than 190 articles and chapters in monographs related to marine geology and deep-sea mineral resources.

Few ones published recently are listed below:

G. Cherkashev, V. Ivanov, V. Bel'tenev, L. Lazareva, , I. Rozhdestvenskaya, M. Samovarov. Massive sulfide ores of the northern equatorial Mid-Atlantic Ridge, *Oceanology*. 2013. 53. 607–619.

G. Cherkashov. Mining for Marine Minerals. In “The regulation of continental shelf development: rethinking international standards” 2013. Eds. M. Nordquist, J. Moore, A. Chircop and R. Long. Center for oceans law and policy. Martinus Nijhoff Publishers. V. 17 p. 71-79.

P. Madureira, Brekke H., Cherkashov G., Rovere M. Exploration of polymetallic nodules in the Area: Reporting practices, data management and transparency. *Marine Policy*. 2016. 70. 101–107.

G. Cherkashov, V.Kuznetsov, K.Kuksa, E.Tabuns, F.Maksimov, V.Bel'tenev. Sulfide geochronology along the Northern Equatorial Mid Atlantic Ridge. *Ore Geology Reviews*. 2017. P. 147-154.

G. Cherkashov. Seafloor Massive Sulfide deposits: distribution and prospecting. In: *Deep-Sea Mining. Resource Potential, Technical and Environmental Considerations*. R. Sharma (ed.) Springer International Publishing AG. 2017. P. 143-165.

The World Ocean. Mineral resources and gas hydrates. L. Lobkovsky, G.Cherkashov (eds). Moscow. Scientific World. 2018. 708 p. (in Russian).

Kuksa K., Bich A., Cherkashov G., A. Firstova, V. Kuznetsov, V. Bel'tenev. Mass-wasting processes input in proximal metalliferous sediments: A case study of the Pobeda hydrothermal fields. *Marine Geology*. 2021. 438. 106517.

G. Cherkashov. Morphology and internal structure of hydrothermal orebodies formed in various geological settings of the World Ocean. *Oceanology*. 2021, Vol. 61, No. 2, pp. 262–271.

Curriculum Vitae: Dr Malcolm Clark

Personal details				
Full name	Title	First name	Second name	Family name
	Dr	Malcolm	Ross	Clark
Present position		Principal Scientist (Fisheries)		
Organisation/Employer		National Institute of Water and Atmospheric Research (NIWA)		
Email		malcolm.clark@niwa.co.nz		

Summary

Dr Clark is a Principal Scientist with the National Institute of Water & Atmospheric Research (NIWA) in New Zealand. He is a highly experienced biological scientist, having carried out research on deep-sea fisheries and ecosystems for almost 40 years. He worked extensively on stock assessment of deepwater fish in the 1980s and 1990s before broadening research to more general ecology of deep-sea ecosystems, and development of ecological risk and impact assessments for human impacts across a range of habitats. His research focuses on how to improve management and effectively balance exploitation of resources with conservation of sustainable ecosystems.

- Malcolm is an active research scientist, currently leading studies at NIWA evaluating the effects of sedimentation from fishing and mining on deep-sea benthos and the water column, as well as resilience and recovery dynamics of deep-sea communities. He has participated in about 90 research expeditions, from the North Sea to the Antarctic. He has published widely with over 120 peer-reviewed papers, 30 book chapters, and 150 technical reports.
- He has widespread linkages with the deep-sea science and management "community". He headed a field programme on seamounts as part of the international Census of Marine Life 2005-12, was on the steering committee of INDEEP 2011-16, and was a trustee of the Deep Sea Biology Society from 2015-21. He has served on numerous international advisory panels, most recently for the EU SponGES project, and for the Institute of Oceanology (IOCAS) in China.
- Has worked closely with the International Seabed Authority since the early 2000s in development of environmental guidelines for exploration and mining operations on abyssal plains, cobalt-rich crust seamounts and Seafloor Massive Sulphide deposits.
- He has served on the Commission for the last six years (2016-2022). During that time he has led its Environmental Working Group, and in particular efforts developing environmental parts of the draft Regulations; several standards and guidelines; and review of the EMP for the CCZ (and new APEIs).
- He has widespread linkages with the deep-sea science and management "community". He headed a field programme on seamounts as part of the international Census of Marine Life 2005-12, was on the steering committee of INDEEP 2011-16, and was a trustee of the Deep Sea Biology Society from 2015-21. He has served on numerous international advisory panels, most recently for the EU SponGES project, and for the Institute of Oceanology (IOCAS) in China.
- Has strong links with Pacific Island countries, having worked with the SOPAC-EU Deep-Sea Mining Project, as well as with the Cook Islands Seabed Minerals Authority. He is currently a member of the Cook Islands Seabed Minerals Licencing Panel.

This experience has given Dr Clark a very broad but deep understanding of the environmental science and management needs associated with deep-sea minerals and potential mining. He brings a balance of academic and applied expertise, and through 6 years on the Commission a good working knowledge of the ISA environment and its processes. This combination can help facilitate a continuity with both ongoing activities within the Commission, and the development of new initiatives.

Academic qualifications

1977 BSc, Victoria University of Wellington, Zoology
 1978 BSc (Hons 1st class), Victoria University of Wellington, Zoology
 1982 PhD, Victoria University of Wellington, Marine biology

Professional positions held

2012–14 Programme Leader, Marine Biological Resources
 2000 Principal Scientist, Fisheries, NIWA
 1995 - Project Director, Deepwater Fisheries, NIWA.
 1993 – 95 Deepwater Group Leader, MAF Fisheries
 1986 – 93 Scientist, Deepwater Group, MAF Fisheries.
 1985 – 86 Contract scientist, Fisheries Research Division (MAF)
 1983 – 84 Research scientist, NZ Department of Lands and Survey
 1982 – 83 Research Assistant, V.U.W Marine Laboratory

Present research/professional speciality

- Deep-sea biodiversity and ecology
- Seamount ecology
- Deep-sea management and conservation
- Fishing and mining impact assessment
- Ecological risk assessment
- Stock assessment of deepwater fish species
- Fisheries abundance estimation methods and design

Total years research experience

40 years

Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc.)

1977 Senior Scholar, V.U.W
 1978 Postgraduate Scholarship, V.U.W
 1980 DAAD Fellowship, Institut für Seefischerei, Hamburg, Germany
 1988 – 91 Secretary and Council Member, NZ Marine Sciences Society.
 2002 – 05 Member Irish Research Evaluation Panel

2004 – 11	Steering Committee, Principal Investigator Census of Marine Life project CenSeam
2006 – 11	Steering Committee Census of Marine Life project SarEco
2008 – 10	Advisory Committee on the UK Indian Ocean Seamounts programme
2011 –13	Senior Advisory Committee, INDEEP
2011 –13	Steering Committee of SOPAC Deep Sea Minerals Assessment Project
2012	New Zealand Marine Sciences Society Award
2012 –16	Oversight Steering Committee, INDEEP
2013 –21	Lead of Deep Sea ecosystems and mining Thematic Group of the IUCN CEM.
2014–	Editorial Board, Marine Ecosystem Ecology (Frontiers in Marine Science)
2015 –21	Deep Sea Biology Symposium Board member (“Trustee”)
2015–	International Scientific Advisory Board, Institute of Oceanology, China
2016 –20	Scientific Advisory Board, EU “SponGES” research programme
2017–22	Member of Legal and Technical Commission of the International Seabed Authority
2020–	Editorial Board, Journal of Ichthyology
2021	NIWA Lifetime Achievement award
2021	Member of Cook Islands Seabed Minerals Licencing Panel

Biogeographical notes

Dr Clark is a highly experienced fisheries and benthic ecologist, having carried out research on deep-sea fisheries and ecosystems for almost 40 years. He worked extensively on stock assessment of deepwater fish, especially orange roughy, in the 1980s and 1990s before broadening research to more general ecology of deep-sea ecosystems.

For many years he has led NIWA research on the biology and ecology of deep-sea fish and invertebrate communities, with an emphasis on evaluating environmental effects of human activities (especially bottom trawling). This work started with seamount habitat in 1998, and expanded to include surveys of over 50 seamounts as well as slope, canyons, cold seeps and hydrothermal vents in New Zealand waters to describe their benthic biology, and evaluate impacts on their faunal communities. Studies included development of ecological risk and impact assessments for human impacts on a range of habitats. His work led to the closure of 19 seamounts in New Zealand to protect representative biodiversity, and he has worked with CBD and GOBI initiatives to identify seamounts in the southern Pacific that are Ecologically or Biologically Significant Areas. He also headed the Secretariat of the Census of Marine Life programme on Seamounts (CenSeam), which was one of 14 field projects forming part of a global census of life in the oceans between 2005 and 2010. Linked to that he was lead editor of a book on Biological Sampling in the Deep-Sea, which was published in 2016 and compiled the latest best-practise techniques and equipment for carrying out research offshore (topics as diverse as deep-sea ecology, survey design, trawl gear, offshore observatories and sensors, habitat mapping, and data management).

In recent years his focus has shifted to evaluating the biodiversity of habitats associated with deep-sea mineral resources, and carrying out research on potential impacts of seabed mining. This underpins work to address how to effectively balance exploitation of resources with conservation of sustainable ecosystems. He currently leads a scientific programme at NIWA that is supporting improved management of potential deep-sea mining, through the

development of New Zealand EIA guidelines, and specific research evaluating the effects of sedimentation on deep-sea benthos and the water column.

Malcolm has worked closely with the International Seabed Authority since the early 2000s in development of environmental guidelines for exploration and mining operations on abyssal plains, cobalt-rich crust seamounts and Seafloor Massive Sulphide deposits. He is at present a member of the Legal and Technical Commission of the ISA (since 2017), where he has played a prominent role in helping examine environmental issues, including aspects of the draft Regulations for Exploitation, environmental standards and guidelines (e.g., EIA, EIS, EMMP, hazard and risk identification), and led certain initiatives with REMPAs (CCZ review of APEIs and NW Pacific seamounts) and environmental goals and objectives.

He has strong Pacific Island links, in the fields of fisheries and seabed minerals. He recently completed work under a SOPAC-EU Deep Sea Mining project in the southwest Pacific, including ecological risk assessments of potential mining impacts on fisheries. He has worked closely with Cook Island colleagues on manganese nodule environments, and in 2017 led collaborative efforts with the USA to undertake deep-sea research in the Cook and Tokelau Islands. In 2021 he was a member of the Cook Islands Seabed Minerals Licensing Panel evaluating applications for minerals exploration. He has also collaborated in several efforts involving regional approaches in United Nations World Ocean Assessments, as well as MACBio Marine Environmental Atlases for several Pacific Islands.

Malcolm has extensive seagoing experience, leading several international surveys, for fisheries off New Caledonia, seamounts in the Tasman Sea, the Ross Sea (Antarctica), and also participated in the 2005 "Ring of Fire" (US) and 2013 "Quelle" (Japan) expeditions. Within New Zealand he has designed and led over 60 deep-sea fish and biodiversity surveys, and many have involved extensive cooperation with fishing and mining sectors.

Malcolm is internationally recognised in deepwater fisheries, seamounts, and deep-sea minerals research and management, with invited participation or consultancy work in numerous countries from 1991 to the present. He has published widely, with over 120 peer-reviewed papers, 30 book chapters, and 150 technical reports and articles.

Total number of <i>peer reviewed</i> publications	Journal articles	Books, book chapters, books edited	Conference proceedings	Technical reports
	125	33	42	165

Selection of relevant research publications and dissemination
Peer-reviewed journal articles
Hyman, J.; Stewart, R.A.; Sahin, O.; Clarke, M.; Clark, M.R. (2022). Visioning a framework for effective environmental management of deep-sea polymetallic nodule mining: Drivers, barriers and enablers: <i>Journal of Cleaner Production</i> 337: 130487. 15 p.
Smith, C.R.; Clark, M.R. ; Goetze, E.; Glover, A.G.; Howell, K. (2021). Editorial: The research topic Biodiversity, Connectivity and Ecosystem Function across the Clarion-Clipperton Zone- a regional synthesis for an area targeted for nodule mining. <i>Frontiers in Marine Science</i> : 5-7. https://doi.org/10.3389/fmars.2021.797516
Mobililia, V.; Cummings, V.; Clark, M.R. ; Tracey, D.M.; Bell, J. (2021). Resilience of the New Zealand deep-sea sponge <i>Ecionemia novaezealandiae</i> to elevated suspended sediment concentrations. <i>Journal of Experimental Marine Biology and Ecology</i> 541: 151579

- Bowden, D.A.; Anderson, O.A.; Rowden, A.A.; Stephenson, F.; **Clark, M.R.** (2021). Assessing habitat suitability models for the deep sea: is our ability to predict the distributions of seafloor fauna improving? *Frontiers in Marine Science* 8:632389. [doi: 10.3389/fmars.2021.632389].
- Boschen-Rose, R.E.; **Clark, M.R.**; Rowden, A.A.; Gardner, J.P.A. (2021). Assessing the ecological risk to deep-sea megafaunal assemblages from seafloor massive sulphide mining using a functional traits sensitivity approach. *Ocean & Coastal Management* 210: 105656.
- Edwards, C.T.T, Roux, MJ, **Clark, M.R.** (2021). Spatially integrated modelling of data-limited orange roughy (*Hoplostethus atlanticus*) using environmental covariates. *Canadian Journal of Fisheries and Aquatic Sciences*. P. 1-10. [dx.doi.org/10.1139/cjfas-2020-0265](https://doi.org/10.1139/cjfas-2020-0265)
- Goode, S.; Rowden, A.A.; Bowden, D.A.; **Clark, M.R.** (2020). Resilience of seamount benthic communities to trawling disturbance. *Marine Environmental Research*. 161: 105086. 15 p.
- Howell, K.L., Hilario, A., Allcock, L., Bailey, D., Baker, M., **Clark, M.R.**... +39..(2020). A blueprint for an inclusive, global deep-sea Ocean Decade field Programme. *Frontiers in Marine Science*. 7:584861. 54 p. [doi: 10.3389/fmars.2020.584861]
- McQuaid, K.A.; Attrill, M.J.; **Clark, M.R.**; Cobley, A.; Glover, A.G.; Smith, C.R.; Howell K.L. (2020). Using habitat classification to assess representativity of a protected area network in a large, data-poor area targeted for deep-sea mining. *Frontiers in Marine Science* 7: 558860
- Drazen, J.C.; Smith, C.R.; Gjerde, K.; Haddock, S.; Carter, G.; Choy, C.A.; **Clark, M.R.**; Dutrieux, P.; Goetze, E.; Hauton, C.; Hatta, M.; Koslow, J.; Leitner, A.; Pacini, A.; Perelman, J.; Peacock, T.; Sutton, T.; Watling, L.; Yamamoto, H. (2020). Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining. *Proceedings of the National Academy of Sciences*. Opinion piece. 6 p. (<https://doi.org/10.1073/pnas.2011914117>)
- Clark, M.R.**; Bowden, D.A.; Rowden, A.A.; Stewart, R. (2019). Little evidence of benthic community resilience to bottom trawling on seamounts after 15 years. *Frontiers in Marine Science* 6:63. 16p. doi: 10.3389/fmars.2019.00063
- Clark, M.R.**; Durden, J.M.; Christiansen, S. (2019). Environmental Impact Assessments for deep-sea mining: can we improve their future effectiveness? *Marine Policy* <https://doi.org/10.1016/j.marpol.2018.11.026>
- Rowden, A.A.; Stephenson, F.; **Clark, M.R.**; Anderson, O.F.; Guinotte, J.M.; Baird, S.J.; Roux, M.-J.; Wadhwa, S.; Cryer, M.; Lundquist, C.J. (2019). Examining the utility of a decision-support tool to develop spatial management options for the protection of vulnerable ecosystems on the high seas around New Zealand. *Ocean and Coastal Management* 170: 1–16
- Rowden, A.A.; Anderson, O.F.; Georgian, S.E.; Bowden, D.A.; **Clark, M.R.**; Pallentin, A.R.; Miller, A. (2017). High-resolution habitat suitability models for the conservation and management of vulnerable marine ecosystems on the Louisville Seamount Chain, South Pacific Ocean. *Frontiers in Marine Science* 4:335. Doi: 10.3389/fmars.2017.00335
- Lundquist, C.J; Bulmer, R.H.; **Clark, M.R.**; Hillman, J.R.; Nelson, W.A.; Norrie, C.R.; Rowden, A.A.; Tracey, D.M.; Hewitt, J.E. (2017). Challenges for the conservation of marine small natural features. *Biological Conservation* 211: 69–79.
- Zeng, C., Rowden, A., **Clark, M.**, Gardner, J. (2017). Population genetic structure and connectivity of deep-sea stony corals (Order Scleractinia) in the New Zealand region: Implications for the conservation and management of Vulnerable Marine Ecosystems. *Evolutionary Applications*. DOI: 10.1111/eva.12509
- Ellis J.I., **Clark M.R.**, Rouse H.L., Lamarche G. (2017). Environmental management frameworks for offshore mining: insights from experience in New Zealand's Exclusive Economic Zone. *Marine Policy*, 84: 178–192

- Clark, M.R.**; Althaus, F.; Schlacher, T.; Williams, A.; Bowden, D.; Rowden, A.A. (2016). The impacts of deep-sea fisheries on benthic communities: a review. *ICES Journal of Marine Science* 73 (Suppl.1): 51-69.
- Wedding, L.M., Reiter, S.M., Smith, C.R., Gjerde, K.M., Kittinger, J.; Friedlander, A.M., Gaines, S.D., **Clark, M.R.**, Thurnherr, A., Hardy, S., Crowder, L. (2015). Protecting the Common Heritage of Mankind: exploitation of the deep seabed. *Science* 349 (6244): 144-145.
- Clark, M.R.**; Bowden, D.A. (2015). Seamount biodiversity: high variability both within and between seamounts in the Ross Sea region of Antarctica. *Hydrobiologia*. 761:161-180 [Doi: 10.1007/s10750-015-2327-9]
- Clark, M.R.**; Rowden, A.A.; Schlacher, T.; Guinotte, J.; Dunstan, P.; Williams, A.A.; O'Hara, T.; Watling, L.; Niklitschek, E.; Tsuchida, S. (2014). Identifying Ecologically or Biologically Significant Areas (EBSA): a systematic method and its application to seamounts in the South Pacific. *Ocean and Coastal Management* 91: 65-79.
- Ardron, J.A.; **Clark, M.R.**; Penney, A.J.; Hourigan, T.F.; Rowden, A.A.; Dunstan, P.K.; Watling, L.E.; Shank, T.; Tracey, D.M.; Dunn, M.; Parker, S.J. (2014). A systematic approach towards the identification and protection of Vulnerable Marine Ecosystems. *Marine Policy* 49: 146–154.
- Boschen, R.E.; Rowden, A.A.; **Clark, M.R.**; Gardner, J.P.A. (2013). Mining of deep-sea seafloor massive sulfides: a review of the deposits, their benthic communities, impacts from mining, regulatory frameworks and management strategies. *Journal of Ocean and Coastal Management* 84: 54-67.
- Clark, M.R.**; Dunn, M.R. (2012). Spatial management of deep-sea seamount fisheries: balancing exploitation and habitat conservation. *Environmental Conservation* 39(2): 204-214
- Clark, M.R.**; Schlacher, T.A.; Rowden, A.A.; Stocks, K.I.; Consalvey, M. (2012). Science priorities for seamounts: research links to conservation and management. *PLoS ONE* 7(1): e29232. Doi:10.1371/journal.pone.0029232.
- Ramirez-Llodra, E.; Tyler, P.A.; Baker, M.C.; Bergstad, O-A.; **Clark, M.R.**; Escobar, E.; Levin, L.A.; Menot, L.; Rowden, A.A.; Smith, C.R.; Van Dover, C.L. (2011). Man and the last great wilderness: human impact on the deep sea. *PLoS ONE* 6(7): e22588. doi:10.1371/journal.pone.0022588
- Clark, M.R.**; Watling, L.; Rowden, A.A.; Guinotte, J.M.; Smith, C.R. (2011). A global seamount classification to aid the scientific design of marine protected area networks. *Journal of Ocean and Coastal Management* 54: 19–36. (doi:10.1016/j.ocecoaman.2010.10.006.)
- Clark, M.R.**; Rowden, A.A.; Schlacher, T.; Williams, A.; Consalvey, M.; Stocks, K.I.; Rogers, A.D.; O'Hara, T.D.; White, M.; Shank, T.M.; Hall-Spencer, J. (2010) The ecology of seamounts: structure, function, and human impacts. *Annual Review of Marine Science* 2: 253–278
- Rowden, A.A.; Dower, J.F.; Schlacher, T.A.; Consalvey, M.; **Clark, M.R.** (2010). Paradigms in seamount ecology: fact, fiction, and future. *Marine Ecology* 31(suppl1): 226–239.
- Williams, A.; Schlacher, T.A.; Rowden, A.A.; Althaus, F.; **Clark, M.R.**; Bowden, D.A.; Stewart, R.; Bax, N.J.; Consalvey, M.; Kloser, R.J. (2010) Seamount megabenthic assemblages fail to recover from trawling impacts. *Marine Ecology* 31(suppl. 1): 183–199.
- Clark, M.R.** (2009). Deep-sea seamount fisheries: a review of global status and future prospects. *Latin American Journal of Aquatic Research* 37(3). 501–512.
- Clark, M.R.**; Rowden, A.A. (2009). Effect of deepwater trawling on the macro-invertebrate assemblages of seamounts on the Chatham Rise, New Zealand. *Deep Sea Research I* 56: 1540–1554

- Clark, M.R.;** Johnson, R.; Hyman, J. (2022). Adaptive Management as a tool for effective environmental management of deep-sea mining. In: Sharma, R. (ed). Perspectives on deep-sea mining. Springer.
- Boschen-Rose, **Clark, M.R.;** Rowden, A.A.; Gardner, J.P.A. (2022). Integrated environmental management of the ecological impacts from seafloor massive sulfide mining – perspectives from the Kermadec Arc. In: Sharma, R. (ed). Perspectives on deep-sea mining. Springer. (accepted June 2021)
- Clark, M.R.,** Bernadino, A.F., Roberts, J.M., Narayanaswamy, B.E., Snelgrove, P., Tuhumwire, J. (2021). Chapter 7L. Seamounts and Pinnacles. In: The Second Global Integrated Marine Assessment: World Ocean Assessment II (United Nations, New York), Vol I, p 435-449. June 2021: 30.
- Clark, M.R.** (2019). The development of Environmental Impact Assessments for deep-sea mining. Pp. 447-470. In Sharma, R. (ed). Environmental issues of deep-sea mining. Impacts, Consequences and Policy Perspectives. Springer.
- Clark, M.R.;** Consalvey, M.; Rowden, A.A. (eds) (2016). Biological sampling in the deep sea. Wiley-Blackwell, Oxford. 437 p.
- Clark, M.;** Smith, S. (2013). Environmental management considerations. Chapter 3. pp. 27-42. In: Baker, E., Bedouin, Y. (eds.). 1A. Deep Sea Minerals: Sea-floor massive sulphides-a physical, biological, environmental, and technical review. SOPAC- GRIDArundel.
- Clark, M.** (2013). Biology associated with cobalt-rich ferromanganese crusts. Chapter 2. pp. 15-22. In: Baker, E., Bedouin, Y. (eds.). 1C. Deep Sea Minerals: Cobalt-rich ferromanganese crusts-a physical, biological, environmental, and technical review. SOPAC- GRIDArundel.
- Consalvey, M.; **Clark, M.R.;** Rowden, A.A.; Stocks, K.I. (2010). Life on Seamounts. Chapter 7 in: McIntyre, A.D. (ed). Life in the World's Oceans: diversity, distribution, and abundance. Wiley Blackwell, U.K. p. 123–138.
- Clark, M.R.,** Koslow, J.A. (2007). Impacts of fisheries on seamounts. Chapter 19. p. 413–441 In: Pitcher, T.J., Morato, T., Hart, P.J.B., Clark, M.R., Haggan, N. Santos, R.S. (eds). Seamounts: ecology, fisheries, and conservation. Blackwell Fisheries and Aquatic Resources Series 12. Blackwell Publishing, Oxford. 527 pp.
- Clark, M.R,** Vinnichenko, V.I.; Gordon, J.D.M.; Beck-Bulat, G.Z.; Kukharev, N.N.; and Kakora, A.F. (2007). Large scale distant water trawl fisheries on seamounts. Chapter 17. p. 361–399. In: Pitcher, T.J., Morato, T., Hart, P.J.B., Clark, M.R., Haggan, N. Santos, R.S. (eds). Seamounts: ecology, fisheries, and conservation.

Refereed conference proceedings

- Clark, M.R.** (2017). Project-level Environmental Impact Assessment. P. 54-57 In: Towards an ISA Environmental Management Strategy for the Area: report of an international workshop convened by the German Environmental Agency (UBA), the German Federal Institute for Geosciences and Natural Resources (BGR), and the Secretariat of the International Seabed Authority (ISA) in Berlin, Germany, 20-24 March 2017. ISA Technical Study No. 17. 122 pp.
- Clark, M.R.,** Rowden, A.A., Lamarche, G. (2016). Deep-sea benthic sampling in the Kermadec region: recent research efforts and the need for a coordinated and integrated approach to future sampling. Pp. 12-15. In: Golder, B., Connell, A. (eds). Proceedings of Kermadec– Discoveries and connections science symposium. Pew Charitable Trust, Wellington, NZ.
- Gardner, J.P.A.; Holland, L.P.; Zeng, C.; Boschen, R.E.; **Clark, M.R.;** Hamilton, J.S. (2016). Connectivity of Vulnerable Marine Ecosystem indicator taxa: genetic data to inform environmental management of the Kermadec region. Pp. 24-28. . In: Golder, B., Connell, A.

(eds). Proceedings of Kermadec–Discoveries and connections science symposium. Pew Charitable Trust, Wellington, NZ.

Lamarche, G.; **Clark, M.** (2013). Enabling management of offshore mining through improved understanding of environmental impacts – a New Zealand perspective. In: Pacific Economic and Cooperation Council (PECC) (ed) PECC International Project 2011-2012. Sustainable Management of Marine Resources. Seminar 3: Management of Deep Sea Marine Resources and Oceans as a Means of Communication, p 153-165.

Clark, M.R.; Rowden, A.A.; Schnabel, K.; Tracey, D.M. (2010). Deep-sea benthic sampling in the Kermadec region: past, present, future. Pp. 56–58 In PEW Environment Group (comps). Proceedings of DEEP: talks and thoughts celebrating diversity in New Zealand's untouched Kermadecs, August 30-31 2010. Wellington, New Zealand.

Rowden, A.A.; **Clark, M.R.**; Consalvey, M. (2009). The biological science required to support deep-sea mining and ocean management of New Zealand's EEZ. Proceedings of the AusIMM New Zealand Branch conference 2008.

Other forms of dissemination (reports for clients, technical reports, popular press, etc)

Clark, M.R., Bernadino, A.F., Roberts, J.M., Narayanaswamy, B.E., Snelgrove, P., Tuhumwire, J. (2021). Chapter 7L. Seamounts and Pinnacles. In: The Second Global Integrated Marine Assessment: World Ocean Assessment II (United Nations, New York), Vol I, p 435-449. June 2021: 30.

Clark, M.R., Bowden, D.A., Stewart, R., Schnabel, K., Quinn, W., Lennard, B., Goode, S.L., Davis, A. (2021). Seamount Recovery: factual voyage report of a survey of seamounts on the Northwest and Southeast Chatham Rise (TAN2009). New Zealand Aquatic Environment and Biodiversity Report No. 262. 117 p.

Clark, M.R.; Mills, S.; Leduc, D.; Anderson, O.F.; Rowden, A.A. (2019). Biodiversity of Benthic Protection Areas and Seamount Closure Areas: a description of available benthic invertebrate data, and a preliminary evaluation of the effectiveness of BPAs for biodiversity protection. New Zealand Aquatic Environment and Biodiversity Report No. 227. 270 p.

Clark, M.R.; Nodder, S.; O'Callaghan, J.; Rowden, A.A.; Cummings, V.; Hickey, C. (2018). Effects of sedimentation from deep-sea mining: a benthic disturbance experiment off New Zealand. Deep-Sea Life 12: 18-19.

Clark, M.R.; Horn, P.; Tracey, D.M.; Hoyle, S.; Goetz, K.; Pinkerton, M.; Sutton, P.; Paul, V. (2017). Assessment of the potential impacts of deep seabed mining on Pacific Island fisheries. Pacific Community.

Clark M., Rouse H, Lamarche G, Ellis J, Hickey, C (2017). Preparing Environmental Impact Assessments: General guidelines for offshore mining and drilling with particular reference to New Zealand. NIWA Science and Technology Series No. 81. 106 p. doi.10.13140/RG.2.2.29649.43360 <https://www.niwa.co.nz/coasts-and-oceans/research-projects/enabling-management-of-offshore-mining>].

Clark, M.R.; Horn, P.; Tracey, D.M.; Hoyle, S.; Goetz, K.; Pinkerton, M.; Sutton, P.; Paul, V. (2017). Assessment of the potential impacts of deep seabed mining on Pacific Island fisheries. Pacific Community, Suva, Fiji. 90 p.

Clark, M.R.; Trnski, T.; Constantine, R.; Aguirre, D.; Barker, J.; Betty, E.; Bowden, D.A.; Connell, A.; Duffy, C.; George, S.; Hannam, S.; Liggins, L.; Middleton, C.; Mills, S.; Pallentin, A.; Riekkola, L.; Sampey, A.; Sewell, M.; Spong, K.; Stewart, A.; Stewart, R.; Struthers, C.; van Oosterom, L. (2017). Biodiversity of the Kermadec Islands and offshore waters of the

- Kermadec Ridge: report of a coastal, marine mammal and deep-sea survey (TAN1612). New Zealand Aquatic Environment and Biodiversity Report No. 179. 95 p.
- Ingels, J.; Bernal, P.; **Clark, M.**; Fujikura, K.; Gates, A.; Jones, D.; Levin, L.; Narayanaswamy, B.; Perez, J.; Priede, I.; Rowden, A.; Ruhl, H.; Santos, R.; Smith, C.; Snelgrove, P.; Soltwedel, T.; Sutton, T.; Sweetman, A.; Van Gaever, S.; Vecchione, M.; Yasuhara, M.; Zettler, L. (2017). Open ocean deep seas. Chapter 36F, p. 685-703 in: Inniss, L.; Simcock, A. (coordinators). The first global integrated marine assessment: World Ocean Assessment 1. United Nations, Cambridge University Press, Cambridge. 973 p.
- Clark, M.R.**; McMillan, P.J.; Anderson, O.F.; Roux, M-J. (2016). Stock management areas for orange roughy (*Hoplostethus atlanticus*) in the Tasman Sea and western South Pacific Ocean. New Zealand Fisheries Assessment Report 2016/19. 27 p.
- Clark, M.**; Tracey, D.; Anderson, O.; Parker, S. (2014). Pilot ecological risk assessment for protected corals. NIWA Client Report WLG2014-70. 32 p. Report prepared for the Department of Conservation.
- Clark, M.R.**; Kelley, C.; Baco, A.; Rowden, A. (2011). Fauna of cobalt-rich ferromanganese crust seamounts. International Seabed Authority Technical Study No. 8. 83 p
- Clark, M.R.**; Williams, A.; Rowden, A.A.; Hobday, A.J.; Consalvey, M. (2011). Development of seamount risk assessment: application of the ERAEF approach to Chatham Rise seamount features. New Zealand Aquatic Environment and Biodiversity Report No. 74.

Dr Jon Copley



Present position (since 2017):

Associate Professor in Ocean Exploration & Public Engagement at the University of Southampton (currently 0.7 FTE with voluntary reduction for family carer role) leading a research programme that explores the ecology of deep-sea habitats, which has involved research grants totalling more than £6.5 million in competitive funding, produced more than 60 research papers, and provided inputs for policymakers (UK Parliament; UN ISA) on environmental management of the deep ocean.

Other relevant roles:

2021-2023: Advisory Board member for the international Deep-Ocean Stewardship Initiative
Since 2014: Scientific Associate of the Natural History Museum
Since 2014: Consultant for BBC Natural History Unit
Since 2011: National Geographic Explorer
2010-2012: Co-Chair of InterRidge organisation coordinating international mid-ocean ridge research
Since 2006: Co-founder & Director of SciConnect Ltd, training scientists in communication skills

Previously:

2007-2017: Lecturer, then Associate Professor in Marine Ecology, University of Southampton
2000-2007: Teaching Fellow / Senior Teaching Fellow in Marine Ecology, University of Southampton
2000-2003: Science Coordinator of the UK Autosub Under Ice research programme
1998-1999: Intern, then Reporter, then Assistant News Editor, *New Scientist*

Education

PhD in Oceanography, University of Southampton, 1998
Thesis title: "Ecology of deep-sea hydrothermal vents"

MSc in Oceanography, University of Southampton, 1994
Awarded John Raymont Memorial Prize for top performance on the course

First Class BSc(Hons) in Zoology, University of Sheffield, 1992
Awarded the JD Jones Prize for top performance on the course

Prizes & nominations

Highly Commended in the Ocean Awards 2016 (Blue Marine Foundation & Boat International Media)
University of Southampton Vice-Chancellor's Award for Postgraduate Supervision & Training 2011
Royal Society of Biology Science Communication Award for Established Researchers 2008
British Science Association Charles Lyell Award Lecture for Environmental Sciences 2007
University of Southampton Vice-Chancellor's Award for Teaching 2007
1st Prize, *New Scientist* / Wellcome Trust Millennial Essay Competition 1997
2nd Prize, *The Daily Telegraph* / National Power Young Science Writer Awards 1996

SUMMARY OF RELEVANT EXPERIENCE FOR LTC ROLE

(1) Research background in deep-sea ecology

My research in deep-sea ecology is focused in three main areas: (1) the biogeography of deep-sea chemosynthetic environments (a global "jigsaw puzzle" of what lives where and why in the deep ocean); (2) how populations of species vary in space and time in island-like and ephemeral seafloor habitats, revealing ecological processes that shape deep-sea communities; and (3) the reproductive biology and life-cycles of deep-sea species, which have consequences for the distributions and dynamics of their populations, including their vulnerability to disturbance by human activities.

My research grants from NERC and National Geographic have included studies of deep-sea environments in the Caribbean, Indian, Atlantic, and Southern Oceans; the evolution of animal life at hydrothermal vents; and the potential impacts of deep-sea mining in the Clarion-Clipperton Zone (a £3.2 million NERC programme from 2021 to 2025 involving nine institutions across the UK).

Highlights of my research achievements include leading a NERC grant that discovered the world's deepest known hydrothermal vents, 5000 metres deep in the Cayman Trough of the Caribbean Sea, in collaboration with US colleagues (Connelly, Copley [joint lead authors] *et al.*, 2012, *Nature Communications*, 3: 620), and leading another NERC grant investigating the first known hydrothermal vents in the southwest Indian Ocean, which discovered seven species of previously undescribed deep-sea animals (Copley *et al.*, 2016, *Scientific Reports*, 6: 38158).

I have participated in 20 international deep-sea research expeditions, including leading expeditions as Principal Scientist with the UK's research ships. In total I have spent two years working at sea on fieldwork expeditions, during which I have specialised in using Remotely Operated Vehicles (ROVs), Human-Occupied Vehicles (HOVs), and Autonomous Underwater Vehicles (AUVs) to investigate ocean-floor environments. I led the first HOV dive to the world's deepest known hydrothermal vents, becoming the first British person to dive more than 5000 metres deep in the ocean, and I led the first HOV dives to reach 1000 metres deep in the Antarctic.

I have published 62 peer-reviewed papers to date, including:

- formal descriptions of 18 new species of animals across 5 phyla, advancing our knowledge of biodiversity in deep-ocean environments;
- studies of spatial and temporal variation in distributions of deep-sea fauna, from metre-scale zonations to global biogeographic patterns and over tidal cycles to decades, revealing the dynamics of deep-sea ecosystems;
- investigations of reproductive biology, food web structure, and population connectivity of deep-sea species, which are important for understanding their potential vulnerability to impacts of human activities such as future deep-sea mining;
- new techniques for studying the microdistributions of deep-sea animals in areas of complex seabed topography using high-definition digital imagery from precision-controlled ROVs;
- recent community-wide papers defining the priorities and vision for deep-ocean science in the UN Ocean Decade.

As recognition of leadership in my field, I am a Scientific Associate of the Natural History Museum (since 2014) and a National Geographic Explorer (since 2011). From 2010 to 2012 I served as Co-Chair of InterRidge, the international organisation promoting and coordinating collaborative research at mid-ocean ridges, during the UK's tenure of the InterRidge Office.

For further details of my research experience, please see Appendix 1 below.

(2) Experience of informing policymakers with my research

I was selected for the Royal Society Parliamentary Pairing Scheme in November 2014 (paired with the Chair of the House of Lords Science & Technology Select Committee), and contributed to the Parliamentary Office of Science and Technology Briefing Note (POSTnote) on Deep-Sea Mining in 2015. I was an invited speaker at the “Discovering Our Oceans” event of the Parliamentary and Scientific Committee APG in 2018, resulting in an invitation to write an article for Committee's *Science In Parliament* magazine (Autumn 2018 issue) about the challenges and opportunities of deep-ocean research.

I submitted written evidence to the House of Commons Environmental Audit Committee inquiry on "Marine Protected Areas Revisited" in 2017 that was directly quoted in its final Report, and my evidence on deep-sea mining for the Committee's inquiry on "Sustainable Seas" in 2018 was also quoted in its final Report and referred to in a speech by the Chair of the Committee to the House of Commons.

In 2020 I was the UK's invited contributor at a UN ISA meeting on the sustainable management of mid-ocean ridge ecosystems, presenting an intervention with perspectives from my research. I have also previously engaged with the processes of the UN CBD, preparing the case for an EBSA in the Indian Ocean submitted to a regional meeting in 2013.

I have briefed teams of UK civil servants with relevant insights from my research, such as a delegation from DEFRA and the FCO in 2015 preparing to negotiate the new BBNJ biodiversity treaty, and a team from CEFAS, MMO and FCO in 2017 planning the surveying of the UKOT Blue Belt MPAs.

I am currently an Advisory Board member (2021-2023) for the international Deep-Ocean Stewardship Initiative (DOSI), providing guidance for a global network of >2500 researchers in marine sciences, engineering, economics and law to advise policymakers on the sustainable use of deep-ocean resources.

For further details of my experience in informing policymakers, please see Appendix 2 below.

(3) Experience of communicating with non-specialists and experts in other disciplines

Being able to share technical information with specialists in other disciplines (e.g. economic geologists and legal experts) is essential for the effective contribution of an LTC member. I have extensive experience in this area from the “public engagement” aspect of my academic position, which involves working as a professional science communicator in popular science writing, broadcast media, and in-person engagement. I also train researchers in how to share their work with wider audiences beyond their specialist colleagues, through a company that I co-founded. I am a recipient of the Royal Society of Biology Science Communication Award for Established Researchers and the British Science Association Charles Lyell Award Lecture for Environmental Sciences.

I have published 132 bylined popular science articles in magazines and newspapers (e.g. *Nature*, *New Scientist*, *Scientific American*, *The Guardian*), such as a commissioned feature article for *New Scientist* in 2020 covering UNCLOS, governance of deep-sea mining, and negotiations for a new BBNJ biodiversity treaty. I am also the author of the popular science book *Ask An Ocean Explorer* published by Hodder & Stoughton in 2019.

My experience as a science communicator includes as work a content producer and presenter of marine science in broadcast and online media, such as the podcast series “Everything you wanted to

know about... the deep sea with Dr Jon Copley" for BBC Science Focus in 2020. I also produced and presented the script for the BBC Earth / OceanX online film "The Deepest Dive In Antarctica Reveals a Seafloor Teeming with Life," which won an international Webby Award ("the Oscars of the internet") in 2019 and has received more than 15 million YouTube views. My other broadcast science communication credits include co-presenter and script co-producer for the 4-part radio series *The Compass: Ocean Stories* on BBC World Service in 2017, guest co-presenter and script co-producer for BBC World Service's *The Science Hour* (4 episodes, 2017-2018), and onscreen contributor in documentaries (e.g. BBC *Blue Planet II* "Our Blue Planet" episode, 2017). Since 2014 I have provided consultancy for the BBC Natural History Unit, for example as a Science Advisor for *Blue Planet II* (and other major documentary series currently in development).

Since 2014 I have engaged total public audiences of more than 86,000 people with my research at in-person events such as talks and exhibitions, such as an 18-date UK tour of "Ask An Ocean Explorer" talks at venues from Scotland to the South Coast in 2019, including major events such as the Hay Festival and New Scientist Live. I was Guest Curator of the "Monsters Of The Deep" exhibition (Jul 2020 to Jan 2022) at the National Maritime Museum in Falmouth, for which I provided content on the history and reality of ocean exploration, visited by more than 37,000 people in 2020.

In 2006 I co-founded SciConnect Ltd, a capacity-building company that provides training in communication skills to help researchers share their work with wider audiences and thereby enhance the contribution of science to society. SciConnect Ltd provides training programmes in areas such as writing for non-specialist audiences, presentation skills, media interview techniques, and online engagement, delivered by a team of expert tutors who are professional practitioners in the areas that they teach, for example with backgrounds as BBC broadcasters or science journalists at *Nature*, *New Scientist* and UK newspapers. SciConnect Ltd has now trained more than 15,000 people for clients including research funders (e.g. The Royal Society), universities and institutions across the UK and in Europe (e.g. European Geophysical Union), government agencies (e.g. JNCC) and NGOs (e.g. Marine Stewardship Council).

Full details of my science communication experience are available at www.jonccopley.com/outreach.html & www.jonccopley.com/pub.html

(4) Delivering education in deep-sea environmental science

I have taught marine ecology and oceanography at the University of Southampton for more than twenty years, including designing and delivering a Masters-level course in deep-sea ecology. I have been Director of Postgraduate Taught Programmes in Ocean & Earth Science, overseeing MSc degrees in Oceanography and in Marine Resource Management, and I have co-supervised 14 PhD students with colleagues at the National Oceanography Centre, Natural History Museum, and British Antarctic Survey. In recognition of excellence in contributions to education, I have received Vice-Chancellor's Awards for Teaching and for Postgraduate Supervision & Training.

My achievements in education include creating the "Exploring Our Ocean" Massive Open Online Course (MOOC) delivered by FutureLearn, which I designed to promote "ocean literacy" by providing an accessible introduction to deep-ocean exploration, with no scientific background required for participants. Since 2014, the online course has been taken up by more than 60,000 people from 180+ countries and internationally Highly Commended in The Ocean Awards 2016.

Full details of my experience of delivering education in deep-sea environmental science and providing training in science communication are available at www.jonccopley.com/teach.html

Appendix 1: further details of research experience

Peer-reviewed publications:

Copley JTP, Tyler PA, Shearer M, Murton BJ & German CR (1996). Megafauna from sublittoral to abyssal depths along the Mid-Atlantic Ridge south of Iceland. *Oceanologica Acta*, 19: 549-559.

Copley JTP, Tyler PA, Murton BJ & Van Dover CL (1997). Spatial and interannual variation in the faunal distribution at Broken Spur vent field (29N, Mid-Atlantic Ridge). *Marine Biology*, 129: 723-733.

Copley JTP, Tyler PA, Van Dover CL, Schultz A, Dickson P, Singh S & Sulanowska M (1999). Subannual temporal variation in faunal distributions at the TAG hydrothermal mound (26N, Mid-Atlantic Ridge). *PSZNI: Marine Ecology*, 20: 291-306.

Ramirez Llodra E, Tyler PA & Copley JTP (2000). Reproductive biology of three caridean shrimp, *Rimicaris exoculata*, *Chorocaris chacei* and *Mirocaris fortunata* (Caridea: Decapoda), from hydrothermal vents. *Journal of the Marine Biological Association of the UK*, 80: 473-484.

Allen CE, Copley JT & Tyler P (2001). Lipid partitioning in the hydrothermal vent shrimp *Rimicaris exoculata*. *PSZNI: Marine Ecology*, 22: 241-253.

Copley JTP, Tyler PA, Van Dover CL & Philp S (2003). Spatial variation in the reproductive biology of *Paralvinella palmiformis* (Polychaeta: Alvinellidae) from a vent field on Juan de Fuca Ridge. *Marine Ecology Progress Series*, 255: 171-181, doi:10.3354/meps225171

Copley JTP & Young CM (2006). Seasonality and zonation in the reproductive biology and population structure of the shrimp *Alvinocaris stactophila* (Caridea: Alvinocarididae) at a Louisiana Slope cold seep. *Marine Ecology Progress Series*, 315: 199-209, doi:10.3354/meps315199

Flint HC, Copley JTP, Ferrero TJ & Van Dover CL (2006). Patterns of nematode diversity at hydrothermal vents on the East Pacific Rise. *Cahiers de Biologie Marine*, 47: 365-370.

Copley JTP, Jorgensen PBK & Sohn RA (2007). Assessment of decadal-scale ecological change at a deep Mid-Atlantic hydrothermal vent and reproductive time-series in the shrimp *Rimicaris exoculata*. *Journal of the Marine Biological Association of the UK*, 87: 859-867, doi:10.1017/S0025315407056512

Copley JT (2007). Audio and video podcasts of lectures for campus-based students: production and evaluation of student use. *Innovations in Education and Teaching International*, 44: 387-399.

Copley JTP, Flint HC, Ferrero TJ & Van Dover CL (2007). Diversity of meiofauna and free-living nematodes in mussel beds at hydrothermal vents on the northern and southern East Pacific Rise. *Journal of the Marine Biological Association of the UK*, 87: 1141-1152, doi:10.1017/S0025315407055956

Cuvelier D, Sarrazin J, Colaco A, Copley J, Desbruyeres D, Glover A, Tyler P & Serrao Santos R (2009). Distribution and spatial variation of hydrothermal faunal assemblages at Lucky Strike (Mid-Atlantic Ridge) revealed by high-resolution video image analysis. *Deep-Sea Research I*, 56: 2026-2040.

Larkin KE, Ruhl HA, Bagley P, Benn A, Bett BJ, Billett DSM, Boetius A, Chevaldonne P, Colaco A, Copley J, Danovaro R, Escobar-Briones E, Glover A, Gooday AJ, Hughes JA, Kalogeropoulou V, Kitazato H, Kelly-Gerreyn BA, Klages M, Lampadariou N, Lejeusne C, Perez T, Priede IG, Rogers A, Sarradin PM, Sarrazin J, Soltwedel T, Soto EH, Thatje S, Tselepidis A, van den Hove S, Tyler PA, Vanreusel A & Wenzhofer F (2010). Benthic biology time-series in the deep sea: indicators of change. In: Hall J, Harrison DE & Stammer D (eds), *Proceedings of OceanObs'09: Sustained Ocean Observations and Information for Society*, 2: 599-615 (European Space Agency Special Publication WPP-306).

Vanreusel A, Fonseca G, Danovaro R, da Silva M, Esteves A, Ferrero T, Gad G, Galtsova V, Gambi C, da Fonseca Genevois V, Ingels J, Ingole B, Lampadariou N, Merckx B, Miljutin D, Miljutina M, Muthumbi A, Netto S, Portnova D, Radziejewska T, Raes M, Tchesunov A, Vanaverbeke J, Van Gaever S, Venekey V, Bezerra T, Flint H, Copley J, Pape E, Zeppilli D, Martinez P & Gleron J (2010). The contribution of deep-sea microhabitat heterogeneity to global nematode diversity. *Marine Ecology*, 31: 6-20.

Glover AG, Gooday AJ, Bailey BM, Billett DSM, Chevaldonne P, Colaco A, Copley J, Cuvelier D, Desbruyeres D, Kalogeropoulou V, Klages M, Lampadariou N, Lejeusne C, Mestre NC, Paterson GLJ, Perez T, Ruhl H, Sarrazin J, Soltwedel T, Soto EH, Thatje S, Tselepidis A, Van Gaever S & Vanreusel A (2010). Temporal change in deep-sea benthic ecosystems: a review of the evidence from recent time-series studies. *Advances in Marine Biology*, 58: 1-95.

- Cuvelier D, Sarrazin P-M, Sarrazin J, Colaco A, Copley J, Desbruyeres D, Glover A, Serrao Santos R & Tyler P (2011). Hydrothermal faunal assemblages and habitat characterisation at the Eiffel Tower edifice (Lucky Strike, Mid-Atlantic Ridge). *Marine Ecology*, 32: 243-255.
- Cuvelier D, Sarrazin J, Colaco A, Copley J, Glover A, Tyler P, Serrao Santos R & Desbruyeres D (2011). Community dynamics over 14 years at the Eiffel Tower hydrothermal edifice on the Mid-Atlantic Ridge. *Limnology & Oceanography*, 56: 1624-1640.
- Rogers AD, Tyler PA, Connelly DP, Copley JT, James R, Larter RD, Linse K, Mills RA, Naveira-Garabato A, Pancost RD, Pearce DA, Polunin NVC, German CR, Shank T, Alker B, Aquilina A, Bennett SA, Clarke A, Dinley RJJ, Graham AGC, Green D, Hawkes JA, Hepburn L, Ilario A, Huvenne VAI, Marsh L, Ramirez-Llodra E, Reid WDK, Roterman CN, Sweeting CJ, Thatje S & Zwirgmaier K (2012). The discovery of new deep-sea hydrothermal vent communities in the Southern Ocean and implications for biogeography. *PLoS Biology*, 10(1): e1001234, doi:10.1371/journal.pbio.1001234
- Connelly DP, Copley JT (joint lead authors), Murton BJ, Stansfield K, Tyler PA, German CR, Van Dover CL, Amon D, Furlong M, Grindlay N, Hayman N, Huhnerbach V, Judge M, Le Bas T, McPhail S, Meier A, Nakamura K, Nye VE, Pebody M, Pedersen RB, Plouviez S, Sands C, Searle RC, Stevenson P, Taws S & Wilcox S (2012). Hydrothermal vent fields and chemosynthetic biota on the world's deepest seafloor spreading centre. *Nature Communications*, 3: 620, doi:10.1038/ncomms1636
- Nye V, Copley J & Plouviez S (2012). A new species of *Rimicaris* (Crustacea: Decapoda: Caridea: Alvinocarididae) from hydrothermal vent fields on the Mid-Cayman Spreading Centre, Caribbean. *Journal of the Marine Biological Association of the UK*, 92: 1057-1072, doi:10.1017/S0025315411002001
- Marsh L, Copley JT, Huvenne VAI, Linse K, Reid WDK, Rogers AD, Sweeting CJ & Tyler PA (2012). Microdistribution of faunal assemblages at deep-sea hydrothermal vents in the Southern Ocean. *PLoS ONE*, 7(10): e48348, doi:10.1371/journal.pone.0048348
- Aquilina A, Connelly DP, Copley JT, Green DRH, Hawkes JA, Hepburn LE, Huvenne VAI, Marsh L, Mills RA & Tyler PA (2013). Geochemical and visual indicators of hydrothermal fluid flow through a sediment-hosted volcanic ridge in the central Bransfield Basin. *PLoS ONE*, 8(1): e54686, doi:10.1371/journal.pone.0054686
- Boschen RE, Tyler PA & Copley JT (2013). Distribution, population structure, reproduction and diet of *Ophiolimna antarctica* (Lyman, 1879) from Kemp Caldera in the Southern Ocean. *Deep-Sea Research II*, 92: 27-35, doi:10.1016/j.dsr2.2013.02.005
- Amon DJ, Glover AG, Wiklund H, Marsh L, Linse K, Rogers AD & Copley JT (2013). The discovery of a natural whale fall in the Antarctic deep sea. *Deep-Sea Research II*, 92: 87-96, doi:10.1016/j.dsr2.2013.01.028
- Marsh L, Copley JT, Huvenne VAI, Tyler PA & the NERC Deep-Platforms Team (2013). Getting the bigger picture: using precision Remotely Operated Vehicle (ROV) videography to construct high-definition mosaic images of newly discovered deep-sea hydrothermal vents in the Southern Ocean. *Deep-Sea Research II*, 92: 124-135, doi:10.1016/j.dsr2.2013.02.007
- Nye VE, Copley JT & Linse K (2013). A new species of *Eualus* Thallwitz, 1891 and new record of *Lebbeus antarcticus* (Hale, 1941) (Crustacea: Decapoda: Caridea: Hippolytidae) from the Scotia Sea. *Deep-Sea Research II*, 92: 145-156, doi:10.1016/j.dsr2.2013.01.022
- Nye VE, Copley JT & Tyler PA (2013). Spatial variation in the population structure and reproductive biology of *Rimicaris hybisae* (Caridea: Alvinocarididae) at hydrothermal vents on the Mid-Cayman Spreading Centre. *PLoS ONE*, 8(3): e60319, doi:10.1371/journal.pone.0060319
- Roterman CN, Copley JT, Linse KT, Tyler PA & Rogers AD (2013). Development of polymorphic microsatellite loci for three species of vent-endemic megafauna from deep-sea hydrothermal vents in the Scotia Sea, Southern Ocean. *Conservation Genetics Resources*, 5: 835-839, doi:10.1007/s12686-013-9921-9
- Nye VE, Copley JT, Plouviez S & Van Dover CL (2013). A new species of *Lebbeus* (Crustacea: Decapoda: Caridea: Hippolytidae) from the Von Damm Vent Field, Caribbean Sea. *Journal of the Marine Biological Association of the UK*, 93: 741-751, doi:10.1017/S0025315412000884
- Nye VE, Copley JT, Linse K & Plouviez S (2013). *Iheypira bathycodon* new species (Vetigastropoda: Trochoidea: Turbinidae: Skeneinae) from the Von Damm Vent Field, Mid-Cayman Spreading Centre, Caribbean. *Journal of the Marine Biological Association of the UK*, 94: 1017-1024, doi:10.1017/S002531541200082

Roterman CN, Copley JT, Linse KT, Tyler PA & Rogers AD (2013). The biogeography of the yeti crabs (Kiwaidae) with notes on the phylogeny of the Chirostyloidea (Decapoda: Anomura). *Proceedings of the Royal Society B*, 280: 2013718, doi:10.1098/rspb.2013.0718

Collins PC, Kennedy B, Copley JT, Boschen RE, Fleming N, Forde J, Se-Jong J, Lindsay D, Marsh L, Nye VE, Patterson A, Watanabe H, Yamamoto H, Carlsson J & Thaler AD (2013). VentBase: Developing a consensus among stakeholders in the deep-sea regarding environmental impact assessment for deep-sea mining. *Marine Policy*, 42: 334-336, doi:10.1016/j.marpol.2013.03.002

Wheeler A, Murton B, Copley J, Lim A, Carlsson J, Collins P, Dorschel B, Green D, Judge M, Nye V, Benzie J, Antoniacomi A, Coughlan M & Morris K (2013). Moytirra: discovery of the first known deep-sea hydrothermal vent field on the slow-spreading Mid-Atlantic Ridge north of the Azores. *Geochemistry Geophysics Geosystems*, 14: 4170-4184, doi:10.1002/ggge.20243

Amon DJ, Wiklund H, Dahlgren T, Copley JT, Smith CR, Jamieson AJ, & Glover AG (2014). Molecular taxonomy of Osedax (Annelida: Siboglinidae) in the Southern Ocean. *Zoologica Scripta*, 4: 405-417, doi:10.1111/zsc.12057

Van Dover C, Bell K, Marsh L, German C, John B, Cheadle M, Vecchione M, Amon D, Ball B, Copley J, Smart C, Fuller S, Phillips B, Cantner K, Auscavitch S & Ballard B (2014). Exploration of the Mid-Cayman Rise. *Oceanography*, 27: 32-33.

Nye VE & Copley JT (2014). The reproductive biology of *Lebbeus virentova* (Caridea: Hippolytidae) at the Von Damm Vent Field, Mid-Cayman Spreading Centre, Caribbean. *Marine Biology*, 161: 2371-2380, doi:10.1007/s00227-014-2512-9

Chen C, Copley J, Linse K, Rogers A & Sigwart J (2015). How the mollusc got its scales: convergent evolution of the molluscan scleritome. *Biological Journal of the Linnean Society*, 114: 949-954, doi:10.1111/bij.12462

Marsh L, Copley J, Tyler PA & Thatje S (2015). In hot and cold water: differential life-history traits are key to success in contrasting thermal deep-sea environments. *Journal of Animal Ecology*, 84: 898-913, doi:10.1111/1365-2656.12337

Amon DJ, Sykes D, Ahmed F, Copley JT, Kemp KM, Tyler PA, Young C & Glover AG (2015). Burrow forms, growth rates and feeding rates of wood-boring Xylophagidae bivalves revealed by micro-computed tomography. *Frontiers in Marine Science*, 2: 10, doi:10.3389/fmars.2015.00010

Chen C, Linse K, Copley JT & Rogers AD (2015). The 'scaly-foot gastropod': a new genus and species of hydrothermal vent-endemic gastropod (Neomphalina: Peltospiridae) from the Indian Ocean. *Journal of Molluscan Studies*, 81: 322-334, doi:10.1093/mollus/eyv013

Mah C, Linse K, Copley J, Marsh L, Rogers A, Clague D & Foltz D (2015). Description of a new family, new genus, and two new species of deep-sea Forcipulatacea (Asteroidea), including the first known sea-star from hydrothermal vent habitats. *Zoological Journal of the Linnean Society*, 174: 93-113, doi:10.1111/zoj.12229

Chen C, Copley JT, Linse K, Rogers AD & Sigwart JD (2015). The heart of a dragon: 3D anatomical reconstruction of the 'scaly-foot' gastropod (Mollusca: Gastropoda: Neomphalina) reveals its extraordinary circulatory system. *Frontiers in Zoology*, 12: 13, doi:10.1186/s12983-015-0105-1

Chen C, Copley JT, Linse K & Rogers AD (2015). Low connectivity between 'scaly-foot gastropod' (Mollusca: Peltospiridae) populations at hydrothermal vents on the Southwest Indian Ridge and the Central Indian Ridge. *Organisms Diversity and Evolution*, 15: 663-670, doi:10.1007/s13127-015-0224-8

Chen C, Linse K, Roterman CN, Copley J & Rogers AD (2015). A new genus of large hydrothermal vent-endemic gastropod (Neomphalina: Peltospiridae). *Zoological Journal of the Linnean Society*, 175: 319-335, doi:10.1111/zoj.12279

Anderson ME, Somerville R & Copley JT (2016). A new species of *Pachycara* Zugmayer, 1911 (Teleostei: Zoarcidae) from deep-sea chemosynthetic environments in the Caribbean Sea. *Zootaxa*, 4066(1): 071-077, doi:10.11646/zootaxa.4066.1.5

Roterman CN, Copley JT, Linse KT, Tyler PA & Rogers AD (2016). Connectivity in the cold: the comparative population genetics of vent-endemic fauna in the Scotia Sea, Southern Ocean. *Molecular Ecology*, 25: 1073-1088, doi:10.1111/mec.13541

Copley JT, Marsh L, Glover AG, Huhnerbach V, Nye VE, Reid WDK, Sweeting CJ, Wigham BD & Wiklund H (2016). Ecology and biogeography of megafauna and macrofauna at the first known deep-sea hydrothermal vents on the ultraslow-spreading Southwest Indian Ridge. *Scientific Reports*, 6: 38158, doi:10.1038/srep39158

- Amon DJ, Copley JT, Dahlgren TG, Horton T, Kemp KM, Rogers AD & Glover AG (2017). Observations of fauna attending wood and bone deployments from two seamounts on the Southwest Indian Ridge. *Deep-Sea Research II*, 136: 122-132, doi:10.1016/j.dsr2.2015.07.003
- Chen C, Zhou Y, Wang C & Copley JT (2017). Two new hot-vent peltospirid snails (Gastropoda: Neomphalina) from Longqi hydrothermal field, Southwest Indian Ridge. *Frontiers in Marine Science*, 4: 392, doi: 10.3389/fmars.2017.00392
- Chen C, Marsh L & Copley JT (2018). Is it sex in chains? Potential mating stacks in deep-sea hydrothermal vent snails. *Plankton and Benthos Research*, 13: 25-17, doi:10.3800/pbr.13.25
- Copley J (2018). Providing evidence of "impact" from public engagement with research: a case study from the UK's Research Excellence Framework (REF). *Research For All*, 2(2): 230-243, doi:10.18546/RFA.02.2.03
- Fielding S, Copley JT & Mills RA (2019). Exploring Our Oceans: using the global classroom to develop ocean literacy. *Frontiers in Marine Science*, 6: 340, doi: 10.3389/fmars.2019.00340
- Chapman A, Beaulieu S, Colaco A, Gebruk A, Hilario A, Kihara T, Ramirez-Llodra E, Sarrazin J, Tunnicliffe V, Amon D, Baker M, Boschen-Rose R, Chen C, Cooper I, Copley J, Corbari L, Cordes E, Cuvelier D, Duperron S, Du Preez C, Gollner S, Horton T, Hourdez S, Krylova E, Linse K, LokaBharathi PA, Marsh L, Matabos M, Mills S, Mullineaux L, Rapp H-T, Reid W, Rybakova (Goroslavskaya) E, Thomas T, Southgate S, Stohr S, Turner P, Watanabe H, Yasuhara M, Bates A (2019). sFDvent: a global trait database for deep-sea hydrothermal vent fauna. *Global Ecology and Biogeography*, 28: 1538-1551, doi:10.1111/geb.12975
- Linse K, Nye V (joint lead authors), Copley JT & Chen C (2019). On the systematics and ecology of two new species of Provanna (Abyssochrysoidea: Provannidae) from deep-sea hydrothermal vents in the Caribbean Sea and Southern Ocean. *Journal of Molluscan Studies*, eyz024, doi:10.1093/mollus/eyz024
- Linse K, Copley JT, Connelly DP, Larter RD, Pearce DA, Polunin NVC, Rogers AD, Chen C, Clarke A, Glover AG, Graham AGC, Huvenne VAI, Marsh L, Reid WDK, Roterman CN, Sweeting CJ, Zwirgmaier K & Tyler PA (2019). The fauna of the Kemp Caldera and its upper bathyal hydrothermal vents (South Sandwich Arc, Antarctica). *Royal Society Open Science*, 6: 191501
- Georgieva MN, Taboada S, Riesgo A, Díez-Vives C, De Leo FC, Jeffreys RM, Copley J, Little CTS, Ríos P, Cristobo J, Hestetun JT & Glover AG (2020). Evidence of vent-adaptation in sponges living at the periphery of hydrothermal vent environments. *Frontiers in Microbiology*, 11: 1636, doi:10.3389/fmicb.2020.01636
- Reid WDK, Wigham BD, Marsh L, Weston JNJ, Zhu Y & Copley JT (2020). Trophodynamics at the Longqi hydrothermal vent field and comparison with the East Scotia and Central Indian Ridges. *Marine Biology*, 167: 141
- Thomas EA, Liu R, Amon D, Copley JT, Glover AG, Helyar SJ, Olu K, Wiklund H, Zhang H & Sigwart JD (2020). Chiridota heheva - the cosmopolitan holothurian. *Marine Biodiversity*, 50: 110, doi:10.1007/s12526-020-01178-x
- Howell K, Hilario A, Allcock L, Bailey D, Baker M, Clark M, Colaço A, Copley J, Cordes E, Danovaro R, Dissanayake A, Escobar E, Esquete P, Gallagher A, Gates A, Gaudron S, German C, Gjerde K, Higgs N, Le Bris N, Levin L, Manea E, McClain C, Menot L, Mestre N, Metaxas A, Milligan R, Muthumbi A, Narayanaswamy B, Ramalho S, Ramirez-Llodra E, Robson L, Rogers A, Sellanes J, Sigwart J, Sink K, Snelgrove P, Stefanoudis P, Sumida P, Taylor M, Thurber A, Rui Vieira P, Watanabe H, Woodall L & Xavier J (2020). A blueprint for an inclusive, global deep-sea Ocean Decade field programme. *Frontiers in Marine Science*, 7: 584861, doi:10.3389/fmars.2020.584861
- Howell K, Hilario A, Allcock L, Bailey D, Baker M, Clark M, Colaço A, Copley J, Cordes E, Danovaro R, Dissanayake A, Escobar E, Esquete P, Gallagher A, Gates A, Gaudron S, German C, Gjerde K, Higgs N, Le Bris N, Levin L, Manea E, McClain C, Menot L, Mestre N, Metaxas A, Milligan R, Muthumbi A, Narayanaswamy B, Ramalho S, Ramirez-Llodra E, Robson L, Rogers A, Sellanes J, Sigwart J, Sink K, Snelgrove P, Stefanoudis P, Sumida P, Taylor M, Thurber A, Rui Vieira P, Watanabe H, Woodall L & Xavier J (2021). A decade to study deep-sea life. *Nature Ecology & Evolution*, 5: 265-276.
- Chen C, Han Y, Copley J & Zhou Y (2021). A new peltospirid snail (Gastropoda: Neomphalida) adds to the unique biodiversity of Longqi vent field, Southwest Indian Ridge. *Journal of Natural History*, 55: 851-866, doi:10.1080/00222933.2021.1923851
- Stefanoudis P, Biancani LM, Cambroner-Solano S, Clark MR, Copley JT, Easton E, Elmer F, Haddock SHD, Herrera S, Iglesias IS, Quattrini AM, Sigart J, Yesson C & Glover AG (2021). Moving conferences online: lessons learned from an international meeting. *Proceedings of the Royal Society B*, 288: 20211769, doi:10.1098/rspb.2021.1769

Research grants:

SMARTEX: Seabed Mining And Resilience To EXperimental impact

PI at University of Southampton (Lead ROs: Natural History Museum & National Oceanography Centre;
other partners: Plymouth; Liverpool; Herriot-Watt; British Geological Survey; Scottish Association for Marine Science)
Natural Environment Research Council (total grant value: £3.24 million)
1/06/21 → 31/05/25

Colonisation of hydrothermal vents by complex life: a natural experiment in macroevolution

PI at University of Southampton (Lead RO: Natural History Museum; other partner: University of Leeds)
Natural Environment Research Council (total grant value: £419k)
4/09/17 → 3/09/21

Chemosynthetically-driven ecosystems south of the polar front: Biogeography and Ecology

Co-I at University of Southampton (Lead RO; other partners: Bristol; Newcastle; Oxford; National Oceanography Centre;
British Antarctic Survey) Natural Environment Research Council (total grant value: £2.3 milion)
16/06/08 → 15/07/14

Hydrothermal activity and deep-ocean biology of the Mid-Cayman Rise

PI at University of Southampton (Lead RO; other partner: National Oceanography Centre)
Natural Environment Research Council (total grant value: £476k)
15/09/09 → 1/03/14

Deep-sea vents between the Azores and Iceland: the missing piece in a global puzzle of marine life

PI at University of Southampton (Lead RO)
National Geographic Society (total grant value £43k)
1/11/11 → 31/03/13

Biogeography and ecology of the first deep-sea hydrothermal vent field discovered on the SW Indian Ridge

PI at University of Southampton (Lead RO)
Natural Environment Research Council (total grant value: £29k)
1/08/11 → 31/07/12

DEEPSETS: Deep-sea & Extreme Environments, Patterns of Species and Ecosystem Time Series

Co-I at University of Southampton (Lead RO: IFREMER, France; other partner: University of the Azores)
EU FP6 MarBEF Network of Excellence (total grant value: ~£164k)
2004 → 2009

Other project participation:

European Sounding Board member, Horizon2020 RETHINK project, evaluating science communication in Europe, 2021-22

Network member, EU COST Association Cross-Cutting Action on Science Communication, 2019-2022

Network member, ESRC Development grant: *Blue seas thinking – a comparative approach to understanding deep-sea mining politics in the UK and Japan* (Lead RO: University of Lancaster), 2019-20

Project Partner, NERC Urgency Grant: *Benthic biodiversity under Antarctic ice shelves: baseline assessment of the seabed exposed by the 2017 calving of the Larsen-C Ice Shelf* (Lead RO: British Antarctic Survey), 2017-18

Project Lead, NERC £7.4k Public Engagement Grant: *Explore the deep – public engagement with deep-ocean research* 2015

Appendix 2: further details of experience in informing policymakers with research

UK Parliament:

House of Commons Environmental Audit Committee Inquiry on Sustainable Seas (final report 8 Jan 2019): submitted written evidence quoted in the report of the inquiry, and referred to in presentation of the report to the House.

Invited article, *Science In Parliament* (magazine of the Parliamentary & Scientific Committee): "Opportunities and challenges of the deep ocean", Autumn 2018 issue, pp 7-8.

Invited speaker, Parliamentary & Scientific Committee: "Into The Deep - Discovering Our Oceans" event, 23 Apr 2018.

House of Commons Environmental Audit Committee Inquiry on Marine Protected Areas Revisited (final report Apr 2017): submitted written evidence quoted in final report.

Contributor to Parliamentary Office of Science and Technology (POST) research briefing (POSTnote) on Deep-Sea Mining, Sep 2015.

Royal Society Parliamentary Pairing Scheme 2014: selected as participant, paired with Lord Selborne (Chair of House of Lords Science and Technology Select Committee).

UK Government:

Invited speaker for briefing of FCO, MMO & CEFAS team preparing management plans for the UKOT Blue Belt MPAs, National Oceanography Centre Southampton, 21 Sep 2017

Invited speaker for briefing of FCO & DEFRA team preparing to negotiate new BBNJ biodiversity treaty, National Oceanography Centre Southampton, Jan 2015

United Nations:

Invited UK contributor, ISA workshop on "Marine Scientific Research in the Area: Establishing collaborative platforms to enhance biodiversity knowledge for environmental management of mid-ocean ridge ecosystems", Dec 2020.

Contributed comments on ISA zero draft regulations for deep-sea mineral exploitation on behalf of the Deep-Sea Ecosystems Special Interest Group of the UK Challenger Society for Marine Science, Nov 2016.

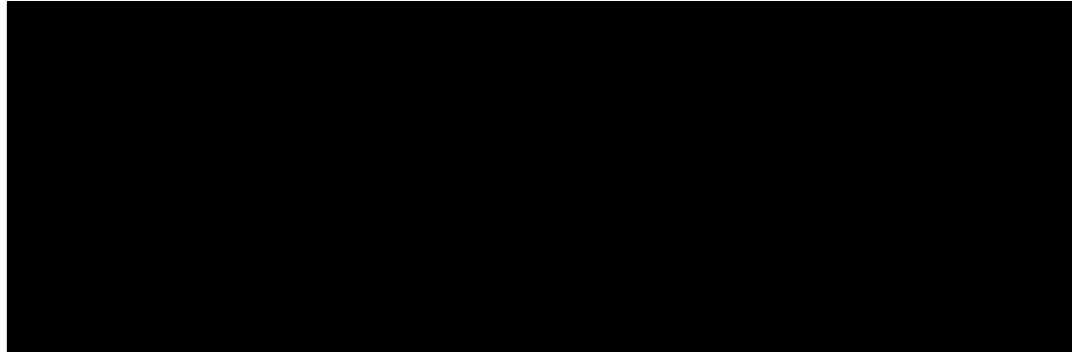
Prepared case for an Ecologically or Biologically Sensitive Area (EBSA) submitted by UK to CBD regional meeting for the Indian Ocean, Jul 2013.

Other:

Invited speaker, virtual visit of British Virgin Islands Ministerial delegation to University of Southampton, advising on sustainable development of marine resources and environmental surveying of BVI's EEZ, 6-7 May 2021

DARKO,RICHARD ADDO

**GHANA NATIONAL PETROLEUM CORPORATION, PRIVATE
MAIL BAG, TEMA, GHANA**



EDUCATION

- **M.Sc. In Exploration Geophysics- May 1999-**
International Institute for Aerospace Survey and Earth
Sciences (ITC)/ TU Delft, the Netherlands.
- **B.Sc. in Exploration Geophysics- June 1991-**Algerian
Petroleum Institute (I.A.P), Boumerders, Algiers, Algeria.
- **Certificate in Intergrated Reservoir Management – 2013**
IFP, Paris, France
- **Certificate in Interpretation of Clastics Reservoir
Systems – 2012, SCA, Houston Texas**
- **Certificate in Petroleum Data Management- Petrad, 2010**
- **Certificate in Petroleum Section in National
Development, Petrad Norway**
- **Certificate in Schlumberger Advanced New Technology**
– Accra, 2011
- **Certificate in French-June 1986-**French Cultural Center,
Algiers, Algeria.
- **Certificate in Delineation of the Outer Limits of the
Continental Shelf- Namibia 2010**
- **Certificate in International Boundary Negotiations –**

University of Durham, UK 2008

- **Certificate in Project Management-Principles & Practices**
–PetroSkills, London September 2014
- **AVO, Inversion and Attributes: Principles and Applications** Petroskills Houston Texas, August, 2015
- **Reservoir Characterization and Geostatistical Modelling in Field Development** – Halliburton, Houston Texas September, 2015.
- **Certificate in Upstream Petroleum Economics & Risk Analysis** – Euromoney Learning Solutions London December 2015

LANGUAGES

- Proficient in:
 - Written and spoken **English**
 - Written and spoken **French**

SUMMARY

- **Twenty-Nine (29) years' experience in Petroleum Exploration and Management activities.**
- **Experience in 2D and 3D seismic interpretation.**
- **Experience in attribute analysis**
- **Knowledge of industry's best practice in 3D seismic data processing: noise attenuation, demultiple technology, velocity analysis, stacking, velocity model building**
- **Experience in Seismic Data analysis, parameter testing and development of processing flows**
- **Negotiations of Petroleum Agreements**
- **Manage, coordinate and regulate petroleum exploration and production operations.**
- **Monitoring of Exploration Work Programs.**
- **Comprehensive Data Management experience.**
- **Knowledge of Geo Information Systems.**

PROFESSIONAL DUTIES (GENERAL)

- Designs, plans, supervise and manage geophysical acquisition and processing programs.
- Undertakes seismic structural interpretation, mapping and seismic attribute studies using workstation interpretation, and mapping and cartographic software to identify drillable, economic prospects.
- Recommends exploration, appraisal and development well locations that satisfy corporate aims.
- Prepares and presents technical papers on behalf of the company at industry technical conferences.
- Liaises with other team members in providing a basis for creating and updating geological and reservoir simulation models.
- Designs, plans and manages appropriate external geophysical work programs and studies.
- Performs geophysical studies using workstation and PC-based software and writes technical reports in conjunction with team members and support staff.
- Prepares and presents prospect inventory, prospect ranking, and farm out material with Geologists and Reservoir Engineers.
- Recommends borehole geophysical logging programs in conjunction with team members and contractors to identify key horizons and reservoirs.
- Represents Company at Technical and Operating Committee Meetings, workshops, farmout presentations and industry technical conferences.
- Consults with Operators on geophysical studies, well planning, and budgets to optimize economic aims.
- Work with team members pro-actively to seek New Venture opportunities to achieve corporate aims in production and reserves base.

- Assists in providing training and transfer of technical skills to national employees

WORK EXPERIENCE

2019 to Present Director Resource Management/Operations – Petroleum Commission, Ghana

The position is responsible for, and oversee the activities of the following departments:

- a. Geosciences (Geology & Geophysics)**
- b. Engineering**
- c. Technical Compliance**
- d. IT & Data Management**
- e. Economics & Projects Evaluation**
- f. Health, Safety and Environment**
- g. Corporate Planning**
- h. Fiscal Metering**

Resource Management

Advise on the assessment of the Hydrocarbon potential/resources of the country and develop plans/strategies in promoting the hydrocarbon potential to attract capable oil companies to undertake oil exploration in Ghana.

Evaluate and advise on Petroleum Agreement application.

Monitor and advise on execution of work programmes of operating oil companies in Ghana through Technical Committee Meetings (TCM) etc.

Assess and advise on appraisal plans and appraisal reports submitted by the international Oil Companies Operating in Ghana.

Review Daily, Quarterly and Annual reports of operating companies and submit recommendations.

Evaluate and advise on Field Development Plans to ensure optimal exploitation of the hydrocarbon resources for Ghana.

Undertake training and capacity building of young Geoscientists.

Operations.

Monitor the daily production rates of the producing fields and advise the commission based on approved rates in the plan of development.

Advise the commission of flaring with regards to reservoir management plans of the companies producing oil and gas in Ghana.

Plan the respective training programs for the reservoir, drilling, subsea and HSE for the operations directorate.

April 2017 to 2019 MANAGER, RESEARCH & DATA MANAGEMENT DEPARTMENT, GNPC

Managed the following projects:

1. Data Transcription
2. Data Archival
3. Scanning of Archival Data
4. Research and Training Center

Jan 2014 to April 2017 CHIEF GEOPHYSICIST AND HESS PROJECT TEAM LEAD-GNPC

Oversee Partners Geophysical work program and budget for assigned blocks and licenses leading to the discovery of seven (07) discoveries.

Oversee Geophysical activities of GNPC to support the exploration, appraisal and development & production of hydrocarbons for assigned blocks.

Developing and implementing project plans and schedules in a timely manner for the Hess project in the Deepwater Tano/Cape Three block.

2007- 2014

Lead Geophysicist -Ghana National Petroleum Corporation (GNPC) Ghana

- Leader Hess Team-GNPC- Monitoring of Hess operations in Ghana. Involved in the discovery of the seven (07) fields in the Hess Block. Currently engaged in the appraisal of the discoveries.
- Member –Reserves Estimation & Reservoir Characterization Team for the Jubilee Field and other discoveries in the Tano/Cape three Points Basin. Involved in the Interpretation of the reservoir units of the various fields in the Deepwater Tano and West Cape Three Points Basins, Offshore Western Ghana.
- Geophysicist-Jubilee Team GNPC- Involved in all Geophysical issues with the Jubilee Field. Jubilee Reservoir Time Lapse Seismic Monitoring. Interpretation of the Reservoir Units of the Jubilee Field using the Extended Elastic Impedance Volume and others Volume Attributes.
- Lead a team of Geoscientists to plan and execute and QC'd 2D and 3D seismic acquisition program in the Tano and Keta Basins, Offshore Ghana. Detail survey design for various contractor's operations in Ghana. Focus on delivering good data and ensuring the data acquired within parameter specifications. Prospect generation, basin analysis and attribute analysis with ENCANA Corporation in promoting in the West Cape Three Points acreage in Ghana. Planning / Negotiating of fiscal as well as technical work program between various exploration companies interested in Ghana and GNPC.

- Assigned to Dana Petroleum Corporation to represent Ghana in the Core Team. The primary aim of the team was to undertake an integrated interpretation of the South Tano Fields. The role involved attribute analysis of maps for reservoir characterization.

2000 –2007

Senior Geophysicist - Ghana National Petroleum Corporation (GNPC) Ghana

Offshore Duties –Gulf of Guinea, Ghana, Vessel-CGG Fohn,

Description of Duties: Analysis of recorded data to ascertain that acquisition parameters are respected. Liaise with consultant of board vessel to accept data quality. Ensure that all procedures are adhered to on board vessel. Assist on board processing team to prepare the job flow for the on-board processing-specific assignment includes:

- Wavelet analysis for the determination of filtering parameters.
- Shot and trace editing.
- Merging of seismic and navigation data.
- Determination of muting parameters
- Trace analysis to determine deconvolution parameters.

Offshore Duties –Gulf of Guinea, Ghana, Vessel-Nanhai 502

Responsible for data quality for the survey as well as supervise the technicians on board the vessel. Generate daily reports for Exploration manager.

Offshore Duties –Gulf of Guinea, Ghana, Vessel-Geolog Dmitriy Nalivkin.

Ghanaian representative on board. Responsible for quality control of data and any other problem related to the operation.

1993-2000 Assistant Geophysicist - Ghana National Petroleum Corporation (GNPC) Ghana

- Pioneered a multi-disciplinary team to establish a Data Management Centre for GNPC.
- Involved in implementation of policies and procedures for the Data Management Centre. Also, advised the Centre on G & G data coding and cataloging and eventually developed a computer – based cataloging of all G & G data.
- Implementation of Tape Transcription System for the Data Management Centre - highly motivated, team player with excellent communication in project management.
- Offshore Duties-Seismic Data Acquisition.

Mining Sector Support Project-Ghana

Worked with a team of consultants from Fugro and GEUS (Denmark) and the Geological Survey Dept of Ghana in the pre-processing, processing and interpretation of aeromagnetic data from the Voltaian Basin, Ghana.

Member of the Technical Core Group: Ghana Continental Shelf Delineation Project.

Preparing the submission to the Commission of the Limits of the Continental under United Nations Convention of the Law on the Sea (UNCLOS).

Ghana-Cote D'Ivoire Maritime Boundary Negotiations

Member of the technical committee on the Ghana-Cote d'Ivoire maritime boundary delimitation.

Head Technical – Petroleum Security Coordinating Committee

Representing GNPC on the committee for the purpose of providing a fast track linkage between the national security apparatus and Government.

ITLOS Ruling Implementation Committee-Ghana/Cote D'Ivoire Boundary Dispute.

Secretary to the technical committee set up by His Excellency, The President of the Republic of Ghana to see to the implementation of the ruling by the International Tribunal of the Law of the Sea (ITLOS) on the Ghana-Ivorian boundary dispute.

Ghana Togo Maritime Boundary Delimitation

Currently (2021), a member of the technical committee for the delimitation of the maritime boundary between Ghana and Togo.

Teaching Experience

Former Part Time Lecturer in Petroleum Geophysics at the Regional Maritime University, Accra Ghana and Kwame Nkrumah University of Science and Technology (KNUST), Kumasi,

SHORT INDUSTRY COURSES

- Certificate in First Aid -Regional Maritime Academy, Ghana
- Certificate in Survival at Sea - Regional Maritime Academy, Ghana
- Certificate in Fire Fighting- Regional Maritime Academy, Ghana
- Certificate in Swimming and Floatation - Regional Maritime Academy, Ghana
- Training in the use of Kingdom Suite in 2D and 3D Seismic interpretation.
- Exclusive Economic Management Course – Ghana Armed Forces Command and Staff College.
- Attribute analysis, AVO Fluid detection, Rock Parameterization at EnCana, Calgary Canada.

COMPUTER APPLICATION SKILLS

Knowledge of Geo-Information Management Software –
Integrated Land and Water Information System (ILWIS).
User of mainstream 2D and 3D seismic interpretation
products; GeoQuest, LandMark and Kinddom Suite
softwares.
Knowledge of Mocrosoft office applications (Word,
Excel,Power Point etc).
User of GeoSoft processing software

MEMBERSHIP

Society of Exploration Geophysicists (SEG).
Ghana Institute of Geoscientists (GhIS).

Curriculum Vitae – Professor Edwin Egede FHEA, FLSW.

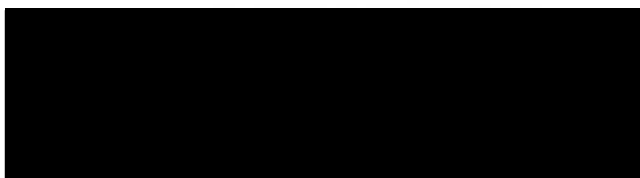
Edwin Egede is currently a Professor of International Law & International Relations at the Cardiff University School of Law & Politics. He is also an Adjunct Professor at the Department of Public Law, Nelson Mandela University, South Africa. Besides he is a Fellow of the Learned Society of Wales (FLSW), the national scholarly academy for arts and sciences for Wales. Additionally, he is one of the editors of a six-volume book project on The Law of the Sea - Contemporary Norms and Practice in Africa and a member of the Advisory Board of the Brazilian Yearbook of Law of the Sea (BYLOS). He has a fine blend of experience in academia and practice, and undertakes interdisciplinary teaching and research in the areas of Public International Law, Law of the Sea, Human Rights in Africa and International Organizations, especially the United Nations and African Union. He has published widely in these areas and has also made academic and professional presentations at various international conferences.

Edwin has also contributed to external engagement beyond academia by his involvement in national and international public policy development through his contributions to professional workshops and by providing advice as consultant to entities, such as the United Nations, International Seabed Authority and African Union. He has been involved in projects funded by some of these organizations and thus is involved in projects that develop impact beyond the University setting. For instance, he has been appointed as a consultant to the United Nations under funded projects to assist the United Nations Economic Commission for Africa (UNECA) in establishing and implementing the African Blue Economy Strategy, in line with the African Mining Vision, especially as regards deep seabed mining (this involved undertaking several missions on behalf of the United Nations), as well as the development of a strategic roadmap for the development of deep seabed mining regulations in the framework of the African Blue Economy. He was also appointed by the African Union (AU) as an independent expert member/consultant of an Ad Hoc Experts group established by the African Union Commission for the development of the annexes to the African Maritime Charter on Security, Safety and Development in Africa, a treaty to implement the African Blue Economy. In addition, he was part of a select team of 25 consisting of military officers, practitioners and academics (one of two academics) invited to participate in a NATO workshop in San Francisco on the law of the sea and human rights.

Before becoming a full time academic in 2007, Edwin occupied senior positions as legal practitioner in various law firms. He has served as a member of the International Bar Association (IBA) Public Law Committee (2016-2020).

Name: Edwin Egede FHEA, FLSW

Nationality: Nigerian/British



Current Positions

Professor of International Law & International Relations in the Cardiff University, School of Law & Politics (August 2020 to date).
Adjunct Professor, Department of Public Law, Faculty of Law, Nelson Mandela University, Port Elizabeth, South Africa (August 2020 to date).

Previous Appointments__

A. Academic

- Reader (Associate Professor) in International Law & International Relations in the Cardiff University, School of Law & Politics (August 2018 to July 2020).
- Senior Lecturer in International Law & International Relations in the Cardiff University, School of Law & Politics (August 2012 to July 2018).

Lecturer in International Law & International Relations in the Department of Politics, Cardiff School of European Language, Translation & Politics Cardiff University (March 2007 to July 2012).

Associate Lecturer (Part-time) in International Law & International Relations in the Department of Politics, Cardiff School of European Languages, Cardiff University (September 2006 to March 2007).

Associate Lecturer in International Law & Human Rights (Part-time), Centre for Lifelong Learning, Cardiff University (2002 to 2005).

Associate Lecturer in International Law (Part-time), Cardiff Law School, Cardiff University (2002 to 2004).

Lecturer in Law, Faculty of Law, University of Lagos, Nigeria (1998 to 2001).

Practice

Senior Caseworker/B3 Examiner, Insolvency Service, Gloucester Office, UK (September 2005 to March 2007).

Litigation and Commercial Partner, Egede & Egede, Lagos, Nigeria (1995-2001).

Senior Counsel/Head of Chambers, Chike Chigbue & Company, Lagos, Nigeria (1992 to 1994).

Counsel, Chike Chigbue & Company, Lagos, Nigeria (1990 to 1992).

Counsel, Tokunbo Ekunkinam & Co. Ilorin, Nigeria (1987 to 1988).

Higher Education and Qualifications

Postgraduate Certificate in University Teaching and Learning – Cardiff University (2007 to 2009).

PhD in International Law of the Sea, Cardiff University Law School (2001 to 2005)

Title of thesis: *The Deep seabed Regime: Africa's Contribution to its Evolution and System of Mining*

Supervisor: Professor Robin Churchill.

Master of Laws (LL.M) (Specialization in Public International Law/Commercial Law) – University of Lagos, Nigeria (1988 to 1989).

Barrister at Law (B.L) (Professional degree required to practice as a Barrister and Solicitor in Nigeria) – Nigerian Law School, Nigeria. (1986 to 1987).

Bachelor of Laws (LL. B Hons) - University of Benin, Nigeria (1982 to 1986).

Fellowships

- Fellow Learned Society of Wales (FLSW) (2021 to date)
- Fellow Higher Education Academy (FHEA) (2009 to date)

Professional Training

Mediation in Practice Training (2010).

Summer Course on Private and Public International Law, Hague Academy on International Law, The Hague, Netherlands. (July/August 2000).

United Nations (UN)/United Nations Institute Training and Research (UNITAR) Fellowship programme in International Law, The Hague, Netherlands. (July/August 2000).

Publications

I. Books

- The Bakassi Dispute and the International Court of Justice: Continuing Challenges* (with Dr. Mark Igiehon), (Routledge Publishers, 2017) (edited book) pp.x + 181, ISBN 9781472470621.
- The Politics of International Law and Justice* (with Prof. Peter Sutch) (Edinburgh University Press, 2013), pp. ix + 374, ISBN 978-0-7486-3472-9.
- Africa and the Deep Seabed Regime: Politics and International Law of the Common Heritage of Mankind*, Springer, Heidelberg/Dordrecht/London/New York, (2011), ppxxxii +271. ISBN 978-3-642-17661-6; e-ISBN 978-3-642-17662-3. DOI 10.1007/978-3-642-17662-3. Also available as e-book, e-ISBN 978-3-642-17662-3. DOI 10.1007/978-3-642-17662-3

II. Journal Articles

- "Gulf of Guinea and Maritime (in)security: musings on some legal implications," (2021) vol.46(2) *Brooklyn Journal of International Law*, pp.369-419.
- "Historic Rights in African State Practice" (2019) 7(2) *Korea Journal of International and Comparative Law*, pp.169-191.
- "Dispute Concerning Delimitation of the Maritime Boundary between Ghana and Cote D'Ivoire in the Atlantic Ocean – Lessons from another Maritime Delimitation Case arising from the African Region", (with Lawrence Apaalse) (2019) 29 *Indiana International & Comparative Law Review*, pp.55-90.
- "Maritime Security: Horn of Africa and Implementation of the 2050 AIM Strategy". (2018) 30(2) *Horn of Africa Bulletin*, pp. 7-11;
- "The Force of Community in the Oil and Gas Rich Region of the Niger Delta: Propositions for New Legal and Contractual Arrangements", (with Dr. Hephzibah Egede), (2016-2017) 25 *Tulane Journal of International and Comparative Law*, pp.45-88.
- Institutional gaps in the Africa's Integrated Maritime (AIM) Strategy", (2016) *Journal of Ocean Law and Governance in Africa* (JOLGA), pp.1-27.
- "The Common Heritage of Mankind of the Area and Sub-Saharan African Native Land Tenure System: 'Clash of Cultures' in the Interpretation of Concepts in International Law?" (2014) 58(1) *Journal of African Law*, pp 71-88.
- "Africa and the Extended Continental Shelf under the Law of the Sea Convention (LOSC) 1982," (2012) 14 *Journal of Jurisprudence*, pp.173-200;
- "Ghana's Extended Continental Shelf and Submission to the Commission on the Limits of the Continental Shelf under Article 76 of the Law of the Sea Convention 1982", (with Lawrence Apaalse, the Project Co-ordinator, Ghana National Continental Shelf Delineation Project) (2010) 22(1) *Sri Lanka Journal of International Law*, pp.141-172.
- "African States and Participation in Deep Seabed Mining: Problems and Prospects", (2009) 24(4) *International Journal of Marine and Coastal Law*, pp.683-712.
- "Human Rights and the Environment: Is there a Legally Enforceable Right to a Clean and Healthy Environment for the 'Peoples' of the Niger Delta under the framework of the 1999 Constitution of Nigeria," (2007) 19(1) *Sri Lanka Journal of International Law*, pp.51-83.
- "Bringing Human Rights Treaties Home: An Examination of Domestic Implementation of Human Rights Treaties in Nigeria" ;(2007)51(2) *Journal of African Law*, pp.249-284.
- Submission of Brazil and Article 76 of the Law of the Sea Convention (LOSC) 1982", (2006) 21(1) *International Journal of Marine and Coastal Law*, pp.33-55.
- "Who owns the Nigerian Offshore Seabed: Federal or States? An Examination of the Attorney General of the Federation v. Attorney General of Abia State & 35 Ors,"(2005) 49(1) *Journal of African Law*, pp.73-93.
- "The Outer Limits of the Continental Shelf: African States and the Law of the Sea Convention 1982", (2004) 35(2) *Ocean Development & International Law*, pp.157 -178.
- "The Nigerian Territorial Waters Legislation and the Law of the Sea Convention (LOSC) 1982", (2004) 19(2) *International Journal of Marine and Coastal Law*, pp.147-172 [Cited in

the International Maritime Organization (IMO) Bulletin for July 2004 and the International Law Association, Baselines Under International Law of the Sea Committee, Sofia Conference Report 2012 at p.20.

"The New Territorial Waters (Amendment) Act 1998 – Comments on the Impact of International Law on Nigerian Law," (2000) 12 *The African Journal of International and Comparative Law*, pp.84-104.

III. Chapter in Edited Volume

"International Seabed Authority and Polar regions" in Yoshifumi Tanaka, Rachael Johnstone, and Vibe Ulfbeck(eds.), *The Routledge Handbook of Polar Law*, (Routledge, forthcoming in 2022);

"Africa and the International Seabed Authority"(with Talatu Akindolire) in Patrick Vrancken, Ifesinachi Okafor-Yarwood, Kamal-Deen Ali, Clara Brillembourg, Edwin Egede, Ms Tafadzwa Pasipanodya and Martin Tsamenyi(eds.)*The Law of the Sea: Contemporary Norms and Practice in Africa, Volume II*(Juta, forthcoming in 2022)

"Africa and the United Nations Commission on the Outer Limits of the Continental Shelf" in Patrick Vrancken, Ifesinachi Okafor-Yarwood, Kamal-Deen Ali, Clara Brillembourg, Edwin Egede, Ms Tafadzwa Pasipanodya and Martin Tsamenyi(eds.)*The Law of the Sea: Contemporary Norms and Practice in Africa, Volume II*(Juta, forthcoming in 2022);

"Mauritius and Deep seabed mining" in Virginie Tassin Campanella & Robert Makgill(eds.), *Routledge Handbook of Seabed Mining & the Law of the Sea* (Routledge, forthcoming in 2022)

"Africa and Deep seabed mining" in Virginie Tassin Campanella & Robert Makgill(eds.), *Routledge Handbook of Seabed Mining & the Law of the Sea* (Routledge, forthcoming in 2022)

(Substantially revised version and peer reviewed) "Law of the Sea." In Renee Marlin-Bennett(ed.) the *Oxford Research Encyclopaedia of International Studies*. (Oxford University Press, 2019),

<https://oxfordre.com/internationalstudies/view/10.1093/acrefore/9780190846626.001.0001/acrefore-9780190846626-e-254?rskey=BBUzaw&result=1>.

doi:10.1093/acrefore/9780190846626.013.254(13000 words).

"Maritime Security and the Deep Seabed Beyond National Jurisdiction", in Catherine Barnett (ed.), *New Uses and Abuses of the Seabed – Legal Challenges* (Brill Publishers, 2020), pp.185-210.

"The Area: Common Heritage of Mankind, Sponsoring States of Convenience and Developing States" in Matz-Lück, Proelss, Sanden, Verheyen Kotzur(eds.), *Sustainable Ocean Resource Governance: Deep Sea Mining, Marine Energy and Submarine Cables* (Brill Publishers, 2018), pp.155-184.

"The Land and Maritime Boundary between Cameroon and Nigeria (Cameroon v. Nigeria: Equatorial Guinea intervening) Case: Interrogating some ongoing Law of the Sea Challenges" in Edwin Egede & Mark Igiehon(eds.), *Bakassi Dispute and the International Court of Justice: Continuing Challenges*, (Routledge Publishers, 2017), pp.117-137.

"Nigeria and the Law of the Sea" in Martin Tsamenyi and Patrick Vrancken (eds.), *The Law of the Sea: The African Union and its Member States*, (South Africa: Juta Publishers, 2017), pp.506-543.

Piracy and the East African Region," in P. Koutrakos and A. Skordas (eds.) *The Law and Practice of Piracy at Sea: European and International Perspectives*, (Oxford: Hart Publishing, 2014), pp.249-265.

- "Common Heritage of Mankind." In Oxford Bibliographies in International Law. Ed. Tony Carty. New York: Oxford University Press, (June 30, 2014)(10,000 words essay – a publication on invitation), <http://www.oxfordbibliographies.com/page/international-law>

"International Straits, Compulsory Pilotage and the Protection of the Marine Environment", in R. Caddell and D. R. Thomas (eds.), *Shipping, Law and the Marine Environment: Emerging Challenges for the Modern Law of the Sea* (London: Lawtext, 2013), pp.28-45.
 Review Essay on Law of the Sea (10,000 words) in Robert Denemark(ed.) *International Studies Compendium, Volume VIII* (2010, Wiley-Blackwell Publishing), pp. 4839-4855. (Peer reviewed essay written on invitation by the International Studies Association, a leading association that promotes research and education in international affairs).

IV. Book Review

"Legal Order in the World's Oceans: UN Convention on the Law of the Sea, Volume 21, edited by Myron H. Nordquist, John Norton Moore and Ronan Long", [Book Review] (2019) 33 *Ocean Yearbook*, pp.598-601.
 "Establishing Continental Shelf Limits beyond 200 Nautical Miles by the Coastal State: A right of involvement for other States? By Signe Veierud Busch" [Book Review] (2017) 23(4) *The Journal of International Maritime Law*, pp.312-314.
 "The Hamburg Lectures on Maritime Affairs 2009 and 2010: Hamburg Studies on Maritime Affairs (vol.23), edited by Jurgen Basedow, Ulrich Magnus and Rudiger Wolfrum" [Book Review] (2012) 18(5) *The Journal of International Maritime Law*, pp. 399-402.

V. Policy Reports

Strategic roadmap for the development of deep seabed mining (DSM) regulations in the framework of the African blue economy (United Nations Economic Commission for Africa (UNECA, March 2020) (Output of United Nations consultancy appointment).
 "A Study on Issues related to the Operationalization of the Enterprise" (with Mati Pal and Eden Charles - for International Seabed Authority, Kingston, Jamaica, June 2019),(Peer reviewed) (Output of International Seabed Authority consultancy appointment), https://isa.org/im/files/files/documents/enterprise_study.pdf
 "Deep Seabed Mining and Africa" (for United Nations/United Nations Economic Commission for Africa /African Minerals Development Centre, Addis Ababa, Ethiopia, November 2017), 106pp. (Output of United Nations consultancy appointment).

VI. Other Papers

"A 'new frontier' for mining? Time for Africa's engagement with deep seabed mining" [Online] International Bar Association, Public Law Committee newsletter, August 2017, <https://www.ibanet.org/Article/NewDetail.aspx?ArticleUid=afdb69a8-7c83-4184-91b4-2a814556bef7>
 "Africa's Lomé Charter on maritime security: what are the next steps?" July 2017 [Online]. Piracy-studies.org. Available at: <http://piracy-studies.org/africas-lome-charter-on-maritime-security-what-are-the-next-steps/>
 "United Nations Secretary-General Appointment Process: Time for a Female Secretary-General?", Academic Council on the United Nations System (ACUNS) *Quarterly Newsletter* issue 3 2014.
 "Bakassi: Critical Look at the Green Tree Agreement," *The Nigerian Daily Independent Newspaper*, January 31, 2008(Newspaper Article).
 "The Limits to Right to Life: The Dianne Pretty Case," *The Nigerian Guardian Newspaper*, February 5, 2002 (Newspaper Article).

Academic and Policy Presentations

- "Maritime security and deep seabed beyond national jurisdiction"*, online International Law lecture series event organized by Dalian Maritime University, China (July 2021)(by invitation).
- "Africa's prosperity is tied to its oceans and seas"*, Zoom event organized by the African Union Commission and the Institute for Security Studies(ISS)(December 2020)(by invitation).
- "Maritime security and deep seabed beyond national jurisdiction"*, Zoom event organized by the Swansea University Political and Cultural Studies Seminar Series(December 2020)(by invitation).
- "Strategic roadmap for the development of Deep Seabed Mining(DSM) regulations in the framework of the African Blue Economy"*, a Workshop organized by the United Nations Commission for Africa(UNECA), Addis Ababa, Ethiopia(January 2020)(by invitation).
- Panel discussant for the topic: *"Balancing Geopolitical, Economic & Geostrategic interests in Maritime Security Initiatives,"* at the Global Maritime Security Conference 2019, Abuja, Nigeria, organized by the Nigerian government, (October 2019)(by invitation).
- "The outer limit of the continental shelf in Africa: present situation and prospects"* International Seabed Authority, African Union and South African Government Capacity Building Workshop for the Promotion of Sustainable Development of Africa's Deep Seabed Resources in Support of Africa's Blue Economy, Pretoria, South Africa, organized by the International Seabed Authority and the Government of South Africa, (May 2019)(by invitation).
- "Independent operation of the Enterprise: perspectives and challenges"* International Seabed Authority, African Union and South African Government Capacity Building Workshop for the Promotion of Sustainable Development of Africa's Deep Seabed Resources in Support of Africa's Blue Economy, Pretoria, South Africa, organized by the International Seabed Authority and the Government of South Africa, (May 2019)(by invitation).
- "African Blue Economy and China's Maritime Silk Road Project: Opportunities for Cooperation?"* International Symposium on Blue Economic Sustainable Development along the Maritime Silk Road, Lancashire Law School, University of Lancashire, Preston, UK (May 2019) (by invitation).
- "The Enterprise – Update on Activities"*, African Group of the International Seabed Authority Deep Seabed Mining Policy Capacity Building Workshop, Ministry of Foreign Affairs, Accra, Ghana (organized by the Commonwealth Secretariat, Pew Charity, United Nations Economic Commission for Africa and the African Minerals Development Centre) (January 2019)(by invitation).
- "African Transboundary National Resources Management: Institutions and Instruments"*, (discussant paper) presented at the High Level Policy Dialogue on Transboundary Natural Resource Disputes in Africa organized by the United Nations Economic Commission for Africa(UNECA), Capacity Development Division, (July 2018)(by invitation).
- "China's Belt & Road Initiative: the Indian Ocean and African Maritime Security"*, International Symposium on Maritime Security and the Belt and Road Initiative: European Perspectives, Lancashire Law School, University of Lancashire, Preston, UK (May 2018) (by invitation).
- "Nigeria-Sao Tome JDA (Nigerian Perspectives,"* 2nd International Workshop Beyond the Joint Development Agreement organized by the Korean Maritime Institute (KMI)/Nottingham

Law School, Nottingham Trent University (NLS-NTU), Nottingham, UK (May 2018) (by invitation).

"Historic Rights in African State Practice", 6th Zhejiang University, Guanghua Law School, Hangzhou Annual Ocean Law and Governance International Conference, Hangzhou, China, (October 2017) (by invitation).

"The African Mineral Development Centre and the Prospects for Improving African Participation in the Deep Seabed Mining Regime" (with Kojo Busia and Kaiser de Souza), Side Event at the 23rd Session of the International Seabed Authority, Kingston, Jamaica, (August 2017) (by invitation).

"African Blue Economy and Deep Seabed Mining", Capacity Development Division of the United Nations Economic Commission for Africa (UNECA) Policy Dialogue on Governance of resources and maritime activities for sustainable development in Africa, Abidjan, Cote d'Ivoire, (June 2017) (by invitation).

"Opportunities for improvement of the AIM Strategy and other related African legal regimes to support the sustainable development and coordination of activities in the Africa's maritime domain and Africa's Blue Economy" Workshop on Marine Mineral Resources of Africa's Continental Shelf and Adjacent International Seabed Area - Prospects for Sustainable Development of the African Maritime Domain, Kampala, Uganda, (May 2017) (by invitation).

"Africa's engagement with deep seabed mining." The Deepsea Mining Summit 2017, London, UK, (May 2017).

"Africa and Deep Seabed Mining in the Area", Africa Union Commission (AUC) Conference on Maritime Governance for Sustainable Development, African Union Headquarters, Addis Ababa, Ethiopia (July 2016) (by invitation).

"Military uses of the seabed. Among others, the Seabed Arms Control Treaty and the role of NATO", 2016 University of Oslo, Faculty of Law - Scandinavian Institute of Maritime Law Workshop on New uses and abuses of the seabed - legal challenges, Oslo, Norway (June 2016) (by invitation).

"Deep Seabed Mining (DSM): Sponsorship and Responsibilities of Developing States", 2016 Hamburg International Environmental Law Conference, Hamburg, Germany (April 2016) (by invitation).

"Swans and Ducks: Need for more interface between International Law and International Relation?" 2016 International Studies Association Annual Conference, Atlanta, United States of America (March 2016).

"Maritime Security and Oil Bunkering in Maritime Zones within National Jurisdiction: The Gulf of Guinea as a Case Study", Presented at University of Buckingham, UK, Faculty of Law Centre for Extractive Energy Studies (UBCEES) Conference on Contemporary Opportunities and Challenges in Offshore Energy Exploitation (October 2015) (by invitation).

"Maritime Security: A Comparison of the African and Asian Approaches", Presented at: Xiamen University - Cardiff University Maritime Security Workshop, Xiamen, China (May 2015).

"Institutional gaps in the African Integrated Maritime Strategy (AIMS)" Presented at: the 2014 Marine and Maritime Law Conference in Port Elizabeth, South Africa, (November 2014) (by invitation).

"Reform of the UN" Presented at: United Nations Cardiff and District Branch Public Lecture, Cardiff, Wales, (April 2014) (by invitation).

"Anglo-Nigerian Relations: Colonialism and Social Justice & Development After 50 years," presented at the British International Studies Association (BISA) Africa and International Studies working group: Public lecture 'Britain and Africa after 50: Social justice and development,' Cardiff, Wales, (February 2014) (by invitation).

"Historic Title, Historic Rights and Their Application in the South China Sea", discussant paper presented at the South China Sea: UNCLOS and State Practice

Conference 2013, Haikou, Hainan Island Province, organized by the National Institute for South China Sea Studies (NISCSS), a prominent research institute and influential think tank on South China Seas studies, (October 2013)(by invitation).

"*International Law for International Relations research*", presented at the ESRC Wales Doctoral Training Centre (DTC) Security, Conflict and Justice Workshop, Swansea University, (June 2013).

"*Responsibility to Protect and the Arab Spring*", Round-table organized by the United Nations Association, Wales & Cardiff University, Cardiff, Wales (February 2013).

"*Are there commonalities between the European Union and African Union Approaches to the Definition of Terrorism?*", presented at a Public Lecture of the European Governance, Identity & Public Policy Research Unit, Cardiff University School of European Studies (June 2011).

"*Compliance with Article 76 of the Law of the Sea Convention (LOSC) 1982: A Burden for Developing States? – An African Perspective*", presented at the 6th International Hydrographic Organization (IHO)/International Association of Geodesy (IAG) Advisory Board on the Law of the Sea (ABLOS) Conference 2010, Monaco (October 2010).

"*The Right to the Enjoyment of the Common Heritage of Mankind under the African Charter: Legal Right or Political Rhetoric?*" presented at the African Studies Association of the UK(ASAUUK) 2010 Conference, Oxford University (September 2010).

"*International Straits, Compulsory Pilotage and the Protection of the Marine Environment*," presented at the Sixth International Colloquium of the Institute for International Shipping and Trade Law, Swansea University (September 2010) (by invitation).

"*The Common Heritage of Mankind of Global Commons and Ownership under African Native Land Tenure System: Are there parallels?*" presented at the Socio-Legal Studies Association (SLSA) 2010 Annual Conference, University of West England, Bristol (March 2010).

"*World Organizations and International Law*," presented at the Cardiff United Nations Association, Cardiff, Wales (February 2009).

"*The United Nations and Terrorism*," presented at the Cardiff University Model United Nations Conference 2008 held at the Welsh Assembly Building, (April 2008).

"*The Fundamental Right to a Clean Environment in the Niger Delta of Nigeria*," presented at the Faculty Seminar Series, Faculty of Law, University of Lagos, Nigeria (February 2001).

"*The Relationship between International Human Rights Treaties and Nigerian Law*," presented at the United Nations/ United Nations Institute for Training and Research (UN/UNITAR) International Law programme at the Peace Palace, the Hague Netherlands (July 2000) (by invitation).

Other Scholarly/Professional Activities

Consultancy

Appointed as United Nations expert Consultant to prepare strategic roadmap for the development of deep seabed mining Regulations in the framework of the African Blue Economy (December 2019 – March 2020).

Appointed as International Seabed Authority expert Consultant to prepare report on the operationalization of the Enterprise (August -December 2018).

Appointed as Independent expert member/consultant of the African Union Commission Ad Hoc Experts Group (January 2017 to date).

Appointed as United Nations expert Consultant to assist and advise the United Nations Economic Commission for Africa (UNECA), in establishing and implementing an African Blue Economy Strategy in relation to deep seabed mining (December 2016 to date).

Appointed as Legal Consultant, Gbenga Biobaku & Company, a leading Nigerian Law Firm (January 2013 to date).

Council Member/Consultant, Council of Legal, Economic & Regulatory Advisors of Gerson Lehrman Group (A worldwide network of research professionals) (2003 to date).
 Legal consultant/Advisor to and provided expert opinion to the Lagos State Government of Nigeria on law of the sea issues in respect of the Supreme Court of Nigeria case of *Attorney-General of the Federation v. Attorney-General of Abia State, Attorney-General of Lagos State & 34 Ors*, SC.28/2001(2000 to 2001).

Other Policy Work

Invited to provide expert advice and participate at African group caucus meetings at the 2019 Annual Session of the International Seabed Authority, Kingston, Jamaica(July-August 2019)

Invited to participate and make a presentation at an African Group workshop on the International Seabed Authority Draft Exploitation Regulations In New York organized by the Permanent Mission of Algeria to the United Nations, the Pew Charitable Trusts and the Commonwealth Secretariat (Skyping in)(June 2019)

Invited to be part of a group convened by the Welsh Centre for International Affairs(WCIA) and Learned Society of Wales, at the request of the Welsh Government Minister for International Relations and Welsh language, to make recommendations/policy proposals to the Welsh Government on the International Strategy for Wales(the report has since been sent to the Welsh Government)(March 2019).

Invited as a law of the sea expert by the Capacity Development Division of the United Nations Economic Commission for Africa (UNECA) to participate in report-review meetings at Addis Ababa, Ethiopia and Nairobi, Kenya, of a draft report on Transboundary Natural Resources disputes in Africa, including such disputes in the maritime zones within national jurisdiction – the 130 page report was published in June 2018 titled "Transboundary natural resource disputes in Africa: Policies, Institutions and Management Experiences", (2017-2018)..

Participated in the International Seabed Authority (ISA), 23rd Annual General Meeting at Kingston, Jamaica, as part of the delegation of the African Minerals Development Centre (AMDC), a Centre established by the United Nations Economic Commission for Africa (UNECA)/African Union (AU), which has observer status with the ISA (August 2017).

Invited as a law of the sea expert to participate as a discussant/rapporteur in a Workshop organized by the International Seabed Authority/Griffiths Law School Australia on Environmental Assessment and Management for Exploitation of Deep Seabed Minerals, Gold Coast, Australia (May 2016).

Invited as an Expert by the International Seabed Authority (ISA) to participate in a stakeholder survey with regard to the first periodic review of the International Seabed Authority (ISA) under Article 154 of the Law of the Sea Convention (LOSC) 1982 (February 2016).

Invited as a law of the sea expert to participate in group discussions at the 3rd Conference on Operational Maritime Law, organized by the North Atlantic Treaty Organization (NATO) Centre of Excellence for Operations in Shallow and Confined Waters'(COE)/Portuguese Navy, Lisbon, Portugal, (Part of Group Discussants) (September 2015).

Invited to participate as an international law of the sea and human rights expert in the NATO Centre of Excellence expert workshop on *the intersection of Naval operations, Maritime Law Enforcement and Human Rights* which took place at the Marines' Memorial Club San Francisco, San Francisco, USA (March 2016).

Membership of public bodies in my field

- Member of the Public Law Committee of the International Bar Association (IBA) (January 2016 to 2019).
- Fellow, Higher Education Academy (HEA) (July 2009 to date).

- Alternate member of the International Law Association (ILA) international research Committee on Baselines under the International Law of the Sea. (May 2011 to August 2018).
- Member, International Law Association (ILA) (March 2008 to date).
- Member, Academic Council on the United Nations System (ACUNS) (July 2009 to date).
- Affiliated Research Member of the Cardiff University Research Institute for Sustainable Places (November 2010 to date).
- Member of the Welsh Centre of International Affairs (WCIA) Legal Affairs Committee (August 2010 to date).
- Member of the Executive of Cardiff United Nations Association (May 2009 to June 2013).
- Member, Nigerian Bar Association (NBA) (November 1987 to date).

Grants Awarded

United Nations grant for Consultancy supported by research on the elaboration of a strategic road map for the development of Deep Seabed Mining Regulations on behalf of the United Nations Economic Commission for Africa (UNECA)(US\$9,900)(2019).

Nigerian government travel grant(flight, accommodation & subsistence) to participate in policy Conference, the Global Maritime Security Conference 2019 in Abuja, Nigeria(Value not made available to me by awarding body).

Cardiff University School of Law and Politics Research Impact Support Fund (RISF) 2018-19 to travel to International Seabed Authority Annual Session 2019 in Kingston, Jamaica(£3500).

International Seabed Authority travel grant (flight, accommodation & subsistence) to participate in policy workshop in South Africa(approx. US\$ 2193)(2019).

Commonwealth Secretariat/ Resolve Charity travel grant(flight, accommodation & subsistence) to participate in African group deep seabed mining policy workshop in Ghana(approx. £1700)(2019).

International Seabed Authority grant for Consultancy supported by research on topic 'Operationalization of the Enterprise'(US\$10K)(2018).

United Nations grant for Consultancy supported by research on topic 'Africa and Deep Seabed Mining' (US \$31k) (2016-17).

United Nations Economic Commission for Africa (UNECA) travel grant (flight, accommodation & subsistence) to present a paper at the African Union, Addis Ababa, Ethiopia. (US \$2555) (2016).

Griffiths Law School Australia travel grant (funded by the Australian Foreign Affairs ministry (flight & accommodation) to attend Environmental Assessment & Management for Exploitation of Deep Seabed Minerals in Queensland, Australia - approx. AUD 1600 (approx. £900) (2016).

South Africa Research Chair in the Law of the Sea & Development in Africa travel grant (flight, accommodation & subsistence) to attend 2014 Marine and Maritime Law Conference in Port Elizabeth, South Africa - ZAR19k (over £1k) (2014).

National Institute for South China Sea Studies travel grant (flight & accommodation) to attend 2013 United Nations Convention on the Law of the Sea (UNCLOS) and State Practice Conference in Haikou, Hainan Island Province. (Over £1k) (2013).

Professional Affiliations

Fellow of the Learned Society of Wales(FLSW)

Fellow of the Higher Education Academy (FHEA) United Kingdom.

Member, International Law Association (British Branch).

Member, Academic Council on the United Nations Systems (ACUNS).

Member, Association of Attenders and Alumni of the Hague Academy of International Law (AAA).
Member, Nigerian Society of International Law (NSIL).
Member, Nigerian Bar Association (NBA).

Curriculum Vitae

Sissel H Eriksen

Name: Sissel Henny Eriksen
Date of birth: 17 September 1961
Place of Birth: Ålesund, Norway
Nationality: Norwegian
Family: Married, 3 children



EDUCATION

1980-1987: Cand. Scient. Geology (Master/Ph.D. equivalent), University of Oslo (UiO)

EMPLOYMENT RECORD

2018-today: Norwegian Petroleum Directorate (NPD), Marine Minerals, *Senior Geologist Project Coordinator, Project Director* of the Norwegian program for Oil for Development (OfD) in Myanmar
2017-2018: Norwegian Ministry of Petroleum and Energy (MPE), *Senior Adviser*, Marine Minerals
2007-2017: NPD *Director Exploration* – (fixed period)
2000-2007: NPD *Senior Geologist and Project Coordinator*, Exploration Department,
1998-2000: NPD *Senior Geologist*, Resource Accounts and Resource Analysis
1986-1998: NPD *Senior Geologist and Project Coordinator*, Development and Production Department
1985/5-1986/10: NPD *Geologist*
1984/01-07: Statoil - *Assistant Geologist*

EXPERIENCE RELATED TO MARINE MINERALS

In my position as Senior Adviser Marine Minerals, in the Ministry of Petroleum and Energy (MPE), my tasks and responsibilities were:

- Preparations for Norwegian Opening Process for activity on Marine Minerals activity on the NCS

In my capacity as Senior Geologist and Project Coordinator in the Norwegian Petroleum Directorate (NPD) I have had the following tasks and responsibilities:

- NPD Marine Minerals Team: data collection and resource assessment, preparation, planning, and execution of the opening process for Marine Minerals on the Norwegian Continental Shelf (NCS)

- Mapping Cruises:
 - o 2020: Senior Geologist, NPD Coiled tubing Drilling Cruise: preparations and 22 days onboard the coiled tubing drilling vessel - day to day operations for core drilling of sulphides at 3000m water depth
 - o 2021: Senior Geologist and NPD representative, Cooperation Cruise between the NPD and the University of Bergen. Exploring and mapping for Manganese crusts and Sulphide deposits
- Coordinator Impact Assessment of Marine Minerals: opening process - planning and execution of the project program, public consultations processes, advise to the Ministry (MPE)
- Talks and presentations at several conferences. Meetings and discussions with the marine minerals industry

EXPERIENCE AND RESPONSIBILITIES AS DIRECTOR OF EXPLORATION

In my capacity as Director Exploration in the Norwegian Petroleum Directorate (NPD), I have had the following portfolio and responsibilities:

- Member of Director General Bente Nyland's Executive Management Team, 2007-2017
- Technical Advisor to the Ministry of Petroleum and Energy (MPE)
- Heading activities in the NPD from opening processes through licensing, exploration, and discoveries up to Plan for Development and Operation as follows:

- *Opening process:* opening of the Barents Sea Southeast for Exploration Activity:
 - o Seismic data acquisition and mapping
 - o Geologic evaluation and Resource Assessment
 - o Advice to the Ministry (MPE) in the opening process on Resource Assessment
- *Data acquisition, mapping and resource assessment* as preparation for an opening process in the Lofoten -Vesterålen and Jan Mayen area
- *Resource assessments of undiscovered petroleum resources on the Norwegian Continental Shelf (NCS)* - Report to the Ministry of Finance and the National Budget
- *Coexistence* between the users of the NCS and *Integrated Management Plans* in the North Sea, Norwegian Sea, and the Barents Sea
- *Exploration Strategy, exploration analysis and resource reports*
- *Exploration wells* 2007-2017
- *Licensing Rounds:* Mapping, preparations, and advice to the Ministry (MPE) on awards, work program and licensees
 - o 10 Annual APA (Awards in Predefined Areas) rounds, 2007-2017
 - o 4 Biannual Licensing Rounds, 20-23 Licensing Rounds
- *NWEHE* – cooperation between North Sea Heads of Europe Exploration – North Sea states
- Data collection and geological evaluation in the *Norwegian Arctic areas*
- Cooperation on mapping and data exchange with *neighbouring states* – especially Russia
- Norwegian outer limits of the Continental shelf

- Marine Minerals Act: NPD expert body to the Ministry of Petroleum and Energy (MPE)

EXPERIENCE WITH THE MANAGEMENT OF OFFSHORE RESOURCES

In my capacity as Senior Geologist and Project Coordinator in the Norwegian Petroleum Directorate, I have had the following tasks and responsibilities:

Exploration:

- Resource Accounts – Norwegian shelf – resource report to the National Budget
- Exploration strategy, exploration analysis, NPD Resource Reports
- Evaluation of and advice to the MPE on new players on the NCS
- Project coordinator Licensing Rounds: NST 2000, 17 Licensing Round
- NPD Coordinator of the Norwegian Integrated Management Plans

Development and Production:

- Project Coordinator plan for development and Production (PDO) Gyda South, North Sea, PDO Åsgard, Norwegian Sea
- Reservoir Geologist in the North Sea and the Norwegian Sea

EXPERIENCE RELATED TO PROJECTS AND COOPERATION WITH THE PETROLEUM INDUSTRY AND INTERNATIONAL EXPERIENCE

- Prequalification of new players/entrants to the NCS, evaluation of technical competence and capacity in relation to review of applications for exploration licences in licensing rounds
- Project Director for the Oil for Development (OfD) Project in Myanmar: Planning, preparations, and execution of the Program in close cooperation with the Myanmar institutions
- Extensive field work experience related to Petroleum Geology: Ainsa basin Spain, mapping of quantitative sedimentological data for reservoir characterization and modelling

CURRICULUM VITAE

Dr. FUKUSHIMA Tomohiko

Deputy Director General, Seafloor Mineral Resources
Department, Japan Oil, Gas and Metals National Corporation
(JOGMEC)

Date of Birth: November 13, 1959
Nationality: Japanese



Dr. Fukushima currently serves as Deputy Director General, Seafloor Mineral Resources Department, Japan Oil, Gas Metals National Corporation (JOGMEC). Throughout his academic and professional careers, he has been involved in **the conduct of environmental impact assessments, technology transfer/capacity building/human development initiatives and policymaking processes related to deep sea mineral resources development**. He has demonstrated his proficiency, skills and abilities in;

- Processing strong scientific knowledge and thorough research experience in deep-sea environment, especially on carrying out evaluation of impact of manganese nodules development on marine ecosystem in the CCZ, cobalt-rich ferromanganese crusts in the western Pacific and polymetallic sulphides in national jurisdiction.
- Having expertise in marshalling environmental impact assessments. (As an expert, he has contributed to the development of ISA's standards, guidelines and development rules etc.)
- Spearheading in technology transfer and human development for developing states including Pacific Islands States

Education:

Kyoto University / Doctor of Science (Biology), 2004

Doctoral thesis: "Ecological Characteristics of Deep-Sea Benthic Organisms in Relation to Manganese Nodules Development Practices"

Tokyo University of Fisheries / Master Degree (Fisheries Science), 1986

Tokyo University of Fisheries / Bachelor Degree (Fisheries Science), 1984

Professional Experience:

- | | |
|----------------|--|
| 2021 - present | Deputy Director General, Seafloor Mineral Resources Department, Japan Oil, Gas and Metals National Corporation (JOGMEC) |
| 2020 - 2021 | Director, Overseas affairs, Deep Ocean Resources Development (DORD) |
| 2014 - 2020 | Japan Agency for Marine-Earth Science and Technology (JAMSTEC) <ul style="list-style-type: none">• Group Leader, MEIA Research Group, Marine Biodiversity and Environmental Assessment Research Center (2016 - 2020)• Group Leader, EIA Research Group, R&D Center for Submarine Resources (2016 - 2019)• Assistant Director, R&D Center for Submarine Resources (2014 - 2015) |

2008 - 2014	Associate Professor, Graduate School of Agricultural and Life Sciences, Atmosphere and Ocean Research Institute, University of Tokyo
2002 - 2008	Research Fellow, the Ocean Policy Research Institute
1989 - 2002	Marine Biological Research Institute of Japan Co., Ltd. <ul style="list-style-type: none"> • Chief, Commercial Management Section (1996 - 2002) • Researcher, Department of Technical Development, Metal Mining Agency of Japan (Secondment) (1993 - 1996) • Researcher (1989 - 1993)
1986 - 1989	Yamanouchi Pharmaceutical Co., Ltd.

Professional Service Experiences (in previous 5 years):

2019 - 2021	International Seabed Authority (ISA) <ul style="list-style-type: none"> • Member, Technical Working Group for Guidelines for the establishment of Baseline Environmental Data • Member, Technical Working Group for Guidelines for the establishment of Environmental management and Monitoring Plan
2007 - present	Japan Oil, Gas and Metal National Corporation (JOGMEC) <ul style="list-style-type: none"> • Chair, Legal and Social Science Research Group (2018 - 2021) • Member, Development for Cobalt-rich Crust Committee (2016 - 2021) • Member, EIA for Seafloor Massive Sulfide Working Group (2007 -2021)
2017 - 2019	Member, Advisory Board for Marine Protected Area, the Ministry of Environment of Japan
2015 - 2020	Environment Center for Petroleum Development, Japan <ul style="list-style-type: none"> • Member, Management for Ocean Petroleum Committee (2018 - 2020) • Member, EIA for Ocean Petroleum committee (2015 - 2020)
2014 - 2019	Deep Ocean Resources Development, Japan <ul style="list-style-type: none"> • Member, Manganese Nodules Development Committee (2014 - 2019) • Technical Advisor (2014 - 2019)
2015 - 2019	Japan Mining Engineering & Training Center, Japan <ul style="list-style-type: none"> • Lecturer, Instruction Course for Resource Business Field (2015 - 2019) • Lecturer, Instruction Course for Developing Countries (2015, 2017)
2014 - 2018	University of Tokyo, Japan <ul style="list-style-type: none"> • Lecturer, Graduate School of Frontier Sciences (2014 - 2018) • Lecturer, Graduate School of Science (2014 - 2017)
2016 - 2017	Open University of Tokyo, Japan <ul style="list-style-type: none"> • Lecturer (2016 - 2017)

RESEARCH EXPERIENCES:

- Long-term monitoring study on Japan Deep-sea Impact Experiment (IFT) at CCZ with Deep Ocean Resources Development Co., Ltd., on R/V Kilo Moana (August 2019)
- Deep-sea environmental research cruise in Japanese EEZ (Okinawa), with Japan Agency for Marine-Earth Science and Technology (JAMSTEC), on R/V Chikyu (July 2014)
- CO₂ deep sea storage experiment at offshore Hawaii Island, with New Energy and Industrial Technology (NEDO), Japan, on R/V KOK (Ka'imikai-O-Kanaloa) University of Hawaii (August 2000)
- Deep-Sea Environmental Impact Experiment (DIET) cruise at West Pacific Ocean, with Metal Mining Agency of Japan (MMAJ), Japan, on R/V Hakurei Maru No. 2 (July – August 1997)

- Deep-Sea environmental baseline study cruise at CCZ, with Metal Mining Agency of Japan (MMAJ), Japan, on R/V Hakurei Maru No.2 (April - May 1995)
- Deep-Sea environmental baseline study cruise at CCZ, with Metal Mining Agency of Japan (MMAJ), Japan, on R/V Hakurei Maru No.2 (April - May 1994)
- Deep-Sea environmental baseline study cruise at CCZ, with Metal Mining Agency of Japan (MMAJ), Japan, on R/V Hakurei Maru No.2 (April - May 1993)
- Benthic Impact Experiment cruise 2 at CCZ, a joint NOAA (USA) and Yuzhmorgeologiya (the Soviet Union) programme, on R/V Yuzhmorgeologiya (July - August 1992)
- Deep-Sea environmental baseline study cruise at CCZ, with Metal Mining Agency of Japan (MMAJ), Japan, on R/V Hakurei Maru No.2 (April - May 1992)
- Benthic Impact Experiment (BIE) cruise at CCZ, a joint NOAA (USA) and Yuzhmorgeologiya (the Soviet Union) programme, on R/V Yuzhmorgeologiya (August - September 1991)

PRESENTATIONS and WORKSHOPS:

ORAL PRESENTATIONS (Invited or Keynote) / ISA TRAINING LECTURER (Previous 5 years)

- Fukushima, T. 2020 Environmental impacts of redeposition event associated with deep sea mining - focusing on species diversity formation mechanism, *From Offshore Oil & Gas to Deep Seabed Mining: new technologies and emerging issues*. 18-19 November 2020, National Research Council of Italy, Online Workshop (Invited)
- Fukushima, T. 2020 Emerging Science and Contractors, *Trust Assessing Impacts of Deep-Sea Mining in the Water Column*. September 2020, 24 September, Pew Charitable Trusts and RESOLVE, Online Workshop (Invited)
- Fukushima, T. 2019 A Lifting Test for Inactive Polymetallic Sulphides in the Okinawa Trough, *Scientific Considerations for Environmental Management of Inactive Polymetallic Sulfide (PMS) Ecosystems*. 22-24 October 2019, NUIG, GOBI and ISA, Galway, Ireland (Invited).
- Fukushima, T. 2018 Distributions of Megabenthos in the Pacific Ocean - in order to make EIA plan. *STAR 2018. The Pacific Islands Science, Technology and Resources Network Conference*, Fiji. (Invited)
- Fukushima, T. 2018. Environmental Impact Assessment Study in relation to Deep-Sea Mineral Resources Development. ISA, JOGMEC, JMEC. (ISA training lecturer)
- Fukushima, T. 2018. Major Factors influencing Seamount Niches, *International Workshop of the REMP for the Cobalt-Rich Ferromanganese Crust in the Triangle Area in the northwest Pacific Ocean*, co-hosted by the ISA and COMRA, Qingdao, China, 2018 May 27 -30, (Invited)
- Fukushima, T. 2017. Appropriate Environmental Impact Assessment Technologies for Seabed Mining, *STAR 2017. The Pacific Islands Science, Technology and Resources Network Conference*, Fiji. (Invited)
- Fukushima, T. 2017 Role of Science for Environmental Impact Evaluation resulting from Ocean Mining, *Forty-first Annual Conference of the Center for Oceans Law & Policy – Marine Environment and UN Sustainable Development Goal 14*, Center for Oceans Law and Policy, University of Virginia School of Law, Yogyakarta. (Invited)

INTERNATIONAL WORKSHOPS/CONFERENCE (Previous 5 years)

- ISA, MOMAF and MARBIK 2020 Workshop on Deep Sea Taxonomic Standardization: Strategic Approaches for Collaboration, 15-16 September 2020, Online Workshop.
- JAMSTEC and IFREMER 2018. International Workshop on Deep sea big data for sustainable development: A contribution to the Deep Ocean Observing / Revaluation Strategy (DOORS). May 2018 French Embassy Tokyo. (Organizer)

- JPI Oceans 2017. 2nd JPI Oceans (The Joint Programming Initiative Healthy and Productive Seas and Oceans Conference), October 2017 Lisbon.
- ISA 2017. Workshop on the Design of “Impact Reference Zones” and “Preservation Reference Zone” in DSM contract areas, September 2017 Berlin. (Dispatched from Japanese Government)
- ISA, USA and BGR, 2017. Workshop: Towards an ISA Environmental Management Strategy for the Area. March 2017, Berlin. (Dispatched from Japanese Government)
- JAMSTEC and IFREMER, 2017. EcoDeep-SIP Workshop II- Dialogue on practical utility of EIA technology - Proponent, potential users, administrator, and independent organization. March 2017 JAMSTEC Tokyo Office (Organizer)

LISTS OF PUBLICATIONS:

PEER-REVIEW ARTICLES

- Travis W., Menot L. Bonifácio, P., Pape, E., Błażewicz, M., Contreras, GB, Dahlgren, T., Fukushima, T., Glover A., Se Jong Ju, Kaiser, S., Yu, OH., and Smith C. 2021. Patterns of Macrofaunal Biodiversity Across the Clarion-Clipperton Zone: An Area Targeted for Seabed Mining. *Frontiers In Marine Science* (2296-7745) (Frontiers Media SA), 2021-04, Vol. 8, P. 626571
- Van Dover, C., Colaço, A., Collins, P.C., Croot, P., Metaxas, A., Murton, BJ., Swaddling, A., Boschen-Rose, RE., Carlsson, J., Cuyvers, L., Fukushima, T., Gartman, A., Kennedy, R., Kriete, C., Mestre, N.C., Molodtsova, T., Myhrvold, A., Pelleter, E., Popoola, S.O., Qian, PY., Sarrazin, J., Sharma, R., Suh, YJ., Sylvan, J.B., Tao, C., Tomczak, M., and Vermilye, J. 2020. Research is needed to inform environmental management of hydrothermally inactive and extinct polymetallic sulfide (PMS) deposits. *Marine Policy*, Volume 121, November 2020, 104183
- Okamoto, N., Igarashi, Y., Matsui, T., and Fukushima, T. 2019 Preliminary Results of Environmental Monitoring of Seafloor Massive Sulfide Excavation and Lifting Test in the Okinawa Trough. *Proc. 29th Int. Offshore and Polar Eng. Conf.*
- Furushima, Y., Higashi, H., Fukuhara, T., Furuichi, H., Yamamoto, H. and Fukushima, T. 2019 Continuous observation of turbulent flow near the hydrothermal venting area in the Okinawa Trough, Japan. *Proc. 29th Int. Offshore and Polar Eng. Conf.*
- Fukushima, T. 2019 Historical Background of Preservation Reference Area (PRA) defined by the International Seabed Authority (ISA). *Proc. 29th Int. Offshore and Polar Eng. Conf.*
- Sugishima, H., Matsui, T., Okamoto, N. and Fukushima, T. 2018 Distributions of megabenthic organisms in the areas of north-west Pacific seamounts where are covered with Cobalt-Rich Ferromanganese Crusts *Proc. 28th Int. Offshore and Polar Eng. Conf.*
- Miyata, Y. and Fukushima, T. 2018. Comparison of Components and Description for Benthic Organisms between Existing Environmental Impact Statements and Administrative Frameworks *Proc. 28th Int. Offshore and Polar Eng. Conf.*
- Fukushima, T. and Tsune, A. 2018. Environmental Condition 17-18 years after the Benthic Impact Experiment, *Proc. 28th Int. Offshore and Polar Eng. Conf.*
- Fukushima, T. and Nishijima, M. 2016 Taxonomic Problems in Environmental Impact Assessment (EIA) Associated with Ocean Mining and the Possibility of New Technology Developments, *J. of Japan Society of Ocean Policy*, 6, 59-72. (in Japanese)
- Nakajima, Y., Yamamoto, J., Kanada, S., Masanobu, S., Takahashi, I., Okaya, K., Matsuo, S., Fukushima, T., and Fujita, T. 2013. Study on grinding technology for seafloor mineral processing. *Proceedings of the ASME 2012 32nd International Conference on Ocean, Offshore and Arctic Engineering OMAE 2013*, June 9-14, 2013, Nantes, France.
- Fukushima, T. 2010. Development for Seafloor Massive Sulfide and Its Problems. *Energy and resources*, 31(4), 207-211. (in Japanese)

- Fukushima, T., and Okamatsu, A. 2010. Current Issues in Seafloor Massive Sulfide Mining Development. *Proc. 20th Int. Offshore and Polar Eng. Conf.*, 181-185.
- Fukushima, T. 2009. Developments and Uses of Ocean Resources, *Environmental Information Science*, 38(2), 49-54. (in Japanese)
- Fukushima, T. 2009 A Profitability Evaluation of Marine Mineral Resources in the EEZ Area of the Okinotorishima, *Ocean Policy Studies*, 7, 49-69. (in Japanese)
- Fukushima, T. 2008. Environmental Assessment Research for Deep-Sea Mineral Resources Developments, *J. of MMIU*, 12(124), 836-843. (in Japanese)
- Yamazaki, T., Takeuchi, R., Monoe, D., Oomi, T., Nakata, K., and Fukushima, T., 2008 Non-steady Growth Modeling of Anaerobic Consortium of Microorganisms around Methane Seepage, *Proc. 17th Int. Offshore and Polar Eng. Conf.*, 498-502.
- Yamazaki, T., Monoe, D., Oomi, T., Nakata, K. and Fukushima, T. 2007. Application of Methane Supply Process Unit in Mass Balance Ecosystem Model Around Cold Seepage. *Proc. 27th Int. Conf. On Offshore Mechanics and Arctic Eng.* Estoril, Paper No. OMAE2008-57498
- Yamazaki, T., Monoe, D., Oomi, T., Nakata, K. and Fukushima, T. 2007. Preliminary Modeling of Chemosynthetic Ecosystem around Methane Seepage. *Proc. 7th OMS sym. of Int. Offshore and Polar Eng. Conf.*, 128-134.
- Yamazaki, T., Nakano, Y., Monoe, D., Oomi, T., Nakata, K. Fukushima, T. 2006 A Model Analysis of Methane Plume Behavior in Ocean Water Column, *Proc. 16th Int. Offshore and Polar Eng. Conf.*, 521-526.
- Fukushima, T. 2005. Examination of Environmental Assessment Methods of Deep-Sea Development, *Ocean Policy Studies*, 2, 19-58. (in Japanese).
- Yamazaki, T., Monoe, D., Nakata, K. and Fukushima, T. 2005. Mass Balance Eco-model for Impact Estimation of Possible Methane Leakage during Methane Hydrate Utilization. *Proc. 15th Int. Offshore and Polar Eng. Conf.*, 631-637.
- Fukushima, T., Harada, K., Shibamoto, Y. and Kuboki, E. 2002. Chemical Compositions of Sediment Plume Discharged from the Benthic Disturber. *Proc. 12th Int. Offshore and Polar Eng. Conf.*, 443-446.
- Shirayama, Y., Fukushima, T., Matsui, T. and Kuboki, E. 2001. The Responses of Deep-Sea Benthic Organisms to Experimental Removal of the Surface Sediment. *Proc. 4th OMS sym. of Int. Offshore and Polar Eng. Conf.*, 77 -81.
- Fukushima, T., Harada, K., Shibamoto, Y. and Kuboki, E. 2001. Chemical composition of deep-sea sediment where artificial rapid deposition event were occurred. *Proc. 11th Int. Offshore and Polar Eng. Conf.*, 541-547.
- Fukushima, T., Shirayama, Y. and Kuboki, E. 2000. The Characteristics of deep-sea epifaunal megabenthos two years after an artificial, rapid deposition event. *Publications of the Seto Marine Biological Laboratory*, 39, 17 - 27.
- Kaneko, T. Ogawa, K. and Fukushima, T. 1995. Preliminary result of meiofauna and bacteria abundance in an environmental impact experiment, *Proc. 1st OMS sym. of Int. Offshore and Polar Eng. Conf.*, 181 - 186.
- Fukushima, T. 1995. Overview "Japan Deep-Sea Impact Experiment = JET", *Proc. 1st OMS sym. of Int. Offshore and Polar Eng. Conf.* 47 - 53.
- Shirayama, Y. and Fukushima, T. 1992. Comparisons of deep-sea sediment and overlying water collected using Multiple Corer and Box Corer. *Journal of Oceanography*, 50, 75 - 82.

NO PEER-REVIEW ARTICLES

- Fukushima, T. and Tsune, A. 2018 Environmental condition 17-18 years after the benthic impact experiment. *Proc. of 27th Ocean Engineering Symposium*, JASNAOE, Tokyo. (in Japanese)

- Fukushima, T. 2017 Reexamination of influence factors and environmental factors. *Proc. of 26th Ocean Engineering Symposium*, JASNAOE, Tokyo. (in Japanese)
- Fukushima, T., 2014 Development of a new environmental impact assessment techniques associated with the deep-sea mineral resources development, Sea Tech Week-Deep Blue Days.
- Fukushima, T., 2010 Interdisciplinary Ocean Education to Solve the Problems of Islands and Ocean *Proc. Int. Seminar on Island and Oceans 2011*, Tokyo, Japan.
- Fukushima, T., 2009 Pacific Seafloor Mineral Resources: Development and other Issues. *Proc. Int. Seminar on Island and Oceans 2010*, Tokyo, Japan, pp. 146-155.
- Fukushima, T., 2008, How should the economic value of an island be evaluated? *Proc. Int. Sym. on Island and Oceans*, Tokyo, Japan, pp. 146-154.
- Someya, M. and Fukushima, T. 2006 Japan nodule development environmental impact study. In *Prospects for International Collaboration in Marine Environmental Research to Enhance Understanding of the deep Sea Environment*. (ed. ISA: ISBN 976-610-558-8). Part II Chapter 10. 168- 181, International Seabed Authority, Kingston Jamaica, pp 257.
- Yamazaki, T., Monoe, D., Nakata, K. and Fukushima, T. 2005 Modeling of Ecosystem Consumption Induced by Seafloor Methane Emission. *Proc. of 18th Ocean Engineering Symposium*, JASNAOE, Tokyo, 417-421 (in Japanese)
- Fukushima, T. 2004 Amount of Megabenthic Organisms in areas of Manganese Nodules, Cobalt-Rich Crust and Polymetallic Sulphide, In *Workshop for the establishment of environmental baselines at deep seafloor cobalt-rich crusts and deep seabed polymetallic sulphides mine sites in the area, for the purpose of evaluating the likely effects of exploration and exploitation on the marine environment* (ed. ISA: ISBN 978-976-95155-7-4). 356-371, International Seabed Authority, Kingston Jamaica, pp 481.
- Fukushima, T., Shirayama, Y. and Yamazaki, T. 2003. A Technical Evaluation of an Environmental Assessment Guideline for Deep Sea Mining. *Proc. of 17th Ocean Engineering Symposium*, JASNAOE, Tokyo, 417-421 (in Japanese)
- Matsui, T. and Fukushima, T. 2002 Data Standard Utilized in the Environmental Studies of the Deep Ocean Resources Development Company Ltd. Japan. In *Standardization of Environmental Data and Information: Development Guideline* (ed. ISA: ISBN 976-610-486-7). 187- 221, International Seabed Authority, Kingston Jamaica, pp 539.
- Fukushima, T. 2000. Deep Sea Benthology - History and Present State -. Annual Report of Marine Biological Research Institute of Japan Co., Ltd. 14: 74 - 82.
- Matsui, T., Fukushima, T. and Ogawa, K. 1997. Responses of megabenthic community to the rapid resedimentation. *Proceedings of International Symposium on Environmental Studies for Deep Sea Mining*, Tokyo, Japan, 337 - 344.
- Shirayama Y. and Fukushima, T. 1997. Responses of a meiobenthos community to rapid resedimentation. *Proceedings of International Symposium on Environmental Studies for Deep Sea Mining*, Tokyo, Japan, 187 - 196.
- Harada, K. and Fukushima, T. 1997. Results of seabed disturbance experiment and bottom sediment investigation, *Proceedings of International Symposium on Environmental Studies for Deep Sea Mining*, Tokyo, Japan, 133 - 142.
- Shirayama, Y. and Fukushima, T. 1997. Benthic organism distribution in the Japanese deep-sea mining claim area. *Proceedings of International Symposium on Environmental Studies for Deep-Sea Mining*, Tokyo, Japan, 311 - 316.
- Ogawa, K., Furusawa, K. and Fukushima, T. 1997. Water quality characteristics of the upper layer of the central Pacific. *Proceedings of International Symposium on Environmental Studies for Deep-Sea Mining*. Tokyo, Japan, 245 - 252.
- Murano, G., Furusawa, K. and Fukushima, T. 1997. Distribution and abundance of zooplankton and phytoplankton along the base line transect (9° N). *Proceedings of*

International Symposium on Environmental Studies for Deep-Sea Mining, Tokyo, Japan, 253 - 270.

- Fukushima, T., and Imajima M. 1997. A study of a macrobenthos community in a deep-sea impact. *Proceedings of International Symposium on Environmental Studies for Deep-Sea Mining*, Tokyo, Japan, 331 - 336.

BOOKS / PUBLICATIONS

- Fukushima, T., Tsune, A. and Sugishima, H. 2022. Comprehensive understanding of seafloor disturbance and environmental impact scenarios, In: Rahul Sharma (ed). *Perspectives on Deep-sea Mining*. Springer Nature Switzerland, pp.313-338.
- Furushima, Y., Yamakita, T., Miwa, T., Lindsay, D., Fukushima, T. and Shirayama, Y. 2019 New Techniques for Standardization of Environmental Impact Assessment, In: Rahul Sharma (ed.), *Environmental Issues of Deep-Sea Mining*, Springer Nature Switzerland, pp. 275-313.
- Fukushima, T. and Tsune, A. 2019 Long-Term Monitoring of Environmental Conditions of Benthic Impact Experiment, In: Rahul Sharma (ed.), *Environmental Issues of Deep-Sea Mining*, Springer Nature Switzerland, pp. 191-211.
- Fukushima, T. 2018 The Rule of Science for Environmental Impact Evaluation Resulting from Ocean Mining, (ed. M. Nordquist, J. N. Moore and R. Long), *United Nations Sustainable Development Goal 14*, Brill Nijhoff. Boston, pp. 234-250.
- Fukushima, T. and Nishijima, M. 2017 Taxonomic Problems in Environmental Impact Assessment (EIA) Linked to Ocean Mining and Possibility of New Technology Development, Rahul Sharma (ed) *In Deep-Sea Mining*, Springer Switzerland, pp. 465-482.
- Shirayama, Y., Itoh, H and Fukushima, T. 2017 Recent Developments in Environmental Impact Assessment with Regard to Mining of Deep-Sea Mineral Resources, Rahul Sharma (ed) *In Deep-Sea Mining*, Springer Switzerland, pp. 445-464.
- Fukushima, T. 2013 Environmental Impact Assessment, (ed. Ilzasa Kokichi). *Industrial use of seabed mineral resources*, CMC publishing, Tokyo, pp. 124-130. (in Japanese)
- Fukushima, T. 2011 Let Japan lead the world in a model for sustainable development, (ed. Ocean Alliance, University of Tokyo), *Japan's Ocean Powers*, Shogakkan, Tokyo, p.35. (in Japanese)
- Fukushima, T. 2011 Mineral Resources Circulation, ed. the Oceanographic Society of Japan), *Ocean Circulation*, Chijin Shokan, Tokyo, pp. 149-161. (in Japanese)
- Fukushima, T. 2006. Maintenance, Conservation and utilization plan of Okinotorishima Island, *Ocean White Paper 2006*, Ship and Ocean Foundation. Tokyo, p.62-66. (in Japanese)
- Matsui, T. and Fukushima, T. 2002, Data Standard Utilized in the Environmental Studies of the Deep Ocean Resources Development Company Ltd. Japan. In *Standardization of Environmental Data and Information: Development Guideline* (ed. ISBA: ISAN 976-610-486-7). 187- 221, International Seabed Authority, Kingston Jamaica, pp 539.
- Fukushima, T. 1996-1997. Marine Biology Class, *Monthly magazine Bonanza*_ 1996.4-1997.3 (12series). Metal Mining Agency of Japan, Tokyo. (in Japanese)

Juan Luis González Minaya



PERFIL LABORAL

Orientado al sector defensa, marítimo y medioambiental con énfasis en gestión de áreas protegidas y dirección de proyectos de investigación en oceanografía física e hidrografía marina. Capacidad para liderar equipos de trabajo en el cumplimiento de metas.

I. DATOS PERSONALES:



II. ESTUDIOS REALIZADOS:

Posgrado	Universidad Autónoma de Madrid, Universidad Complutense de Madrid, Universidad de Alcalá.
Título Obtenido	Máster en Espacios Naturales Protegidos.
Grado	Escuela Naval de Cadetes Almirante Padilla (ENAP).
Título Obtenido	Oceanógrafo Físico. Profesional en Ciencias Navales.
Diplomado	Técnicas de Investigación del Fondo Marino. (UNIBE-ANAMAR) Riesgo Sísmico. (Comisión Nacional de Emergencia)
Cursos	Retos para la conservación en África: los parques nacionales de África Central (Fundación Interuniversitaria Fernando González Bernáldez-Europarc España) Oceanografía por Sensores Remotos. (NOAA-GEO-CIEHLYC)

Tecnologías de Información (SIG)
aplicado al medio Marino y Costero
(ArcGIS).
(INVEMAR)

Inspector para la prevención de la
contaminación marítima y fluvial por
hidrocarburos.
(ENAP)

Cursos MARPOL 73/78.
(ENAP)

Procesamiento de Datos Batimétricos
Agencia mexicana de Cooperación
Internacional para el Desarrollo.
(AMEXCID)

Análisis numérico de datos.
(UNIVARIADA)
(CIOH)

Cooperación Internacional.
(SENA)

Compendio de Inteligencia.
(Ministerio de Defensa)

Instructor Marítimo Modelo OMI 6.09.

Gestión de Riesgos.
(Ministerio de Defensa)

Manejo táctico de botes.
Naval Special Warfare

Seminarios

XV seminario nacional de ciencias y
tecnologías del mar (SENALMAR).
(Cartagena-Colombia)

LÍNEA DE INVESTIGACIÓN:

Oceanografía física, hidrografía, medio ambiente, imágenes del color del océano
(sensores de percepción remota).

Publicaciones: Regionalización dinámica de la Isla de Santo Domingo mediante
productos de sensores remotos del tipo espectroradiómetros. Boletín científico No.
32 del Centro de Investigaciones Oceanográficas e Hidrográficas del Caribe (CIOH),
Pag:149-161.

III. EXPERIENCIA LABORAL:

Institución : Armada de República Dominicana.
Ocupación : Sub-Encargado del Centro de Operaciones Marítimas (COM).
Fecha de Inicio : 07-01-2015.
Fecha de finalización : 30-09-2016.

Institución : Ministerio de Medio Ambiente y Recursos Naturales.
Ocupación : Especialista en Oceanografía Física
Fecha de Inicio : 01-11-2016
Fecha de finalización : 30-04-2018

Ocupación : Encargado del Departamento de Ordenamiento de Recursos Marinos
Fecha de Inicio : 01-05-2018

Laborando hasta la fecha.


IV. REFERENCIAS PERSONALES:

Nombre : Martin Arturo Minaya.
Ocupación : Verificador de despachos Aduanales.
Teléfono : 849-815-0342.

V. REFERENCIAS FAMILIARES:

Esposa : Jessica Margarita Pérez Ariza.
Ocupación : Lic. En Administración Pública.
Celular : 829-559-3536.

Padre : Juan González Martínez.
Ocupación : Retirado.
Celular : 829-784-3739.



JUAN LUIS GONZÁLEZ MINAYA
Cédula: 224-0047708-3

DAO VIET HA (VIET NAM)

Year of birth: 1969

Sex: Female

Languages: Vietnamese; English

Expertise and research interests/experience:

- Biochemistry, marine toxins, seafood poisonings, safety and security
- Bioactive substances in marine organisms.

CURRENT TITLE & POSITION

Associate Professor, PhD., Senior Researcher

Director, Institute of Oceanography, Vietnam Academy of Science and Technology

Chairwoman, Vietnam National IOC (Intergovernmental Oceanographic Commission) Committee

Dean, Faculty of Marine Science and Technology, Graduate University of Science and Technology, Vietnam Academy of Science and Technology

Project leader, IOC/WESTPAC project on Marine toxic organisms

EDUCATION

2009 - Ph.D in Aquatic Sciences, the University of Tokyo, Japan

2001 - MSc in Marine Science (Marine toxins), Aarhus University, Denmark

1991 - BSc in Biochemistry, VNU University of Science, Viet Nam

EXPERIENCE

Vice Director, Institute of Oceanography, Vietnam Academy of Science and Technology
— 2014 - 2018

Head, Department of Marine Biochemistry, Institute of Oceanography, Vietnam Academy of Science and Technology — 2009 - 2014

Acting Head of Department of Marine Biochemistry, Institute of Oceanography, Vietnam Academy of Science and Technology — 2003 - 2009

Deputy Head, Department of Marine Biochemistry, Institute of Oceanography,
Vietnam Academy of Science and Technology — 2002 - 2003

Researcher, Institute of Oceanography, Vietnam Academy of Science and Technology —
1991 - 2002

RECENT INTERNATIONAL CONFERENCES, WORKSHOPS, TRAINING COURSES PARTICIPATED

- ❖ 12th Intergovernmental Session of the IOC Sub-Commission for the Western Pacific (WESTPAC-XII), Manila, the Philippines, 02 - 05 Apr 2019, Speaker
- ❖ WESTPAC-HAB Workshop 2019 "Harmful raphidophytes in the Western Pacific: species/population distribution and fisheries damages", Bangkok, Thailand, 25-27 February 2019, Scientific Steering Committee
- ❖ 2nd Global Ocean Summit, Qingdao, China, 3-5 July 2018, Viet Nam Delegation
- ❖ WESTPAC Training Workshop on "Applying analytical method for detecting Ciguatoxins (CTXs) in fish", Nha Trang, Viet Nam, 5 - 9 April 2018, Host/ Organizer/ Lecturer
- ❖ WESTPAC Training Course on HAB Mitigation and Management (lecturer), University of Tokyo, October 31- November 5, 2017, Chair of session
- ❖ 13th Session of the IOC Intergovernmental Panel on Harmful Algal Blooms, Paris, France, 3-5 May 2017, Speaker
- ❖ 10th WESTPAC International Scientific Conference; Advancing Ocean Knowledge, Fostering Sustainable Development: from the Indo-Pacific to the Globe, Qingdao, China, 17 - 20 April 2017, Chair of session
- ❖ HAB Regional Strategic Meeting, Bangkok, Thailand, 10-11 May 2016, Speaker
- ❖ WESTPAC Advisory Group Meeting, Qingdao, China, 28-30 November 2016, Speaker
- ❖ Scientific workshop "Progress and trends in science and technology", Ha Noi, February 2016, Speaker
- ❖ 12th Session of the IOC Intergovernmental Panel on Harmful Algal Blooms (PHAB-XII), Paris, France, 28 - 30 April 2015, Speaker
- ❖ Workshop "Sea based activities and their possible impacts to resources and environment in "Bien Dong", Nha Trang, Viet Nam, 9 July 2015, Organizer/ Participant

SELECTED PUBLICATIONS

Books chapter

- ❖ Yasuwo Fukuyo, Masaaki Kodama, Takuo Omura, Ken Furuya, Elsa F. Furio, Mirriam Cayme, Lim Po Teen, Dao Viet Ha, Yuichi Kotaki, Kazumi Matsuoka, Mitsunori Iwataki, Rujinard Sriworn and Thaithaworn Lirdwitayaprasit, 2010. Ecology and oceanography of harmful marine microalgae (book chapter), *In: Coastal Marine Science in Southeast Asia* (S. Nishida, M.D. Fortes, and N. Miyazaki eds.) pp.23-48. TERAPUB, Tokyo.
- ❖ Dao Viet Ha, Jacob Larsen, Du Tuyet Nga, 2004. Algal toxins: Harmful effects and epidemiology. In "Potentially Toxic Microalgae of Vietnamese Waters", 2004, Opera Botanica 140. 2004 (J. Larsen và Nguyen N.L.).

Monography

- ❖ Dao Viet Ha, 2020. Marine toxic organisms in Viet Nam. Science and Technics Publishing House, Viet Nam

Journals/ articles

- ❖ Xuan-Vy Nguyen, Nhu-Thuy Nguyen-Nhat, Xuan-Thuy Nguyen, Viet-Ha Dao, Karla J. McDermid, Jutta Papenbrock. 2022. Microsatellite-based analysis of the genetic diversity and population structure of the seagrass species *Thalassia hemprichii* from southern Viet Nam. *Aquatic Botany* 178 (2022) 103497.
- ❖ Ha Viet Dao, Aya Uesugi, Hajime Uchida, Ryuichi Watanabe, Ryoji Matsushima, Zhen Fei Lim, Steffiana J. Jipanin, Ky Xuan Pham, Thu Minh Phan, Chui Pin Leaw, Lim Po Teen Lim and Toshiyuki Suzuki. 2021. Identification of Fish Species and Toxins Implicated in a Snapper Food Poisoning Event in Sabah, Malaysia, 2017. *Toxins* 13 (9), 657. doi:10.3390/toxins13090657.
- ❖ Xuan-Vy Nguyen, Va-Khin Lau, Nhu-Thuy Nguyen-Nhat, Trung-Hieu Nguyen, Kim-Hoang Phan, Viet-Ha Dao, Duan Ho-Dinh, Ken-ichi Hayashizakid, Miguel D. Fortese, Jutta Papenbrock, 2021. Update of seagrass cover and species diversity in Southern Viet Nam using remote sensing data and molecular analyses. *Regional Studies in Marine Science* 44, 101803. DOI: 10.1016/j.rsma.2021.101803.
- ❖ Xuan-Vy Nguyen, Nhu-Thuy Nguyen-Nhat, Xuan-Thuy T. Nguyen, My-Ngan T. Nguyen, Viet-Ha Dao, Karla J. McDermid. 2021. Three New Records of Marine Macroalgae from Viet Nam Based on Morphological Observations and Molecular Analyses. *Pacific Science* 75(4):497-512. doi.org: 10.2984/75.4.3.
- ❖ Fricke, A., Nguyen, X.V., Stuhr, M., Hoang, T.D., Dao, V.H., Tran, M.D., Pham, T.S., Le, H.C., Le, M.H., Pham, Q.L., Schmid, M., Kunzmann, A., Gärdes, A., Teichberg, M. 2021. Subtidal macrophyte diversity and potentials in Nha Trang Bay - baseline data for monitoring a rising natural resource. *Estuarine, Coastal and Shelf Science* 259, 107460. Doi: 10.1016/j.ecss.2021.107460.
- ❖ Kazuya Takahashi, Wai Mun Lum, Garry Benico, Hajime Uchida, Mayu Ozawa, Hiroshi Oikawa, Toshiyuki Suzuki, Nguyen Van Nguyen, Dao Viet Ha and Mitsunori Iwataki. 2021. Toxigenic strains of *Azadinium poporum* (Amphidomataceae, Dinophyceae) from Japan and Vietnam, with first reports of *A. poporum* (ribotype A) and *A. trinitatum* in Asian Pacific. *Phycological Research* 69(3), 175-187. doi: 10.1111/pre.12455.
- ❖ Van Quang Vo, Hsuan-Ching Ho, Ha Viet Dao & Hoa Hong Thi Tran. 2021. A new arrowtooth eel of genus *Meadia* (Synphobranchidae: Ilyophinae) from Vietnam, South China Sea. *Zootaxa* 4952 (1): 181-191.
- ❖ Nguyen, X.V., Nguyen-Nhat, N.T., Nguyen, T.X.T., Dao, V.H., Lawrence, M.L., Papenbrock, J. 2021. Analysis of rDNA reveals a high genetic diversity of *Halophila* major in the Wallacea region. *PlosOne* 16(10): e0258956. doi.org: 10.1371/journal.pone.0258956
- ❖ Le Ho Khanh Hy, Pham Xuan Ky, Dao Viet Ha, Nguyen Phuong Anh, Phan Bao Vy, Doan Thi Thiet. 2021. Preparation of Nano-hydroxyapatite Obtained from Lates Calcarifer

Fish Bone by Alkaline Hydrolysis Method. American Journal of Chemical and Biochemical Engineering 5(1), 32-40.

- ❖ Le Trong Dung, Nguyen Hong Thu, Le Hung Phu, Pham Hong Ngoc, Cao Van Nguyen, Dao Viet Ha, 2021. Pollution of total petroleum hydrocarbon in coastal zone Ca Na, Ninh Thuan province. Vietnam Journal of Marine Science and Technology 21(4A), 93-100.
- ❖ Nguyen Phuong Anh, Pham Xuan Ky, Dao Viet Ha, Phan Bao Vy, Le Ho Khanh Hy, Doan Thi Thiet, 2021. Compostion and antioxidant activity of crude extract from squid *Uroteuthis chinensis*. Vietnam Journal of Marine Science and Technology 21(4A), 81-91.
- ❖ Le Ho Khanh Hy, Dao Viet Ha, Pham Xuan Ky, Nguyen Phuong Anh, Doan Thi Thiet, Phan Bao Vy, 2021. Preparation of nanohydroxyapatite from skipjack tuna bone (*Katsuwonus pelamis*) by alkaline hydrolysis and thermal calcination methods. Vietnam Journal of Marine Science and Technology 21(4A), 67-80.
- ❖ Le Hung Phu, Pham Hong Ngoc, Le Trong Dung, Nguyen Hong Thu, Dao Viet Ha, 2021. Microplastics in three sandy beaches in Khanh Hoa province. Vietnam Journal of Marine Science and Technology 21(4A), 39-47.
- ❖ Pham Thi Mien, Dao Viet Ha, Hoang Xuan Ben, Bin Chen, Lan Liu and Phan Minh Thu, 2020. Antimicrobial Activities of Sponge-Derived Microorganisms from Coastal Waters of Central Vietnam, J. Mar. Sci. Eng. , 8, 594; doi:10.3390/jmse8080594,
- ❖ Ha Viet Dao, Ky Xuan Pham, Ben Xuan Hoang, Masato Tanioka, Ryuichi Watanabe & Toshiyuki Suzuki, 2020. Occurrence of tetrodotoxin in three *Nassarius* gastropod species in Khanh Hoa Province, Vietnam. *Fisheries Science vol 86, p 181–186*.
- ❖ Pham K.X., Dao H.V. and Amano M, 2020. Changes in brain and pituitary GnRH levels during a reproductive cycle in wild female Asian sea bass, *Lates calcarifer* (Bloch, 1790). Iranian Journal of Fisheries Sciences 19(6): 3255-3268.
- ❖ Nhu-Thuy Nguyen-Nhat, Viet-Ha Dao and Xuan-Vy Nguyen, 2019. New record of the rare brown alga *Dictyota hauckiana* from Vietnam. Botanica Marina, Vol. 62, Issue 6, p 599–603.
- ❖ Nguyen Xuan Vy, Nguyen Trung Hieu, Dao Viet Ha, Liao Lawrence. 2019 New record of *Grateloupia taiwanensis* S.-M. Lin et H.-Y. Liang in Vietnam: Evidence of morphological observation and rbcL sequence analysis. Biodiversitas (Journal of Biological Diversity); Vol. 20 No. 3.
- ❖ Pham Xuan Ky, Pham Thi Mien, Le Ho Khanh Hy, Dao Viet Ha, Nguyen Phuong Anh, Doan Thi Thiet, Phan Bao Vy, Ho Van The. Investigation of Antibacterial Activity of Crude Extracts from Marine Snails and Bivalves in the Southern Coast of Vietnam. American Journal of Biomedical and Life Sciences, Vol 7, Issue 1, p 10-15.
- ❖ Le Ho Khanh Hy, Pham Xuan Ky, Dao Viet Ha, Nguyen Thu Hong, Phan Bao Vy, Doan Thi Thiet, Nguyen Phuong Anh, 2019. Preliminary study on chemical mechanism of decrease of tetrodotoxin content in ovaries of a puffer fish *Lagocephalus inermis*

(Temminck & Schlegel, 1850) fermented with rice bran, Journal of Marine Science and Technology. Vol 19 No 1.

- ❖ Dao Viet Ha, Phan Bao Vy, 2019. Ciguatoxin-like toxin in mackerel *Acanthocybium soladria* in Vietnam. *J Mar Sci Technol* 19(4A), 159-166
- ❖ Dao Viet Ha, Aya Uesugi, Hajime Uchida, Pham Xuan Ky, Dang Quoc Minh, Ryuichi Watanabe, Ryoji Matsushima, Hiroshi Oikawa, Satoshi Nagai, Mitsunori Iwataki, Yasuwo Fukuyo, and Toshiyuki Suzuki, 2018. Identification of Causative Ciguatoxins in Red Snappers *Lutjanus bohar* Implicated in Ciguatera Fish Poisonings in Vietnam. *Toxins* 10(10), 420.
- ❖ Teng, S.T., S. N. Tan, H. C. Lim, V. H. Dao, S.S. Bates and C. P. Leaw. 2017. High diversity of *Pseudo-nitzschia* along the northern coast of Sarawak (Malaysian Borneo), with descriptions of *P. bipertita* sp. nov. and *P. limii* sp. nov. (Bacillariophyceae). *Journal of Phycology* 52: 973–989
- ❖ Toshiyuki Suzuki, Dao Viet Ha, Aya Uesugi and Hajime Uchida, 2017. Analytical challenges to ciguatoxins. *Current Opinion in Food Science*, 18: 37-42.
- ❖ Ky X.P., M.Amano, N.Amiya, H. V. Dao and Q. V. Vo. 2016. Three forms of gonadotropin- releasing hormone (GnRH) in brain and pituitary of Asian seabass *Lates calcarifer* (Bloch, 1790) analysed by high performance liquid chromatography combined with time-resolved fluoroimmunoassay and immunohistochemistry. *Indian J. Fish.*, 63(1): 57-66
- ❖ Dao Viet Ha, 2016. Production of antibody against domoic acid in New Zealand white rabbit, *J Mar Sci Technol*, Vol 16, No 2 (2016)
- ❖ Dao V.H., P. B. Vy, S. T. Teng, H. Uchida, C.P. Leaw, P. T. Lim, T. Suzuki, P. X. Ky. 2015. *Pseudo-nitzschia fukuyoi* (Bacillariophyceae), a domoic acid-producing species from Nha Phu Bay, Khanh Hoa Province, Vietnam. *Fisheries Science*. 81(3): 533-539. ISSN: 0919-9268.
- ❖ Teng, S.T., H.C. Lim, P.T. Lim, V.H. Dao, S.S. Bates, and C.P. Leaw. 2015. *Pseudo-nitzschia kodamae* sp. nov. (Bacillariophyceae), a toxigenic species from the Strait of Malacca, Malaysia. *Harmful Algae*. 17-28. DOI: 10.1016/j.hal.2014.02.005.
- ❖ Ha Viet Dao, Vy Bao Phan, Sing Tung Teng, Hajime Uchida, Chui Pin Leaw, Po Teen Lim, Toshiyuki Suzuki & Ky Xuan Pham, 2015. *Pseudo-nitzschia fukuyoi* (Bacillariophyceae), a domoic acid-producing species from Nha Phu Bay, Khanh Hoa Province, Vietnam. *Fisheries Science*, 81(3): 533-539.
- ❖ Dao Viet Ha, Po Teen Lim, Pham Xuan Ky, Yoshinobu Takata, Sing tung Teng, Takuo Omura, Yasuwo Fukuyo and Masaaki Kodama, 2014. Diatom *Pseudo-nitzschia cf. cacciantha* (Bacillariophyceae), the Most Likely Source of Domoic Acid Contamination in the Thorny Oyster *Spondylus versicolor* Schreibers 1793 in Nha Phu Bay, Khanh Hoa Province, Vietnam, 2014. *Asian Fisheries Science* 27 (2014):16-29.

- ❖ Dao Viet Ha, Shigeru Sato, 2013. The toxicity of the fishsource made from a tetrodotoxin - bearing puffer *Toquigener gloerfelti*. *J Mar Sci Technol* 13(3): 263-267
- ❖ Dao Viet Ha, 2013. Amnesic Shellfish poisoning toxin (domoic acid) in Vietnam: Occurrence, seasonal variation and origin, 2013. Proceedings of the 2nd International workshop on Vietnam Marine Resources, Ha Noi 4-5 June 2013; Publishing House of Natural Sciences and Technology, Vietnam
- ❖ Dao VH, Dung NT, Hong NT, Takata Y, Sato S, Kodama M, Fukuyo Y, 2012. High Individual variation in the toxicity of three species of marine puffer in Vietnam. *Coastal Marine Science* 35(1):1-6.
- ❖ Dao Viet Ha, Takuo Omura, Yoshinobu Takata, Pham Xuan Ky, Yasuwo Fukuyo and Masaaki Kodama (2012). *Pseudo-nitzschia* species, a possible causative organism of domoic acid in *Spondylus versicolor* collected from Nha Phu Bay, Khanh Hoa Province, Vietnam. *Coastal Marine Science* 35(1), 2012: 7-10.
- ❖ Dao Viet Ha, 2011. Harmful Algal Blooms in Asia during 2001-2010. Proceedings of the International cooperation on Investigation and Researches on Marine Resource and Environment. Ha Noi, 9/2011; Publishing House of Natural Sciences and Technology, Vietnam
- ❖ Dao, H.V., Takata, Y., Omura, T. *et al.*, 2009. Seasonal variation of domoic acid in a bivalve *Spondylus versicolor* in association with that in plankton samples in Nha Phu Bay, Khanh Hoa, Vietnam. *Fish Sci* 75, 507–512 (2009).
<https://doi.org/10.1007/s12562-009-0057-5>
- ❖ Takata, Y., Sato, S., Ha, D.V. *et al.*, 2009. Occurrence of domoic acid in tropical bivalves. *Fish Sci* 75, 473–480 (2009). <https://doi.org/10.1007/s12562-009-0073-5>
- ❖ Dao, H.V., Takata, Y., Sato, S. *et al.*, 2009. Frequent occurrence of tetrodotoxin-bearing horseshoe crab *Carcinoscopius rotundicauda* in Vietnam. *Fish Sci* 75, 435–438 (2009).
<https://doi.org/10.1007/s12562-008-0041-5>
- ❖ Viet Ha Dao, Y. TakATA, Takuo Omura, T.D. Nguyen, T.H. Nguyen, S. Sato, Yasuwo Fukuyo, M. KodAMA, 2009. Domoic acid in small-sized plankton in Nha Phu Bay, Khanh Hoa Province, Vietnam, 2009. *La Mer*, Vol 46 Issue 4, p 117-120.
- ❖ Dao Viet Ha, Nguyen Tien Dung, Nguyen Thu Hong, Yoshinobu Takata, Shigeru Sato, Masaaki Kodama and Yasuwo Fukuyo, 2011. High individual variation in the toxicity of three species of marine puffer in Vietnam. *Coastal Marine Science* 35(1):1–6
- ❖ Dao Viet Ha and Shigeru Sato, 2010. Toxicity of some marine snail responsible for recent food poisonings in Viet Nam. *Journal of Marine Science and Technology*, 10(3): 89-95.
- ❖ Dao Viet Ha, Yoshinobu Takata, Shigeru Sato, Yasuwo Fukuyo and Masaaki Kodama, 2009. Frequent occurrence of tetrodotoxin – bearing horseshoe crab *Carcinoscopius rotundicauda* in Vietnam. *Fisheries Science*, 75(2): 435–438.
- ❖ Dao Viet Ha, Yoshinobu Takata, Takuo Omura, Shigeru Sato, Yasuwo Fukuyo and Masaaki Kodama, 2009. Seasonal variation of domoic acid in a bivalve *Spondylus*

versicolor in association with that in plankton samples in Nha Phu Bay, Khanh Hoa, Vietnam. *Fisheries Science*, 75(2): 507–512.

- ❖ Dao Viet Ha, Yoshinobu Takata, Takuo Omura, Nguyen Tien Dung, Nguyen Thu Hong, Shigeru Sato, Yasuwo Fukuyo and Masaaki Kodama, 2009. Domoic acid in small-sized plankton in Nha Phu Bay, Khanh Hoa Province, Vietnam. *La Mer*, 46(4): 117-120.
- ❖ Dao Viet Ha, Takata Y, Sato S, Fukuyo Y, Kodama M, 2009. Frequent occurrence of tetrodotoxin-bearing horseshoe crab *Carcinoscopus rotundicauda* in Vietnam. *Fisheries Science* 75(2):435–438



CURRICULUM VITAE

FEDERICO GABRIEL HIRSCH

-
- ❖ Age 41
 - ❖ Member of the Argentine Foreign Service (Argentine Diplomat)
 - ❖ First Secretary of Embassy

ACADEMIC BACKGROUND

- ❖ “Instituto del Servicio Exterior de la Nación”(Diplomats Academy), Ministry of International Relations, International Commerce and Worship of the Argentine Republic (2011-2012).
- ❖ Coursed the Master in International Relations, University of Buenos Aires (2006-2008)
- ❖ Lawyer with specialization in Public International Law, University of Buenos Aires (2004).
- ❖ Bachelor of Law, University of Buenos Aires (2003)

SEMINARS

- ❖ The Hague International Summer Academy- Public International Law Session (The Hague, July 2014)
- ❖ Seminar “Law of Treaties, its practice and the internal application of conventional obligations for the Latin American Region”. Ministry of Foreign Affairs of Peru together with the Treaty Section of the United Nations Office of Legal Affairs (Lima, June 2013).

WORK EXPERIENCE AT THE ARGENTINE MINISTRY OF FOREIGN AFFAIRS

- ❖ 2021- Argentine Ministry of Foreign Affairs- Office of the Legal Advisor: Law of the Sea, Limits and Boundaries, Treaties Law, Diplomatic Law.
- ❖ 2016-2021 Consul at the General Consulate of the Argentine Republic in Hamburg, Germany. Covered matters related to Law of the Sea, Maritime Law and the International Tribunal of the Law of the Sea (ITLOS).
- ❖ 2013-2016 Argentine Ministry of Foreign Affairs-Office of the Legal Advisor: Law of the Sea, Limits and Boundaries, Treaties Law, Diplomatic Law, International Civil Aviation, Outerspace Law, and Environmental Law, etc.


CURRICULUM VITAE

SE-JONG JU, Ph.D

Principal Research Scientist

Deep-sea Resources Research Center

Korea Institute of Ocean Science & Technology (KIOST)



a. Academic Background

Inha Univ., Incheon, Republic of Korea, Oceanography B. S. (1988) and M.S. (1990)

Univ. of Maryland at College Park, USA Mar.-Estuarine-Environ. Sci. Ph.D. (2000)

b. Professional Career

- 2020 - Present Senior Director of Management Division, Korea Institute of Ocean Science and Technology (KIOST)
- 2019 - Present A member of PICES Government Council for Republic of Korea
- 2016 - Present A member of Legal and Technical Commission, International Seabed Authority (ISA)
- 2016 - Present Professor, College of Ocean Science & Technology, Korea Maritime University
- 2011 - Present Principal Research Scientist, Korea Institute of Ocean Science and Technology (KIOST)
- 2009 - Present Adjunct Professor, Marine Biology Major, University of Science and Technology
- 2016 - 2018 Chair, Biological Oceanography Committee, North Pacific Marine Science Organization (PICES)
- 2015 - 2016 Vice-chair, Biological Oceanography Committee, North Pacific Marine Science Organization (PICES)
- 2006 - 2011 Senior Research Scientist, Korea Ocean Research & Development Institute (KORDI)
- 2000 - 2006 Post-doc, Chesapeake Biological Lab., UMCES, Maryland, USA.

c. Research Interest

Marine Ecology (food web dynamics), Marine Biogeochemistry, Invertebrate Biology, Environmental Impact Assessment

d. Honors and Awards

- Prime Minister's Commendation for Korean Science Day, Rep. of Korea, 2017
- A Best Poster Presentation Award from 2014 PICES annual meeting, Yeosu, Rep. of Korea, 2014
- Award for distinguished scientific publication in Ocean and Polar Research in KIOST, 2012
- Award for a distinguished researcher in KORDI, 2011

e. Major Publication (see attachments for the list of publications)

- Papers (64) in International Peer Reviewed Journals
- Papers (30) in Domestic Peer Reviewed Journals (in Korean)
- Book contribution (4)

f. Research Projects involved

- Korea Deep-Sea Environmental Study in the Northeastern Pacific (CCFZ), Ministry of Oceans and Fisheries, Republic of Korea
- Exploration for Seafloor Hydrothermal Deposits and Fe-Mn Crusts in the Southwestern Pacific, Ministry of Oceans and Fisheries, Republic of Korea
- Carbon fluxes in the Northwestern Pacific: Atmosphere-surface ocean-deep ocean carbon fluxes, KIOST

g. Cruise Experience

- Participates more than 20 research cruises for scientific researches including environmental baseline surveys and exploration for deep seabed mineral resources using ROV

h. Coordination and Organization of Meetings

- 2016 China, Japan, Korea IMBER symposium, March 2016, Jeju, Republic of Korea: a member of Scientific Steering Committee and a convenor
- 6th Zooplankton Production Symposium, May 2016, Bergen, Norway: a member of Scientific Steering Committee and a convenor
- Eco-Deep SIP workshop: The crafting of seabed mining ecosystem based management, July 2015, Tokyo, Japan: a convenor and a panel
- The 6th to 8th Meeting of China-Korea Cooperation on Deep-sea Mineral Resources Development, from 2008 to 2016 every two years
- Underwater Mining Institute Conference 2016, Oct. 2016, Incheon, Republic of Korea: a member of local organizers

i. Professional Activities.

- Ocean & Polar Research (Journal): Chief Editor
- Advisory board of DOSI (Deep Ocean Stewardship Initiative)
- Marine Ecology Progress Series, Journal of Experimental Marine Biology and Ecology, Limnology and Oceanography, Marine Biology, etc: reviewer
- North Pacific Research Board: a proposal reviewer
- Scientific Committee on Oceanic Research – Integrated Marine Biogeochemistry and Ecosystem Research project: Korea National contact

Attachment

List of Publications

Papers in International Peer Reviewed Journals

- Muñoz-Royo, C., Peacock, T., Alford, M.H., Smith, J.A., Le Boyer, A., Kulkarni, C.S., Lermusiaux, P.F.J., Haley Jr., P.J., Mirabito, C., Wang, D., Adams, E.E., Ouillon, R., Breugem, A., Decrop, B., Lanckriet, T., Supekar, R.B., Rzeznik, A.J., A. Gartman and **Ju, S.-J.**, 2021, Extent of impact of deep-sea nodule mining midwater plumes is influenced by sediment loading, turbulence and thresholds. *Communications Earth & Environment*, <https://doi.org/10.1038/s43247-021-00213-8>
- Kim, T., Baker, D.M., **Ju, S.-J.** and Lee, J. C.-Y., 2021, Fatty acid profiles of separated host-symbiont fractions from five symbiotic corals: applications of chemotaxonomic and trophic biomarkers. *Mar. Biol.*, 168(11), <https://doi.org/10.1007/s00227-021-03979-9>
- Kim, M., Kim, H. J., Ko, A., Yoo, C.M., **Ju, S.-J.** and Hwang, J., 2021, Characteristics of sediment resuspension on a deep abyssal plain in the Eastern Tropical Pacific Ocean. *J. of Sea Res.*, 175, <https://doi.org/10.1016/j.seares.2021.102085>.
- Lee, W.-K., Juniper, S.K., Perez, M., **Ju, S.-J.** and Kim, S.-J., 2021, Diversity and characterization of bacterial communities of five co-occurring species at a hydrothermal vent on the Tonga Arc. *Ecol. & Evol.*, 11(9), 4481-4493.
- Washburn, T.V., Menot, L., Bonifacio, P., Pape, E., Brazewicz, M., Bribiesca-Cont, Dahlgren, T.G., Fukushima, T., Glover, A.G., **Ju, S.-J.**, Kaiser, S., Yu, O.H. and Smith, C.R., 2021, Patterns of Macrofaunal Biodiversity Across the Clarion-Clipperton Zone An Area Targeted for Seabed Mining. *Frontiers in Mar. Science*, <https://doi.org/10.3389/fmars.2021.626571>
- Lee, W.-K., Chan, B.K.K., **Ju, S.-J.**, Kim, D. and Kim, S.-J., 2021, The mitochondrial genome of hydrothermal vent barnacle *Eochionelasmus coreana* (Cirripedia: Thoracica) from the Indian Ocean. *Mitochondrial DNA B*, 6(3), 710-712.
- Suh, Y.J., Kim, M.-S., Kim, S.-J., Kim, D. and **Ju, S.-J.**, 2021, Carbon sources and trophic interactions of vent fauna in the Onnuri Vent Field, Indian Ocean, inferred from stable isotopes. *Deep-Sea Res. I*, doi: <https://doi.org/10.1016/j.dsr.2021.103683>.
- Chan, B.K.K., **Ju, S.-J.**, Kim, D. and Kim, S.-J., 2020, First discovery of the sessile barnacle *Eochionelasmus* (Cirripedia: Balanomorpha) from a hydrothermal vent field in the Indian Ocean. *J. of the Mar. Biol. Assoc. of the U. K.*, 100(4), 585-593.
- Lee, W.-K., Hou, B.K., **Ju, S.-J.** and Kim, S.-J., 2020, Complete mitochondrial genome of the hydrothermal vent provannid snail *Alviniconcha boucheti* (Gastropoda: Abysochrysoidea) from the North Fiji Basin. *Mitochondrial DNA B*, 5(2), 1848-1849.
- Kim, R.-O., Won, E.-J., Kang, H.M., **Ju, S.-J.** and Kim, S.-J., 2019, Patterns of Gene Expression Variation across Body Parts of the Hydrothermal Vent Shrimp *Nautilocaris saintlaurentae*. *Ocean Sci. J.*, 54(4), 595-609.
- Suh, Y.J., Diefendorf, A.F., Bowen, G.J., Cotton, J.M. and **Ju, S.-J.**, 2019, Plant wax integration and transport from the Mississippi River Basin to the Gulf of Mexico inferred from GIS-enabled isoscapes and mixing models. *GEOCHIMICA ET COSMOCHIMICA ACTA*, 257, 131-149.
- Lee, W.-K., Kang, H.M., Chan, B., **Ju, S.-J.** and Kim, S.-J., 2019, Complete mitochondrial genome of the hydrothermal vent stalked barnacle *Vulcanolepas fijiensis* (Cirripedia, Scalpelliforms, Eolepadidae). *Mitochondrial DNA B*, 4(2), 2725-2726.
- Lee, W.-K., Kim, S.-J., **Ju, S.-J.** and Hou, B.K., 2019, Complete mitochondrial genome of the hydrothermal vent shrimp *Rimicaris variabilis* (Decapoda: Caridea: Alvinocarididae) from the North Fiji basin. *Mitochondrial DNA B*, 4(2), 3475-3476.
- Lee, W.-K., Kim, S.-J., Hou, B.K., Van Dover, C. and **Ju, S.-J.**, 2019, Population genetic differentiation of the hydrothermal vent crab *Austinograea alayseae* (Crustacea: Bythograeidae) in the Southwest Pacific Ocean. *PLOS ONE*, 14(4)

- Chan, B., **Ju, S.-J.** and Kim, S.-J., 2019, A new species of hydrothermal vent stalked barnacle *Vulcanolepas* (Scalpelliformes: Eolepadidae) from the North Fiji Basin, Southwestern Pacific Ocean. *Zootaxa*, 4563(1), 135-148.
- Kim, H., **Ju, S.-J.**, Kang, J.-H. and Shin, K.-H., 2019, Diet source of *Euphausia pacifica* revealed using carbon- and nitrogen-stable isotopes in the Yellow Sea Cold Water Mass in summer. *J. Oceanogr.*, 75(1), 51-59.
- Kim, R.-O., Chan, B.K., Hou, B.K., **Ju, S.-J.** and Kim, S.-J., 2019, Complete mitochondrial genome of the deep-water epibiotic stalked barnacle, *Glyptelasma annandalei* (Cirripedia, Lepadiformes, Poecilasmatidae). *Mitochondrial DNA B*, 4(1), 99-100.
- Kim, S.-J., Lee, W.-K., Kim, R.-O. and **Ju, S.-J.**, 2018, Complete mitochondrial genome of the hydrothermal vent barnacle *Eochionelasmus ohtai* (Cirripedia, Thoracica). *Mitochondrial DNA B*, 3(1), 46-47.
- Oh, C., Kim, J.K., Son, Y.B., **Ju, S.-J.**, Jeung, H.D., Yang, H.S., Choi, K.S., Le Moullac, G. and Kang, D.H., 2017, Phylogenetic, histological and age determination for investigation of non-native tropical black-lip pearl oyster, *Pinctada margaritifera*, settled in jeju, Korea. *Ocean Sci. J.*, 52(4), 593-601.
- Badejo, A.O., Hyun, S., Kim, W., **Ju, S.-J.** and Song, B., 2017, Sources and distribution of allochthonous organic matter in surface sediment from the Seomjin River to the southern inner shelf of Korea. *Ocean Sci. J.*, 52(4), 489-499.
- Badejo, A.O., Seo, I., Kim, W., Hyeong, K. and **Ju, S.-J.**, 2017, Effect of eolian Fe-supply change on the phytoplankton productivity and community in central equatorial Pacific Ocean during the Pleistocene: A lipid biomarker approach. *Organic Geochem.*, 112, 170-176.
- Kim, S.-J., Kim, J.-H. and **Ju, S.-J.**, 2017, Adaptation responses of individuals to environmental changes in the ciliate *Euplotes crassus*. *Ocean Sci. J.*, 52(1), 127-138.
- Ahn, D.-H., Kim, S.-J., **Ju, S.-J.** and Min, G.-S., 2017, A new species of *Paraglypturus* (Crustacea: Decapoda: Axiidea: Callinassidae) from a vent field in the Tonga Arc of the south-western Pacific Ocean. *J. Mar. Biol. Assoc. U.K.*, 97(1), 105-111.
- Ko, A.-R., **Ju, S.-J.**, Choi, S.-G. and Shin, K.-H., 2016, The feasibility of assessing the diets of minke whale (*Balaenoptera acutorostrata*) in the East Sea through fatty acid composition in blubber and stable isotopic ratio of skin. *Ocean Sci. J.*, 51(3), 397-410.
- Hyun, B., **Ju, S.-J.**, Ko, A.-R., Choi, K.-H., Jung, S. W., Jang, P.-G., Jang, M.-C., Moon, C. H. and Shin, K., 2016, Thermal Effects on the Growth and Fatty Acid Composition of Four Harmful Algal Bloom Species: Possible Implications for Ichthyotoxicity. *Ocean Sci. J.*, 51(3), 1-10.
- Kim, H. J., Kim, J., Pak, S. J., **Ju, S.-J.**, Yoo, C. M., Kim, H. S., Lee, K. Y. and Hwang, J., 2016. Geochemical characteristics of sinking particles in the Tonga arc hydrothermal vent field, southwestern Pacific. *Deep-Sea Res. I*, 116(1), 118-126.
- Nosworthy, R., Hong, H.-K., Keshavmurthy, S., Lee, H.-J., **Ju, S.-J.**, Kim, J.-B., Jung, S., Kang, C.-K. and Choi, K.-S., 2016, An assemblage of mollusks associated with the high latitude scleractinian coral *Alveopora japonica* (Eguchi 1968) in Jeju Island, off the south coast of Korea. *Ocean Sci. J.*, 51(1), 21-31.
- Vieira, C., Keshavmurthy, S., **Ju, S.-J.**, Hyeong, K., Seo, I., Kang, C.-K., Hong, H.-K., Chen, C. A. and Choi, K.-S., 2016, Population dynamics of a high-latitude coral *Alveopora japonica* Eguchi from Jeju Island, off the southern coast of Korea. *J. of Mar. & Fresh. Res.*, 67(5), 594-604.
- Ko, A.-R., Yang, E. J., Kim, M.-S. and **Ju, S.-J.**, 2016, Trophodynamics of euphausiids in the Amundsen Sea during the austral summer by fatty acid and stable isotopic signatures. *Deep-Sea Res. II*, 123, 78-85.
- Jeon, S.-M., Kim, J. H., Kim, T. H., A., Park, Ko, A.-R., **Ju, S.-J.**, Heo, S.-J., Oh, C., Affan, M. A., Shim, W.-B. and Kang, D.-H., 2015, Morphological, Molecular, and Biochemical Characterization of Monounsaturated Fatty Acids-Rich Chlamydomonas sp. KIOST-1 Isolated from Korea. *J. Microbiol. Biotechnol.*, 25(5), 723-731.
- Kim, S.-J., Moon, J.-W. and **Ju, S.-J.**, 2015, Complete mitochondrial genome of the blind vent crab *Gandalfus puia* (Crustacea: Bythograeidae) from the Tonga Arc. *Mitochondrial DNA*, DOI: 10.3109/19401736.2015.1046162 (on line).
- Lee S., Kim, S.-J., **Ju, S.-J.**, Pak, S.-J., Son, S.-K., Yang, J. and Han, S., 2015, Mercury accumulation

- in hydrothermal vent mollusks from the Southern Tonga Arc, Southwestern Pacific Ocean. *Chemosphere*, 127(1), 246-253.
- Kim, J. H., Affan, M. A., Jang, J., Kang, M.-H., Ko, A.-R., Jeon, S.-M., Oh, C., Heo, S.-J., Lee, Y.-H., **Ju, S.-J.** and Kang, D.-H., 2015, Morphological, molecular, and biochemical characterization of astaxanthin-producing green microalga *Haematococcus* sp. KORDI03 (Haematococcaceae, Chlorophyta) isolated from Korea. *J. Microbiol. Biotechnol.*, 25(2), 238-246.
- Kim, S.-J., Kim, J., Ahn, D.-H., **Ju, S.-J.**, Min, G.-S. and Kim, S., 2014, Complete mitochondrial genome of the hydrothermal vent ghost shrimp *Paraglypturus tonganus* (Crustacea, Axiidea, Callianassidae). *Mitochondrial DNA*, DOI: 10.3109/19401736.2014.928860 (on line).
- Feinberg, L. B., Shaw, C. T., Peterson, W. T., Decima, M., Okazaki, Y. and **Ju, S.-J.**, 2013, *Euphausia pacifica* brood sizes: a North Pacific synthesis. *J. Plank. Res.*, 36(6), 1192-1206.
- Kim, S.-J., Kim, H. S. and **Ju, S.-J.**, 2013, Mitochondrial genome of the hydrothermal vent crab *Austinograea alayseae* (Crustacea: Bythograeidae): Genetic differences between individuals from Tofua Arc and Manus Basin. *Mitochondrial DNA*, DOI: 10.3109/19401736.2013.800489 (on line).
- Kim, S.-J., Lee, K. Y. and Ju, S.-J., 2013, Nuclear mitochondrial pseudogenes in *Austinograea alayseae* hydrothermal vent crabs (Crustacea: Bythograeidae): effects on DNA barcoding. *Mol. Ecol. Resour.*, 13, 781-787.
- Uddin, M. J., Jeung, H.-D., Yang, H.-S., Kim, B.-K., Ju, S.-J. and Choi, K.-S., 2013, Quantitative assessment of Reproductive effort of the Manila clam *Ruditapes philippinarum* (Adams & Reeve, 1850) in a lagoon in Jeju Island, Korea using enzyme-linked immunosorbent assay (ELISA). *Invertebrate Reproduct. & Develop.*, 57(4), 316-324.
- Collins, P. C., Kennedy, B., Copley, J. C., Marsh, L., Nye, V., Boschen, R., Fleming, N., Ju, S.-J., Lindsay, D., Watanabe, H., Yamamoto, H., Carlsson, J., and Thaler, A. D., 2013, VentBase: Developing a consensus among stake holders in the deep-sea regarding environmental impact assessment for deep-sea mining- A workshop report. *Mar. Policy*, 42, 334-336.
- Yang, E. J., Ju, S.-J. and Choi, J.-K., 2010, Feeding activity of the copepod *Acartia hongii* on phytoplankton and microzooplankton in Gyeonggi Bay, Yellow Sea. *Estuar. Coast. Shelf Sci.*, 88, 292-301.
- Harvey, H. R., Ju, S.-J., Son, S.-K., Feinberg, L. R., Shaw, C. T. and Peterson, W. T., 2010, The biochemical estimation of age in Euphausiids: Laboratory calibration and field comparisons. *Deep-Sea Res. II*, 57 (7), 663-671.
- Ju, S.-J., Kang, H.-K., Kim, W. and Harvey, H. R., 2009, Comparative lipid dynamics of euphausiids from the Antarctic and Northeast Pacific Oceans. *Mar. Biol.*, 156 (7), 1459-1473.
- Puckett, B. J., Secor, D. H. and Ju, S.-J., 2007, Validation and application of lipofuscin-based age determination for Chesapeake Bay blue crabs. *Trans. Am. Fish. Soc.* 137 (6), 1637-1649.
- Harvey, H. R., Secor, D. H. and Ju, S.-J., 2008, The use of extractable lipofuscin for age determination of crustaceans: Reply to Sheehy (2008), *Mar. Ecol.-Prog. Ser.*, 353, 307-311.
- Torres, J. J., Daly, K., Harvey, H. R., Ju, S.-J., Quetin, L. B., Ross, R. M. and Gallagher, S. M., 2007, The physiology of autumn and winter krill (*Euphausia superba*) in the waters of the Western Antarctic Peninsula Shelf. *Global International Newsletter*, 13(1), 60 -62.
- Ju, S.-J., Gómez-Gutiérrez, J., Peterson, W. T. and Harvey, H. R., 2006, The role of lipid during embryonic development and sedimentation in eggs of the euphausiids *Euphausia pacifica* and *Thysanoessa spinifera*. *Limnol. & Oceanogr.*, 51(5), 2398-2408.
- Ju, S.-J. and Harvey, H. R., 2004, Nutritional condition of the Antarctic krill, *Euphausia superba* and *Euphausia crystallorophias*, during austral winter. *Deep-Sea Res. II*, 51, 2199-2214.
- Ju, S.-J., Scolari, K., Daly, K. and Harvey, H. R., 2004, Understanding trophic roles of Ctenophore *Callianira antarctica* in Antarctic ecosystem using lipid biomarkers. *Polar Biol.*, 27(12), 782-792.
- Shin, K., Jang, M.-C., Jang, P.-K., Ju, S.-J. and Chang, M., 2003, Influence of food quality on egg production and viability of marine planktonic copepod *Acartia omorii*. *Prog. Oceanogr.*, 57, 265-277.
- Ju, S.-J., Secor, D. H. and Harvey, H. R., 2003, Demographic assessment of the blue crab (*Callinectes sapidus*) in Chesapeake Bay using extractable lipofuscins as age markers. *Fisher. Bull.*, 101(2), 312-320.
- Ju, S.-J., Secor, D. H. and Harvey, H. R., 2001. Growth rate variability and lipofuscin accumulation

- rates in the blue crab, *Callinectes sapidus*. *Mar. Ecol.-Prog. Ser.*, 224, 197-205.
- Ju, S.-J., Secor, D. H. and Harvey, H. R., 1999. The use of extractable lipofuscin for age determination of the blue crab, *Callinectes sapidus*. *Mar. Ecol. -Prog. Ser.*, 185, 171-179.
- Ju, S.-J., Kucklick, J. R., Kozlova, T. and Harvey, H. R., 1997, Lipid accumulation and fatty acid composition during maturation of three pelagic fish species in Lake Baikal. *J. Great Lake Res.*, 23(3), 241-253.

Papers in Domestic Peer Reviewed Journals (in Korean)

- Lee, W.-K., Lee, G.H., Ju, S.-J. and Kim, S.-J., 2021, Additional Records of the Hydrothermal Vent Scale Worm Branchinotogluma segonzaci (Polynoidae: Lepidonotopodinae) from the North Fiji Basin and Tonga Arc. *J. of Korean Soc. of Systematic Zoology*, 37(4), 273-279.
- Park, C., Lee, W.-K., Kim, S.-J. and Ju, S.-J., 2020, DNA Barcoding of Isaacsicalanus paucisetus (Copepoda: Calanoida: Spinocalanidae) from the Hydrothermal Vent in the North Fiji Basin, Southwestern Pacific Ocean. *J. of Korean Soc. of Systematic Zoology*, 35(1), 182-184.
- Lee, W.-K., Ju, S.-J., Heo, B. and Kim, S., 2019, DNA Barcoding for the Hydrothermal Vent Crab Austinograea Species (Crustacea: Bythograeidae) from the North Fiji Basin, Southwestern Pacific Ocean. *J. of Korean Soc. of Systematic Zoology*, 35(1), 30-32.
- Park, C., Ju, S.-J., Park, W., Kim, H.-W., Lee, S.R. and Park, J.-H., 2018, The strategy of population maintenance by coastal copepod inferred from seasonal variations in abundance of adults and resting eggs. *Ocean & Polar Res.*, 40 (4), 213-222.
- Yoon, H., Ko, A.-R., Kang, J.-H., Choi, J. K. and Ju, S.-J., 2016, Diet of Chaetognaths *Sagitta crassa* and *S. nageae* in the Yellow Sea inferred from gut content and fatty acid analyses. *Ocean & Polar Res.*, 38 (1), 35-46.
- Son, J.-W., Kim, K. H., Kim, H. J., Ju, S.-J. and Yoo, C. M., 2014, Evaluation of Similarity of Water Column Properties and Sinking Particles between Impact and Preserved Sites for Environmental Impact Assessment in the Korea Contracted Area for Manganese Nodule Development, NE Pacific. *Ocean & Polar Res.*, 36 (4), 423-435.
- Ko, A.-R., Kim, M.-S. and Ju, S.-J., 2013, Understanding the Nutritional Sources of Gastropods and Anomura from the Mangrove Forest of Weno Island, Micronesia. *Ocean & Polar Res.*, 35 (4), 427-439.
- Ju, S.-J. and Kim, S.-J., 2013, Assessment of the Impact of Climate Change on Marine Ecosystem in the South Sea of Korea II, *Ocean & Polar Res.*, 35 (2), 123-125.
- Kang, D.-H., Heo, S.-J., Oh, C., Ju, S.-J., Jeon, S.-M., Choi, H.-W., Noh, J. H., Park, S. H. and Kim, T.-Y., 2012, Review on Major Factors for Microalgae Biofuel Commercialization. *Ocean & Polar Res.*, 34 (4), 365-384.
- Noseworthy, R. G., Mondol, M. R., Ju, S.-J. and Choi, K.-S., 2012, The Occurrence of Clithon retropictus (von Martens in Kobelt, 1879) (Gastropoda: Neritidae) in Jeju Island, Republic of Korea. *Korean J. Malacol.* 28(2), 81-90.
- Kim, Y.-O., Noh, J.-H., Lee, T.-H., Jang, P.-G., Ju, S.-J. and Choi, D.-L., 2012, Using Tintinnid Distribution for Monitoring Water Mass Changes in the Northern East China Sea. *Ocean & Polar Res.*, 34 (2), 219-228.
- Kang, Y. H., Ju, S.-J. and Park, Y.-G., 2012, Predicting Impacts of Climate Change on Sinjido Marine Food Web. *Ocean & Polar Res.*, 34 (2), 239-251.
- Ju, S.-J. and Kim, S.-J., 2012, Assessment of the impact of climate change on marine ecosystem in the South Sea of Korea. *Ocean & Polar Res.*, 34 (2), 197-199.
- Son, Y. B., Ryu, J. H., Noh, J. H., Ju, S.-J. and Kim, S.-H., 2012, Climatological variability of satellite-derived sea surface temperature and chlorophyll in the South Sea of Korea and East China Sea. *Ocean & Polar Res.*, 34 (2), 201-218.
- Cha, I.-T., Park, S.-J., Kim, J.-G., Jung, M.-Y., Kim, S.-J., Ju, S.-J., Kwon, K. K. and Rhee, S.-K., 2012, Identification of Anaerobic Thermophilic *Thermococcus* Dominant in Enrichment Cultures from a Hydrothermal Vent Sediment of Tofua Arc. *Kor. J. Microbiol.*, 48(1), 42-47.
- Ju, S.-J., Ko, A.-R. and Lee, C. R., 2011, Latitudinal variation of nutritional condition and diet for copepod species, for *Euchaeta* sp. and *Pleuromamma* spp., from the Northwest Pacific Ocean

- using lipid biomarkers. *Ocean & Polar Res.*, 33 (3), 349-358.
- Ko, A.-R., Ju, S.-J., Moon, D.-Y., Choi, S.-G., Kim, Z. G. and Shin, K.-H., 2011, Stratification of Lipid Content and Composition in Blubber of Marine Cetacean from Korean Waters. *Ocean & Polar Res.*, 33 (1), 35-43.
- Kim, H. S., Ju, S.-J. and Ko, A.-R., 2010, Comparisons of Feeding Ecology of *Euphausia pacifica* from Korean Waters Using Lipid Composition. *Ocean & Polar Res.*, 32 (2), 165-175.
- Ko, A.-R., Ju, S.-J. and Lee, C. R., 2009, The Physiological and Ecological Comparisons between Warm (*Pleuromamma* sp.) and Cold Water Copepod Species (*Neocalanus plumchrus*) in the Northwestern Pacific Ocean Using Lipid Contents and Compositions. *Ocean & Polar Res.*, 31 (1), 121-131.
- Yang, E. J., Ju, S.-J. and Kim, W.-S., 2008, Regional Comparisons of Heterotrophic Protists Grazing Impacts and Community in Northwest Pacific Ocean. *Ocean & Polar Res.*, 30 (3), 289-301.
- Chi, S.-B., Lee, H.-B., Hyeong, K., Ju, S.-J., Lee, G. C. and Ham, D. J., 2008, Geotechnical Properties of Pelagic Red Clay in Northeast Equatorial Pacific. *The Sea, J. Kor. Soc. Oceanogr.*, 13 (3), 286-294.
- Lee, H.-B., Chi, S.-B., Park, C.-K., Kim, K.-H., Ju, S.-J. and Oh, J.-K., 2008, Contrasting Physical Properties of Surface Sediments of the KR (Korea Reserved) 1, 2, and 5 Areas, Northeastern Equatorial Pacific. *The Sea, J. Kor. Soc. Oceanogr.*, 13 (3), 168-177.
- Son, J.-W., Son, S.-K., Ju, S.-J., Kim, K.-H., Kim, W.-S. and Park, Y.-C., 2007, Sources and distributions of dissolved organic matter by fluorescence method in the Northeastern Pacific Ocean. *Ocean & Polar Res.*, 29 (2), 87-99.
- Kim, K.-H., Son, S.-K., Son, J.-W. and Ju, S.-J., 2006, Methodological comparison of the quantification of total carbon and organic carbon in marine sediment. *J. Kor. Soc. Mar. Environ. Engineering*, 9(4), 235-242.
- Ju, S.-J., Harvey, H. R., Shin, H.-C., Kim, Y. and Kang, S.-H., 2004, A morphological approach to evaluate body shrinkage as an overwintering mechanism for Antarctic krill. *Ocean & Polar Res.*, 26(4):679-684.
- Ju, S.-J. and Harvey, H. R., 2002, Effects of temperature and heavy metals on extractable lipofuscin in the blue crab, *Callinectes sapidus*. *J. Kor. Soc. Oceanogr.*, 37 (4), 232-241.
- Hyun, J.-H., Ju, S.-J. and Harvey, H. R., 2002, Fecal contamination associated with local reclamation activity in the Han River Estuary. *J. Kor. Soc. Oceanogr.*, 37 (4), 224-231.
- Ju, S.-J., 1997. Review; The silver cycle and fluxes in the Ocean. *J. Kor. Soc. Oceanogr.*, 32 (3), 156-161.

Book contributions

- 'Oceanography of the East Sea (Japan Sea)' (2015) published by Springer: Editor and coauthor
- 'Deep-sea: Treasure of Resources' (2015), published by KIOST: coauthor
- 'Understanding nutritional sources for gastropods and anomura from mangrove forest' (2014), published by KIOST: chapter corresponding author
- 'Ocean Science Series III (2nd ed)' (2012), published by KIOST: coauthor

CURRICULUM VITAE

Michael Imran Kanu, SJD

I. PERSONAL INFORMATION

Profession: Lawyer (international law, contracts)

Date of Birth: 28 May 1985

Nationality: Sierra Leonean

Languages: English, French (basic), Krio

II. PROFESSIONAL EXPERIENCE

1. **Ambassador and Deputy Permanent Representative for Legal Affairs at the Permanent Mission of the Republic of Sierra Leone to the United Nations in New York (2018 - To date):** Current work portfolio covers representation and engagement in the Sixth (Legal) Committee of the United Nations General Assembly; the work of, inter alia, the International Law Commission, the United Nations Commission for International Trade Law (UNCITRAL), oceans and law of the sea issues including the meetings of the States Parties to the United Nations Convention on the Law of the Sea, the Ad Hoc Working Group of the Whole on the Regular Process, and the Open-ended Informal Consultative Process on Oceans and the Law of the Sea, and the International Seabed Authority (ISA). Relevant activities and leadership roles include:
 - President of the United Nations Convention on the Law of the Sea (UNCLOS), 29th Meeting of the States Parties, 17-19 June 2019 (SPLOS 29). Successfully presided over the commemoration of the 25th anniversary of the entry into force of UNCLOS.
 - Alternate representative of Sierra Leone in the Intergovernmental Conference on an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction on BBNJ; and coordinator of the Legal Experts of the African Group on BBNJ.
 - Head of Sierra Leone delegation/alternate representative since 2018 respectively, International Seabed Authority (ISA) Council and Assembly meetings, including in the negotiations of the comprehensive set of rules, regulations and procedures issued by the ISA to regulate prospecting, exploration and exploitation of marine minerals in the international seabed Area (the "Mining Code").
 - Lead of the African Member States of Council of the ISA in the Informal Working Group on Inspection, Compliance and Enforcement in the elaboration of the ISA's "Mining Code".
 - Head of Sierra Leone delegation/alternate representative and technical lead since 2018 respectively, United Nations Commission on International Trade Law (UNCITRAL) Working Group III on Investor-State Dispute Settlement (ISDS) reform; and coordinator of the Legal Experts of the African Group in New York on UNCITRAL Working Group III on ISDS reform.

2. **Managing Partner, Kanu & Associates** (formerly Cole, Kanu & Partners), **Sierra Leone (2017 – 2018)**: Co-founded and managed a commercial and public interest law firm in Sierra Leone (see [website](#)). Relevant projects included:
 - Climate Information and Early Warning System Project: Lead Researcher in the Sierra Leone Environment Protection Agency's research project on 'Climate Information Integrated into Development Plans and Early Warning System (EWS): Review of Relevant Laws in Sierra Leone and Recommendations for the Integration of Climate Risk into National Policies and Plans'. Projected supported by the Global Environment Facility, United Nations Development Programme and Climate Information and Early Warning Systems Secretariat.
 - Judicial Training Curriculum: Developed the 'Training Curriculum on Environmental Law for Judges and Magistrates in Sierra Leone', Judicial and Legal Training Institute (October 2018).
 - Community Based Justice in Sierra Leone: Legal Expert, research project on 'Understanding Costs and Benefits of Community-Based Justice Services in Sierra Leone'. Project supported by Open Society Justice Initiative for West Africa, International Development Research Council and Open Society Initiative (OSI).
3. **Prosecutor of the Anti-Corruption Commission of the Republic of Sierra Leone (2011 – 2015)**: Prosecuted cases for and on behalf of the Anti-Corruption Commission in the courts of superior judicature in Sierra Leone; prepared legal memoranda, motions, appeals, reviewed case materials, undertook case analyses and conducted legal research and interviews. Activities included:
 - Successfully prosecuted and secured the conviction in the following corruption cases: *State vs. Dr. Magnus Ken Gborie, Dr. Edward Magbity, and Lansana S.M. Roberts (2014)*; *State vs. Rev. Hassan Mansaray and Abduls Aziz Bangura (2013)*; *State vs. Mark George (2012)*, and *State vs. Isaac Sheriff (2011)*.
 - Staff Editor (previously Research Assistant), *Digest of Jurisprudence – The SL Anti-Corruption Act, 2008*, (ACC, 2013).
 - Presented the Commission's Position Paper to the Legislative Committee of the National Parliament on the *National Public Procurement Bill*, August 2014, principally objecting to waiver provisions adjudged to potentially weaken integrity and transparency in the public procurement process.
4. **Secretary (part time) of the General Legal Council of the Republic of Sierra Leone (2011 – 2015)**: The General Legal Council (Council) is the regulatory authority with respect to the legal profession and legal practice in Sierra Leone. Primary duties included managing the Secretariat, coordinating and facilitating the implementation of the Council's functions as required by the Legal Practitioners Act 2000 (as amended). Also provided secretariat services to Council and the Disciplinary Committee for legal practitioners, and administered the registration of legal practitioners in Sierra Leone.

5. **Partner** (previously Associate), **M. S. Turay & Associates, Spancho Chambers, Freetown, Sierra Leone (2008; 2010 – 2011)**: Contract review, drafting and registration of legal instruments, banking legal compliance, developed appropriate training programs to enhance staff legal compliance and court representation. Relevant consultancies and projects included:
 - ClasLegal (Sierra Leone) Consultant – Part of the team that advised Sierra Leone subsidiary of Maltese and Swiss parent companies in a USD \$360 million renewable ethanol bio-fuel project in Sierra Leone. Advised the local subsidiary of a mining equipment leasing/rental company on a USD \$10 million credit facility. Led the legal advisory team in Sierra Leone in the acquisition of a leading cash crop farm; and initially advised on the compliance with Sierra Leone law of an iron ore mining company, including on a USD \$2 billion draw term facility and share acquisition by a foreign entity; and led the finance and restructuring of a multi-million USD agro-based project company.
 - Legal Consultant Ecobank Microfinance (formerly ProCredit Bank (SL) Limited - Advised parties on the legal and human resource management issues relating to the acquisition of ProCredit by Ecobank, April to June 2010.
6. **Legal Officer, Procredit Bank (SL) Limited, Freetown, Sierra Leone (2009 – 2010)**: Contract review, drafting and registration of legal instruments, banking legal compliance, developed appropriate training programs to enhance staff legal compliance and court representation.
7. **Visiting Associate, White & Case LLP, London, England (2009)**: This was done through the International Lawyers for Africa (ILFA) secondment program. ILFA is a UK charity whose mission is to provide work experience in top law firms in the UK, Dubai and Africa, combined with training in international law and key legal practice skills to lawyers chosen on a competitive basis from across Africa.

III. EDUCATION

1. **Doctoral of Juridical Science in International Business Law (SJD)**, Central European University (CEU),¹ Budapest, Hungary, 2015 – 2018. Dissertation Title: *Access to Credit and Personal Property Security Law Reforms in the Least Developed Countries (LDCs): Examining the Legal Framework in Sierra Leone with Comparative Perspectives from England and the United States*, graded *summa cum laude*. Selected activities and honours:
 - CEU Award for Advance Doctoral Students, 2017/2018 academic year (AY).
 - Visiting Scholar, Columbia Law School, Columbia University of New York, January - April 2018.
 - Junior Academic Visitor, Harris Manchester College, Oxford University, January – February 2017.
 - CEU Academic Achievement Award for First-Year Doctoral Students, 2015/16 AY.
 - Co-Convener, Africa Research Group, Central European University.
2. **Master of Laws in International Business Law (LL.M)**, Central European University, Budapest, Hungary (2014 – 2015):

¹ The University has an absolute charter from the Board of Regents of the State of New York (US) and is accredited by the Middle States Commission on Higher Education in the US. <http://www.msche.org/Documents/SAS/119/Statement%20of%20Accreditation%20Status2.htm>

3. **Degree of Utter Barrister (B.L)**, Sierra Leone Law School, Freetown, Sierra Leone (2007– 2008).
Selected activities & honours:
 - Best performance prize in contract law.
 - Best performance prize in equity and trusts.
4. **Bachelor of Laws with Honours (LL.B)**, Fourah Bay College, University of Sierra Leone (2003 – 2007):

IV. **RELEVANT FELLOWSHIP, PROFESSIONAL & OTHER TRAININGS**

1. **United Nations International Law Fellow**, United Nations International Law Fellowship Programme, The Hague, Netherlands July-August 2019; and **Summer Courses on Public International Law**, The Hague Academy of International Law.
2. **Certificate in Energy Transition, Geopolitics & Urban Security**, University of Groningen Summer Schools, the Netherlands September 2016.
3. **Accelerated Route to Membership (International Commercial Arbitration)**, Chartered Institute of Arbitrators (CI Arb), England, December 2013.

V. **RELEVANT PEER-REVIEWED JOURNALS AND OTHER PUBLICATIONS**

1. Phillip J. Turner, Sophie Cannon, Sarah DeLand, James P. Delgado, David Eltis, Patrick N. Halpin, Michael I. Kanu, Charlotte S. Sussman, Ole Varmer, Cindy L. Van Dover, 'Memorializing the Middle Passage on the Atlantic seabed in Areas Beyond National Jurisdiction', *Marine Policy*, Volume 122, 2020, <https://doi.org/10.1016/j.marpol.2020.104254> (peer-reviewed).
2. Michael I. Kanu, 'The Legal Legacy of the Special Court for Sierra Leone: The Sierra Leone Perspective—When the Story Is as Important as the Storyteller.' *FIU Law Review* 15.1 (2021): 37 (solicited).
3. Michael I. Kanu, 'Unlocking the Sixth Committee's Potential to Act for Crimes Against Humanity as It Did for Genocide', *African Journal of International Criminal Justice*, Issue 2, 2020, 284 (solicited).
4. Michael I. Kanu, 'Towards a Purposeful Economic Integration in Africa: Free Movement of Persons in Lieu of Illegal Migration (2020 Journal of the African Union Commission on International Law (AUCIL), p.165 (peer-reviewed).
5. Michael I. Kanu, '70 Years of the International Law Commission, Its Future Role in the Changing Landscape of International Law and the Small-Developing States Nexus', (October 25, 2019). Florida International University Legal Studies Research Paper No. 13 FIU L. Rev. 1043 (solicited).
6. Michael I. Kanu, 'The Fight against Corruption in Sierra Leone: Challenges and Opportunities in the Jurisprudence', (2016) 2 *African Journal of International Criminal Justice (AJICJ)* 49 (peer-reviewed).

7. Michael I. Kanu, 'Not Too Big to Fail? - Towards a Corporate Rescue Culture in Sierra Leone: A Comparative Analysis', (2017) the General Legal Council (Sierra Leone) Law Journal (peer-reviewed).
8. Michael I. Kanu, 'Fighting Corruption in Sierra Leone: The Offence of Misappropriation of Public Funds, Revenue and Property Examined', (The General Legal Council (Sierra Leone) Law Journal 2016) 43 (peer-reviewed).
9. Michael I. Kanu, 'Charting a New Path to Commercial Arbitration: Sierra Leone to Accede to the New York Convention' (Kluwer Arbitration Blog, April 2017).
10. Michael I. Kanu, 'Post-Brexit UK and Free Trade with Sierra Leone: The Devil in the Details' Politico SL (Freetown, 30 August 2017).

VI. RELEVANT CONFERENCE PAPERS, PANELS AND PRESENTATIONS

1. Panellist, "African Union Workshop UNCITRAL Reform on Investor-State Dispute Settlement (ISDS) and the Stakes for African Member States", *organized by the African Union Office of Legal Counsel*, 8 November 2021.
2. Moderator, "An Interactive Dialogue on Past and Present Topics on the International Law Commission Agenda: State Responsibility, Sea-level Rise, Crimes Against Humanity and Jus Cogens", *Sixth Committee of the United Nations General Assembly side event co-hosted by Argentina, Cyprus, Kenya and Sierra Leone*, 1 November 2021.
3. Panellist, "Sierra Leone's Accession to the New York Convention: Significance, Opportunities, Challenges and the Next Steps", *organized by the Center for International Law and Policy in Africa (CILPA) and the Sierra Leone Bar Association (SLBA)*, 25 February 2021.
4. Speaker, "Transforming the Future: The Making of International Law", *Reconceptualizing International Law Series - Session 2, organized by Independent International Legal Advocates, Gibson, Dunn & Crutcher LLP, TWAIL Seminar at UCLA Law, and co-sponsored by Centre for International Law National University of Singapore*, 13 January 2021.
5. Speaker, "Draft BBNJ Agreement: Finance for Capacity Building Workshop", *Co-hosted by Guyana, Norway, Sierra Leone and the United Kingdom in collaboration with the Pew Charitable Trusts*, 29 October 2020.
6. Speaker, "High Seas: Shared Stewardship of Our Global Ocean", *United States Capitol Hill Ocean Week 2020 organized by the National Marine Sanctuary Foundation*, 9 June 2020.
7. Speaker, "Roundtable Focused on BBNJ Capacity Building", *BBNJ side-event organized by the Group of 77 and China in advance of the BBNJ IGC4*, 19 August 2019.
8. Panellist, "Legal Implications for Maritime Activities, Zones and Treaties: Effects of Changing Coastlines", *Panel Discussion hosted by the Asian African Legal Consultative Organization (AALCO)*, 25 March 2019.

Candidacy of Dr. Erasmo A. Lara Cabrera as Member to the Legal and Technical Commission of the International Seabed Authority for the period 2023-2028

Biographical and academic background

Erasmo A. Lara Cabrera was born in Mexico City. In 1995 he obtained his law degree from the National Autonomous University of Mexico (UNAM). He holds a Master in Laws (LLM) degree from the University of Cambridge (1996) and since 2001 has a Doctorate in Law (PhD) from the University of London, with specialization in international law.

Diplomatic career

He is member of Mexico's Foreign Service since 2004. At the Ministry of Foreign Affairs, he has held several positions, including Head of the International Law Section III at the Office of the Legal Advisor, Director-General for Human Rights and Democracy, among others. He has represented Mexico abroad as Legal Advisor at the Embassy in the Netherlands, as Permanent Alternate Representative at the Mission of Mexico to the United Nations in Vienna, and as Deputy Head of Mission and Consul at the Embassy of Mexico in Germany.

Trajectory in the field of international law and law of the sea

Dr. Erasmo Lara has been counsel and agent of Mexico before international courts, in both contentious and advisory proceedings. He has taken part in intergovernmental conferences and negotiations on issues related to the law of the sea at the United Nations General Assembly, the Meeting of States Parties to the United Nations Convention for the Law of the sea (UNCLOS) and the International Seabed Authority (ISBA).

He has also participated in working groups and specialized conferences related to maritime delimitation, sovereign rights and uses of maritime zones, including in Mexico and the Caribbean. He is a designated conciliator pursuant to Annex V of UNCLOS.

Since 2019 he is member to the Legal and Technical Commission (LTC) of the ISBA, and as such has made relevant contributions as per the normative and regulatory aspects of the work of the Commission, including by facilitating complex matters as it relates to the process for the elaboration of standards and guidelines for the Draft Regulations for the Exploitation of Mineral Resources in the Area, among others.

Publications

Dr. Lara Cabrera is the author of chapters in books on public and comparative law, as well as articles in national and international journals – such as the Mexican Journal of Foreign Policy, the Inter-American and European Human Rights Journal and the Journal of the Society of Advanced Legal Studies – on issues such as international environmental law, human rights and international criminal law.

Mexico and the International Seabed Authority

MAJOR CONFERENCE/SEMINAR PARTICIPATION

- ISA/ Intergovernmental Forum for Mining, Mineral and Sustainable Development (IGF) Webinar on Regulatory Framework for Deepsea Minerals
 - Presentation: Government Perspective on Seabed Mining (as a Small Island Developing State (SIDs) and new Sponsoring State), September 2021
- Pew/ Resolve Webinar, Assessing the Impact of Deep Seabed Mining in the Water Column
 - Presentation: Perspectives on considering and addressing the emerging science, September 2020
- Workshop on the Law of Treaties, Treaty Negotiation and Drafting with reference to CARICOM Member States, Caribbean Law Institute, University of the West Indies/Government of Canada
 - Paper presented: Core Provisions of Treaties in CARICOM, workshop outcome document was a manual CARICOM Member States, November 2018
- Yeosu Academy Law of the Sea, Republic of Korea (ROK)
 - Presentation: Structure and Functions of the ISA, August 2018
- Commonwealth Secretariat: Commonwealth Caribbean Working Session on Maritime Boundaries and Ocean Governance; London (2016)
 - Paper Presented: Defining Our Borders- Jamaica's Strategy for Delimitation

Represented the Government of Jamaica at various seminars, workshops, and conferences (locally, regionally, and internationally). Presentations made on topics such as maritime delimitation, and environmental law and treaty implementation and particular challenges faced by small developing states in implementing international obligations.

EDUCATION

University of London

- Master of Laws (LLM), *University College, University of London*, United Kingdom, 1990

University of West Indies

- Certificate of Legal Education, *Norman Manley Law School*, Jamaica, 1991
- Bachelor of Laws Degree (Hons), *Cave Hill Campus*, Barbados, 1988

REFERENCES

Available upon request.

RESUME

YANG Shengxiong



Background Summary

A marine geoscientist focus on the research of deep sea minerals, marine gas hydrates, marine geology and geophysics, and marine Hi-Tec development. Especially, with more than 30 years of experience for deep sea mineral resources exploration on the Area.

Being the PI and chief geoscientist on the mineralization and evolution research of polymetallic ferromanganese nodules in CC area, Co-rich ferromanganese Crusts in west Pacific seamounts etc., has a wide range of experience and knowledge on deep sea mineral resources estimation.

Being a member of LTC of the ISA from 2018, familiar with the LTC community and operation procedure.

Education:

BA, Marine Geology and Geophysics, Shandong College of Oceanology(now named Ocean University of China), Qindao, China, 1985.

MSc, Marine Geology, Ocean University of Qingdao(now named Ocean University of China), Qingdao, China, 1988.

PhD, Marine Sedimentology, China University of Geosciences(Beijing), Beijing, China, 2004.

Professional Experience:

- | | |
|--------------|---|
| 2020-present | PI of the Program “Deep-Sea exploration innovation”, China Geological Survey. |
| 2005-2020 | Chief Geoscientist and research professor, Guangzhou Marine Geological Survey(GMGS), China Geological Survey(CGS). |
| 2001-2005 | Deputy Chief Geoscientist and research professor, Guangzhou Marine Geological Survey(GMGS), China Geological Survey(CGS). |
| 2000-2000 | Chief Geoscientist and senior marine geologist, Second Marine Geological Investigation Brigade, GMGS. |

- | | |
|-----------|--|
| 1994-1999 | Senior Marine Geologist, Second Marine Geological Investigation Brigade, GMGS. |
| 1988-1994 | Marine geologist, Second Marine Geological Investigation Brigade, GMGS. |

Research Experience:

- | | |
|--------------|---|
| 2016-present | PI of the Program “Deep-Sea exploration innovation”, China Geological Survey. |
| 2012-2016 | Expert panels member of the subject “Marine Oil and Gas Resources Development Technology” of National High-Tec R&D Program. |
| 2009-2013 | Chief Scientist of the project “Research on the Enrichment Characteristics and Production Knowledge Base of Gas Hydrate” supported by National Basic Research Program. |
| 2007-2011 | Chief Scientist of the project “Deep Sea Mineral Resources Estimation Research on the Co-rich crusts and polymetallic nodules etc.”. |
| 2007-2010 | Expert Committees member of the priority “Sea Technology” of National High-Tec R&D Program. |
| 2001-2005 | Chief Scientist of the project “Deep Sea Mineral Resources Investigation and Estimation Research”. |
| 2001-2004 | Expert panels member of the subject “Marine Resources Development Technology” of National High-Tec R&D Program. |
| 2003-2004 | Visiting Scholar in Technical University of Berlin, Berlin, Germany, Research on Deep Sea Mineral Resources supported by BMBF, Germany. |
| 1993-1993 | Visiting Scholar in IFREMER and Ecole Nationale Supérieure des Mines de Paris, France, Research on Deep Sea multimetallic nodules Resources Estimation supported by the French Ministry of Foreign Affairs. |

Onboard Investigation Experience:

- | | |
|------|---|
| 2016 | Chief Scientist, Leg.1 of GMGS 2016 gas hydrate drilling expedition by M/V Voyager |
| 2015 | Chief Scientist, Leg.1 of GMGS 2015 gas hydrate drilling expedition by M/V Voyager |
| 2013 | Chief Scientist, Leg.1 of GMGS 2013 gas hydrate drilling expedition by M/V Rem Eive |
| 2012 | Chief Scientist, Deep Sea Mineral Resources Expedition, Leg.1 of cruise DY27 by R/V Haiyang Liuhao on Pacific |
| 2011 | Chief Scientist, Deep Sea Mineral Resources Expedition, Leg.1 of cruise |

DY23 by R/V Haiyang Liuha0 on Pacific

- 2007 Chief Scientist, Leg.2 of GMGS 2007 gas hydrate drilling expedition by M/V Bavenit in Shenhu Area
- 2004 Chief Scientist, Deep Sea Mineral Resources Expedition, Leg.2 of Cruise DY105-16 by R/V Dayang Yi Hao on Pacific
- 2003 Chief Scientist, Deep Sea Mineral Resources Expedition, Cruise DY105-13 by R/V Haiyang Si Hao on Pacific

Recent Publication and lecture:

- (1) Yang Shengxiong et al, *Research on Gas Hydrate Accumulation*, 2019, Science Press, Beijing, China
- (2) Shengxiong Yang, *Gas Hydrates R&D - Efforts and Future Plan*, 2018, Natural Gas Hydrate Systems, Gordon Research Conference, Galveston, Texas
- (3) Yang Shengxiong, Liang Jinqiang, Lu Jingan et al, *Petrophysical Evaluation of Gas Hydrate in Shenhu Area, China*, 2017, The 23rd Formation Evaluation Symposium of Japan
- (4) Yang Shengxiong, Liang Jinqiang, Liu Chanling, Sha Zhibin, *Progress on the Program of Marine Gas Hydrate Investigation, China Geological Survey*, 2017, 4(2):1-8. in Chinese with English abstract
- (5) Yang Shengxiong, Liang Jinqiang, Lei Yong, Gong Yuehua, Xu Huaning, Wang Hongbin, Lu Jingan, Melanie Holland, Peter Schultheiss, Wei Jiangong, and the GMGS4 Science Team, 2017, *GMGS4 Gas Hydrate Drilling Expedition, Fire in the Ice*, 17(1):7-11
- (6) Yang Shengxiong, Liang Jinqiang, Lu Jinan et al, *New Understanding on Characteristics and Controlling Factors of Gas Hydrate Reservoir in Shenhu Area*, *Earth Science Frontiers*, 2017, 24:1-24. in Chinese with English abstract
- (7) Yang sheng-Xiong, Long Xiao-Jun, Qi Qi et al, *The Mineralogical and Geochemical characteristics of Co-rich crusts from the western Pacific -taking the Co-rich crusts from Magellan and Marcus-wake seamounts as an example*, *Periodical of Ocean University of China*, 2016, 2:105-116. in Chinese with English abstract
- (8) Shengxiong YANG, Guangxue ZHANG, Ming ZHANG, Jinqiang LIANG, Jingan LU, Melanie HOLLAND, Peter SCHULTHEISS, *A COMPLEX GAS HYDRATE SYSTEM: RESULTS FROM DRILLING EXPEDITION GMGS2, 2014*, Proceedings of the 8th International Conference on Gas Hydrates (ICGH8-2014), Beijing, China

- (9) YANG Shengxiong, WANG Hongbin, ZHANG Guangxue, HE Gaowen, *New Achievement of Methane Hydrate R&D*, 2014, ISOPE-2014 BUSAN, KOREA, in English Abstract
- (10) YANG Shengxiong, ZHANG Haiqi, ZHANG Guangxue, ZHANG Ming, WANG Hongbin, XU Huaning, *Occurrence and Enrichment Characteristics of Gas Hydrate*, 2010 Western Pacific Geophysics Meeting, 2010, Taipei. in English abstract
- (11) Yang Shengxiong, Wang Hongbin, Xu Huaning, Zhang Baojin, *Seismic Reflection of the Nature Gas Hydrate*, Workshop on Geophysical Investigation by National Basic Research Program of China, 2009, Beijing. In Chinese
- (12) Shengxiong YANG, Haiqi ZHANG, Nengyou WU et al, *High Concentration Hydrate in Disseminated Forms Obtained in Shenhu Area*, ICGH 2008, 2008, Beijing
- (13) Yang Shengxiong, He Gaowen, Chen Bangyan, *The development on the marine mineral resources exploration and environmental inspecting*, in 2007 China High-tech development bulletin, Science Press, 2007, pp160-167. in Chinese
- (14) Yang Shengxiong, *Characteristics of the Cobalt-Rich Ferromanganese Crusts Resources on the Seamounts*, Seminar on the Minerals and Other Resources Found in Marine Areas Beyond the Limits of National Jurisdiction(the "Area"), 2007, Manado, Indonesia
- (15) Yang Shengxiong, *A Suggested Consideration to the Draft Regulation on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts*, Workshop on Mining Cobalt-rich Ferromanganese Crusts and Polymetallic Sulphides in the Area, ISA, 2006, Jamaica
- (16) Yang Shengxiong, Fu Xi, Wu Ya-dong and Wen Peng-fei, *The principle of least-squares-inverse filtering and its application in gas hydrate*, Acta Oceanologica Sinica, 2004, 3:75-81. in Chinese with English abstract
- (17) Yang Shengxiong, Chen Bangyan, Liu Feng, *Environment inspecting on the seafloor and the ocean mineral resources exploration and estimation*, in 2003 China High-tech development bulletin, Science Press, 2003, 141-147. in Chinese
- (18) Yang Shengxiong, He Gaowen, Guan Yongxian, Li Liqing, *The accurate processing of the Seabeam bathymetric data and geomorphology atlas of China pioneer area in east Pacific*, in 2001 Conference for ocean mineral resources by COMRA, China Ocean Press, Beijing, 2001, 201-209. in Chinese
- (19) Yang Shengxiong et al, *Development Aspect and Countermeasure of the Three-dimensional Exploration Technology for Marine Mineral Resources and Environments*, China Geology, 2001, 10-15. in Chinese with English abstract.

- (20) Yang Shengxiong, Zhang Guangxue, Zhang Ming, *The Key-Technology of the Gas Hydrates Exploration on the Deep Sea Water*, in 99 workshop in the development of marine high-tech, China ocean press, Beijing, 2001, 507-512. in Chinese with English abstract.

Since 2002, Mexico has been an important participant and contributor with the work of the ISBA, including through the participation of recognized Mexican experts¹ in the LTC, particularly in the environmental, geological and legal fields, including on the law of the sea. The specialization and professionalism of those Mexican nationals has strengthened the elaboration and finalization of procedures, criteria and recommendations,² including on the follow-up and effective supervision of exploration activities in the Area. For example, the participation of such experts assisted in the establishment of a centralized database of marine minerals, as well as in the elaboration of the Regional Environmental Management Plan (REMP) for the Clarion-Clipperton Fracture Zone.

Since 2019 and in only two years of membership to the LTC, the participation and commitment of Dr. Lara Cabrera have contributed in strengthening processes and contents of a series of priority guidelines and norms³ that the Council has deemed are necessary before exploitation activities in the seabed can start. Such normative framework will ensure that those activities are carried out in a way that is compatible with UNCLOS and the principle of Common Heritage of Mankind (CHM), where the preservation, conservation and sustainable use of the mineral resources of the seabed, on the basis of the best available scientific information, is of utmost importance.

Erasmus A. Lara Cabrera and the LTC

As member to the LTC, Dr. Lara Cabrera has strived to contribute to the work of the Commission having in mind the importance of the role of the LTC on the regulatory, normative and environmental aspects within the comprehensive regime established by the Convention and the Agreement for Part XI. In his opinion, the current situation makes it necessary for strive towards strengthening relevant institutions, and pursue the elaboration of the highest regulatory and environmental standards for activities in the Area, promote marine scientific research and national capacity-building, in addition to the continuous dialogue with all relevant stakeholders. In his vision, the role of the LTC within the framework of UNCLOS makes it a key component in the effective implementation of the "constitution for the oceans" and the principle of Common Heritage of Mankind.

Candidatura del Dr. Erasmo A. Lara Cabrera como miembro de la Comisión Jurídica y Técnica de la Autoridad Internacional de los Fondos Marinos para el periodo 2023-2028

Datos biográficos y vida académica

Erasmo A. Lara Cabrera nació en la Ciudad de México. Se graduó en Derecho por la Universidad Nacional Autónoma de México en 1995. Realizó estudios de Maestría en

¹ Dr. Colo Carrera Hurtado (2002-2006), Dr. Elva Escobar Briones (2007-2016), Mr. Alfonso Ascencio Herrera (2017), Mr. Alonso Martínez Ruiz (2018) and Dr. Erasmo Alonso Lara Cabrera (2019-present).

² Procedures and criteria for the extension of an approved plan of work for exploration; Recommendations regarding contractors' guidelines for reporting actual and direct exploration expenditures; Recommendations for the guidance of contractors and sponsoring States regarding training programs in accordance with the plans of work for exploration; Recommendations for the guidance of contractors regarding the content, format and structure of their annual reports; Recommendations for information from contractors with respect to the evaluation of the possible environmental effects of the exploration of marine minerals in the Area and Recommendations to guide contractors with respect to the transfer of areas subject to exploration contracts for polymetallic sulphides or crusts ferromanganese with high cobalt content.

³ Draft guidelines on the preparation and assessment of an application for the approval of a Plan of Work for exploitation; Draft standard and guidelines on the development and application of environmental management systems; Draft standard and guidelines on the form and calculation of an Environmental Performance Guarantee; Draft guidelines for the establishment of baseline environmental data; Draft standard and guidelines for the environmental impact assessment process; Draft guidelines for the preparation of environmental impact statements; Draft guidelines for the preparation of Environmental Management and Monitoring Plans; Draft guidelines on the tools and techniques for hazard identification and risk assessment; Draft standard and guidelines for the safe management and operation of mining vessels and installations; Draft standard and guidelines for aration and implementation of emergency response and contingency plans.

Derecho por la Universidad de Cambridge en 1996 y desde 2001 es Doctor en Derecho por la Universidad de Londres, con especialización en derecho internacional.

Carrera Diplomática

Miembro de carrera del Servicio Exterior Mexicano desde 2004. En México, ha ocupado los cargos de Director de Derecho Internacional III en la Consultoría Jurídica y Director General de Derechos Humanos y Democracia, entre otros. En el exterior, se ha desempeñado como Asesor Jurídico en la Embajada de México en Países Bajos, Representante Permanente Alterno en la Misión de México ante los Organismos Internacionales en Viena, así como Jefe de Cancillería y Cónsul en la Embajada de México en Alemania.

Trayectoria en el ámbito del derecho internacional y el derecho del mar

El Dr. Lara Cabrera ha sido asesor y agente de México ante cortes internacionales, en procedimientos contenciosos y consultivos. Ha participado en conferencias y negociaciones intergubernamentales sobre derecho del mar en la Asamblea General de las Naciones Unidas, en la Reunión de Estados Partes de la Convención de las Naciones Unidas sobre el Derecho del Mar (CONVEMAR), y en la propia Autoridad Internacional de los Fondos Marinos (AIFM).

Ha participado también en grupos de trabajo y conferencias especializadas relacionadas con cuestiones de delimitación marítima, derechos soberanos y uso y aprovechamiento de las zonas marinas, incluyendo con énfasis en México y el Caribe. Es conciliador conforme al Anexo V de la CONVEMAR.

Desde julio de 2019 es miembro de la CJT de la AIFM, en la que ha hecho contribuciones relevantes, incluyendo la facilitación de cuestiones complejas con relación al proceso de elaboración de estándares y directrices para el proyecto de Reglamento de Explotación de Minerales en la Zona, entre otros.

Publicaciones

El Dr. Lara Cabrera es autor de capítulos en libros en derecho público y comparado. Ha publicado artículos en revistas nacionales e internacionales – como la Revista Mexicana de Política Exterior, la Inter-American and European Human Rights Journal o la Journal of the Society of Advanced Legal Studies – en temas como derecho internacional ambiental, derechos humanos y derecho penal internacional.

México y la AIFM

Desde 2002, México ha contribuido directamente con los trabajos de la AIFM, incluyendo a través de la participación de destacados expertos mexicanos⁴ en las actividades de la CJT, particularmente en materia ambiental, geológica y de derecho del mar. La especialización

⁴ Dr. Galo Carrera Irujo (2002-2006), Dra. Elva Escobar Briones (2007-2016), Mto. Alfonso Ascencin Herrera (2017), Mto. Alonso Martínez Ruiz (2018) y Dr. Erasmo Alonso Lara Cabrera (2019-presente).

y profesionalismo de los nacionales mexicanos ha favorecido la elaboración y finalización de procedimientos, criterios y recomendaciones de importancia⁵ incluyendo en lo que toca a actividades de exploración en la Zona y su efectiva supervisión. Por ejemplo, la participación de los expertos mexicanos facilitó el establecimiento de una base central de datos de minerales marinos, además de contribuciones relevantes en la elaboración del Plan de ordenación ambiental para la zona de la fractura Clarion-Clipperton.

Desde 2019 y en tan sólo dos años, la participación y el compromiso del Dr. Lara Cabrera, se han traducido en contribuciones para el fortalecimiento de procesos y contenidos de una serie de proyectos de directrices y normas prioritarias⁶ que el Consejo ha determinado necesarias previo el inicio de actividades de explotación de los fondos marinos. Este marco normativo permitirá asegurar que estas actividades se lleven a cabo de manera compatible con la CONVEMAR y el principio de Patrimonio Común de la Humanidad (PCM), para lo que la preservación, conservación y uso sostenible de los recursos del fondo marino, con base en la mejor ciencia disponible, resulta de crucial importancia.

Erasmus A. Lara Cabrera y la CJT

El Dr. Lara Cabrera ha buscado contribuir con el trabajo de la CJT teniendo en mente la importancia de su papel en los aspectos regulatorios, normativos y ambientales dentro del régimen integral que estableció la CONVEMAR y el Acuerdo de la Parte XI. En su opinión, la actual coyuntura hace necesario avanzar en el fortalecimiento institucional, la elaboración de los más altos estándares regulatorios y ambientales para las actividades en la Zona, la promoción de la investigación científica marina y el fortalecimiento de las capacidades, en adición al diálogo constante con todos los actores relevantes. En su visión, el papel que juega la CJT en el andamiaje de la CONVEMAR la hace una pieza clave en la efectiva implementación de la “constitución de los océanos” y el principio del Patrimonio Común de la Humanidad.

⁵ Procedimiento y criterios para la prórroga de un plan de trabajo aprobado para la exploración; Recomendaciones relativas a las orientaciones de los contratistas para la presentación de informes sobre los gastos de exploración efectivos y directos; Recomendaciones para la orientación de contratistas y Estados patrocinadores relativas a los programas de capacitación de conformidad con los planes de trabajo para la exploración; Recomendaciones para orientar a los contratistas respecto al contenido, el formato y la estructura de sus informes anuales; Recomendaciones para información de los contratistas con respecto a la evaluación de los posibles efectos ambientales de la exploración de minerales marinos en la Zona y Recomendaciones para orientar a los contratistas con respecto a la cesión de áreas objeto de los contratos de exploración de sulfuros polimetálicos o costras de ferromanganeso con alto contenido de cobalto.

⁶ Proyecto de directrices sobre la preparación y evaluación de las solicitudes de aprobación de planes de trabajo para la explotación; Proyecto de norma y de directrices sobre desarrollo y la aplicación de sistemas de gestión ambiental; Proyecto de norma y de directrices sobre la forma y el cálculo de una garantía de desempeño ambiental; Proyecto de directrices para el establecimiento de datos ambientales de referencia; Proyecto de norma y de directrices para el uso de evaluación del impacto ambiental; Proyecto de directrices para la preparación de declaraciones de impacto ambiental; Proyecto de directrices para la preparación de planes de gestión y vigilancia ambientales; Proyecto de directrices sobre instrumentos y técnicas para la detección de amenazas y la evaluación de riesgos; Proyecto de norma y de directrices para la gestión y explotación seguras de los buques e instalaciones de minería y el Proyecto de norma y de directrices para la preparación y aplicación de planes de contingencia y respuesta de emergencia.

CURRICULUM VITAE (CVA)

Part A. PERSONAL INFORMATION

CV date 04/03/2022

First name	Adolfo		
Family name	Maestro-González		
Gender (*)	Male	Birth date (dd/mm/yyyy)	15/08/1968
<div style="background-color: black; width: 100%; height: 40px;"></div>			
		URL Web	
Open Researcher and Contributor ID (ORCID) (*)		000-0002-7474-725X	

(*) Mandatory

A.1. Current position

Position	Scientific Researcher		
Initial date	15/02/2021		
Institution	C.N. Instituto Geológico y Minero de España-CSIC		
Department/Center			
Country	Spain	Teleph. number	+34917287260
Key words	Structural Geology, Tectonic, Marine Geology, Tectonic Geomorphology, Marine Geophysics, Basin Analysis		

A.2. Previous positions (research activity interruptions, art. 14.2.b))

Period	Position/Institution/Country/Interruption cause
1994-1996	Research Fellow/Zaragoza University/Spain
1996-1998	Research Fellow/Instituto Geológico y Minero de España/Spain
1999-2000	Geology Freelancer/Instituto Geológico y Minero de España/Spain
2001-2002	Adjunct Professor/Autonomous University of Madrid/Spain
2001-2002	Senior Graduate/Instituto Geológico y Minero de España/Spain
2002-2021	Senior Scientist/Instituto Geológico y Minero de España/Spain
2003-present	Adjunct Professor/Autonomous University of Madrid/Spain
2017-2022	Elected member/Legal and Technical Commission-ISA/Jamaica

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD.	Zaragoza University/Spain	1999
MSc.	Zaragoza University/Spain	1994
BSc.	Zaragoza University/Spain	1992

Part B. CV SUMMARY (max. 5000 characters, including spaces)

Dr. Adolfo Maestro González, holder of a PhD in Earth Sciences from the University of Zaragoza (Spain) in 1999, is currently a Research Scientist at the Geological and Mining Institute of Spain (IGME), where he is developing his research in Marine Geology. In addition to his research experience, he is Adjunct Professor in Geology in Environmental Sciences and Biology in the Faculty of Science in the Autonomous University of Madrid from 2003. His research and technical experience is mainly focused on topics related to structural and marine geology. Within the structural geology discipline, the researches carried out have focused on the analysis of Cenozoic deformation at the macrostructural and mesostructural scale based on the brittle structures population analysis to establish stress tensors and determine the stress field(s) that has/have acted during the geodynamic evolution of the studied areas and determined the sedimentary basins tectonic evolution and geometry from seismic profiles interpretation (from ultra-high to multi-channel resolution). The studied areas are located in the northern and eastern part of the Iberian Peninsula and the northern part of the Antarctic Peninsula (South Shetland, South Orkney and James Ross archipelagos) and Tierra del Fuego. From the point of view of the studies related with marine geology, these have been developed fundamentally address in

the tectonic aspects related to the evolution of the Iberian Continental Margin, specifically in the Gulf of Cadiz, Galicia and Cantabrian margins, focusing the studies topics about the tectonic-sedimentation relationships and recent tectonic evolution in relation to the seabed morphostructural features. He has participated in twenty-five oceanographic cruises in the Iberian and Antarctica continental margins and adjacent abyssal plains, and in fifty research projects, of which he was/is Project leader/team coordinator of eleven, funded by the Spanish National Research Programme, the European Commission Framework Programme and IGME. He has also authored a total of 493 scientific-technical contributions: 65 publications in journals of international relevance (SCI), 65 publications in national and international journals, 9 international book chapters, 9 national books, 12 national book chapters, 57 scientific-technical reports, 77 geological and geophysical maps, 141 communications in international congresses, and 58 communications in national congresses. In addition, he has co-directed co-directed a doctoral thesis and three master's theses in aspects related to marine geology. Moreover, he was member of the Subcommittee for the Delimitation of the Continental Shelf of the Inter-ministerial Commission on International Maritime Policy for the Extension of the Spanish Continental Shelf of the Ministry of Foreign Affairs in 2003, and he is team coordinator for the IGME of the Spanish Exclusive Economic Zone Working Group from 2003 to present, member of the Marine Geology Expert Group of the EuroGeoSurveys from 2010 to 2019, member of the Spanish Delegation at the Council and Assembly of the International Seabed Authority from 2016 to present, and elected member of the Legal and Technical Commission of the International Seabed Authority from 2017 to 2022. He has participated in the projects evaluation at the Research Foundation Flanders (FWO) (2011); Comisión Técnica de Evaluación de Proyectos de Investigación, Programa Nacional de Investigación (2015-2016); Agencia Nacional de Evaluación y Prospectiva (ANEP) (2016, 2019, 2020 and 2021); Agencia Nacional de Evaluación y Prospectiva (ANEP), Ramón y Cajal Evaluation Committee, CTM-RYC-2019 (2020); and Agencia Nacional de Evaluación y Prospectiva (ANEP), Juan de la Cierva Incorporation Evaluation Committee, CTM-IJC-2020 (2021).

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions)

1. **Maestro, A.**, Jané, G., García-Mayordomo, J., Fernández-Revuelta, B., Rodríguez-Pascua, M.A., Martínez-Díaz, J.J., Pérez-López, R. 2011. Cause of the rupture and distribution of broken submarine carbonate chimneys in the Gulf of Cadiz (southwestern Spain). *Quaternary International*, 242, 240-253. DOI: 10.1016/j.quaint.2011.04.007. Índices de calidad: Factor de Impacto: **1.874**; Cuartil: **Q2**; Citas: **6**
2. **Maestro, A.**, López-Martínez, J., Llave, E., Bohoyo, F., Acosta, J., Hernández-Molina, F.J., Muñoz, A. Jané, G. 2013. Geomorphology of the Iberian Continental Margin. *Geomorphology*, 196, 13-35. DOI: 10.1016/j.geomorph.2012.08.022. Índices de calidad: Factor de Impacto: **2.577**; Cuartil: **Q1**; Citas: **31**
3. **Maestro, A.**, López-Martínez, J., Galindo-Zaldívar, J., Bohoyo, F., Mink, S. 2014. Evolution of the stress field in the southern Scotia Arc from the late Mesozoic to the present-day. *Global and Planetary Change*, 123 (B): 269-297. DOI: 10.1016/j.gloplacha.2014.07.023. Índices de calidad: Factor de Impacto: **2.766**; Cuartil: **Q1**; Citas: **9**
4. Mink, S., López-Martínez, J., **Maestro, A.**, Garrote, J., Ortega, J., Serrano, E., Durán, J.J., Schmid, T. 2014. Insights into deglaciation of the largest ice-free area in the South Shetland Islands (Antarctica) from quantitative analysis of the drainage system. *Geomorphology*, 225: 4-24. DOI: 10.1016/j.geomorph.2014.03.028. Índices de calidad: Factor de Impacto: **2.785**; Cuartil: **Q1**; Citas: **25**
5. Mink, S., **Maestro, A.**, López-Martínez, J., Schmid, T., Galindo-Zaldívar, J., Trow, R.A.J. 2014. Morphostructural analysis and Cenozoic evolution of Elephant Island, Southern Scotia Arc, Antarctica. *International Journal of Earth Science*, 104 (3): 833-851. DOI: 10.1007/s00531-014-1099-1. Índices de calidad: Factor de Impacto: **2.093**; Cuartil: **Q2**; Citas: **5**
6. Oliva-Urcía, B., Gil-Peña, I., **Maestro, A.**, López-Martínez, J., Galindo-Zaldívar, J., Soto, R., Gil-Imaz, A., Rey, J., Pueyo, O. 2015. Paleomagnetism from Deception Island (South Shetlands archipelago, Antarctica), new insights into the interpretation of the volcanic evolution using a geomagnetic model. *International Journal of Earth Science*, 105 (5): 1353-1370. DOI: 10.1007/s00531-015-1254-3. Índices de calidad: Factor de Impacto: **2.133**; Cuartil: **Q2**; Citas: **21**
7. **Maestro, A.**, Jané, G., Llave, E., López-Martínez, J., Bohoyo, F., Druet, M. 2017. The role of tectonic inheritance in the morphostructural evolution of the Galicia continental margin and adjacent abyssal plains from digital bathymetric model (DBM) analysis (NW Spain). *International Journal of Earth*

Sciences, 107 (4): 1267-1286. DOI: 10.1007/s00531-017-1531-4. Índices de calidad: Factor de Impacto: **2.276**; Cuartil: **Q2**; Citas: **8**

8. Llave, E., Jané, G., **Maestro, A.**, López-Martínez, J., Hernández-Molina, F.J., Mink, S. 2018. Geomorphological and sedimentary processes of the glacially influenced northwestern Iberian continental margin and abyssal plains. *Geomorphology*, 312: 60-85. DOI: 10.1016/j.geomorph.2018.03.022. Índices de calidad: Factor de Impacto: **3.681**; Cuartil: **Q1**; Citas: **10**
9. **Maestro, A.**, Ruano, P., Torres Carbonell, P., Bohoyo, F., Galindo-Zaldívar, J., Pedrera, A., Ruiz-Constán, A., González-Castillo, L., Ibarra, P., López-Martínez, J. 2019. Stress field evolution of the southernmost Andean Cordillera from paleostress analysis (Argentine Tierra del Fuego). *Tectonics*, 38, 7-25. DOI: 10.1029/2018TC005158. Índices de calidad: Factor de Impacto: **3.543**; Cuartil: **Q1**; Citas: **6**
10. Torres Carbonell, P.J., **Maestro, A.**, Ruano, P., Galindo-Zaldívar, J. 2020. Superposed deformation in the Península Mitre recess (Fuegian thrust-fold belt, Southern Argentina), and implications for orogenic curve kinematics. *Journal of Structural Geology*, 131, 10.1016/j.jsg.2019.103947. Índices de calidad: Factor de Impacto: **3.571** (2019); Cuartil: **Q2** (2019); Citas: **2**

C.2. Congress

- 1) **Maestro, A.**, López-Martínez, J. (2011). Stress permutations related with a subduction zone evolution registered by faults in Wright Peninsula (Adelaide Island, Antarctica). 11th International Symposium on Antarctic Earth Sciences. Programme and Abstracts, 425 [Poster].
- 2) **Maestro, A.**, López-Martínez, J., Bohoyo, F. (2011). Paleostress reconstruction in the South Orkney Microcontinent from structures in Signy Island (Antarctica). 11th International Symposium on Antarctic Earth Sciences. Programme and Abstracts, 426 [Poster].
- 3) Oliva, B, Gil-Peña, I., **Maestro, A.**, Soto, R., Gil-Imaz, A., López-Martínez, J., Rey, J., Galindo, J. (2012). Paleomagnetism in volcanic deposits as a tool to determine paleo-topography; an example from Deception Island (63°S, Antarctica). XXXII SCAR Open Science Conference and XXIV COMNAP AGM. Abstracts, 1 [Poster].
- 4) **Maestro, A.**, López-Martínez, J., Galindo, J., Bohoyo, F., Mink, S. (2013). Palaeostress evolution of the southern Scotia Arc (Mesozoic to present). The Scotia Arc: Geodynamic Evolution and Global Implications. Abstracts volume, 81-82 [Poster].
- 5) **Maestro, A.**, López-Martínez, J., Galindo-Zaldívar, J., Bohoyo, F. (2014). Cenozoic stress field evolution in King George Island from mesofault population analysis. XXXIII SCAR Open Science Conference. Abstracts, 163 [Poster].
- 6) **Maestro, A.**, Ruano, P., Torres Carbonell, P., Bohoyo, F., Galindo-Zaldívar, J., Pedrera, A., Ruiz-Constán, A., González-Castillo, L., Ibarra, P., López-Martínez, J. (2015). Paleostress field in Tierra de Fuego and their relationship with the Scotia Arc based on brittle mesostructures population analysis. XII International Symposium on Antarctic Earth Sciences, ISAES 2015. Abstracts, 232 [Poster].
- 7) Jané, G., Llave, E., **Maestro, A.**, López-Martínez, J., Hernández-Molina, F.J. (2016). High resolution mapping of offshore morphosedimentary features in the northwestern Iberian continental margin and abyssal plains. 35th INTERNATIONAL GEOLOGICAL CONGRESS. Abstracts, Paper Number, 3655 [Poster].
- 8) López-Martínez, J., Oliva-Urcia, B., **Maestro, A.**, Gil-Imaz, A., Lago, M., Galé, C., Ubide, T. (2018). Magmatism and Paleomagnetism of the Quaternary Volcanism in Bransfield Strait. POLAR 2018: Where The Poles Come Together. Abstract Proceedings, Fri_153_GG-1_2023, 2112 [Poster].
- 9) **Maestro, A.**, Bohoyo, F., Galindo-Zaldívar, J., Berry, R. (2020). The tectonic stress field evolution of Tasmania since the Cenozoic. SCAR Open Science Conference 2020: Antarctic Science-Global Connections. Full Abstract Book, 1034 [Poster].
- 10) **Maestro, A.** (2020). The future of mining: the exploitation of marine geological resources. LV CICA. International Conference on Global Commons & Security Trends: Towards a Peaceful 21st Century. Abstracts, 33-34 [Oral].

C.3. Research projects

- 1) Project title: **Determination of recent geological processes in the exclusive economic zone of the Cantabrian margin (CTM2011-13367-E)**. Funding Institution: Ministerio de Ciencia e Innovación, Dirección General de Investigación, Subdirección General de Proyectos de Investigación. Participating organisations: Instituto Geológico y Minero de España, Universidad Autónoma de Madrid, Universidad de Vigo. Duration, from 2012 to 2014. Principal researcher: **Adolfo Maestro González**.

- 2) Project title: **Lithological and chronostratigraphic study of the recent sedimentary units of Port Foster (Deception Island, Antarctica) (CTM2011-13902-E)**. Funding Institution: Ministerio de Ciencia e Innovación, Dirección General de Investigación, Subdirección General de Proyectos de Investigación. Participating organisations: Instituto Geológico y Minero de España, Universidad de Zaragoza, CSIC-CMIMA, Universidad Autónoma de Madrid, Universidad de Granada, CSIC-INTA, Universidad de Valladolid. Duration, from 2012 to 2014. Principal researcher: **Adolfo Maestro González**.
- 3) Project title: **Pacific-Atlantic Connection Studies: Geodynamic and paleoceanographic evolution in the Drake Passage and Scotia Sea, global implications**. Subproject title: **Land-sea and continental margins tectonic correlation (CTM2011-30241-C02-02)**. Funding Institution: Ministerio de Ciencia e Innovación, Dirección General de Investigación, Subdirección General de Proyectos de Investigación. Participating organisations: Instituto Geológico y Minero de España, Universidad de Granada, Universidad de Montpellier, Universidad de Texas (USA), Universidad de Buenos Aires (Argentina), CADIC-CONICET (Argentina), Instituto Antártico Argentino (Argentina), Universidad Nacional del Sur (Argentina). Duration, from 2012 to 2014. Principal researcher: Fernando Bohoyo Muñoz.
- 4) Project title: **Geomorphology, landform evolution, periglacial environment and hydrogeology: changes and impacts in the northern region of the Antarctic Peninsula. (CTM2011-26372)**. Funding Institution: Ministerio de Ciencia e Innovación, Dirección General de Investigación, Subdirección General de Proyectos de Investigación. Participating organisations: Universidad Autónoma de Madrid, Instituto Geológico y Minero de España, Universidad de Valladolid, Boston University (USA), University of Waikato (Nueva Zelanda), Instituto Nacional del Agua (Argentina). Duration, from 2012 to 2014. Principal researcher: Jerónimo López Martínez.
- 5) Project title: **Realización de las actividades establecidas en el Convenio de colaboración entre el Ministerio de Defensa y el IGME para la ejecución de actuaciones en el ámbito del Plan de Investigación Científica de la ZEEE**. Funding Institution: Instituto Geológico y Minero de España. Participating organisations: Instituto Geológico y Minero de España, Instituto Hidrográfico de la Marina, Real Observatorio de la Armada, Instituto Español de Oceanografía, Universidad Complutense de Madrid. Duration, from 2015 to 2018. Principal researcher: **Adolfo Maestro González**.
- 6) Project title: **The Antarctic Circumpolar Current: origin, evolution and its effect on climate and Antarctic ice sheet evolution (TASMANDRAKE) (CTM2014-60451-C2-2-P)**. Funding Institution: Ministerio de Economía y Competitividad, Dirección General de Investigación, Subdirección General de Proyectos de Investigación. Participating organisations: Instituto Geológico y Minero de España, Instituto Andaluz de Ciencias de la Tierra, British Antarctic Survey, Instituto Geológico del Sur (INGEOSUR-CONICET), Centro Austral de Investigaciones Científicas, P.P. Shirshov Institute of Oceanology, Royal Holloway University of London, Instituto Nazionale di Oceanografia e di Geofisica Sperimentale. Duration, from 2015 to 2018. Principal researchers: Fernando Bohoyo Muñoz and **Adolfo Maestro González**.
- 7) Project title: **Timing and main tectonic processes involved in the onset and evolution of the Antarctic Circumpolar Current (ACC): development of continental margins and oceanic basins (TASDRACC) (CTM2017-89711-C2-2-P)**. Funding Institution: Ministerio de Economía y Competitividad, Dirección General de Investigación, Subdirección General de Proyectos de Investigación. Participating organisations: Instituto Geológico y Minero de España, Instituto Andaluz de Ciencias de la Tierra, British Antarctic Survey, Instituto Geológico del Sur (INGEOSUR-CONICET), Centro Austral de Investigaciones Científicas, P.P. Shirshov Institute of Oceanology, Royal Holloway University of London, Instituto Nazionale di Oceanografia e di Geofisica Sperimentale. Duration, from 2018 to 2022. Principal researchers: Fernando Bohoyo Muñoz and **Adolfo Maestro González**.
- 8) Project title: **Arqueología del Tardiglacial y Postglacial: variabilidad socioecológica y tecn-económica entre los cazadores prehistóricos de las áreas litorales y la media montaña mediterránea**. Funding Institution: Conselleria de Educación, Investigación, Cultura y Deporte de la Comunitat Valenciana. Participating organisations: Universitat de València, Universidad Nacional Española a Distancia, Instituto Geológico y Minero de España. Duration, from 2020 to 2021. Principal researcher: Dr. J. Emili Aura Tortosa.

Complete curriculum vitae of the candidate nominated by a State party for the election of one member of the Legal and Technical Commission on the International Seabed Authority

Affonso Rêgo Gavino, Marzone (Brazil)

Statement of qualifications

Navy Captain Marzone, retired, has over 31 years of national and international experience in sea related matters. He is, currently, an advisor at The Interministerial Commission for the Resources of the Sea (CIRM), coordinated by National Maritime Authority, which is responsible for carry out the activities related to the resources of the sea that encompass, among others, the following programs: The Brazilian Antarctic Program (PROANTAR); The Brazilian Continental Shelf Survey Plan (LEPLAC) and The Sectorial Plan for the Resources of the Sea (PSRM) and The National Coastal Management Plan (PNGC).

Navy Captain Gavino is responsible for the programs related to the marine mineral resources: The Program for the Prospecting and Exploration of Mineral Resources in the Equatorial and South Atlantic International Area (PROAREA) and Development and Sustainable Use of the Blue Amazon (PRO AMAZÔNIA AZUL).

During his career in the Brazilian Navy, he held significant positions such as two commands at sea; Head of the Foreign Affairs Division; Head of the Maritime and Environmental Affairs Division, both in the Brazilian Navy General Staff; and Defense and Naval Attaché in Germany and the Netherlands.

Personal Information

Year and place of birth: 1967, Rio de Janeiro, Brazil

Current positions:

Manager of the Program for the Prospecting and Exploration of Mineral Resources in the Equatorial and South Atlantic International Area (PROAREA) and Development and Sustainable Use of the Blue Amazon (PRO AMAZÔNIA AZUL).

Organization: The Interministerial Commission for the Resources of the Sea (SECIRM)

Academic Qualification

Doctoral Degree in Marine Sciences, Policy, Strategy and Decision Making - Brazilian Naval War College, 2015

Master of Business Administration (MBA) in International Management - COPPEAD Graduate School of Business of the Federal University of Rio de Janeiro, 2015

Master's Degree in Marine Sciences - Brazilian Naval War College, 2007

Master of Business Administration (MBA) in Business Management - COPPEAD Graduate School of Business of the Federal University of Rio de Janeiro, 2007

General Staff Course for intermediate Officers, 1998

Commanding Officer Mine Countermeasures Vehicle Course, Belgium, 1997

Mine Warfare Staff Officers Course, Belgium, 1997

Specialization in machinery, 1993

Bachelor's Degree in Marine Sciences, Brazilian Naval Academy, 1990

Military Career

Ranks: Midshipman, 1990; Ensign, 1991; Lieutenant (Junior Grade), 1993; Lieutenant, 1996; Lieutenant-Commander, 2001; Commander, 2008; Captain, 2013; retired, 2020

Recent Professional Activities

2020 to date Manager of the Program for the Prospecting and Exploration of Mineral Resources in the Equatorial and South Atlantic International Area (PROAREA) and Development and Sustainable Use of the Blue Amazon (PRO AMAZÔNIA AZUL) in The Interministerial Commission for the Resources of the Sea (SECIRM)

2018-2020 in charge of the Maritime and Environmental Affairs Division (General Staff of the Navy)

2016-2018 Defense and Naval Attaché in Germany and the Netherlands

2012-2014 In charge of the International Relations Division (General Staff of the Navy)

Selected Participations in Symposia, Seminars, Conferences, and Meetings

2022 Took part in the National coordination effort in preparation for the Fourth session of the United Nations Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction (4th IGC BBNJ).

2019 Marine Spatial Planning Workshop

2019 Combating Litter at Sea Seminar

2019 LAAD Defence & Security

2018 Lecture to the Oceanographic Institute of the University of São Paulo on scientific research in Brazilian jurisdictional areas

2019 Delegation member of presentation of the Brazilian Equatorial Margin Partial Revised Submission to the Commission on the Limits of the Continental. United Nations Headquarters

2019 1st Brazilian Science, Technology and Innovation Forum for Oceans

2015 LAAD Defence & Security

2014 Delegation member of Navy staff talks Brazil-Germany

2014 Delegation member of Navy staff talks Brazil-Chile

2014 Delegation member of Navy staff talks Brazil-Ecuador

2014 Delegation member of Navy staff talks Brazil-Bolivia

2014 Delegation member of Navy staff talks Brazil-Argentina

2013 Delegation member of Navy staff talks Brazil-Peru

2013 Delegation member of Navy staff talks Brazil-France

2013 Delegation member of Navy staff talks Brazil-Uruguay

2013 Delegation member of Navy staff talks Brazil-Paraguay

2013 Delegation member of Navy staff talks Brazil-Angola

2012 Delegation member of navy staff talks Brazil-Chile

Decorations and Awards

2019 Naval Merit Order (Degree of "Great Officer")

2014 Military Gold Medal (Platinum Ribbon)

2012 Sea Service Merit Medal (Three Anchors)

2010 *Tamandaré* Merit Medal



H.E. GAMAL ABDELREHIM MOHAMED METWALLY

E-Mail: [REDACTED]

Current Position – November 2021 - Present

Assistant Minister of Foreign Affairs for International Legal Affairs and Treaties

Background Summary:

A career diplomat with more than 30 years of experience with the Egyptian Ministry of Foreign Affairs. Being a member of the Diplomatic corps, has a wide range of experience and knowledge with international diplomatic community, including several positions as head-of-missions.

PERSONAL DETAILS:

Date of birth : 15 November 1966

Marital Status : Married with three children

Education Background:

- * Bachelor of Arts in English Literature, Faculty of Arts Zagazig University, 1988.
- * Bachelor of Law, Faculty of Law, Cairo University, 2000
- * Post – Graduate Diploma in International Law, Faculty of Law, Cairo University, 2004.
- * Master Degree in Public International Law, Faculty of Law, Cairo University, February 2018.

Professional Background:

- * November 2021 – to Present – **Assistant Minister for International Legal Affairs and Treaties**
- * 15 September 2021 – 1st of November 2021 – **Assistant Minister, Director of the Institute for Diplomatic Studies**
- * 2018 – 2021 – **Ambassador of the Arab Republic of Egypt to Malaysia**

- * 2018 – 2021 - **Ambassador of the Arab Republic of Egypt to Brunei Darussalam (Non- Resident)**
- * 2015-2018 - **Deputy Assistant Minister for Diplomatic and Consular Corps and Inspection.**
- * 2011-2015 - **Ambassador of the Arab Republic of Egypt to Angola.**
- * 2011-2015 - **Ambassador of the Arab Republic of Egypt to Sao Tome and Principe (Non Resident).**
- * 2005-2009 - **Counsellor, Egyptian Interests Section in Tehran, Iran.**
- * 2000-2003 - **First Secretary, Egyptian Embassy in Abuja, Nigeria.**
- * 1998-2000 - **Head of Liaison Office of the Egyptian Embassy in Abuja, Nigeria.**
- * 1993-1997 - **Third Secretary, Egyptian Embassy in Mexico City, United States of Mexico,**
- * Since 13th June 1990 - **Diplomat with the Egyptian Foreign Ministry**

Special Assignments:

- * August-October 2010: **Charge d'Affaires of Egypt in Sultanate of Oman.**
- * March – September 2004: **Charge d'Affaires of The Interests Section of Egypt in El Salvador.**

Committees and Associations

- November 2021- Head of the Egyptian National Committee dealing with Constitutional Procedures for international treaties.
- November 2021- Head of the Egyptian Committee for setting standards and rules for concluding international agreements with foreign entities for development goals.
- November 2021- Deputy Head of the Egyptian National Committee of the Seas.
- November 2021- Member of the Egyptian National Committee for Combating the Financing of Terrorism and Money Laundering.
- November 2021- Member of the Egyptian National Committee for International Humanitarian Law.
- November 2021- Member of the Egyptian Supreme Authority for Arbitration and Settlement of disputes.
- November 2021- Member of Coordination Committee for Studying and Updating Judicial Cooperation Treaties.

November 2021- Member of International Arbitration Committee

November 2021- Member of National Committee to study joining the United Nations Convention on International Settlement Agreements Resulting from Mediation (the "Singapore Convention on Mediation")

Training Courses:

- * Training Courses, Germany June 1991
- * Training Courses, United Kingdom July 1991
- * Training Courses, United States of America July 1991

Languages:

- * Arabic (Mother Tongue)
- * English (Written and Spoken)
- * Spanish (Written and Spoken)

CURRICULUM VITAE

Name: **Piotr Nowak**
Date of birth: March 21, 1963
Birth place: Olsztyn / Poland
Nationality: Polish

EXPERIENCE

2016 – 2022 **Ministry of Climate and Environment** (former: Ministry of Environment, Ministry of Climate):
01.2016 - 06.2020 Director of the Department of Geology and Geological Concessions (DGK)
07.2020 - 11.2020 Deputy Director of DGK
01.2021 - until today Expert, Ocean Research Team Leader - Department of Geological Supervision and Raw Materials Policy

2017 – 2022 Representative of the Republic of Poland in the Legal and Technical Commission of the International Seabed Authority

2017-2022 Member and Head of the Polish Delegation for ISA sessions

2018 -2020 Chairman of the Supervisory Board of **WFOŚiGW** in Wrocław

2011-2015 Country Manager - **Celtique Energie**, Warsaw

2006-2011 **Grupa Lotos**, Warsaw:
2007 – 2010 Head of the Crude Oil Supply Diversification Office
2006 – 2007 Project Manager for the diversification of oil supplies
2006 Export Sales Specialist at Lotos Treading International Office

2000-2006 Supply Manager in **ExxonMobil Poland**, Warsaw

1994-2000 **Fortum** (Neste) Poland, Warsaw:
1999-2000 Direct Sales Manager, Fortum Polska
1997-1999 Traffic Sales Manager, Neste Polska
1994-1997 Operations, Fuel Supply Representative, Neste Oil Poland
1992-1994 Stones Cargo Ltd Warsaw shipping and customs agent

EDUCATION

2016-2022	Participation in internal training courses organized for management at the Ministry of Climate and Environment
2011-2014	Participation in ISE training, Warsaw: <ul style="list-style-type: none">- <i>Project Management in the Gas Exploration and Production Area,</i>- <i>The latest legal regulations in the field of hydrocarbon exploration;</i>
2006-2007	Participation in MBA postgraduate studies at IFG, Warsaw
2007	Economics of Refining and Oil Quality, Cambridge
2006	Trading Oil on International Markets, Cambridge
1997-2006	Participation in training aimed at improving professional qualifications
1991	Faculty of Power and Aeronautical Engineering, Warsaw University of Technology <i>Master's degree in Mechanical Engineering</i>

LANGUAGES

English - fluent

Russian - conversational

French, German - basic

I consent to the processing of my personal data for the purposes of the recruitment process (in accordance with the Act of May 10, 2018 on the protection of personal data (Journal of Laws of 2018, item 1000) and in accordance with the Regulation of the European Parliament and of the Council (EU) 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46 / EC (GDPR).



Dr. Haryo B. Nugroho

Indonesia's Candidate for the Legal and Technical Commission, International Seabed Authority (2023-2027)

Dr. Haryo B. Nugroho is an international law of the sea expert and a career diplomat with the rank of Counsellor. Since he joined the Ministry of Foreign Affairs in 2007, he was assigned to the Directorate General for Legal Affairs and Treaties, whereas he works on issues relating to UNCLOS implementation.

He was also tasked in various law of the sea issues, from the International Seabed Authority (ISA), boundaries negotiations, marine environment and Biodiversity Beyond National Jurisdiction (BBNJ), submarine cables and pipelines, to maritime safety and security. He also well experienced in both bilateral and multilateral diplomacy, as he was posted to the Indonesian Embassy in the Hague in 2008, Washington D.C. in 2009-2014, and the Permanent Mission of the Republic of Indonesia to the UN in New York from 2018-2021.

Dr. Nugroho not only involved in the ISA related matters, he was also the Head of the Indonesian Delegation to the 20th Session of the ISA, 2014. Dr. Nugroho was also assigned to spearhead the national inter-agency process to revitalize Indonesia's participation in the ISA. Currently, Dr. Nugroho is assigned to the Directorate for Legal and Territorial Treaties, where he continues to work, lead, and serves as the Coordinator on ISA related matters.

Educations

- University of Virginia School of Law (Doctor of Juridical Science/ S.J.D.) – 2013
Dissertation Title: the Legal Regime of Submarine Cables
- University of Virginia School of Law (Master of Laws/ LL.M.) – 2010
Thesis Title: Particularly Sensitive Sea Area – History and Development
- Faculty of Law, Universitas Indonesia (Bachelor of Laws/Sarjana Hukum) - 2006
Undergrad Thesis Title: Particularly Sensitive Sea Area: Feasibility Studies for Implementation in the Straits of Malacca and Singapore
- Fellow – International Tribunal for the Law of the Sea (ITLOS) – 2014
- International Foundation for the Law of the Sea Academy (IFLOS) - 2013
- Rhodes Academy of Oceans Law and Policy – 2010
- Mid-Career Diplomatic Training Course (2015)
- Junior Diplomatic Training Course (2007)

Assignments

- Directorate for Legal and Territorial Affairs Treaties, Ministry of Foreign Affairs (2022 - present)
- Counsellor, Permanent Mission of the Republic of Indonesia to the UN, New York (2018-2021)
- Deputy Assistant to the President's Special Envoy for Maritime Delimitation (2015-2018)
- Directorate for Political, Security, and Territorial Treaties, Ministry of Foreign Affairs (2014-2015)
- Third Secretary, Indonesian Embassy in Washington D.C. (2009-2014)
- Directorate for Political, Security, and Territorial Treaties, Department of Foreign Affairs (2008-2009)
- Attaché (Political, Consular, and Information Affairs) Indonesian Embassy in the Hague (2008)
- Directorate for Political, Security, and Territorial Treaties, Department of Foreign Affairs (2007-2008)

Negotiations and Select Experiences

- Member of the Indonesian Delegation for various maritime boundaries and border cooperation negotiations (2007-2009, 2014-2018, 2022-present)
- Head (2014) and member (2015, 2022) of the Indonesian Delegation to the Sessions of the ISA
- Member of the Indonesian Delegation to the Biodiversity Beyond National Jurisdiction (BBNJ) Preparatory Committee (1st and 3rd Sessions 2016-2017)
- Member of the Indonesian Delegation to the Intergovernmental Conference on BBNJ (4th Session 2022)
- Member of the Legal Working Group, Conference on Partnership for Regional Peace: Operationalising ASEAN-China Comprehensive Strategic Partnership (2015-2016)
- Member of the Indonesian Delegation to the 20th Meeting of States Parties to the 1982 United Nations Convention on the Law of the Sea (2010)

Select Publications:

- Nugroho, Haryo Budi (2012) "Law of the Sea Aspects of Indonesian National Legislation on Submarine Telecommunications Cable," *Maritime Border Diplomacy*.
- Nugroho, Haryo Budi (2012) "Particularly Sensitive Sea Area (PSSA)," *the Law of the Sea Convention: US Accession and Globalization*.
- Nugroho, Haryo Budi (2015) "*Pemberantasan Penangkapan Ikan Ilegal Berdasarkan Advisory Opinion Mahkamah Hukum Laut Internasional [Eradicating Illegal Fishing through Advisory Opinion of the International Tribunal for the Law of the Sea]*" Indonesia – Kompas.
- Nugroho, Haryo Budi (2016) "Is Freedom of Navigation a Security Threat?" *the Jakarta Post* 22 March 2016.
- Nugroho, Haryo Budi (2019) "Managing Disputes in the South China Sea through Cooperation to Protect Submarine Cables as a Vital Communication Lane in the Region," *South China Sea Review No. 2*.

Ellen Pape



Belgium
0032 9 264 85 23 (Office)
Ellen.Pape@Ugent.be

PROFESSIONAL EXPERIENCE

Scientific Project coordinator/Postdoctoral scientist | Marine Biology Research Group, Ghent University

01/04/2014 - present

- Coordination of the biological environmental baseline study in the exploration contract area of Global Sea Mineral Resources (GSR) in the Clarion Clipperton Fracture Zone (CCFZ; Pacific), an area of interest for deep-sea mining (service contract with GSR).
- organization of the ISA workshop on taxonomic methods and standardization of meiofauna in exploration areas for deep-sea mining (Ghent, 14-17 December 2015)
- participated in sampling campaigns in the CCFZ in September-October 2015 and in March-April 2019; organization of biological sampling during all GSR sampling campaigns

Postdoctoral researcher | Marine Biology Research Group, Ghent University

01/04/2013 – 31/01/2014

- research topic: impact of anthropogenic disturbance (bottom trawl fisheries) on deep-sea ecosystem functioning

PhD student | Marine Biology Research Group, Ghent University

01/10/2007 – 31/03/2012

- research topic: biodiversity and ecosystem function of nematodes in contrasting deep-sea environments (European BIOFUN & HERMIONE project)
- organization and/or participation of/in outreach (Day Of Science, UGent at Sea), organization of scientific conference (14th International Meiofauna Conference)

Scientific assistant | Flanders Marine Institute (VLIZ)

01/03/2007 – 30/09/2007

Set-up of project websites & maintenance of project databases

PhD student | Lab of Pharmacology, Catholic University of Leuven

01/10/2006 – 04/01/2007

Research into lipid rafts in the peroxisomal membrane

HIGHER EDUCATION

- PhD in Marine Sciences – 2013 – Ghent University
- Master of Marine and Lacustrine Sciences – 2006 – Ghent University
- Master in Biology – 2005 – Catholic University of Leuven

PUBLICATIONS

Bezerra TN, Pape E, Hauquier F, Vanreusel A (2021) Description and Distribution of *Erebussau* Nom. Nov. pro *Erebus* Bussau, 1993 Nec *Erebus* Latreille, 1810 with Description of a New Species, and of *Odetenema* Gesaræ Gen. Nov., Sp. Nov. (Nematoda: Desmoscolecida) from Nodule-Bearing Abyssal Sediments in the Pacific. *Zootaxa*. <https://doi.org/10.11646/zootaxa.4903.4.4>.

- De Smet B, Simon-Lledó E, Mevenkamp L, **Pape E**, Pasotti F, Jones DOB, Vanreusel A (2021) The Megafauna Community from an Abyssal Area of Interest for Mining of Polymetallic Nodules. *Deep Sea Research Part I: Oceanographic Research Papers* 172 (June): 103530. <https://doi.org/10.1016/j.dsr.2021.103530>.
- Lins L, Zeppilli D, Menot L, Michel LN, Bonifácio P, Brandt M, **Pape E**, et al. (2021) Toward a Reliable Assessment of Potential Ecological Impacts of Deep-Sea Polymetallic Nodule Mining on Abyssal Infauna. *Limnology and Oceanography: Methods* 19 (9): 626–50. <https://doi.org/10.1002/lom3.10448>.
- Pape E**, Bezerra TN, Gheerardyn H, Buydens M, Kieswetter A, Vanreusel A (2021) Potential Impacts of Polymetallic Nodule Removal on Deep-Sea Meiofauna. *Scientific Reports* 11 (1): 19996. <https://doi.org/10.1038/s41598-021-99441-3>.
- Pasotti F, Mevenkamp L, **Pape E**, Bonifácio P, Riehl T, Lefaible L, Lins L, and Vanreusel A (2021) A Local Scale Analysis of Manganese Nodules Influence on the Clarion-Clipperton Fracture Zone Macrobenthos. *Deep Sea Research Part I: Oceanographic Research Papers* 168. <https://doi.org/10.1016/j.dsr.2020.103449>.
- Washburn TW, Menot L, Bonifácio P, **Pape E**, Błazewicz M, Bribiesca-Contreras G, Dahlgren TG, et al. (2021) Patterns of Macrofaunal Biodiversity Across the Clarion-Clipperton Zone: An Area Targeted for Seabed Mining. *Frontiers in Marine Science* 8. <https://doi.org/10.3389/fmars.2021.676571>.
- Ingels J, Vanreusel A, **Pape E**, Pasotti F, Macheriotou L, Arbizu PM, Sørensen MV, et al. (2020) Ecological Variables for Deep-Ocean Monitoring Must Include Microbiota and Meiofauna for Effective Conservation. *Nature Ecology & Evolution*, November. <https://doi.org/10.1038/s41559-020-01335-6>.
- Ramalho SP, Lins L, Soetaert K, Lampadariou N, Marina R, Cunha, Ann Vanreusel, **Pape E**. (2020) Ecosystem Functioning Under the Influence of Bottom-Trawling Disturbance: An Experimental Approach and Field Observations From a Continental Slope Area in the West Iberian Margin. *Frontiers in Marine Science* 7. <https://doi.org/10.3389/fmars.2020.00457>.
- Zeppilli D, Vanreusel A, Martínez-Arbizu P, **Pape E**, Goetze E, Stedman G, Bezerra TN, Laroche O, Menzel L, Macheriotou L, Murakami C, Smith CR (2019) Metazoan Meiofauna. In: Deep CCZ Biodiversity Synthesis Workshop Report.
- Smith CR, Washburn T, Menot L, Bonifacio P, **Pape E**, Bribiesca-Contreras L, Dahlgren T, Tomohiko Fukushima, Glover A, Jong Ju Se, and Ok Hwan Yu (2019) A synthesis of sediment macrofaunal biodiversity in the Clarion-Clipperton Zone. In: Deep CCZ Biodiversity Synthesis Workshop Report.
- Jones DOB, Simon-Lledó E, Cuvelier D, Durden JM, Amon D, Se-Jong Ju4, McQuaid K, **Pape E**, Laming S, Leitner A, Drzen J, Howell K, Christodoulou M, Martínez-Arbizu P, Fukushima T, Clark MR, Smith CR (2019). Invertebrate megafauna. In: Deep CCZ Biodiversity Synthesis Workshop Report
- Pape E**, Bezerra T N, Hauquier F, and Vanreusel, A. (2017) Limited Spatial and Temporal Variability in Meiofauna and Nematode Communities at Distant but Environmentally Similar Sites in an Area of Interest for Deep-Sea Mining. *Frontiers in Marine Science*. 4:205 DOI: 10.3389/fmars.2017.00205
- De Smet B, **Pape E**, Riehl T, Bonifácio P, Colson L, and Vanreusel A (2017) The Community Structure of Deep-Sea Macrofauna Associated with Polymetallic Nodules in the Eastern Part of the Clarion-Clipperton Fracture Zone. *Frontiers in Marine Science*. 4:103 DOI: 10.3389/fmars.2017.00103
- Durden JM, Billett DSM, Brown A, Dale AC, Goulding L, Gollner S, Murphy K, **Pape E**, Purser A, Rolin J-F, Smith AJ, Stewart I, Turner PJ, de Wachter T, Weaver PPE, van Dover CL, Verlaan P and Jones DOB (2016) Report on the Managing Impacts of Deep-sea Resource Exploitation (MIDAS) Workshop on Environmental Management of Deep-Sea Mining. *Research Ideas and Outcomes* 2, e10292.
- Bernhard JM, Morrison CR, **Pape E**, Beaudoin DJ, Todaro AM, Pachiadaki MG, Kormas KA, Edgcomb VP (2015) Metazoans of redoxcline sediments in Mediterranean deep-sea hypersaline anoxic basins. *BMC Ecology* 13:105
- Pirlet H, Van Rooij D, **Pape E** (2015) Diepzeemijnbouw: de nieuwe goldrush? *De Grote Rede* 40: pp 13-19.
- Sabeel RAO, Ingels J, **Pape E**, Vanreusel A. (2014) Intertidal Macrofauna along the Sudanese Red Sea coast: potential effect of mangrove clearance on community and trophic structure. *Mar. Ecol.*
- Bezerra TN, **Pape E**, Hauquier F, Vanreusel A, Ingels J (2013) New Genus and Two New Species of the Family Ethmolaimidae (Nematoda: Chromadorida), Found in Two Different Cold-seep Environments. *Zootaxa* 3692 (1): 7.
- Pape E**, van Oevelen D, Moodley L, Soetaert K, Vanreusel A (2013) Nematode Feeding Strategies and the Fate of Dissolved Organic Matter Carbon in Different Deep-sea Sedimentary Environments. *Deep-Sea Res. Pt. I* 80: 94–110.
- Pape E**, Bezerra TN, Jones DOB, Vanreusel A (2013) Unravelling the Environmental Drivers of Deep-sea Nematode Biodiversity and Its Relation with Carbon Mineralisation Along a Longitudinal Primary Productivity Gradient. *Biogeosciences* 10 (5): 3127–3143.
- Pape E**, Jones DOB, Manini E, Bezerra TN, Vanreusel A (2013) Benthic-Pelagic Coupling: Effects on Nematode Communities Along Southern European Continental Margins. *PLoS ONE* 8 (4): e59954
- Pape E**, Bezerra TN, Vanneste H, Heeschen K, Moodley L, Leroux F, Van Breugel P, Vanreusel A (2011) Community structure and feeding preference of nematodes associated with methane seepage at the Darwin mud volcano (Gulf of Cádiz). *Mar. Ecol. Prog Ser.* 438: 71-83
- Van Dongen S, Lens L, **Pape E**, Volckaert FA, Raemaekers JAM (2009) Evolutionary history shapes the association between developmental instability and population-level genetic variation in three-spined sticklebacks *J. Evolution. Biol.* 22(8): 1695-1707
- Vanreusel A, Fonseca G, Danovaro R, da Silva MC, Esteves AM, Ferrero T, Gad G, Galtsova V, Gambi C, V da Fonseca Genevois, Ingels J, Ingole B, Lampadariou N, Merckx B, Miljutin D, Miljutina M, A Muthumbi, S Netto, Portnova D, Radziejewska T, Raes M, Tchesunov A, Vanaverbeke J, Van Gaever S, Venekey V, Bezerra TN, Flint H, Copley J, **Pape E**, Zeppilli D, Martinez PA, Galeron J (2009) The contribution of deep-sea macrohabitat heterogeneity to global nematode diversity. *Mar. Ecol.* 31(1): 6-20
- Pape E**, Muthumbi A, Kamanu CP, Vanreusel A (2008) Size-dependent distribution and feeding habits of *Terebralia palustris* in mangrove habitats of Gazi Bay, Kenya. *Estuar. Coast. Shelf Sci.* 76 (4): 797-808

ORAL PRESENTATIONS

- Simon-Lledó E, Amon D, Cuvelier D, Ramalho SP, Uhlenkott K, Arbizu PM, Vink A, Durden JM, Smith CR, Horton T, Bribiesca-Contreras G, **Pape E**, Ju SJ, McQuaid K, Howel K, Jones DOB (2021) Regional patterns in biodiversity of abyssal benthic megafauna at the Clarion Clipperton Zone. 16th Deep-Sea Biology Symposium. 12-17 Sep 2021. Brest, France

- Macheriotou L, Pape E, Vanreusel A (2021). Metabarcoding as a rapid biodiversity assessment strategy. MiningImpact II workshop on "Rapid assessment methods for baseline studies and impact assessment". 9 Aug 2021.
- Vanreusel A, Hauquier F, Macheriotou L, Bezerra TN, Pape E, Mevenkamp L (2019) Meiofauna research to understand the future impact of deep-sea mining in the Clarion-Clipperton Zone. 17th International Meiofauna Conference. 7–12 July 2019, Évora, Portugal
- Bezerra TN, Pape E, Hauquier F, Macheriotou L, Vanreusel A (2019) Distribution of the genus *Halalaimus* in areas of polymetallic nodules unveiling potential connectivity between different study areas. 17th International Meiofauna Conference. 7–12 July 2019, Évora, Portugal
- Pape E, Bezerra TN, Buydens M, De Clercq S, Vanreusel A (2019) Meio- and nematofauna living inside polymetallic nodules from the CCFZ. 17th International Meiofauna Conference. 7–12 July 2019, Évora, Portugal
- Pape E, Lefaible N, Bezerra TN, Gheerardyn H, De Smet B, Vanreusel A (2018) Do nodules matter for meio- and macrofauna in the Clarion Clipperton Fracture Zone? 15th Deep-Sea Biology Symposium. 9-14 Sept 2018, Monterey, USA
- Dahlgren TD, Wiklund H, Glover A, Smith C, Jones D, Janssen A, Martinez PA, Neal L, Bonifacio P, Taboada S, Menot L, De Smet B, Vanreusel A, Pape E, Ravara A, Cunha M (2018) High Genetic Diversity and Connectivity in Common CCZ Taxa. 15th Deep-Sea Biology Symposium. 9-14 sept 2018, Monterey, USA
- Macheriotou L, Hauquier F, Pape E, Bezerra TN, Derycke S, Vanreusel A (2018). Diversity and biogeography of deep-sea nematodes in the Clarion-Clipperton Fracture Zone: a molecular approach. 15th Deep-Sea Biology Symposium. 9-14 Sept 2018, Monterey, USA
- Pape E, Mevenkamp L, De Smet B, Lefaible N, Wright H, Hauquier F, Bonifacio P, Riehl T, Vanreusel A (2018) Spatial and temporal (intra- and interannual) variability in polychaete communities within the GSR license area. 18-22 June 2018, Brest, France
- Pape E et al. (2018) Spatial and temporal (intra- and interannual) variability in nematode genus composition and diversity within the GSR license area. 18-22 June 2018, Brest, France
- Pape E, Gheerardyn H, Vanreusel A (2018) Spatial and temporal (intra- and interannual) variability in copepod communities within the GSR license area. 18-22 June 2018, Brest, France
- Macheriotou L, Hauquier F, Bezerra TN, Mevenkamp L, Pape E, Great E, Arbizu PM, Vanreusel A (2017) Spatial variability of nematode assemblages in the East Pacific. Final JPIO MiningImpact 1 meeting. 18-20 Oct. 2017, London, UK
- De Smet B, Pape E, Riehl T, Bonifacio P, Colson L, Vanreusel A (2017) The community structure of deep-sea macrofauna in an area of interest for deep-sea mining. 15th Marine Biology Section Symposium. 24 Feb 2017, Gent, Belgium.
- De Smet B, Pape E, Bezerra T, Gheerardyn H, Vanreusel A (2017) Polymetallic nodule areas: a unique and poorly known deep sea habitat at risk. VLIZ Marine Science Day. 3 March 2017, Brugge, Belgium.
- Pape E, Kieswetter A, Bezerra TN, Macheriotou L, Arbizu PM, Vanreusel A (2016) Meiofauna in abyssal polymetallic nodule fields: seasonal variability and recovery following anthropogenic disturbance. International Meiofauna Conference. Heraklion, Crete, 3-7 July 2016
- Pape E, Bogaert K, De Smet B, Vanreusel A (2016) Barcoding of meio- and macrofauna from the Clarion-Clipperton Fracture Zone, an area of interest for deep-sea mining. Workshop on the application of genomic tools for biomonitoring the marine environment. Geneva, Switzerland, 4-5 April 2016
- Pape E, Bogaert K, Vanreusel A (2015) GSR - Meiofauna baseline surveying: from sampling to taxonomic identification. ISA workshop on taxonomic methods and standardization of meiofauna in exploration areas for deep-sea mining. Ghent, Belgium, 14-17 Dec 2015
- Pape E, Vanreusel A (2015) Deep-sea mining and the Belgian side of things. 13th Marine Biology Section Symposium. Ghent, Belgium, 6 March 2015
- Pape E, Vanreusel A (2014) Global Sea Mineral Resources N.V. – status of activities on biological baseline surveying in the CCFZ. ISA workshop on standardization of macrofauna in the CCFZ. Ulsan, South Korea, 22-17 Nov 2014
- Ramalho SP, Cunha MR, Lins L, Pape E, Cordova EA, Lampadariou A, Vanreusel A (2014) Bottom trawling impacts on the deep-sea benthic communities from the SW Portuguese continental slope (NE Atlantic). ICES Symposium "Effects of fishing on benthic fauna, habitat and ecosystem function". Tromsø, Norway, 16 – 19 June 2014
- Danovaro R, Bezerra TN, Corinaldesi C, Dell'Anno A, Gambi C, Pape E, Pusceddu A, Vanreusel A, Zeppilli D (2011) Micro-scale patterns of biodiversity and ecosystem functioning in deep-sea sediments of the Atlantic Ocean and Mediterranean Sea. World Conference of Marine Biodiversity. Aberdeen, Scotland, 26-30 Sept 2011
- Vanreusel A, Guilini K, Ingels J, Pape E (2011) Nematodes and their food: difficult customers in the deep sea? World Conference of Marine Biodiversity. Aberdeen, Scotland, 26-30 Sep 2011
- Casula V, Sabbatini A, Pancotti I, Pape E, Negri A (2011) Biocoenosis of deep foraminiferal fauna on the Galicia Bank Area (NE Atlantic). SymBioSe 2011. Basel, Switzerland, 27 July – 6 Aug 2011
- Pape E, Moodley L, Soetaert K, Vanreusel A (2011) Habitat-specific feeding preferences of deep-sea nematodes: Results from onboard isotope-tracer experiments. 9th Marine Biology Section Symposium. Ghent, Belgium, 1 April 2011
- Pape E, Bezerra TN, Vanneste H, Moodley L, Heeschen K, Van Breugel P, Vanreusel A (2010) Small-scale spatial heterogeneity in structural and trophic diversity of meiofauna associated with methane seeping at the Darwin mud volcano (Gulf of Cádiz). 14th International Meiofauna Conference. Ghent, Belgium, 12-16 July 2010
- Pape E, Moodley L, Vanreusel A (2010) Meiofaunal biodiversity and ecosystem functioning at the Galicia Bank (NE-Atlantic). 12th Deep-Sea Biology Symposium. Reykjavik, Iceland, 7-11 June 2010
- Pape E, Moodley L, Vanreusel A (2010) Meiofaunal biodiversity and ecosystem functioning at the Galicia Bank (NE Atlantic). Final EuroDEEP meeting. Reykjavik, Iceland, 6 June 2010
- Pape E, Bezerra TN, Vanneste H, Moodley L, Heeschen K, Van Breugel P, Vanreusel A (2010) "Small-scale spatial heterogeneity in structural and trophic diversity of meiofauna associated with methane seeping at the Darwin mud volcano (Gulf of Cádiz). Annual HERMIONE meeting. Malta, 12-16 April 2010
- Pape E, Bezerra TN, Moodley L, Vanreusel A (2009) Structural & functional diversity of meiofauna in relation to geochemical conditions on the Darwin MV. 7th Marine Biology Section Symposium. Gent, Belgium, 13 Feb 2009
- Vanreusel A, Fonseca G, Danovaro R, da Silva MC, Esteves AM, Ferrero T, Gad G, Galtsova V, Gambi C, da Fonseca Genevois V, Ingels J, Ingole B, Lampadariou N, Merckx B, Miljutin D, Miljutina M, Muthumbi A, Netto S, Portnova D, Radziejewska T, Raes M, Tchesunov A, Vanaverbeke J, Van

- Gaever S, Venekey V, Bezerra TN, Flint H, Copley J, **Pape E**, Zeppilli D, Martinez PA, Galeron J (2008) Large scale patterns in the diversity and community structure of deep-sea nematodes. World Conference of Marine Biodiversity. Valencia, Spain, 11-15 Nov 2008
- Pape E**, Bezerra TN, Vanreusel A (2007) The function of meiofauna and the importance of their biodiversity in contrasting southern European deep-sea environments (BIOFUN). 1st EuroDEEP meeting. Taormina, Sicily, 26-28 Nov 2007

PARTICIPATION IN WORKSHOPS AND MEETINGS RELATED TO DSM

- MiningImpact 2 final meeting. Online. 1-2 Feb 2022
- ISA workshop on "Enhancing Image-based Biodiversity Assessments to Advance Deep-Sea Taxonomy". Online. 12-14 Dec 2021
- MiningImpact 2 Connectivity workshop. Online. 15-17 Feb 2021
- MiningImpact 2 stakeholder information day. Online. 21 Jan 2021
- ISA Workshop on Marine Scientific Research in the Area: Establishing collaborative platform to enhance biodiversity knowledge for environmental management in mid-ocean ridge ecosystem. Online. 15-17 Dec 2020.
- MiningImpact II Annual Meeting. Online. 7-8 Oct 2020
- ISA Workshop on DeepData: Focusing on Data Management Strategy. Online. 21-25 Sept 2020
- ISA Workshop on Deep Sea Taxonomic Standardization: Strategic Approaches for Collaboration. Online. 15-16 Sept 2020
- Workshop "Towards a standardized approach for Regional Environmental Management Plans in the Area". Hamburg, Germany, 11-14 Nov 2019
- ISA DeepCCZ workshop. Friday Harbor, USA, 1-4 Oct 2019
- Workshop "Deep-sea taxonomy under pressure". Frankfurt, Germany. 7-10 May 2019
- JPIOceans MiningImpact2 meeting. Brussels, Belgium, 19 – 20 Sept 2018
- JPIOceans MiningImpact2 meeting. Ghent, Belgium, 4–5 July 2018
- FOD Economy Workshop: "Deep-sea mining: Contributing to the elaboration of a Belgian policy" Brussels, Belgium, 5 June 2018
- JPIOceans MiningImpact 1 annual meeting. Bremen, Germany. 13-15 Feb 2017
- MIDAS final meeting. Ghent, Belgium. 4-7 Oct 2016
- MIDAS WP8 workshop on Environmental Management. Southampton, UK. 28-30 June 2016
- JPIOceans Annual Meeting. Gent, Belgium, 25-27 Jan 2016
- Deep-sea mining Conference. Brussels, Belgium. April 26, 2016
- ISA workshop on Taxonomic Methods and Standardization of Meiofauna in the Clarion-Clipperton Fracture Zone. Ghent, Belgium, 14-17 Dec 2015
- ISA Workshop on standardization of the macrofauna in the CCFZ. 23-30 Nov 2014, Ulsan, Korea

SKILLS

Languages

CEFR (Common European Framework of Reference for Languages) levels are indicated between brackets

	Speaking	Understanding	Writing	Reading
NL	Mother tongue (C2)			
EN	Excellent (C2)			
FR	Intermediate (B1)			
DE	Beginner (A1)	Intermediate (B1)	Beginner (A1)	Intermediate (B1)
ES	Intermediate (B1)	Intermediate (B1)	Intermediate (B1)	Intermediate (B1)

Software

- Statistics and bio-informatical analyses: R, Primer (incl. PERMANOVA)
- Office: Word, Excel, PowerPoint, SharePoint, Access, Endnote, Zotero

- Graphics: Gimp, Adobe Illustrator, Inkscape
- Other: QGIS, ArcGIS, Geneious, html (basic knowledge), bash (basic knowledge), Python (basic knowledge)

Short Curriculum Vitae

Name Dr. Carsten Michael Rühlemann
Date of birth 5 May 1962
Place of birth Hannover, Germany
Citizenship German
Employer Federal Institute for Geosciences and Natural Resources (BGR), Department of Marine Resource Exploration, Stilleweg 2, 30655 Hannover, Germany

Academic qualifications

1996 PhD in Geology, University of Bremen
1992 Diploma (MSc equivalent) in Geology, University of Göttingen
1986 Diploma (MSc equivalent) in Cartography, University of Applied Sciences in Berlin

Academic positions

Since 2016 Head of Marine Geology section at BGR
2003 - 2016 Research Scientist at BGR, Department of Marine Resource Exploration
2002 - 2003 Research Fellow in BMBF project "Rapid Climate Changes in the Western Tropical Atlantic - Assessment of the biogenous and sedimentary record", University of Bremen
1999 - 2002 Research Fellow in DFG project "Paleohydrography of the Westiberic Continental Slope", University of Bremen
1996 - 1999 Research Fellow in DFG project "Paleo Caribbean - Late Quaternary evolution of the Caribbean-Atlantic water mass exchange", University of Bremen
1992 - 1996 Research Assistant, Division of Marine Geology, University of Bremen

Research topics

- Marine resource exploration strategies with emphasis on manganese nodules in the Pacific Ocean (CCZ) and seafloor massive sulphides in the southwestern Indian Ocean (Central Indian Ridge, Southeast Indian Ridge)
- Environmental baseline and monitoring aspects of deep-sea resource exploration, with emphasis on oceanography and sedimentology
- Late Quaternary paleoceanography and paleoclimatology with a focus on paleoproductivity variations and rapid climate changes in the tropical Atlantic and Indian Oceans, and climate teleconnections (marine geochemistry, isotope geochemistry)

Professional activities

- Member of the Legal and Technical Commission of the International Seabed Authority since February 2020
- Coordinator of the work programme in the German license area for the exploration of polymetallic nodules, 2010-2019
- Member of the German delegation at the International Seabed Authority since 2016
- Member of Operational Group 1 of the European Commission's "European Innovation Partnership on Raw Materials" initiative since 2013
- Member of the advisory board of the EU research and innovation project "Blue Nodules", 2016-2020
- Two-month visiting fellow at the European Science Foundation in Strasbourg in 2002
- Evaluator of scientific funding proposals for the Deutsche Forschungsgemeinschaft, German Ministry of Research, Natural Environment Research Council (UK), National Science Foundation (USA), European Commission
- Field research on 25 marine expeditions with different vessels since 1993, chief scientist on 7 cruises including the organisation and scientific management, and the guidance of ISA trainees from developing countries

Publication list

1. Mulitza, S., T. Bickert, H. Bostock, C.M. Chiessi, B. Donner, A. Govin, N. Harada, E. Huang, H. Johnstone, H. Kuhnert, M. Langner, F. Lamy, L. Lembke-Jene, L. Lisiecki, J. Lynch-Stieglitz, L. Max, M. Mohtadi, G. Mollenhauer, J. Muglia, D. Nürnberg, A. Paul, C. Rühlemann, J. Repschläger, R. Saraswat, A. Schmittner,

- E.L. Sikes, R.F. Spielhagen, R. Tiedemann (2022): World atlas of late Quaternary foraminiferal oxygen and carbon isotope ratios. *Earth System Science Data* (in press).
2. Weldeab, S., C. Rühlemann, Q. Ding, V. Khon, B. Schneider, W.R. Gray (2022). Impact of Indian Ocean surface temperature gradient reversals on the Indian Summer Monsoon. *Earth and Planetary Science Letters*, 578, 117327.
 3. Kuhn, T., C. Rühlemann (2021). Exploration of polymetallic nodules and resource assessment: A case study from the German contract area in the Clarion-Clipperton Zone of the tropical northeast Pacific. *Minerals*, 11, 618.
 4. Harbour, R.P., A.B. Leitner, C. Rühlemann, A. Vink, A.K. Sweetman (2020). Benthic and demersal scavenger biodiversity in the eastern end of the Clarion-Clipperton Zone – an area marked for polymetallic nodule mining. *Frontiers in Marine Science*, 458.
 5. Watzel, R., C. Rühlemann, A. Vink, (2020). Mining mineral resources from the seabed: Opportunities and challenges. *Marine Policy*, 114, 103828.
 6. Kuhn, T., K. Uhlenkott, P. Martinez, A. Vink, C. Rühlemann (2019): Manganese Nodule Fields from the NE Pacific as Benthic Habitats. In: P. Harris, E. Baker (Eds.): *Seafloor Geomorphology as Benthic Habitat*, 2nd edition. Elsevier, Amsterdam. Chapter 58, 933-947.
 7. Rühlemann, C., T. Kuhn, A. Vink (2019). Tiefseebergbau – Ökologische und sozioökonomische Auswirkungen. *Ozeane und Meere, Landeszentrale für politische Bildung Baden-Württemberg*, 226.
 8. Waelbroeck, C., B.C. Loughheed, T. Vazquez Riveiros, ... C. Rühlemann, ... M. Ziegler (63 authors) (2019). Consistently dated Atlantic sediment cores over the last 40 thousand years. *Scientific Data*, 6, 1-12.
 9. Weldeab, S., C. Rühlemann, B. Bookhagen, F.S. Pausata, F.M. Perez-Lua (2019). Enhanced Himalayan glacial melting during YD and H1 recorded in the northern Bay of Bengal. *Geochemistry, Geophysics, Geosystems*, 20, 2449-2461.
 10. Portilho-Ramos, R.C., A.P.S. Cruz, C.F. Barbosa, A.E. Rathburn, S. Mulitza, I.M. Venancio, T. Schwenk, C. Rühlemann, L. Vidal, C.M. Chiessi, C.S. Silveira (2018). Methane release from the southern Brazilian margin during the last glacial. *Scientific reports*, 8, 1-9.
 11. Knobloch, A., T. Kuhn, C. Rühlemann, T. Hertweg, K.-O. Zeissler, S. Noack (2017): Predictive mapping of the nodule abundance and mineral resource estimation in the Clarion-Clipperton Zone using artificial neural networks and classical geostatistical methods. In: R. Sharma (Ed.): *Deep-Sea Mining: Resource Potential, Technical and Environmental Considerations*. Springer International, Cham, pp. 189-212.
 12. Kuhn, T., A. Wegorzewski, C. Rühlemann, A. Vink (2017): Composition, Formation, and Occurrence of Polymetallic Nodules. In: R. Sharma (Ed.): *Deep-Sea Mining: Resource Potential, Technical and Environmental Considerations*. Springer International, Cham, pp. 23-64.
 13. Morley, A., D. Heslop, C. Rühlemann, S. Mulitza, A. Paul, M. Schulz (2015). Detecting Holocene changes in the Atlantic meridional overturning circulation: Integration of proxy data and climate simulations. In: M. Schulz, A. Paul (Hrsg.): *Integrated Analysis of Interglacial Climate Dynamics (INTERDYNAMIC)*, Springer Briefs in Earth System Sciences, pp. 43-48.
 14. Milzer, G., J. Giraudeau, C. Rühlemann, J. Faust, J. Knies, S. Schmidt (2015): Recent benthic stable isotope variability in the Trondheimsfjord: Proxy records of mixing dynamics related to the NAO. *Estuarine, Coastal and Shelf Science*, 172, 34-46.
 15. Mewes, K., J.M. Mogollón, A. Picard, C. Rühlemann, A. Eisenhauer, T. Kuhn, W. Ziebis, S. Kasten (2015). Diffusive transfer of oxygen from seamount basaltic crust into overlying sediments: An example from the Clarion-Clipperton Fracture Zone. *Earth and Planetary Science Letters*, 433, 215-225.
 16. Rühlemann, C., S. Knodt (2015): Manganese nodule exploration & exploitation from the deep ocean. *The Journal of Ocean Technology*, 10, 1-9.
 17. Wiedicke-Hombach, M., T. Kuhn, C. Rühlemann, A. Vink, U. Schwarz-Schampera (2015). Deep-sea mining - a future source of raw materials? *Mining Report*, 151, No. 4, 318 - 329.
 18. Mewes, K., J.M. Mogollón, A. Picard, C. Rühlemann, T. Kuhn, K. Nöthen, S. Kasten (2014). Impact of depositional and biogeochemical processes on small scale variations in nodule abundance in the Clarion-Clipperton Fracture Zone. *Deep Sea Research Part I*, 91, 125-141.

19. Milzer, G., Giraudeau, J., Faust, J., Knies, J., Eynaud, F., & Rühlemann, C. (2013). Spatial distribution of benthic foraminiferal stable isotopes and dinocyst assemblages in surface sediments of the Trondheimsfjord, central Norway. *Biogeosciences*, 10, 4433-4448.
20. Rühlemann, C., Kuhn, T., Wiedicke, M., Kasten, S., Mewes, K., Picard, A. (2011): Current status of manganese nodule exploration in the German license area, *Proceedings of the Ninth (2011) ISOPE Ocean Mining Symposium*, p. 168-173.
21. Kuhn, T., Rühlemann, C., Wiedicke-Hombach, M. (2011): Development of methods and equipment for the exploration of manganese nodules in the German license area in the central equatorial Pacific, *Proceedings of The Ninth (2011) ISOPE Ocean Mining Symposium*, p. 174-177.
22. Morley, A., Schulz, M., Rosenthal Y., Mulitza, S., Paul, A., Rühlemann, C. (2011): Solar modulation of North Atlantic central water formation at multidecadal timescales during the late Holocene, *Earth and Planetary Science Letters*, 308, 161-171.
23. Bamberg, A., Rosenthal, Y., Paul, A., Heslop, D., Mulitza, S., Rühlemann, C., Schulz, M. (2010): Reduced North Atlantic central water formation in response to early Holocene ice-sheet melting, *Geophysical Research Letters*, 37, L17705, doi: 10.1029/2010GL043878.
24. Williams, M.A.J., Ambrose, S.H., der Kaars, S.V., Rühlemann, C., Chattopadhyaya, U., Pal, J., Chauhan, P.R. (2010): Reply to the comment on "Environmental impact of the 73ka Toba super-eruption in South Asia" by M. A. J. Williams, S. H. Ambrose, S. van der Kaars, C. Rühlemann, U. Chattopadhyaya, J. Pal, P. R. Chauhan [*Palaeogeography, Palaeoclimatology, Palaeoecology* 284 (2009) 295-314], *Palaeogeography, Palaeoclimatology, Palaeoecology*, 296, 204-211.
25. Steph, S., R. Tiedemann, M. Prange, J. Groeneveld, M. Schulz, A. Timmermann, D. Nürnberg, C. Rühlemann, C. Saukel, G. Haug (2010): Early Pliocene increase in thermohaline overturning: A precondition for the development of the modern equatorial Pacific cold tongue, *Paleoceanography*, 25, PA2202, doi: 10.1029/2008PA001645.
26. Rühlemann, C., U. Barckhausen, S. Ladage, L. Reinhardt, M. Wiedicke (2009): Exploration for polymetallic nodules in the German license area, *Proceedings of The Eighth (2009) ISOPE Ocean Mining Symposium*, pp. 8-14.
27. Williams M.A.J., S.H. Ambrose, S. van der Kaars, C. Rühlemann, U. Chattopadhyaya, J. Pal, P.R. Chauhan (2009): Environmental impact of the 73 ka Toba super-eruption in South Asia, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 284, 295-314.
28. Lückge, A., M. Mohtadi, C. Rühlemann, G. Scheeder, A. Vink, L. Reinhardt, M. Wiedicke (2009), Monsoon versus ocean circulation controls on paleoenvironmental conditions off southern Sumatra during the past 300,000 years, *Paleoceanography*, 24, PA1208, doi:10.1029/2008PA001627.
29. Jaeschke, A., C. Rühlemann, H. Arz, G. Heil, G. Lohmann (2007), Coupling of millennial-scale changes in sea surface temperature and precipitation off northeastern Brazil with high-latitude climate shifts during the last glacial period, *Paleoceanography*, 22, PA4206, doi:10.1029/2006PA001391.
30. Rühlemann, C., M. Butzin (2006), Alkenone temperature anomalies in the Brazil-Malvinas Confluence area caused by lateral advection of suspended particulate material, *Geochemistry, Geophysics, Geosystems*, 7, Q10015, doi:10.1029/2006GC001251.
31. Conte, M. H., M. Sicre, C. Rühlemann, J. C. Weber, S. Schulte, D. Schulz-Bull, T. Blanz (2006): Global temperature calibration of the alkenone unsaturation index (UK'37) in surface waters and comparison with surface sediments, *Geochemistry, Geophysics, Geosystems*, 7, Q02005, doi:10.1029/2005GC001054.
32. Kim, J.-H., N. Rambu, S. J. Lorenz, G. Lohmann, R. R. Schneider, S.-I. Nam, S. Schouten, F. Sirocko, C. Rühlemann (2004): North Pacific and North Atlantic sea-surface temperature variability during the Holocene. - *Quaternary Science Reviews*, 23, 2141-2154.
33. Mulitza, S., B. Donner, G. Fischer, A. Paul, J. Pätzold, C. Rühlemann, M. Segl (2004): The South Atlantic oxygen isotope record of planktic foraminifera. In: G. Wefer, S. Mulitza, V. Ratmeyer (Hrsg.): *The South Atlantic in the late Quaternary: Current systems and material budget*, Springer- Verlag, Berlin Heidelberg, pp. 121-142.
34. Rühlemann, C., S. Mulitza, G. Lohmann, A. Paul, M. Prange, G. Wefer (2004): Intermediate-depth warming in the tropical Atlantic related to weakened thermohaline circulation: Combining paleoclimate data and modeling results for the last deglaciation. *Paleoceanography*, 19, PA1025, doi:10.1029/2003PA000948.

35. Schulte, S., A. Benthien, N. Andersen, P.J. Müller, C. Rühlemann, R. Schneider (2004): Stable carbon isotopic composition of the C₃₇-alkenone: A proxy for CO₂(aq) concentration in oceanic surface waters? In: G. Wefer, S. Mulitza, V. Ratmeyer (Hrsg.): *The South Atlantic in the late Quaternary: Current systems and material budget*, Springer-Verlag, Berlin Heidelberg, pp. 195-211.
36. Schulte, S., A. Benthien, P.J. Müller, C. Rühlemann (2004): Carbon isotopic fractionation ($\delta^{13}C_p$) of C₃₇-alkenones in deep-sea sediments: Its potential as a paleonutrient proxy. *Paleoceanography*, 19, PA1011, doi:10.1029/2002PA000811.
37. Lamy, F., C. Rühlemann, D. Hebbeln, G. Wefer (2002): High- and low-latitude climate control on the position of the southern Peru-Chile Current during the Holocene. *Paleoceanography*, 17, 10.1029/2001PA000727.
38. Vink, A., C. Rühlemann, S. Mulitza, K.A.F. Zonneveld, H. Willems (2001): Shifts in the position of the North Equatorial Current and rapid productivity changes in the western tropical Atlantic during the last glacial. *Paleoceanography*, 16, 479-490.
39. Rühlemann, C., B. Diekmann, M. Frank, S. Mulitza (2001): Late Quaternary changes of western equatorial Atlantic surface circulation and Amazon lowland climate recorded in Ceará Rise deep sea sediments. *Paleoceanography*, 16, 293-305.
40. Kasten, S., R. R. Haese, M. Zabel, C. Rühlemann, H.D. Schulz (2001): Barium peaks at glacial terminations in sediments of the equatorial Atlantic Ocean - relicts of deglacial productivity pulses? *Chemical Geology*, 175, 635-651.
41. Gerhardt, S., H. Groth, C. Rühlemann, R. Henrich (2000): Aragonite preservation in late Quaternary sediment cores on the Brazilian continental slope: implications for intermediate water circulation. *International Journal of Earth Sciences*, 88, 607-618.
42. Mulitza, S., C. Rühlemann (2000): African monsoonal precipitation modulated by interhemispheric temperature gradients. *Quaternary Research*, 53, 270-274.
43. Diekmann, B., G. Kuhn, A. Mackensen, R. Petschik, D.K. Fütterer, R. Gersonde, C. Rühlemann, H.-S. Niebler (1999): Kaolinite and chlorite as tracers of modern and late Quaternary deep water circulation in the South Atlantic and the adjoining Southern Ocean. In: G. Fischer, G. Wefer (Hrsg.): *Use of Proxies in Paleoceanography: Examples from the South Atlantic*, Springer-Verlag, Berlin Heidelberg, pp. 285-313.
44. Gingele, F., F. Schmieder, T. von Dobeneck, R. Petschik, C. Rühlemann (1999): Terrigenous flux in the Rio Grande Rise area during the past 1500 ka: Evidence of deepwater advection or rapid response to continental rainfall patterns? *Paleoceanography*, 14, 84-95.
45. Höll, C., B. Karwarth, C. Rühlemann, K.A.F. Zonneveld, H. Willems (1999): Paleoenvironmental information gained from calcareous dinoflagellates: The late Quaternary eastern and western tropical Atlantic Ocean in comparison. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 146, 147-164.
46. Rühlemann, C., S. Mulitza, P.J. Müller, G. Wefer, R. Zahn (1999): Warming of the tropical Atlantic Ocean and slowdown of thermohaline circulation during the last deglaciation. *Nature*, 402, 511-514.
47. Rühlemann, C., P.J. Müller, R.R. Schneider (1999): Organic carbon and carbonate as paleoproductivity proxies: Examples from high and low productivity areas of the tropical Atlantic. In: G. Fischer, G. Wefer (Hrsg.): *Use of Proxies in Paleoceanography: Examples from the South Atlantic*, Springer-Verlag, Berlin Heidelberg, pp. 315-344.
48. Wolff, T., S. Mulitza, C. Rühlemann, G. Wefer (1999): Response of the tropical Atlantic thermocline to late Quaternary trade wind changes. *Paleoceanography*, 14, 374-383.
49. Zonneveld, K.A.F., C. Höll, D. Janofske, B. Karwarth, B. Kerntopf, C. Rühlemann, H. Willems (1999): Calcareous dinoflagellate cysts as paleo-environmental tools - In: G. Fischer, G. Wefer (Hrsg.): *Use of Proxies in Paleoceanography: Examples from the South Atlantic*, Springer-Verlag, Berlin Heidelberg, pp. 145-164.
50. Mulitza, S., C. Rühlemann, T. Bickert, W. Hale, J. Pätzold, G. Wefer (1997): Late Quaternary $\delta^{13}C$ gradients and carbonate accumulation in the western equatorial Atlantic. *Earth and Planetary Science Letters*, 155, 237-249.
51. Rühlemann, C., M. Frank, W. Hale, A. Mangini, S. Mulitza, P.J. Müller, G. Wefer (1996): Late Quaternary productivity changes in the western equatorial Atlantic: Evidence from ²³⁰Th_{ex}-normalized carbonate and organic carbon accumulation rates. *Marine Geology*, 135, 127-152.

In addition, ca. 50 technical reports on scientific results of expeditions and (third-party funded) research projects.

Name	Joshua Tiwangye Tuhumwire
Expertise	Geologist/Mining
Nationality	Uganda
Contact Information	
Country of Work Experience	Uganda, International
Language	English, Swahili, Rukiga-Runyankore
Educational and Other Qualification	1986: Vrije Universiteit Brussel - M.Sc. (cum laude) Geology (Mineral Prospecting). 1980: Makerere University – B.Sc. (Hons.) Geology & Chemistry.
Summary of Experience	<p>42 years of technical and managerial experience. A highly self-motivated team player and effective communicator with demonstrated professional, administrative capabilities and with extensive project and corporate management experience;</p> <ul style="list-style-type: none"> • Founder and Managing Director of Gondwana Geoscience Consulting Ltd (2010 to date): Consulting services in mineral exploration and mining, geological mapping, mineral resource appraisal, artisanal and small-scale mining, tenements management, community engagement, and environment impact assessment. Clients include: Sipa Resources Australia; Paul C. Rizzo Inc. USA; Oryx Minerals Ltd, Uganda; Greenstone Resources Ltd, Uganda; Kampala Cement Company Ltd; • Director and Chairman of Sipa Exploration (U) Ltd; a subsidiary of Sipa Resources, Australia (2013 to date); • Director of several mineral exploration companies operating in Uganda (2010 – 2014); • Member of United Nations Group of Experts for the Regular Process on World Ocean Assessment I (2010 to September 2014); • Member of United Nations Group of Experts for the Regular Process on World Ocean Assessment II (2015 - 2020); • Member of Legal and Technical Commission of the International Seabed Authority (2017 - 2021); • Advisor to the Board of Uganda Chamber of Mines and Petroleum (2013 to 2017); • Commissioner of Department of Geological Survey and Mines (2001 to June 30, 2010): Head of department and responsible for overall general administration and finance, technical and mineral policy

	<p>implementation, carrying into effect provisions of the Mining Act and Regulations, and provision of technical advice in mineral sector and geosciences to all levels of public administration. A member of the government task force that drafted the Mineral Policy, 2001 and Mining Act, 2003.</p> <ul style="list-style-type: none"> • Board Member, Uganda Electricity Transmission Company Ltd. (July 2006 – January 2009): With good understanding of the country's energy sector. • Member of the United Nations Ad Hoc Steering Group on Assessment of Assessments for the State of Marine Environment (2006 – 2009): Representing the Africa Region on the committee to oversee the Pool of Experts in the Regular Process for the global reporting and assessment of the state of marine environment. <ul style="list-style-type: none"> • Project Coordinator, Sustainable Management of Mineral Resources Project (SMMRP) (2003 – 2006): in addition to being head of department, also coordinator of the SMMRP, a five-year, US\$ 45.7 million sector development project financed by the World Bank/IDA, African Development Bank, Nordic Development Fund and Government of Uganda. Involved in mineral sector review, project formulation and negotiation with development partners till funding was secured. As head of Project Coordination Unit, responsible for contractual relationships with financiers, planning and overall supervision of activities, financial management, procurement and investment promotion • National Project Director, Mineral Investment Promotion Project, UGA/89/001 (1992 – 1996): Counterpart to the Chief Technical Advisor of UNDP-Government of Uganda funded project (US \$2.5 million). Among responsibilities were: overall direction of the project on behalf of the government, including planning, timely and technical execution of activities and outputs, selection of experts, work plans, selection of mineral exploration targets, budgetary management of counterpart funding and preparation activity reports. 	
Relevant Experience Related with the Assignment	<ul style="list-style-type: none"> • As a geologist, senior geologist, principal geologist assistant commissioner/geology and as geological consultant, I have more than 40 years' hands-on experience addressing the technical and economic challenges facing Uganda's mining sector, involved in field geological mapping and mineral exploration programs for government of Uganda as well as private companies, including over 30 years at senior management level with responsibilities of technical and policy matters in the mineral sector. 	
Period: From To	Name of Activity /Project/Funding/	Job Title and Activities undertaken/Description of Actual role performed

	Organization	
2016 to 2020	The Second Global Integrated Marine Assessment, World Ocean Assessment II; DOALOS, United Nations, New York	Member, Group of Experts Expert on geology/mining: as lead member for the group, to oversee the preparation of chapters on seabed mining, offshore hydrocarbons as well those chapters with a geological component namely coastal erosion and sedimentation.
2013 to Present	Exploration for base metals and precious metals in the Kitgum-Pader region, Northern Uganda; Sipa Exploration Ltd./Sipa Resources, Australia.	Director and Chairman Technical adviser on in-country operations with respect to mining law and regulations, recruitment of local experts as well as tenement management.
2017 to Present	Legal and Technical Commission (LTC), International Seabed Authority, Kingston, Jamaica	Member, Legal and Technical Commission As expert on mission, one of the 30 commissioners comprising of earth scientists, engineers, environmental scientists, lawyers, and economists and the LTC is the legal and technical body of the ISA; responsible to the Council. Commission decisions are by consensus. Activities undertaken include the review of annual reports, periodic reports of ISA's contractors with seabed exploration contracts (30), review of new exploration applications by contractors and recommendation to Council, drafting of exploitation regulations in the Area (Seabed beyond national jurisdiction, drafting of EIA, standards and guidelines for future mining, issuance of guidance to contractors on compliance to regulations.
2010 – 2014	The First Global Integrated Marine Assessment, World Ocean Assessment I; DOALOS, United Nations, New York	Member, Group of Experts Expert on mining: as lead member for the group, to oversee the preparation of chapters on seabed mining and geology related chapters as well contributor/co-author to some chapters.
2012 - 2013	Exploration for additional gold deposits for Greenstone Resources (client)	In association with Paul C Rizzo Inc. As a contractor undertook sampling and logging of trenches and underground workings, prepared samples for laboratory analyses.

	<p>at Tira gold mine, Busia, Uganda</p> <p>Exploration for pozzolanic rocks for Kampala Cement Ltd. (client)</p>	<p>Consultant: Carried out sampling and evaluation of pozzolanic rocks in Fort Portal, Bunyaruguru, Rubanda and Mt. Elgon volcanic fields for the production of pozzolanic cement.</p>
1980 - 1997	<p>Various geological mapping and exploration tasks for Geological Survey and Mines Department.</p>	<p>Employed as Geologist, Senior Geologist and Principal Geologist: Undertook mineral exploration activities including for iron ore resources at Muko, tin occurrences in Ntungamo area, clay occurrences for construction around selected urban areas of Uganda, gold occurrences in Buhweju goldfield, copper-cobalt exploration in Kilembe mine area, glass-sand occurrences at Lambu and Bukakata beaches of Lake Victoria, gold occurrences in Busia goldfield and phosphate deposit at Busumbu ridge.</p>

Key Publications

- Various unpublished technical reports for the Department of Geological Survey and Mines, Uganda
- Introduction – Planet, oceans and life; Chapter 1 of The Global Integrated Marine Assessment, World Ocean Assessment I (contributor/co-author)
- Land-Sea Physical Interaction; Chapter 26 of The Global Integrated Marine Assessment, World Ocean Assessment I (contributor/co-author)
- Offshore Mining Industries; Chapter 23 of The Global Integrated Marine Assessment, World Ocean Assessment I (contributor/Lead Member)
- World Ocean Assessment II Lead Member for chapters: 7L (Continental Slopes and Submarine canyons), 7N (Seamounts), 7O (Abyssal Plains), 7Q (Ridges, Plateaus and Trenches), 19 (Seabed Mining), 20 (Offshore hydrocarbons).

Key Trainings / Conferences

Several professional/technical courses from various providers including:

- Remote Sensing Applications for Geological Mapping & Mineral Exploration,
- Regional Centre for Mapping & Remote Sensing, Nairobi, 1984;
- Advanced Regional Mapping: Tanzania & Germany - BGR, Hanover 1992;
- Applications of Geographical Information Systems in Mineral Deposit Modelling & Resource Assessment, Colorado School of Mines, USA, 1993;
- Management for Geoscientists, Australian Mineral Foundation, Adelaide, 1995;
- Procurement and Contract Negotiations, International Law Institute, Kampala, 2001;
- Management of Donor Funded Projects, Development Training International, Mbabane,

Swaziland, 2005;

- Corporate Governance Strategies for Public and Private Enterprises, IP3 Institute, Washington, D.C., 2007;
- Attended several annual mining investment conferences as a speaker including Prospectors and Developers Association Convention (PDAC), Toronto, African Mining Indaba, Cape Town, Mines and Money, London; 1998 - 2010

References

1. Mr. Fred Kabagambe-Kaliisa, Former Permanent Secretary, Ministry of Energy and Mineral Development, Uganda. Phone: +256-772-633025. Email: fakkaliisa@gmail.com
2. Edwards K. Katto, Former Director, Directorate of Geological Survey and Mines, Uganda. Phone: +256-772-962639. Email: kagimba@hotmail.com

Declaration

I confirm my intention to serve in the stated position and will be available to serve for the term of the assignment. I also understand that any willful misstatement described above may lead to my disqualification, before or during my engagement.

Signed by Mr. Joshua Tiwangye Tuhumwire

Date Signed: 24 January 2022



MICHELLE N WALKER

Citizenship: Jamaica

SUMMARY

Highly experienced attorney-at-law, with over 20 years' practice specialising in international law with substantial experience in law of the sea matters. Skills include negotiation, treaty drafting, leadership, capacity building, policy development and review, research and provision of advice on complex legal matters, provision of advice on legislation - particularly for implementation of international law obligations, coaching/training, and team building.

HIGHLIGHTS

- Considerable knowledge of principles and practice of international law including the drafting and negotiation of agreements at the bilateral, regional, and multilateral levels.
- Expertise in law of the sea matters, particularly maritime delimitation, and regulatory regime for deep seabed mining.
- In-depth experience managing complex legislative issues which require wide-ranging knowledge of domestic law and appreciation of comparative legislation from other jurisdictions
- Extensive experience working for and with governmental, regional, and international organisations.

EXPERIENCE

Deputy Solicitor General, International Affairs Division, Attorney General's Chambers

Kingston, Jamaica - August 2020 - present

Responsible for providing expert legal advice to Government Ministries, Departments and Agencies on a range of matters specifically related to international law.

Manages the International Affairs Division and Legal Units of Ministries assigned. Maintains a timely workflow, coaches staff and manages human/ institutional capacity development, with limited resources.

Achievements:

- In the context of ongoing negotiations to finalise an international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ), provided technical and legal support for the CARICOM Delegation in the preparations leading up to and the negotiations during the Fourth Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction, particularly on capacity building and transfer of marine technology, and cross-cutting issues. March 2022.
- Established an internal team within the Division to increase focus on law of the sea matters, with emphasis on, among other matters, the exploitation regulations.
- Supported and provided guidance for the coordination by Jamaica's International Seabed Authority (ISA) Secretariat by contributing to goal of developing a larger pool of technical experts with the ability to comment on Jamaica's position with respect to, among other matters, the exploitation regulations and related standards and guidelines.

EXPERIENCE cont'd

Head, Legal Service Unit: Ministry of Foreign Affairs and Foreign Trade

Kingston, Jamaica - April 2001 - July 2020

Responsible for managing the Legal Services Unit that provides legal advice to the Ministry, particularly on matters related to Foreign Affairs and Foreign Trade. This required wide-ranging experience in and knowledge of laws of Jamaica, to ensure compliance with treaty obligations.

Achievements:

- Over twenty years' experience with international law practice concerning treaty drafting, negotiation and conclusion at bilateral, regional, and multilateral levels including advancing delimitation negotiations with several neighbouring states as deputy lead negotiator of the Jamaican delegation; the negotiation of several agreements for the Caribbean Community (CARICOM) under the Revised Treaty of Chaguaramas (the RTC), The Arms Trade Treaty (ATT) and United Nations (UN) system.
- Advised on the development of national guidelines for conducting marine research in Jamaican maritime space.
- Represented Ministry and advised National Council on Ocean and Coastal Zone Management particularly on implementation of treaty obligations.
- Made presentations at ISA National Seminars on the work of the Authority and its relevance to Jamaica and the Region.
- Convened several inter agency processes to identify legislative gaps and oversaw development of legislation. In doing this, also identified additional donor support mechanisms, and provided required status reports to respective donors
- Represented Ministry on inter-agency working groups for the implementation of regional environmental agreements.
- Developed a Commonwealth Secretariat technical assistance project for capacity building for maritime delimitation negotiations, then coordinated and monitored national implementation of the project.

Senior Legal Officer, Caribbean Community (CARICOM) Secretariat

Georgetown, Guyana - Oct 1998 - March 2001

Under direction of General Counsel, provided legal advice to the Secretary-General, Secretariat, and organs/ bodies of CARICOM on matters including interpretation of the RTC and obligations of Members states. Provided legal support and advice in meetings of Legal Affairs Committee (of the region's Attorneys General) and Council on Trade and Economic Development (COTED), an organ of CARICOM dealing with trade matters.

Achievements:

- Established and convened CARICOM Working Group on Intellectual Property
- Prepared paper for Legal Affairs Committee on options for establishment of CARICOM Human Rights Commission and constitutional requirements of Member States for implementing Caribbean Court of Justice Agreement
- Member of CARICOM electoral team for Suriname Presidential Elections which observed elections and prepared a report for CARICOM (2000)
- Provided legal advice to Technical Working Groups which developed protocols which were then consolidated into the RTC

EXPERIENCE cont'd

Crown Counsel, International Law Division – Attorney General's Chambers

Kingston, Jamaica- — Sept 1991 to Sept 1998

Provided advice to Government of Jamaica on matters concerning treaties and implementation of Jamaica's international law obligations in areas such as environmental law, law of the sea, trade law, and human rights law.

Achievements:

- Supported lead negotiator in the negotiation of various bilateral agreements including on maritime delimitation
- Represented Jamaica in various regional and international fora e.g., Organisation of American States (OAS), United Nations Environment Programme, and the UN
- Prepared national response to international human right bodies at the UN and OAS

MAJOR GOVERNMENTAL, NON-GOVERNMENTAL/CIVIL SOCIETY PARTICIPATION AND LEADERSHIP

Delimitation Committee

The Delimitation Committee is an inter-agency body responsible for advising Government of Jamaica on issues concerning maritime delimitation as well as conducting negotiations.

2020 to Present: Lead Negotiator

Legal and Technical Commission (LTC), International Seabed Authority

2017 to 2022: Elected Member - Chairperson (2018-2021); Vice Chair (2017- 2018)

2017 to 2022: Member of Commission that finalised and delivered draft exploitation regulations to Council

2016-2017: Replacement for an outgoing Member

Joint Appeal Board of International Seabed Authority

The Joint Appeal Board is a body established under the Staff Regulations to consider and advise the Secretary-General on appeals filed under the terms of a specific staff regulation.

2018 to Present: Member (reappointed, two-year terms)

The International Seabed Authority, Jamaica

2017 to Present: Deputy Permanent Representative (Government of Jamaica)

2001 to Present: Member of Jamaican Delegation, role included (subject to the limits of LTC mandate) advising on legal issues such as interpretation of provision of United Nations Convention of the Law of the Sea (UNCLOS), interpretation of rules of procedure for relevant Organ, and other legal issues arising during sessions.

Various: Convening inter-agency committees