WORKSHOP FOR THE PROMOTION OF SUSTAINABLE DEVELOPMENT OF AFRICA'S DEEP SEABED RESOURCES IN SUPPORT TO AFRICA'S BLUE ECONOMY, PRETORIA, SOUTH-AFRICA, 16-18 May 2019

SESSION V: ***Management and dissemination of geological, mineral and environmental information***

Theme 2: Geological, mineral and environmental data as a critical tool to inform decision-making processes, investments and governance of mineral activities in the Area

By

Professor Théophile Ndougsa Mbarga, P.Geo, P.Eng, MAusIMM (#325177#)

Legal and Technical Commission, ISA, Cameroon

Expert for the Extractive Industry Monitoring Improvement Project, Ministry of Higher State Control, Cameroon

Former Director in charge of mining exploration in Cameroon's Ministry of mines

OBJECTIVES

OBJECTIVES:

- Clarify key concepts and definitions related to the management of geo-scientific, mining and environmental data;
- State the legal basis for the management of geo-scientific, mining and environmental data as a constraint on mining activities in the Area;
- Identify the role of key tool for decision-making for investment and governance of mining activities in the Area;
- Make a link with Africa's blue economy & geo-scientific, mining & environmental knowledge management of the Area;
- Explore some routes for the active participation of African States Parties.

CONTENT

CONTENT

DEFINITIONS OF KEY CONCEPTS & TERMS

❑ INTRODUCTION

- The discovery of mineral indices & deposits is tailored by geoscientific data as well as the environmental and mining data are playing a key role in the development of a mineral resource deposit.
- The access to existing data sets by investors is a very important for the risk assessment and reduction during prospecting/exploration and exploitation phases, which incorporate high risk in a long term view.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ INTRODUCTION (Cont'd)

- The capacity by the mining developers to use existing data enables to better orientate the efforts for the future identification of mineral and energy natural resources of our planet.
- The management and the accessibility of geoscientific, mining and environmental data is considered as a key factor in the decision making processes for mining investment and for a good governance in a sustainable exploration and exploitation, both incorporating an inclusive and participative approaches.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ INTRODUCTION (End)

❑ **The geoscientific, mining and environmental data support:**

- The effective discovery of a new generation of vast low-cost mineral and energy resources and their optimal development and sustainable exploitation;
- Infrastructure development and spatial planning on the continent and the delimitation and sustainable use of maritime spaces and corridors;
- Sustainable and efficient management and conservation of continental and marine ecosystems.

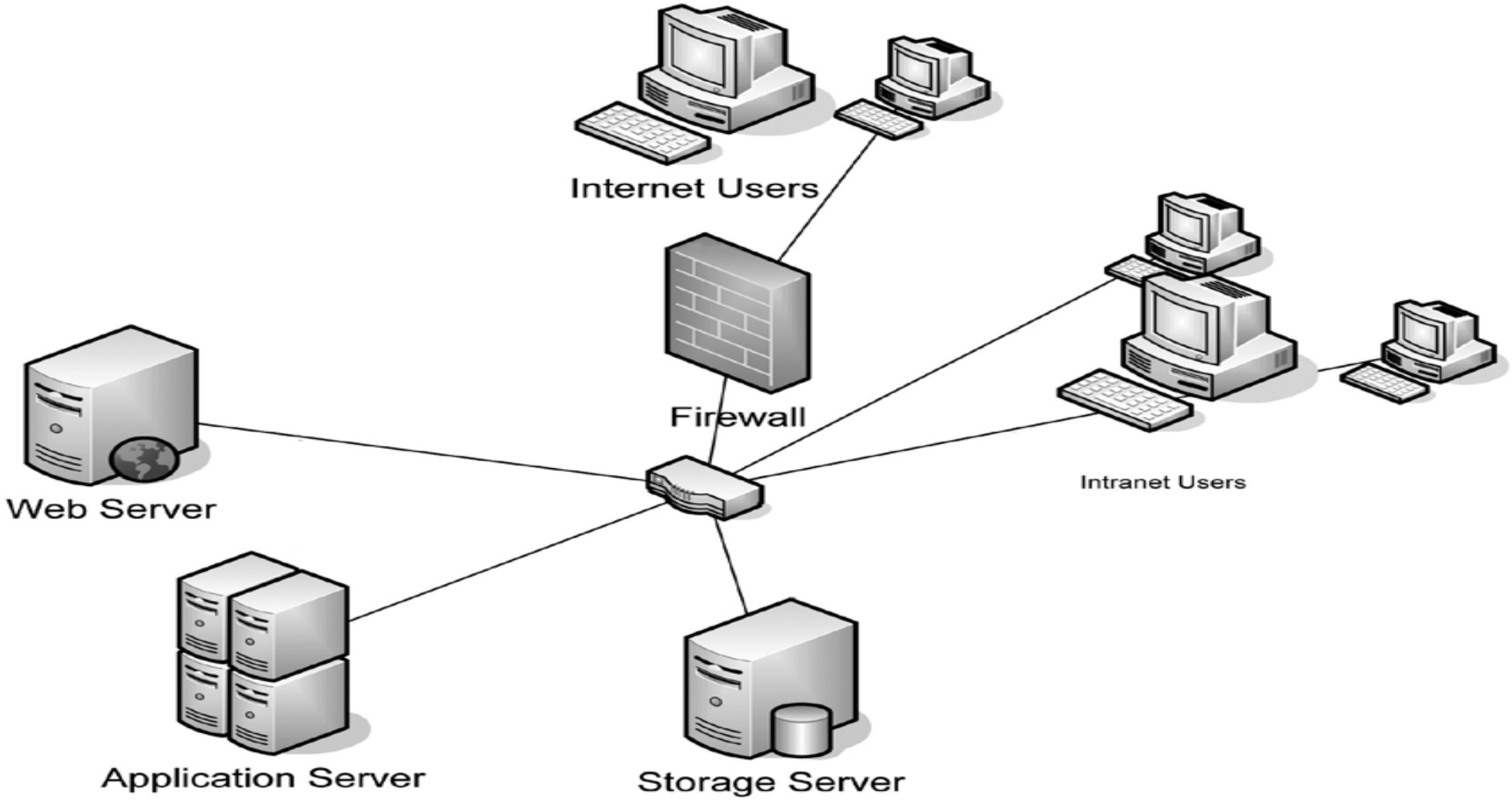
DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ THE CONCEPT OF DATA MANAGEMENT & ACCESSIBILITY

1. Data management and dissemination is the set of mechanisms implemented to process, model, interpret, store and make data accessible in variable standards and normative formats with the use of various data access codes and nomenclatures.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ THE CONCEPT OF DATA MANAGEMENT & ACCESSIBILITY



DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ THE CONCEPT OF GEOSCIENTIFIC, MINING AND ENVIRONMENTAL DATA MANAGEMENT & DISSEMINATION

2. The management and dissemination of geoscientific, mining and environmental data is the set of technological means implemented to process, model, interpret, store and make these data from ground, sea or airborne surveys or field surveys, accessible in standard and standardized variable formats (maps, 2D or 3D digital models, photographic and / or statistical representations) with various access codes.

.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ **DEFINITIONS OF SOME KEY TERMS**

3. Geoscientific data: They constitute the body of knowledge contained within the geoscience infrastructure, which includes geological, geophysical, topographic and bathymetric maps and associated databases. They present fundamental geoscience information for the extractive sector and related activities such as water and environmental resource management, land and marine use, geohazard management and infrastructure works.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ DEFINITIONS OF SOME KEY TERMS

4.a. Mining data: They are composed of all the knowledge relating to the structure of a mineral deposit including the physical parameters of the ore such as its geometry of distribution, its content, its volume or tonnage, the density of the mineral (or minerals) with commercial value, the mine life and the mine planning, etc.

4.b. Mining deposit: Any natural deposit of mineral substances marketable under the current economic conditions.

4.c. Mineral deposit: A concentration of mineral substances within a specific area of the earth's crust (continental or marine).

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ DEFINITIONS OF SOME KEY TERMS

5. Environmental data: It is the set of environmental knowledge including the data relating to the behaviour of the continental and marine ecosystems with their fauna and flora vis-à-vis the impacts resulting from the mining activities, including the battery of measures of mitigation and management to take during the implementation of the mining project to avoid, reduce, mitigate or offset negative environmental and social impacts.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ DEFINITIONS OF SOME KEY TERMS

6. Protection of the environment in mining activities:

- The concept of environmental protection in mining activities is based on the effects of mineral exploration and production, recovery and / or processing of mining products.
- This activity which induced effects and impacts on the physical environment (including fauna and flora) and human, requires a response from the point of view of prevention, mitigation and remediation of the different environmental, physical and social impacts that can occur.

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ DEFINITIONS OF SOME KEY TERMS

6. Protection of the environment in mining activities (end):

- The protection of the environment in mining activities is **the set of mechanisms implemented to prevent, mitigate and remedy the various impacts related: (i) to exploration and production activities, (ii) to mineral processing, recovery and valorisation / or its transformation.**

7. Good governance in mining activities consists of achieving these activities in an optimal and sustainable manner, i.e **so as to be economically profitable, ecologically acceptable, inclusive and participatory of all stakeholders involved or impacted by these activities including those related to.**

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

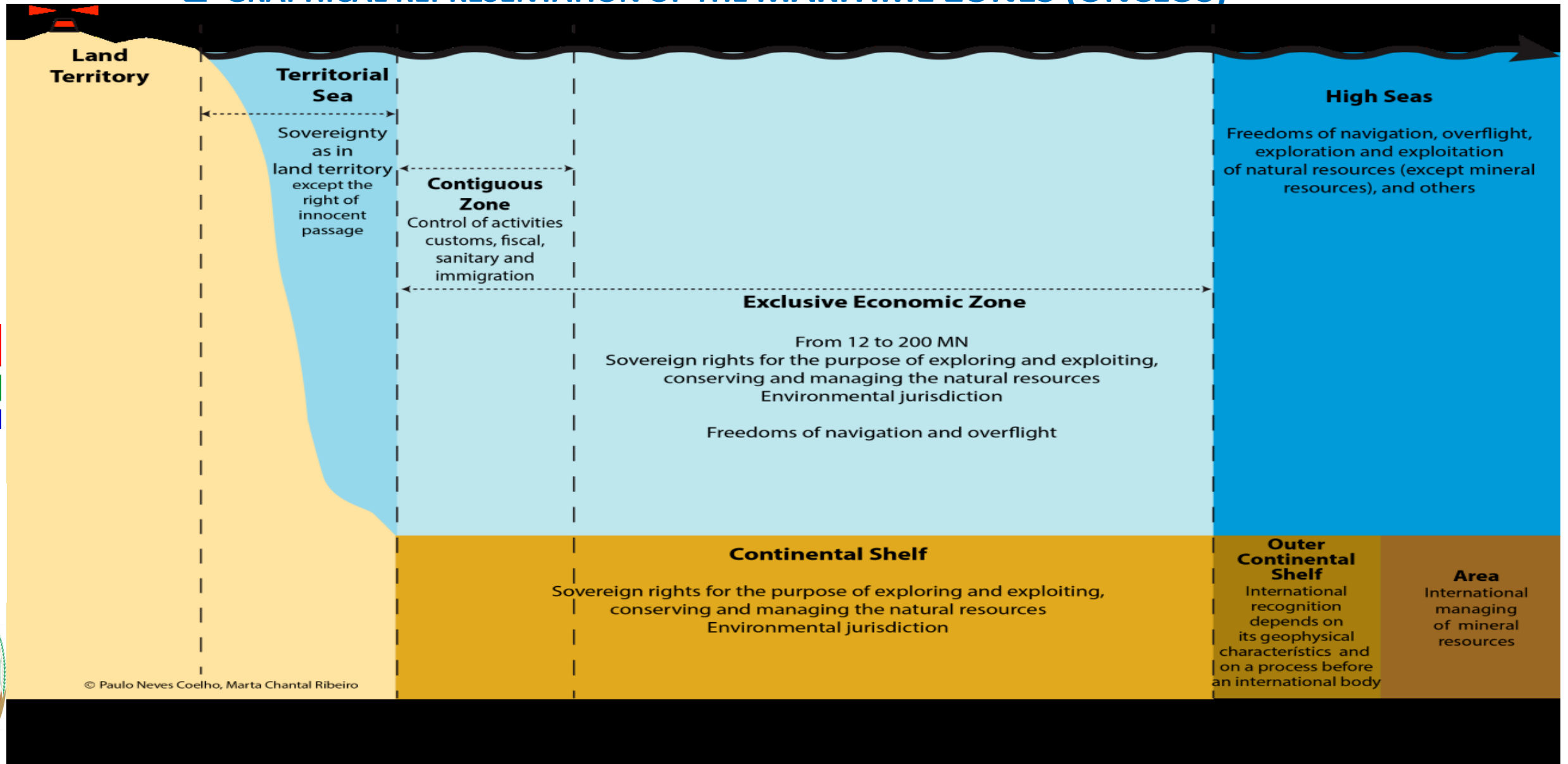
❑ DEFINITIONS OF SOME KEY TERMS

8. The Area: It is the seabed and their subsoil beyond the limits of national jurisdiction. It is rich in mineral resources such as polymetallic nodules, polymetallic sulphides and cobalt-rich ferromanganese crusts.

❑ The Convention divides the ocean into six major maritime areas. Four of these areas are under the jurisdiction of the coastal State: the territorial sea, the contiguous zone, the exclusive economic zone and the continental shelf. The other two correspond to maritime areas beyond national jurisdictions: the high seas and the seabed area beyond the continental shelf, called the « Area ».

DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ GRAPHICAL REPRESENTATION OF THE MARITIME ZONES (UNCLOS)

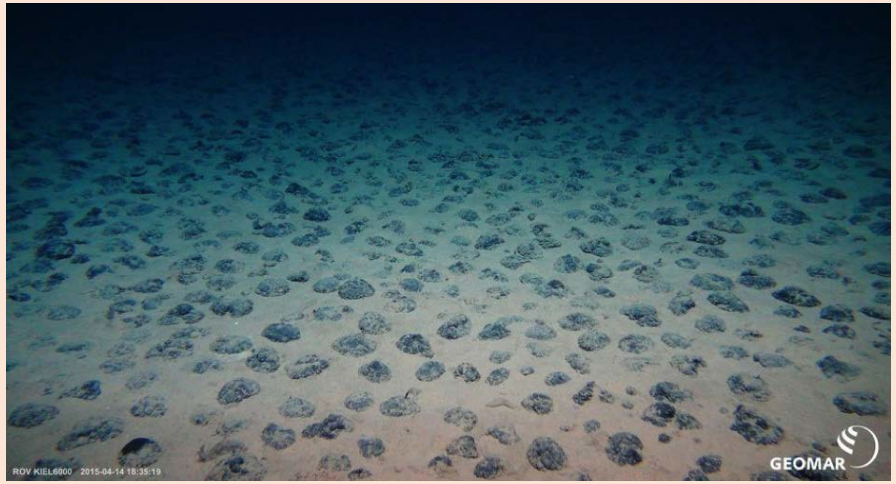


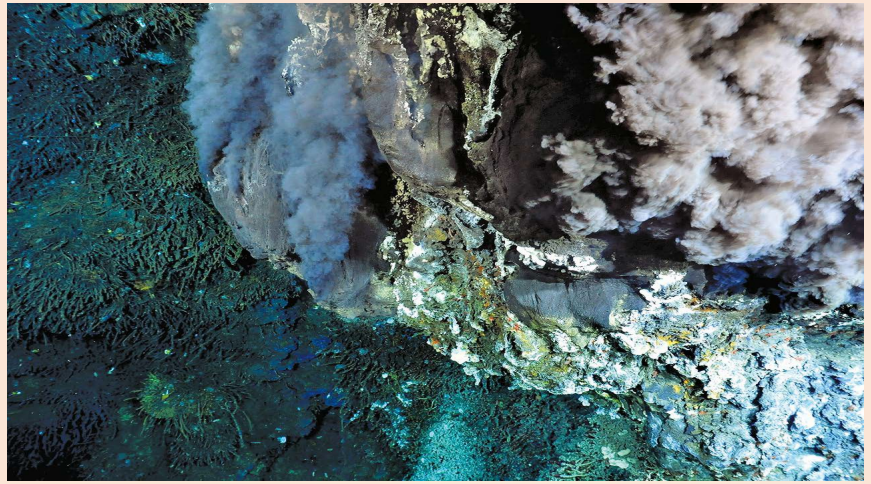
DEFINITIONS OF KEY CONCEPTS & TERMS (cont'd)

❑ DEFINITIONS OF SOME KEY TERMS: MINERAL TYPES IN THE AREA

9. Polymetallic nodules(PMN): It is any deposit or agglomerate of nodules, located on the surface of the deep seabed or just below it, which contains manganese, nickel, cobalt and copper.

PMN





PMS

10. Polymetallic sulphides(PMS): It is deposit of sulphide minerals of hydrothermal origin and associated mineral resources containing concentration of metals such as copper, lead, zinc, gold and silver.

DEFINITIONS OF KEY CONCEPTS & TERMS (End)

❑ DEFINITIONS OF SOME KEY TERMS: MINERAL TYPES IN THE AREA (end)

11. Cobalt-rich ferromanganese crust: These are deposits of oxides and hydroxides of ferromanganese crust enriched with minerals, formed by direct precipitation of seawater minerals on solid substrates containing significant amounts of cobalt, titanium , nickel, platinum, molybdenum, tellurium, cerium, other metals and rare earths.

CRFC or PMC

- All geoscientific, mining and environmental knowledge related to mining activities (prospecting, exploration and mining) in the Area, is the key in making investment decisions and governance of mining activities in the said marine area.

CONTENT

LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA

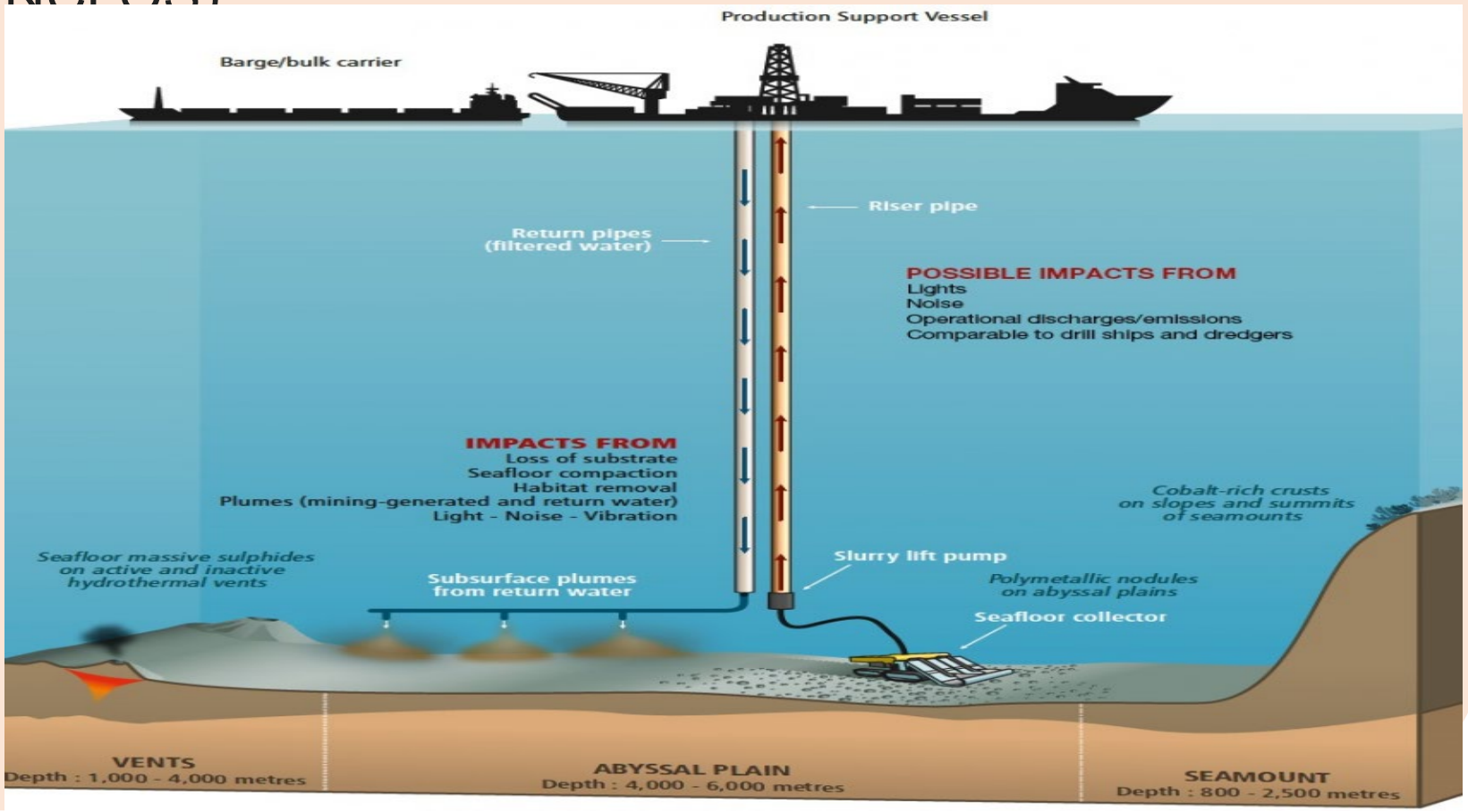
- The letter and spirit of the United Nations Convention on the Law of the Sea (UNCLOS) in general, encourages the collection of data relating to the improvement of geoscientific (geological, geophysical, bathymetric, etc.), mining and environmental of the Area, whose resources are considered as the Common Heritage of Human Kind (CHHK).
- In Part XI, the collection and management of the three types of data and knowledge derived from them constitutes the binding basis for all mining activities in the Area, from prospecting, exploration to exploitation stage for the three classes of mineral resources identified on the seabed. The Authority (ISA) has all the administration rights over the resources of the Area (art.137, par.3 of UNCLOS).

LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA(cont'd)

- Data acquisition and knowledge of geoscientific, mining and environmental in the Area are derived from prospecting, exploration and exploitation activities undertaken by contractors who are either States parties, those private parties sponsored by one (or more) State Party (s) or natural persons having the nationality of the States Parties, are under the control of the Authority (Article 153 of the UNCLOS, Annex III, Arts 2 & 3). The Contractor has the obligation to communicate to the Authority all relevant data and information as laid down in art. 14 of Annex III.
- In addition, the Authority is authorized to carry out marine scientific research on the Area or may enter into contracts for this purpose (Article 143 UNCLOS).

LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA (cont'd)

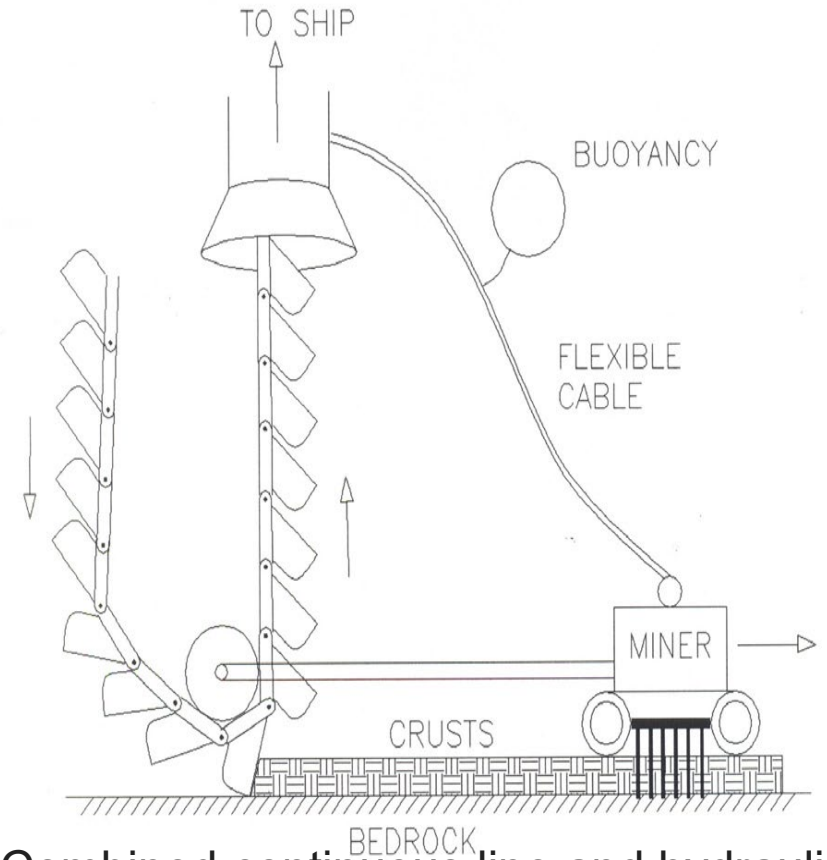
- The Authority coordinates the management and dissemination of the results and analyses of marine scientific research when they are available (art.143, par.2 of UNCLOS)



LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA (ctd)

❑ GEOSCIENTIFIC DATA & KNOWLEDGE (GEOLOGICAL, GEOPHYSICAL, BATHYMETRIC, ETC.)

- The Contractor must first provide the Authority with a request for approval of a work plan of knowledge and information (in the form of maps) relating to the physical and geoscientific characteristics such as geographical coordinates, the topography of the seabed, the bathymetry and bottom currents, geological description of facies, etc. (ISBA / 19 / C / 17, Annex II, sec.II, para.19 a).

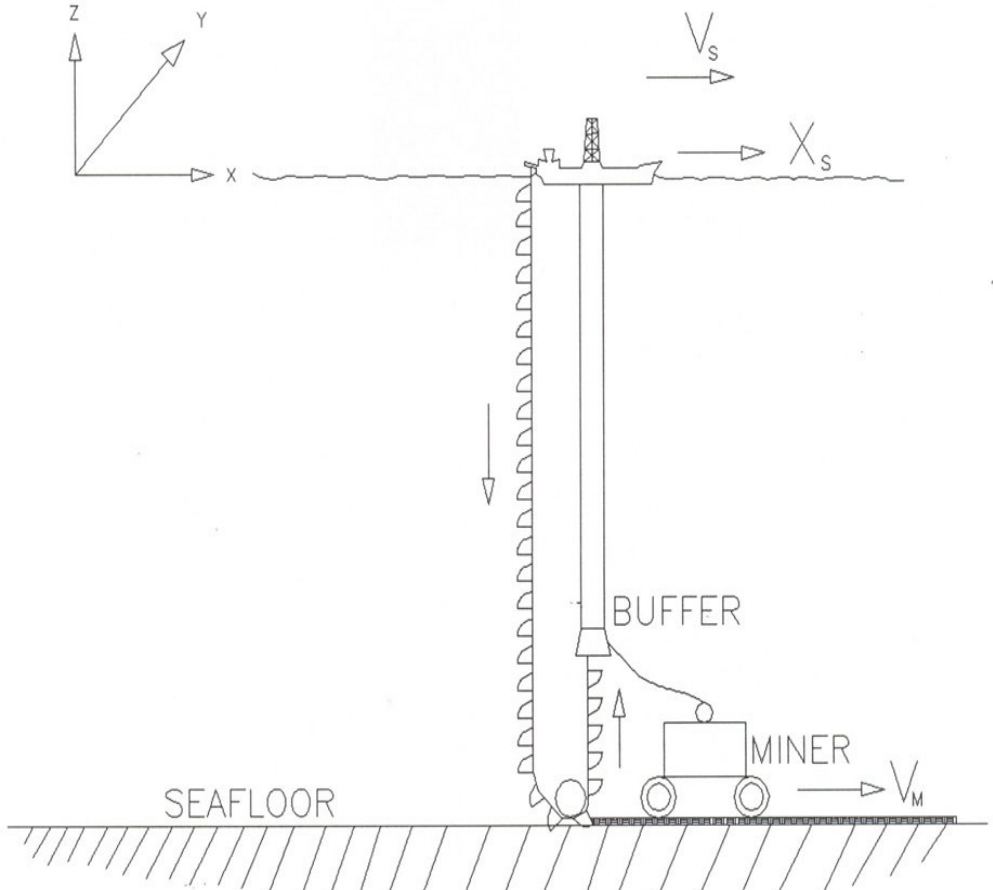


Combined continuous line and hydraulic system (Cheung, 1994, Mavistra, 2000)

LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA (cont'd)

❑ DATA AND MINING KNOWLEDGE

- The Contractor must first provide the Authority with a request for approval of a work plan with knowledge and information on the average density of minerals of economic interest, their composition including their content (ISBA / 19 / C / 17, Appendix II, sec.II, para.19 a).



Continuous line bucket system via a pipe (Cheung, 1994, Mavistra, 2000)

LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA (cont'd)

❑ ENVIRONMENTAL DATA & KNOWLEDGE

- ❑ Mining activities carried out in the Area are subject to an obligation to the collection of data and measures to improve knowledge in order to prevent, reduce and control potential pollution and any ecological disturbance of the marine environment on the one hand, and protect and conserve natural resources while preventing damage to marine fauna (UNCLOS Arts 145 & 146).
- ❑ The Contractor must provide to the Authority prior to the approval of a plan of work, the knowledge and information relating to the environment (speed & direction of winds, salinity & water temperature, biogenesis (ISBA / 19 / C / 17, Annex II, sec.II, para.19 (b)) and shall take necessary measures to monitor the environment and report annually to the SG (ISBA / 19 / C / 17, Annex IV, art.5).

LEGAL FOUNDATIONS OF GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AS A CONSTRAINST FOR MINING ACTIVITIES IN THE AREA (end)

❑ ANNUAL REPORT OBLIGATIONS

- The Contractor is required to submit an annual report no later than 90 days after the end of each calendar year to the SG, including all relevant geological, mining and environmental data and information from its space activities, in accordance with the relevant contractual clauses (ISBA / 19 / C / 17, Annex IV, Article 10).
- The Contractor shall, upon the expiry or termination of a contract, submit and provide, if it has not already done so, all relevant geological, geophysical, geochemical and environmental data and information including all technical, economic and environmental reports. and related financial information, estimates of exploitable sectors (ISBA / 19 / C / 17, Annex IV, art.11). This is even before the request for approval of a plan of work for the exploitation (ISBA / 19 / C / 17, Annex IV, art.11.3).

CONTENT

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A USEFULL TOOL IN DECISION MAKING PROCESSES IN MINING ACTIVITIES INVESTMENT IN THE AREA

Phase	Step	Duration (yrs)	Types of data & information required	Decision		Observation	
				Ok	No	Ok	No
Attribution of Explor Contrat	**Exploration contract Application Process**	≤ 01	**File documentation:** Physical Characteristics and Geoscience of DS, Mineral data of economic interest, data and environmental monitoring measures	Fav	Defav	PoW aprouved & Attribut C. Explor	PoW reject
Exploration	**Pre-feasibility study**	06	**Prefeasibility study:** Geological data, geophysical, geochemical data on the deposit, inferred tonnage, mineral content, methods and operating equipment sketch, preliminary data on environmental impacts.	NPV›0	NPV‹0	Go ahead	Stop/abandonment

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A USEFULL TOOL IN DECISION MAKING PROCESSES IN MINING ACTIVITIES INVESTMENT IN THE AREA

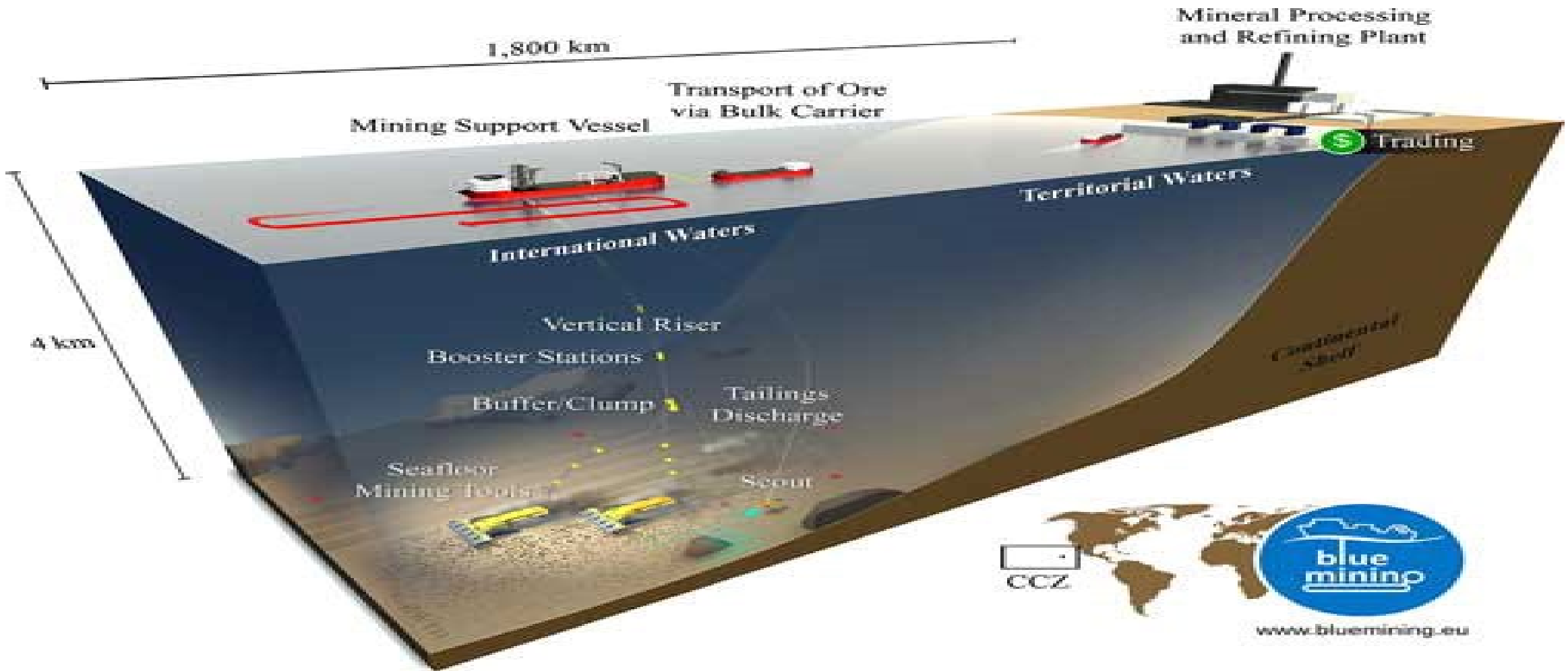
Phase	Step	Duration (yrs)	Types of data & information required	Decision		Observation	
				Ok	No	Ok	No
Exploration (End)	**Feasibility study**	04	**Feasibility study:** Refinement of geological, geophysical, geochemical data and information on the deposit, determination of probable and proven mineral reserves, mineral content, determination of mining and mineral processing methods and equipment, determination of impacts and completion of EIA and proposal for environmental protection measures.	NPV›0	NPV‹0	Go ahead for investment	Stop /abandonment
Exploitation	**Investment**	03	**Investment**: Order & purchase of production and processing equipments, refinement of information on the effects of these equipments on marine ecosystems, refinement of the impact management plan, setting up equipment and production tests.	Complies with the environmental requirements	Improper	Go ahead	Recalibration of equipment to comply

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A USEFULL TOOL IN DECISION MAKING PROCESSES IN MINING ACTIVITIES INVESTMENT IN THE AREA

Phase	Step	Duration (yrs)	Types of data& information required	Decision		Observation	
				Ok	No	Ok	No
Exploitation (end)	**Production**	≥20	**Update of geoscientific, mining & environmental information:** Monitoring and evaluation of the production plan, Monitoring and evaluation of the implementation of the measures to protect the marine environment and the management of environmental impacts, evaluation of compliance with the requirements of production plans, protection of the marine environment and environmental impact management.	Compliant	Not compliant	Production continue	Stop & remediation
	Closure & remediation	≤05?	**Update of environmental information:** Monitoring and evaluation of closure and dismantling, monitoring and evaluation of the behaviour of the marine environment.	Meets environmental requirements?	Not compliant?	Environment preserved?	?

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A USEFULL TOOL IN DECISION MAKING PROCESSES IN MINING ACTIVITIES INVESTMENT IN THE AREA

- PLACE OF GEOSCIENTIFIC & MINING KNOWLEDGE IN THE INVESTMENT DECISION CHAIN



CONTENT

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A KEY TOOL FOR A GOOD GOVERNANCE OF THE MINING ACTIVITIES IN THE AREA

Good governance of mining activities implies sustainable, optimal management of mineral resources through an inclusive and participatory process of all the stakeholders of the CHM.

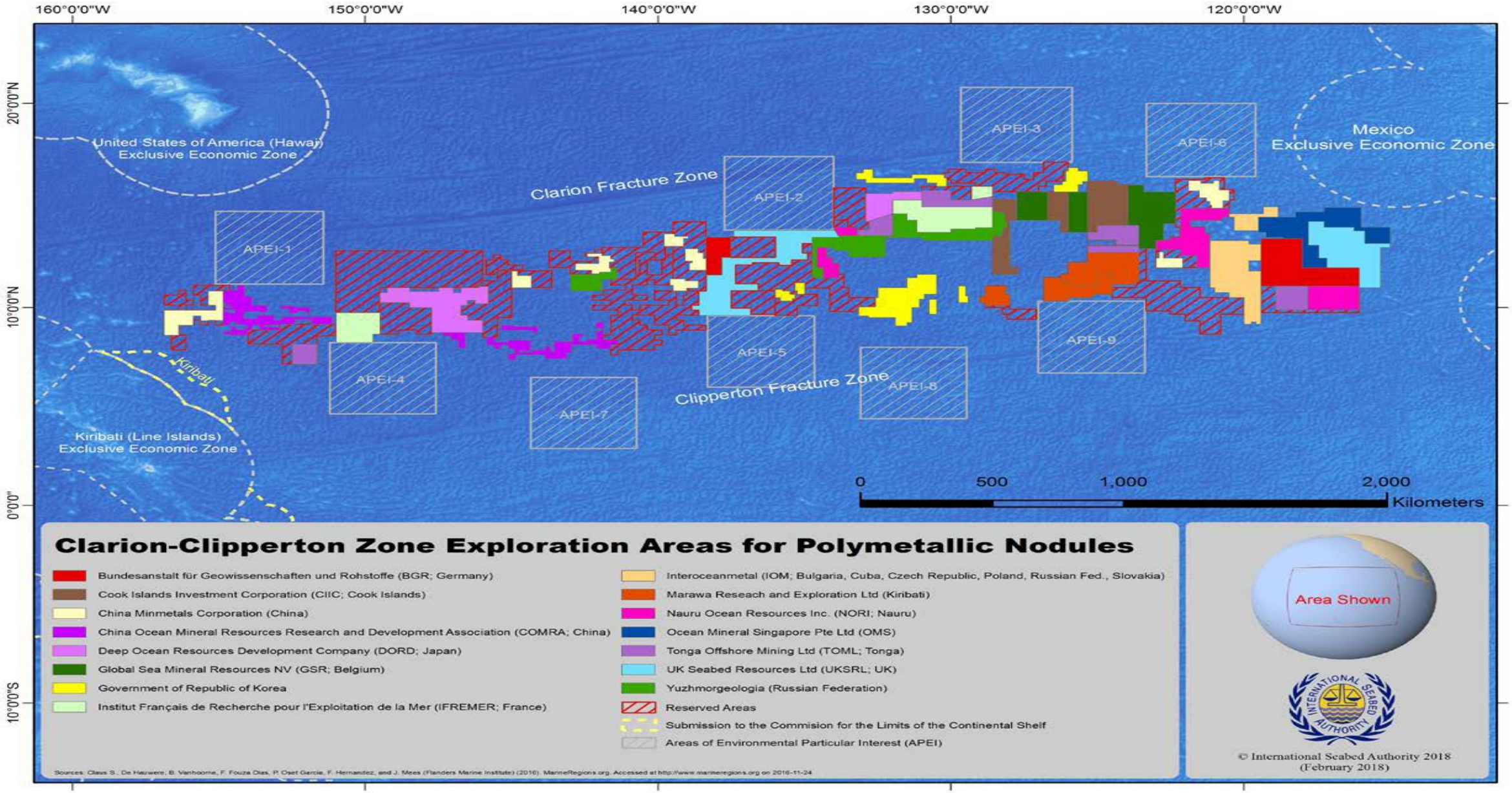
- It is the responsibility of the Contractor under the supervision of the Authority, on the basis of geoscientific, mining and environmental data, knowledge and information, to proceed to: (1) the reservation of sectors, (2) the definition of reference for the conservation of marine ecosystems and reserved areas (Annex 3, art.8 of UNCLOS), (3) the inventory of data and information to be provided for the protection of the environment by the Contractor (ISBA / 19 / C / 17, arts.18b, c & d, 31).
- In order to effectively protect the marine environment, the Authority and the sponsoring States apply the precautionary principle of Principle 15 of the Rio Declaration and the Best Environmental Practices (ISBA / 16 / A / 12 / Rev.1) by carrying up evaluations.

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A KEY TOOL FOR A GOOD GOVERNANCE OF THE MINING ACTIVITIES IN THE AREA

Good governance of mining activities implies sustainable, optimal management of mineral resources through an inclusive and participatory process of all the stakeholders of the CHM (end).

- Recommendation ISBA / 19 / LTC / 8 sets guidelines for the assessment of potential environmental impacts related to the exploration of marine minerals in the Area, while ISBA / 21 / LTC / 15, Annex V sets ISA standards for reporting on mineral exploration assessments, mineral resources and mineral reserves.

GEOLOGICAL, MINING & ENVIRONMENTAL DATA & INFORMATIONS: A KEY TOOL FOR A GOOD GOVERNANCE OF THE MINING ACTIVITIES IN THE AREA



CONTENT

Norad

GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AND THE RELATIONSHIP WITH THE AFRICA'S BLUE ECONOMY

- Africa's blue economy is made up of resources contained in mainland rivers and lakes, groundwater, oceans and seas. Several states have initiated its implementation at the national level by its inclusion in the national strategic development plans (exple: Côte d'Ivoire, Mauritius, Comoros, etc.)
- A large number of African states (46) are UNCLOS State Parties, which means that, they have the right to actively participate in the collection and management of geoscientific, mining and environmental data and information in the Area, within the framework of UNCLOS, in order to implement at the national or regional level their blue economy policy.

GEOLOGICAL, MINING & ENVIRONMENTAL DATA MANAGEMENT AND THE RELATIONSHIP WITH THE AFRICA'S BLUE ECONOMY (end)

- It is imperative to create at the level of the African States the interest relating to the collection of geoscientific, mining and environmental data and information by pooling efforts for their participation in the activities carried out in the Area, in accordance with the provisions of Article 148 of UNCLOS, because who holds such data even being preliminary information, can easily play the role of the sponsoring State for exploration and exploitation activities, in view of the fact that they constitute an essential element in the decision making process for investment in exploration activities, prior to the exploitation of deposits discovered.

CONTENT

Norad

CONCLUSIONS & RECOMMANDATIONS

Geoscientific, mining and environmental data & information constitute a key tool for a sustainable management and implementation of good governance in the Area's mining activities. In that vein it becomes urgent for Africa's States for their active participation in that movement to set up:

1. The pooling of efforts for the acquisition and compilation of historical data and information concerning the Area.

2. The development of legal instruments to incentive frameworks at the national and sub-regional level, in order to make them being capable to stimulate private investment in data collection and the establishment of mineral resource database systems, not only on the continental shelf (CS) but also beyond the CS.

CONCLUSIONS & RECOMMANDATIONS

3. The development of a cooperation mechanism similar to that of the maritime safety of the courts, which encourages cooperation in the framework of marine scientific research on the one hand, and that which deals with the sponsorship of entities in the framework of exploration contracts that are sources of geo-scientific, mining and environmental data collection & information, on the other hand.

4. The development within the Centres of Excellence of a database of African expertise deployed worldwide in the collection of geo-scientific, mining and environmental data and information.

THANK YOU FOR YOUR KIND ATTENTION