

Deep seabed mining in the Area:

- Capacity building in ASEAN and BIMSTEC Regions

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Why deep-sea mining

- Increasing metal and raw-material requirement
- Global demand for nickel for instance has risen by 3.2% annually for the last sixty years
- Land resources are depleting fast



- Oceans cover much larger area on the surface of the earth
- Oceans are the next alternative for all human requirements
- Oceans are a store house of untapped mineral resources
- Large areas in the oceans are international waters

What are deep-sea minerals

EEZ = 200 nm

Hydrothermal
Sulfides

>2500 m

>3500 m

Ferromanganese
crusts

>5000 m

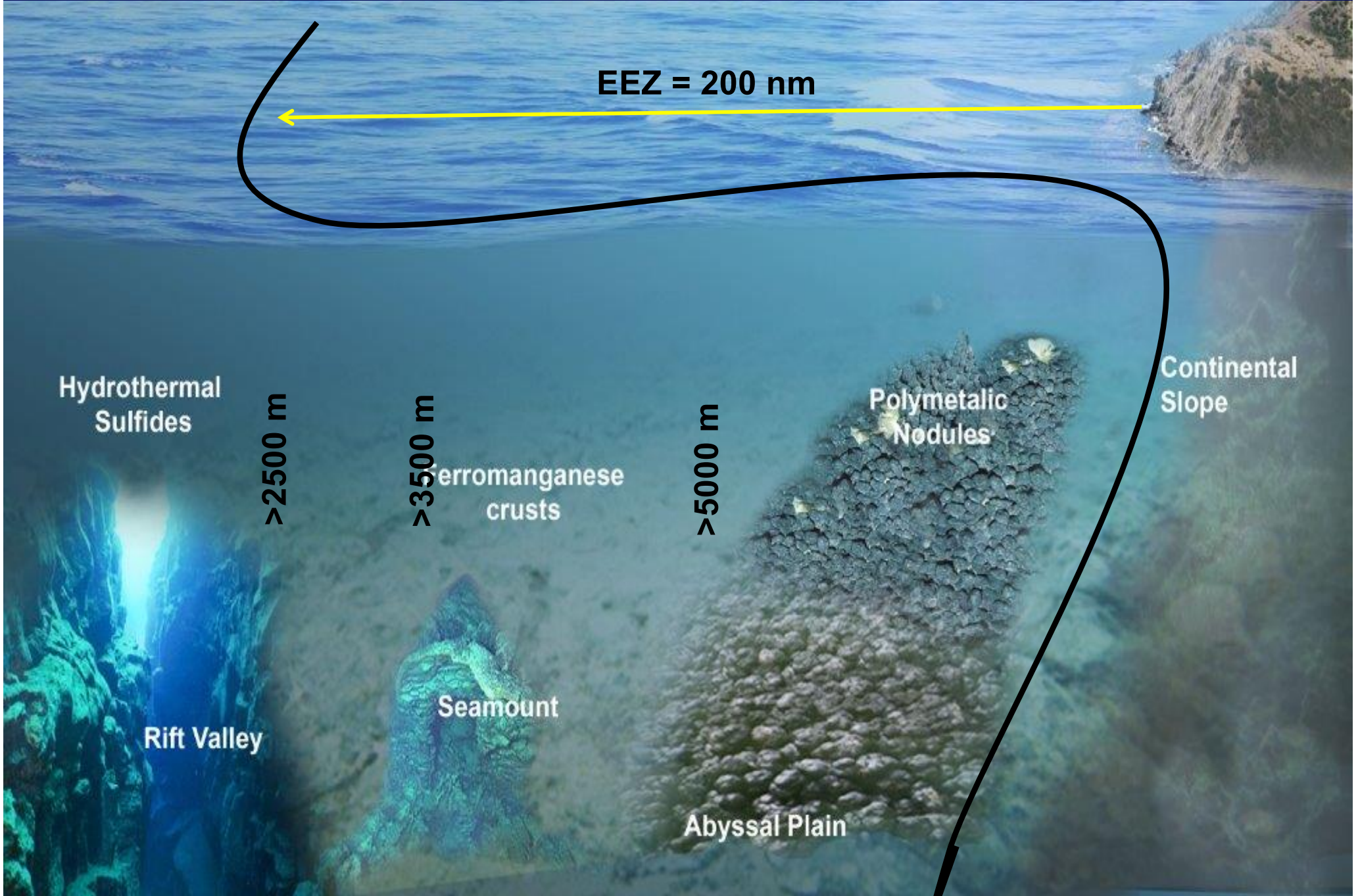
Polymetallic
Nodules

Continental
Slope

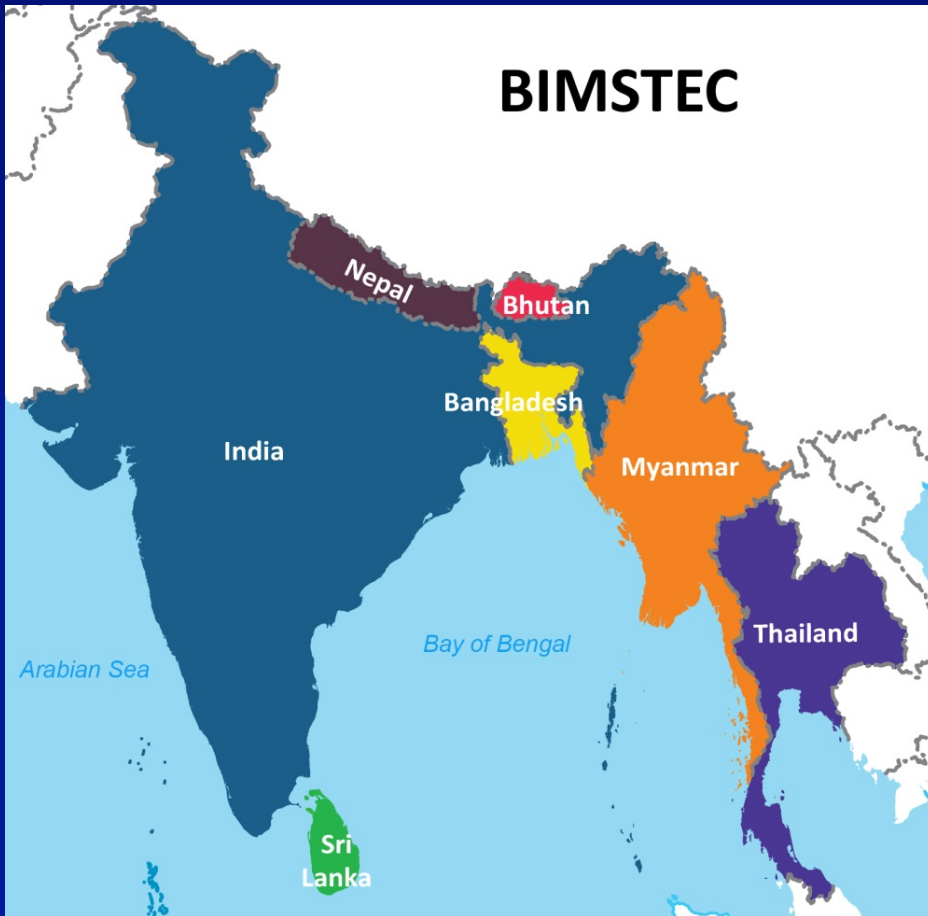
Rift Valley

Seamount

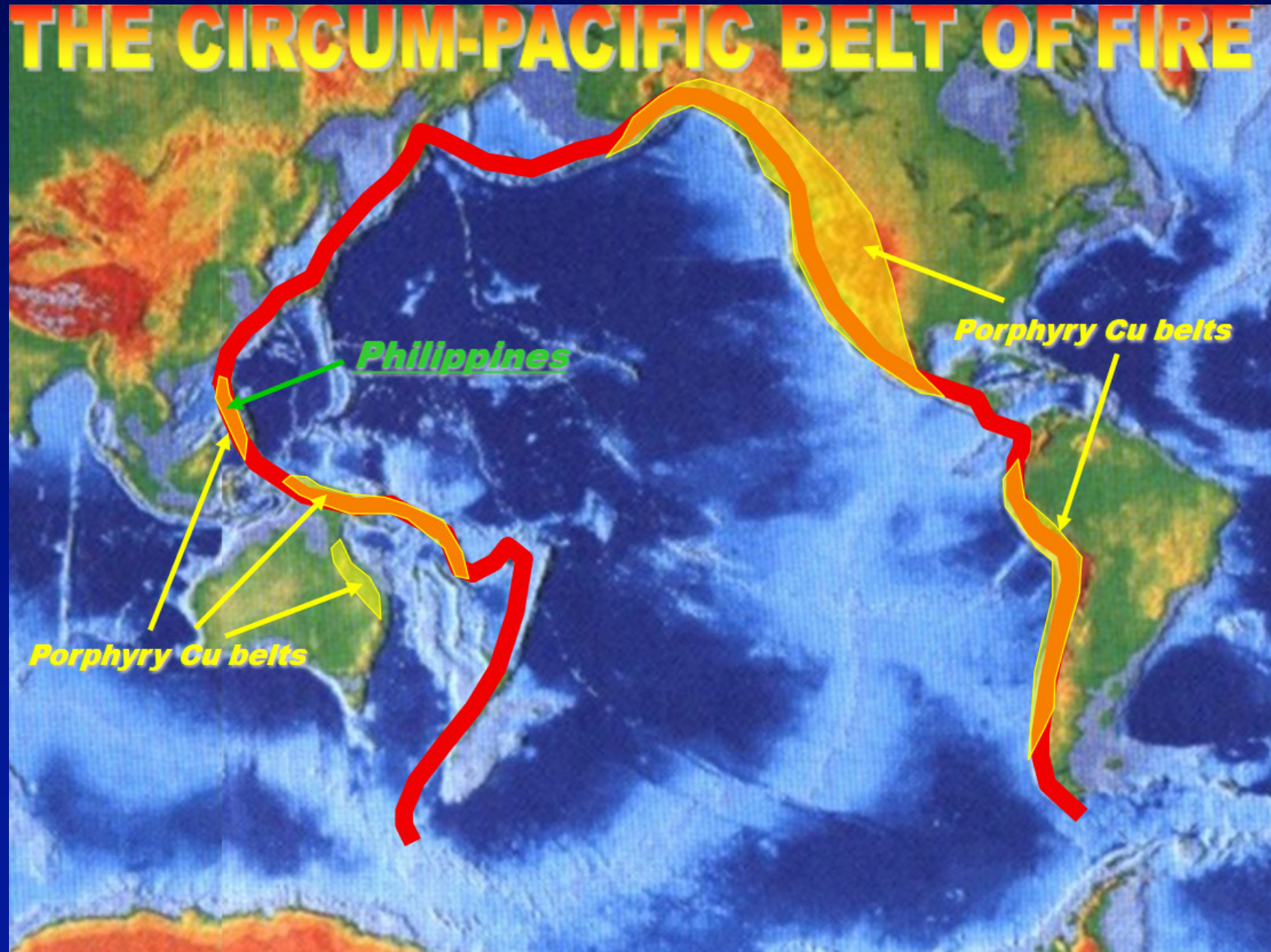
Abyssal Plain



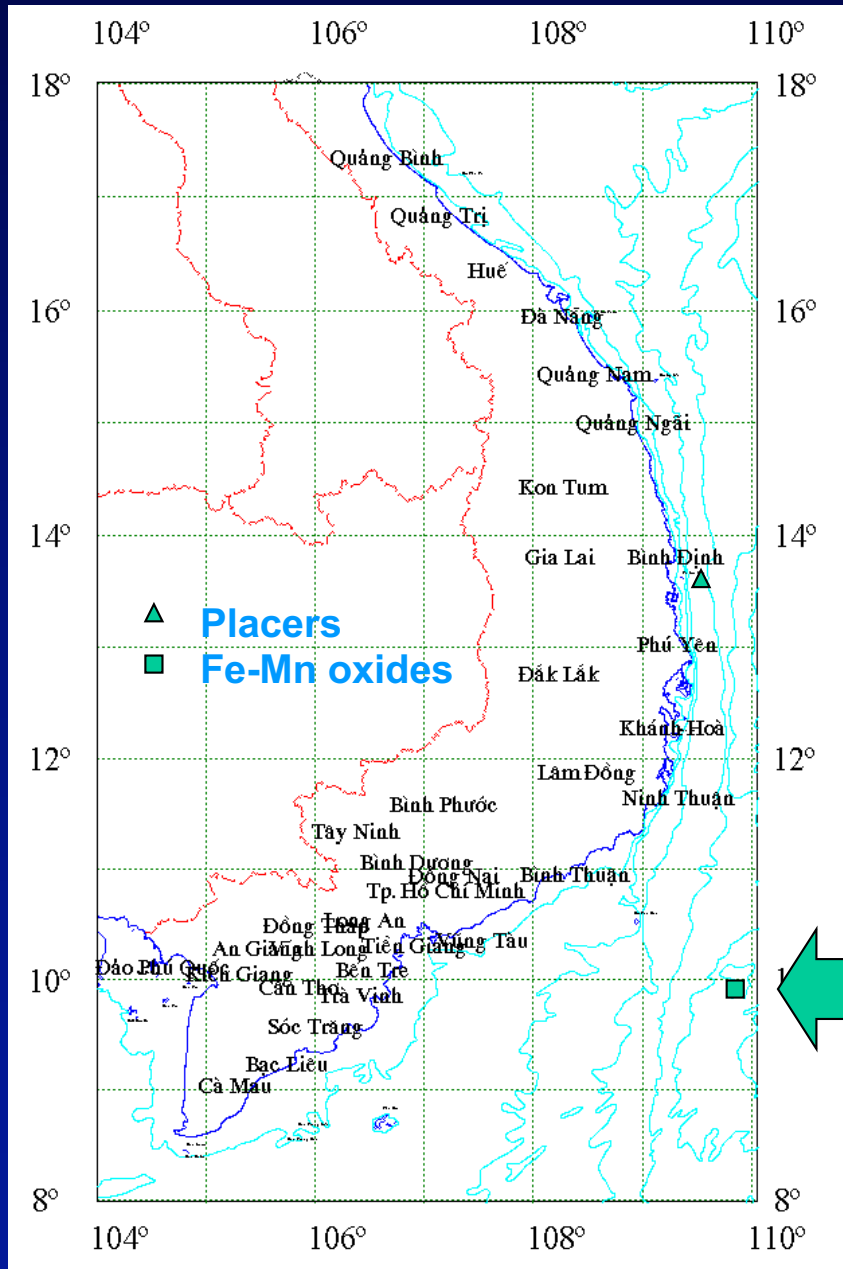
ASEAN, BIMSTEC and the neighboring seas



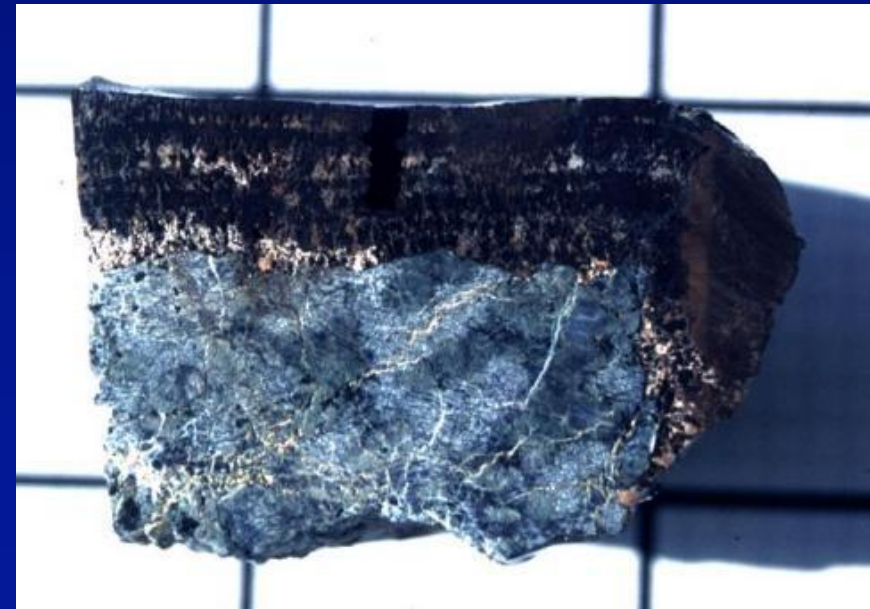
Areas of potential hydrothermal sulfides ASEAN Region



Vietnam – potential offshore Ferromanganese deposits



Fe-Mn oxides are known to occur on topographic highs off Vang Tau province, South Vietnam



(Source : Dr. B N Nath, NIO, Goa)

INDONESIAN ENERGY AND MINERAL RESOURCES

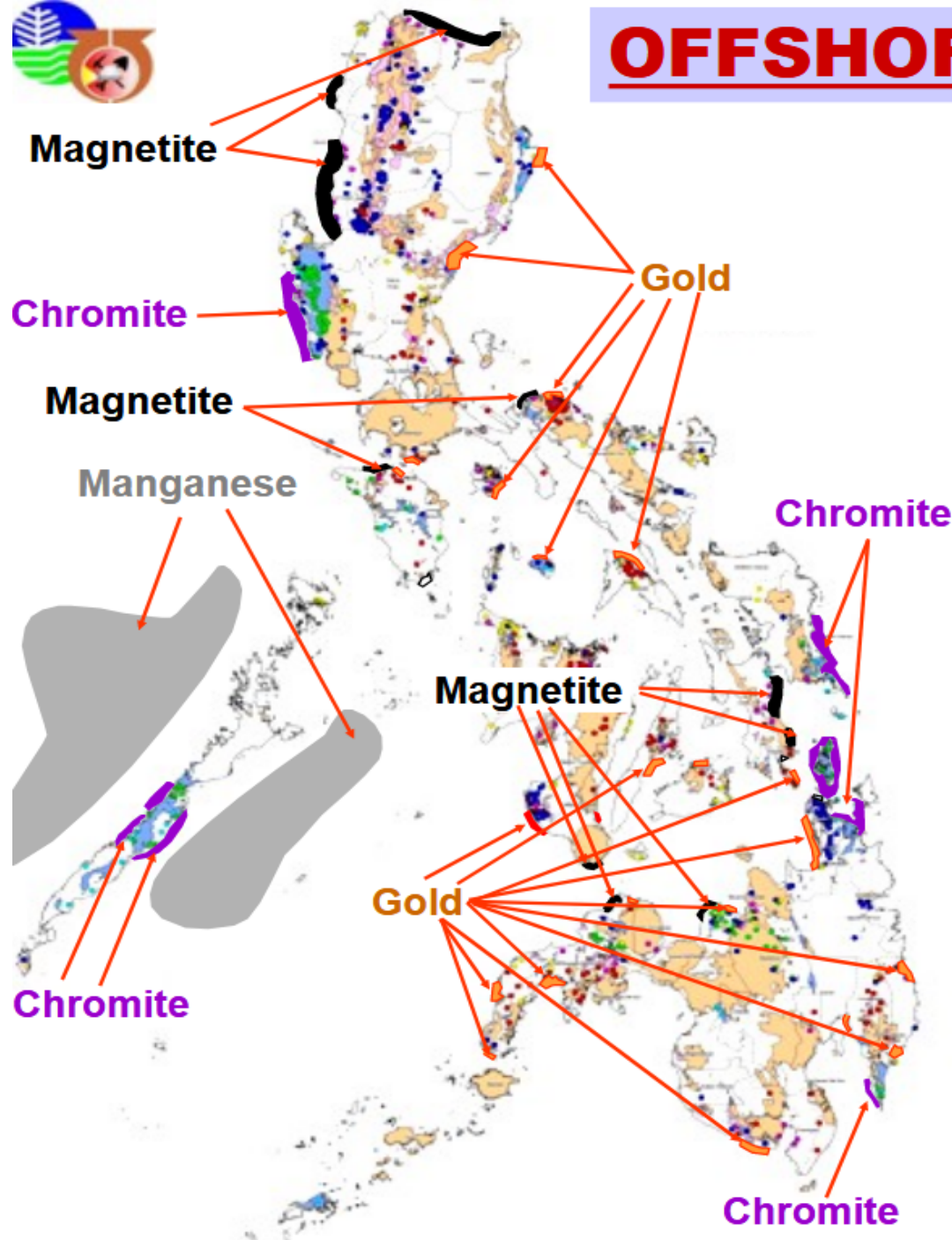


- Indonesia is a potential region for the formation of various energy and mineral resources.
- Resources such as oil, gas, coal, tin, nickel, copper, and gold have so far given important contribution to the Indonesian economy.
- The majority of Indonesian territory has not been explored thoroughly, and therefore the chance to discover new economical energy and mineral deposit is likely to be substantial.

*S. Suryantoro and M.H. Manaf (2002)
DEPARTMENT OF ENERGY AND MINERAL
RESOURCES,
THE REPUBLIC OF INDONESIA*



OFFSHORE RESOURCES



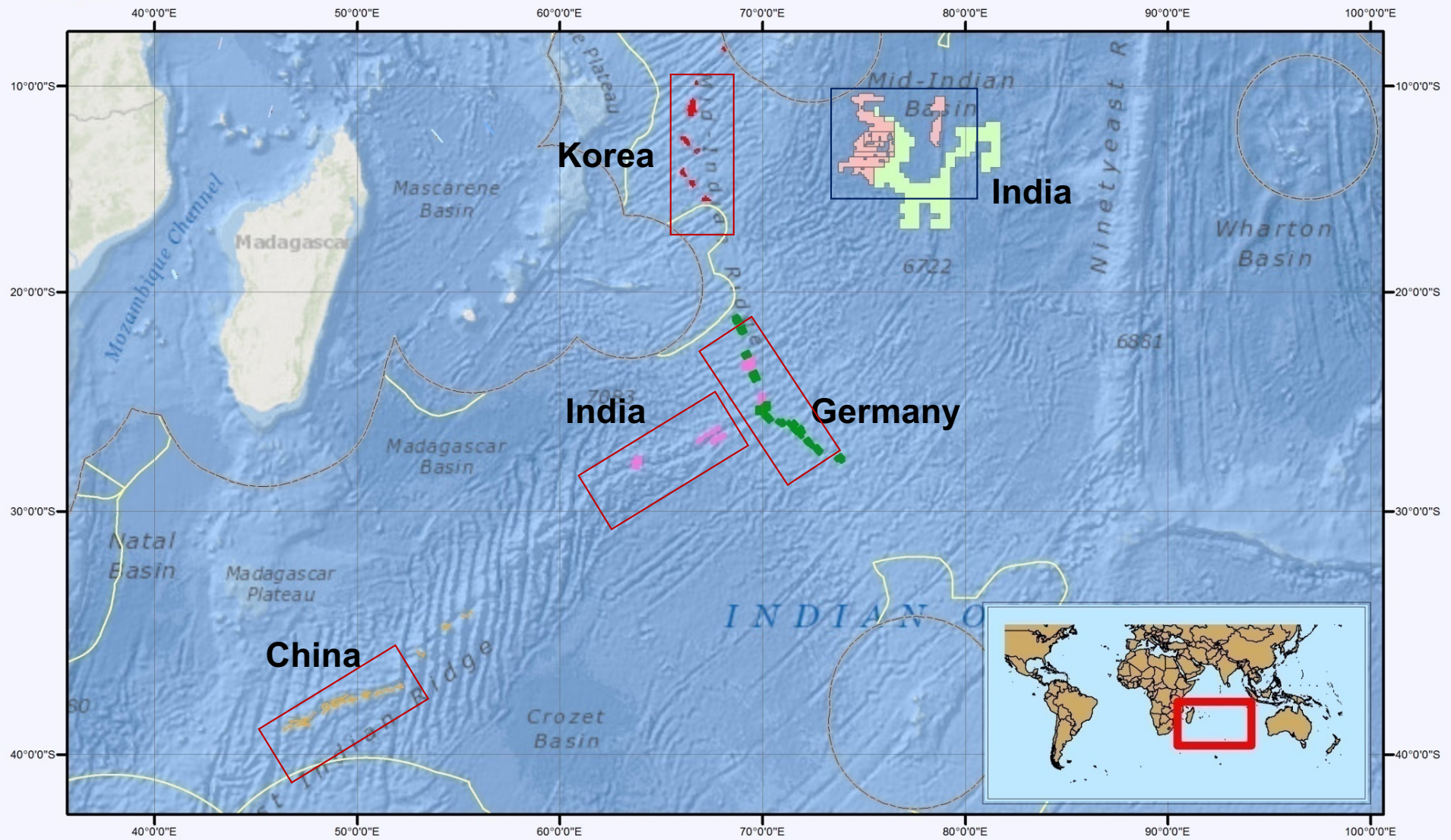
- **Philippines offshore area including EEZ 2.2 million Km²**
- **Potential offshore mineral resources:**
 - **Placer minerals including gold, chromite, magnetite, silica**
 - **Offshore Palawan also holds resources of manganese**
 - **Aggregate resources (sand & gravel)**
 - **Decorative stones, manganese nodules/encrustations with associated copper, gold, zinc, cobalt**
 - **Polymetallic sulphide deposits containing gold, copper, cobalt, etc.**

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Polymetallic Nodules and Polymetallic Sulphides Exploration Areas in the Indian Ocean

Approved plans of work and areas reserved for the International Seabed Authority



■ India - polymetallic sulphides exploration area	■ India - polymetallic nodules exploration area
■ BGR (Germany) - polymetallic sulphides exploration area	■ Area reserved for the Authority
■ COMRA (China) - polymetallic sulphides exploration area	— Outer limit of Exclusive Economic Zones
■ Republic of Korea - polymetallic sulphides exploration area	— Submission to the Commission on the Limits of the Continental Shelf

The Way Forward for ASEAN and BIMSTEC

Capacity building through

- Training Programs
- Hands-on training

Broad topics :

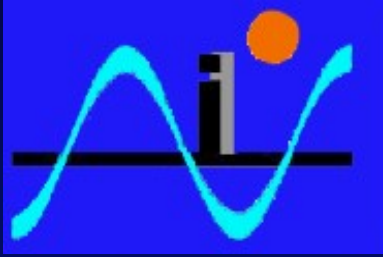
- Marine surveys for inter-disciplinary research
- Exploration of marine minerals and resource evaluation
- Law of the Sea



Interactive sessions



Hands-on training



NIO, India

**Technical Assistance Program
- for
Marine Research (TAP - MAR)**



ISA, Jamaica

at

**National Institute of Oceanography
Goa, India**



26 October – 19 December 2009



International Seabed Authority

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Endowment Fund - objectives

- ❖ to promote and encourage the conduct of marine research in the Area for the benefit of the mankind,
- ❖ by supporting the participation of scientists and technical personnel from developing countries in marine scientific research,
 - by providing them with opportunities to participate in international technical and scientific cooperation,
 - through training, technical assistance and cooperation programmes

TAP-MAR - goal

- to provide assistance to professionals in the field of marine research,
- to enable them to undertake independent research programs as per the requirement of their respective countries / organisations.



Technical Assistance Program - for Marine Research (TAP - MAR)



Interactive sessions on

- Marine surveys for inter-disciplinary research
- Exploration of marine minerals and resource evaluation
- Marine ecosystems and biodiversity
- Environmental impact assessment of offshore projects
- Law of the Sea

Qualifications required

Degree in any field of science, engineering, law, social science

Experience preferred

Involvement in marine research, policy or administration

Duration : 8 weeks

TAP-MAR
26 October – 19 December 2009
Program

Date	9.30-11.00	11.30-13.00	14.30-16.30
26 Oct	<u>Inauguration</u> – interaction with CSIR representative and resource persons	Biodiversity in coastal and deep-sea areas (B.S. Ingole)	Visits to laboratories and other facilities in the institute (Rahul Sharma)
27 Oct	Exploration methods and marine research areas (Shyam Prasad)	Continental shelf – legal and scientific interface (A.K. Chaubey)	Visit to Coastal research vessel ‘Sagar Shukti’ (Sanjeev, G.P. Naik)
28 Oct	Marine mineral resources and sediments (B.N. Nath)	Geochemical analyses of marine sediments (Brenda Periera)	Analytical methods for minerals and sediments (B.N. Nath)
29 Oct	Microbiological properties of sediments and seawater (P.A. Lokabharathi)	Biochemical properties of sediments and seawater (P.A. Lokabharathi)	Marine biological techniques (P.A. Lokabharathi)
30 Oct	Coastal ecosystems (A.C. Anil)	Environmental impact assessment in marine ecosystems (B. N. Nath)	EIA and coastal processes modelling (P. Vethamony, M.T.Babu)
3 Nov	Circulation patterns in different levels of water column (S. Prasanna)	Marine Environmental issues (Dileep Kumar)	EIA related to marine structures (Sanil Kumar)
4 Nov	Sedimentological aspects of marine sediments (A.B. Valsangkar)	Geotechnical properties of marine sediments (N.H. Khadge)	Sedimentological analyses in laboratory (Valsangkar, Khadge)
5 Nov	Marine mining and environmental issues (Rahul Sharma)	The legal regime for the deep seabed in general (Michael Lodge)	Curatorial aspects of marine samples (G. Vijaykumar)

TAP-MAR
26 October – 19 December 2009
Program (contd.)

6 Nov	Remote sensing and ocean data observations (Ramesh Kumar)	The regulatory regime for exploration (Michael Lodge)	Submerged cultural heritage (K. H. Vora)
9 Nov	Oceanographic sampling equipment (G.P Naik)	Application of u/w photographic data, for seafloor environmental conditions (Rahul Sharma)	Instrumentation for underwater surveys (Sanjeev Afzalpurkar)
10 Nov	Oceanographic data collection using mooring technology (V. Fernando)	Microbial ecological processes (N. Ramaiah)	Molecular biology techniques (N. Ramaiah)
11 Nov	Marine data processing and archival (S. Jai Sankar)	Marine information systems (M.P. Tapaswi)	Financial management and procurement procedures in marine scientific research (Murthy, Pant)
12 Nov	Discussions with project supervisors and planning of field work		
13 Nov	Field work		
16 Nov -11Dec	Live project (4 weeks)		
12-17 Dec	Report writing and presentations		
18-19 Dec	Valedictory and closing		



Regional capacity building Centre / Program for ASEAN and BIMSTEC Region



Objectives:

Develop expertise for marine resources and marine environment conservation

Through – Training programs for professional in marine scientific research

- Organising exchange programs for researchers to other organisations
- Develop regional projects for exploration and exploitation of resources

Literature on deep-sea minerals and environment

-Publications in scientific journals and symposia volumes

-ISA website (www.isa.org.jm)

-Books on deep-sea mining and environmental issues

