DeepSea Minerals Research in Indonesia: Status and Challenges

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The territory of Indonesia is largely ocean and more than 2/3 is deep sea;

Seabed minerals research is still within the basic research level;

The existence and content of deep sea minerals have great potential in the future, both in the economic (benefit) and political (the existence of a nation)
GENERAL CONDITION OF INDIENSIAN SEAS

- Islands: 17,504; Waters 5.9 million km², Territorial Sea 0.4 million km²
- EEZ claim 2.7 million km²
- Claims of Continental Shelf Territory 3,700 km² (proven 375 km²)
- Proposed Claims International SeaBed Authority (ISBA)

NATIONAL POLICY: Key Pillar Maritime Development of MEMR

1. **Marine Energy Development**: Utilization of marine resources (current energy, waves & OTEC)

2. **Small Island / Frontier/ Border area Potency Development**:
   - Energy infrastruct dev to supports Maritime economic cluster
   - Renewable Energy potency utilization

3. **Marine Mineral Resources Development**: Placer (REE) and seabed mineral potency research/investigation

4. **Marine Strategic Issues and Infrastructure**: Pipelines, sedimentation, ports, inter-island bridge, mitigation and gological hazard analysis
OVERVIEW OF SEABED MINERAL RESOURCES POTENCY

- PLACER DEPOSITS: Tin, Iron-sand, Ti-sand, Heavy mineral (zircon, monazite, apatite, rutile, ilmenite), carbonate aggregate & REE → West Indonesia Waters;
- HIDROTHERMAL DEPOSIT: Mg, Co - crust and nodule, Cu and Au, hidrothermal vent, submarine volcano → East Indonesia Waters

PRELIMINARY RESULTS:

Snellius I Expedition (1930), First deep sea sediment studies in Indonesia. Later, Snellius II Expedition (1984) provided the first information on oozes and Fe-Mn deposits. During this expedition many small nodules rich in manganese and iron occurred in their samplings. The deposit appears to be of typical of hydroxide of manganese and iron crystallized but is in a phase of disintegration nodules and seems to be buried by very fine sediments.
Manganese Crust:
The history of polymetallic crust discovery was conducted in 1996, when the GEOBANDUT Expedition scientists hauled up the first sample of polymetallic crusts from a depth of 3956 m at the crest of the Tampomas Ridge, northern Banda Sea. The crust containing a high concentration of Fe (46,829 ppm), Mn (24,780 ppm), Mg (2,910 ppm), Co (102 ppm), and Ni (1,288 ppm).

Seabed Mineral Hidrothermal in Komba Waters, Flores (MGI, 2003)
Hydrothermal Mineral (2007)

Hydrothermal mineral deposits are a byproduct of the exchange of heat and chemicals between the lithosphere and ocean. Metalliferous mineral samples taken from the seabed of Komba complex, southern Banda Sea, are the first hydrothermal mineral deposit found in Indonesia. The samples are economic resource highest of metal content such as Au (5.12 ppm), Ag (7.13 ppm) and Cu (0.017%).

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<th>Pb (ppm)</th>
<th>Zn (ppm)</th>
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Submarine volcano characterization (2009)
SUMMARY:

✓ Potentials Of Deepsea Minerals occurs in The Eastern Indonesia Waters;
✓ Research deep sea minerals, still in early stage level;
✓ International cooperation is needed to accelerate potential mapping;
✓ Potential mapping results of all seabed (deepsea) mineral resources potential in the Indonesia marine area as "the last promising frontier"