

### Japan's Work of Cobalt Rich Crusts Exploration And Technology Development

"Challenge for deep sea mineral resources development"

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# Japan's work of Cobalt Crust Exploration And Technology Development

- Who we are
- Deep sea mineral resources
- Government's ocean development policy
- JOGMEC's activities on deep sea mineral resources
- Contract with ISA for cobalt rich ferromanganese crusts
- Conclusion

## Who we are

#### Japan Oil, Gas and Metals National Corporation (JOGMEC)

- An incorporated administrative agency established by the Japanese government in 2004
- Focusing to maintain stable supply of mineral and energy resources under the JOGMEC Law

#### Ministry of Economy, Trade and Industry(METI)



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# **Deep sea mineral resources**

## Three categories of deep sea mineral resources



### What are deep-sea mineral resources



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#### Usage of metals contained in seabed minerals





# Government's ocean development policy and JOGMEC's activities

#### Deep sea mineral resources research by MMAJ/JOGMEC





**R/V Hakurei-maru** 1975-2000



#### **R/V Hakurei-maru No.2** 1980-2011

\*SOPAC : Committee for Coordination of Joint Prospecting for Mineral Resources in South Pacific Offshore Areas(CCOP/SOPAC)

#### new R/V HAKUREI Launched in 2012



Overall length : 118.3m Breadth: 19.0m Gross tonnage: 6,200t

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#### Framework of ocean management of Japanese government

#### **Basic Act on Ocean Policy (Act No. 33 of April 27, 2007)**





# JOGMEC's Activities on deep sea mineral resources

#### HAKUREI's survey tools



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### HAKUREI, featuring two styles of marine drilling



# Deep sea drilling equipment of HAKUREI

#### Benthic multi-coring system (BML)

On-board drilling machine system





Maximum Drill Length: 50m 3000m of Water Depth Maximum Drill Length: 400m 2000m of Water Depth

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## Major polymetallic sulphides fields

Polymetallic sulphides (PMS) fields widely distribute in Okinawa trough and Izu-Bonin back-arc basin within Japan's EEZ



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### Significant results of recent 5 years

Discovery of new hidden sulphide bodies at around 30m or deeper under sea-floor in IZENA, OKINAWA trough during 2013 drilling cruise.



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# R&D of mining technology for PMS

### **Concept design of mining system for PMS**







### Sea-trial of mini-scale mining tools



## Mineral processing test for PMS



#### **Samples of Bayonnaise**



#### **Samples of Izena**



#### JOGMEC



# **Contract with ISA on cobalt-rich ferromanganese crusts**

#### ISA and JOGMEC sign exploration contract on January 27, 2014







# Location of Japan's exploration area

 Exploration area is located approximately 2500km Southeast of Tokyo in the Western Pacific The area comprises 150 blocks, each with an 2500km area of 20 square km, and is located over 6 seamounts shima Island 130°F 6 seamounts 21 200km JOGMEG

### Research activities over crust deposit



# 15 year exploration plan of the contract

| Stage year                                  | Exploration work  | Environmental<br>survey               | R&D   |
|---|---|---------------------------------------|---|
| <b>Stage 1</b><br>(year 1-5)<br>(2014-2018) | Preparatory work  |                                       |   |
|   | Resources evaluation<br>Core sampling with geological<br>and geographical surveys<br>(Collection of data)                         | Environment<br>baseline study         | <b>Pre- R/D in</b> Mining,<br>ore beneficiation,<br>Metallurgical<br>technologies |
|   | Training<br>Four training opportunities(on-board and on-land) between 2014 and 2018<br>12 trainees will be accepted               |                                       |   |
| Stage 2<br>(year 6-10)                      | Detailed resource evaluation<br>of the proposed blocks.<br>(Choose promising blocks 1/3)  | Continuing<br>environmental<br>study. | <b>R/D</b> in mining,<br>ore beneficiation,<br>metallurgical<br>technologies      |
| Stage 3<br>(year 11-15)                     | Further resource evaluation of<br>promising blocks to be<br>exploited from ten years<br>evaluation.<br>(Choose developing blocks) | EIA                                   | Verification of technologies  |

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# Conclusion

- JOGMEC has been conducting research on deep sea mineral resources since 1970' and have accumulated experiences in this area.
- JOGMEC executes extensive surveys for PMS within Japan's EEZ since 2008. JOGMEC carries out, not only resource assessment, but also technical development for mining and processing in consideration of environment impact mitigation.
- JOGMEC's 15 year exploration contract with ISA for crusts just begins in 2014. For the conduct of the contract, JOGMEC will apply its experience and sophisticated technology in consideration of environment impact mitigation and technical transfer.
- JOGMEC expets to maximize synergies between PMS programme and Crusts programme.

