India gets licence for exploring polymetallic nodules

Prelims: Current events of national and international importance

Why in news?

India has got an exploration contract from International Seabed Authority (ISA) to explore the underwater in the north west Indian Ocean.

- This is the ***first licence granted globally*** for exploring ***polymetallic Sulphur nodules in the Carlsberg Ridge***.
- It is India's ***third major deep-sea exploration*** project.
- **Polymetallic nodules** - Polymetallic nodules are mineral concretions found on the deep ocean floor, formed from iron and manganese hydroxides.
- **Formation** – They form slowly on the deep seafloor by the ***hydrogenetic and diagenetic precipitation of manganese and iron hydroxides*** around a central core, such as a fossil or rock fragment
- These nodules are concentrations of rock found in the deep ocean and said to be ***rich in manganese, cobalt, nickel, zinc and copper***.
- **Distribution** - Nodules have been found in ***all the oceans and even in lakes***, especially in the centre of the north central Pacific Ocean, the Peru Basin in the south-east Pacific Ocean and the centre of the north Indian Ocean.
- **Exploration technologies -**
  - ***Hydraulic Mining System*** uses high-pressure jets of water to break apart rock and extract minerals from the ground, forming a slurry that is then piped to a collection point.
  - ***The Continuous Line Bucket (CLB)*** is a system developed in Japan, that uses a continuous, circularly shaped cable to lift mineral-rich buckets from the ocean floor to a surface vessel.
- **Uses** –
  - ***Cobalt -*** Used in batteries (especially for electric vehicles) and superalloys for jet engines.
  - ***Nickel*** - Essential for producing stainless steel and batteries.

    - ***Copper*** - A key component in electronics, batteries, and other industrial applications.
    - ***Manganese*** - Utilized in steel production and batteries, and can be used to reduce gasoline octane levels
- In 2024, India had applied for exploration rights in two regions of the Indian Ocean - ***Carlsberg Ridge*** has been granted, and the ***Afanasy-Nikitin Sea (ANS) mount*** – is yet to be approved.
- **Significance** - It will help India in ***reduction of import dependency*** of metals, creating employment for engineers, scientists, and technicians across the country.

To know more about India's Deep Ocean Exploration, click here

Quick facts

International Seabed Authority
• An autonomous international organization established in 1994 ***under 1982 United Nations Convention on the Law of the Sea*** (UNCLOS) and 1994 Agreement relating to the Implementation of UNCLOS. • **Headquarters** - Kingston, Jamaica • **Members** -168 Members (167 Member States and the European Union) • For exploration in areas part of the 'high seas' or part of the ocean that is so far away from any country, that it is not part of their territories, countries ***must obtain permission from the ISA***. • 19 countries have such exploration rights.
Carlsberg Ridge & Afanasy-Nikitin Sea (ANS) mount

• **Carlsberg Ridge** - It is a 3,00,000-sq km stretch that ***lies in the Indian Ocean***.
• It forms the ***boundary between the Indian and Arabian tectonic plates***, extending from near Rodrigues Island to the Owen fracture zone.
• **ANS mount** – It is located in the ***Central Indian Ocean*** to the southeast of Sri Lanka.

Reference

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