Mission to Explore Ocean Deeps

A submarine mission called "Five Deeps" will explore the bottom of each of the world's oceans.

- The Five Deeps Expedition is the **first manned expedition** to the deepest points in each of the world's five oceans.
- Deep Oceans remain uncharted territory for humans, while hundreds of people have ventured into space, only three people have touched down on the deepest known places in oceans.
- The expedition provides the unprecedented opportunity to sample life across a gradient of depths, temperatures, salinity, food supply, latitude and in places around the world that were formed, split, or united millions of years ago by the shifting of the Earth's tectonic plates.
- **Five spots in oceans where expedition will go are**:
    - **Puerto Rico Trench** (Atlantic Ocean)
    - **South Sandwich Trench** (Southern Ocean)
    - **Java Trench** (Indian Ocean)
    - **Challenger Deep** (Pacific Ocean)
    - **Molloy Deep** (Arctic Ocean)

DSV Limiting Factor

- The expedition crew will use **Deep Submergence Vehicle (DSV) Limiting Factor** submarine for exploring the ocean deeps.
- Limiting Factor is the **only human-occupied vessel that can visit any place in oceans, at any depth**, and from any properly-equipped ship.

Goals of the Mission

- To collect samples which will be used in research involving effects of **undersea seismic activity**
- Find **deep-sea features and habitats** using high-resolution multibeam sonar and learn about lives in those habitats
- Discover how organisms survive in **Hadalpelagic zones**
- Determine the organism's' role in each given ecosystem
- Connect the Five Deeps through genetic differentiation of species found on the dives

Zones in the Ocean

- Scientists have divided the ocean into five main layers. These layers, known as "zones", extend from the surface to the most extreme depths.
    - **Epipelagic Zone -**
        - The surface layer of the ocean is known as the epipelagic zone.
        - It extends from the **surface to 200 meters (656 feet).**
        - It is also known as the **sunlight zone** because this is where most of the visible light exists.
    - **Mesopelagic Zone -**
        - Below the epipelagic zone is the mesopelagic zone, extending from **200 meters (656 feet) to 1,000 meters (3,281 feet).**
        - The mesopelagic zone is sometimes referred to as the **twilight zone or the midwater zone**.

        - The light that penetrates to this depth is extremely faint.
        - **Bioluminescent creatures** (visible light produced by the creatures themselves) starts appearing in this zone.
    - **Bathypelagic Zone** -
        - This zone extends from **1,000 meters (3,281 feet) down to 4,000 meters (13,124 feet).**
        - It is sometimes referred to as the **midnight zone or the dark zone.**
    - **Abyssopelagic Zone -**
        - It is also known as the **abyssal zone** or simply as the abyss.
        - It extends from **4,000 meters (13,124 feet) to 6,000 meters (19,686 feet).**
        - The water temperature is near freezing, and there is no light at all.
    - **Hadalpelagic Zone -**
        - This layer extends from **6,000 meters (19,686 feet) to the bottom of the deepest parts of the ocean.**
        - These areas are mostly found in deep water trenches and canyons.
        - **The deepest point in the ocean is located in the Mariana Trench off the coast of Japan at 35,797 feet (10,911 meters).**
        - The temperature of the water is just above freezing, and the pressure is 800 times as that on the surface.
        - In spite of the pressure and temperature, life can still be found here.

India’s Deep Ocean Mission

- Union Ministry of Earth Sciences, Government of India has also launched a **‘Deep Ocean Mission’** for **exploration of polymetallic nodules in Central Indian Ocean Basin.**
- **Polymetallic nodules contain multiple metals** like copper, nickel, cobalt, manganese, iron, lead, zinc, aluminum, silver, gold, and platinum etc. in variable constitutions and are precipitate of hot fluids from upwelling hot magma from the deep interior of the oceanic crust.
- Of these, cobalt, copper, and nickel are of much importance and in great demand in India as cobalt is used extensively in medical treatment and nickel in batteries.
- It will reduce India’s dependence on imports of cobalt and other rare earth metals.