

Greater Maldive Ridge (GMR)

February 19, 2022

In news- In a recent study, an Indian researcher traced the tectonic evolution and the nature of the Greater Maldive Ridge (GMR), a very crucial geodynamic feature in the western Indian Ocean whose origin has been the centre of many scientific debates.

About the study-

- The **study was conducted by the Indian Institute of Geomagnetism, Mumbai**, an autonomous institute of the Department of Science & Technology, Govt. of India.
- The study has **chalked the possible geological cross-sections along the GMR for the first time** with the help of satellite-derived high-resolution gravity data.
- The researchers postulated that the **GMR may be underlain by an oceanic crust**.
- The results from their study can provide additional constraints in understanding the plate-tectonic evolution of the Indian Ocean.
- **The study can help reconstruct the original Gondwanaland break up** and dispersal that led to present-day configuration of continents, continental fragments, and formation of ocean basins in the Indian Ocean.
- It **provides the crustal architecture and the state of gravitational equilibrium between Earth's crust and mantle (isostasy) of the Greater Maldive Ridge** segment of the larger Chagos-Laccadive Ridge (CLR) system.
- The study, based mainly on the interpretation of gravity anomalies (small differences in the pull of gravity) with broadband seismic and refraction seismic data, **provided for the first time a three-dimensional picture of the variation of Moho along the Greater Maldive Ridge and the adjoining ocean basins**.
- IIG team found that Moho is deeper over the Maldive

Ridge (MR) segment and shallows southwards in the Deep Sea Channel region (DSC).

- However, the effective elastic thickness (a proxy for the strength of the lithosphere) values were lower over the MR compared to the DSC region.
- The research suggests that Maldive Ridge might have formed in the close vicinity of the Mid-Oceanic Ridge (where creation of a new ocean floor occurs due to divergent motion of lithospheric plates or spreading centre).

About Maldive Ridge–

- It is **an aseismic ridge that is not associated with earthquake activities**.
- It is located **in the western Indian Ocean, southwest of India**, which is not well investigated.
- It is of paramount importance to gain knowledge on the structure and geodynamics of aseismic ridges (as it provides valuable inputs towards understanding the evolution of ocean basins).
- It extends from the western shore of the Indian Peninsula to the Arabian-Indian (or Carlsberg) Ridge.
- The peaks of the Maldive Ridge rise above the water, forming coral islands (atolls)–the Laccadive Islands, Maldive Islands, and Chagos Archipelago.

What is Mohorovicic discontinuity (Moho)?

- The Mohorovičić discontinuity, usually referred to as the Moho discontinuity or the Moho, is the boundary between the Earth's crust and the mantle.
- It is defined by the distinct change in velocity of seismological waves as they pass through changing densities of rock.

Seismic Discontinuity

