



### Wednesday Talk Series

**Date:** Wednesday, December 10, 2025

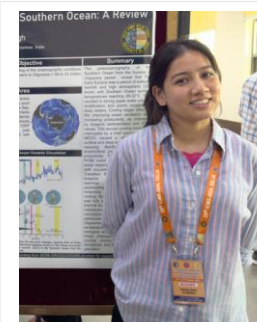
**Time:** 04:00 PM-5:00 PM

**Venue:** Mithal Hall, Department of Earth Sciences, IIT Roorkee



## Eocene to Oligocene Paleoceanography of the Southern Ocean: Insights into Antarctic Ice Sheet Evolution and Reorganization of Thermohaline Circulation

**Speaker: Deepika Rawat**



**Abstract:** The Southern Ocean experienced a major climatic shift from a warm early Eocene to a cold, glaciated Oligocene, driven by declining atmospheric CO<sub>2</sub> and tectonic reorganization, particularly the opening of the Drake Passage and Tasmanian Gateway. These events enabled the development of the Antarctic Circumpolar Current (ACC), triggered large-scale Antarctic glaciation. The initiation of Antarctic glaciation intensified high-latitude cooling and sea-ice formation, which promoted the development of dense, oxygen-rich Antarctic Bottom Water (AABW) which is the coldest and densest water mass in the global ocean today, marking the onset of modern thermohaline circulation and restructuring global deep-water pathways.

However, the timing and sequence of these linked events, especially the opening of the Drake Passage, remain debated due to limited datasets and a predominantly on records toward the Pacific and Atlantic sector, leaving the Indian sector underexplored. To reconstruct the detailed oceanographic conditions of this interval, we are examining ODP Sites 744 and 738 on the Kerguelen Plateau to understand the upper-water-column structure, ocean circulation, and variations in marine productivity during this Paleoceanographic reorganization. Our study employs marine microfossils known as foraminifera, using assemblage analysis, biostratigraphy, and stable isotopes ( $\delta^{18}\text{O}$ ,  $\delta^{13}\text{C}$ ), along with bulk geochemical proxies including  $\delta^{13}\text{C}_{\text{org}}$  and Total organic carbon (TOC). These multiproxy datasets will offer a comprehensive reconstruction of paleoceanographic evolution in the Southern Ocean and aid in better predicting current and future climate responses.

**Brief introduction:** Deepika Rawat is a UGC-JRF conducting research in Paleoceanography under the supervision of Prof. Dharmendra Pratap Singh. She holds both her B.Sc. in ZBG (Zoology, Botany, Geology) and M.Sc. degrees in Geology from Kumaun University, Nainital, Uttarakhand. Her doctoral work focuses on palaeoceanographic reconstruction of the Southern Ocean during Eocene to Oligocene Period, using a combination of geochemical and faunal proxies.