National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Interannual variability of Indian Summer Monsoon rainfall in mid-Pliocene
Speaker	: Karishma Dahiya
Supervisor	: 8125817908
Venue	: ER Dept. 303 Class Room
Date and Time	: 18 Jun 2024 (4;15 PM)
Abstract	: The Indian Summer Monsoon (ISM) occurs every year but its intensity, distribution, and timings (onset and withdrawal) vary considerably, often causing heavy floods and droughts. Variations in the ISM Rainfall (ISMR) can have enormous consequences for India's economic and sociological well-being. Thus, the accurate and timely prediction of rainfall during ISM is essential. So understanding of ISMR past and present variability is essential for predicting future monsoon variability, especially in a warming climate. To understand the interannual variability (IAV) in ISMR, we have chosen one of the recent past warm intervals i.e. Pliocene epoch (5.33-2.58 Ma), which was 2-3 oC warmer than the pre-industrial era. The IAV in ISMR is highly linked with tropical climate drivers such as El Nino Southern Oscillations (ENSO). In this study, we investigated the IAV of Indian Summer Monsoon rainfall and its associated tropical climate driver (ENSO) in mid-Pliocene and pre-industrial period simulations using the latest version of Coupled Model Intercomparison Project (CMIP) 6 models. We found that there is an increase in the mean state of ISMR but there is a decrease in the IAV of ISMR during the warm mid-Pliocene relative to the pre-industrial period from all the CMIP6 models. To understand these variations, it is found that there is a decrease in IAV in SST anomaly over the Nino3.4 region also during the mid-Pliocene than the pre-industrial period simulations of CMIP6 models. However, the teleconnection between ENSO and ISMR is stronger in the mid-Pliocene than in the pre-industrial period. In addition, the teleconnection of the Indian Ocean Dipole and extratropical forcings like Eurasian snow cover and North Atlantic Oscillation is found to be weaker during both the mid-Pliocene and pre-industrial periods. The IAV of ISMR is mainly found to be driven by ENSO and this teleconnection is found to be stronger during the warm mid-Pliocene.