
Departmental Seminar

Seminar Title	: Evaluating the Indian Summer Monsoon variability during the end of the 21st century using CMIP6 projections.
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Venue	: ER 303 Class Room
Date and Time	: 27 Dec 2024 (4:30 PM)
Abstract	: Large uncertainties exist in the Indian Summer Monsoon (ISM) rainfall projections in a warming climate scenario. The state of the ISM during the warm period is of concern from India's agriculture and economy perspective. In this study, we aim to evaluate the ISM state by the end of the 21st century with respect to the mid-Pliocene period which has very similar warming or temperature changes. To evaluate this, we have compared mid-Pliocene changes from the pre-industrial period with near future (2051-2080) and far future (2071-2100) changes from the historical period (1985-2014) using six models from the Coupled Model Intercomparison Project (CMIP) phase 6. The ensemble of the models simulated an increase in precipitation of nearly 21% and 29% in the near future and far future respectively. The precipitation changes in the near future changes are relatively less than the precipitation changes in past mid-Pliocene period (~29 %) while far future precipitation changes are similar to the past mid-Pliocene changes. From this analysis, we assume that the ensemble of CMIP6 models simulated similar intensification in ISM rainfall in the far future period for nearly similar warm temperature conditions. Further, we have evaluated the changes and similarities through thermo dynamical and dynamical factors. The change in global surface temperature in the near future and far future is simulated to be 2.83 0C and 4.14 0C respectively with corresponding changes in precipitable water is 9.54 kg/m2 and 10.50 kg/m2 . The change in precipitable water is comparable in the far future and past mid-Pliocene. The regional scale Monsoon Hadley circulation over the Indian region is simulated to be strengthened in both past and future climates (near and far). In addition, large-scale wind circulation at 850 hPa is simulated to be stronger along the coast of Somalia in the near and far future and this intensity change magnitude is similar in the far future and mid-Pliocene. The findings of this research highlight the potential for significant changes in the Indian Summer Monsoon by the end of the 21st century, which is mainly dependent on thermo dynamical change rather than the dynamical change.