

---

Registration Seminar

---

Seminar Title	: A Study on Urban Effects During Pre-Monsoon Thunderstorm Scenarios over Major Indian Cities and Associated Climatology
Speaker	: Debjyoti Roy ( Rollno : 522er6008)
Supervisor	: Prof. Jagabandhu Panda
Venue	: ER-303, Department of Earth and Atmospheric Sciences
Date and Time	: 22 Oct 2024 (04:15 PM)
Abstract	: Urbanization has a significant impact on local-scale processes like thunderstorms and associated phenomena. It impacts the development process as well as spatial patterns and intensities of mesoscale convective events by altering the heat and moisture budget. Therefore, the study aims to address how increasing urbanization impacts thunderstorms in major Indian cities, where urbanization is more prominent and continuously increasing. To quantify the historical trend of thunderstorms over the major cities, climatological analysis of thunderstorm-associated parameters like precipitation, lightning, and different thermodynamic indices has been performed along with Mann-Kendall test. Preliminary results suggest that over most of the urban areas, pre-monsoon thunderstorm-related rainfall has an increasing trend, except for Kolkata and Ahmedabad. Lightning climatology also suggests an upward trend over most cities from 1999 to 2020. An east-west contrast between the cities of the eastern part of the country and the western part has also been noted in case of both precipitation and lightning. The WRF modeling framework has been used to simulate thunderstorm events over Delhi region. The results from the sensitivity analysis of different planetary boundary layer (PBL) and microphysics parameterizations suggest that a combination of YSU PBL and Lin microphysics scheme performs better in the case of precipitation, 10 m wind, and other simulated parameters, which has been validated using observational and reanalysis datasets and performing statistical error analysis.