
Progress Seminar

Seminar Title	: Decoding Atmosphere-Biosphere Nexus in the Phase of Environmental Extremes
Speaker	: Shyam Sunder Ms (Rollno : 521er1012)
Supervisor	: Prof. Bhishma Tyagi
Venue	: ER303
Date and Time	: 06 Nov 2024 (0430 PM)
Abstract	: Due to climate change, the decreased mortality rate of Biomes over the forests is drastically affected by drought, heatwaves and forest fires. This case study explores the nexus between extreme heat events, drought, and heatwaves inducing forest fire events for the year 2022 in Uttarakhand, India. The study area is segmented into three minor parts (S1, S2, and S3), making zone-based legitimate analysis this helped provide small-scale variation analysis with reduced data usage complexities. ERA-5 Land Hourly dataset variables like temperature, dew point temperature, precipitation and volumetric soil water layer 1 (0 &ndash 7 cm) were utilized for calculating Standard Soil Moisture Index (SSI), heat wave analysis having maximum temperature for three consecutive days and analysis, vapour pressure deficit (VPD) was calculated, MODIS products used over this study such as FIRM's dataset for validation of forest fire episode, MOD13Q1 for NDVI, MOD15A2H for LAI and MOD11A1 for verifying land surface temperature. Moreover, the vegetation condition index (VCI) and canopy density levels were calculated to understand the vegetation dynamics. It was observed that the occurrence of heatwaves during April and May months above ~30 °C decreased the surface soil moisture level, increasing the drought conditions (below ~ -2). This supported rapid senescence stages, resulting in the worst VCI ranging around ~45 - 50 eventually, this formation of live foliage and wood loads supported, inducing more fire counts (~120) in June 2022. This analysis provides imperative insights for drought and heatwave nexus with forest fires.