
Defence Seminar

Seminar Title	: Terrestrial Carbon Cycle and its Feedback at the Regional Scale
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Venue	: Seminar Hall, Department of Mining
Date and Time	: 27 Feb 2024 (0400 pm)
Abstract	: Mapping ecosystem carbon across different scales and comparing estimates from various systems is essential, both in its own right and for understanding the increasing exchange of atmospheric CO ₂ between the atmosphere and biosphere. The fundamental biophysical mechanisms governing ecosystem-carbon-climate interactions and their feedback mechanisms remain highly uncertain. Significant carbon variability is associated with large uncertainties stemming from land use changes (LUC), resulting in a regional carbon source at seasonal to interannual scales, although without long-term positive or negative feedback. In the face of rapid LUC, continuous monitoring of carbon variability is crucial to understand India's role as a carbon sink in the global budget. Integrating predictive Earth system models (ESMs) with diverse data streams reveals the sensitivity of carbon fluxes to various global environmental drivers across diverse climate and vegetation gradients. Focusing on understanding India's regional carbon dynamics in recent history, this thesis employs in-situ, remote sensing, and process-based models to emphasise the interaction of regional carbon dynamics with multiple drivers. India's diverse flora results in varying carbon uptake across biomes, with tropical ecosystems serving as dominant carbon storage hubs. However, the regional carbon cycle is reshaped by multiple environmental drivers, subsequently influencing climate patterns. Considering atmospheric aerosols as a hindrance, a remote sensing process-based model, the Carnegie Ames Stanford Approach (CASA), was employed to examine the potential effect of aerosol load on ecosystem productivity across diverse agroclimatic zones of India. Carbon flux sensitivity varies across ecosystems, with pronounced positive and negative feedback effects observed over forest and cropland ecosystems. To explore the complex dynamics of India's carbon uptake under various forcing scenarios over the past century, the Community Earth System Model (CESM) was utilised.

The link for online participation in the seminar will be <https://meet.google.com/hjc-csze-ybv>