

EARTH SURFACE DYNAMICS

This group is one of the strongest groups in the department and focuses on the Himalayan River systems with emphasis on river morphology, hydrology and water quality monitoring from remote sensing platforms. Data from a variety of spatial scales ranging from satellite remote sensing, airborne platforms and UAVs are utilized for this research. Innovative approaches using optical, thermal infrared and hyperspectral remote sensing are applied for understanding morphodynamics, sediment dynamics, and water quality to aid in the development of sustainable river management strategies. A geomorphic approach using remote sensing data in a GIS framework is used to understand the spatial distribution and causal factors of natural hazards such as floods and forest fire risk. Specialized research on Critical Zone Science has focused on soil moisture/crop water stress estimation and groundwater dynamics from in-situ measurements as well as satellite platforms. Fundamental research on wetland hydrology has covered geomorphic connectivity analysis and hydrodynamics making extensive use of topography, landuse/landcover and geomorphology. Satellite and UAV based remote sensing have also been used to develop wetland cover types (WCTs) with an emphasis on wetland health. Another important area of research has included the understanding of the linkage between rivers and ancient civilization based on an integrated approach of geophysical surveys, drill core sedimentology and chrono-stratigraphy. Our research has particularly demonstrated a clear non contemporaneity of the Harappan civilization with any large river system in NW India.