

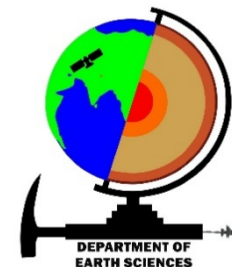


Wednesday Talk Series

Date: Wednesday, October 08, 2025

Time: 04:00 PM-5:00 PM

Venue: Mithal Hall, Department of Earth Sciences, IIT Roorkee



Role of Climate and Tectonics in Shaping the Weathering Dynamics: U-series isotopes Insight from In-situ Weathering Profiles, Garhwal Himalaya

Speaker: Sohan Kumar



Abstract: Chemical weathering in the Himalaya significantly contributes to global biogeochemical cycles and long-term sequestration of atmospheric CO₂, essential for both terrestrial and marine ecosystems. Weathering is coupled with erosion, and existing literature in the Himalaya exhibits indirect estimation of soil production from catchment averaged erosion rates and river wash loads. In this study, soil production rates are estimated from in-situ weathering profiles, and correlated across a spectrum of climate and tectonic settings. The humid conditions in the Lesser Himalaya have accelerated weathering rates by up to 3.5 times compared to the semi-arid Higher Himalaya, with at least a twofold increase in element flux. The ~60 ka weathering record in the Higher Himalaya corresponds to deglaciation period, and due to low residence time, the profile here is thinner and weathering intensity is less than the Lesser Himalayan weathering profile. A metabasic weathering profile near a strike-slip fault exhibits almost three-fold increase in weathering rates than another profile from similar litho-climatic setting, outside the fault influence. The accelerated weathering is attributed to high fracture density, reduced strength, and increased reactive surface area due to brittle deformation. The study provides insights into variability of weathering rates and corresponding element flux in Himalaya as a function of climate and tectonic conditions.

Brief introduction: Mr. Sohan Kumar is a PhD scholar (PMRF) at the Department of Earth Sciences, IIT Roorkee, working under the supervision of Prof. Pradeep Srivastava. His doctoral thesis title is “Rock Weathering Dynamics in the Garhwal Himalaya: A Multidisciplinary Approach of Metagenomics, U-series and Cosmogenic Radionuclide Dating”. He has done M.Tech in applied Geology from Kurukshetra University Kurukshetra, Haryana, and worked as a Senior Geologist in Aimil Ltd., New Delhi, and JRF-SRF at Wadia Institute of Himalayan Geology, Dehradun.