Abstract

Erosion of rocks by surface processes can be classified into - physical (abrasion, attrition, freezing and thawing action), chemical (carbonate action or acid rain) and biological processes (roots growing within the rock mass). Eroded sediments are further transported by rivers, glaciers, wind action or by hillslope failure. People have tried to quantify and classify erosion over different timescales including monthly, annual, decadal, millennial or even over millions of years. However, the process of quantification or the tools of inspection vary across the time-window of interest.

In this study, we focus on two major issues-

1. the sedimentological analysis in Chenab valley to assess the effect of different transport or erosional mechanisms on transported sediments. With analysis of grain-size and grain-shape, we are able to statistically differentiate the fluvial, fluvio-glacial and hillslope debris flow sediments stored in and around the Kishtwar Window where, fluvial and fluvio-glacial sediments are often intercalated with hillslope debris and makes the field identification and categorization of sedimentary deposits a bit tricky. Our new data shows the impact of transport distance on grain-size sorting and grain-roundness.

and,

2. Quantification of the paleo-erosion rates in the Kangra valley by using ^{10}Be cosmogenic nuclide. Kangra basin in the western Himalaya transiently stores foreland-bound sediments, where aggradation is manifested by formation of alluvial fans and the fans are further re-incised to form several levels of fluvial terraces. In this study I recalculated paleo-erosion rates published in Dey et al., (2016) by using two different production rate calculation schemes known as the LSDn model, and the time-dependent Lal and Stone Lm model. I show the variation of obtained erosion results while using the two different methods. The erosion rate calculations show that over the last 100 kyr, the erosion rates from the Dhauladhar Range have been fluctuating by an order of magnitude. High erosion rates are observed from the source region

during the strengthened monsoon phases, especially at the transitions from glacial to interglacial periods.

I initiated my work on isotopic fingerprinting of eroded sediments in the Chenab valley to understand the erosional extent in the valley. Existing long-term exhumation rates suggest that the Lesser Himalaya exposed within the Kishtwar Window is experiencing a 3.2-3.6 mm/yr exhumation over the Quaternary period. If that holds true, the eroded sediment flux would show a dominant Lesser Himalayan Sr-Nd signal. Due to nationwide lockdown this year, I couldn't acquire the results though.