

An integrated palaeoclimatic record of Himalayan foreland basin during Pleistocene, NW Himalaya, India

MOHD MUNAZIR CHAUHAN^{1,2}, SAJID ALI^{1,3},
BIRENDRA P SINGH², VIKAS ADLAKHA⁴ AND BINITA
PARTIYAL¹

¹Birbal Sahni Institute of Palaeosciences

²Panjab University, Chandigarh

³Jamia Millia Islamia

⁴Wadia Institute of Himalayan Geology

Presenting Author: munazirali12@gmail.com

Past weathering regimes serves as a crucial tool to comprehend the climatic variations and its impact on silicate weathering and erosion. The sediments of the Himalayan foreland basin hold an excellent archive to interpret climate and weathering records because it lies adjacent to hinterland. In this study, we present geochemical analysis (major, trace and rare earth elements), clay mineral compositions and environmental magnetic records of siliciclastic sediments since 2 Ma. We carried out study on Ramnagar and Garjiya formations (upper Siwalik subgroup) of NW Himalaya in order to understand the source rocks composition and climatic variabilities. The source rock composition of both formations are characterised by various elemental ratios i.e. Eu/Eu*, La/Lu, La/Sc, Th/Sc, La/Co, Th/Co and Cr/Th suggests felsic source. Enriched LREE values in Chondrite-normalised REE pattern with negative Europium anomaly also attributed to felsic source. The possible source of the studied sediments were Higher Himalayan series and Lesser Himalayan region. The marked shift at ~1.0 Ma from relatively warm and wet climate, attributed to strengthened Indian Summer Monsoon (ISM), to cold and dry climatic condition associated with weak ISM is evidenced in kaolinite/(illite+chlorite) ratios, chemical weathering indices (such as Rb/Sr, CIA, PIA and WIP) and magnetic susceptibility. Furthermore, abrupt increases in $\delta^{13}\text{C}$ values of soil organic matter recorded after ~1.0 Ma also suggests weakening of ISM in the study region. Our inferences are also supported by global oxygen and carbon data, which reveals global drawdown of CO_2 .