Goldschmidt 2024 Abstract
https://doi.org/10.46247/gold2024.21889

Grain size controls on Sr-Nd isotope composition of sandy Thar surface sediments from northwestern India

ROHAN BHATTACHARYYA[1], SATINDER PAL SINGH[2], SUDESH YADAV[3] AND ANUPAM SHARMA[4]

[1]Indian Institutes of Science Education and Research Bhopal
[2]Indian Institute of Science Education and Research Bhopal
[3]Jawaharlal Nehru University
[4]Birbal Sahni Institute of Palaeosciences

Presenting Author: rohanb17@iiserb.ac.in

Grain-size controls on Sr-Nd isotopes in finer lithic sediments are well established[a]. However, such isotopic controls in sandy sediments from arid/semi-arid regions under subaerial conditions remain elusive. This study presents geochemical and radiogenic Sr-Nd isotope compositions along with grain size data in sandy surface sediments (n=14) collected following the regional wind pattern across the Thar Desert, Rajasthan, India. The spatial distribution patterns of mean grain size (M_z) and sorting show dramatic variations and hint at a long-range transport of the sampled sediments. The scatter plot of $^{87}Sr/^{86}Sr$–M_z shows a statistically significant and modest correlation (R=–0.7, p = 0.003), while a relatively poor e_{Nd}–M_z correlation (R=0.5, p = 0.08) is found. The coherent positive trends of major oxide abundances and negative trends of K_2O/Al_2O_3 and Rb/Sr with Mz negate the roles of clay adsorption or chemical weathering. Rather, the partitioning of K-feldspars at the expense of Plagioclase in finer fractions seems to control Sr isotope variability with grain-size reduction as evident from a negative trend of $K_2O/(CaO+Na_2O)$ with Mz. Additionally, the presence of heavy minerals in finer fractions also appears to control Nd isotope variability with grain-size reduction. This study highlights the grain-size dependency on Sr-Nd isotope composition of sandy Thar sediments, which could occur during sand dynamism and is also expected during Thar dust production and its downwind dispersals.

[a] *Meyer I., Davies G. R. and Stuut J. B. W. (2011) Grain size control on Sr-Nd isotope provenance studies and impact on paleoclimate reconstructions: An example from deep-sea sediments offshore NW Africa. Geochemistry, Geophys. Geosystems* ***12****.*