Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.12850

Re-Os and PGE systematics of Paleoarchean komatiites from the Western Dhawar Craton, India

J. ELIS HOFFMANN[1], ARATHY RAVINDRAN[2] AND SRINIVASAN BALAKRISHNAN[3]

[1]Freie Universität Berlin
[2]ETH Zürich
[3]Pondicherry University
Presenting Author: jeh@zedat.fu-berlin.de

The composition and evolution of the Archean mantle is a matter of debate. Primary high-degree melts such as komatiites tap directly Archean mantle reservoirs. They have been applied to provide valuable information on early differentiation processes as well as mixing of late accreted material into the mantle after core formation [e.g., 1]. Isotope constraints of these rocks may also provide information on the presence of recycled crustal material that may date back to the Hadean [2].

Here, we report ^{187}Re-^{187}Os isotope data and HSE abundance data for well characterized komatiitic rocks from 3.15 Ga Banasandra komatiites and 3.25 Ga Sargur-Holenarsipur komatiites from the western Dhawar craton, India that were previously analyzed for bulk rock chemistry and Hf- ^{142,143}Nd isotope compositions [3,4]. Reported initial e_{Hf}values for the Sargur-Holenasipur komatiites reflect highly depleted sources of up to +21 [4] and μ^{142}Nd values of the Banasandra komatiites are undistinguishable from the modern mantle [3]. First Re-Os isotope data show highly radiogenic ^{187}Os isotopic compositions reflected in positive gOs(t) values of up to +10.8 as well as a negative gOs(t) values of -13 for one sample. Samples from the Banasandra greenstone belt show strong Re enrichment. PGE abundances are lower than primitive upper mantle and show typical melt patterns of depleted mantle sources where the IPGE increase towards Pt and Rh; Pd is depleted and Re is variable. The measured Os isotope compositions may reflect disturbance of the Re-Os isotope system, early seafloor alteration or enriched Os signatures inherited from the source. Crustal contamination can be excluded as the initial Hf isotopes show extremely radiogenic compositions and LREE enrichment is not observed [3].

[1] Puchtel et al. (2021) *Chemical Geology* ***594****, 120776.*

[2] Tusch et al. (in revision) *PNAS.* https://doi.org/10.1002/essoar.10507464.2

[3] Maya et al. (2017), *Geoscience Frontiers* 8, 467-481.

[4] Ravindran et al. (2021), *Lithos* 404-405, 106491.