Sr and Nd isotope studies on sediment core samples from Cauvery delta, South India: Evidence for monsoon induced changes in provenance

MALIK ZUBAIR AHMAD, S. BALAKRISHNAN AND P. SINGH*

Department of Earth Sciences, Pondicherry University, Pondicherry 605014, India
(*correspondence: pramods@yahoo.com)

Sr and Nd isotope composition of sediments are useful to trace their provenance and past changes in climate [1]. Here, we present $^{87}Sr/^{86}Sr$ ratios of four different leachate fractions and Sr and Nd isotopic composition of the residual detrital phase of the sediments from a 25 m core obtained from the distal part of the Cauvery River delta. The $^{87}Sr/^{86}Sr$ ratios of exchangeable, carbonate, Fe-Mn and organic phases of the sediments exhibit similar trends falling between seawater and river water values (Fig.1). All these phases exhibit a sharp positive excursion at 3.8 m depth. This could be due to stabilization of vadoze zone for a long period, permitting greater microbial assisted weathering of minerals to release more radiogenic Sr.

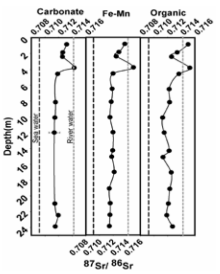

Figure 1.

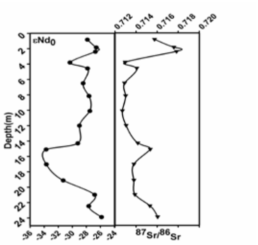

Figure 2.

Comparison of trends of εNd_o and $^{87}Sr/^{86}Sr$ ratios in the detrital phase of the sediments shows five excursions (Fig. 2). Comparing the isotope ratios of rocks exposed from the catchment of Cauvery river suggest that the dominant source of sediments varied from (1) granitic gneisses and basalts of Dharwar craton exposed along northern westcoast, receiving rains during southwest monsoon (2) enderbites and granulites of Nilgiri mountains that receive rainfall during both southwest and northeast monsoon and (3) gneisses and granulites found along Moyar, Bhavani and Cauvery shear zones and Southern Granulite Terrain receiving rains during NE monsoon. Evidence for intensification of SW monsoon is observed at a depth of 4 m upward (~7800 years B.P.) to 1.85m (upto ~5990 years B.P.).

[1] Goodbred (2003) *Sedimentary Geology* **162**, 83–104.

Redox conditions of formation of osmium-rich alloys from dunite and chromitite of the Guli massif (Maimecha-Kotui Province, Russia)

K.N. MALITCH[1]*, A.A. KADIK[2], BADANINA I.YU.[1] AND E.V. ZHARKOVA[2]

[1]Russian Geological Research Institute, St. Petersburg, 199106, Russia (*correspondence: dunite@yandex.ru)
[2]Institute of Geochemistry and Analytical Chemistry, Russian Academy of Sciences, Moscow, 119991, Russia (kadik@geokhi.ru)

This study presents the new data on mineral composition and physico-chemical conditions of formation of Os-rich alloy grains derived from dunite and chromitite of the Guli clinopyroxenite-dunite massif (Maimecha-Kotui Province, Russia). The study employed a multitechnique approach that utilized electron microprobe analysis and experimental determination of the intrinsic oxygen fugacity (fO_2) of Os-rich alloys using solid electromechanical cells.

Measured fO_2 values of native osmium ($Os_{84}Ir_{11}Ru_5$) and iridian osmium ($Os_{66}Ir_{28}Ru_5$) are plotted (Fig. 1) between standard equilibrium buffers of wustite – magnetite (WM) and quartz – fayalite – iron (QFI). The similarity of fO2 for Os-rich alloys from dunite and chromitite indicates that formation of these minerals occurred in compatible redox conditions, characteristic of the region of generation of mantle peridotites.

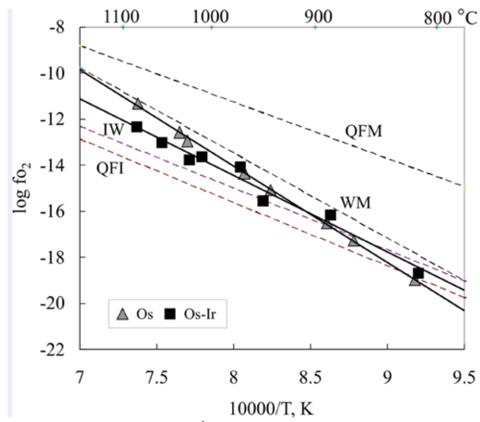

Figure 1: Plot log fO_2 - 10^4/T (K) for the measured samples of native osmium from dunite and iridium osmium from chromitite.

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