Tectono-magmatic evolution of peninsular India: new insights from trace element and Nd isotopic study of mid-Proterozoic Vindhyan sediments from Rajasthan, India

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The mid-Proterozoic Vindhyan Basin of India comprises a ~4km thick pile of unmetamorphosed sediments deposited between ~1630 Ma and 550 Ma [c.f. 1,2]. These sediments provide valuable information on the tectono-magmatic evolution of the continental crust through time and specifically, that of peninsular India [3]. Prominent Archean and Proterozoic orogenic belts border the Vindhyan basin to its west, south and east. The centrally-located Archean Bundelkhand granite massif divides the basin into two: the Son valley Vindhyan to the east and the Aravalli/Rajasthan–Vindhyan to the west. Trace element and Nd isotopic composition of Son-valley sediments indicate derivation from an Andean-type arc that existed south of this basin [3]. In this study, we investigate the provenance of the Vindhyan sediments from Rajasthan which are thought to be correlated with the Son valley sediments based on their sedimentological parameters and relative stratigraphy. However, C and Sr isotopic compositions of carbonate horizons in the two sub-basins show differences [4]. To investigate the stratigraphic correlation between the two sub-basins further, we have measured trace element compositions of both siliciclastic and carbonate horizons of the Aravalli-Vindhyan sub-basin and compared it with that of type-region [3] in the Son valley. Our trace element data from the sandstones and shales are consistent with other published data [5,6]. Compared to their Son-valley 'counterparts', carbonates from the Aravalli-Vindhyans show relatively low REE concentrations while sandstones and shales show higher REE concentrations; Aravalli-Vindhyan sediments also show more fractioned REE ($La/Lu_{(N)}$) and higher Th/U, the former indicating a different sediment provenance. To better evaluate the provenance of these sediments, Nd isotopes will be measured in Aravalli-Vindhyan samples and compared with available data [3] from the Son-valley Vindhyans.

[1] Ray *et al* (2002) *Geol*. **30**, 131-134 [2] Malone *et al* (2008) *Precamb*. *Res*. 1**64**, 137-159 [3] Chakrabarti *et al* (2007) *Precamb*. *Res*. **159**, 260-274 [4] Ray *et al* (2003) *Precamb*. *Res*. **121**, 103-140 [5] Raza *et al* (2010) *Jour, Asian*. *Ear*. *Sci*. **39**, 51-61 [6] Raza *et al* (2012) *Jour, Asian*. *Ear*. *Sci*. **48**, 160-172