

Oxygen isotope evidence for crustal contamination in Deccan Basalts

Sourendra Kumar Bhattacharya

Visiting Research fellow

Academia Sinica

Abstract

A set of whole rock lava flows and dykes from the western part of Deccan Traps was analyzed for oxygen isotope ratios. $\delta^{18}\text{O}$ stratigraphy of the upper formations in the Mahabaleshwar section of the Western Ghats area can be correlated with the Sr and Nd isotopic stratigraphy. Increased $\delta^{18}\text{O}$ values are associated with increased initial $^{87}\text{Sr}/^{86}\text{Sr}$ and decreased initial ϵNd . The increases of $\delta^{18}\text{O}$ values (up to +11.8 ‰) exceed the range of primitive mantle-derived materials, strongly suggesting that isotopic variations of these suite of Deccan basalts are due to crustal contamination rather than input of continental lithospheric mantle as previously considered. The co-variations of $\delta^{18}\text{O}$ vs $^{87}\text{Sr}/^{86}\text{Sr}$ and $\delta^{18}\text{O}$ vs ϵNd indicate that there are at least two contaminating domains, most likely (1) Archean granitic upper crust and (2) Archean carbonates plus granulitic lower crust.