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# The $^{142}$Nd signature of crustal xenoliths in dykes associated with the Narmada-Tapi rift zone, central Deccan Traps

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The Indian Shield hosts some of the oldest (≤3.7 Ga) crustal lithologies known on Earth's surface. However, eruption of the Deccan flood basalts about 66 million years ago resulted in coverage of a substantial area of the western and central Indian basement. A few Deccan-related dykes host crustal xenoliths, for example in the Nandurbar-Dhule region of the Narmada-Tapi rift zone [1]. Crustal xenoliths provide the opportunity to study the inaccessible basement rocks beneath this region. In addition, they have the advantage of representing randomly sampled crustal rock types from different depths of the same column of crust.

Two dykes south of Dhule, the Talwade and Rajmane dyke, host a large quantity of crustal xenoliths, representing a variety of crustal lithologies [1]. Xenoliths from the Rajmane dyke show highly variable $^{87}Sr/^{86}Sr$ ratios between 0.70935 and 0.78479 [1]. In-situ U-Pb dating of zircons from xenoliths from Talwade indicates a Neoarchaean formation age of about 2.53 Ga with two subsequent metamorphic events at around 2.46 and 2.37 Ga, respectively [2]. The available geochemistry and the U-Pb ages imply that the xenoliths are associated with the Dharwar craton [1, 2].

Our sample set comprises mostly gneissic crustal xenoliths ($n$ = 11) from mafic dykes near Talwade and Ranala in the Nandurbar-Dhule region. In this study, the $^{146,147}$Sm-$^{142,143}$Nd decay systems, along with major and trace element concentrations are employed to define the magmatic history of these rocks and their protoliths. Particularly, $^{142}$Nd compositions are powerful tools to constrain magmatic fractionation processes that occurred during the first ca. 500 Ma of Earth's history using Archean-aged crustal rocks. The competing effects of host magma assimilation and metamorphic or metasomatic overprinting will be additionally evaluated for their effects on the $^{142}$Nd compositions of the xenoliths. Together, the heterogeneous rock suite provided by the xenoliths will be used to study the evolution of a vertical cross section of continental crust and evaluate whether randomly sampled crustal lithologies may have a common Hadean heritage.

[1] Ray et al. (2008) *Gondwana Res*. **13**, 375–385.

[2] Upadhyay et al. (2015) *J. Geol.* **123(3)**, 295–307.