# Recycled crust in the source of Deccan flood basalts

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The Deccan Flood Basalts (DFB), Seychelles plateau and Mascarene Islands (e.g. Réunion) are thought to trace the evolution of a single mantle plume from its initial stage under thick continental lithosphere to a hot-spot stage under thinner oceanic lithosphere. DFB may also have contributed to the Cretaceous-Tertiary-boundary mass extinction [1].

We intend to reconstruct the source compositions of lavas from the DFB and the Mascarene Islands using the compositions of melt inclusions and host olivine phenocrysts following [2]. Preliminary results on samples from the Kutch district (Gujarat state, India) indicate significant Ni excess and Mn deficiency in the composition of olivine phenocrysts similar to Hawaiian magmas (see Fig). This suggests a large contribution of pyroxenite-derived melt (recycled oceanic crust). Furthermore, this component appears compatible with that of lavas from the Réunion Island.

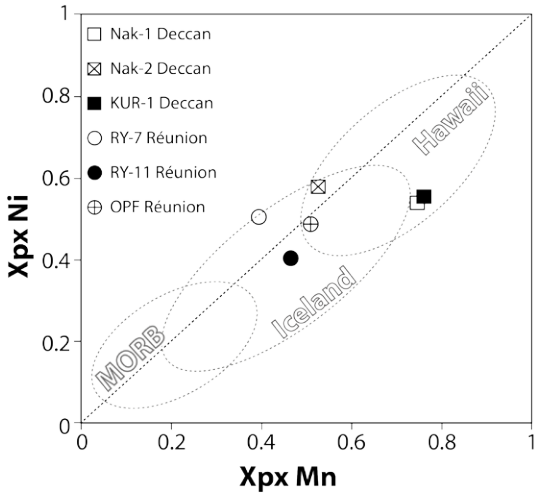


**Figure 1:** Proportion of pyroxenite derived melt from Ni excess and Mn deficiency in averaged (per sample) olivine compositions [2].

[1] Courtillot, V. *et al*. (1988) *Nature* **333**, 843–846.
[2] Sobolev, A.V. *et al*. (2008) *Science* **321**, 536.

# Serpentinite channel and the role of serpentinite buoyancy for exhumation of HP rocks (Voltri Massif, Western Alps)

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The high-pressure (HP) Voltri Massif (at the eastern end of the Western Alps) consists of meta-ophiolites and metasediments recording peak blueschist (Palmaro-Caffarella Unit) to eclogite (Voltri Unit) facies. Eclogite and blueschist metagabbro lenses within highly sheared serpentinite or metasediments reveal strain heterogeneity within the lenses and between lenses and host-rocks. P-T pseudosections of these rocks indicate clockwise P-T paths for subduction and exhumation. Peak conditions range from 10-15 kbar and 450-500°C (Palmaro-Caffarella), to 21 kbar and 450-490°C, and to 22-28 kbar, 460-500°C (Voltri). To constrain exhumation of these rocks, we performed 2D numerical models simulating intraoceanic subduction in a basin surrounded by continental margins, same as the Mesozoic Ligurian Tethys. We reproduced a non-layered lithosphere typical of slow and ultra-slow spreading ridges, where serpentinized lithospheric mantle hosts discrete gabbro intrusions and is discontinuously covered by basalts. As the result of slab dehydration, a viscous serpentinite channel forms in the mantle wedge, whose evolution is strongly controlled by rheology of serpentine. Ductile deformation of serpentine within the channel enhances mixing of parts of the overriding plate with slab-derived sediments, oceanic crust and mantle. The simulations show that serpentinites decreased the bulk density of HP terrains below the mantle value, causing exhumation of part of the serpentinite channel. They also provide P-T paths of selected rock volumes with close correspondence with the P-T paths of the Voltri gabbroic lenses. The dominance of highly sheared serpentinite, the strong strain-partitioning, the metamorphic peaks attained by the various rock volumes within the Massif, and the similarity of natural and simulated P-T paths, suggest that the Voltri Massif may represent a ‘fossil’ serpentinite channel.