

Geochemical Sr-Nd isotope inheritance as evidence for crustal re-melting in Neoproterozoic volcano-plutonic rocks from the Malani Igneous Province, NW India

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The Neoproterozoic era has been a time of fast plate-tectonic re-organisation. During the late Tonian the Malani Igneous Suite (MIS) formed by a large pulse of volcano-plutonic activity (770 to 750 Ma). In the last couple of years several models and plate-tectonic reconstructions have been proposed by different authors. The MIS, consisting of felsic and bimodal rocks, has been identified in NW India, SE Pakistan and Seychelles. In this study we analysed major and trace elements and Sr and Nd isotopic compositions of 40 samples from the felsic and mafic plutonic and volcanic rocks of the MIS in NW India. Our new model shows that this magmatic event is related to slab roll-back in the late-stage of ca. 130 Myr of Cordilleran-type subduction in front of the Neoproterozoic India-South China plate. Re-melting of the crust was triggered by underplating of asthenosphere and melt emplacement focused along lithospheric discontinuities in the pre-Malani basement architecture. Our data from an E to W section recover the transition from stable continental crust into the continental margin of the Indian plate. A significant influence of the underlying pre-Malani basement is seen in the geochemical composition of the MIS. This is especially evident in differences in Sr and Nd isotopes, which mimics the signature of the basement below ($\epsilon\text{Nd}_{\text{initial}}$ from -3.4 in the E to +5.6 in the W).