

The Nidar Ophiolite (NW Himalaya, India): new data

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The Nidar Ophiolite is located between the North Himalayan nappes and the Indus Suture Zone in the NW Himalaya (Eastern Ladakh, India). Based mainly on the geochemistry of volcanic rocks, this ophiolite is classically interpreted as a relic of an intra-oceanic arc (Mahéo et al. 2000; Mahéo et al. 2004), which developed at around 140 Ma, prior to the collision between the Indian and Eurasian plates (Ahmad et al. 2008).

Recent detailed mapping of the Nidar Ophiolite between Nidar village and the Kyun Tso area revealed a great diversity of mafic and ultramafic rock types. Field data demonstrate that the internal structure and lithologic relationships of the ophiolite are more complex than previously suggested.

From top to bottom the following rock types have been distinguished: various sedimentary rocks immediately overlying basaltic rocks are composed of conglomerates with elements rich in quartz and K-feldspar, and conglomerates with clasts of basalt and radiolarites. This compositional heterogeneity reflects contributions from different detrital sources, e.g. from the felsic part of the batholith and the upper part of the ophiolite. Pillow lavas are the most abundant volcanic rocks and they are mainly located on top of the layered gabbros. These gabbros are the main plutonic rocks of the Nidar Ophiolite. The underlying partially serpentinized mantle rocks are harzburgites with irregular contacts to surrounding dunites. Minor rock types are clinopyroxenites, gabbroic dykes and rare chromitites.

Layered gabbros and the upper part of the mantle rocks are locally intruded by several kilometre-sized intrusive complexes. These complexes can be subdivided in: a) porphyritic rocks and amphibole-gabbros; b) dunites, wehrlites, olivine pyroxenites, clinopyroxenites, pegmatite-gabbros, and plagiogranites; c) pyroxenites, ol-pyroxenites and leucogabbros which are only exposed in the mantle section.

Our new field data indicate that two main events can explain the formation of the Nidar Ophiolite:

- 1) Formation of oceanic crust documented by the layered gabbros, underlying harzburgites and some volcanic rocks as olivine basalts.
- 2) Crystallization of intrusive complexes within the layered gabbros and in the mantle rocks, which might be related to the formation of an intra-oceanic arc. Dating of various gabbros will help to constrain the time scales of magmatism in the Nidar Ophiolite (ongoing work).

References:

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