

Magmatism in the High Himalayan Crystalline Sequence in SE Zaskar (NW India)

Contact Persons

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Context

The High Himalayan Crystalline (HHC) corresponds to the metamorphic core zone of the Himalayan orogeny. It consists of a 5–40 km thick sequence of Precambrian and lower Cambrian detrital sediments, including graywackes, siltstones, and pelites, now transformed into greenschist facies to migmatitic paragneiss. In NW India, the monotony of the stratigraphic sequence is interrupted by the intrusion of the Kade granite at ca. 470 Ma. Moreover, intrusive basic rocks are sporadically found in the metasediments and the Kade orthogneiss as well.

A typical Barrovian metamorphic field gradient is very well preserved in the metapelites of the HHC in the Miyar Valley (NW India). Going up the valley the successive crystallization of chlorite, biotite, garnet, kyanite ± staurolite and sillimanite mineral in the HHC rocks reflects a continuous and regular increase of the metamorphic conditions toward the north. This metamorphism is collectively interpreted as the results of a crustal thickening phase that occurs in the early time of the Himalayan orogeny, shortly after the continental collision between India and Asia 55 Ma ago.

Recently, sporadic arguments documenting a pre-Himalayan history have been reported, suggesting that the sediments deposited on the northern Indian margin were not necessarily preserved from metamorphism prior to the Cenozoic Himalayan orogenic cycle. Olivine gabbros and mafic intrusion are rare in the HHC and, compared to the pelitic rocks, these rocks have been very little studied so far. This project proposes to investigate in detail the mineral assemblage and texture of the mafic rocks along the well constrained prograde pelitic suite of Miyar Valley section in order to identify any arguments supporting a pre-himalyan metamorphism. In addition, geochemical investigation should also allow identifying the origin and the source generating the intrusion of these mafic rocks.

Aims and methods

The aim is to study in detail the intrusive rocks that have been collected along the different metamorphic zones of the HHC along the Miyar Valley section (NW India) in order to

- 1) better constrain the tectono-metamorphic evolution of the HHC in NW India.
- 2) constrain the magmatic evolution of the intrusive rocks
- 3) discuss the tectonic environment and emplacement mechanism of the intrusive rocks of the HHC of NW India.

Whole rocks chemistry, microprobe analyses, LA-ICPMS and stable isotope chemistry are methods that can be used on selected samples to answer the scientific questions.

References

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