

Title

Volcanism preceding the Himalayan orogeny in central Ladakh, Indian Himalaya

Contact persons

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Context

The Himalayan Orogeny is generally considered as a classic continent–continent collisional event. The remnants of volcanic arcs dispersed across the Indus suture zone indicate, however, a more complex geodynamic evolution prior to the final collision between the Indian and Eurasian continents. In Ladakh, Indian Himalaya, a prominent batholith represents the intrusive elements of a volcanic arc active in the Paleocene to Eocene and located in the NeoTethys ocean between the two continents. The nature of this arc substratum, i.e. continental or oceanic, is however contentious. Furthermore, several volcanic units of poorly constrained origin outcrop in proximity of the batholith. Due to a lack of geochemical and geochronological data, their origin, their potential relationship with the Ladakh arc and their overall geodynamic implications are open to question. The aim of the project is to investigate the volcanic units sampled along a N-S transect of the batholith in western Ladakh. The goal is to get a better understanding of the geodynamic evolution of this sector prior to the final collision between India and Eurasia.

Aims and Methods

This project proposes to undertake a comprehensive petrological, geochemical and geochronological investigation of volcanic units outcropping along a transect of the Ladakh batholith (Indian Himalaya). The aim is to get a better understanding of the subduction processes during convergence between the Ladakh arc and respectively the Indian and Eurasian continents. The planned work will include: (1) Petrographic characterization of samples representative of several magmatic units. (2) Major and trace element bulk rock geochemistry to document subtle variations in magma composition (XRF+LA-ICPMS). (3) Zircon U-Pb dating and trace elements analyses (LA-ICPMS).

References

Rolland, Reubi & Singh, 2023, Magmatism in the Kohistan–Ladakh Paleo-arc. In *Himalaya, Dynamics of a Giant 2: Tectonic Units and Structures*. ISTE/WILEY. <https://onlinelibrary.wiley.com/doi/10.1002/9781394228621.ch1>

Martin et al., 2023, Paleomagnetic constraint on the age of the Shyok suture zone. *Journal of Geophysical Research:Solid Earth*, 128, <https://doi.org/10.1029/2022JB026137>

Bouilhol et al. 2013, Dating the India–Eurasia collision through arc magmatic records, *EPSL* 366. <http://dx.doi.org/10.1016/j.epsl.2013.01.023>



Website

Prerequisite

Indicate if the student must take some course or module



ECOLE LEMANIQUE DES SCIENCES DE LA TERRE
DES UNIVERSITES DE GENEVE ET DE LAUSANNE

Master ès Sciences in
Earth sciences