

The Ladakh batholith (India): Formation, erosion and constraints on the beginnings of the Himalayan orogeny

Contact persons: Prof. Jean-Luc Epard, Prof. Othmar Müntener, Olivier Reubi

Context

The Ladakh batholith (110-45 Ma) is one of the largest batholith worldwide and is related to the subduction of an ocean separating India and Asia. The study of its formation, its exhumation and its erosion will contribute to better understand the geodynamic events related to the oceanic subduction, to the HP metamorphism of the Indian crust and to the closure of the different basins linked to the suture. The evolution and age of the various intrusive bodies of the batholith compared to age spectra of detrital zircons trapped in the sediments associated with the arc will provide kinematic and temporal constraints on the early stages of the formation of the Himalayan range

A series of samples from the batholith collected in 2017, together with sediments covering fore-arc ophiolites collected during a recent PhD provide the basic material for this study. The sediments have never been studied for their detrital zircon record. Batholith data combined with detrital zircons studies will provide basic data to better understand the early formation of the Central Himalaya.

Objectives and Methods

The planned work will improve the dataset on the formation of the batholith, contemporary to subduction, and its erosion, marked by the appearance of detrital zircons in ophiolite-related sediments. The closing of the ocean separating India from Asia and the early stages of the Himalayan formation can be specified.

The work will be based on detailed petrological analysis, geochemistry and dating (U / Pb La-ICPMS on zircons) of the batholith samples and on the extraction and dating of detrital zircons from the sedimentary rocks of the suture zone.

Literature

Aitchison et al. (2011) : Detrital zircon U–Pb ages along the Yarlung-Tsangpo suture zone, Tibet: Implications for oblique convergence and collision between India and Asia. *Gondwana Research* 20, 691–709

Weinberg et al. (2000): Growth and deformation of the Ladakh Batholith, Northwest Himalayas: Implications for timing of continental collision and origin of calc-alkaline batholiths. *The Journal of Geology*, 108, 303–320. doi: 10.1086/314405.

Magma mingling in the Ladakh batholith



Sites WEB

Buchs & Epard (2017): Indus suture zone, poster SGSM, Davos.
https://serval.unil.ch/notice/serval:BIB_B09C1C6739E5

<http://www.unil.ch/geoleman/home/menuinst/memoires/memoire-de-master---sujets-r.html>

Choice of orientation :

Orientation GATO (Geochemistry, Alpine tectonics, Ore Deposits): Modules: Isotope Geochemistry, Computational tectonics Analytical Toolbox, Magmatic Petrology, etc