

Detrital zircons dating and apatite fission track analyses of foreland basin sediments: Implications for collisional process in the NW Himalaya

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The Cenozoic foreland basin in Himachal Pradesh, India bears a nearly complete sedimentary record of syn to post collisional history of the Himalaya. The lowermost Subathu formation (57-41 Ma) marks transition from marine to terrestrial sedimentation which is correlated with the early phase of India – Asia collision. The younger strata, Dagshei (~31-24 Ma), Kasauli (24-13 Ma) and Siwalik (13-1 Ma) formations, record uplift and exhumation of the orogen[1,2]. In this study we present new Apatite Fission Track analyses and U-Pb detrital zircon dating further constraining provenance and deformation of the Himalayan foreland basin. Our new U-Pb detrital zircon dating results obtained for the Siwalik sediments suggest, that except for well acknowledged detrital signature from the rising Himalaya[3], material was also supplied from the trans-Himalayan batholith and possibly also from the suture zone. It implies that the Himalaya not form a barrier preventing southward fluvial transport.

The foreland basin sequences are intensely deformed, forming a nappe stack[4]. We attempted to reconstruct its formation using AFT analysis. Preliminary results obtained on pre Siwalik sequences show unimodal age population and are consistently younger than stratigraphic ages. Thermal modelling based on kinetics of track annealing indicates that sediments underwent weak heating to temperatures < 90°C by a combination of sedimentary burial and internal thrusting. Fairly rapid cooling starting at about 5 Ma is correlated with cessation of movement along MBT and thickening due to nappe stack formation.

[1] Najman, Y. (2006) *Earth-Sci Rev* 74, 1-72. [2] Najman, Y. et al. (2004) *Basin Res* 16, 1-24. [3] Ravikant, V. (2011) *EPSL* 304, 356-368. [4] Mishra & Mukhopadhyay (2012) *Geol. Soc. London Spec. Publ* 366, 201-208.