
What causes the formation of the Himalayan transverse anticlines? Thermochronology of the Rangit window in the Sikkim Himalaya

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[Poster]

The Gondwana Formation (GF) is a poorly understood lithological unit at the base of the Lesser Himalayan Sequence (LHS), with a poorly constrained Permian age. West of Nepal and East of Bhutan, in the Sikkim region of India, tectonics and perhaps river incision influenced the formation of a double tectonic window revealing micaceous sandstone of the GF in the core. Bounded by the Main Central Thrust (MCT) at the base, and the Ramgarh Thrust in the roof, the area has undergone a great amount of deformation resulting in a transverse antiform of the LHS. Such structures are rare in the Himalayas and one hypothesis states that these structures are the result of interaction between tectonics (Himalayana collision) and focused erosion (incision of the largest Himalayan rivers). Using $^{40}\text{Ar}/^{39}\text{Ar}$ dating of detrital muscovite grains from GF, the provenance of GF and its thermal and structural history will be interpreted. Combined with a concomitant study using other thermochronometers this study will determine exhumation rates in the window and thus help determine the relative importance of focused river incision and localized tectonic deformation. Preliminary ages suggest that the temperatures caused by Tertiary Himalayan metamorphism and tectonic burial were not high enough to reset the $^{40}\text{Ar}/^{39}\text{Ar}$ ages of the muscovite grains. This puts a constraint on maximal temperatures and therefore burial attained by the GF.