Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.8688

Eocene to Miocene metamorphic evolution and tectonic implication of the Ilam Nappe in Nepal Himalaya: Constraints from P–T conditions and monazite petrochronology

TAKESHI IMAYAMA[1], RYUHEI HOSHINO[1], KEEWOOK YI[2] AND RYOICHI KAWABATA[1]

[1]Research Institute of Frontier and Science Technology, Okayama University of Science

[2]Korea Basic Science Institute Ochang

Presenting Author: t.imayama@gmail.com

The Ilam Nappe, consisting of the High Himalayan Crystalline Sequence (HHCS) in far-eastern Nepal, was largely emplaced southward along the Main Central Thrust (MCT). Here we present the P–T–t path of the Ilam Nappe using conventional geothermobarometers, pseudosection modelling, and monazite petrochronology. Amphibole-bearing migmatite just above the MCT experienced prolonged fluid-present melting from a prograde metamorphism at 39–31 Ma to peak upper amphibolite-facies metamorphism (696°C and 10.6 kbar) during 24–19 Ma, followed by cooling. Kyanite-sillimanite migmatites record a prograde metamorphism at 35–28 Ma and peak lower granulite-facies metamorphism (738–760°C and 8.3–9.3 kbar) under kyanite stability via the muscovite dehydration reaction at 25–20 Ma, followed by isothermal decompression under sillimanite stability. The clockwise P–T path and Early-Middle Miocene peak metamorphism of the Ilam Nappe can be correlated to those in the lower-middle HHCS hinterland. The regional prograde metamorphism observed in the Ilam Nappe and the entire HHCS hinterland may represent the timing of the crustal thickening accompanied by overthrusting before the normal faulting of the South Thrust Detachment System (STDS), followed by diachronous extrusions of the upper HHCS along the High Himal Thrust, and of the lower-middle HHCS along the MCT with nappe emplacement. The lower-granulite-facies Ilam Nappe was exhumed during the Early-Middle Miocene from the deeper or lower structural level of the HHCS, compared to the earlier Oligocene exhumation of the upper-amphibolite-facies Karnali and Kathmandu klippes from the shallower or uppermost structural level of the HHCS.