Constraints on the Timing of High Himalayan Unroofing, as Deduced from Detrital Garnets from Sediments of the Kasauli Formation (Lesser Himalaya, N India)

POSTER

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The Subathu, Dagshai and Kasauli Formation sediments are of Lower Tertiary age and document the early stages of India-Eurasia continental collision. Deposited on Indian plate basement rocks in front of the orogen, they became deformed into the Lesser Himalayan thrust stack as the orogen migrated south. The limestones and mudstones of the Subathu Formation are of Palaeocene-Mid Eocene age. They are of shallow marine origin and were deposited between initial and terminal continental collision. The red Dagshai Formation and the grey Kasauli Formation sediments are Mid Eocene-Upper Oligocene and Lower-Mid Miocene aged, respectively. They are sandstones and mudstones, interpreted as fluvial, foreland basin sediments, with palaeocurrent directions indicating flow from the north-west, away from the rising orogen.

Fragmented and complete detrital garnets have been found in the Dagshai and Kasauli Formations. Electron microprobe analytical traverses were made across Kasauli Formation garnets and the results plotted on Ca-Mg-Fe and Mn-Mg-Fe triangular diagrams and compositional profile diagrams. The results were then compared with the work of Arita (1983), Metcalfe (1990) and Staubli (1989) who analysed garnets in the Lesser Himalaya Main Central Thrust zone (footwall) and the High Himalayan Crystallines (hangingwall). All workers found that the garnets in the MCT zone showed 'bell-shaped' compositional profiles which were absent in samples from the Higher Himalayan Crystallines. Presumably this reflects the higher grade of the latter.

Although the detrital garnets from the Kasauli Formation show bell-shaped profiles, and therefore resemble those found in the MCT zone, this does not necessarily mean that the MCT zone was the source for the Kasauli Formation, as similar composition garnets could be present in the Indian craton. It does however, suggest that the high-grade High Himalayan crystallines were not unroofed until post-Kasauli times i.e. post Early-Mid-Miocene. This date for 'unroofing' is in agreement with other workers e.g. Amano and Taira (1992).

References

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