



Onset of rapid exhumation in the Namche Barwa syntaxis

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The evolution of Himalayan syntaxes is debated: they have been subjected to anomalously young (~ 10 Ma) high-grade metamorphism, melting and unusually high rates of exhumation (up to 10 mm/yr), compared to the main arc of the range where peak metamorphism occurred in the Early Miocene and exhumation rates of ≤ 2 mm/yr are more common. The timing of metamorphism and the onset of rapid exhumation of the eastern Namche Barwa syntaxis is poorly constrained. Bedrock studies have been interpreted to imply rapid exhumation since either 3-4 Ma or 8-10 Ma. Previous studies focused on detrital deposits have suggested onset of rapid exhumation in the last 6 Myr. Several models have been proposed to explain the syntaxial evolution, invoking different controlling factors, such as compressive crustal-scale folding orthogonal to the strike of the mountain belt, subduction geometry in the indenter region, or tectonic-surface process interactions and crustal channel flow. In order to understand how and why the syntaxis formed, this study better constrains the exhumation of Namche Barwa using the proximal detrital record of material eroded from the syntaxis by the paleo-Siang River. The recently dated Sibbo-Remi-Siang Siwalik section is located directly downstream of the syntaxis, and is therefore the most likely location to contain these sediments. We report new detrital zircon fission-track, white-mica $^{40}\text{Ar}/^{39}\text{Ar}$ and rutile U-Pb data, together providing a more precise age for the onset of rapid exhumation of the eastern syntaxis. Our results, along with published data from bedrock and detrital data from the eastern syntaxis region are incorporated in a 1D version of the thermokinematic model Pecube, to reconstruct the syntaxis evolution from Miocene to present day.