Thermochronology 101: Using temperature-sensitive stopwatches to measure Himalayan erosion

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Abstract

Rock deformation, heat, and erosion interact over millions of years to shape the evolution of landscapes and mountain systems. Thermochronology (the study of rock thermal histories) is a remarkable tool for determining the rates of these processes. Similar to the way carbon-14 acts like a stopwatch that starts ticking when a plant dies, thermochronometer stopwatches start ticking when a mineral cools below a certain temperature. Time recorded by thermochronometers defines the cooling histories of rocks on the surface, and because temperature increases with depth in the Earth, cooling histories can be interpreted in terms of a region's erosional or faulting history. This Common Hour, we will explore how these tools are being used to investigate the relative influence of climate change and tectonic forcing on erosion in the Nepal Himalaya.