



Quantitative geomorphology of the White Mountains (California) using detrital apatite fission track thermochronology

P. Vermeesch (1)

(1) Isotope Geology and Mineral Resources, ETH-Zurich (pieter.vermeesch@erdw.ethz.ch)

Detrital thermochronology has been proposed as a method for measuring average basin-wide erosion rates. Using low temperature thermochronometers such as apatite fission tracks (AFT), it is now also possible to map out where in a basin erosion takes place. Five samples of detrital AFT ages were collected on an alluvial fan that is fed by the Marble Creek drainage basin in the northern White Mountains (California). Using a digital elevation model to characterize the basin's "shape" and a few published basement samples to constrain the age-elevation curve of the catchment, the detrital AFT distribution was predicted. Comparing the observed with the predicted "Cumulative Age Distributions" (CADs) reveals that the currently active Marble Creek is fed by localized rock fall events, but the erosion rates integrated over the entire alluvial fan evince steady erosion over somewhat longer time periods. The method can be readily extended to the (U-Th)/He chronometer, promising better precision and potential applications to (paleo-)relief estimation.