

Quantifying the erosional response to tectonic forcing: Be¹⁰ Catchment average erosion rates from the Taupo Rift, New Zealand.

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While it has long been known that denudation is greater in tectonically active areas, few studies have explicitly compared the relationship between uplift rates, catchment average erosion rates and fluvial geomorphic indices (i.e., the normalised steepness index, k_{sn}). Here we present data from the actively extending Taupo Rift (North Island, New Zealand). At the southern end of the Taupo Rift, NE-striking faults primarily delineate the rift margins, uplifting the Kaimanawa Mountains to the east at around 1 mmyr^{-1} . Geologic mapping and topographic analysis indicates that the Kaimanawa Mountains are a tilted fault block, allowing the extrapolation of the uplift rate across the study area. River long profiles were extracted for the whole area and contain both vertical step knickpoint associated with lithologic variation and slope-break knickpoints high up in the catchments, probably related to the initiation of faulting and also base level changes in Lake Taupo. Samples for Be¹⁰ catchment average denudation rate determination were collected both along the strike of the NE-SW trending faults and across the fault block. The three datasets show strong correlations and demonstrate the utility of combing different approaches to understand the geomorphology and geology of actively deforming regions.