



## **Uplift and denudation rates of an actively growing mountain range inferred from *in-situ* produced cosmogenic $^{10}\text{Be}$ : the Yumu Shan (NE Tibetan Plateau)**

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Located in the foreland of the Qilian Shan (NE Tibet), the Yumu Shan is an isolated mountain range bounded by an active NW-SE striking thrust fault. Geomorphic and structural features such as fault scarps and wind gaps suggest that the  $\sim 70$  km long range is actively growing (Hetzel *et al.*, 2004; Tapponnier *et al.*, 1990), hence the tectonic uplift should exceed the rate of denudation. Here we quantify the rate of these two competing processes using *in-situ* produced cosmogenic  $^{10}\text{Be}$ . Catchment-wide denudation rates are derived from  $^{10}\text{Be}$  concentrations in stream sediments, whereas rock uplift rates are obtained by combining scarp topographic profiles with dating of geomorphic surfaces deformed by active thrust faults at the Yumu Shan mountain front. Both denudation and rock uplift rates integrate over a similar temporal scale ( $\sim 10$ -100 ka) and thus over many earthquake cycles. Our data document that catchment wide-denudation rates vary from  $\sim 100$  to  $\sim 400$   $\text{mm ka}^{-1}$  as a function of morphology and lithology, while rock uplift takes place at the rate of  $\sim 0.7$   $\text{mm ka}^{-1}$ . The difference between these values confirms that the Yumu Shan is in a topographic pre-steady state and in accordance with geomorphic and structural features. Tectonic features indicate that over few millions of years the Yumu Shan may rise to a similar height as the main ranges of the Qilian Shan farther south, which have peaks with elevations between  $\sim 5$  and  $\sim 5.5$  km.

### References:

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