



Denudation rates across climatic zones and vegetation gradients in Western South America

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Previous studies investigating vegetation effects on denudation have proved challenging due to poorly understood interactions between vegetation and other factors such as precipitation and surface processes. The results from this study quantify where vegetation and precipitation thresholds influence millennial time scale denudation rates along a 3,500 km transect of the extreme climate and vegetation gradient of the Andean Western Cordillera (6°S to 36°S latitude). Unique to our approach is the consideration of very large (continental scale) transect of new and existing denudation rates measurements that identify thresholds and non-linearities in vegetation-denudation interactions. We do this using 94 cosmogenic radionuclide-derived denudation rates and multivariate statistics. Based on the trend in correlation coefficients with varying precipitation, vegetation cover and local slope we identify different zones, separated by two distinct thresholds, where the effects of vegetation cover on denudation exhibits either an increasing or decreasing correlation with denudation rates. Vegetation influences catchment-averaged denudation rates by stabilizing hillslopes and accelerating weathering.