



10Be-inferred paleoerosion history from >10-Ma-old fluvial deposit in northernmost Chile

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We report a tenfold increase in catchment-wide paleodenudation rates at ca. 11 Ma in the western Central Andes, as inferred from terrestrial cosmogenic nuclide concentrations recorded in mid-Miocene fluvial sediments. The timing of Andean uplift and its possible links to paleo-climatic changes, represent a matter of long-standing debate. One of the proposed scenarios involves an episode of rapid uplift during the Late Miocene, paired with a shift from arid to hyperarid conditions in the western forearc. The El Diablo formation found in northern Chile (ca. 19°S) comprises fluvial mudstones, sandstones and conglomerates deposited between 17-11 Ma, and may constitute a continuous sedimentary archive of the mentioned tectonic and paleo-climatic event.

We measured cosmogenic ^{10}Be concentrations in quartz extracted from 10 units of the El Diablo Formation, whose ages are known through magnetostratigraphy. We estimated the postdepositional concentration and subtracted it from the measured signals, in order to isolate the inherited signal, which we used to infer catchment-wide denudation rates at the time of deposition. Results provide unprecedented insights into the Late Miocene erosional history of the western Central Andes, as they suggest a sharp increase of the denudation rates from ca. 1 m/Myr to >10 m/Myr at roughly 11.1 Ma. This erosional pulse is thus coeval and consistent with a shift from ephemeral to perennial discharge inferred from the sedimentology of the deposit.