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Basin wide erosion rates in the central and northern Tibetan Plateau estimated using in-situ produced ^{10}Be concentrations from river sediments

is part of the Paper Session:

Environmental Change and Human Adaptation on the Tibetan Plateau - II: Environmental Change and Landform Evolution

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Abstract:

The long-term erosion pattern of the Tibetan Plateau and its bordering mountains is critical to understand the interaction between climate, tectonic movement, and landscape evolution. This study presents a new dataset of basin wide erosion rates in the central and northern Tibetan Plateau derived using in-situ produced ^{10}Be concentrations of river sediments from a wide range of watersheds (1.5 to 80,000 km^2). Erosion rates in the central plateau (relatively flat plateau surface) are 10-40 mm/kyr, indistinguishable from nearby published site specific erosion rates measured from bedrock surfaces. In contrast, erosion rates from the northern margin (Kunlun Mountains) are much higher (> 100 mm/kyr), consistent with the studies from the southern margins of the plateau, but are lower than nearby published site specific erosion rates from bedrock surfaces. These results suggest a long-term equilibrium between site specific erosion and basin wide integrated erosion in the central part of the plateau where different portions of the landscape are denudated at a similar rate to keep a relatively stable and gentle relief. On the contrary, the fluvial incision in the northern margin of the plateau is still in a responding stage to the uplift of the plateau and Kunlun Mountains.

Keywords:

Basin wide erosion rate, Tibetan Plateau, Landscape evolution, Cosmogenic nuclides