



Erosion of the NE Tibetan Plateau based on Be-10 in river sediments

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The Tibetan Plateau is a massive topographic feature whose uplift and erosion may have caused the global cooling trend resulting in Quaternary glaciations. Studies of landscape erosion that might confirm high rates of erosion have almost exclusively focused on the high-relief plateau margins. We report basin-wide erosion rates based on cosmogenic nuclides in river sediments from the Bayan Har Shan region of the northeastern Tibetan Plateau characterized by a low-relief and formerly partly glaciated plateau surface fringed by steep fluvial valleys. We sampled river sediments from a range of landscapes including steep fluvial valleys, low-relief never-glaciated plateau surfaces, and glacially eroded landscapes. Be-10 measurements of sediments from these 22 basins reveal a large group of modest erosion rates (7-40 mm/ka) and two basins along the plateau margin with higher erosion rates (100 mm/ka). This finding, that basins within the steep fluvial landscape generally have higher erosion rates than basins on the low-relief plateau surface, confirms previous geomorphological interpretations based on geomorphological analysis. Low erosion rates (10-17 mm/ka) in river sediments derived from Bayan Har Shan glacial landscapes indicate that very limited glacial erosion occurred during the last 35-60 ka, in line with glacial exposure ages indicating long periods of ice-free conditions, including minimal glaciation during the global last glacial maximum. The spatial pattern of erosion rates indicates that the interior Tibetan Plateau surface is a slowly eroding 'relict' plateau surface and that fluvial incision along the plateau margins dominates landscape evolution and sediment delivery to marginal basins and seas.