



Rock glaciers and the sediment dynamics in arid mountain belts

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Rock glaciers are common periglacial features in highest elevations of semiarid to arid mountain ranges. Rock glaciers predominate in realms where precipitation values fall below thresholds that allow for ice glacier formation, then even outranging ice glaciers in size and number.

The influence of ice glaciers on high-mountain's sediment dynamics is manifold: ice-glacier-driven erosion produces large amounts of clastic material; ice glaciers act as a conveyor belt for sediments, delivering material from their source regions to their terminus; ice glaciers entering trunk valleys form efficient dams that interrupt sediment delivery. While these mechanisms have been addressed in numerous earlier studies, the role of rock glaciers for the sediment dynamics of arid mountain belts remains elusive.

We address this shortcoming by analysing a rock glacier inventory that we compiled for the Himalaya-Karakoram ranges and the Tien Shan ranges in Central Asia. Our inventory comprises more than 1000 specimen, a large number of which form dams of large trunk rivers and minor tributaries, disconnecting the sediment fluxes from upstream. In certain regions that are nearly devoid of ice-glaciers, like the Gamugah surface of NW Pakistan, rock glaciers of >104-m length occupy valley bottoms entirely, constituting the only mode of transport for sediments produced in headwaters. In conclusion, we call for a better understanding of the role that rock glaciers take in the sediment dynamics of arid mountain belts.