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Geomorphic impacts, age and significance of two giant landslide dams in the Nepal Himalayas: Ringmo-Phoksundo (Dolpo District) and Dhampu-Chhoya (Mustang District).

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Large catastrophic slope failures have recently retained much attention in the northern dry Himalayas (1). They play a prominent role in the denudation history of active orogens at a wide range of spatial and time scales (2), and they impact durably landforms and process evolution in upstream catchments. Their occurrence mostly results from three different potential triggers: earthquakes, post-glacial debuttressing, and permafrost melting. We focus on two examples of giant rock slope failures that occurred across and north of the Higher Himalaya of Nepal and assess their respective influence on the regional, geomorphic evolution.

The Ringmo rockslide (4.5 km3) results from the collapse of a mountain wall (5148 m) cut into palaeozoic dolomites of the Tethysian Himalayas. It caused the damming of the Suli Gad River at the origin of the Phoksumdo Lake (3600 m asl). The presence of glacial till at the very base of the sequence suggests the rockslide event is post-glacial, a field assumption confirmed by cosmogenic dating. Two consistent 36Cl ages of 20,885 $\pm$1675 argue for a single, massive event of paraglacial origin that fits well with the last chronologies available on the Last Glacial Maximum in the Nepal Himalaya. The persistence of the Phoksumdo Lake is due to its dam stability (i.e. high lime content of landslide components) and to low sediment flux from the arid, upper Suli Gad catchment.

The Dhampu-Chhoya rock avalanche (about 1 km3, area extent 10 km2) was derived from the northward failure of the Kaiku ridge, uphold by north-dipping, upper crystallines of the Higher Himalaya. It dammed the Kali Gandaki River, with complex interactions with the Late Pleistocene ice tongues derived from the Dhaulagiri (8167 m) and Nilgiris (7061 m) peaks. Both the rock avalanche and glaciers controlled the existence and level of the "Marpha Lake" (lacustrine deposits up to Kagbeni). Again, consistent 10Be ages of 29,680 $\pm$ 1015 ka obtained from two large blocks (>1000 m3) suggest a single event, in full agreement with other 10Be dates obtained by a different team from the same site (3). This latter event occurred during glaciation, and was likely triggered in connection with the North Himalayan Fault and/or Thakkhola fault activity. Post-landslide dam evolution includes rapid dissection of lacustrine deposits (4), yet the braided pattern of the Kali Gandaki evidence the delay in headward erosion caused by landslide dam persistence.

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