

Glacial landforms and deposits of the Bayan Har Shan, NE Tibetan plateau – a dataset for reconstructing the extent of former glaciations

Jakob Heyman¹, Arjen P. Stroeven¹, Clas Hättestrand¹, Helena Alexanderson¹, Yingkui Li², Jon Harbor³, Marc Caffee⁴, Liping Zhou⁵, Daniel Veres¹

- (1) Department of Physical Geography and Quaternary Geology, Stockholm University
- (2) Department of Geography, University of Missouri-Columbia
- (3) Department of Earth and Atmospheric Sciences, Purdue University
- (4) Purdue Rare Isotope Measurement Laboratory, Purdue University
- (5) Department of Geography, Peking University

Glacial reconstructions of the Tibetan plateau range from a plateau-scale ice sheet to restricted valley glaciers and ice caps. However, the Tibetan glacial landforms and sediments – although forming a crucial tool for paleoglaciological reconstructions – have rarely been mapped for larger areas. We here present data on the glacial landforms and deposits in the Bayan Har Shan area on the northeastern Tibetan plateau, previously suggested to have nourished the most extensive Quaternary Tibetan ice mass. Detailed geomorphological mapping based on remote sensing and extensive field studies reveal a generous array of glacial landforms and deposits, indicating former glaciers of varying extent. Large scale glacial landforms mapped from a digital elevation model and satellite imagery are abundant in elevated mountain blocks. The mapped landforms testify of alpine style glaciation but lend no support to the existence of any ice sheet. Field observations of glacial, and non-glacial, deposits further enhance the dataset concerning former glacial extent. Tills and erratic boulders are present within the glacial landscape based on remote sensing, but in several localities they also exist further down some distance outside mapped glacial landforms. There is a notable absence of glacial deposits around the Huang He valley and in the northern part of the study area, where they have previously been reported as evidence of a paleo-ice sheet. We argue for a non-glacial origin of deposits in these areas, because we have not found any indications of a glacial origin. The mapped landforms and deposits display an interesting dataset for paleoglaciological reconstructions. While the glacial landforms from remote sensing – by virtue of completeness covering extensive areas – present a good image of the more restricted glaciations, the identified most extensive glaciation is so far only recorded as point data in the form of glacial deposits.