Tracing glacier wastage in the Northern Tien Shan (Kyrgyzstan/Central Asia) over the last 40 years

Peter Niederer - Centre for Development and Environment (CDE), NCCR North–South, University of Berne, Bern, Switzerland

Viktor Bilenko - Kyrgyz-Russian Slavic University, Bishkek, Kyrgyzstan

Natasha Ershova - Kyrgyz-Russian Slavic University, Bishkek, Kyrgyzstan

Hans Hurni - Centre for Development and Environment (CDE), NCCR North–South, University of Berne, Bern, Switzerland

Sergeji Yerokhin - State Agency on Geology and Mineral Resources, Bishkek, Kyrgyzstan

Daniel Maselli - Centre for Development and Environment (CDE), NCCR North–South, University of Berne, Bern, Switzerland (daniel.maselli@cde.unibe.ch)

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ABSTRACT

The status and dynamics of glaciers are crucial for agriculture in semiarid parts of Central Asia, since river flow is characterized by major runoff in spring and summer, supplied by glacier- and snowmelt. Ideally, this coincides with the critical period of water demand for irrigation. The present study shows a clear trend in glacier retreat between 1963 and 2000 in the Sokoluk watershed, a catchment of the Northern Tien Shan mountain range in Kyrgyzstan. The overall area loss of 28% observed for the period 1963–2000, and a clear acceleration of wastage since the 1980s, correlate with the results of previous studies in other regions of the Tien Shan as well as the Alps. In particular, glaciers smaller than 0.5 km^2 have exhibited this phenomenon most starkly. While they registered a medium decrease of only 9.1% for 1963–1986, they lost 41.5% of their surface area between 1986 and 2000. Furthermore, a general increase in the minimum glacier elevation of 78 m has been observed over the last three decades. This corresponds to about one-third of the entire retreat of the minimum glacier elevation in the Northern Tien Shan since the Little Ice Age maximum.