Submitted Abstract

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First Author First Name Last Name	 Eric (1) Pohl
Submitting Author First Name Last Name	 Eric Pohl
Correspondence	eric.pohl@unifr.ch
Co-Authors **>> E-Mails will be not listed**	Barandun, Martina (2)
Organisations	1: Alpine Cryosphere and Geomorphology Group, Department of Geosciences, University of Fribourg, Fribourg, Switzerland 2: Institute of Earth Observation, EURAC research, Bolzano, Italy
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Abstract

A picture of strong heterogeneous mass balance variability over Central Asia was previously identified using a snowline observation-based mass balance modelling approach. The high temporal (annual) resolution of this approach provides the possibility to investigate the spatio-temporal patterns of mass balance variability in addition to the purely spatial heterogeneity previously reported for the region based on geodetic methods. The dataset allows investigating the relationship between mass balance and potential meteorological drivers over time. However, large uncertainties in meteorological datasets, due to lack of precise ground truthing, renders this investigation difficult. We present an in-depth analysis using multiple, frequently used reanalysis and satellite-based snow cover datasets, as well as topographic parameters in multiple linear regression analyses to identify spatial and temporal mass balance variability relationships with climatic and static drivers. Based on the chosen meteorological data, the derived relationships can vary significantly and prevent conclusive understanding. We extend this study by incorporating mass balance estimates from a recent geodetic study to highlight the range of possible conclusions that can be drawn, and, that great care should be taken when concluding driving factors of mass balance variability.