

Distributed modelling of snow- and ice-melt in the Lhasa River basin from 1971 to 2080

MONIKA PRASCH¹, MARKUS WEBER² & WOLFRAM MAUSER¹

¹ *Department of Geography, Ludwig-Maximilians-Universität Munich, Luisenstraße 37, 80333 Munich, Germany*
m.prasch@lmu.de

² *Commission for Glaciology, Bavarian Academy of Sciences, Alfons-Goppel-Straße 11, 80539 Munich, Germany*

Abstract The contribution of melt water release from snow and ice to water availability in mountain regions and adjacent forelands can often only be roughly assessed with simple models, because only sparse data are accessible. The impact of global climate change on water availability thus is afflicted with large uncertainties. We present a distributed modelling approach to determine the contribution of snow- and ice-melt to runoff at a regional scale in the Himalayan basin of the Lhasa River in Tibet under past and future climatic conditions. To fulfil the complex input data requirements, publicly available data are used. The successful validation of the model results for the past proves the application of the approach even in remote regions. Under IPCC SRES A2 climatic conditions with constant precipitation snowmelt will clearly decrease, whereas changes in ice-melt are small, although glacier retreat continues. However, runoff is reduced because of increasing evapotranspiration.

Key words snowmelt; glacier ice-melt; mountain hydrology; climate change; sparse data; Lhasa River, Tibet