

Comparison of satellite-based and re-analysed precipitation as input to glacio-hydrological modelling for Beas River basin, northern India

LU LI^{1,2,3}, MARKUS ENGELHARDT¹, CHONG-YU XU^{1,4}, SHARAD K. JAIN⁵ & V. P. SINGH⁶

1 Department of Geosciences, University of Oslo, Norway
lu.li@geo.uio.no

2 Uni Climate, Uni Research, Bergen, Norway

3 Bjerknes Centre for Climate Research, Bergen, Norway

4 Department of Earth Sciences, Uppsala University, Sweden

5 Department of Water Resources Development and Management, Indian Institute of Technology, Roorkee, India

6 Department of Civil and Environmental Engineering, Texas A&M University, Texas, USA

Abstract Precipitation is the most critical input for hydrological models. In this paper we evaluate the usefulness and reliability of re-analysed and satellite-based precipitation datasets in driving a large-scale hydrological model for the Beas River basin, a mountainous region in northern India. The spatial and temporal distribution of gridded precipitation in India is compared with raingauge measurements by using three statistical tests. Then a large-scale glacio-hydrological model (GSM-WASMOD), which couples WASMOD-D and a glacier mass-balance module, is applied for the basin. The three precipitation datasets are used to drive the large-scale GSM-WASMOD for simulating the water balance of the Beas River basin for the period 1997–2001. The model results are compared and assessed based on Nash-Sutcliffe efficiency (NS) and relative volume error (VE). On average, the global gridded satellite-based dataset performs as well as the sparse raingauge data in this region, indicating that the satellite-based dataset can be used as a data source for water resources in basins with little or no ground-based measurements.

Key words global datasets; TRMM; WFD; large scale Glacier and Snow Melt – WASMOD model; raingauge