



Comparison of different gridded precipitation data sets over a sub-region of High Mountain Asia

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Precipitation is an important component of the water cycle of High Asia and here particularly crucial for the glacier mass balance and the seasonal dynamics of snow cover. To successfully model (i) past and future response of glaciers to climate forcing and (ii) the development of snow cover, reliable precipitation data are needed. However, this is especially difficult in high mountain areas where observational data, particularly at higher and complex terrain, are scarce. Beyond station data, other, spatial explicit data sources for precipitation are (i) simulated rainfall from models and (ii) retrievals from weather satellites. While precipitation patterns are highly heterogeneous in both, time and space they are difficult to simulate correctly. With satellite data on the other hand, the assignment of rates of liquid and especially solid precipitation is yet uncertain. To assess the differences among the several precipitation data sets, we compare selected accessible gridded data sets in High Mountain Asia. We present a comparison of five precipitation products (ERA-Interim, ERA5, HAR, JRA-55 and MERRA-2) and one satellite-based precipitation product (IMERG) for the period of April 1st to October 31st, 2014. The study area (80-87°E and 28-31°N) includes parts of India, a part of the Himalayas and parts of the Tibetan Plateau. The main statistical metrics used for comparison are the correlation coefficients r of different data sets and the corresponding coefficients of determination r^2 for different methods of temporal and spatial data aggregation. We further compare the data sets to existing observational data available to the public.