

Estimation of mass change of glaciers using a precipitation data set with fine spatial resolution in High Mountain Asia

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In High Mountain Asia, estimates of glacier mass change using reanalysis, glacier models or GRACE still have uncertainty. To estimate glacier mass change in High Mountain Asia glacier models have important roles because there are sparse mass balance observations of glacier and also this region is intensive irrigated area.

Results of glacier models are critically sensitive to the quality of precipitation input. In addition, accumulation of glaciers in High Mountain Asia is driven more by high precipitation than other colder regions. Although, there are large spatial variations of precipitation on glacier mountain areas, reliable precipitation data is not well established in these areas because this remote region lacks a dense gauge network.

In this study, we developed a precipitation data set with high spatial resolution as input precipitation for a glacier model. And we calculated glacier mass change using the glacier model and evaluated the effect of spatial distribution of precipitation for glacier mass change. The precipitation data set with fine special resolution from 1998 to 2007 at daily time scales using satellite radar observation and rain gauge observation has developed. We basically used satellite observed precipitation data with 4-km spatial resolution, which directly estimates precipitation well even in high mountain area. And then we combined the satellite based data and gridded data on the basis of rain gauge observation with daily time step. Finally, we will show the results of examination of glacier mass change calculation by different precipitation data sets.

Keywords: glaciers, mass change, precipitation radar, spatial resolution