

Precipitation and its variability in high elevation areas of the Nepal Himalayas

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A hydrologic cycle in the Himalayas is characterized by high orographic precipitation along the slopes, glaciers and many headwaters of the major rivers, which provides water resources for millions of peoples in the major Asian river basins. Precipitation in high elevations area (> 3000 m) of the Himalayas plays an important role in maintaining the high mountain hydrologic cycle. Most of precipitation in central and eastern Himalayas is brought in summer monsoon season. However, how much precipitation falls around the glacier area is not yet well known despite its importance.

In order to better understand precipitation in the high elevation area and mechanisms of its variability, we started an international collaborative research on precipitation in the Himalayas in October 2018. Our research project performs a comprehensive research based on *in-situ* observations including glacier sites, satellite remote sensing (e.g., TRMM, GPM and CloudSat), large-scale and regional-scale data analyses (e.g., ERA5) and numerical simulation by cloud-resolving models (e.g., WRF and CReSS). We focus on the two observation sites around the Rolwaling Valley in eastern Nepal and the Bhimthang Valley in central Nepal where automatic weather stations (AWSs) have been installed closed to or on the glaciers since 2016. We newly installed other six rain gauges along the Rolwaling valley at the different elevation in May 2019. Here, we will introduce the ongoing research project and some preliminary results.