

Precipitation patterns, snow and glacier response in High Asia and their variability on sub- decadal time scales

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The Tibetan Plateau (TP) is known as the 'Asian water tower' highlighting the unique features of this area with its large amount of glaciers and being the main source of Asian rivers. One fifth of the world's population depends on the water supply of these rivers. The impact of climate change on the precipitation distribution on the TP is not well understood due to its heterogeneous terrain and the complex interaction of various circulation patterns. Transient precipitation events like mid-latitudinal fronts and locally orographic lifting of air masses also affect precipitation amounts in this area.

However, data scarcity and the lack of high elevated station observation data challenge the compilation of high resolution gridded precipitation datasets that would allow to analyze the precipitation processes and the influencing circulation patterns over the TP in more detail.

Satellite-based precipitation retrievals can provide area-wide information about the precipitation processes and circulation patterns in a high spatiotemporal resolution. The second generation of GEO VIS/IR systems enhanced the spatial, temporal and spectral resolution of data available for precipitation retrieval. Based on this gain of information, the aim of this project is to understand precipitation variability on the TP by compiling an enhanced precipitation retrieval product in a high spatiotemporal resolution on the TP using GEO data of second generation data. A central aspect is the differentiation between precipitation and snow since snow is an important parameter for glacier mass balances and the hydrological cycle on the TP. The new precipitation retrieval will provide information about the precipitation processes in High Asia and their links to the atmospheric circulation. The precipitation is retrieved using a machine learning approach like random forest which combines the different GEO channels, a cloud mask and GPM (Global Precipitation Measurement Mission) data. The validation of the new precipitation retrieval is performed against independent GPM data.

The poster presents first results of the random forest model output, the first precipitation retrieval and further steps to improve the retrieval.