

Intercomparison of the relationship between precipitation and elevation among gridded precipitation datasets over the Asian region

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Precipitation is strongly affected by topography. Orographic precipitation, which is forced by topography, is useful as water resources for human societies and is often harmful as natural disasters such as flooding. It is, therefore, important to estimate precipitation amount quantitatively over mountain regions and to understand its characteristics such as intensity and frequency. Climate models are a useful tool to project future climate change. Therefore it is necessary to validate their reproducibility of precipitation in terms of not only its amount and spatial distribution but also its characteristics. However, observed precipitation datasets, which are derived from rain gauges, satellites or their combination, have not been sufficiently validated in terms of quantitative accuracy and precipitation characteristics. We conducted an intercomparison of the relationship between precipitation and topography among sixteen gridded precipitation datasets (rain-gauge based [6]; satellite based [8]; their combination [2]). In this study, we focused on the intercomparison of the relationship between precipitation and elevation. An analysis of the vertical distribution of mean and accumulated precipitation shows that the spread of the difference of precipitation among rain-gauge based datasets is smaller than that among satellite-based datasets and the differences between them have a seasonality. The analysis for heavy precipitation defined by 95 percentile of daily precipitation shows features similar to those for mean precipitation. Results also indicate that some improvements are needed for a better estimation of terrestrial precipitation by satellite not only quantitatively but also qualitatively.