

High Latitude Precipitation Analysis and Considerations in the Latest GPCP products (V3.2)

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Difficulties in accurate quantification of precipitation has limited observational evidence for high latitude hydrological acceleration during the past few decades. Here we assess various precipitation products over cold regions in high latitudes and near the poles. The assessment includes products from the Global Precipitation Measurement (GPM) mission and the Global Precipitation Climatology Project (GPCP) and is performed using various resources including gauge stations, ground radar, and other related observations such as SNOTEL, mass change, and snow depth. The analyses are also performed as a function of environmental variables such as near surface air temperature and total precipitable water for further error diagnosis and analysis. Here we summarize the outcomes of few recent studies in high latitudes and cold regions. We show how measurements made available by recent observation from GPM, CloudSat, and GRACE have added insights to guide the development of the next version of products such as GPCP. We will also quantify changes that these modifications bring to the global precipitation amounts and distribution. In particular, starting with GPCP V3.1, observations from TRMM, GPM, and CloudSat are integrated into GPCP through the development of the Tropical Combined Climatology (TCC) used at lower latitudes and the Merged CloudSat, TRMM, and GPM (MCTG) climatology used over the extra tropics and higher latitudes. The outcome suggests considerable changes over the oceans, especially around 40°S-60°S. Starting from GPCP V3.2, analysis based on GRACE and other observations led to modification of methods used for bias adjustment of precipitation undercatch in rain gauges. GPCP V3.2 also provides higher spatial (0.5°x0.5°) resolution than the previous GPCP V2.3 (2.5°x2.5°) product. It is believed that the type of assessment presented here can complement traditional evaluation methods as it also considers consistency of the component of the water budget in the assessment. More examples and case studies will be provided in the presentation.