The Newly Released Daily and Monthly GPCP V3.3 and efforts towards GPCP V4

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Abstract:

The Global Precipitation Climatology Project (GPCP) provides a widely used satellite–gauge merged precipitation dataset designed to meet Climate Data Record (CDR) standards for long-term consistency and homogeneity. The latest release, Version 3.3 of the GPCP Monthly (1983–2024) and Daily (1998–2024) products, issued in February 2025, represents the final generation before the transition to GPCP Version 4. This presentation summarizes the V3.3 products and their satellite–gauge inputs, compares them with Version 3.2, and highlights major updates. It also includes evaluations over the global oceans using Passive Aquatic Listeners (PALs), buoys, and atolls, assessments over sea ice using snow-depth data from ICESat-2, CryoSat-2, and ERA5, and analyses over Antarctica using CloudSat and GRACE, together with insights from GPM Version 07. Key upgrades in GPCP V3.3 include adoption of GPROF 2021 for passive microwave retrievals, a revised ocean climatology based on updated GPM and TRMM radar and microwave data, sensor-specific adjustments to GPROF-calibrated PERSIANN-CDR, and the introduction of a new absolute bias error variable. Relative to V3.2, V3.3 shows an approximately 11% increase in global ocean precipitation and a 9% global increase, driven mainly by ocean changes, while land precipitation changes are small (about 1%). Initial ocean evaluations using limited in situ data indicate a slight overestimation in V3.3, although energy-budget closure supports the overall increase. Interannual variability is also slightly larger, while regional and global precipitation trends remain largely unchanged. Enhancements in the GPCP V3.3 Daily product stem from updates to the Monthly analysis and incorporation of IMERG V07B Final Run, which uses GridSat to extend daily coverage back to January 1998 through May 2000. The presentation concludes with plans for GPCP V4, emphasizing higher spatial resolution, reduced latency, and more advanced retrieval and gauge-analysis techniques. In support of these goals, and in addition to several updates, two new products have been developed for incorporation into GPCP V4, which we briefly introduce here: (1) the Climate Hazards Global Precipitation from Stations (CHGPS) dataset, a global land-only, gauge-based precipitation product covering 60°S–90°N from 1900 to the present, in which the 0.05° monthly product merges the GPCC 0.25° full analysis with Climate Hazards Precipitation with Stations (CHPS) to leverage the complementary strengths of the GPCC and CHC station networks; and (2) the University of Arizona High-latitude Infrared-based Precipitation Analysis Version 2 (UA-HIPA), which provides consistent long-term precipitation estimates from AVHRR back to 1981 and improves sampling, accuracy, spatial resolution, and temporal consistency of satellite-based precipitation over high latitudes.