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The Global Precipitation Climatology Centre (GPCC) - in situ observation based precipitation climatology on regional and global scale

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The Global Precipitation Climatology Centre (GPCC, http://gpcc.dwd.de) provides global monthly precipitation analyses for monitoring and research of the earth's climate. The centre is a German contribution to the World Climate Research Programme (WCRP), to the Global Climate Observing System (GCOS), and to the Global Earth Observation System of Systems (GEOSS). It contributes to water resources assessments, flood and drought monitoring, climate variability and trend analyses. GPCC published in year 2008 a new global precipitation climatology as well as a reanalysis of its full data base for all months of the period 1901-2007.

The GPCC data base comprises monthly precipitation totals from more than 70 000 different stations in the world. It produces gridded data sets of monthly precipitation on the earth's land surface derived from raingauge based observation data. Intensive quality control of observation data and station metadata ensures a high analysis quality.

The different GPCC products are adjusted to different user needs. It routinely produces 2 near real-time precipitation monitoring products. Its 2 non real-time products are updated at irregular time intervals after significant updates of its observation station database. All GPCC products can be visualised and accessed free of charge via Internet from http://gpcc.dwd.de.

The GPCC First Guess Product of the monthly precipitation anomaly is based on synoptic weather reports (SYNOP) from about 6,300 stations worldwide received near real-time via the WMO Global Telecommunication System (GTS). The product is available within 5 days after end of an observation month. Main application purpose is near real-time drought monitoring. The product uses since mid 2008 the new GPCC monthly precipitation climatology as analysis background. Spatial product resolution: 1.0° and 2.5°.

The GPCC Monitoring Product of monthly precipitation is based on SYNOP and monthly CLIMAT reports received near real-time via GTS from about 8,000 stations. It is available within about 2 months after end of an observation month. The analyses are based on automatic and manual quality-control (QC) of input data and related station metadata. The GPCC Monitoring Product is the in situ component to the satellite-raingauge combined precipitation analyses of GPCP and CMAP. It also supports regional climate monitoring in context of WMO RA VI and EUMETNET. The product uses since mid 2008 the new GPCC monthly precipitation climatology as analysis background. Spatial product resolution: 1.0° and 2.5°.

The GPCC Full Data Reanalysis Product is of higher accuracy compared to the GPCC near-realtime products mentioned above. Thus its application is recommended for hydrometeorological model verification and water cycle studies. This analysis product is based on all stations, near real-time and non real-time, in GPCC's data base with precipitation data for the individual month. Since end of September 2008 the updated Version 4 of this product is ready based on a significantly enlarged database, which enabled an extension of the analysis period to 1901-2007. The product uses the new GPCC monthly precipitation climatology as analysis background. Spatial product resolution: 0.5°, 1.0° and 2.5°.

The GPCC 50-Year Dataset VASClimO is based on data being selected with respect to a (mostly) complete temporal data coverage and homogeneity of the time-series. These long-term climatological analyses of homogenised area-averaged precipitation time-series are of special interest for GCOS and contributed to the IPCC Fourth Assessment Report WG I. VASClimO Version 2 is planned to be ready until mid 2009 based on a significantly enlarged database, which will enable an extension of the analysis period to 1951-2005. Spatial product resolution: 0.5°, 1.0° and 2.5°.

Since May 2008 a new GPCC global monthly precipitation climatology is available, based on data from more than 50,000 different stations worldwide with at least 10 years of data. Data sources for the gridded analyses are the normals collected by WMO, normals delivered by the countries to the GPCC, and normals calculated from data time-series available in the GPCC database. The new climatology enabled GPCC to change its analysis method now using the climatology as background for its near real-time and non real-time precipitation analyses. This further improves the representation of orography in areas with poor station density. Spatial product resolution of the climatology: 0.25°, 0.5°, 1.0° and 2.5°.

GPCC plans for additional products take into account the availability of new precipitation products based on remote sensing EO technologies like satellites and weather radar. The development of a daily near real-time precipitation monitoring product is in preparation based on combination of GPCC analyses with the satellite-based precipitation products of HOAPS (Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data, http://www.hoaps.org), which are operationally processed by the EUMETSAT Climate Monitoring Satellite Application Facility (CM-SAF) hosted at DWD. Further down the road is the development of climatological regional hourly precipitation analysis products using weather radar based quantitative precipitation estimates online adjusted with measurements from automatic precipitation observation stations.