Gridded analysis products and quality control provided by the Global Precipitation Climatology Centre (GPCC)

M. Ziese, U. Schneider, A. Meyer-Christoffer, P. Finger, K. Schamm, A. Becker, B. Rudolf
Deutscher Wetterdienst, Global Precipitation Climatology Centre, Offenbach/M., Germany, (gpcc@dwd.de)

The Global Precipitation Climatology Centre (GPCC) has been established in 1989 on request of the WMO. It is operated by Deutscher Wetterdienst (DWD, National Met. Service of Germany) as a German contribution to the World Climate Research Programme (WCRP). Mandate of the GPCC is the global analysis of monthly precipitation on the earth’s land-surface based on in-situ rain gauge data. The data set has continuously grown in temporal coverage (original start of the evaluation period was 1986), as well as in extent and quality of the underlying data base (Figure 2).

Data Base
The GPCC receives the SYNOP weather and the monthly CLIMAT messages in near real-time via the WMO global telecommunication system. Core data source of the GPCC analyses are the data from station networks operated by the National Meteorological/ Hydrological Services (NMHS’s) worldwide; data deliveries have been received from more than 190 countries (Figure 1). The GPCC integrates also other global precipitation data collections (i.e. FAO, CRU and GHCN), as well as regional data sets, yielding about 67,200 stations with climatological normals in GPCC’s data base (comprising data of more than 89,000 stations in total).

Data Base and Quality Control

Quality Control (QC)
The data processing steps include QC of the precipitation data and selection of a “best” value for each station and month/year following a prioritization along statistically derived expectation values of the source specific data quality. Since 2009 the precipitation data to be imported into GPCC’s data base is compared against a background statistic helping to screen out several data errors in this early step of data processing. Additionally the data base has been intensively checked according to different statistical criteria. Climatological means, maxima or minima for each calendar month have been checked for their spatial consistency.

Near-Real-Time
Near-real-time products are the ‘First Guess’ (Figure 3) and the ‘Monitoring Product’ (Figure 4). While the ‘First Guess’ is based only on SYNOP reports, the data base is extended by CLIMAT reports for the ‘Monitoring Product’. The main difference between both products results from the enhanced quality control for the ‘Monitoring Product’ in comparison to the ‘First Guess’. The ‘Monitoring Product’ and ‘First Guess’ are available within 2 months or 3 to 5 days after the end of each month, respectively. We offer both products with 1°×1° spatial resolution, based on roughly 7,000 stations distributed globally.

Gridded Data Products

First Guess Daily
The calculation of daily precipitation amounts based on SYNOP reports will restart in 2013. We plan to release daily products together with the ‘First Guess’ 3 to 5 days after the end of each month.

Scheduled GPCC Product Releases
A new homogenized precipitation analysis (HOMPRA) shall be released by the end of 2013. It will replace ‘VASClmO’ and cover the period 1951 to 2005.

Non-Real-Time
Non-real-time products are the ‘Full Data Reanalysis’ (Figure 5), ‘VASClmO’ and ‘Climatology’ (Figure 6) data sets. These products are based on additional station data, which are provided offline by national meteorological and hydrological services or other data collectors. The ‘VASClmO’ data set will be replaced by a new homogenized product (HOMPRA), see below) in order to reflect the significant growth of the data base. Non-real-time products are available with spatial resolutions of 0.5°, 1.0° and 2.5°. The current ‘Full Data Reanalysis’ covers the period 1901 to 2010 and the climatology is built on years 1951 to 2000, both based on data from roughly 67,200 stations.

All topic GPCC products have been referenced and published through digital object identifiers (DOIs) in August 2012 (Becker et al., 2012).

References: