

## Global Precipitation Climatology Centre (GPCC)

Since 1988 GPCC operates under the auspices of the WMO as a German contribution to the World Climate Research Programme (WCRP) and to the Global Climate Observing System (GCOS). It is funded by the Federal Government of Germany and is located within Deutscher Wetterdienst (DWD).

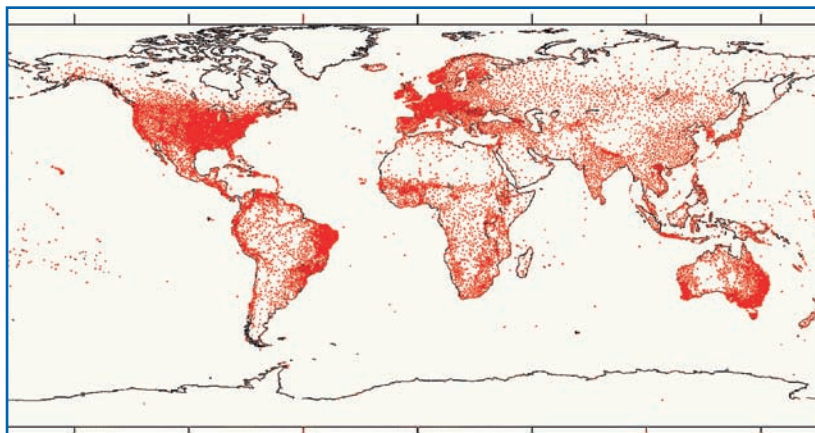
### Description

The main objective of GPCC is the analysis of the spatial and temporal distribution of global land-surface precipitation on a monthly time-scale based on in situ observation data.

The rain gauge station observation data base used for the GPCC analyses comprises:

- near-realtime weather and climate observation data (SYNOP and CLIMAT) continuously exchanged via the WMO Global Telecommunication System (GTS);
- non realtime precipitation observation data provided by WMO Member State's National Hydrological and Meteorological Services. More than 170 WMO member countries have contributed data to GPCC. All major monthly precipitation station databases have been integrated into GPCC's database.

Thus GPCC holds the largest monthly in situ precipitation observation database of the world comprising more than 1.5 million station years (since 1951) of rain gauge based precipitation data for more than 60 000 stations. More than 10 000 station records are available for year 1920, more than 15 000 stations for 1940, more than 25 000 stations for 1960, and more than 40 000 stations for 1990.



*Spatial distribution of monthly in situ precipitation stations with at least 10 years of data in GPCC Data base (Total number of stations in July 2006: 43028)*

The GPCC data processing steps include quality-control and quality assurance of the station meta data and of the precipitation observation data, interpolation of the station-related data to regular grids, and calculation of the spatial means on the 2.5° respectively 1.0° latitude/longitude gridbox areas.

In order to fulfil the different user requirements the GPCC has implemented a set of various gridded monthly precipitation products, which have been optimized for the purpose of their application:

First Guess Analysis (Oct. 2003-present)

- Designed for global precipitation anomaly analysis useful e.g. for early drought monitoring;
- Based on weather observation data received near real-time via the GTS from ca. 6,500 stations;

Monitoring Product (Jan. 1986-present)

- Designed for global near realtime precipitation monitoring in context of GCOS and used by GEWEX/ GPCP for global satellite-gauge combined products;
- Based on weather and climate observation data from approximately 7,500 stations;

Full Data Reanalysis (1951-2004, Version 3)

- Optimised for spatial density and accuracy needed for model verification and water cycle studies;
- Best spatial coverage for the individual months by use of all available data in the GPCC data base;
- Data coverage per month varies from 10,000 to more than 43,000 stations;

50-Year Analysis of monthly precipitation (1951-2000, Version 1.1)

- Optimised for time-series homogeneity and quality needed for climate variability/trend analyses;
- Based on more than 9.300 stations in the GPCC data base providing nearly complete time-series;

Corresponding to international agreement, station data provided by Third Parties to GPCC are protected. However, all gridded GPCC analysis products are disseminated free of charge via Internet (<http://gpcc.dwd.de>). More than 2000 users per month visualise and download GPCC products.

### Added Value

The provision of historical as well as timely precipitation data by GEO Member States to the GPCC can be widened substantially and maintained on a sustainable level with the agreement and adherence of GEO Members to the GEOSS Ten Year Implementation Plan. The quality of the gridded GPCC precipitation products highly depends on the availability of sufficient rain gauge station observation data. High quality precipitation products of the GPCC enable its clients in the research and modelling community to substantially improve their findings which in turn has a direct impact on the GEO identified societal benefit areas related to weather, water, climate, disasters, agriculture.

### Relevance to GEO

Water serves as the basis for life on earth and impacts on all GEOSS societal benefit areas. Precipitation is not only a key component of the hydrological cycle, but also of paramount importance to sustain life. Accurate knowledge of precipitation amounts reaching the land surface is of special importance for fresh water assessment and management related to land use, agriculture and hydrology, incl. risk reduction of flood and drought. High interest in long-term precipitation analyses arises from the needs to assess climate change and its impacts on all spatial scales. Therefore timely and reliable information on precipitation on a global scale is critical to the purpose and scope of GEOSS.

GPCC is listed in the GEOSS 10 year Implementation Plan Reference document among the initially identified GEO modelling and data processing centres. It presents a direct contribution towards the objectives of tasks DA-07-03, DI-07-01, US-07-03, WA-06-02, WA-06-05, WA-07-01, WA-07-02.

### Participants

All GEO Members are involved through their National Hydrological and Meteorological Services. They are the points of contact for the provision of precipitation observation data and associated meta-data. The GPCC maintains links to a number of GEO Participating Organisations, inter alia WMO, WCRP, GCOS, UNEP, UNESCO, FAO. Water and climate related programmes and projects of the United Nations, their specialised agencies and the scientific research community are users of GPCC analysis products and influence further product improvements adjusted to their application purposes.

A special thank is addressed to the many data contributors, which have supported GPCC so far. Their kind support enables the GPCC global precipitation analyses described in this document.

*Contact:* Global Precipitation Climatology Centre (GPCC) c/o Deutscher Wetterdienst (DWD)  
Postbox 100465 - D-63004 Offenbach  
Phone +49 69 8062 2872 - Email: [gpcc@dwd.de](mailto:gpcc@dwd.de) - Web: <http://gpcc.dwd.de>

### Current Status and next Steps

Long-term operation of GPCC is ensured due to its operational implementation within the Deutscher Wetterdienst (DWD). Continuous update of the monthly GPCC in situ observation precipitation database by contributions of GEO members is needed to meet the quality demands for the different GPCC products, e.g. concerning climate variability/trend studies and verification of global climate models.

The significantly enlarged GPCC data base enables to prepare new and extended versions of the Full Data Reanalysis (Version 4) and of the VASCLimO Climatology (Version 2) as well as the release of a new global monthly precipitation climatology, planned to be available until end of year 2007.