# Recent development of GPCC's data base and quality-control in preparation of new gridded global precipitation analyses

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## GPCC background

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 landsurface based on in-situ raingauge 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.
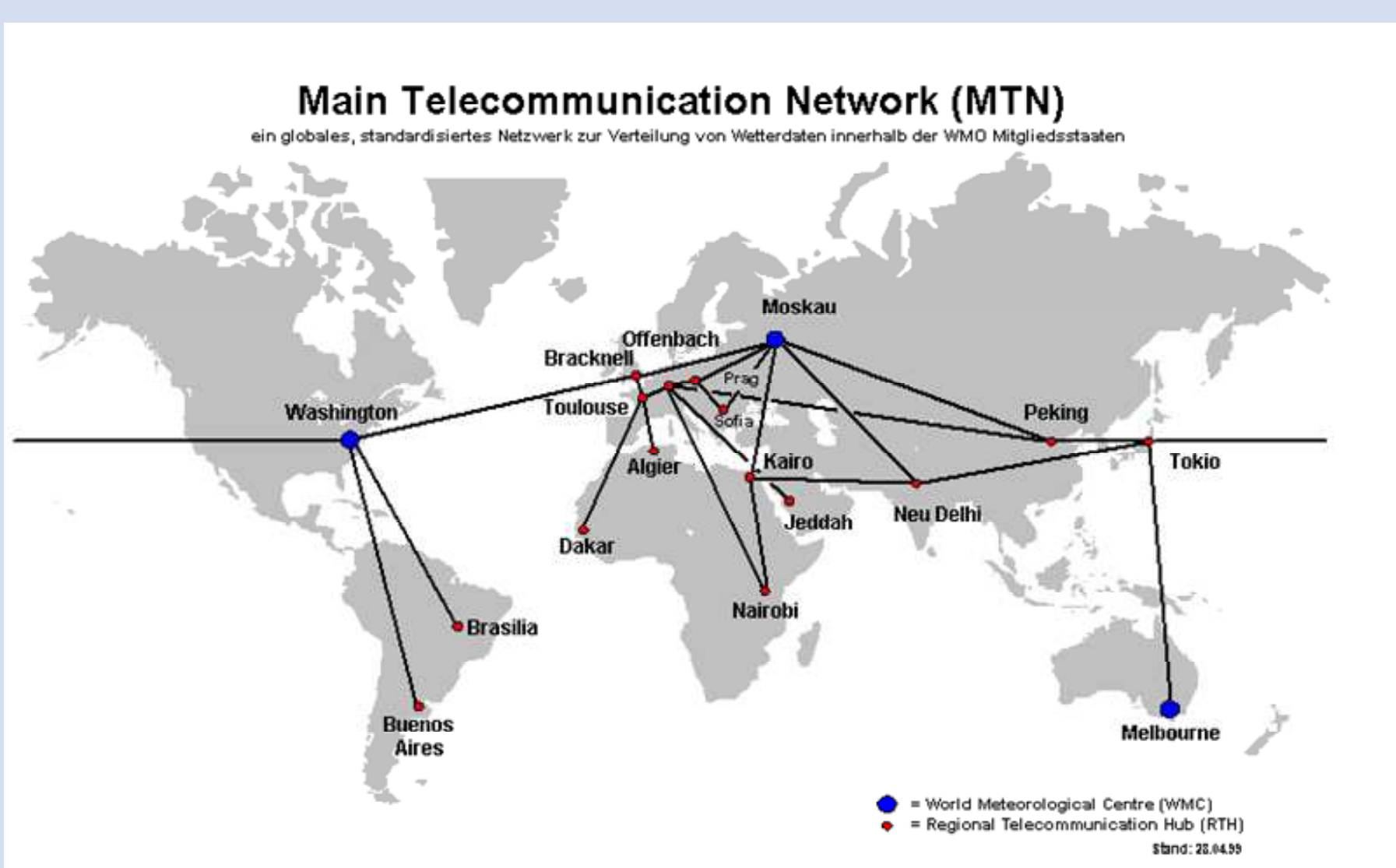
## GPCC data base



Fig. 1: Overview of WMO's Global Telecommunication System (GTS)



Fig. 2: Length of period of the data delivered by National Meteorological / Hydrological Services (NMHS's)



Fig. 3: Stations per 2.5°grid with climatological n ormals usable in the new precipitation climatology (ca. 64,000 stations)

The GPCC receives the SYNOP weather and the monthly CLIMAT messages in near real-time via the WMO GTS (Fig. 1).
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 ca. 190 countries (Fig. 2).
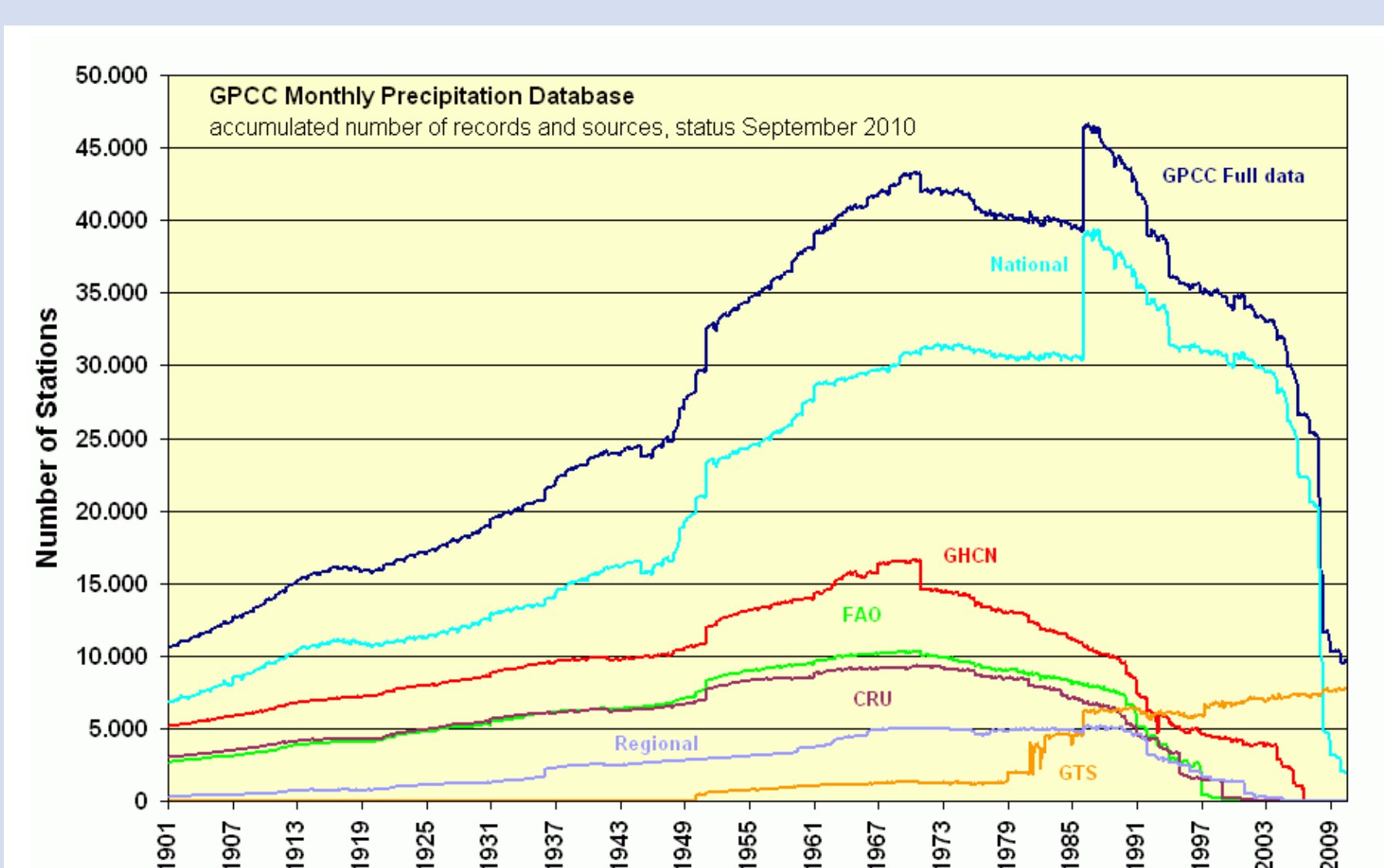
The GPCC integrates also other global precipitation data collections (i.e. FAO, CRU and GHCN), as well as regional data sets, resulting in ca. 64,000 stations with climatological normals (Fig. 3) in GPCC's data base (overall containing data of ca. 80,000 stations).
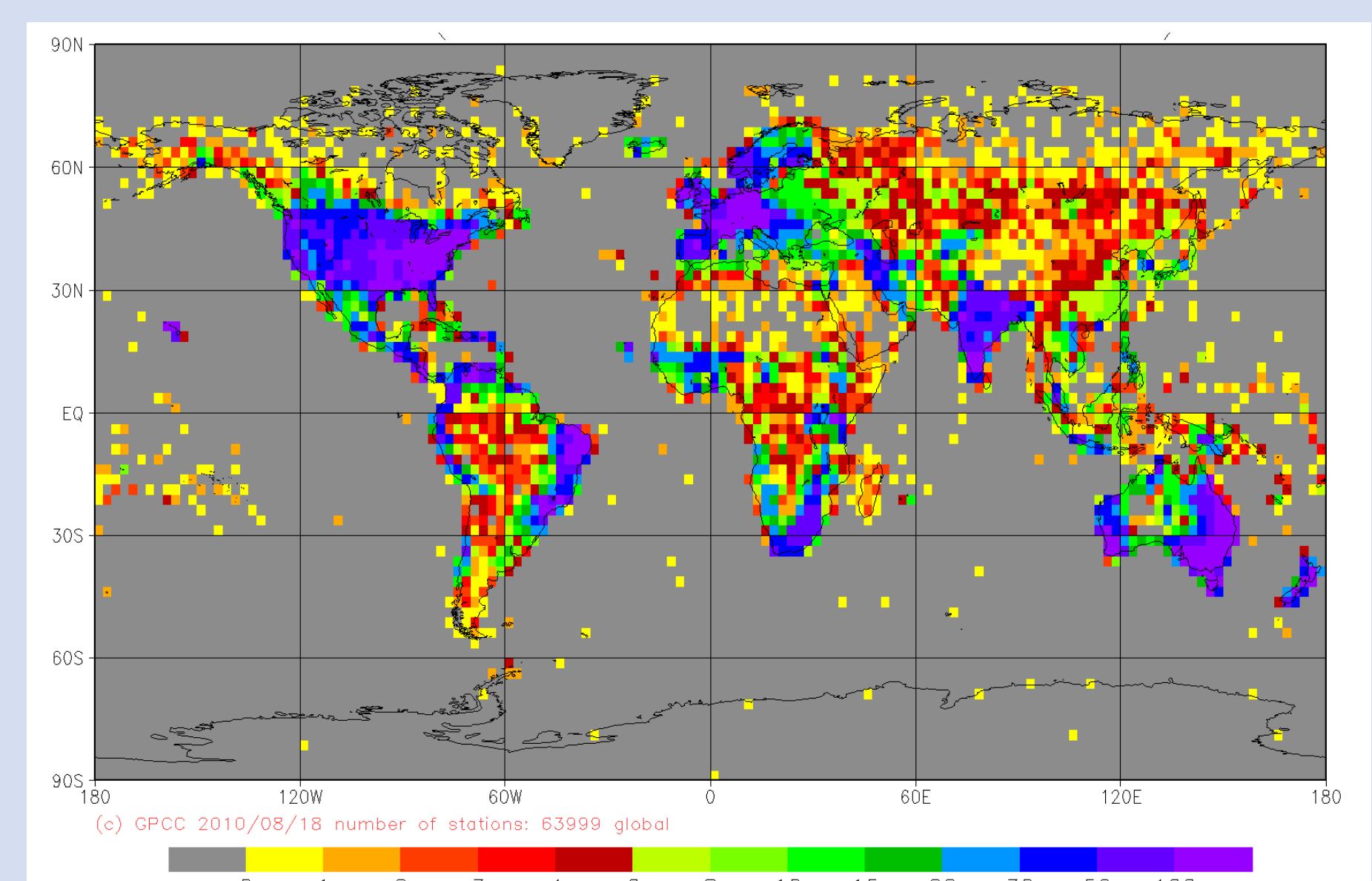The acquired data sets are pre-checked, reformatted and then imported into a relational data

base, where they are archived separately in source specific slots (Fig. 4), thus allowing an intercomparison of data from different sources. Any time new data sets are imported to the data base, the metadata in the input data set are compared to those already available in the data base, thus resulting in a perpetual improvement of the station meta data.



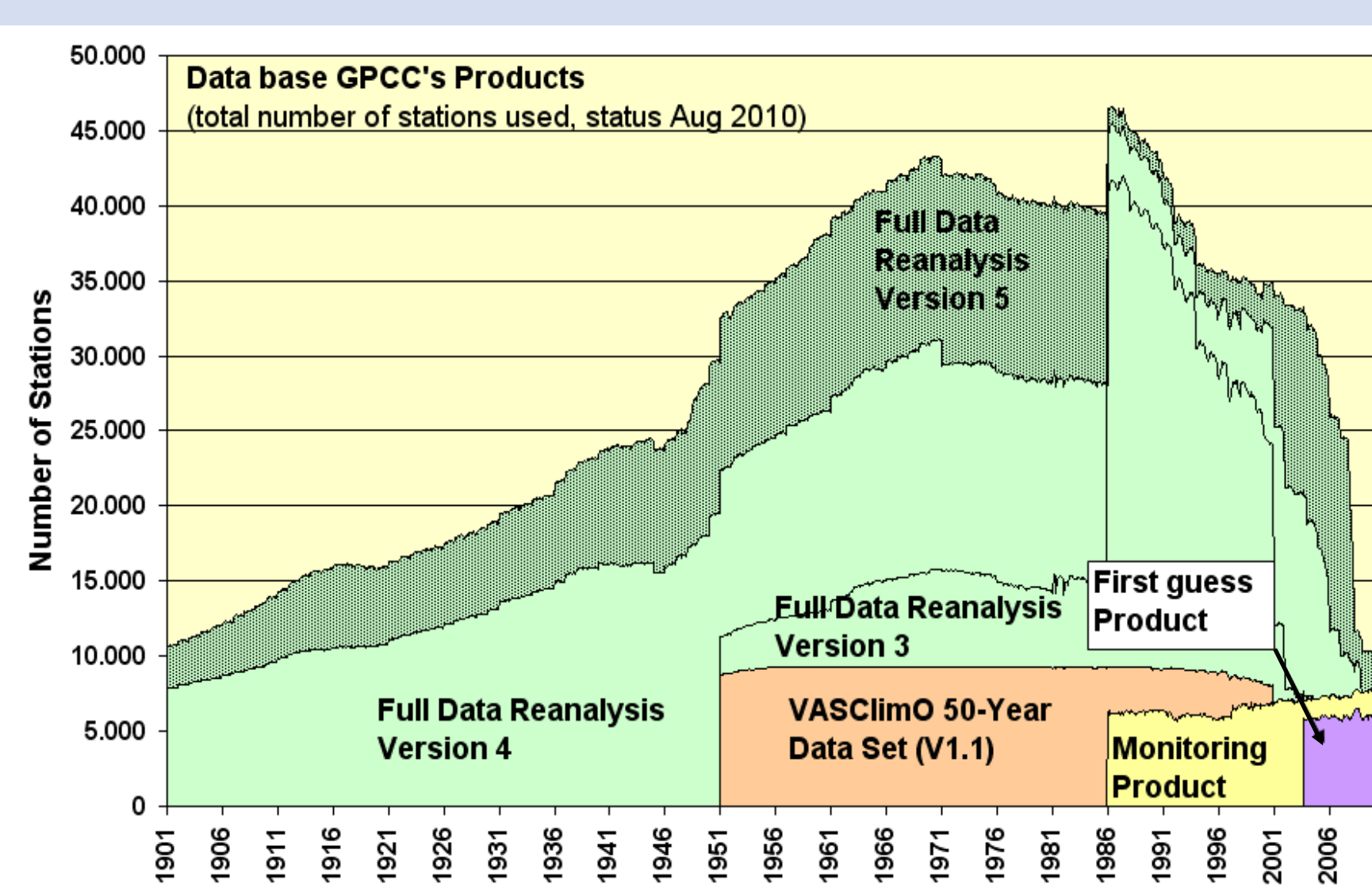Fig. 4: Number of precipitation data per month with regard to the data source and overall



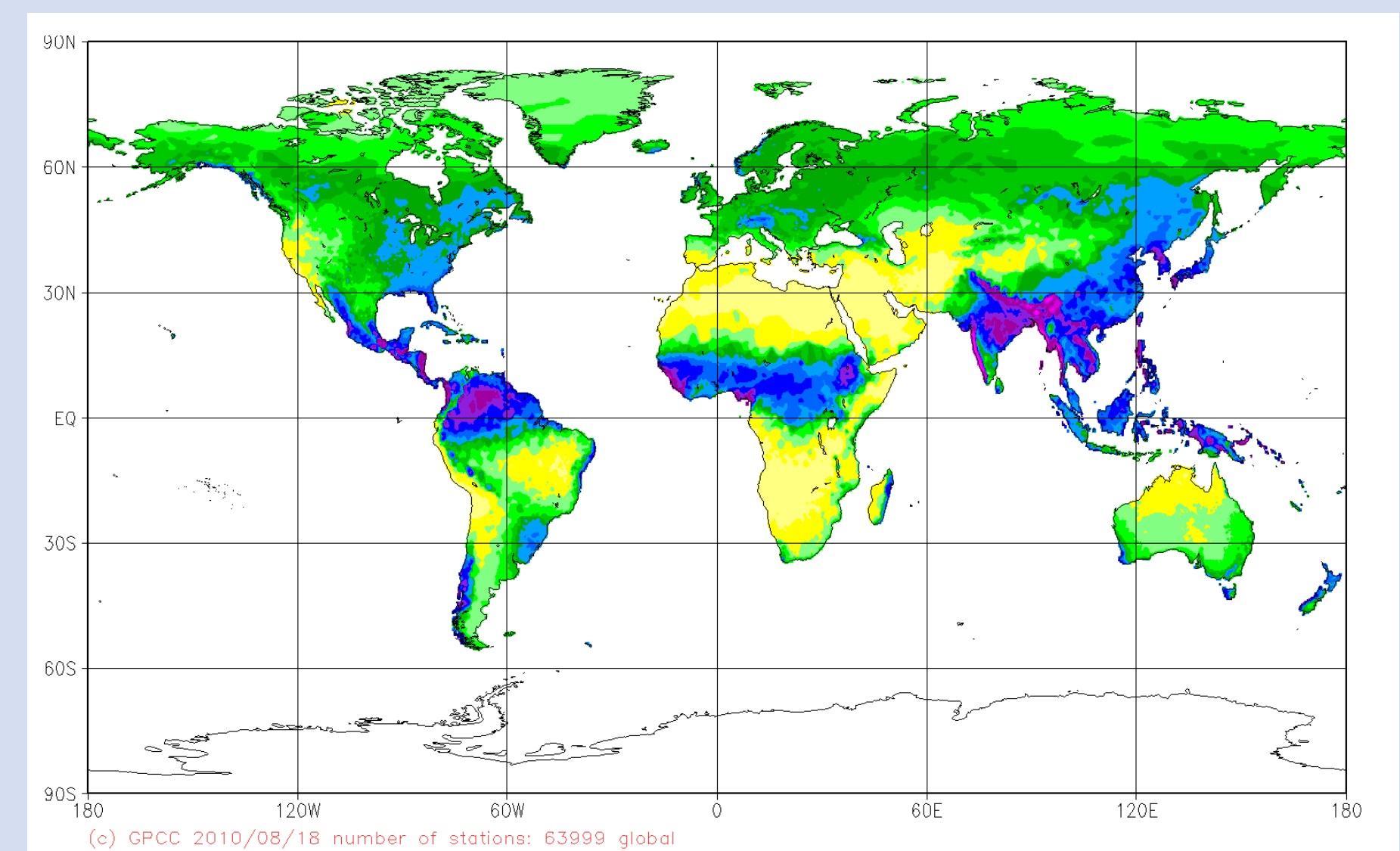Fig. 5: Number of precipitation data per month for the different GPCC analysis products



Fig. 6: New global precipitation climatology V. 2010 (beta) for July

## 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 priority scheme according to statistical investigations of the data source quality. Since 2009 the precipitation data to be imported into GPCC's data base is compared against a background statistic helping to filter out several data errors in this early step of the 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 spatial consistency and time series have been checked for temporal homogeneity. Overall the following typical/frequent errors have been detected and, as far as possible, corrected:
- factor*10 errors,
- errors in conversion inch to mm (factor*2.54 etc.),
- "0" instead of missing values,
- data shifted by 1 (or more) months,
- data shifted by a year.

## GPCC analysis products

GPCC's analysis products (First-Guess, Monitoring Product, Full Data Reanalysis; data base see Fig. 5) are calculated as anomaly analyses before the background climatology (Fig. 6). The gridded precipitation products are freely available via Internet: http://gpcc.dwd.de
For more information about GPCC's analysis products see the internet product description or the companion poster by M. Ziese et al. "Gridded data products and interpolation technique utilized by the GPCC"