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Wetter und Klima aus einer Hand

Release of an improved Full Data Reanalysis and Climatology of the Global Precipitation Climatology Centre (GPCC)

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Task of the GPCC

The task of the Global Precipitation Climatology Centre (GPCC) is to collect observational data from rain gauges around the world and provide gridded precipitation analyses. It was initiated by the World Meteorological Organization (WMO) and started its operation in 1989. Since then it is hosted by Deutscher Wetterdienst (DWD), the national meteorological service of Germany.

Data Base

Data from several sources are collected by the GPCC. Near-real-time data are collected from the WMO Global Telecommunication System (GTS), the CLIMAT- and SYNOP data, and additionally monthly totals from the NOAA's Climate Prediction Center (CPC). Non-real-time data are collected from national meteorological and/or hydrological services. Additionally, other global and regional data collections have been integrated into GPCC's data base.

Data Policy

Data provided to the GPCC are applied to generate gridded precipitation analyses. These analyses are publicly available free of charge from the GPCC website. As the GPCC does not claim copyright on the provided data, it does not parse original station data.

Products

Several near- and non-real-time products are generated by the GPCC. Near-real-time products are the '**First Guess**', '**Monitoring Product**' and '**GPCC Drought Index**' with monthly data and '**First Guess Daily**' based on daily data. The underlying data are collected from the GTS. Non-real-time products are the '**Full Data Reanalysis**', '**Climatology**' and a homogenized analysis. The products have different timeliness, input data, quality control levels and target applications.

Quality Control and Detected Errors

The GPCC stores its data in a relational data bank in source specific slots. This allows a retraceability of the data to a source and changes during the quality control procedure. Also data from different sources can be compared. Before loading the data into the data bank, the location of the station within the boundaries of the country is checked (Fig. 1). During the import into the data bank several tests against background statistics and data from the same source are done. Later on, external checks between the several data sources are undertaken (Fig. 2). Located errors like wrong precipitation data or wrong station meta data are corrected, if possible, or eliminated. Typical errors are factor-10-error and conversion errors between millimeter and inch for precipitation and confusion with other stations for meta data.

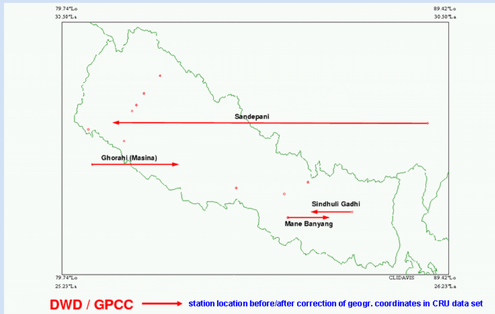


Figure 1: Locations of stations are shown. Wrong meta data were corrected.

Sometimes data from one station are delivered with different station names:

- Huddur
- Huduur
- Hudur
- Hodur
- Oddur
- Xuddur
- Xudur

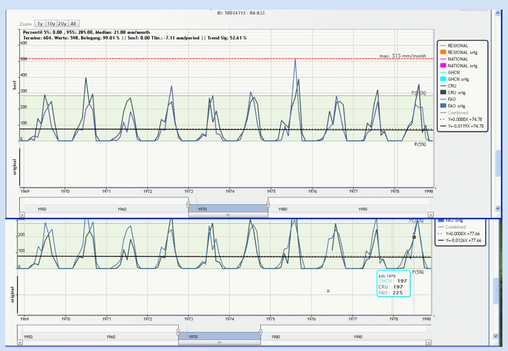


Figure 2: Example cross-check of time series of monthly totals from two stations is depicted. As a result data were interchanged between the stations.

Improvements of new Release

Similar to previous updates of its non-real-time products, the main improvement lies in the increased number of underlying stations. Now the products are based on roughly 72,000 stations (see Fig. 5; release 2011: 67,200 stations). Large data sets from e.g. Mexico and Brazil were added, but also an update for the GHCN data. Due to the additional data, errors in the data base were identified and corrected, for example in Central Africa, Mexico and Indonesia.

Also new land-sea-mask will be utilized with the upcoming release. It is based on ISLSCP2 Land/Water, GLDAS Unified Land/Sea Mask and GPCC station data. The main improvements are additional islands in the Pacific and southern oceans, which were missing in the previous releases (see Figs. 3 and 4). All additional islands were interactively verified.

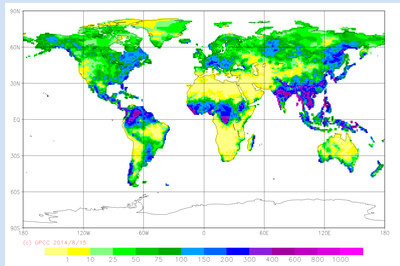


Figure 3: Old land-sea-mask utilized at GPCC since 1989.

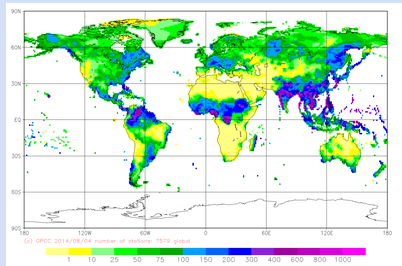


Figure 4: New land-sea-mask getting operational with next non-real-time products release.

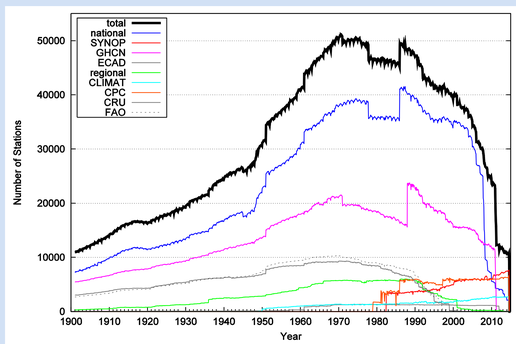
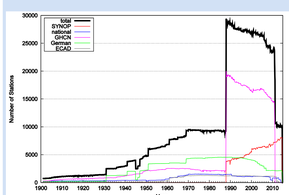


Figure 5: Number of stations per month for monthly totals (left) and daily precipitation amounts (right); status: September 2014.



GPCC reference publications:

- **Becker et al., 2013,** A description of the global land-surface precipitation data products of the Global Precipitation Climatology Centre with sample applications including centennial (trend) analysis from 1901-present, Earth System Science Data, Vol. 5, p. 71-99, DOI: 10.5194/essd-5-71-2013
- **Schneider et al., 2013,** GPCC's new land-surface precipitation climatology based on quality-controlled in situ data and its role in quantifying the global water cycle, Theoretical and Applied Climatology, Vol. 115, Is. 1-2, p. 15-40, DOI: 10.1007/s00704-013-0860-x
- **Schamm et al., 2013,** Global gridded precipitation over land: a description of the new GPCC First Guess Daily product, Earth System Science Data, Vol. 6, p. 49-60, DOI: 10.5194/essd-6-49-2014
- **Ziese et al., 2014,** GPCC Drought Index - a new, combined, and gridded global drought index, Earth System Science Data, Vol. 6, p. 285-294, DOI: 10.5194/essd-6-285-2014

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