

# Global Precipitation Climatology Centre (GPCC)

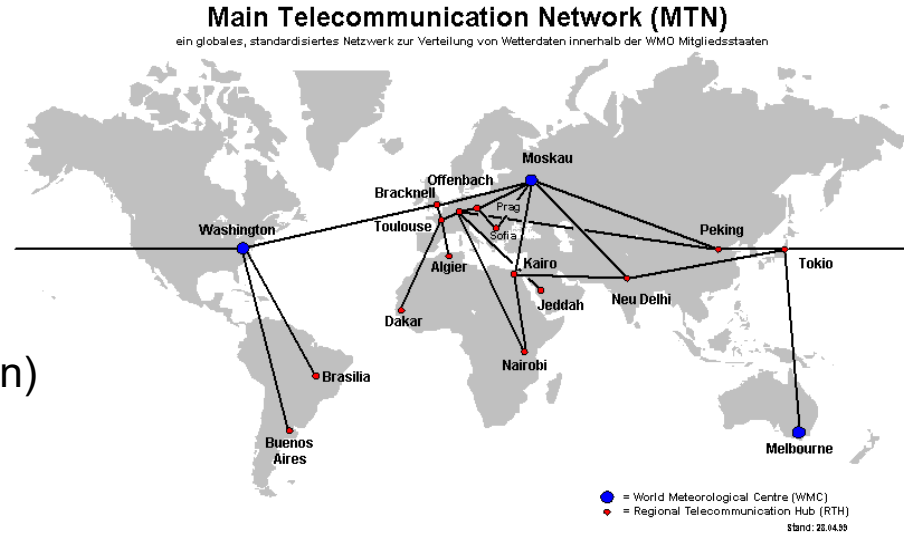
Zora Schirmeister, Markus Ziese, Elke Rustemeier, Peter Finger, Astrid Heller, Raphaela Schulze, Magdalena Zepperitz, Siegfried Fränkling, Michael Jahn, Jan Nicolas Breidenbach, Marc Schröder

# Global Precipitation Climatology Centre - Background

- GPCC was **established at the beginning of 1989** at Deutscher Wetterdienst (DWD) on invitation by WMO; now in operation for **35** years
- GPCC's main task is the analysis of precipitation on the basis of in-situ data for the land-surface
- GPCC is contributing to **GEWEX** (Global Energy and Water Exchanges Project) and to **GCOS** (Global Climate Observing System)
- Within **GDAP** (GEWEX Data and Analysis Panel) it is the component for the analysis of the in-situ measurements for the **GPCP** (Global Precipitation Climatology Project)

# GPCC data sources

- ➔ Near real-time:
  - ➔ GTS **SYNOP** (DWD RTH Offenbach)
  - ➔ GTS **CLIMAT** (DWD RTH Offenbach)
  - ➔ GTS **CLIMAT** (JMA RTH Tokyo)
  - ➔ **SYNOP**-based (NOAA RTH Washington)
- ➔ Non real-time:
  - ➔ Additional data from ca. **190** countries
  - ➔ International project data (**GEWEX**-related and other)
  - ➔ Historical data collections (**CRU, FAO, GHCN, ECA&D, ...**)

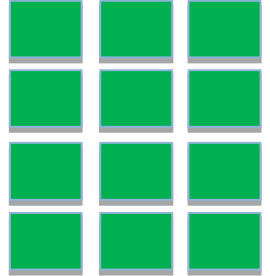


# GPCC data flow

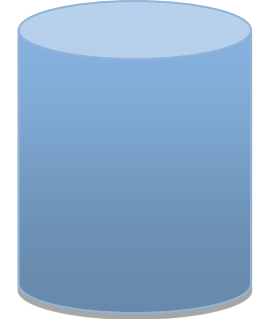
Data delivered in different formats



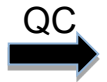
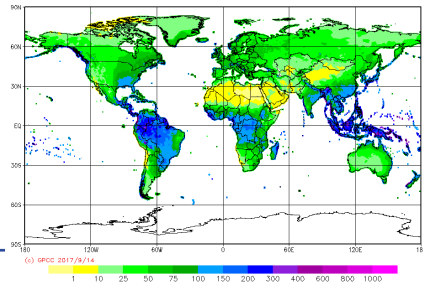
All data in same format



Data stored in data bank



Extracted data for analyses

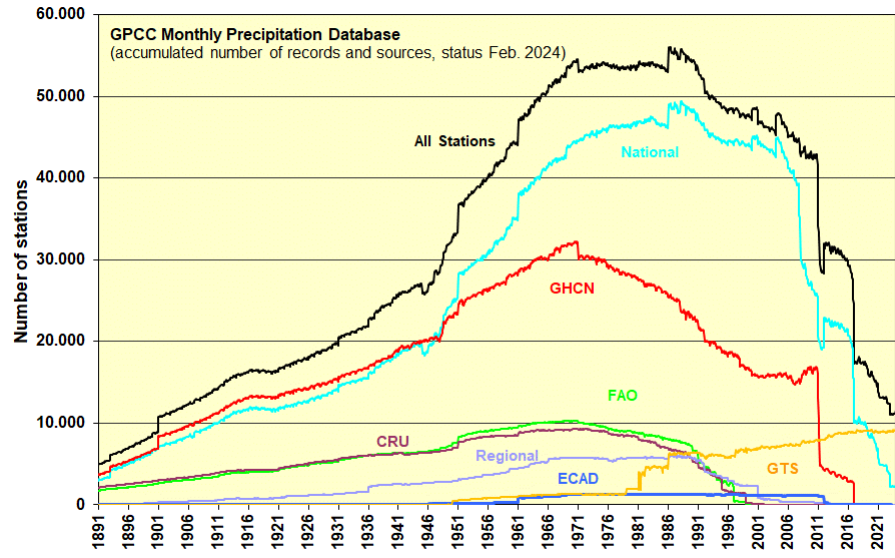


## GPCC quality control

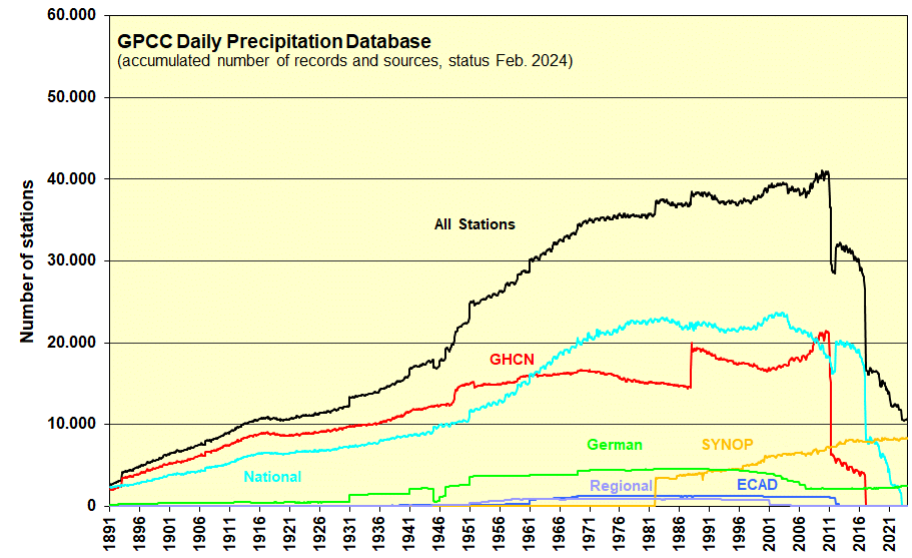
- Coding of data, missing values, trace amounts
- Coordinate reference of meta data
- Check meta data against existing stations in DB
- Check new data against station/grid statistics
- Visual spatial comparison of extreme values
- Homogenization of time series (possible only for high station densities)
- Applied QC-flags: original, confirmed, corrected & deleted (not physical)
- A multi-layer quality control procedure is implemented at GPCC, combining automatic and manual routines depending on data source and product

# GPCC data base

➔ Monthly totals, collected since 1989



➔ Daily totals, collected since 2012

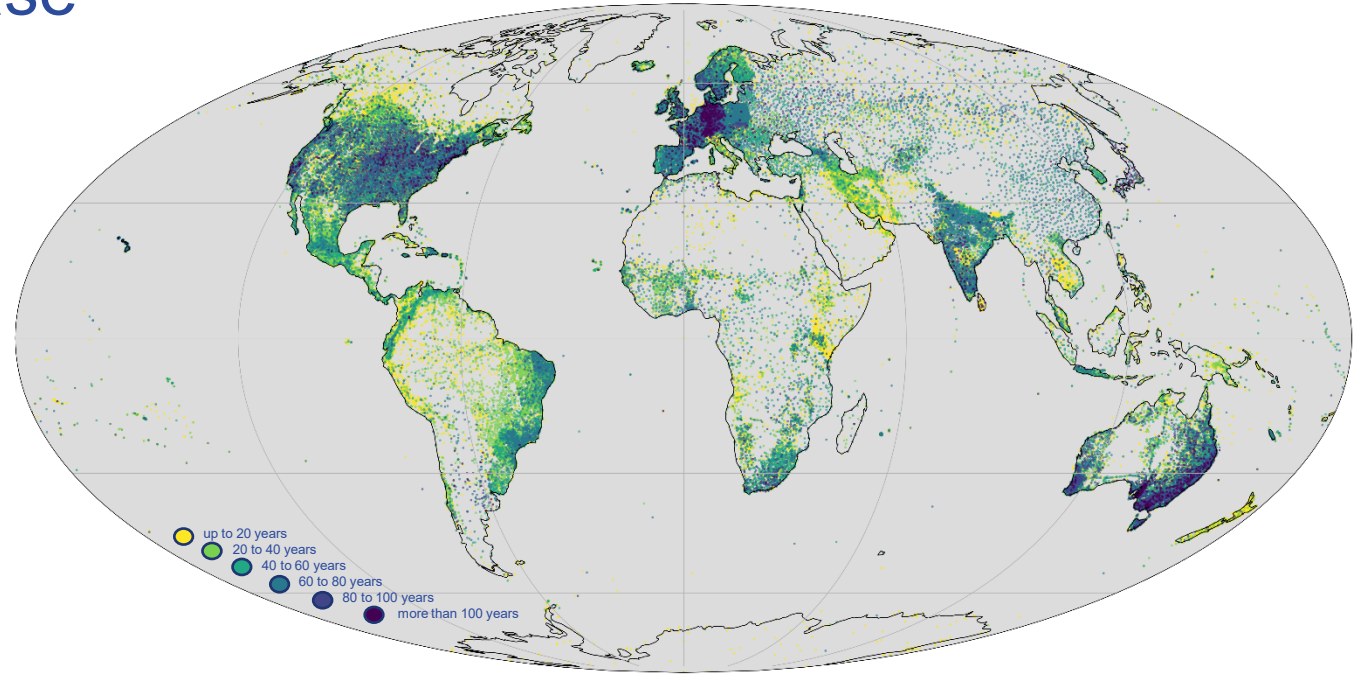


Number of stations in data bank: more than 126,000



# GPCC data base

→ Spatial distribution and length of time series of stations



# GPCC data base growth

## → Data added in last ~12 months from:

- Australia
- Czechs Republic
- Ethiopia
- France
- Iceland
- New Zealand
- Oman
- Poland
- Switzerland
- UK
- Near-real time data (SYNOP, CLIMAT)

## → Receive regular/automatic data updates from:

- Austria
- Brazil
- Canada
- Czechs Republic
- Denmark/Greenland
- Estonia
- Finland
- Hong Kong
- Hungary
- Iceland
- Ireland
- Italy
- The Netherlands
- Norway
- Poland
- Sweden
- Switzerland
- Spain
- UK

## → More OpenData-Portals/APIs exist, implementation in progress/pending



# Access to GPCC data sets



## Visualize and Download GPCC Products



GPCC Product	Spatial Resolution	Time Coverage	Possible Application
<i>First Guess Monthly</i>	1.0°	2004 - present	<i>drought monitoring</i>
<i>First Guess Daily</i>	1.0°	2009 - present	<i>analysis of extremes</i>
<i>Monitoring Version 2022</i>	1.0°, 2.5°	1982 - present	<i>calibration of satellite data</i>
<i>Full Data Monthly Version 2022</i>	0.25°, 0.5°, 1.0°, 2.5°	1891 - 2020	<i>hydrological studies</i>
<i>Full Data Daily Version 2022</i>	1.0°	1982 - 2020	<i>analysis of extremes</i>
<i>HOAPS/GPCC global daily precipitation Version 2</i>	0.5°, 1.0°, 2.5°	1988 - 2015	<i>analysis of extremes</i>
<i>HOMPRA Europe Version 1</i>	0.5°, 1.0°, 2.5°	1951 - 2005	<i>trend analysis</i>
<i>Precipitation Climatology Version 2022</i>	0.25°, 0.5°, 1.0°, 2.5°	1951/2000	<i>for application as a reference, and for utilization of the anomaly interpolation method</i>
<i>Interpolation Test Dataset</i>	1.0°	1988	<i>comparison of interpolation schemes</i>
<i>Drought Index Version 1</i>	1.0°	2013 - present	<i>drought monitoring</i>
<i>Drought Index Version 1.1</i>	1.0°	1952 - 2013	<i>drought monitoring</i>
<i>GPCC P-Quantiles Version 2022</i>	1.0°	1982/01 - last monitoring month	<i>statistic</i>
<i>GPCC Visualizer</i>			<i>access to the GPCC Visualizer, where you can create maps with your own coordinates and parameters</i>
<i>GPCC Home</i>			<i>detailed information about GPCC</i>
<i>Many thanks to the data suppliers</i>			<i>country list of data suppliers</i>

➔ Download gate:

[https://opendata.dwd.de/climate\\_environment/GPCC/html/download\\_gate.html](https://opendata.dwd.de/climate_environment/GPCC/html/download_gate.html)

➔ Visualizer:

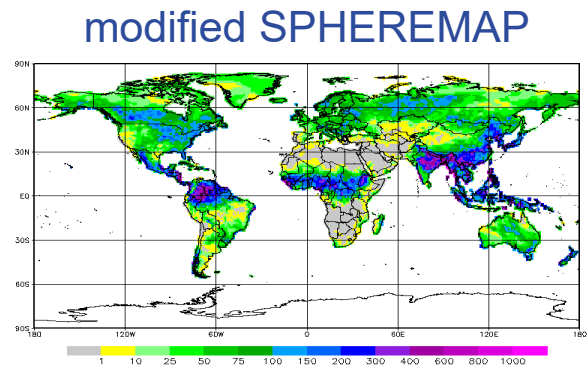
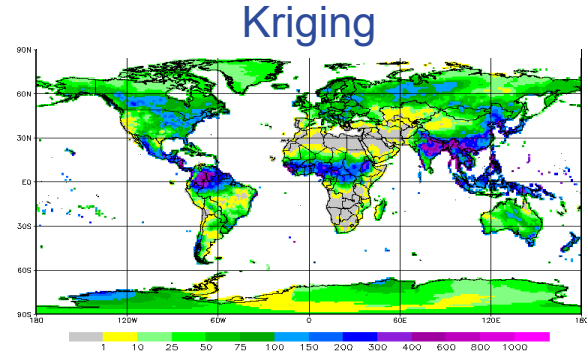
<https://kunden.dwd.de/GPCC/Visualizer>

➔ Website:

<https://gpcc.dwd.de>

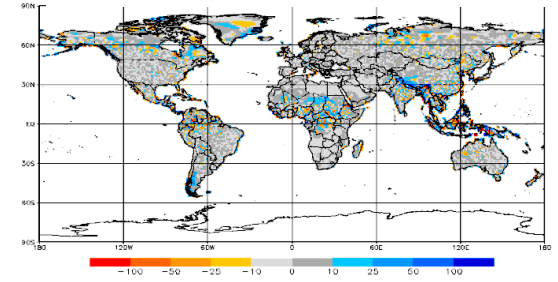


# Comparison SPHEREMAP and Kriging July 1986



- overall patterns look similar
- Kriging produces smoother patterns

### Kriging - SPHEREMAP



- most differences due to different gradients of precipitation and in data sparse areas

## GPCC outlook

- Add more automatic data fetches from APIs and open data portals
- Improve tool to add data to data bank with „batch mode“ (automatic loading of fetched data)
- Use of AI for quality control
- Want to collect also sub-daily data
- Release of next product versions in 2025, maybe some more changes than version number

# Contact to GPCC

- Download gate:
  - [https://opendata.dwd.de/climate\\_environment/GPCC/html/download\\_gate.html](https://opendata.dwd.de/climate_environment/GPCC/html/download_gate.html)
- Visualizer:
  - <https://kunden.dwd.de/GPCC/Visualizer>
- Website:
  - <https://gpcc.dwd.de>
- Email:
  - [gpcc@dwd.de](mailto:gpcc@dwd.de)

