Global Precipitation Analysis Products of the GPCC

- Data Base
- Products and User Applications

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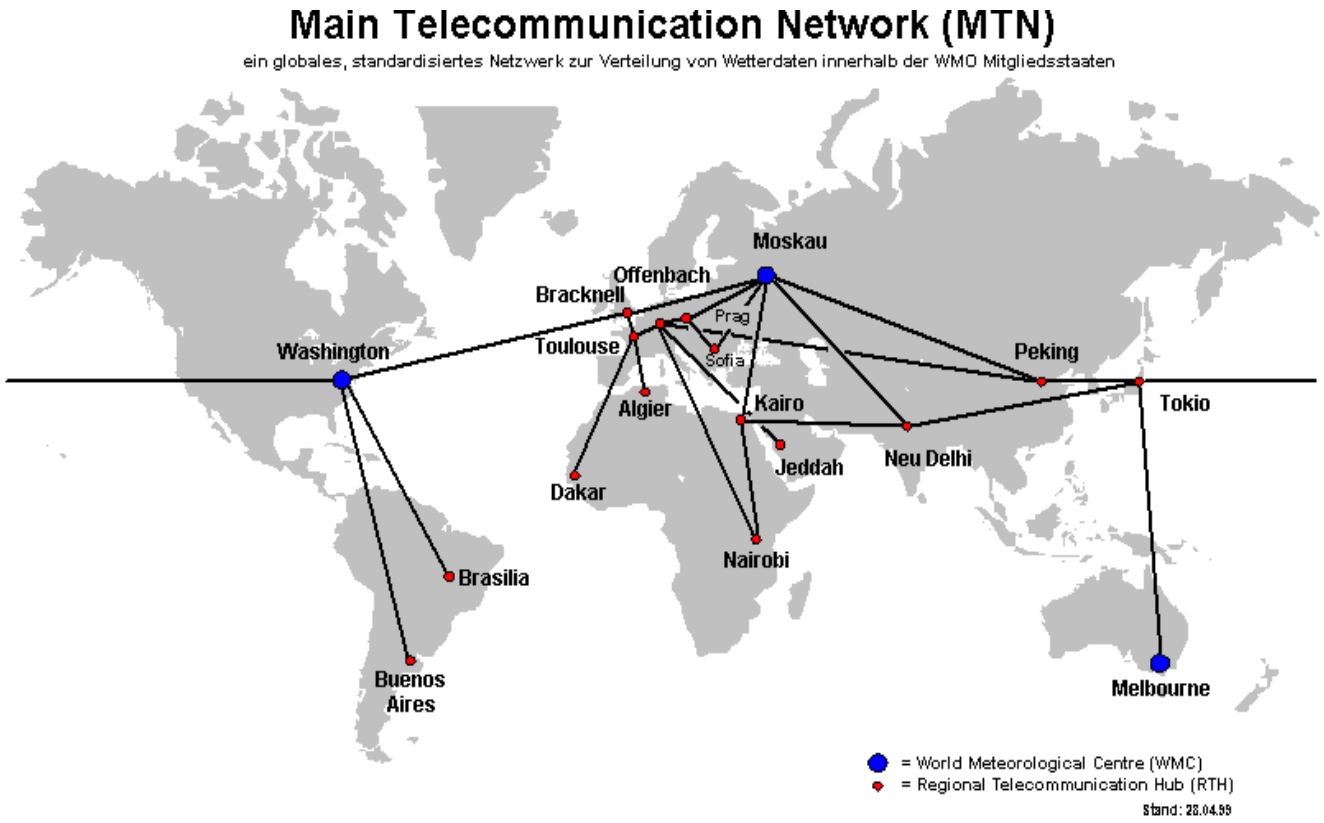
GPCC data base

Near realtime precipitation observation data regularly exchanged via the WMO Global Telecommunication System:

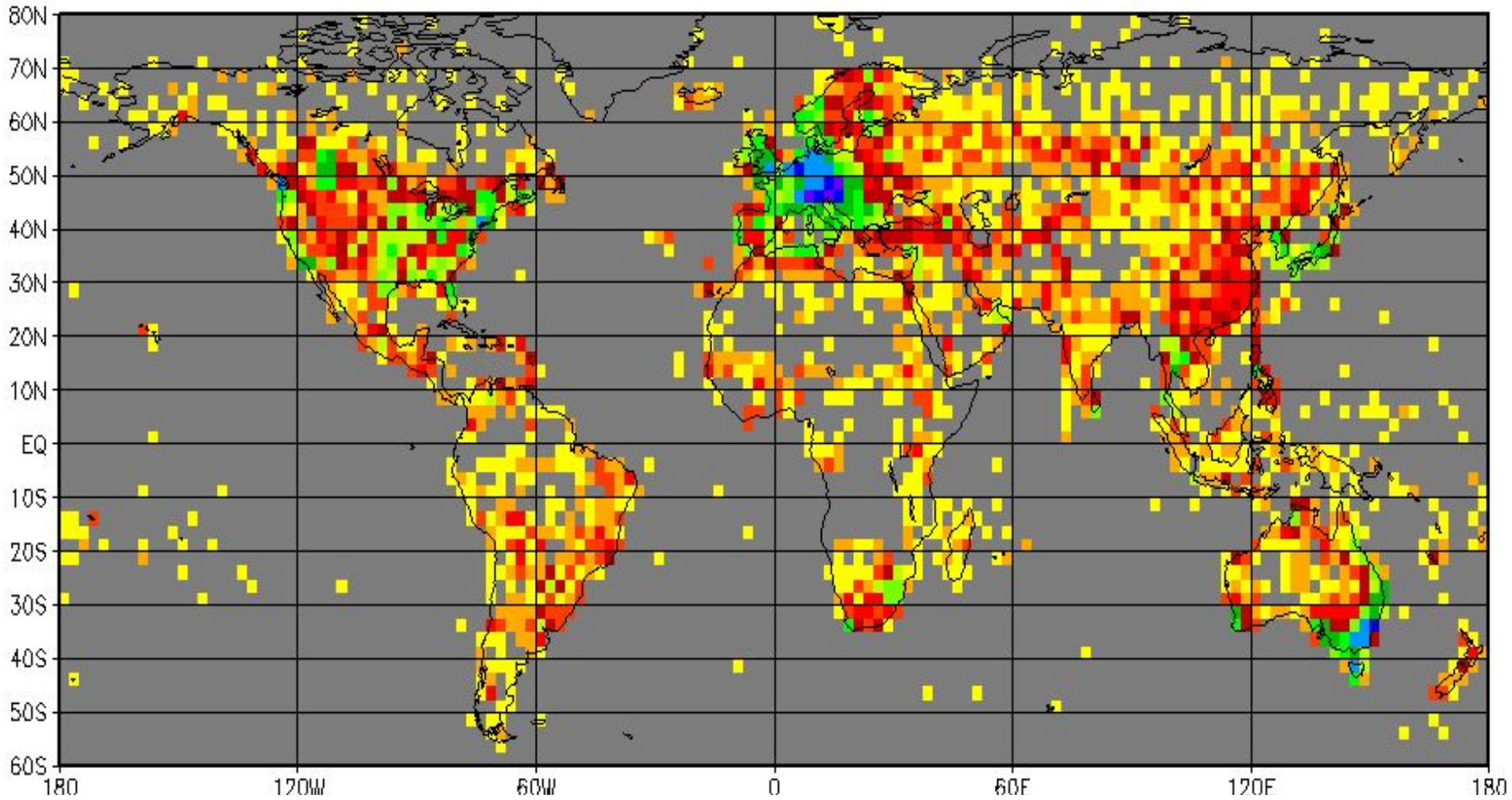
- **few hourly weather reports (SYNOP) -> 6500 stations**
- **monthly climatological totals (CLIMAT) -> 2300 stations**

=> 8000 stations



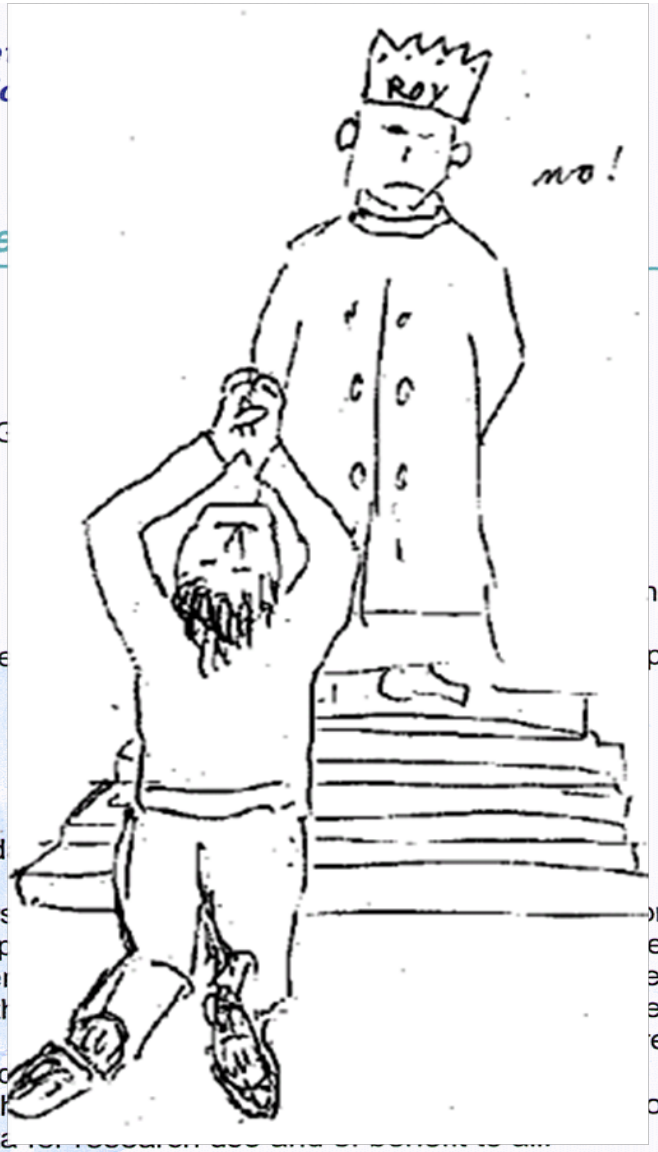
GPCC Data base

Near real-time data base for analyses in 2.5° x 2.5° spatial resolution



⇒ **Green and blue colours indicate grids with data coverage sufficient to meet the GPCC criterion: Sampling error < 10 %**

GPCC data base



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Website: www.wmo.int

Our ref.: G/C

GENEVA, 8 July 2004

Subject:

natology Centre (GPCC)

Action require

plying precipitation data

Dear Sir/Mad

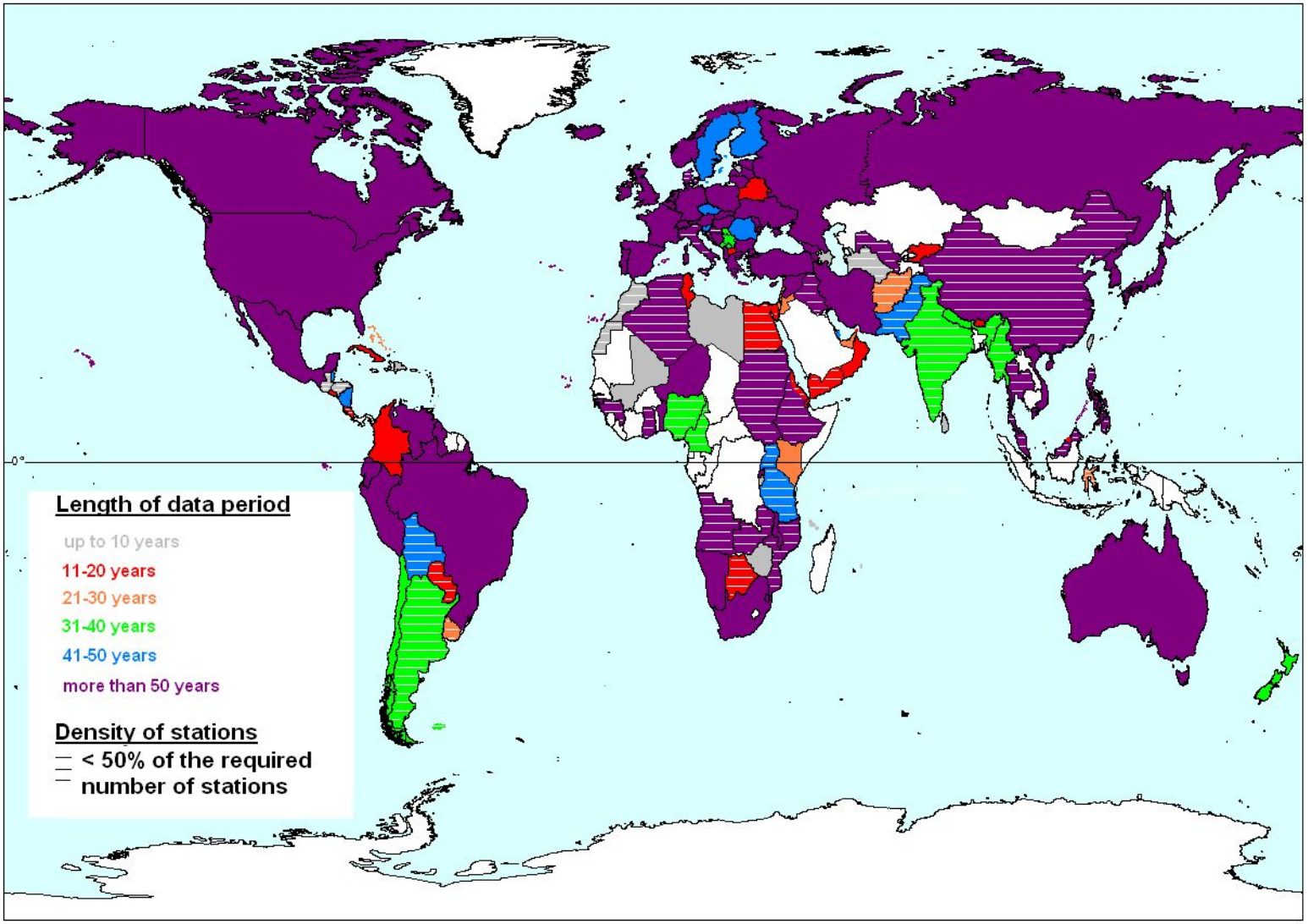
Firs

on to all Members contributing to the
Global Precip
egular delivery of precipitation data.
These deliver
earch and monitoring, and I am very
glad to see th
e have already provided data to this
Centre. Up
e than 40,000 stations have been
compiled and
near present. The purpose of this
letter is to th
our support by providing additional
historical data

WMO requesting data contribution from all Members

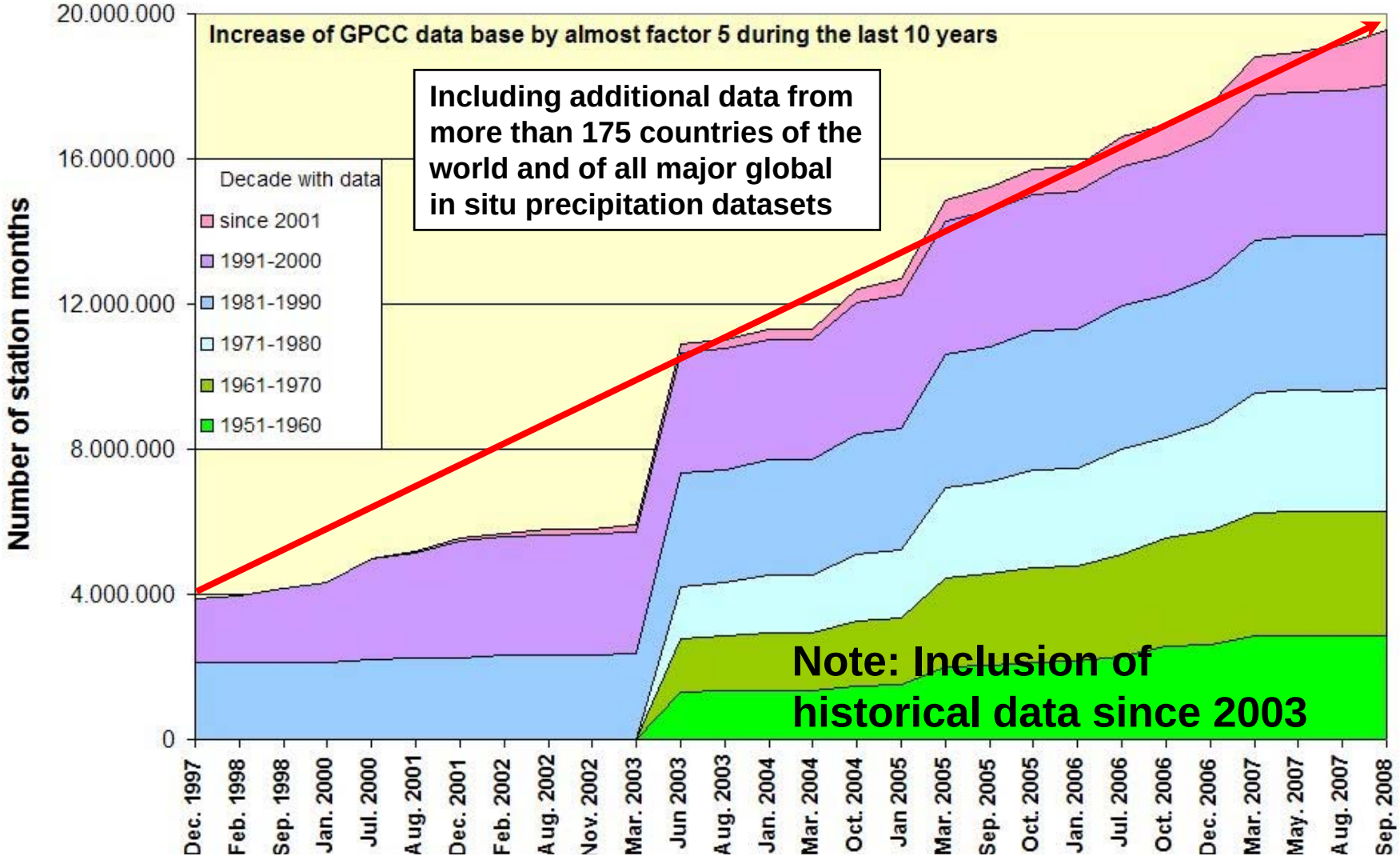
GPCC Data base

Status: August 1st 2008



Data contributions by more than 175 countries to GPCC

GPCC data base



Temporal evolution of the GPCC Database from Jan. 2000 until Sep 2008 (Number of records per time of data base query).

GPCC quality control / quality assurance

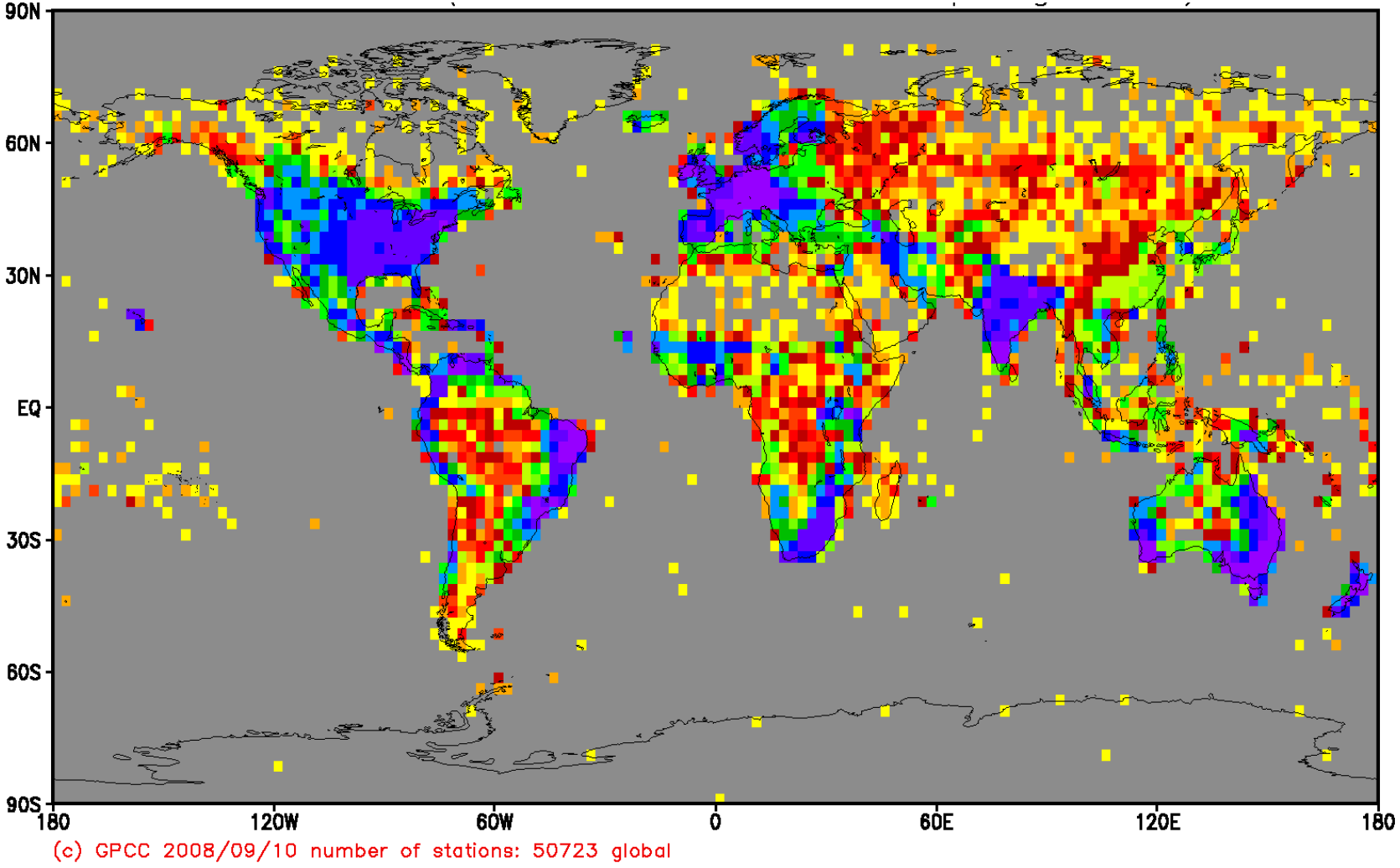
Evaluation of GPCC's new Global Precipitation Climatology

Major problems detected during the QC process of GPCC's complete precipitation data base:

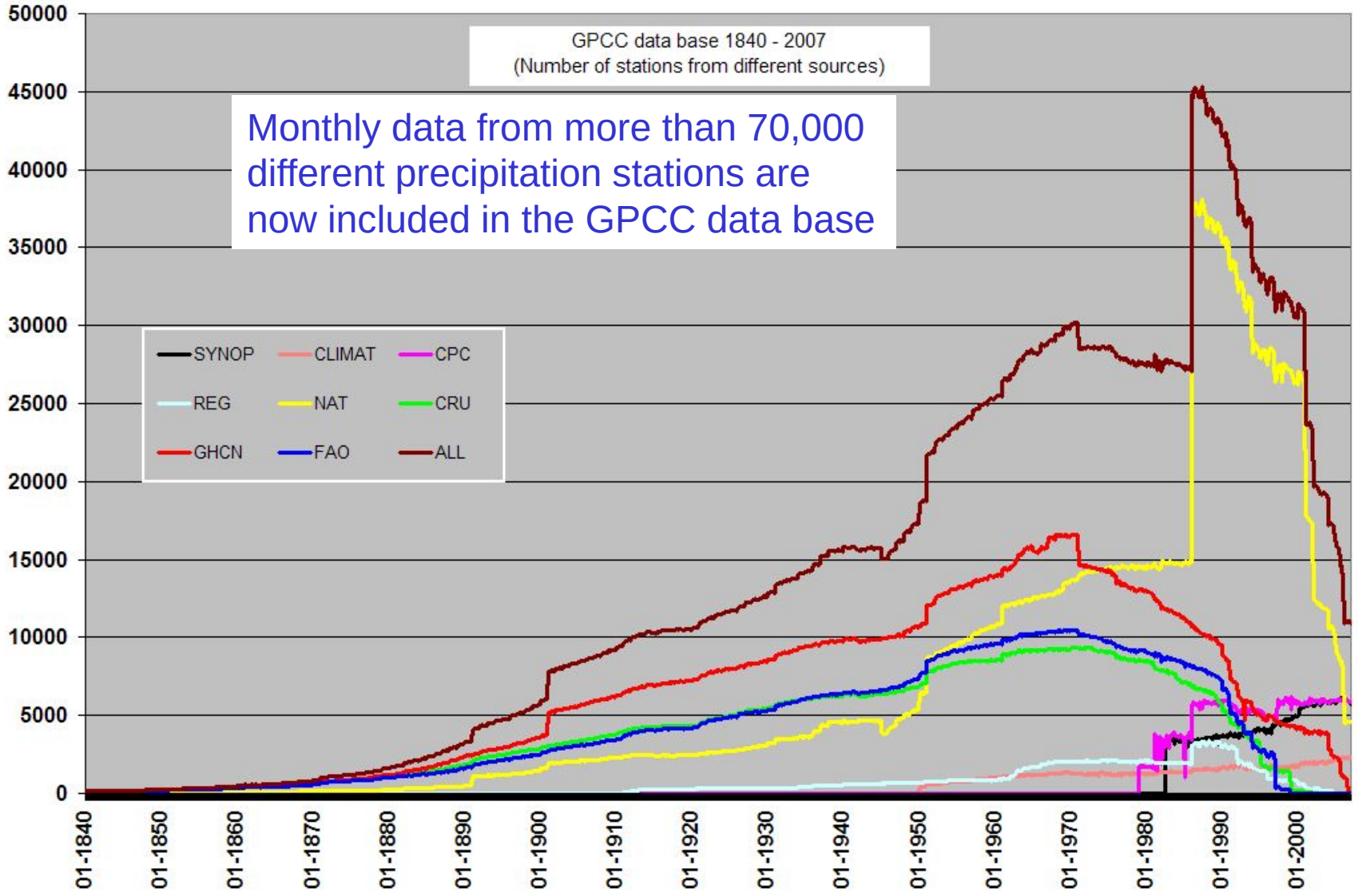
- **Errors in station meta information**
  - mainly in geogr. coordinates (typing errors, wrong sign, missing convertion ° ' " → 0.01° etc.)
  - sometimes erroneous elevation
- **Errors in the data itself**
  - in few cases temperature data (0.1°) instead of precip. data
  - „0" instead of missing values
  - factor*10 problem (1/10 mm instead of mm)
  - errors in the convertion of feet, inch → mm
  - precip. data shifted by 1, 2 or more months or a whole year
- **Duplicate stations**
  - mainly duplicate stations are existing in delivered data sets
  - in a few cases duplicate stations „created" in GPCC's data base (in spite of thorough QC) because of differences in station meta information (different names, geogr. coordinates etc.)

GPCC Data base

Non real-time data base for the new GPCC precipitation climatology in 2.5° x 2.5° spatial resolution

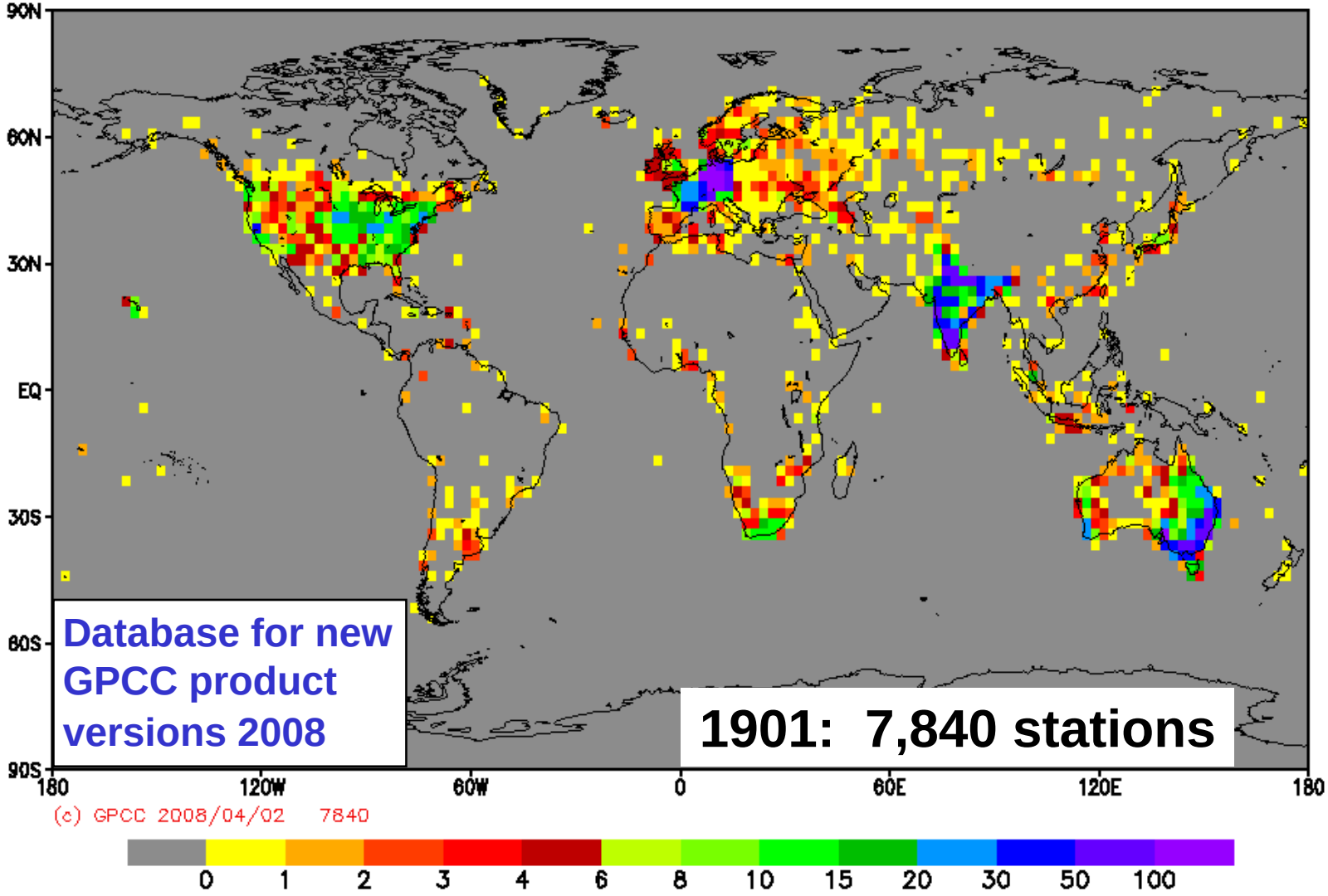


GPCC Data base



Number of stations in the GPCC database for each month of the period 1840-2007 – data from different sources are kept seperately

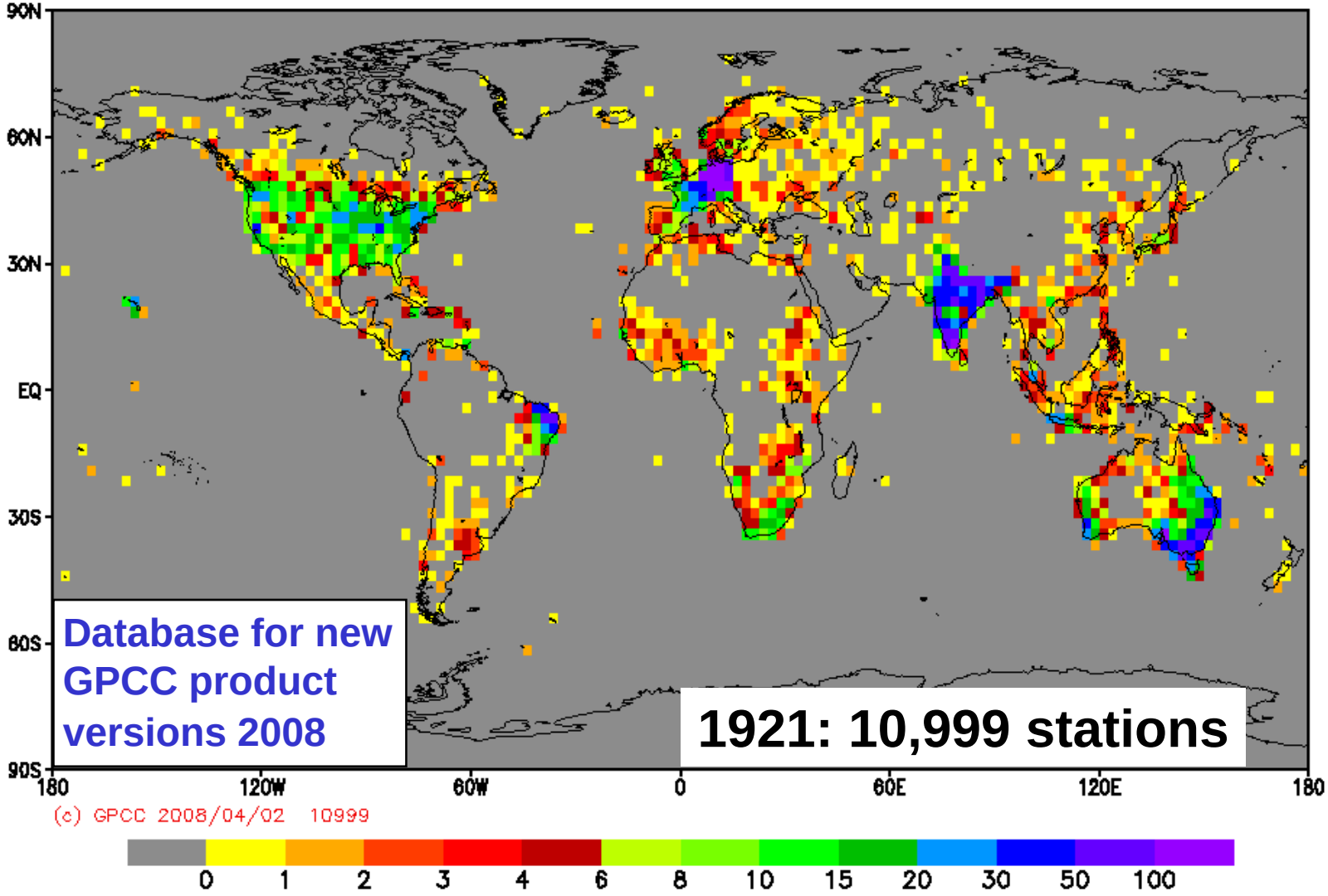
GPCC Data base



GPCC monthly precipitation stations for July 1901

Colors indicate number of stations per 2.5° x 2.5° analysis grid

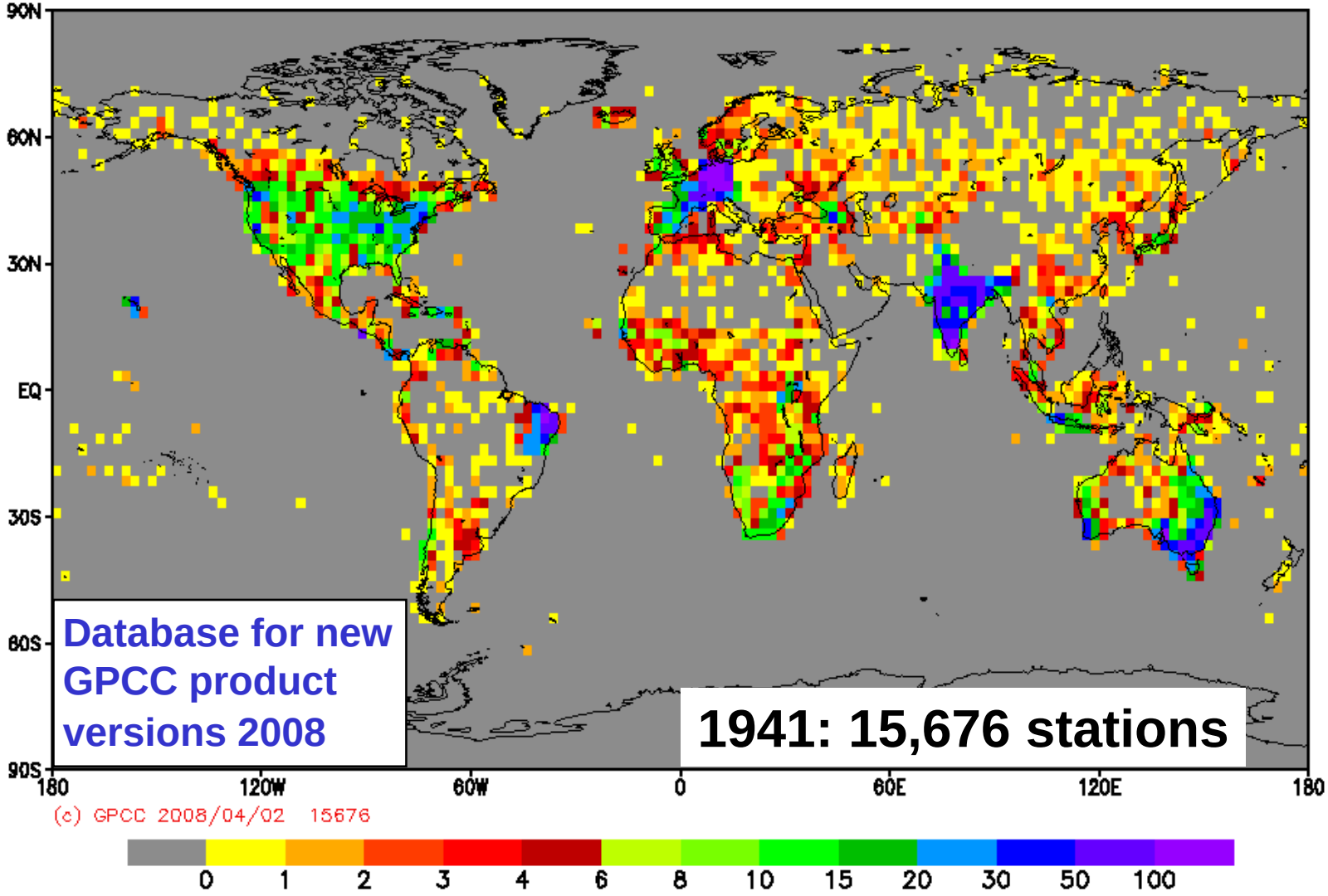
GPCC Data base



GPCC monthly precipitation stations for July 1921

Colors indicate number of stations per 2.5° x 2.5° analysis grid

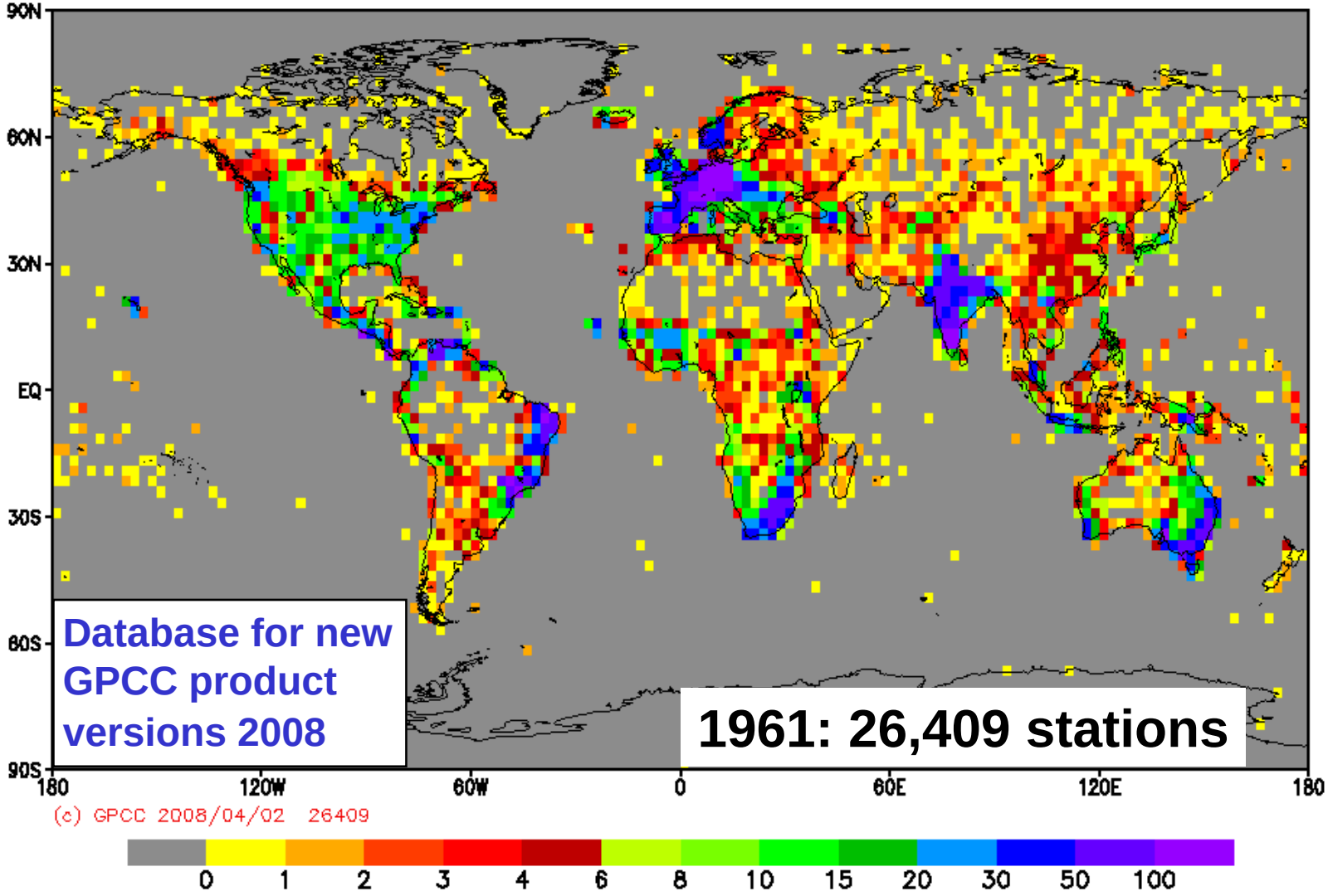
GPCC Data base



GPCC monthly precipitation stations for July 1941

Colors indicate number of stations per 2.5° x 2.5° analysis grid

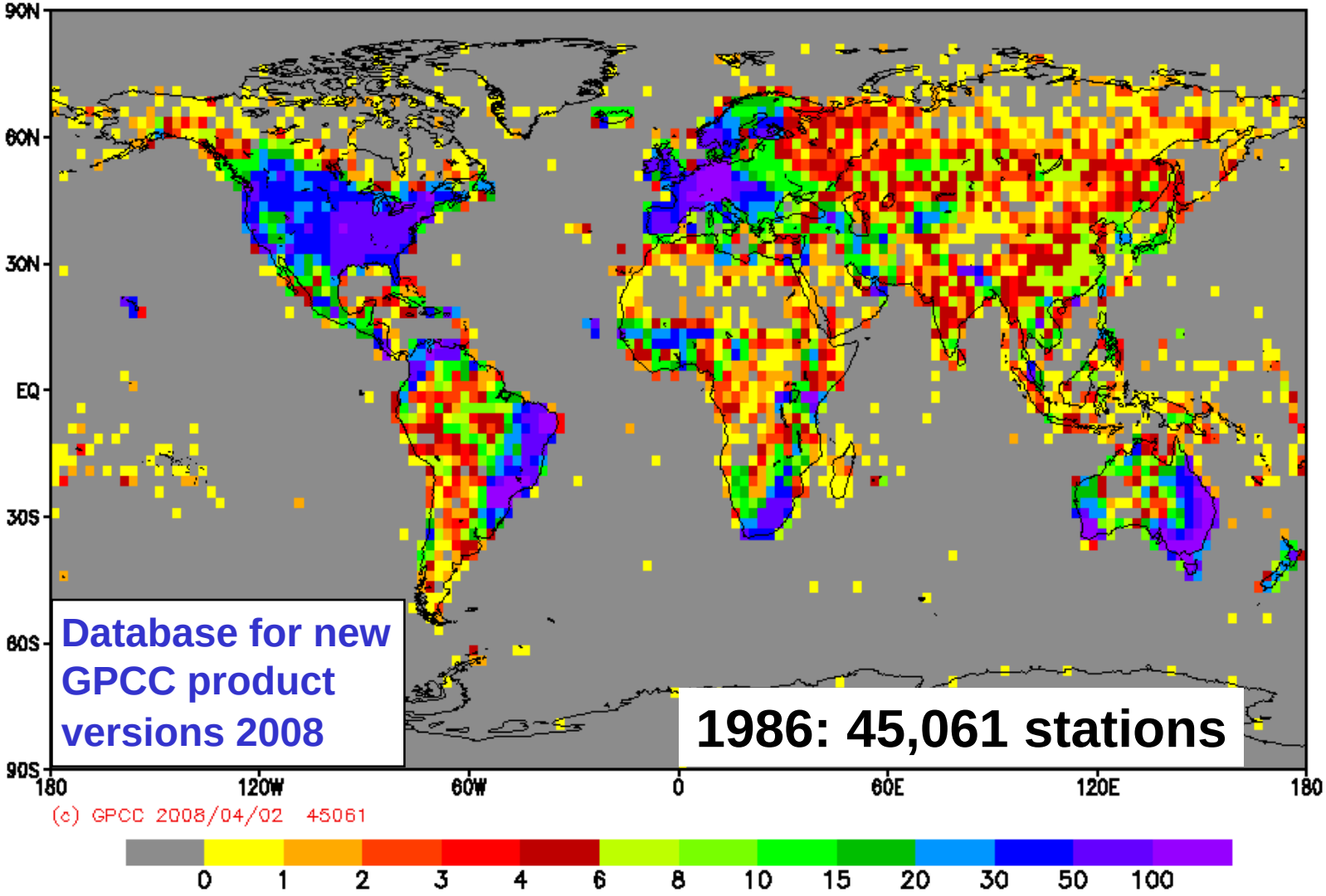
GPCC Data base



GPCC monthly precipitation stations for July 1961

Colors indicate number of stations per 2.5° x 2.5° analysis grid

GPCC Data base



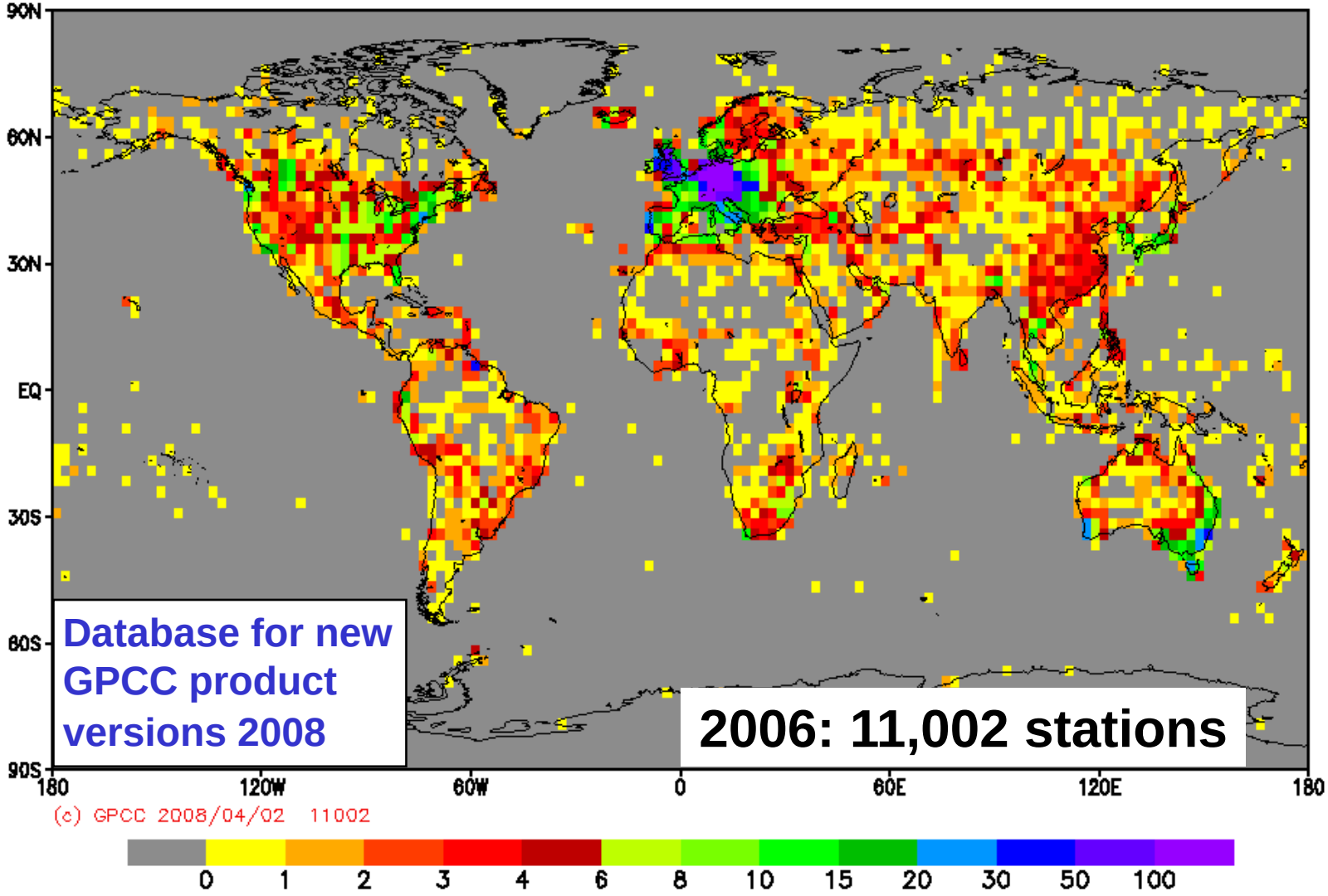
Database for new GPCC product versions 2008

1986: 45,061 stations

GPCC monthly precipitation stations for July 1986

Colors indicate number of stations per 2.5° x 2.5° analysis grid

GPCC Data base



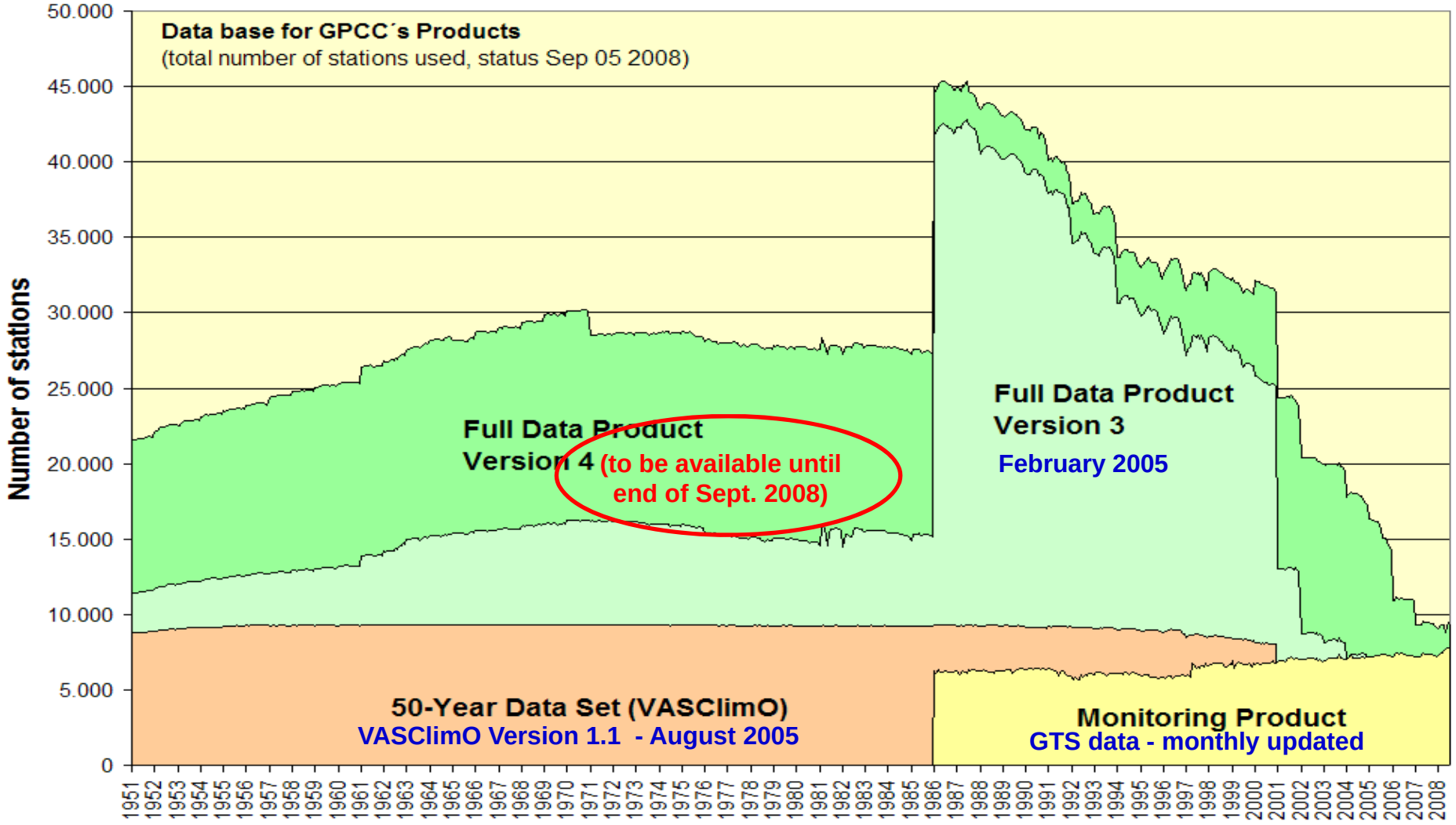
Database for new GPCC product versions 2008

2006: 11,002 stations

GPCC monthly precipitation stations for July 2006

Colors indicate number of stations per 2.5° x 2.5° analysis grid

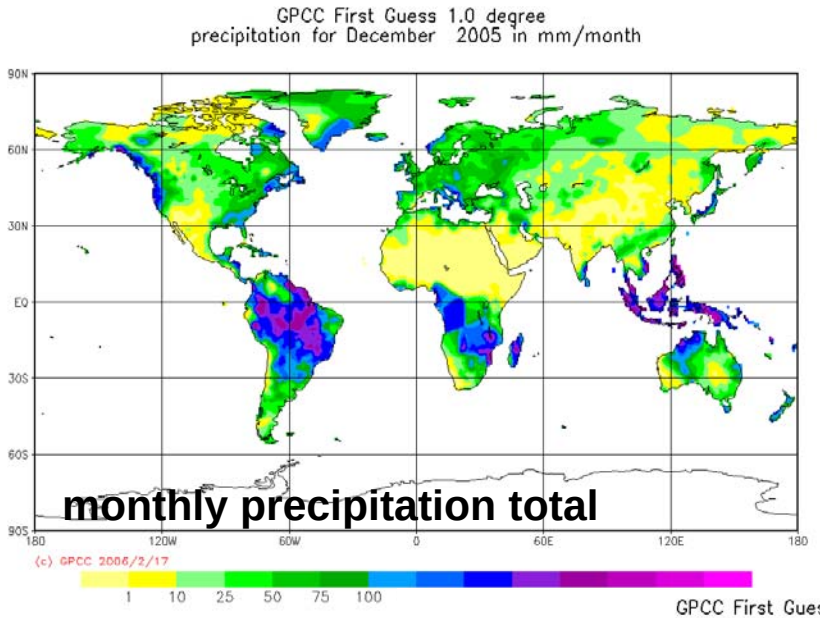
GPCC Data base

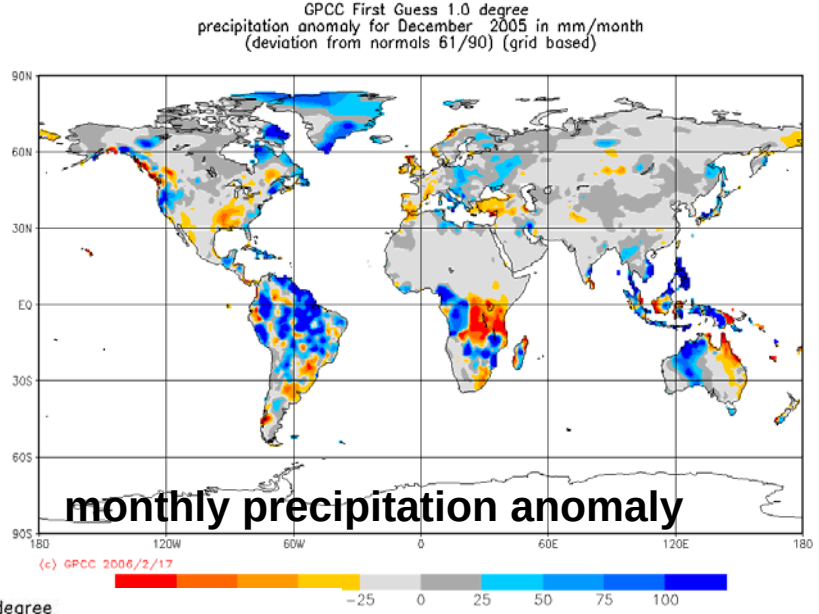


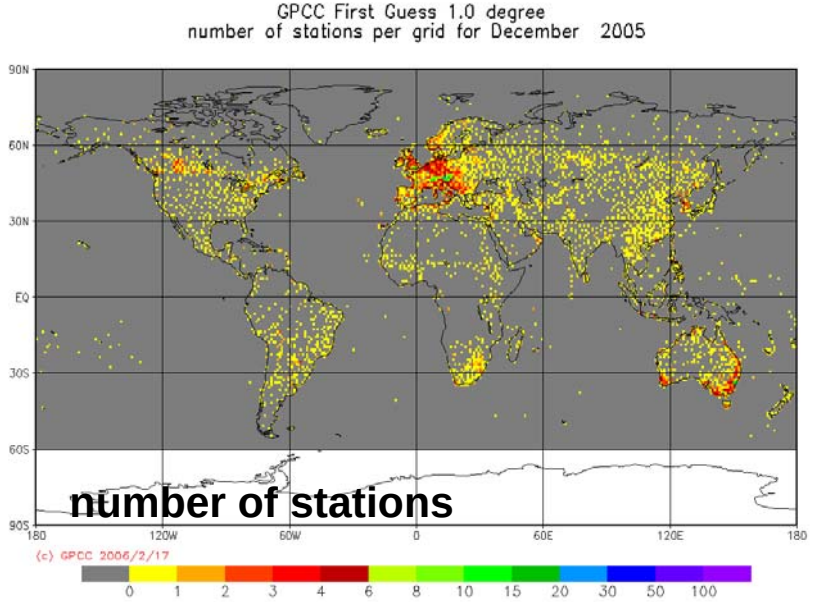
Number of stations used for the current GPCC products and for the new GPCC Full Data Reanalysis Version 4

GPCC Products and User Applications

Standard GPCC products provided on the grid







GPCC Products and User Applications

Monthly operational near real-time GPCC products

First Guess Product

Application: Drought Monitoring
(Users: FAO and other institutions)

Available: **3 - 5 days after end of month**
Data base: **6,500 stations**
Data source: **SYNOP data only**
Quality control: **automatic only**
Available products: **Only the current product**

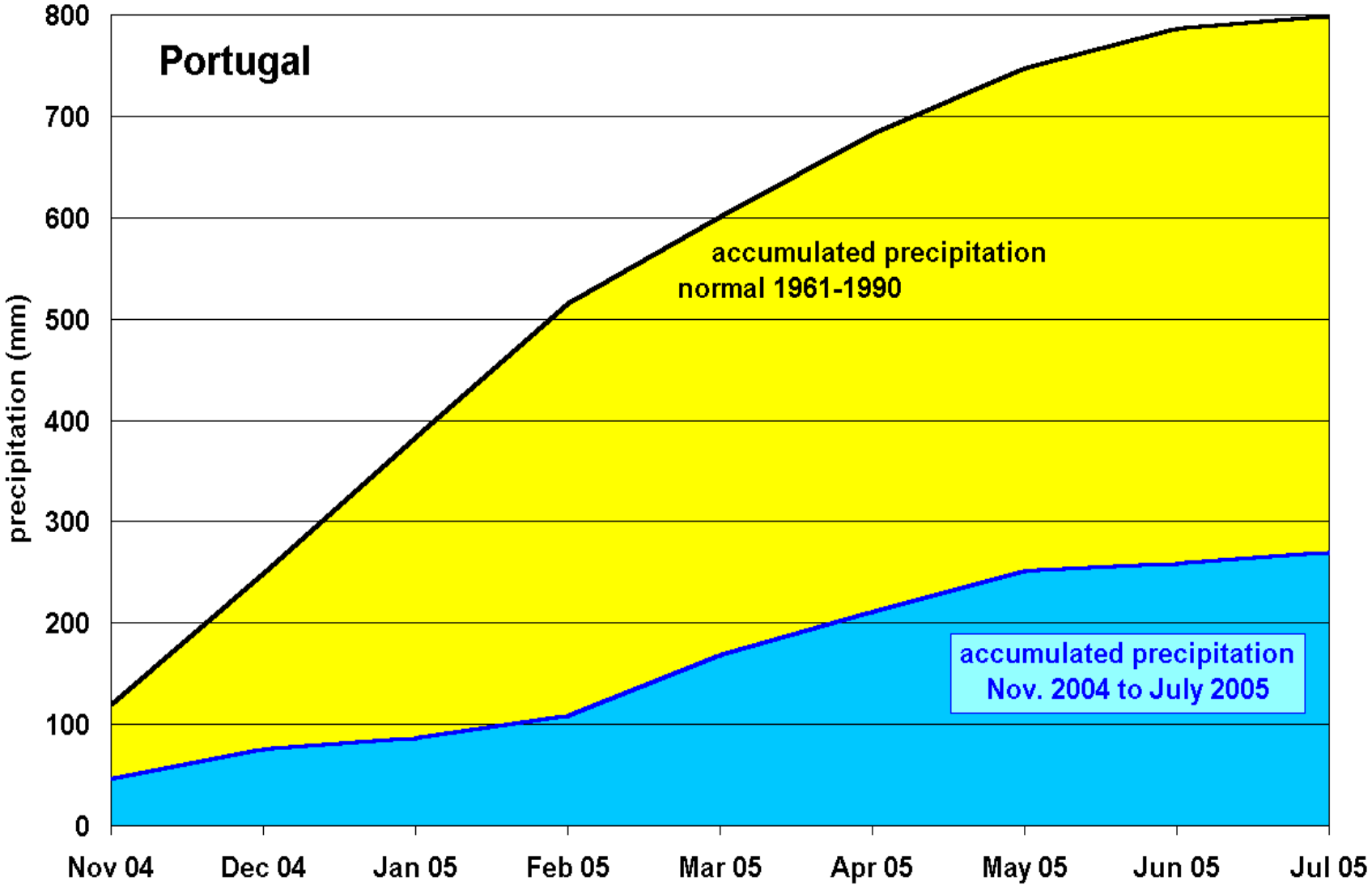
Monitoring Product

Application: Precipitation Monitoring
(Users: WCRP/GEWEX/GPCP, GCOS and other institutions)

Available: **2 months later**
Data base: **7,900 stations**
Data sources: **SYNOP data plus monthly CLIMAT and CPC**
Quality control: **automatic and visual**
Available products: **From Jan. 1986 up to near present**

GPCC Products and User Applications

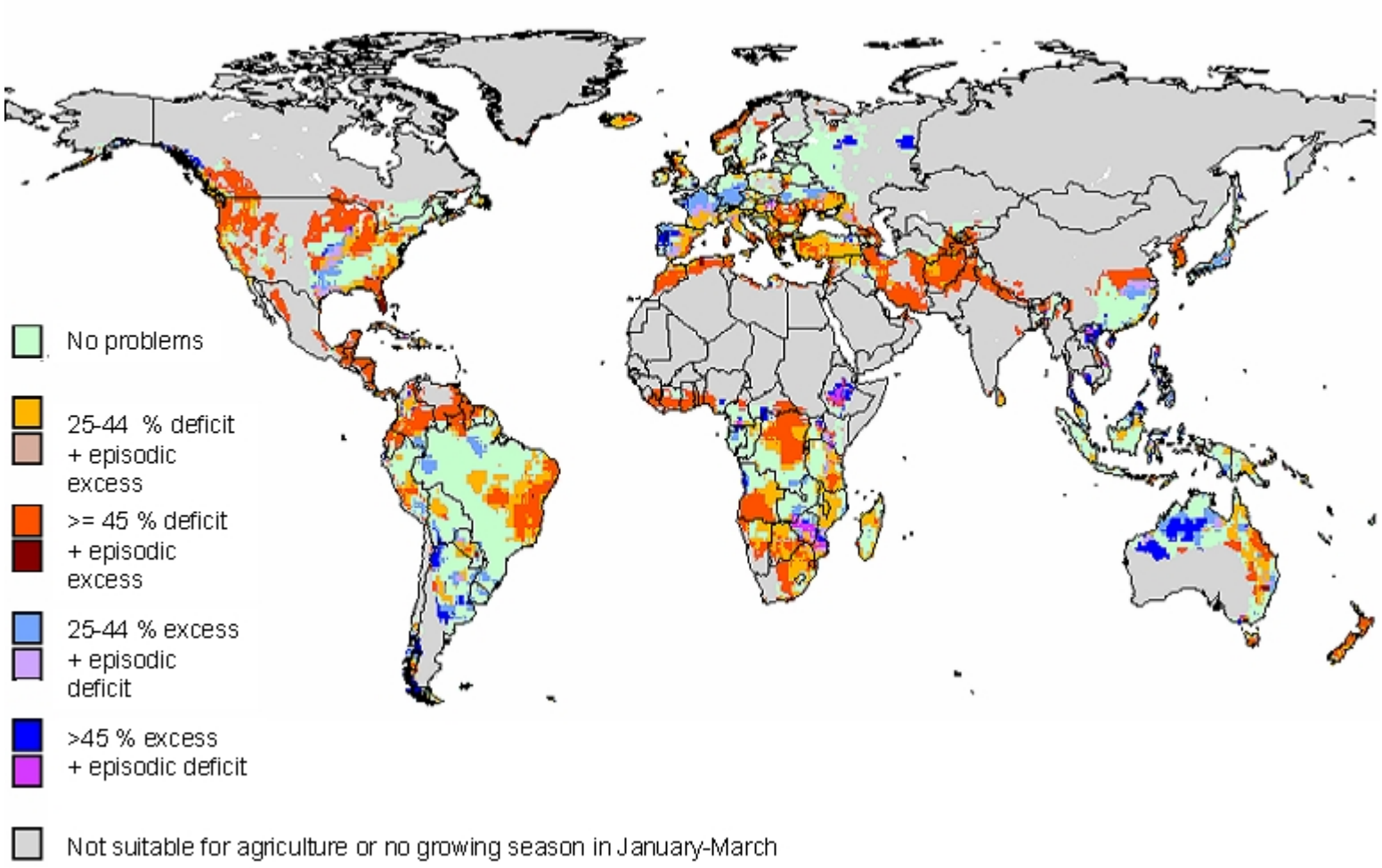
Increasing precipitation deficiency in year 2005 in South West Europe



GPCC First Guess Product based application

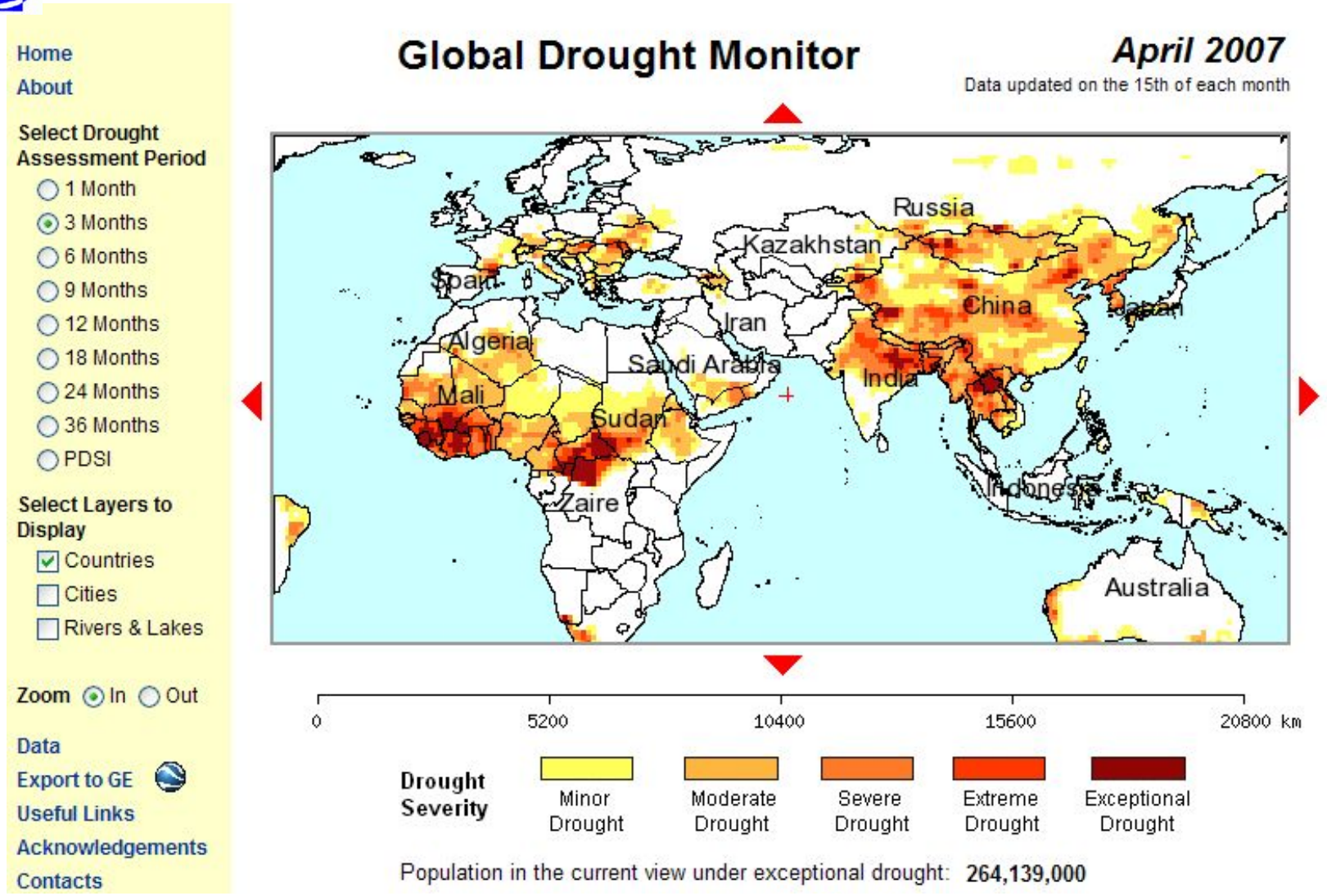
GPCC Products and User Applications

Global Water Stress Map



GPCC First Guess Product based application under development at FAO (Example provided by M. Bernardi, FAO, Rome, 2007)

GPCC Products and User Applications



Operational GPCC First Guess Product based application for the „Global Drought Monitor“ of the UCL Hazard Research Center (Web: http://drought.mssl.ucl.ac.uk)

GPCC Products and User Applications

Monthly full data base GPCC products

Full Data Reanalysis

Application: verification of models, continental water cycle studies (Users: UNESCO, GTN-H, GRDC, ECMWF, and other institutions)

Use of all data available at GPCC

- Current version 4 based on more than 70,000 stations (up to 45,000 stations in one month)
- Period: 1901 - 2007
- Quality control/assurance of meta data and monthly precipitation data

50-Year Climatology

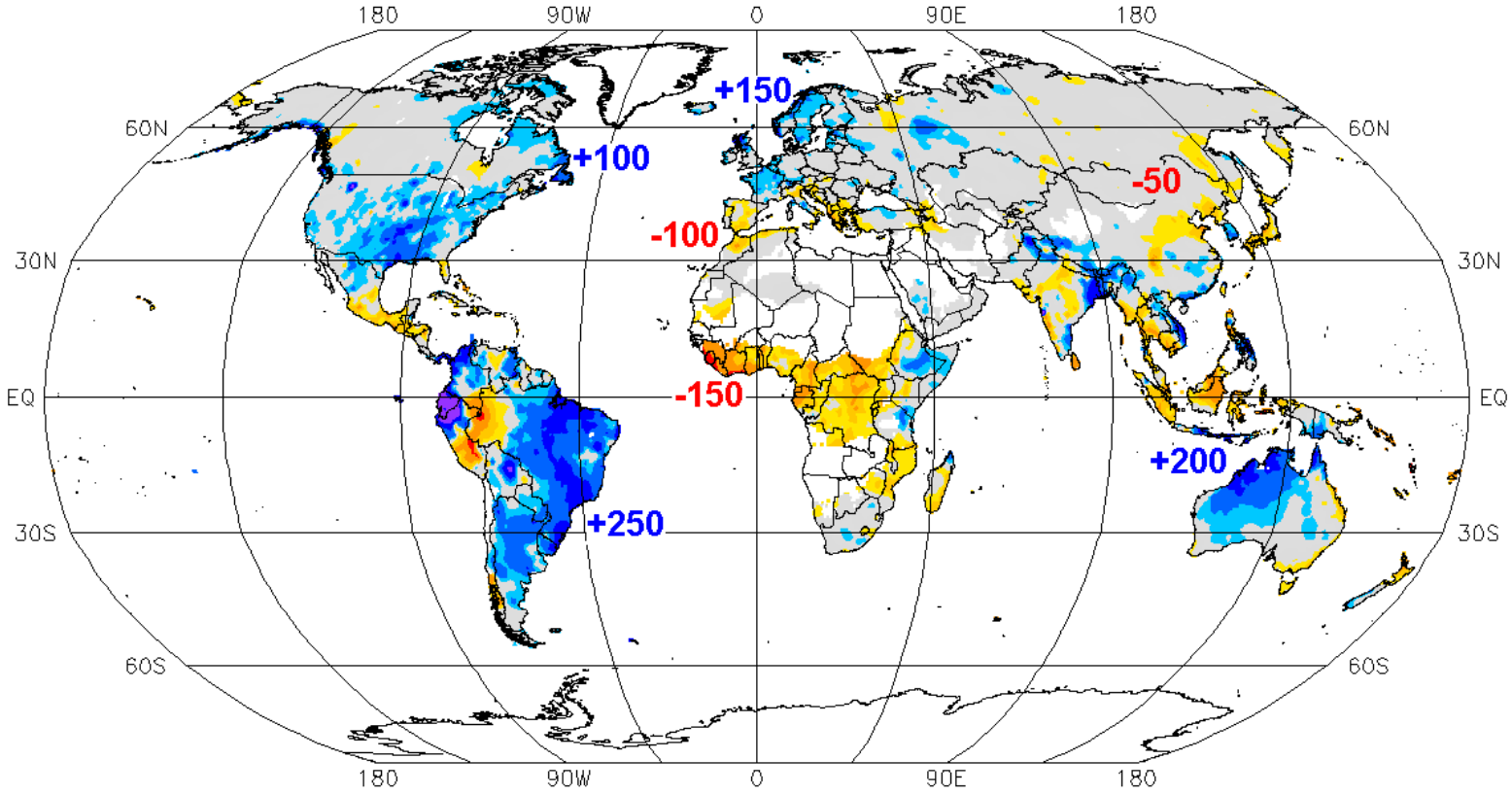
Application: climate variability and trend analysis (Users: GCOS, IPCC, and other institutions)

Use of selected data time-series

- Current Version 1.1 with 9,343 stations
- High level quality and homogeneity control analysis based on climatic background
- Period 1951 – 2000
- new analysis to be available early 2009: (extensions: 15 000 stations, 1951-2005)

GPCC Products and User Applications

GPCC 50-Year Data set:
Linear trends of annual precipitation for 1951-2000



drier **wetter**

no trend in global mean, but regional redistributions

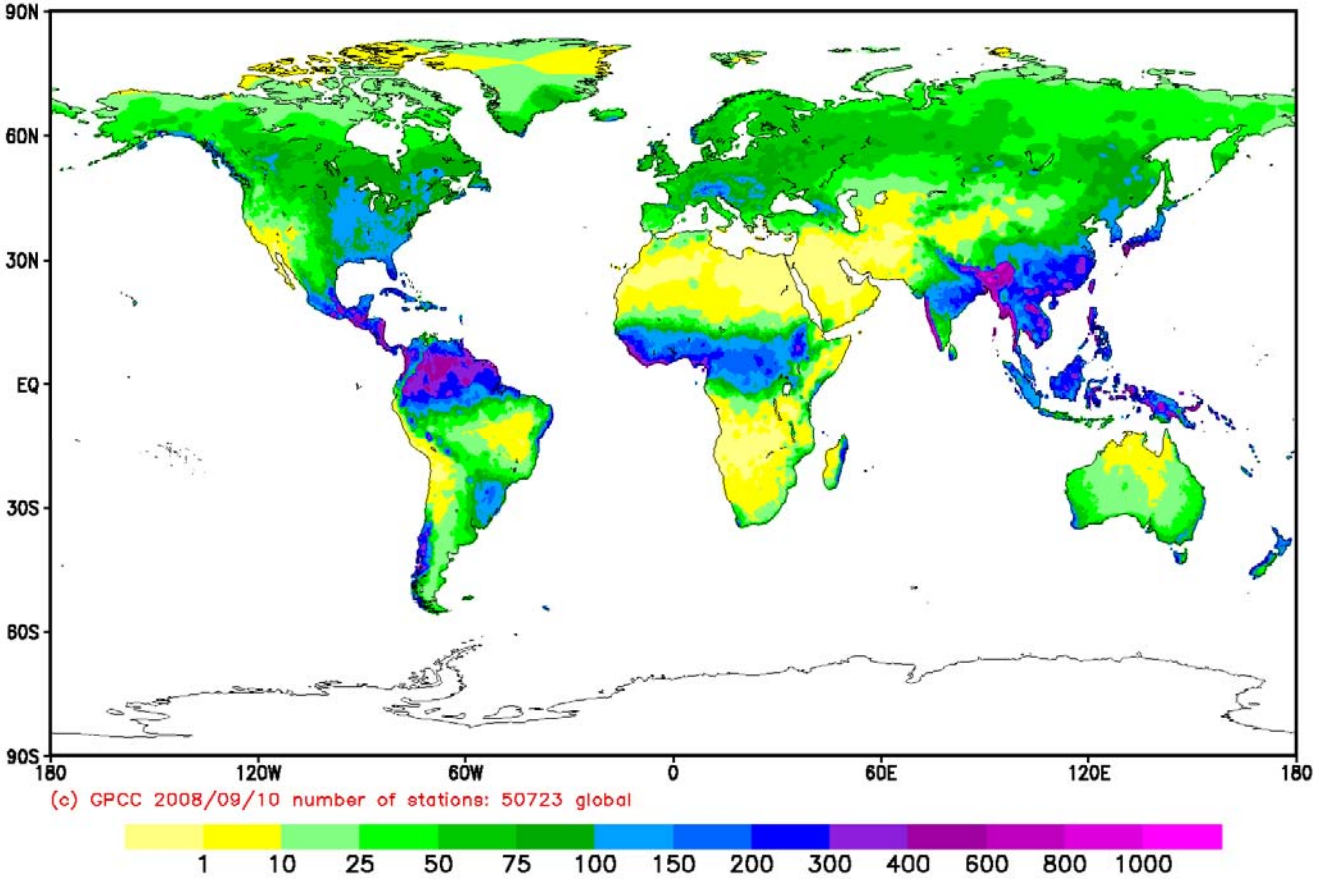
(Source: German Research Project VASClimO, C. Beck, J. Grieser, B. Rudolf, 2005)

GPCC Out Now

GPCC just finalised a new monthly Global Precipitation Climatology:

- **-> based on more than 50,000 stations with at least 10 years of data;**
- **-> intensive QC of metadata and data;**
- **-> doubling of the number of available stations compared to the previous normals;**
- **-> spatial grid resolution: 0.25°, 0.5°, 1°, 2.5°**

Example:
New GPCC Global precipitation climatology analysis for June;
spatial resolution: 0.25°



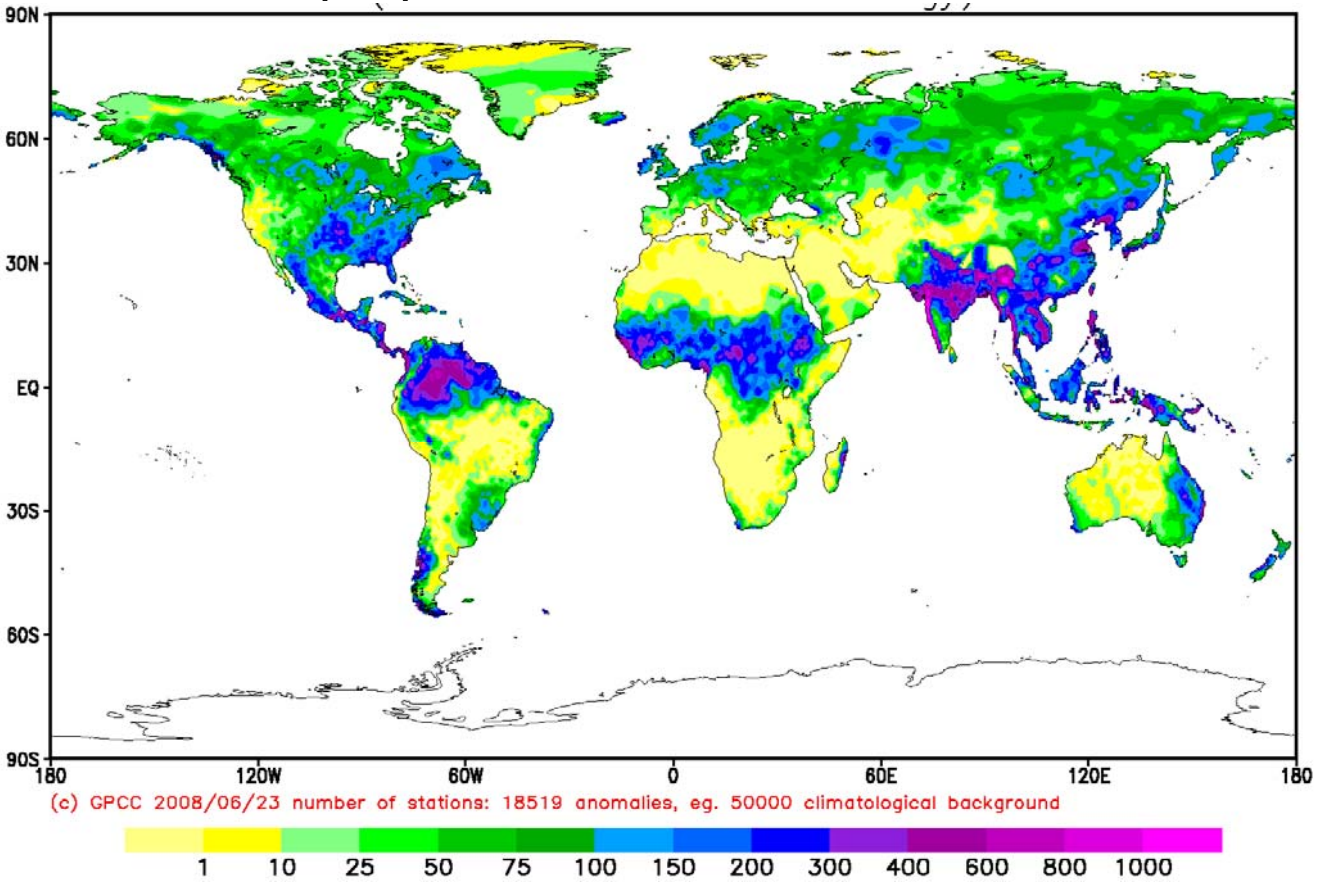
GPCC Out Now

GPCC just finalised a new

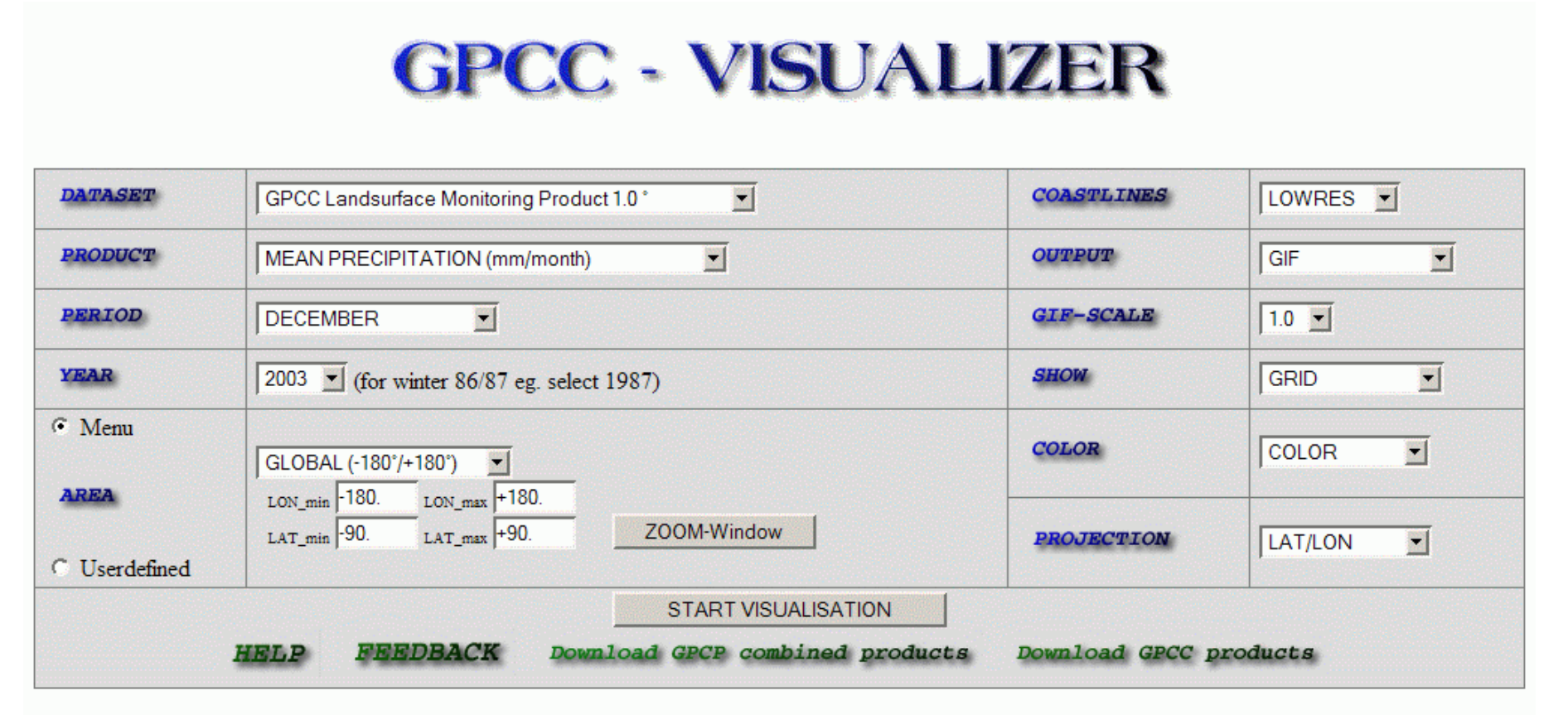
Full Data Global Precipitation Reanalysis (Version 4):

- **-> analyses for all months of the time period 1901-2007;**
- **-> intensive QC of metadata and data;**
- **-> using the GPCC global precipitation climatology as background;**
- **-> spatial grid resolution: 0.5°, 1°, 2.5°**

Example:
New GPCC Global precipitation reanalysis for July 1950;
spatial resolution: 0.5°



More Information on GPCC



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