A Global High Quality Gridded Dataset of Daily Precipitation from 1950

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Abstract

- Existing global gridded datasets of daily precipitation to investigate variability and extremes are lacking due to limited availability of high quality precipitation records
- Here we present our efforts to create a **spatially dense**, **high quality** in situ daily precipitation data for interpolation, by combining major data archives and applying an automated quality controlled process

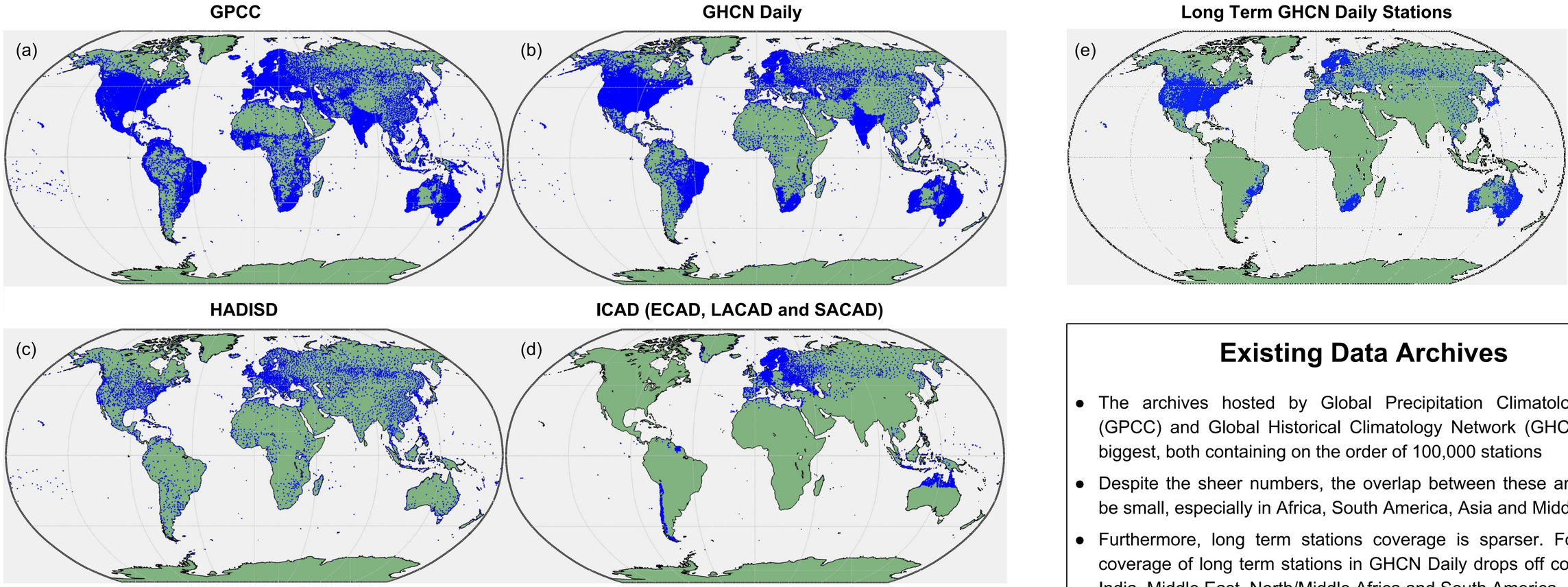
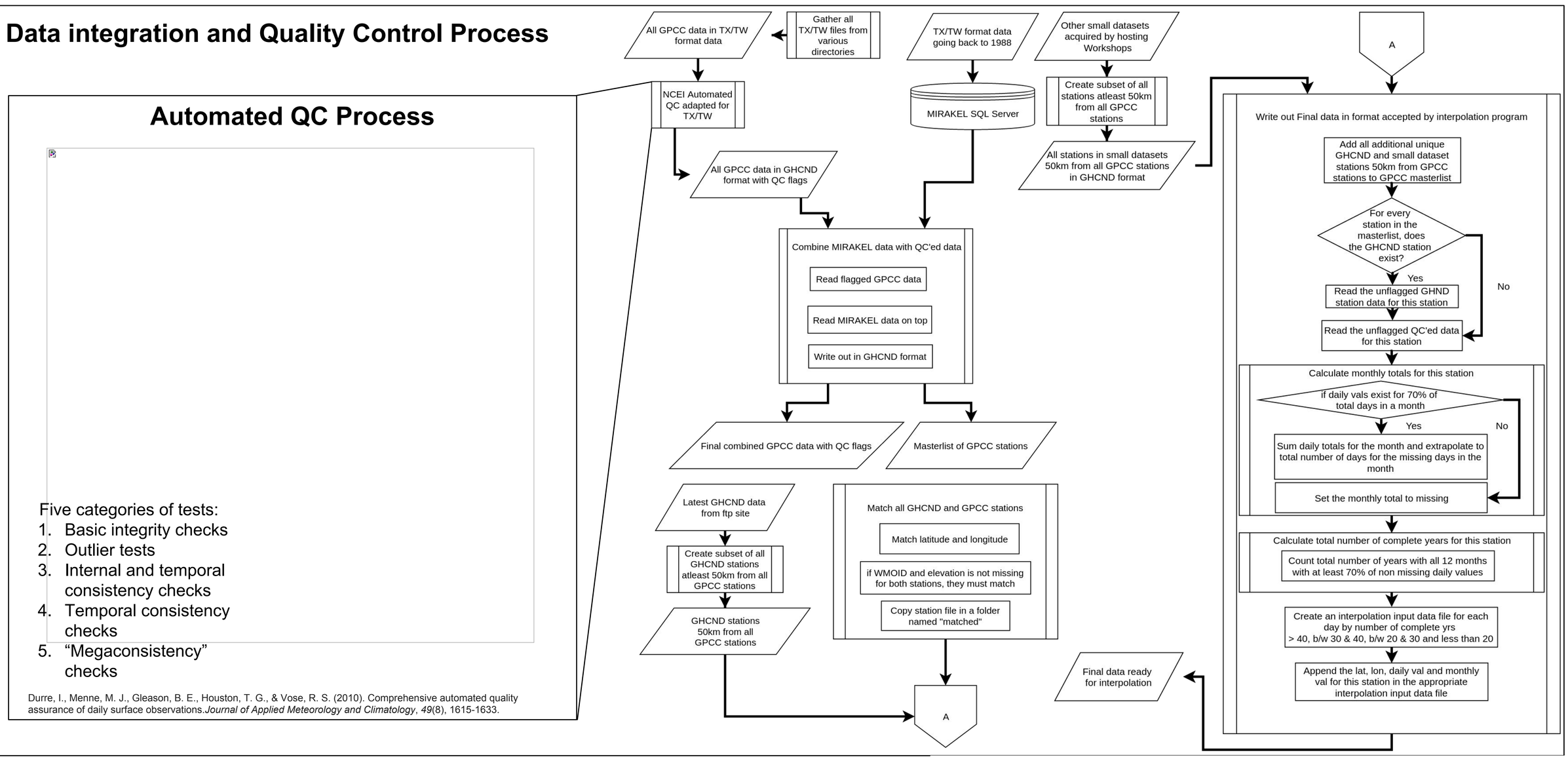


Figure 1: (a)-(d)The four biggest archives of in situ daily/sub-daily precipitation data. (e) Only the stations from GHCN-Daily containing 40 complete years of data.

Existing Data Archives

- The archives hosted by Global Precipitation Climatology Centre (GPCC) and Global Historical Climatology Network (GHCN) are the biggest, both containing on the order of 100,000 stations
- Despite the sheer numbers, the overlap between these archives can be small, especially in Africa, South America, Asia and Middle East.
- Furthermore, long term stations coverage is sparser. For e.g. the coverage of long term stations in GHCN Daily drops off completely in India, Middle East, North/Middle Africa and South America

Data integration and Quality Control Process



Automated QC Process

Five categories of tests:

1. Basic integrity checks
2. Outlier tests
3. Internal and temporal consistency checks
4. Temporal consistency checks
5. "Megaconsistency" checks

Durre, I., Menne, M. J., Gleason, B. E., Houston, T. G., & Vose, R. S. (2010). Comprehensive automated quality assurance of daily surface observations. *Journal of Applied Meteorology and Climatology*, *49*(8), 1615-1633.

Conclusions and Future Work

- The largest data archives were combined to create a raw dataset with the highest achievable spatio-temporal density
- We applied strict quality control to this dataset before using only the long term stations for interpolation
- In future, we will provide various measures of uncertainties and metadata, such as number of stations per grid cell used in interpolation, to assist users with the sensible use of this dataset.

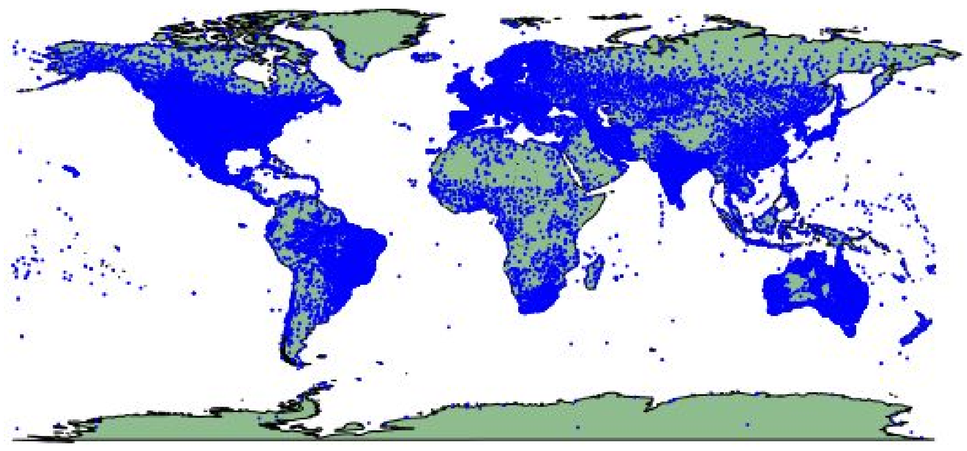


Figure 2: The locations of the final list of stations used for interpolation. There are 94,004 stations.

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