Geophysical Research Abstracts
Vol. 19, EGU2017-10271-2, 2017
EGU General Assembly 2017

A precipitation database of station-based daily and monthly measurements for West Africa: Overview, quality control and harmonization

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West Africa is a data sparse region. High quality and long-term precipitation data are often not readily available for applications in hydrology, agriculture, meteorology and other needs. To close this gap, we use multiple data sources to develop a precipitation database with long-term daily and monthly time series. This database was compiled from 16 archives including global databases e.g. from the Global Historical Climatology Network (GHCN), databases from research projects (e.g. the AMMA database) and databases of the national meteorological services of some West African countries. The collection consists of more than 2000 precipitation gauges with measurements dating from 1850 to 2015. Due to erroneous measurements (e.g. temporal offsets, unit conversion errors), missing values and inconsistent meta-data, the merging of this precipitation dataset is not straightforward and requires a thorough quality control and harmonization. To this end, we developed geostatistical-based algorithms for quality control of individual databases and harmonization to a joint database. The algorithms are based on a pairwise comparison of the correspondence of precipitation time series in dependence to the distance between stations. They were tested for precipitation time series from gages located in a rectangular domain covering Burkina Faso, Ghana, Benin and Togo. This harmonized and quality controlled precipitation database was recently used for several applications such as the validation of a high resolution regional climate model and the bias correction of precipitation projections provided the Coordinated Regional Climate Downscaling Experiment (CORDEX). In this presentation, we will give an overview of the novel daily and monthly precipitation database and the algorithms used for quality control and harmonization. We will also highlight the quality of global and regional archives (e.g. GHCN, GSOD, AMMA database) in comparison to the precipitation databases provided by the national meteorological services.