A new global precipitation dataset for climate monitoring based on rain-gauge and satellite data

U. Pfeifroth^{1,2}, J. Lenhardt¹, R. Müller¹, B. Ahrens²



Abstract

Precipitation is a central element in the global energy and water cycle. It is a sensitive parameter concerning climate change and climate variability. Monitoring precipitation is essential but not trivial.

Already existing precipitation datasets do either lack of global coverage or do offer low spatial resolution. In the framework of EURO4M (European Reanalysis and Observations for Monitoring) a new precipitation dataset will be generated by trying to integrate satellite data over oceans (HOAPS) and raingauge data over land (GPCC).

The new dataset will have almost global coverage, will span a time period of more than 20 years and will offer a spatial resolution of 0.5°. The EURO4M global precipitation dataset is intended to be suitable for climate monitoring.

Data basis for EURO4M-dataset

GPCC (Global Precipitation Climatology Centre)

- Part of GCOS (Global Climate Observation System) and WCRP (World Climate Research Programme)

- Lead by German Meteorological Service (DWD)
- Includes ~70000 rain-gauge stations from ~190 countries into a monthly dataset on a 0.5° grid
- Time period: 1901-2010



HOAPS (Hamburg Ocean Atmosphere Parameter and Fluxes from Satellites)

- Global precipitation and evaporation fields over ice-free ocean, using passive microwave measurements (SSM/I)

- Homogeneous and consistent time series

- Monthly, pentade and twice-daily precipitation data on 0.5° grid, currently from 1987 to 2005

Preliminary EURO4M precipitation dataset

EURO4M precipitation [mm/d] -150 Mean precipitation [mm/d] (1989 to 2005) of the preliminary EURO4M dataset with 0.5° resolution

Evaluation over ocean with PACRAIN data

PACRAIN (Pacific Rainfall Database) collects rainfall in a datapoor region, including data from atoll stations.



Correlation coefficient (a) and median of absolute deviations (b) of EURO4M (black), GPCP (red) and ERA-Interim (green) to PACRAIN atoll stations

Comparisons of EURO4M precipation

with GPCP (Global Precipitation Climatology Project)





Zonal means of precipitation [mm/d] (1989-2005) over ocear

with ERA-Interim (ECMWF Reanalysis)

over land



Zonal means of precipitation [mm/d] (1989-2005). over ocean

Zonal means of precipitation [mm/d] (1989-2005) over land

References/ Acknowledgement

GPCP Huffman et al. HOAPS Andersson et al. PACRAIN . Greene et a ERA-Reanalysis: nwf.int, Uppala et al GPCC:

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EURO4M European Reanalysis and Observations for Monitoring, Contact: euro4m@knmi.nl, uwe.pfeifroth@dwd.de







