

IMPROVED PRECIPITATION ANALYSES OF GPCC DUE TO STATION-RELATED CORRECTION OF DAILY PRECIPITATION VALUES REGARDING SYSTEMATIC MEASURING ERRORS

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Precipitation analyses based on conventional observations, like the operational precipitation analyses of GPCC, have to be corrected regarding systematic measuring errors of the gauges, mainly caused by wind influence and evaporation losses. This is essential before using these analyses for calibration of remote-sensing data, for verification of model results as well as for water balance assessments.

The GPCC is currently using mean monthly bulk correction factors on a 0.5°-grid, based on the statistical assessment of correction factors from worldwide more than 25000 gauges (Legates, 1987). Based on synoptic data, necessary parameters for station-related correction like wind speed at the rim of the gauge, air temperature, relative humidity and precipitation intensity can be directly or indirectly derived. Recently an on-event correction method of the systematic measuring error on a daily basis has been developed for all gauges in countries of the Baltic Sea Catchment Area (Rubel and Hantel, 1999).

This method was transferred to raingauge types, which are used worldwide, in a project of the GPCC. Literature-based information about gauge type and height of the rim of the gauge was collected for all countries of the world. Using the reported present weather, an analysis based on more than 600 000 global synoptic data from 16 winter months was done, which made it possible to relate air temperature and dew point temperature to the probable distribution of liquid, solid and mixed precipitation phase. Based on these informations, the systematic measuring error of daily precipitation totals can be calculated and on-event correction terms for wind-induced losses dependent on precipitation phase and intensity as well as climatological correction terms for evaporation and wetting losses can be added.

The operational implementation of this new method for station-related correction of daily precipitation regarding systematic measuring errors, based on synoptic data daily received from worldwide more than 6000 stations via WMO's Global Telecommunication System (GTS), will lead to a significant improvement of GPCC's precipitation analyses. This will be exemplarily demonstrated at ECAC 2000 based on recent precipitation events.

Literature

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