



## **The diurnal cycle of tropical precipitation given by satellite, model and rain gauge data**

Uwe Pfeifroth (1), Jörg Trentmann (1), Andreas H. Fink (2), and Bodo Ahrens (3)

(1) Deutscher Wetterdienst, Climate Monitoring, Offenbach, Germany (uwe.pfeifroth@dwd.de), (2) Institute for Meteorology and Climate Research, Karlsruhe Institute of Technology, Karlsruhe, Germany (andreas.fink@kit.edu), (3) Institute for Atmospheric and Environmental Sciences, Goethe-University, Frankfurt, Germany (bodo.ahrens@iau.uni-frankfurt.de)

Monitoring precipitation and its variability is essential in climate science. Traditionally, rain gauges are used for precipitation measurements, but on the global scale the density of the rain gauge network is partly weak and large gaps exist, e.g. over the oceans and in the tropics. There, satellite data is often the only available data source for precipitation information. There are various satellite-based precipitation data sets, offering quasi-global coverage and high spatiotemporal resolutions.

Here, several satellite-based precipitation data sets are evaluated in the West African tropics, with reference to high-resolution rain gauge data from the AMMA-CATCH database, in order to analyze their ability to capture the precipitation diurnal cycles as observed on the ground.

The validation shows, that, even though biases exist, the satellite-based precipitation data sets perform reasonably in getting the true diurnal cycles and its variability. Nevertheless, it is revealed that there is the tendency of some satellite-based data sets to capture the afternoon diurnal rainfall peak too late. These findings are relevant, e.g. for choosing the appropriate data set for model validations.