**Towards climate robust high-resolution precipitation monitoring and re-analysis**

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**Text :**

Precipitation is a key element of the hydrological cycle. Its amount, intensity and duration as well as changes in totals, variability and extremes have a direct impact on the community regarding e.g. water availability, droughts, and flooding. However, the IPCC AR5 WG1 report has again identified deficiencies in the capabilities of current precipitation data sets and gridded analyses in terms of coverage, geo-spatial resolution and data homogeneity, limiting confidence in assessments and their attribution to climate change. On the other hand climate change and the related adaptation pressures have enhanced the demand for timely access to accurate, consistent, reproducible and current data in particular on the essential climate variable precipitation, including its robustness for climatological assessments.

We provide an overview on recent achievements (post AR5 WG1) in precipitation monitoring specific for the supporting observational regimes (in-situ, satellite, radar and micro-link) but also through the combination, cross-calibration and re-processing of observations and ultimately through re-analyses products such as the first European coupled reanalysis of the 20th century currently built by the ERA-CLIM2 project. We want to show the current and future capability of the integrated assessment and utilization of the variety of monitoring and re-analysis approaches

* to tailor products for the growing user community
* to assess the uncertainty and reliability of precipitation products
* to increase data homogeneity for trend analysis
* to cross-fertilize purely observational and model based re-analyses
* to develop and provide a global (land & ocean) precipitation product by merging/fusing gauge and satellite information

Extreme precipitation is of particular relevance and accompanied by high vulnerabilities especially in urban areas. Here high-resolution measurements and analysis of precipitation is crucial in order to describe the hydrological response and to improve water risk management. In this context radar based precipitation climatology bears the potential to enhance the geo-temporal resolution of heavy precipitation risk maps by at least one order of magnitude. We show examples how most recent precipitation observation and re-analysis based data sets do and will contribute to the WCRP GC on ‘Understanding and Predicting Weather and Climate Extremes’ and on ‘Water Availability’ and become more and more instrumental to size measures in the field of adaptation against changing hydro-climatological backgrounds from global to urban scales.