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Evaluation of satellite-retrieved extreme precipitation using gauge observations

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Precipitation extremes have already been intensively studied employing rain gauge datasets. Their main advantage is that they represent a direct measurement with a relatively high temporal coverage. Their main limitation however is their poor spatial coverage and thus a low representativeness in many parts of the world. In contrast, satellites can provide global coverage and there are meanwhile data sets available that are on one hand long enough to be used for extreme value analysis and that have on the other hand the necessary spatial and temporal resolution to capture extremes. However, satellite observations provide only an indirect mean to determine precipitation and there are many potential observational and methodological weaknesses in particular over land surfaces that may constitute doubts concerning their usability for the analysis of precipitation extremes.

By comparing basic climatological metrics of precipitation (totals, intensities, number of wet days) as well as respective characteristics of PDFs, absolute and relative extremes of satellite and observational data this paper aims at assessing to which extent satellite products are suitable for analysing extreme precipitation events. In a first step the assessment focuses on Europe taking into consideration various satellite products available, e.g. data sets provided by the Global Precipitation Climatology Project (GPCP). First results indicate that satellite-based estimates do not only represent the monthly averaged precipitation very similar to rain gauge estimates but they also capture the day-to-day occurrence fairly well. Larger differences can be found though when looking at the corresponding intensities.