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Object-based extreme precipitation climate monitoring and statistics

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In 2017, the new high-resolution precipitation climatology RADKLIM of Deutscher Wetterdienst has been published. This data set is based on contiguous radar-based reflectivity measurements adjusted to hourly station-based precipitation totals and corrected for typical measurement errors applying specific climatological correction methods. The data set is available with a spatial resolution of 1 km x 1 km covering the German territory and temporal resolutions of one hour as well as five minutes. Derived products comprise, inter alia, a new map of precipitation erosivity (R factor of the Universal Soil Loss Equation). The assessment of the temporal evolution of historical erosivity data culminating in the latest RADKLIM-based product points to a significant increase in erosivity over the last decades due to climate change. Moreover, statistical analysis of the RADKLIM data set revealed that the risk of extreme convective precipitation is given in all regions of Germany and depends much less on orography than previously thought. Up to now, this statistical analysis has been performed pixel-wise. Within the framework of the new project KlamEx financed by the Strategic Alliance of Agencies 'Adaptation to Climate Change' we perform the first approach to identify and characterize extreme precipitation events of distinct temporal and spatial extents. The goal of the project is to objectively define independent events, to classify the extremity and characteristics of extreme precipitation objects, and to statistically analyse potential correlations to meteorological and non-meteorological parameters. In addition to the meteorological approach, data of emergency services' operations will be collected. Key questions point to the correlation between meteorological events and operations in a qualitative and quantitative way, the detection of local hot spots of heavy precipitation events, and the potential correlation to external parameters, e.g. temperature or large scale weather patterns, resulting in measures to improve risk prevention in disaster management and urban development.