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Hourly weather radar based real-time precipitation analyses for Germany

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Hydrological applications for forecasts and warnings in context of flood risk management need temporally and spatially high resoluted precipitation analyses and forecasts. Extreme precipitation events often occur on small scales and can not be properly detected or quantitatively estimated based only on in situ observed precipitation station data. Therefore the hydrometeorological department of the Deutscher Wetterdienst (DWD) developed jointly with representatives of the water management authorities of the German "Länder" high-resoluted quantitative precipitation analysis and forecast products. These products are based on a combination of in situ precipitation observations with weather radar based precipitation estimations.

The operational weather radar network of DWD comprises 16 stations, which completely cover the area of Germany every 5 minutes with precipitation scans. The precipitation analysis fields of the different radars are merged to analyses for the whole area of Germany with spatial resolution of 1 km x 1 km. The Radar Online Adjustment Procedure (RADOLAN) of DWD adjusts the radar based precipitation analyses every hour to the in situ based precipitation observations. The RADOLAN Quantitative Precipitation Estimation (QPE) fields are provided near real-time to the water management authorities of the German "Länder" as input for their hydrological models. The RADOLAN QPE fields are used as input for quantitative precipitation forecast products. Tracking procedures currently in development enable high resoluted precipitation nowcasting up to 2 hours into the future.