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Evaluating the utility obtained by using radar-based precipitation for prediction of flood events in western Black Sea basins of Turkey

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Climate change has a direct influence on the hydrological cycle and its elements. Consequently, extreme events are expected to occur more frequently at different times and locations on the Earth and become more catastrophic.Hence, it is critically important to develop systems to accurately forecast rising water levels of streams and rivers prior to occurrence of dangerous conditions. Real-time flood forecasting systems are becoming a critical tool for emergency preparedness and decision making. Given radar observations may provide high spatial and temporal resolution precipitation information, these observations are commonly used to estimate precipitation for short-term period (1-2 h) and to monitor the track and extent of the precipitation events. Therefore, their use in flood prediction becomes very critical. With the aim of developing a fully coupled atmosphere-hydrology model system, the Weather Research and Forecasting (WRF) model is enhanced by integrating a new set of hydrologic physics parameterizations (WRF-Hydro) accounting for lateral water flow occurring at the land surface. In addition to precipitation input derived from WRF, in simulating flood events with one-way coupled system, radar-derived precipitation will also be used as input to the modeling system. The performance of the modeling systems will be evaluated for the selected heavy rainfall events and associated flooding conditions over Western Black Sea basins in Turkey. Radar based precipitation information is expected to improve the accuracy of the flood simulations.