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A meteo-hydrological model intercomparison as tool to quantify forecast uncertainty at medium-sized basin scale

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In the framework of AMPHORE, an INTERREG III B EU project devoted to the improvement of the operational hydro-meteorological forecasts for the prediction and prevention of flood risks in the Western Mediterranean area, a meteo-hydrological model intercomparison has been carried out, in order to estimate the uncertainty associated with the discharge prediction. The study is performed for an intense precipitation event, which affected Northern Italy and caused a flood event of the Reno river, selected as case study within the project. Two different hydrological models have been applied over the Reno river basin, a medium-sized catchment in Northern Italy: the physically based distributed rainfall-runoff model TOPKAPI, run in a continuous way, and the physically, semi-distributed, and event-based HEC-HMS model. A comparison is conducted in terms of streamflow simulation using precipitation measures, to be aware of the performance of the two models over the selected catchment, as well as driving the hydrological models with rainfall forecasts provided by the non-hydrostatic numerical mesoscale models Lokal Modell (LM) and MM5, to evaluate the reliability of the discharge forecast resulting by the one-way coupling. Furthermore, different configurations of LM and MM5 have been adopted, trying to improve the description of the phenomena determining the precipitation amount. The accuracy of these forecasts is assessed in terms of discharge predictions resulting from the one-way coupling with TOPKAPI and HEC-HMS, employing the hydrological models as validation tools. Finally, the different scenarios of discharge flow provided in an independent way by the two different hydrological models each forced with the

two different meteorological models can be regarded as members of an ensemble of discharge prediction which enables to convey a quantification of uncertainty about the discharge forecast.