



Extreme flood prediction: maximum discharge sensitivity to increased atmospheric resolution

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Flood events become more frequent and of stronger intensity in the last decades in Romania and the SE Europe. Such episodes are associated over this area with the persistent cyclonic activity under southerly or westerly atmospheric circulation with significant atmospheric rivers transport and precipitations fallen over saturated soil, mainly during spring under snow melt conditions. The floods may have a total duration of 6-12 days and is so important to assess the extended predictions system's ability to capture these conditions in order to mitigate damages and consequences.

Are being investigate here the actual monthly weather forecasts' ability to represent regional climate conditions that are favouring extreme flooding events, over a pilot area in Romania, the Crisul Alb River Basin. For a case of an extreme flooding event on this target area it was also performed a dynamical downscaling of a sub-ensemble of the ECMWF EPS monthly forecast to 3 km resolution, using the regional climate model RegCM4.5. The downscaling model configuration was preliminarily optimised for the area under a serial of cross-parameterisation schemes tests. Both the ECMWF EPS sub-ensemble and their downscaling are coupled to the same hydrological model in order to assess changes in flood forecasts from increased spatial resolution of meteorological parameters. The hydrological model used is CONSUL. This Romanian hydrological model allows the simulation of discharge hydrographs on sub-basins, their routing and composition on the main river and tributaries and passing through the reservoirs, according to the schematic representation of how water flows and collects in Crisul Alb River Basin. After topological modelling of the Crisul Alb River Basin, according to the position of the tributaries, hydrometric stations and reservoirs that influence the regime of flow, 42 sub-basins and 19 river reaches were established for model configuration. CONSUL model was previously calibrated over the pilot area.