P44 Non-hydrostatic hydro-meteorological atmospheric simulations of extreme weather events: WRF and WRF-Hydro model applications to a case study in central Italy.

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Recently the need for improving hydro-meteorological predictions for flood, droughts and water resources has become more critical and has promoted a fully two-way coupled atmospheric-hydrologic approach. Fully coupled high-resolution models, such as the coupled WRF/WRF-Hydro system, are new generation tools designed to link multi-scale processes of the atmosphere and terrestrial hydrology and to perform coupled and uncoupled multi-physics simulation at wide range of spatial and temporal scales.

In this framework, the use of WRF-Hydro fully coupled model is compared to the classical WRF stand-alone meteorological approach to investigate the situations in which the fully coupled configuration may provide tangible improvement in the study of precipitation events and storm-runoff generation. The improved process representation of lateral redistribution and infiltration runoff and exfiltration processes provide a more complete depiction of terrestrial hydrologic states and fluxes which influence land-atmosphere energy exchanges. The two model approaches (stand-alone WRF vs. fully coupled WRF/WRF-Hydro) are explored for different temporal scales (from event to seasonal scales), with a particular focus on warm season convection.

The setup is applied to one of the most important basins in central Italy (the Tiber catchment), characterized by complex topography and annual precipitation characterized more by liquid precipitation, than by snow accumulation.