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Towards spatially distributed flood forecasts in flash flood prone areas: application to the supervision of a road network in the South of France

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Accurate flood forecasts are crucial for an efficient flood event management. Until now, hydro-meteorological forecasts have been mainly used for early-warnings in France (Meteorological and flood vigilance maps) or over the world (Flash-flood guidances). These forecasts are generally limited to the main streams covered by the flood forecasting services or to specific watersheds with particular assets like check dams which are in most cases well gauged river sections, leaving aside large parts of the territory. A distributed hydro-meteorological forecasting approach will be presented, able to take advantage of the high spatial and temporal resolution rainfall estimates that are now available to provide information at ungauged sites. The proposed system aiming at detecting road inundation risks had been initially developed and tested in areas of limited size. Its extension to a whole region (the Gard region in the South of France) will be presented, including over 2000 crossing points between rivers and roads and its validation against a large data set of actually reported road inundations observed during recent flash-flood events. These first validation results appear promising. Such a tool would provide the necessary information for flood event management services to identify the areas at risk and to take the appropriate safety and rescue measures: pre-positioning of rescue means, stopping of the traffic on exposed roads, determination of safe accesses or evacuation routes. Moreover, beyond the specific application to the supervision of a road network, this work provides also results concerning the performances of hydro-meteorological forecasts for ungauged headwaters.