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Flash Flood Hydrometeorological Early Warning Systems: recent advancements in Europe and case-study Agramunt'2015

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Heavy rainfalls are the triggering agents of a number of natural hazards affecting our society through their impacts on the outdoor exposed activities and assets. Classically floods, and specifically flash floods, have been considered the main natural hazard directly caused by heavy rainfall, but, as new areas of relevant socioeconomic interest requiring specific hazard assessment appear, this perception is moving towards the new more general paradigm of "heavy rainfall induced hazards". Regarding all these weather-affected activities, and more precisely in the case of flash floods, the main requirement is to anticipate the occurrence of heavy rainfalls with high spatial and time resolution. This capability is the crucial point to provide appropriate hazard assessment to be used by Civil Protection and other emergency management authorities. The advancements of the last decades in rainfall forecasting with Numerical Weather Prediction models have been recently completed with the improvements on the very short-term rainfall forecasting (or nowcasting) using radar rainfall composites and other complementary sensor networks. The high resolution of radar-based observations and their capability to capture the short-term evolution of the rainfall field make them a crucial source of information to anticipate the impacts of these intense rainfalls. Thus, in the last years we have seen a number of applications based on continental networks of weather radars, such as the US and Europe, achieving significant improvements in short-term rainfall forecasting that are crucial for improving the real time management and response of the risks associated to heavy rains. The presentation will focus on showing the recent advancements at European scale developing hydrometeorological Early Warning systems to support the implementation of the European Flood Directive and the need to establish risk management plans in the flood prone areas. The case-study of November 2015 in Agramunt (Lleida) will be used as illustration.