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Seamless probabilistic MUlti-source Forecasting of heavy rainfall hazards for European Flood awareness – SMUFF project

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Last years, the policies to reduce the impacts caused by severe storms and heavy precipitation include adaptive risk management approaches (e.g. the Flood Risk Management Plans promoted by the EU Flood Directive, which identified the importance of Early Warning Systems). In this context, the development of tools capitalizing on the recent advances in real-time systems (including observations, improved capacity to anticipate the phenomena and their impacts, and characterization of the uncertainty) is crucial to support decision and response.
This project, lasting the years 2018-2019, develops tools for assessing and forecasting pan-European hazards induced by severe storms and flash floods. In particular, the project will focus on (i) probabilistic nowcasting of convective storms that cause hazards in urban areas, (ii) providing a continuous hazard forecasting horizon (from 1 hour to week) by seamlessly integrating the nowcasts of precipitation with the NWP outputs of ECMWF, and (iii) developing tools to characterize the uncertainty affecting the different components of the hazard forecasting algorithms.
This supposes an extension of the tools developed in the EC Civil Protection projects HAREN, EDHIT and ERICHA. Similarly, the developments made in the project are targeted to be integrated in the very-short term forecasting layer of the European Flood Awareness System (EFAS), which is the reference system for flood monitoring and forecasting used by agents in charge of the emergency management and response. Specifically, the following development will be performed: Operational real-time, quality-controlled, multi-source, pan-European fields of heavy rainfall will be piloted by integrating rainfall estimates from the data of the EUMETNET project OPERA, rain gauges, EUMETSAT product CRR and lightning location (GLD 360) into a truly pan-European composite. From them probabilistic, rainfall nowcasts for lead times 0-6 hours are generated that are seamlessly blended (in the lead time range of 3-8 h) with the ECMWF ensemble predictions of rainfall. Algorithms that can at best generate reasonable seamless blending of the multi-source probabilistic nowcasts are so far commonly lacking. In topic (i) European-scale object-oriented cell tracking -based probabilistic nowcasts of convective heavy rainfall will be compared to nowcasts obtained with the original high time-space resolution of radar data.
The SMUFF products will be integrated into new layers on the ERICHA/SMUFF platform, including probabilistic flood hazard products based on the respective rainfall ensemble predictions. Optimal characterization of probabilities and uncertainties in the products from the end user perspective as well as real-time evaluation of the rainfall and flooding hazard assessment products and user interfaces is performed in collaboration with Civil Protection Agencies. The presentation in EGU will highlight the SMUFF project, its mid-term results and final objectives.