



An operational real-time flood forecasting system in Southern Italy

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A real-time flood forecasting system has been operating since year 2012 as a non-structural measure for mitigating the flood risk in Campania Region (Southern Italy), within the Sele river basin (3.240 km²).

The Sele Flood Forecasting System (SFFS) has been built within the FEWS (Flood Early Warning System) platform developed by Deltares and it assimilates the numerical weather predictions of the COSMO LAM family: the deterministic COSMO-LAMI I2, the deterministic COSMO-LAMI I7 and the ensemble numerical weather predictions COSMO-LEPS (16 members).

Sele FFS is composed by a cascade of three main models. The first model is a fully continuous physically based distributed hydrological model, named TOPKAPI-eXtended (Idrologia&Ambiente s.r.l., Naples, Italy), simulating the dominant processes controlling the soil water dynamics, runoff generation and discharge with a spatial resolution of 250 m. The second module is a set of Neural-Networks (ANN) built for forecasting the river stages at a set of monitored cross-sections. The third component is a Model Conditional Processor (MCP), which provides the predictive uncertainty (i.e. the probability of occurrence of a future flood event) within the framework of a multi-temporal forecast, according to the most recent advancements on this topic (Coccia and Todini, HESS, 2011). The MCP provides information about the probability of exceedance of a maximum river stage within the forecast lead time, by means of a discrete time function representing the variation of cumulative probability of exceeding a river stage during the forecast lead time and the distribution of the time occurrence of the flood peak, starting from one or more model forecasts. This work shows the Sele FFS performance after two years of operation, evidencing the added-values that can provide to a flood early warning and emergency management system.