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Efficiency of a real time flood forecasting system in the Alps and in the Apennines: deterministic versus ensemble predictions

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Real time hydrological forecasting is still a challenging task for most of the Italian territory, especially in mountain areas where both the topography and the meteorological forcing are affected by a strong spatial variability. Nevertheless there is an increasing request to provide some clues for the development of efficient real time flood forecasting systems, for warning population as well as for water management purposes. In this perspective the efficiency of a real time forecasting system needs to be investigated, with particular care to the uncertainty of the provided prediction and to how this prediction will be handled by water resources managers and land protection services.

To this aim a real time flood forecasting system using both deterministic and ensemble meteorological predictions has been implemented at University of Brescia and applied to an Alpine area (the Toce River – Piemonte Region) and to an Apennine area (the Taro River – Emilia Romagna Region). The Map D- Phase experiment (autumn 2007) was a good test for the implemented system: daily rainfall fields provided by high resolution deterministic limited area meteorological models and esemble rainfall predictions provided by coarser resolution meteorological models could be used to force a hydrological model and produce either a single deterministic or an esemble of flood forecats. Namely only minor flood events occurred in the Alpine area in autumn 2007, while one major flood event affected the Taro river at the end of November 2007. Focusing on this major event the potentials of the forecasting system was tested and evaluated with reference also to the geographical and climatic characteristics of the investigated area.