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Effectiveness and Efficiency of Early Warning Systems for Flash Floods - EWASE

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EWASE is a R&D project within the ERA-NET CRUE integrated project supported by the European Commission under the Sixth Framework Programme. The scope of the contribution is to introduce the motivation, objectives and methodology of the EWASE project which was launched in December 2006.

Flood alerts provided by Early Warning Systems (EWS) are an important element in flood risk management strategies. The potential benefit of forecasts concerning imminent floods provided by EWS is unquestioned. However, the utility of the released alerts depends on the lead time , the response time of the hydrological system as well as on the reliability of the underlying hydrometeorological and hydrological forecasts provided. Usually, a set of simulation models is used to generate rainfall, runoff and inundation forecasts. Each model is subject to diverse sources of uncertainty affecting the reliability of the simulation results. Likewise, the frequent case of malfunctioning measurement or communication devices during a flood event also influences the reliability of forecasts produced.

The issue addressed within the EWASE project centres on the assessment of the effectiveness and efficiency of EWS for medium sized river basins prone to flash floods. The approach pursued relates the concept of risk analysis to the evaluation of strategies for flood damage prevention through early warnings. For the assessment of EWS efficiency, the reliability of forecasts will be linked to the potential damage reduction

- both as a function of forecast lead time. For this purpose, two basic factors will be compared: the reliability of the provided forecasts and the economic benefit of this information, e.g. in terms of avoided damages. In particular, the different steps of the warning production chain and their qualitative impact on uncertainty propagation and forecast reliability are reviewed. Also, the uncertain factors present in risk analysis and economic evaluation are analysed. Within the scope of EWASE, two operating EWS in river basins in different climatic regions are examined (the Besòs (1020 km^2), Mediterranean climate, near Barcelona, Spain, and the Traisen (921 km^2), alpine climate, north east Austria). Historical events will be used to advance methods for the uncertainty analysis of rainfall and flood forecasts, the impact analysis of failures in EWS operation as well as the risk analysis and economic evaluation.

The outcome of the project will contribute to the comparability of the effectiveness and the efficiency of EWS with other non-structural measures as well as with structural measures in a flood risk management context. Further, it is projected to develop guidelines for the assessment of EWS giving advice to investors, planners and operators concerning benefits and limitations of EWS.