



Including flood mapping in forecasting systems

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The goal of each flood forecasting system is to determine the future flood danger with a lead time large enough so that population at risk can be evacuated. This is a complicated task since it is not enough to determine the flood peak maximum and its timing. Flood extent and water depth are information of paramount importance for an efficient evacuation plan. Fortunately, recent developments for the flood wave propagation modelling in such systems tend to replace more and more hydrological models by using hydrodynamic ones. The main advantage is that it is possible to calculate also the water level where cross-sections are available.

For many river segments flood plain modelling has been accomplished to determine the flood extent for a predefined discharge, usually the 30 and 100 years probability return discharge. For these segments, cross sections are not limited to the main river channel but extent also over the flood plain. Furthermore detailed digital elevation models are available for the flood plains because nowadays most studies are done with 2-dimensional models.

The idea is then to use data and results of these flood plain studies in flood forecasting systems so that it is possible to map the flood extent and the water depth for each model run. Because 2-dimensional models are still too computer demanding flood plain are modelled using a "quasi 2D" approach where artificial and connection channels allow to (1) set specific hydraulic parameters for the flood plain compared to the main channel and (2) propagate the water from the main channel to the flood plains and vice versa. It is then possible to map the flood extent and the water depth by "comparing"

the modelled water level on the flood plains with the detailed digital elevation model.

The present work illustrates the method and the results that can be obtained when flood mapping is incorporated in forecasting systems. This method has been used for the Enns River flood forecasting system developed recently in Styria (Austria). Whereas the total river length is around 130 km in Styria, the flood mapping could be set up for around 50 km only because detailed information is available just on this segment.