



## **Regional climate modeling and flood risk maps: an integrated hydrological and hydraulic approach**

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Regional flood risk areas mapping is an essential tool for a wide number of applications, ranging from engineering to climate change studies, and is crucial for planning effective emergency responses. The lack of large consistent floods observations, and the uncertainties of the available data sets, suggests the use of regional climate data to increase the temporal and spatial resolution of discharges information along the river network. We show the results of an integrated hydrological and hydraulic modeling approach for the risk assessment of flood-prone areas applied over the Po river (Northern Italy) at 90m resolution, in which the river discharges are obtained by the hydrological model CHyM driven by the regional climate model RegCM4 at 12 km resolution. The discharges are used to produce the Synthetic Design Hydrographs (SDHs) for different return periods which are processed by the CA2D-par hydraulic model in order to create the flood risk maps.

The maps for each return period are compared to those obtained with the river discharges produced by the hydrological model CHyM driven by rainfall data observed from the ACQWA project. The "RegCM driven" produced flood hazard maps for return periods of 50, 100, 500 and 1000 years are in good agreement both with reference maps and with the "observations driven" flood hazard maps suggesting strong potential of this approach for future applications.