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Expert-based spatial modelling of socio-economic vulnerability in the Salzach catchment – An approach to derive spatial vulnerability units

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In the frame of the FP6 research project BRAHMATWINN (Twinning European and South Asian River Basins to enhance capacity and implement adaptive management approaches) an approach has been developed to model vulnerability to floods and tested in the catchment of the Salzach River, Austria. A major objective of the project is the integration of different indicators (social and environmental) within the DPSIR-Framework and the delineation of spatially integrated units, so-called hydrological response units, in the case study areas of the Danube and Brahmaputra river basin.

To assess, next to environmental and physical factors, the social domain, a joint vulnerability approach has been developed. Vulnerability to a hazard is therefore defined as a function of sensitivity and adaptive capacity, whereas adaptive capacity can be summarised as a relationship of resilience and social skills. This approach is being applied to both river basins. Specific and suitable indicators have been identified for the different settings of test areas in Asia, whereas in the European test area an asset based approach has been chosen.

The overall aim of the work conducted is to derive spatial vulnerability units (VulnUs) for a sub-catchment of the Salzach river basin. The case study site is characterised by the urban agglomerate of the City of Salzburg, rural and mountainous areas. The area is generally prone to floods as the Salzach River is one of the most regulated rivers in the Eastern Alps.

The project attempts to integrate various publicly available georeferenced datasets from sources such as governmental spatial data infrastructures and grid-based results of the Austrian census.

For each domain, conceptualised in the pre-defined vulnerability approach, indicators have been chosen. In a further step, local stakeholders and experts have been identified to weight the different indicators. The weights are being integrated to model sensitivity, adaptive capacity and vulnerability respectively. Methodologies applied include weighted linear combination and regionalisation algorithms. As a result, spatial units have been identified which represent common characteristics of vulnerability. Additionally risk maps have been derived through the integration of modelled and observed flood probabilities.