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Development of a Spatial Decision Support System for Analyzing Changes in Hydro-meteorological Risk

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In the framework of the EU FP7 Marie Curie ITN Network "CHANGES: Changing Hydro-meteorological Risks, as Analyzed by a New Generation of European Scientists (http://www.changes-itn.eu)", a spatial decision support system is under development with the aim to analyze the effect of risk reduction planning alternatives on reducing the risk now and in the future, and support decision makers in selecting the best alternatives.
The SDSS is one of the main outputs of the CHANGES network, which will develop an advanced understanding of how global changes, related to environmental and climate change as well as socio-economical change, may affect the temporal and spatial patterns of hydro-meteorological hazards and associated risks in Europe; how these changes can be assessed, modeled, and incorporated in sustainable risk management strategies, focusing on spatial planning, emergency preparedness and risk communication. The CHANGES network consists of 11 full partners and 6 associate partners of which 5 private companies, representing 10 European countries. The CHANGES network has hired 12 Early Stage Researchers (ESRs) and is currently hiring 3-6 researchers more for the implementation of the SDSS.
The Spatial Decision Support System will be composed of a number of integrated components. The Risk Assessment component allows to carry out spatial risk analysis, with different degrees of complexity, ranging from simple exposure (overlay of hazard and assets maps) to quantitative analysis (using different hazard types, temporal scenarios and vulnerability curves) resulting into risk curves. The platform does not include a component to calculate hazard maps, and existing hazard maps are used as input data for the risk component. The second component of the SDSS is a risk reduction planning component, which forms the core of the platform. This component includes the definition of risk reduction alternatives (related to disaster response planning, risk reduction measures and spatial planning) and links back to the risk assessment module to calculate the new level of risk if the measure is implemented, and a cost-benefit (or cost-effectiveness/ Spatial Multi Criteria Evaluation) component to compare the alternatives and make decision on the optimal one. The third component of the SDSS is a temporal scenario component, which allows to define future scenarios in terms of climate change, land use change and population change, and the time periods for which these scenarios will be made. The component doesn't generate these scenarios but uses input maps for the effect of the scenarios on the hazard and assets maps. The last component is a communication and visualization component, which can compare scenarios and alternatives, not only in the form of maps, but also in other forms (risk curves, tables, graphs). The envisaged users of the platform are organizations involved in planning of risk reduction measures, and that have staff capable of visualizing and analyzing spatial data at a municipal scale. This paper presents the main components of the SDSS and the overall design and plans for the user interface.