Geophysical Research Abstracts
Vol. 15, EGU2013-6915, 2013
EGU General Assembly 2013

A methodology for the assessment of flood hazards at the regional scale

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In recent years, the frequency of water-related disasters has increased and recent flood events in Europe (e.g. 2002 in Central Europe, 2007 in UK, 2010 in Italy) caused physical-environmental and socio-economic damages. Specifically, floods are the most threatening water-related disaster that affects humans, their lives and properties.
Within the KULTURisk project (FP7) a Regional Risk Assessment (RRA) methodology is proposed to evaluate the benefits of risk prevention in terms of reduced environmental risks due to floods.
The method is based on the KULTURisk framework and allows the identification and prioritization of targets (i.e. people, buildings, infrastructures, agriculture, natural and semi-natural systems, cultural heritages) and areas at risk from floods in the considered region by comparing the baseline scenario (i.e. current state) with alternative scenarios (i.e. where different structural and/or non-structural measures are planned). The RRA methodology is flexible and can be adapted to different case studies (i.e. large rivers, alpine/mountain catchments, urban areas and coastal areas) and spatial scales (i.e. from the large river to the urban scale). The final aim of RRA is to help decision-makers in examining the possible environmental risks associated with uncertain future flood hazards and in identifying which prevention scenario could be the most suitable one. The RRA methodology employs Multi-Criteria Decision Analysis (MCDA functions) in order to integrate stakeholder preferences and experts judgments into the analysis. Moreover, Geographic Information Systems (GISs) are used to manage, process, analyze, and map data to facilitate the analysis and the information sharing with different experts and stakeholders.
In order to characterize flood risks, the proposed methodology integrates the output of hydrodynamic models with the analysis of site-specific bio-geophysical and socio-economic indicators (e.g. slope of the territory, land cover, population density, economic activities) of several case studies in order to develop risk maps that identify and prioritize relative hot-spot areas and targets at risk at the regional scale. The main outputs of the RRA are receptor-based maps of risks useful to communicate the potential implications of floods in non-monetary terms to stakeholders and administrations.
These maps can be a basis for the management of flood risks as they can provide information about the indicative number of inhabitants, the type of economic activities, natural systems and cultural heritages potentially affected by flooding. Moreover, they can provide suitable information about flood risk in the considered area in order to define priorities for prevention measures, for land use planning and management. Finally, the outputs of the RRA methodology can be used as data input in the Socio- Economic Regional Risk Assessment methodology for the economic evaluation of different damages (e.g. tangible costs, intangible costs) and for the social assessment considering the benefits of the human dimension of vulnerability (i.e. adaptive and coping capacity).
Within the KULTURisk project, the methodology has been applied and validated in several European case studies. Moreover, its generalization to address other types of natural hazards (e.g. earthquakes, forest fires) will be evaluated. The preliminary results of the RRA application in the KULTURisk project will be here presented and discussed.