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Open Source and Open Standard based decision support system: the example of lake Verbano floods management.

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The Locarno area (Switzerland, Canton Ticino) is exposed to lacual floods with a return period of about 7-8 years. The risk is of particular concern because the area is located in a floodplain that registered in the last decades a great increase in settlement and values of the real estates. Moreover small differences in lake altitude may produce a significant increase in flooded area due to the very low average slope of the terrain. While fatalities are not generally registered, several important economic costs are associated, e.g.: damages to real estates, interruption of activities, evacuation and relocation and environmental damages.

While important events were registered in 1978, 1993, 2000, 2002 and 2014 the local stakeholder invested time and money in the set-up of an up-to-date decision support system that allows for the reduction of risks.

Thanks to impressive technological advances the visionary concept of the Digital Earth (Gore 1992, 1998) is being realizing: geospatial coverages and monitoring systems data are increasingly available on the Web, and more importantly, in a standard format. As a result, today is possible to develop innovative decision support systems (Molinari et al. 2013) which mesh-up several information sources and offers special features for risk scenarios evaluation. In agreement with the exposed view, the authors have recently developed a new Web system whose design is based on the Service Oriented Architecture pattern. Open source software (e.g.: Geoserver, PostGIS, OpenLayers) has been used throughout the whole system and geospatial Open Standards (e.g.: SOS, WMS, WFS) are the pillars it rely on.

SITGAP 2.0, implemented in collaboration with the Civil protection of Locarno e Vallemaggia, combines a number of data sources such as the Federal Register of Buildings and Dwellings, the Cantonal Register of residents, the Cadastral Surveying, the Cantonal Hydro-meteorological monitoring observations, the Meteoswiss weather forecasts, and others. As a result of this orchestration of data, SITGAP 2.0 serves features that allows, for example, to be informed on active alarms, to visualize lake level forecasts and associated flooding areas, to evaluate and map exposed elements and people, to plan and manage evacuation by searching for people living in particular areas or buildings, by registering evacuation actions and by searching for evacuated people.

System architecture and functionalities, and consideration on the integration and accessibility of the beneath information together with the lesson learnt during the usage of the system during the last floods of November 2014, provides interesting discussion points for the identification of current and future needs.