PREVIEW Service 2: forecasting shallow rapid landslides

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PREVIEW (Prevention, Information and Early Warning, pre-operational services to support the management of risks) is an European Commission FP6 Integrated Project with the aim of developing, at a European level, innovative geo-information services for atmospheric, geophysical and man made risks. Within this framework, Service 2 (Prediction of shallow rapid slope movements) of the Landslides Platform has the objective of developing an integrated procedure for the forecasting and warning of distributed shallow landsliding to be used for civil protection purposes. The service will blend advanced techniques from different fields and involving different tools: meteorology, hydrology, geologic modelling, remote sensing and GIS.

The service is being developed in a pilot test site in Italy, the Armea river basin, located in the Province of Imperia, Liguria, in NE Italy. Two field campaigns have been carried out for collecting data for the development and calibration of the models that will be applied within the service.

The topographic base that will be used for the modelling is a DEM with a cell size of 5 m specifically created for this purpose by digitizing a large scale contour map. A distinctive feature of the service being developed is the use of an innovated soil depth model for predicting the distributed thickness of the soil (depth-to-bedrock) within the basin, one of the most important parameters controlling shallow landslide triggering. Data from a probabilistic downscaled short term rainfall forecast will be used to estimate soil saturation and meteorological radar outputs will be employed to determine

overall system evolution in the very short term (less than 6 hours lead time). The final step regards the use of hydrogeological modelling to calculate the distributed factor of safety on a pixel-by-pixel basis. The infinite slope model is used for this purpose. Validation of the service will make use of two rainfall events: one that occurred in 2000, which triggered numerous superficial landslides but for which the rainfall data is less well-known and a smaller, more recent event (2006) that caused fewer landslides but for which more information is available, including a high-resolution optical satellite image.

Once fully developed the entire service will run within a WebGIS system so that end-users involved in PREVIEW can interactively access and download data. Currently, the end-users interested in the development of the service in the Armea basin are the Italian Department of Civil Protection and the Agency for Environmental Protection of the Liguria Region (ARPAL).