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The FlaIR regional model in landslide early warning.

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Over recent years, the link between rainfall and landslides has been the focus of many studies. The analytical approaches which can be found in the specific technical literature differ greatly in terms of methodology and formulation.
The methodology here proposed concerns the hydrological FLAIR model (Forecasting of Landslides Induced by Rainfall - Sirangelo & Versace 1992) that was applied following a regional approach.
Regional models are, often, the only alternative when it is necessary to predict the triggering of landslide movements in vast areas where there is concern not only about the reactivation of pre-existing movements, but also activation of new movements whose exact location is unforeseeable.
The regional FLaIR model was used for studying the hydrogeological events which have occurred in the Region of Calabria (South Italy) over the winters from 2008 to 2010, during which heavy, persistent rainfalls have placed the security of tens of thousands of people in great trouble, involving nearly the entire region as more than 1,600 events, from landslides and flood rivers.
The University of Calabria, through CAMILab, Centre of Competence of the National Department of Civil Protection, has developed a systematic study of the events recorded over this period, carrying out on-the-spot investigations, analysing photographic documentation, images and news provided by local television, the press and governmental organisations (Versace et al. 2011).
Following the procedures proposed by FLaIR model, a comparison was made of the events foreseen by the model and those which actually occurred, estimating the number of Correct Alarms (CA), Missed Alarms (MA) and False Alarms (FA), which are the principal indicators for evaluating how efficacious and efficient the various models are. The results presented in this work show that the model is highly capable of predicting the different events, with a limited number of MA.
Even by comparison with the results obtained by employing the rainfall thresholds of the Calabria region, the regional FLaIR model provide better performance, encouraging the use and the improvements of the approach.
In the work, first alluvial events in Calabria during the 2008-2010 period will be summarized, then the areal model will be described and, finally, the results of this application will be analyzed, indicating strategies to improve further the efficiency of the model.