Early warning system based on the history of disasters in a region

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We propose an early warning system that would tackle the issue of enhancing the analysis of available information, prior to a possible flooding event whose probability to occur is justified by meteorological events that are part of a geographical area's history. Meteorological and hydrological information, together with GIS procedures and various other pieces of information are parts of this informational system that can be used to offer information and various suggestions for action to those interested in the hazard of extreme weather events and flooding that a particular region is prone to, and also in the mitigation of a possible disastruous aftermath of such an event.

The approach we are using is based on the history of flooding events caused by precipitation, not on their simulation. This is due to the fact that the system will be used to obtain as fast as possible a raw estimation of the damage that a flood would cause in an area, the system being operated simultaneously with, or before the development of a potentially dangerous situation (for example, when heavy rain is falling upstream a small river that passes through several settlements). Due to the nature of this system, after it has been consulted, decisions would have to be made in regard to which situation on the ground exactly, and to which meteorological situation and events more attention should be payed ahead of an event that may occur during conditions similar to those of a previous one. Whereas, when running a simulation of such an event with a dedicated hydrological model in order to obtain an accurate prediction for water levels, one would waste valuable time spanning from a few hours to days until the results are ready, depending on the input parameters of the model and the processing power of the computers that the model would be run onto.

An operator would provide data to the system on the current synoptic and mesoscale meteorological context, and then various information would be presented about the flooding events that have occured in a similar context. Also, information about the disasters in an area would be obtainable, based on settlement identifiers.

The advantages of such a system are: linking various pieces of information based on unique identifiers for events and settlements; prompt analysis of the consequences of disastruous events in the past, and their projection into the current meteorological and hydrological context; providing information that has proven useful during past events, that can be used if the current hazard comes to incident in the interest area (for example, which escape routes to use).

The disadvantages of this system are inherently linked to the precision of the assessment made by its operators of the current meteorological and hydrological context, and to landscape configuration, use and modification during the time between any two disasters.

However, as a fast analysis system on past and probable disasters, and as a tool that can be used by the meteorologist and hydrologist who has to prepare a warning for a certain area, this system is useful in the aforementioned limits.