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Integrative landslide early warning systems within the ILEWS project

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This poster provides a brief overview on the ILEWS project (Integrative Landslide Early Warning Systems) which aims to develop and implement modular and transferable landslide early warning systems for local and regional scales. Experts from different backgrounds are involved in the project including natural and social scientists. The projects' methodological architecture spans from field installations of novel sensor combinations and near-real time landslide modelling to action advises in correlation to actual needs of the end-user.
The project consists of three clusters: Monitoring, Modelling and Implementation.
The cluster Monitoring is concerned with the measurement of landslide controlling factors and the landslide movement itself. These key factors include meteorology, soil moisture conditions, surface and sub-surface movement rates. Historical data is included to gain a better understanding of frequency-magnitude correlations of past events.
The cluster Modelling applies and combines three early-warning systems on the local scale. A physical-based calculation of slope stability is carried out with a WebGIS application of CHASM (Combined Hydrology And Stability Model). Movement characteristics are analysed using the progressive failure method. Further on a statistical analysis of all measured data is used to define critical thresholds initiating landslide movement. Regional analyses are based on rainfall thresholds regarding the antecedent soil-water status.
The cluster Implementation defines protection goals and damage potentials. Alternative risk management strategies and possible outcomes are identified and communicated with the end-users involved. First results show that local authorities are not interested in precise information about current situation. They simply need brief information (e.g. a flashing red light) if the the situation is critical. These findings are the basis for further steps in the clusters Monitoring and Modelling.
The slope under investigation is located in the Swabian Alb in SW-Germany and comprises a reactivated complex rotational landslide which shows extremely slow movement rates. Seasonal reactivations cause reoccurring damages to at least one building. Further on, research is carried out in the region of South Tyrol, Italy.