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Overview of Existing Landslide Early-Warning Systems in Operation

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The project SafeLand is intended to develop generic risk management tools and strategies for landslides. Indeed, the intention of the screening study is to provide guidelines that will help and facilitate the establishment of new early warning systems (EWS) and to increase the quality of existing systems (Bazin et al., 2012). Consequently, one of the first steps is to merge actual knowledge and expert judgments. Thus, as part of this study, we gathered experiences from organizations in charge of landslide EWSs and risk management in order to compile information about the state of the art technologies and existing strategies. To ensure those objectives, a questionnaire was produced by UNIL, ICG and ÅTB. Divided in 5 parts, the questionnaires collected information about:

1. General information on the unit in charge of the EWS;
2. Knowledge about the monitored landslide;
3. Pre-investigations used to design the EWS;
4. Monitoring parameters, thresholds and sensors evaluation;
5. Warnings, communications and decision making process.

Finally, sent in June 2011 to about hundred organizations in charge of one or several EWS, 14 institutions from 8 countries sent the questionnaires back during the summer and autumn 2011, speaking about 23 landslides. The compilation and analysis of the most interesting answers are the scope of this poster.

First, there are no common requirements to design and operate EWSs. From the surveyed countries, only Norway and Slovakia have produced codes or recommendations for this purpose. Secondly, more than 81% of the EWSs are based on displacement monitoring, certainly because it is the direct evidence of deformations. Then the weather conditions are monitored for more than half of the cases. It is also an essential parameter since rainfalls are a destabilizing factor for more than 80% of the studied landslides.

Then, advantages and limitations of existing EWSs are clearly defined. Indeed, an EWS should be (1) robust, (2) simple, (3) redundant and (4) protected from power blackout and communication loss. On the other hand, an EWS should avoid to be (1) vulnerable to the landslide that it is monitoring and (2) based only on surface displacements data. Finally, to improve them, the 14 operational units which answered advice (1) to monitor more than one parameters, such as water table levels, weather conditions, surface displacements, etc., and (2) to integrate well all monitored data in order to continuous have the overview of the stability situation.

Bazin S. and the SafeLand Team. 2012. SafeLand guidelines for landslide monitoring and early warning systems in Europe - Design and required technology. Geophysical Research Abstracts Vol. 14, EGU2012-1347-1, EGU General Assembly.