



## Representation problems of danger and “risk” maps

Pierrick Nicolet (1), Frédéric Berger (2), Michel Jaboyedoff (1), Christian Gerber (3), and David Giorgis (4)

(1) University of Lausanne, Institute of Geomatics and Risk Analysis, Lausanne, Switzerland (pierrick.nicolet@unil.ch), (2) Cemagref Grenoble, 2 rue de la Papeterie, 38402 Saint Martin d’Hères Cedex, France, (3) Canton de Vaud, Département de la Sécurité et de l’Environnement, Secrétariat Général, Place du Château 1, 1014 Lausanne, Switzerland, (4) Canton de Vaud, Office de l’Information sur le Territoire, Avenue de l’Université 5, 1014 Lausanne, Switzerland

Natural hazard are managed in Switzerland with danger maps, which are a representation of the level of danger defined by a combination of frequency and intensity. The different levels of danger are represented with colors, namely: white (no danger, or negligible danger), white-yellow (residual danger), yellow (low danger), blue (medium danger), and red (high danger). Colors are chosen through matrices established for the different types of phenomenon. The zoning is performed on actual state, taking into account assessment measures as long as they are considered as durable in terms of functionality and if there maintenance is guaranteed (projects cannot be integrated). These maps are then used for the land use planning and to establish protection measures. They are supposed to be checked “periodically” and updated “in case of important modification of the danger”. The yellow-white color is displayed for both very low occurrence/very high intensity hazards or very low danger remaining after protection measures. Thus, we identify two problems in this methodology:

- The difficulty to identify the initial-state danger level and the risk of forgetting the danger (more or less willingly)
- The ambiguity of the yellow-white color

Thus, we propose to adapt the Swiss system with a new color code. A zone where the danger is reduced by a safety measure could take the color of the original danger, with the overprinting of a pattern of symbols representing the method of danger reduction drawn in the color of the new level of danger. As the representation of protection measures with pictograms is not easy to understand, the symbology should be carefully chosen. We assume that with this new symbology, the authorities and the public will be aware of the potential danger and of the reduction method and that the danger cannot then be forgotten anymore. Furthermore, the yellow-white color would only represent the very low occurrence/very high intensity hazards. This symbology would offer more tools to perform the interests weighing at the risk study level.

Two examples are used to illustrate this procedure. The first one concern the village of Chardonne, in Switzerland, which is threatened by rockfalls, whereas the second one focus on the protection offered by a forest. Both of them offer the advantage to have been extensively studied with and without protections measures.