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Zischg, A., Fuchs, S., Keiler, M., & Meißl, G. (2005): Modelling the system behaviour of wet snow avalanches using an expert system approach for risk management on high alpine traffic roads. Natural Hazards and Earth System Sciences 5, 821 - 832.

Abstract

The presented approach describes a model for a rule-based expert system calculating the temporal variability of the release of wet snow avalanches, using the assumption of avalanche triggering without the loading of new snow. The knowledge base of the model is created by using investigations on the system behaviour of wet snow avalanches in the Italian Ortles Alps, and is represented by a fuzzy logic rule-base. Input parameters of the expert system are numerical and linguistic variables, measurable meteorological and topographical factors and observable characteristics of the snow cover. Output of the inference method is the quantified release disposition for wet snow avalanches. Combining topographical parameters and the spatial interpolation of the calculated release disposition a hazard index map is dynamically generated. Furthermore, the spatial and temporal variability of damage potential on roads exposed to wet snow avalanches can be quantified, expressed by the number of persons at risk. The application of the rule base to the available data in the study area generated plausible results. The study demonstrates the potential for the application of expert systems and fuzzy logic in the field of natural hazard monitoring and risk management.