

Zischg, A.; Fuchs, S.; Keiler, M. & J. Stötter (2005): Temporal variability of damage potential on roads as a conceptual contribution towards a short-term avalanche risk simulation. *Natural Hazards and Earth System Sciences* 5, pp. 235-242. SRef-ID: 1684-9981/nhess/2005-5-235.

Abstract

The fatality risk caused by avalanches on road networks can be analysed using a long-term approach, resulting in a mean value of risk, and with emphasis on short-term fluctuations due to the temporal variability of both, the hazard potential and the damage potential. In this study, the approach for analysing the long-term fatality risk has been adapted by modelling the highly variable short-term risk. The emphasis was on the temporal variability of the damage potential and the related risk peaks. For defined hazard scenarios resulting from classified amounts of snow accumulation, the fatality risk was calculated by modelling the hazard potential and observing the traffic volume. The avalanche occurrence probability was calculated using a statistical relationship between new snow height and observed avalanche releases. The number of persons at risk was determined from the recorded traffic density. The method resulted in a value for the fatality risk within the observed time frame for the studied road segment. The long-term fatality risk due to snow avalanches as well as the short-term fatality risk was compared to the average fatality risk due to traffic accidents. The application of the method had shown that the long-term avalanche risk is lower than the fatality risk due to traffic accidents. The analyses of short-term avalanche-induced fatality risk provided risk peaks that were 50 times higher than the statistical accident risk. Apart from situations with high hazard level and high traffic density, risk peaks result from both, a high hazard level combined with a low traffic density and a high traffic density combined with a low hazard level. This provided evidence for the importance of the temporal variability of the damage potential for risk simulations on road networks. The assumed dependence of the risk calculation on the sum of precipitation within three days is a simplified model. Thus, further research is needed for an improved determination of the diurnal avalanche probability. Nevertheless, the presented approach may contribute as a conceptual step towards a risk-based decision-making in risk management.