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The influence of different vulnerability approaches on the results of snow avalanche risk analysis

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Snow avalanches pose a threat to settlements and infrastructure in alpine environments. In the past, alpine settlements have always been confronted with natural hazards since they have been populated. However, due to catastrophic events, the public is more aware of this phenomenon in recent years. Nevertheless, changes in land use and in dealing with avalanches hazards lead to an altering perception of this threat. In this study, three different vulnerability approaches for buildings due to the impact of snow avalanches are comparatively applied. The results highlight the influence of each vulnerability approach to the outcome of snow avalanche risk assessment.

The quantitative risk was calculated on the basis of the probability of an avalanche event, the modelled impact pressures, the vulnerability of the buildings and the building values. Additionally, the main study includes a multi-temporal avalanche risk assessment. Changes of the risk were quantified for buildings between 1950 and 2000. For each avalanche track different scenarios according to the temporal development of mitigation measures were calculated. The decrease of hazard potential is overlain by an increase in buildings and infrastructure as well as a change of their construction type.

This study leads to a better understanding of the methodology used for snow avalanche risk assessment and the factors that influence risk. It also provides useful data for the accentuation of risk assessment sensibility to applied methodology and assumptions.