



## **Engineering meets social science: integrating public risk perception and evaluation in formal natural hazard risk assessment**

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Protection from natural hazards is a major duty of the federal authorities (e.g. Switzerland, WuG Art. 19). Due to several heavy hazardous events in the last years, Swiss policy was subject of a paradigm change in natural hazard management strategy: From a protection of hazards towards a proactive risk-based approach. Risk evaluation plays a significant role within this new approach, giving answers to the question: "What may happen?"

Risk evaluation is mainly based on risk perception. The predominant psychometric approach was widely used in the field of technical hazards to study risk perception. In recent years however psychometric techniques were also applied to natural hazards. Various risk perception studies indicate strong variation in individual risk perception and highlight deviations between experts' and laypersons' perception (Slovic 2000).

In Switzerland various formal, technical risk evaluation approaches were elaborated (threshold values for individual risk and collective risk, aversion function in combination with a marginal cost approach) (Merz et al. 1995). Main deficit of such approaches, when being applied to natural hazards, however is a missing consideration of public perception of risk. Therefore, a major challenge to present research is a consideration of public risk perception and evaluation within the risk management processes of responsible institutions. A promising approach is to model public risk perception and evaluation empirically based on survey data.

The proposed contribution presents an approach to model risk evaluation. The method originates in an expression for individual risk perception and models the perceived and evaluated collective risk based on the perceived and evaluated individual risk. The study discusses two main questions: Which factors of risk perception are relevant for such a model (i) and how do they have to be weighted and linked (ii)? The approach is verified using current empiric survey data from Germany (Plapp 2004) and Switzerland (Siegrist et al. 2004).

#### References:

Merz, H.A., T. Schneider, and H. Bohnenblust (1995): Bewertung von technischen Risiken. Beiträge zur Strukturierung und zum Stand der Kenntnisse. Modell zur Bewertung von Todesfallrisiken. Vdf Verlag der Fachvereine, Zürich

Plapp, T. (2004): Wahrnehmung von Risiken aus Naturkatastrophen. Eine empirische Untersuchung in sechs gefährdeten Gebieten Süd- und Westdeutschlands. Verlag für Versicherungswirtschaft. Karlsruhe.

Siegrist, M., H. Gutscher, P. Orlow, and Ü. Yoker (2004): Hochwassergefahren in der Schweiz. Risikobewusstsein in der Bevölkerung und die Implikationen für eine erfolgreiche Risikokommunikation. Schlussbericht. Universität Zürich, Sozialforschungsstelle, Zürich

Slovic, P. (2000): The Perception of Risk. Earthscan. London.