

# Value of information analysis in earthquake risk management

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## ABSTRACT:

The present paper considers the problem of quantification the value of additional information in the context of earthquake risk management. Substantial uncertainties are generally associated with the fragility curves and which in turn affects the uncertainty associated with loss estimation in earthquake risk management. In the present paper uncertainties are quantified in dependency of the level of detail – or scale – which is applied as basis for the assessment of the fragility curves. As it is obvious that a higher resolution assessment will reduce uncertainty and thereby provide more certain information but also higher expenses, the problem of optimal collection of information is addressed. Based on the pre-posterior decision theory and the concept of value of information an optimization problem is formulated in regard to information collection where the objective function considers the overall costs associated with risk management of portfolios of structures subject to earthquake hazards. The application of the methodology is illustrated through an example where a newly developed risk assessment framework is applied to identify optimal risk management decisions for a portfolio of generic reinforced concrete structures located on a site close to the western part of the North Anatolian Fault in Turkey. The risk assessment framework is based on an integration of Bayesian probabilistic networks in a GIS data management structure which greatly facilitates efficient assessment of risks and optimal risk management actions for larger number of structures.