Geophysical Research Abstracts, Vol. 8, 07031, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07031

Concepts of Uncertainty in Interdisciplinary Flood Risk Analysis

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This paper illustrates an interdisciplinary approach to flood risk analysis taking account of uncertainty. The approach is illustrated with a case study of flash flooding on the Vienna River, which combines hydrological modeling, Monte Carlo simulation and risk management.

In the course of developing an interdisciplinary approach to examining catastrophic flood risks, we found that the concept of risk used in flood management varied subtly but significantly between the disciplines contributing to the study. An important result of this study is the integration of these different disciplinary concepts of risk within a single interdisciplinary analysis. A fuller accounting for uncertainty in a way that is consistent between the component disciplines, and the appropriate distinction between various different types of uncertainty, form a second major aspect of the study. Our primary finding is that an approach that integrates perspectives on risk characteristic of the technical disciplines contributing to this study is feasible and that it provides a useful framework for comparing the characteristics of mitigation strategies. The results of simulations suggest alternatives for combining different mitigation measures such that the characteristics of the components of an overall strategy complement each other to lower total costs and to reduce both the likelihood and the uncertainties of catastrophic financial losses.