



BET-VH: A probabilistic tool for long- and short-term volcanic hazard assessment

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The purpose of this work is to present the probabilistic code BET-VH (Bayesian Event Tree for Volcanic Hazard) for long- and short-term volcanic hazard assessment. BET-VH follows the probabilistic scheme recently published by Marzocchi et al. (2004; Quantifying probabilities of volcanic events: the example of volcanic hazard at Mt. Vesuvius, *J. Geophys. Res.*, vol. 109, B11201, doi:10.1029/2004JB003155), and it includes the fuzzy logic to minimize the effects of the choice of some particular thresholds of the model. In brief, BET-VH is based on a Bayesian approach applied to an Event Tree scheme that produces the probability estimation of any possible event in which we are interested, using all available information including theoretical models, historical and geological data, and monitoring observations. The general sequence is to estimate an a priori probability distribution based upon theoretical knowledge, to modify that using data. The procedure deals with epistemic and aleatory uncertainties in a formal way, through the estimation of probability distributions at each node of the Event Tree. In order to illustrate the potentiality of BET-VH in managing emergencies and in land use planning, we present applications of the code to some explosive volcanoes.