

The potential role of a database in building an event probability tree: Case of Mt. Merapi eruptions

Antonius Ratdomopurbo¹, Chris Newhall¹, Joko Subandriyo², Sri Sumarti², Nurnaning Aisyah²

¹Earth Observatory of Singapore, Nanyang Technological University, Singapore, ²Center of Volcanology and Geological hazard Mitigation, Geological Agency, Indonesia

E-mail: rdpurbo@ntu.edu.sg

Mt. Merapi has frequent eruptions with a repose period of less than 7-years, a long history of monitoring, and a well-known geological history. These three aspects together make the volcano a good case study for simulation in building event probability trees.

The Merapi eruptions were preceded by various anomalies in monitoring data including geochemical, seismic and deformation. Although each unrest episode has its own specific pattern, it still shares common behaviour with other episodes. This common behaviour may be characteristic of Mt. Merapi. For building a retrospective event tree for the case of Merapi unrest, we use multiple historical events such as those of 1986, 1994, 1997, 1998, and 2001. A complete database of historical unrest from those years would be a key for having an accurate event tree of 2006. For the simulation, we use information in WOVOdat about historical unrest of Merapi to aid in quantitative estimates of probability.

For volcanoes with less frequent eruptions or longer repose periods, and for those without monitoring data, we can consider some analogous volcanoes for reference. One of the advantages of having a worldwide database of volcanic unrest, especially for volcanoes with limited monitoring data, is that it provides a way to build event trees quickly without waiting for new research on the restless volcano itself.