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HASSET: A probability event tree tool to evaluate future eruptive scenarios based on bayesian inference. Presented as a plugin for qgis

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Event tree structures constitute one of the most useful and necessary tools of modern volcanology to assess the volcanic hazard of future eruptive scenarios. They are particularly relevant to evaluate long- and short-term probabilities of occurrence of possible volcanic scenarios and their potential impacts on urbanized areas. In this contribution we present HASSET, a Hazard Assessment Event Tree probability tool, built on an extended version of the Bayesian event tree structure previously published for Teide-Pico Viejo stratovolcanoes, Tenerife, Canary Islands. This extended version of the event tree adds two additional nodes to the six existing ones to account for the type and extension of the hazard phenomena. Also, the new version introduces the Delta method to approximate the accuracy in the probability estimates, by constructing a one standard deviation variability interval around the expected value for each scenario. The method uses Bayesian Inference to assess volcanic hazard of future eruptive scenarios, by evaluating the most relevant sources of uncertainty when estimating the future probability of a specific volcanic event. HASSET is presented as a free software package in the form of a plugin for the open source geographic information system Quantum Gis (QGIS), providing a graphically supported computation of the event tree structure in an interactive and user-friendly way.