

Eruption event of Asama-Maekake volcano and the trial proposal of probabilistic event tree of its eruptive sequence

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The eruption event of Asama-Maekake volcano consists of four types: (1) small scale single eruption (phreatic and phreato-magmatic), (2) intermediate scale single eruption (Vulcanian and Strombolian), (3) continuously eruptive stage (phreatic, phreato-magmatic, Vulcanian and Strombolian), and (4) large scale eruption (sub-Plinian or Plinian). A single eruption event occurs after a dormant interval of more than two years. In a continuously eruptive stage, eruptions continue for more than four years including an intercalating dormant stage of less than one year. A trial probabilistic event tree of eruptive sequence is proposed based on eruption events since 1527AD. The event tree begins with a magma intrusion detected by crustal deformation and volcanic earthquakes. The magma intrusion branches off to “no eruption” (67% probability) and “eruption” (33%). The “no eruption” event ends there. The “eruption” branches off to the “small scale eruption” (22%) and the “intermediate scale eruption” (78%). The “small scale eruption” ends there. The “intermediate scale eruption” branches off to the “continuously eruptive stage” (30%) and the “single eruption” (70%). The “continuously eruptive stage” ends there. The “single eruption” branches off to the intermediate scale eruption which ends there (88%) and the intermediate scale eruption which shifts to the “large scale eruption” (12%). The probability of occurrence of “large scale eruption” after a magma intrusion event is about 2%.

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