



Real-time acquisition and evacuation technique on debris flow in Mt. Sakurajima, volcano, Japan

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The purpose of this study is to obtain a real-time and reliable forecasting method of debris flow in a volcanic area where the upstream basins are bare and therefore yield abundant sediment. For example, Mt. Sakurajima, a famous volcano because of its vital activity, has been exploding volcanic ash and stones from its crater. In the Nojiri River, debris flows have been observed by using a system of a supersonic sensor, an acoustic sensor, an acceleration sensor and a video-camera sensor. In general, going away from valley, these responses by debris flow will become small and this phenomenon seems to be different from volcanic activity. To examine the phenomenon of debris flow, we carried out the outdoor experiments in the campus, and replicated the surging out of debris in an active volcano. By using the acceleration sensor, we found that the spectrum of ground tremor observed in the outdoor experiments is very similar to the spectrum observed in debris flows in the active volcano. We confirmed that the magnitude of discharge has a tendency to be in proportion to the size of ground tremor. The ratio between the size of ground tremor and the magnitude of discharge at peak and in decreasing time becomes approximately twice of that in increasing time. By using Neural Network computer program, we were successful in finding the optimum value of parameters to estimate the hydrograph of debris flow. We could find out that observed frequency of ground tremor distinguishes between debris flow from clear water flow. The value of frequency from 50 Hz to 100 Hz for debris flow and less than 50 Hz for clear flow. By utilizing this principle, inhabitants will be able to evacuate quickly from the occurrence of landslide, snow avalanche and so on.