

Hypocenters and Source Mechanism of Volcanic Earthquakes at Kuchinoerabujima Volcano

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Kuchinoerabujima volcano is located at Ryukyu Islands, south off Kyushu. Historical record noted that the eruptions were dominated by phreatic eruptions. Last eruption occurred at the fissure east of the summit crater in 1980. Monitoring of volcanic activity at Kuchinoerabujima has been conducted continuously by one short-period seismometer since 1992 and three broadband seismometers were added in 2002. Seismicity is dominated by high-frequency (HF) events.

In 2006, the seismicity at Kuchinoerabujima kept high level. Monochromatic event characterized by slowly decaying quasi-sinusoidal coda part increased in August and September (115 and 75 events, respectively). Low-frequency (LF) events increased significantly in October, which about of 55 events were recorded. And then, HF events increased to 450 events in November 2006.

By applying FFT method on the waveforms, spectra of HF events have a dominant frequency in ranges of 6-25Hz, meanwhile LF events have dominant frequency 1~5 Hz. Monochromatic events show two patterns of spectrum. First pattern have dominant frequency 1~5 Hz and second pattern have dominant frequency in ranges of 6-15 Hz. Some peaks of subdominant frequencies can also be identified from the spectra of monochromatic events.

Hypocenters were calculated by assuming homogeneous half space $V_p=2.1$ km/s. HF events located at the Shindake crater at depth of 0.0 to 0.6 km beneath the crater. LF and monochromatic events are also distributed inside the crater rim with 0.0 to 0.2 and 0.0 to 0.4 km in deep beneath the crater, respectively.

Analysis of focal mechanism has been done by assuming double-couple mechanism. Fault plane solutions of HF events are normal fault type. All LF events also show non double-couple mechanisms since polarities at all stations show dilatation. Mechanisms of monochromatic events for high-frequency component are normal fault types. Low-frequency monochromatic events show non double-couple mechanism, similar to LF events mechanism.