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Infrasonic wave and seismic tremors recorded during Shinmoe-dake (Kirishima) eruption

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Following the blast eruption of Shinmoe-dake (Kirishima volcano group) on January 26th, 2011, Institute of Seismology and Volcanology (SEVO), Kyushu University equipped two temporal observation stations Shinyu (KRSY, 3km WSW from the crater) and Onamiike-tozando (KRON, 4km WNW) in order to detect movement of magma from the chamber to the active crater. We set two broadband seismometers, an infrasonic wave vibrograph (KRSY), and a tiltmeter (KRON). These real-time data were transmitted to SEVO using a mobile phone data terminal.

During eruption activity of Shinmoe-dake in January to February, there were 12 big-blast eruptions were detected by JMA, and infrasonic waves were observed also by our vibrograph clearly. Especially a blast eruption in the morning in February 1st was so big that many glass windows hotels and houses within 10km from the crater were broken by the infrasonic wave. Our vibrograph recorded more than 1500 Pa, though the instrument was uncalibrated within this large value area. Onset waveform of this infrasonic wave is less narrow than other infrasonic blast data.

From January 31st, we several times observed harmonic tremors with peak frequency of 1–2 Hz using the broadband seismometers. And also our infrasonic wave vibrograph recorded almost similar waveform as broad-band seismometer. More aculeate analysis we found time lag between two signals have time rag of about 6.2 second and 1.7 second at Shinmoe-kita (SMN, 750m NW from the crater). This fact shows that the vibration source of the harmonic tremor was very shallow just under the active crater, and radiates the tremor and infrasonic wave simultaneously. Furthermore, we found the dominant frequency of the harmonic tremor is different every time, so that the size of vibration sources also changed every time.

Keywords: Kirishima Volcano, Shinmoedake, Air blast, broadband seismic stations, harmonic tremor, infrasonic wave