

Seismic activity beneath the Hakusan Volcano: Focusing on the activity on September 2008

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The volcanic activity at the summit of the Hakusan volcano started about 0.03~0.04 Ma. No volcanic activities have not observed since the 1659 eruption except the appearance of a blowhole in 1935. It is, however, pointed that the Hakusan volcano may reactivate its volcanic activity on the near future from studies of past activities based on tephra stratigraphy and historical records (Moriya, 2000). The seismogenic zone just beneath the Hakusan volcano is shallow, 0~1 km (Takahashi et al., 2003), and a low velocity and high V_p/V_s region exists in the depth of 10~14 km beneath the volcano (Takahashi et al., 2004). Four swarm activities and the largest event of Mj4.5 for 30 years were observed in 2005 beneath the volcano. After 2005, seismic activity beneath the Hakusan volcano has been calm till the occurrence of an Mj2.4 event on September 2008. We report here recent seismic activity, focusing on the activity on September 2009, beneath the Hakusan volcano.

A temporal seismic observation was operated at Murodo, a vicinity of the summit, and Shiramine, a foot of mountain, from the early August to the late September 2008. We search events visually from continuous seismic records at Murodo and determine hypocenters using records of temporal stations and those operated by universities, NIED, JMA, and the Japanese University Group of the Joint Seismic Observations at NKTZ. We use the velocity structure of Takeuchi (1978) and the formula of magnitude of Watanabe (1971) in this study. The seismic activity during the analyzed period concentrate on 6th and 7th September and the largest event is M2.6. Most of events are distributed 0.5~1 km off west from the summit and the hypocentral depth is shallower than 1 km. To improve the accuracy of hypocenter distribution, we apply station corrections (Frohlich, 1979) with fixed stations for relatively larger 13 events. This does not change the distribution largely but provides a remarkable distribution, shallower just beneath the summit and deeper with distance from the summit. We estimate fault plane solutions using the polarity of P-waves for larger three events, showing strike-slip types with the compression axes of E-W and WNS-EWE. An active region of seismicity on September 2009 is included in the source region of the activity on October 2005. The source mechanism of the events on September 2009 is consistent with that of tectonic event in this region. Furthermore, we observe no volcanic tremors and low frequency events. These facts suggest that the seismic activity on September 2009 does not show the magmatic activity beneath the Hakusan volcano.

We observe several events greater than M2 on January 2009, showing a high occurrence rate of M2~3 events since 2005. We report features on these events together with the seismic activity mentioned before.

Acknowledgement: We use waveform data recorded by seismic stations of Japanese University Group of the Joint Seismic Observations at NKTZ, ERI, Tokyo Univ, DPRI, Kyoto Univ., Nagoya Univ., NIED, and JMA.