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Seismological studies of the 2007 small eruption of Mt. Ontake and recent seismic observations

Haruhisa Nakamichi^{1*}, Yu Hashida¹, Yoshiko Yamanaka¹, Fumihito Yamazaki¹,
Shinichiro Horikawa¹, Takashi OKUDA¹, Fumiaki Kimata¹

¹Nagoya University

We present seismological studies of Mt. Ontake, which relate to the small eruption in 2007. Hashida and Nakamichi (JPGU, 2010) determined the hypocenter locations beneath the summit of Mt. Ontake. The focal depths are from 0.5 to 2.0 km below sea level. Temporal changes of the focal depths have not been seen. Although reverse fault type of focal mechanisms with a NE-SW compressional axis are dominant, the polarities of P-wave first motions are dilatational for stations close to the summit, therefore it is possibility that the focal mechanism might contain non-double-couple components. Nakamichi et al. (JVGR, 2009) conducted a moment tensor inversion to determine the location and source mechanisms of a very-long-period (VLP) event, which occurred on 25 January 2007. The VLP source was located at 600 m above sea level beneath the summit and explained by volumetric changes (seismic moment of 10^{14} Nm) in an inclined crack at the source. Minifie et al. (JPGU, 2010) conducted S-wave splitting measurements to estimate spatial variations and temporal changes of seismic anisotropy associated with the eruption in 2007. The average of polarization angles of fast S-waves for local events is N78E, which differs to the WNW-ESE orientation of regional principal stress by 35 degrees and is nearly perpendicular to the strike of the VLP crack source. The polarization angles show no significant change before or after the eruption, as the eruption was so small. There is a possibility that the eruption was too small in magnitude to influence the anisotropy. An alternative explanation is that the results are restricted by a too short measuring period to allow detection of temporal changes.

We recently installed five seismic stations around Mt. Ontake in late 2008 and conducted a campaign seismic observation of Mt. Ontake in the period from August to November 2009. These seismic observations were supported by the MEXT. We expect that these observations will be useful to reveal seismic activity and stress field around Mt. Ontake.

Keywords: Mt. Ontake, eruption, seismic activity, stress field, focal mechanism, S-wave splitting