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Seismicity in and around Kirishima Volcanic Group for recent 10 years and temporary seismic observation

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Extensive magmatic eruption started at Shinmoe-dake on January 26, 2011. No remarkable VT earthquake beneath Kirishima Volcanic Group was observed before and after the eruption. We therefore conclude that the activity of the VT earthquake was quite low. The same seismic characteristic was also recognized at the previous small-ash eruptions which occurred on August, 2008 and/or during 2011. It is interesting that the low activity of VT earthquakes has been observed during the inflation of the volcano edifice (JMA, 2008) has been continued. On the other hand, episodic tectonic earthquakes were located beneath the north-east and east flank of the volcanic group. Shallow crustal earthquakes in and around Ogiri Area (Ida et al., 1986) were occasionally observed during the period. Morita and Ohminato (2005) suggested a classification of VT earthquake as follows: 1) VT earthquakes are caused by slipping on the pre-existing fault, and so on. 2) The earthquakes are caused by simple volcanic processes like magma intrusion. We investigated the above mentioned VT earthquakes in and around the volcanic group to clarify whether the type of the earthquakes is 2) or not. It is important that we discuss the cause of VT earthquakes, and that we mention the quite low seismicity of the VT earthquakes beneath the volcanic edifices.

Nansei-Toko Observatory for Earthquakes and Volcanoes, Kagoshima University (NOEV) has been located tectonic earthquakes in and around south Kyushu, Japan, for about 20 years by use of the seismic data of the observatory, JMA, and Hi-net. After 2001, the seismic network has been able to locate the crustal micro-earthquakes larger than M0.5-1.0 (Mori, 2001). Therefore, we can describe the temporal change of the seismicity on the constant quality of the hypocenter list having the constant quality. The ability of the location however is extensive low for the very small BL and BH earthquakes just beneath the active crater of Shinmoe-dake and Ohachi. Therefore, we limit our discussion on the regional earthquakes in and around Kirishima Volcanic Group. We installed 5 temporary short-period seismic stations at the volcanic group after the extensive eruption to intense seismic observation.

The characteristics of the VT earthquakes larger than or equal to M1.5 are summarized as follows. The number of the VT earthquakes was only 47. The maximum magnitude was 4.1. No earthquake whose magnitude from 2.5 to 4.0 was occurred. The depths of the earthquakes were limited the range shallower than 3.5km below sea level. On the other hand, there are two areas that the seismicity became active in the recent years: A) the seismicity beneath the east flank of the volcanic group became obviously active in 2006. B) it is interesting that the crustal seismicity (M1-2) locates between Kirishima Volcanoes and Aira Caldera remarkably active after 2009. In this presentation, we show the details and characteristics of the VT earthquakes in and around Kirishima Volcanic Group. We also discuss the distribution and temporal changes of principal stress axis of the focal mechanisms.

Keywords: Kirishima Volcanic Group, Shinmoe-dake, Volcano-Tectonic earthquakes