

Distribution and characteristics of tephra on the February 2, 2009 eruption of Asama volcano, Central Japan

Naomichi Miyaji[1]; Tatsuro Chiba[2]; Kunihiro Endo[1]; Tatsuo Kanamaru[3]; Miki Maeda[4]; Kazutaka Mannen[5]; Masayuki Murase[6]; Masashi NAGAI[7]; Yusuke Suganaka[4]; Masaki Takahashi[1]; Takato Takemura[4]; Maya Yasui[8]; Shuji Yamakawa[9]

[1] Geosystem Sci., Nihon Univ.; [2] Asia Air Survey; [3] Geosystem Sci., Nihon Univ.; [4] Nihon Univ.; [5] HSRI, Kanagawa Pref.; [6] CHS, NU; [7] Geosystem, Nihon University; [8] Geosystem Sci., Nihon Univ.; [9] Geosystem sciences, Nihon Univ.

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We studied the distribution and sedimentological and petrological characteristics of the tephra ejected at the February 2, 2009 eruption of Asama volcano. Lithic fragment larger than 1 cm in diameter distribute within 8 km, SE direction from the crater. Grains of the ash finer than 62 micron at 5 km, SE direction from the source occupy about 10 % to the total grains and about 30 % at 9 km, ESE direction. The distribution axis, line of maximum weight of isopleths per unit square, extend to SE direction from the crater and bend to SE direction at Shimonita town, distant 32 km from the source. Furthermore, the tephra distribute to the south from Chichibu basin, distant 66 km. At the day of eruption, the Aleutian low (960 hPa) faced to the traveling anticyclone (1028 hPa) at Japan island. Strong NW wind with 20 to 25 m/s blow at 4.5 km in altitude, at where top of the eruption column reached. This strong wind must have formed main distribution of the tephra. Surface wind at 3 to 4 am had blown from N to NNE direction with the speed of 2 to 6 m/s at southern Kanto plain. This wind must have moved the distribution axis of the tephra from SE at northern Kanto plain to S at southern Kanto plain.

Starting time of volcanic ash fall at southern Kanto plain is different at EW direction perpendicular to the distribution axis. If the peak of count number of the dust and pollen monitoring sensor in this area at the morning of February 2 mean the number of ash particle, ash started to fall at Saitama to Kana prefecture at 4:00 to 4:30 on the distribution axis. On the other side, ash stopped to fall at 7:00 on the eastern side of the distribution axis and at 9:00 to 10:00 on the western side. Actually, we observed aggregated ash deposited on the western Tokyo during 10:00 to 17:00. Grains of the ash finer than 62 micron at eastern side of the axis occupy about 30 % to the total grains and about 90 % at western side. Total amount of the tephra is estimated to 15 thousand ton by Fierstein & Nathenson (1992) method and 11 thousand ton by Takarada et al (2001) method based on the data 5 km away from the source.

Volcanic ash collected at the foot of Asama volcano are consist of mainly rounded dense cryptocrystalline fresh lava fragments and groundmass phenocrysts with small amount of clear glass. The volcanic seismic wave at 1:51 resemble with the wave appeared at the explosive eruption on 2004, and the long high frequency appeared after the wave are different with the 2004 eruption (Ouminato 2009).

In conclusion, magma of the February 2, 2009 eruption must have broken and dispersed the lava erupted and deposited on the bottom of crater at 2004 eruption or the other lava and have deposited them at the foot of the mountain as lithic fragments at first. Secondary the eruption with ash fall had continued with the release of volcanic gas. Volcanic ash deposited at eastern part of southern Kanto plain will have derived from the first explosive eruption and ash eruption continued after the first eruption, and at western part will have derived from the second ash eruption. We appreciate the offer of ash samples and support of various analyses by many people.