

Distribution, weight, and component characteristics of tephra from the eruption on 2 February 2009 of Asama volcano

Fukashi Maeno[1]; Yuki Suzuki[2]; Setsuya Nakada[1]; Etsuro Koyama[3]; Takayuki Kaneko[4]; Toshitsugu Fujii[2]; Jun'ichi Miyamura[5]; Shin'ya Onizawa[6]; Masashi NAGAI[7]

[1] ERI, Univ. Tokyo; [2] Earthq. Res. Inst., Univ. Tokyo; [3] ERI, Univ. of Tokyo; [4] Volc. Res. C., ERI, Univ. Tokyo; [5] JMA; [6] GSJ, AIST; [7] Geosystem, Nihon University

Asama volcano erupted at 01:51 on 2 February 2009. The eruption continued about 20 minutes with ash emission and ballistics. The ash was widely dispersed toward the southeast, and affected areas up to the east of Chiba prefecture in the morning.

We measured the weight per unit area of ash fall deposits at the southeastern foot of the volcano in order to determine the detail dispersal axis and isopleth contour. In proximal locations we can access, the weight per unit area of the ash fall deposits is over 500 g/m². Angular lava fragments with a size of 1.5 *2 cm were also found at the same locations. One of characteristics of the ash fall deposit is that fine particles sometimes aggregate as a few mm size drops. Isopleth contours of the ash fall deposit are narrow and extended toward the southeast, and are much denser in the west than in the east. In areas close to the crater, ash fall deposit is mainly recognized in the southern side, based on photographs; however, little in the northern side. These indicate that the distribution of ash fall was affected by the wind from the northwest. The ash cloud probably has a spread of 4 km in NE-SW direction in Karuizawa town.

Based on the contour map, the total weight of ash fall was estimated to be 20,000-24,000 ton, using a log area (m²) - log weight (g/m²) plot. The estimated volume is approximately one fifth of the eruption on 1 September 2004 and almost same as one on 13 November 2004, which were estimated using the same method (Yoshimoto et al., 2005).

Components of ash sampled at about 8 km distal from the source were analyzed. Juvenile materials, less than 1 wt%, are recognized as brown vesiculated glass shards in fine grains (less than 0.25 mm). Coarse grains (more than 0.25 mm) do not include juvenile, and are composed of fresh lava, altered lava, individual crystals, and ceramite. Juvenile materials can be divided into two groups based on chemical composition. One has same rhyolitic composition as juveniles in the 2004 eruption and the other has dacitic composition. These component and chemical characteristics indicate that magma related to this eruption is little, and the eruption on 2 February 2009 would be categorized into a vulcanian-type eruption with a production of a large amount of fine ash.

The eruption on 2 February 2009 is similar to the eruption on 26 April 1982 in terms of the weight and distribution pattern of tephra, no-large explosions, long-time ash emission, less juvenile materials, and so on.