Volcanic eruption clouds in southwest Japan observed from the ground and satellites

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Results of ground observation network of eruption clouds at volcanoes in southwest Japan in these several years are summarized, and compared with satellite images for large scale eruptions. Automatic long-term camera recording systems have been installed at Aso, Kirishima and Sakurajima volcanoes in mainland Kyushu, and at insular volcanoes Satsuma-Iojima and Suwanosejima south of Kyushu. Some of the systems are connected with Internet for real-time monitoring.

White vaporous plumes, with the heights about 200-300 m or less, were often observed at Aso volcano from the site 3 km west of the crater since May 2009.

Kirishima-Shinmoedake volcano experienced subplinian eruption on 26-27 January 2011, ejecting huge amount of ash clouds easily observed in satellite images of MODIS, MTSAT etc. A complete interval record of the onset and development of the eruption was obtained at 50 km away from the crater by using a video camera with the NIR mode in spite of poor visibility condition. The change of white vaporous clouds since 2008 to continuous ash plumes was observed on several days prior to the big eruption, indicating the magma intrusion to the surface. After the climax of the eruption, isolated strong vulcanian eruptions happened occasionally until September 2011.

At Sakurajima volcano, eruptive activity of Showa crater near the summit started in 2006 and strongly increased since 2009, while Minamidake crater at the southern summit was rather dormant in this century. Multi-point automatic recordings of Sakurajima plumes have been conducted at the sites 10-17 km away from the crater in different directions, so as to obtain stereographic features of eruption clouds and their dispersion patterns with wide coverage. The records of the plumes were utilized in analyzing the surface concentration of sulfur-dioxide at the stations around the volcano.

Automatic camera recording at Satsuma-Iojima was conducted during 1998-2007 at the site 3 km west of the Iodake summit crater. It was found that the crater was almost always ejecting white or light-gray clouds with rather constant strength, while explosive eruptions were rarely seen.

Network-camera monitoring of Suwanosejima volcano was done during 2002-2007 at a site 25 km NE in Nakanoshima Island. The NIR mode of the camera was very effective for the observation over the sea recording many explosive eruptions, which were also detected in satellite images. In 2008, the system restarted at a new site 5 km SSW from the crater inside the same island. The eruptive activity of Suwanosejima gradually decreased in late 2000s.