

The 2000-02 Eruption of Miyake-jima Volcano --- Surface Changes as Observed by Helicopter

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The eruption of Miyakejima Volcano that began in 2000 is still continuing with emission of large volume of volcanic gas (especially of poisonous SO₂ gas) with the 3800 inhabitants removed away from the volcano island for more than 1.5 years. Intrusion of about 0.5 km³ magma to the NW from the main magma chamber below the summit, and the resultant formation of a collapse caldera about 1.6 km across and 500 m deep was the essential activity of the 2000 eruption of Miyakejima Volcano, while the long-term emission of gas is the secondary activity of the eruption. In this presentation, recent change of caldera observed from the air (by helicopters) will be described.

1. Change of vents and crater activity

The main crater was first formed on the top of the pyroclastic cone located in the southern part of the caldera floor. The locality seems to have been controlled by two weak lines aligned in the NW-SE direction. The main crater was accompanied by two subordinate craters chained to the SE in 2000 (N1 to N3 craters). In 2001, new vent opened on the southern line to form S1 to S3 craters, and now the southeasternmost crater (S3) is most active. Change of vents was partly affected by rock falls from the southern caldera wall that became obstacle to emission of gas. Some microseismicity seems to have also been due to the same origin.

2. Change of caldera rim and caldera floor

The steep-sided caldera wall is continuing to collapse. The diameter of the caldera is now about 1.8 km, and piles of debris fan are growing at the foot of the caldera wall. Some shocks of the rock-fall and collapse of the wall contributed to microseismicity, and the rising dust clouds covered leeward surfaces in nearly the same way as the primary air-fall deposits. In the bottom of the caldera, two large pond persisted in the N and W. By the collapse of the N wall in late November (or early December) 2001, N pond disappeared, and today new NE pond and central pond are the major. Due to the wall collapse, location of ponds that reflects the lowest portion of the caldera floor is moving toward the center of the caldera.

3. Surface topography of the upper slope

By the ash-falls and gas attack, vegetation was lost especially on the upper flanks. That made the original topography more clear, and lava channels and crater rows became discernible.

4. Way of gas flow and vegetation disaster

Most of the vegetation has been lost by poisonous gas (SO₂), however, green colored vegetation is still surviving in three areas of the island, SW (Ako area), NW (Izu area), and SE (Tsubota area). These areas are located in the shadow area from the gas flow, that are controlled by the topography of an old caldera about 4 km across which lies on the middle slope of the volcanic edifice. The upper slope within the old caldera is more gentle than the lower slope outside of the caldera. The difference of the slope angle forms shadowy area where gas flow flies over without damage to vegetation. The topographic control to gas seems important also to human being and animals.