# Temporal change in sediment discharge from the fine ash-covered slope of Miyakejima Volcano (1)

# Takao Yamakoshi[1], Takahisa Mizuyama[2], Taro Uchida[3], Masaaki Nakano[1], Nobuo Anyoji[4], Tatsuro Chiba[5]

[1] PWRI, [2] Forestry, Agri., Kyoto Univ., [3] Forestry, Agri, Kyoto Univ., [4] STC, [5] Asia air survey

Miyakejima Volcano resumed its eruptive activity from June 26, 2000 after the 17-year dormancy. The eruptions with fine-ash emission continued until the end of August 2000. These eruptions left fine-ash deposit on the slope of the volcano. In the upper slope of the volcano, thickness of ash deposit reached one meter or more. The ash mantle impeded water infiltration into the soil and resulted in the frequent occurrence of mudflows.

In general, it is well known that a large amount of ash-fall brings about devastation of a volcanic slope and make mudflows easy to be triggered by small rainfall. It is also empirically known that sediment discharge due to mudflows decreases year by year after the cessation of ash emission. Miyakejima Volcano is supposed to be in the similar course. However, it is difficult to predict the future sediment discharge quantitatively because the mechanisms of the decrease in the sediment discharge have not been clarified yet. In the purpose of clarifying the mechanisms, the study on the 2000 eruption of Miyakejima Volcano is being executed as a typical example. Here, the authors show the result of field infiltration tests and aerial-photo surveys on gully erosion in the first one year had passed since the cessation of ash emission.

Previous studies on the sediment discharge from the newly erupted volcano have shown that the condition of slope changes significantly in the first year after the cessation. To know the change in the hydrological characteristics of the ash deposits that would drastically alter the characteristics of sediment discharge, the authors carried out field infiltration tests twice in Aug. 2000 and Aug 2001. As a result of the tests, no significant changes were found in the grain size distribution, bulk density, nor final infiltration capacity. On the other hand, small gullies are found to originate from topographic depressions in the slope where original permeable ground surface is exposed. Consequently, even though infiltration capacity of ash deposit itself does not increase, the exposure of the permeable original surface brings about the decrease in the surface runoff from the whole slope at the time of rainfall.

A large portion of sediment discharge seems to be shared by gully erosion in Miyakejima Volcano. The authors interpreted three sets of aerial photographs taken in Aug.2, 2000, Nov.8, 2000, and June 4, 2001 to investigate gully evolution processes in the three periods, which are from the onset of the eruptions to Aug. 2000, from Aug. 2000 to Nov. 2000, and from Nov. 2000 to June 2001, respectively. In addition, aerial reconnaissance was taken several times by using a helicopter. As a result of the surveys and observations, the following are clarified. 1) The evolution rate of gullies was largest in the first period and decreased rapidly in the second and third period. 2) The gully network had been fully developed in the first period. On the other hand the width of the gully kept increasing even in the second and third period. It shows that gullies get longer at first and secondly widened in the case of Miyakejima Volcano. 3) Most of gullies were formed along the topographic depressions in the topographic map made before the eruption. It seems that gully evolution is subject to the original topography in the case that volcanic ash deposit is not thick enough to change the original topography. 4) Lava or welded scoria, having originated in the past eruptions, is exposed along many gullies. They seem to block the vertical evolution of the gullies. It is important to obtain information on geological setting of the volcanic slope to predict the amount of the post-eruptional gully erosion.