

## 30 years from the 1979 eruption of the Ontake volcano

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### **Introduction**

It is passing 30 years after the first historical eruption of Ontake volcano on October 28 October, 1979. Many volcanologists never had any idea of volcanic eruption in Ontake at the eruption. Since 1979, eruptions were repeated two times in 1991 and 2007. Earthquake swarm is also repeated in the southeast and east foot of Ontake volcano more 30 years since 1976, and M6.8 occurred in this area in 1984.

Research on volcanic activities in Ontake volcano in 1979 eruption and it is made clear until now. This presentation is reviewed of research results on Ontake volcano.

### **Pre-eruption process in 1979, 1991 and 2007 eruptions**

The nearest seismic station was located 20 km distance from the volcano summit in the 1979 eruption. However some tremors were observed beneath the summit of the volcano every hour since five hours before the eruption.

Observation networks of seismology and GPS measurements were established before the 2007 eruption. Earthquake swarm was detected beneath the summit and inflation deformation was observed in December 2006. A minimal eruption occurred in March after the tremors had occurred in January. In spite of minimal eruption, we understand the typical eruption process through the volcanic activity in Ontake through the period December 2006 to March 2007. When more dense observation network including tiltmeter is established around the Ontake, eruption process should be detected precisely.

### **Active historical activity**

Ontake volcano was repeated phreatic eruptions more five times in the last 6000 years (Kobayashi, 1993). Recent researches on Ontake volcano make clear more activity in history. Eruptions including phreatomagmatic eruption were recognized more than 10 times by geological survey around the volcano (Oikawa, 2007). A pyroclastic flow reached to the Nigorigo hot spring 5 km from the top at the phreatomagmatic explosion (Sizuki et al., 2008). On the other hand, two eruptions reported from some historical documents were misunderstood (Oikawa, 2008). The 1979 eruption was the first eruption since recorded history in Ontake volcano.

### **Deep earthquakes and mantle-derived gas**

Deep low period earthquakes are observed beneath Ontake volcano based on seismological observation network established in 1996. The deep earthquakes are not frequently, but they distribute to 50 km depth as a chain of epicenters. Additionally mantle-derived gas was measured at hot spring water in eastward mountain foot (Takahata et al., 2003; Azuma et al., 2005). Recently, fresh olivine suggesting mantle-derived is recognized in volcanic ashes (Suzuki et al., 2009). Ontake is suggested to be a volcano connected directly with mantle as mentioned above.

### **Difficulty of eruption disaster mitigation by depopulation and megamerger**

The population of Ontake village decreased from 2000 at the 1979 to 1000 or less by reducing the forestry office in 2008. Additionally, the finance of the village becomes a great deficit, and is very difficult even continuing the village from the overinvestment to the ski area.

The municipality around the Ontake volcano became the Kiso Cho, the Takayama City, and Gero City because of the large cities, towns, and villages amalgamation at the Heisei era. Therefore, the remainder by two hours was needed in Takane in the north mountain foot until the disaster prevention section reached from the city. These are negative factors in the disaster prevention system.