

Why do we discuss about Ontake Volcano activity and earthquake swarm now?

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Around Ontake Volcano, central Japan, a seismic swarm has been observed since August 1976. In November 1979, Ontake Volcano was erupted, and M6.8 Naganoken-Seibu Earthquake is attacked in September 1984. A seismic swarm is continued for about 30 years.

The recent research based on Ontake Volcano area makes clear the high crustal activity with more detail. Firstly, the hypocenters of earthquake swarm are determined shallowly within 10 km depth (e.g. Yamaoka et al., 1999; Iio et al., 2000). In general, earthquake hypocenters are distributed in a shallow part of 10 km depth in crust beneath North Alps, Central Japan Mountain Range, according to observation by Kamitakara Seismological Observatory of Kyoto University. In the Ontake swarm earthquakes area, the depths of earthquake hypocenters are shallower and the shallowest undersurface of the earthquake hypocenters is a depth of 6 km. It is suggested that the ground temperature is rising to 300 ~ 400 degree even if in a depth of about 6 km. We hope Ito would discuss the hypocenter depths of earthquakes occurred beneath North Alps with more detail in this session. Secondly, gas considered to be the mantle origin is observed in the location of a hot spring around the earthquake swarm area (e.g. Takahata et al., 2003). This is also data that the high temperature region has reached very near the ground surface or there are some channels from the mantle.

Low resistivity zone is detected in the northwest part of Mitake where is located shallowest undersurface of the earthquake hypocenters, from the magmatic survey (e.g. Kasaya et al., 2002). Moreover uplift of ground deformation is also observed (Kimata et al., 2003). These are considered to be activities in the hypocenter area of earthquake swarm. Low resistivity is estimated to be by hydrothermal system not magma system.

Kawasaki discuss large magma chambers in depth of several to ten km beneath the North alps from the geophysical and geochemical research at the open lecture of 2002 Fall Meeting of the Volcanological Society of Japan (<http://hakone.eri.u-tokyo.ac.jp/kazan/jishome/koukai97/kawasaki.html>). It is suggested that the Ontake volcano and its earthquake swarm activity support typically the discussion by Kawasaki. Then, although the Ontake volcano is the present quiet volcanic activity, a high temperature region exists even to with a depth of 5-8 km of shallow crust and thermal supply also continues now and the earthquake swarms are continuing in shallow crust over 30 years.

As discussing above, activity of the magma in deeper depths is recognized as the geothermal activity, earthquake swarm and ground deformation in shallow crust, and it is good scientific field to discuss the earthquake occurrence and magma activity around the Ontake volcano. In order to make clear magma activity it is necessary to have synthetic observation targeting deeper crust.