

## Gravity change and crustal deformation in active Tokachi-dake volcano, Hokkaido, Japan

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Magmatic mass monitoring is one of fundamental parameter for activity forecasting. Recent development in portable gravity meter and high precision GPS positioning techniques have allowed us to make gravity observation on active volcano repeatedly. Simultaneous observation of gravity and ground deformation at same point will provide valuable information for deformation source material, e.g. magma or water.

Tokachi-dake is active basaltic-andesite volcano in southwestern Kuril subduction zone. Three magmatic eruptions had been recorded in a recent hundred years. To investigate magma storage system, relative microgravity measurement along a loop-profile with 27 benchmarks has been carried out since 1998. Scintrex CG-3M and CG-5 gravity-meters, and dual-frequency GPS receiver for three dimensional positioning has been simultaneously in operation at benchmarks.

Broad gravity increasing and ground subsidence was detected during 1998 to 2011. Total 0.12mGal gravity increase and 15cm subsidence in maximum were observed. Free-air calibrated gravity data well agreed with that estimated from ground subsidence. These facts implied deflation of volcano edifice during totally 13 years induced gravity buildup.

Active geothermal activity with ground temperature increasing was observed during 1995 to 2000. Lowering in ground temperature, however, had recorded in 2003. Weak geothermal activity has been kept in a recent decade. Possible volcano deflation due to weakening of geothermal activity could explain gravity increase and ground subsidence. Localized inflation near active crater since 2007 might induce lesser deformation than that of 1995 to 2000. These observations implied complex geothermal system has been in progress during rest stage of this volcano.