

Crustal deformation of Mt. Tarumai with GPS measurements (1997-2007)

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GPS observations was made at ten points on and around Mt. Tarumai in September, 2007. Geographical Survey Institute also made GPS observation at Mt, Tarumai in the same period. It calculated together with the data of three points observed by Geographical Survey Institute. Two points of them are at the summit of Mt. Tarumai and the other one is located at the east lakeshore of 'Lake Shikotsu' which is named 'Chitose' station that is one of the 'GPS Earth Observation Network System (GEONET)' stations.

Those points were settled and observed in 1997 as a part of 'Joint Geophysical and Geochemical Observations of the three Volcanoes in the southwestern Hokkaido'. The changes of about ten years between those observations are discussed. During this period, The 2000 eruption of Mt. Usu and the 2003 Tokachi-oki earthquake occurred, so these events might affect the deformation of Mt. Tarumai. We examined those effects by the change of the length between the two GEONET points 'Chitose' and 'Shiraoi', which are located at northeastern side and the south western side of Mt. Tarumai. At the 2003 Tokachi-oki earthquake, about 1.5cm co-seismic shortening of the base-line length and the little after-seismic shortening were detected. But at the 2000 Usu eruption, no clear change was observed. The total shortening of the base-line length between 'Chitose' and 'Shiraoi' was about 4cm, and it is thought to be about 40% of the change is related to the Tokachi-oki earthquake.

About this area, Geographical Survey Institute did not propose the correction due to the 2003 Tokachi-oki earthquake, so we should make the method for the correction of the deformation related to the Tokachi-oki earthquake. But, the correction method is not yet constructed.

Using at the baselines in the nearly perpendicular to the direction of the co-seismic change of Tokachi-oki earthquake and the changes of the length between 'Chitose' and 'Shiraoi', the qualitative discussion of the volcanic deformations are made. The early stage until the end of 1999, Mt. Tarumai was swelling. At 2000, the volcanic deformation due to the deep source was changing to the contraction, but the shallow source did not disappear and remained. As the shallow source effect, the summit area have been holding the state in 1999 and detected the expansion during the early stage at the 2007 observation.

It is scheduled that this change of Mt. Tarumai at the period is clarified using the change of all base-lines around Mt. Tarumai. Correcting the change related to the Tokachi-oki earthquake, using the data of GEONET points around Mt. Tarumai, and the quantitative evaluation is done at the Japan Geoscience Union Meeting 2008.