

Disasters accompanying volcanic deformations at Mt. Usu in the 1977-1982 activity and the 2000 activity

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Mt. Usu is one of the most active volcanoes in Japan. The volcano is located in the southwestern part of Hokkaido. Since 1663, many eruptions have been recorded at Mt. Usu. In 20th century, Mt. Usu erupted four times.

Significant characteristics of the activity at Mt. Usu are violent seismic activity including huge number of felt earthquakes, and extremely large ground deformations accompanying intruding and extruding lava domes. Therefore, at Mt. Usu disaster with deformation, which advances gradually, is quite significant that are very rare at general other volcanoes.

After the 1910 activity, spa was found at the northwestern foot, development for sightseeing has been progressing at the foot and many buildings have been made in the dangerous region within several kilometers from the center of the volcano. It enlarges volcanic disaster.

Disasters accompanying the last two activities (the 1977-1982 activity and the 2000 activity) of Mt. Usu are shown in reference to the volcanic deformations as follows. I collect and arrange them as fundamental data for disaster mitigation at Mt. Usu.

In the 1977-1982 activity, main activity took place in the summit area of Mt. Usu. Craters are distributed in the graben structure which is located at the center of the summit area elongating in the northwest-southeast direction. At the northeastern side of the graben, Usu-Shinzan and Ogari-yama uplifted about 185m.

Ko-Usu lava dome subsided about 55m at the northwestern part of the graben. U-shaped block formed in the northwestern part of the summit atrio. At the bottom the U-shaped block, Usu-Shinzan and Ogari-yama were pushed up. The northeastern rim was thrust toward the northeast about 200m during the activity. The northwestern rim were also thrust 5-50m outward.

As the results of those thrusts of the northwestern and the northeastern rim, complex wavy shaped deformation took place at the northwestern and northeastern foot of Mt. Usu. And many faults were also made in that area. Many buildings on such faults were destructed and a large number of constructions in that area damaged by those deformations.

In the 2000 activity, precursory deformations, which took place throughout the whole area of Mt. Usu, made many cracks at the paved road. Main activity was localized at the western foot of Mt. Usu. The uplift region, which was about 1km length in the northeast-southwest direction and about 400m width, formed in the active stage. Many faults and cracks accompanying that deformation appeared on and around that uplift region. As the result, many constructions were destructed or damaged by those faults and cracks. At the southwestern foot of Mt. Usu, The edge of the uplift region thrust outward and made damages the railroad and highway bridges and tunnels.