

## Time dependent model of pressure sources volume at Asama Volcano by precise leveling in 1902-2005

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Asama Volcano, Central Japan began a magmatic eruption at on September 1st, 2004 after an interval of 31 years since 1973. At the major eruption in 1783 (Tenmei 3), villages around the volcano received a large disaster by the lava flow, pyroclastic flow, and lahar, and the cold summer hit the Japanese Islands by the volcano gush. The Asama volcano repeated the eruptions of the Blcano type in the 1910's, the 1930's and the 1950's. After 1902, the precise leveling surveys are being repeatedly by The University of Tokyo and Geographical Survey Institute around the Asama Volcano. However location and shape of intrusive magma were not clarified enough by a current research. Then, we discussed the pressure source of the Asama Volcano based on the vertical deformations detected from the levelings in 1902-2005. Firstly, we modeled pressure source from the leveling data of four times (1935-1939, 1939-1950/53, 1932/35-1950/53, 1990-2005) executed in the volcano neighborhood. The models of spherical pressure sources, dike intrusion and their combination were examined by genetic algorithm (GA) and Akaike's information criteria (AIC). A model consisting from three spherical sources showed the best optimal parameters. Next, the time dependent inversion using Akaike's Bayesian information criterion was calculated for volume changes of three spherical sources for every five years from 1902 to 2005. The most active spherical pressure source was estimated at a depth of 7km of the Kurofu Volcano located in 3km south of the summit of the Asama Volcano. The inflation at the source was amounting to  $1.2-10.1 \times 10^6$  m<sup>3</sup>/year in the period of 1902-1942. The second and third pressure sources were estimated with a rate of  $10^4-5 \times 10^3$  m<sup>3</sup>/year under the Maekake Volcano(Asama volcano) and Oiwake in 7 km south from the Asama Volcano respectively. The inflation suggests the rate of 10 percent or more small than that under the Kurofu Volcano. Finally, the most active pressure source under the Kurofu Volcano indicated deflation since 1947. However the deflation turned to inflation at 1987 and it should be one cause of the 2004 volcano eruption.