43. Results of Rerunning the Line of Levels Crossing Mt. Asama.

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(Comm. by A. IMAMURA, M.I.A., May 13, 1940.)

It is well known that volcanic activity is often accompanied with upheaval and subsidence of the ground in and around the volcano concerned. Such deformation is to be expected also with the activity of volcano Asama, in order to confirm which, 25 bench-marks were laid down in 1935 on a line across Mt. Asama linking Karuizawa with Miyota-mura, near Komoro.

This line of levels makes one complete circuit if its two extremities be joined to a pre-existing line of levels, one east at B. M. No. 547 and the other west at B. M. No. 551 (See Fig. 1). The levels in the circuit were run first in 1935,¹⁾ and later in July-September 1939, as the result of which the vertical displacement of each bench-mark was worked out, assuming B. M. No. 551 unchanged during the period 1935-1939.

Fig. 1. The Line of Levels crossing Mt. Asama.

As the volcano erupted several times since these marks were laid down, it is unfortunate that four of them, viz, Kin-4, Kin-5, Kin-6, and Kin-7, which are situated very near the crater, were buried very deep under ejecta, so that the changes in height of these marks could not be ascertained.

The vertical displacements of these bench-marks thus worked out are shown in Fig. 2, from which it will be seen that western slope of Asama upwarped,²⁾ while an area extending from Kutukake to Mine-

1) R. Takahasi, Bull. Earthq. Res. Inst., **14** (1936) 18-25.

2) In this upwarped area, the anomalies in geomagnetic dip were found to be minimum, which however is attributed to special features in the topography. c. f. T. Minakami, Bull. Earthq. Res. Inst. **16** (1938), 100-116.

no-tyaya (near B. M. No. 10823) slightly subsided as referred to B. M. No. 551, the latter fact being shown by changes in the height of marks situated south-east of the volcano.

Fig. 2. Vertical displacements of successive bench-marks.

It will be seen that the maximum elevation in the upwarped part was about 40 mm. Should the line of levels fail to pass through the centre of the upwarped area, the true extent of the upwarp will still remain unknown; the elevation might possibly have been larger than 40 mm at the centre of the area. It is however noteworthy that the centre of the upwarped area is likely to lie on the western slope, certainly not at the crater of the volcano.

It is also noteworthy that the sum of the changes in the height-difference between successive bench-marks that form, as a whole, a circular line of levels, is -1.9 mm, which, theoretically speaking, should vanish. On the other hand, since the line extends for about 65 km, the closing error for the circuit should be about 12 mm. It may be unavoidable that the sum of the changes in the height-difference of the circuit should amount to ten percent of the usual closing error.

The revision work was undertaken with the aid of a grant made the Earthquake Research Institute by the Harada Sekizenkwai, to the council of which we wish to express our sincere thanks.