

Vertical movements observed by tide gage at the 1983 Miyakejima Volcano eruption

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Rapid ground deformation in the 2000 eruption

The rapid crustal deformations at the 2000 Miyakejima volcano eruption on June 26 are detected by tilt movements, GPS and sea level measurements at the almost the same time of the earthquake occurrence. The ground deformation amounts to 10 to 20 cm until the morning of June 27. The residual between the observation and the calculation of the sea level at Miyake tide gage station distinctly shows the subsidence of 15 cm, which means the uplift of the ground. It suggests that the dike intrusion was going rapidly under the Miyakejima volcano within about twelve hours after the earthquake occurrence on January 26. In spite of the rapid ground deformation, only the small eruption at the sea bottom off of the west coast of the Miyakejima volcano is observed.

Discussion of the tide level change with the hourly data in the 1983 eruption

While the ground deformation at the 1983 Miyakejima volcano eruption is difficult to define because the observation system of the volcanic activity is inadequate. Tide level observation at Miyakejima in 1983 suggests a different interpretation of the vertical movements. The heavy meandering of the Kuroshio Current cause the large change of the tide level, and it causes the large noise to discuss the ground deformation from the tide level change. They discuss on the monthly or daily average of the tide level.

We discuss the hourly data of the tide level in our paper, because the meandering of the Kuroshio Current changes with the superior frequency of few months.

Rapid ground subsidence in the 1983 eruption

The differences of the tide levels observed at Miyakejima and Kozujima shows that the rapid rise of the tide level is started at 12:00 on October 3, 1983 and it amounts to 15 cm until 6:00 in October 4. Although the tide levels between at Miyakejima and Kozujima are ranging 40 cm in 1983, the rapid changes of 20 cm within few hours is observed only on October 3. Therefore the rapid change of tide level is caused by the ground deformation at Miyakejima.

The earthquake swarm is just felt at Miyakejima at 12:00. Ground deformation is just started at the same time of the earthquake occurrence on October 3, 1983.

Conclusion

We conclude that the rapid ground deformations are also progressing in the 1983 Miyakejima volcano eruption and it starts at the same time of the earthquake occurrence. The tide level measurements show the subsidence of about 15 cm at the eruption. Tide level at Miyakejima is made clear the rapid uplift of the ground in the 2000 eruption but it shows the subsidence of the ground in the 1983 eruption. In the 2000 eruption the remarkable subsidence is detected at the GPS site with the distance of only 500 m from the Miyakejima tide station. It suggests that the locations of the dike intrusion are different in 2000 and 1983.