

Classification of seismic waves form around Kurikomayama to presume the areas of scattered materials

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1. Introduction

Kurikomayama is an active volcano located in the boundary of Akita, Iwate and Miyagi Prefecture. It erupted most recently on November 20, 1944. The volcanic activity in Kurikomayama is calm now.

2008 Iwate-Miyagi Nairiku Earthquake (M7.2), centered in southern part of Iwate prefecture, near Kurikomayama, occurred on June 14, 2008. The aftershock activity is continuing now. We thought that it seemed to depend on the spread route of the aftershock waves greatly whether the aftershock waves scattered or were not so, by looking at aftershock waves. We classify the aftershock waves paying attention to scattered degree of waves and the position of sites and hypocenters, and discuss the structure around Kurikomayama.

2. Used data

We use 4 sites. One of them is Kurikoma Oyasu that Japan Meteorological Agency (JMA) set up on July 2, 2008. Last 3 sites are Ichinosekihigashi, Higashinaruse, and Naruko of High Sensitivity Seismograph Network Japan (Hi-Net) that National Research Institute for Earth Science and Disaster Prevention (NIED) construct. A investigation period is from 18:00:00(JST) on July 2, 2008 to 24:00:00(JST) on July 21, 2008. The classification area is enclosed with all sides about 23km, that center on the top of Kurikomayama. Basically, we use earthquakes of M2 or more of the JMA catalogue data so as not to use the data buried in noise. But, for consideration, the southeast part of the top is also classified about earthquakes less than M2. 134 earthquakes of M2 or more and 110 earthquakes of less than M2 are classified.

3. Attention point

Seismic wave is chiefly influenced by the frequency response of the seismographs, characteristic of the ground, routes of seismic waves and mechanisms of the fault slip.

We pay attention to whether both P and S phases are clear or not, and the wave forms are scattered or not, and qualitatively classify the state of scattering aftershock waves.

4. Classification result

Aftershocks are roughly classified into four patterns. (1) P and S phase are plain in four sites. (2) Waves are scattered only in Naruko. (3) Waves are scattered only in Higashinaruse. (4) Waves are scattered only in Kurikoma Oyasu. Other patterns are not clearly found in our classification.

Aftershocks of type (2) occurred in the northeast area where is away from the top of Kurikomayama at about 8-16km. P and S phase of aftershocks that occurred near the top are plain in four sites though aftershocks occurred similarly in northeast area of the top. Aftershocks of type (3) occurred in the south of the top. Aftershocks of type (4) occurred in the southeast area where is away from the top of Kurikomayama at about 8-10km. (Because the number of aftershocks of M2 or more scattered in Kurikoma Oyasu is only two, aftershocks of less than M2 are also used.)

5. Consideration

The relation between the sites that observe scattered waves and hypocenters that radiate them is roughly point symmetry that centers on the top of Kurikomayama. It is thought that materials to cause scattering exist under the top. It is presumed that they exist from 4km to 10km in depth, by calculating routes of S waves by JMA 1-D velocity structure called JMA2001. But, a part of shallow aftershocks under the top and the aftershocks in the southern part of the top draws waves in plain P and S phase with four sites. Therefore, it is thought that the materials to cause scattering don't exist thoroughly but exist partially under the top.

6. Conclusion

It can be presumed that there are materials to cause scattering under the top of Kurikomayama by paying attention to the scattered condition of waves of aftershocks of 2008 Iwate-Miyagi Nairiku Earthquake by our classification.

We thought that a quantitative analysis is necessary to specify materials and concrete areas where they exist.