Population extraction around active volcano by using GIS

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Factors causing volcanic disasters are various such as pyroclastic flows, lava flows, mudflows, ballistic projectiles and tephra falls (hawaiian to phreatoplinian). In general, residents living near active volcanoes are relatively dangerous by these volcanic disasters. Therefore, we tried to evaluate the risk living around active volcanoes by counting population around the volcanoes using GIS.

The analytical approach of this research is as follows:

1. Circles of 2 km, 5 km, 10 km, and 15 km in radius were made from the typical vent.
2. Each circle and the population data (1 km mesh) were superimposed.
3. The populations included in the circles were counted.

We used the latitude and longitude data of the positions of the vents from the National Catalogue of the Active Volcanoes in Japan (second edition) and the JMA report (January 21, 2003). Totaling 85 active volcanoes were evaluated. Submarine volcanoes and volcanoes in the northern territories were excluded. The regional mesh statistics (1 km mesh) were used for the population data.

Comparing population data around the active volcanoes became possible by totaling population data based on the same standard. There are totaling 48 active volcanoes in which people live around the volcano within the circle with a radius of 2 km. These volcanoes are monogenetic volcanic groups and the volcanic islands. There are 9 active volcanoes in which 10,000 or more people live within the circle with a radius of 5 km. These 9 volcanoes are located near the urban area. There are 28 volcanoes, 1/3 of all active volcanoes, in which 10,000 or more people live within the circle with a radius of 10 km. This is because the total area reaches the core of the urban area within the 10 km circles. There are 45 active volcanoes, half of all active volcanoes, in which the population is more than 10,000 within the circle with a radius of 15 km. The population in the circle with a radius of 15 km exceeds 500,000 in the Hakoneyama and Sakurajima.

Even if the scale of eruptions is small, it becomes a threat for the residents around the active volcano. Therefore, multiple analytical approaches including evaluation of social conditions are necessary to assess the risk of the active volcanoes.