

A-type Earthquakes at Sakurajima during Inflation Stage of the Aira Caldera

Sri Hidayati, Kazuhiro Ishihara, Masato Iguchi

1. Sakurajima volcano is located at southern rim of the Aira caldera (northern part of Kagoshima bay). The ground of the Aira caldera and Sakurajima had been subsided during the active period from 1974 to 1992, when a few hundreds explosive occurred each year. During the period, volcano-tectonic earthquakes (A-type) had gradually decreased with time, though numerous volcanic earthquakes had been originated. In 1993-1994, eruptive activity and number of B-type earthquakes declined significantly. Then the ground around the caldera was turned into inflation, and A-type earthquakes began to increase gradually.

2. A significant increase of A-type earthquakes around Sakurajima was observed in the end of 2003, when gradual inflation almost recovered the ground level in 1974. A-type earthquakes temporally swarmed southwest off the volcano from November 2003 to February 2004, which was followed by occurrence of those at the northern part of the Aira caldera from December 2003 to April 2004. In addition, inflation of the caldera was accelerated in October 2004. However, no significant changes in eruptive activity were observed.

In this study, we examined the location and focal mechanism of A-type events, including caldera area, during the period of 2001 to 2004, and discuss their volcanological implications.

(1) Location of A-type earthquakes during the period were distinguished into three regions; 1 to 5 km beneath the summit (Region A), 7 to 9 km deep

southwest off Sakurajima (Region B), and 4 to 13 km deep in the Aira caldera (Region C). During the deflation stage from 1974 to 1993, few A-type earthquakes were observed in Region C.

(2) Focal mechanism in Region A has variation; both normal and reverse fault types were observed at shallow part, and strike-slip type is predominant in deeper portion. This result is similar as pointed by Nishi (1978).

(3) A-type earthquakes in Region B, southwest of Sakurajima, have mechanism of normal fault type with horizontal tension axis striking nearly to E-W direction. In contrast, the mechanism of earthquakes in Region C, the Aira caldera, is of strike slip type.

Some of discussion will be done, in relation with previous studies on volcano-tectonic earthquakes.