

Volcanic history of western margin of Aira caldera based on K-Ar geochronology

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Western margin of Aira caldera consists of the Yoshino-dai plateau with a gentle slope to the west and the northern high volcanic mountain area with up to 550 m height with a steep caldera wall faced to Kagoshima Bay of more than 200 m height. It is the area where the most voluminous volcanic rocks distribute around the rim of Aira caldera as well as the post-caldera Sakurajima volcano. Therefore, it is an important area to understand how the Aira caldera has been evolved.

Systematic K-Ar dating by sensitivity method at Kyoto University and Geological Survey of Japan has been performed to the volcanic rocks distributed in this western margin of Aira caldera. The history of the pre-caldera volcanic activities obtained is as follows: (1) Andesitic magmas erupted at the present high volcanic mountain area in the north of present Yoshino-dai plateau from 1 to 0.7 Ma, then formed the volcanic bodies with up to 550 meters height. (2) Next, dacite erupted at the southeastern side of the above mountain area at 0.5 Ma, besides, subsequently basaltic lavas erupted from the present Kagoshima Bay side, overlaid the dacites and had also flown between volcanoes of the high volcanic mountain area and in the Kagoshima Bay. (3) Then, rhyolitic pyroclastic flows and subsequent basaltic lava flows erupted westward from the Kagoshima Bay side again and formed Yoshino-dai plateau from 0.45 to 0.35 Ma. (4) The volcanic body which located in the Kagoshima Bay and erupted magmas westwards through 0.5 to 0.35 Ma had collapsed and disappeared some time after 0.35 Ma. Then the Yoshino-dai plateau and the caldera wall had remained as the foot of the previous volcano as shown in the present time. It was also found that the basaltic magma erupted around Aoshiki which locates in the 10 km north from the Yoshino-dai plateau at 0.08 Ma. This implies that the activity of basaltic magma occurred during the period when the volcanic activity at Aira caldera became more active after 0.1 Ma than before as shown in the multiple pyroclastic eruptions including Aira pyroclastic eruption. The K-Ar ages obtained so far from the whole Aira caldera area implies that the location of volcanic activity had migrated along the caldera rim since 1.5 Ma.