

Evolution of the Aira Caldera inferred from the ejecta of the Aira pyroclastic eruption

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1. Introduction

The Aira pyroclastic eruption produced the Aira Caldera about 25,000 years ago. The Osumi plinian pumice fall (+ Tarumizu pyroclastic flow), Tsumaya pyroclastic flow, Ito pyroclastic flow (+ Kamewarizaka breccia and AT co-ignimbrite ash) were ejected (Aramaki, 1984; Fukushima and Kobayashi, 2000; Machida and Arai, 1976). It is thought that the Aira Caldera became the present form by this eruption. However, it does not understand about at which time under eruption it was formed. In this research, the caldera formation process is considered from the feature of the ejecta.

2. Description and analysis and result

From the Aira pyroclastic eruption ejecta located in the northern Aira Caldera, the samples were continuously collected from the lowermost part of Tsumaya pyroclastic flow deposit to the topmost part of the Ito pyroclastic flow deposit. Lithic concentration zones (the Kamewarizaka breccia) are recognized that in the boundary of the Tsumaya pyroclastic flow deposit and the Ito pyroclastic flow deposit near the caldera. Grain sizes of the deposit become coarse toward the lower part of the lowermost part of the Tsumaya pyroclastic flow deposit to the Ito pyroclastic flow deposit. A systematic grain size change is not shown in the Ito pyroclastic flow deposit. A component analysis of the glass fragments (0.5-0.25 mm in diameter) shows that large bubble glass fragments increase upward from the lower part to upper part of the Tsumaya pyroclastic flow deposit (20-90 %) and decrease upward from the lower part to upper part of the Ito pyroclastic flow deposit (90-60 %).

3. Discussion

Lithic concentration zone (Kamewarizaka breccia) is often recognized between the Tsumaya pyroclastic flow and the Ito pyroclastic flow deposit boundary. It is considered that there were rapid vent enlargement and the rapid rise of the rate of magma discharge rate by it in the changes time of the Tsumaya pyroclastic flow to the Ito pyroclastic flow. From change of the diameter of bubbles contained in glass fragments, it is thought that magma chamber was gradually decompressed through the eruption period of the Tsumaya pyroclastic flow and was gradually compressed through the eruption period of the Ito pyroclastic flow. It is thought that main formation of the Aira Caldera started at the time of the eruption boundary of the Tsumaya pyroclastic flow and the Ito pyroclastic flow.