

Distribution of submarine pyroclastic-flow deposits of Akahoya eruption, Kikai caldera

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Kikai caldera, most of which is submerged in the seawater of the south of the Kyushu Island, southwest Japan, is the Quaternary active caldera volcano. Latest eruption accompanied by caldera collapse taken place in 7.3 ka is the biggest Holocene eruption in Japan Archipelago. The ash-fall known as Akahoya was spread to entire southwest Japan and the pyroclastic flow thought as a low-aspect ratio ignimbrite is distributed in subaerial parts of the surrounding islands 40-80 km away from the source. Such submarine caldera must supplied the products not only in air, but largely in the water which has not been identified yet.

In order to understand the distribution of the pyroclastic-flow deposits beneath the sea around Kikai caldera, we conducted high resolution marine seismic studies from 2016 to 2018 by T/V Fukae-maru. We identified the uppermost unit widely recognized around Kikai caldera as the pyroclastic-flow deposit associated with 7.3-ka Akahoya eruption from the seismic sequence stratigraphic analysis and glass composition of sediments. The uppermost unit, characterized by subparallel to hummocky configurations of high amplitude reflections, covers the slope fan and progradational deposits of shelf edge developed between the Kyushu Island and Kikai caldera. These secondary deposits under the uppermost unit are interpreted to deposit around the last glacial by reason of the erosion structure seen on the top-lap surface of regressive clinoform at 120 m below current sea level. Since uppermost unit is deposited after the last glacial (18 ka) and shows consistent seismic facies around Kikai caldera, the unit is inferred as products of 7.3-ka eruption. This is supported by analysis of glass composition of the sediments sampled at the seafloors interpreted as the above seismic unit, which shows the bimodal geochemical characteristic of high SiO₂ glass shards and lesser amount of low SiO₂ glass shards by which Koya pyroclastic-flow deposits are characterized (Nakaoka et al., this meeting).

This uppermost seismic unit interpreted as pyroclastic-flow deposit represents Akahoya eruption is distributed with a thickness of ~50 m around Kikai caldera. It maintains a certain amount of thickness until it reaches the shelf edge of the Kyushu and surrounding islands. At least 40 km radius circle around the caldera, this unit is recognizable in most of the area of the seismic profiles. This result shows that a large amount of volcanic materials are ejected not only in air rather in the water at 7.3-ka Akahoya eruption.

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