

Volcanic edifice structure of Myojinsho caldera by bathymetry and seismic survey

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Submarine volcanic eruption can be highly destructive generating cock's tail jets and base surges in addition to pyroclastic gravity currents. In case of caldera-forming eruption, submarine eruption may result in worldwide disaster. In Izu-Mariana arc, many submarine caldera volcanoes are reported, and one of the active volcanoes is Myojinsho caldera. In the 1952-53 eruption of the post-caldera volcanic cone, some researchers were killed by phreatomagmatic eruption.

We surveyed Myojinsho caldera in December 2006 and April 2008 by Ship Natsushima and Hyperdolphin (JAMSTEC) to understand the mechanism of submarine caldera eruption and evolution of caldera volcanoes. We also carried out SCS survey across the caldera in order to estimate inner structure of volcanic body. Samples for petrological and geochemical analyses in the laboratory are obtained (more than 50 rock and some sediment samples).

We found facts as follows; (1) Myojinsho is a conical edifice whose surface of the slope consists of deposits by gravity currents of pumices at distant farther than 500 m from the vent, and dense angular lava blocks probably as a consequence by cock's tail jets that accompanied by phreatomagmatic eruptions in 1952-53. (2) The edifice of Myojinsho caldera consists of the alternation of altered lava and pyroclastic layers at deeper part than ca. 500 m bsl (below sea level), and thick pumice fall and flow deposit that would have been generated by caldera eruption. The whole rock compositions of these caldera wall samples show that most of the erupted magma is andesite to dacite but can be grouped in terms of sample locality. (3) Deposits outside the caldera also consist of pumiceous materials. (4) The N-S aligned ridge is a chain of pyroclastic cones consisting of scoria, spatter and lavas with some morphological variety.