

Post-caldera volcanism and hydrothermal activity revealed by AUV surveys in Myojin Knoll caldera, Izu-Ogasawara Arc, Japan

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Myojin Knoll caldera is one of submarine silicic calderas lying on the volcanic front of the northern Izu-Ogasawara arc and has attracted increasing attention since the discovery of a large hydrothermal field called the Sunrise deposit. Although many detailed surveys using a manned submersible have been conducted in Myojin Knoll caldera, they have explored too limited areas to draw a complete picture of the caldera and the Sunrise deposit. We carried out deep-sea surveys using an autonomous underwater vehicle (AUV) and obtained high-resolution bathymetric and magnetic data and sonar images covering ~70 % of the caldera. Besides post-caldera volcanism in the central cone, it was revealed that volcanic eruptions have commonly occurred in the caldera wall. Regular or irregular mottled patterns are ubiquitous in sonar images from the caldera floor, and those in the northwestern floor correspond to areas Mn precipitation was confirmed by a submersible survey. The Sunrise deposit lies in the foot of the caldera wall and is mainly composed of three ridges growing straight in the sloping direction. Only slight reduction in magnetization is observed in the deposit area, suggesting a dipping alteration zone beneath the Sunrise deposit. Preferential magma intrusion along a NW-SE direction was inferred from the distribution of high magnetization in the central cone and may play a major role in the occurrence and evolution of the Sunrise deposit in the southeastern caldera wall.