Integrated marine investigations of Kikai Caldera, SW Japan

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We started integrated marine investigations of Kikai Caldera with T/S Fukae-maru of Kobe University on October, 2016. Aims of our investigations are to reveal the structure of the caldera, the existence of magma reservoir, and to understand the mechanism of catastrophic caldera-forming eruption at 7.3 ka and a potential for a future catastrophic eruption. We conducted multi-beam echo sounder mapping, multi-channel seismic reflection (MCS) surveys, remotely operated vehicle (ROV) observations, rock sampling by dredging and diving, geophysical sub-seafloor imaging with ocean bottom seismometers, electro-magnetometers (OBEMs), some of which equip absolute pressure gauge, ocean-bottom magnetometers, and surface geomagnetic surveys.

The first finding of our investigations is lines of evidence for creation of a giant rhyolite lava dome (~32 km^3) after the caldera collapse. This dome is still active as water column anomalies accompanied by bubbling from its surface are observed by the water column mapping. Chemical characteristics of dome-forming rhyolites akin to those of presently active small volcanic cones are different from those of supereruption. The voluminous post-caldera activity is thus not caused simply by squeezing the remnant of syn-caldera magma but may tap a magma system that has evolved both chemically and physically since the 7.3-ka supereruption.

We have been conducting integrated analyses of our data set, and have planned the fourth research cruise with T/S Fukae-maru on March, 2018, consisting of MCS survey, ROV observation, OBEM with absolute pressure gauge observation, and bathymetric and surface geomagnetic survey. We will introduce results of the data analyses and the upcoming cruise in the presentation.

