

Heterogeneous structure of Sumisu-Torishima conjugate calderas deduced by seismic reflection and other geophysical data

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During the KY03-10 cruise by R/V Kaiyo, we special focused on the Sumisu and the Torishima caldera areas. SeaBeam bathymetric survey were conducted along box type tracks for 6 nights and duration of MCS operation, totally 300 miles long. In the Sumisu and Torishima caldera regions, track lines were planned to fill a lack of data and wider coverage operated by R/V Kairei KR02-16.

According to the 11 single channel seismic (SCS) records obtained by the R/V Kairei KR02-16 cruise, we designed to deploy Multi-channel Seismic (MCS) system as overwrap and across lines; a set of GI_GUN and streamer cables as parallel, subparallel or crisscross tied SCS track lines around the Sumisu and the Torishima regions.

Based on SCS sections, MCS system had been carried out to recover wave signals from much deeper reflectors and high quality signal/noise ratio with 450m length streamer cable. The streamer cable which has length of 450 m long with 18 channels and 150m lead-in cable operated and recorded seismic signals. The GI_Gun (350 cu in: Generator 245 cu in and Injector 105 cu in), which is a sound source by SSI Co.ltd., can generate high fidelity pulse.

During night-time operation from Sep. 5th to Sep. 19th, we observed totally 450 miles long and 14 MCS lines records (No. 01-12 for a 25 miles parallel line, No.13 for 125 miles length, and No.14 for 8 miles). Along the mantle wedge and around the Sumisu and Torishima caldera regions, negative Bouguer gravity anomalies are obtained. Positive magnetization values are obtained on the Sumisu and Torishima calderas by Parker's inverted method. We performed a paleomagnetic measurements on the Torishima onland rock sample.