

Potential of Hydrothermal activity around the northern part of Sumisu Submarine Caldera, Izu-Ogasawara Arc

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Sumisu Submarine Caldera, Izu-Ogasawara Arc is distant about 470km southerly from Tokyo. The caldera 9×8km in diameter, has steep inner walls about 550-800m high, and a floor averaging about 900m below sea level. Tokai University preformed acoustic water column research by Multi Beam Echo-Sounder and sampling in the northern part of Sumisu Submarine Caldera in 2016. We extrapolated potential of hydrothermal activities in the research area.

We detected a number of acoustic water column anomalies that indicated a pattern like rising horizontally from northern rim of Sumisu Submarine Caldera. The acoustic anomalies came into begin ambit about 4km in the east-west direction in the northern rim. We called the area 'Bosei site' tentatively. In addition, we obtained many reddish brown clastic rocks by sampling in the same area. Infill of reddish brown clastic rocks include volcanic rock fragment, calcareous sediment (embracing biogenic silica), crystalline calcite, reddish brown granular calcite, cristobalite and amorphous ferruginous veinlet. Infill of the rocks had many crystalline calcite because hydrothermal behavior of hydrothermal activity was neutrality side alkalinity. Some reason of environmental transformation changed the behavior to acidity. It may be low temperature that is making reddish brown granular calcite, cristobalite and amorphous ferruginous veinlet.

So we supposed two type hydrothermal activities have occurred in the Bosei site. And it may be that unknown phenomena which cause multi-beam acoustic scattering have been occurred around the seabed by the present hydrothermal activities in the Bosei site.

Keywords: Sumisu Submarine Caldera, Acoustic water scolumn anomaly, Reddish brown clastic rock, Hydrothermal activity