◎Cruise Number： NT10-17

◎Ship Name： R/V Natsushima and ROV Hyper-Dolphin

●Title of the cruise：Izena and Iheya Expedition

●Chief Scientist： KAWAGUCCI, Shinsuke（PEL, JAMSTEC）

●Representatives of the science party：

KAWAGUCCI, Shinsuke（PEL, JAMSTEC）

「Liquid CO2 venting: The Elemental Sulfur Cap Hypothesis to reveal a reason of the curious phenomena at the Izena Cauldron hydrothermal field」

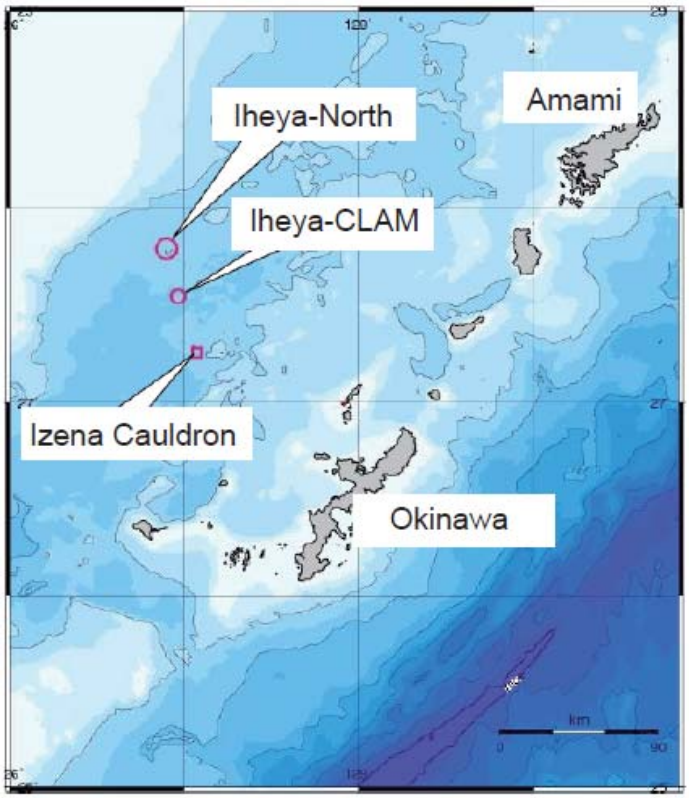
WATANABE, Hiromi（Biogeos, JAMSTEC）

「Hydrothermal vent activity inferred from shell growth of bivalves」

●Cruise period：13/SEP/2010 – 23/SEP/2010

●Port call：Naha - Naha

●Research Area：Izena Cauldron, Iheya North, and Iheya CLAM hydrothermal sites




Izena Cauldron, surrounded with the lines of 27° 14.0'N=127° 03.0'E and 27° 17.0'N=127° 06.0'E

Iheya North field, within 2 miles from 27° 47.5'N=126° 54.0'E

Iheya CLAM site, within 2 miles from 27° 33.0'N=126° 58.0'E

## ●Overview of the observation

Izena investigation

While liquid $CO_2$ venting from the seafloor at the Izena Cauldron was identified in 1989 by the DSV Shinkai2000 (Sakai et al., 1990, science), it has been still not understood how liquid $CO_2$ pool in the subseafloor was established. We hypothesized that elemental sulfur, which is exposed at around the vent of liquid $CO_2$ and can be produced by cooling of vapor components resulted from subseafloor boiling of hydrothermal fluid, works as the subseafloor cap of liquid $CO_2$ pool. To testify this “Elemental Sulfur CAP process” hypothesis (ESCAPE hypothesis), we in this cruise investigated the Izena Cauldron hydrothermal systems using water sampler, corer, and cutter to take venting fluid, sediment, and sulfur crust around the liquid $CO_2$ venting site by ROV HyperDolphin.

Iheya-North investigation

The D/V Chikyu established the casing pipe for a drilled hole at the Iheya North hydrothermal field during the "Deep Hot Biosphere" expedition (IODP 331) to investigate geochemical processes and microbial activities in the hidden subseafloor environment. We in this cruise approach the casing pipe by ROV HyperDolphin and carried out sampling using a "KANDATA" system, which was developed to take deep water sample (and cultivate subseafloor microbes) without any contamination from the surface world.

Iheya CLAM investigation

Physiological property of deep-sea bivalves has been still poorly known due partly to the difficulty on breeding at onshore laboratory. We in this cruise carry out "Sr marking" into their CaCO3 shells by adding Sr solution on the seafloor. This in-situ experiment enables us to estimate their shell growth rate independent from onshore breeding.