

# Cruise Summary

## 1. Cruise Information

(1) **Cruise ID:** KS-21-20

(2) **Vessel:** R/V SHINSEI MARU

(3) **Cruise Title**

Unraveling an abnormal gold enrichment mechanism at the Higashi-Aogashima Knoll Caldera hydrothermal field

(4) **Chief Scientist**

Tatsuo Nozaki (JAMSTEC)

(5) **Representative of the Science Party**

S21-8 Tatsuo Nozaki (JAMSTEC)

(6) **Research Titles**

S21-8 Unraveling an abnormal gold enrichment mechanism at the Higashi-Aogashima Knoll Caldera hydrothermal field

(7) **Cruise Period**

2021/08/30 - 2021/09/08

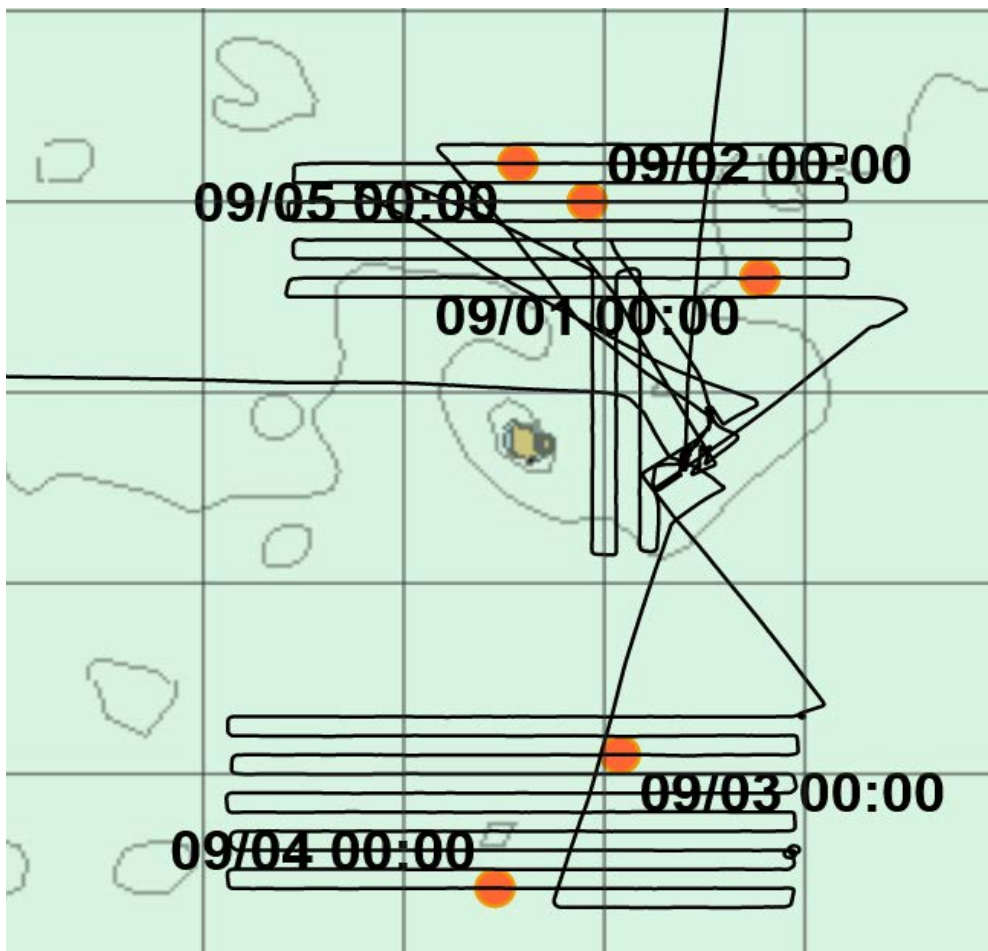
(8) **Ports of departure/call/arrival**

JAMSTEC Yokosuka HQ - Kochi

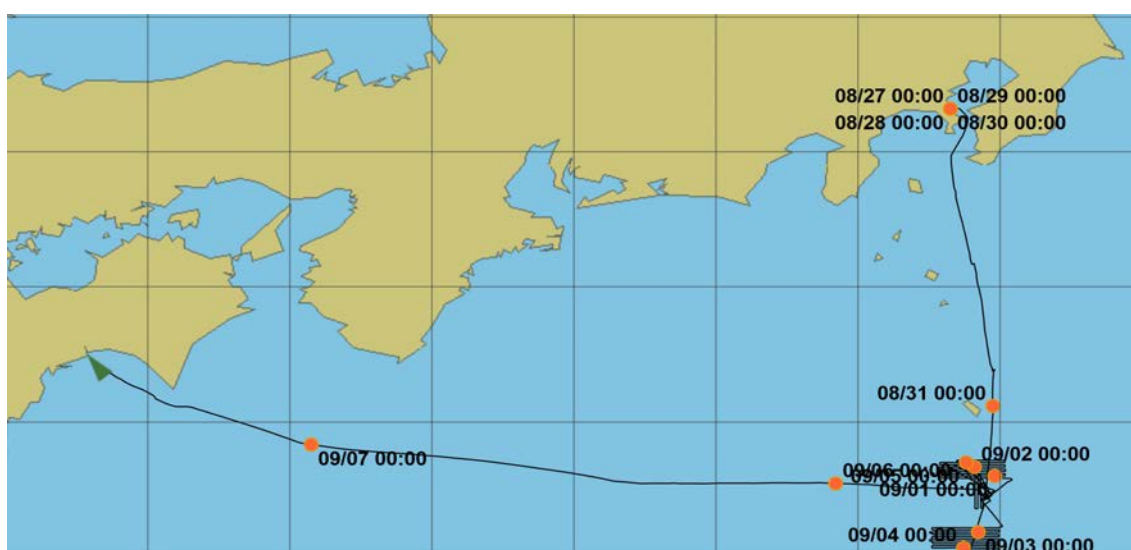
(9) **Research Area**

Higashi-Aogashima Knoll Caldera

(10) Cruise Track



North latitude: From 32.00' to 32.50', East longitude: From 139.20' to 140.10'.



North latitude: From 32.00' to 36.00', East longitude: From 133.00' to 141.00'.

## **2. Overview of the Observation**

The Higashi-Aogashima Knoll Caldera hydrothermal field is a relatively new one discovered in 2015. There are three hydrothermal sites of the Central Cone, East and Southeast Sites in the Higashi-Aogashima Knoll Caldera hydrothermal field and an abnormal gold enrichment was reported only from the Central Cone Site. Although this abnormal gold enrichment is considered to be closely associated with the boiling process of hydrothermal fluid, merely fundamental petrographic signatures of chimney and mound rock samples have been reported. Thus, in this cruise, so as to multidirectionally understand the abnormal gold enrichment mechanism, we aim to obtain rock, seawater, hydrothermal fluid and (micro)biological samples as well as geophysical survey data. Moreover, we also conduct installment and recovery of gold adsorption and pyrite reaction apparatuses on the natural hydrothermal vents.

During the cruise KS-21-20, the sea state was relatively calm and we could conduct five ROV dives out of planned six dives. Based on the detailed bathymetric data obtained by the cruise YK21-10 in June 2021, seafloor observation and sampling of rock, seawater, hydrothermal fluid, push core, microorganism and animal fauna were conducted at the Central, East and Southeast sites. During the ROV dives, temperature measurement of hydrothermal fluid and installment of gold adsorption and pyrite reaction apparatuses were also performed. Moreover, we obtained geophysical data of high-resolution magnetic data by towed magnetometer as well as bathymetric (MBES), magnetic, gravitic and shallow subseafloor structural data (SBP) by onboard instruments. ROV went to the bathymetric unique points detected by AUV data as much as possible and most of these unique points were outcrops of altered volcanic rock, however, these unique points include the mound and chimney at the East Site, leading us to the quick discovery of the East Site during the ROV dive. In future, we will conduct the petrographic observation and various chemical analyses on these samples/data in order to unravel the abnormal gold enrichment mechanism in detail. The gold adsorption and pyrite reaction apparatuses installed at this cruise will be recovered by another cruise in the next fiscal year.