

## Cruise Summary

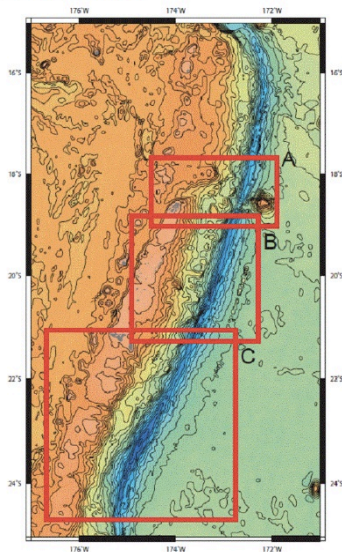
### 1. Cruise Information

- Cruise ID: YK13-10
- Name of vessel: Yokosuka
- Title of the cruise: QUELLE Quest4 -Tonga Trench-
- Chief scientist [Affiliation]: KITAZATO, Hiroshi (JAMSTEC)
- Representative of the Science Party [Affiliation]: (If there are no scientific proposals, it is not necessary to fill this section for exception) KITAZATO, Hiroshi (JAMSTEC), MICHIBAYASHI, Katsu (Shizuoka University)
- Title of proposal:
  1. “Survey of Biological diversity of hadal deep at Tonga Trench: Trench Biology Part III”
  2. “Structure formation of island arc and biological activity with ultra mafic rock environment: Field survey of Tonga trench”
  3. “Global sea surface:  $p\text{CO}_2$  observation: Estimation of carbon budget between Ocean-Atmosphere by GOSAT data”
- Cruise period: 6<sup>th</sup> of October, 2013 (Sunday) – 21<sup>st</sup> of October, 2013 (Monday)
- Ports of call: Suva, Fiji – Nuku’alofa, Tonga
- Research area: Tonga trench, South Pacific Ocean
- Research map:

Examples:

Cruise Track, Dive points, Survey areas, Observation points, Survey lines etc.

YK13-10 トンガ海溝調査予定海域図



## 2. Overview of the Observation

- Overview of the observation

1 : "Field Survey of Ultra deep biology at The Tonga Trench: Comparative Trench Biology 3"

The ultra deep ecosystem among the Tonga Trench from abyssal plain to the world second deepest Horizon deep. The high-definition visual recording, water sampling and sediment coring were realized by 11K Free Fall type mooring Camera System. The Ultra deep profiling lander to measure the respiration rate of benthic community by in-situ oxygen micro electrode. Capturing of Deep-sea animals are also tried by baited traps on both systems. Shinkai 6500 is also deployed to observe the abyssal plain to the slope of the trench around 6000m depth. We collected the macro to mega animals, sediment cores and waters during observation to understand the transition of biological aspects from abyssal plain to trench.

2 : "Structure formation of island arc and biological activity with ultra mafic rock environment: Field survey of Tonga trench"

The YK13-10 cruise is the first time in scientific history to study Tonga Trench by submersible. We investigate and collect rock samples along the land-ward slope by Shinkai6500 in order to identify geological structure and lithological distribution. The degree of serpentinization are observed in order to understand fluid-rock interaction on the deep sea floor. We also investigate the limit of the life in relation to serpentinization on the deep sea floor.

3. "Global sea surface  $pCO_2$  observation: Estimation of carbon budget between Ocean-Atmosphere by GOSAT data"

The average concentration of carbon dioxide and  $pCO_2$  of oceanic surface were logged during the cruise. The auto solar tracking system were served to acquire the absorbance spectrum of methane and carbon dioxide with solar as light source.