



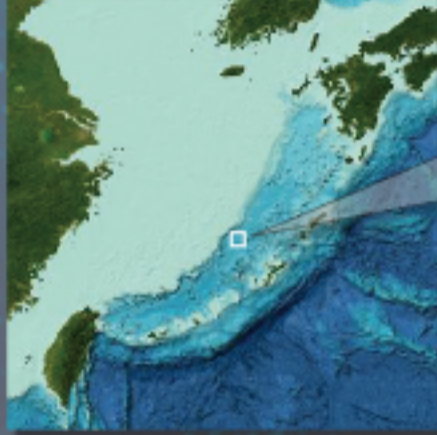
JAMSTEC

Dynamic Features of the Okinawa Trough Hydrothermal System -Observation by km-scale to cm-scale mapping and imaging-

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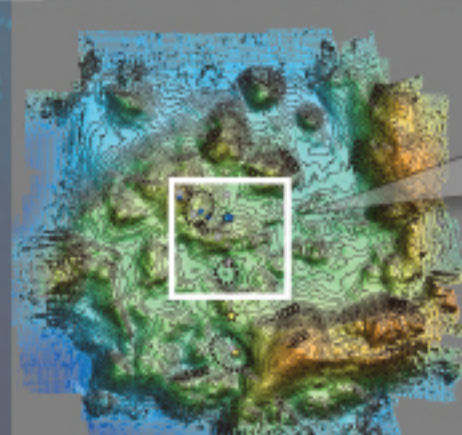
A variety of mapping and imaging technologies has been deployed to understand the basic features and dynamic processes that characterize the hydrothermal system of the Okinawa Trough (Fig.1~Fig.4). The hydrothermal system responded to the D/V Chikyu drilling operation (IODP Exp.331) including dramatic changes in the ecological habitat and chimney growth (Fig.5~Fig.8). The recent progress of mapping and imaging technologies (Fig.9~Fig.13) will influence the societal use and stakeholders request for the availability of types of information regarding deep-sea environments.

Fig1



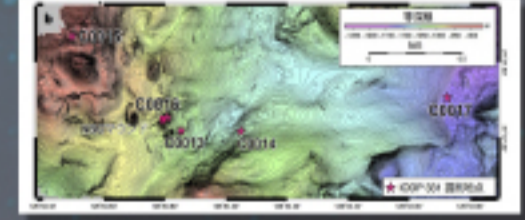
A bathymetric chart of the Okinawa Trough that is available through GEBCO. The Okinawa Trough is a back-arc basin of the Ryukyu arc where the rifting of continental crust and submarine volcanic activity are widespread.

Fig2

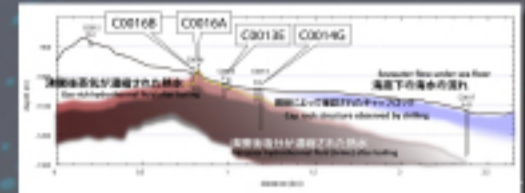


Swath bathymetric map of the Iheya Knoll. Composite volcanic edifices with hydrothermal activities were detected by ROV and Shinkai 6500 dives.

Fig3



High resolution bathymetric map of a part of the Iheya Knoll produced by AUV Urashima. Chikyu drilling sites (IODP) Exp.331 are indicated.



Cross section of the drilling sites and a large hydrothermal fluid pool. Site C0014G is the location of well-head shown below.

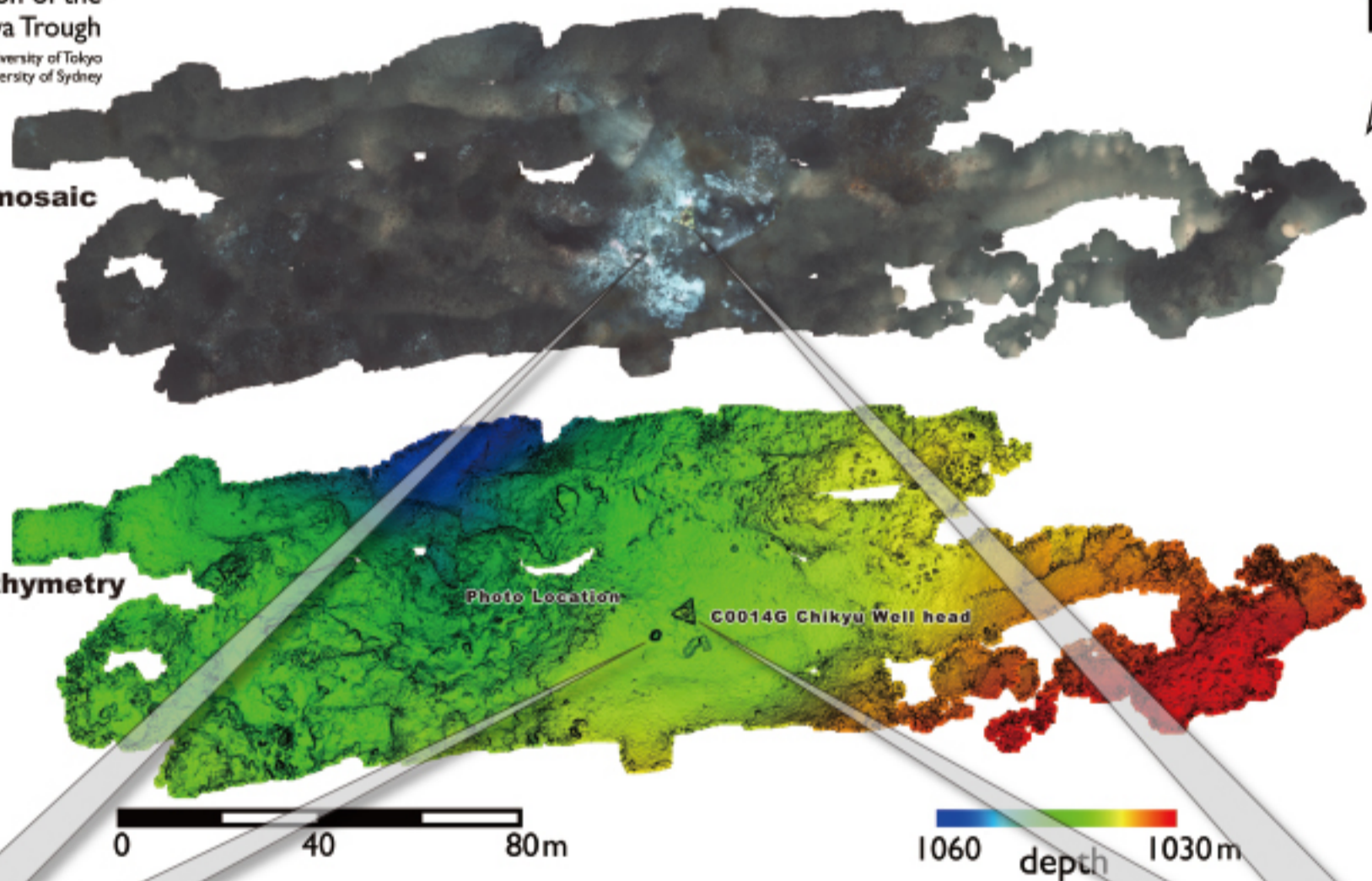
Fig4

3D visual reconstruction of the Iheya North Field, Okinawa Trough

Institute of Industrial Science, The University of Tokyo
Australian Centre for Field Robotics, The University of Sydney

Photo-mosaic

Laser-scanning Bathymetry



Data collected by SeaXerocks

Ultra-high resolution photomosaic and laser bathymetric map around Site C0014G. The image was obtained SeaXerocks (Laser and Flash-light Photography) apparatus equipped on a ROV

Fig5 Pre Drilling



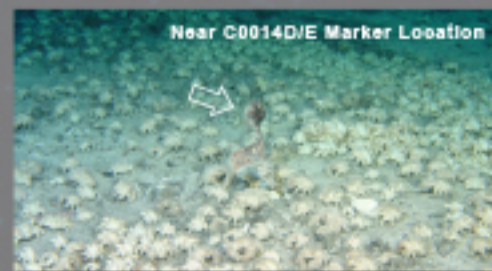
A photo showing Caripitogena clam community inhabited at the seafloor before the IODP drilling.

Fig6 25months after the drilling



A photo taken 25 months after the drilling. The pre-drilling community was apparently diminished.

Fig7 38-40 months after the drilling



A photo taken 38 months after the drilling. A large field was covered with Shinkaiia crosnieri galatheid crabs.

Fig8



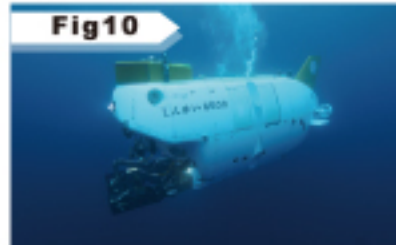
A photo of the well-head of Site C0014G

Fig9



D/V Chikyu (JAMSTEC)

Fig10



Manned submersible Shinkai 6500 (JAMSTEC)

Fig11



AUV Urashima (JAMSTEC)

Fig12



ROV Hyper-dolphin (JAMSTEC)

Fig13



SeaXerocks: Camera with Flash Light and Laser Scanning Technology (University of Tokyo)