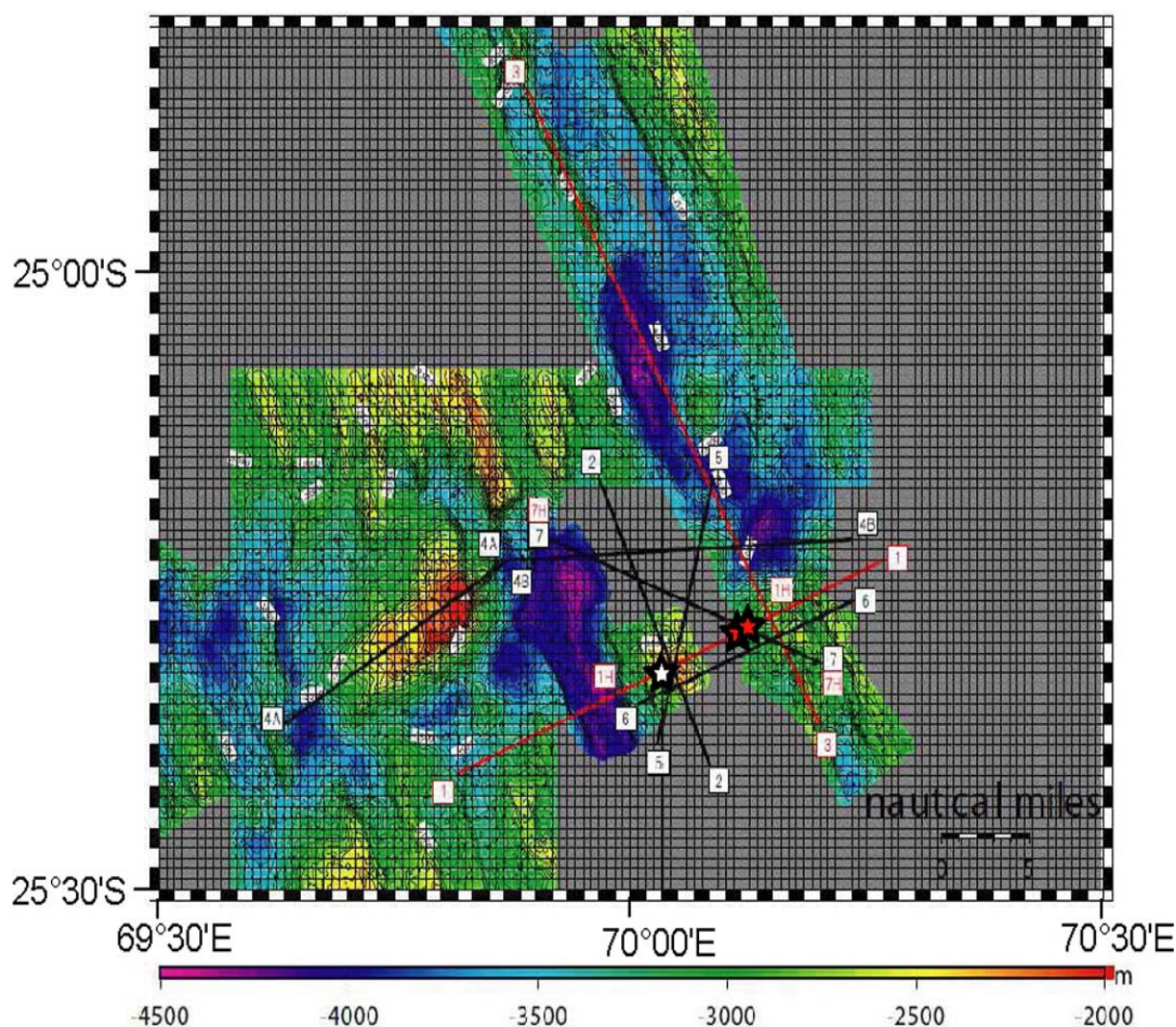


Geophysical survey near the Kairei hydrothermal field, Indian Ocean: Toward an IODP drilling

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Sea floor hydrothermal system attracts broad interests since its discovery in mid-70s. A remarkable feature of the habitat around hydrothermal fields is that lithotrophic micro-organisms are independent from energy derived from sunlight. Because such an environment around the deep sea hydrothermal field resembles early stages of the Earth's history where the first ecosystems had established, the ecosystems around the deep sea hydrothermal field seem to be modern

proxies of an early evolutionary progenitor of the Earth's history. Consequently, some predominant ideas related to the origin of life specifically relate to the deep-sea hydrothermal system.

Within such hydrothermalism, Kairei hydrothermal field have been focused to its unique assemblages of the microorganism and fluid chemistry. The Kairei hydrothermal field is known by its remarkably high concentration of hydrogen in its vent water along the intermediate rate spreading Mid-Ocean Ridges. It developed at the shoulder of the western flank of the Hakuho-Knoll, one of the abyssal hills near Rodriguez Triple Junction, Indian Ocean. Although such abyssal hills are normally parallel to the ridge axes, it slightly obliquely elongated to the present ridge axis.

Seismic and heatflow survey as the part of the comprehensive geophysical survey were conducted in YK09-13 Leg2 around the Kairei hydrothermal field. Total 66 hours of Single Channel Seismic survey (SCS) were performed to investigate the shallow structure near the hydrothermal field. Although the limited penetration of seismic waves, clear high angle normal faults were found in the SCS images at western flank of the Hakuho-Knoll near Kairei hydrothermal field. Normal heatflow values on the young plate near an active Mid-Ocean Ridge were recorded at the two stations behind the Kairei hydrothermal field. The measurements were performed using short heatflow probe (SAHF) at Shinkai6500 submersible dive #1173.

Figure: SCS survey lines and heatflow stations around the Kairei hydrothermal field. Within seven survey lines of SCS (shown as solid lines), red lines show those where high density shooting were carried. Red stars: heatflow stations. White star: Kairei hydrothermal field.

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