

Cruise Summary

1. Cruise information

Cruise ID: YK16-16

Research vessel: YOKOSUKA

Cruise title: Response of marine ecosystem to the ocean acidification in the subarctic western North Pacific & Tsunami early warnings by the seafloor electromagnetic observations

Cruise period (port call): 10 November (Harumi, Tokyo) – 25 November 2016 (Yokosuka, Kanagawa)

Research area: The subarctic western North Pacific and North Pacific Basin

Chief Scientist: Tetsuichi Fujiki (Research and Development Center for Global Change (RCGC), JAMSTEC)

Deputy Chief Scientist: Hiroaki Toh (Graduate School of Science, Kyoto University)

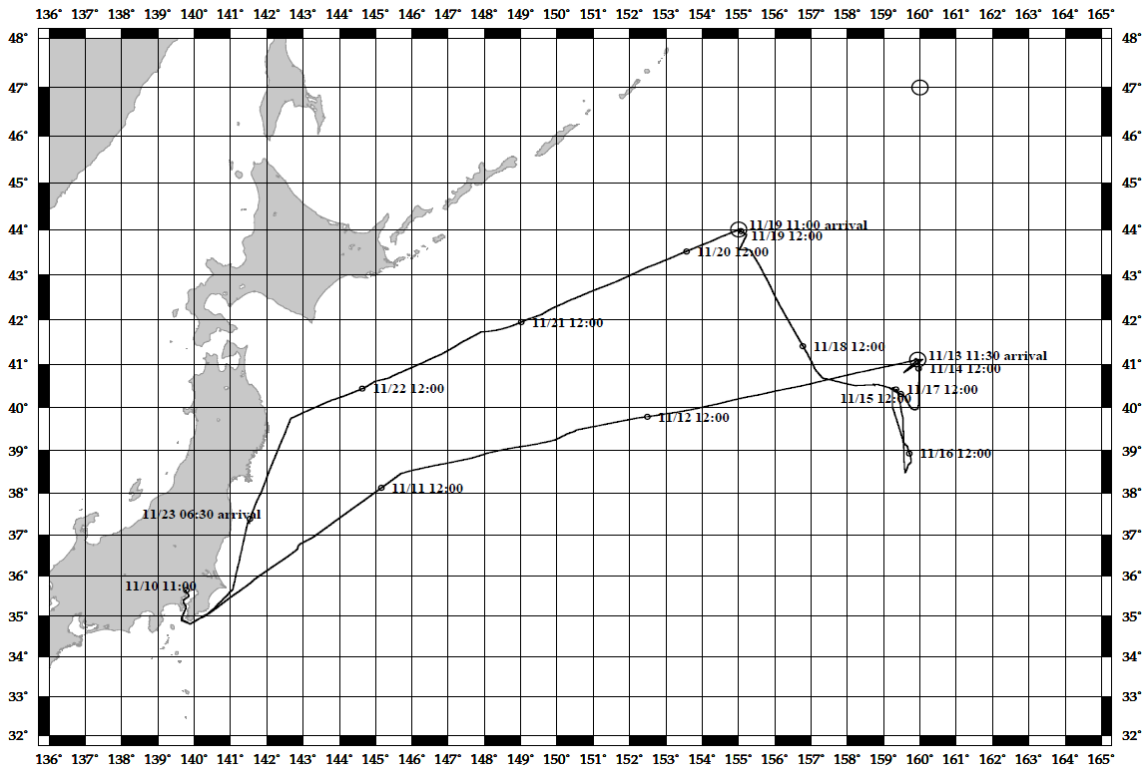
Representative of the Science Party: Tetsuichi Fujiki (RCGC, JAMSTEC)

Hiroaki Toh (Kyoto University)

Proposal title:

1. Response of marine ecosystem to the ocean acidification in the subarctic western North Pacific
2. Tsunami early warnings by the seafloor electromagnetic observations

Cruise track:



2. Research brief

2.1 Response of marine ecosystem to the ocean acidification in the subarctic western North Pacific

The subarctic western North Pacific is a cyclonic upwelling gyre (western subarctic gyre; WSG) that extends from the northeast of Japan to near the international dateline. To investigate the spatial and temporal variability of biogeochemical processes in the WSG, time-series observations have been carried out since 1997 at time-series stations KNOT (44°N, 155°E) and /or K2 (47°N, 160°E), indicating that ocean acidification was rapidly progressing in this gyre. However, the effect of ocean acidification on lower trophic levels in this region is not well understood.

The main purpose of this research is to investigate the plankton community response to the progress of ocean acidification in the WSG. During the cruise period, we couldn't go to Sta. K2 due to bad weather. However, we conducted the following main studies at Sta. KNOT.

Content of research:

- (a) Impact assessment of ocean acidification on marine organisms based on dissolved chemical constituents
- (b) Relationship between plankton community and ocean acidification
- (c) Measurements of carbonate shell density of planktic foraminifers and pteropods by the Micro-focus X-ray CT
- (d) Increase of N₂O production rates as a consequence of ocean acidification

2.2 Tsunami early warnings by the seafloor electromagnetic observations

We succeeded in recovering SFEMS5 (SeaFloor ElectroMagnetic Station 5) by acoustic release on November 14th, 2016. SFEMS5 was deployed during the R/V Kairei cruise in May, 2013 (KR13-09), for the detection of tsunami-generated electromagnetic (EM) fields. All equipment attached to SFEMS5 was safely recovered without any glass sphere flooding. We obtained long-term EM time series over 2.8 years. The obtained long-term data will be useful not only to study tsunami-related EM fields but also to investigate the secular variation of the geomagnetic main field and couplings between EM fields with other oceanic flows with time scales longer than tsunamis.