

Cruise Summary

1. Cruise Information

1.1 Cruise number: KY08-09

1.2 Ship name: KAIYO

1.3 Title of the cruise: KAIYO Independent cruise for KEO buoy/ CTD/Sonde

1.4 Chief Scientist: Hiroshi Ichikawa,
Institute of Observational Research for Global Change,
Japan Agency of Marine and Earth Science and Technology

1.5 Representative of Science Party:
Hiroshi Ichikawa,
Institute of Observational Research for Global Change,
Japan Agency of Marine and Earth Science and Technology

1.6 Title of proposal: Kuroshio Transport and Surface Flux Observation Study

1.7 Cruise period: 2 - 19 September, 2008

1.8 Port call: From/To JAMSTEC Pier. No Port call.

1.9 Research Area: Kuroshio Extension Region

1.10 Research Map:
Cruise track: See Fig.1 attached.
Observation sites: See Fig.2 attached.

2. Overview of Observation

2.1 Overview of Observation

2.1.1 Purpose and background

The heat flux to the atmosphere in the Kuroshio Extension (KE) region is comparable with the largest value among the world oceans. For better understanding on the ocean circulations in the North Pacific including the KE and the climate change system, and for improving the prediction accuracy of numerical prediction model, it is necessary to examine the spatial distribution of surface heat flux in the KE region and its temporal variations with high accuracy.

The present cruise was conducted in the KE region including the areas near the K-TRITON buoy deployed in February 2008 to the north of KE and the KEO buoy maintained by U.S. National Oceanic and Atmospheric Administration to the south of KE, in order to obtain necessary data for validation of sea surface turbulent heat flux estimated from satellite data and improvement of its estimation method, and to operate replacements of sensors on the KTRITON buoy.

2.1.2 Observations, activities, methods and instruments

The following actions were conducted during the cruise.

- 1) Recovery of K-TRITON buoy.

- 2) Oceanographic surveys using XCTD.
- 3) Oceanographic surveys using CTD with LADCP.
- 4) Atmospheric soundings using GPS radio-sonde.
- 5) Underway marine meteorological measurements of short and long wave radiations, air temperature and relative humidity, wind speed and direction, precipitation, and barometric pressure.
- 6) Underway measurement of current velocity in the surface layer using ship-mounted ADCP.
- 7) Water samplings for CO₂ measurements.
- 8) Deployments of Argo floats requested by Univ. of Washington, USA..
- 9) Recovery and deployment of KEO buoy under the payment of additional cost by PMEL/NOAA.

2.1.3 Research results

The results or conclusions of above-mentioned activities are as follows.

- 1) Recovery of K-TRITON buoy.
Before the cruise, it was planned to have the buoy hull and top 20m wire rope on deck without releasing the acoustic releaser (A/R), replace sensors, and the redeploy the buoy hull. However, due to malfunction of A/R, a set of grass-spheres with A/R was found at sea surface, and we recovered all the mooring line and instruments at K-TRITON buoy. By these works, we have confirmed the procedure having the buoy hull on deck without releasing the A/R, and recovered the high resolution data stored at the buoy since 29 February 2008.
- 2) Oceanographic surveys using XCTD.
Vertical profiles of water temperature and salinity were obtained at grand total of 57 sites, i.e., 14 sites along N-line and near K-TRITON buoy, 24 sites along E-line, and 19 sites near KEO buoy and along W- and X-lines.
- 3) Oceanographic surveys using CTD with LADCP.
Vertical profiles of water temperature, salinity, and current velocity were obtained at 3 sites, i.e., at N08 and W08, and near K-TRITON.
- 4) Atmospheric soundings using GPS radio-sonde.
Vertical profiles of air temperature, relative humidity and wind velocity were obtained at grand total of 40 sites, i.e., 8 sites near K-TRITON buoy, 15 sites along E-line, 10 sites near KEO buoy, and 7 sites in other areas.
- 5) Underway marine meteorological measurements of short and long wave radiations, air temperature and relative humidity, wind speed and direction, precipitation, and barometric pressure were conducted.
- 6) Underway measurement of current velocity in the surface layer using ship-mounted ADCP was conducted.
- 7) Water sampling was conducted near K-TRITON buoy for CO₂ measurement.
- 8) 10 Argo floats were deployed at 6 sites along E-line and 4 sites along W-line and near KEO buoy.
- 9) Recovery and deployment of KEO buoy were conducted.

2.2 Title of project
None

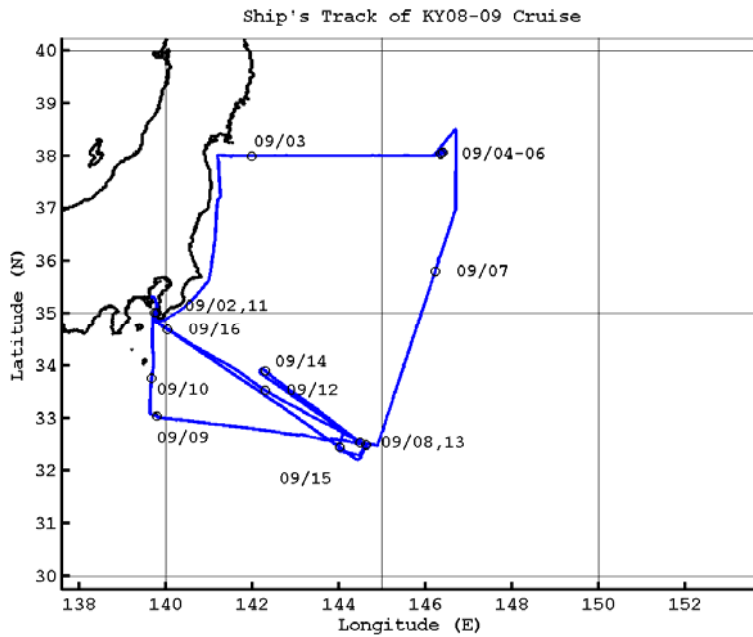


Figure 1 Cruise track with ships position at noon (circle) on each day.

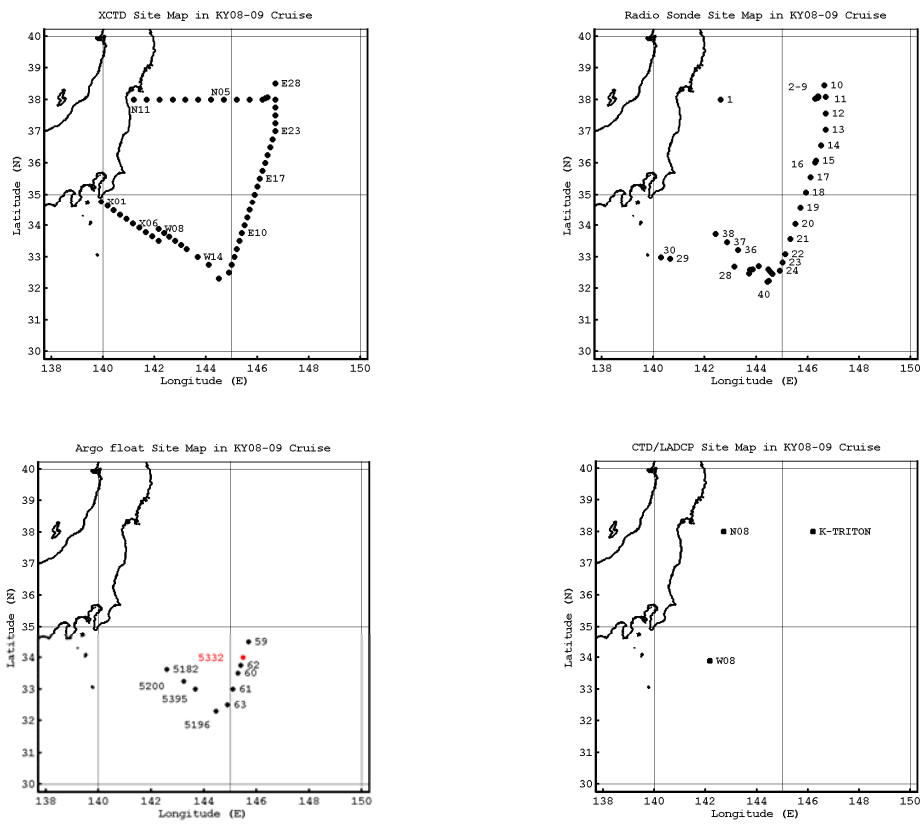


Figure 2 Location maps showing the observation sites. Top-left: XCTD, Top-right: Atmospheric sounding, Bottom-left: Argo float (red: with DO sensor), Bottom-right: CTD with LADCP.