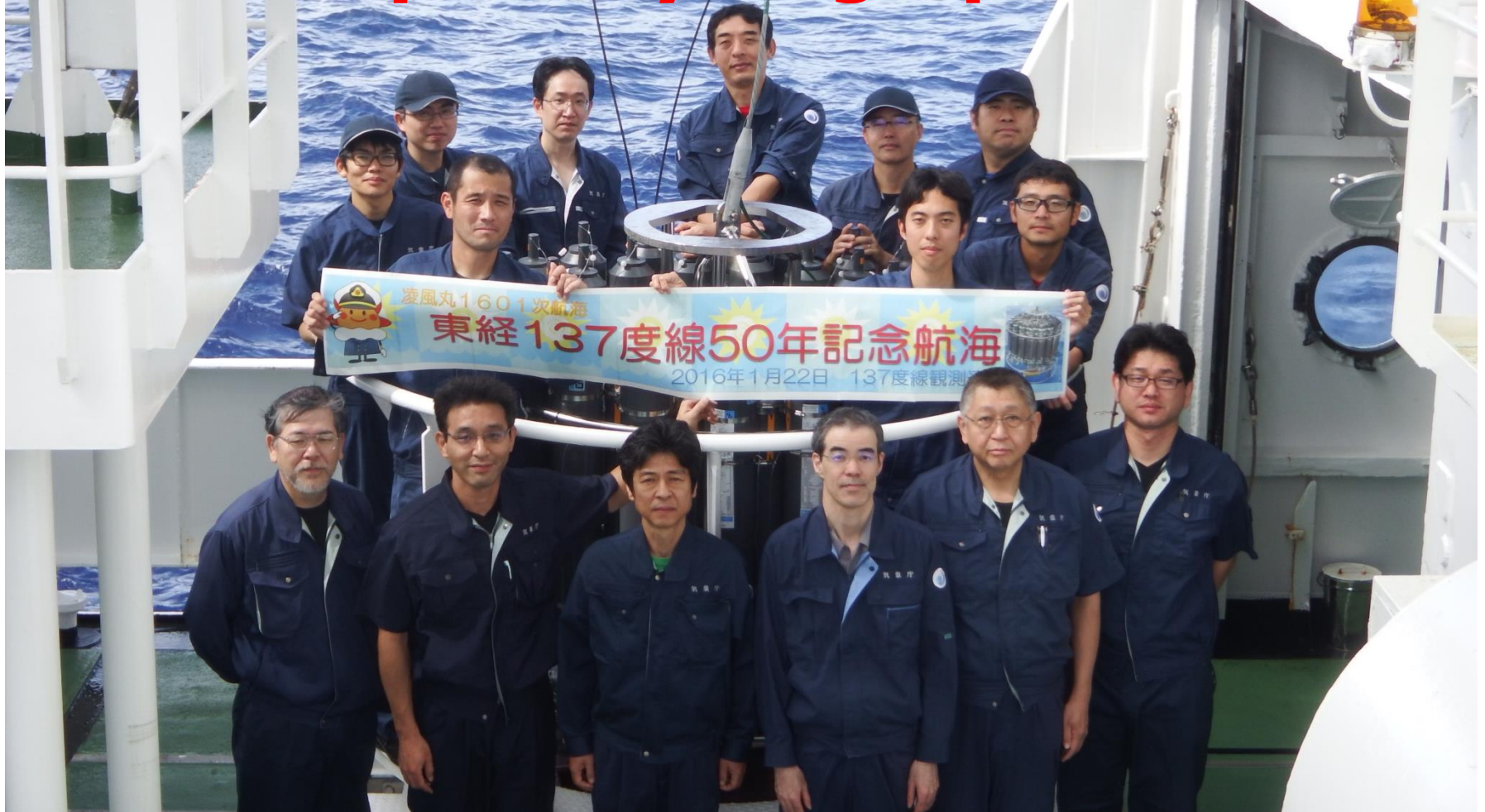


# Japan Meteorological Agency 50-year long 137°E repeat Hydrographic Section





# Ryofu Maru II (1966–1995)

1,598t (79.2m, 12m)



# First observation “RY-6701”



**Dr. Jotaro MASUZAWA  
(1922–2000)**

Director-General of JMA  
(1980–1982)

President of Oceanographic Society of Japan  
(1987–1988)

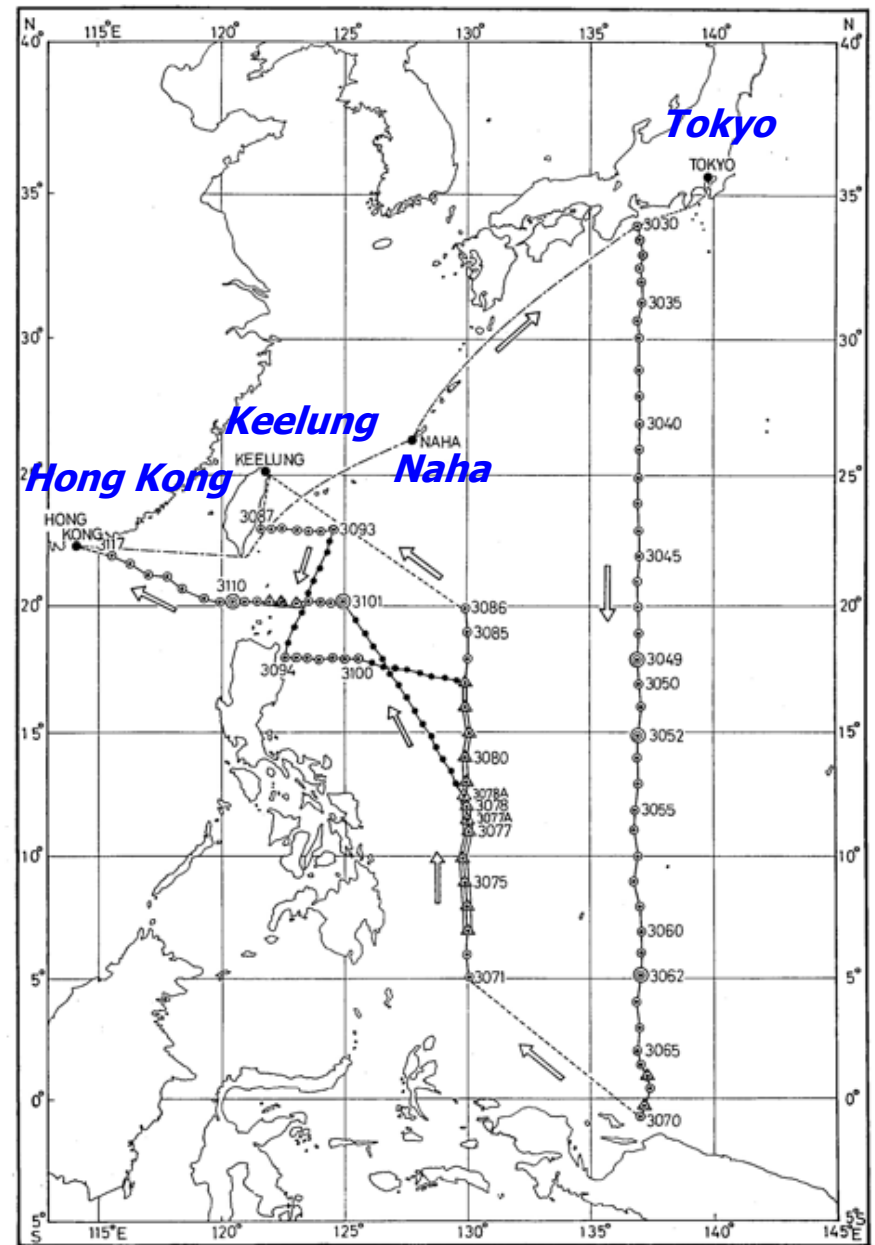
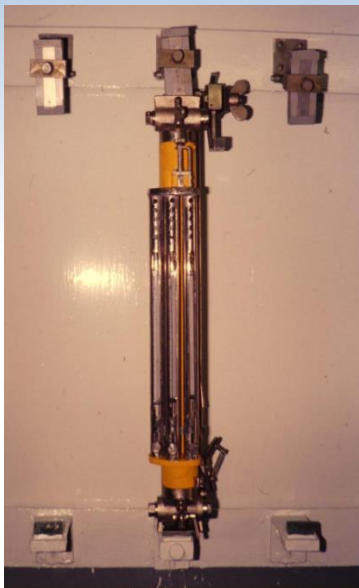


Fig. 1. Track chart of the CSK cruise of the R/V Ryofu Maru, JMA in January to March 1967.

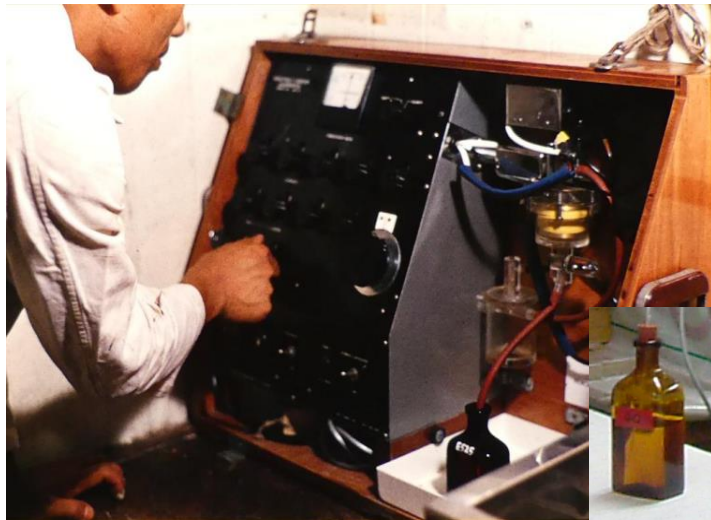
Masuzawa, 1967



# Former hydrographic observation



**NANSEN bottle and reversing thermometer**

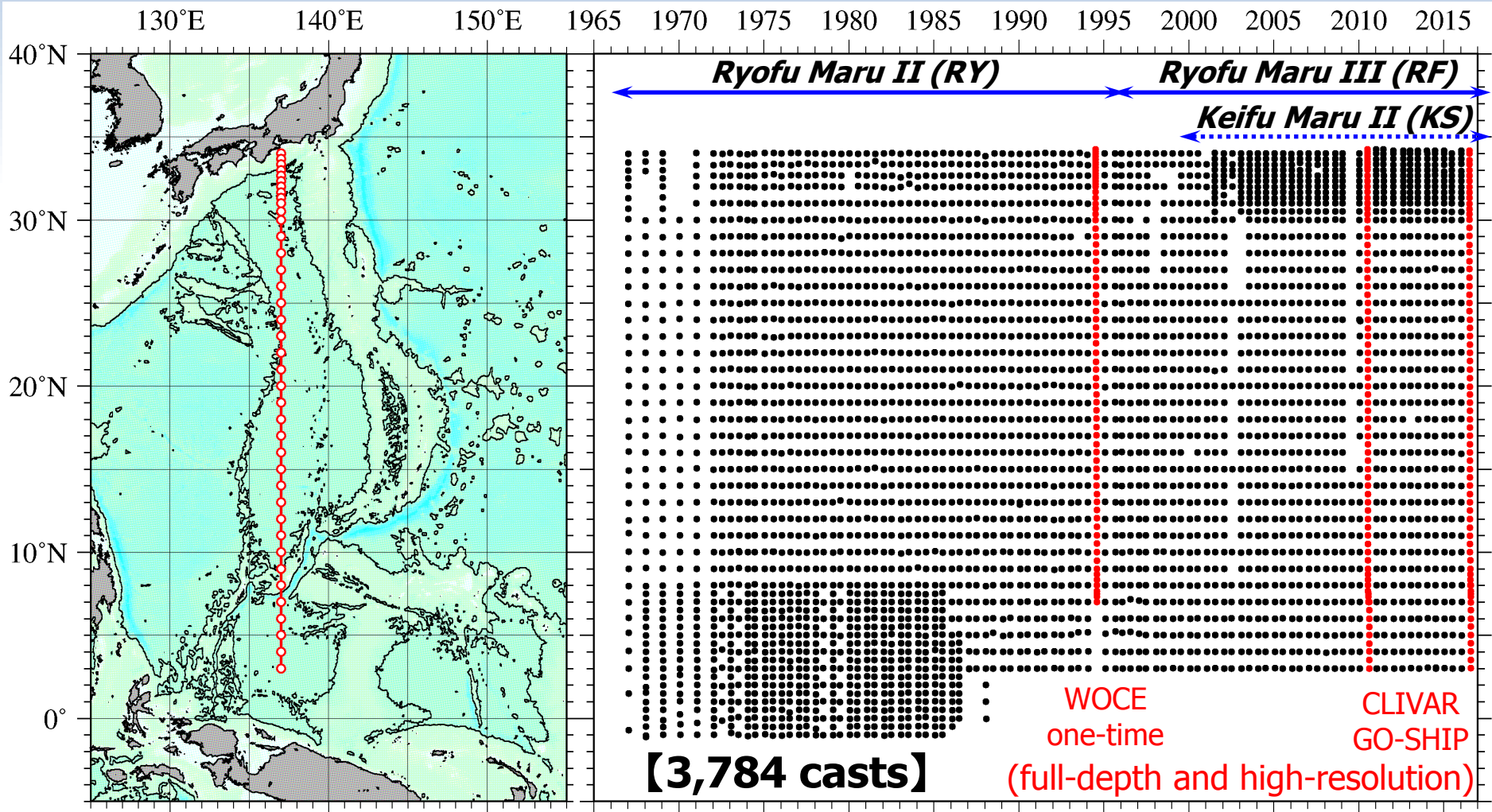


**Autolab Salinometer**



**Dissolved oxygen**

# History of JMA 50-year long 137°E section



- started in **1967 for winter** season and **1972 for summer** season
- extends from the south of Japan (**34°N**) across the subtropical gyre to the tropics at **1°S (now 3°N)** off New Guinea.



# Ryofu Maru III (1995–)

1,380t (82m, 13m)



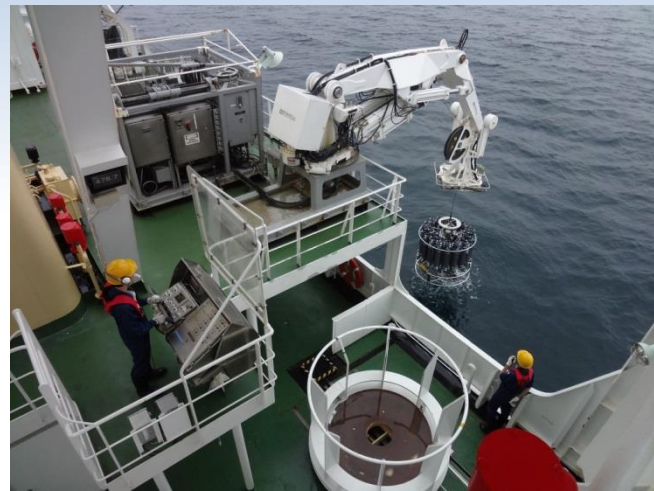
# Keifu Maru II (2000–)

1,483t (81.4m, 13.4m)

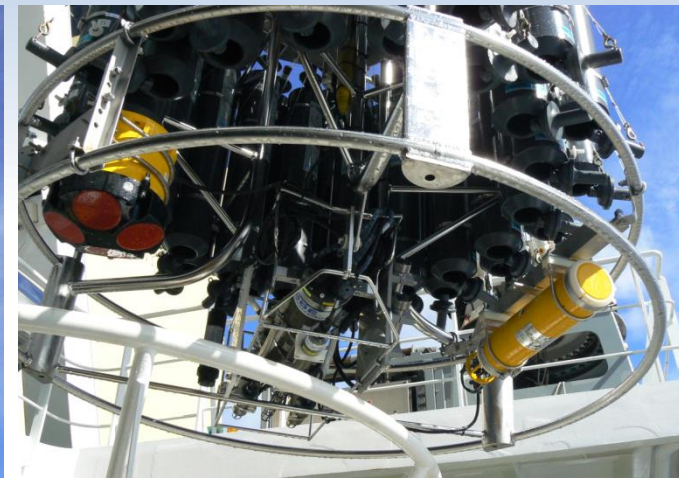




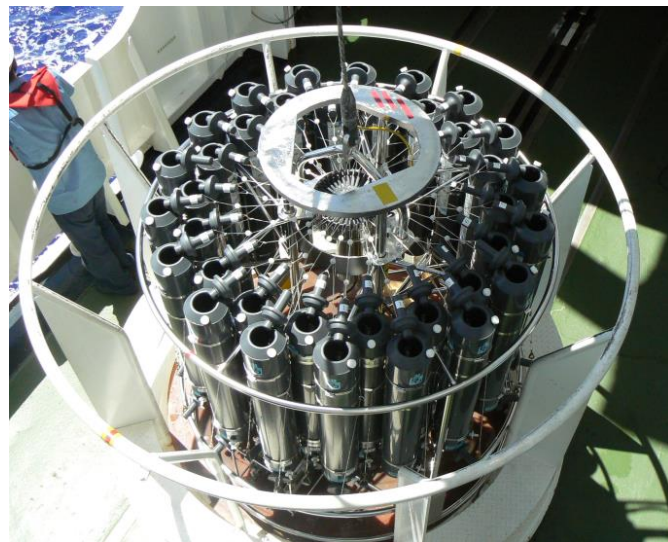
# Present CTD Observing system



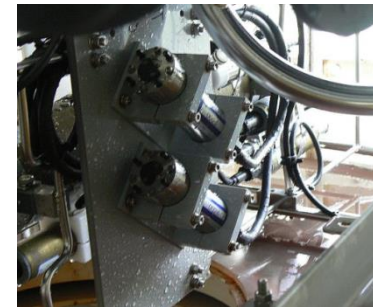
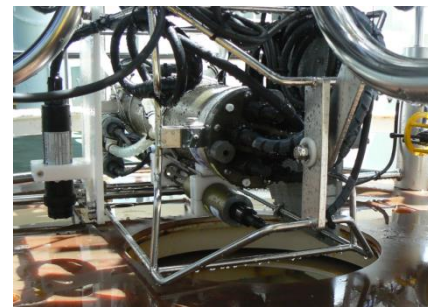
**Winch and Crane**



**CTDO<sub>2</sub> system**



**36-position (10L)**



**(left) T-C sensor, (center) Deep standard thermometer, (right) DO sensor**



# Water sampling measurements



**Salinity**

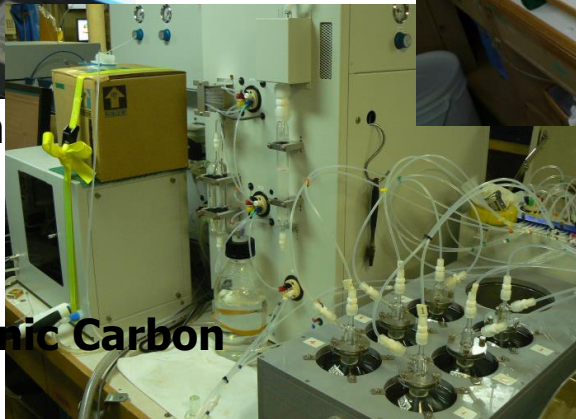
**Nutrients  
( $\text{PO}_4$ ,  $\text{NO}_3$ ,  $\text{NO}_2$ ,  $\text{SiO}_2$ )**



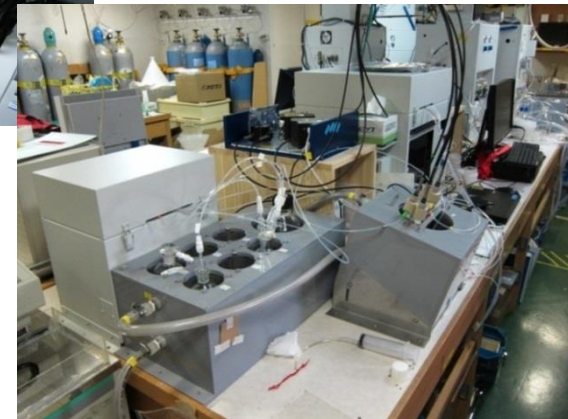
**Dissolved Oxygen**



**Dissolved Inorganic Carbon  
Total Alkalinity**

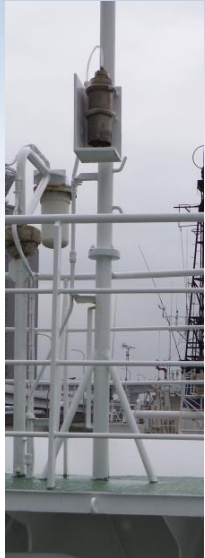


**pH**





# Underway measurements



**Atmospheric and oceanic pCO<sub>2</sub>**

**Thermo-salino graph  
Chlorophyll-a**

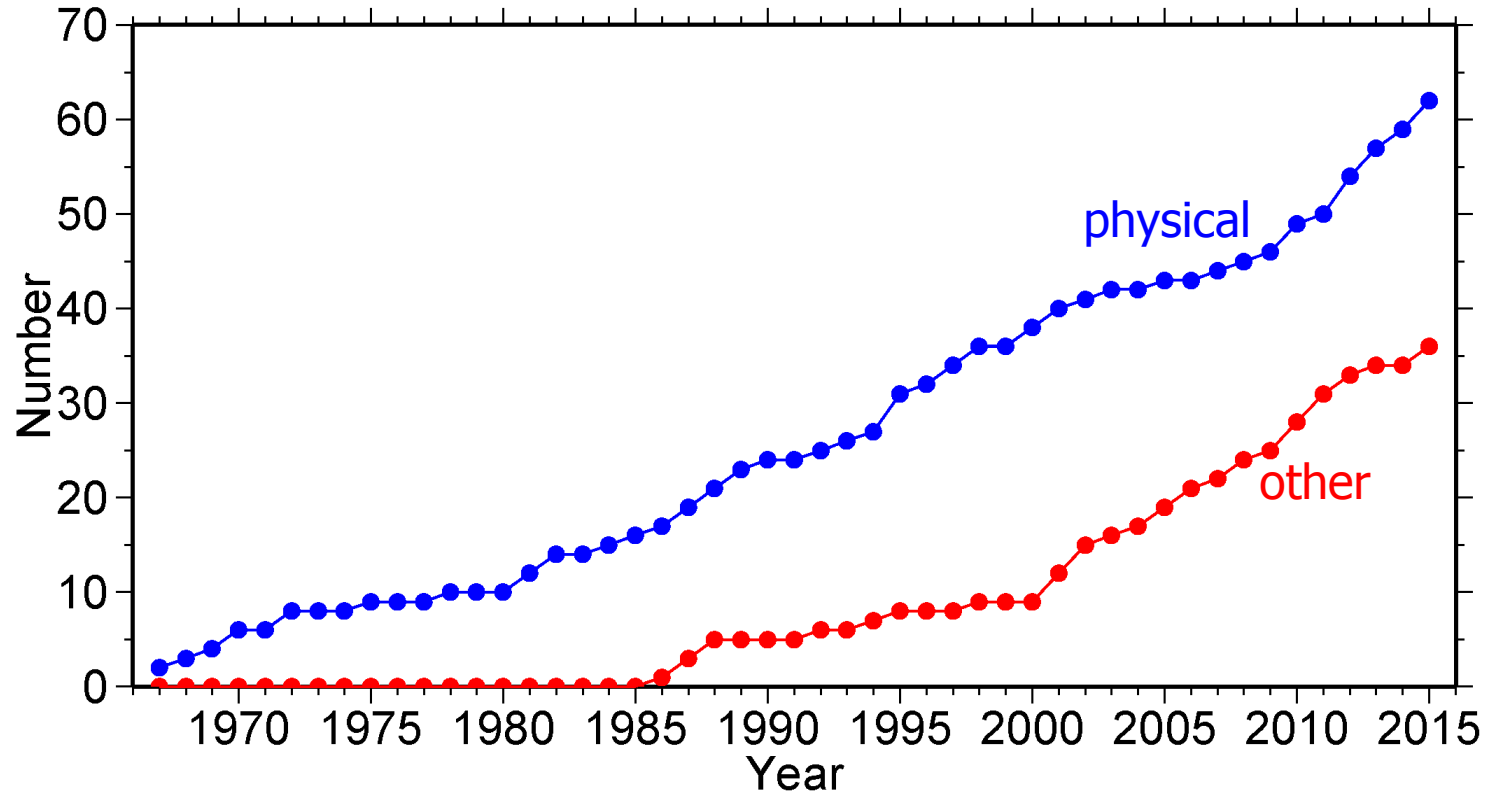


**Acoustic Doppler Current Profiler**



# Published paper using 137°E section dataset

*More than 100 papers !*



Seven papers referred to "IPCC AR5"



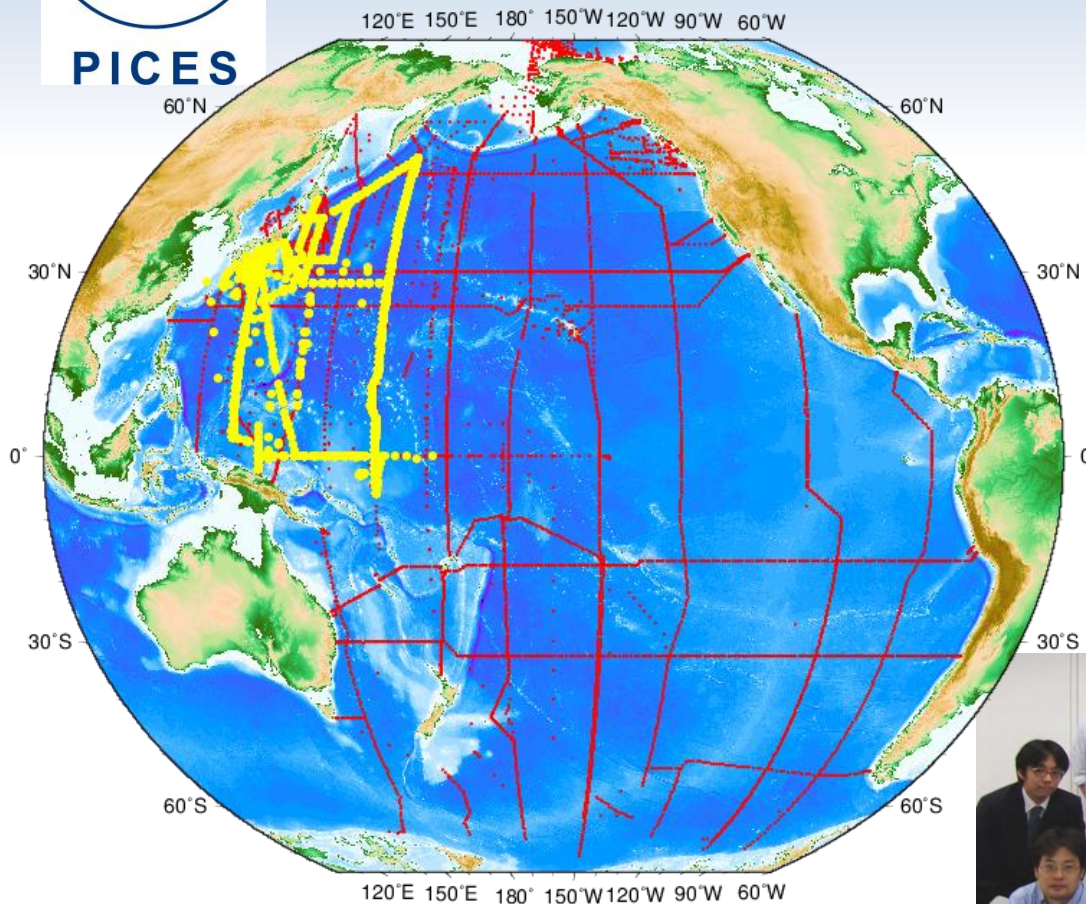
PICES

# PACIFICA

## PACIFIC ocean Interior CARBON



Pacific Ocean Interior Carbon Database



**JMA cruise: 78/306**

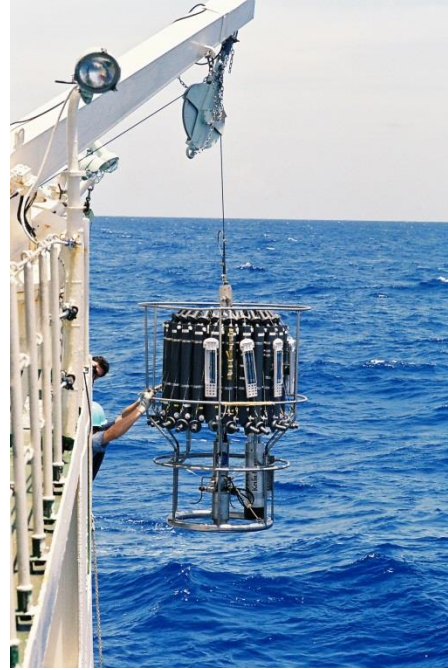
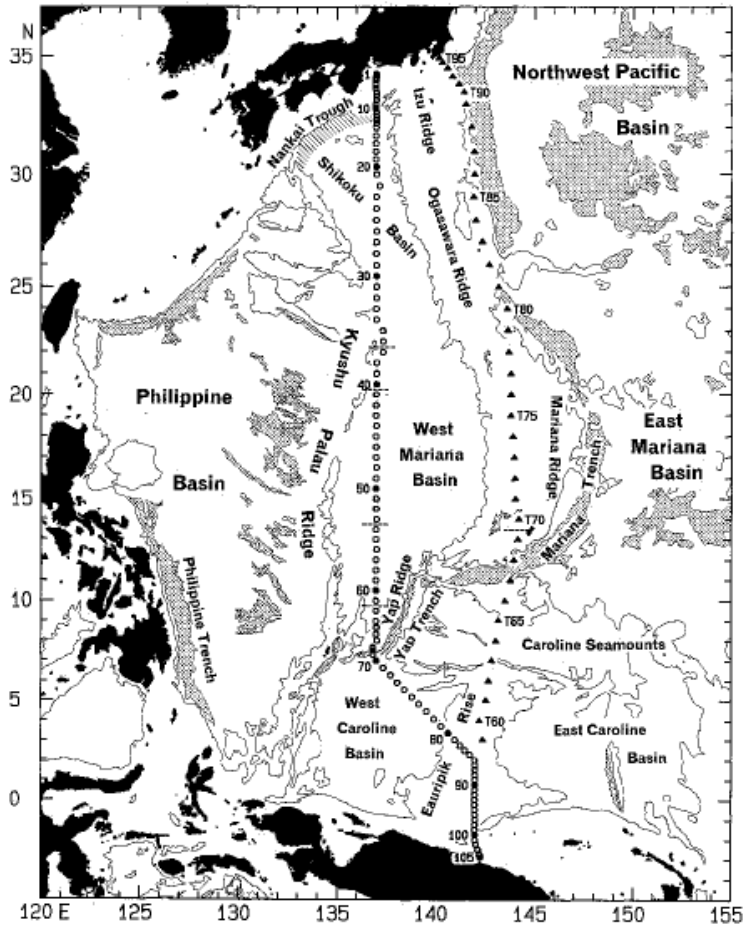


**PACIFICA Workshop (June 2–4, 2010, Tokyo)**



# WOCE one-time (1994)

## July 7–September 7 (63 days, 105 casts)



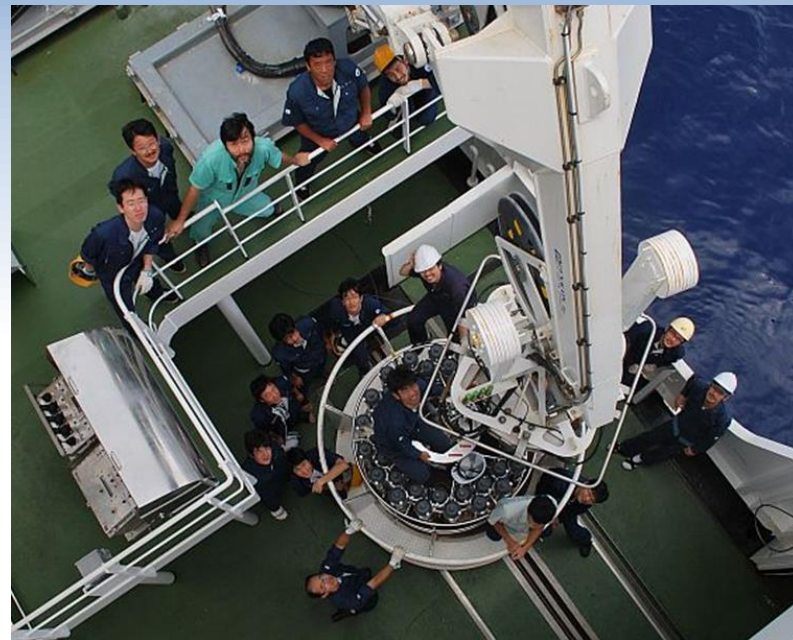
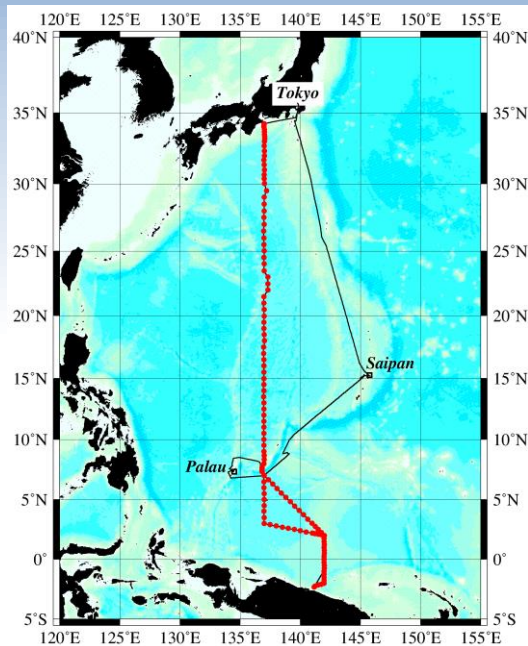
Chief scientist  
**Dr. Ikuo Kaneko**

**Figure 1.** Station location chart for the July–September 1994 (RY9407) cruise of R/V *Ryofu Maru*. Open and solid circles indicate hydrographic observations (stations 1–105) while solid triangles denote expendable bathythermograph (XBT) observations (stations T59–T95). Solid circles are used for hydrographic stations, of which station numbers are appended in the chart. Locations where continuous occupations were interrupted are shown by dotted lines. Isobaths of 4000 m are included. Dotted areas are deeper than 6000 m, and the hatched area south of Japan indicates the Nankai Trough.

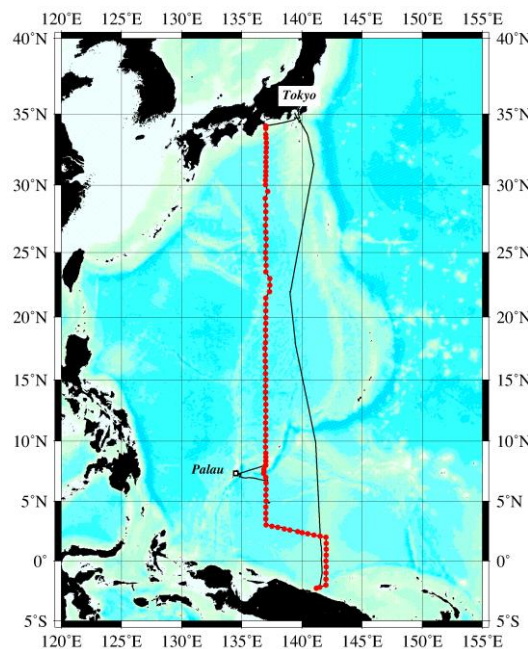
Kaneko et al., 1998



**P9 revisit (2010)  
July 6–September 1  
(58 days, 124 casts)**



**P9 revisit (2016)  
July 3–August 24  
(53 days, 93 casts)**





# "JMA Oceanographic Data Report"

## Oceanographic and Marine Meteorological Observations by Research Vessels

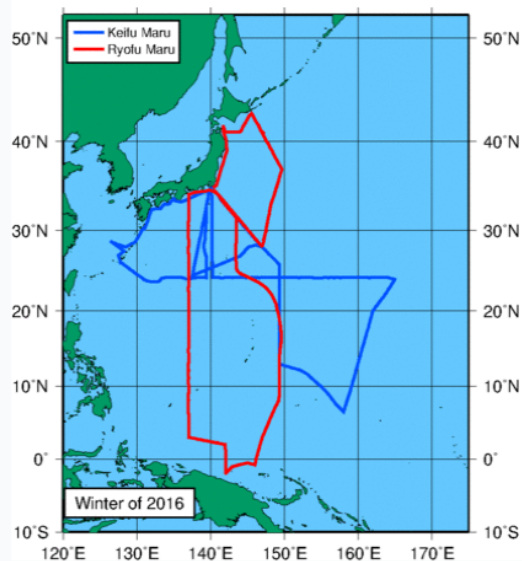
Oceanographic and marine meteorological observations are conducted in the western North Pacific and in the seas adjacent to Japan by two JMA research vessels named Ryofu Maru and Keifu Maru. Background marine pollution and greenhouse gases are also observed. For details of the data provided on this website, please refer to [Description and Format of Data](#).

### Observation Data

Year:   Please select a year and click the "Refresh" button.

Point to one of the seasons below to display all observation tracklines for the season. Clicking on the season shows a list of observation cruises for that period in the table on the right.

[Winter](#) [Spring](#)



Pointing to a ship name displays its trackline in the figure on the left. Click on the ship name to view the station chart and observation data of the cruise.

[Revision History](#)

### Winter of 2016

Ship Name	Cruise No.	Observation Area	Start Date	End Date
<a href="#">Keifu Maru</a>	1601	South of Honshu and the East China Sea	2016/01/07	2016/01/26
<a href="#">Keifu Maru</a>	1602	The western North Pacific	2016/02/01	2016/03/10
<a href="#">Keifu Maru</a>	1603	East of Honshu and South of Honshu	2016/03/15	2016/03/24
<a href="#">Ryofu Maru</a>	1601	The western Pacific	2016/01/09	2016/02/22
<a href="#">Ryofu Maru</a>	1602	East of Honshu	2016/02/27	2016/03/24

[JMA Data Report of Oceanographic Observations Special Issue](#)

[http://www.data.jma.go.jp/gmd/kaiyou/db/vessel\\_obs/data-report/html/ship/ship\\_e.php](http://www.data.jma.go.jp/gmd/kaiyou/db/vessel_obs/data-report/html/ship/ship_e.php)

**Thank you very much !**

