CRUISE INFORMATION

Ship	Research Vessel Hakurei Maru	
	Operator	Metal Mining Agency of Japan Tokiwa Bilding, 1-24-14 Toranomon, Minato-Ku, Tokyo 105-0001, Japan Phone: +81-3-5512-1563, Fax: +81-3-3505-0570 http://www.mmai.go.jp/
Cruise No	NH94-2	
Departure	August 8 1994	
Arrival	October 6 1994	
Area	Central Pacific Ocean, Line along longitude 175 E	
Objectives	In order to quantitatively evaluate the carbon cycle in the ocean, a field survey was carried out to clarify physical circulation, biogeochemical processes and accumulation on the seafloor. Meteorological, oceanographic and biogeochemical information related to the carbon cycle was collected from the western North Pacific indicated as the right figure, because the survey areas include different climate and oceanic zones. Geological information was also collected to identify the long-term carbon accumulation on the seafloor.	
Project	Northwest Pacific Carbon Cycle Study (NOPACCS) founded by the New Energy and Industrial Technology Development Organization (NEDO), Japan	
Measurement Parameters	CTD, DO, NO_2, NO_3, PO_4, Si, DIC, TAlk, pH, Chl-a, fCO_2(sea), fCO_2(air), Chl-a	

Principle Investigators	*Name*	*Term*	*Number*
	Akira Nishimura/(GSJ)	Chief Scientist	

Methods

SHIP POSITION
determined using GPS or NNSS

WATER DEPTH
determined using PDR and uncorrected.

METEOROLOGICAL PARAMETERS
Air temperature, barometer, wind direction and wind speed were measured automatically using sensors installed on the upper deck of the vessel every 10 minutes. Those data were recorded at the start time of the sampling. Weather and sea condition were determined by visual observations based on the Beaufort scale.

SAMPLING DEPTH AND WATER TEMPERATURE
determined from the CTD record just before firing the RMS.

SALINITY
Salinity of bottle samples was measured on board using Guildline Autosal Salinometer model 8400A.

DISSOLVED OXYGEN
determined on board following a potentiometric titration method with an automatic titration system, Radiometer Model VIT90 ABU91, by using Pt-Ag/AgCl combined electrode as an end-point detector, at the constant temperature, 25±0.05 ℃.

PHOSPHATE
determined on board following the molybdophosphate-ascorbic acid reduction method with a spectrophotometer Hitachi Model U-1000.

SILICATE
determined on board following the molybdosilicate-stannous reduction method with a continuous flow analytical system Alpkem Model RFA-300. All the silicate levels were adjusted to the SiO_2 standard.

NITRITE
determined on board following the sulfanilamide-diazotizing method with a continuous flow analytical system Alpkem Model RFA-300.

NITRATE AND NITRITE
analyzed on board following the sulfanilamide-diazotizing method by using a continuous flow analytical system Alpkem Model RFA-300, after reducing to nitrite with a copper plating cadmium tube.

TOTAL ALKALINITY
determined on board following a potentiometric titration method with a titration system, VIT90 ABU91, and a glass-Ag/AgCl combined electrode, titrating with HCl/NaCl solution at

25±0.05 ℃.

PH

measured on using pH-meter, Model ION85, with a set of glass electrode and Ag/AgCl electrode in a closed jacketed glass vessel regulated the temperature at 25±0.05 ℃. Both NBS and SWS (Seawater Scale) standards were used.

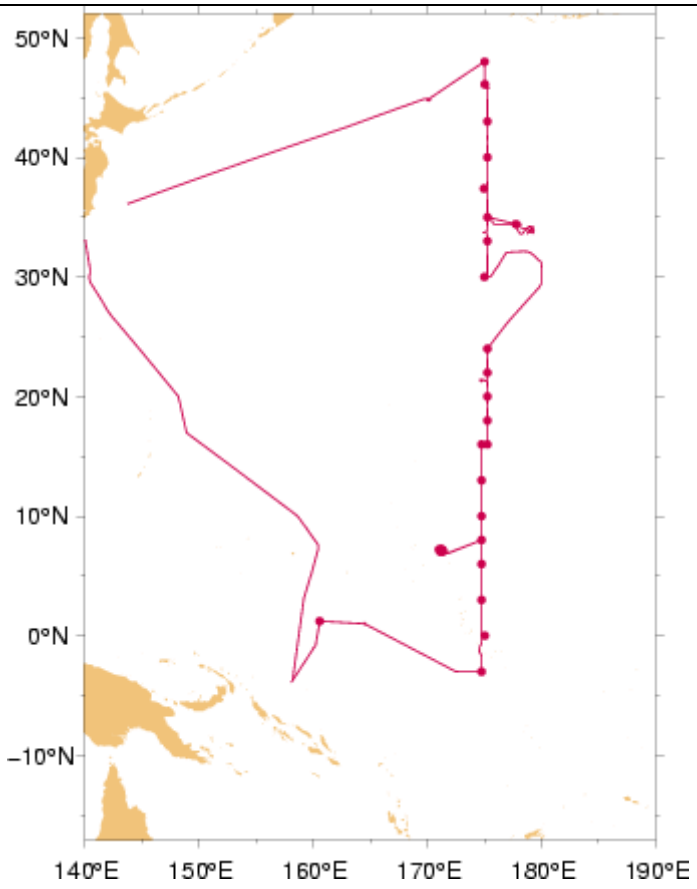
TOTAL CARBONATE CONTENT

measured on board following the phosphoric acid-helium purging method using a gas-chromatograph with TCD as a detector, Shimadzu Model GC-14 with auto-sampler.

CHLOROPHYLL-A

One liter of seawater sample was sequentially filtered by 10-, 3- and 1-micro m Nuclepore filters and Whatman GF/F filter. Chlorophyll-a on each filter was measured fluorometrically by using Turner Designs Fluorometer Model 10-005R after extraction with dimethylformammide. Total concentration of chlorophyll-a was obtained by summing the values of four deferent filters

Track Chart



References

With regard to the further information on the research, please refer to the following issue;

NOPACCS - Northwest Pacific Carbon Cycle Study, Data Set (1990-1996) published by Japan Oceanographic Data Center, March 1999