NOAA SHIP OCEANOGRAPHER

R-101

CRUISE REPORT

EAST CHINA SEA EXPERIMENT

RP-5-OC-80

29 MAY - 5 JULY 1980

TABLE OF CONTENTS

TABLE OF CONTENTS - continued

TABLE OF CONTENTS - continued

1. ABSTRACT

The objectives of the East China Sea Experiment were accomplished.

The cruise was divided into three legs:

LEG I : 2 - 3 June

Shanghai : 4 - 8 June

LEG II : 9 - 28 June

Shanghai : 29 June - 1 July

LEG III : 2 - 4 July

Sasebo : 5 July

3 sub-surface current meter moorings and 1 sediment transport tripod were deployed. 1 sub-surface mooring was recovered by a Chinese fishing vessel and returned. 1 sub-surface mooring and the tripod was recovered. 1 sub-surface mooring was not recovered after an extensive search.

130 CTD casts were performed.

879 salinity/conductivity samples were processed.

985 NM of seismic profiling were conducted.

425 NM of 3.5 KHZ measurements were conducted.

369 suspended sediment samples were processed.

42 tethered current meter casts were performed.

12 XBT casts were performed.

3250 NM of bathymetry for the Defense Mapping Agency were conducted.

Scientists from the Peoples Republic of China were aboard for each leg of the cruise.

Satellite navigation was the primary means of positioning information.
There were no major breakdowns of shipboard equipment or shipboard instrumentation.
The NOAA Administrator hosted two large receptions aboard the OCEANOGRAPHER during the first Shanghai in-port.

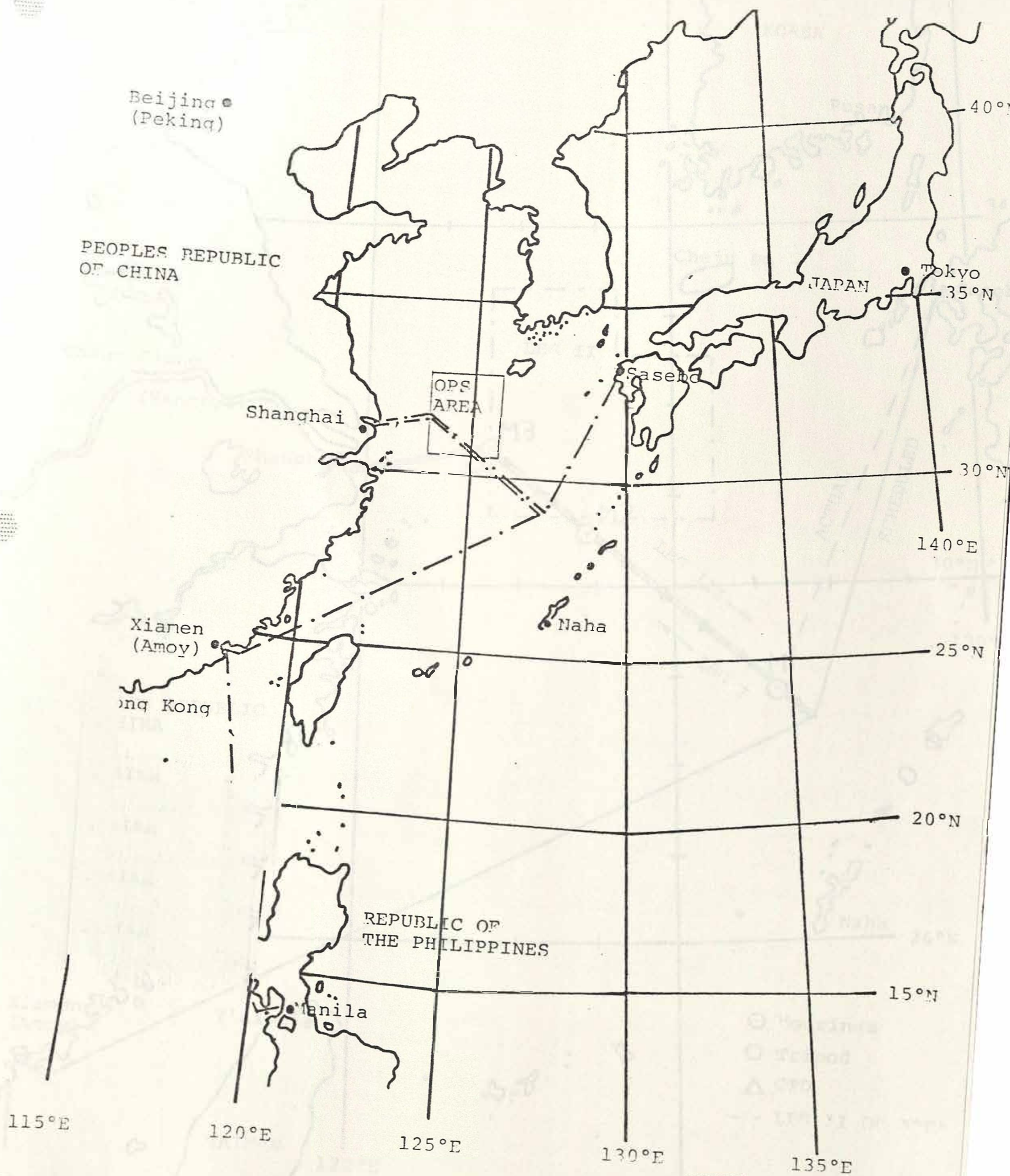
2. OBJECTIVE

The primary objective of the East China Sea Experiment was to monitor the hydrographic and current regime of the East China Sea shelf adjacent to the Yangtze River, as well as to delineate the sedimentology and recent history/morphology of the shelf.

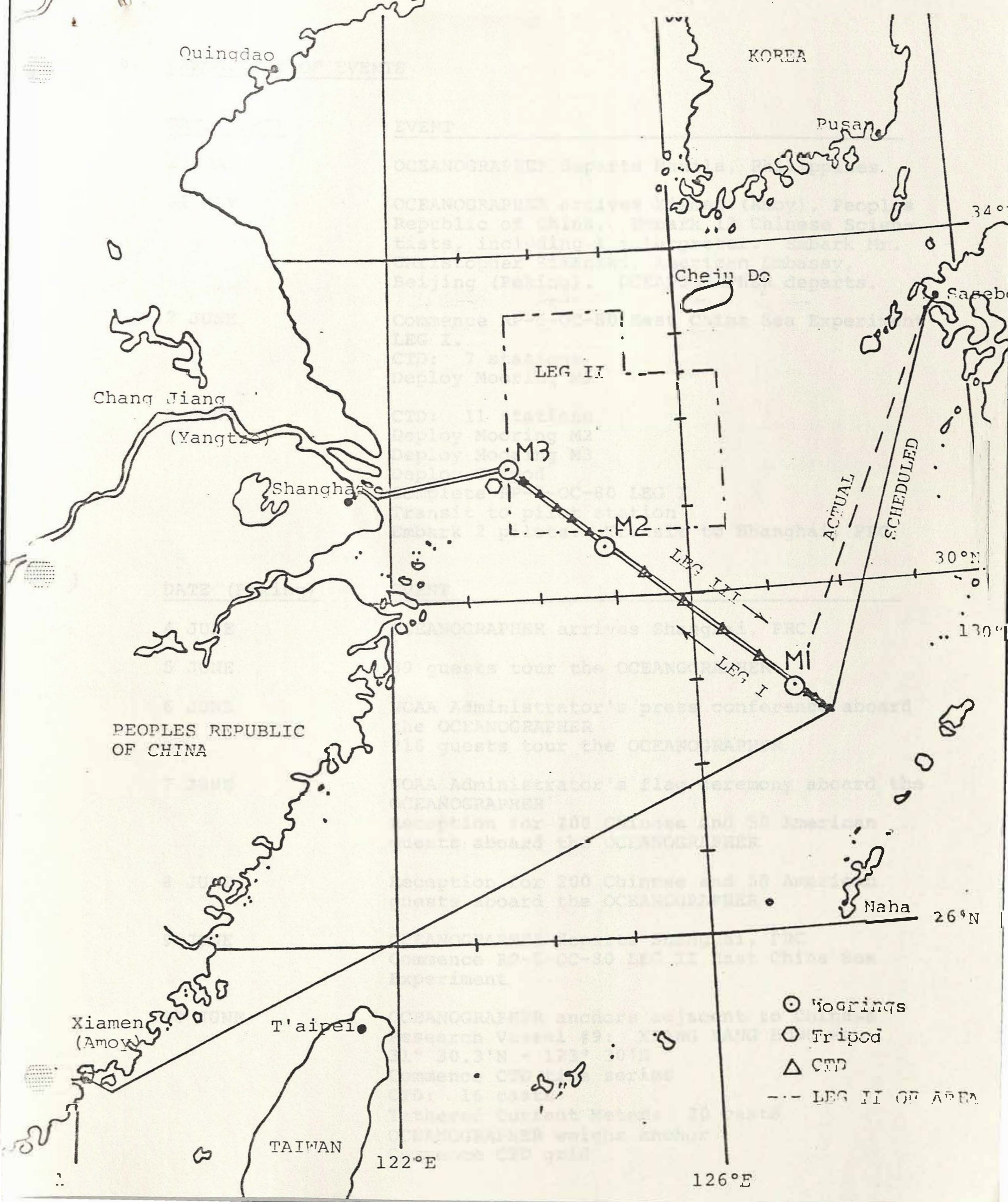
3. BACKGROUND

The Yangtze River flowing into the East China Sea is the fourth largest in the world in terms of sediment influx to the ocean and is the third largest in water discharge. In spite of the large sediment influx to the East China Sea, sedimentological studies show that only the coastal zone and the inner continental shelf contain modern fine-grained sediments. The outer shelf contains relict sand deposited during a lower sea level. The sedimentation patterns reflect the circulation patterns, but few long-term current measurements have been made. This project will attempt to develop an understanding of the discharge of fresh water and sediment from the Yangtze River, and to determine its influence on the East China Sea sedimentary regimes. It represents a cooperative effort of Chinese and United States scientists from many institutions, and it involves specialists in marine geology, biological oceanography, marine geochemistry, and physical oceanography. The work will involve the NOAA Ship OCEANOGRAPHER and three Chinese research ships with scientists of each country on all. The project is an outgrowth of United States - Chinese negotiations over the last year or so to develop joint oceanographic research projects. Additional background information is located in the introduction section of the project instructions: Appendix (F).

4. CRUISE TRACK



5. OPERATIONS AREA



6. CHRONOLOGY OF EVENTS

DATE (GMT)	EVENT
29 MAY	OCEANOGRAPHER departs Manila, Philippines
31 MAY	OCEANOGRAPHER arrives Xiamen (Amoy), Peoples Republic of China. Embark 13 Chinese Scientists, including 1 interpreter. Embark Mr. Christopher Szmanski, American Embassy, Beijing (Peking). OCEANOGRAPHER departs.
2 JUNE	Commence RP-5-OC-80 East China Sea Experiment LEG I. CTD: 7 stations Deploy Mooring M1
3 JUNE	CTD: 11 stations Deploy Mooring M2 Deploy Mooring M3 Deploy Tripod Complete RP-5-OC-80 LEG I Transit to pilot station Embark 2 pilots: Transit to Shanghai, PRC

DATE (Peking)	EVENT
4 JUNE	OCEANOGRAPHER arrives Shanghai, PRC
5 JUNE	89 guests tour the OCEANOGRAPHER
6 JUNE	NOAA Administrator's press conference aboard the OCEANOGRAPHER 216 guests tour the OCEANOGRAPHER
7 JUNE	NOAA Administrator's flag ceremony aboard the OCEANOGRAPHER Reception for 200 Chinese and 50 American guests aboard the OCEANOGRAPHER
8 JUNE	Reception for 200 Chinese and 50 American guests aboard the OCEANOGRAPHER
9 JUNE	OCEANOGRAPHER departs Shanghai, PRC Commence RP-5-OC-80 LEG II East China Sea Experiment
10 JUNE	OCEANOGRAPHER anchors adjacent to Chinese Research Vessel #9: XIANG YANG HONG at 31° 30.3'N - 123° 30'E Commence CTD time series CTD: 16 casts Tethered Current Meter: 20 casts OCEANOGRAPHER weighs anchor Commence CTD grid

DATE (Peking)	EVENT
11 JUNE	Continue CTD grid CTD: 7 stations
12 JUNE	Continue CTD grid CTD: 7 stations
13 JUNE	Complete CTD grid CTD: 3 stations Commence seismic profiling grid
14 JUNE	Continue seismic profiling grid
15 JUNE	Continue seismic profiling grid
16 JUNE	Continue seismic profiling grid
17 JUNE	Complete seismic profiling grid Commence large scale side scan sonar survey
18 JUNE	Complete large scale side scan sonar survey Transit to 31° 05'N - 123° 30'E Upon arrival OCEANOGRAPHER anchors and transfers 2 personnel to Chinese Research Vessel #6 OCEANOGRAPHER completes 1 CTD, weighs anchor and commences CTD grid CTD: 4 stations
19 JUNE	Continue CTD grid CTD: 10 stations
20 JUNE	Complete CTD grid CTD: 8 stations
21 JUNE	OCEANOGRAPHER anchors at 32° 37.1'N -123° 34.7'E Commence CTD time series CTD: 22 casts Tethered Current Meter: 22 casts
22 JUNE	Complete CTD time series CTD: 4 casts Tethered Current Meter: 3 casts OCEANOGRAPHER weighs anchor Commence seismic profiling grid

DATE (Peking)	EVENT
23 JUNE	Continue seismic profiling
24 JUNE	Continue seismic profiling
25 JUNE	Continue seismic profiling
26 JUNE	Complete seismic profiling Commence CTD grid CTD: 4 stations
27 JUNE	Continue CTD grid CTD: 8 stations
28 JUNE	Complete CTD grid CTD: 9 stations
29 JUNE	Arrive at Shanghai pilot station Transit to Shanghai, PRC
30 JUNE	In port: Shanghai, PRC
1 JULY	In port: Shanghai, PRC

DATE (GMT)	EVENT
2 JULY	Depart Shanghai, PRC Commence RP-5-OC-80 LEG III Arrive M3/TRIPOD location CTD: 1 station Transit to 31° 02.7'N - 122° 15.0'E Rendezvous with R/V SHUGANG #6 Transfer Chinese scientists Transit to M3/TRIPOD location
3 JULY	M3/TRIPOD search TRIPOD recovery M3 search secured Commence CTD line towards M1 CTD: 3 stations
4 JULY	M1 recovery CTD: 3 stations Complete RP-5-OC-80 East China Sea Experiment Medivac: Depart for Sasebo, Japan
5 JULY	Arrive Sasebo, Japan

7. OPERATIONS

LEG I: (A) Current Meter Moorings

All moorings were deployed from the fantail using both the crane and the gallows frame.

Mooring M1 was deployed sub-surface sphere first. The array was payed out and the anchor lowered to the sea floor by means of the deep sea winch with a gravity release attachment.

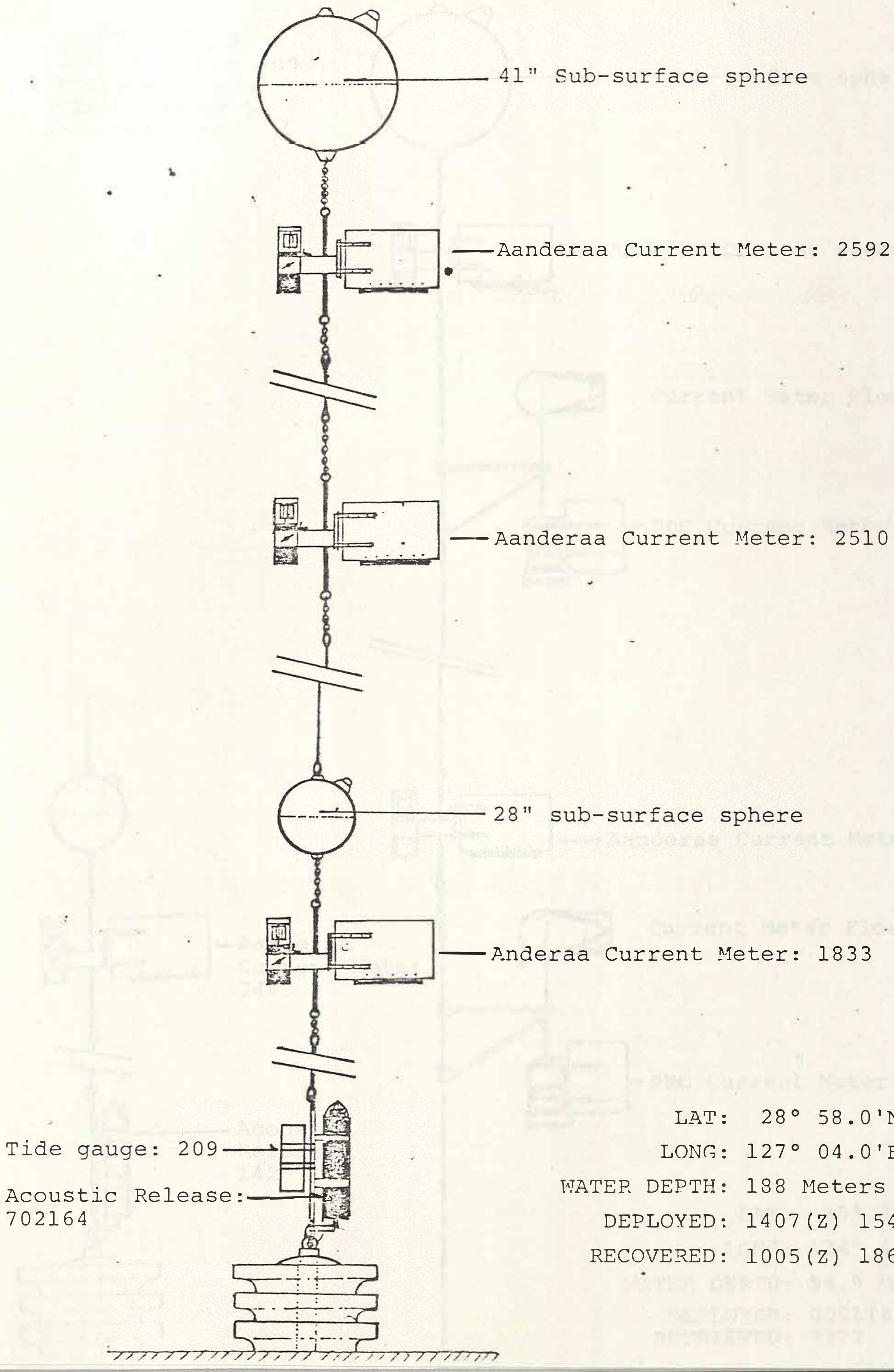
Mooring M2 and M3 were deployed anchor first and released at the sub-surface shpere by means of a trip hook.

A total of 13 current meters were deployed. 9 current meters were from the United States, and 4 current meters were from the Peoples Republic of China.

Each anchor for the moorings consisted of a three railroad wheel stack.

Reference mooring diagrams.

M1



LAT: 28° 58.0'N

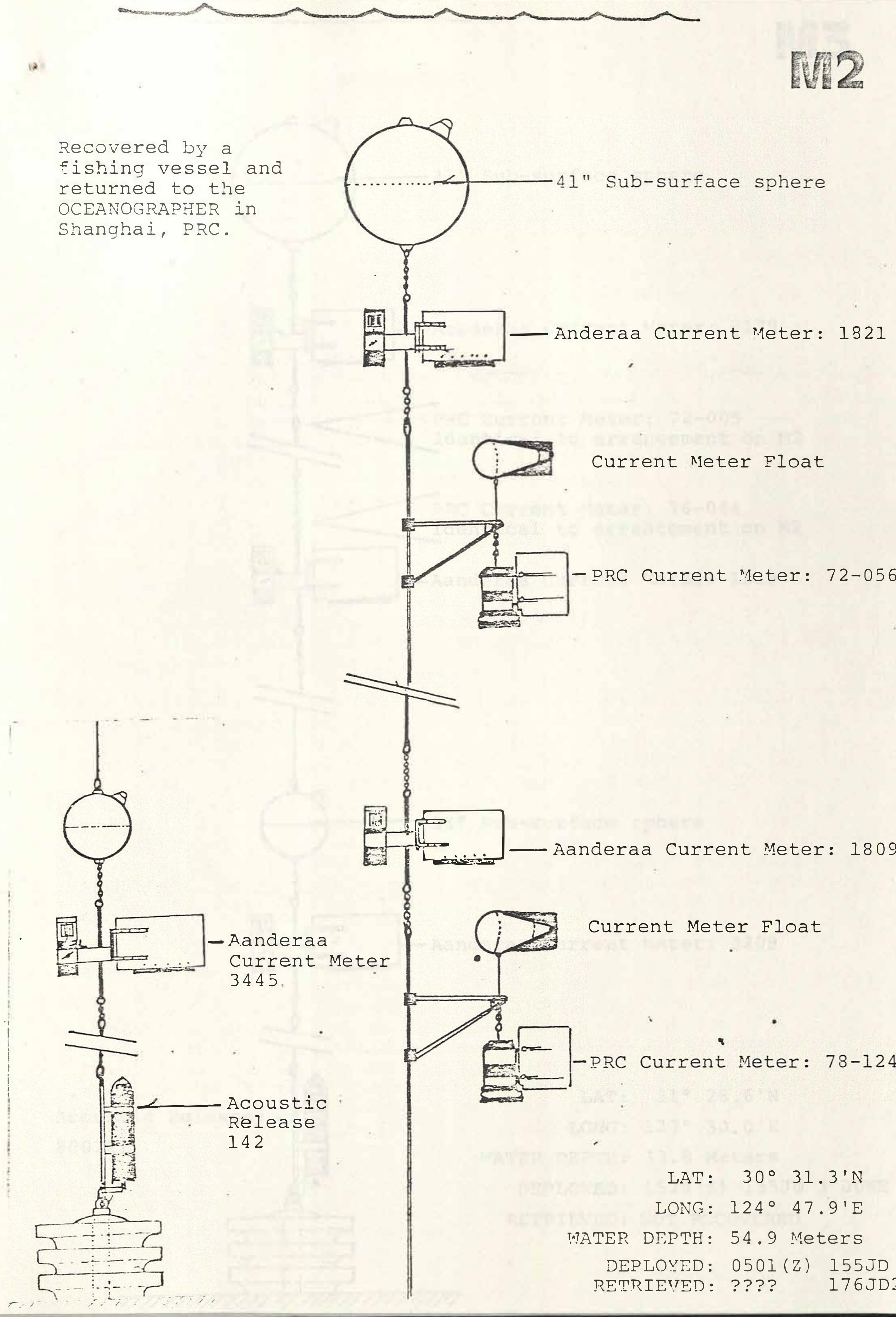
LONG: 127° 04.0'E

WATER DEPTH: 188 Meters

DEPLOYED: 1407(Z) 154JD 2JUN80

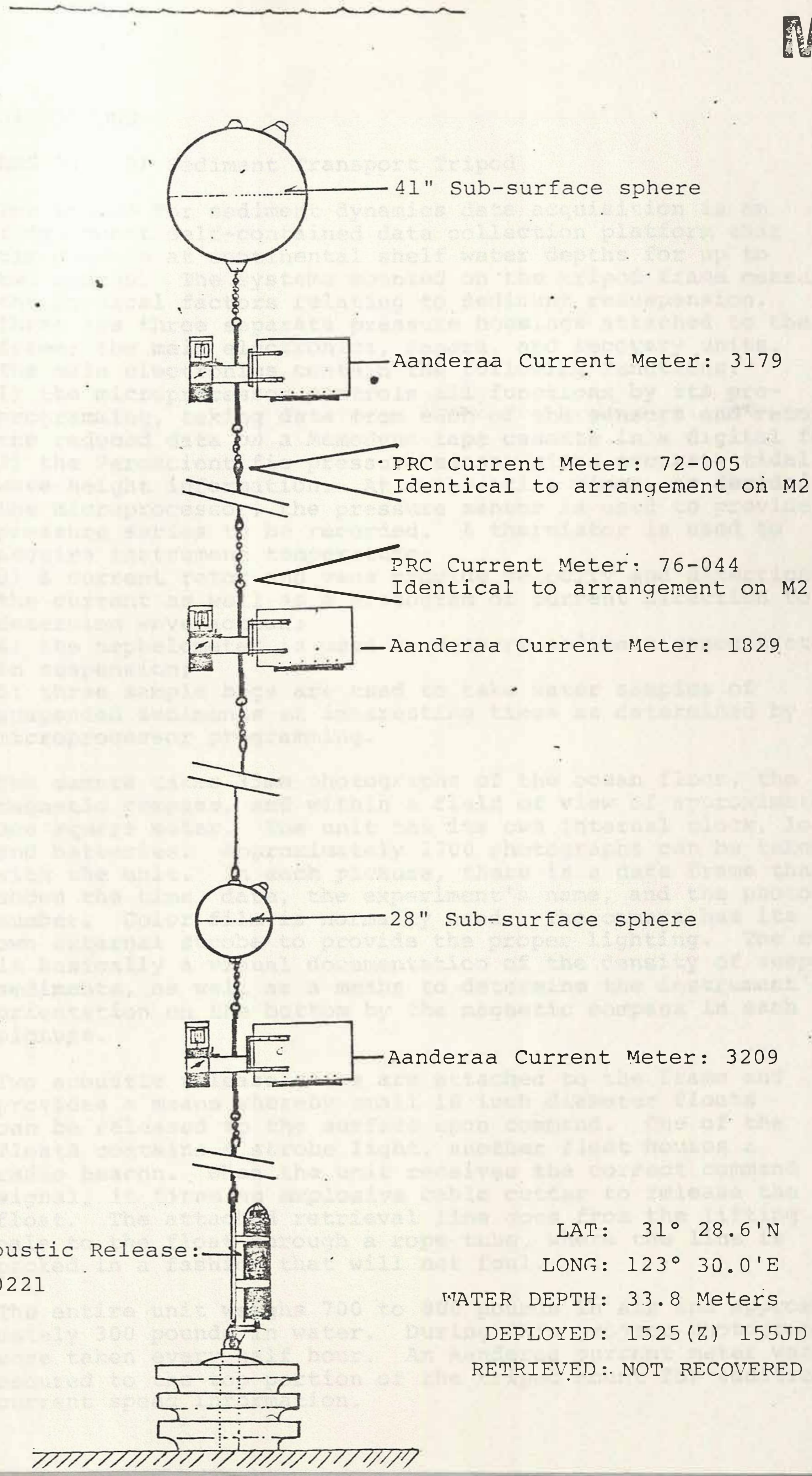
RECOVERED: 1005(Z) 186JD 4JUL80

M2



LAT: 30° 31.3'N
LONG: 124° 47.9'E
WATER DEPTH: 54.9 Meters
DEPLOYED: 0501(Z) 155JD 3JUN8
RETRIEVED: ???? 176JD24JUN8

M3



LAT: 31° 28.6'N

LONG: 123° 30.0'E

WATER DEPTH: 33.8 Meters

DEPLOYED: 1525(Z) 155JD 3 JUNE '80

RETRIEVED: NOT RECOVERED

7. OPERATIONS

LEG I: (B) Sediment Transport Tripod

The tripod for sediment dynamics data acquisition is an independent self-contained data collection platform that can operate at continental shelf water depths for up to two months. The systems mounted on the tripod frame measure the physical factors relating to sediment resuspension. There are three separate pressure housings attached to the frame; the main electronics, camera, and recovery units. The main electronics contain the following functions:
1) the microprocessor controls all functions, by its pre-programming, taking data from each of the sensors and recording the reduced data on a Memodyne tape casette in a digital format;
2) the Paroscientific pressure sensor gives accurate tidal and wave height information. At interesting times, as decided by the microprocessor, the pressure sensor is used to provide a pressure series to be recorded. A thermistor is used to acquire instrument temperature;
3) a current rotor and vane provide velocity and direction of the current as well as a histogram of current direction to determine wave action;
4) the nephelometer is used to measure sediment concentrations in suspension;
5) three sample bags are used to take water samples of suspended sediments at interesting times as determined by the microprocessor programming.

The camera takes 35mm photographs of the ocean floor, the magnetic compass, and within a field of view of approximately one square meter. The unit has its own internal clock, logic, and batteries. Approximately 1700 photographs can be taken with the unit. In each picture, there is a data frame that shows the time, date, the experiment's name, and the photo number. Color film is normally used. The camera has its own external strobe to provide the proper lighting. The camera is basically a visual documentation of the density of suspended sediments, as well as a means to determine the instrument's orientation on the bottom by the magnetic compass in each picture.

Two acoustic release units are attached to the frame and provides a means whereby small 18 inch diameter floats can be released to the surface upon command. One of the floats contains a strobe light, another float houses a radio beacon. When the unit receives the correct command signal, it fires an explosive cable cutter to release the float. The attached retrieval line goes from the lifting bale to the float through a rope tube, where the line is packed in a fashion that will not foul.

The entire unit weighs 700 to 800 pounds in air and approximately 300 pounds in water. During this project photographs were taken every half hour. An Aanderaa current meter was secured to the top portion of the tripod mount for additional current speed information.

The tripod was deployed on 3 June 80 at 1555(Z) JD:155 at 31° 27.8'N, 123° 30.0'E.

The Tripod was lowered to the sea floor by means of the Morgan winch cable and electrically released from the vessel. The tripod was kept within 15° of vertical during the deployment.

7. OPERATIONS

LEG I: (C) CTD Measurements

The OCEANOGRAPHER's Plessey 9040 CTD was the primary instrument during this phase of the operation, inbound to Shanghai. CTD stations 1A to 5 were positioned by depth, while CTD stations 5 thru 16 were occupied by location. CTD stations 1A to 4 were performed at least 10 meters from the sea floor, and the remaining stations were conducted at 5 meters from the sea floor.

Six (6) bucket samples were taken in between CTD stations 10 to 16 and processed for temperature and salinity. Reference CTD station list/Leg I and locations, and Section 5: Operations Area.

A total of 18 CTD casts were performed during LEG I.

LEG I: (D) 3.5 KHZ Measurements

As per the memorandum from Dr. George Keller to Dr. Glenn Cannon (Appendix: G), 3.5 KHZ measurements were conducted from 27° 29.8'N, 125° 51.5'E to CTD station 1A to 29° 15.7'N, 126° 35.7'E. The 3.5 KHZ signal penetrates the upper sediment layer and delineates sub-bottom stratigraphy. The sub-bottom profiling was recorded and annotated hourly on one of the Universal Graphic Recorders in the Plot Room.

A total of 185 NM of 3.5 KHZ measurements were conducted during LEG I.

LEG I: (E) XBT Measurements

As requested by the Chief Scientist, four (4) XBT casts were performed at 100, 200, 500 and 600 fathoms while crossing the continental shelf and approaching CTD station 1A from the southwest. The purpose of the casts was to determine the core of the Kuroshio Current which flows parallel to the continental shelf.

RP-5-OC-80 EAST CHINA SEA EXPERIMENT LEG I

CTD STATION	LATITUDE	LONGITUDE	REMARKS
1A	28° 19.7'N	127° 58.1'E	
1B	28° 31.6'N	127° 44.1'E	
1C	28° 40.4'N	127° 29.7'E	600 fathoms
2	28° 50.5'N	127° 17.1'E	500 fathoms
3	28° 52.5'N	127° 14.7'E	350 fathoms
4	28° 55.1'N	127° 08.3'E	200 fathoms
5	28° 57.9'N	127° 03.8'E	Mooring M1
6	29° 15.9'N	126° 35.7'E	
7	29° 34.7'N	126° 09.6'E	
8	29° 45.0'N	125° 42.0'E	
9	30° 11.5'N	125° 17.3'E	
10	30° 31.3'N	124° 47.9'E	Mooring M2
11	30° 38.9'N	124° 39.2'E	
12	30° 43.0'N	124° 23.0'E	
13	30° 58.6'N	124° 15.0'E	
14	31° 10.0'N	124° 00.0'E	
15	31° 21.3'N	123° 46.6'E	
16	31° 25.4'N	123° 30.0'E	Mooring M3/Tripod

SHANGHAI IN PORT

OCEANOGRAPHER moored port side to the International Passenger Terminal by mid afternoon of 4 June. On the pier the OCEANOGRAPHER was saluted and applauded by a special contingent of National Bureau of Oceanography (NBO) officials, border guards, customs and immigration officials. Numerous banners were flying from staffs along the pier, and two large banners were hung from the balcony of the passenger terminal building. One banner was in Chinese and the other in English, welcoming the OCEANOGRAPHER to the city of Shanghai and China. That evening twenty members of the ship's complement attended an acrobatic show at the Peoples Theater. The tickets were provided through the courtesy of the Chinese Bureau of Oceanography. The Deck and Survey Departments began erecting the tent on F-Deck fantail and the Steward Department commenced food preparations for the upcoming receptions.

On 5 June Captain S. Monk, U.S. Consulate, Shanghai/U.S. Naval Attache, visited the Commanding Officer. Eighty-nine Chinese toured the vessel. Preparations continued throughout the vessel in preparation for the upcoming receptions.

On the morning of 6 June, 121 Chinese toured the vessel. The groups were scientists, technicians, and naval officers. The Commanding Officer departed the OCEANOGRAPHER and attended a luncheon with the NOAA Administrator at the Heng Shan Guest House. In the afternoon, the Commanding Officer and the Administrator arrived aboard the OCEANOGRAPHER for a press conference and tours. Tours were provided for the Administrator, the press and 95 Chinese visitors. After the tours the Administrator addressed the NOAA Commissioned Officers and then the crew of the OCEANOGRAPHER at another separate meeting. In the early evening the Administrator and his party departed the vessel. That evening a reception was hosted by the Shanghai Science and Technology Commission at the Heng Shen Guest House for the officers and crew of the OCEANOGRAPHER, the Administrator, and his party.

On 7 June, thirty members of the vessel attended a tour of the Yu Gardens in Shanghai. In the afternoon, the Administrator, his party, and Robert Anderson, U.S. Consulate, Shanghai, arrived on board to host a reception and tours aboard the OCEANOGRAPHER for 200 Chinese and 50 American guests. A ceremony was performed prior to the reception. On behalf of the Administrator of NOAA, the Commanding Officer hauled down the Administrator's flag from the OCEANOGRAPHER's mast. The flag and a duplicate flag were both signed by the Administrator, the Commanding Officer, Mr. Luo Yuru, Deputy Director of the National Bureau of Oceanography and Mr. Li Chong Xun, Deputy Director of Shanghai Science and Technology Commission. Mr. Luo Yuru and Mr. Li Chong Xun were both presented the flags as a token of present and future joint oceanographic ventures. All dignitaries and guests participated in a reception consisting of various types of fish and beverages. All of the food items were prepared by the Steward Department under the supervision of H.P. Mefford, National Marine Fisheries Service and Chief

Steward Nebril. By early evening all visitors had departed the vessel.

That evening 34 members of the ship's complement attended an acrobatic show at the People's Theater. The tickets were provided through the courtesy of the National Bureau of Oceanography. Also that evening the Commanding Officer, Executive Officer, Operations Officer and the NOAA Liaison Officer, China, attended a formal banquet at the Jing Jiang Hotel. The banquet was hosted by Mr. Shen, Director of the National Bureau of Oceanography. The Administrator, his party, the U.S. Consulate, Shanghai, his party, and American scientists were all in attendance.

On the morning of 8 June, 45 members of the ship's complement attended a tour of a rural commune, including a ten course lunch hosted by commune officials. In the afternoon, the Administrator, his party, the U.S. Consulate, Shanghai, his party, and 200 Chinese and 50 American guests arrived aboard the OCEANOGRAPHER for a reception and tours. Food items and beverages were identical to those of the previous day. By early evening all visitors had departed the vessel. Later that evening a banquet was hosted by the Administrator at the Hoping Hotel. The Administrator's party, the U.S. Consulate, Shanghai, his party, Chinese oceanographic officials, Chinese scientists, American scientists, and OCEANOGRAPHER's Commissioned Officers and the Chief Engineer were all in attendance.

On the morning of 9 June, two river pilots, Wang and Shen, arrived aboard and the OCEANOGRAPHER departed the passenger terminal. While transiting along the Huangpu River the OCEANOGRAPHER slowed to enable three participating Chinese research vessels to follow behind. They were R/V XIANG YANG HONG #9, R/V SHUGANG #6 and R/V FENDOU. When all four vessels were in line the OCEANOGRAPHER increased speed and transited down the Ch'ian (Yangtze) River. The two pilots departed the vessel in the late afternoon and the OCEANOGRAPHER set an easterly course to anchor at 31° 30'N - 123° 30'E, located in the western region of the working grounds.

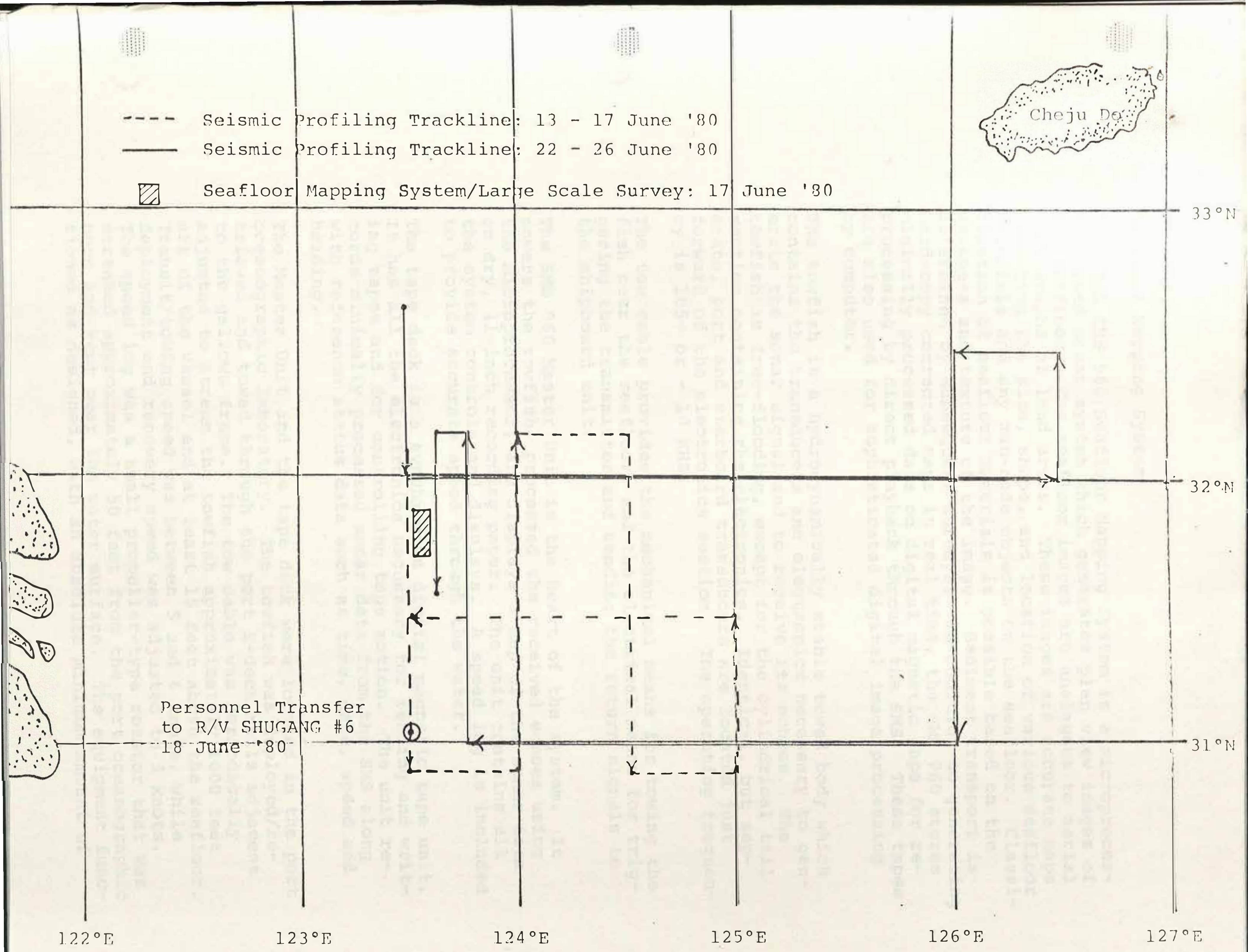
7. OPERATIONS

LEG II: (A) Seismic Profiling

Seismic profiling was accomplished by using three separate sensors: 1) Seafloor Mapping System, 2) Uniboom, and 3) Sparkarray. The sensors were deployed singularly and collectively. At times, and as requested by the Chief Scientist, 3.5 KHZ measurements were conducted in conjunction with the towed sensors to compliment and analyze specific study areas.

All of the equipment was streamed from the stern, and placards were placed on the bridge throttle consol to indicate what particular piece of equipment was deployed.

A total of 985 NM of seismic profiling was performed.



RP-5-OC-80 East China Sea Experiment Leg II

1. Seafloor Mapping System

The EG&G SMS 960 Seafloor Mapping System is a microprocessor-based sonar system which generates plan view images of the seafloor. The seafloor images are analagous to aerial photographs of land areas. These images are accurate maps depicting the size, shape, and location of various seafloor materials and any man-made objects on the seafloor. Classification of seafloor materials is possible based on the darkness and texture of the image. Sediment transport is determined by subsequent surveys. In addition to generating hard-copy corrected maps in real time, the SMS 960 stores minimally processed data on digital magnetic tape for reprocessing by direct playback through the SMS. These tapes are also used for sophisticated digital image processing by computer.

The towfish is a hydrodynamically stable towed body which contains the transducers and electronics necessary to generate the sonar signal and to receive its echoes. The towfish is free-flooding, except for the cylindrical tail section containing the electronics. Identical, but separate, port and starboard transducers are located just forward of the electronics section. The operating frequency is 105+ or - 10 KHZ.

The tow cable provides the mechanical means for towing the fish near the seafloor, and the electrical means for triggering the transmitter and sending the return signals to the shipboard unit.

The SMS 960 Master Unit is the heart of the system. It powers the towfish, processed the received echoes using the microprocessor, and displays a map of the sonar data on dry, 11-inch recording paper. The unit contains all the system controls and displays. A speed log is included to provide accurate speed through the water.

The tape deck is a synchronous digital magnetic tape unit. It has all the electronics necessary for reading and writing tapes and for controlling tape motion. The unit records minimally processed sonar data from the SMS along with reference status data such as time, date, speed and heading.

The Master Unit and the tape deck were located in the port oceanographic laboratory. The towfish was deployed/retrieved and towed through the port E-deck rails adjacent to the gallows frame. The tow cable was periodically adjusted to stream the towfish approximately 1000 feet aft of the vessel and at least 15 feet above the seafloor. Transit/towing speed was between 5 and 6 knots, while deployment and recovery speed was adjusted to 3 knots. The speed log was a small propeller-type rotator that was streamed approximately 50 feet from the port oceanographic boom and kept near the water surface. The equipment functioned as designed, with an absolute minimum amount of down time.

The seafloor mapping system was deployed for 165 hours.

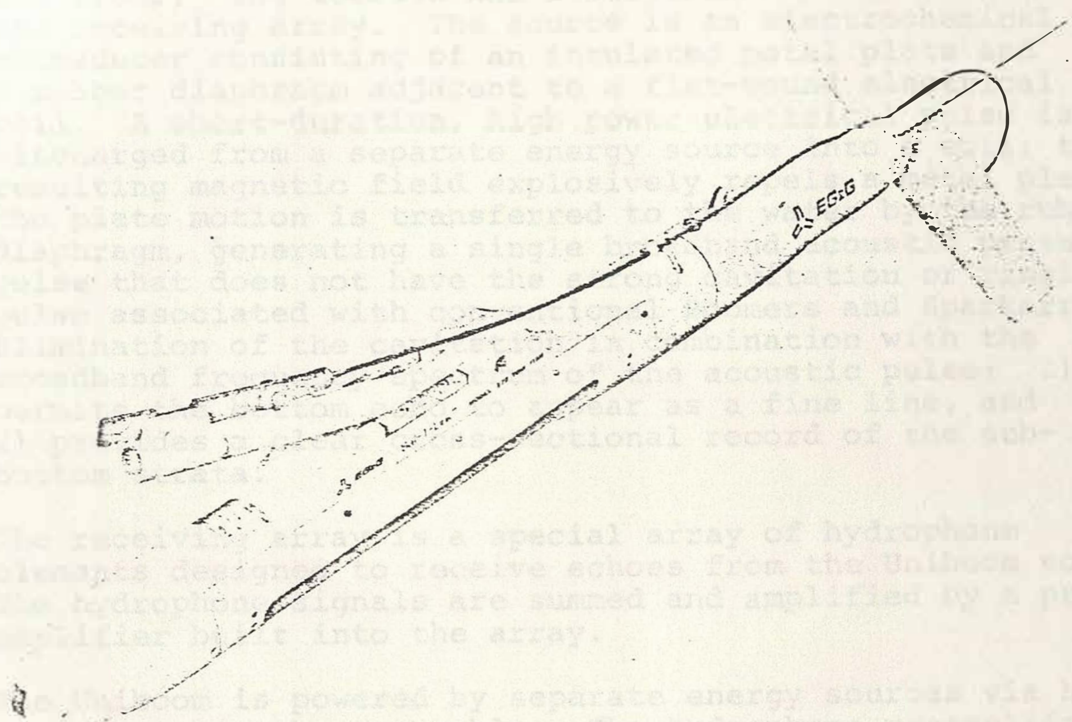


FIG. 8 - SMS TOWFISH.

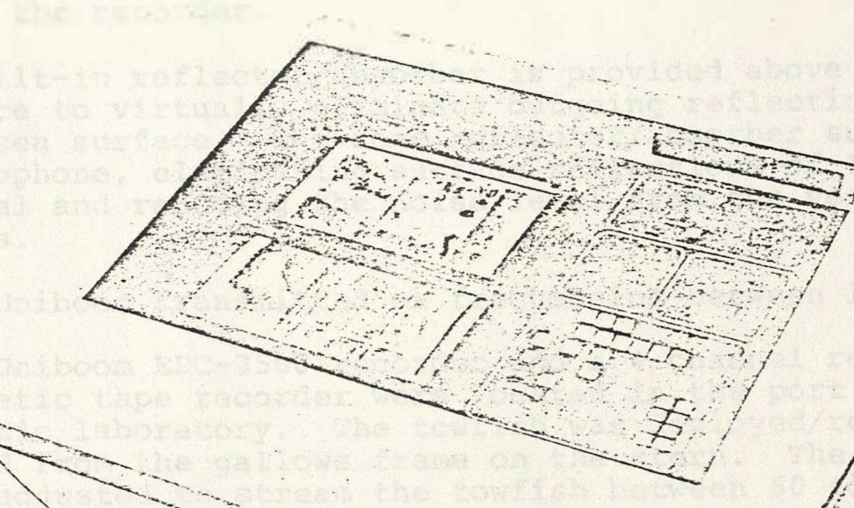


FIG. 9 - SMS MASTER UNIT.

2. Uniboom System

The Uniboom Sub-Tow is a self-contained high resolution source and receiver, towed by an electrochemical cable and a key part of a system designed to provide high resolution profiles of sub-bottom geology just below the sea floor. The towfish has a built-in Uniboom source and receiving array. The source is an electrochemical transducer consisting of an insulated metal plate and a rubber diaphragm adjacent to a flat-wound electrical coil. A short-duration, high power electrical pulse is discharged from a separate energy source into a coil; the resulting magnetic field explosively repels a metal plate. The plate motion is transferred to the water by the rubber diaphragm, generating a single broadband acoustic pressure pulse that does not have the strong cavitation or ringing pulse associated with conventional Boomers and Sparkarrays. Elimination of the cavitation in combination with the broadband frequency spectrum of the acoustic pulse: 1) permits the bottom echo to appear as a fine line, and 2) provides a clear cross-sectional record of the sub-bottom strata.

The receiving array is a special array of hydrophone elements designed to receive echoes from the Uniboom source. The hydrophone signals are summed and amplified by a pre-amplifier built into the array.

The Uniboom is powered by separate energy sources via heavy conductors in the tow cable. The hydrophone preamplifier is also powered down the tow cable by a battery in an interface box at the top end of the cable. Signals from the hydrophone/preamplifier are transmitted up shielded wires in the tow cable to the same interface box for interface with the recorder.

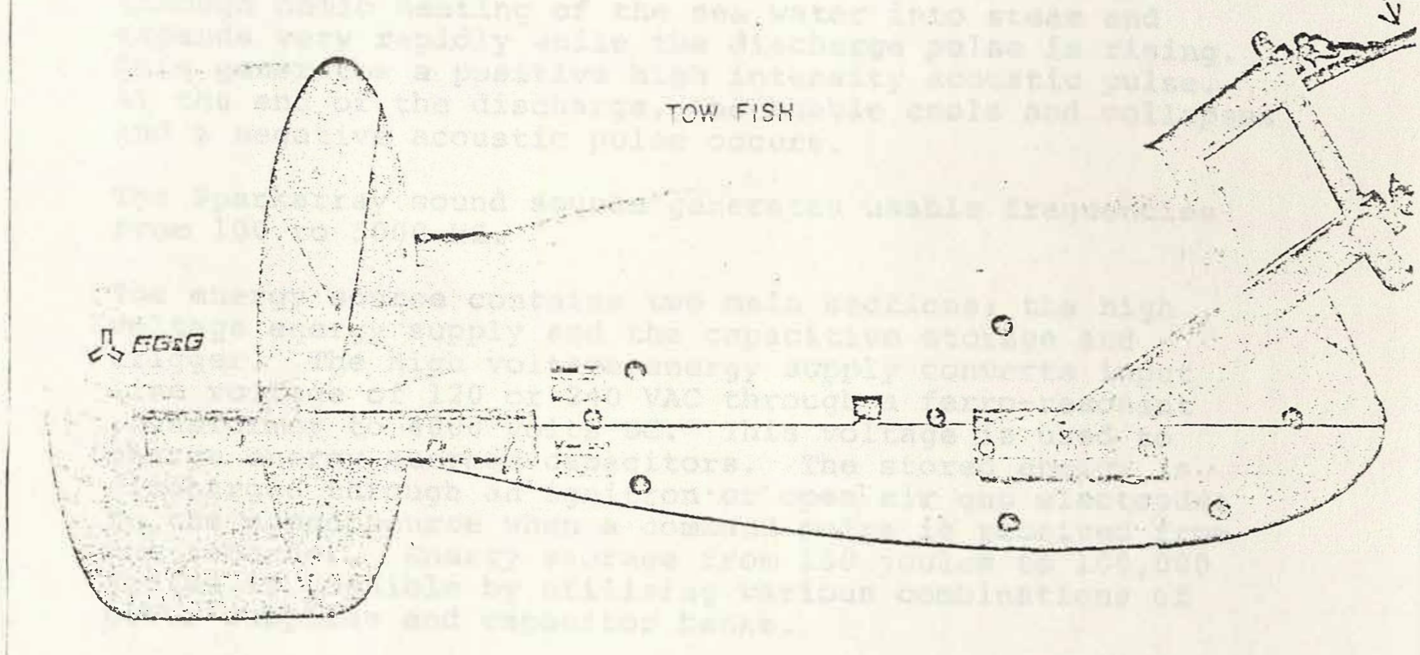
A built-in reflector/absorber is provided above the Uniboom source to virtually eliminate outgoing reflections from the sea surface. The same reflector/absorber surrounds the hydrophone, eliminating surface reflections of the received signal and reducing the noise level from the vessel and waves.

The Uniboom transmitted on frequencies between 1 and 10 KHZ.

The Uniboom EPC-3500 recorder and a 4 channel reel to reel magnetic tape recorder were located in the port oceanographic laboratory. The towfish was deployed/retrieved and towed from the gallows frame on the stern. The tow cable was adjusted to stream the towfish between 60 to 80 feet aft of the vessel and approximately 50 feet below the water surface. Transit/towing speeds were between 5 and 6 knots, while deployment and recovery speed was adjusted to 3 knots.

The Uniboom functioned as designed, however, after several days the EPC-3500 recorder completely failed. The Uniboom was then connected to the Universal Graphic Recorder in the Computer Room. A significant effort was made by the OCEANOGRAPHER's electronics technicians to assist in repairing the EPC-3500 unit.

The Uniboom was deployed for 236 hours.



3. Sparkarray

The Sparkarray is a low frequency, medium to high energy sound source utilized for medium penetration sub-bottom profiling in salt water. Pulses of electrical energy are discharged from an array of electrodes to a ground plane frame. The arc discharge created, generates a sound wave whose characteristics are a function of the spark gap design and the electrical energy discharged. When a high energy pulse is fed from the energy source to the sparkarray electrode, a plasma bubble is quickly formed at the submerged end of the electrode. It very rapidly expands to a maximum size. The size of the bubble is a function of discharged energy and the current density in the discharge path. The bubble is formed through ohmic heating of the sea water into steam and expands very rapidly while the discharge pulse is rising. This generates a positive high intensity acoustic pulse. At the end of the discharge, the bubble cools and collapses and a negative acoustic pulse occurs.

The Sparkarray sound source generates usable frequencies from 100 to 5000 HZ.

The energy source contains two main sections; the high voltage energy supply and the capacitive storage and trigger. The high voltage energy supply converts input line voltage of 120 or 240 VAC through a ferro-resonant transformer to 4000 volts DC. This voltage is used to charge energy storage capacitors. The stored energy is discharged through an ignitron or open air gap electrodes to the sound source when a command pulse is received from the recorder. Energy storage from 100 joules to 100,000 joules is possible by utilizing various combinations of power supplies and capacitor banks.

A hydrophone receiver that is sensitive to variations in pressure is used in conjunction with the Sparkarray. The hydrophone rides on the end of a cable which contains a pre-amplifier. Upon return of an acoustic signal it is routed through a power supply, then to three amplifiers which contain high and low frequency filters and finally to a recording unit.

The Sparkarray also used the EPC-3500 recorder, until it failed, and alternated using the UGR in the Computer Room with the Uniboom.

The Sparkarray electrode was deployed/retrieved and towed through the E-deck port chock on the stern. The tow cable was adjusted to stream the electrode 50 feet aft of the vessel and approximately 50 feet below the water surface. Transit/towing speeds were between 5 and 6 knots, while deployment and recovery speed was adjusted to 3 knots.

The hydrophone was deployed/retrieved and towed through the E-deck starboard chock on the stern. The tow cable was adjusted to stream the instrument 350 feet aft of the vessel and approximately 10 feet below the water surface.

The Sparkarray was deployed for 37 hours.

LEG II: (B) CTD/Hydro Measurements

A Plessey 9041 CTD with a transmissometer was the primary instrument and was provided by WHOI. Casts were performed three (3) meters off the sea floor and conducted from the starboard oceanographic boom. Three station grids were occupied.
CTD Grid 1: 20 stations. A to T
CTD Grid 2: 23 stations. A to T, including E1, F1, P8025
CTD Grid 3: 20 stations. A to T, including U and A', excluding L, M, E1, F1, and P8025
In addition to the CTD casts, surface samples were taken for temperature and salinity at each CTD station and at 4 NM intervals between CTD stations.

A total of 369 suspended sediments samples were processed. Three samples were taken at each CTD station plus the surface samples taken at intervals between the stations. 2000 mils of water was filtered through 0.45 micron millipore filters per suspended sediment sample.

Two CTD time series anchor stations were occupied:

Station	Location	CTD Casts	Time on Station
1	31° 30.4'N, 123° 30.0'E	16	18 hours
2	32° 47.0'N, 123° 34.7'E	26	26.5 hours

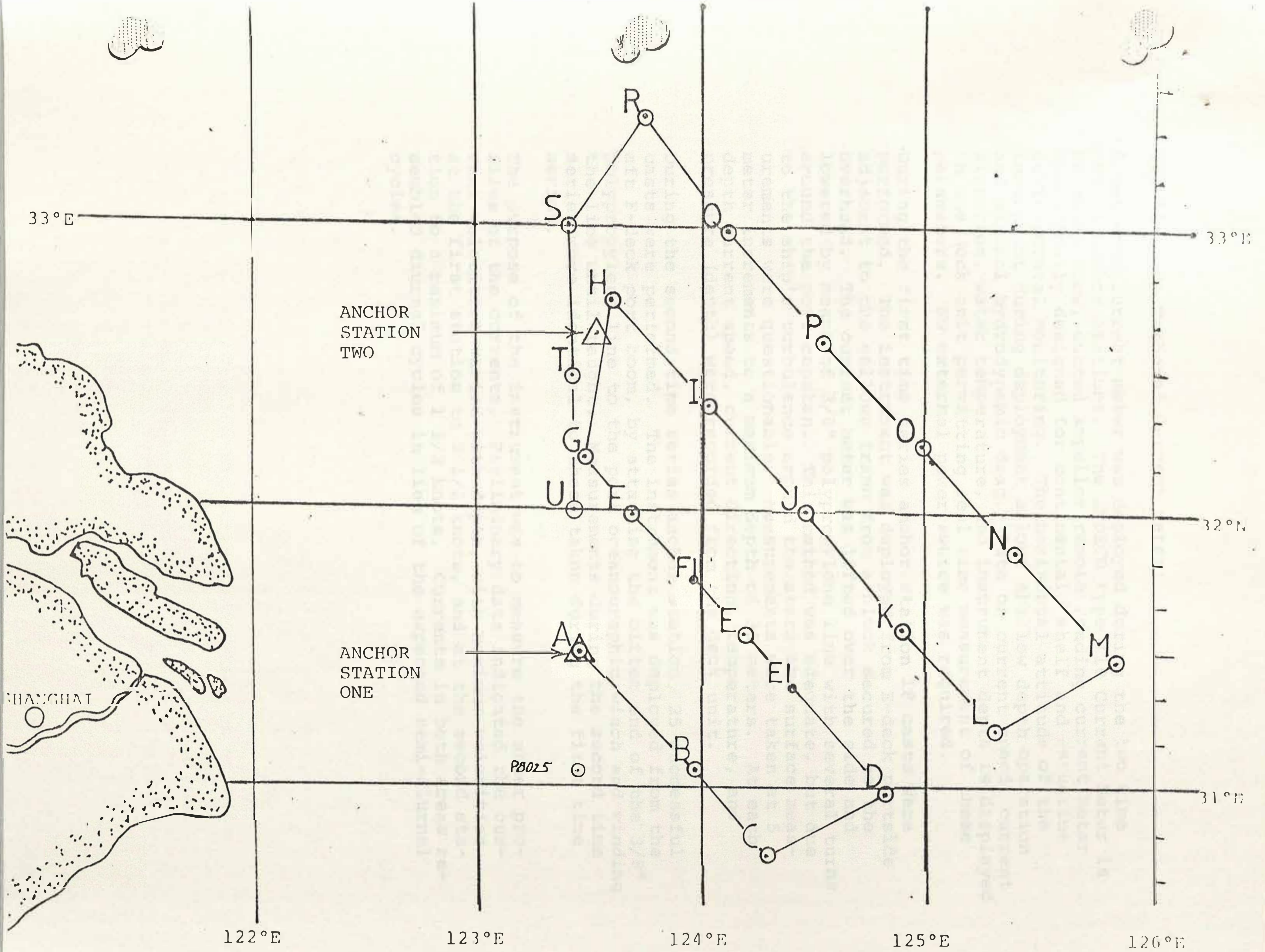
Preliminary results of the CTD grid/quasi-synoptic survey indicates the Yangtze River plume moves and separates to the west of the survey area. Also, based on the suspended sediment, the region to the north—in deeper water—is more turbid, while the entire survey area was most turbid below the thermocline.

A total of 105 CTD/Hydro casts were performed for LEG II.

RP-5-OC-80 East China Sea Experiment Leg II

CTD/HYDRO STATIONS: Beardsley/WHOI

	IDENTIFIER	PROJECT CODE	LATITUDE	LONGITUDE
TRIPOD	A	P8024	31° 30'N	123° 30'E
	B	P8027	31° 07'N	123° 57'E
	C	P8028	30° 44'N	124° 22'E
	D	P8031	30° 59'N	124° 51'E
	E	P8030	31° 21'N	124° 26'E
	F	P8029	31° 45'N	124° 00'E
	G	P8022	32° 11'N	123° 30'E
	H	P8032	32° 45'N	123° 39'E
	I	P8033	32° 23'N	124° 04'E
	J	P8034	32° 00'N	124° 30'E
	K	P8035	31° 37'N	124° 55'E
	L	P8036	31° 13'N	125° 21'E
	M	P8041	31° 30'N	125° 50'E
	N	P8040	31° 52'N	125° 25'E
	O	P8039	32° 15'N	125° 00'E
	P	P8038	32° 38'N	124° 34'E
	Q	P8037	33° 00'N	124° 09'E
	R	P8042	33° 23'N	123° 44'E
	S		33° 00'N	123° 30'E
	T		32° 30'N	123° 30'E
	U		32° 00'N	123° 30'E
	E1		31° 23'N	124° 23'E
	F1		31° 46'N	123° 58'E
		P8025	31° 05'N	123° 30'E



33°E
33°E
32°N
31°N
122°E
123°E
124°E
125°E
126°E
ANCHOR STATION TWO
ANCHOR STATION ONE
SHANGHAI
PB025
R
S
Q
H
P
T
I
O
G
U
F
J
N
F1
K
E
M
A
E1
L
B
D
C

LEG II: (C) Tethered Current Meter:

A tethered current meter was deployed during the two time series anchor stations. The ENDECO type 110 Current Meter is an axial flow, ducted impeller remote reading current meter specifically designed for continental shelf and estuarine environmental monitoring. The horizontal attitude of the instrument during deployment allows shallow depth operation and minimal hydrodynamic drag. Data on current speed, current direction, water temperature, and instrument depth is displayed on the deck unit permitting real time measurement of these parameters. No external power source was required.

During the first time series anchor station 18 casts were performed. The instrument was deployed from E-deck portside adjacent to the gallows frame from a block secured to the overhead. The current meter was lifted over the side and lowered by means of 3/8" polypropylene line with several turns around the port capstan. This method was adequate, but due to the ship's turbulence around the stern the surface measurements were questionable. Measurements were taken at 5 meter increments to a maximum depth of 35 meters. At each depth current speed, current direction, temperature, and pressure (depth) were recorded from the deck unit.

During the second time series anchor station, 25 successful casts were performed. The instrument was deployed from the aft F-deck port boom, by attaching the bitter end of the 3/8" polypropylene line to the port oceanographic winch and winding the line until taught. Measurements during the second time series were identical to those taken during the first time series.

The purpose of the instrument was to measure the sheer profiles of the currents. Preliminary data indicated the current velocities varied with depth, with maximum velocities at the first station to 2 1/2 knots, and at the second station to a maximum of 1 1/2 knots. Currents in both areas resembled diurnal cycles in lieu of the expected semi-diurnal cycles.

7. OPERATIONS

LEG III: (A) Current Meter Moorings

Mooring M2

During the second Shanghai in-port, the OCEANOGRAPHER was informed that Mooring M2 had been completely recovered, including the anchor, by a PRC fishing vessel on 24 June 1980. Apparently China's National Bureau of Oceanography had issued a notice to local fishing fleets pertaining to the location of all three moorings and the tripod. However, it is highly probable that the locations were extracted from the (draft) project instructions (Appendix: F) section 4.3: Moorings. The project instructions specify that the locations are approximate, but a typographical error was made in the latitude of Mooring M2. The approximate latitude should have been typed 30° 20'N in lieu of 31° 20'N. Two sources, an American and a Chinese, both claimed that the fishing vessel reported the mooring to be 60 NM from its reported position.

On Leg I, when the CTD transect line and the mooring locations were finalized, Mooring M2 was eventually deployed at 30° 31.3'N, 124° 47.9'E.

The United States' equipment was returned to the OCEANOGRAPHER intact, with the exception of the anchor, during the in-port period. Bent current meter vanes and bent spindle assemblies were the only apparent damage to the equipment. The PRC current meters attached to the mooring were not delivered to the OCEANOGRAPHER.

Mooring M3

The original recovery plan for Mooring M3 and the Tripod was to proceed from Shanghai with 9 Chinese scientists aboard, retrieve the equipment, rendezvous with the R/V SHUGANG #6, transfer personnel and equipment, and then proceed down the CTD transect line to eventually recover Mooring M1. However, as a result of acoustic release problems on the moorings several alterations were required. Excluding the time alloted to the recovery of the Tripod, a total of 11 hours, 29 minutes were spent in search of both the mooring and the Tripod.

The search for both the mooring and Tripod was performed by positioning the vessel on station by satellite navigation, compensated Loran C positioning and submerging two hydrophones over the side, at various depths. Each hydrophone either interrogated or actuated the acoustic releases on both the mooring and the Tripod. During the search, three additional lookouts were stationed on the flying bridge, which complimented the four watchstanders on the bridge. The environmental conditions were very good, with a sea of three feet running and occasional whitecaps. Visibility was approximately five nautical miles.

Several factors were working against a successful recovery:

1. The acoustic releases on the mooring and tripod never responded to the interrogation or the actuate signal.
2. The estimated range of the transponder was three nautical miles for the mooring. The estimated range of the transponder for the tripod was one nautical mile.
3. Due to the relatively shallow depth—33.8 meters—it is possible the return signal from the acoustic releases were distorted, or the batteries in the acoustic releases too weak to transmit the signal over several miles.
4. It is possible the acoustic release actuated properly, and drifted away from the vessel undetected. The size of the flotation on the mooring was relatively small; an unlighted 41" yellow sphere, in addition to an unlighted 28" yellow sphere. Only half of the floatation remains out of the water for observation.
5. It is possible the acoustic release totally failed.
6. It is conceivable the mooring was recovered by a foreign fishing vessel. While on station several pair trawlers were observed in the area.

<u>Mooring M1</u>

The OCEANOGRAPHER navigated to the deployment location, the hydrophone deployed, the acoustic release interrogated, and the acoustic release responded with the correct signal. The slant range of the signal was recorded at 5000 yards and the vessel was re-positioned three times to isolate and reduce the distance to the mooring. While interrogating the acoustic release on the last re-positioning station the instrument released itself and emitted a release signal. The lookouts were notified, and shortly thereafter the floats were observed 1/2 nautical mile off the port beam. The recovery was swift and uneventful.

Marine Operations Log and Deck Log Abstract:

DATE (LOCAL)	TIME (LOCAL)	EVENT
2 July '80	0914	OCEANOGRAPHER departs Shanghai
	1845	On station M3: 31° 27.2'N, 123° 30.0'E Hydrophone(s) submerged - commenced search
	1855	Sunset
	2240	Hydrophone(s) on deck - secure search Commence CTD station 16
	2312	Depart M3/Tripod station for rendezvous with R/V SHUGANG #6 at 31° 02.7'N, 122° 15.0'E
3 July '80	0456	At rendezvous position: anchor
	0524	Commence transfer of Chinese scientists and equipment to R/V SHUGANG #6
	0744	Anchor aweigh - Transit to M3/Tripod location
	1243	On station M3/Tripod - Hydrophone(s) submerged - resume search
	1453	R/V SHUGANG #6 loitering on station awaiting retrieval of Mooring: M3
	1747	Tripod marker float sighted
	1855	Sunset
	1902	Tripod on deck. Resume search for M3
	2100	R/V SHUGANG #6 detached Secure from search for M3 Underway to CTD station 14

LEG III: (B) Tripod

The final plan during the last hours of the search was to position the vessel at four inter-cardinal points around the deployment location of the Tripod. The Tripod location was selected as the center point of the grid, because during the deployment of the instrument a highly accurate SM1 type satellite navigation position was recorded. Shortly after departing one of the stations on the grid the 18" orange float was sighted by the officer of the deck. The strobe light on the float was weak but operational. Some difficulty was encountered in attaching the working line from the vessel to the surface float by seamen in the Zodiac. A slight sea was running and strong currents prevailed. Once the working line was attached, precise shiphandling was required to keep the Tripod within 15° of vertical. While the Tripod was being retrieved a marker float was deployed to serve as a reference marker for additional and unsuccessful search efforts for Mooring M3.

Once the instrument was on deck it was obvious that only one of the acoustic releases had functioned properly. The alternate release that contained an 18" orange float with a radio transmitter was loose from its housing but still securely attached to the frame of the Tripod. The instrument had some hairy brown growth on it, but all associated equipment appeared to be undamaged and functioning properly. The sediment trap bags were full. Reference Section 12: Chief Scientist's Comments LEG III for additional information regarding the Tripod.

LEG III: (C) CTD Measurements/Salinity

The OCEANOGRAPHER's Plessey 9040 CTD was the primary instrument during this phase of the operation outbound from Shanghai. As a result of the time expended in search of Mooring M3 and the Tripod, five CTD stations were deleted from the transect. The original schedule was to occupy all of the CTD stations performed during LEG I. Completed CTD stations were performed at least 5 meters from the sea floor.

Surface bucket samples, for temperature and salinity, were taken at approximately 4 NM increments along the transect from CTD stations 16 to 10. Surface bucket samples were taken in lieu of performing CTD stations 9 and 7.

Shortly after CTD station 5, the vessel was vectored to Sasebo, Japan as a result of a crew member suffering from a heart ailment. The medevac required CTD stations 4, 3, 2, and 1C to be deleted.

Reference CTD list/LEG III, and section 5: Operations Area.

A total of 7 CTD casts were performed during LEG III.

As per a Field Request from Dr. Robert Aller to the Commanding Officer, NOAA Ship OCEANOGRAPHER (Appendix: H) salinity samples were taken at specific locations while transiting along the CTD transect line.

RP-5-OC-80 EAST CHINA SEA EXPERIMENT LEG III

CTD STATION	LATITUDE	LONGITUDE	REMARKS
16	31° 28.4'N	123° 30.0'E	Mooring M3/Tripod
14	31° 10.0'N	124° 00.0'E	
12	30° 50.0'N	124° 20.0'E	
10	30° 31.3'N	124° 47.9'E	Mooring M2
8	29° 55.0'N	125° 37.0'E	
6	29° 15.9'N	126° 37.4'E	
5	29° 01.0'N	127° 03.3'E	Mooring M1

LEG III: (D) 3.5 KHZ Measurements

As per the memorandum from Dr. George Keller to Dr. Glenn Cannon (Appendix: G), and as verbally requested by Dr. Keller in Shanghai, 3.5 KHZ measurements were conducted from 31° 25.7'N, 123° 30'E southwest along the CTD trackline to 28° 58.2'N, 127° 07.7'E.

The 3.5 KHZ signal penetrates the upper sediment layer and delineates sub-bottom stratigraphy. The sub-bottom profiling was recorded and annotated hourly on one of the Universal Graphic Recorders in the Plot Room.

A total of 240 NM of 3.5 KHZ measurements were performed during LEG III.

8. OCEANOGRAPHER's EQUIPMENT

(A) SENSORS

1. Expendable Bathythermographs: XBT
T4 type: 12 successful launches
0 aborted launches

2. Auto-Salinometer:
879 Salinity/Conductivity samples processed

3. Oxygen Titration:
0 Oxygen samples processed

4. Surface Reference Temperature:

The instrument was operated for the duration of the cruise. All bucket temperature readings were recorded on the analog strip chart for comparison. The results of the comparisons were excellent.

5. Pyranometer:

The instrument was operated for the duration of the cruise and performed as designed.

6. Universal Graphic Recorders:

Two of the three recorders were operated for the duration of the cruise. At times all three were operating, recording seismic profiling, DMA bathymetry, and 3.5 KHZ profiling. All recorders operated extremely well with a minimum of down time.

7. Nisken Bottles:

All bottles performed as designed.

8. Protected and Un-Protected Thermometers:

Only protected thermometers were used for CTD casts, due to the relatively shallow water. All thermometers functioned as designed.

9. Navigation Units:

The two satellite navigation units performed extremely well for the duration of the cruise and were the primary means of positioning the vessel.

A satellite navigation - Loran C comparison log was maintained on the bridge during periods of time and location where the Loran C information was relatively accurate.

(B) COMPUTER

Computer Hardware:

Routine maintenance was performed on the PDP - 11/34 data system.

Computer Software:

The X-axis of the program 'S Plot' is offset. A data comparison from 'Lister' of CTD data with a temperature/salinity 'S Plot' showed the salinity X-axis to be offset by approximately 1.5 parts per thousand. C5 Rockville will be informed via standard procedures.

(C) DATA PROCESSING

Magnetic tapes from PODAS, in addition to the DDL tapes were completed. Listings of the CTD data, along with temperature, salinity, and transmissometer plots versus depth, and temperature/salinity plots were also completed. Duplicate copies of the listings and all plots were furnished to the Chinese scientists for LEGS I and II. Contour plots of the CTD time series stations were also provided. All times for LEG I and III were GMT. All times for LEG II were in Peking Time = Ship's Time = Local Time.

The OCEANOGRAPHER's Survey Department did an impressive job of collecting, processing and duplicating the data.

9. MARINE MAMMAL OBSERVATIONS

Requirements for Project Instructions: RP-13-OC-80, Marine Mammal Reporting Program, were carried out. Bridge watchstanders, using 7X50 binoculars, were instructed to report all marine mammal sightings. The marine mammals reporter was called to the bridge for purposes of identification and logging.

Relatively few animals were seen while OCEANOGRAPHER conducted operations in the East China Sea. Four possible factors may have accounted for this:

1) Poor visibility. Foggy or rainy conditions prevailed for much of the time.
2) Poor water clarity. Murky, silt-laden water in the Yangtze delta may discourage certain cetacea from inhabiting the area, i.e. those species without physiological echolocation mechanisms adapted to low visibility, shallow-water areas.
3) Vessel traffic. With the major port of Shanghai nearby, the heavy shipping may also discourage the presence of certain animals.
4) Fishing. Extensive net fishing and pair trawling by numerous local vessels could be depleting cetacea food sources.

It should be remembered, of course, that the last three of the above are strictly speculative.

An interesting and unusual sighting was made while OCEANOGRAPHER was at anchor in the port of Hsia-men (Amoy), People's Republic of China. A group of medium sized dolphins were seen repeatedly diving and surfacing. Their striking trait was the solid, ivory-white coloration of the adults bodies. Several juveniles, slate gray in color, were also seen. The rostrum and melon shape resembled those of river dolphins, so there is likelihood they may be members of the family Platanistidae; perhaps related in some way to Lipotes vexillifer, Chinese Lake Dolphin. The Chiu-Lung Chiang River flows into Hsia-men.

The following is a synopsis of the marine mammals sighted. Further details may be found in the Marine Mammals Sighting Log submitted to Northwest and Alaska Fisheries, Marine Mammals Division, Seattle.

Date	Location	Number	Species
5/30	20°13'N 118°24'E	4-8	Unidentified large dolphins
5/31	24°26'N 118°04'E	4-8	Unidentified dolphins
6/01	26°02'N 122°29'E	25-35	Mixed herd: Whitebellied dolphins & Spotters (Delphinus sp., Stenella sp.)

Date	Location	Number	Species
6/18	31°28'N 123°34'E	4-5	Pacific Bottlenose dolphins (Tursiops gilli)
7/02	31°29'N 123°23'E	15-25	Unidentified dolphins

10. BATHYMETRY FOR THE DEFENSE MAPPING AGENCY

In accordance with project instructions S-T701-OC-80, Deep Sea Tracklines, sounding data was collected for the Defense Mapping Agency. In keeping with the Defense Mapping Agency agreement with the Peoples Republic of China no work was done within the twenty (20) meter depth contour off the coast of China. Bathymetry was conducted during all three legs of the East China Sea Experiment. Bathymetry was periodically secured during mooring bathymetry, mooring deployment and recovery, CTD casts, and over redundent CTD grid tracklines. The methods and procedures set forth in Publication 606, "Guide to Marine Observing and Reporting" were complied with. The bathymetry was also on a not-to-interfere basis with the research project. From 29 May to 5 July 1980 a total of 3,250 nautical miles of bathymetry were conducted.

11. INTEGRATED GLOBAL OCEAN STATION SYSTEM (IGOSS)

In accordance with project instructions Integrated Global Ocean Station System dated November 29, 1979, all requirements were complied with. Bathythermographs (XBT) are deployed within one hour of 0000, 0600, 1200, 1800 GMT. However, casts are to be made only in geographical areas where water depth exceeds 200 fathoms, unless the Pacific Marine Center directs otherwise. As a result of the OCEANOGRAPHER transiting and operating in relatively shallow water——less than 200 fathoms——only eight (8) IGOSS XBT's were cast from 29 May to 5 July 1980. For those XBT's that were cast, messages were transmitted from the vessel and the XBT logs and graphs were forwarded to the National Oceanographic Data Center (NODC) via transmittal letter.

12. CHIEF SCIENTIST's COMMENTS
RP-5-OC-80, LEG I

The U.S.-Chinese cooperative program involved three legs by OCEANOGRAPHER and participation by U.S. scientists on two Chinese research vessels. PMEL participated on Legs I and III on the OCEANOGRAPHER and on the Chinese ship SHUGUAN #6. This report summarizes the PMEL participation. Background information was sent first on 10 January 1980 following the NOAA sponsored delegation to China. An overall summary of the project is in the introduction of the OCEANOGRAPHER's Project Instructions.

Cannon, Pashinski, and Parker joined the OCEANOGRAPHER for Leg I (29 May-4 June) in Manila, Philippine Islands, on 24 May accompanied by participants from the University of Washington. Cannon was chief scientist of the work from Manila to Shanghai with a stop in Xiamen, China to pick up 13 Chinese scientists from a large variety of institutions.

The stop in Xiamen (Amoy) was historic. This city has only very recently been opened to Americans. Only a few others had been there before us. We arrived at daybreak on 31 May and stayed until dark, although the people there wanted us to stay longer. During the day the entire ship was taken ashore in two groups of about 40 each for a 2-3 hour tour of the NBO's Third Institute of Oceanography and a temple in the town, plus a short stop for shopping. In return, the ship provided tours for a large number of Chinese scientists who were not participating in the cruise to Shanghai. The Chinese were extremely friendly.

The work on Leg I included a CTD section from the Okinawa Trough across the Kuroshio, and then across the East China Sea into the Yangtze River plume. The inner limit was 123° 30'E as dictated by the Chinese during their visit to the U.S. in March 1980. (Note: Cannon participated in those discussions with the Chinese in San Diego, Washington, D.C. and Easton.) In addition, three current meter moorings were deployed at the shelf break, mid shelf and in the plume. On each of the mid shelf and plume moorings, two Chinese current meters were deployed paired with PMEL Aanderaa meters. Prior to arriving in Xiamen, we were unaware of this addition. Coincident with the plume mooring, a bottom tripod was deployed by Dr. Richard Sternberg (University of Washington) to measure various characteristics of suspended sediment near bottom. Sternberg also participated in last December's delegation to China.

The ship arrived in Shanghai on 4 June with much celebration. It was the first U.S. Government ship to go there in over 30 years. I was particularly moved at the arrival by the number of Chinese to greet us from institutions from all over China (Shanghai, Hangzhoe, Qingdao, Beijing, Nanjing, and Xiamen).

Many were those I had met either during the NOAA delegation to China last December or during the Chinese delegation to the U.S. this March. During the 4-8 June inport, there were many celebrations of the occasion. These included a banquet hosted by the City of Shanghai for the entire ship, the NOAA delegation, and all U.S. scientists; plus two banquets hosted by NBO and NOAA for slightly smaller groups; and finally, two open houses on the OCEANOGRAPHER with spectacular samplings of seafoods from throughout the U.S.

The OCEANOGRAPHER and the three Chinese ships sailed on 9 June for the main legs of the joint program. Parker from PMEL and the two University of Washington personnel returned to Seattle. Parker (PMEL) and two others from the UW would return for Leg III on OCEANOGRAPHER to recover moorings and the tripod. Cannon and Pashinski (PMEL) sailed on the smaller Chinese vessel (SHUGUAN #6) for ten days (9-19 June) to work in the mouth of the Yangtze River estuary. Cannon was chief scientist for the American party which included, in addition to the two physical oceanographers, two geological oceanographers from WHOI (M. Fitzgerald and Mr. Yang, who actually was from Qingdao, but working in the U.S. for two years) and two chemical oceanographers from MIT (Dr. John Edmond and B. Grant). In addition, fifteen Chinese scientists from various institutions, plus an interpreter participated in the work.

Following our discussions with the Chinese delegation during their visit to the U.S. in March, we agreed to the work on the Chinese ship shown on the accompanying figure. It included one current meter mooring, four anchored time series stations for 25 hours each, and a grid of CTD stations bracketing the mouth of the estuary. This work would attempt to document what was flowing out of the Yangtze while the other ships were working on the shelf studying the effluent. Observations included physical, geological and chemical oceanography.

The Chinese supplied the surface float and anchor for the estuary mooring and a light for navigation. The float was similar to the old USC & GS Roberts floats which were boat shaped.

The U.S. provided two current meters and various cable and fittings for the mooring, a profiling current meter and CTD, and all geological and chemical sampling gear. Chinese current meters could not be used on the mooring because currents were too large (2-5 knots). However, the Chinese did bring a current meter more useful for profiling in the high currents than the one we took.

Overall, the work on the Chinese vessel went reasonably well. The ship was well outfitted for the coastal work with four hydrographic winches that could be operated simultaneously. However, there were several items which with little extra would make significant improvements in the operation. A few of these specifically concern safety on the vessel. These recommendations are attached separately and represent a consensus of the U.S. scientists working on SHUGUAN #6.

Leg III on the OCEANOGRAPHER went from Shanghai to Sasebo. Parker from PMEL was chief scientist accompanied by two participants from the University of Washington. After extensive searching, mooring 3 was declared lost, presumably to fishing. The tripod, however, was recovered from its nearby location. Recovery required considerable searching following release of its anchor. Mooring 2 was recovered by Chinese fishermen about 24 June and was returned. Mooring 1 was recovered after its anchor was released. Because of the time involved with searching for mooring 3, only alternate CTD's were occupied (16, 14, 12, 10, 8, 6, and 5). The scientific party returned home from Sasebo.

Finally, Cannon took a short course in Chinese before going. Although not able to carry on extensive conversations, communications were greatly facilited.

Glenn Cannon, PhD
NOAA/PMEL - RF28

12. CHIEF SCIENTIST'S COMMENTS
RP-5-OC-80, LEG II

This cruise had two major scientific objectives. One was to study the influx and fate of the Yangtze River water onto the East China Sea continental shelf. The other was to study the morphology and shallow, ie. late quaternary, structure of the shelf sediments.

The first objective was accomplished by occupying a series of 22 hydrographic stations east of the 123° 30'E meridian, plus two time series stations. CTD casts were augmented by water samples and light transmissometer measurements. Temperature, salinity and suspended matter samples were taken from the water samples. These hydrographic stations were occupied three separate times, once each at the beginning, middle, and end of the cruise. In this way, we were able to monitor the change with the time of the Yangtze River plume. Perhaps most surprising was the plume of suspended mud that characterized the bottom waters in the northern part of the study area. Whether this mud is Yangtze River mud or represents resuspended Hwangho mud from the north is not known at this time.

The other half of the cruise was geophysical, with measurements being taken with a Uniboomer, Sparker, 3.5 echo sounder, and a side scan mapper. After considerable trouble on the first part of the cruise, due primarily to a faulty recorder, we finally eliminated the sparker profiling and concentrated on Uniboomer profiling and sea floor mapper (side scan sonar) instead. The quality of data gathered varied considerably, but we were able to map regional distribution of various bed forms as well as delineate areas with relatively great thickness and finally trace the path of old buried river channels across the shelf.

All the scientific personnel aboard were greatly impressed with the spirit of cooperation and interest shown by the officers, crew and technicians of the OCEANOGRAPHER. It made the trip an enjoyable and memorable one for all of us.

John A. Milliman, PhD
Woods Hole Oceanographic Institute

12. CHIEF SCIENTIST'S COMMENTS
RP5-OC-80, LEG III

Leg III of the East China Sea program had two major objectives: to recover moorings of current meters and a bottom tripod which were deployed on Leg I, and to continue the CTD program with replicate casts at previously occupied stations. The current meter arrays had various instruments from PMEL as well as current meters supplied by the Chinese (PRC). The deployment sites were denoted M1, M2, and M3. The positions of the arrays and the schematic illustration of each array are elsewhere in this cruise report. The tripod (SDS) is operated by the University of Washington and was deployed .8 miles from mooring M3. In addition to the major objectives, 3.5 khz bottom profiles and bucket samples of surface water were taken for Dr. G. Keller (OSU) and Dr. R.C. Allen (Univ. of Chicago). Samples were taken east of 124°E longitude.

The vessel departed Shanghai on 2 July 1980. On 1 July we were notified that a Chinese fishing vessel had recovered mooring M2. The details of where and when the fishing vessel recovered this mooring were not available when we departed Shanghai. We suspect the fishing vessel picked up the mooring on 24 July. This mooring had three (3) Aanderaa current meters and two (2) PRC meters. All instruments were returned. This mooring had been deployed some 30 miles south of the originally designated location for this mooring. See the cruise report for Leg I for details of the deployment.

On 2 July we proceeded to the vicinity of mooring M3 and the tripod. An attempt to acoustically locate M3 failed and we attempted to fire the flashing beacon on the tripod. No success was had and we left the area to return the Chinese Scientists to PRC #6 at the arranged rendezvous point. The OCEANOGRAPHER then returned to M3 and a search pattern was initiated. The tripod was found north of its assumed position and recovered in extremely strong surface currents. Because of darkness and a lack of acoustic response from M3, this mooring was abandoned and the following message relayed to PRC #6 which was on the station:

> To NBO:
> Unable to locate current meter mooring M3. Hydrophone and visual search were performed from 1800-2300 on 2 July and 1230-2030 on 3 July. Suspect acoustic release malfunction or mooring was dragged from original location by fishing vessel. Required to discontinue search to perform CTD's and recover mooring M1. R/V SHUGANG No. 6 rendezvoused at 1600 on 3 July and informed of our departure intentions via blinker light. Position of M3 for possible NBO search is 31-28N, 123-30E within a radius of 5 NM. Probable location in northwest quadrant. Tripod recovered.

From M3 the OCEANOGRAPHER proceeded to M1 taking seven (7) CTD casts along the way. Mooring M1 was recovered near dusk on 4 July. Because of a medical problem we then proceeded as rapidly as possible to Sasebo, Japan with further scientific effort secured.

All recovered current meters were functioning properly on recovery and the prognostic is for an excellent set of data. This data will be processed by PMEL. The tripod also appeared to have functioned properly. There was little sign of corrosion although the tripod was rich in plant growth. The microprocessor was functioning properly on recovery and had a full casette of data. This means that we recovered a great deal of information on wave conditions near to the bottom. All three sample bags fired indicating a range of nephelometer readings from .25 to .5 to .75 of full scale. The camera system was also operating. The instruments will be opened in Seattle to ascertain the full data base.

Extremely strong surface currents possibly in excess of three knots made recovery difficult, particularly for the tripod. As chief scientist I thank Captain Saladin and the team work he promotes on the OCEANOGRAPHER. Recovery of the tripod would not have happened without persistent effort by the observers, the willingness to stretch the ship schedule for another few sample stations and the expertise of the deck crew.

In order to recover the tripod the OCEANOGRAPHER had to back into a current of at least three knots as the recovery line was taken aboard. All of the operation was done at a professional level reflecting the dedication and experience of the officers and crew of the OCEANOGRAPHER.

Lawrence H. Larsen
University of Washington

13. RECOMMENDATIONS

While working with research vessels from the Peoples Republic of China, verbal ship to ship communications was virtually non-existent. However, during Legs II and III several rendezvous situations were scheduled to transfer personnel and equipment. Communications with the transfer vessel could only be accomplished by contacting a shore facility and having the information relayed. This method is time consuming, and a direct function of the reliability of the shore facility. When two vessels attempt to make rendezvous at sea there are numerous variables that could change the time and location of the meeting. Vessels suffer engine failures, equipment failures and malfunctions on station, medevacs, etc. The end result of one vessel not arriving at the rendezvous is lost ship time. Also, ship to ship communication is a primary tool for preventing collisions at sea. When vessels are in close quarters situations during a rendezvous it is good seamanship to know the intentions of the other vessel. It is highly recommended for future joint research vessel projects with the Peoples Republic of China to include verbal ship to ship radio communications into the operational planning of the research mission.

As a result of the recovery of mooring M2 by a PRC fishing vessel, it is also possible that mooring M3 was retrieved by another non-Chinese fishing vessel. In either case, both arrays were deployed in an area of dense fishing traffic. Regardless of whether the locations of the moorings are registered with the local fishing fleets, it is likely that other foreign fishing vessels occupying the same fishing grounds will not get the information. To alleviate future premature mooring recoveries and enhance scheduled sub-surface mooring retrievals, it is recommended that lighted surface marker buoys be placed adjacent to sub-surface arrays. Furthermore, the marker buoy should be considered an integral part of the sub-surface mooring, particularly in foreign fishing grounds.

It is recommended that interpreters from both the United States and the Peoples Republic of China continue to be provided on each participating research vessel for the duration of future joint research cruises.

It is recommended that 25 power binoculars be included as part of the ship's equipment. These high power binoculars similar to those used by the marine mammal observers during EPOCS Leg II are instrumental in locating small objects on the sea. They would compliment the marine mammal observation program, assist bridge watchstanders; and in the case of locating the 18" diameter tripod float, they could have saved valuable ship time.

13. RECOMMENDATIONS FOR FUTURE WORK ON CHINESE RESEARCH VESSELS

1. Scientific party should have sufficient flexibility to make reasonable changes in the sampling program at sea. Oceanographic conditions are not always as anticipated in pre-cruise plans, and the scientists in the field can best make choices for the most profitable and optimum use of the ship time. The captain of the ship should have final say only concerning safety of the ship and prearranged meetings with other vessels. If this flexibility does not exist, then much valuable ship time and personnel time on the vessel can be wasted.

2. Scientists from other oceanographic organizations within China should be encouraged by NBO to participate as partners, not just observers. Much excellent equipment exists in these other organizations. NBO's programs would profit considerably by utilizing those scientists and their tools more fully.

3. Ship conditions were generally very good. However, a few improvements which would be beneficial are:

   1) Oceanographic winches and davits were generally in good condition. Four davits, two each side, easily were moved inboard to outboard. However, the top of the davits should be rigged with blocks, so that the wire does not rub when there are large wire angles on anchor stations. Also, wire which easily kinks should be cut off, discarded and ends reterminated with thimbled eyes permanently. All were removed at end of cruise. Finally the wire should be wound evenly on the drums without overlapping; the level winds may need readjusting.

   2) The decks presently are extremely slippery and very dangerous. Non-skid paint would greatly improve the safety, particularly in wet weather.

   3) Sufficient life jackets should be available for all onboard, preferably in individual rooms.

   4) More use of soap or detergents in cleaning would also help, keep oil off decks and in passageways, the heads cleaner, and in general provide better living conditions with little extra effort and cost.

   5) Some improvements in seamanship for the crew would greatly improve safety of working conditions. Use of their whale boat had several near misses and no life jackets were carried. No Americans rode in their whale boat.

4. Future sampling should include sections along channels on flood and ebb tides from fresh water to outside the mouth of the estuary. These should include anchored current profiles, which are relatively quick in shallow water. Echo sounding should also be made when over the salt wedge interface to look for internal waves during periods of high flow.

5. Chinese scientists on all ships were generally excluded from parties in Shanghai while U.S. scientists attended. This did not make the best working relationships.

6. U.S. scientists on the Chinese ships ate separately. We on SHUGUAN #6 felt that all should eat together in the future.

7. Finally, much work needs to be done regarding mooring deployment techniques, particularly in not using old hardware and chain. Two breaks barely missed causing serious injury. Many were unsure of techniques resulting in much confusion.

Glen Cannon, PhD
NOAA/PMEL - RF28

14. DATA CUSTODIANS

LEG I: Glenn Cannon, PhD
NOAA, Pacific Marine Environmental Laboratory
3711 15th Avenue, Northeast
Seattle, Washington 98105

LEG II: SEISMIC PROFILING:

John Milliman, PhD
Woods Hole Oceanographic Institute
Woods Hole, Massachusetts 02453

LEG III: MOORINGS/WATER CHEMISTRY:

Glenn Cannon, PhD
NOAA, Pacific Marine Environmental Laboratory
3711 15th Avenue, Northeast
Seattle, Washington 98105

SEDIMENT TRANSPORT TRIPOD:

Richard Steinberg, PhD
University of Washington
Applied Physics Laboratory
1013 Northeast 40th Street
Seattle, Washington 98105

APPENDIX

(A) PERSONNEL

1. NOAA Commissioned Officers

Commanding Officer	Captain Gerald C. Saladin, NOAA
Executive Officer	Commander Phillip C. Johnson, NOAA
Operations Officer	Lt. Cdr. Dennis Pepe, NOAA
Navigation Officer	Lt. Lawrence D. Parsons, NOAA
Electronics Officer	Lt. Lars A.G. Pardo, NOAA
Smooth Plot Officer	Lt(jg) J. Fain McGough, NOAA
Computer Officer	Lt(jg) Walter P. Latimer, NOAA
Meteorological Officer	Ens. Stephen L. Carlson, NOAA
Moorings Officer	Ens. Paul D. Moen, NOAA
Ship's Store Officer	Ens. Daniel J. Marler, NOAA
Ship's Surgeon	Lt. Cdr. Richard K. Rudy, USPHS

2. Ship's Officers

Chief Marine Engineer	Eckley K. Guerin
Chief Electronics Technician	Russel Eastman
Chief Yeoman	Clarence C. Fairchild
Chief Survey Technician	Tony D. Mandich
Chief Boatswain	William J. Halama
Chief Steward	Novelito A. Nebril
Chief Quartermaster	James W. Stucky
First Assistant Engineer	John C. Bergstrom
Second Assistant Engineer	Jack F. Fujio
Third Assistant Engineer	John P. Amtower
Third Assistant Engineer	Christopher J. Johnson

3. Scientific Party: United States: LEG I, Manila to Shanghai

Chief Scientist	Glenn A. Cannon, PhD NOAA/Pacific Marine Environmental Laboratory, Seattle, WA
Associate Investigator	Richard Sternberg, PhD University of Washington
Electronics Specialist	David J. Pashinski, NOAA/PMEL
Electronics Specialist	William Parker, NOAA/PMEL
Electronics Specialist	Jeffrey P. Ellis, WHOI
Electronics Specialist	Rex Johnson, Univ. of Washington
NOAA Food Services	Hall P. Mefford, NOAA, National Marine Fisheries Service, Washington, D.C.
Photographer	Friedrich J. Hoelsz, NOAA/ Public Affairs

4. Scientific Party: Peoples Republic of China
RP-5OC-80, LEG I, East China Sea Experiment
Xiamen, PRC to Shanghai, PRC

Su Jilan	Second Institute, National Bureau of Oceanography, Hangzhou
Sui Liangren	Second Institute, National Bureau of Oceanography, Hangzhou
Ying Renfang	Second Institute, National Bureau of Oceanography, Hangzhou
Jiang Jingzhong	Second Institute, National Bureau of Oceanography, Hangzhou
Zhue Yongqi	Second Institute, National Bureau of Oceanography, Hangzhou
Guo Bingjuo	First Institute, National Bureau of Oceanography, Qingdao
Le Kentang	Oceanographical Institute of Academia Sinica, Qingdao
Li Fan	Oceanographical Institute of Academia Sinica, Qingdao
Zhou Fugen	Tong Ji University, Shanghai
Xu Dongyu	Institute of Marine Geology Ministry of Geology, Qingdao
Shi Maochong	Shantong College of Oceanography Qingdao
Chen Shunnian	Institute of Oceanographic Instrumentation, Tienjin
Xu Mingcai	Hydraulic Research Institute of Nanjing

Diplomatic Representative:

Christopher Syzmanski — United States Embassy, Beijing

5. Scientific Party: United States
RP-5-OC-80, LEG II, East China Sea Experiment
Shanghai, PRC to Shanghai, PRC

Chief Scientist	John A. Milliman, PhD Woods Hole Oceanographic Institute Woods Hole, Massachusettes
Associate Investigator	Robert C. Beardsley, PhD, WHOI
Associate Investigator	Jeffrey P. Ellis, WHOI
Associate Investigator	Richard Limeburner, WHOI
* Electronics Specialist	Roger L. Caron, EG&G, Waltham, Massachusettes
NOAA Coordinator	Alice C. Hogan, NOAA Research and Development Rockville, Maryland
* Photographer	Friedrich J. Hoelsz, NOAA Public Affairs Boulder, Colorado

* Transferred to Chinese research vessel SHUGANG #6 on 18 June 1980 enroute to Shanghai, PRC.

6. Scientific Party: Peoples Republic of China
RP-5-OC-80, LEG II, East China Sea Experiment
Shanghai, PRC to Shanghai, PRC

Sui Liangren	Second Institute, National Bureau of Oceanography, Hangzhou
Ying Renfang	Second Institute, National Bureau of Oceanography, Hangzhou
Jiang Jingzhong	Second Institute, National Bureau of Oceanography, Hangzhou
Zhu Yongqi	Second Institute, National Bureau of Oceanography, Hangzhou
Miao Yutian	Second Institute, National Bureau of Oceanography, Hangzhou
Guo Binghuo	First Institute, National Bureau of Oceanography, Qingdao
Le Kentang	Oceanographical Institute of Academia Sinica, Qingdao
Li Fan	Oceanographical Institute of Academia Sinica, Qingdao
Zhou Fugen	Tong Ji University, Shanghai
Xu Dongyu	Institute of Marine Geology Ministry of Geology, Quindao
Shi Maochong	Shantong College of Oceanography Qingdao
Xu Mingcai	Hydraulic Research Institute of Nanjing
Zhao Xucai	Institute of Marine Scientific and Technological Information, National Bureau of Oceanography

7. Scientific Party: United States
RP-5-OC-80, LEG III, East China Sea Experiment
Shanghai, PRC to Sasebo, Japan

Chief Scientist	Lawrence H. Larsen University of Washington
Electronics Specialist	William Parker, NOAA/PMEL
Mooring Specialist	Heinrick V. Miller University of Washington

8. Scientific Party: Peoples Republic of China
RP-5-OC-80, LEG III, East China Sea Experiment
Shanghai, PRC to R/V SHUGANG #6

Personnel transfer at 31° 02.6'N - 122° 16.0'E on 2 July 80

Sui Liangren	Second Institute, National Bureau of Oceanography, Hangzhoa
Ying Renfang	Second Institute, National Bureau of Oceanography, Hangzhou
Miao Yutian	Second Institute, National Bureau of Oceanography, Hangzhou
Le Kentang	Oceanographical Institue of Academia Sinica, Qingdao
Li Fan	Oceanographical Institute of Academia Sinica, Qingdao
Zhou Fugen	Tong Ji University, Shanghai
Xu Dongyu	Institute of Marine Geology Ministry of Geology, Qingdao
Xu Mingcai	Hydraulic Research Institute of Nanjing
Zhao Xucai	Institute of Marine Scientific and Technological Information, National Bureau of Oceanography

DEPARTMENT OF STATE

INCOMING

Amembassy, MANILA

TELEGRAM

CN: 2520W

ACTION: ECON

INFO: AMB, DCM, POL, POLR, CONS, DAO, ECOM, LGAT, LO, ADM, USIS, CPRP, JMAG, CEBU, AID, ADB, AGR, B&F, RMO, GSO, THU, DEA, PTR, RSO, RSC, ATO, RCO, CRO, TSO, CRU, CY/INIT

UNCLASSIFIED
Classification

NNNNVV MJA5670RA740
PP RUMVC
DE RUHGJAA #8704 1492146
ZNR UUUUU ZOV RUHGJAA0060 REROUTE OF RUWMFUA8704 1491731
RUMVC T NOAAS OCEANOGRAPHER
P 281630Z MAY 80
FM NOAACPM SEATTLE WA
TO RUHGJAA/NOAAS OCEANOGRAPHER
INFO RUMVC/AMEMBASSY MANILA RP
CM GRNC
BT
UNCLAS
OC-128/CPMX1
PASS TO CDR GELB, NOAA
A. MY 272205Z MAY 80.
B. AMEMBASSY BEIJING 270931Z MAY 80.
1. US STATE DEPARTMENT HAS THIS DATE GIVEN CLEARANCE FOR OCEANOGRAPHER TO PROCEED INTO CHINESE WATERS AND PORTS OF CALLS AT AMOY AND SHANGHAI AS PLANNED. DRAFT PROJECT PROJECT INSTRUCTIONS RP-5-OC-80, EAST CHINA SEA EXPERIMENT, DATED MAY 19, 1980, ARE HEREBY CONSIDERED FINAL AS MODIFIED BY REF A CONCERNING AMOY DEPARTURE DATE. YOU ARE AUTHORIZED TO PROCEED WITH EAST CHINA SEA EXPERIMENT.
2. ARE YOU IN RECEIPT OF REF B? PLEASE ADVISE.
BT
#8704

CRU

UNCLASSIFIED
Classification

APPENDIX (B)

INCOMING
Amembassy, MANILA

TELEGRAM

CN: 2430W

ACTION:
ECON-4

INFO:
AMB
DCM
POL
POLR
CONS
DAO
ECOM
LGAT
LO
ADM
USIS
CPRP
JMAG
CEBU
AID
ADB
AGR
B&F
RMO
TSO
THU
DEA
PER
RSO
RSC
ATO
RCO
CRO
TSO

CRU ——
CY/INIT
6DC

UNCLASSIFIED
Classification

AMEMBASSY

VV MJA348ORB164
PP RUMVC
DE RUHPSGG #1386 1482353
ZNR UUUUU
P 272205Z MAY 80
FM NOAACPM SEATTLE WA
TO RUMVC /AMEMBASSY MANILA
ZEN/NOAAS OCEANOGRAPHER
CM GRNC
BT
UNCLAS
OC-126/CPMX1
PASS TO CDR ED GELB, NOAA
A.EAMEMBASSY 270904Z MAY 80 (attached)
1.EYOU ARE AUTHORIZED TO PROCEED WITH PLANS OF REF A. OCEANOGRAPHER AUTHORIZED TO DEPART MANILA 29 MAY AND PROCEEDE TOWARD PORT OF AMOY, PRC. UNTIL CLEARANCE IS OBTAINED VIAE STATE DEPARTMENT.WE WILL NOT AUTHORIZE OCEANOGRAPHER TO APPROACHE CLOSER THAN 12 MILES OF CHINESE MAINLAND. WE ARE EXPECTINGE CLEARANCE SOON AND WILL ADVISE. WE AGREE YOUR 29 MAY MANILAE DEPARTURE IS NECESSARY TO KEEP SCHEDULE AND WE ANTICIPATEE CLEARANCE PRIOR TO YOUR SCHEDULED AMOY 31 MAY ARRIVAL.
2.ELATEST MESSAGE FROM AMEMBASSY BEIJING ADVISES THAT CHINESE SCIENTIST IN AMOY WILL BOARD VIA LAUNCH. EMBOFF SZYMANSKI OF AMEMBASSY BEIJING IS ENROUTE TO AMOY TO OBTAIN ADDETIONAL INFO. ALL CONTACTS FOR OCEANOGRAPHER PORT CALLS TO BE DIRECTED TO THE BRANCHES OF CHINA OCEAN SHIPPING COMPANY IN PENAVICO SHANGHAI AND PENAVICO XIAMEN (AMOY) RESPECTIVELY.
3.ECDR GELB HAS NOAA/PMC APPROVAL TO PROCEED TO SHANGHAI TOE ASSIST WITH ADVANCE ARRANGEMENTS AS SOON AS MANILA RESPONSIBILITIES ALLOW. KEEP PMC ADVISED OF PLANS.
BT
#1386

1980 MAY 28 AM 8 16

CRU

UNCLASSIFIED
Classification

APPENDIX (C)

INCOMING
Amembassy, MANILA

DEPARTMENT OF STATE

TELEGRAM

CN: 2384W

ACTION:
E/c 4
INFO:
AMB
DCM
POL
POLR
CONS
DAO
ECOM
LGAT
LO
ADM
USIS
CPRP
JMAG
CEBU
AID
AG
B&F
RMO
GSO
THU
DEA
PER
RSO
RSC
ATO
RCO
CRO
TSO
CRU
CY/INIT

UNCLASSIFIED
Classification

ACTION COPY

Action Taken: E.R.
No action necessary:
Date: 5/28/80 Inits:

1980 MAY 27 PM 5 40

CRU

NNNNVV MJA213NGA466
OO RUMVC
DE RUMJPG #4817 1480935
ZNR UUUUU ZZH
O R 270931Z MAY 80
FM AMEMBASSY BEIJING
TO RUEHC/SECSTATE WASHDC IMMEDIATE 4318
RUMVC/AMEMBASSY MANILA IMMEDIATE 1108
RUMJSA/AMCONSUL SHANGHAI 98
BT
UNCLAS BEIJING 4817

DEPT PASS NOAA/FERRIS WEBSTER AND ALICE HOGAN

DEPT FOR OES/SCT AND EA/PRCM; MANILA PASS OCEANOGRAPHER

E.O. 12065: N/A
TAGS: TATT, CH, US
SUBJ: VISIT OF NOAA SHIP OCEANOGRAPHER: PORT CALL AT XIAMEN

REF: A. STATE 134741; B. BEIJING 4734; C. BEIJING 4793

1.OEMBOFF SZYMANSKI IN FUZHOU HAS OBTAINED THE FOLLOWINGO (PARTIAL) INFORMATION REQUESTED REF A:O
1)OCALL SIGN XIAMEN/XSM FREQUENCY 8453 KC AT 0900 HOURSO TO 1300 HOURS, 4314 KC AT 1300 HOURS TO 0900 HOURS, 500 KC FOR 24 HOURS;
2)OWHEN APPROACHING XIAMEN PORT PASS THROUGH CHANNEL BETWEENO CHINGSU AND JIXU ISLANDS TO PILOT ANCHORAGE 242540 NO 1180320 E.O

2.ONBO HAS JUST NOTIFIED THE EMBASSY THAT QTE. TO GUARANTEEO THE SUCCESS OF THE SURVEY AND RESEARCH WORK, THE CHINESEO SIDE IS PREPARED TO ADD ANOTHER GEOPHYSICAL EXPLORATIONO VESSEL, THE FENDOU (STRUGGLE) UNQTE. ROYO
BTO
#4817

UNCLASSIFIED
Classification

APPENDIX (D)

```
VZCZCMAA *
OO RUMJSA RUMJPG RUWMFUAO
DE RUMJMA #0165 148 **
ZNR UUUUU ZZH                                        CLASS: UNCLASSIFIED
O 272904Z MAY 80                                     CHRGE: PROG 5/17/80
FM AMEMBASSY MANILA                                  APPRV: ECOM:EWKEMPE
TO RUMJSA/AMCONSUL SHANGHAI NIACT IMMEDIATE 2882     DRFTD: ECOM:EJRANKIN/FPO
INFO RUMJPG/AMEMBASSY BEIJING IMMEDIATE 1228         CLEAR: ECOM
RUWMFUA/DPMC NOS NOAA SEATTLE WA IMMEDIATE           DISTR: ECOM4 AMB DCM
OEN/NOAAS OCEANOGRAPHER                                     OCEANOGRAPHERO
BT                                                          CPU JA
UNCLAS MANILA 10165
```

E.O. 12065: N/A. B/WS

TAGS: TOCY,OCLR,CH,US

SUBJECT: NOAA SHIP VISIT TO CHINA

1. FOLLOWING MESSAGE SENT BY TELEX TO CHINA OCEAN SHIPP-O ING AGENCY, AMOY. QUOTE: NOAA SHIP OCEANOGRAPHER PLANS ARRIVAL OFF PORT OF AMOY, PRC 0500 - 0800 LOCAL 31 MAY 1980 FOR PURPOSE OF EMBARKING REPRESENTATIVES OF PRC NATIONAL BUREAU OF OCEANOGRAPHY. PLEASE ADVISE AS SOON ASO POSSIBLE REGARDING PILOTAGE; COMMUNICATION WITH PORT AUTHORITIES; LOCATION AND METHOD OF BOARDING SCIENTISTS; CUSTOMS, IMMIGRATION, AND QUARANTINE CLEARANCES. ANCHOR-AGE PREFERRED WITH DEPARTURE FROM AMOY AS SOON AS SCIEN-TISTS ARE ABOARD AND AMENITIES ARE COMPLETED. SHIP'S PARTICULARS: DRAFT: 6.0 METERS, NRT: 1,095, LENGTH O/A; 92.4 METERS, DISPLACEMENT: 4,233 TONS, GRT: 3,701, HULL NR: R101. THE SHIP WILL HAVE APPROXIMATELY 11 OFFICERS, 63 CREW, AND 15 SCIENTIST ABOARD. REGARDS. UNQUOTE.

2. REQUEST AMERICAN CONSUL CHECK WITH COSA, AMOY TO VERIFYO ARRANGEMENTS AND RELAY RESULTS TO ALL ADDEES THRU NORMAL COMMUNICATIONS CHANNELS. EARLY RESPONSE WOULD BE APPRECI-ATED.

MURPHY
BT
#0165

NNNN

APPENDIX (E)

APPENDIX (F)

D R A F T

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102

D R A F T

May 19, 1980 OA/CPM11/GLF

Commanding Officer
NOAA Ship OCEANOGRAPHER

PROJECT INSTRUCTIONS: RP-5-OC-80, East China Sea Experiment

1. INTRODUCTION

Sediment dynamics involve the complex interaction of a number of processes: the physical regime (current and wave regime); biological communities and their effects upon the substratum (and vice versa), both physical and chemical; the biochemical and geochemical alteration of organic and inorganic sedimentary constituents; the role and mode of input of sedimentary particles. A satisfactory understanding of the sedimentary environment, therefore, necessitates delineation of these processes and their relative importance upon the resultant system.

The East China Sea offers a unique environment for study for two major reasons: 1) the East China Sea is influenced directly by the Yangtze River, fourth largest in the world in terms of sediment influx to the ocean (500 x 10^6 tons/year) and third largest in water discharge (7.5 x $10^{11} m^3/yr$); 2) the continental shelf is extremely wide (locally 600 km), thereby reaching the dimensions of epicontinental seas, which were so prominent in ancient environments, but which have few modern analogs. Moreover, because the Yangtze drains a region of continental collision (where there are no examples on other continents), study of the area represents an almost unique chance to examine a modern diagenetic analog of ancient rivers which drained onto North America in the Paleozoic.

In spite of the large sediment influx to the East China Sea, sedimentological studies show that only the coastal zone and inner shelf contain modern fine-grained sediments. The outer shelf is covered with a relict sand, deposited during the last lower strand of sea level, at least 10,000 years ago. Clearly the sedimentation patterns in this area reflect the current and wave regime in the area, although few long-term current measurements have been made.

Briefly, the general circulation over the continental shelf of the East China Sea appears to be controlled by both nearshore and offshore processes, in addition to seasonal atmospheric forcing. The Yangtze River clearly is the major freshwater source and the very high runoff in late spring and summer creates a large (but relatively thin) surface plume of brackish water (S 27 o/oo), which can extend over 250 km from the estuary. The northward flowing Taiwan Straits Current, partially driven by the northward summer monsoon winds and by the Kurishio, advects the Yangtze plume towards northeast. During the winter, Yangtze runoff is much smaller, the strength of the Taiwan Straits current is reduced, and the monsoonal winds are predominantly southward; as a result, the Yangtze surface plume extends only 20 to 40 km directly offshore from the estuary. A distinct salt wedge exists in the estuary throughout the year.

Studies in such an area clearly would enhance our knowledge about sediment-water-organism interactions in areas of unusually high sedimentation and sediment mobility. Without question, the biological-geochemical, and sedimentological environments depend heavily upon the depositional regime, but the interdependence of these parameters is presently unknown. In some areas on the shelf, these processes may have a greater influence than the current and wave regime, although where (and how) is not yet documented.

This project will attempt the delineation of the various oceanographic processes in the East China Sea as they affect the sedimentary regime. It represents a cooperative effort of Chinese and U.S. scientists, and involves specialists in marine geology, biological oceanography, marine geochemistry, and physical oceanography.

2. OPERATING AREA

The operating area is confined to the waters of the East China Sea approximately between Okinawa and China, with most of the work being restricted to the continental shelf off the Yangtze River. Attached figures illustrate the mooring locations and CTD sampling stations. Mooring deployments will be made on transit from Amoy.

3. SCHEDULE

Leg I	Depart Amoy	June 1
	Arrive Shanghai	June 4
Leg II	Depart Shanghai	June 9
	Arrive Shanghai	June 29
Leg III	Depart Shanghai	July 2
	Arrive Sasebo	July 6

4. OPERATIONS

4.1 The basic purpose of this project is to monitor the hydrographic and current regime of the East China Sea shelf adjacent to the Yangtze River, as well as to delineate the sedimentology and recent history/morphology of the shelf. To accomplish this, there will be three ships obtaining data: The OCEANOGRAPHER and two Chinese ships. One Chinese ship will be confined to the Yangtze estuary, the other will work primarily in coastal waters (landward of 123°30'E). The following operations are planned for the OCEANOGRAPHER:

4.11 Deployment of 3 current-meter arrays for a period of approximately one month.

4.12 Seismic profiling of the shelf. This work will include profiling near-shore areas as well as the middle and outer shelf. Sparker, Uniboomer and side-scan sonar will be used as well as the ship's 3.5 KHz echo-sounder. This work will be done primarily during Leg II of the cruise.

4.13 Hydrographic survey of the Yangtze plume and shelf waters. June is a period of high runoff for the Yangtze River, and we expect influences of this runoff to be felt as far seaward as the outer shelf. The hydrographic survey planned for Leg II of the cruise will allow us three sequential quasi-synoptic views of the movement of plume and its interaction with offshore waters. We plan on using a CTD combined with light transmissometer. In order to facilitate maximum coverage of area, we envision using XBT's at intervening stations, thus lessening the demand for the ship to stop so often. During a number of CTD stations, we also will take water cast stations, using the 5-l bottles supplied by the ship. As water depths are shallow in this area (40-90 m, for most part), hydrocasts should be extremely quick.

4.14 Time-series stations. At one location of the inner shelf, we plan to occupy a station for one tidal cycle (13 hours), during which we will make CTD lowerings every hour and hydrocasts every other hour. This will be done on Leg II of the cruise.

4.15 Biologic sampling. Neuston samples will be taken at the hydrographic stations during the leg from Shanghai to Sasebo.

4.2 Itinerary

Leg I	June 1	Depart Amoy with Chinese scientific personnel and equipment for Shanghai.
	June 2-3	Deploy three current meter arrays on the outer and inner shelf of the East China Sea; test seismic equipment.
	June 4	Arrive Shanghai
Leg II	June 9	Depart from Shanghai and begin hydrographic lines onshore-offshore eastward from 123°30'E. At the end of this survey, one time-series station will be occupied (over one tidal cycle) at or near the inner current meter station.
	June 13	End hydrographic survey and begin seismic studies, using high-resolution seismic equipment, low-frequency echo sounding and side-scan sonar.
	June 18	End seismic survey; transfer EG&G technician to Chinese ship and re-occupy hydrographic stations.

	June 22	End hydrographic survey and re-initiate geophysical survey.
	June 25	End geophysical survey and re-occupy hydrographic stations.
Leg III	July 2-6	This short leg is designed to retrieve the current meter moorings deployed during Leg I, as well as to re-occupy hydrographic stations. At the stations, neuston samples will be taken. Records and scientists will be off-loaded in Sasebo. If Chinese scientists are embarked for the retrieval, they will be transferred to a PRC ship at sea upon completion.

4.3 Moorings

a. Deploy three subsurface current meter moorings from PMEL on the leg, Amoy to Shanghai, at the following approximate locations (see Figure). The first is on the outer edge of the continental shelf. The second is outside of, and the third inside of the Yangtze River plume. A special tripod will be colocated with the third mooring. Location of the plume will be determined from CTD observations along the transit line.

	Latitude	Longitude	Depth
1.	29°00'N	127°00'E	180 m
2.	31°20'N	124°45'E	60 m
3.	31°30'N	123°30'E	40 m

b. Deploy a special bottom tripod from University of Washington near the site of the third current meter mooring.

c. Recover moorings and tripod on return leg, Shanghai to Sasebo.

4.4 Hydrographic Measurements

Conduct CTD measurements along the axis of the mooring line beginning in the Okinawa Trough and running northwest through the East China Sea to the 20 meter contour east of the mouth of the Yangtze River (Figure). The Chief Scientist will specify the priority and sequence of these stations which are located in Chinese waters. Station spacing will be roughly 15 miles between the 20 m contour and mooring #2, and about 35 miles between moorings #2 and #1. Offshore stations will be at about 200 m, 500 m, and 1000 m depths with two more stations in excess of 1000 m crossing the Kuroshio. The eastern most station will be at about 28°30'N, 127°50'E.

The approximate sequence will be to sail from Amoy on June 1 and occupy the CTD stations up to mooring 1. Mooring 1 would be deployed on the morning of 2 June. CTD stations would then continue until the plume is located (approx. 27°/oo at surface). The ship will deploy mooring 2 outside the plume on the morning of 3 June. CTD stations would continue to the 20 m station, if allowed. Otherwise, they stop at 123°30'E at mooring 3.

The UW tripod will be deployed following mooring 3 at a nearby location.

The ship's Plessey system will be used for all CTD operations. Niskin bottle water samples will be taken for calibration purposes on every other CTD cast. Approximately 15-20 CTD casts will be made on the transect.

4.5 Biological Observations

On Leg III, Shanghai-Sasebo, near surface plankton samples are to be collected at each of the CTD stations. Nets will be lowered into the water while the ship is stopping for the CTD station and can be done at any location on the ship not to interfere with the CTD operation.

No additional time is required, and 1-2 people can do the operation. Two additional people will participate to do this work: Dr. George Grice of Woods Hole and one of the Chinese scientists. The Chief Scientist will provide more specific details on this work.

4.6 Geological Observations

On Legs I and III, 3.5 KHz profiles shall be obtained in the Okinawa Trough and along the west wall (continental slope) during and along the CTD transect. No additional time is required, and no scientists will be on board specifically for this task. This work is requested by Dr. George Keller, Oregon State University, per attached letter.

5. PERSONNEL

Leg I	Glenn Cannon, Chief Scientist	PMEL
	David Pashinski	PMEL
	William Parker	PMEL
	Rick Miller	UW
	Richard Steinberg	UW
	Rex Johnson	UW
	6-12 TBN	PRC

Rick Miller will be on board from the Sulu Sea experiment. The rest will join the ship at Manila. The PRC scientists will board at Amoy.

NOAA Public Affairs Officer, Al Mark, has arranged for a number of press people to participate on Leg I, Manila to Shanghai. These include representatives from:

New York Times	(1)
Wall Street Journal	(1)
NOAA Public Affairs	(1)
CBS	(2-3, one may be female)

Leg II	John Milliman, Chief Scientist	WHOI
	Jeffrey Ellis	WHOI
	Robert Beardsley	WHOI
	Richard Limeburner	WHOI
	Roger Caron	EG&G
	Alice Hogan (F)	NOAA
Leg III	Glenn Cannon, Chief Scientist	PMEL
	William Parker	PMEL
	Lawrence Larson	UW
	TBN	UW
	George Grice	WHOI
	4-6 TBN	PRC

The PRC scientists will probably have to be transferred at sea, preferably at the location of mooring 3.

6. EQUIPMENT

6.1 The OCEANOGRAPHER will provide:

a. Hydrowinch with slip rings
b. Niskin bottles
c. Rosette sampler with calibrated thermometers
d. Copenhagen standard water
e. Recently calibrated CTD system
f. Recently calibrated meteorological instruments
g. Navigation equipment, including satellite and Omega systems
h. Fathometer and necessary supplies to make bathymetric surveys in 1500 meters of water
i. CTD data logger tapes (for Plessey DDL) and field log forms for 200 CTD casts
j. XBT probes (T-4) and paper

6.2 The scientific party will provide:

a. Side Scan Sonar
b. Sparker/Uniboomer system
c. EPC graphic recorders and paper
d. Suspended matter filtering system
e. Current meters
f. Hardware for current meter arrays
g. Acoustic releases
h. Neuston nets
i. Bridge logs
j. Charts

The list of equipment is still not complete. Some equipment was loaded at Seattle and San Diego, and some is being air shipped to Manila for loading.

6.3 In consideration of the cost and complexity of equipment used in this study, all connections, shackles and attaching methods will be concurred upon by the FOO, CBM, and Chief Scientist before placing over the side.

7. MISCELLANEOUS

7.1 Modification of detail in these Instructions may be made in the field as appropriate by the Chief Scientist with the concurrence of the Commanding Officer.

7.2 Monthly progress sketch shall be submitted at the scale of DMA Chart 94027. Report monthly accomplishments on NOAA Form 12-8b, Work Identification: Continental Shelf Surveys.

7.3 The bridge is requested to assist the Chief Scientist by completing the standard log (provided by the scientific party) with specific information pertaining to exact station location, time of sampling, weather, etc.

7.4 All samples and data, both processed and unprocessed, will be shared by Chinese and American scientists. Analyses will be done in both Chinese and U.S. labs. It is planned to set up a central data center, but the exact location of this data center has not been designated.

7.5 The Commanding Officer and Chief Scientist shall submit a joint Cruise Report in accordance with Section XI of NOAA Directive 17-17. A copy of the Cruise Report must be received by the Department of State within 30 days following the end of the project.

7.6 Routine communications are to be maintained with PMC. Radio messages will be handled by KVJ. With concurrence of the Commanding Officer, the Chief Scientist may communicate operational reports and problems to cognizant onshore personnel as necessary to ensure successful completion of the mission at a mutually agreeable radio schedule.

8. WEATHER INFORMATION

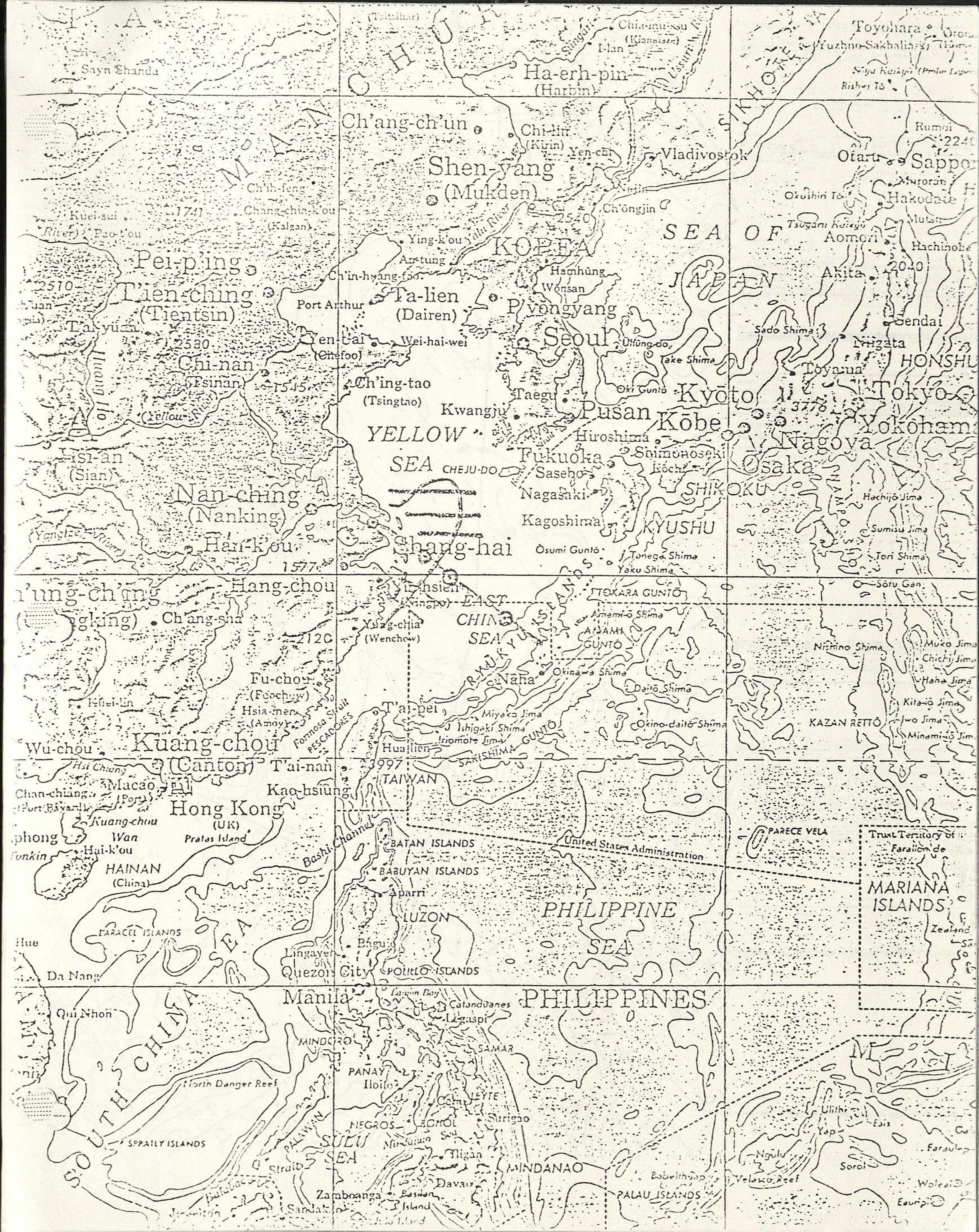
8.1 Weather information from RATT, facsimile, CW weather broadcasts or other appropriate means shall be copied twice daily for planning at-sea scientific operations.

8.2 Regular six-hourly synoptic weather observations will be recorded on NOAA Forms 72-1 and 72-4 and transmitted to appropriate radio stations in the Far East. Refer to Publication, "Radio Stations Accepting Ships' Weather Observations."

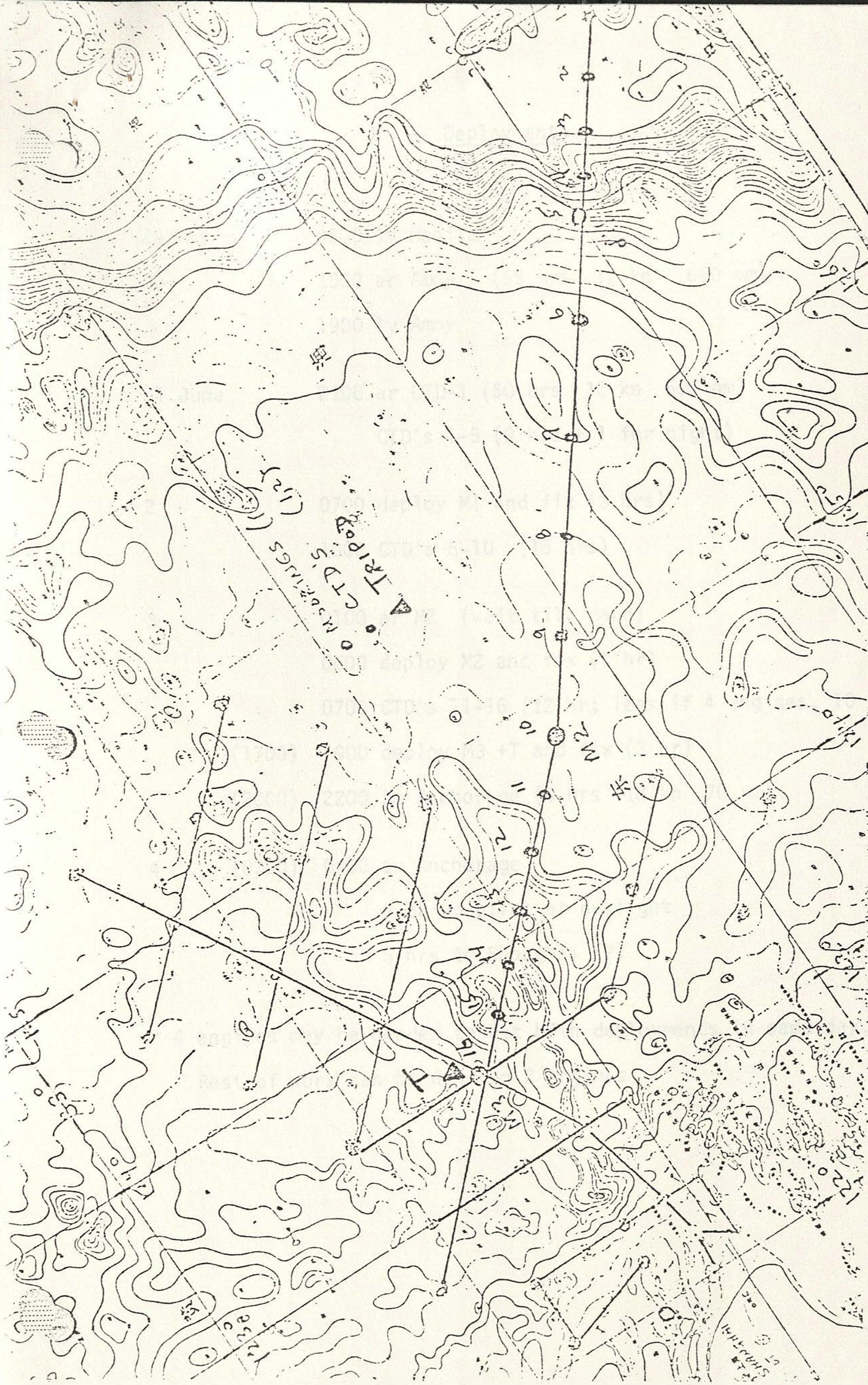
E. A. Taylor
Rear Admiral, NOAA
Director, Pacific Marine Center

for Dr. John Apel
Director, Pacific Marine
Environmental Laboratory

for John Milliman
Woods Hole Oceanographic Institute



MANCHURIA
Sayn Shanda
Ha-erh-pin (Harbin)
I-lan
Toyohara
Ch'ang-ch'un
Chi-lin (Kirin)
Yen-chi
Vladivostok
Otaru
Sapporo
Rumoi
Shen-yang (Mukden)
Ch'ih-feng
Chang-chia-k'ou (Kalgan)
Kuei-sui
Pao-t'ou
Ch'ongjin
Hakodate
Aomori
Hachinohe
Ying-k'ou
Yalu River
KOREA
SEA OF JAPAN
Akita
Pei-p'ing
T'ien-ching (Tientsin)
Ch'in-huang-tao
Port Arthur
Ta-lien (Dairen)
Hamhung
Wonsan
P'yongyang
Seoul
Sendai
Niigata
Sado Shima
Take Shima
Yen-t'ai (Chefoo)
Wei-hai-wei
Chi-nan (Tsinan)
Ch'ing-tao (Tsingtao)
Taegu
Kwangju
Pusan
Kyoto
Toyama
Tokyo
HONSHU
Yokohama
Nagoya
Kobe
Osaka
YELLOW SEA
CHEJU-DO
Hiroshima
Shimonoseki
Fukuoka
Sasebo
Nagasaki
Kagoshima
SHIKOKU
KYUSHU
Hsi-an (Sian)
Nan-ching (Nanking)
Han-k'ou
Shang-hai
Yangtze River
Yellow River
Hachijo Jima
Tori Shima
Hang-chou
Ning-po
EAST CHINA SEA
TOKARA GUNTO
AMAMI GUNTO
Ch'ang-sha
Yung-chia (Wenchow)
Naha
Okinawa Shima
Daito Shima
Fu-chou (Foochow)
Hsia-men (Amoy)
Kuei-lin
T'ai-pei
Miyako Jima
Ishigaki Shima
Okino-daito Shima
SAKISHIMA GUNTO
KAZAN RETTO
Iwo Jima
Wu-chou
Kuang-chou (Canton)
Macao (Port.)
Hong Kong (UK)
T'ai-nan
Kao-hsiung
TAIWAN
Formosa Strait
PESCADORES
Hualien
Chan-chiang (Port Bayard)
Kuang-chou Wan
Pratas Island
Hai-k'ou
HAINAN (China)
Bashi Channel
BATAN ISLANDS
BABUYAN ISLANDS
United States Administration
PARECE VELA
Trust Territory of
MARIANA ISLANDS
Aparri
LUZON
PHILIPPINE SEA
PARACEL ISLANDS
Hue
Da Nang
Lingayen
Baguio
Quezon City
POLILLO ISLANDS
Manila
Legaspi
PHILIPPINES
Qui Nhon
SOUTH CHINA SEA
MINDORO
SAMAR
PANAY
Iloilo
LEYTE
Cebu
North Danger Reef
NEGROS
BOHOL
Surigao
SPRATLY ISLANDS
PALAWAN
SULU SEA
Iligan
MINDANAO
Davao
Zamboanga
PALAU ISLANDS
Ulithi
Yap
Sorol
Ngulu
Velasco Reef
Woleai


TRIPOD
M2
T

Deployment

28 May		0800 lv Manila
30		1500 ar Amoy (55 hrs 12 kn 660 nm)
		1900 lv Amoy
1 June		2100 ar CTD-1 (50 hrs 12 kn 600 nm) CTD's 1-5 (9 hrs + 1 for night)
2		0700 deploy M1 and fix (3 hrs)
		1000 CTD's 6-10 (15 hrs)
3		0100 ar M2 (wait till dawn)
		0600 deploy M2 and fix (1 hr)
		0700 CTD's 11-16 (12 hr; less if 4 engines, 10 hr)*
	(1700)	1900 deploy M3 +T and fix (3 hr)
	(2000)	2200 to Anchorage (6 hrs 12 kn 70 nm)
4	(0200)	0400 ar Anchorage pick up pilot at daylight
		5 hrs to Shanghai (?)

* 4 engines may be needed to get both deployments in same day. Rest of work can be done on 2 engines

Recovery (order M2-M3-M1)**

day		
1	1300	lv Shanghai
	1800	drop Pilot
2	0500	ar Mooring 2 and recover
	0800	steam to Mooring 3 and Tripod (4 engines)
	1500	recover M3 and T
	1800	(Transfer Chinese to Chinese vessel at M3)*
	1900	7 CTD's to M2 location (#16-10) 13 hrs.
		5 CTD's to M1 location (# 9-5) 15 hrs.
3	2300	4 CTD's off shore and return (#4-1) 13 hrs.
4	1200	ar Mooring M1 and recover
	1500	lv for Sasebo
5	1500	ar Sasebo (285 nm 12 kn 24 hrs.)

* Chinese would be onboard for recovery of M2 and M3 only, and not for any CTD's. This is my preferred plan if they can or cannot go to Sasebo. No time is spent waiting for daylight.

** Preferred sailing from Shanghai is 2 July in order to get 30 days record on moorings M3 and M2.

Recovery (order M3 + T, M2, M1)

day		
1	1300 lv Shanghai	
	1800 drop pilot	
2	0000 ar M3	(6 hrs. wait)
	0600 recover M3 + T	
	0900 CTD's to M2 13 hr	
	2200 ar M2	(8 hrs. wait)
3	0600 recover M2	
	0800 CTD's to M1 15 hrs.	
	2300 ar M1	
	CTD's #4-1 offshore and back 13 hrs.	
4	1200 ar M1 and recover (3 hrs)	
	1500 lv for Sasebo	
5	1500 ar Sasebo 24 hrs.	

School of Oceanography
Oregon State University
Corvallis, Oregon 97331 (503) 754-3504

16 April 1980

MEMORANDUM

TO: Glenn Cannon

FROM: George H. Keller *George*

RE: 3.5 kHz Profiles Okinawa Trough Area

As I mentioned the other day in our phone conversation it would be very desirable to obtain some 3.5 kHz profiles in the Okinawa Trough and along its west wall if this U.S.-China study is going beyond this initial cruise. If we are going to move out onto the continental slope and into the Trough in the following years, it is essential to obtain some information ahead of time regarding sediment accumulation in this area.

Since the OCEANOGRAPHER will be in the area, I want to reiterate my request that an attempt be made to run a 3.5 kHz profile from the Trough up over the west wall. Obviously, if there is any available time 2 to 4 profiles would be very desirable. If the ship comes into the area from east of the Trough, by all means get a 3.5 kHz profile across the entire area.

Even if we should not get back in future years, these profiles would probably be helpful to us in our present study in that they might shed some light on where the sediments from the rivers are being deposited. All help is appreciated.

sgh
cc: J. Milliman
A. Hogan

DR.R.C.ALLER
Dept. of Geophysical sciences
University of Chicago
5735 S. Ellis Ave.
Chicago,Illinois
60637

30 June 1980

FIELD REQUEST

TO:Commanding officer
NOAA Ship OCEANOGRAPHER

FROM:Robert C. Aller,Ph.D.

RE:Surface Water Samples

Please take surface water samples at approximately the following positions while moving off the shelf:

123°30' E
124°30' E
125°30' E
126°30' E

(NOTE:Try to get a range of salinities between about 15%-35%.Start before the tripod station.)

These samples should be treated as follows:

1)Lower bucket and collect sample after initial rinse.

2)Take up 50 ml. into syringe sampler and filter through filter holder.The holder has already been loaded.Discard this first sample,as it is only a rinse.

3)Filter 100 ml of sample water into bottle.

4)Label bottle with the ship's position.

5)Store bottle in cold dark place,preferably a refrigerator, making sure cap is screwed on tightly.

6)Please ship all samples to me.

APPENDIX (I)

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102

March 18, 1980 OA/CPM11/GLF

TO: Distribution List

FROM: Eugene A. Taylor, RADM, NOAA
Director, Pacific Marine Center

SUBJECT: Project Instructions - S-T701-OC-80, Deep Sea Tracklines

Enclosed, for your information, is a copy of subject Project Instructions for a National Oceanic and Atmospheric Administration vessel operating in your area. If you have any questions about these Instructions or the ship's operating schedule, please contact my Chief of Operations at the above address or call (206) 442-4548.

Enclosure

Distribution List:

C.O., OCEANOGRAPHER (Original +2)
CPM11 (3)
CPM1
C3
C351
C7
C71
Lewando, NAVOC
Stillwaugh, EDS
Cannon, PMEL
Holbrook, PMEL
CAPT Taggart, C7

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102

March 17, 1980 OA/CPM11/GLF

Commanding Officer
NOAA Ship OCEANOGRAPHER

PROJECT INSTRUCTIONS: S-T701-OC-80, Deep Sea Tracklines

1. Tracklines to collect sounding data for the Defense Mapping Agency (DMA) shall be run between Kwajalein and the Sulu Sea, Manila and Okinawa, and Shanghai to Seattle. Also, sounding and navigational information should be observed while piloting in coastal and port areas. This information is needed for correction of DMA charts and publications and dissemination to navigators through Notices to Mariners.

2. Work shall be in accordance with Publication 606, "Guide to Marine Observing and Reporting." Pages 6 and 7 contain detailed instructions on collecting and reporting sounding data in DMA format. Pages 9 through 13 contain information and illustrative material on reports desired on coasts and their approaches and on ports and harbors.

3. Collected data (annotated fathograms, navigation logs, reports) should be transmitted to:

Director
Defense Mapping Agency Hydrographic Center
Attention: Code NV
Washington, DC 20390

Copies of the transmittal letters are to be provided to PMC.

4. In keeping with the agreement with the Peoples Republic of China, no work is to be done within the 20 meter depth contours off the coast of China.

5. Work on this project shall be on a not-to-interfere basis to the assigned research projects.

6. The satellite navigation system shall be used and supplemented by any other navigation systems and methods available.

7. A monthly progress sketch shall be submitted at an appropriate scale. Report monthly accomplishments on NOAA Form 12-8b, Work Identification, "Deep Ocean Surveys."

E. A. Taylor
Rear Admiral, NOAA
Director, Pacific Marine Center

APPENDIX (J)

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Pacific Marine Center
1801 Fairview Avenue East
Seattle, Washington 98102

November 29, 1979 OA/CPM11/GLF

Commanding Officers/Masters
NOAA Ships OCEANOGRAPHER, DISCOVERER, SURVEYOR,
MILLER FREEMAN, FAIRWEATHER, RAINIER, TOWNSEND CROMWELL,
DAVID STARR JORDAN, OREGON, JOHN N. COBB

PROJECT INSTRUCTIONS: Integrated Global Ocean Station System (IGOSS)

1.0 GENERAL

1.1 The United States, with NOAA as the lead agency, has participated in the Integrated Global Ocean Station System (IGOSS) project since its inception in 1972. All PMC ships taking bathythermograph data will continue to participate in the IGOSS project, following the procedures outlined by these instructions. All previous instructions regarding bathythermograph observations are superseded by these instructions.

2.0 INTRODUCTION

IGOSS is a service program intended to facilitate the exchange of data for ocean purposes and contribute to the provision of worldwide information on and prediction of the state of the ocean.

3.0 DATA COLLECTION

3.1 IGOSS is mainly concerned with the worldwide collection, exchange and processing of sea temperature data received, either in the form of BATHY reports via telecommunications, or in log form submitted via mail.

3.2 Temperature and depth data will be transmitted to IGOSS data collection centers through Fleet Numerical Weather Central via coastal radio stations. These centers will thereupon enter collectives or observations in bulletin form into the World Weather Watch (WWW)/Global Telecommunications System (GTS). All data entering the GTS must be in the internationally adopted BATHY code form, NOAA Form 77-22. Shipboard procedures for logging, encoding, and transmitting data will be in accordance with "Instructions for Preparing the Bathythermograph Log," dated February 1972.

3.3 XBT casts will be taken twice daily, preferably at 12-hour intervals. Casts are to be made only in geographical areas where water depth exceeds 200 fathoms, unless PMC directs otherwise.

3.4 The preferred BATHY observation times are within one hour of: 0000, 0600, 1200, and 1800 GMT; however, observations made at any hour will be accepted.

3.5 One STD, CTD, or Nansen cast per day, when available, should be encoded and transmitted in the HISTD code format in accordance with the Coast Guard Manual CG-410, "Manual of Oceanographic Observations." This is required only when these casts are being made on the assigned project. Special casts for IGOSS are not mandatory.

4.0 COMMUNICATIONS

4.1 Each observation should be transmitted in the BATHY code to Fleet Numerical Weather Central, Monterey, California. OBS METEO, Washington, DC, is within this system and will automatically receive copies of the data. These data should be available at the IGOSS analysis center within 24 hours of the observations.

4.2 Transmission should be made only during normal duty hours of the ship, and at times which will not interfere with the transmission of meteorological reports.

5.0 TRANSMITTAL OF DATA

5.1 Unless required by the Chief Scientist on research projects, original XBT logs and graphs are to be sent to the National Oceanographic Data Center (NODC). Copies of transmitting letters should be sent to Pacific Marine Center. Transmitting letters should state whether or not digitized output is available.

6.0 MISCELLANEOUS

6.1 XBT observations on regular assigned projects are to be included in the Monthly Accomplishment Report for that particular project. A separate Form 12-8b for IGOSS will be submitted for all XBT casts made independently of any other project.

E. A. Taylor
Rear Admiral, NOAA
Director, Pacific Marine Center