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Technical Meeting for the Co-operative Study Cruises
In the Yellow Sea Marine Basin
For the UNDP/GEF Yellow Sea Project
Qingdao, China, 17-18 October 2005

Workplan for the Co-operative Study Cruises In the Yellow Sea Marine Basin

1 BACKGROUND

Based on the discussion and agreements during the preparation phase of the project (PDF-B), Joint Cruise activities were included in the YSLME Project Document, which was approved by the Government of China (8 August 2002), and the Government of Korea (23 July 2002). The first Project Steering Committee meeting approved the Implementation Plan of the project, during which the number of cruises originally planned was reduced from 6 to 2, due to changes in the financial conditions from within, and externally to the Project over the past 5 years.

Following the decisions of the Project Steering Committee (PSC), the Regional Working Groups (RWGs) and the Regional Scientific and Technical Panel (RSTP) further discussed the details of co-operative monitoring cruises, and two cruises were subsequently planned to be undertaken in the Yellow Sea marine basin, although excluding the territorial sea areas of the participating countries.

2 OBJECTIVES OF THE CRUISES

The main objectives of the co-operative study cruises are:

(i) To provide basin-wide, data and information for the Yellow Sea covering all components identified in the Implementation Plan of the project, and based on the data and information gaps identified by the Regional Working Groups,;

(ii) To provide data and information that will be used, together with other existing data and information, in the preparation of the Transboundary Diagnostic Analysis (TDA), in particular the data and information covering the entire Yellow Sea; and

(iii) To prepare necessary baselines of the status of the Yellow Sea environment at start of the project implementation, when combined with all data and information

available to the project. The baseline information will be used in the later stage as one of the indicators for the evaluation of the project.

3 RESEARCH VESSEL

Following the discussions and agreements of the Regional Working Groups and the Regional Scientific and Technical Panel, the research vessel "Bei Dou" will be used for the co-operative study cruises. Brief information on the research vessel is provided in Table 1 below and more detailed information can be found in document UNDP/GEF/YS/JC.1/INF.5.

Table 1. Information on the Research Vessel 'Bei Dou'

Name of the research vessel:	Bei Dou
Owner of the research vessel:	Yellow Sea Fisheries Research Institute, China
Tonnage:	1147 mt
Power:	2250 BHP (1685KW)
Length:	56.2 m
Beam:	12.5 m
Depth mid. (upper deck)	7.8 m
Fish. Lab.:	$20m^2$
Hydro. Lab.:	$20m^2$

4 DATES OF THE CRUISES

Based on the agreement of the RSTP, the first cruise will be organised from 4-25 January, 2006, with participation of experts from P.R. China and R. Korea.

All sampling equipment will be ready and on-board the vessel before January 4th and all scientists are required to be on-board in Qingdao, China, on the morning of January 4th. The vessel will depart in the evening on January 4th and return to Qingdao on the January 25th.

The second cruise will be organised in May 2006. The detailed survey plan will be discussed in the 2nd meeting of the Regional Scientific and Technical Panel for the YSLME project.

5 OBSERVATION STATIONS AND TRANSECTS

As agreed by the first RSTP meeting (*Dalian, China, 4-6 July, 2005*), the sampling stations and transect lines have been decided, and are shown in the attached map (Fig. 1), and the locations of the sampling stations are shown in the Table 2.

There are 52 observation stations, including:

- 52 stations, for bottom trawl, Phytoplankton & Zooplankton sampling
- 15 stations (c.) for pelagic trawl based on acoustic echogram, and not dependent on the fixed stations.
- 27 Environmental Stations (CTD deployment)

Since the survey time is fixed, the track will start from south to north, so that the cruise can be terminated if required (due to bad weather, etc) with the remaining stations being abandoned, so the ship can head for port. All station points can be adjusted according to weather and sea conditions.

6 PARAMETERS TO BE OBSERVED AND SAMPLED

Following the discussion and agreements of the regional working groups and the RSTP, the parameter to be observed and sampled during the co-operative study cruise are following:

(i) Fisheries component

- Bottom trawl sampling at predetermined stations
- Adaptive pelagic and/or bottom trawl sampling at selected site based on acoustic observations
- Continuous acoustic sampling along transects

Population

- Species composition by station
- Total number and weight of all catch by station
- Abundance by dominant pelagic species and zoo plankton

Biometrics

- Number, weight, size, age, by species, by station
- Stomach content

Ichthyoplankton

- Larval composition of dominant species

Condition of Fishing Grounds

- Water temperature and salinity by depth
- Food (chlorophyll, Zoo plankton)

(ii) Ecosystem component

Oceanographic variables

- CTD with PAR, beam-transmission, fluorescence
- Nutrients

Phytoplankton

- Phytoplankton species counts
- Size-fractionated biomass (chl-a) and primary production
- pico-Phytoplankton cell counts and primary production
- Bio-optics (down-welling and upwelling spectral radiance, attenuation, HPLC, particulate absorption, pigment absorption, etc)

Zooplankton

- Zooplankton species abundance
- Meso-zooplankton biomass
- Meso-zooplankton fecal pellet production
- Meso-zooplankton egg production
- Vertical distribution of fecal pellets from water sample
- Zooplankton vertical distribution, in selected station(s), using MOCNESS (or MPS)

Benthos

- Benthos species diversity, abundance, and biomass (by grab-sample)
- Sediment core (<1m length)
- Grain size of bottom sediments
- Sediment organic content
- Bottom temperature, salinity, and oxygen level

Bacteria

- Abundance & biodiversity
- Heterotrophic bacterial production
- Limiting resources for bacterial growth (potential impact by yellow sand)
- Heterotrophic bacterial respiration

Protozoa

- Protistan (flagellate & ciliates, etc..) abundance and composition
- Protozoan grazing on the picoplankton

(iii) Pollution component

- Common environmental parameters: including temperature, salinity, pH, transparency, DO, COD, SS, Chlorophyll a;
- Nutrients
- Organic pollutants
- Heavy metals

In Seawater

- Routine parameters: temperature, salinity, pH, turbidity, DO, COD, SS, chlorophyll a;
- Nutrients: nitrogen (nitrate, nitrite and ammonia), phosphate, silicates;
- Organic pollutants: total organic carbon, oil, PAHs, PCBs, OCPs;
- Heavy metals: Cd, Cr, Cu, Pb, Hg, Zn, As.

In Sediment

- Sulfide, TOC, Oil, Total nitrogen, Total phosphate, Heavy metals (Cd, Cr, Cu, Pb, Hg, Zn, As), Eh;
- Organic pollutants: PAHs, PCBs, OCPs.

In Biota

- Heavy metals: Cd, Cr, Cu, Pb, Hg, Zn, As.
- Organic pollutants: oil, PAHs, PCBs, OCPs;

7 SCIENTISTS ON-BOARD VESSEL DURING SURVEY

The research vessel can accommodate a maximum of 31 scientists at any one time. Based on the discussion of the workload for the different project components, the distribution of the scientists on-board the vessel is as follows:

• Regional Working Group for Fisheries:	10
• Regional Working Group for Ecosystem:	12
• Regional Working Group for Pollution:	6
• Regional Working Group for Biodiversity	2
• PMO:	1
Total:	**31**

Fig. 1. Observation stations and transaction lines of the co-operative study cruises

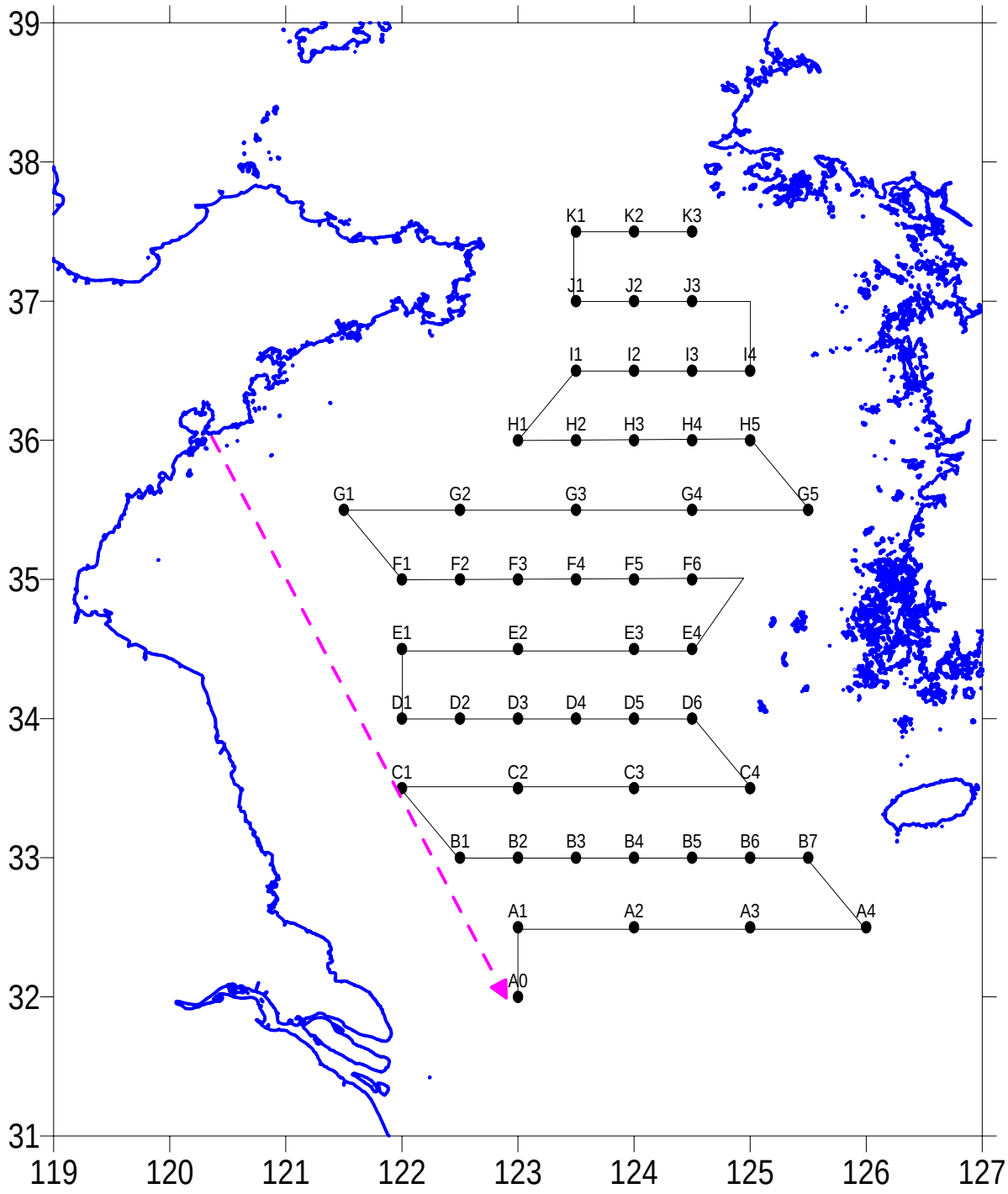

Table 2. Locations of the observation stations

St. No.	Latitude	Longitude	St. No.	Latitude	Longitude
A0	32	123	F1	35	122
A1	32.5	123	F2	35	122.5
A2	32.5	124	F3	35	123
A3	32.5	125	F4	35	123.5
A4	32.5	126	F5	35	124
B1	33	122.5	F6	35	124.5
B2	33	123	G1	35.5	121.5
B3	33	123.5	G2	35.5	122.5
B4	33	124	G3	35.5	123.5
B5	33	124.5	G4	35.5	124.5
B6	33	125	G5	35.5	125.5
B7	33	125.5	H1	36	123
C1	33.5	122	H2	36	123.5
C2	33.5	123	H3	36	124
C3	33.5	124	H4	36	124.5
C4	33.5	125	H5	36	125
D1	34	122	I1	36.5	123.5
D2	34	122.5	I2	36.5	124
D3	34	123	I3	36.5	124.5
D4	34	123.5	I4	36.5	125
D5	34	124	J1	37	123.5
D6	34	124.5	J2	37	124
E1	34.5	122	J3	37	124.5
E2	34.5	123	K1	37.5	123.5
E3	34.5	124	K2	37.5	124
E4	34.5	124.5	K3	37.5	124.5