NIO Technical Report
November 2000

North Arabian Sea Environment and Ecosystem Research (NASEER)
Technical Report:

Nutrients, chlorophyll, fractional primary productivity in water column of the North Arabian Sea in 1992-1994

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INTRODUCTION

Five cruises were carried out under the Pak-US cooperative project "North Arabian Sea Environment and Ecosystem Research (NASEER) from 1992-1994. The main objective of this project was:

* To determine the spatial and temporal variation in Bacteria-phytoplankton and Bacteria-Bacteriophage coupling in the Arabian Sea.
* To quantifying the marked seasonal variation in pigment biomass, primary productivity and nutrients present in the waters of the Arabian Sea in relation to the physical forcing factors.

This seasonal variation, which is poorly documented, must be quantified in both space and time.

During these cruises nutrients, chlorophyll and fractional primary production rates were measured at different stations in the wide area of Northwest Arabian Sea.

Details of cruise dates are given below

I. 7-25th January1992 on M/V AGHYAR
II. 11-25th August 1992 M/V AGHYAR
III. 13-21st March 1993 on M/V MANGEN
IV. 11-21st May 1994 on R/V BEHR PAIMA
V. 18-28th December 1994 R/V BEHR PAIMA

METHODS

Sampling

During these cruises seawater samples were collected with an acoustically triggered rosette (General Oceanic) with 12 bottles (PVC) of 5 liter capacity, each containing silicon rubber tubing as well as O-rings.

Nutrient analysis

Nutrient (nitrite, ammonia, phosphate and silicate) samples were analyzed according to the Parsons et al. (1983) method on the Tecnicon II Auto analyzer. Nitrate is first reduced with the cadmium column to nitrite and then diazotized with the salfanilamide and mixed with N-1 Napthylethylene diammine dihydrochloride forming the azo dye

which were measured at 543nm (Spectrometer Shimadzu UV-260). Dissolved Silicate and Phosphate formed blue color complex with the ammonium molybdate in acid medium and the color intensity measured at 810 and 882nm.

Chlorophyll

During the cruises 2.5-3.0 liter samples were filtered on 47mm GF/F filters. Filters were placed in glass vials containing 10 ml of 90% acetone (Merck GR grade), ground with a glass rod and kept overnight in the refrigerator for complete extraction. Spectrophotometric techniques were used for the analysis as described by Parsons et al. (1984).

Primary productivity

Primary productivity was measured using the C-14 method describe by Steemann-Nielson et al, (1952) modified by Parsons (1984). Triplicate 50 ml of samples were taken in the pre-cleaned Pyrex vial and added to 100 micro liter of 100-200 u Ci (Sodium Bicarbonate), triplicate blanks were also used and samples in-situ incubated 4-6 hours (In pelxi glass box) during the first cruise (January 1992). For the second cruise (August 1992) on-deck incubations (in pelxi glass aquarium) were carried-out at 100%, 30% & 9% light, using the screen which was calibrated with the Light meter (Licor model 185B equipped with a lambda instruments 192S under water quantum sensor). During the incubation, the temperature was maintained at sea surface temperature with control water bath circulator. Incubation was terminated by filtration. These samples were filter (pre-washed) through 15,15 and 20ml through the 0.45 (Millipore HWAP membrane, 1.0, 3.0 and 5.0 micron (Nucleopore) filter paper respectively. Filter papers were placed in the Scintillation vials and then 100µl of 10% HCL was added and left for 1 hour when Scintillation liquid was added the viles were again kept in the refrigerator for at least two to four day for counting. Activity of these samples measured at Beckman scintillation counter (Model LS-6000) and quench correction was by using the channel ratio method. Primary productivity calculated per hour by dividing the incubation time and converting the primary productivity to per day by multiplying the value ”10” for the winter monsoon and “12” for the southwest monsoon.

Acknowledgements

We are grateful to Miss Sierra Ishaq and Fazal-ur-Rahim for help with analyzing nutrient samples and thanks also NIO's scientists (Ms. Nuzhat Khan, S.M. Tebraz, M. Danish Arshad Ali) and crewmembers on the M/V Behr Paima, M/V Mangen and M/V Mangen for their Cooperation in this cruise. The NASEER project was funded as a Pak-US Cooperative Program in Oceanography in the Northwest Arabian Sea.

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