

**No.D-3                      Studies on Environmental Changes based on Global Mapping  
of Satellite Ocean Color Data**

**Contact Person**        Akira Harashima  
Head, Ocean Research Team  
Global Environment Division, National Institute for Environmental  
Studies, Environment Agency  
Tel:+81-298-51-6111(Ext.322) Fax:+81-298-51-4732  
E-mail:harashim@nies.go.jp

**Total Budget for 1990 - 1992**        129,198,000Yen

**Key Words**                Satellite ocean color data, Chlorophyll, Global mapping  
Modelling, Primary productivity

**1. Background**

The ocean environmental parameters change with respect to time and space and hence satellite data is required as well as the traditional *in situ* observations or experiments. The phytoplankton biomass, which is represented by chlorophyll-a quantity, reflects the ocean environment and can be detected as visible light signals by the ocean color sensors such as CZCS and future Sea WiFS( from 1993 ) and OCTS ( from 1996 ).

In order to utilize the ocean color data efficiently, however, several other data sets, models, and correction algorithms are required to validate them and to clarify the relationship between the chlorophyll concentration and the environmental parameters. Under this research title, four governmental institutions and three universities participated to construct the schemes to utilize ocean color data. The results are as follows.

(1)-1 By operating mooring and drifting buoys in the coastal and the off-shore seas, in-water bio-optical data sets were obtained.

(1)-2 A primary productivity measurement was performed in the equatorial Pacific in the El Nino period using carbon isotope technique.

(1)-3 Atmospheric correction algorithms were constructed particularly for the western Pacific by considering the effects of Kosa( Asian Dust ) and two near-infrared channels of CZCS. Based on this algorithms 4,129 scenes of CZCS data were processed into CD-ROM and distributed.

(2)-1 In situ ocean observation data for the validation of ocean color data were searched systematically.

(2)-2 A vertically one-dimension physical-biological model were constructed based on the biogeochemical data measured in the local upwelling area off Izu Peninsula.

(3)-1 A monitoring scheme using ferry boat was conceptually designed and performed as a mission-oriented monitoring of Center for the Global Environmental Research of National Institute for Environmental Studies. Time series of biogeochemical data (fluorometric chlorophyll, pH, dissolved nutrients) were obtained. They revealed the spring and autumn blooming of phytoplankton and their depression due to the decrease of nutrients.

(3)-2 A technique of BPC ( Bio-Particle Counter ) was developed using laser beam via glass fiber.

(4) Physical model of ocean basin scale was constructed to analyze the surface mixed layer and vertical motion, which is essential for the interpretation of CZCS image.