

A Preliminary Survey on Primary Productivity Measured by the ^{14}C Assimilation Method in the KEEP Area

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ABSTRACT

Primary productivity (PP) at the four sampling stations in the KEEP (Kuroshio Edge Exchange Processes) area, which located on the southern East China Sea north of Taiwan, was measured by the ^{14}C assimilation method from May 4 to May 10, 1994. Stations 1, 8 and 11 and 17 represented the coastal, the upwelling and the Kuroshio waters respectively. PP varied among stations and depths, ranging from < 11 to $134 \text{ mgC m}^{-3} \text{ d}^{-1}$ with the highest and lowest values observed at stations 1 and 17 respectively. The euphotic zone integrated productivity (EIP) for stations 1, 8, 11 and 17 were 1901, 418, 1537 and $425 \text{ mgC m}^{-2} \text{ d}^{-1}$ respectively. Higher PP and EIP values and chlorophyll *a* concentration observed at stations 1 and 11 might be explained by the high nitrate supply rates. Normalized productivity (P^{B}) ranged from 0.6 to $10.9 \text{ mgC mgChl}^{-1} \text{ h}^{-1}$ with higher values observed at stations 8 and 11. Both PP and P^{B} decreased exponentially with depth at all sampling stations, indicating a possible effect of light exerted on P^{B} . The EIP value derived from the in situ incubation ($569 \text{ mgC m}^{-2} \text{ d}^{-1}$) was 36% higher than that of the on deck incubation. This might be due to the tilting of the in situ incubation array which allowed the in situ bottles to expose to higher light level.

(Key words: Phytoplankton, Marine Ecology, Southern East China Sea, Kuroshio)

INTRODUCTION

Phytoplankton are the major organisms that fix inorganic carbon (i.e. CO_2 , HCO_3^- , etc.) into organic carbon, either in particulate or dissolved forms via photosynthetic processes. They constitute the base of the marine food webs and thus, may affect the dynamics of higher trophic levels due to the variability in their biomass and productivity. More importantly, the sinking of dead phytoplankton to the deep ocean (i.e. export production) which may act as an important sink for atmospheric CO_2 (i.e. biological pump).

Studying the temporal and spatial variability of primary productivity and its controlling

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