Abstract Details

AOGS 1st Annual Meeting > Ocean and Atmospheres > (OA4) Factors Influencing Biogeochemical Changes in the Coastal Ocean Based on HPLC Pigment Signatures >

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Title: (OA4) Factors Influencing Biogeochemical Changes in the Coastal Ocean Based on HPLC Pigment Signatures

Abstract: In order to determine physical and chemical factors influencing phytoplankton community composition in a southern sea of Korea where red-tide outbreaks every year, we have analyzed photosynthetic pigments together with nutrients and other environmental parameters during the summer 2003. In addition, we utilized real-time buoy monitoring data for determining factors controlling the temporal variation of phytoplankton community composition. The monitoring buoy provides data for nutrients, chlorophyll a, bioluminescence, and other environmental parameters. For the analyses of photosynthetic pigments, we followed the method by Wright et al. [1] after a slight modification using a HPLC (Waters Co. system) with a Rexchrom-S5-ODS column (Regis, USA, 250×4.6 mm, particle size: 5 μm). The pigment ratios of peridinin/fucoxanthin indicate the abundance of dinoflagellates relative to diatoms in seawaters [2]. Our data showed that these ratios were significantly increased offshore where nutrients were almost completely depleted. Similarly, the time-series data showed a sudden increase of these ratios when inorganic nutrients go almost depletion. These phenomena suggest that dinoflagellates reproduce effectively using dissolved organic nutrients when diatom growth is limited under depleted dissolved inorganic nutrients. For the sites where dinoflagellates increased largely, the pigments for chlorophyll b, alloxanthin, and prasinoxanthin decreased while all other pigments (fucoxanthin, lutein, violaxanthin, 19'-hexanoyloxyfucoxanthin, and 19'-butanoyloxyfucoxanthin) increased. This may be associated with the selective grazing of green algae, prasinophytes, and cryptophytes by mixotrophic dinoflagellates. The HPLC pigment signatures together with other environmental parameters appear to be a powerful tool for studying ecological responses to environmental changes in the coastal ocean. References [1] S. W. Wright et al., Mar. Ecol. Prog. Ser. 77, 183 (1991). [2] R. A. Andersen et al., Deep Sea Res. 43, 517 (1996).

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