Abstract Details

AOGS 1st Annual Meeting > Ocean and Atmospheres > Physicobiological Analysis of the Large Chl-a Plume off the Yangtze River >

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Title: Physicobiological Analysis of the Large Chl-a Plume off the Yangtze River

Abstract: Resubmit.OA17 The Yangtze River is the longest river in China. A large phytoplankton plume off the Yangtze River mouth has a very important impact on the biological processes in the East China Sea and the Yellow Sea. In the present study, the seasonal changes of the phytoplankton plume off the Yangtze River were analyzed using SeaWiFS-derived chlorophyll-a (Chl-a) data obtained over the period 1979 to 2003. Sea surface temperature (SST), sea surface wind, and other oceanographic data obtained in 2001 were also investigated. A three-dimensional numerical model POM (the Princeton Ocean Model) was applied to understand the seasonal changes in the plume related with the Yangtze River discharge, and the regional winds and tides. The large phytoplankton plume was observed all year around, with attention being given to its seasonal variation in terms of Chl-a concentration, shape, and dispersion direction. Phytoplankton blooms, with increasing Chl-a concentration, occurred in late spring every year, coincided with an increasing Yangtze River discharge and the rising of SST. In winter and autumn, the phytoplankton plume tended southward along the west coast of the East China Sea, and the northerly wind was a dominant factor that tended to disperse the Chl-a plume southeastward. In spring and summer, the plume extended southeastward 200 km, and then turned northeastward reaching Cheju Island. The southerly wind was one of factors that pushed the plume northeastward. Energetic tidal mixing is plentiful in the area near the Yangtze River mouth. Both the southerly wind and the strong tidal currents play significant roles in the plume dispersion in summer. Generally, while the wind tended to express the plume dispersion southward in winter and eastward in summer, the tidal effect tended to disturb the plume dispersion by vertical mixing processes throughout the year.A combination of satellite remote sensing data and numerical model analysis can yield a better understanding of the biological processes associated with dynamical oceanography. References: (1) Oh, I. S. and T. Park, 2003, A numerical study on the dispersion of the Yangtze River water in the Yellow and East China Seas, J. Korean Soc. Oceanogr, in press. (2) Tang, D. L., I. H. Ni., F. E. Müller-Karger, and Z. J. Liu, 1998, Analysis of annual and spatial patterns of CZCS-Derived pigment concentrations on the continental shelf of China, Cont. Shelf Res., 18, 1493-1515. (3) Tang, D. L., I. H. Ni, F. E. Müller-Karger, and I. S. Oh, 2003, Monthly variation of pigment concentrations and seasonal China's marginal seas, Hydrobiologia,32, in press.

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