



Numerical study of summertime dynamical and physical changes in the southern South China Sea due to the monsoons and its impacts on primary productivity

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Abstract

The ecosystem off the east coast of Peninsular Malaysia is controlled by multiple physical processes during the monsoons (winter and summer), including the air-sea interaction (such as net heat and surface freshwater fluxes), the small-scale eddies off the southern South China Sea (SSCS), and the monsoon wind induced coastal upwelling. Using high-resolution Regional Ocean Modeling System (ROMS), in-situ observations and remote sensing data, this paper attempts to study the hydrodynamics of the shelf and coastal processes as well as thermohaline circulation in response to changes in the hydrological seasonal cycle especially in the summer monsoon. In addition, we investigate its impacts on the spatial patterns of chlorophyll biomass which acts as a proxy for primary productivity in the SSCS. This study looks into not only the detailed small-scale-circulation such as localized eddies but also the link between the southern South China Sea and the Indian Ocean through the Straits of Malacca and the Java Sea. The flow through the Strait of Malacca and the Java Sea is not only important for navigational purpose but also has an influence on the seasonal spatial and temporal variations of primary productivity in the region.

Keywords: southern South China Sea; summer monsoon; coastal upwelling; primary productivity