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Response of nutrient concentrations and primary production over the shelf in the East China Sea to the changes in oceanic

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A three dimensional coupled biophysical model was used to examine the response of nutrient concentrations and primary production over the shelf in the East China Sea to the changes in oceanic and riverine nutrient input. The model consisted of two parts: the hydrodynamic module was based on a nested model with a horizontal resolution of 1/18 degree, whereas the biological module was a lower trophic level ecosystem model including two types of phytoplankton, three elements of nutrients, and biogenic organic material. The model results suggested that seasonal variations occurred in the distribution of nutrients and chlorophyll a over the shelf of the ECS. After comparison with available observed nutrients and chlorophyll a data, the model results were used to calculate response of nutrient concentrations and primary production over the shelf in the East China Sea to the changes in oceanic and riverine nutrient input with several additional calculations in which the nutrient concentrations in the Kuroshio water and in the Changjiang river water were artificially increased or decreased. Model results suggested that the oceanic nutrients were distributed in the bottom layer from the shelf break to the region offshore of the Changjiang estuary from spring to summer and appeared in the surface layer from autumn to winter. The calculations also implied that the supply of oceanic nutrients to the shelf can change the consumption of pre-existing nutrients from rivers. The influences of riverine nutrients on primary production were confined to the offshore of estuary.

Keywords: Oceanic nutrients, riverine nutrients, ecosystem model, East China Sea