

Seasonal variations in nutrients and biogenic particles in the East China Sea and their exchange fluxes with adjacent seas

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Based on a three dimensional low-tropical ecosystem model, we reevaluated the budgets of nutrients and biogenic particles (phytoplankton and detritus) in the East China Sea (ECS), a continental shelf sea with high productivity and affected by a large river (Changjiang) and a western boundary current (Kuroshio). After a careful comparison of model results with all available observation data, we calculated monthly standing stock of the nutrients and biogenic particles in the ECS and the fluxes of the nutrients and biogenic particles through the lateral and vertical interfaces of the ECS. As an improvement over previous nutrients budget calculations that treated the ECS as a one box, we divided the water column into two layers to represent the euphotic and aphotic layers. Our calculation shows a necessary for evaluating not only the horizontal fluxes of nutrients and biogenic particles into and out of the ECS through its lateral boundaries with adjacent seas but also the exchange fluxes of nutrients and biogenic particles between the euphotic and aphotic layers. Our calculation also reveals that the export of biogenic particles from the ECS to the Japan/East Sea is more than that from the ECS to the Kuroshio region and the export pathway of biogenic particles from the ECS to the Kuroshio region is through the middle layer of the shelf slope of the ECS, not the previously reported bottom layer.

Keywords: low-tropical ecosystem model, East China Sea, Kuroshio, Changjiang, Japan/East Sea