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Circulation & biogeochemical processes in the East China Sea and the vicinity of Taiwan

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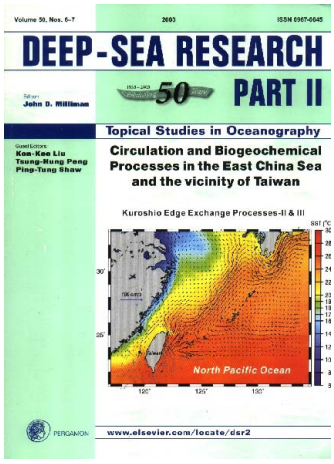

The East China Sea shelf (including the Yellow Sea and the Bohai Sea) is a very challenging system for hydrodynamic and biogeochemical studies due to its complicated physical and chemical forcing. It receives much attention because of its capacity for absorbing atmospheric CO_2 in spite of large riverine fluxes of terrigenous carbon. This volume reports field observations and modeling studies during the Kuroshio Edge Exchange Processes (KEEP) and ensuing projects, which are a part of the continental margins study in the Joint Global Ocean Flux Study (JGOFS). A 3-D numerical model has been developed to simulate the climatological circulation in the East China Sea. The model result is supported by observations in the seas around Taiwan. The significance of inflow from the Taiwan Strait is emphasized. Geochemical tracers prove useful in understanding the water and material transport. Biogeochemical studies suggest very efficient recycling of organic carbon by bacterial and protozoan consumption in the shelf water, but a finite amount of particulate organic carbon with a significant terrigenous fraction is exported from the shelf. The fine-grained sediments in the inner shelf appear to be an important source of organic carbon for export. Future studies are needed to improve our understanding of key physical and biogeochemical processes, to develop coupled physical–biogeochemical models, and to catch and survey the elusive spring algal bloom. A tantalizing goal of our ongoing effort is to document or even to predict future changes in the East China Sea shelf caused by the operation of the Three-Gorge Dam, which is under construction in the middle reach of the Yangtze River.