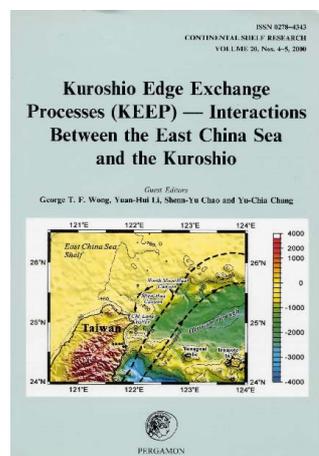


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Kuroshio Edge Exchange Processes (KEEP) - Interactions between the East China Sea and the Kuroshio

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The Kuroshio edge exchange processes (KEEP) study is a multidisciplinary study on the internal cycling of material, especially carbon, within the East China Sea Shelf and the exchange of material between this Shelf and its adjoining Kuroshio. The project has been ongoing since 1989.

The Bohai, the Yellow Sea (Huanghai) and the East China Sea (Tunghai) constitute a series of interconnected marginal seas that extend from 41 to 25°N along the coast of China. It is one of the larger systems of marginal seas in the world. It is bounded to the west by the Asian continent and it serves as the receiving water of much of the river runoff of the densely populated northern China. The East China Sea is the southernmost and, by far, the largest and deepest member of these three seas. It receives more than 90% of

the river runoff to this marginal sea system and it is the only member that can communicate directly with the North Pacific either through the Kuroshio or through the Tsushima Warm Current via the Japan Sea. Thus, the East China Sea is an important conduit that may channel the large quantities of terrigenous and anthropogenic material from northern Asia to the North Pacific.

The East China Sea Shelf is a net sink of atmospheric carbon dioxide. Rich supplies of nutrients, mostly from the upwelling of the Kuroshio Subsurface Water and, to a lesser extent, from the riverine discharges, notably from the Changjiang, sustain a high primary production ($550 \text{ mg C m}^{-2} \text{ d}^{-1}$) on the Shelf and help the draw down of carbon dioxide. The sum of the demands for organic carbon for sustaining the observed bacterial production in the water column and the rate of sulfate reduction in the sediments of this Shelf appears to exceed its primary production. This suggests that a large fraction of the photosynthetically fixed carbon is recycled effectively within the Shelf. However, a comprehensive and definitive carbon budget for the Shelf cannot yet be constructed. Organic particles that survive oxidation within the Shelf and reach the Okinawa Trough are deposited in a belt along the upper northwestern slope of the Trough. A particle-rich mid-depth layer and the very high fluxes of sinking particles off the shelf break northeast of Taiwan suggest active cross shelf transport of particles from the Shelf to the Okinawa Trough. The cyclonic eddy at the shelf edge northeast of Taiwan is an important pathway for the exchange of dissolved and particulate materials between the Shelf and the Kuroshio. Nitrogen fixation may be a significant contributor of combined nitrogen to the oligotrophic Kuroshio Surface Water and the Taiwan Strait Warm Water so that it may support up to 25% of the new production in the Kuroshio Surface Water.

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