

Seasonal Variability and the Dynamics of Kuroshio Intrusion into the Luzon and Taiwan Straits

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Abstract

A fourth-order, fully two-way-coupled duo-grids Pacific Ocean Model (DUPOM) is developed to simulate the regional circulation in the vicinity of Taiwan and Asian Marginal Seas. The model uses $1/4^\circ$ and $1/8^\circ$ horizontal resolutions for the western and eastern Pacific Ocean domains, respectively. Many important features in the Asian Marginal Seas are reproduced. These include the variations of Kuroshio path; Kuroshio extension; Kuroshio intrusion and retreat through Luzon Strait and over southern East China Sea; formation of a warm core eddy in northern South China Sea in winter; seasonal variation of circulation in Taiwan Strait and others. The dynamic of Kuroshio intrusion into the Luzon and Taiwan Straits is further investigated and analyzed. Bottom topography plays an important role on the generation of coastal eddies and their movements. Seasonal Kuroshio intrusion in the Luzon Strait compares well with observations and indicates a possible three layer structures. The throughflow transport variation in the Taiwan Strait is also consistent with the field measurements. Our results confirm the existence of Kuroshio Branch Water (KBW) in the southeastern portion of the strait.

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