Eddy Effect on the Kuroshio East of Taiwan from Satellite Altimetry

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Kuroshio is a western boundary current in the North Pacific Ocean. It flows northward along the east coast of Taiwan. Previous studies have shown that there is an eddy-rich zone located at 18°-26°N, 122°-160°E. The westward propagating eddies may affect the axis of Kuroshio when they impinge the Kuroshio east of Taiwan. To more understand the phenomenon, satellite altimeter data are used to investigate effects of oceanic mesoscale eddy on the Kuroshio from 18°N to 26°N. The Kuroshio axis is defined as a line with the maximum surface velocity along the Kuroshio path. The velocity of Kuroshio is calculated from the absolute dynamic topography data derived from satellite altimetry with the geostrophic relations. The results show that the Kuroshio meander occurred 13 times from 1993 to 2013 which were caused by westward or northward moving cold eddies when they propagated to the east of Taiwan. The average duration of the meanderings was 27 ±20 days, and the maximum duration was 80 days. The farthest position of the Kuroshio axis meandering was approximately 270 km from the average Kuroshio axis. It is affected by the size of the cold eddy. Under the circumstances of a cold eddy, the mean speed of the Kuroshio axis drops to 0.63 m/s, which is approximately 84% of the seasonal average.

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