



Seasonal Characteristics and Dynamic Mechanism of the Surface Kuroshio Branch intrusion into the South China Sea

Jingsong Guo, Zhixin Zhang, Changshui Xia, and Fangli Qiao
First Institute of Oceanography, SOA, China

Abstract Using the observational data of the Argos satellite-tracked drifters from 1988 to 2012, we analyzed the surface Kuroshio Branch (KB) intrusion into the South China Sea (SCS). The analysis results are as follows. The surface KB mostly originates from the southern Balintang Channel (SBLTC) and the southern Babuyan Channel (BBYC). It starts in late September, reaches its peak (in terms of both speed and intrusion probability) in December-January and declines at the end of March. The mean speed of the drifters during traversing the Luzon Strait (LS) was 43% faster than that during the two days before entering the LS when the flow originated from the SBLTC, but there was no significant increase in speed when the flow came from the BBYC. The observations showed that in wintertime the monthly-mean sea-level anomalies (SLAs) were positive southwest of Taiwan Island and extended to the northern LS, and were negative northwest of Luzon Island and extended to the southern LS. The SLAs were accompanied by an anticyclonic circulation and a cyclonic circulation, which acted like a pump, forcing a part of the Kuroshio water westward into the SCS, especially for the water originated from the SBLTC. The condition under which the KB forms is solved by the equations of motion. The theoretical results indicate that whether the Kuroshio Surface Water can cross the LS into the SCS depends upon the sea-level gradient at the central LS and the region to the west, as well as the position, velocity and direction of the Kuroshio Surface Water when it enters the LS.

Key words: surface Kuroshio Branch, Luzon Strait, dynamic mechanism