Abstract View

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An Event in Water Exchange between Continental Shelf and the Kuroshio off Southern Japan: Lagrangian Tracking of a Low-Salinity Water Mass on the Kuroshio

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ABSTRACT

Low-salinity water masses were occasionally observed in spring and summer on the surface of the Kuroshio, south of Japan. Many of the masses were accompanied by excessive discharge of fresh water from major rivers in southern Japan and were observed 20–40 days after the discharges. The salinity difference between the low-salinity water mass and the Kuroshio was closely proportional to the river water discharge.

To specify their origin, the behavior of a water mass seen on 10 August 1979 was studied in detail. A large number of labeled particles were deployed in the water mass and were tracked numerically by the Euler-Lagrangian method. The fresh water forming the low-salinity water mass in the Kuroshio was concluded to originate in the Seto-Inland Sea and the Tosa Bay, and 58% of the river water discharge was sufficient to form the low-salinity water mass. When a particle in the Kuroshio flows along the southern coast of Japan, it receives coastal water which is discharged in excess due to snow melting in spring and heavy rainfall such as that caused by a stagnating front, a cyclone or a typhoon. The parcel of coastal water is estimated to move from the river mouth to the continental shelf region at a mean speed of 5–10 cm s^{-1}.