

Lagrangian statistical analysis of near-surface transport in the Japan Sea based on altimetry data

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Northward near-surface transport of subtropical waters in the Japan Sea frontal zone is simulated and analyzed based on altimeter data for the period from January 2, 1993 to June 15, 2015. Computing a few Lagrangian indicators for a large number of synthetic tracers launched weekly for 21 years in the southern part of the Sea, we find preferred transport pathways across the Subpolar Front. This transport is shown to be meridionally inhomogeneous with "gates" and "barriers" whose locations are determined by the local advection velocity field. The eastern and western gates are provided mainly by the Tsushima Warm Current and the East Korean Warm Current, respectively. The central gates "open" due to suitable dispositions of mesoscale eddies along the Subpolar Front. The transport via the central gates occurs by a portion-like manner due to large-scale intrusions of subtropical waters round the eddies which have been documented with the help of Lagrangian drift maps. There are some "forbidden" zones in the frontal area where the northward transport has not been observed during all the observation period. They exist due to long-term peculiarities of the advection velocity field there.