

Initial analysis of Tsushima Strait fluctuations by using HF radar

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A 19-year-long surface-current dataset obtained by seven HF radars deployed in the Tsushima Strait, a 180-km-wide channel connecting the East China Sea and the Sea of Japan, has been compiled. Among the seven radar systems, two (three) were installed along the west (east) coast of the Tsushima Island, one at the Iki Island situated in the south, and one at a mainland Kyushu coast in the southeast. Radial velocities measured at the radar sites were converted into hourly surface-current vectors defined on a longitude-latitude grid with a spacing of 0.025 degree, which were decomposed into geostrophic and Ekman-drift components by following a method of Yoshikawa et al.(2009). The temporal coverages of the current-vector data in the Eastern and Western channels of the strait were year 2002-2020 and 2002-2017, respectively. The data were packed as a series of three-monthly netCDF files which conform the CF conventions to retain portability. This study focuses mainly on the characteristics of surface currents in the Western Channel west of the Tsushima Island, where a direct measurement is sparse even though the area is part of the main route of the Tsushima Warm Current. Temporal changes of the regional and monthly averaged surface currents (geostrophic component) showed high correlation with that of the monthly-mean sea-level difference between Geoje-do at southwestern Korea and Izuhara at the southern Tsushima Island, indicating that the extraction of geostrophic components from the raw surface-current data was successful to some extent. It was also found that the strong surface currents tend to reside in area where the water depths are deeper than 100 m. In the presentation, further analysis on the relation between the current distribution and the bottom topography, as well as the temporal changes of the currents ranging from monthly to decadal timescales will be also shown.

Keywords: East China Sea, Sea of Japan, surface current measurement, interannual variability