

Seasonal transport variation over the entire Kuroshio region

*ZHENLONG ZHANG¹, Hirohiko Nakamura¹

1. Kagoshima University

As the observations of the Kuroshio were conducted regionally by different groups, studies for the seasonal variation and its mechanism were also proceeded separately. By using the data collected by satellites and assimilation model's outputs, we focus on the seasonal transport variation over the entire Kuroshio region. Our main purpose is to show the temporal and spatial feature of the seasonal transport variation and give an insight for its driving mechanism.

The results from Aviso data reveal that the surface transport variation reaches maximum in July for most of the Kuroshio region, but its minimum appears in different months. Near Luzon Island and in the East China Sea, the minimum values appear in October or November. For the area of Taiwan, most of the minimum values are found in January or February. Time when the minimum values occur also shows propagation signals: it shifts from September to November in Luzon Strait, while moves gradually from November to June south of Japan. Another feature is that the amplitudes of the surface transport variation are large near Luzon Island, Taiwan, and south of Japan, where there is a land boundary to the west of the Kuroshio. The results from EOF analysis, which is conducted by using an assimilation dataset estimated from the Multivariate Ocean Variation Estimation system, also indicate that the transport variation tends to dominate in the areas where the western land boundary exists.

Czeschel et al. (2012) suggested that fast barotropic waves propagate the signals due to wind-induced coastal upwelling (downwelling) southward along the simple slope off the North American coast and contribute largely to the annual cycle of the Florida current transport. While for the North Pacific western boundary, the barotropic waves are considered to propagate along the complicated coastline with large topographic modulation. This might be a possible cause that leads to the regional features of seasonal transport variation revealed in this study.

Keywords: Kuroshio, seasonal transport variation