Effects of the Kuroshio meander on phytoplankton in Japanese waters as observed by satellite remote sensing

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The Kuroshio current is one of the western boundary currents and known as a thermal energy transporter from low latitudes to to mid-latitudes in the Western Pacific. On the other hand, the Kuroshio is also a unique western boundary current in that it causes a large meander. Indeed, the meander has occurred in 2017 and is still continuing (at the time of writing). In ecological perspective, the Kuroshio is characterized as a carrier of oligotrophic seawater. In spite of the oligotrophy, the Kuroshio water is known for spawning and feeding grounds of commercial/non-commercial fish larvae, explaining a higher fisheries production in the region. Thus, it currently puzzles an ecological representation of the Kuroshio water in that a relationship among nutrient fields, standing stock and productivity of organisms are not well understood. In order to better understand the Kuroshio ecosystems, phytoplankton dynamics, a lower-trophic organism, is investigated using remote sensing data of phytoplankton chlorophyll-a pigment and of phytoplankton community structure inferred from the pigment. Especially time series analysis was conducted to identify temporal scales of their variability from daily scale to decadal scale, thanks to the high-frequency observation by the Advanced Himawari Imager, AHI, and to the long-term observation by the Moderate Resolution Imaging Spectroradiometer, MODIS. In this presentation, we discuss how the temporal variability of different phytoplankton groups (as well as the total phytoplankton community) in the Kuroshio and adjacent waters are affected by the large meander of the Kuroshio occurring since 2017.

Keywords: Kuroshio, phytoplankton, meander, remote sensing

