

Observation Across the Large-meander Path of the Kuroshio South of Japan by a Saildrone

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The Kuroshio large-meander (LM) path formed in September 2017 continues to exist at present. Unlike most of other past LM paths, the present LM path is peculiar in that the current path is quite variable (Nagano et al., 2018). This peculiarity is anticipated to be attributable to the horizontal and/or vertical current structures of the Kuroshio. To understand the dynamics of the Kuroshio LM path, an examination based on potential vorticity is required, and it is essential to obtain spatially high-resolution current velocity vector field. A saildrone, a 7-m length, 5-m height unmanned surface vehicle, is remotely controlled for several months at sea via satellite communication, and collected data are transmitted to us in near real time. Monitoring the location of the Kuroshio by the real time HYCOM nowcast system, we can operate a saildrone to observe variable currents such as an unstable type LM path of the Kuroshio. Current velocity vectors from the sea surface to a depth of approximately 100 m were obtained every 1 min by a 300 kHz acoustic Doppler current profiler (ADCP) installed on a saildrone. In addition, temperature and salinity at the sea surface layer and meteorological parameters (wind speed/direction, humidity, air temperature, etc.) measured by sensors equipped on the saildrone. Based on the nowcast of sea surface current, the Kuroshio current path location was identified and five ADCP velocity transects of the Kuroshio current were obtained. Using the data, we will discuss the dynamics of the LM path.

Keywords: Kuroshio, Large-meander path, Saildrone