

## Temporal and spatial velocity variations over the Kuroshio Extension, Kuroshio and Ryukyu Current System in 1982-2014

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Four dimensional variational Ocean ReAnalysis for the Western North Pacific (FORA-WNP30) from 1982 to 2014 is used to investigate temporal and spatial velocity variations over the regions consisting of Kuroshio Extension (KE), Kuroshio and Ryukyu Current System (RCS). In order to identify such temporal and spatial features, we made Hovmöller diagrams at several depths, which display temporal variations of along-stream velocity along the current path from Luzon Island to KE region. In this study, we particularly examine long-term (> 1 year) variations for their regional characteristics (Luzon Island to KE region) and their vertical features (sea surface to 1000 m depth). The results revealed that 1) the KE is dominated by decadal signals while the upstream regions include clearer interannual signals in addition to decadal ones, 2) decadal variations in the KE tends to be almost out of phase to those variations in the upstream regions from Luzon Island to Izu-Ridge, and 3) the velocity variations at the sea surface tend to be similar to those variations at 1000 m depth.

Keywords: Kuroshio, Ryukyu Current, Kuroshio Extension, Velocity, Long-term variations