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Interannual Variability of the Kuroshio Frontal Structure along Its Western Boundary in the North Pacific Ocean Associated with the 1982 ENSO Event

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ABSTRACT

The vertically averaged temperature (T_{av}) over the upper 200 m of ocean in the western boundary of the North Pacific is used to detect changes in the strength and path of the Kuroshio Front along the western boundary from Luzon (18°N) to Honshu (34°N) during the period 1979–82. During this time the Kuroshio Front experienced significant interannual changes associated both with the disappearance of the Kuroshio Meander in late 1980 and with the development of the 1982 ENSO event in early 1982. When the Kuroshio Meander south of Honshu disappeared from the fall of 1980, until the summer of 1981, the intensity of the Kuroshio Front increased, associated with warmer than normal temperatures all along the western boundary of the North Pacific from Luzon to Honshu. The amplitude of the Kuroshio Meander was also correlated with fluctuations in the path of the Kuroshio Front at the Tokara Strait (30°N) and the Bashi Strait (20°N) and with the amplitude of the East China Sea Meander. The East China Sea Meander occurs west of the Ryukyu Islands at 25°N, formed when the Kuroshio Current enters the East China Sea from the Philippine Sea northeast of Taiwan Island. It had large amplitude in winter and smaller amplitude in spring and early summer, similar to that in the Kuroshio Meander when it was present during this period. It also had related interannual variability; i.e., when the Kuroshio Meander disappeared in fall of 1980, the East China Sea Meander was weak. These results and earlier ones dealing with the Kuroshio Front east of Japan (e.g., White and He) indicate that fluctuations in the amplitude of the Kuroshio Meander south of Honshu were associated with similar changes in the mesoscale meandering character over the entire Kuroshio Current System during this four-year period.

During the 1982 ENSO event, the temperatures in the region of the Kuroshio Front in the western boundary became colder than normal, while both the Kuroshio Meander south of Honshu and the East China Sea Meander northeast of Taiwan Island developed larger amplitudes. This is consistent with the results of White and He, who found the

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mesoscale meander pattern in the Kuroshio Extension intensifying during the 1982 ENSO period. During this time, the magnitude of the Kuroshio Front all along the western boundary and in the Kuroshio Extension region was weaker in comparison with the three years prior to the 1982 ENSO event.

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