VARIABILITY OF THE KUROSHIO CURRENT DYNAMIC HEIGHT ON DECADAL TIME SCALES

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Abstract

Sixteen years sea surface height (SSH) data from multiple satellite altimeters and Nino3 SST data from NOAA CPC are used to investigate the anomaly of Kuroshio and the relationship with El-Nino. Using Fourier spectral analysis, filtering and sliding correlation analysis methods, the dynamic height variation of the Kuroshio axis were analyzed. The results show that the variation of absolute dynamic topography (ADT) of Kuroshio axis exist 1 year, 118 days and quasi-two-year period; The variation of latitude of Kuroshio axis exist 1 year, quasi-two-year period and quasi-four-year period; The variation of intensity of Kuroshio exist 1 year, quasi-two-year period and quasi-four-year period. Through the sliding correlation analysis, the ADT of Kuroshio axis was positively correlated with the El-Nino, with the correlation coefficient of 0.59, and 11 months ahead; The variation of Kuroshio axis latitude was negatively correlated with the El-Nino, with the correlation coefficient of -0.66, and lag of about 8 months; The variation of Kuroshio intensity was positively correlated with the El-Nino, with the correlation coefficient of 0.72, and lag of about 4 months;

Kuroshio axis is identified by the ADT contours, and the maxima grads of ADT are a good indicator for the Kuroshio axis. Figure 1 show the ADT contours and its gradient map，line denote the ADT contour, the orange line denote the adt 240cm, Color is the gradient map. ADT 240cm located at or near the the gradient maxima, Therefore, the location of the Kuroshio axis was determined by using ADT 240cm and the maximum gradient.

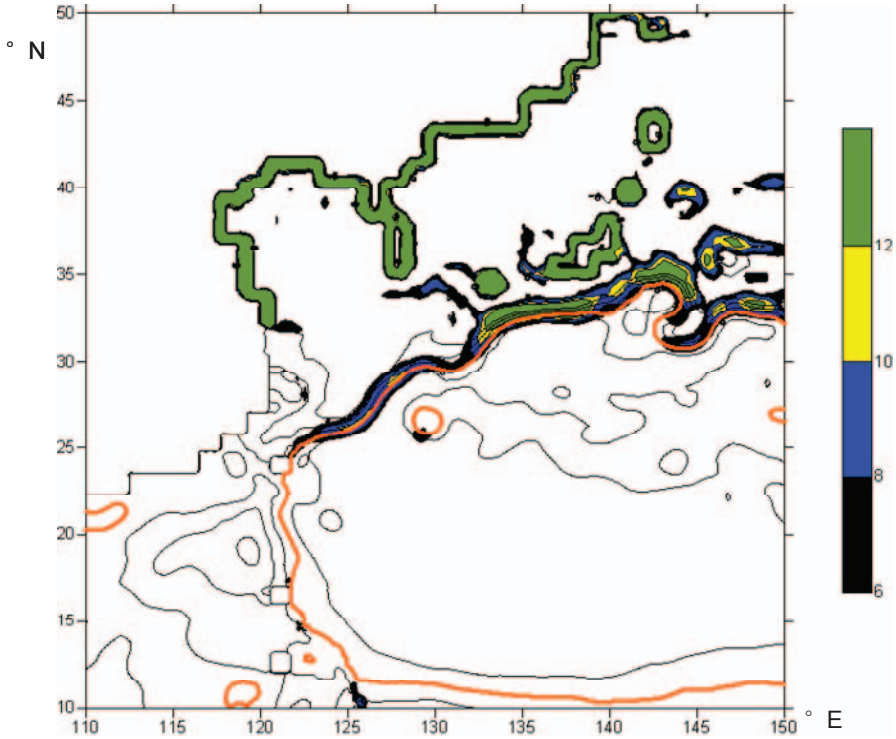

Figure 1 ADT contours and its gradient map

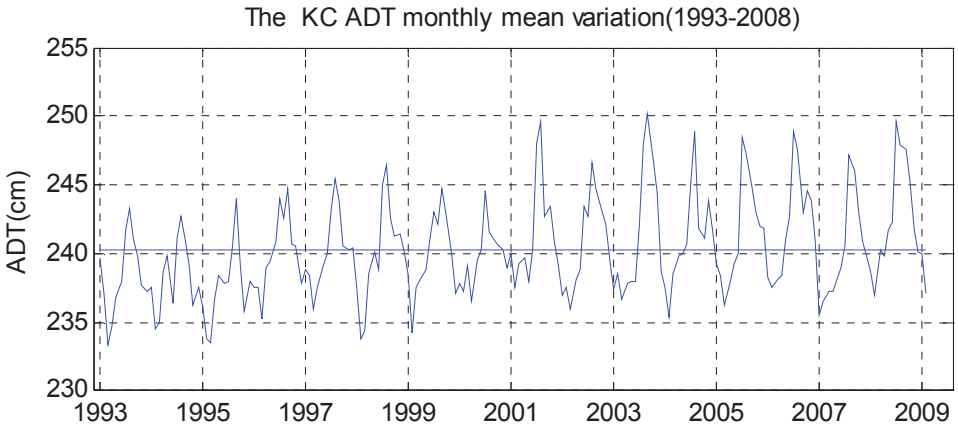

Figure 2 monthly mean variation of ADT of Kuroshio Current axis

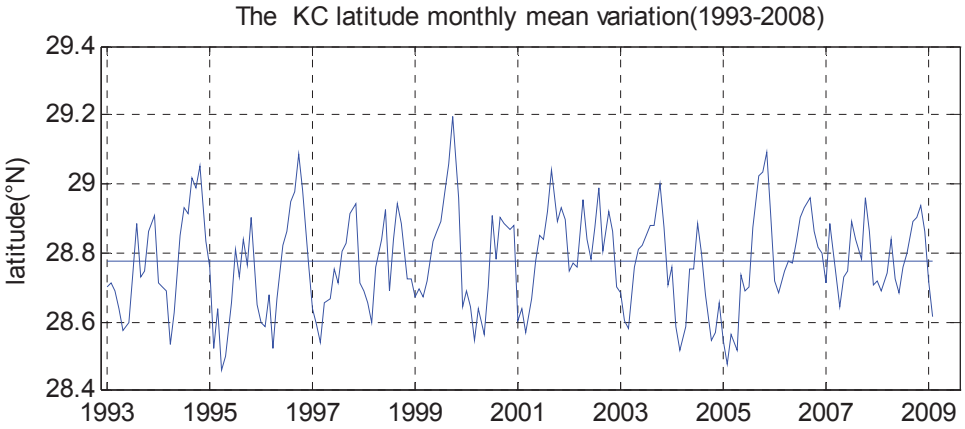

Figure 3 monthly mean of the latitudinal position of the KC axis

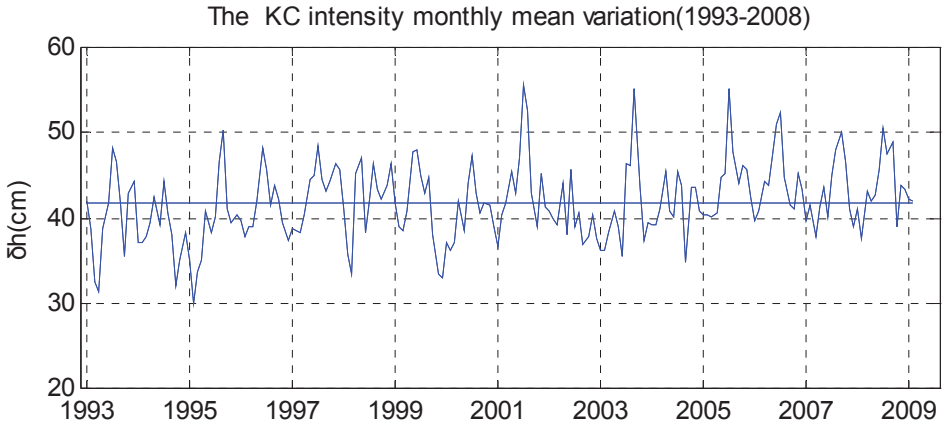

Figure 4 monthly mean of the KC intensity

δh is used to stand for the intensity of Kuroshio. δh is the evaluated at each longitude by first averaging the ADT values over the 1.0° bins centered by 1.0° north and south of the Kuroshio axis ,and then taking the difference as δh .

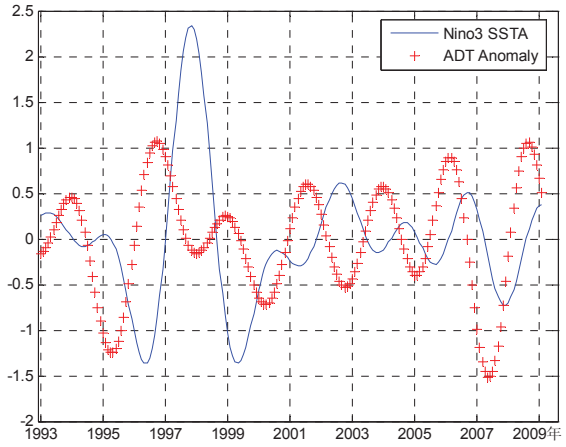

Figure 5 2-7 year signal of KC ADT anomaly and Nino 3 SSTA