# Distribution features of travelling eddies in the South China Sea

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By means of a 0.1-degree daily ocean simulation STORM (supported by the German consortium project STORM; J. von Storch et al, 2012), this paper has investigated the characteristics of the travelling eddies in the South China Sea (SCS) from 1950 to 2010 using daily data. The STORM dataset, forced by the 6-hourly NCEP reanalysis data, realistically capture the hydrodynamics in the SCS (Zhang and H. von Storch, 2017). Based on a monotonicity-based eddy detection and tracking method, eddies in the SCS have been detected and tracked from the gridded sea surface height anomaly (SSHA) field of STORM (Zhang et al, 2017). In this paper, we focus on eddies with high relative intensity and long travel length. They fulfill the following criteria:

1. The accumulated travel length is 100 km or more, and the ending point is required to be at least 50km away from the beginning one.
2. All the eddy points must have relative intensity (RI) over 3 mm. In addition, the RI of the strongest point along one track surpasses 6 mm. RI is defined by the absolute difference between the extremum SSHA and the averaged SSHA of its 24 neighbors.
3. An eddy track must travel for over 90% of its lifetime in water deeper than 200 m, which allows the eddy to extend in the vertical direction.

From 1950 to 2010, a total of 1871 anti-cyclonic eddies (AE) and 4219 cyclonic eddies (CEs) were detected, corresponding to 65137 AE points **(2.9 per day)** and 143798 CE points **(6.5 per day)**. We extracted the time series of the daily eddy number, and plotted the distribution probability (Fig. 1) of daily AE points and daily CE points. **Daily AE number varies from 0 to 9, with the most frequent number of 3, and daily CE number ranges from 0 to 17, with the most frequent number of 6.**

The maximum of 9 AEs appears once in 12 continuous days, which are 09 – 20/05/1981. And the maximum of 17 CEs occur once in 3 days of 21 – 23/03/2005. As an example, the eddies occurring in 09/05/1981 and in 21/03/2005 are all collected in Fig. 2. **Most of the AEs are located along the SCS western coast and near the Luzon Strait, except some CEs in the Sulu Sea. And when the maximum number of one type eddy takes place in one day, many of the other type eddy occur as well.**

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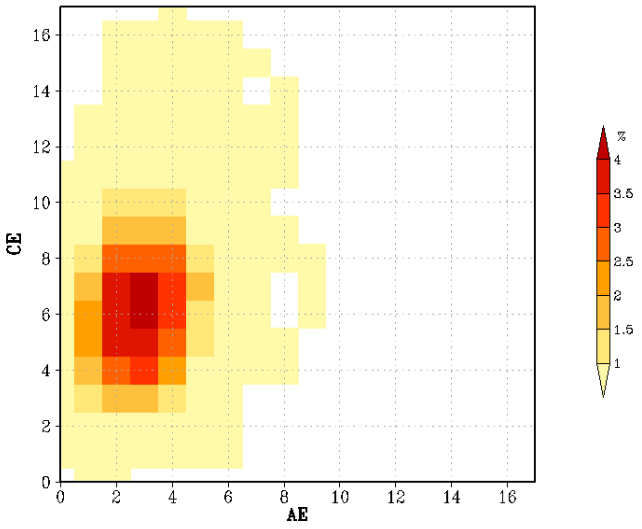


Figure 1. The occurrence probability of daily AE number and daily CE number.

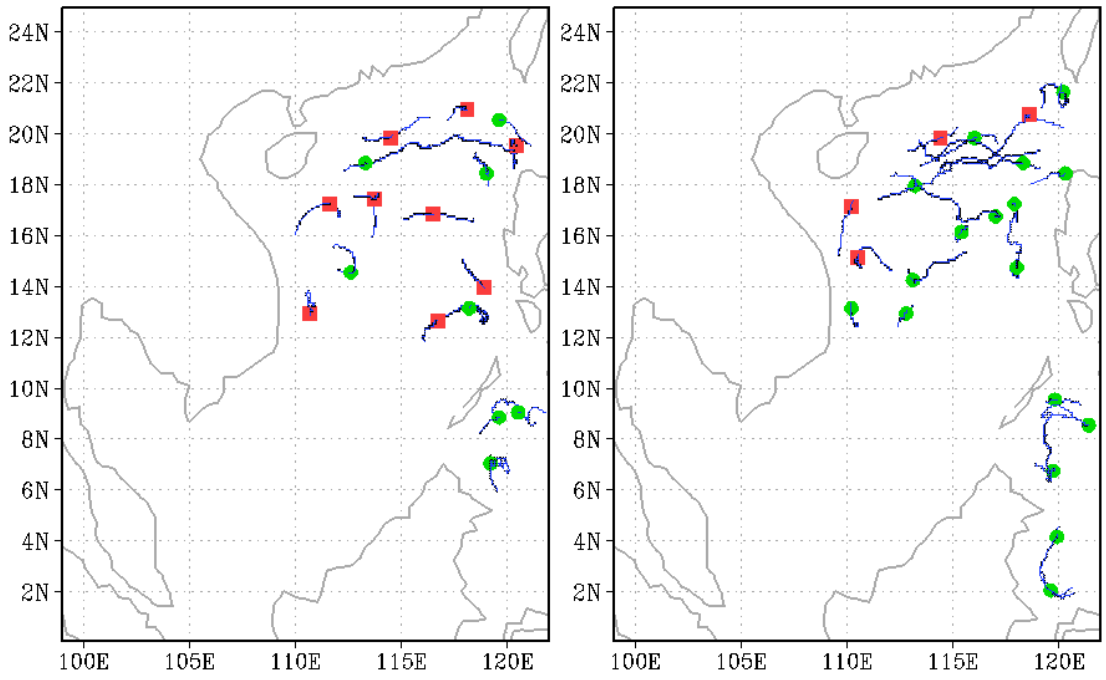


Figure 2. The tracks that appeared in 1981/05/09 (the left figure) and 2005/03/21 (the right one); Red squares and green circles present AEs and CEs at certain date.