

Travelling eddies in the South China Sea- multi-decadal statistics and large-sale conditioning

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1. Introduction

- Determination of the statistics of eddies in the South China Sea (SCS) as simulated by a state-of-the-art ocean general circulation model forced by daily NCEP atmospheric state. Its grid resolution in the SCS is about 0.1° .
- Examining the resulting statistics if they may be used in empirical downscaling schemes, which estimate certain parameters representative for the seasonal eddy activity in the SCS from seasonal mean large-scale oceanic features.

2. Evaluation of "STORM" simulation

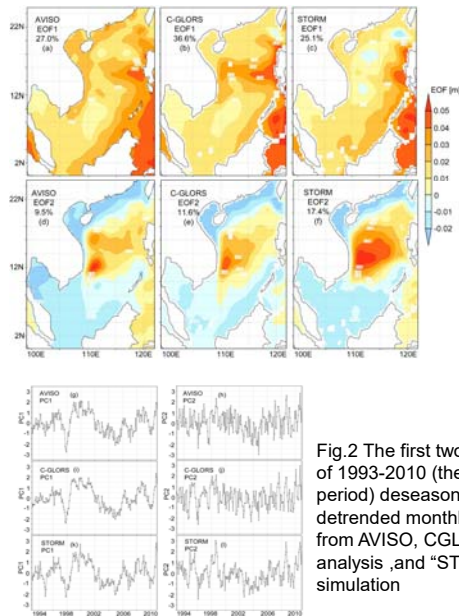
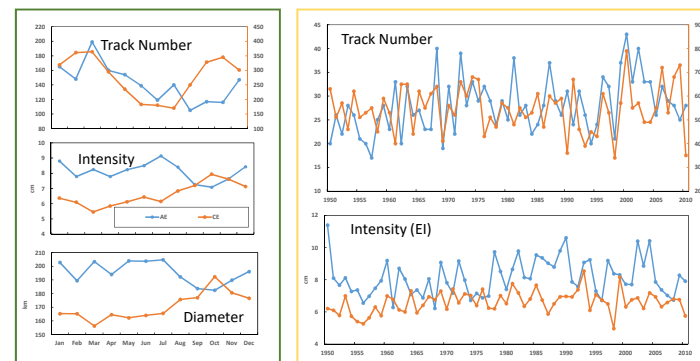
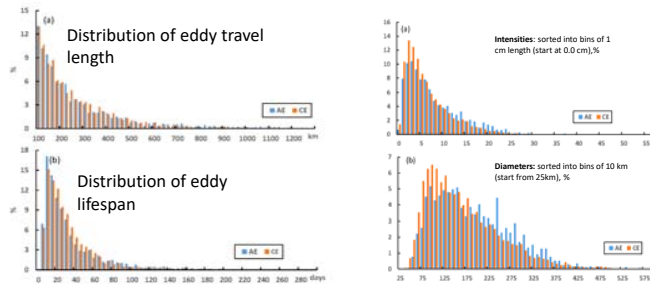
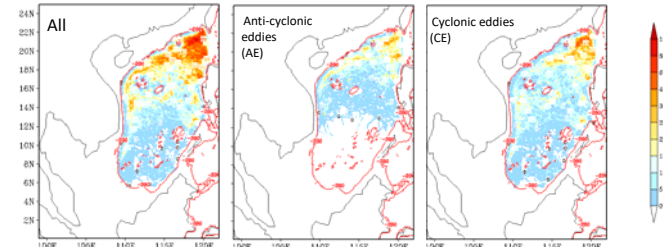


Fig.2 The first two EOFs [m] of 1993-2010 (the joint period) deseasonalized and detrended monthly SSHA from AVISO, CGLORS reanalysis, and "STORM"-simulation

"STORM" simulation proves to reproduce the SCS ocean dynamics reliably, comparable with the C-GLORS reanalysis data. More details can be found in Zhang and H. von Storch (2017).

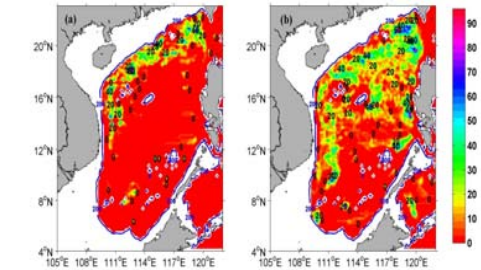
3. Travelling Eddy statistics

The occurrence frequency of eddy centers:



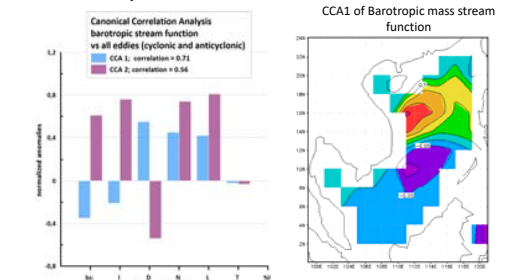
Seasonal and annual time series of eddy track number and the EI and ED of peak eddy points

4. Eddies as manifestation of intrinsic noise



Eddy occurrence for the 21 model years in the 0.2° model (a; left) and in the 0.04° model (b; right). The units are the numbers of the eddy. The blue lines indicate the 200m isobaths.

A canonical correlation analysis of aggregated eddy statistics and barotropic stream function point to a "conditioning" of eddy activity by the barotropic state



5. Summary

We have derived long-term statistics of eddy formation and lifecycle in the South China Sea using a multidecadal simulations with an Ocean general Circulation model (OGCM). There are no trends, but a clear annual cycle and inter-annual variability. The spatial variability is hardly organized, and a robust link to the large-scale current state has not yet been determined.

基于多年际的全球环流模式模拟结果，我们提取了南海涡旋形成及其成长衰减的长期统计特性。我们发现南海涡旋没有年代际趋势变化，但是有显著的年循环和年际变率。其空间变化没有显著模态，与大尺度环流状态没有显著关联

