# Supporting Information for Vertical interaction between NBC rings and its implications for South Atlantic Water export

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## Introduction

This supporting information describes the animation of the model snapshots in each layer and the eddies (cyclones and anticyclones) identified using *py-eddy-tracker* (Mason et al., 2014; Pegliasco et al., 2022, tutorial files uploaded separately).

## S1. Eddy identification animations

This section provides the animated Okubo-Weiss (OW Okubo, 1970; Weiss, 1991; Isern-Fontanet et al., 2004) maps averaged within the upper (surface–1024.5 $\mathrm{kg\,m^{-3}}$) and lower (1024.5–1026.9 $\mathrm{kg\,m^{-3}}$) layers for 2 years of our CROCO simulation. The OW is used to identify and track eddies with the following parameters:

- Identification: (i) Spatial filter: 15 km rolling window; (ii) OW range: $[-1 \times 10^{-9}$ to $-2 \times 10^{-12}]$ at a $2 \times 10^{-12}$ $s^{-2}$ interval; (iii) shape error: 50; (iv) allowed pixels: minimum 20, maximum 10000. The value of relative vorticity ($\zeta$) is then used to characterize a cyclone ($\zeta > 0$) or an anticyclone ($\zeta < 0$);
- Tracking: (i) type: Area Tracker; (ii) minimum trajectory size: 7 days; (iii) filling gaps: 3 days (6 detections) with linear interpolation.

### S2.1 Additional Supporting Information (Files uploaded separately)

- Animation S1.1: OW vertically averaged within the upper (layer 1) and lower (layer 2) layers for 2 years of the CROCO simulation. For details on eddy identification and tracking see Mason et al. (2014); Pegliasco et al. (2022) and section 2.2 of this paper.
- *py-eddy-tracker* tutorial for NBC rings

The animation, a minimal tutorial code for the NBC rings can be obtained at `https://doi.org/10.5281/zenodo.10636521`(Napolitano et al., 2024). A detailed description of the usage of *py-eddy-tracker* can be found in the documentation `https://py-eddy-tracker.readthedocs.io/en/stable/`.

## References

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