Review of

Comparison between three implementations of automatic identification algorithms for the quantification and characterization of mesoscale eddies in the South Atlantic Ocean.

J.M.A.C. Souza, C. de Boyer Mantégut and P.Y. Le Traon

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This paper reviews the performance of some of the vortex identification criteria most extended in the oceanographic community: an Okubo-Weiss based criterion, a wavelet packet based criterion and a geometrical criterion. These criteria are applied to altimetric maps that combine data from different instruments. In my opinion, this is a very relevant question for the oceanographic research since vortices are the fundamental building blocks of turbulent flows and both, satellite observations and numerical simulations, have provided large amounts of data that can only be analyzed using automatic/objective methods. Furthermore, since most identification criteria are mainly heuristic, although they may have a solid theoretical basis, the vortex size and the number of detected vortices will depend on the criterion used and the threshold applied, if any. Therefore, it is important to have a clear idea about the advantages and limitations of each criterion to select the most appropriate for a specific study.

Recomendation

In my opinion, this paper is interesting, timely and original. Therefore, **I would recommend it for publication in Ocean Science**. To complete the excellent review of the literature done by the authors I suggest to include the paper by Isern-Fontanet et al. J. Atmos and Oceanic Technol. 2003 since it provide a discussion about the link between 2D and 3D vortex identification criteria.

Principal Criteria	1
Scientific Significance: Does the manuscript represent a substantial contribution to scientific progress within the scope of Ocean Science (substantial new concepts, ideas, methods, or data)?	**Good (2)**
Scientific Quality: Are the scientific approach and applied methods valid? Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?	**Excellent (1)**
Presentation Quality: Are the scientific results and conclusions presented in a clear, concise, and well-structured way (number and quality of figures/tables, appropriate use of English language)?	**Excellent (1)**