

# ***Interactive comment on “Dynamical Connections between Large Marine Ecosystems of Austral South America based on numerical simulations” by Karen Guihou et al.***

## **Anonymous Referee #3**

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This study uses ROMS / NEMO ocean circulation models and a Lagrangian particle tracking routine to study transport of water around southern South America (1) between the deep ocean to coastal regions and (2) and between the Pacific and Atlantic coasts. The study represents a considerable amount of effort on the part of the authors and they have done a good job thoroughly exploring the models. I think the paper could be benefited by a few additional considerations.

In the Introduction the authors discuss the importance of this region from ecological, economic (fisheries) and climate perspectives. They argue that a better understanding of the ocean circulation in this region would be useful, particularly in the context of the

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movement of larval/juvenile fishes. However, the authors never really come back to this idea in the Discussion or Conclusions. It would be helpful to know how their findings are useful in that regard.

Additionally, I wonder how sensitive your results are to use of monthly averaged velocity fields. An earlier study examining the sensitivity of transport predictions to the spatial and temporal resolution of ocean circulation model output found quite large differences between daily snapshots and monthly averages at 1/12 (0.08) degree resolution (<https://royalsocietypublishing.org/doi/pdf/10.1098/rsif.2012.0979>). For instance, the daily snapshots better represented the movement of oceanographic drifters and the 30 day averages tended to over-predict offshore transport (movement from the continental shelf to oceanic waters), but the overall distances traveled were reduced. Though most of the focus of that paper was in a western boundary current region, effects were also apparent in an eastern boundary current. I would feel more confident about the results if the transport predictions were either compared to some in situ Lagrangian measurement of ocean movement (e.g., drifters from NOAA's Global Drifter Database that contains 30+ years of drifter tracks, <https://www.aoml.noaa.gov/phod/gdp/index.php>) and/or to compare results to model output with daily (or better) temporal resolution. For this type of analysis you could consider only a subset of the years/results to compare. In my view all you need to do is to identify for the reader what type of bias (if any) they are looking at.

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