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Ocean Science
Discussions

Interactive comment on "The influence of the Brazil and Malvinas Currents on the southwestern Atlantic shelf circulation" *by* R. P. Matano et al.

C. Provost (Referee)

christine.provost@lodyc.jussieu.fr

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The manuscript presents results from numerical simulations dedicated to the examination of the influence of the Brazil and Malvinas Currents on the southwestern Atlantic shelf circulation.

It is a review paper which summarizes simulations already published by Palma et al. (2008, 2009) and Matano and Palma (2008). Many of the figures have already been published

Section 2 Methods briefly presents the model used.

The three following sections cover one region of the southwestern Atlantic shelf:

Section 3 is about "the South Brazil Bight" and summarizes Palma and Matano (2009) "Disentangling the upwelling mechanisms of the South Brazil Bight" published in Cont. Shelf Res..

Section 4 is about "the Patagonia shelf" and summarizes the Palma et al. paper "Anumerical study of the Southwestern Atlantic Shelf circulation: stratified ocean response to local and offshore forcing".

Section 5 is about "the subtropical shelf front" and recalls results from Piola et al. (2000; 2008), that is results from observations and almost none from the numerical experiments. Fig.13 is incomplete: it is made of a single panel while the figure caption announces three panels.

Section 6, is a summary and discussion.

General comment:

The manuscript is interesting and I suggest it be accepted after minor revisions.

The manuscript lacks unity and accuracy. It could be improved. Respective informations from observations and modeling should be clearly exposed.

Section 2 "Methods" is ONLY about model. It should include observations (in situ and satellite). Precise comparisons with observations would have been a definite plus and demonstrate the qualities and limitations of the model. Limitations of the model are never mentioned.

Section 3 "South Brazil Bight " is ONLY model

Section 4 mentions results from observational studies. (although quite incomplete)

Section 5 is mostly observations.

Comparisons with observations are lacking particularly in section 3.

Section 6 is only model and processes. It should include perspectives. What is needed

from both modeling and observation points of view?

Moreover, the paper lacks quantification (fluxes etc..) , which can easily be done with a model.

I do not find useful to show the unrealistic numerical experiments EXP2 and EXP3 in a review paper. The corresponding figures can be removed.

Detailed comments:

Section 3:

P 842 line 10: *Winter SSTs, which are not influenced by coastal upwelling, are more homogeneous with values between 20 and 23˚C (Fig.2b):* This is right except for a coastal patch of colder water (below 20˚C) just to the south of cabo frio,at 23.5˚S and 44˚W. This patch deserves an explanation. Could the author comment about it?

The sentence l 26-20 p 843 "As shown in previous work (which one?) the circulation and density structures derived from the numerical simulations correspond well with observations" is frustrating. . .

Lateral and vertical mixing, bottom friction are key parameters in this circulation simulation. Yet they are not discussed. A comment on the sensitivity of the model results to the choice of parameterization?

Section 4:

South of 39S "there is a well-defined jet known as the Patagonian Current"

This current is not clear on Fig. 7 where there is a broad flow. It should labeled on Fig. 1 to help the reader.

The largest entrainment of deep waters is observed through the Le Maire Strait. Could that entrainment be quantified?

"observed" line 23 p 844 refers to model results and not in situ observations , right? If

so observed may not be the most appropriate word.

Figure 7: the depths corresponding to the upper, intermediate and bottom levels should be explained. Are intrusions from the MC onto the shelf observed in the data around 59˚S as shown in fig. 7c?

P 845: line 16 "The magnitude of the upwelling is proportional to the transport of the MC" Could this be tested with observations?

P 846:

line 18 : "*Imports deeper waters through Le Maire Straits and the shelf break region".* Could these imports be quantified? How large is the import through the narrow and shallow Le Maire Straits? The import through Le Maire Strait is not clear in the schematic representation of Fig.10.

Could the "offshore fluxes at the B/M confluence" and "those at the STSF " be quantified? Do they vary seasonally?

Part 6: Summary and discussion

P 850 is nice

P 849 Lines 22 -27 should be removed. Too far fetched.

What are the key issues ? What are the suggested approaches?

Interactive comment on Ocean Sci. Discuss., 7, 837, 2010.