

Interactive comment on “An observed 20 yr time-series of Agulhas leakage” by D. Le Bars et al.

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Answers to Neil Swart

"Firstly, thanks to the authors for this nice piece of work. I look forward to it being published."

We thank Neil Swart for his useful comments on our manuscript and answer all of them below.

"I have a few comments: 1) In figure 1b, what is labelled as the "GoodHope section" is not really accurate - the GoodHope section starts out westward from Cape Town near 34S, not near 30S as shown. For example see Swart et al. [2008] (<http://onlinelibrary.wiley.com/doi/10.1029/2007JC004223/abstract>). Maybe there are

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good reasons for your choice - but then don't call it the "GoodHope section".

There was an issue here in the way we plotted the section. This is now fixed. However we are aware that the section that we use extends a bit further west compared to the real "Good Hope section". We added a comment on this point: "Parcels reaching a section close to the Good Hope Section (Ansorge et al. 2005) in the Cape Basin were captured and aggregated"

"2) As for the long-term trends, we are told: "Over this short period the trends have the same sign in the model and altimetry, 0.6 Svdecade⁻¹ and 2.9 Svdecade⁻¹ respectively. But when we look at the trends in Fig 9b. they are all of opposite sign in altimetry and the model (presumably because they are from different periods). Why not include the altimetry trend over the "short" overlapping period so we can compare visually. It would also be useful to know a bit more about how the trends were calculated. I'm assuming for the model they are centered 20 year running trends, but it is not clear - for the SSH (green) they seem to extend to 1999, but this is <10 for 2007 which is the end of the model run. You could also provide confidence intervals if you want to show whether the trends are significant."

The figures are already rather full and compare time series of different lengths. We think it would be unclear to include the trend on figure 9a. This is why we decided to include the trend values in the text while mentioning which period of time they refer to.

The trends are indeed calculated using centered 20 year running trends. The SSH curve extended to 1998.5 which was not exact, as you point out, because the last point is calculated from 01-01-1988 to 01-01-2008 and the center should then be 01-01-1998. This is now fixed in the new figure 9b.

"3) Also for the trends, another possible reason for a positive trend in the model and no or small trend in the altimetry is that the model forcing is wrong. What is important here are the wind-stress fields. The CORE wind stress is derived from NCEP Reanalysis 1, and this has well known trend biases in the Southern Hemisphere winds."

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We agree with this comment, however also note that the CORE wind forcing (wind stress are calculated at runtime) is the result of observationally-based corrections. It is thus improved against the original NCEP product. To include this possibility, we modified the first sentence of this paragraph to: "This is not a surprise because of the nonlinearity of the system and possible biases in the atmospheric forcing of the model."

"4) Fig 8 caption could use "altimetry" in there just to make clear that it is not from the model."

We added this information to the caption of figure 8.

"5) Finally, is it not a surprize (dissapointment??) that the simulated transport does not show the same interannual variability as the observed transport, despite being driven with the observed forcing. This tells us something - the response to the forcing is indirect."

We do not know what relation to expect between wind stress forcing and leakage at interannual time scales, as it is strongly influenced by nonlinear processes in the system.

"There are also some small grammatical things, which are not serious, but for example in Fig. 9b caption it says "blue circles in are sensitivity a..." but it should say "blue circles are a sensitivity..." Also in the abstract: "which allows to deduce" -> "which allows us to deduce" "allows to validate" -> "allows us to validate" "does not allow to determine" -> "does not allow us to determine""

Thank you for these grammatical comments. We included your suggestions in the new version of the manuscript.

Interactive comment on Ocean Sci. Discuss., 11, 171, 2014.

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