

## ***Interactive comment on “Marine climate change over the eastern Agulhas Bank of South Africa” by Mark R. Jury***

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It was a pleasure to read this interesting manuscript about the impact of climate related changes on the Agulhas Bank. Using ECMWF re-analysis products, coupled model simulations and satellite data Dr. Jury analyzes the impact of climatic trends on oceanic variables and speculates about the potential impacts of these trends on the regional conditions. This information will not only be useful to earth scientists and students but also to policymakers.

The main criticism that can be made to this article is that although it concerns the impact of climate change on the ocean state, it does not seriously consider how changes in the large-scale oceanic circulation affects the shelf area. Instead, it focus all the

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attention on atmospheric variables. I think that the article would benefit in considering how climate related changes of the Agulhas Current might affect (through shelf/deep-ocean interactions) the shelf region. It seems reasonable to surmise that the reported (Backberg et al., Elipot and Beal, etc) intensification of eddy variability in the Agulhas C. should lead to similar changes of shelf/deep-ocean exchanges. Those exchanges are not small; in our own simulations we have observed exchanges of the order of 1-10 Sverdrups (although the along shelf transports are one order of magnitude smaller!). To put these values in context it is useful to compare them with the discharges of local rivers, which are of the order of 1-10 m<sup>3</sup>/s. That is, shelf/deep-ocean exchanges are between one million to one billion times larger than river discharges, yet these exchanges are largely ignored. My specific recommendation to Dr. Jury, therefore, is to include an analysis and discussion of these matters. I think that this inclusion will strengthen the analysis and the appeal of this article.

I found intriguing the lack of inclusion of satellite sea surface height (SSH) data in the analysis. From a dynamic point of view SSH is far more important than SST data, since it represents a deeper portion of the water column. Use of SSH data, moreover, would allow Dr. Jury to link changes in the atmospheric and oceanic circulation. I am a bit skeptical, for example, of the conclusion that a tightening of the SST gradient should necessarily lead to a steepening of the sea slope (1st paragraph of page 9).

In summary, I think that this is a very nice article that can be substantially strengthened with a more in depth analysis of the trends in the large-scale circulation and their impact on the shelf region.

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