

## ***Interactive comment on “Interannual response of global ocean hindcasts to a satellite-based correction of precipitation fluxes” by A. Storto et al.***

**P.-Y. Le Traon (Editor)**

pierre.yves.le.traon@ifremer.fr

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THIS IS THE REVIEW OF THE REVISED MANUSCRIPT BY REFEREE 1

The author's motivations are not clearly established and artificial hypothesis applied together with the method of rainfalls correction contaminates largely the interpretation of the results, this paper is then not suitable for publication. Here are the main reasons why the paper should be largely reconsidered.

### **MAJOR POINTS**

1) Method of correction We have to find the response in the specific points and the ex-

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planation remains unclear. We still don't know if the good set of corrected precipitation has been used in the subsequent diagnostics.

2) Impact of EMP redistribution Authors give their motivations for zeroing E-P-R at each time step in the AR2 response. Authors argue unrealistic drift prevents the study of an interannual signal, this statement is wrong, even with a trend the interannual variability of the SSH can still be studied; and, more, a sea level trend is present, then zeroing E-P-R will give no chances to understand/capture this global trend. They argue also the use of this model for reanalysis application but altimetry assimilation is another point which is beyond the scope of this paper. Even if, for the assimilation strategy, I can understand the EMP term needs to be balanced. An easy solution would be to perform experiments without this redistribution. And, if the cost of the experiment is too expensive, performing experiments at lower resolution should handle the main results.

3) Impact in the Southern Ocean Authors recognize the major impact of the EMP redistribution in the ACC. Clearly, correcting only the precipitations field won't give such impacts (it's obvious in Figures 2 and 3 of AR2's response for instance). Also, the positive impact of this redistribution in the ACC is attributed to the bias in the evaporation field (even if evaporation estimations from PMWC in these regions are far from being reliable) but, first, the freshwater field is not uniformly distributed in the oceans south of 60°S and, secondly, part of this freshwater bias could also come from an underestimation of the increasing melting ice sheets as the model uses climatological runoffs. If this redistribution has such an impact on the Southern Ocean, this should have also a (large?) impact on stratification and sea ice over Arctic Ocean, area where precipitations are fairly weak.

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