

Interactive comment on “Forecast and analysis assessment through skill scores” by M. Tonani et al.

M. Tonani et al.

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We thank the referee for pointing out missing elements in our study. We think we have answered all the comments and the paper is improved. We start by addressing answering the general comment and then the specific comments. A revised manuscript has been submitted to OS, a paragraph has been added to ch. 4 and all the figures have been redrawn.

GENERAL COMMENTS Referee: ...the results presented in this paper fall far short of what should be, and could be, a more rigorous assessment of the model's performance. Furthermore, the paper presents only the "forecast assessment" but not the "analysis assessment" as indicated in the title... Answer: We thank the referee for pointing put these limits in our work. As you have suggested, we have included a paragraph in section 4 in order to consider the analysis assessment. The period of study has been

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extended to one year and we have included other measures such as the bias and the anomaly correlation.

SPECIFIC COMMENTS 1) Referee: Considering the fact that the paper was submitted in Feb 2007, is there some particular reason why the authors restricted their assessment to only 22 forecasts when they could have used a much longer period (perhaps even an entire year)? Answer: We have extended the period to one year.

2) Referee: Since the forecast assessment is based on a comparison to the analyzed fields (as opposed to real data), it is very important to include here the "analysis assessment" (note the title of the paper) in which we are given some indication of the magnitude and behaviour of the errors associated with the data assimilation system. If this assessment is given in a companion paper, then at least a clear reference to that paper and a brief summary of the performance of that system should be repeated here. I have no problem using the analysis fields as truth as long as we know something about their quality. Alternatively, they should include a validation based on the data, but this too has its pitfalls as the data are incorporated through the data assimilation system (unless there are some independent data available). Answer: We have added in section 4 the assessment of the analyses against independent and quasi-independent observations. We have modified figure 2 which is now composed of three different panels (2a, 2b and 2c) and added table 1 in order to describe this part of the assessment.

3) Referee: The validation of the forecasts is restricted to the rmse and the rmse based ssp. Model evaluations of this type usually include, in addition to rmse, some measure of the bias (mean error) and some measure of the anomaly correlation score (acc). While rmse measures the domain averaged accuracy of the forecasts, acc tells us something about the spatial skill and the ability of the model to forecast the anomaly patterns. Answer: We thanks the reviewer for this suggestion. We have included the measure of the bias and anomaly correlation in this study.

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4) Referee: Their definition of "persistence" (Eq. 2) is rather strange. Usually persistence is used as a minimum skill forecast which the model must beat in order to have predictive value. Thus $\text{rmse}(\text{persistence})$ should be defined (in the author's notation) as $\text{Rms}(t) = \text{SQRT} [\text{SUM} (X_a(t=1) - X_a(t))^2 / N]$, i.e., persistence is a forecast in which the initial conditions are persisted, but which should be compared to appropriate analysis at the later verification time. I do not understand the meaning or significance of FP as they defined it in Eq. 2 in which they compare the evolving forecast fields to the initial conditions. Subsequently, all of the evaluation of model performance with regard to persistence is highly questionable. Answer: We have reformulate equation 2 taken into account this comment and we have explained in section 4.2 the meaning of AP and FP.

5) Referee: In the first two paragraphs of Section 4.1, the references to Figures 3 and 4 are reversed. Answer: We have taken this remark into account.

6) Referee: In the paragraph that begins at the end of p.195 the authors present the normalized rmse of the near surface atmospheric fields that are used to force the model. They note that the decay of the atmospheric forecast skill (i.e., increase in rsme) is nearly linear and based on the similar growth of the ocean model rsme (FA) they conclude that the inaccuracies in the atmospheric forcing are the main source of error. I am not at all convinced by this simplistic explanation. One must recall that the model is forced by wind stress and heat flux components, all of which are nonlinear functions of the meteorological variables that they assess. This is probably further compounded by comparing normalized rmse of the atmospheric forecasts with absolute rmse of the ocean forecasts. Answer: We thank the referee for this remark. We have also computed the rmse Analysis-Forecast for the flux of heat and momentum of the model in order to estimate the impact of the atmospheric forcing on the model. We agree with the point you raise, and have rephrased the sentence.

7) Referee: On p. 199 line 9, I believe they mean "effective" and "ineffective" rather than "efficient" and "inefficient". Answer: Thanks for the remark. We have rephrased

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the sentence

8) Referee: Page 199, line 14. I would prefer to see a somewhat more rigorous definition of "predictability limit" rather than a simple eyeball assessment of the "saturations" of the rmse curve. Answer: Thanks for the remark, the sentence has been re-formulated. 9) Referee: The list of references should be arranged alphabetically. Answer: We have taken this remark into consideration.

10) Referee: Some of the figure, such as the right panels of Fig.2 are unreadable. Answer: We have redrawn all the figures and they are now readable.

11) Referee: The entire manuscript can use a good editorial reading for spelling mistakes, grammatical errors, and missing words. Answer: We have revised the entire manuscript.

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