

## ***Interactive comment on “S<sup>4</sup>CAST v2.0: sea surface temperature based statistical seasonal forecast model” by R. Suárez-Moreno and B. Rodríguez-Fonseca***

### **Anonymous Referee #3**

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This study nicely introduces a statistical prediction model designed to account for non-stationary behaviour. I have a few concerns about presentation of the results that are detailed below. Beyond that I would like to see a discussion of how to determine whether you are in a statistical significant or not statistical significant period. In other words, explain how one can determine that a forecast is likely to be skilful? The useful application of such a model requires that the user can determine whether a skilful forecast is possible. I feel it this point is not adequately discussed in the paper.

Detailed comments

1. p3980, S15, what do you mean “particular institution”
2. p3981, s10, it should

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be “if the forecast”. Same section, I find the explanation of lead time hard to follow. In particular, is a synchronous prediction really a prediction. After all, the even has already occurred. Also, I am not why partially overlapping seasons are of interest (i.e., is it relevant to predict JAS rainfall with data for JJA. 2/3 of the seasonal mean should be already observed. Furthermore, why is AMJ also considered zero lag? Isn't this a one season lead forecast? 3. Pg 3981, s25, It is not clear to me why you would apply a low-pass filter and then use the model to predict seasonal variability. Furthermore, the statistical model would be developed using information from future data, and so it is also not so clear how you would apply the model in forecast mode. Is the filter only used for computing the statistical relations, and then applied to the raw data. Please explain. 4. pg 3982, s10, again it is not clear why you refer to AMJ as zero lead forecast of JAS. 5. Pg 3983, S15, I am not sure what the purpose of centred or advanced correlation coefficients are considered. To me only the delayed makes sense in a forecast context. I assume this analysis is used for defining the SC/NSC periods. In which case you should clarify that you are not specifically discussing predictions. 6. P3984, S10, shouldn't this be “leave-one-out”? 7. Pg 3987, S5, Is the filtering only applied for deriving the model, or is it used in the predictions, and if so what is the impact of the filtering on the end points and resulting forecasts? 8. Pg3987, s10, I do not really understand the model used in the synchronous selection. Do you have three models: one for each of the three possible overlapping seasons? Or do you construct a statistical model using all three seasons as predictors? If so, how can you compare synchronous and asynchronous prediction (using only one seasons of data for the predictor)? 9. Fig 3 caption, it would probably be useful to use more descriptive terms in the figure caption than SL0 and SL1. 10. Pg 3989, top, If I understood correctly, the MCA is repeated for the NSC period. If there is no significant correlation in the Sahel box, does this simply indicate that the leading mode does not explain much variance in rainfall in the box, even if it is the mode that should maximise the correlation between predictor and predictand fields? It could be useful to clarify why there is no correlation in the rainfall box. 11. pg3990, s15, The correlations shown in figure 8 indicate negative

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skill. If this is systematic, then actually multiplying the forecasts by -1 would give you skill? Does this imply that there is useful information in the NSC period or is there an issue with the significance test? 12. pg3990, s20. This should be figure 9. 13. pg3992, bottom, the paragraph is not very precise. I guess you mean skill in the second sentence, but actually it is not clear for what region/phenomenon/index you are discussing. For ENSO, dynamical models are beginning to outperform statistical systems. I believe this is described in a recent BAMS papers by Barnston et al. 14. pg 3993, s15, this should be "hierarchical Bayesian methods being one ..."

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Interactive comment on Geosci. Model Dev. Discuss., 8, 3971, 2015.

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