

## ***Interactive comment on* “Impact of the sea surface temperature forcing on hindcasts of Madden-Julian Oscillation events using the ECMWF model” by E. de Boisséson et al.**

**E. de Boisséson et al.**

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Dear Dr Remy,

First I would like to thank you for your comment. I attached to this reply a revised version of the manuscript and new figures. The structure of the manuscript has changed for, hopefully, a better clarity and also more physical description of the MJO and of the results. Details have been added in several sections in order to adapt to readers that would not be “so familiar” with the MJO.

This reply is made on behalf of all my co-authors and can be considered as an official revision of the paper. In the following, the answers to your comments:

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## General comments

> “This article addresses the sensitivity of the MJO model forecast to different SST products. The Madden Julian Oscillation is an intraseasonal oscillation, representing an important mode of variability in the tropics. Its mechanism is still not fully understood. The role of the ocean in the MJO is an open question: does it just responding to the atmospheric forcing or does it actively contributes to the MJO. A large panel of experiments using different SST products to force the ECMWF atmospherical model is presented. It allows testing the MJO forecast sensitivity to different parameters. A new observation based SST product, OSTIA, is tested.”

In the revised version, the AVHRR-only SST reanalyses is also tested in order to give more weights to the results.

> “A weakness of the paper is the lack of a clear description of the context as well as a clear physical description of the hypothesis tested in this study. The experiments done can be more “valorize” given more physical interpretation of the results.”

New paragraphs have been added in the introduction in order to describe more the context of the study. New experiments, including a coupled run, have been performed in order to improve the physical interpretation of the results.

> “More emphasis on the potential role of the ocean and underlying assumption tested in this study could be interesting.”

The comparison to a series of coupled MJO hindcasts has been added to the paper to show the importance of the ocean-atmosphere interactions on the simulation of the MJO.

## Specific comments

> “Introduction: More physical insights could be given to justify the study and set it in the current research context. It also should replace the numerical experiments in this context and expose the possible limitation of the study. For example, it will help justify

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the choice of 32day long experiment, explain the physical links and then phase relationship between the wind, SST, OLR and convection.”

Two paragraphs on air-sea interactions in the context of MJO have been added in the introduction. 32-day long forecast are the operational configuration of the ECMWF monthly forecast system that is used to forecast the MJO. This is now mentioned in Section 3.1 of the new manuscript. A description of the phase relationship between winds and OLR (and thus convection) has been added in Section 3.2 together with additional details on the EOF analysis used to evaluate the MJO hindcasts.

> “Model: How “realistic” is the ERAi reanalysis in terms of reproducing the MJO (propagation and intensity) as it use as reference to evaluate the different experiments presented in the paper?”

It is difficult to answer this question as there is no global observations of the winds at 200hPa and 850hPa. However, the paper from Dee et al (2011) describing ERA interim showed that the MJO signal in the new reanalysis is much better than in the previous reanalysis. The initial conditions from ERA interim also provide better MJO predictions. Moreover, when analysing the phase relationship between SS and OLR, the ERA interim OLR gives similar results as the NOAA satellite OLR, suggesting that the two OLR products are very similar on intraseasonal time scales. The manuscript has been modified to take these informations and your comment into account (see Section 3.2).

> “Experiment settings: The citation of the IFS cycle (36R4) is useless unless explained or referenced. As the Ocean Science journal readers can be not so familiar with specifically related vocabulary to atmosphere, a particular attention should be given to reduce the number of acronym and specific terms, like ISV, even if they are once defined.”

The citation of the IFS cycle (36R4) is now referenced as readers who are actually familiar with the ECMWF system may be interested. The acronym ISV has been removed, but we chose to keep MJO, OLR ans some others to stay concise.

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> “A short physical interpretation of the first 2 EOFs could be helpful for a better understanding of what physic is represented or not with such criteria used to validate the simulations.”

This description has been added in Section 3.2 where the EOFs are described.

Technical corrections

> “Typing errors: L14 p2536: respect - L1 p2537: difficult - L24 p2544: experiments.”

These corrections have been taken into account.

I would like to thank you again for your comment.

Best regards,

Eric de Boisseson

Please also note the supplement to this comment:

<http://www.ocean-sci-discuss.net/9/C1157/2012/osd-9-C1157-2012-supplement.pdf>

Interactive comment on Ocean Sci. Discuss., 9, 2535, 2012.

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