



Interactive comment on “Wavelet-based spatial comparison technique for analysing and evaluating two-dimensional geophysical model fields” by S. Saux Picart et al.

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Received and published: 2 February 2012

The authors would like to thank the reviewer for the helpful comments and questions. We have addressed them all and try to improve the manuscript accordingly.

Some general and some specific comments

This is a useful adaptation/improvement of a powerful validation technique which
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should be of use to the scientific community.

However the method completely ignores the question of bias between the datasets being compared. This is billed as a positive aspect of the method because it allows the user to better investigate the spatial structures but this is not explained enough.

I think this should be expanded on a little further - in particular explaining why we should want to ignore the bias to compare spatial patterns.

It is also worth mentioning the fact that biases between datasets can be inferred from the results of this method by comparing the relative sizes/values of the quantile ranges for each dataset.

This has now been made clearer in the revised version of the manuscript. The following paragraph has been added at the beginning of the discussion:

"When comparing model output to another dataset, one may observe differences in the characteristics and possibly in the shape of data distributions. However, the model can still show some skill in representing relative patterns such as extreme events for example. It is therefore important to use a methodology which will be able to highlight the skill of the model without being affected by the bias or the data distribution shape. The bias can be studied separately using simple classical methods but it is worth noting that one can compare the size and mean value of quantile ranges to study it in more detail (for each quantile range separately)."

Some other points to consider are:

- 1. Inclusion of Briggs and Levine (1997) in literature review to show that these wavelet techniques are older than Casati et al. (2004) (most of the cited texts are post 2004).*
- 2. I think that Casati et al. (2004) should really be referenced in the abstract rather than simply saying “A methodology has recently been developed”*
- 3. Do we need quite so many plots in Figs. 4 and 5? I think the point could be made with many fewer images if space was tight.*

1. Briggs and Levine (1997) has been added in the introduction.
2. We have voluntarily avoided to put any reference in the abstract because we feel the abstract should be a stand-alone statement. However we have change the sentence to make it a bit clearer: "This work builds on a published methodology, that evaluates precipitation forecast using radar observations based on predefined absolute thresholds"
3. We appreciate the comment of the reviewer about figure 4 and 5, but we believe that all the plots are useful for the reader to fully understand the benefits of using the quantile range definition. As far as we know space is not tight, but this will have to be checked at a later stage.

Mathematical corrections

3167-12: *Should be "[V^{0%}, V^{20%}]" rather than "[V^{0%}, V^{20%}[".* If the "]" is meant to signify strictly less than (i.e. not equal to) then the terminology "[V^{0%}, V^{20%})" would be preferable.

This has been changed in the manuscript.

3167-17: *It might be worth explicitly defining quantile ranges $[X^{q_1}, X^{q_2})$ here and mention that you call these q later?*

This has been taken into account in the manuscript.

3167-17: *The RHS of equation (4) uses the strange terminology $W_{father}^{l,q}$ and $W_{father}^{l-1,q}$ which are not consistent with the rest of the paper. I would recommend changing this*

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to $W_{father}^l(Zq)$ and $W_{father}^{l-1}(Zq)$ to be consistent with the LHS of this equation - and equation (3) above.

This has been changed in the manuscript

3169-1: *You could tie this into the definition in 3167-17 above?*

This has been taken into account in the manuscript, and definition of Z_q has been moved up.

3169-11: *The sum on the RHS of equation (5) has two upper limits! The ", q" should be removed*

q has been removed from equation 5.

3169-16: *I am left unsure what the summation notation is doing in equation (6). In particular what indices/ranges are these quantities being summed over? Is it summation over the whole domain? Or should it be using the $\langle \cdot \rangle_{2^l \times 2^l}$ averaging notation? This should be cleared up.*

The summation signs here means: summation over the whole domain. This is now explained in the text bellow equation 6.

3170-6: *Equation (8) is missing an L from the top row (or $1/L$ on bottom as is in Casati et al.). This has already been corrected by the authors in response to a public comment.*

This has been changed in the revised manuscript.

Figure corrections

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Figure 2b is incorrect and is just 2a replicated. I note that the correct image has been subsequently added by the authors.

It has now been included in the revised manuscript.

Minor corrections (spelling/grammar etc.)

All minor corrections have been taken into account in the revised manuscript. We are very grateful to the reviewer for having taken the time to list them all, it greatly helped improving the readability of the manuscript.

Interactive comment on Geosci. Model Dev. Discuss., 4, 3161, 2011.