

## **Responses to two reviewers:**

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## Response to RC1

We thank the editor and the reviewers for their careful reading of our manuscript and for their constructive comments. The suggestions have helped to improve the clarity and presentation of the paper.

Below, we provide point-by-point responses to all reviewer comments. Reviewer comments are reproduced in italics, followed by our responses.

Comments for further clarity:

*In Algorithm 1: what is  $S[2]$ ?*

Response: We added an explanation of the notation  $S[2]$  used in Algorithm 1. See L154-155.

*L117: rather than  $N0 + 1$  with sufficiently small  $r$  or other observation conditions.*

Response: Thank you for the suggestion. We added the conditions for more appropriate statement of our results. See L117.

*L195: To evaluate the ..., we define...*

Response: Thank you for pointing out the grammatical error. We revised it accordingly. See L196-197.

*L203: As explained in Sect. 1*

Response: We revised it accordingly. See L204.

*L204: the filter accuracy in Eq. (19)*

Response: We revised it accordingly. See L205.

*L204: Do you mean that ... the expectation of SE is of the order of  $r^2$  but the squared expectation of RMSE...?*

Response: We mean that the following two condition is not equivalent:

- (1) the expectation of SE is of the order of  $r^2$ .
  - (2) the squared expectation of RMSE is of the order of  $r^2$ .
- (1) Implies (2) , but (2) does not necessary implies (1).

*L246: ... works effectively under the small  $r$  assumption because ...*

Response: We revised it accordingly. See L247.

*L247: To allow for a relaxed condition of using large  $r$  with  $m = 14$ , we examined an alternative condition...*

Response: Thank you for the suggestion. We revised the sentence accordingly. See L248-249.

*L369: ... this does not contradict the condition for filter accuracy*

Response: We revised the sentence accordingly. See L328.

## Response to RC2

We thank the editor and the reviewers for their careful reading of our manuscript and for their constructive comments. The suggestions have helped to improve the clarity and presentation of the paper.

Below, we provide point-by-point responses to all reviewer comments. Reviewer comments are reproduced in italics, followed by our responses.

*The abstract is significantly improved. However, I would suggest to tune down the sentence:*

*"Numerical experiments with the EnKF applied to the Lorenz 96 model indicate that the minimum ensemble size required for filter accuracy satisfies  $m^* = N_+ + 1$ ."*

*to "Numerical experiments with the EnKF applied to the Lorenz 96 model indicate that the minimum ensemble size required for this filter accuracy satisfies  $m^* = N_+ + 1$ ." Otherwise, the claim is still confusing with respect to the literature, at this early stage when reading the paper.*

Response: Thank you for the accurate comment. We revised the abstract accordingly.