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Nonlinear Processes in Geophysics
Discussions

Interactive comment on "On the localization in strongly coupled ensemble data assimilation using a two-scale Lorenz model" *by* Zheqi Shen et al.

Anonymous Referee #1

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The paper discusses localization in strongly coupled data assimilation systems. The authors use a two-scale Lorenz model to develop their technique and prove their idea through twin-experiments. 1- In general, the paper is not well-written. The grammar and the structure of the sentences is quite weak. There are a lot of language mistakes that I can't even list here, for brevity. If this to be reviewed and submitted again, I strongly encourage editing the manuscript by a native speaker. 2- Furthermore, around 80% of the paper is based only on academic information that the community is aware of, with little to no novelty. The only new idea is found in Section 3.3 where the authors propose a cross-domain localization strategy for SCDA. However, even that seems to be model specific and may not be generalized for realistic atmospheric applications in

my opinion. 3- The assessment of the results is poor. I wasn't sure if the authors are reporting forecast or analysis errors. Also, the RMSE on its own is often not a very good metric to assess a new assimilation/localization strategy. I wanted to see how the authors choice of equations 10 and 11 affect the ensemble spread evolution. 4- Related to point #2, I suggest the authors test their method in a large model assimilating real data. This at least will improve the quality of the manuscript given the lack to any theoretical developments. 5- Sections 2.3 and 3.1 can be removed or summarized. The EAKF equations can be referenced and the same goes for Gaspari-Cohn function and localization in general. Based on the above evaluation, I recommend rejection of the paper!

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