

Interactive comment on “Variational data assimilation with superparameterization” by I. Grooms and Y. Lee

Anonymous Referee #2

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This paper addresses the important but often overlooked problem of having observations which contain both slow and fast features. The authors employ here a superparameterization model of a modified slow-fast Lorenz-96. The author's main focus is to design a data assimilation procedure which works in the context of superparameterization. Here the authors employ a 3D-VAR filter and report the analysis and forecast skill of their filter. The forecast skill is compared with the skill obtained if only the observations and the climatological means were taken.

The analysis has been done carefully and the manuscript is interesting and well written. I recommend publication subject to minor corrections:

Comments:

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I would find the results more convincing if their filter using SP were compared to standard techniques for the full true model (an ensemble filter would be feasible in this situation), rather than just comparing with the observations and the climatology.

page 518: In what sense is 'the assumption that they are uncorrelated [is] reasonable'? Could the authors elaborate on this?

pages 527/528: On page 527 the climatological mean value of X_k is 3.8 and 3.6, and on page 528 it is 0.57 and 0.53, respectively.

The figure labels should be increased.

Interactive comment on Nonlin. Processes Geophys. Discuss., 2, 513, 2015.

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