

Interactive comment on “Data-driven versus self-similar parameterizations for Stochastic Advection by Lie Transport and Location Uncertainty” by Valentin Resseguier et al.

Anonymous Referee #1

Received and published: 26 November 2019

In this study, the authors focused on the common challenge of the stochastic subgrid parameterization schemes: the unresolved velocity construction. Two kinds of parameterizations, data-driven and self-similar parameterizations, were applied to LU and SALT frameworks. The results show that these two parameterizations can lead to high quality ensemble forecasts. In my opinion, the main innovation of this study is the proposal of the self-similar parameterization, which improves the work of Resseguier et al. (2017b). Although this manuscript may be suitable for publication in NPG, there are still some issues to be addressed.

1. Recently, many parameterizations are available. In this study, the authors proposed

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a new self-similar parameterization. I know that its advantage is tuning-free. However, more interestingly, when this parameterization is used to the numerical models, whether the improvements of the simulations or forecast are significantly enhanced, comparing to other parameterizations, especially for the one of Resseguier et al. (2017b).

2. Figure 7 shows that the patterns obtained by the data-driven and self-similar parameterizations are similar to that in the Low-resolution deterministic SQG model at day 110. This means that, for the short-term simulations, the stochastic subgrid parameterizations have very weak improvements on the low-resolution simulations?

3. The authors tested the two parameterizations in the SQG model. This model is very simple. Please discuss how to apply these parameterizations to the complicated atmosphere and ocean models.

4. In this study, the term “SALT-LU” appears frequently. In my opinion, this term may mislead readers. They can think that the authors aimed at combining the SALT and LU parameterizations.

5. Lines 47 and 51. in (Gay-Balmaz and Holm, 2018)→ in Gay-Balmaz and Holm (2018); in (Cotter et al., 2018b, a) → in Cotter et al. (2018b, a)

6. Line 126. Two vertical lines were not plotted in the left panel of figure 1.

7. Line 401. Similar results UQ results→ Similar UQ results?

Interactive comment on Nonlin. Processes Geophys. Discuss., https://doi.org/10.5194/npg-2019-54, 2019.

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