

Geosci. Model Dev. Discuss., referee comment RC1  
<https://doi.org/10.5194/gmd-2022-133-RC1>, 2022  
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## Comment on gmd-2022-133

Anonymous Referee #1

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Referee comment on "Data assimilation for the Model for Prediction Across Scales – Atmosphere with the Joint Effort for Data assimilation Integration (JEDI-MPAS 1.0.0): EnVar implementation and evaluation" by Zhiquan Liu et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-133-RC1>, 2022

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The manuscript showcases an integration between the MPAS model with the JEDI data assimilation system. The authors focus on the evaluation of EnVar performance when assimilating various subsets of observations. By incrementally increasing the number of satellite radiance observing systems, the authors establish the robustness and correctness of the integrated JEDI-MPAS system. A highlighted component in the manuscript is the JEDI-MPAS's capability of assimilating all-sky microwave radiances to update the hydrometeor analyses.

In general, the manuscript is well-written and properly supported. The implementation of JEDI-MPAS is of significant importance to the community and is suitable for the scope of Geoscientific Model Development.

Minor comments:

- A more detailed caption for Figure 1 is required for standalone comprehensibility.
- Figure 2 has quality issues.
- Please refer to the GMD style guide
  - Avoid the use of hyphenate modifiers containing abbreviated units. This includes "6-h" (e.g., line 240, 275 ), "30-km" (e.g., line 237, 241, ), etc
  - Numbers that begin a sentence should be spelled out or reformulated (e.g., line 243, 412, 416).
  - The units of physical quantities in the denominator should be formatted with negative exponents (e.g., m/s should be  $m\ s^{-1}$ )
  - Equations should be referred to by the abbreviation "Eq." and the respective number in parentheses (e.g., line 118, 161, 190, ).