

Geosci. Model Dev. Discuss., referee comment RC1
<https://doi.org/10.5194/gmd-2021-289-RC1>, 2021
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Comment on gmd-2021-289

Anonymous Referee #1

Referee comment on "Assessment of the data assimilation framework for the Rapid Refresh Forecast System v0.1 and impacts on forecasts of a convective storm case study" by Ivette H. Banos et al., Geosci. Model Dev. Discuss.,
<https://doi.org/10.5194/gmd-2021-289-RC1>, 2021

General comments:

The paper is overall well structured, clearly described, and provides a succinct evaluation of a single use case used for tuning some parameters of RRFS. My one critical comment here is that the title may be a bit misleading, and should be modified if possible (something along the lines of '*... on forecasts of a convective storm case study*'). As it stands, readers are at first likely expecting a larger, more comprehensive, data assimilation evaluation paper consisting of multiple case studies and deeper analyses. To be clear, this single case study paper is useful, but the correct expectation should be set with the title.

Specific comments:

- GSI is capable of hybrid 4DEnVar. Is there a reason this flavor of DA was not included in the comparisons?
- For those not familiar with how rapid refresh systems are typically cycled, why is it necessary to perform a periodic cold start even though hourly DA is performed?
- You mention the great importance of tuning localization parameters but only vertical localization is tuned, why is it assumed that the default horizontal localization does not need tuning?

technical corrections

- At first I was confused by the different version numbers RRFsv1a/RRFSv0.1, perhaps it would be useful to clarify early on that these are the physics suite / cycling system
- 64 - define what the "convective gray zone" is for readers who might not be unfamiliar
- 92 - "as good" -> "as well"