

Earth Syst. Sci. Data Discuss., referee comment RC2
<https://doi.org/10.5194/essd-2021-217-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on **essd-2021-217**

Anonymous Referee #2

Referee comment on "Development of East Asia Regional Reanalysis based on advanced hybrid gain data assimilation method and evaluation with E3DVAR, ERA-5, and ERA-Interim reanalysis" by Eun-Gyeong Yang et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-217-RC2>, 2021

1, Title. Suggest the authors change it. If it is the development of EARR, the information of input observations data quality or evaluations of more variables/indexes during the whole 10 years 2010-2019 should be included in the figures, but not only 201701 and 201707 mainly in Fig 2-4, 7-13 and only 2017-2018 in Fig 4-5. If it is the development of AdvHG, the innovation contents from your own group should be included in 2.2.2 (page5-8), otherwise, they are all the approaches you could adopt, but not develop. The main contents of the paper is evaluation in 2017-2018, including the method, results and usage in EARR, so maybe it is more suitable to call the title like "Evaluation of EARR based on AdvHG", for your reference. If more figures of longer time series results could be replaced here, it is better. Anyway, the results are not enough, the period is short. The representativeness of the result is limited, comparing with the ERA (2010-2019).

2, horizontal resolution, 12km. It is suggested to mention the raw description of model/DA like other reanalysis, for it is not the same resolution anywhere in the global. Add the information only once in 2.1, like in line 84 (540*432 grid points), it is suggested.

3, 1. introduction. The motivation is described well enough here, like a full story, while the scientific background introduction is not enough, not like an excellent scientific introduction in a paper.

4, 2. system. Line 83-85, the sentence is not right, Fig 1 is the domain.

5, Line 134-140, what is alpha in EQ 7?

6, The authors make great effort in the DA approach, while what is the characteristics in East Asia of the EARR, comparing with other regional reanalysis, considering of the terrain, climate state like monsoon. In this scope, 50% is cover by the ocean, how is the ocean-land-atmospheric coupled here or just simply depends on all in WRF?

7, Line 160, it is wrong here to mention QuikSCAT which is 199907-200911, it is not in 2010-2019. For your reference: (1) Coriolis/WindSAT (20070813-20120804) from CFSR prepbufr, (2) Oceansat-2/OSCAT (20091215-20140220) KNMI reprocessed but not in CFSR, (3) MetOp-A/ASCAT (20070101-20140331 KNMI reprocessed , GTS data till present in GDAS), (4) MetOp-B/ASCAT (20140408-present in GDAS). You may not use reprocessed ASCAT wind, but it is used in ERA5.

8, 4. Result, it is suggest to shorten the results to 60%. The emphasis is how good is EARR but not ERA5. There are many sentences/paragraphs with the subject of ERA5 but not your reanalysis. Like line 235-256, 260-262, 290-291, 328-331, 410-412, 449-452, 520-521. And the difference between ERA5 and ERA-I could be shorten like line 265-270. Pay more attention in how good EARR but not how is ERA5 like line 357-363. The order of the results from different reanalysis is also important. Line 312-314 is good in expression.

9, Line 324, except for strong thresholds, how is strong? >4 mm/6h? how is week?

10, Fig 7, Line 346-348, results of AdvHG in Jan is better than in Jul, FBI closer to 1. Different FBI results in Jul are larger than 1 (over-forecast) more than in Jan, more difficult to improve for summer than winter. Index ETS and FBI are more difficult to handle and analysis than POD and FAR which is better when it is larger and smaller, separately.

11, Line 354, (Figs. 8a and b), is it right? 8b is FAR.

12, 6. Summary, it is not concise in this paragraph.

13, Reference, line 608-614, it is repeated, please delete. Line 621-622 seems with larger font size.

14, Fig 2, is it the result of all EARR domain? Jan and Jul shown in Fig 2-6 while YYYYMM or YYYYMMDD shown in Fig 7-11, it is suggested to use unified expression. Fig 6, Temp revised to T like Fig 2.