

## Author's Response

Dear Dr. David Carlson,

On behalf of all co-authors, I appreciate you and the reviewers for reviewing our paper (entitled “East Asia Reanalysis System (EARS)”, essd-2022-429) and providing valuable and insightful comments that led to possible improvements in the present version. We have carefully considered the comments and tried our best to address every one of them, and the manuscript has been revised accordingly. For your convenience, we have also uploaded a version with tracked changes. An item-by-item reply to the Reviewers is shown as follows.

I look forward to hearing from you soon.

Sincerely yours,

Dr. Jinfang Yin

April 14, 2023

## Response

1. Line 165: Users might need citation for the 2014 assessments?

**Answer:** Thank you very much for your kind suggestion. Before generating long-term reanalysis, one-year (2014) test reanalysis data was generated and validated. Although the test data supported our subsequent work, we did not expend the effort to release it. Readers may refer to the reports of Yin et al. (2019) and Liang et al. (2020) for some results.

2. Line 174 (and later, Line 189, line 193, 194, 232, etc.): as both reviewers noted, with previously-unavailable data mentioned as strong feature of ERAS, they really need more information about QC for newly-assimilated observations? In addition to reference in individual sections (surface, radiosonde, radar), include a summary statement about unique aspects and challenges of additional local data? Show readers/users how you have added benefit while incorporating standard QC functions? Perhaps in conclusion section? Review ESSD guidelines (at <https://www.earth-syst-sci-data.net/10/2275/2018/>) to ensure you have met all expectations.

**Answer:** Thank you. It's a good question. We already explained in Section 4 (Lines 476-484) as follows.

“An important feature of the EARS is the use of a large number of observations from CMA. Compared with IGRA version 2, more than 33 operational radiosonde observations over China were used. Besides, more radiosonde vertical-level observations were included by merging logs of old records. Moreover, radiosonde observations from field experiments over China were also employed. A large number of aircraft observations and surface (over land and sea) hourly observations over China were utilized. Note that only a small portion of the observations has been shared in the GTS. Another characteristic is the application of over 200 Doppler radar observations and the cloud-derived wind vector datasets from Fengyun-2 geostationary meteorological satellites.”

3. Line 178 (): readers will need assurance of availability at CMA!

**Answer:** At present, the website is maintained by the China Meteorological Administration (CMA). Readers are free to register and download most of the data. Although all data is placed online, some data needs (e.g. radar observations) require further requests before they can be accessed. It should be emphasized that the use of the data is under the regulations of the CMA.

4. Line 242: Need clarification / changed language here?

**Answer:** Thank you for your kind reminders. We revised the sentence as follows:  
“Note the number of radar observations shows obvious seasonal various because some radars were switched off in cold seasons due to the absence of weather processes.”

5. Lines 290 and following (again at line 458): comparison here to data from single radiosonde station during July 2016. How differs from earlier comparison mentioned for 2014?

**Answer:** Generally speaking, the results in the present study are close to those in earlier comparison of the test reanalysis data in 2014. This is understandable as the East Asian reanalysis system (EARS) has been frozen since then. The radiosonde observations were carried out in July 2016 in the central Taklimakan Desert, Xinjiang Uygur Autonomous Regions, China. The central Taklimakan Desert is far from other observation sites and the data were not applied to any reanalysis systems. Therefore, we took the radiosonde data as independent observations.

6. Line 388: Need clarification / changed language here?

**Answer:** Thank you very much for your kind suggestion. We revised the sentence as follows:  
“The RMSEs for  $Q$  decrease rapidly with increasing height and approach zero near 200 hPa.”

7. In a few figures (e.g. Fig 7), panels (a, b) mentioned in legend do not appear in graphics? Please assure that readers find accurate representations?

**Answer:** Thank you for the kind reminder. Fig. 7 has been updated. We have double-checked the figures to ensure that all figures are correctly labeled.

8. Users will need clearer guidance about what data products to find and use from Zenodo vs CMA. Provide clarification in data availability section?

**Answer:** We have revised data availability section accordingly to make it clearer. In order to effectively share the EARS reanalysis data, several ways were taken to promote the data. A Digital Object Unique Identifier (DOI: <https://doi.org/10.5281/zenodo.7404918>) was applied based on the *Zenodo*. One of the advantages is that we can provide details of EARS in English, and can keep them up to date. However, the total volume of the EARS data exceeds the volume that could be provided by Zenodo. Therefore, we have to host the data at the CMA Data-as-a-Service platform (<http://data.cma.cn/>). It should be noted that only a general description of the ERAS can be given on the CMA website in Chinese. Therefore, users can obtain comprehensive and up-to-date information about EARS and sample data in *Zenodo*, and all data can be downloaded from the CMA Data-as-a-Service platform (<http://data.cma.cn/>).