

Second review of "A Comprehensive Evaluation of Key Tropospheric Parameters from ERA5 and MERRA-2 Reanalysis Products Using Radiosonde data and GNSS measurements", by Lijie Guo et al.

GENERAL The manuscript has been improved wrt. to the first. However, I still find it lacks in precision of what's been done, and that it lacks severely wrt. to language.

For that reason my recommendation is: Major revision.

LANGUAGE The paper is still full of unfinished and/or incorrect sentences. A few examples: Line 53 - it is not, .."have established", but "have been established"

Line 59 - clearly an unfinished sentence. "As" indicates something is causing something else. Like, " As I'm tall, I can reach high."

Line 256 "..dramatic water vapour.."

Line 278 "..agrees well than.."

Line 287 "It is not ..altitude" Not meaningful.

Line 343 "It is not.. latitude" Not meaningful

Line 346 "Across the board.."

Line 348 "..represent slightly.." represent not the proper word.

Line 356 "..water vapour is rich and changes violently.."

Line 400 "However, ..altitude" Words missing.

Line 411+ Higher than what?

And there are many more.

If between the 9 of you, you don't see errors like the above get help from a professional in scientific writing in English to help you with the language. It could be an extra author or hired help.

SCIENCE

Consider including biases in the abstract.

When you speak about biases, remember to tell the order. Is it for example ZTD_ERA - ZTD_GNSS or the opposite?

Some abbreviations are introduced several times. One is enough. In line 43 ZWD should be ZHD.

You divide some of the analysis into Northern and Southern Hemisphere. Mention how many sites are in each of these (both GNSS and radiosondes).

Page 4. Don't use "x" as a symbol for multiplication. Whatever you do, do it systematically through the whole paper. On page 4 you are highly inconsistent, even within the same formulas, like equation 8.

You are free to choose the symbols of your variables. But the standard naming for specific humidity in meteorology is q .

The numerical integration indicated righthand side of eq. 1 and 2 is only correct as long as data are available to "the top of the atmosphere". With the top model levels at 1 hpa and 0.1 it is acceptable for ERA5 and MERRA-2, but the radiosondes in general does not get that high, and you need to add the contribution to ZHD (and ZTD) that comes from above the radiosonde. How did you do that?

It is not clear precisely what you do wrt. to altitude corrections when stations sites and model surface have different altitudes. Do you skip comparison for all GNSS sites lower than the model surface?

Line 217+ The problem is that the vertical distribution of humidity can vary significantly from day to day, and that surface humidity is not representative for the humidity further up.

You finish by telling (line 411+) that ERA5 and MERRA-2 has higher precision. But you don't tell higher than what. You have not included any quantitative measure of the precision of ZTD etc. based on previous reanalysis data in your manuscript. How can you then claim it is higher for ERA5 and MERRA-2?

You can safely claim ERA5 and MERRA-2 is has better temporal and spatial resolution than previous products, but we knew that already.