Dear Francesco Marra,

thank you for your time and for the constructive review of our manuscript. We amended the manuscript with the missing information, following your comments. Please find our specific responses below.

RC: Lines 229-233: “where reasonable” and “too large to be sensibly filled”: these sound a bit generic. Does this mean that each situation is handled ad hoc? It is based on expert opinion? Perhaps some more details would be needed

AC: We added the maximum data gap length in hours and rephrased the sentence to “If resulting gaps exceed 24 h, values are replaced by either NaN or an appropriate integer fill value.”

RC: (Very minor) The second sentence in the abstract (lines 2-5) needs some attention, as it seems a verb is missing

AC: We split the sentence to make it more readable. It now reads: “These datasets, based on the continuous WegenerNet 3D observations, form a growing multi-year observational data collection at sub-kilometer scale and sub-hourly resolution. They are capable to support the study of weather extremes in a changing climate, water vapor – cloud – precipitation interactions and interactions between the surface and the free atmosphere, among other uses.”

Dear Anonymous Referee #2,

thank you for taking the time to review our manuscript and for your helpful and constructive comments. Please find our responses to the specific comments below.

RC: Figure 1: It would be good to show geographical coordinates (lon/lat) on the x- and y axis.

AC: We added lon/lat labels following your suggestion.

RC: Section 2, TSR radiometer: What dataset are the retrievals for IWV and LWP based on? Can you add some information on this? Could a biased retrieval training dataset potentially explain the offsets in Fig. 5?

AC: The IWV and LWP retrievals are based on neural networks which are trained on reanalysis data. The numerical values of the network coefficients and input/output scaling functions are provided by the manufacturer and tuned for the instrument location. The theory behind this approach is given in (Jung et al., 1998, Del Frate et al, 1999; Solheim et al, 1999; Churnside et al; 1994) and the implementation details are presented in the instrument software manual (https://www.radiometer-physics.de/download/PDF/Radiometers/HATPRO/RPG_MWR_STD_Software_Manual%20G5_2023.pdf).

We amended the paragraph describing the TSR in section 2 with the following sentence and corresponding references to incorporate this information:

“These statistical retrievals are implemented using feed-forward neural networks (e.g., Jung et al. 1998), trained on reanalysis data for the specific sensor location. The numerical values of the network coefficients, offset parameters and scaling factors are provided by the instrument manufacturer.”

Churnside, J. H., T. A. Stermitz, and J. A. Schroeder, Temperature profiling with neural network inversion of microwave radiometer data, J. Atmos. Oceanic Technol.., 11, 105-109, 1994

Jung, T., E. Ruprecht, and F. Wagner, Determination of cloud liquid water path over the oceans from SSM/I data using neural networks, Journal of Applied Meteorology, 37, 832844, 1997

Del Frate, and F., G. Schiavon, A combined natural orthogonal functions/neural network technique for the radiometric estimation of atmospheric profiles, Radio Science, 33, 405410, 1998

Solheim, F., and J.Godwin, Passive ground-based remote sensing of atmospheric temperature, water vapor, and cloud liquid water profiles by a frequency synthesized microwave radiometer, Meteorol. Zeitschrift, N.F.7, 370-376, 1998

RC: Figure 5: I do not have a good explanation for this trend in IWV offset neither, but I find it a bit puzzling. As none of these observations are assimilated into NWP models: Did you check a comparison to model IWV (e.g. from ERA5) to see whether such a trend can be also seen there?

Thank you for this suggestion. We computed the IWV trend from ERA5 for the center of the network. The reanalysis shows a trend similar to that of the radiometer (0.69 +- 0.06) kg / m2

for the same time period with instrument data gaps considered. This means that all measurement systems and ERA5 show a IWV increase for the region, with slightly lower values from GNSS.

RC: Figure 9: Why do you have large interpolated time periods for LWP after about 14:00? Were there no clouds? Or was the instrument not measuring?

AC: There was indeed a data gap following the precipitation event.