I have reviewed the paper titled "Determination of low-level temperature profiles from microwave radiometer observations during rain" by Foth, Lochmann, Saaverdra Garfias and Kalesse-Los. I found the science and its presentation to meet the standards. I hence recommend that this manuscript be accepted with corrections.

Main questions/ concerns:

1. L.65-69: discussion on the wet-radome mitigations on the HATPRO radiometer:

What is the HATPRO radome made of? Is it still the blue foam? if so, if it gets wet, it will take time to dry out and, as with sponges, the water will not stop at the top and will fill all the foam by capillarity. This could be problematic for measurements below zenith…

2. L.166, L.278 and L.281: On L. 166: "[…] no rain, moderate rain (2.7 mm h^{-1}) and heavy rain (3.7 – 11 mm h^{-1})". Is moderate defined as 2.7 to 3.6mm/h so that heavy will be defined as 3.7 to 11 mm/h and therefore light will be <2.6 mm/h? your definition is not clear to me. In North America, we have definition for light, moderate and heavy rains: light (< 2.5 mm/h), moderate (2.6 to 7.5 mm/h) and heavy (> 7.6 mm/h); there might be relevant standards in Europe to follow.

Although I agree that the new 4ν9φ scanning strategy can be used up to 2mm/h (L.278) without too much bias, the following lines (L. 280 – 282) in the conclusion:

"In summary, the HATPRO 4ν9ϕ retrieval method demonstrated in this study achieves unprecedented accuracy of low-level temperature profiling up to 2 km in rain. It was shown that even in heavier rain measurements at elevation angles below 40° can be used to derive temperature profiles up to 1.5 km. "

could be interpreted very differently should a casual reader only read the concluding remarks… As such, I would strongly advise that the sentence be re-written much clearer with the

limitations of 2mm/h. It is also good practice, even for short papers, to summarize the findings in the conclusion for the casual reader.

3. L.250 & Figure 6 : Although I agree that the 4ν9φ outperforms the other retrievals, there is still some clear influence of the rain in the temperature measurements as seen in Figure 6.h: the retrieved temperature between rain events is smooth like the ECMWF, but during the rain events (3 UTC, 9-13 UTC and 20UTC) the retrieved temperature still shows quite some variability compared to the temperature profiles and still leads to +/- 3K temperature difference. This could be because of the wet radome, as the wet radome emissions are likely angle dependent.

Minor fixes:

- L. 35 – 37: "Xu et al. (2014) retrieved thermodynamic profiles such as temperature and humidity as well as liquid water profiles by using off-zenith MWR observations at 15° elevation to reduce the impact of rain on the measurements. As retrieval technique Xu et al. (2014) used a neural network approach. "

would be clearer if written:
Xu et al. (2014) retrieved thermodynamic profiles such as temperature and humidity as well as liquid water profiles by using off-zenith MWR observations at 15° elevation to reduce the impact of rain on the measurements [using] a neural network approach.

- L. 82: "Their accuracy in contrast to other types of radiosondes is described by Turner et al. (2003). "

It is unclear to me where this phrase is going. How does the accuracy of the RS80 compare to other types namely the RS41 which is used by the Lindenberg site (MOL-RAO).

- L. 91-95: there is not a single reference to ERA5 papers. At the very least the following paper should be referenced:

Hersbach, H. et al. 2020: The ERA5 global reanalysis. Q. J. of the R. Meteorol. Soc., 146, 1999–2049.https://doi.org/10.1002/qj.3803.

- L. 118 – 120: "The second panel (b) shows the results of the spectral consistency checks which is retrieved by the so-called *tbx* retrievals, which work as follows. There are 14 HATPRO frequencies and only 13 of them are used to estimate the expected value for the 14th

frequency and then the difference between the estimated and the measured brightness temperature is determined. “

would be clearer if written:
The second panel (b) shows the results of the spectral consistency check which is retrieved by the so-called *tbx* retrieval [. During spectral consistency check (*tbx* retrievals), 13 of the 14 HATPRO frequencies are used to estimate the value of the unused frequency which is then compared to the measured brightness temperature and the discrepancy is noted.]

- Figure caption on Figure 2. “Time series of Moon or Sun and rain quality flag (a), spectral consistency quality flag (b), air temperature and rainfall rate from HATPRO’s weather station (c), and height-time series of temperature profiles based HATPRO’s firmware radiometer retrieval algorithms in Lindenberg (Germany) on Aug 26, 2020. tb in the colorbar (b) means brightness temperature. “

Should be:

Time series of Moon or Sun and rain quality flag (a), spectral consistency quality flag (b), air temperature and rainfall rate from HATPRO’s weather station (c), and height-time series of temperature profiles based HATPRO’s firmware radiometer retrieval algorithms in Lindenberg (Germany) on Aug 26, 2020. tb in the colorbar ([d]) means brightness temperature.