This paper needs a major revision. I think the material is there, but a more thorough analysis is needed. A lot of information on the radars are missing (hardware signal processing e.gl) so that the results are hard to interpret. Figures are not properly discussed (e.g Figure 17) where two modes are visible. In principle you would expect one linear dependence (ideally 1:1).
**Reply:** Thank you for your valuable comments. We will revise the manuscript according to your suggestions. We will add information about the radar hardware and provide a more thorough discussion of the figures in the revised version.

Some more specific comments;

You don't list other options to verify the calibration and consistency of data in the network, most importantly the sun as a reference. Please include and discuss!
**Reply:** Thank you for your comment. Improving network consistency is a comprehensive task. The two inter-radar consistency analysis methods proposed in this paper represent the first stage of this work. The results provide a reference for operational staff, helping them identify which radars should be prioritized for calibration and correction in the second stage. During calibration, t Solar Calibration and Metal Sphere Calibration will be used as references to further identify and rectify specific radars. This paper mainly focuses on the method design and results analysis of the first stage.

A technical description of the radars you investigate is missing. This is important to interpret the results:
e.g. antenna gain, beam width, transmit power, tx type, dualpol or not, signal processing, clutterfilter and so on.
**Reply:** This information was not confirmed for public disclosure before submission. We will verify which parts can be made public and include them in the revised manuscript after confirmation.

you missed https://amt.copernicus.org/preprints/amt-2021-257/amt-2021-257.pdf
check out this paper
**Reply:** Thank you for providing this information. We will carefully review it and include it in the references.

l 48: "satellite used as a reference standard": I would disagree here. No weather radar network is using satellite radar data as a reference operationally
**Reply:** We fully agree with your point. The purpose of our study is to use the FY-3G satellite as a reference standard to analyze the deviations between ground-based radars, rather than to compare the differences between the satellite and radars themselves, as it is not possible to determine which observation is closest to the actual state of the target. Considering that FY-3G itself is calibrated for stability and consistency using other satellites such as GPM, we believe it can provide a stable long-term time series. In this sense, it serves as a reference standard among all the radars in the network.

l.100: is an attenuation correction performed with the Ku, Ka-Band data? or do you avoid situations with attenuation?

**Reply:** As mentioned in line 78 of the manuscript, the FY-3G Level 2 product was used, which contains reflectivity factor products for the S-band, C-band, and X-band. These reflectivity factors have been corrected for frequency, and I will provide references for the specific correction methods in the revised version of the manuscript.

1. 135: the specific mathematical detail to get the coordinates right, should be moved to an appendix, unless there is something new here.

**Reply:** Spatial matching is a key aspect for analyzing the observational consistency between adjacent radars. The formulas and methods presented are intended to better illustrate Figure 4. These technical details are also one of the innovative aspects of our approach, so we prefer to include them in the main text to facilitate readers' understanding and reproduction of the algorithm.

1. 232: is this a X-Band phased array? You don't use an attenuation correction?

this section needs be reworked in order to really provide a meaningful comparison between the two bands

**Reply:** The X-band weather radar used in line 232 of this paper is a all solid-state mechanical X-band radar, which is yet to be calibrated. We did not apply attenuation correction to its base data, and this part of the analysis is intended only to illustrate that, when comparing the consistency of radars operating at different bands, attenuation can cause variations in the results. In the subsequent analyses presented later in the paper, we use X-band phased array radars deployed in Guangdong Province, for which attenuation correction has already been applied to the base data. The specific correction method can be found in the following reference: Xiao LS, Hu DM, Chen S, et al., 2021. Study on attenuation correction algorithm of X-band dual polarization phased array radar [J]. Meteorological Monthly, 47(6): 703–716 (in Chinese). The methods described in Sections 3.1, 3.2, and 3.4 were actually used. We will add this reference in the revised version of the manuscript.

1. 244: the 15-35 dBZ: do you do an attenuation correction? or do you avoid any precipitation > 35 dBZ? but then 35 dBZ is probably too large for the X-Band; you will have attenuation. Please clarify.

**Reply:** As mentioned in the previous question, the reflectivity factors from the X-band phased array radars we used have undergone attenuation correction before generating the base data. When we limit the range of reflectivity factors, it is to focus our analysis on stable precipitation. For stronger convective precipitation, rapid changes in targets can lead to mismatches in the overlapping areas during comparison, where the targets may not correspond to the same echo. This approach helps to exclude errors caused by the weather process itself (rather than the radar system).

1. 12: I couldn't find a reference to figure 9. it is not clear which radar is the Radar1 or 2. Clearly state what radar is meant! what kind of correction is shown?

**Reply:** Thank you for your correction. The figure referenced in line 241 should be Figure 9. We will switch the positions of the left and right images according to common reader habits.

In Figure 9, we use the X-band radar as Radar 1 and the S-band radar as Radar 2. An adaptive attenuation correction method was used, and we will add a detailed description of this method and its references in the revised version of the manuscript.

l 265, fig 10: no dualpol system? no sqi, Doppler filter implemented?

**Reply:** In Figure 10, the radar exhibiting sea clutter echoes is a dual-polarization radar. SQI is not involved in the signal processing; and one-dimensional and two-dimensional clutter Doppler filtering methods are applied.

1. 280: describe the fuzzy logic interference removal I think you mean the left figure as the quality controlled picture?

**Reply:** Yes, the left image is the quality-controlled one. We will adjust the order of the left and right images according to the readers' reading habits. The identification and removal of radial interference echoes were mainly performed using a fuzzy logic method. Four characteristic parameters reflecting the differences between radial interference echoes and precipitation echoes were extracted from the reflectivity factor, including:

RREF, representing the continuity of the reflectivity factor along the current radial (as shown in Equations (1)-(2));

dZ, indicating the consistency of echo power in the adjacent range bins along the current radial (as shown in Equations (3)-( 5));

TDBZ (unit: dB²), expressing the local textural consistency of reflectivity along the radial (as shown in Equation (6));

SPIN, representing the sign changes of adjacent reflectivity factors within a local area (as shown in Equations (7)-(8)).

$$R_{\mathrm{REF}} = \frac{\sum_{i=0}^{N_{\mathrm{R}}} N_{\mathrm{Z}}}{N_{\mathrm{R}}} \times 100\% \tag{1}$$

$$N_{\mathrm{Z}} = \begin{cases} 1 & Z_{i,j} = Val \\ 0 & Z_{i,j} \neq Val \end{cases} \tag{2}$$

$$B_{i,j} = Z_{i,j} - 20\mathrm{lg}R_{i,j} \tag{3}$$

$$\overline{B} = \frac{\sum_{N_{\mathrm{R}*0.9}}^{N_{\mathrm{R}}} B_{i,j}}{N_{\mathrm{R}} * 0.1} \tag{4}$$

$$\mathrm{dZ} = B_{i,j} - \overline{B} \tag{5}$$

$$T_{\mathrm{DBZ}} = \frac{\sum_{j=-5}^{j=5} (Z_{i,j} - Z_{i,j+1})^2}{11} \tag{6}$$

$$M_{S_{\mathrm{PIN}}} = \begin{cases} 1 & \dfrac{|Z_{i,j} - Z_{i,j-1}| + |Z_{i,j+1} - Z_{i,j}|}{2} > Z_{\mathrm{thresh}} \\ 0 & \dfrac{|Z_{i,j} - Z_{i,j-1}| + |Z_{i,j+1} - Z_{i,j}|}{2} \leq Z_{\mathrm{thresh}} \end{cases} \tag{7}$$

$$S_{\mathrm{PIN}} = \sum_{j=-5}^{j=5} M_{S_{\mathrm{PIN}}} \quad (8)$$

In the equations, *Zi,j* (unit: dBZ) is the reflectivity factor at a certain range bin, *Val* is the effective detection value (unit: dBZ), *Ri,j* is the distance between the range bin and the radar (unit: km), *NR* is the number of range bins for the reflectivity factor, and $Z_{\mathrm{thresh}} Z_{thresh}$ is the threshold for changes in the reflectivity factor between range bins.
For specific technical details, please refer to the following literature: Wen Hao, Zhang Lejian, Liang Haihe, Zhang Yang. 2020. "Radial interference echo identification algorithm based on fuzzy logic for weather radar." Acta Meteorologica Sinica, 78(1): 116-127. We will add this reference in the revised version of the manuscript.

l 310: figure 15: I don't understand this figure. How does the ground based consistence analysis looks like? Take radar 1: what is the reference radar here? How do you come up with the bias?
**Reply:** When analyzing ground-based consistency, we set a distance threshold between adjacent radars (for example, 200 km between S-band radars), so any two radars within this threshold can be paired for matching. For Radar 1, if it can be paired with five surrounding radars, we calculate the bias between Radar 1 and each matched radar for every volume scan according to the method described in the paper. After one volume scan, Radar 1 will have five comparison results, and we take the mean of these five results as the final result for Radar 1 at that time. In this way, if Radar 1 has a significant systematic bias, it will be reflected in the bias result. If the standard deviation is large, it indicates that the observations from this radar are more dispersed and that further calibration and detailed analysis of the hardware are necessary.

Fig 16: font cannot be read. Rework the figures. X-Axis is a time axis. What time period? why not showing the times? Larger biases can be attributed to specific weather events? Are there any snow cases?
**Reply:** We will redraw these figures in the revised version of the paper, increasing the font size for better readability. The X-axis represents the number of samples, with each sample corresponding to one volume scan. Since not every volume scan contains precipitation and meets the algorithm's threshold requirements, using time as the X-axis would result in discontinuity, so we used the sample count instead. Larger biases are closely related to specific weather events; convective weather, in particular, tends to produce larger biases due to the rapid movement and variability of targets. Additionally, because our analysis focuses on the southern coastal region, snowfall cases are expected to be very rare.

l319: reflectivity is not "strong" it is large, small I would say
**Reply:** Thank you for your suggestion. We will address this issue in the revised version of the manuscript.

Fig 17: clearly two modes are visible in each plot, they are not discussed and explained! (two linear fits with different slopes could be fitted). Two modes suggest that there is something fundamentally wrong, or?

**Reply:** We will add a discussion of the two modes in the revised version of the paper. As long as there is a precipitation event, ground-based consistency analysis will produce comparison results. However, since it takes FY-3G about 1–2 days to pass over the same location, and its spatial resolution is lower than that of radar, there is a significant difference in both the number of samples and the temporal frequency between the two methods. Therefore, for now, we have not considered analyzing the results of the two modes together in the same figure.

l. 328: without discussing the quality control of the reflectivity factor from the X-Band the results are difficult to interpret: are you really sure that you can rule out attenuation effects e.g.?

**Reply:** We used X-band phased array radars distributed in Guangdong Province, and attenuation correction algorithm has already been applied prior to the generation of the base data.

l 335: so Fig 19: really doesn't say anything about the biases. Comparing Fig 19 and 15 one would assume similar performance of the S and X-Band. Why do you show standard deviations? Doesn't make sense to me. Please explain!

**Reply:** In our radar network consistency analysis, we calculated several metrics, including bias, standard deviation, and correlation coefficient. The standard deviation reflects the dispersion of reflectivity bias as well as the stability of system observations. In Figure 15, the standard deviation of ground-based S-band weather radar consistency refers to the results of comparisons between S-band radars. Figure 19 shows the standard deviation between X-band phased array radars, which only reflects the dispersion of observational bias among radars with the same band and system. Factors such as the distance between overlapping areas and weather processes also have an impact. Of course, the final assessment of consistency is still primarily based on bias.

l 361: what is a SC model weather radar?

**Reply:** The SC radar is a model of S-band weather radar that operates within the operational weather radar network.

Fig 23: the result suggests that the satellite / radar has further systematic problems errors in my view. The calibration does not provide a more consistent result.

**Reply:** Thank you for your comment. Figure 23 shows that the bias between the satellite and radar has always existed. The smaller bias on the right side may be due to the limited number of observed targets in the 30–35 dBZ range. Since satellite observations have relatively low temporal and spatial frequency, we will collect more weather events for further analysis.