Reply on RC2
Michael Frech et al.

Author comment on "Assessing and mitigating the radar - radar interference in the German C-band weather radar network" by Michael Frech et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-532-AC2, 2022

We thank the reviewer for his helpful and constructive comments which will help to improve the paper. We respond to the issues raised in point by point reply and incorporate this response in the revised manuscript.

Reviewer comment: RFIs at C-band are nowadays widespread in Europe. The study focuses on RFIs caused by other weather radars. In the data analysis, it is not clear how, in the data analysis, wifi RFIs are distinguished from weather radar ones. The amount of wifi RFIs can be partially inferred by Figure 6, where about 200 bins are classified as disturbed.

Response: We did not try to eliminate the WIFI disturbances. We analyze the relative difference in the numbers of the identified classified rangebins. Any differences are then attributed to the respective radar configuration of the transmitting radar. This makes the assumption, that the WIFI disturbance is constant throughout the considered time period. For the MHP radar this is a valid assumption based on the continuous monitoring for WIFI interferences as described in Schaper at al. (2022).

Reviewer comment: A short description of current meteorological conditions, focusing on atmospheric refractivity, could help to better interpret the analysis. Moreover, it is unclear which PW is set up in the experimental scans.

Response: First, all transmitting radars were using a PW of 0.8 μs during the experiment. We will add this information to table 3. The PWs of the receiving radar MHP is described in the appendix, tables A.1 and A.3. All evaluated sweeps use a PW of 0.8 μs as well. Second, we agree that showing the connection between disturbed bins and refractivity gradients would be helpful. We will add a new paragraph at the end of section 2 where we calculated refractivity gradients from radiosonde data and compare the frequency of occurrence of strongly negative values with the amount of recorded interferences. This will be supported by an additional figure. It will show that we have more disturbed bins when the radiosondes show lower values for the refractivity gradient.

Reviewer: Figure 6 and Figure 7 summarize the number and properties of disturbed bins: RhoHV shows a wide variability: it's worthing to add some comments trying to explain possible causes.
**Response:** First of all, RhoHV is the cross correlation coefficient from time series where no Doppler-Clutter filter has been applied. There is no further processing or quality control (e.g. thresholding; this information will be in the revised manuscript) applied. The large variability in RhoHV reflects the typical observed value range if there is no precipitation, and where the backscattered signal is caused by targets (e.g. insects, moving ground clutter) that are often without correlated backscatter in the two polarization planes.

% The uncorrected RhoHV also has a strong dependence on SNR: if SNR is below 0, RhoHV never reaches values above 0.6 even in pure rain. at SNR ~10 dB, RhoHV can take almost all values between 0 and 1 and only above that RhoHV takes on stable values. RhoHV in figure 6 therefore has a small variability, since most SNR values lie stably above 10 dB. In figure 7, variability in RhoHV is higher, because more bins have a SNR clearly below 10 dB which results in a lower RhoHV. We will add a few new sentences at the end of section 3.2 that explain this connection.

Also please note that with your suggestion of having matching axes in both figures it becomes very clear that variability of RhoHV is only high in figure 7. The boxes in Figure 6 for RhoHV become very small when showing the whole range from 0 to 1.

**Reviewer:** The German radar network shows large overlapping areas where 2D or even 3D winds can be retrieved. Do the authors believe that the "Radar Tango" scan strategy affects or limits such retrieval? The reviewer suggests a discussion on the possible drawbacks of "Radar Tango".

**Response:** We do not expect a disadvantage. This is supported by the evaluation of the dual-Doppler retrieval of the 3-D wind vector from volume data with multiple sweeps we just did for another study. Even without the Radar-Tango, there always will be time differences in sampling a specific volume from 2 or more radars. So a stationarity assumption always has to be made, which is, depending on the meteorological phenomena, more or less an approximation, especially if data from multiple sweeps are used.

**Minor remarks of the reviewer:**

Figure 1 - Add scale bar and North Arrow, please.

- We will add a scale bar to the figure. A North Arrow would not be useful in our opinion. The projection of the map is such that the longitudes converge towards north. If we put the arrow in the lower left corner, for example, it would only be valid for this exact longitude. The north direction in the center or on the right hand side of the map is a different one. To clarify the position and direction of the map we will add the following sentence to the description: "The grid is in latitudes north and longitudes east."

Figure 2 - Add scale bar and North Arrow, please. Adding distance in km at each arrow could improve clearness.

- We will add all requested items to the map in the revised version.

Figure 6 - change "Boxplot of the number of disturbed pixels" to "Boxplot of the number of disturbed bins", please

- We will change the annotations from "pixels" to "bins" in Figures 6 and 7.

Figure 6 and Figure 7 should report the same range on both axes.

- We agree, the difference is more clearly seen with matching ranges. We will adopt your suggestion in the revised version of the manuscript.