The authors thank the anonymous reviewer for their comments. Please see the individual responses to the reviewer's comments below.

Reviewer #2 Comments – Major Revisions

General comments:

Using high-resolution radiosondes from the MAGIC field campaign, the planetary boundary layer height (PBLH) along the transect between California and Hawaii are derived and discussed. In particular it is investigated how radio occultation data retrieval would underestimate the true refractivity below the PBLH, given perfect measurements (if radio occultation data had the very high vertical resolution of the radiosondes), when there is ducting. Results are compared to similar results obtained by using ERA5 data. In both cases (radiosondes and ERA5) data are forward-modelled and inverted in end-to-end simulations to obtain the underestimated refractivity profiles.

1. **I find the study interesting and worthy publication, but it is a bit unclear to me what is new and what has been found before. Has it been found before that the PBLH increases along the MAGIC transect from west to east? Or is this a new result? I suppose it is new to perform end-to-end simulations to study the ducting and PBLH variations along this transect and how it would underestimate radio occultation retrievals in this area. However, it is only in principle, because in practice the radio occultation vertical resolution is somewhat coarser than the resolution of the MAGIC radiosondes. I think this needs to be mentioned.**
    a. The authors appreciate the suggestions, and have modified the introduction to emphasize the unique contribution of this study, i.e., identification and illustration of the detailed characteristics of ducting, and assessment of its potential impact on GNSS RO through simulation study.
    b. Past studies have documented the PBLH in the MAGIC region from various data sources including the radiosonde and GNSS RO (e.g., Ho et al., 2015). The ducting induced *N*-bias in RO retrieval also has been recognized for a long time (Sokolovskiy, 2003). However, those studies did not provide detailed characteristics of ducting from radiosonde observations. Moreover, no comprehensive study on the impact of various ducting (e.g., height, strength, etc.) on GNSS RO retrieval has been conducted. Thus, the detailed analysis of the ducting characteristics, and end-to-end simulation of the MAGIC radiosondes are the new and major contribution of this study.
    c. The reviewer has a great point regarding the vertical resolution. The conventional belief is that GNSS RO has a vertical resolution of approximately 100 m in the lower troposphere. Gorbunov et al. (2004) demonstrated that radioholographic retrieval algorithms resolve atmospheric multipath problems, reduce RO biases in the moist lower troposphere, overcome the limitation from Fresnel diffraction, and improve the vertical resolution up to ~60 m. Although we did not specifically investigate into this issue, we did apply 100 m vertical smoothing on the radiosonde profiles, but not on ERA5 profiles, which has a resolution of less than100 m below 1 km.

d. Added to beginning of the last paragraph in the introduction:

i. "To comprehensively assess the potential impact of ducting on GNSS RO retrievals, we begin by constructing a detailed ground truth of PBL ducting statistics. This is derived from an extensive set of high-resolution radiosonde data over the northeastern Pacific Ocean, a region known for prevailing ducting conditions. Subsequently, we conduct a simulation study using the radiosonde data to evaluate the *N*-biases caused by varying ducting characteristics."

ii. In Section 2.2, "In this study, the MAGIC radiosonde refractivity profiles were first interpolated to a uniform 10 m vertical grid and then smoothed by a 100 m boxcar window to reduce the noise in the gradient profile resulting from the high sampling rate. *Moreover, the 100 m smoothed radiosonde will be more consistent with the vertical resolution of GNSS RO measurements (e.g., Gorbunov et al., 2004).*"

e. References:

i. Gorbunov, M. E., H. H. Benzon, A. S. Jensen, M. S. Lohmann, and A. S. Nielsen, 2004: Comparative analysis of radio occultation processing approaches based on Fourier integral operators. Radio Sci., 39, RS6004, https://doi.org/10.1029/2003RS002916.

ii. Ho, S.-P., L. Peng, R. A. Anthes, Y.-H. Kuo, and H.-C. Lin, 2015: Marine boundary layer heights and their longitudinal, diurnal and inter-seasonal variability in the southeast Pacific using COSMIC, CALIOP, and radiosonde data. J. Climate, 28, 2856–2872, https://doi.org/10.1175/JCLI-D-14-00238.1.

iii. Sokolovskiy, S. V.: Effect of super refraction on inversions of radio occultation signals in the lower troposphere. Radio Sci., 38 (3), https://doi.org/10.1029/2002RS002728, 2003.

2. **For the same reason as above, and because the study does not actually present radio occultation data, I suggest to insert 'Potential' in front of 'Impact' in the title.**

   a. Thank you for this suggestion. The authors have agreed, and the title has been updated:

   i. 'Assessing the Ducting Phenomenon and its Potential Impact on GNSS Radio Occultation Refractivity Retrievals over the Northeast Pacific Ocean using Radiosondes and Global Reanalysis'

3. **Throughout the manuscript the authors refer to their results being a 'climatology'. I think that is a misuse of the term 'climatology'. There is only one year of data which is averaged in longitude bins along the transect without taking seasonal variations into account. I wouldn't consider that a climatology. I suggest not to call it 'ducting climatology', or 'N-bias climatology', etc. Most of the results are statistics based on that one year of data, so in most places 'climatology' could be replaced by 'statistics', or just removed.**

   a. Thank you for this comment. The authors have replaced 'climatology' with 'statistics'.

4. **I think the paper could be shortened by taking out some paragraphs (see specifics below), and perhaps even by taking out all of section 3.3.3 that describes some rather obvious correlations. They seem to be of little importance. In my opinion, the paper would be better (and the rest of the study is sufficient) without section 3.3.3.**
    a. The authors believe that Sect. 3.3.3 includes some important information and have tried to make the main points clearer. Firstly, the ducting characteristics change quite significantly along the transect, especially the ducting strength and ducting height. Figures 10 & 11 demonstrate the consistent linear relationship between the PBLH and ducting height as well as the linear relationship between the ducting characteristics and *N*-biases (Fig. 11). The relationship is relatively independent of the spatial location of the profiles. Further, the difference between radiosonde and ERA5 observations shows the potential impact of the uneven vertical sampling in ERA5.
    b. This answer will also address the similar question stated in 'Specific comments' point 7 below.

5. **I find that parts of the manuscript are badly written, and there are several mistakes in the figure captions (see specifics below). In some parts of the manuscript, almost every sentence needs revision.**
    a. The authors have made significant effort to improve the overall writing of the manuscript. It is our sincere hope that the reviewer recognizes these efforts and deems the result of such detailed comments as a worthy improvement.

<u>Specific comments</u>:

1. **lines 137-139: It is not clear how the root mean square error of the refractivity gradient profile is calculated. Is it really an 'error'? Compared to what? Over which vertical interval? Please clarify. Please also write in the text what each of the symbols in eq. 2 stand for. Why are you writing X when it is N (I think)?**
    a. The variables 'X' used in the original source (Ao et al., 2012) cited in the paper is replaced with refractivity (N) for clarification.
    b. The "error" in sharpness parameter definition has been removed, and the manuscript has been updated as follows:
        i. 'To assess robust PBLH detection with gradient method, Ao et al. (2012) introduced the sharpness parameter ($\widetilde{N}'$) to measure the relative magnitude of the minimum gradient, which is defined as the ratio of the minimum vertical refractivity gradient (N'_{min}) to the root mean square (N'_{RMS}) of the refractivity gradient profile from surface to 5 km as follows:'

2. **Fig. 2: Please provide information about latitude, date, and time, for this example.**
    a. Text added to main body and caption to reflect the date and time (2012-10-02 at 05:30 UTC) and location of the radiosonde (23.69˚N, −150.02˚E) and ERA5 (23.75˚N, −150.00˚E)

3. **Text before Fig. 2: Please provide information on how the gradients in Fig. 2 were calculated. In the ERA5 refractivity gradient there are sawtooth-like features just above the minimum gradient (and elsewhere in the profile to a lesser degree), and levels seem very unevenly spaced. Are these features real (in the model) or an artifact of how the gradients are calculated?**
    a. Thanks for catching this. Both the radiosonde and ERA5 data were vertically interpolated to a 10 m resolution. The refractivity gradient for both profiles is calculated by taking the derivative of the interpolated profile with respect to height. In this case, the derivative is calculated with a three point Lagrangian interpolation technique that is part of the IDL 'deriv' function. Note that while the saw-toothed feature mentioned is due to the vertical derivative being calculated from the interpolated profile, this is only noticed in the plotting and does NOT impact the result of the study.

4. **line 241-243: "This results in a sharper refractivity gradient caused by the frequent residual layer (below 1 km) as compared to the actual PBLH near 2 km.". How do you know which one is the 'actual PBLH' when there are such residual layers with apparently sharper gradients? What do you consider to be the definition of the PBL in this study? Please discuss this in the text.**
    a. The definition of the PBL height in this study is simply defined as the height of the minimum refractivity gradient as is defined within the text of lines 124-129. The detailed description of the gradient method for PBLH detection is added in Section 2.2. However, the physical meaning/definition of PBLH can vary (e.g., Seidel et al., 2010).
    b. Over the western segment of the transect (near Hawaii), there are often two gradient layers (one at ~1km and another at ~2km) with comparably *N*-gradients (e.g., Fig. 2). Generally, the higher-level gradient layer exhibits a slightly larger *N*-gradient and will be identified as the PBLH based on the gradient method. Such a PBLH around 2 km is widely known as the PBL trade-wind inversion. However, the lower-level gradient layer around 1 km, is a result of the ERA5 having more sampling layers below 1 km (~19 model levels) than higher levels (~8 levels from 1-2 km). The gradient method could identify the lower-level gradient layer as the PBLH due to the artificially higher sampling rate at lower levels. Such discrepancy in PBLH between ERA5 and radiosonde is seen in Fig. 4a. (continued on next page)

c. Text of this line has been changed to the following.
    i. "Such a discrepancy could be due to the sensitivity of gradient method to the vertical resolution of the data. Over the western segment of the transect (near Hawaii), two major gradient layers (one at ~1 km and the other at ~2 km) with comparable refractivity gradients are often observed (e.g., Fig. 2). The gradient layer at around 2 km is well-known as the trade-wind inversion. While the lower-level gradient layer at ~1 km, is generally called the mixing layer. Note the radiosonde data exhibit consistent vertical sampling (~125 points per km) below ~3 km and resolve both layers well. However, the ERA5 data have uneven vertical sampling intervals that increase with height with 10 – 100 m resolution below 1 km, 100 – 160 m within 1-2 km, and 160 – 200 m within 2-3 km. Therefore, the ERA5 data are more likely to resolve the sharp gradient structure below 1 km than the one at higher altitude. This could result in resolving the mixing layer (below 1 km) as the sharpest refractivity gradient, instead of the trade-wind inversion near 2 km in the ERA5 data."

5. **Fig. 5b: How did you calculate such narrow ducting thicknesses for ERA5, in particular in the western part of the transect? The median thicknesses are between 50 and 100 m in the western part, while the ducting height is within 1-2 km where there are only 8 levels in ERA5 (noted in line 115). Please provide more detailed information on the calculation of the ducting thickness.**
    a. As described in Section 2.1, the raw vertical resolution of radiosonde is ~ 8 m below 3 km, whereas the ERA5 data have 10 – 100 m resolution below 1 km, 100 – 160 m within 1-2 km, and 160 – 200 m within 2-3 km. All the radiosonde and ERA5 *N*-profiles were then interpolated into 10 m vertical grids. Therefore, both the radiosonde and ERA5 data can resolve the sub-100 m ducting layer (seen in Fig. 6). Near the western boundary of the transect the ERA5 data tend to identify the shallow mixing layer below 1 km as the dominant ducting layer instead of the trade-inversion above (as discussed in #4 above).

6. **line 297: Why 'median' here? It is individual cases in Fig. 6, right?**
    a. Thank you for catching this error. The word 'median' has been removed from this sentence.

7. **line 320-326: I think the discussion about the small difference between the PBLH and the maximum N-bias is a bit academic. The exact size probably depends on the particular method of calculating the PBLH and the end-to-end simulations, including the smoothing that is involved. Is it important? The differences are seen later in Fig. 8, which seems sufficient.**
    a. The authors feel the difference between the PBL height and maximum *N*-bias height warrants discussion. But we agree that the paragraph should be moved to Section 3.3.2 and merged with the discussion of the Fig. 8.

8. **line 327-331: It seems that this is discussing results shown later in Fig. 8. I suggest to move this text to section 3.3.2.**
    a. The authors agree with the reviewer. This paragraph was revised and merged with the rest of the Figure 8 discussion.
    b. See Technical corrections 19 (a and b) for description of changes.

9. **Table 1: The median numbers here are a bit off from the numbers discussed in the text (end of section 3.3.1). Please revise either the text or the numbers in the table.**
    a. Thank you catching this. The table figures were not updated, but the in-text figures were correct. The Table has now been updated.

10. **line 348-349: I suppose you are discussing the ERA5 data here, but it should be made more clear.**
    a. Thanks for the comment. "ERA5" has been added to the sentence.

11. **line 374-379: I didn't quite understand this paragraph. For example, I don't understand that a "much higher ducting height and larger variation leads to smoothed and much smaller median N-gradient values". Why are you using the word 'leads'? Does the former cause the latter? I think you are trying to say that without the normalization the N-bias would be smaller than it is with normalization, but it is not clear. Please clarify and revise this paragraph.**
    a. Yes, the reviewer's understanding is correct. We have updated the paragraph for better clarification as below:
        i. 'Note that normalizing each *N*-bias profile to the PBLH preserves the magnitude of the *N*-bias with various heights. Therefore, the relatively large normalized *N*-bias observed near Hawaii indicates more persistent ducting over the trade-cumulus boundary layer regime compared to the transition region in the middle of the transect at -147.5˚E (Fig. 8a).'

12. **line 422-426: I don't understand the sentence: "... it is interesting to note that the difference in the correlation of the radiosonde (−0.83) and the ERA5 (−0.84) does not lie in the observations with the larger magnitude peak N- bias, but in those closer to zero as the radiosonde data clearly centers below the regression line and trends above while the ERA5 with peak N-bias less than 5% are centered around the regression line.". Are you talking about the very small difference between 0.83 and 0.84? I can't see how you can conclude that this difference comes from the data with small maximum N-bias. In any case I don't think it is important. Is the sentence necessary? Please clarify if it is.**
    a. We agree with the reviewer and removed the sentence.

13. **line 434: I suggest to replace 'climatology and the impact of' with 'and the'. The study did not investigate the ducting climatology since there was only one year of data. The study did not investigate the impact of the biases (impact on what?). The sentence also needs to clarify that it is in relation to radio occultation retrievals that there would be biases. Please revise.**
    - **a.** Thank you for the comment. The sentence has been modified to improve the clarity as follows:
        - **i.** 'In this study, radiosonde profiles from the MAGIC field campaign have been analyzed to investigate ducting characteristics and the induced systematic refractivity biases in GNSS RO retrievals.'

14. **line 438: I don't understand 'at a well-defined PBL throughout the transect' in this sentence? Could it be removed?**
    - **a.** The sentence has been removed.

15. **line 458-459: I don't think this is correct: "While this segment of the transect also coincides with a better sampling rate for the ERA5 data (~40 m vertical resolution)". Isn't the resolution of ERA5 the same throughout the transect? Maybe you mean that because the PBLH is lower in the eastern part, the ERA5 vertical resolution around the height of the ducting layer is higher in the eastern part, but it is not clear. Please clarify.**
    - **a.** You are correct. The sampling rate of the ERA5 is the same throughout the transect.
    - **b.** The statement was meant to refer to the fact that since the refractivity gradient is stronger and PBL is at a lower altitude, the higher vertical resolution of the ERA5 is more likely to identify the PBL at a height similar to that which is identified by the radiosonde.
    - **c.** This line has been revised to improve the clarity of the statement, see comment 16.c.i. below.

16. **line 462-464: I don't think you can conclude that the differences that you see between the radiosondes and ERA5 are due to the 'limited number of model levels in ERA5 near 2 km'. There is no investigation of the impact of the lower resolution in this study. In principle, ERA5 could be underestimating the heights for other reasons. Please be more moderate in the conclusions.**
    - **a.** This is a fair point. Generally, the authors chose to include this line as a reference to the large discrepancy of the PBL height on the western side of the analysis transect where the difference between the median PBL height between MAGIC and ERA5 exceeds 800 m. The authors felt this was likely due to the number of ERA5 data points between 1 and 2 km was an average of 8 where as the number of radiosonde data points for each 1 km layer from the surface to 3 km are an average of 8 m (125 observations per km). The radiosonde data are more likely to observe the true location of the minimum gradient height and thereby the PBLH. Additionally, the reduced sharpness of the gradient in the western portion of the transect mean the minimum gradient is not as well defined and, in turn, height of the PBLH identified by the minimum gradient could be washed out due to the natural smoothness of the ERA5 profile.
    - **b.** The sentence is updated as follows:
        - **i.** 'It is worth noting that the PBL over the western portion of the transect near Hawaii frequently shows two major gradient layers (a mixing layer at ~1 km and the trade-inversion at ~2 km), with comparable refractivity gradients (e.g., Fig. 2). The much lower PBLH seen in ERA5 in this region is likely due, in part, to the decreasing number of model levels in ERA5 at higher altitude, which could lead to higher possibility of identifying the lower gradient layer as the PBLH. However, the impact of the vertical resolution on the performance of gradient method for PBLH detection has not been performed in this study and warrants more comprehensive study in the future.'

17. **line 465-468: I think this 'future study' paragraph should be removed. It does not belong in a conclusions section, and there is no need for it.**
    - **a.** The authors agree and the 'future study' paragraph has been removed.

<u>Technical corrections</u>:

1. **line 21-22: I think either the 'and' in line 21 should be replaced with a comma, or the ';' in line 22 should be a comma. Maybe correlation should be plural. Please revise sentence.**
    - **a.** The last line has been changed:
        - **i.** 'Further, the underestimation of the *N*-bias in the ERA5 data increases in magnitude westward, the correlations between the *N*-bias with the minimum gradient and sharpness all remaining strong.'

2. **line 32-36: I don't think you need 'etc' in line 36 when you have 'such as' in line 32.**
    - **a.** Thanks, the "etc." has been removed.

3. **line 111-112: Maybe it should be 'reanalysis', not 'Reanalysis' in line 111. I think there is no need for 'reanalysis' in line 112, as it is already part of the ERA5 acronym.**
    a. The word reanalysis has been removed as it is referenced in the description of the acronym.

4. **line 126: I don't understand "the minimum refractivity describes the largest magnitude value." Please revise the sentence.**
    a. The sentence has been removed.

5. **line 159 and Fig. 2: I think it should be 10 x N-units (not 1/10). Like with m and km, if you plot something as a function of height/1000, where height is in m, the axis unit becomes km (1000 x m).**
    a. The reviewer's point is understood. In this case, the refractivity values are an order of magnitude larger than those of temperature, and mixing ratio. As a result, the *N* value must be divided by 10 in order to fit on the x-axis with the units used for temperature (˚C) and specific humidity (g kg^{-1}).

6. **Fig. 2: I suppose T is in degree Celsius here (not kelvin).**
    a. The unit has been corrected in the caption and in the Figure 2 x-axis title.

7. **line 167-168: I think it should be 'a residual layer' instead of 'the residual layer'. There has been no mention of this layer earlier in the text. Something is not right with line 168, maybe an 'and' is missing. Please revise.**
    a. The other reviewer also brought both points up. The line has been revised:
        i. 'The PBLH of the radiosonde (2.10 km) is almost identical to the colocated ERA5 (2.14 km) and the "dominant" ducting layer near the PBLH demonstrates similar thickness. However, a second, weaker ducting layer seen in the radiosonde above the PBLH was not captured by the ERA5.'

8. **line 180: '1-dimensional' instead of '1-dimentional'**
    a. Changed to "1-dimensional".

9. **line 184: I think it should be 'increases' instead of 'decreases' (if it is 'with height' as written).**
    a. The reviewer is correct; "decreases" has been changed to "increases".

10. **line 194-195: The word 'respectively' is used here to describe what is in Fig. 3a and 3e, but it is used wrongly. What is seen in the two figures are refractivity profiles from the radiosonde and the ERA5 data, respectively. It is not the input refractivity profile and corresponding Abel refractivity retrieval, respectively. Please revise.**
    a. The sentence has been revised as follows:
        i. 'Figures 3a and 3e show refractivity profiles from the radiosonde (N_{rds}) and the colocated ERA5 (N_{ERA5}) data, as well as their corresponding Abel refractivity retrievals (N_{Abel}).'

11. **Fig 3 caption: I think "10 km" should be "4 km" and "minimum gradient" should be "refractivity gradient". The last sentence could be revised to be more precise, for example: "The same is shown in panels e-h for the co-located ERA5 profile".**
    a. The authors agree with the reviewer and all three suggested changes have been made.
    b. Revised caption for Fig. 3:
        i. 'Figure 3: End-to-end simulation data for MAGIC radiosonde launched at 0530 UTC on 20121002 showing: (a) N_{Obs} (solid red) and N_{Abel} (blue dashed) from surface to 4 km; (b) PBLH adjusted N-bias ((N_{Abel} − N_{Obs})/N_{Obs} x 100); (c) refractivity gradient and (d) bending angle vs. impact parameter. The same is shown in panels e-h for the colocated ERA5 profile.'

12. **line 211: "Out of a total of 583 ..., quality control has been implemented ...". I think I understand what you want to say, but literally it makes little sense. Please revise the sentence.**
    a. First sentence of the paragraph was changed:
        i. 'Quality control for radiosonde (and co-located ERA5) profiles was based on five key criteria.'

13. **Fig. 4 caption: I believe b) and c) should be interchanged (also in lines 232-233). It seems that the MAD error bars are dotted for both radiosondes and ERA5, whereas it is the lines connecting the points that are dashed or dot-dashed. Please revise.**
    a. The authors appreciate the reviewer for bringing their attention to this error and the line styles of median and MAD were switched.
        i. Text in caption and body have been changed to accurately reflect line order as:
            1. '…value of PBLH (a), minimum gradient (b) and sharpness (c) along the transect.'
        ii. Text in caption has been changed to accurately reflect line texture as:
            1. '…for MAGIC (median in red circle and dashed line, MAD in red dotted error bars) and ERA5 (median in blue diamond and dot-dashed line, MAD in blue dotted error bars)'

14. **Reference to figures: Often references to figures are made in parentheses, in particular for Fig. 5 in Section 3.2, but also elsewhere. Probably references to figures should be made in text (without parentheses) at least the first time around (I am not sure what the AMT guidelines say).**
    a. The AMT guidelines for figure references do not specify the use of in text vs. parentheses for the first use, only that in text should be abbreviated "Fig." when used in running text unless it comes at the beginning of a sentence in which case "Figure" should be used.
    b. Time was taken to scan for the first reference to each figure and ensure that it was made in text instead of in parentheses while following the aforementioned AMT guidelines.

15. **Fig. 5b: This panel has a different x-axis coverage than the other tree panels. Please adjust.**
    a. Figure 5b has been adjusted so the x-axis coverage is uniform for all four windows in the plot.

16. **Fig. 5 caption: I suppose it should not be 'error bars' in '(median in blue diamond and dot-dashed error bars)'. Please revise.**
    a. Yes. Caption section has been changed to median in blue diamond and dot-dashed line, MAD in blue-dotted error bar).

17. **line 315: Should the 'e.g.' be 'i.e.'?**
    a. Yes. ‘e.g.’ has been changed to ‘i.e.’.

18. **line 318: Should 'between' be 'of'?**
    a. Yes. ‘Between’ has been changed to ‘of’.

19. **line 327-331: I don't understand what is meant by 'favors the radiosonde data' here. Could it be written differently? There are ending parentheses without beginning parentheses in this paragraph. Please revise.**
    a. The sentence has been modified and moved to Section 3.3.2 for Fig. 8 discussion:
        i. ‘The maximum peak *N*-bias (−7.86%) in the radiosonde data is located at the easternmost of the transect near California (−122.5˚E). Whereas the minimum peak *N*-bias (−4.37%) is located near the center of the transect (−147.5˚E). Similarly, the ERA5 also show the maximum peak *N*-bias (−5.92%) near California (−122.5˚E). However, the minimum peak *N*-bias (−0.77%) is found near Hawaii (−157.5˚). Overall, the *N*-bias in ERA5 are smaller than radiosonde in all bins.’

20. **line 344-346: This sentence does not make sense to me: "The radiosonde N-bias variation shows a minimum magnitude of near the center of the transect and two of the largest magnitude difference values of as the bookends while the ERA5 N-bias values have a larger range but peak values (−5.41% to −6.23%) in the three bins closest to California". Could it be written differently?**
    a. The paragraph has been rewritten for clarity as follows:
        i. ‘However, a noticeable difference exists between the ERA5 and radiosonde profiles for the two westernmost longitude bins (−157.5˚E and −152.5˚E) where the ERA5 reveals a much lower and weaker *N*-bias than the MAGIC data.’

21. **line 440: I suggest to use 'California', 'Hawaii' and 'refractivity' throughout the abstract instead of 'CA', 'HI', and 'N'.**
    a. Authors agree with the full name replacement of abbreviations for California and Hawaii.
    b. The use of *N* in reference to refractivity mainly used when referring to the refractivity gradient (*N*-gradient) and bias (*N*-bias).
        i. All instances of '*N*-gradient' have been changed to 'refractivity gradient' or just 'gradient' when refractivity is already referenced within the sentence.
        ii. The authors planned to reference the bias within this paper and, as such, defined '*N*-bias' as an abbreviation for refractivity bias. Since this is the case, the authors believe that keeping the reference to '*N*-bias' is acceptable and should remain throughout the paper.

22. **line 450-453: Correlation between the PBLH and the height of the maximum N-bias is mentioned twice. Please revise.**
    a. Removed second mention of the correlation.

23. **line 454: Past tense is used here, whereas the next sentence is in present tense. Please be consistent.**
    a. Noted. Changed to present tense for consistency with the following sentence.

24. **line 455: I suggest to say 'opposite' instead of 'reverse'.**
    a. 'reverse' has changed to 'opposite'.

25. **line 538: doi.org/10.1175/HTECH-D-19-0206.1 is wrong. It should be 'JTECH'.**
    a. Changed to 'JTECH'