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

Reviewer #1 Comments – Minor Revisions

Review of Assessing the Ducting Phenomenon and the Impact on GNSS Radio Occultation Refractivity over Northeast Pacific Ocean using Radiosondes and Global Analysis

Recommendation: Accept with minor revisions.

This work is original and important. The authors compare the characteristics of PBL height and ducting phenomena along the transect from Los Angeles to Hawaii using radiosondes and ERA5 analysis. They also assess the impact of ducting on GNSS Radio Occultation Refractivity. I only have a few minor comments.

Minor comments:

1. L22-23: **Delete "there is no evidence of zonal dependence".**
    a. Deleted

2. L33: **What does VAMO stand for?**
    a. The official name for acronym Variability of the American Monsoon Systems (VAMOS) has been added to text.

3. L35: **What does GCSS stand for?**
    a. Thank you for bringing this to the authors' attention, the abbreviation GCSS is a collection of other abbreviations as is the acronym MAGIC. Each are listed below.
        i. Global Energy and Water Experiment (GEWEX)
        ii. GEWEX Cloud System Studies (GCSS)
        iii. ARM (Atmospheric Radiation Measurement)
        iv. In full, the MAGIC campaign abbreviation uses the first letter of the abbreviations of other field studies that also use the first letter of other abbreviations (Zhou et al., 2015).
        v. ***M*** (Marine) ***A***(Atmospheric Radiation Measurement) ***G*** (GPCI (GEWEX (Global Energy and Water Experiment) Pacific Cross Section Intercomparison)) ***I***nvestigation of ***C***louds
    b. Full names listed in b and c above added to the text.
        i. '…field campaigns such as the Boundary Layer Experiment 1996 (BLX96, Stull et al. 1997) and the Variability of the American Monsoon Systems (VAMOS) Ocean-Cloud-Atmosphere-Land Study Regional Experiment (VOCALS-REx, Wood et al. 2011), and the Marine Atmospheric Radiation Measurement (ARM) Global Energy and Water Experiment (GEWEX) Cloud System Studies (GCSS) Pacific Cross Section Intercomparison (GPCI) Investigation of Clouds (MAGIC, Zhou et al. 2015).'

4. **L66: Add (Fjeldbo et al. 1971) after "inversion".**
    a. Citation added, "Fjeldbo, G., Kliore, A.J., and Eshleman, V.R.: The Neutral Atmosphere of Venus as Studied with the Mariner V Radio Occultation Experiment. *Astron. J.*, 76, 123-140, doi.org/10.1086/111096, 1971."

5. **L76: Replace "ERA5" with "the ECMWF Reanalysis version 5 (ERA5, Hersbach et al. 2020)".**
    a. Replaced

6. **L99-107: Shorten this paragraph focusing on the benefits of the data set for this study.**
    a. Removed two separate lines in order to streamline this paragraph
    b. Shortened to:
        i. 'Use of this data set serves multiple benefits. First, the northeast Pacific transitions from a shallow stratocumulus-topped PBL to a higher, trade-cumulus boundary layer regime along the GPCI transect (Garratt, 1994). Second, the large number of observations over a 12-month time frame provides high temporal (diurnal and seasonal) and spatial profiling of the PBL along the GPCI transect (Fig. 1). Finally, ducting is prevalent throughout the domain which creates a natural cross-section of X (zonal) and Z (vertical) dimensions.'

7. **L101: Replace "(Garret, 1992)" by "(Garret, 1994)".**
    a. Replaced

8. **L111-112: Replace "the ECMWF Reanalysis version 5 (ERA5, Hersbach et al. 2020)" with "ERA5".**
    a. Replaced

9. **L113: Remove "(Hersbach et al. 2020)".**
    a. Citation removed

10. **L143: The procedures for smoothing the data by 100 m should be described.**
    a. The 100 m smoothing is achieved by a boxcar average technique that is used in the 'smooth' function in the IDL programming language. The profiles are interpolated to 10 m vertical resolution and then the width of the smoothing window is specified to 10 points which equates to a 100 m average. This has been added to the text with the following statement:
        i. '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.'
    b. Side note that this is the same response as that for comment 14. Smoothing will be defined/described when first referred to at this point in the paper and then be referenced at the second point when smoothing of the bending is mentioned.

c. The differences in smoothing window size will be stated explicitly in both references.

11. L167: Explain what you mean by "the residue layer".

a. The use of "residue layer" was accidental and should have been "residual layer". It is used in reference to the location on the gradient profile below the PBL that showed the instance of a strong refractivity gradient that did not reach the critical value.

b. This line was also noted by the second reviewer and has been deemed unnecessary in terms of the section and subsequently removed from the manuscript.

12. Figure 2: When was this sounding taken? The figure caption for (a), (b), (c), (d) is out of sequence.

a. The sounding in this example was taken on 10/2/2013 at 0530 UTC.

i. MAGIC: (Latitude, Longitude) (23.69˚N, -150.02˚E)

ii. ERA5: (Latitude, Longitude) (23.75˚N, -150.00˚E)

b. These profiles are also used in Figure 3. The caption has been rewritten to improve clarity as follows:

i. Figure 2: Vertical profiles of refractivity (N in deca-N-units, solid blue), temperature (T in ˚C, dotted red) and specific humidity (q in g kg^{-1}, dashed green) for (a) radiosonde at (23.69˚N, -150.02˚E) launched at 2012-10-02, 05:30 UTC, and (c) colocated ERA5 at (23.75˚N, -150.00˚E); and associated gradient profiles for radiosonde (b) and ERA5 (d). The horizontal dashed line highlights the height of the minimum gradient, i.e., PBLH. The paired horizontal dotted lines represent the bottom and top of the two ducting layers in the radiosonde profile (a and b) but only one in the ERA5 profile (c and d).

13. L181: Add a reference to Abel integration.

a. Included 3 references to the end of this sentence:

i. 1 previously listed in bibliography

1. Sokolovskiy, 2001

ii. Two references for specific Abel integration.

1. Eshleman, V.R.: The radio occultation method for the study of planetary atmospheres, Planet. Space Sci., 21, 1521-1531, doi.org/10.1016/0032-0633(73)90059-7, 1973.

2. Fjeldbo, G., and Eshleman, V.R.: The Atmosphere of Mars Analyzed by Integral Inversion of the Mariner IV Occultation Data, Planet. Space Sci., 16, 1035-1059, doi.org/10.1016/0032-0633(68)90020-2, 1968.

14. L189: How did you perform 50 m vertical smoothing?

a. The 50 m smoothing is achieved by a boxcar average technique that is used in the 'smooth' function in the IDL programming language. The profiles are interpolated to 10 m vertical resolution and then the width of the smoothing window is specified to 5 points which equates to a 50 m average.
b. More detail on smoothing method is added in response to comment 10.

15. L247: What is the meaning of "moisture lapse"?

a. The phrase "moisture lapse" should have been "moisture lapse rate". The term refers to the decrease in moisture with height. This concept is analogous to the "temperature lapse rate", where a positive value indicating a decrease in temperature with increasing height.
b. "Moisture lapse" was found in multiple places in the manuscript, and all have been changed to either "moisture lapse rate" or "sharp moisture lapse rate".

16. L249: Cite Riehl (1979) or any other references at the end of this sentence.

a. Citation added:
    i. Riehl, H.: Climate and weather in the tropics. London: Academic Press. 611 pp. ISBN 0.12.588180.0.1979

17. Section 3: It might be useful to plot a typical ERA5 sounding and compare it with the observed radiosonde sounding near Hawaii as well as off the California coast.

a. The authors considered adding a second radiosonde and ERA5 profile to represent conditions adjacent to the California coast as the initial manuscript was written. In the interest of space it was determined that the most sensible way to add a second set of profiles would be to introduce them in Figures 2 and 3. While this would add a visual of the difference at each end of the transect, the authors felt that the addition of overlaid profiles might create confusion within the illustrations used to describe the refractivity gradient, ducting layer, PBLH and *N*-bias. The authors further determined the 5˚median statistics were sufficient in illustrating the behavior of the profiles by use of key variables PBLH, minimum refractivity gradient and sharpness in Figure 4 and *N*-bias profiles in Figures 7 and 8.

Reviewer References:

Riehl, H. 1979: Climate and weather in the tropics. London: Academic Press. 611 pp.