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Second Review of Xu et al. 2024 (v3)

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Xu, Xiaoze, Wei Han, Jincheng Wang, Zhiqiu Gao, Fenghui Li, Yan Cheng,and Naifeng Fu, 2024: Quality Assessment of YUNYAO GNSS-RO Refractivity Data in the Neutral Atmosphere. *Atmos. Meas. Tech.*
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This version is improved over the first version, which was already very good, and the authors have been responsive to the two reviews. The addition of the information on how the processing of the Yunyao data was improved since the original evaluation of the data provided to ROMEX about one year ago is a good addition. The paper is now acceptable for publication after the authors consider a few more comments. The authors may respond as they wish to each one, but they are not requirements before the paper is published. I do not need to review the paper again.

1. The authors have added some welcome details concerning the future launches of Yunyao RO satellites, and a few more details would be interesting if it is not too difficult. First, please give an estimate of the total number of RO profiles per day that are expected from the 90 satellites in lines 13, 56, and 352. Second, the sentence in line 354 "As of September 25, 2024..." should be updated with a more recent date in 2025. A timeline showing the number of RO profiles per day as new launches occur and previous satellites die would be interesting, but it is not necessary for the publication of this paper.

2. The statement in lines 94-97 is interesting: *"Notably, the YUNYAO satellite's data transmission to the ground is primarily dependent on ground stations located within China. During the data transmission process, the satellite is required to execute specific onboard operations, thereby reducing the number of occultation observations over China and its surrounding areas, as well as throughout its entire trajectory from the United States into China."* However, I do not see a noticeable reduction in numbers of RO from GPS (b) and GLONASS (d) in Fig. 2. There are noticeable reductions (dark blue) over the middle east/eastern Europe and Indonesia in all three figures (b,d, and f), but I don't see any noticeable reduction over China and between China and the US in figures 2b and 2d.

3. Section 2.1.3: The authors used a limited, low-resolution version of the ERA5 reanalysis, with 37 layers and top at 1 hPa (about 47 km). The full ERA5 dataset consists of 137 levels with a top at 0.01 hPa (80 km) https://cds.climate.copernicus.eu/datasets/reanalysis-era5-complete?tab=overview. This means they cannot compare RO data with ERA5 above about 40 km and the low resolution produces a wavy structure in some of the

profiles (e.g. Fig. 5), as the author note. The authors should acknowledge that they are using a low-resolution version of ERA5 and give a reason why they don't use the full version.

4. In Fig. 8b, the Yunyao N biases between 20 and 40 km of ~-0.5% with respect to ERA5 look a bit too large compared to what we find in the ROMEX data. The biases in Fig. 8a are much closer to zero and are more like what we find. This is just a comment for the authors to consider. It looks like the sample in different in Fig. 8b compared to 8a. Are there other reasons?

In the Summary, the authors may want to revise the sentence to focus on the 8-35 km layer where the observations have much more effect on NWP models: "*Compared to the refractivity calculated from ERA5, the absolute value of the mean bias (MB) of YUNYAO RO refractivity and bending angle data within the 0–40 km range are less than 1.54% and 4.51%, respectively, with larger biases mainly occurring in the lower troposphere. The negative bias in the lower troposphere has been extensively discussed in previous studies (Sokolovskiy et al., 2014; Xie et al., 2010). The standard deviation (SD) of refractivity and bending angle data between 0 and 40 km are less than 3.35% and 11.06%, respectively, with larger values mainly found in the lower troposphere and upper stratosphere.*" The biases and SD are much smaller in this layer.

Minor editorial comments

Line 9: "is" should be "are"

Line 86: Caption to Table 3-I suggest replacing "main parameters" with "Characteristics".

Line 105-replace "at bottom atmosphere" with "in the lower troposphere"

Line 107-replace "is greater" with "is not as deep."