Reviewer #3:

Overall Comments: The work carried out by the authors in the submitted manuscript is of great significance for regularizing the sparsely available GNSS radio occultation (RO) data on a global grid. Such a data may be gainfully used for morphological construction of RO climatology. The technique of machine learning (ML) developed in the work is an advancement over Bayesian Interpolation (BI) – both as standalone model as well as when combined with BI. It is also a timely application of the current global use of AI/ML approaches, especially, with a copious amount of GNSS RO data being available from past and existing satellite missions. The manuscript is clear in its objectives, cogent and systematic in its presentation and well-written in lucid language. Though the authors have liked to restrict their objective to showcase the benefit of ML – as standalone and as combined model with BI, it would have been thorough if some of the advanced ML models such as those based on decision trees viz. random forest, XGBoost etc or using several regressors like stacking regressor were also compared in terms of their statistical metrics. However, this is just a suggestion for future work. I strongly recommend for the manuscript to be accepted for publication in the journal of AMT after incorporation of corrections suggested as minor comments below.

Dear reviewer, thank you very much for taking the time to review our work, we appreciate your comments and your positivity towards the manuscript. Indeed, in future works, we intend to apply more advanced ML methods to further enhance the results; this work was performed to investigate the potential of ML to construct RO climatologies and compare with the state-of-the-art method Bayesian interpolation.

Following, you can find our answers to all your minor comments.

Other minor comments:

1. Line 107: wetPf2 is not the refractivity rather it is the name assigned to a set of retrieved state parameters using 1dVAR method. It is better to state "analyzed refractivity sourced from wetPf2 files from the data portal ….".

Thank you for pointing this out. This has been changed accordingly.

2. Authors to precisely refer in texts (Lines 115-125) to each sub-figures using the assigned alphabets in figure 1. What is the grid size along the zonal and meridional direction chosen for each sub-figures of figure 1.

Thank you for the suggestion, we have now referred to each sub-figure in the text.
The data plotted in Figure 1 are for the COSMIC-2 distribution, for 10 days in January 2020. These data are plotted for the latitude-longitude coordinates of the COSMIC distribution; it looks like a grid because 40000 data points are plotted together.

3. Lines 145-150: Authors to mention whether they have accounted for the difference between geopotential fields for interpolated refractivity from ECMWF model forecasts and geometric altitude above mean sea level for COSMIC-2 refractivity before comparing?

Thank you noticing this. We point out that from the ECMWF data that we have, we also compute geometric altitude above mean sea level using the following formula:
Geometric_alt_above_mean_sea_level = Earth_Radius*geopotential_height/(Earth_radius – geopotential height)
Therefore, we have also used the geometric height above mean sea level for the evaluations of our algorithms applied to ECMWF data, as we did also for the COSMIC-2.

For clarification the part in bold has been added in the text:
'We computed refractivity profiles **(and geometric altitude above mean sea level)** at the times and locations of COSMIC-2 RO soundings….'.

4. In line 145, what is the reason for not using any prior forecast fields such as 3 hours, 6 hours? Is it availability or any other justifiable reason?

The main reason is that we want to use ECMWF forecasts as a "nature run" to avoid any effect of assimilation of COSMIC-2 RO data into ECMWF, please see beginning of section 2.2. The main reason that we choose 12 hours is that after 12 hours the effects of the assimilated data in the forecast model is neglectable and the products will be physically consistent. In addition, ECMWF forecasts start at 00:00:00 and 12:00:00, and therefore, we can either have 0-hour forecast (where the assimilated data constrain the atmospheric state) or 12-hour forecast (where the assimilated data do not constrain anymore the atmospheric state).

5. In line 464: correct the combined model name to BI&ML.

Thank you for noticing. This has been changed.