

Review Comments to the manuscript on “**GNSS Radio Occultation Climatologies mapped by Machine Learning and Bayesian Interpolation**” submitted to Journal of AMT.

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.**

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