Review of "Dynamic statistical optimization of GNSS radio occultation bending angles: an advanced algorithm and its performance analysis" by Li et al.

General comments:

In radio occultation, the ionospheric residual and receiver noise become significant and comparable with the variation of bending angles in the neutral atmosphere above 35-40 km. In order to prevent such errors from degrading accuracy in the lower stratosphere, an upper boundary initialization of bending angle is necessary in RO data inversion. One commonly employed method for initialization is called statistical optimization (SO), which combines the raw observed RO bending angle with the background bending angle according to their error covariances. However since it is difficult to have an unbiased background bending angle, not to mention the reliable error covariance matrices under assumption, the standard SO is usually simplified imperfectly in practical operations. It remains one of the main challenges in RO technique. This study proposed a claimed "better" way to estimate the background and observation error covariance matrices, and tested its performance by comparing with widely used methods using simulated and observed RO data. Though the authors made great efforts on this challenge and the manuscript is well written, in general I am reluctant to agree with the proposed SO method, and feel the comparison of the performances for different SO methods is not entirely justified. My main concerns are as followings:

1. In my understanding, model analyses data should not be directly involved in the statistical optimization in principle. In this study, the model analyses are used to estimate the "unbiased" background bending angle and the observation error correlation matrix. In addition, the same model analyses data are used as references to evaluate the performance of proposed SO method statistically.
2. Obviously the proposed SO method is not applicable for the (near) real-time RO data processing. It needs to be clarified in the paper, especially when you compare your SO method with those methods designed for real-time RO data processing.
3. It would be important to understand what information comes from the pure observation, and what information is affected by the background in optimized RO bending angle. So could you please present the histograms of the median weighting height where the background and observation bending angle uncertainty are same for different SO methods?
4. As mentioned in section 2.1, the authors updated the calculation of the mean variable in each grid cell by averaging the variable over a longer temporal period (7 days) and a larger geographic region (1000 km x 3000 km) compared to the b-dynamic scheme. The choice of average domain is a trade-off between in capturing the mean field variations and in removing short-term/random variations. So could the authors please say few more words about what kind of improvement in performance get from this update? If more RO data available per day in the future, would it impact the choice of the average?

5. As mentioned in section 3.2, the authors applied different quality checks for RO data retrieved with different SO schemes. I would like to suggest the authors to make sure the same dataset used for comparison.