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Interactive comment on "Benefit of ozone observations from Sentinel-5P and future Sentinel-4 missions on tropospheric composition" *by* Samuel Quesada-Ruiz et al.

Anonymous Referee #2

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In this study, Quesada-Ruiz et al. conducted an Observing Simulated System Experiment (OSSE) in order to assess the benefit of future ozone data from individual or combined use of GEO (Sentinel-4) and LEO (Sentinel-5P) satellite observations on tropospheric ozone composition. This OSSE, which focused over Europe during the summer 2003 period, consisted in the following two main steps: (1) assimilating S4 and S5P synthetic ozone profile data simulated by the DISAMAR inversion package using LOTOS-EUROS and TM5 3D-CTM fields as input, and (2) comparing the assimilation results to a reference run based on the assimilation of simulated ozone data at a selection of 1132 AirBase stations. Results showed that S4 and S5P satellite data in the UV range clearly bring direct added value to the tropospheric ozone composition

in the middle troposphere (200-500 hPa). This study also confirmed the limited use of satellite observations in the UV for deriving the ozone distribution inside the boundary layer.

The manuscript is well written and clearly structured and the presented results are scientifically relevant. I recommend the paper for publication in AMT after addressing the following specific comments:

1/Page 4, lines 16-24: one important parameter which has a large impact on the analysis is the background error covariance matrix. The authors should further justify how they built this matrix and why it does not evolve with time. For instance, it would be also interesting to know whether the chosen variance and correlation lengths values come from prior sensitivity tests.

2/Page 5, line 17: It would help the reader to briefly summarize what were the evaluation results of TM5 ozone data against MOZAIC aircraft measurements in August 2003.

3/Page 5, lines 27-28: The bias between LOTOS-EUROS and the surface ozone measurements is about 10-20μg.m-3. Does this bias can be considered as a bad, fair or good agreement ? Given the fact that the selection of the nature run component is of great importance for the OSSE, what is the impact of this bias on the results of the study ?

4/Page 6, lines 26-29: Could you justify the choice of the SNR values for the solar irradiance and Earth radiance measurements ?

5/Page 12, lines 18-20: Pixels with cloud fraction greater than 0.05 have been discarded from the analysis. Does it mean that the methodology presented in the manuscript is only valid in clear-sky conditions ? Is a cloud treatment included in the DISAMAR package ? It would be useful to further comment on this cloud issue.