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Atmospheric Measurement Techniques Discussions

Interactive comment on "Monitoring the lowermost tropospheric ozone with thermal infrared observations from a geostationary platform: performance analyses for a future dedicated instrument" *by* P. Sellitto et al.

Anonymous Referee #1

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This paper present performance analyses for a concept geostationary observing system. In general this topic fits well into AMT. The paper is well organized and shows the capabilities of future air-quality geostationary mission over Europe. The instrument configuration and the pseudo-observation simulator are not sufficiently presented in details. The authors should refer more to their previous study Sellitto et al. 2013a and should provide a more descriptive overview of setups and methods. The vertical resolution and lowermost tropospheric ozone sensitivity and the general statistical analysis are interesting enough to make the paper scientific content sound. However, there are

a lot of presentation issues. The quality of the figure is low and some parts of the text remains not very easy to understand. The English wording should be improved all through the text.

Here are my specific comments:

P6447

L9: Independent to what?

P6449

L16: Again independent to what? I would use a different wording here, for example "a full single piece of information".

P6451

L8: I do not think the word "punctual" is appropriate here. Please rephrase this sentence.

P6452

L15: "a horizontal resolution of 15 km x 15 km at sub-satellite point, a sub-satellite point at latitude= 0 and longitude= 0, and a field of regard of (15_W–35_ E, 35_ N–65_ N)."

Please re-consider the comment 1.a of the access review. A horizontal resolution of 15km at sub-satellite point is not necessarily 15km at the field of regard. Please precise if the horizontal resolution at the field of regard is the same as the sub-satellite point or different (and then specify what resolution you really use over Europe).

L20: Were you not able to reprocess the algorithm?

P6453:

L13: The authors should have made an evaluation of the model against independent measurements in order to show that the MOCAGE run is realistic. The authors can

alternatively do an overview of the various studies which evaluate the MOCAGE model against independent measurements.

L14: What is the resampling in this case: interpolation, means, weighted mean (e.g. partial column calculation)?

P6454:

L14-17: This point needs to be more discussed. What is the impact of clouds on the evaluation the authors are doing in the next sections of the paper? For example, what is the level of significance of the tests made in table 4 5 6 and 7 if you flag the time series with clouds, as it should be done in reality?

L18: Before beginning this section it should be useful if the authors specify the vertical resolution and the number of levels of the simulated data. A figure might be appropriated. As mentioned in the access review a plot of the full averaging kernel matrix/function (one typical example) would improve the quality of the paper.

P6455:

L1-2: What do you call surface- 3km TOC and surface-6km TOC. Supposing you have one level by kilometer of altitude is that the 3 or 6 first levels partial column? This point can be clarified by answering the one above.

From P6455 L14 to P6456 L26: This paragraph is a bit long and very detailed to end up to the conclusion that day/night time affects more the sensitivity than land sea surface. This part of the text could be shortened a little bit.

From P6456 L27 to P6457 L6: Please clarify this part of the text. Especially explain the last sentence: “The AKs for strongly positive thermal contrast (> 5 K) are only a bit more separated.“ Is that shown in any figures or has it been demonstrated before?

From P6457 L8 to P6458 L3: The authors should be more concise on this part in order to make it easier for the reader. It would also be interesting if the authors have related

the DOF to the skills scores of the simulated observation versus the nature run. After looking at tables 2, 3, 4 and 5 the more DOF you have the best scores you have.

P6457

L11-12: Please provide percentages.

From P6458 L4 to L17: The authors should go further in the discussion and, again, relate the DOF to the performance of the simulated observation regarding the nature run. A map of the DOF (surface 3km and surface 6km) should be helpful here. Please explain why comparing (MAGEAQ – MOCAGE raw) but not (MAGEAQ – MOCAGE smoothed). By doing (MAGEAQ – MOCAGE raw), you look at the differences mostly due to the smoothing error P6458 L21: We focus on the local scale

P6459

L11: Please specify/clarify which kind of comparison you are doing. Is it the MOCAGE pseudo reality smoothed by the averaging kernel or the MOCAGE raw pseudo reality?

From P6459 L29 to P6460 L1: Please explain why?

P6460

L6: “mean of the mean biases” correct by “the mean biases”

P6460

L19-20: This sentence is a bit confusing please reformulate.

P6460

L26: A conclusive paragraph here is missing; please do a little summary about the capability of the MAGEAQ-TIR pseudo observations to follow the ozone partial columns temporal evolutions.

P6461

L2-3: The sentence is confusing please rephrase.

P6461

L12: Like in comment "P6459 L11" what kind of comparison are you doing?: Is it the MOCAGE pseudo reality smoothed by the averaging kernel or the MOCAGE raw pseudo reality?

Figure 3 and 4: the maps are a way too small. There is a lot of white wasted space between the maps. Please reduce this space in order to make the maps larger, or split the figures. Adapt the color scale of the differences to make it more accurate.

Figure 5 and 6: as for figure 3 and 4 reduce the space between the plots or split the figures.

Figure 7: use more different colors for Surf-3km and Surf-6km DOF and reduce the wasted space between the plots.

Figure 8: use error bars or a box plot instead plotting all the data points by levels. Reduce the wasted space between the plots.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 6445, 2013.