

Dear Editor,

Thank you very much for the attention to our paper. We thank also reviewers for their valuable comments. Please find below our replies on remaining comments.

L110: "and increased aerosols after Soufrière Hills, Rabaul and Tavurvur volcanic eruptions".

If the authors are confident that Rabaul and Tavurvur are two distinct eruptions, please include references for each. Otherwise, if they agree with my comment regarding Table 2, then they need to modify the text accordingly.

You are right, it was the same prolonged eruption with the maximum in October 2006 (<https://volcano.si.edu/faq/index.cfm?question=eruptionsbyyear&checkyear=2006>, <https://doi.org/10.5194/essd-12-2607-2020>)

We modified Table 2, figures and text.

L181: "Envisat (Environmental Satellite)." Replace it with Environmental Satellite (Envisat).

Corrected

Figure 7: The x and y-axis multiplier are challenging to follow. Please use  $\times 10^{-4}$  and add it to the figure caption instead of each axis.

The figure is improved, the axis multipliers are clearly visible now.

L279: "Figure 7 shows comparison of the monthly zonal mean FMI-GOMOSaero aerosol extinction coefficients at 21.5 km"

Could you please specify whether the comparison is conducted globally or for a specific zone?

The comparison is made globally, we added this.

L302: Can you comment on the bias with SCIAMACHY? The bias is similar to SAGE, 20-40%, however, it is always negative. A comment about the AERGOM difference is also needed.

Corresponding comments are added.

I preferred to see the AERGOM difference between the other two instruments instead, but I am okay with Fmi-GOMOS-AERGOM plot if the authors can explain its significance to the reader.

Additional panels for AERGOM are not shown in Figure 8 (like they are shown in Figure 9) because AERGOM does not provide aerosol extinction profiles at 525 nm. Therefore, some small biases with respect to SAGE II and SCIAMACHY are expected. In the right panel of Figure 8, both AERGOM and FMI-GOMOSAero are at 550 nm.

L338: "The largest enhancement at 21 km is in the tropics and it is associated with Soufrière Hills, Rabaul and Tavurvur volcanic eruptions in 2006." Also, in L361. See my comments regarding L110 and Table 2, and make sure the text is consistent if you agree with my comments.

Corrected, as indicated above.

L326: A short statement pointing to the improvement of the proposed new dataset over the AERGOM dataset is warranted here.

A short statement is added.

Table 2: I'm not aware of a Rabaul eruption in August 2006. However, it erupted in October 2006, reaching 18 km, according to this article <https://reliefweb.int/report/papua-newguinea/volcano-erupts-papua-new-guinea-island>, reporting that the eruption took place in Mount Tavurvur, near Rabaul. which may lead to different naming of the same eruption. Please disregard my comment if you can provide a reference for both eruptions in L110 or modify the text if you agree they are the same."

You are right, this was a mistake. It is corrected now.

I also note that the production office requests you check your figures for readability by those with common colour blindnesses, and revise accordingly. I note many of your figures use a rainbow colour bar (for heat maps or line plots) and these are problematic for those with red-green colour blindness.

The colors in Figures 2, 4, 6, 8, 11 are changed.