

Topical Editor Technical corrections:

- Reff should be written with "eff" as subscript throughout the manuscript.

Yes – it's corrected -- done.

P4, L90: Typo in methodologies (third "o" is missing)

Yes – it's corrected -- done.

P10, L292: add "a" -> with a number of models.....

Yes – it's corrected -- done.

P10, L298: add "a" -> generate a peak loading

Yes – it's corrected -- done.

P10, L309: remove space between Pin20 and closing parentheses.

Yes – it's corrected -- done.

P11, L349: space between circulation and opening parentheses missing.

Yes – it's corrected -- done.

P11, L355: Abbreviation OPC has not been introduced.

Yes – it's corrected -- on line 341 changed "OPC" → "optical particle counter (OPC)" (341 is 1st use). Note we also made a change after realising our statements about the HIRS data on lines 355-359 were incorrect – we changed "is inconsistent with" to "is partially consistent with" (lines 354-355) and also changed "may be inaccurate" to "may well be accurate". We're sorry for our mistake there.

P12, L361: add "in the" so that it reads "...are shown in the Supplementary Figures....."

Yes – it's corrected also modified as ", these are shown"

P12, L366: Abbreviation NH has not been introduced yet.

P13, L397: Abbreviation SH has not been introduced yet.,

Yes – these set to "Northern Hemisphere (NH)" and "Southern Hemisphere (SH)" -- done.

P14, L431: add "to" -> leading to faster.....

Yes – it's corrected -- done.

P16, L512: add "to" -> relative to the.....

Yes – it's corrected – done.

P16, L513: "the" twice, thus one is obsolete.

Yes – it's corrected -- done.

P16, L515: Check sentence. Do you mean the modelled Pinatubo forcings?

Yes – it's corrected -- to "the Pin20 simulation also over-predicts the magnitude of the Pinatubo forcing compared to the ERBE anomaly" – done.

P16, L518: Add space between number and unit.

Yes – it's corrected -- done.

P16, L530: add "a" -> might be a much weaker..... or write plural "much weaker signals".

Yes – it's corrected – from “might be much weaker” to “might be poorly sampled” -- done.

P17, L545: add "that the" -> predicts that the Pinatubo aerosol.....

Yes – it's corrected -- done.

P17, L546: as in? I would suggest to write either as found in or as seen in.

Yes – it's corrected -- done.

P17, L561: stratospheric -> stratosphere

Yes – it's corrected -- done.

P17, L561: reanalyses or re-analyses, it should be written one way consistently throughout the manuscript.

Yes – it's corrected -- done.

P17, L562: Figure 8 is referenced before Figure 7. It seems that the reference to Figure 7 is missing at all.

Yes – we have corrected that sentence to say:

“Figure 7 shows ERA-interim temperature anomalies compared to the model's volcanic warming, i.e. the temperature difference between the sensitivity (Pin10, Pin14 and Pin20) and control (Pin00) simulations”.

P18, L576: add "the" -> via the middle branch.....

Yes – it's corrected -- done.

P18, L576: at around -> better to write to around or up to around.

Yes – it's corrected -- done.

P18, L585: better to write "at extinction of"?

Yes – it's corrected – done.

P18, L589: removal of what? Please add.

Yes – it's corrected – done.

P19, L624: add "the" -> suggest that the tropical

Yes – it's corrected -- done.

P19, L634: use plural -> different responses between two CMIP assessments.

Yes – it's corrected – we re-worded the sentence to say:

“Hence, the historical climate integrations performed using these two forcing datasets will have simulated substantially different Agung surface cooling between the two CMIP assessments.”

P19, L635: Sato data -> The Sato data

Yes – it's corrected -- done.

P20, L636: add "a" -> within a couple of months

Yes – it's corrected – we preferred to re-word to “just a few months after the eruption”.

P20, L636: Thenafter -> Thereafter

Yes – it's corrected – done.

P20, L642: add "the" -> to the CMIP6 datasets

Yes – it's corrected – done.

P20, L642: add "a" -> predict a secondary

Yes – it's corrected -- done.

P20, L651: add "that" -> It is notable that those....

Yes – it's corrected -- done.

P21, L673: Add "the" -> Although the lidar

Yes – it's corrected -- done.

P21, L673: add "the" -> ...the Agung aerosol

Yes – it's corrected -- done.

P21, L676: Rewrite sentence. Either "modelled tropics to NH midlatitude transport" or "weak transport from tropics to NH midlatitudes in the model"

Yes – it's corrected – and we re-worded slightly to improve the wording.

P21, L677: add "the" and "S" in capital letter -> the Supplementary Figure

Yes – it's corrected -- done.

P21, L678: add "the" -> the Lexington lidar

Yes – it's corrected -- done.

P21, L684: add "an" -> estimated an about 1.5.K

Yes – it's corrected – and we re-worded that sentence to say:

“Using radiosonde data, Free and Lanzante (2009) attributed around 1.5 K warming to the Mt. Agung volcanic aerosol”

P21, L685: add "the" -> due to the westerly QBO

Yes – it's corrected -- done.

P21, L699: 1991-3? Do you mean 1991-1993?

Yes – it's corrected -- done.

P22, L704: add "a" -> it is a common feature

Yes – we re-worded the sentence to:

“The model ensembles compare very well to mid-visible and near-infra-red aerosol extinction from SAGE-II measurements, although the model has sAOD high bias in the tropics, a common feature seen in interactive stratospheric aerosol models (Niemeier et al., 2009; Mills et al., 2016; Sukhodolov et al., 2018)”. N.b. we changed that to cite the 2009 Niemeier study :

Niemeier, U., Timmreck, C., Graf, H.-F., Kinne, S., Rast, S. and Self, S.

“Initial fate of fine ash and sulfur from large volcanic eruptions”
Atmos. Chem. Phys., 9, 9043–9057, 2009.

P22, L709: rage -> range

Yes – it's corrected -- done.

P22, L728: Sato data -> The Sato data

Yes – it's corrected -- done.

P22, L733: suggests that -> suggest a

We re-worded that sentence to read:

“Comparison with the lidar measurements from Lexington suggests that the UM-UKCA simulated vertical extent of the Agung cloud in the NH mid-latitudes is in best agreement for run Agu09.”

Figure 7, 10, 13: Colour bar label cut and in Figure 13 also the x-axes labels are cut.

Yes – it's corrected -- done.

Supplement, P2, L24: space between numbers and units missing.

Yes – it's corrected – done. We also realised we missed out an important part of the methodology to explain the 1-year time offset we applied re: applying the extinction-to-backscatter ratio values from Pinatubo (from Jaeger and Deshler, 2003) to the Agung cloud.

So we also added the sentence “Since the Northern Hemisphere Agung cloud had much lower optical thickness than the Pinatubo cloud, we also included a 1-year time offset, with the 1993 and 1994 extinction-to-backscatter ratio values used for Lexington data in 1964 and 1965 respectively.”

Supplement, P3, Fig S1 caption: One monthly mean obsolete? Shouldn't it read "Monthly mean tropical stratospheric zonal mean wind?

Yes – it's corrected -- done.

Supplement, P3, Fig S1 caption: in Pin 10.... -> of the Pin 10....

Yes – it's corrected -- done.

Supplement, P4, Fig S2 caption: in -> of the

Yes – it's corrected -- done.