

Atmos. Chem. Phys. Discuss., community comment CC3
<https://doi.org/10.5194/acp-2021-206-CC3>, 2021
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Reply on AC2

Petr Šácha

Community comment on "The Brewer–Dobson circulation in CMIP6" by Marta Abalos et al.,
Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-206-CC3>, 2021

Dear authors,

thank you very much for your reply.

Regarding our point 2) and your response (copied below this reply):

- Can you provide further details on how you ensured that the requirements made in Garber and Manzini (2016) were fulfilled? Did you apply a method similar to Dietmüller et al. (2018, see their Supplement) to check this or you rely on personal communications with the individual modelling groups?

Anyway, it is good to hear that there are no inconsistencies in CMIP6 data regarding the data request for the TEM formulae (unlike in CCM1).

Best regards,

Reference:

Dietmüller, S., Eichinger, R., Garny, H., Birner, T., Boenisch, H., Pitari, G., Mancini, E., Visioni, D., Stenke, A., Revell, L., Rozanov, E., Plummer, D. A., Scinocca, J., Jöckel, P., Oman, L., Deushi, M., Kiyotaka, S., Kinnison, D. E., Garcia, R., Morgenstern, O., Zeng, G., Stone, K. A., and Schofield, R.: Quantifying the effect of mixing on the mean age of air in CCMVal-2 and CCM1-1 models, *Atmos. Chem. Phys.*, 18, 6699–6720, <https://doi.org/10.5194/acp-18-6699-2018>, 2018.

- *POINT 2: Please clarify your methodology with respect to the usage of w^*_bar (results around Figs. 7, 10 and 11). As reported in the supplement of Dietmüller et al. (2018) for CCM1 simulations, there were inconsistencies in the type of w^*_bar provided by the modelling groups, despite the log-pressure formula being solicited in the data request. In the DynVar data request by Gerber and Manzini (2016), the log-pressure formula is also solicited. If there are inconsistencies in the w^*_bar formulae between CMIP6 simulations, this can result in differences in w^*_bar climatology and trends as quantified in Eichinger and Sacha (2020). Hence, our findings can help to narrow down the w^*_bar differences in Fig. 11. Generally, note that due to stratospheric cooling, the relation of log-pressure metres to geometric metres is not constant, which projects also to the magnitude of w^*_bar trends.*

We ensured that the requirements made in Garber and Manzini (2016) were fulfilled in all the simulations we used.