Reply to topic editor comments for
https://doi.org/10.5194/egusphere-2025-5669-RC1

Dear Mingxu Liu, thank you for handling our AerChemMIP2 experiment protocol. Your suggestions are helpful in further improving the presentation in the protocol. Our replies are in blue beneath the comments in black.

Thanks for addressing the two reviewers' comments. By checking your response to these comments and my own reading of this manuscript, I have some remaining suggestions.

1) Please revise Figure 4, Figure 5, and Figure 8, in which the font sizes are too small to be seen clearly.

We have now increased the font sizes in these figures.

2) As the authors update the names of the scenario VLLO to VL, why do they still appear to be VLLO in Figure 7, Figure 8, and Figure 9?

Thanks for spotting this, the name has been updated in the figures as well.

3) I agree with one reviewer that models with nitrate aerosol treatment are desirable. Very few model outputs of nitrate are available in CMIP6 and AerChemMIP. Should we expect more model experiments with nitrate simulation included (interactive or prescribed)?

Agreed, we are optimistic to receive more model contributions for addressing the role of nitrate in AerChemMIP2 than was possible for AerChemMIP. First responses to our AerChemMIP2 survey indicate that at least six Earth system models plan to contribute experiments with interactive aerosols, of which at least four have the capability to run experiments with interactive nitrate but the exact model configurations are not yet known. We therefore cannot reply with exact numbers for nitrate simulations yet and encourage modelling centers to complete AerChemMIP2's quick survey, which remains open for responses until the end of March 2026. We add more citations for models with nitrate at line 259: „e.g., GFDL-ESM4.5, which is an updated configuration of ESM4.1 (Dunne et al., 2020, Horowitz et al., 2020), and other models (Kelley et al., 2020, Jones et al., 2021, Tilmes et al., 2023).

Newly added references:

Dunne, J. P., Horowitz, L. W., Adcroft, A. J., Ginoux, P., Held, I. M., John, J. G., et al. (2020). The GFDL Earth System Model Version 4.1 (GFDL-ESM 4.1): Overall coupled model description and simulation characteristics. Journal of Advances in Modeling Earth Systems, 12, e2019MS002015. https://doi.org/10.1029/2019MS002015

Horowitz, L. W., Naik, V., Paulot, F., Ginoux, P. A., Dunne, J. P., & Mao, J., et al. (2020). The GFDL global atmospheric chemistry-climate model AM4.1: Model description and simulation characteristics. Journal of Advances in Modeling Earth Systems, 12, e2019MS002032. https://doi.org/10.1029/2019MS002032

Kelley, M., Schmidt, G. A., Nazarenko, L. S., Bauer, S. E., Ruedy, R., & Russell, G. L., et al. (2020). GISS-E2.1: Configurations and climatology. Journal of Advances in Modeling Earth Systems, 12, e2019MS002025. https://doi.org/10.1029/2019MS002025

Tilmes, S., Mills, M. J., Zhu, Y., Bardeen, C. G., Vitt, F., Yu, P., Fillmore, D., Liu, X., Toon, B., and Deshler, T.: Description and performance of a sectional aerosol microphysical model in the Community Earth System Model (CESM2), Geosci. Model Dev., 16, 6087–6125, https://doi.org/10.5194/gmd-16-6087-2023, 2023.