

Participant Call November 9, 2023

Participants: Paul, Jon, Joana, Richard, Christian, Annika, Colin, Kenjiro, Colleen, Jesse, Olivia

Grid intercomparison (Activity 1)

- Model data updates:
 - 10707: Previous flagged issue: the sum of the effective conductances often exceeds V_d . Christian, Olivia, and Paul followed up with Richard after the October call. One outcome of these exchanges was that the currently reported lower canopy and soil pathways likely are duplicates (LOTOS-EUROS does not have an explicit lower canopy pathway, but like CMAQ M3Dry and STAGE distinguishes between deposition to vegetated and non-vegetated soil) and that accounting for this duplication might resolve the issue. Christian will redo the plots without the lower canopy pathway to see if this resolves the inconsistencies and will let Richard know. In Christian's analysis, he will look at this on both a grid-by-grid and spatially aggregated basis to determine whether some of the inconsistencies seen in previous spatially aggregated analyses may also have resulted from masking issues.
 - 10708: Paul is working with Roberto to re-estimate several diagnostic variables currently not being reported. Several email exchanges since the October call. Paul to follow up with Roberto.
 - 10702: flagged issue: potential units and lower limit cut-off issues for EU 2010 effective flux data for HNO_3 (0351-042-15,16,17,18). No follow-up to date.
 - 10709: error in model post-processing or model output, array overflows in the output field. [Added by Christian]: this appears to be not just be in the effective flux variables 15 – 18, but also the corresponding effective conductance variables 06 – 09, e.g. 10709-0251-042-06. Also, the effective conductances (at least for O_3) do not add up to V_d . After first being alerted to these issues, Young-Hee had sent an email that she will look into them.
- Data storage updates:
 - No updates since the last call
- Analysis updates:
 - Christian is continuing the analysis of the ozone dry deposition diagnostics (grid-scale and LU-specific) and LU information submitted by all groups. Paul and Stefano are providing feedback during regular monthly calls. Iannis will join these calls to coordinate work on the operational analysis manuscript. Christian shared a few examples of recently completed analyses.
 - Next week, Annika, Paul, Stefano, Olivia, and Christian will have a call to discuss specifics of Annika's planned work on using AQMEII4 data (Activity 1 and/or Activity 2) for statistical error estimation
 - Colin Lee and Joana Soares presented plans for potentially using hierarchical clustering analysis to analyze the Activity 1 ensemble output. Colin shared slides describing the method that was originally developed by Joana for more limited datasets and later was parallelized and made computationally more efficient by Colin so that it can now be applied to larger datasets such as the grid model output from Activity 1. His slides also showed examples how the method can be applied to determine airsheds / clusters of similarities from model outputs, with potential applications in monitoring network review and design. The group welcomed this planned analysis of Activity 1 datasets. Colleen noted that this

work might also be of interest to the CASTNET network design team and will get Colin in touch with that group.

Point intercomparison (Activity 2)

- An Activity 2 call was held on November 7, call notes will be posted to the github site.
 - Colin presented his ongoing work on applying physics-informed machine learning to the Activity 2 dataset
 - Anam has started to analyze results from some of the sensitivity simulations submitted so far. She will present this work at AGU and plans to give a preview of her presentation during next month's call
- Olivia reported that she continues to work with Nichole Ruiz on the analysis of summertime stomatal conductance at the Bugacpuszta site. The analysis has been expanded to 20 years of observational data for water vapor and carbon fluxes. There is good consistency between water vapor flux and carbon flux based estimates of stomatal conductances and both estimates show large interannual variability. For ozone (only 2 years of flux measurements), non-stomatal processes may counteract some of the effects of that stomatal interannual variability. Jesse might be interested in using this observation-constrained stomatal conductance estimate in STAGE (along with the observed ozone deposition velocity) to then optimize the representation of the non-stomatal portion. Olivia noted that as part her analysis with Nichole, she would like to bring in some model-based estimates from potentially existing long-term grid model runs and/or additional simulations performed over this longer time period by some of the Activity 2 point models. Jesse and Paul responded that such point model simulations should be possible if the driving datasets are available. Jesse also noted that the 2002 - 2019 108 km resolution hemispheric CMAQ (STAGE) simulations performed by Christian for the EQUATES project might be of interest for this analysis. Christian will follow up with Olivia about extracting outputs (ozone concentrations, deposition velocities, etc.) for the grid cell containing Bugacpuszta and surrounding areas.

Paul gave an AQMEII4 status update at the October 24 NADP TDEP meeting

Special issue - submission deadline extended to July 31, 2024

- Galmarini et al. (2021) Activity 1 overview technical note - published (<https://acp.copernicus.org/articles/21/15663/2021/>)
- Hogrefe et al. (2023) analysis of EPA CMAQ NA simulations - published (<https://acp.copernicus.org/articles/23/8119/2023/>)
- Clifton et al. (2023) Activity 2 overview manuscript - published (<https://acp.copernicus.org/articles/23/9911/2023/>)
- Additional planned / potential manuscripts:
 - Activity 1: Makar et al. – critical loads ensemble analysis - continue to work on draft
 - Activity 1: Makar et al. potential updates to GEM-MACH - how can results from Activity 2 be used to check/update the representation of dry deposition in regional modeling. Paul will lead this, but not until after finishing the critical loads analysis, i.e. not before September.

- Activity 1: Kioutsioukis et al. – multi-model operational evaluation and analysis of AQMEII4 grid models - no recent progress, then start working full time on
- Activity 1: Hogrefe, Galmarini, Makar, Kioutsioukis et al. - multi-model analysis of ozone dry deposition diagnostics (grid-scale and LU-specific) and LU information - Christian will start this analysis and Paul, Stefano and Christian will have monthly calls to review progress and scope out a draft manuscript. Target: winter 2023/2024
- Activity 2: Lee, Soares, Makar, et al. – use of hierarchical cluster analysis for grid model intercomparison
- Activity 2: Khan, Clifton, et al. – observational constraints on stomatal conductance and point model sensitivity simulations
- Activity 2: Lee, Makar, et al. – use of meteorological cluster analysis for point model evaluation
- Activity 2: Lee, Makar et al. – physics-informed machine learning for potentially refining point model parameter values
- Activity 2: Bash et al. – use of AQMEII4 flux measurement for optimization of selected STAGE resistances. Finished all calibration runs, will start writing after AGU.

Next call December 14