Participant Call April 10, 2025

Participants: Jesse Bash, Stefano Galmarini, Christian Hogrefe, Rohit Mathur, Kenjiro Toyota, Jon Pleim, Vladislavs Singarjovs, Annika Vogel, Roberto San Jose

Special issue manuscript status

- **Active work:**
  - Activity 2: Khan, Clifton, et al. – observational constraints on stomatal conductance and point model sensitivity simulations (https://egusphere.copernicus.org/preprints/2024/egusphere-2024-3038/)
    - Revised manuscript submitted, waiting for editor decision after 1 required reviewer report was received on April 2 according to the manuscript status page.
  - Activity 1: Kioutsioukis, Galmarini et al. – multi-model operational, probabilistic, and diagnostic evaluation and analysis of AQMEII4 grid models (https://egusphere.copernicus.org/preprints/2025/egusphere-2025-1091/)
    - Published as preprint in EGUSphere March 19.
    - No reviewers accepted yet.
  - Activity 1: Hogrefe, Galmarini, Makar, Kioutsioukis et al. - multi-model analysis of ozone dry deposition diagnostics (grid-aggregated and LU-specific) and LU information (https://egusphere.copernicus.org/preprints/2025/egusphere-2025-225/)
    - Published as preprint in EGUSphere February 6, two generally positive reviewer comments received, discussion closed
    - Christian working on response to reviewers and manuscript revisions, expect to circulate drafts early next week
  - Activity 2: Bash et al. – use of AQMEII4 flux measurement for optimization of selected STAGE resistances and application of revised STAGE formulation to hemispheric CMAQ simulations
    - Not much progress since the last meeting due to competing priorities. Hopefully will find time soon.
  - Activity 1: Baublitz et al. - analysis of Activity 1 wet deposition fields by looking at multi-variable relationships between fluxes and meteorology / concentrations to identify communalities in spatio-temporal patterns of model spread.
    - Colleen was not able to join the call. During the last call, she shared that she aims to have a draft manuscript in late spring / early summer.
  - Activity 2: Vogel et al. - error estimation analysis
    - Annika shared that while most of her focus is on projects for her new position in Germany, she is also finishing up some work she had started during her postdoc appointment at ECCC. The first portion of that previous work (not related to AQMEII4) may be wrapped up by May so after that there may be time for finishing up the AQMEII4 work over the summer.
  - Activity 2 + Activity 1: Toyota 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. The goal is to address negative ozone bias in GEM-MACH forecast system, looking at potential

updates to dry deposition scheme (e.g. include VPD impacts on stomatal conductance which currently isn't included)
    - During the March call, Kenjiro had shared some plots from annual GEM-MACH simulations in which updated deposition parameters were incorporated into the operational forecast model.
    - Will now proceed with implementing the Makar et al. canopy shading effect into the forecast model. Once the code merging is done (maybe in ~1 month), will perform another annual simulation and repeat the model performance evaluation
  - Activity 2: Lee, Makar et al. – physics-informed machine learning for potentially refining point model parameter values
    - Colin was not able to join the call, no updates via email
  - Activity 2 + Activity 1: Olivia's work with Nichole Ruiz on analyzing observed and modeled data at Bugacpuszta is expected to lead to a draft manuscript.
    - Olivia shared via email that she would still like to work on this and may have some time to do so next week.
  - Possibly related manuscript led by Paul and his postdoc: analysis and sensitivity of SO_2 deposition. Will revisit the discussion whether it would be a good fit for the SI once the analysis has progressed further.
    - No updates since the last call.
- Potential work, currently lower priority:
  - Activity 1: Lee, Soares, Makar, et al. – use of hierarchical cluster analysis for grid model intercomparison
    - Colin was not able to join the call, no updates via email
- **Published articles:**
  - Galmarini et al. (2021) Activity 1 overview technical note (https://acp.copernicus.org/articles/21/15663/2021/)
  - Hogrefe et al. (2023) analysis of EPA CMAQ NA simulations (https://acp.copernicus.org/articles/23/8119/2023/)
  - Clifton et al. (2023) Activity 2 overview manuscript (https://acp.copernicus.org/articles/23/9911/2023/)
  - Makar et al. (2025) Critical loads ensemble manuscript (https://acp.copernicus.org/articles/25/3049/2025/

Other Point Intercomparison (Activity 2) Updates

  - Stefano and Christian shared the flux datasets at Auchencorth Moss and Easter Bush prepared for Olivia's paper David Simpson after hearing back from the site PI. The datasets for all other sites were shared previously.
  - Laurens' student Vladislavs presented results from his M.Sc. thesis work with the MLC-Chem model using the Borden Forest data prepared for Olivia's AQMEII4 paper. Given the general underestimation of measured Vd at this site during the summer by most of the point models, his research investigates how representative the measured soil moisture values at 2 cm and 50 cm depth are for reflecting soil moisture limitations on stomatal ozone uptake and whether incorporating deeper soil moisture data into the models may improve agreement. To this end, he developed a method to infer an effective soil moisture and found that it is located at a depth of

about 160 cm at this site. Using this effective soil moisture in the MLC-Chem calculations improved agreement with observations. Follow up work investigated the effects of relative humidity on the remaining differences between observed and modeled dry deposition velocities. Vladislavs may develop this work into a manuscript and target it for the AQMEII4 ACP special issue that is open for submissions through the end of the year.

Other Grid Intercomparison (Activity 1) Updates

- Model data updates:
  - No updates since the last call
- Data storage updates:
  - Paul created an extra backup copy of all AQMEII4 grid and point model data currently stored on the JRC sftp and https servers and the EPA GoAnywhere server

Next Call

The next call is scheduled for Thursday May 8. Prior to calls in subsequent months, Christian will reach out to participants working on manuscripts to see if any updates are available. If not, individual monthly calls may be cancelled but we will aim to maintain at least a bimonthly frequency for the coordination calls through the end of the calendar year.