Participant Call May 9, 2024

Participants: Stefano Galmarini, Christian Hogrefe, Ummugulsum Alyuz, Colleen Baublitz, Paul Makar, Olivia Clifton, Rohit Mathur, Annika Vogel, Jesse Bash

Grid intercomparison (Activity 1)

- Model data updates:
  - 10709: Young-Hee is currently working on reprocessing the LU-specific dry deposition diagnostic values for O3, followed by the grid-scale and LU-specific diagnostics for the other three species for which diagnostics were reported by 10709, i.e. HNO3, HCHO, and SO2.
  - 10707: no recent updates from Richard
- Data storage updates:
  - No updates since the last call
- Analysis updates:
  - Christian is continuing to write the analysis portion of the multi-model ozone dry deposition manuscript. The revised goal is to have a draft version for co-authors by the middle of June and initiate EPA review and clearance by the middle of July.
  - Paul updated all figures and tables and went through almost all comments on the critical loads analysis manuscript. He hopes to send out a revised version for final co-author comments and EPA internal review by the end of May before going on annual leave.
  - Stefano, Paul, and Christian will have a call with Iannis on May 17 to learn more about the latest updates to his variance analysis that is intended for inclusion in the operational evaluation manuscript based on last year's ITM presentation.

Point intercomparison (Activity 2)

- An Activity 2 call was held on May 7. Olivia reported that she expects Anam to provide an update on her draft manuscript after her PhD defense this month.
- Jesse presented results from his work to use the point intercomparison data to optimize the representation of non-stomatal (cuticular and soil) conductance in STAGE. His work now also includes a hemispheric CMAQ modeling component that demonstrates a clear improvement in modeled ozone concentrations with observations relative to the base STAGE model when using three different versions of the optimized STAGE model. Jesse and Olivia will follow up to see if incorporating the observational constraints on stomatal conductance prepared by Anam into his work might help to further refine revisions to STAGE. Sharing those stomatal conductance estimates is not expected to happen before Anam's defense.
- Annika will present her ongoing work on statistical error estimation at a workshop on sensitivity analysis and data assimilation at the end of May. During the call, she shared draft

slides that illustrate the application of her mathematical approach to the AQMEII4 point intercomparison dataset. In this presentation, she will focus on the importance of carefully selecting the assumptions about error correlations that are required by her approach. While the assumption that observational errors are uncorrelated to errors in the point models likely is justified, the approach requires one further assumption of one pair of point models also having uncorrelated errors. Annika's slides illustrate that arbitrarily selecting the pair of point models for which this condition is assumed to be true can yield unrealistic and un-interpretable results. In her most recent work, she developed a formal methodology for selecting the pair of point models assumed to satisfy this conditions. Applying this new methodology to the data set at one example site yields results that allow for a meaningful analysis of error relationships between the different point models as well as observations.

Special issue - submission deadline previously extended to July 31, 2024

- The group discussed and agreed that a further extension of the deadline by another year is needed. Stefano will contact Copernicus to request this extension.
- 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/)
- Active work:
    - Activity 1: Makar et al. – critical loads ensemble analysis - draft circulated to co-authors
    - Activity 1: Kioutsioukis et al. – multi-model operational evaluation and analysis of AQMEII4 grid models
    - 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 for draft manuscript: summer
    - Activity 2: Khan, Clifton, et al. – observational constraints on stomatal conductance and point model sensitivity simulations - expect draft soon
    - Activity 2: Vogel et al. - error estimation analysis
    - 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
    - Activity 2 + Activity 1: Olivia's work with Nichole Ruiz on analyzing observed and modeled data at Bugacpuszta might lead to an additional manuscript. Olivia is planning to present this work at the IGAC conference in September.

- No recent updates:
    - Activity 2: Lee, Makar et al. – physics-informed machine learning for potentially refining point model parameter values
    - 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.
    - Activity 1: Lee, Soares, Makar, et al. – use of hierarchical cluster analysis for grid model intercomparison
    - Activity 2: Lee, Makar, et al. – use of meteorological cluster analysis for point model evaluation

Next call: June 13.