Activity 1 Participant Call December 14, 2023

Participants: Christian, Olivia, Ummugulsum, Paul, Kenjiro

Grid intercomparison (Activity 1)

- Model data updates:
  - 10707: Email sent to Richard on November 11, showing that the issues with the dry deposition diagnostics cannot be solely attributed to a double counting of the soil and lower canopy pathways, but may be related to some terms not being weighted by vegetation fraction. Paul also reached out to Richard to obtain a write-up of the LOTOS-EUROS model configuration.
  - 10708: Roberto is recalculating effective conductances and fluxes using an approach proposed by Paul to overcome inconsistencies between the code in WRF/Chem and the post-processing code relating to limit values. The recalculation has been completed for NA 2016 for all pollutants except SO2 and NH3. NA 2010, EU 2009, and EU 2010 will be reprocessed next before tackling SO2 and NH3. The new fields for HNO3 fixed the issues Paul had seen. Christian will look how this impacted the O3 diagnostic fields.
  - 10709: previously flagged issues: error in model post-processing or model output, array overflows in some output fields for effective fluxes and effective conductances. In addition, the effective conductances (at least for O3) do not add up to Vd, and the post-processing of 10709 may also have been affected by the limit value issue encountered for 10708 and recently fixed by Roberto. Young-Hee responded by email in November that she is working on these issues but does not have a timeline for creating corrected fields.
  - 10702: previously flagged issue: potential units and lower limit cut-off issues for EU 2010 effective flux data for HNO3 (0351-042-15,16,17,18)

- Data storage updates:
  - No updates since the last call

- Analysis updates:
  - Paul plans to circulate a draft to co-authors before Christmas and then ask for comments back by the end of January.
  - During the first half of November Christian continued 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 a call in mid November. Since then Christian has not made further progress on the analysis and plans to resume this work in the coming weeks.
  - In November, Annika, Paul, Stefano, Olivia, and Christian held a call to discuss specifics of Annika's planned work on using AQMEII4 data (Activity 1 and/or Activity 2) for statistical error estimation. The decision was made to start with Activity 2 data. Annika has downloaded all data and has started her analysis.

Point intercomparison (Activity 2)

- An Activity 2 call was held on December 5, call notes have been posted to the github site. The main portion of the call was spent on reviewing Anam Khan's draft AGU slides on her work to better

constrain the stomatal component of the point models. Kenjiro also presented an update on this work to revise the Wesely scheme implemented in GEM-MACH.

- To support Olivia's ongoing work with Nichole Ruiz on the Bugacpuszta analysis of summertime stomatal conductance, Christian extracted model output (ozone concentrations, deposition velocity, and stomatal resistance) from an archived set of 2002 - 2019 108 km resolution hemispheric CMAQ STAGE simulations performed for the EQUATES project. The extractions were performed for an area surrounding the grid cell containing Bugacpuszta.

Presentations and interactions with other communities

- Christian gave an AQMEII4 status update at a December 5 virtual workshop on air quality modeling and exposure science jointly organized by EPA and partners in the UK.

- Olivia, Stefano, and Christian will have a call with the HTAP organizers in mid January to discuss how experiences from AQMEII4 (and TOAR) can inform the upcoming HTAP OPNS simulations

Check-in on AQMEII4 special issue (submission deadline 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: 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. 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 January 11, 2024