

# Participant Call April 7, 2022

Participants: Paul Makar, Donna Schwede, Christian Hogrefe, Richard Kranenburg, Ummugulsum Alyuz Özdemir, Jesse Bash, Chris Holmes, Rohit Mathur, Stefano Galmarini, Olivia Clifton, Roberto San Jose

## Grid intercomparison (Activity 1)

- Participant updates on postprocessing, data upload, and analysis
  - Paul: rerunning all three cases for both 2010 and 2016. Uploaded base case for 2016, running four cases right now, hoping to finish in a few weeks.
  - Ummugulsum: WRF/CMAQ post-processing for meteorology and emissions finished for 2009 and 2010 and files are being uploaded. 2009 concentration post-processing is ongoing. 2010 CMAQ run expected to finish within two weeks, post-processing for 2010 after that should be faster than for 2009 since the same scripts can be re-used. No further updates for WRF/Chen
  - Richard: No major updates, will look at initial diagnostic plots for resistances and conductances and share feedback for cases where 10707 differed from other models.
  - Roberto:
    - High cuticular effective conductance (ECUT) values were caused by Rc limit imposed by WRF/Chem (minimum surface resistance Rc limited to 100 s/cm)
      - "About the conductance peaks for HNO<sub>3</sub>, HNO<sub>4</sub> and N<sub>2</sub>O<sub>5</sub>, sometimes, we have observed that the cuticular resistance rcut has very low values (e-5 aprox.) for those pollutants (in particular when we have rain or humidity > 95%). Just these pollutants have very high values for Henry constant (e+13). These cuticular resistance values should make that the surface resistance RC values to be very low (e-5), but in the WRF/Chem model code, the Rc is limited to 100 (s/cm) so that the cuticular resistance (ECUT = (1/rcut)\*Rc), instead of using a value in the order of e-5, the model is using a value of 100, so that we obtain large values of the cuticular resistance."
    - Found unit issues for 10702 and 10708 diagnostic component resistances, both Aura and Roberto plan to reprocess the affected variables
      - "The WRF/Chem model works in m/s for the deposition velocity. In order to go to cm/s, we multiply by 100. But now for the resistances (s/m), we should have divided the values but in the code I am mentioning, instead of dividing, the code multiplies as in the following example:

```
real, parameter :: m2cm = 100.  
dvel(its:ite,1,j,p_RES_SURF_o3)=m2cm*rcx(its:ite,j,p_o3)
```

So, the consequence is: all resistance values are expressed in hm/s NOT in cm/s as requested. All resistances values have to be divided by 10000 or multiply by 10000 if we do it over the 1/r. So that, the resistances values would compare favorably with the resistances from other models."

- PM10 represents only the coarse fraction between PM2.5 and PM10, for comparisons to observed PM10 use PMTOT
- NA 2010 simulation is being started, should finish by the end of May

- Aura is currently uploading new files to the sftp server but couldn't join the call, will follow up with her later.
- Feedback requested but not received for diagnostic variable screening plots and Iannis' initial ensemble analysis
- Stefano is in contact with Iannis on his analysis, Iannis is making progress but had to cancel the last biweekly meeting with Stefano due to his high teaching load.

### **Point intercomparison (Activity 2)**

- Participant call held March 22
- Iterating on specification of input parameter settings for all models contributing runs to the introduction/overview paper. Asking for modelers to look out for email from Olivia and Donna within the next week to start rerunning their models. Will require downloading new input files. Some groups will also need to add or update some model descriptions.
  - For the overview / introduction paper, input parameters are expected to be harmonized to the maximum extent possible
  - Future sensitivity runs may be needed to connect these simulations with the application of these schemes in the grid models (e.g. use of a single LU and associated parameters in the point model overview modeling vs. mix of LU types within the context of the schemes' application in the grid models)
- New models joining:
  - Chris Holmes will contribute GEOS-Chem implementation of Wesely
  - Amos Tai has several dry deposition schemes implemented in their model
    - Wesely (1989) as implemented in GEOS-Chem
      - Base (same as Chris Holmes, don't need) / Ball-Berry / Medlyn stomatal resistance
    - Zhang et al. (2003) multiplicative scheme
      - Base / Ball-Berry / Medlyn stomatal resistance
  - DO3SE (Lisa)
- On April 19, Olivia will give an invited presentation at the NADP TDEP spring meeting on AQMEII4 single point modeling
  - <https://nadp.slh.wisc.edu/spring2022/>
  - Note from Donna: All are welcome to attend the NADP meeting. Please register at the website.

### **Special issue**

- Stefano reached out to Joshua Fu, proposing to alert him several weeks ahead of and immediately prior to any manuscript submission to make sure that either he will pick it up as handling editor or alternatively makes sure that any handling editor picking it up is fully aware of the scope and structure of the special issue and how a particular submission fits into it.

- Prepare standard introductory statement / note to editor providing this information for any submission
- Also provided the following list of tentatively planned manuscripts:

Activity 1:

- Hogrefe et al. – Evaluation and comparison of EPA group WRF/CMAQ M3DRY and STAGE 2010 and 2016 simulations over North America - expected submission summer 2022
- Kioutsioukis et al. – Joint evaluation and ensemble analysis of all NA and EU grid model simulations – expected submission spring 2023 (?)
- Makar et al. – Ensemble analysis of critical loads over NA and EU using grid model results – expected submission spring 2023 (?)
- Makar et al. – analysis of GEM-MACH simulations comparing Robichaud, Zhang and operational configuration results - aiming for end of summer 2022

Activity 2:

- Clifton et al. - overview of process level differences; model inputs as consistent as possible – expected submission spring 2022 (?)
- Bash et al. - STAGE
- Pleim and Ran - M3DRY and PSN model
- Makar et al - effective flux vs effective conductance (combining grid and box modeling)
- Ganzeveld et al - Stomatal differences across models
- San Jose et al - WRF-Chem performance
- Around June, Stefano and Christian will reach out to Copernicus and Joshua to extend the special issue by either a year (August 2023) or end of 2023.

**Next call May 5, 9:00 EDST / 15:00 CEST**