Nested Model Working Group

Co-chairs:

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Peking University

Yuxuan Wang
Univ. of Houston/Tsinghua
The nested-grid GEOS-Chem

- Run GEOS-Chem at the native GEOS grid resolution over nested domains
- Apply the same chemical and transport mechanism as the global simulations
- Dynamic lateral boundary conditions from the consistent global simulations

1° × 1° (GEOS-3) (Y. Wang et al., 2004)
1/2° × 2/3° (GEOS-5) (Chen et al., 2009)
1/2° × 5/8° (MERRA-2)
1/4° × 5/16° (GEOS-FP)
Africa (GEOS-5; GEOS-FP) (E. Marais, U. Birmingham; M. Evans, U. York)
Australia (GEOS-FP) (Jenny Fisher, U. Wollongong; new development)
1/4° × 5/16° nested model over North America

Sensitivity to model resolution

- Applications of the 1/4° × 5/16° nested model at Harvard Univ. on the interpretation of observations from the SEAC4RS aircraft campaign over the Southeast US.

- **Karen Yu et al. (ACP 2016)** shows that the high-resolution model captures the observed negative correlation between NOx and isoprene.

- Model simulated ozone and NOx at the regional scale are insensitive to grid resolution.
The nested model simulates most of the day-to-day variability in PM$_{2.5}$ concentrations over China.

[Lin Zhang, Peking Univ.]
GEOS-Chem v10-01 and newer: nested-grid fully compatible with HEMCO

- Nested-grid emissions are now processed with HEMCO;
- With high-resolution emissions implemented in the model, we do not need to generate the emission files for the nested models.

For details of the nested model setup:
http://wiki.seas.harvard.edu/geos-chem/index.php/Setting_up_GEOS-Chem_nested_grid_simulations#How_to_run_the_0.25x0.3125_nested-grid_for_GEOS-FP

[Yuxuan Wang, U. of Houston/Tsinghua]
Two-way nesting model: application on tropospheric ozone

- Global $2^\circ \times 2.5^\circ$ coupled with three nested-grid domains at $1/2^\circ \times 2/3^\circ$ resolution (Y.Y. Yan, ACP 2014; 2016);
- Developed by J.T. Lin’s group, Peking Univ.
Publications with the GEOS-Chem nested model

Asia: 36+
North America: 23+
Europe: 6+
Adjoint, two-way, others: 6+

**Nested Model WG Breakout**

Day 2, 15:45-16:45 pm, Meteorology Building 1115

To join email list send email to:
geos-chem-regional-join@seas.harvard.edu

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