Updates and Perspectives from the GCHP Working Group

Randall Martin and Sebastian Eastham

GCSC Meeting
23 February 2022
Updates to GCHP: Improved Scalability

- Performs well from coarse to fine resolution on multiple clusters including on cloud
- Global C360 (~25 km) on 2300 cores achieves 20 model days/wall day
Ultra-high Resolution Simulations with GCHP
Opportunity to resolve spatial heterogeneity

- 220 million boxes
- 2900 cores
- 0.9 million boxes
- 36 cores

Dandan Zhang and Liam Bindle

Martin, Eastham, et al., submitted
GCHP Being Extended to TOMAS for Aerosol Microphysics

Betty Croft, Liam Bindle, Jeff Pierce

Aerosol microphysics on stretched grid simulation at ~25 km resolution
Cubed-sphere Meteorological Data

Directly reading transport variables on cubed sphere improves representation of transport (foreshadowing!)

One year of GEOS-FP mass fluxes at hourly C720 resolution (since March 11, 2021)

Full archive of data covering the MERRA-2 period now being generated at C180 resolution (GEOS-IT)

One year of GEOS-IT data now available for testing

Liam Bindle

Martin, Eastham, et al., submitted
Recent Improvements and Planned Actions for GCHP

- Recent
  - Improved error reporting through the pfLogger component
  - New diagnostic of vertical air mass flux
  - Improved flexibility in diagnostic output (e.g. monthly output now possible)
  - Ingestion of horizontal air mass fluxes

- Planned
  - Ongoing improvements to scalability
  - Incoming changes from GMAO:
    - YAML-based input file specification to improve flexibility
    - Ongoing improvements to error handling and reporting