GFDL participation in CMIP6

- Top priority MIPs == those with interest from inside GFDL
- Model development
- Infrastructure and resources
    - Implications for model resolution and number of runs
    - Estimates of future computer and storage resources

GFDL MIP plans

- Too many MIPs to participate in all of them
- DECK + ScenarioMIP (everybody)
- Detection/Attribution (DAMIP; Knutson, Dunne, Horowitz, others)
- Radiative Forcing (RFMIP; Paynter, Ming)
- Cloud Forcing (CFMIP; Silvers, Ming)
- Ocean (OMIP; Winton, Hallberg, Dunne)
- Flux Anomaly Forcing (FAFMIP; Winton, Hallberg, Dunne)
- Coupled Carbon Climate Cycle (C4MIP; Dunne)
- Land Use (LUMIP; Dunne/Shevliakova)
- Aerosol and Chemistry (AerChemMIP; Horowitz)
- Dynamics and Variability of the Strat-Trop (DynVar MIP; Wilson, Horowitz)
- Global Monsoon (GMMIP; Ming)

GFDL CMIP6 Statuss

- Model development – CM4/ESM4
  - Physical model development completed by end of 2016
  - Testing of carbon cycle and updates to land and atmospheric chemistry will begin when physical model frozen
- Testing of forcings input to model
  - Tested most of the historical forcings (WMGG, short-lived emissions, solar, volcanic, SST/SIC)
  - Historical land use changes not tested yet
  - No significant problems found…so far
  - Physical climate model will require ozone concentrations, either from full-chemistry model or provided by CMIP6, depending on order of our CMIP6 runs
- End to end tests (scripts, post processing etc)
  - Diagnostic tables still need a lot of work! (Tables provided by CMIP6 still incomplete/ inaccurate?) Many variables from new tables (e.g., aerMonthly, emMon) have not yet been implemented in GFDL models.

GFDL Model CMIP6 Configurations

- GFDL-ESM4 –
  - Coupled climate-chemistry-carbon model, with 1 degree L48 full-chemistry atmosphere, 1/2 degree ocean with biogeochemistry
  - To be used for AerChemMIP, C4MIP, ScenarioMIP, DAMIP, CFMIP, DynVarMIP, GMMIP, LUMIP, RFMIP
- GFDL-CM4 –
  - Coupled physical climate model, with 1/2 degree L32 atmosphere with aerosol-only chemistry, 1/4 degree ocean.
  - To be used for OMIP.
- GFDL-ESM2M –
  - 2 deg L24 atm, 1 deg ocean.
  - To be used for FAFMIP.