

BGCWG Update, June 2016

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Summary from Feb 2016

Results from CESM-(BGC) 1.2⁺ & 1.5 runs

- 20C C uptake looks good in 1.2⁺
- large unexplained diff in land 20C C uptake between BDRD and BPRP runs
- large C drift in 1.5 precludes 20C C analysis
- atm CO₂ seasonal cycle looks good in 1.2+ & 1.5
- ocean surface nutrients improved in 1.5 vs. 1.0
- problematic equatorial upwelling in W Pac

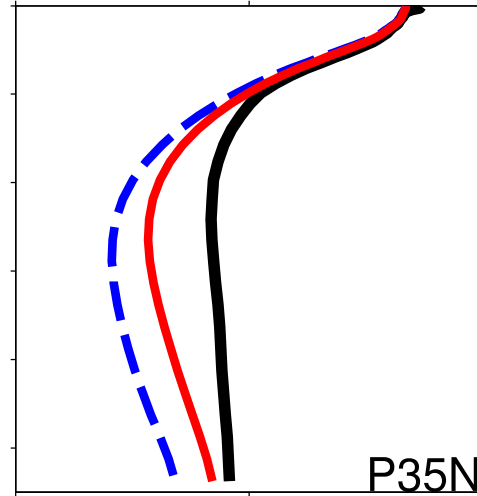
Relevant Efforts Since Feb 2016

- CLM development to CLM 5.0
- Incorporation and evaluation of new ocean model physics parameterizations
- Incorporate ocean BGC developments into MARBL
- Coupled runs with new physical components

Relevant new ocean model physics parameterizations

- Increased Redi diffusion coeff lower bound
- Wave model and Langmuir enhancement of vertical mixing
- 2 hour ocean coupling

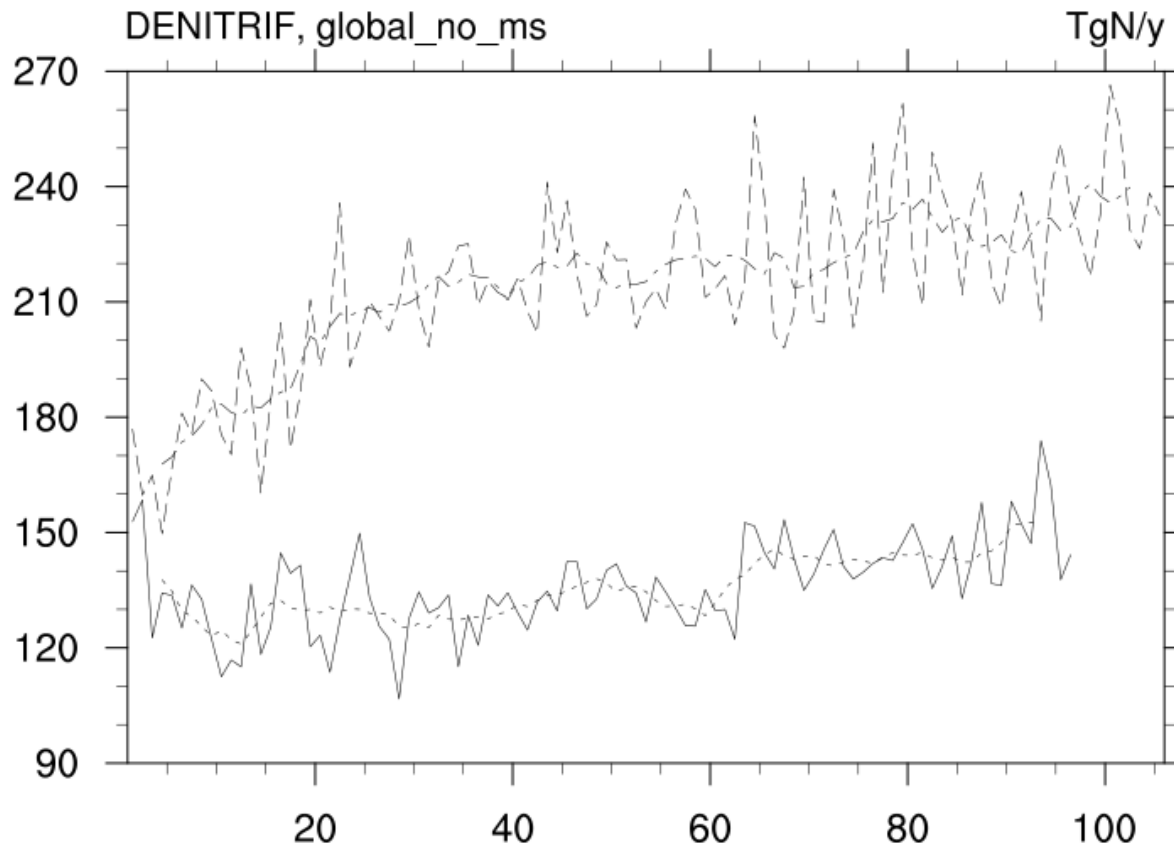
Improvement in natural ^{14}C from increased Redi diffusion lower bound



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Improvements in Ocean Physics Parameterizations Reduce Denitrification, Improving the Global Ocean Nitrogen Balance



Ocean BGC Scientific Developments

color denotes coupling to non-ocean components

- Prognostic atmospheric dep of dust/iron
- Prognostic scaling of sediment burial
 - C, P, Si balance
- NH_x emissions to atmosphere
- Prognostic Fe ligand, variable C:P ratio

- H₂O, C, N Isotopes
- Optional Phaeocystis functional group
- DMS module (air-sea flux)
- Methane module (air-sea flux)

Near-term Efforts

- Evaluation of BGC in latest coupled simulations
- Complete incorporation of model features
 - model freeze targeted for Sep 2016
 - model release targeted for Dec 2016
- CSL computing proposal due Sep 2016
 - Tier 1 CMIP experiments covered
 - Tier 2 CMIP experiments are WG responsibility