

# BGCWG Highlights: Carbon Cycle in CESM1 & CESM2

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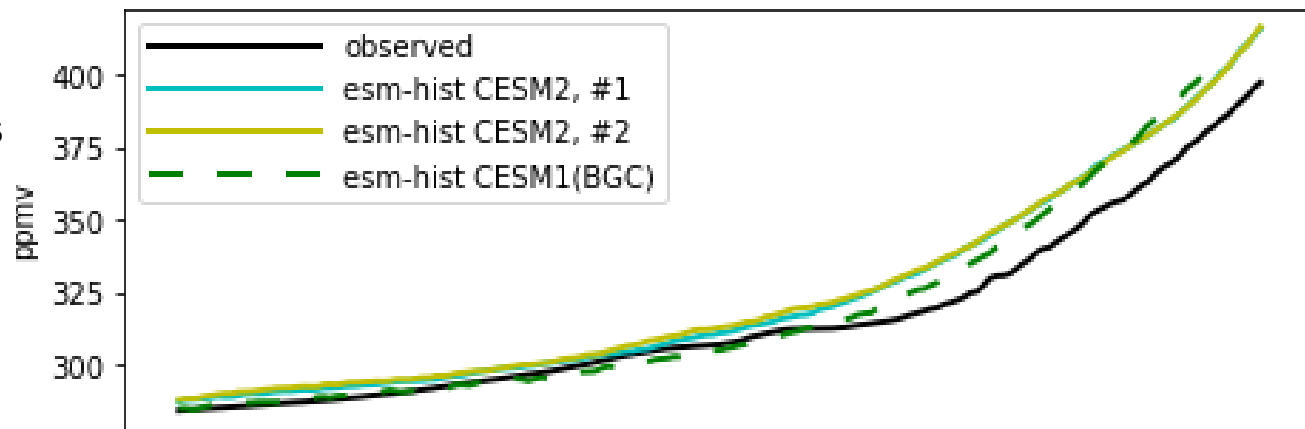


June 15, 2020

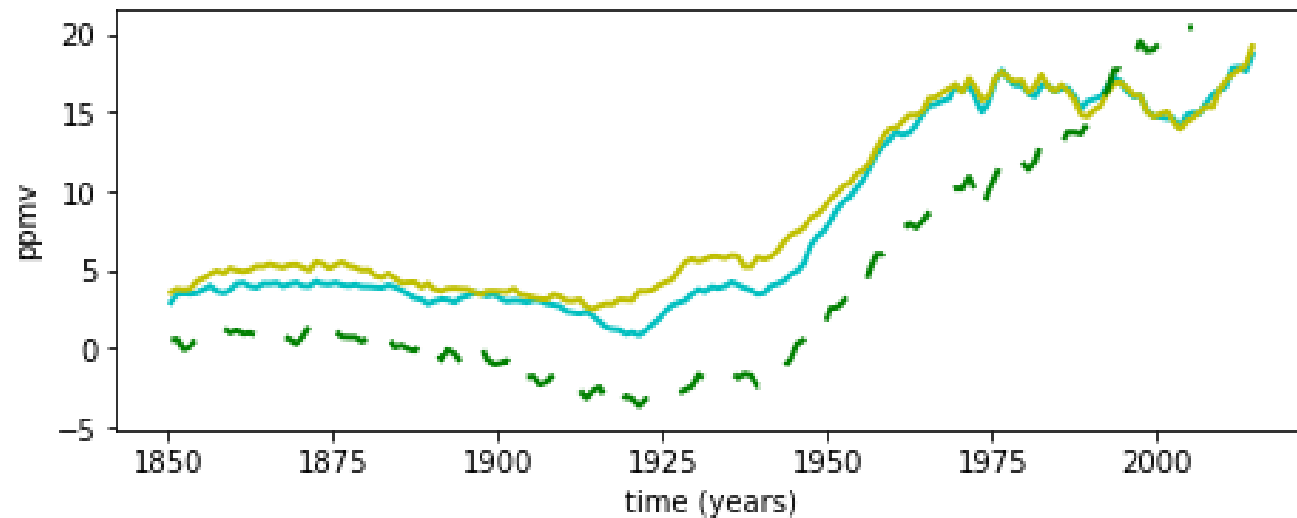


# Surface CO<sub>2</sub> in esm-hist Experiment

Model & Observations

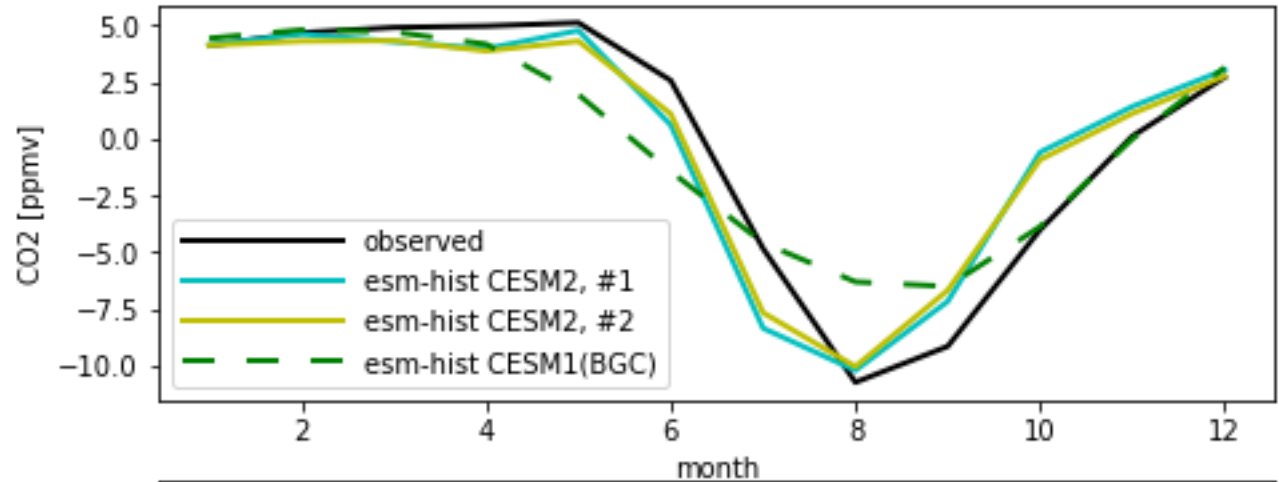


Model - Observations

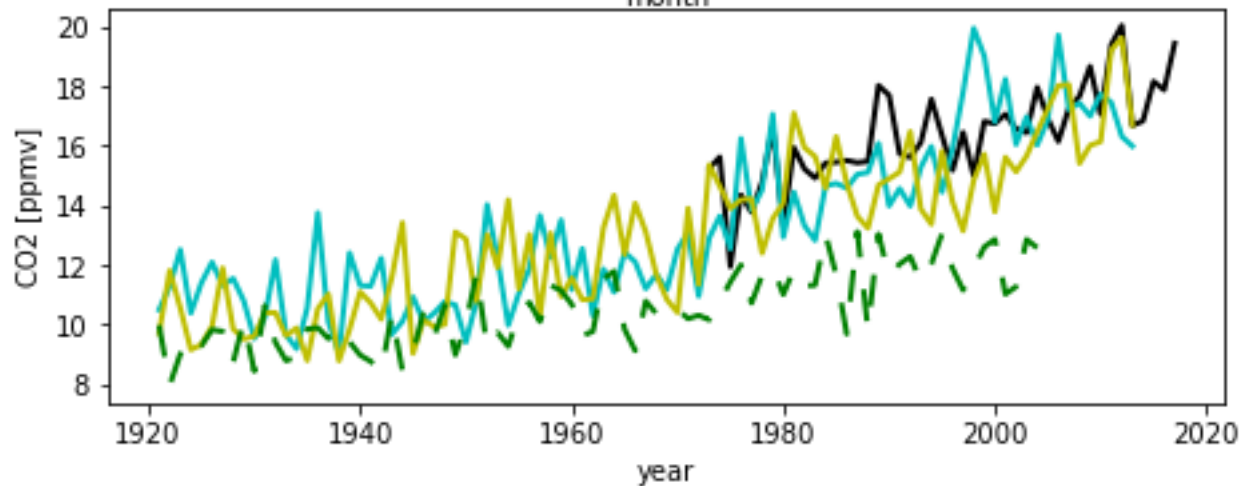


# Seasonal Cycle of CO<sub>2</sub> at Barrow, Alaska

1981-2004 Climatology

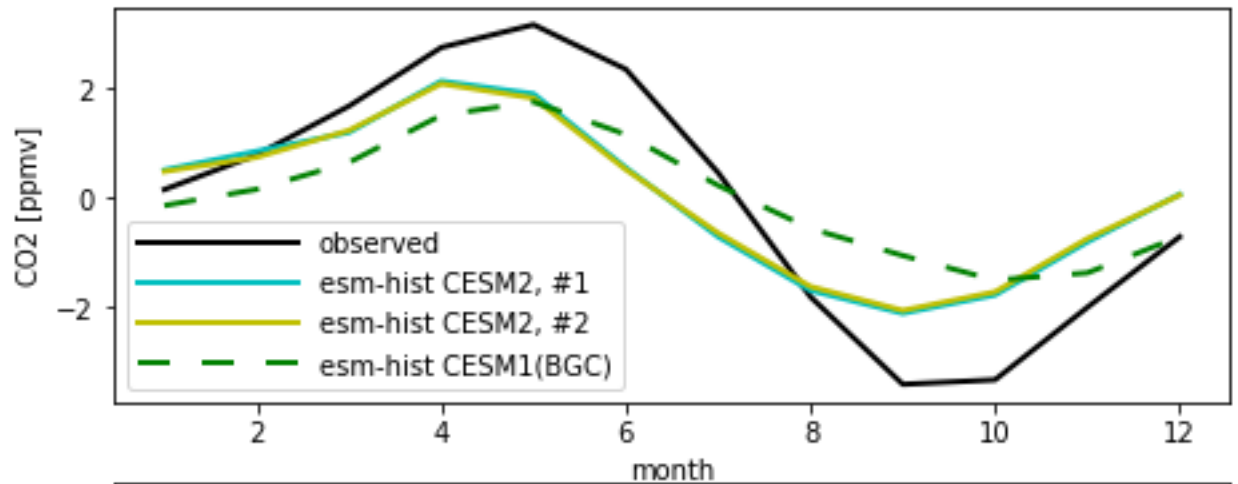


Seasonal Amplitude vs Time

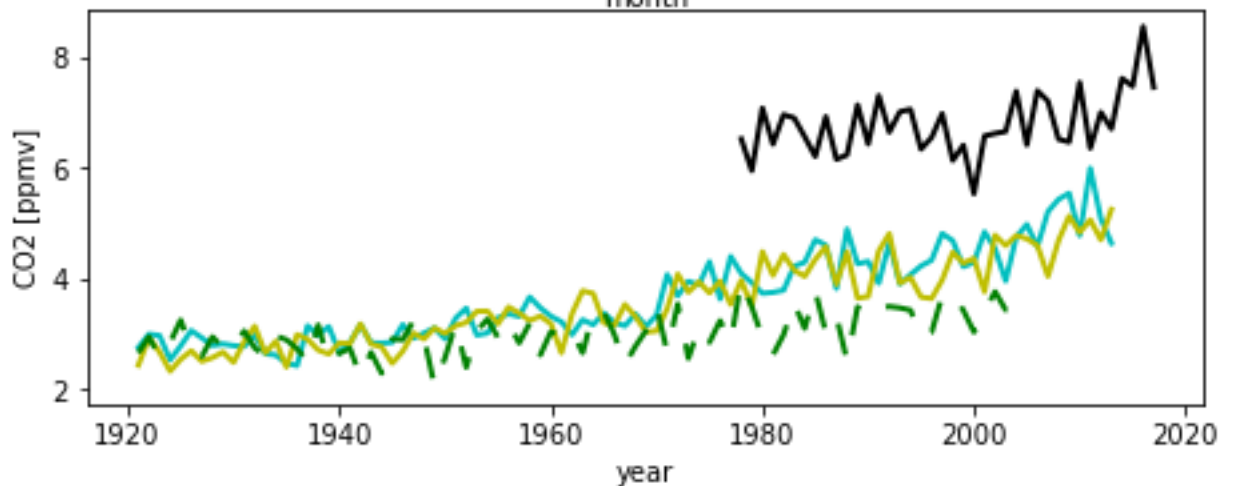


# Seasonal Cycle of CO<sub>2</sub> at Mauna Loa, Hawaii

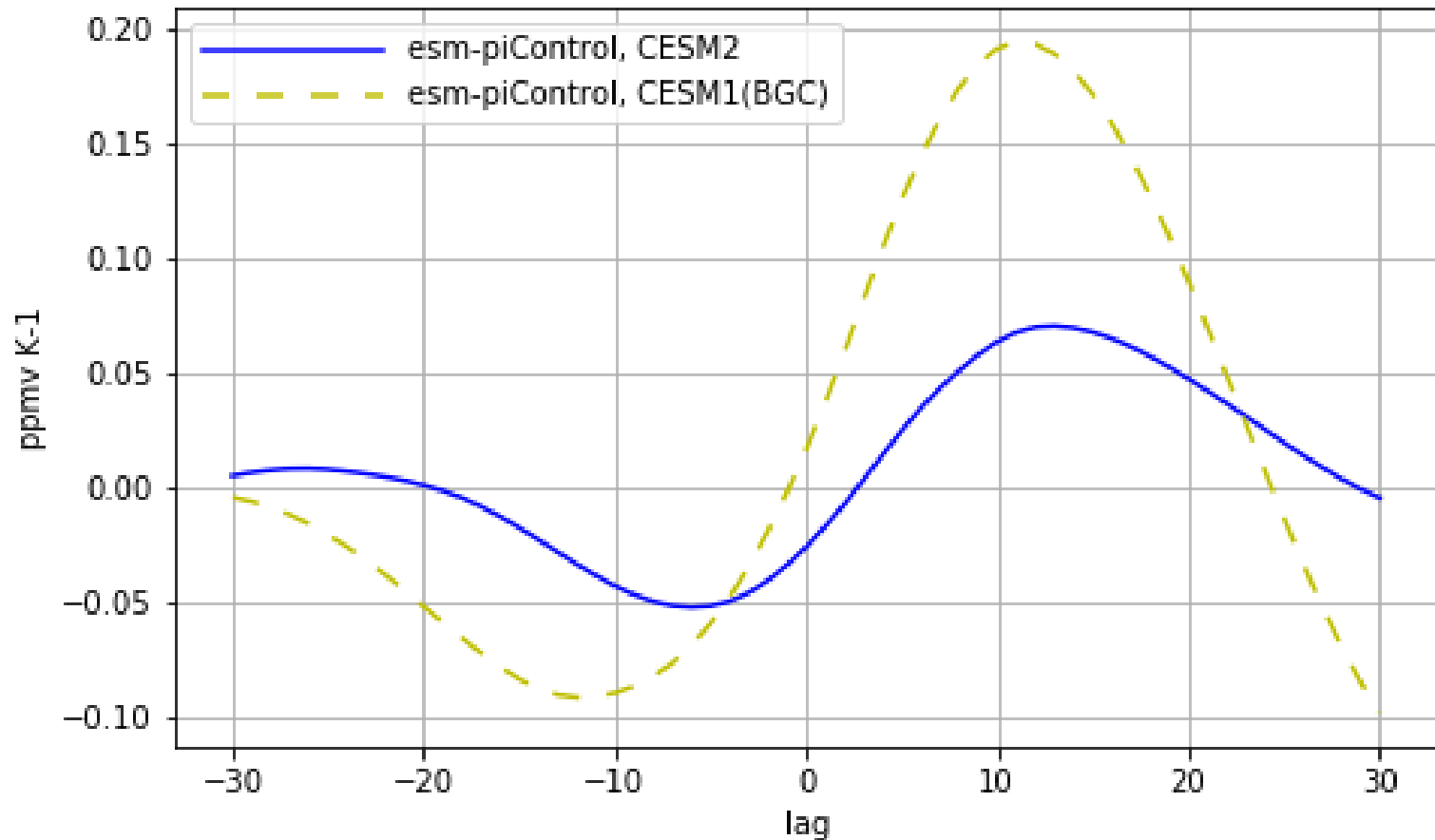
1981-2004 Climatology



Seasonal Amplitude vs Time



# Surface CO<sub>2</sub> lag regression slope against Nino 3.4 SST (esm-piControl , monthly anomns , low freq filtered out)



# Summary

- Uptake of anthropogenic CO<sub>2</sub> in CESM2 is improved considerably, compared to CESM1(BGC)
  - improvement due to land model
- The seasonal cycle of atmospheric CO<sub>2</sub> is improved in CESM2
- Magnitude of carbon cycle interannual variability has gone down, making a bias worse
- CESM2 Special Collection manuscript in preparation
- Additional community analysis encouraged & welcome

## Near Term Activities

- Continued analysis of carbon cycle in CESM2
- Transition to MOM6 for CESM3
- Couple MARBL to MOM6
  - on the lookout for hiccups from time -varying vertical grid

