

ACCESS-ESM1.5

C4MIP and CDRMIP

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C4MIP and CDRMIP overview

C4MIP

- Coupled Climate-Carbon Cycle Model Intercomparison Project
- Analysis of carbon cycle feedbacks and climate interactions
- Here: idealized 1% per year CO₂ increase simulations

CDRMIP

- Carbon Dioxide Removal Intercomparison Project
- Explore the potential, impacts and challenges of CDR
- Here: climate and carbon cycle reversibility experiment (idealized return high future CO₂ to lower levels)

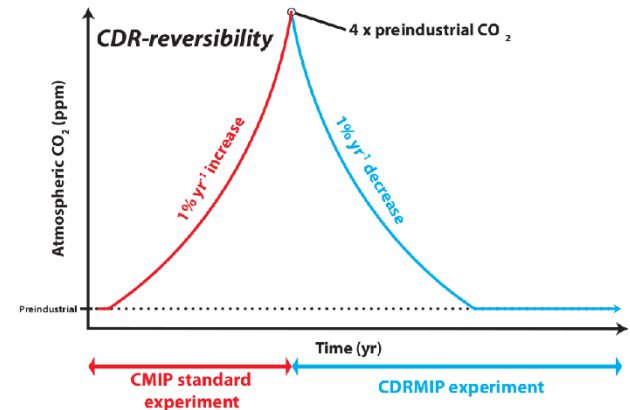
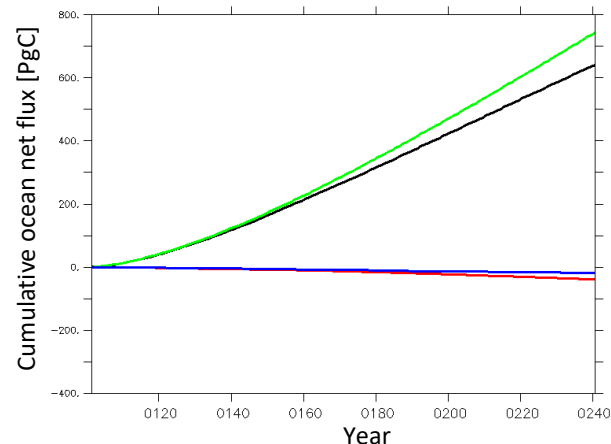
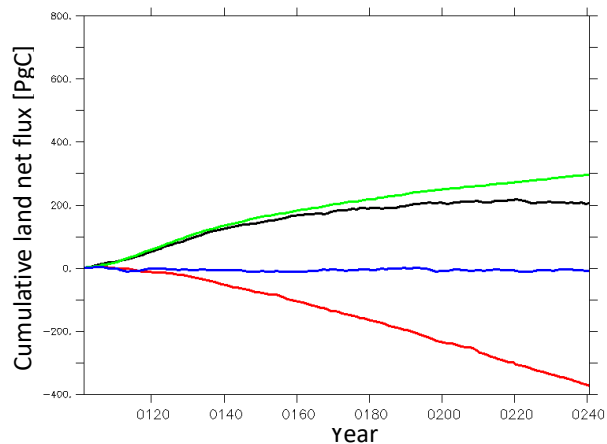
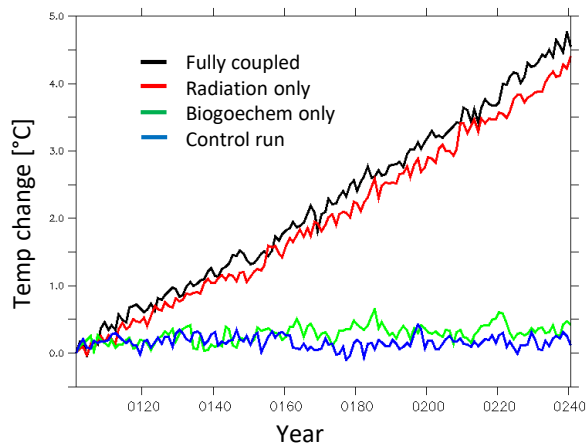


Figure from Keller et al. (2017)

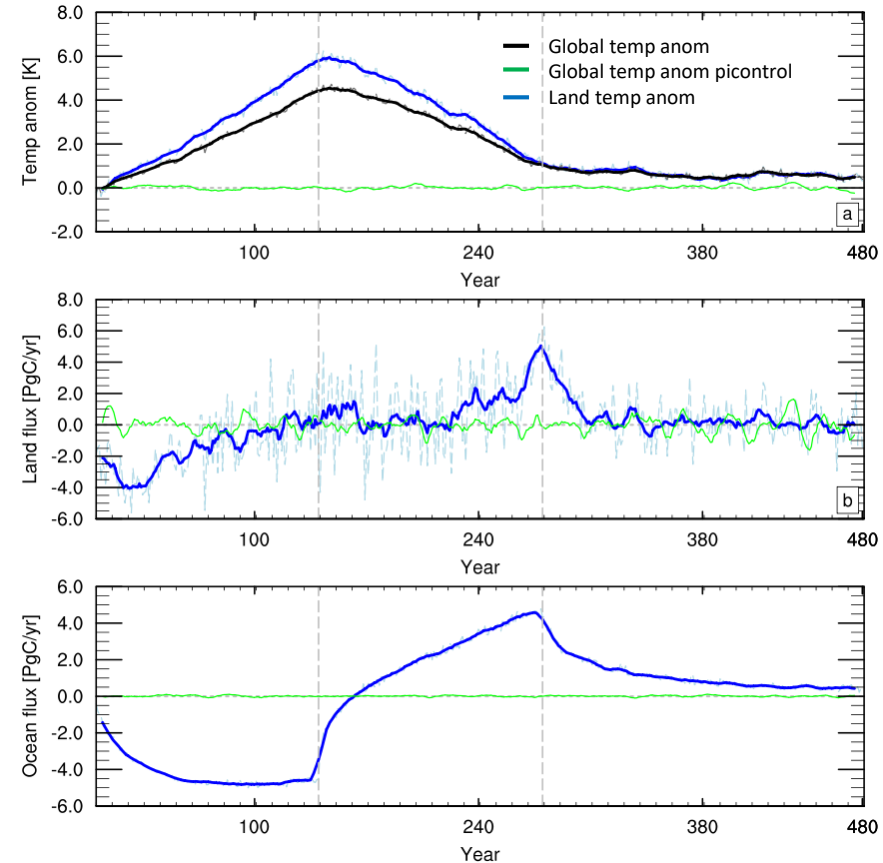
C4MIP – 1% CO₂ runs

- Increase CO₂ concentrations by 1% per year over 140 years
 - **Fully coupled** (warming + CO₂ fertilization)
 - **Radiation only** (warming)
 - **Biogeochemistry only** (CO₂ fertilization)
- Used to estimate feedbacks, such as carbon-concentration and carbon-climate feedback

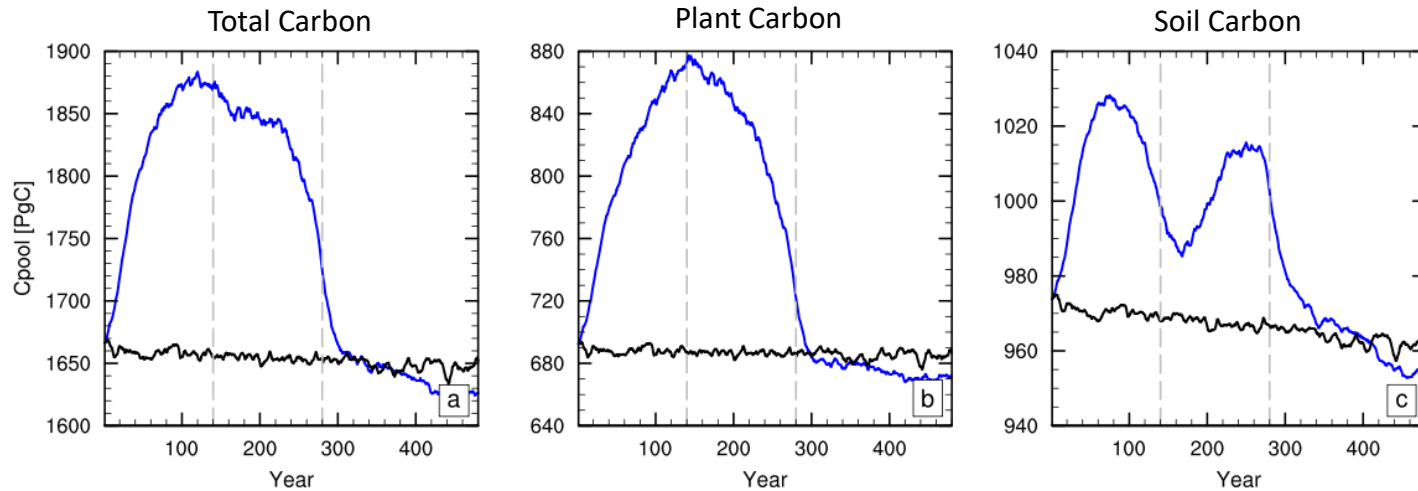


CDRMIP – Reversibility

- Temperature peaks at same time as CO₂
- Land temp anomaly: 6°C
- Global temp anomaly: 4°C
- Temp anomaly of 1°C remains after CO₂ returned to pre-industrial levels
- Land becomes sink with increasing CO₂, but weakens and turns into source when CO₂ peaks
- Ocean turns into sink with increasing CO₂, turns into source with decreasing CO₂

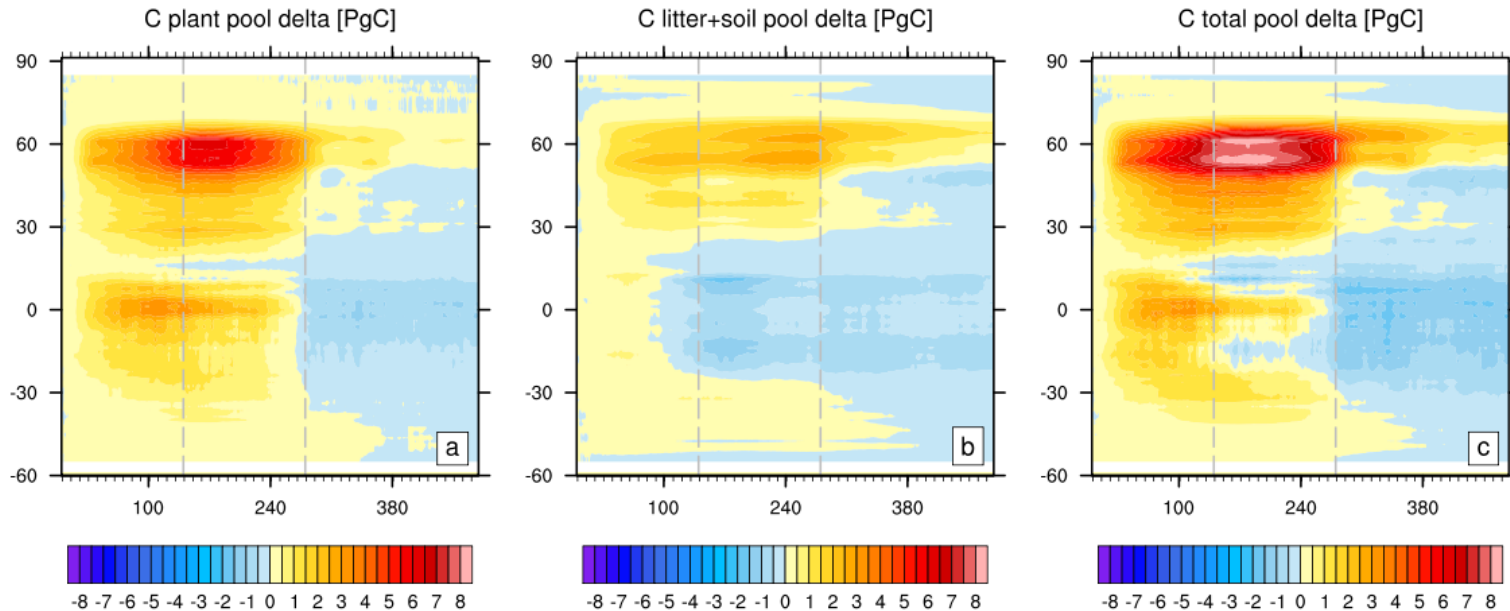


CDRMIP – Reversibility



- Biomass carbon peaks at same time as CO₂, reversible within time scale of changing CO₂
- Soil carbon peaks earlier than CO₂, second peak towards end of changing CO₂

CDRMIP – Reversibility



Thank you

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