First results from CESM-HOPE

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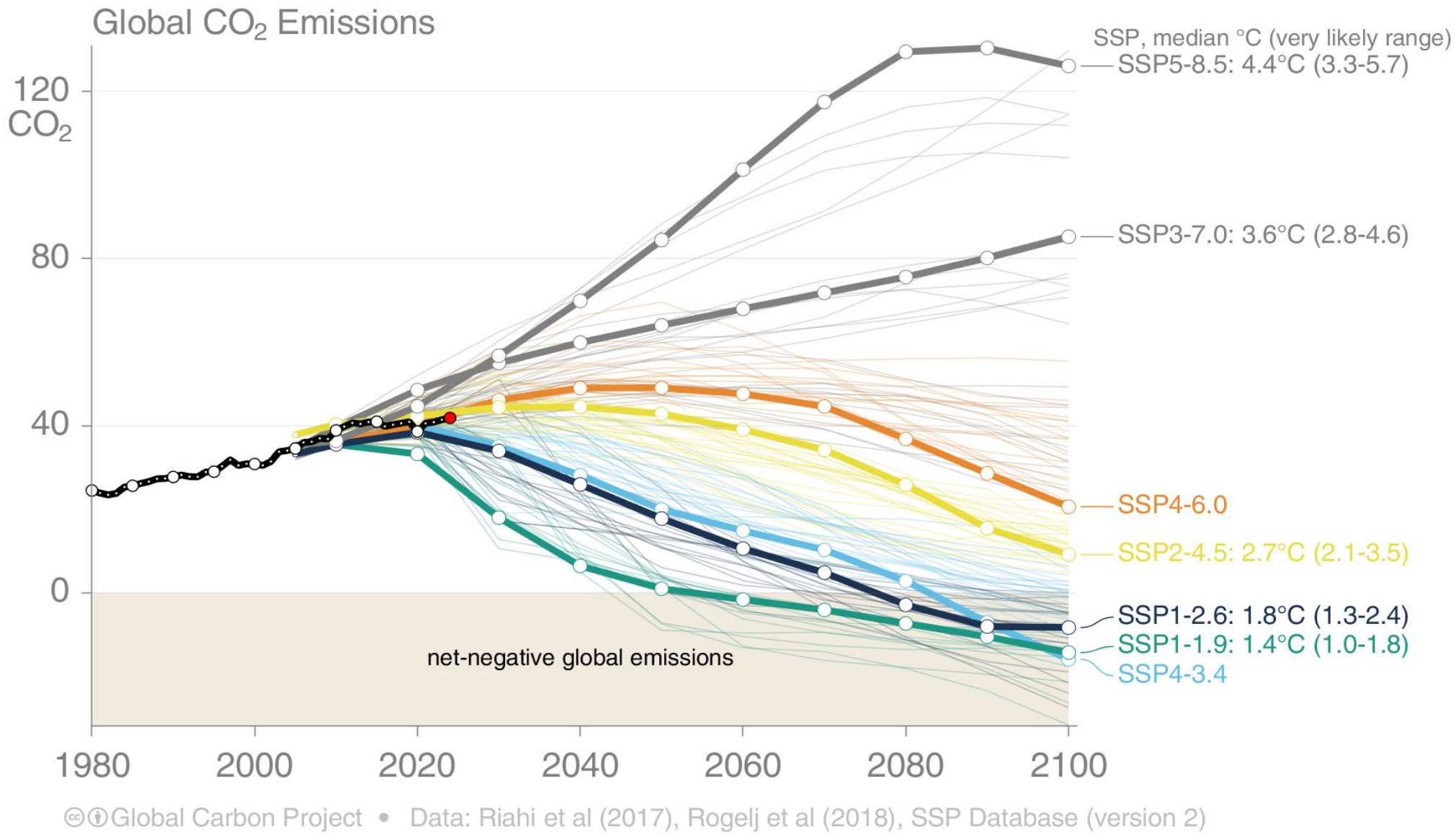
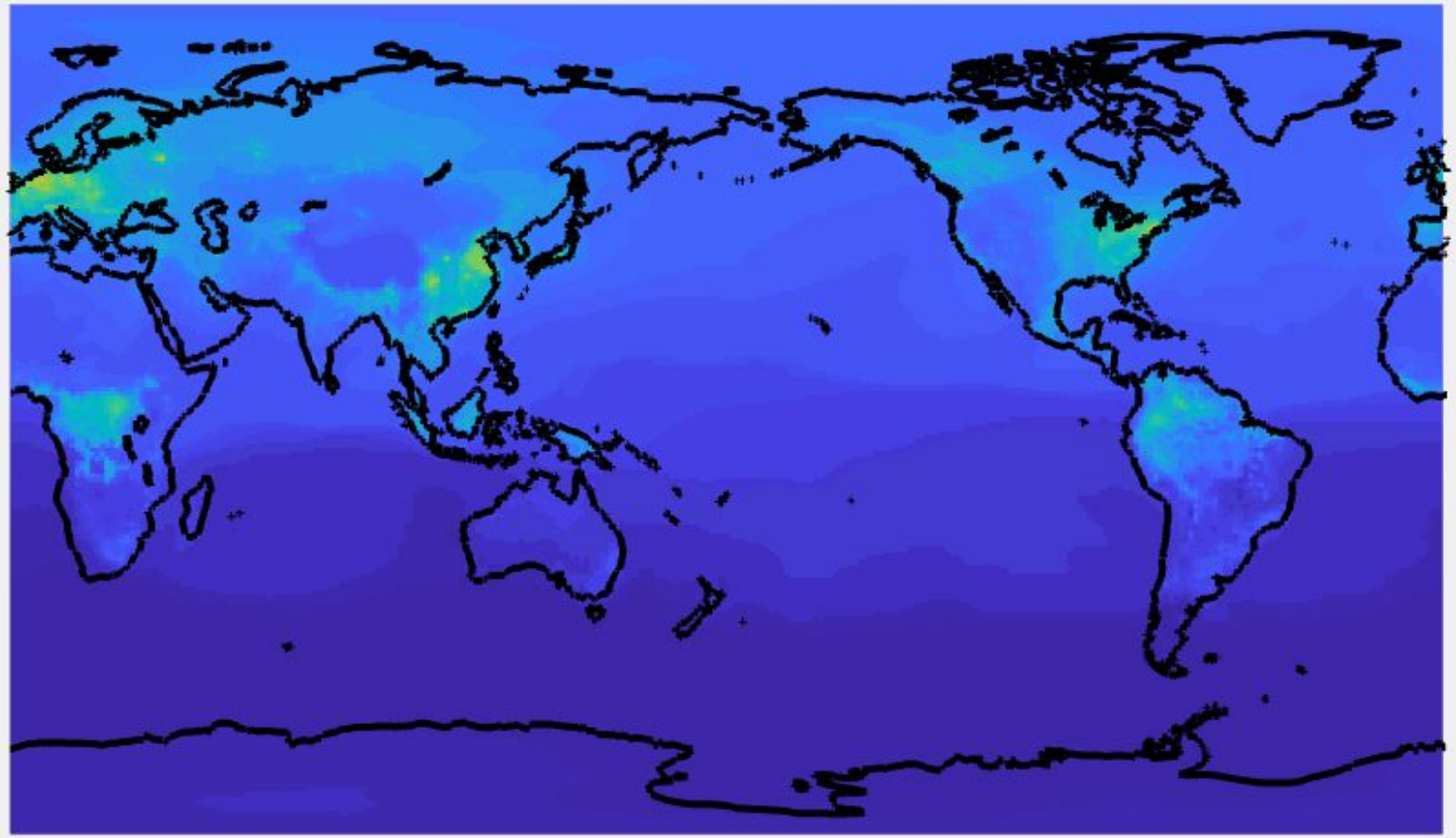
This work would not have been possible without

Peter Lawrence, Dave Lawrence, CESM SSC, CESM BGCWG, …

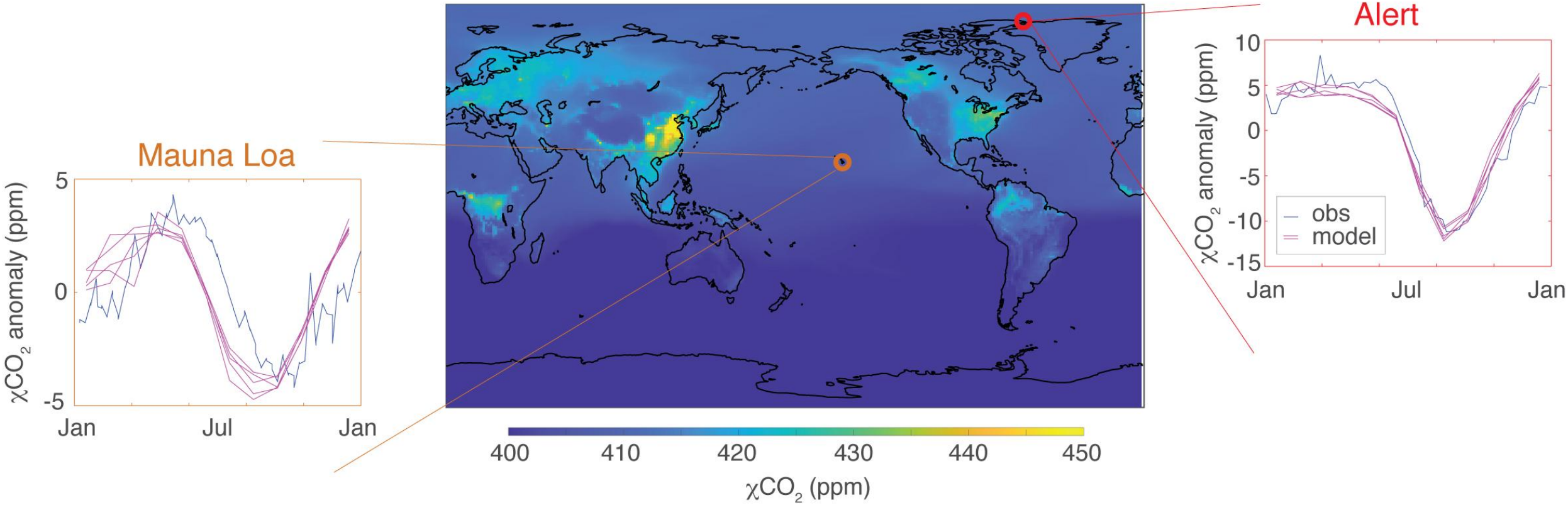
CESM-HOPE (Highly Optimistic Projection Ensembles)



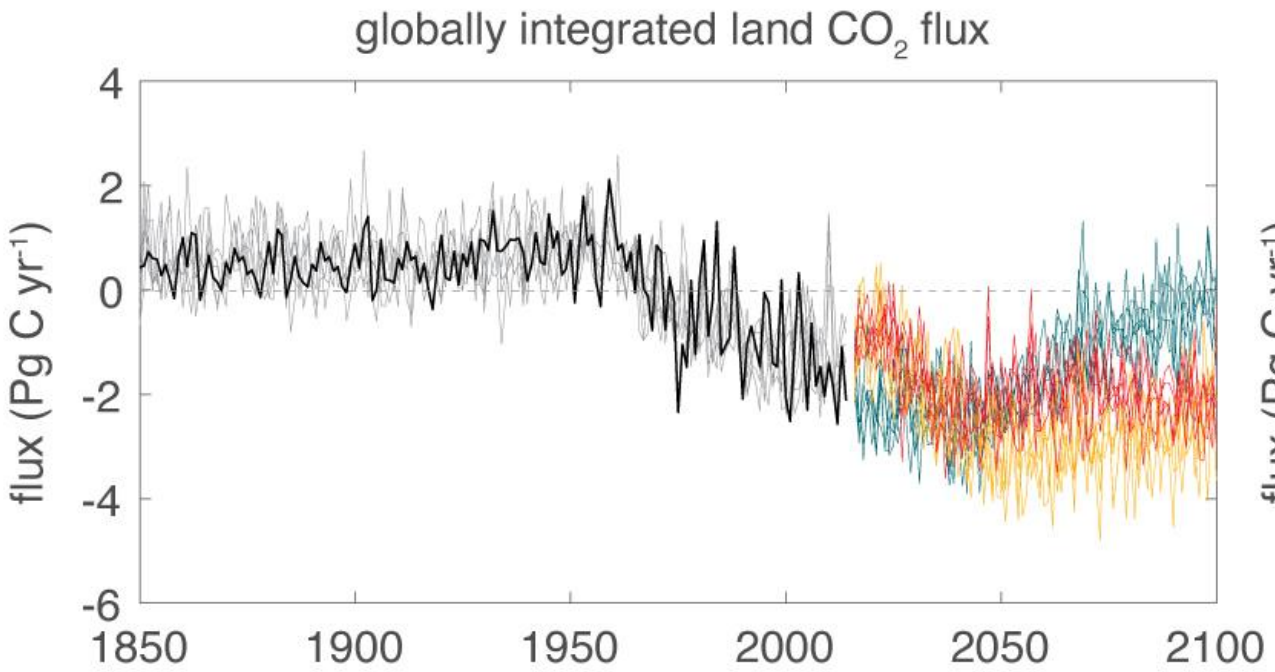
Surface χCO_2

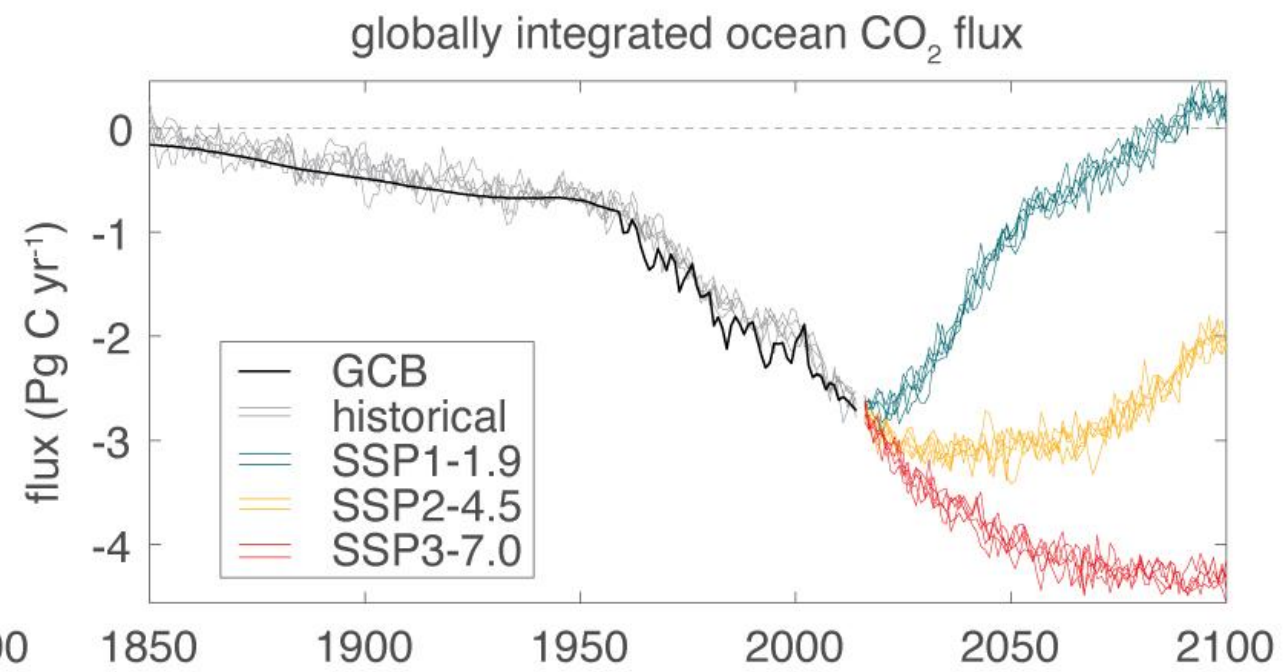


Seasonal cycle in χCO_2



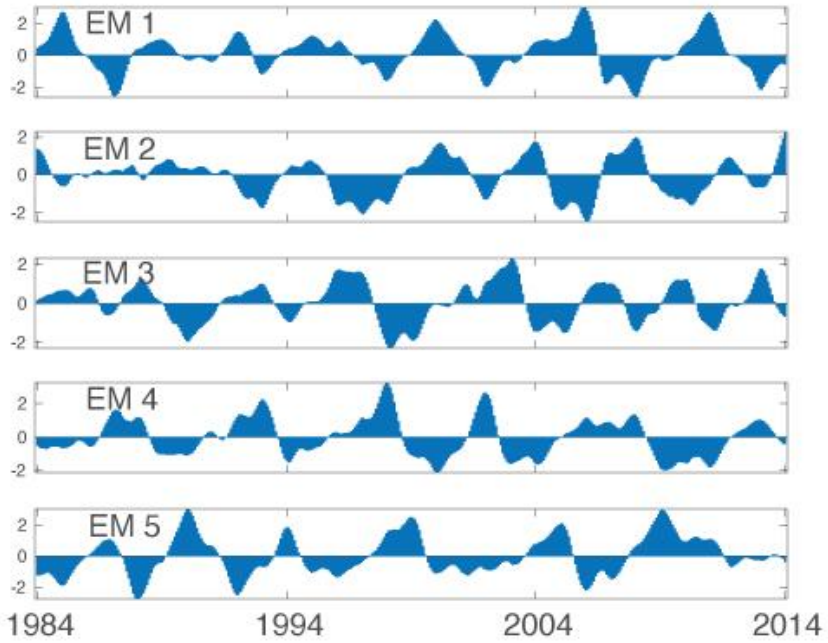
Globally integrated CO_2 flux

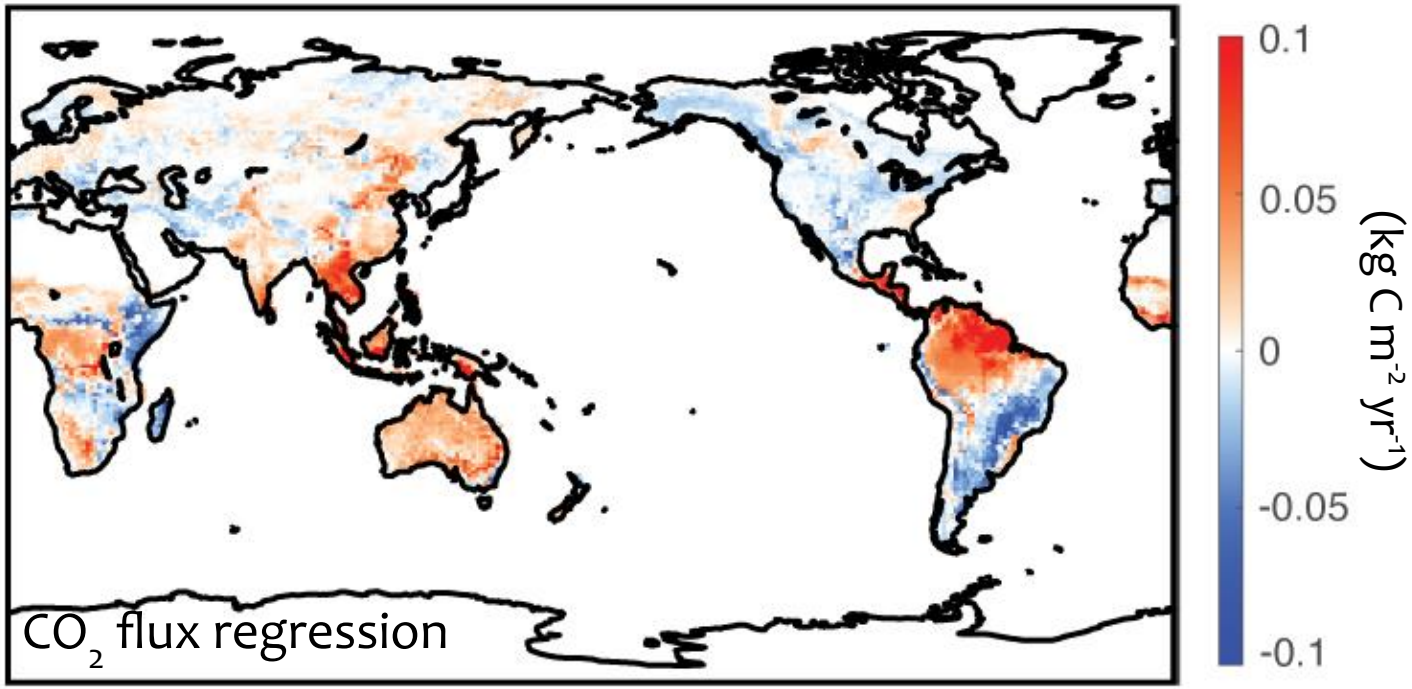


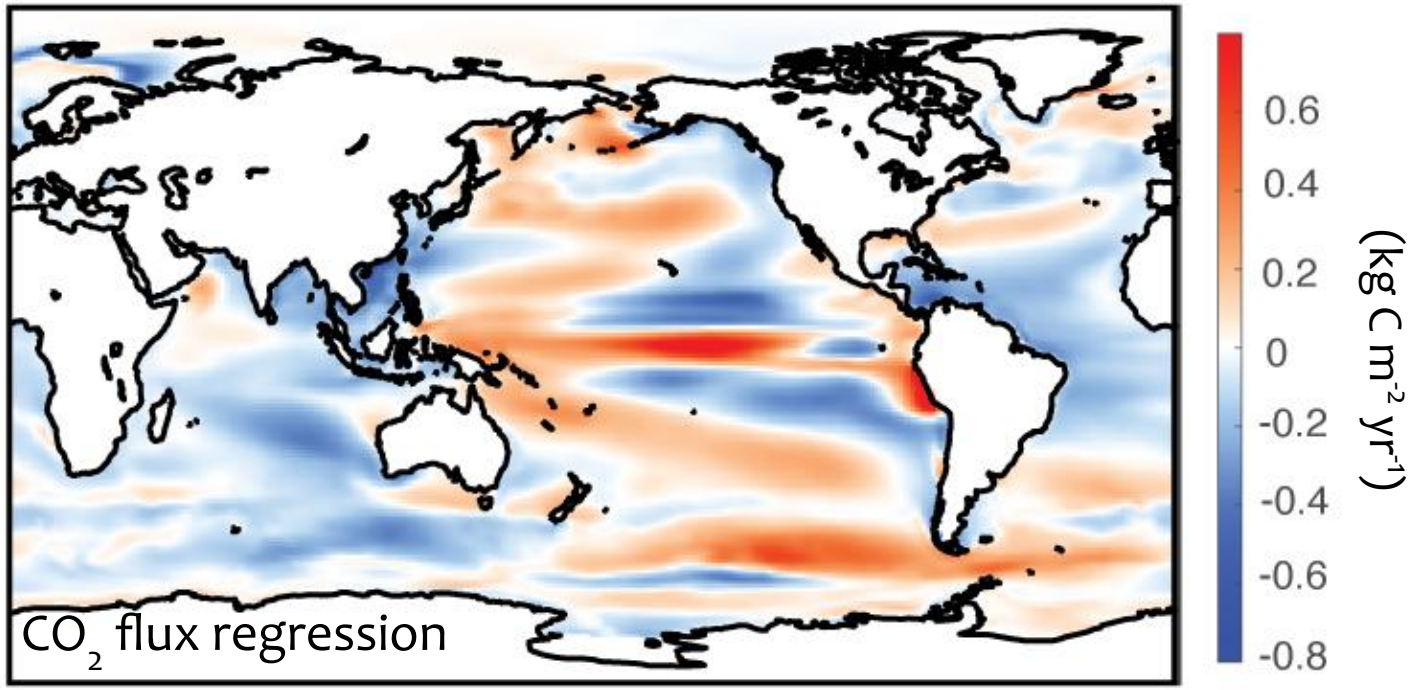


ENSO in CESM-HOPE

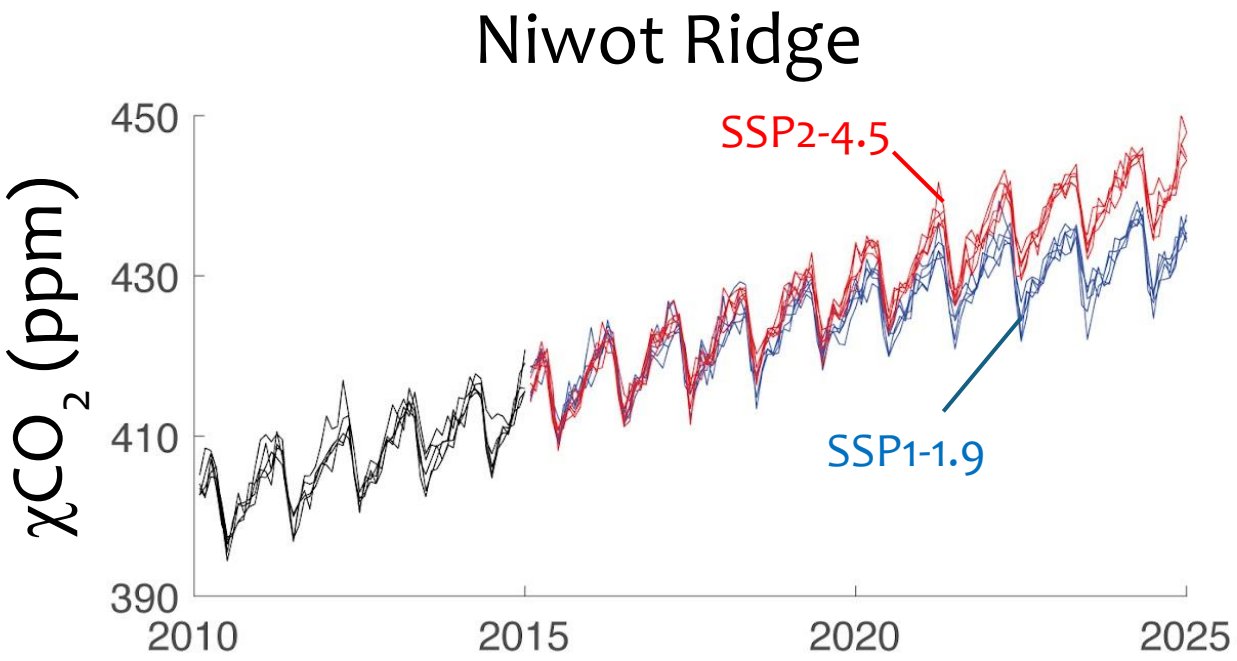
Niño3.4 index



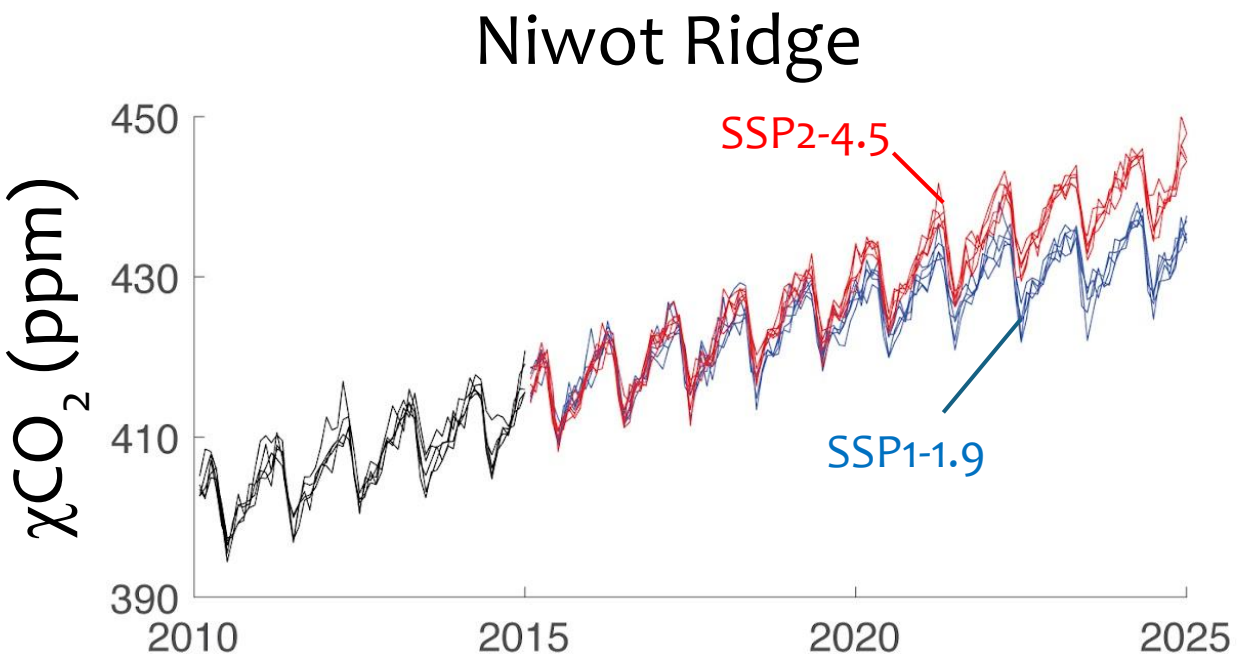


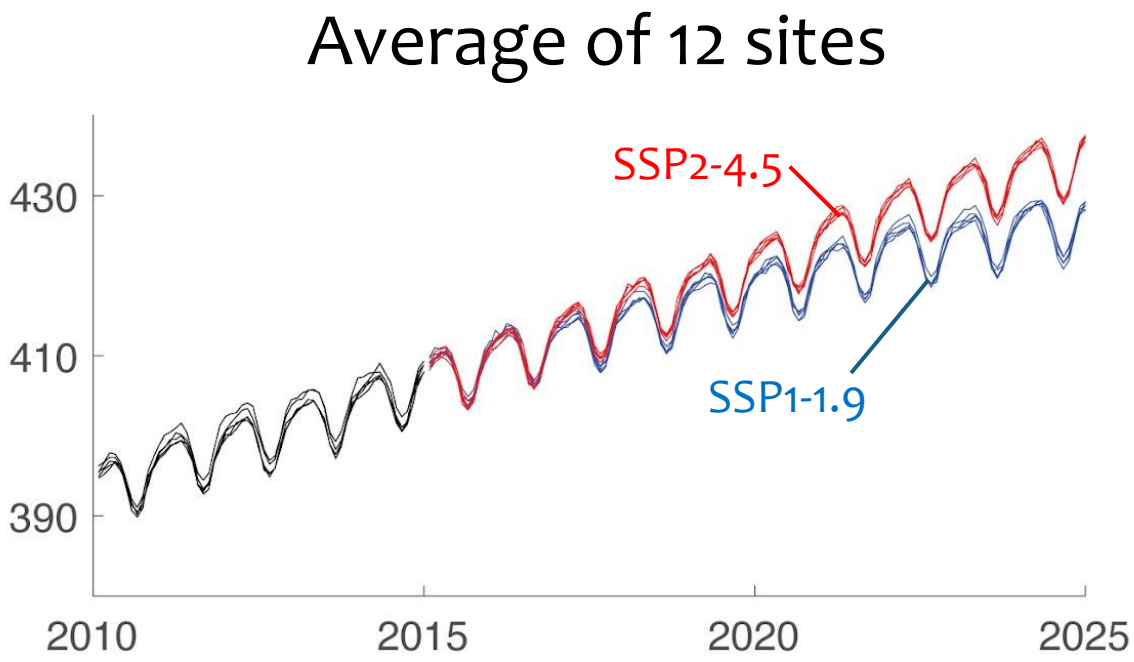


Finding emissions reductions in χCO_2

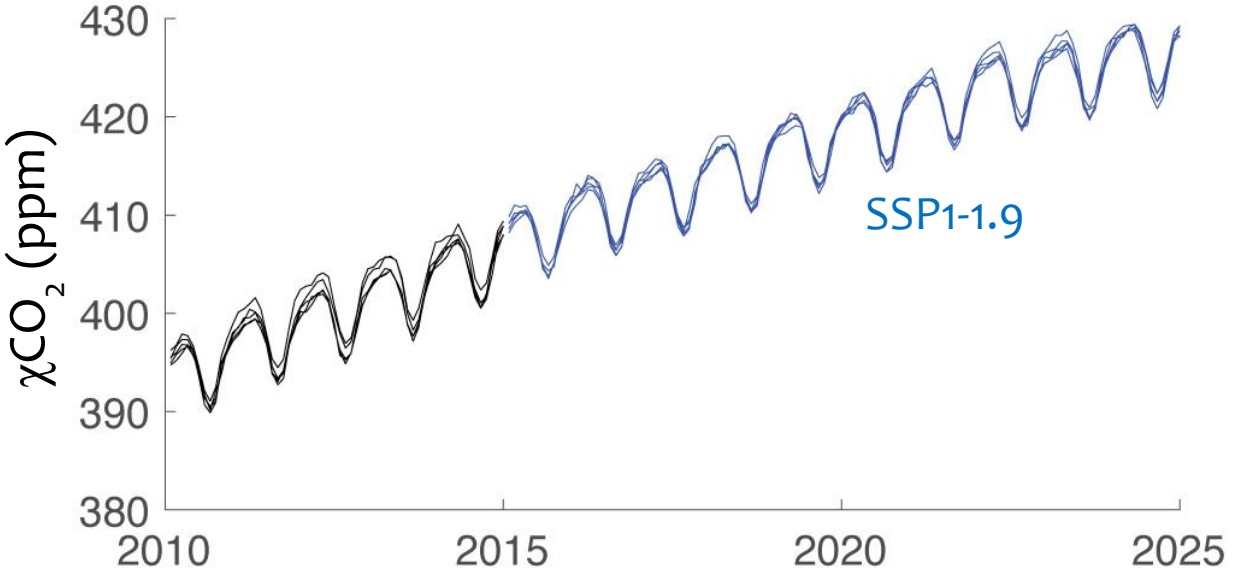


Finding emissions reductions in χCO_2





The ‘fingerprint’ of emissions reductions



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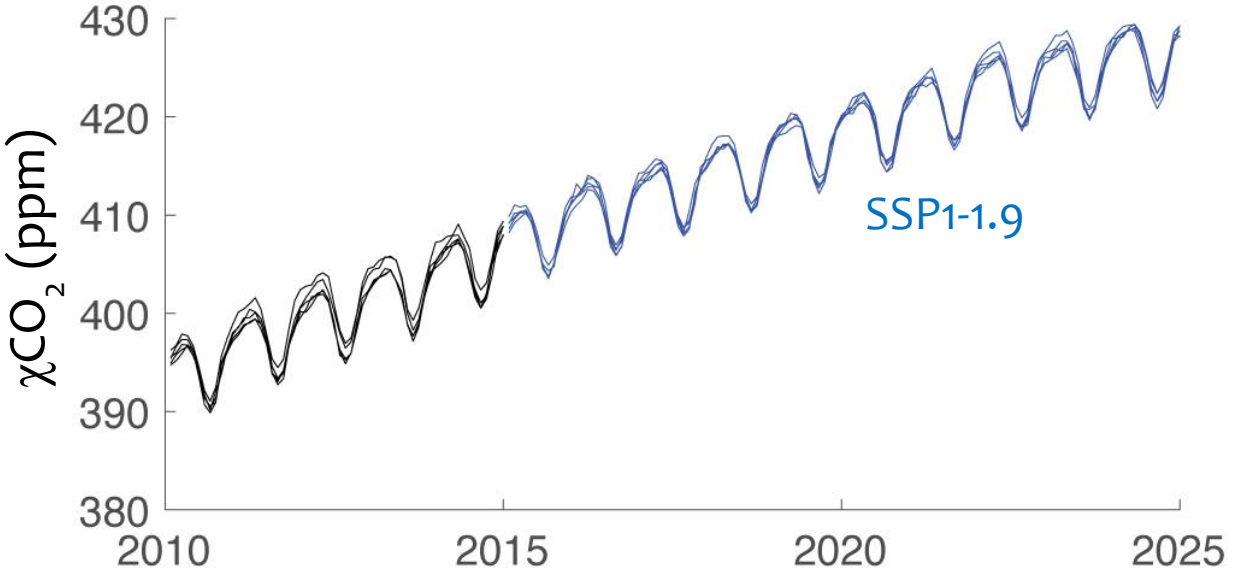
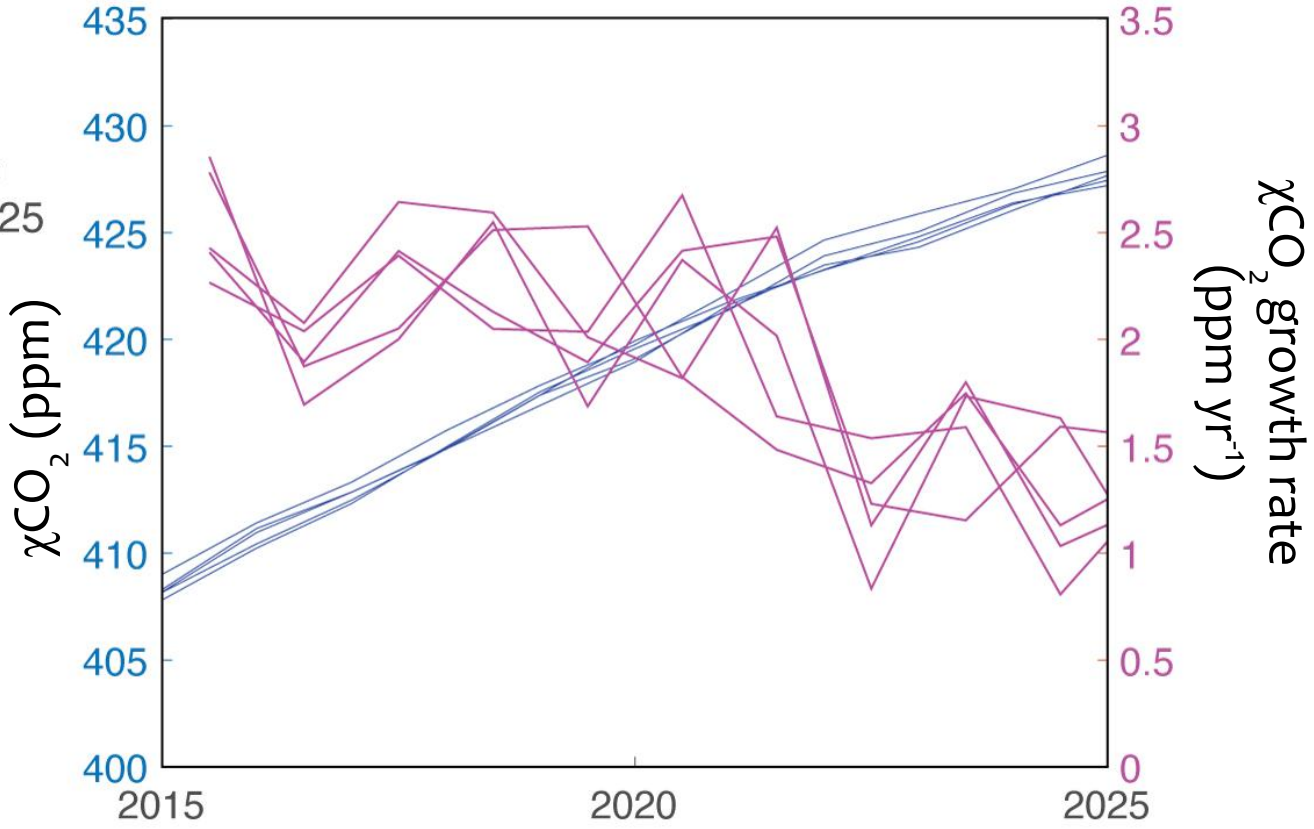
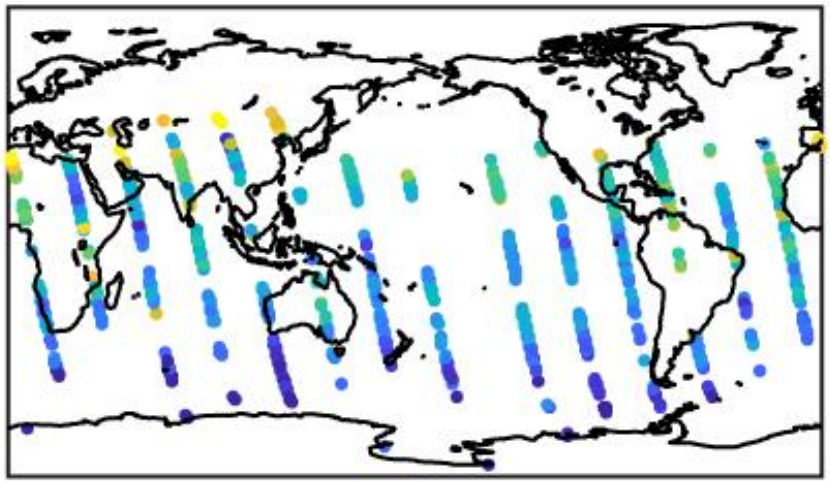
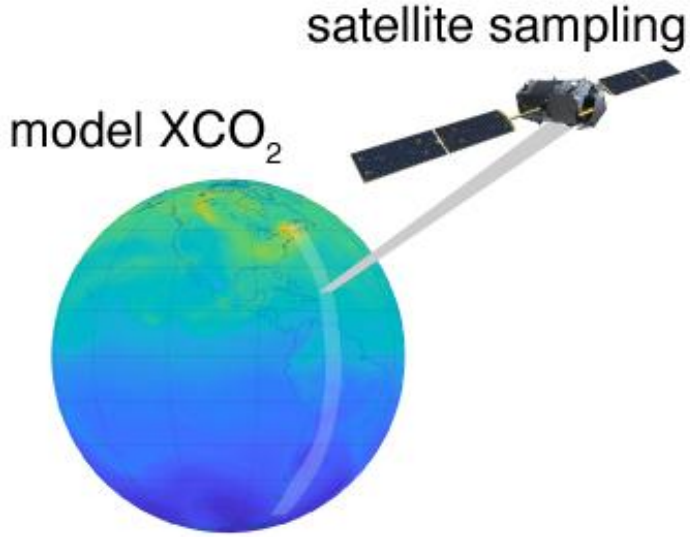




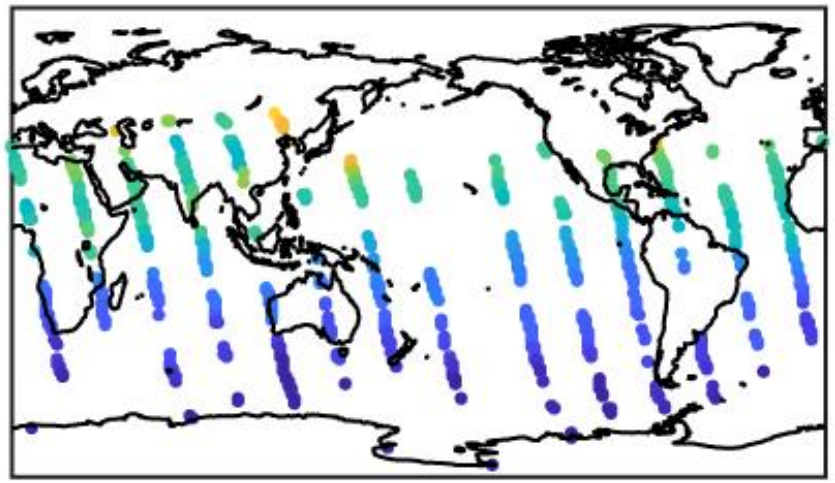
Future work: Satellite XCO_2 simulator

satellite XCO_2

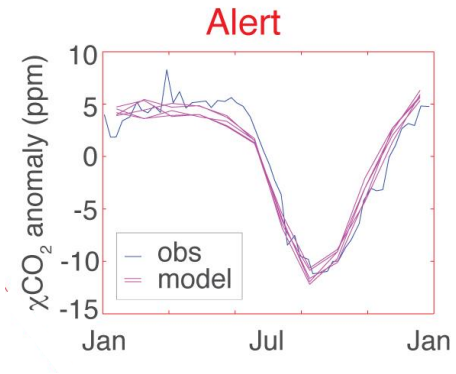




satellite-like model XCO_2

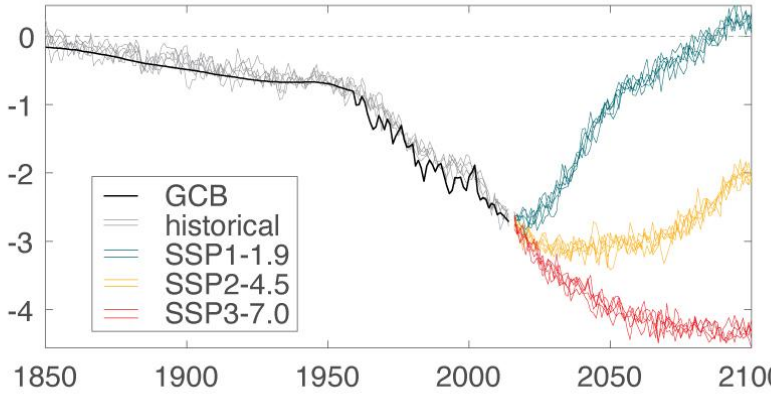


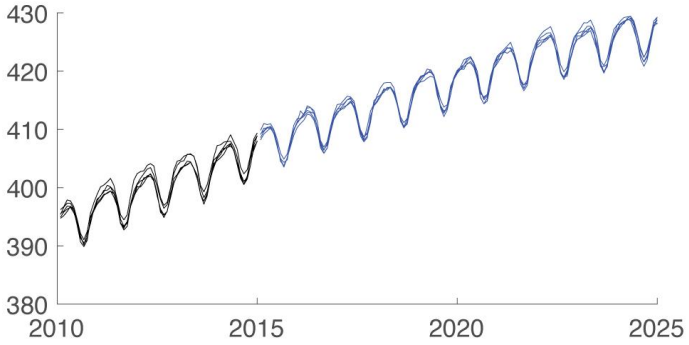
Conclusions



Emissions-driven historical simulations of CESM-HOPE generate a realistic representation of the carbon cycle

Under extreme reductions in emissions, CESM-HOPE predicts that the ocean will become a source of CO_2 to the atmosphere by the end of the century





The fingerprint of global emissions reductions can be detected in the declining growth rate of χCO_2 from the global flask network after ~10 years

The end!

Emissions forcing