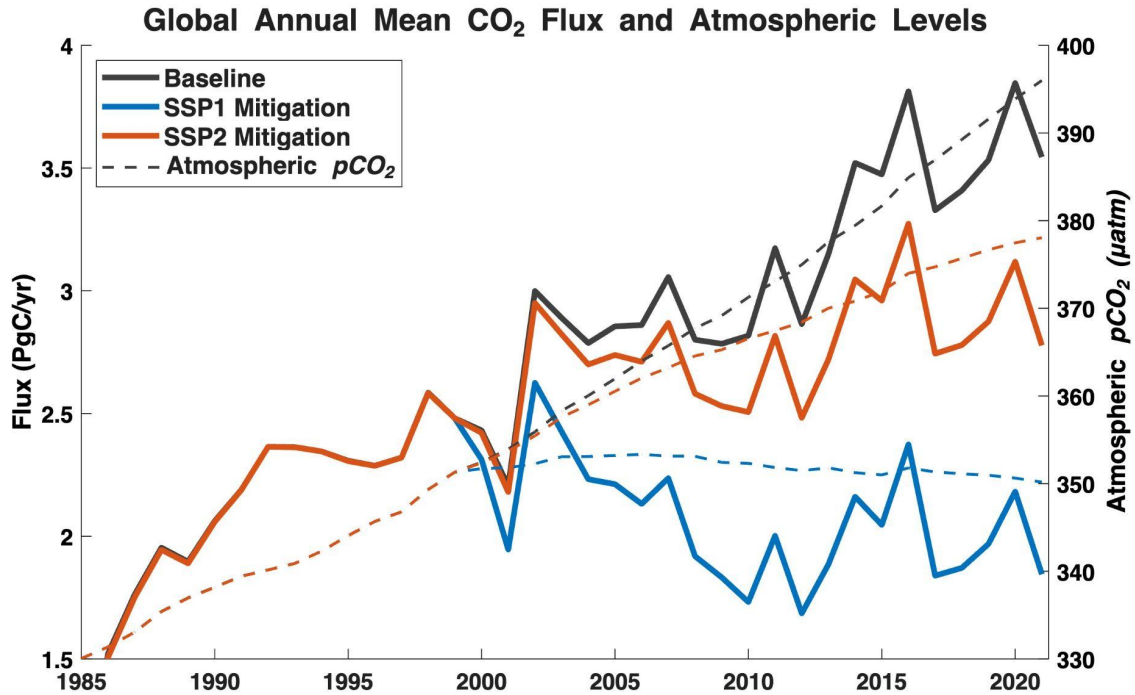


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Supplementary Material

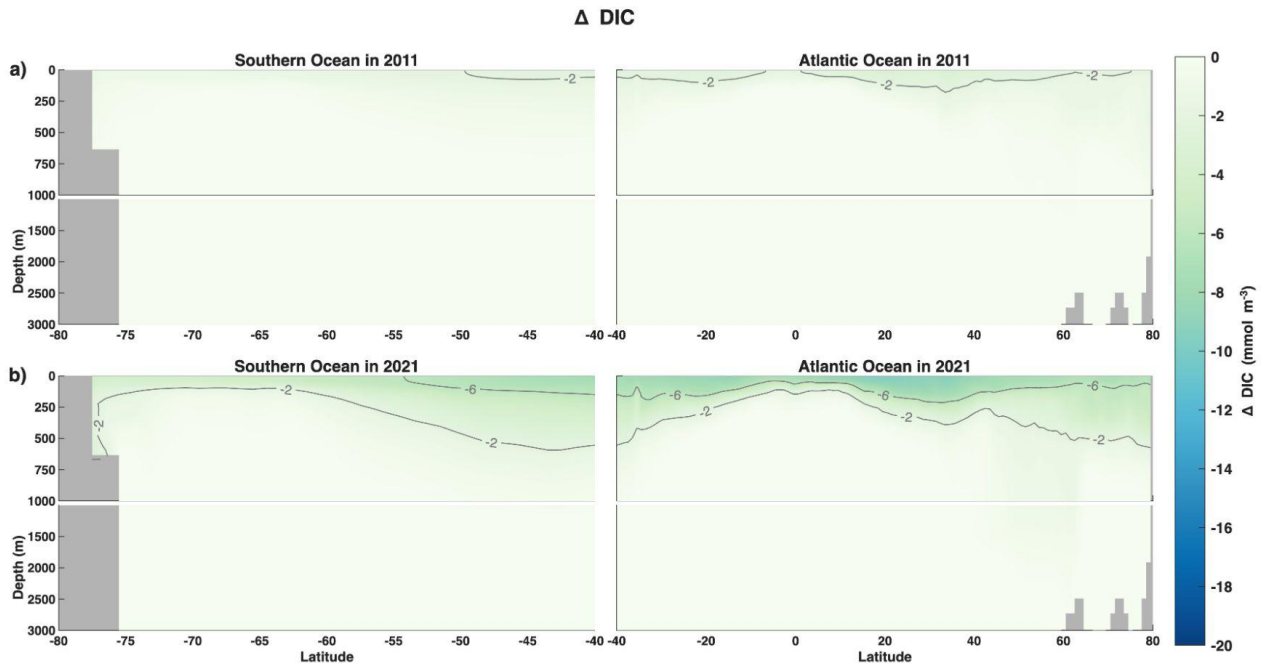
Quantifying the Near-term Response of the Ocean CO₂ Sink to Emissions Mitigation

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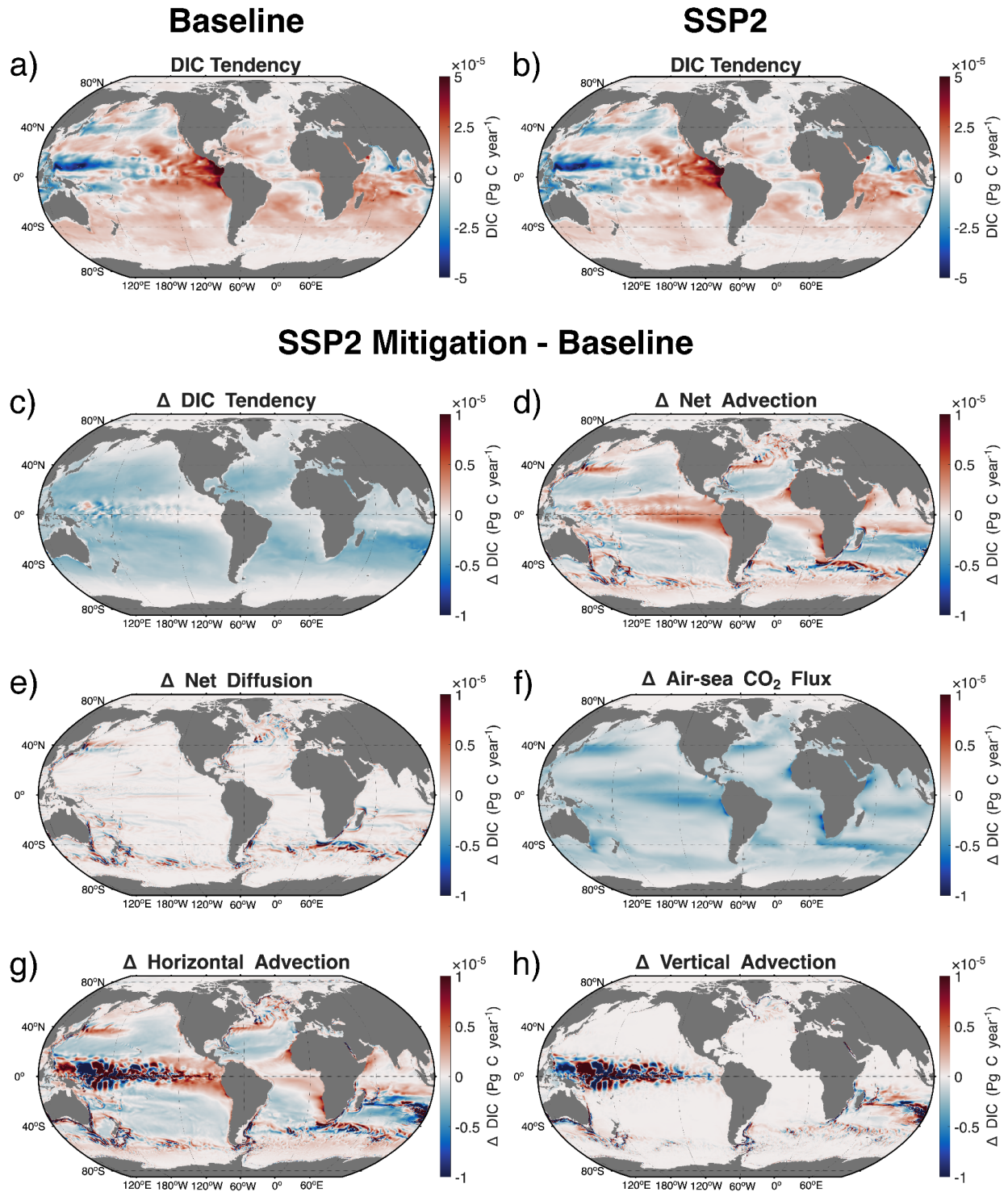


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Figure S1: Annual-mean time series of air-sea CO₂ flux (solid lines) and atmospheric pCO₂ (dashed lines) for baseline and SSP mitigation simulations. Air-sea CO₂ flux is globally integrated, and atmospheric pCO₂ represents a global mean. Full time series presented here; SSP scenario forcing is applied in January 2000. Positive flux represents ocean uptake.



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 17 **Figure S2:** Southern Ocean and Atlantic basin-averaged zonal mean Δ DIC concentration (mmol m^{-3}) for SSP2 Mitigation minus Baseline. **a)** top panel shows changes in 2011 (11 years post
 18 mitigation), **b)** bottom panel shows 2021, (the last year of the simulation). Negative values
 19 (cooler colors) indicate more carbon accumulation in Baseline as compared to mitigation
 20 scenarios.
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 23 **Figure S3:** DIC budget. Time-mean (2016–2021) vertically integrated DIC tendency for **(a)**
 24 Baseline and **(b)** SSP2 Mitigation. Differences in ECCO-Darwin DIC budget terms (SSP2
 25 Mitigation – Baseline) for surface-to-500 m vertically integrated 2016–2021 mean DIC
 26 tendency: **(c)** tendency, **(d)** net diffusion, **(e)** net advection, and **(f)** air-sea CO₂ flux. Net advection is
 27 further decomposed into **(g)** horizontal and **(h)** vertical components.
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