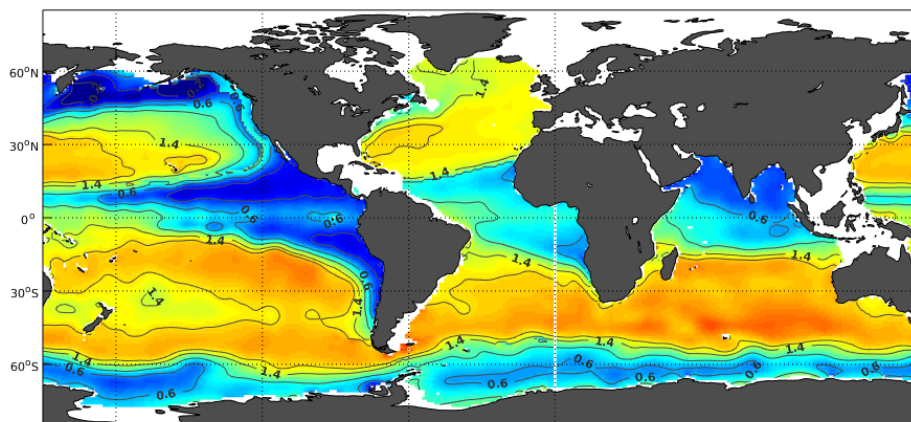


Figure S1 Surface map of the annually constant sea ice thickness in the model in meter.

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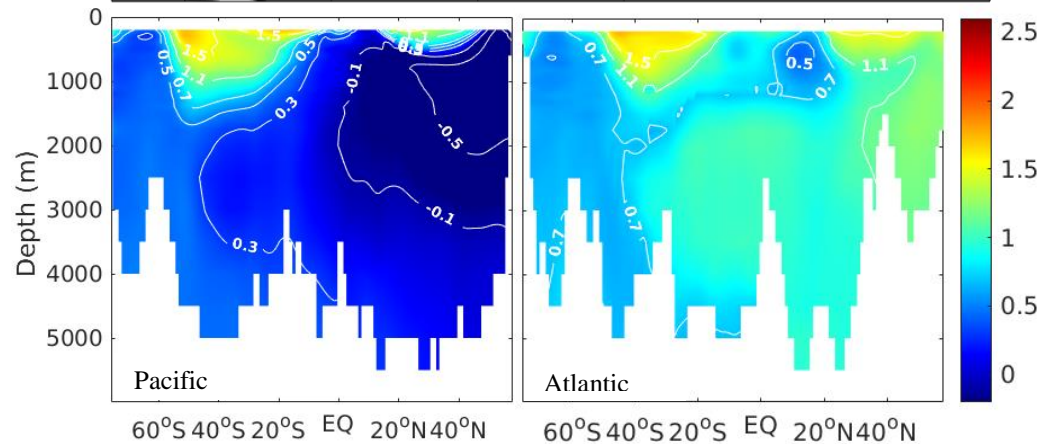


Figure S2 Pre-industrial $\delta^{13}\text{C}$ data based on Eide et al. (2017b) at 200 m depth (top), a Pacific transect at 150° W (bottom left) and an Atlantic transect at 30° W (bottom right)

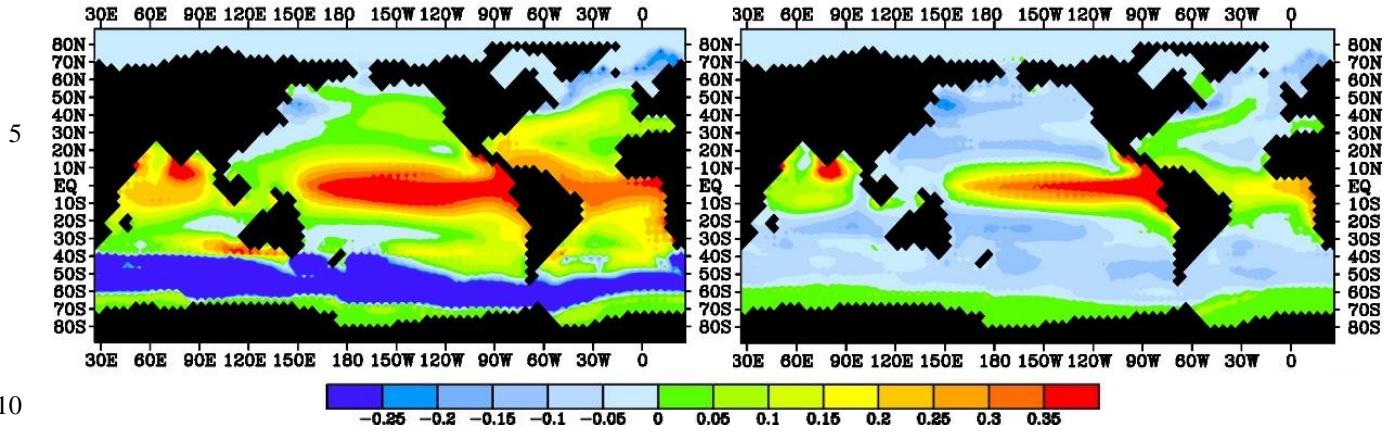


Figure S3 Air-sea ^{13}C [$\text{gC m}^{-2} \text{ year}^{-1}$] flux for the Vmax experiment (left) and model control run (right). Negative values indicate carbon uptake by the ocean.

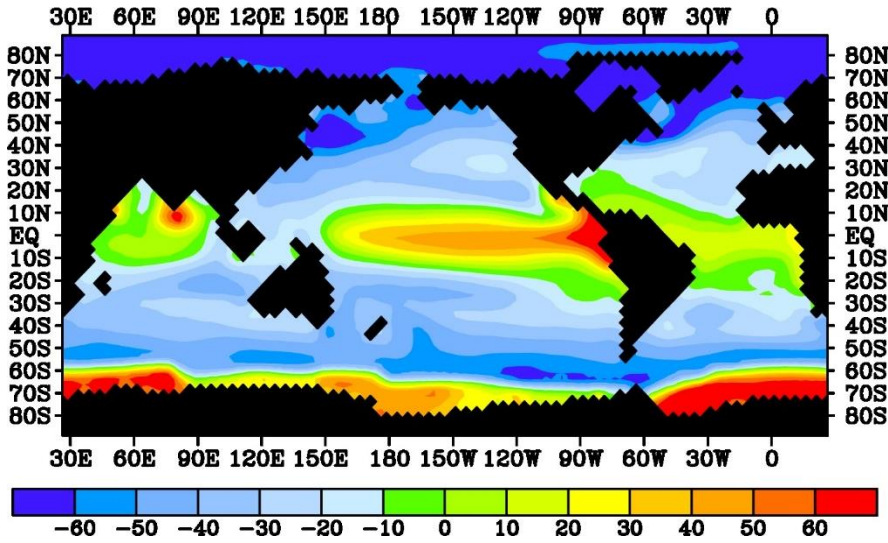


Figure S4 The pCO_2 differences between the ocean and the atmosphere. Negative values indicate carbon uptake by the ocean.