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

Figure S2 Pre-industrial δ¹³C 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 [gC m$^{-2}$ 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.