Supplemental Figures for Ocean Carbon Uptake Under Aggressive Emission Mitigation

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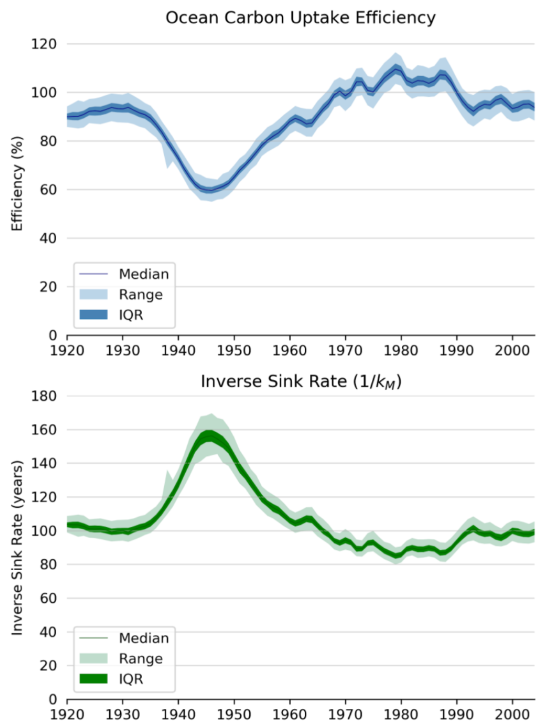

Figure S1. Top, historical ocean C_{ant} uptake efficiency, and spread in due to internal variability. This is the best estimate of internal variability from the full 40 member CESM Large Ensemble. Dark shading is the ensemble interquartile range (25-75% percentile) and the light shading is the ensemble maximum and minimum. Bottom, inverse sink rate (k_M) for the historical period. Inverse sink rate approximately 90-100 years in the historical period. This means that atmospheric C_{ant} would be drawn down to zero by the ocean in 100 years in the sink rate remained constant. The large decline in efficiency/increase in inverse sink rate is due a flattening of the pCO_2^{atm} curve that begins in 1929, the start of the Great Depression.

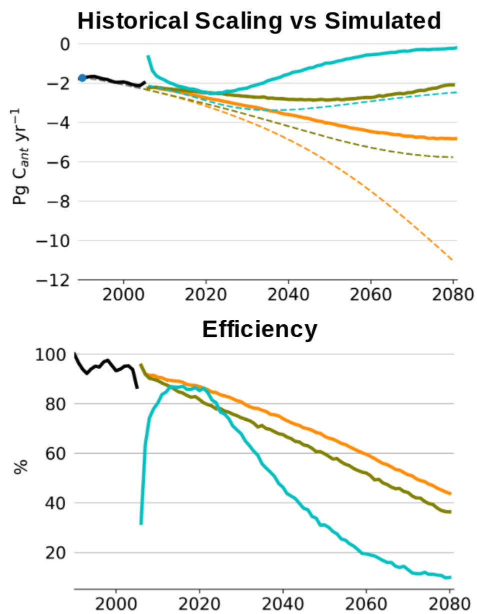

Figure S2. Top, CESM simulated ocean C_{ant} uptake (solid lines) vs the historical scaling. Bottom, ocean C_{ant} uptake efficiency and (dashed lines). Same as Figure 2a,b in main text, but including the omitted years. The small 6 ppm discontinuity between the historical and projection periods (see main text Figure 2) is enough to cause a large jump in efficiency and ocean C_{ant} uptake. Note there are also even smaller pCO_2^{atm} discontinuities for RCP4.5 and RCP8.5 that impact efficiency. Air-sea flux is thus very sensitive to the harmonization method.