

Supporting Information for: On the detection of COVID-driven changes in atmospheric carbon dioxide

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Contents of this file

1. Figures S1 to S4

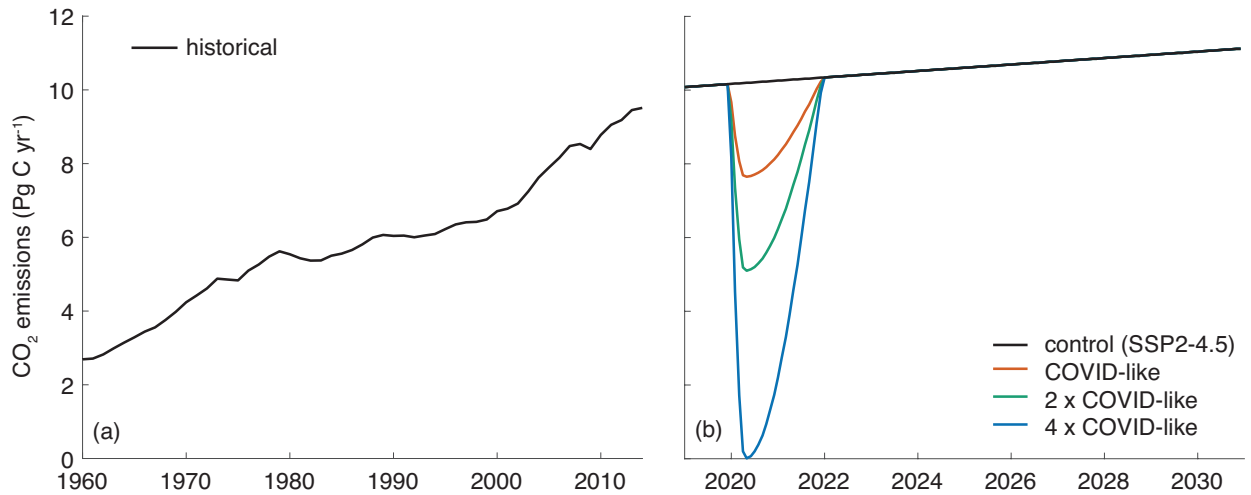
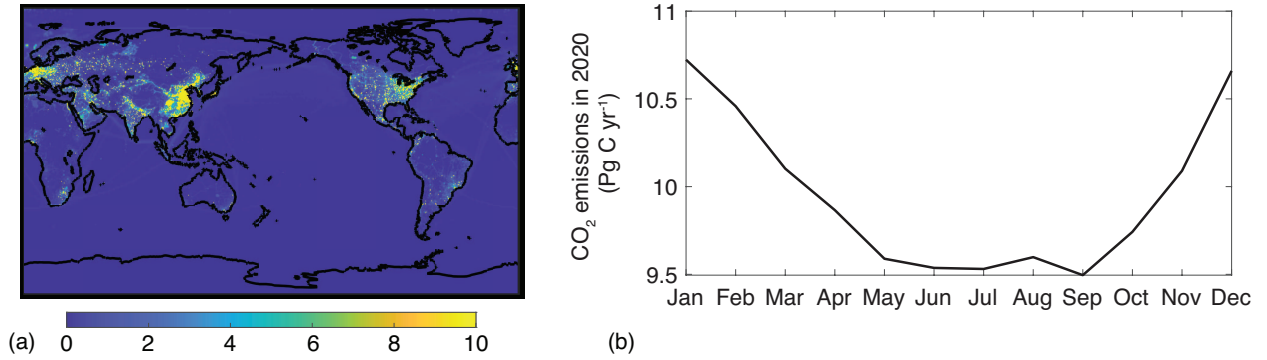
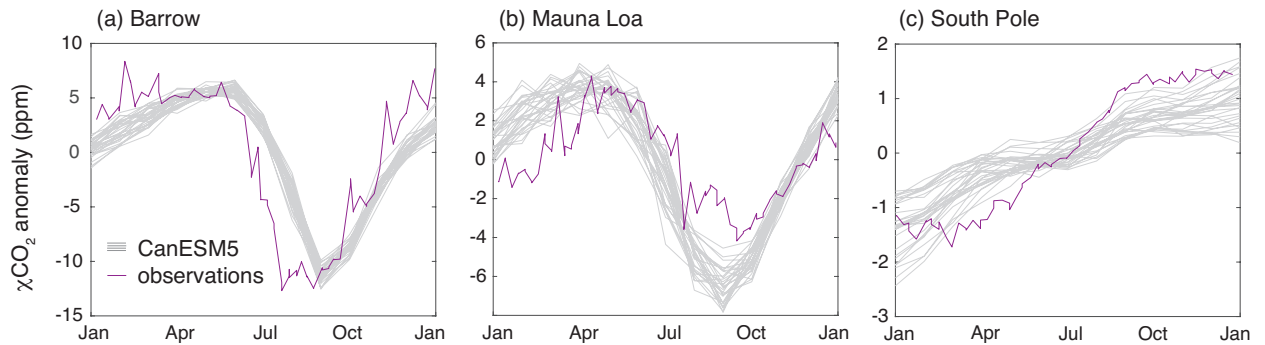


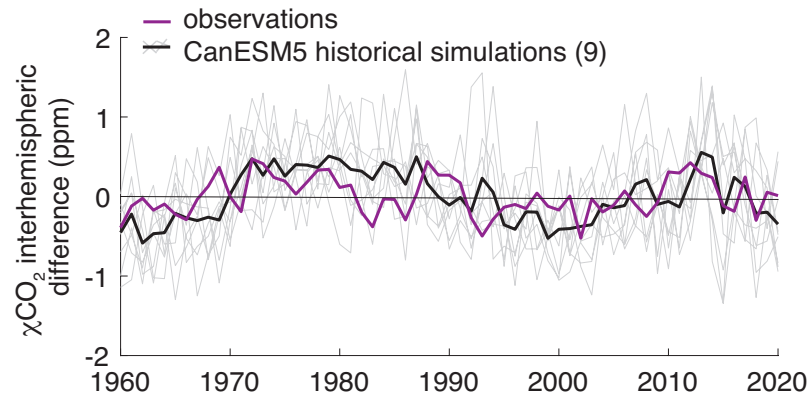
Figure S1. Global-mean, de-seasoned CO₂ emissions (Pg C yr⁻¹) (a) over the historical period, and (b) for the (black) control / SSP2-4.5, (red) COVID-like, (green) 2 × COVID-like, and (blue) 4 × COVID-like scenarios.



18 **Figure S2.** (a) Spatial distribution of 2020 annual-mean CO₂ emissions for the control (SSP2-
 19 4.5) ensemble (kg m⁻² yr⁻¹). (b) Seasonally varying 2020 global-mean CO₂ emissions for the
 20 control (SSP2-4.5) ensemble (Pg C yr⁻¹).



21 **Figure S3.** Monthly χ CO₂ anomaly (ppm) relative to the time-mean χ CO₂ from (gray)
 22 the CanESM5 control ensemble and (purple) observations during 2015 at (a) Point Barrow, (b)
 23 Mauna Loa, and (c) South Pole stations.



24 **Figure S4.** Annual-mean, de-trended interhemispheric difference in χ CO₂ (Mauna Loa mi-
 25 nus South Pole; ppm) from (purple) observations, and (gray/black) the CanESM5 historical
 26 simulations. Gray lines show individual model ensemble members, and thick black line shows
 27 the ensemble mean. Number in parenthesis on legend corresponds to the number of ensemble
 28 members plotted.