Impact of COVID-19 on CO_2 emissions

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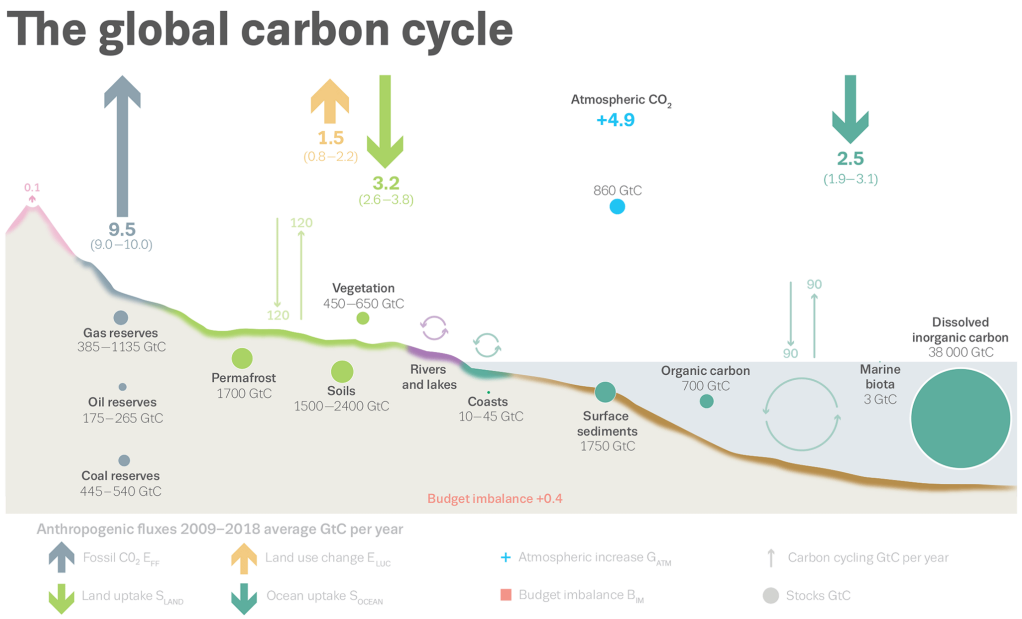
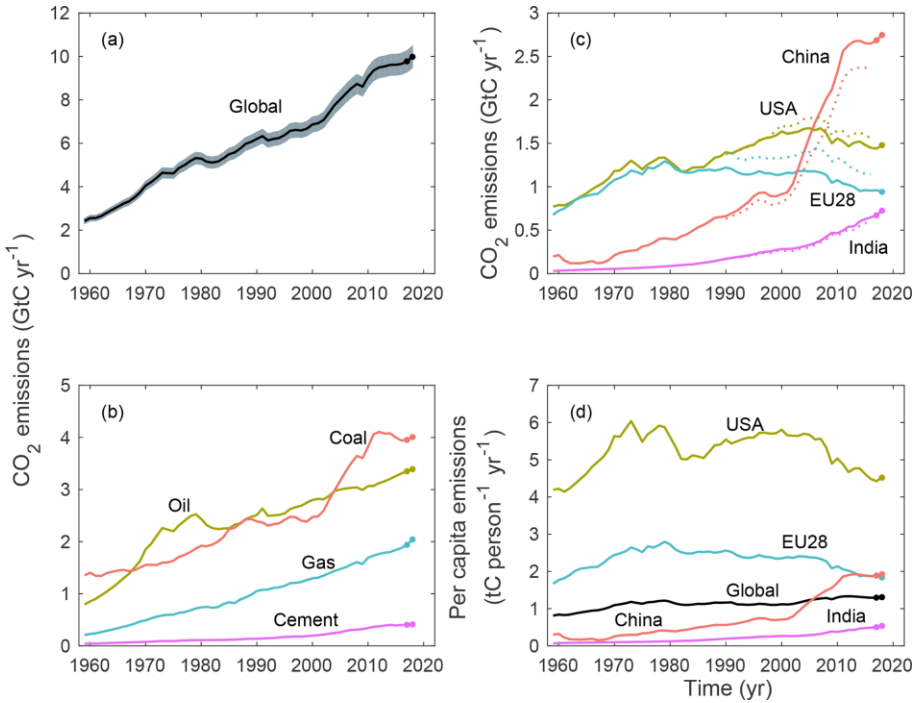
Climate-Carbon Interactions in the Current Century

Impact of COVID-19 lockdown on CO_2 emissions

Background information: we do not have real time actual data on CO_2 emissions per sector or source at the country level.

Even for EU, we only have monthly data on coal, oil and gas (all with about a 3 months lag).





Source: Friedlingstein et al (2019)

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3 published studies:

- Le Quéré et al. (2020), Forster et al. (2020), Zhu et al. (2020)
- All using similar methodology: use of proxy data of socio-economic activity across the world to infer changes in CO_2 emissions
- Examples of proxy data : electricity use, coal use, steal production, road traffic, aircraft departures.

nature climate change
ARTICLES
https://doi.org/10.1038/s41558-020-0797-x
Check for updates

Temporary reduction in daily global CO_2 emissions during the COVID-19 forced confinement

Corinne Le Quéré[1,2]✉, Robert B. Jackson[3,4,5], Matthew W. Jones[1,2], Adam J. P. Smith[1,2], Sam Abernethy[3,6], Robbie M. Andrew[7], Anthony J. De-Gol[1,2], David R. Willis[1,2], Yuli Shan[8], Josep G. Canadell[9], Pierre Friedlingstein[10,11], Felix Creutzig[12,13] and Glen P. Peters[7]

nature climate change
ARTICLES
https://doi.org/10.1038/s41558-020-0883-0
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Current and future global climate impacts resulting from COVID-19

Piers M. Forster[1]✉, Harriet I. Forster[2], Mat J. Evans[3,4], Matthew J. Gidden[5,6], Chris D. Jones[7], Christoph A. Keller[8,9], Robin D. Lamboll[10], Corinne Le Quéré[11,12], Joeri Rogelj[6,10], Deborah Rosen[1], Carl-Friedrich Schleussner[5,13], Thomas B. Richardson[1], Christopher J. Smith[1,6] and Steven T. Turnock[1,7]

nature COMMUNICATIONS

ARTICLE
https://doi.org/10.1038/s41467-020-18922-7 OPEN
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Near-real-time monitoring of global CO_2 emissions reveals the effects of the COVID-19 pandemic

Zhu Liu et al.#

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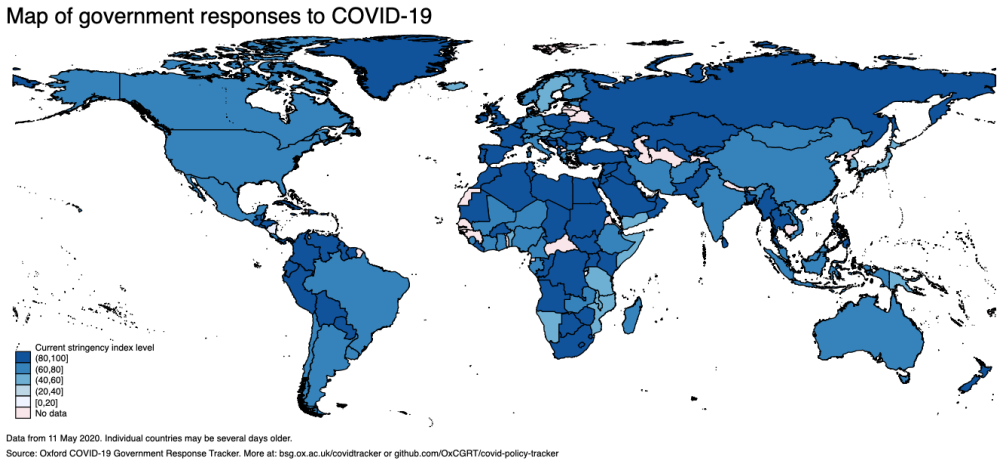
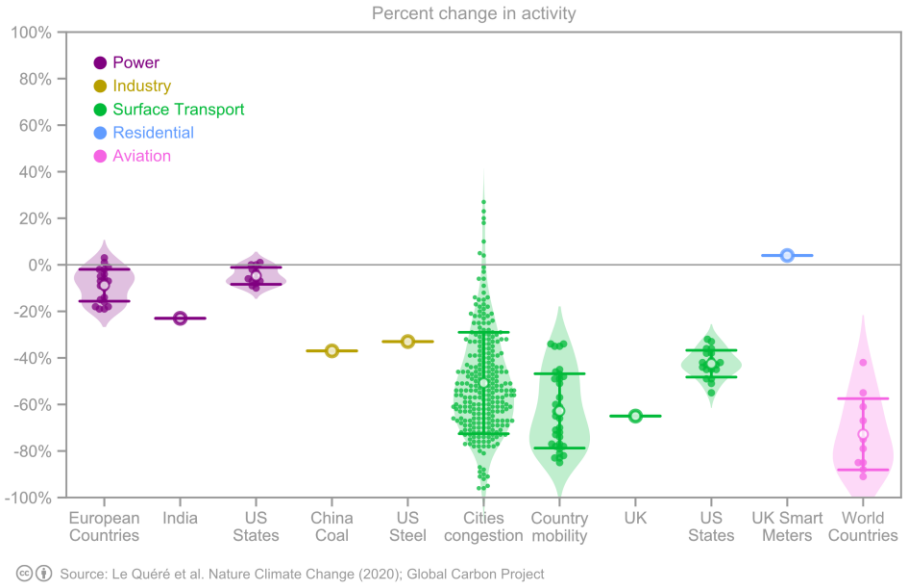
Impact of COVID-19 lockdown on different sectors

- At its peak in April, regions responsible for ~90% of global fossil CO_2 emissions were under some level of confinement
- Aviation decreased by 75%, surface transport by 50%, power generation by 15%, industry uncertain but ~35%, small increase in residential buildings of 5%





Source: Le Quéré et al (2020)

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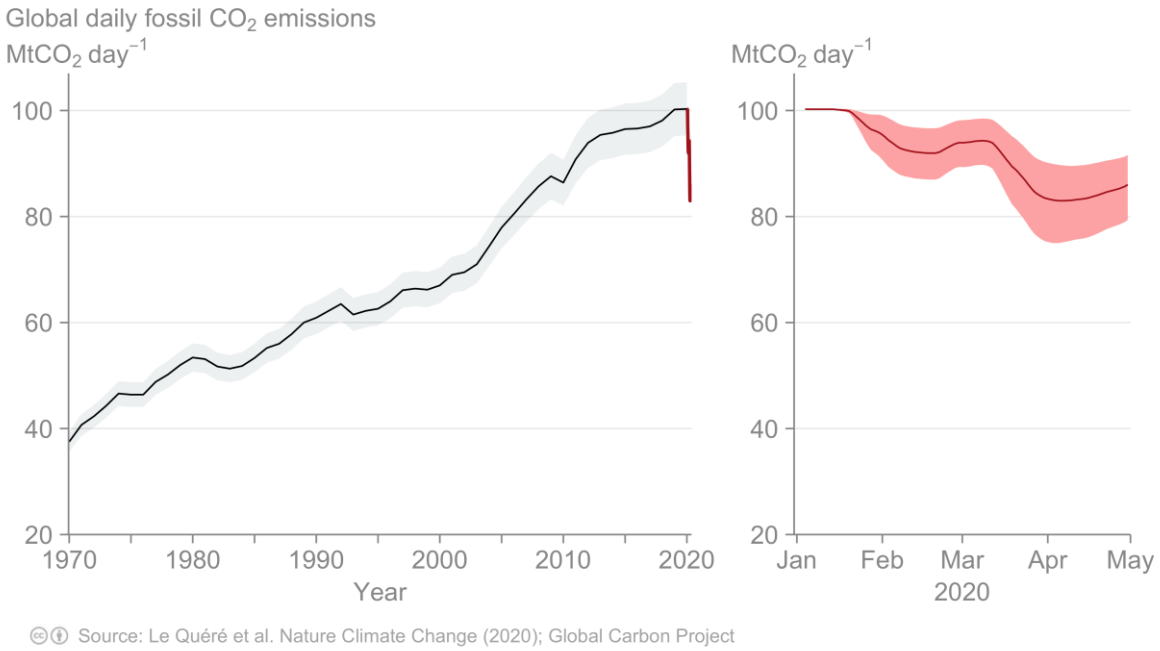
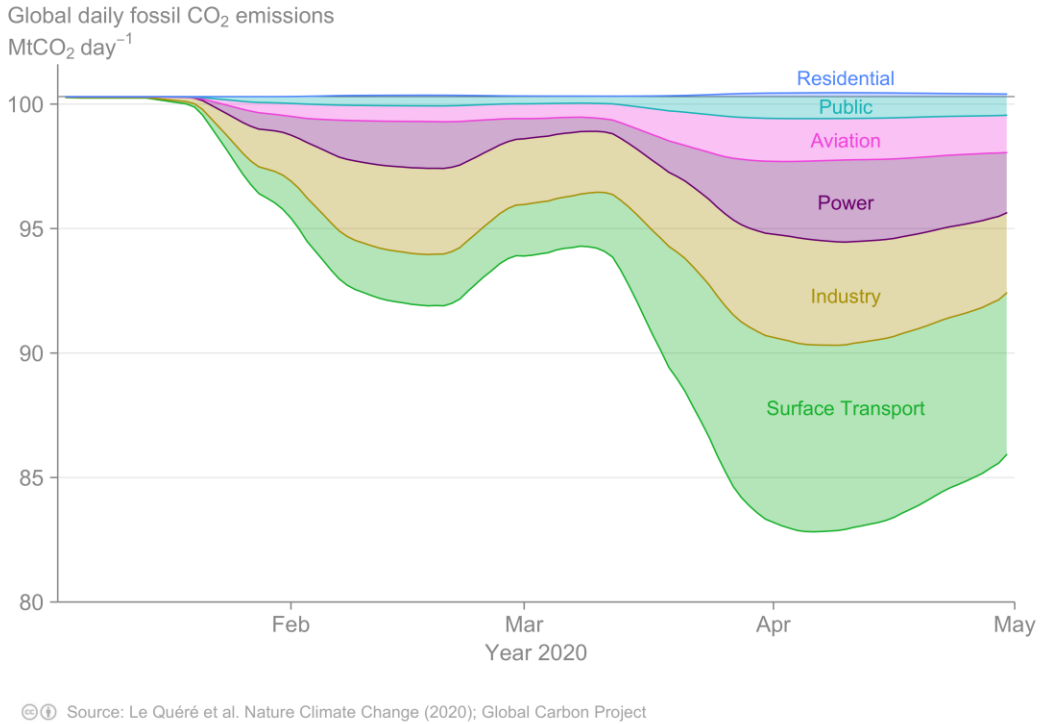
Impact of COVID-19 lockdown on Fossil Fuel CO_2 emissions

- Global lockdown induced large drop in emissions, 3-months 8% and peak drop 17% unprecedented, dropping to levels last observed in 2006. At their peak, emissions in individual countries decreased by ~27%.
- Emissions from surface transport accounted for almost half (43%) of the decrease, industry & power together accounted for 43%, & aviation 12%.





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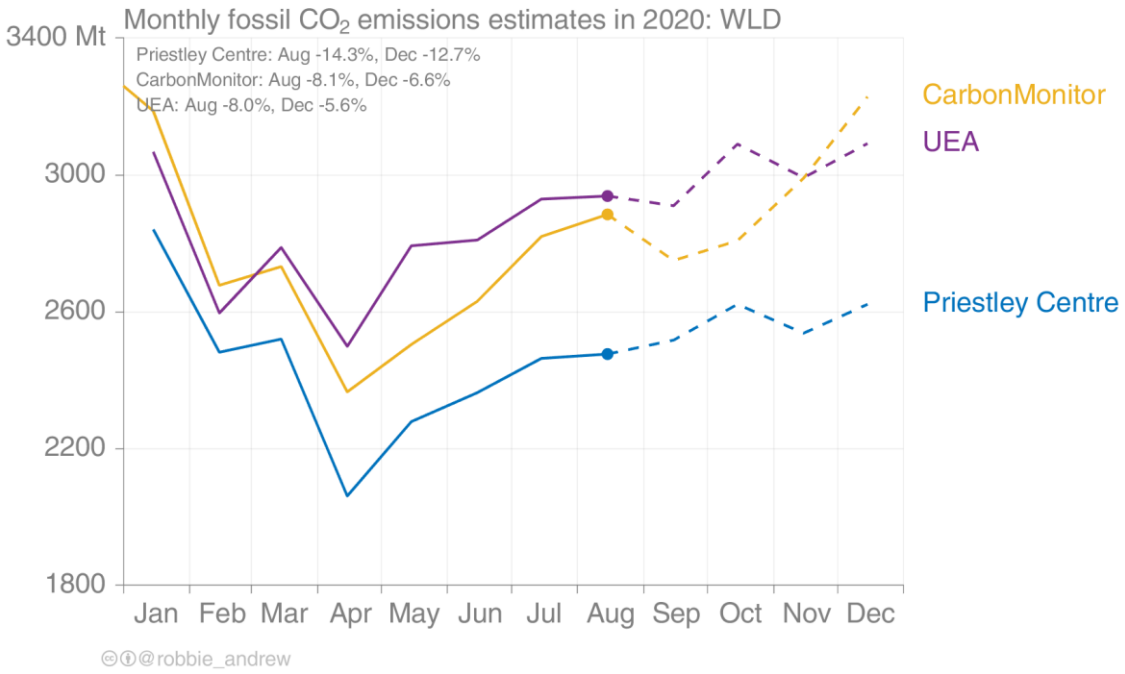
Source: Le Quéré et al (2020)

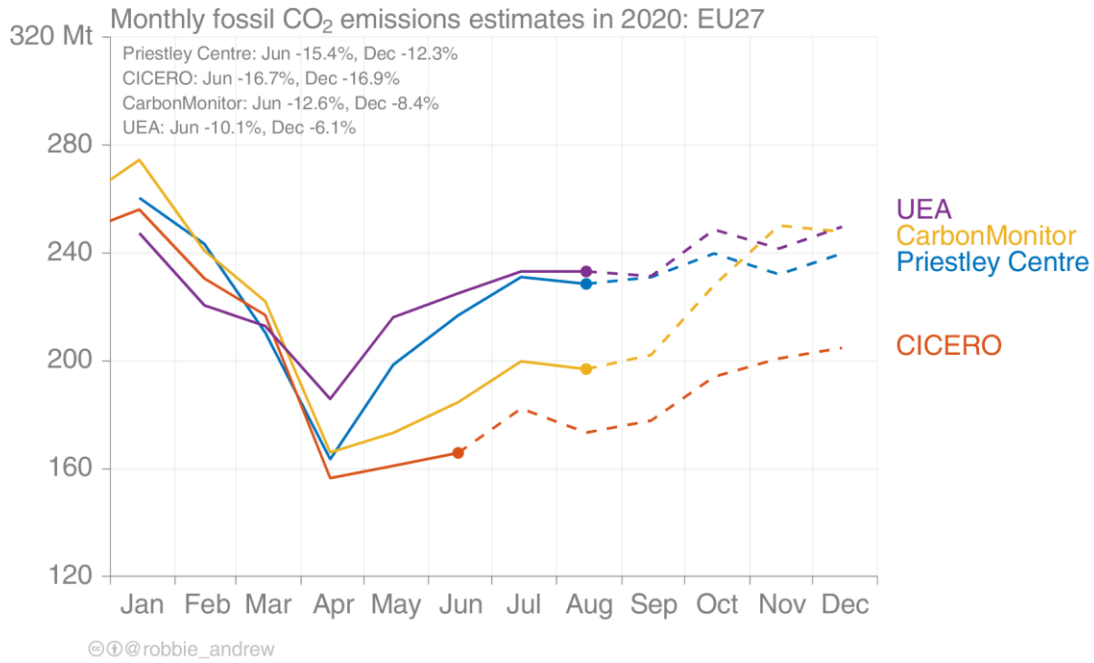
Impact of COVID-19 lockdown on Fossil Fuel CO_2 emissions

- 3 studies broadly consistent, with some significant regional differences
- Projection for the full year : about -6%

World



EU 27



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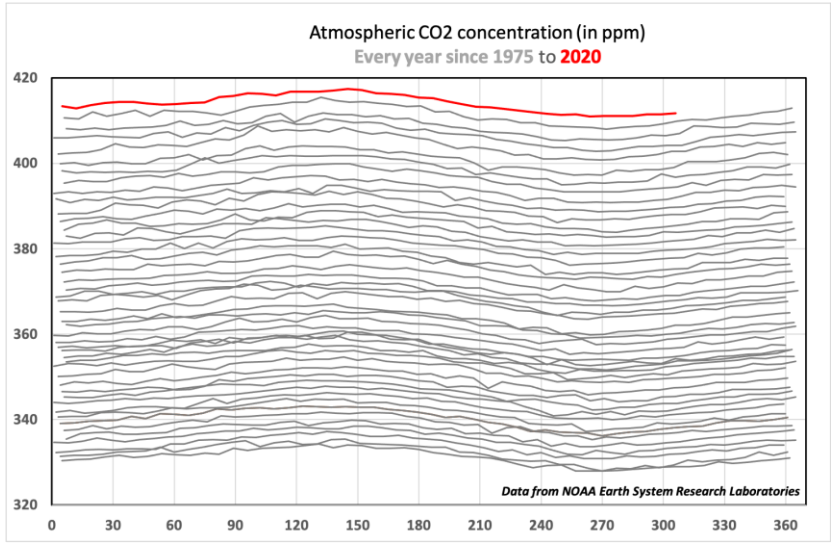
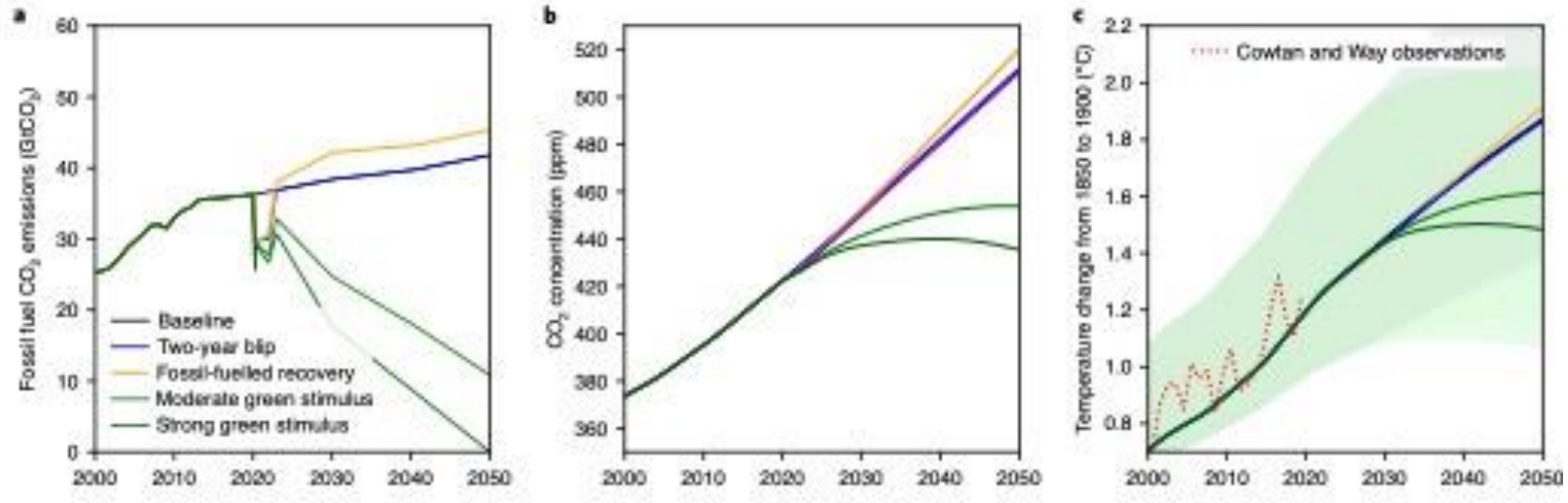
Implication for climate mitigation

- Drop in CO_2 emissions had no detectable impact on atmospheric CO_2 or climate change.
- Drop is extremely small (~1 GtC) compared to the emissions accumulated so far (~600 GtC).
- Direct effect on climate is also negligible.
- However, green recovery route would lead to significant reduction in warming compared to “back to usual business”
- Data show the great opportunity in doing more in the transport sector, which links very well with the greening of the electri cal grid and what can be done with an expansion of both. Changes in active mobility in big cities in response to crisis could partially become permanent with great benefits.





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Conclusions

Government policies during the COVID-19 pandemic have drastically altered patterns of energy demand around the world.

The impact on CO_2 emissions has been estimated based on observed changes in activity using proxy data (such as electricity use, coal use, steel production, road traffic, aircraft departures, etc).

Daily global CO_2 emissions decreased by about 17% by early April 2020 compared with the mean 2019 levels.

The impact on 2020 annual emissions will depend on the number and duration of confinements across the world. So far, from January to August, CO_2 emissions are projected to have declined by about 8%.

Government actions and economic incentives post COVID-19 crisis will likely influence the global CO_2 emissions path (and hence warming) for decades.

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