

# WMO on impact of COVID-19 on science



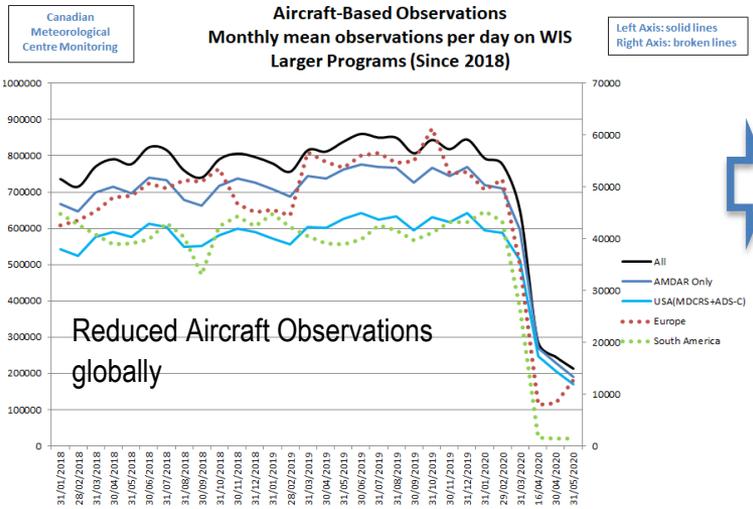
**WMO OMM**

World Meteorological Organization

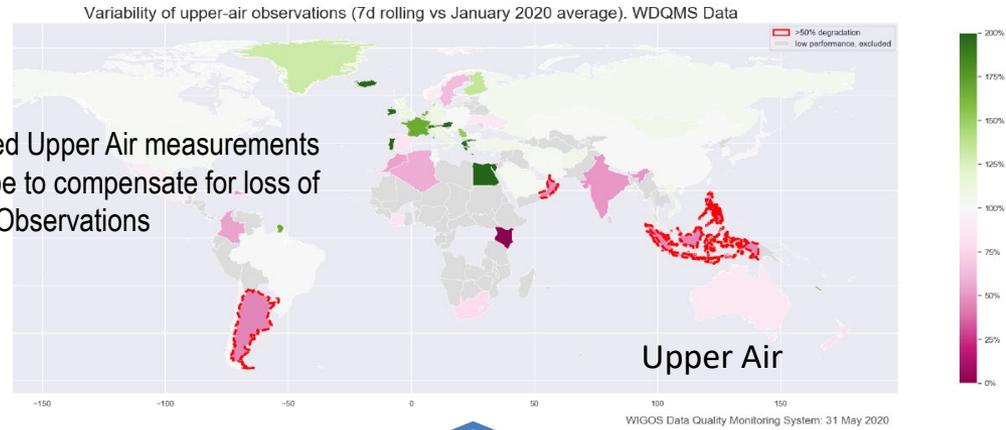
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# Where the impacts happen?

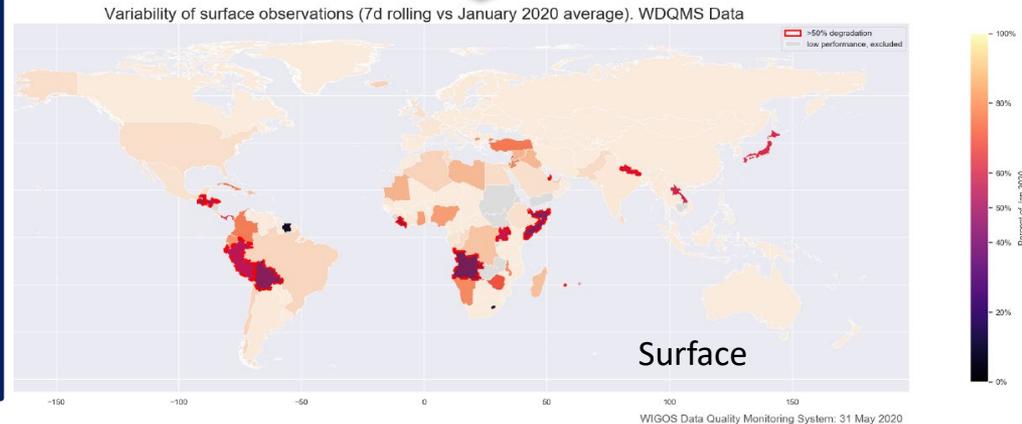
- COVID-19 impact on observational infrastructure
- COVID-19 and the state of environment
- COVID-19 and climate research



Increased Upper Air measurements in Europe to compensate for loss of Aircraft Observations



Reduced Observations in some countries with manual observations



## Other Surface Observations

It is difficult to quantify the impact on other observations (e.g. cryosphere, biosphere), as these are not (yet) monitored daily

Surface observations are being interrupted where they are made manually and there is a slow degradation of automatic measurements where maintenance and calibration cannot be performed.

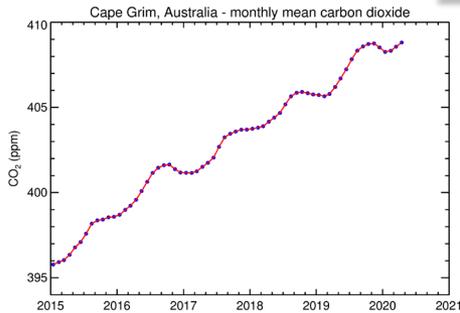
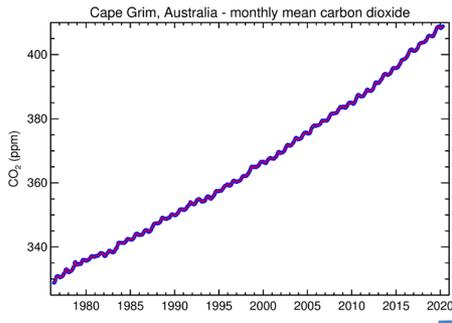
e.g. the Long-Term Ecological Research programme (LTER) in the US, noted that this might lead to the first interruption in more than 40 years at some sites.

This will lead to:

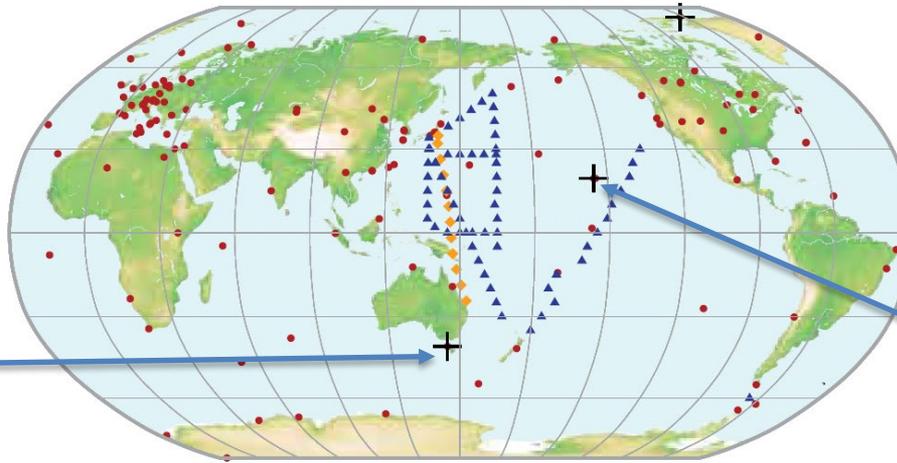
- Degradation of climate monitoring
- Degradation of weather forecasts globally
- Significant impacts on local forecasts, and emergency warning systems in the countries lacking observations

<https://public.wmo.int/en/media/pr-ess-release/covid-19-impacts-observing-system>

# Impact on the global CO<sub>2</sub> concentration

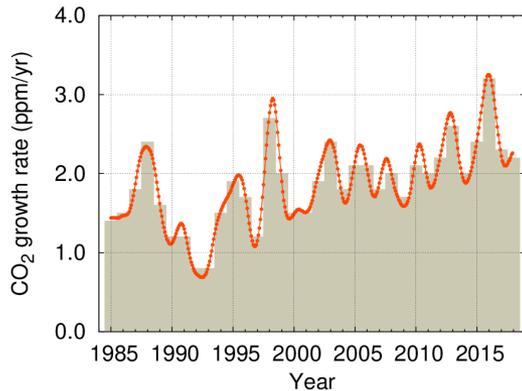
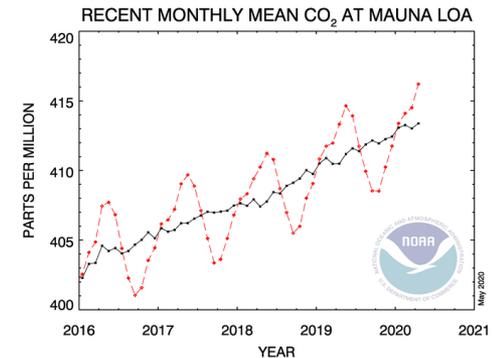
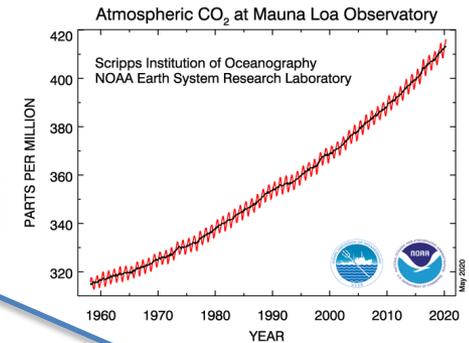


Cape Grim GHG webpage data - created on Fri May 15 07:15:04 2020 by gluser-aa@GDL-AS



• Ground-based    ♦ Aircraft    ▲ Ship    + GHG comparison sites

1 ppm is within natural interannual variability  
 Lock-down measures can decrease the growth rate  
 by 0.2 ppm max

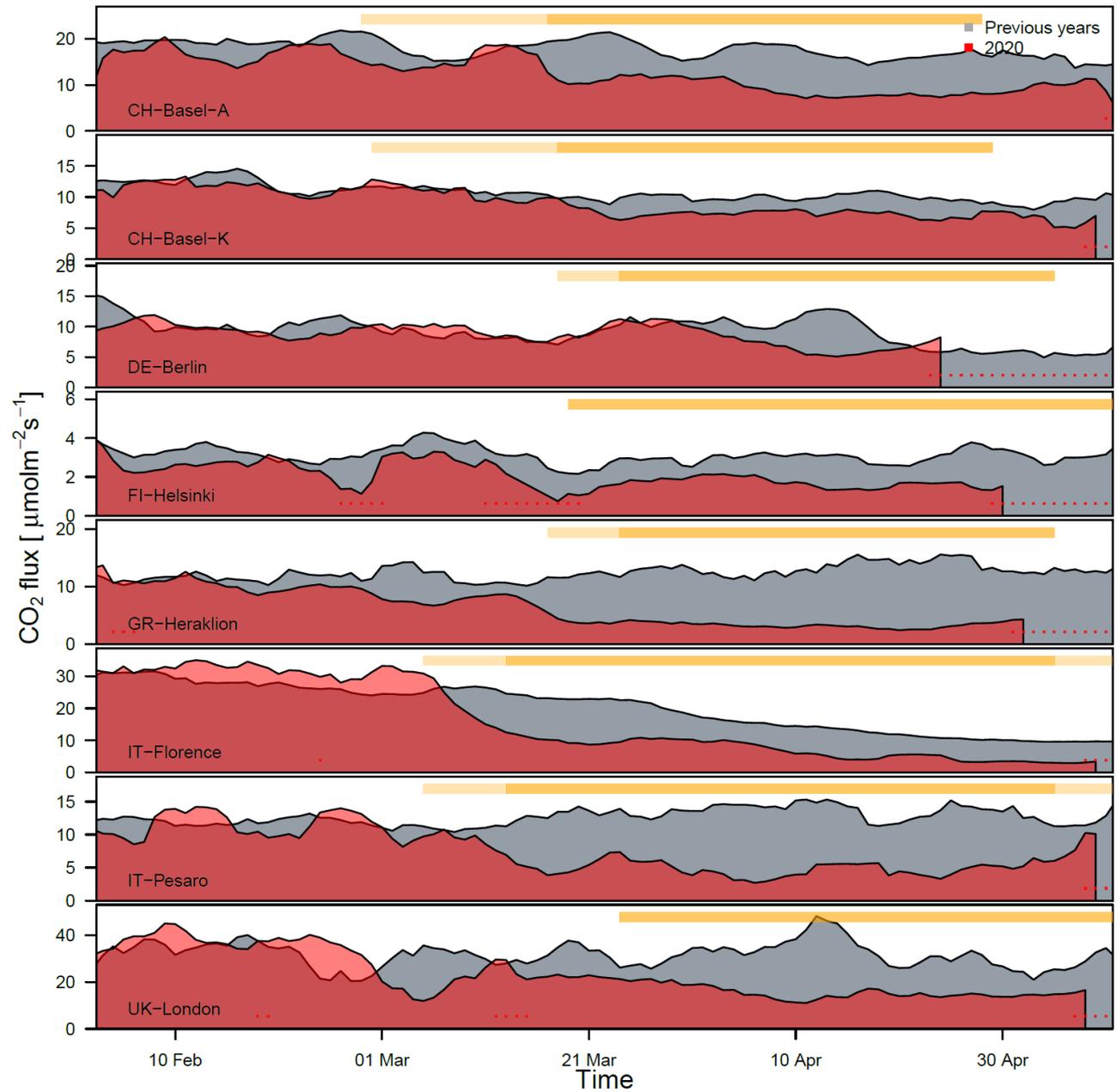


1. Concentration of carbon dioxide (and other long-lived greenhouse gases) in the atmosphere will not decrease as a result of lock-down measures
2. Separation of natural variability from the one driven by lock-down measures needs longer datasets and more complicated analysis (e.g use of isotopes)
3. The most substantial impact of emission reduction on atmospheric GHG concentrations is visible in urban areas there emission changes can be detected by direct flux measurements

# ICOS work on urban scale

Significant changes can be measured within cities using so called **eddy covariance techniques** that directly measure vertical exchange fluxes.

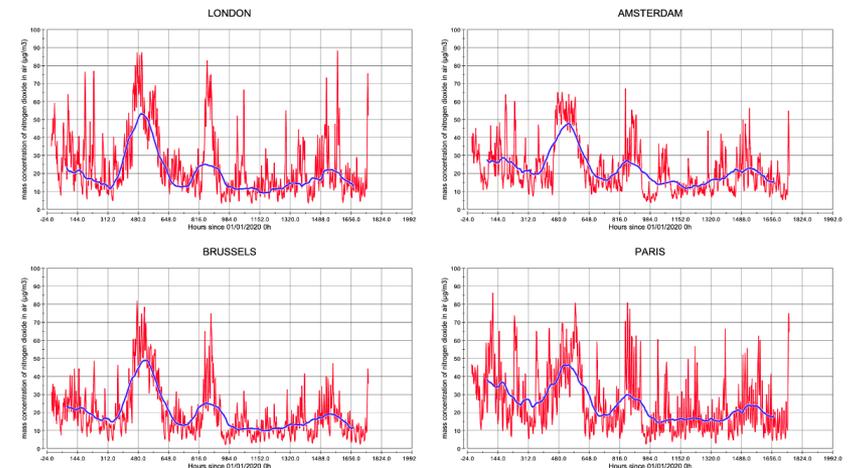
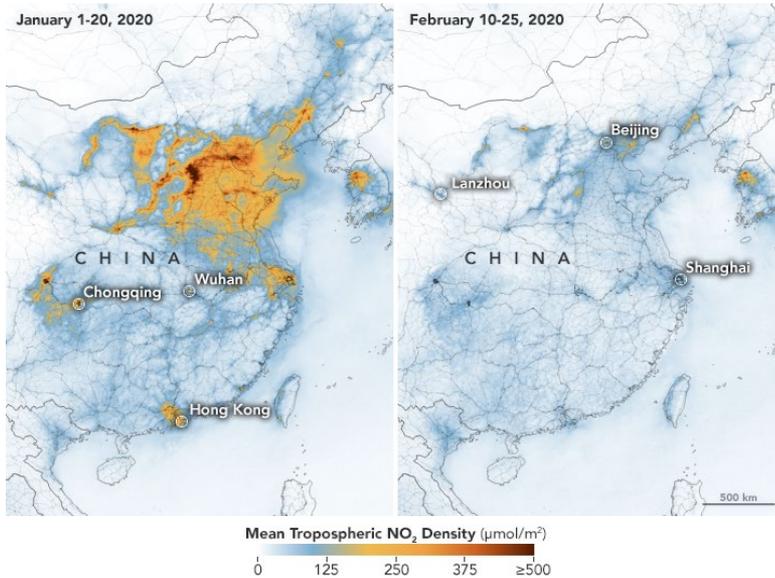
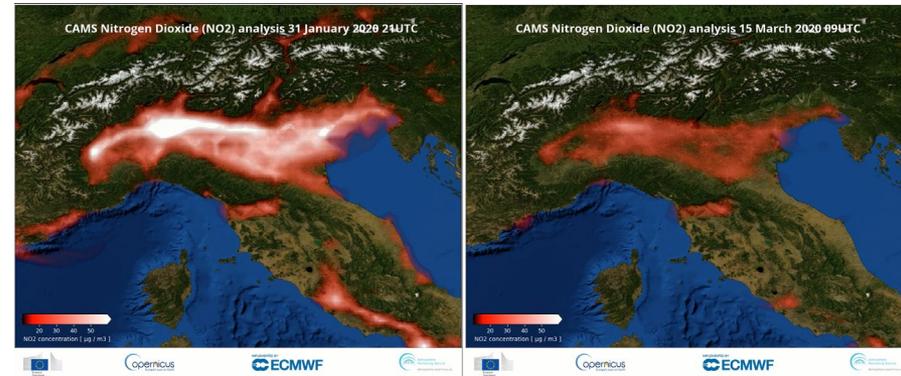
WMO Integrated Global Greenhouse Gas Information System (IG<sup>3</sup>IS) can be used to identify emission changes combining measurements and analysis.



# Impact on air pollution

The Copernicus Atmosphere Monitoring Service (CAMS)\* provides daily analyses of hourly concentrations of the regulatory air pollutants, which can serve as 'ground truth' to assess quantitatively and in more details the changes in concentrations identified from satellite and attributed to the effects of COVID-19 measures across the world.

Data from the Centre for Research on Energy and Clean Air (Crea) [shows](#) concentrations of fine particles (PM<sub>2.5</sub>) and nitrogen dioxide (NO<sub>2</sub>) across China are now at the same levels as one year earlier. At the height of the country's coronavirus response in early March, NO<sub>2</sub> levels were down by 38% from 2019 and levels of PM<sub>2.5</sub> were down by 34%.

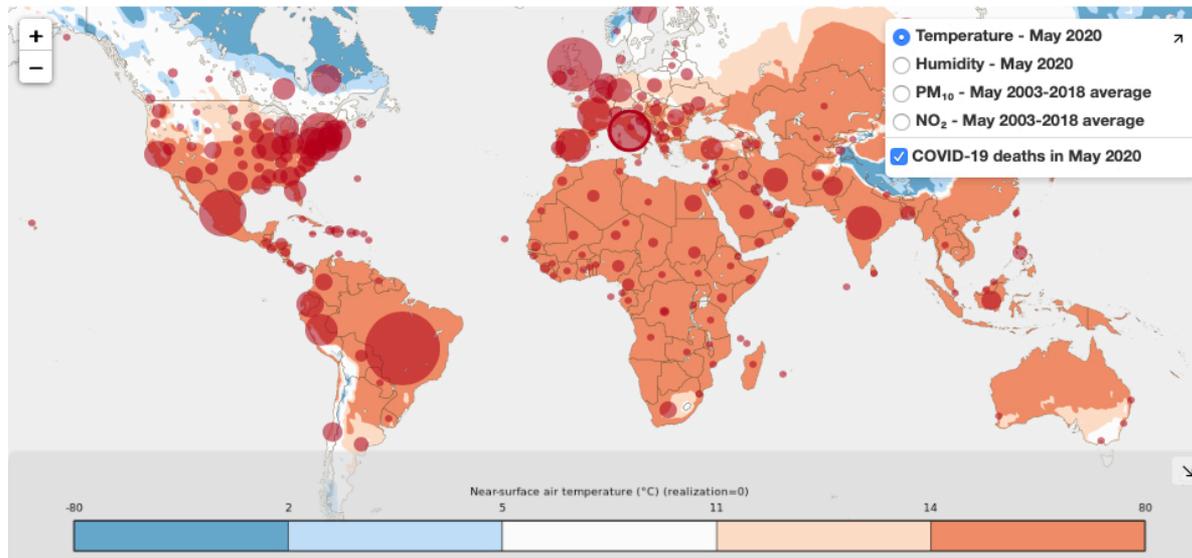


Weather-related episodes of high (between weeks 3 and 4; week 6) and low NO<sub>2</sub> surface concentrations are the main features that can be seen.

# Climate COVID-19 Links



- Requires a coordinated assessment of this potential association
- Too much speculative and misinformation out there.... but excellent resources as well e.g. <https://cds.climate.copernicus.eu/>



- There is growing evidence linking exposure to dirty air to increased risk of death from Covid-19, prompting calls to keep air pollution low to help avoid the dangers of a second wave of infection.

## What are the interactions of climate and COVID-19?

**Direct influence of climate on SARS-COV-2 transmission: NO**

Future seasonal patterns active area of research.

**Indirect impact on COVID-19 : YES**

- Socio-economic impacts increase vulnerability to climate extremes,
- Ambient and environmental conditions may aggravate symptoms,
- Result in co-morbidities of other climate-sensitive diseases (e.g seasonal influenza),
- Weather alters human behaviours that increase transmission

**Joint WHO/WMO Task Team: rapid review and coordination mechanism** to synthesize and review potential environmental linkages of the global COVID-19 pandemic; providing a platform to discuss, share, and strengthen interdisciplinary research partnerships

**Virtual “Global Symposium on the seasonal and environmental confounders of the COVID-19 pandemic”** , 4-6 August 2020

Department of Science and Innovations-South Africa, WMO , Future Earth, ISC, AGU, GEOHealth etc.

# Thank you



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