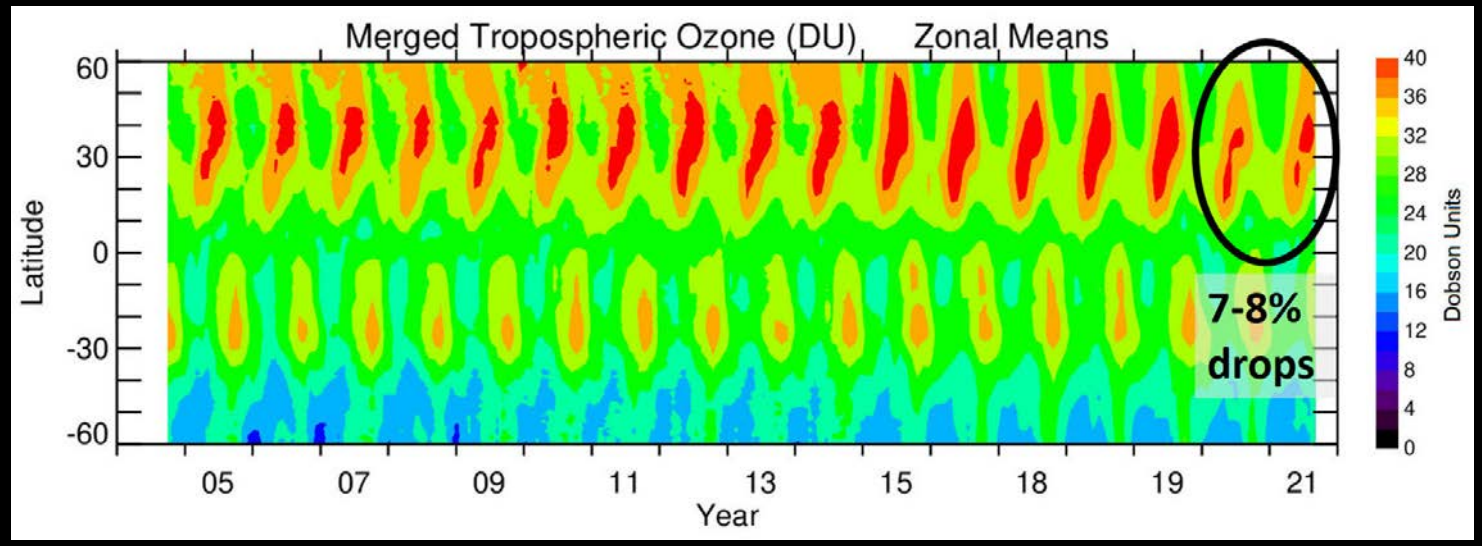
Reduced Human Activity During COVID Lockdowns Caused Decreases in Tropospheric Ozone

NASA Scientists using satellite ozone data (OMI, OMPS and EPIC) measured decreases in tropospheric ozone throughout the Northern Hemisphere during the spring-summer of 2020 and 2021. These ozone reductions were the lowest on record for the 2005–2021 time period.

The satellite data also exhibit smaller decreases in the Southern Hemisphere austral summer (December 2020–February 2021).



Stratospheric ozone column derived from MERRA-2 showing 7-8% drops in ozone

These unusual reductions in tropospheric ozone in the Northern Hemisphere are directly correlated with reductions in ozone precursors, including nitrogen dioxide (NO_2), during spring-summer 2020 and 2021. These decreases in NO_2, and subsequently ozone, are due to reduced human activities caused by lockdowns associated with the coronavirus pandemic.

The magnitude of tropospheric ozone reductions in 2020 and 2021 (~7-8%) is comparable to positive decadal trends observed in Northern Hemisphere tropospheric ozone since 2004.

Ziemke, J. R., N. A. Kramarova, S. M. Frith, L.-K. Huang, D. P. Haffner, K. Wargan, L. N. Lamsal, G. J. Labow, R. D. McPeters, and P. K. Bhartia, NASA satellite measurements show global-scale reductions in tropospheric ozone in 2020 and again in 2021 during COVID-19, Geophys. Res. Lett., 49, https://doi.org/10.1029/2022GL098712, 2022.