

Supplementary Information for:

An Arctic Ozone Hole in 2020 If Not For the Montreal Protocol

Catherine Wilka¹, Susan Solomon¹, Doug Kinnison², David Tarasick³

5 ¹Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA, USA

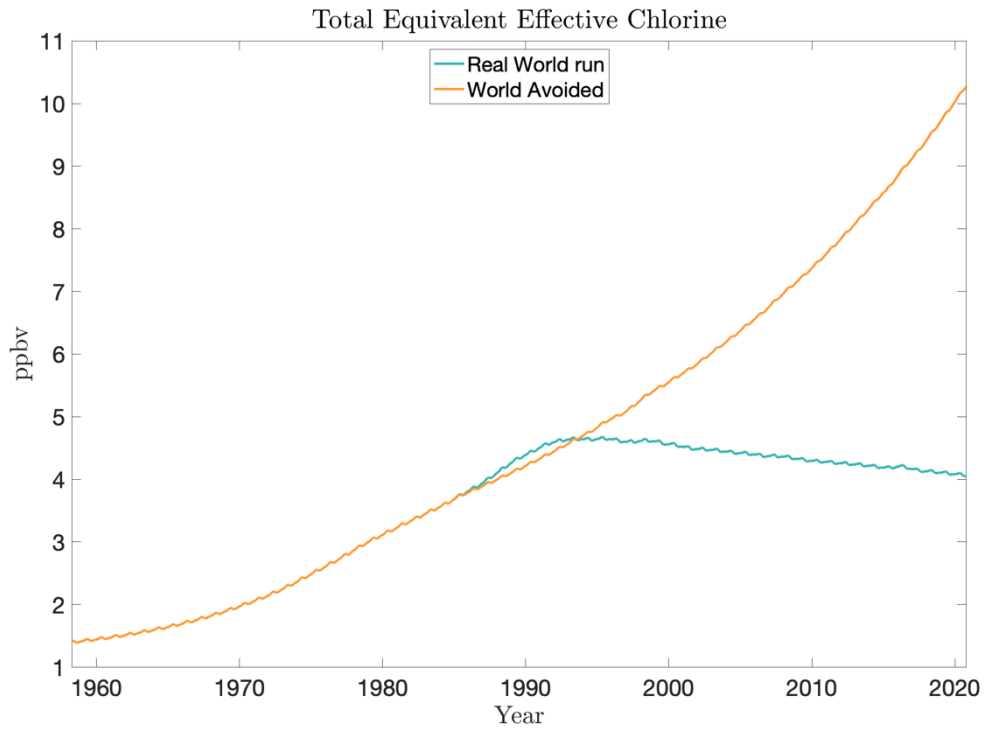
²Atmospheric Chemistry Division, National Center for Atmospheric Research, Boulder, CO, USA

³Environment and Climate Change Canada, Toronto, ON, Canada

Correspondence to: Catherine Wilka (cwilka@mit.edu)

10 **This Supplement Includes:**

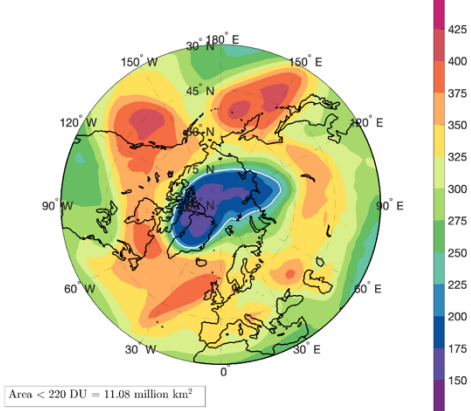
Figures S1 to S6



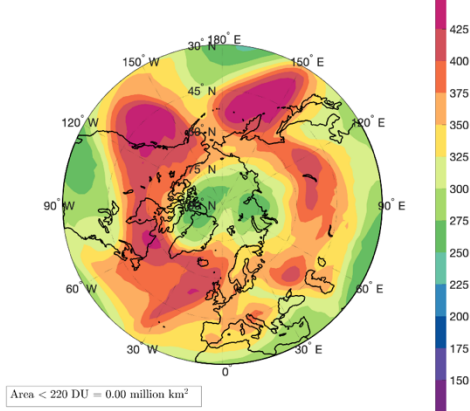
15

Figure S1. Evolution of Total Equivalent Effective Chlorine in ppbv, globally averaged, in the Real World run and the World Avoided. The two diverge beginning in 1985.

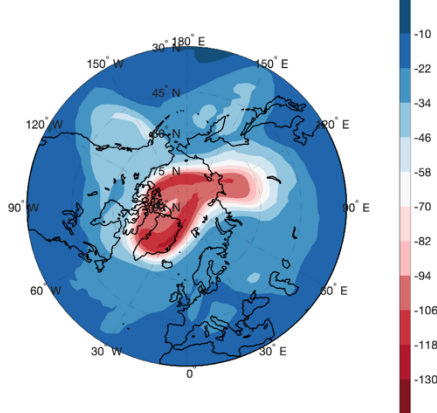
SD-WACCM Total Column O₃, World Avoided, 17-Mar-2011



SD-WACCM Total Column O₃, Real World, 17-Mar-2011



SD-WACCM Total Column O₃, WA - RW, 17-Mar-2011



OMI Total Column O₃, 17-March-2011

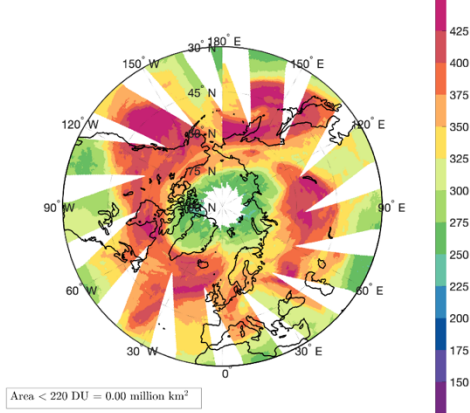
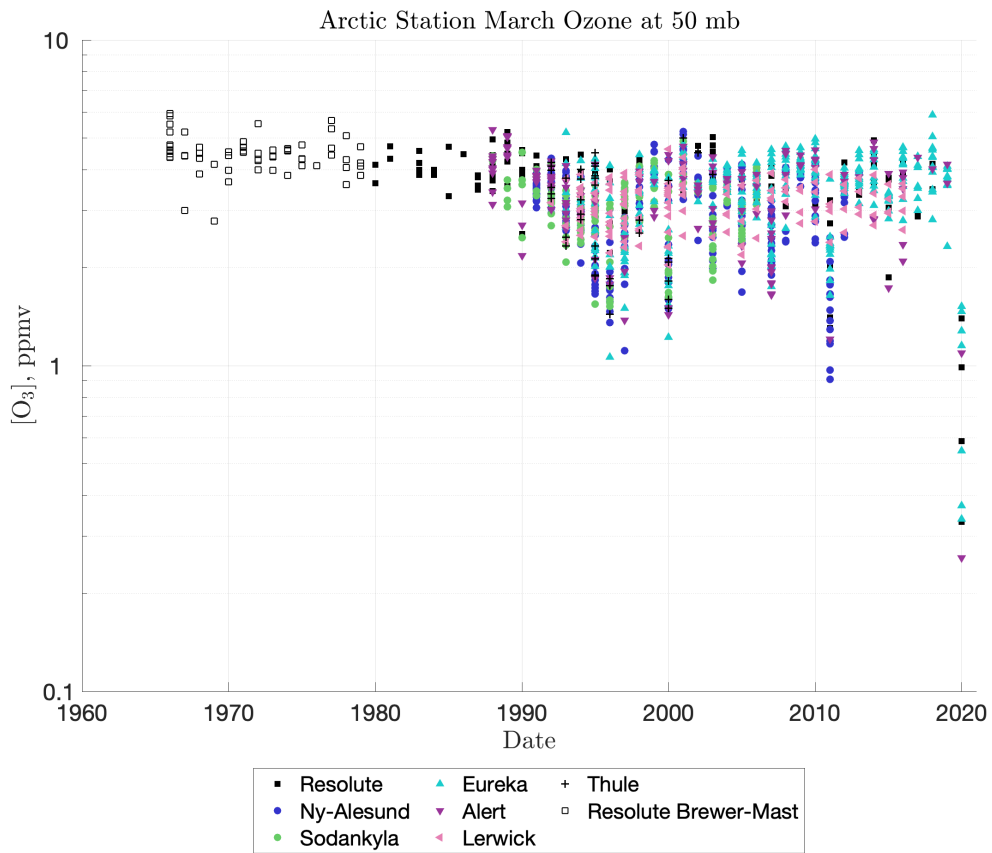
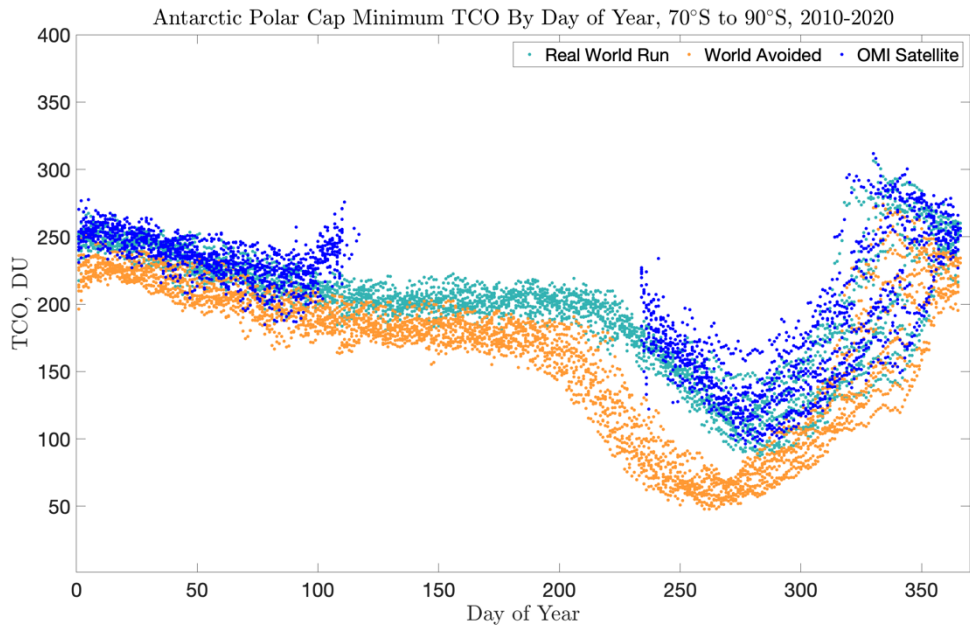


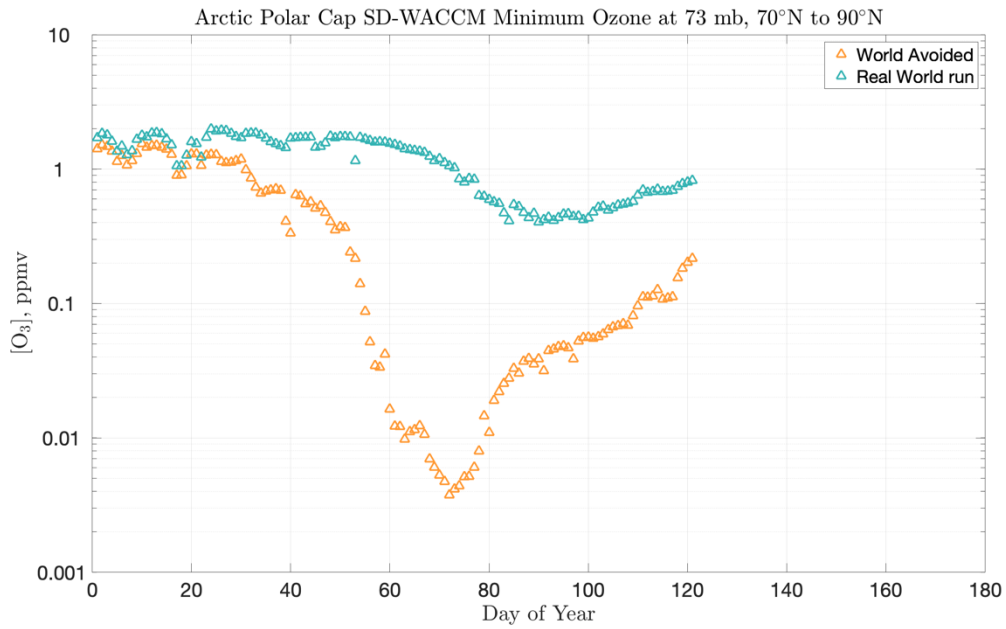
Figure S2. As for Figure 1, but for 2011.



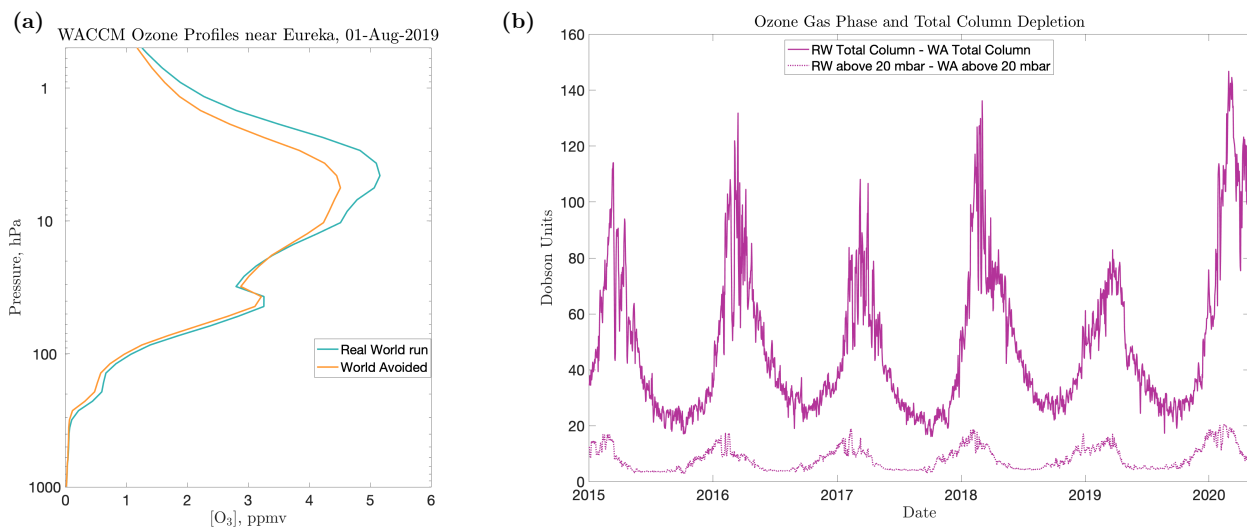
25 **Figure S3.** As for the left panel of Figure 2, but in log-scale.



30 **Figure S4.** As for Figure 4, but for the Antarctic.



35 **Figure S5.** Minimum ozone across the polar cap (70° N- 90° N, all longitudes) for each day in 2020 for Real World (teal) and World Avoided (orange) runs in SD-WACCM at 73 mb.



40 **Figure S6. (a)** Comparison between the Real World and World Avoided profiles in SD-WACCM at the model gridpoint nearest to Eureka station for August 1st, 2019. Note the y-axis goes to lower pressures than the profiles in Figures 2 and 5. **(b)** Comparison between the total column ozone depletion and the partial column ozone depletion at altitudes above 20 mb in the Real World vs World Avoided runs.