**Data sets used in the analysis presented in the manuscript** “A New Method for Assessing the Efficacy of Emission Control Strategies to Comply with the Ambient Ozone Standard”

The modeled datasets used for the analysis presented in this manuscript were provided by researchers in EPA/ORD/NERL/CED. In particular, the EPA/ORD/NERL/CED researchers provided surface mixing ratios for daily maximum 8-hr average ozone observations and WRF/CMAQ model output for two sets of simulations:

* 1990 – 2010 simulations performed at 36 km horizontal resolution over the contiguous U.S.. The data for these simulations were provided in 12 monthly files for each of the 21 years, i.e. 252 individual files.
* 2010 simulations performed at 12 km horizontal resolution over the contiguous U.S. for a base case scenario and a scenario with emissions and boundary conditions reflecting a 20% reduction in anthropogenic emissions. The data for these simulations were provided in 12 monthly files for each scenario, i.e. 24 individual files.

Each of the monthly files is formated as comma-separated value (csv) ASCII format and contains paired observed and model simulated daily maximum 8-hr average ozone mixing ratios at all stations for which monitoring data were available during that month. The first six lines of each file contain header information.

The data column in the files are as follows:

Column 1: “state” – two-character ID of the state containing the monitor

Column 2: “county” – three-character ID of the county containing the monitor

Column 3: “site” – four-character ID of the site at which the monitor is located

Column 4: “Longitude” – longitude (in degrees) of the monitor site location

Column 5: “Latitude” – latitude (in degrees) of the monitor site location

Column 6: “column” – integer indicating the model grid cell column containing the monitor

Column 7: “row” – integer indicating the model grid cell row containing the monitor

Column 8: “date” – date (mm/dd/yyyy) of the observed and modeled values

Column 9: “O3\_1hrmax” – observed daily maximum 1-hr ozone in ppb

Column 10: “O3\_1hrmax\_time” – hour when the observed daily maximum 1-hr ozone occurred

Column 11: “O3\_1hrmax” – WRF/CMAQ daily maximum 1-hr ozone in ppb

Column 12: “O3\_1hrmax\_9cell” – WRF/CMAQ daily maximum 1-hr ozone in ppb, considering the grid cell containing the monitor as well as the surrounding eight grid cells

Column 13: “O3\_8hrmax” – observed daily maximum 8-hr average ozone in ppb

Column 14: “O3\_8hrmax\_time” – hour when the observed daily maximum 8-hr average ozone occurred

Column 15: “O3\_8hrmax” – WRF/CMAQ simulated daily maximum 8-hr average ozone in ppb

Column 16: “O3\_8hrmax\_9cell” – WRF/CMAQ daily maximum 8-hr average ozone in ppb, considering the grid cell containing the monitor as well as the surrounding eight grid cells

Column 17: “W126” – cumulative W126 exposure index calculated from observations in ppm-hours

Column 18: “W126” – cumulative W126 exposure index calculated from WRF/CMAQ simulations in ppm-hours

Only the data contained in columns 4, 5, 13 and 15 was used in the analysis presented in this manuscript.

For the first set of simulations (1990 – 2010 at 36km horizontal resolution), the 252 individual monthly files are named “AQS\_Daily\_DOE\_CONUS36\_SF\_RERUN.csv” in folders named “YYYYMM” indicating a four digit year (1990 – 2010) and a two digit month (01 – 12).

For the second set of simulations (2010 at 12km horizontal resolution for both the base case and the sensitivity scenario described above), the 24 individual monthly files are named “AQS\_Daily\_AQMEII3\_BASE.csv” and “AQS\_Daily\_AQMEII3\_BC\_GLO\_EM\_GLO.csv” in folders named “MM” indicating a two digit month (01 – 12).

**Original WRF/CMAQ Model Data**

The data from the original WRF/CMAQ model simulations from which the attached data were extracted are very large (several terabytes) and cannot be uploaded to ScienceHub due to size restrictions. These original WRF/CMAQ model simulations are stored on the /asm archival system accessible through the atmos high-performance computing system. Due to data management policies, files on /asm are subject to expiry depending on the template of the project. Files not requested for extension after the expiry date are deleted permanently from the system. The format of the files used in this analysis and listed below is ioapi/netcdf. Documentation of this format, including definitions of the geographical projection attributes contained in the file headers, are available at https://www.cmascenter.org/ioapi/documentation/3.1/html/AA.html

1. **Meteorological and Air Quality Variables for the First Set of Simulations**

Files with gridded hourly air quality and meteorological variables used in the analysis are available for each hour for the 1990 – 2010 time period and are organized in 252 individual files, one for each month. The horizontal resolution of the files is 36 km on a Lambert Conformal projection. In all file names listed below, {YYYY} is the year (1990 – 2010), and {MM} is the two-digit month (01 – 12)

For 1990 – 1994, the monthly files are:

/asm/css/DOE\_20years/36km/{YYYY}/CCTM\_DOE\_36km\_SF\_combine.aconc.{YYYY}{MM}

For 1995 – 2000, the monthly files are:

/asm/css/DOE\_20years/36km/{YYYY}/CCTM\_DOE\_36km\_SF\_RERUN\_combine.aconc.{YYYY}{MM}

1. **Meteorological and Air Quality Variables for the Second Set of Simulations**

WRF Meteorological Input Files to CMAQ

/asm/MOD3APP/met/MCIP\_v4.1.3/WRF\_2010\_35aL/12US1\_wetlands100/mcip\_out

Emission Input Files to CMAQ

/asm/MOD3EVAL/E21/smoke\_out/2007ed\_10/12US1/cmaq\_cb05\_soa

/asm/css/AQMEII3/EMIS/anthro20

EPIC Input Files to CMAQ

/asm/eni/output4CMAQ/app/toCMAQ/2010

Boundary Condition Input Files to CMAQ

/asm/css/MACC/icbcs/bctr\_12km\_MACC\_AQMEII3\_2010${MM}.ioapi where {MM} is the two-digit month (01 – 12)

/asm/css/MACC/icbcs/bctr\_12km\_MACC\_AQMEII3\_GLO\_2010${MM}.ioapi where {MM} is the two-digit month (01 – 12)

CMAQ Output Files

/asm/css/AQMEII3/BASE/Outputs (base case simulation)

/asm/css/AQMEII3/BC\_BASE\_EM\_GLO/Outputs (20% emission reduction simulation)