PHILOSOPHICAL TRANSACTIONS A

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Supporting Information for Tropospheric Ozone Assessment Report, Phase II: Changing Health Impacts of Global Ozone Exposure

Gaige Hunter Kerr[1*], Kofi Amegah[2†], Lulu Chen[1†], James L. Crooks[3,4†], Drew Shindell[5†], Dimitris Akritidis[6,7], Karn Vohra[8], Susan C. Anenberg[1], Chris Carlsten[9], Forrest Lacey[10], Soo-Yeon Kim[1], Jintai Lin[11], M. Omar Nawaz[12], Pallavi Pant[13], Andrea Pozzer[7,14], Louis Rivoire[15], Erika von Schneidemesser[16], Martin G. Schultz[17,18], Steven T. Turnock[19], Shuxiao Wang[20,21], J. Jason West[22], YingYing Yan[23]

[1]*Department of Environmental and Occupational Health, George Washington University, Washington, DC, United States of America, 0000-0001-8869-0752*
[2]*Department of Biomedical Sciences, University of Cape Coast, Accra, Ghana, 0000-0001-5868-6402*
[3]*Division of Biostatistics and Bioinformatics, National Jewish Health, Denver, Colorado, United States of America, 0000-0002-0021-5701*
[4]*Department of Epidemiology, Colorado School of Public Health, Aurora, Colorado, United States of America*
[5]*Nicholas School of the Environment, Duke University, Durham, North Carolina, United States of America, 0000-0003-1552-4715*
[6]*Department of Meteorology and Climatology, School of Geology, Aristotle University of Thessaloniki, Thessaloniki, Greece, 0000-0003-3104-5271*
[7]*Atmospheric Chemistry Department, Max Planck Institute for Chemistry, Mainz, Germany, 0000-0003-2440-6104*
[8]*School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, UK, 0000-0001-6570-0663*
[9]*Division of Respiratory Medicine, Faculty of Medicine, University of British Columbia, Vancouver, BC V5Z 1M9, Canada, 0000-0003-2455-6575*
[10]*National Science Foundation National Center for Atmospheric Research, Boulder, CO, United States of America, 0000-0003-4578-8375*
[11]*Laboratory for Climate and Ocean-Atmosphere Studies, Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University, 0000-0002-2362-2940*
[12]*School of Earth and Environmental Sciences, Cardiff University, Cardiff, CF10 3AT, United Kingdom, 0000-0001-7706-7287*
[13]*Health Effects Institute, Boston, MA, 02110, United States of America, 0000-0003-0251-6580*
[14]*Climate and Atmospheric Research Center, The Cyprus Institute, Nicosia, 2121, Cyprus*
[15]*Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA, 02139, United States of America, 0000-0002-3030-7922*
[16]*Research Institute for Sustainability (RIFS) at GFZ, Potsdam, Germany, 0000-0003-1386-285X*
[17]*Jülich Supercomputing Centre (JSC), Forschungszentrum Jülich, Jülich, Germany, 0000-0003-3455-774X*
[18]*Department of Mathematics and Computer Science, University of Cologne, Germany*
[19]*Met Office Hadley Centre, Exeter, United Kingdom, 0000-0002-0036-4627*

*Author for correspondence (gaigekerr@gwu.edu).
†Denotes lead authors, as defined by the Tropospheric Ozone Assessment Report, Phase II

[20]*State Key Laboratory of Regional Environment and Sustainability, School of Environment, Tsinghua University, Beijing 100084, China*
[21]*Key Laboratory of Sources and Control of Air Pollution Complex, Ministry of Ecology and Environment, Beijing 100084, China*
[22]*Department of Environmental Sciences and Engineering, Gillings School of Global Public Health, University of North Carolina, Chapel Hill, North Carolina, United States of America, 0000-0001-5652-4987*
[23]*Department of Atmospheric Science, School of Environmental Sciences, China University of Geosciences, Wuhan, China, 0009-0006-2270-0229*

Text S1

The absence of *in-situ* O_3 data from a given country in the TOAR-II Database reflects a combination of factors. First, some countries do not operate quality-controlled monitoring networks due to cost, logistical, or other constraints; where low-cost sensor networks have recently been established, these were excluded from the Database per a TOAR steering committee decision. Second, in some countries monitoring is organized at the regional level with no centralized data collection effort, making it impossible to obtain records given the resource constraints of TOAR as an unfunded, bottom-up initiative. Third, some countries operate monitoring networks and provide real-time data via public websites, but do not provide public access to the quality-controlled data required for TOAR assessments; in some cases data access was negotiated directly, but resource constraints limited how many such cases could be pursued. Fourth, some countries were willing to share data for a specific analysis involving in-country scientists but were not willing to provide open-access data redistributable via the TOAR data infrastructure. Fifth, in some countries the CC-BY 4.0 license was unfamiliar to agency contacts or approval responsibilities were unclear, preventing working-level staff from obtaining management authorization for data sharing under these terms.

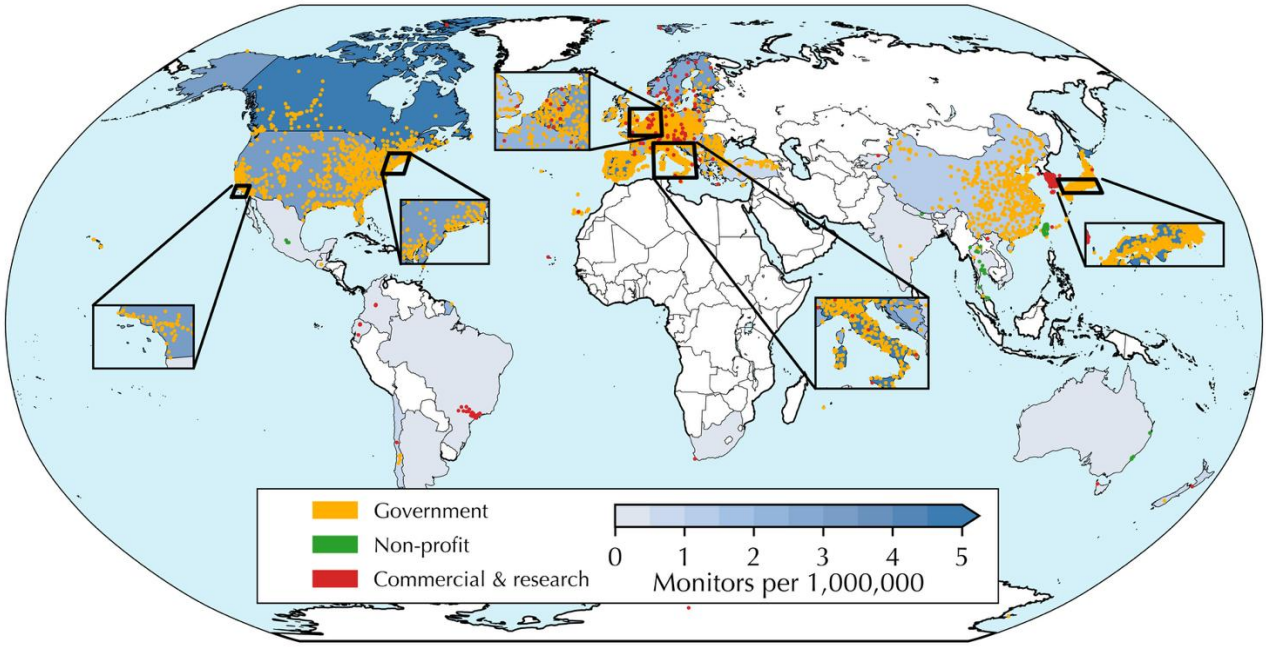


Figure S1. Location of in-situ, surface-level O_3 monitors by type. *Monitors shown in the global and regional maps are those included in the TOAR-II Database and which meet the inclusion criteria for our assessment (≥ 3 years of valid data from 2016-2020). Monitors are colored by their type, and the "Commercial & Research" category also includes university-operated monitors. Multiple sites could be overlaid. Shading shows the number of monitors per 1,000,000 people using national-level 2020 population estimates from the UN World Population Prospects, and countries shaded in white have no monitors in the Database that meet inclusion criteria.*

Figure S2. Spatial variations in station-level ozone season daily maximum 8-hour mixing ratio (OSDMA8) O_3. *Observations represent median 2016-2020 OSDMA8 concentrations.*

Figure S3. Same as Figure S2 but for annual average daily maximum 8-hour mixing ratio (DMA8) O_3.

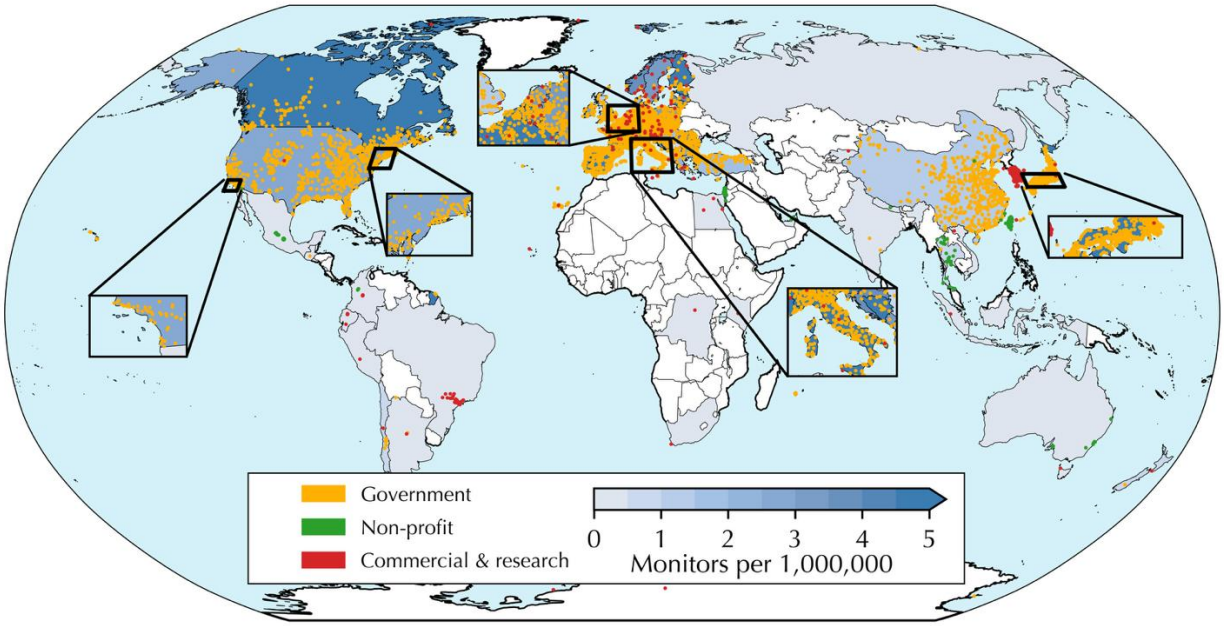


Figure S4. Location of in-situ, surface-level O_3 monitors by type with relaxed inclusion criteria.
Interpretation follows Figure S1 but the TOAR-II period inclusion criteria was relaxed from ≥ 3 years of valid data from 2016-2020 to 1 year. Multiple sites could be overlaid.

Figure S5. Density of in-situ surface-level O_3 monitors and observed O_3 concentrations with relaxed inclusion criteria. *Interpretation follows Figure 2 in the main text but the TOAR-II period inclusion criteria was relaxed from ≥ 3 years of valid data from 2016-2020 to 1 year.*

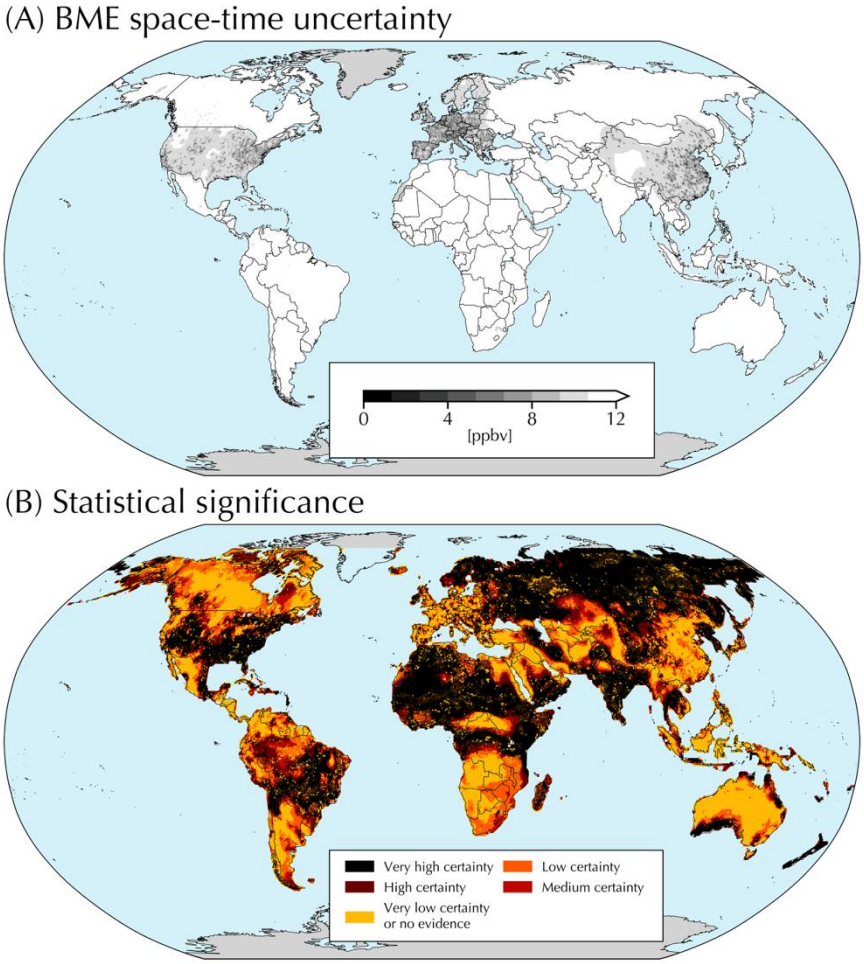


Figure S6. *(A) The BME-estimated space-time uncertainty of 2016-2020 OSDMA8. For ease of interpretation, the dataset's native aggregated variance (ppbv^2) was converted to standard deviation (ppbv). (B) The statistical significance of trends shown in (B), based on TOAR-II categories (Section 4). The BME dataset does not estimate O_3 outside of approximately -56˚S to 75˚N, and land masses outside of these latitudes are shaded in grey.*

Figure S7. Trends in station-level ozone season daily maximum 8-hour mixing ratio (OSDMA8) O_3. *Trends are fit through 2000-2020 OSDMA8 concentrations using median quantile regression.*

Figure S8. Same as Figure S7 but for annual average daily maximum 8-hour mixing ratio (DMA8) O_3.

Figure S9. O_3-attributable premature mortality rates from the GBD Study 2021. *Interpretation follows Figure 5 in the main text, but time series represent regional O_3-attributable premature mortality rates formed by weighting national-level rates by national-level population for all countries in each GBD-designated region.*