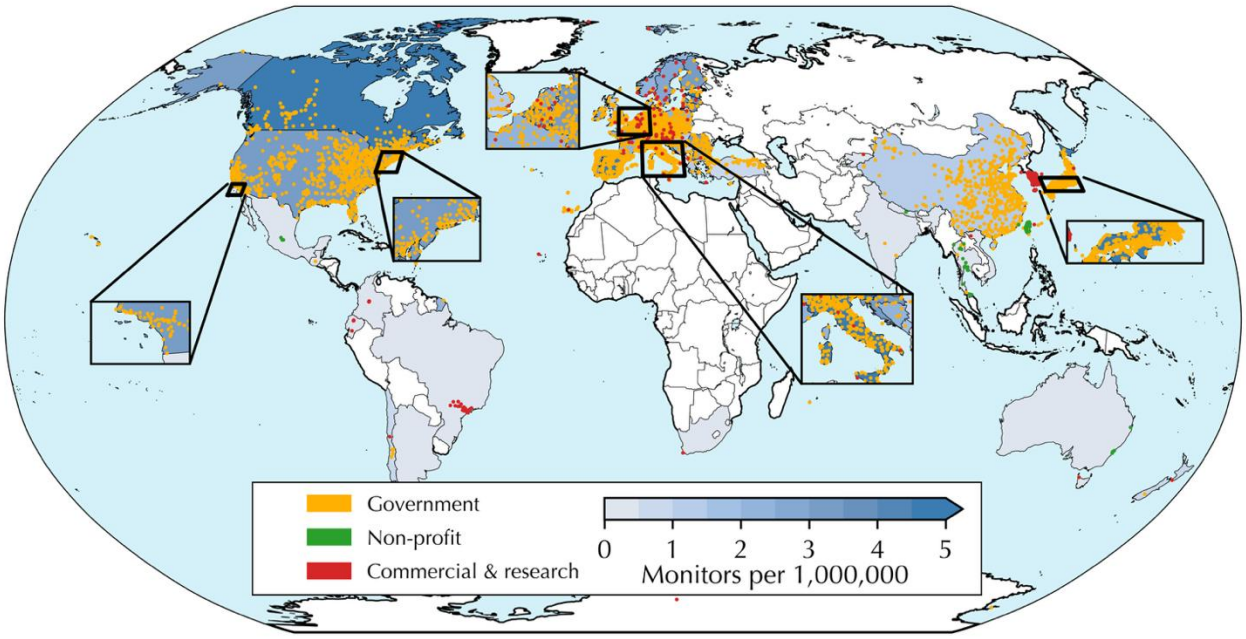
Supplementary material for Kerr et al., 2026, Tropospheric Ozone Assessment Report, Phase II: Changing Health Impacts of Global Ozone Exposure, *Phil. Trans. R. Soc. A.* doi: 10.1098/rsta.2025.0268

1 Barriers to data inclusion in the TOAR-II Database

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.

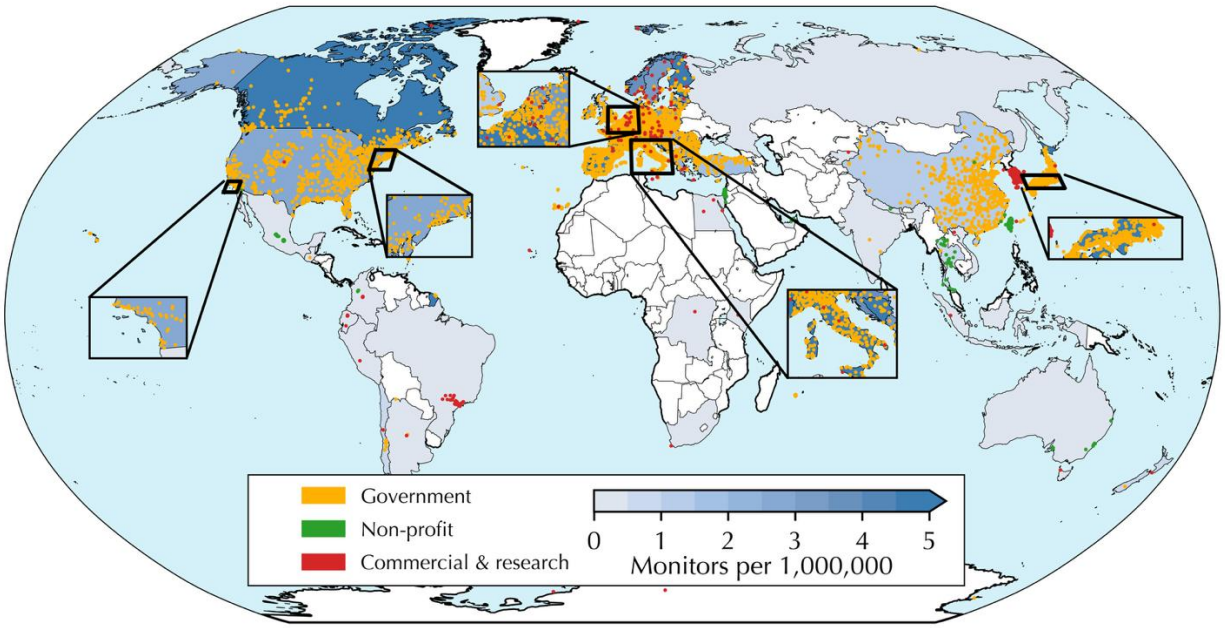
2 Supplementary Figures



Supplementary Figure 1. 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.

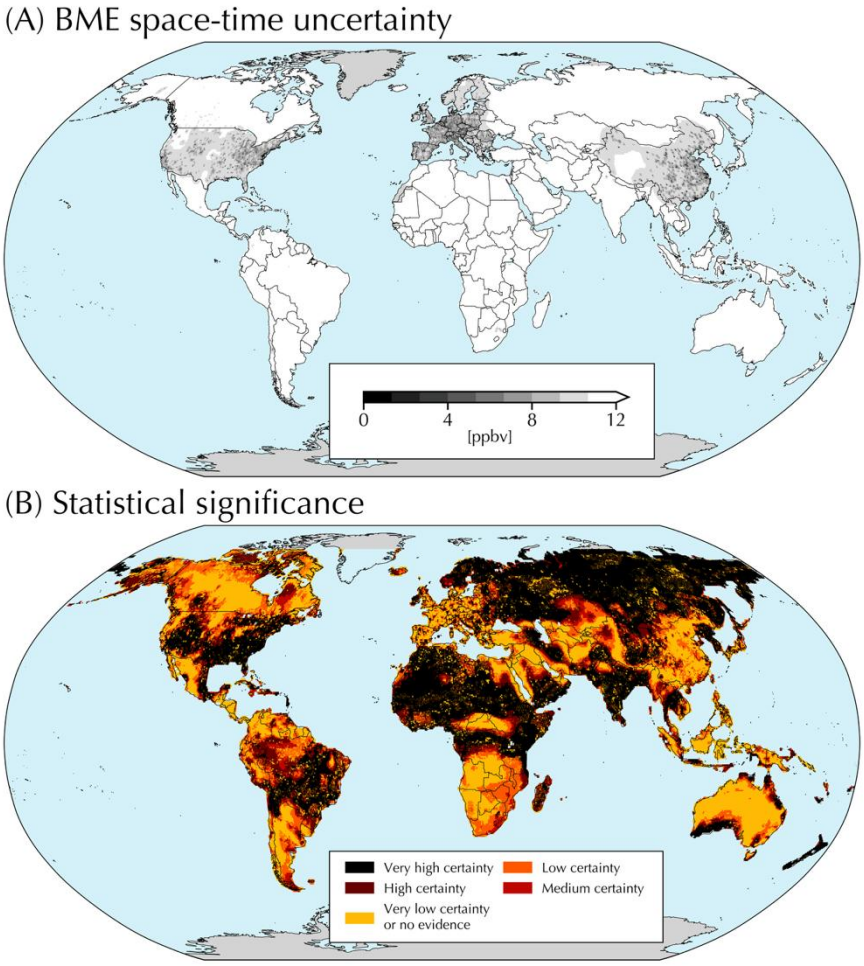
Supplementary Figure 2. Spatial variations in station-level ozone season daily maximum 8-hour mixing ratio (OSDMA8) O_3. Observations represent median 2016-2020 OSDMA8 concentrations.

Supplementary Figure 3. Same as Supplementary Figure 2 but for annual average daily maximum 8-hour mixing ratio (DMA8) O_3.



Supplementary Figure 4. Location of in-situ, surface-level O_3 monitors by type with relaxed inclusion criteria. Interpretation follows Supplementary Figure 4 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.

Supplementary Figure 5. 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.



Supplementary Figure 6. (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.

Supplementary Figure 7. 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.

Supplementary Figure 8. Same as Supplementary Figure 7 but for annual average daily maximum 8-hour mixing ratio (DMA8) O_3.

Supplementary Figure 9. 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.

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