1.076 A Global assessment of Ozone Trends relevant to Human Health: Results from the Tropospheric ozone Assessment Report IGAC activity.

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Abstract:

We quantify present-day (2000-2014) global and regional trends for five ozone metrics relevant for short-term and long-term human exposure, calculated by IGAC's

Tropospheric Ozone Assessment Report. Most of these metrics are associated with regulatory standards to protect human health from ozone exposure, and are derived on the basis of clinical, epidemiological and cohort studies. The five metrics are: the 4th highest MDA8 (4MDA8); number of days per year with MDA8 > 70 ppb (NDGT70); annual sum of ozone means over 35 ppb (SOMO35); annual maximum of the 3-month running mean of daily 1-hour ozone (3MMDA1); and the warm season average MDA8 (AVGMDA8). We explore trends in these metrics at 2,600 ozone monitoring sites worldwide, which were classified as urban or non-urban based on population and nighttime lights data. Over this period we find significant positive trends in 4MDA8 and NDGT70, determined predominantly by peak ozone concentrations, at many sites in South Korea and Hong Kong, with mixed trends across Japan. In contrast, significant negative trends occur at many USA and some European sites. The other three metrics have similar, positive trends across much of East Asia, and negative trends for many non-urban North American and some European and Japanese sites. Generally, trends are unchanged at many sites when a 1995-2014 period is used; although some urban sites in Europe and Japan that have a non-significant 2000-2014 trend, have a significant 1995-2014 positive trend. We also examine 1970-2014 trends (much fewer sites) for two metrics: 4MDA8 and SOMO35. Over this longer period, more sites in North America have significant downward trends, whilst more urban sites in Europe show significant trends than in 2000-2014. For Japan, differences are more apparent, whereby most sites exhibit significant positive trends. Insufficient data exist to characterise trends for the rest of Asia and other world regions.