Global Ozone Trends: First Results from the Tropospheric Ozone Assessment Report (TOAR)

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Tropospheric ozone is a greenhouse gas and pollutant detrimental to human health and crop and ecosystem productivity. Since 1990 a large portion of the anthropogenic emissions that react in the atmosphere to produce ozone have shifted from North America and Europe to Asia. This rapid shift, coupled with limited ozone monitoring in developing nations, has left scientists unable to answer the most basic questions: Is ozone continuing to decline in nations with strong emission controls? To what extent is ozone increasing in the developing world? IGAC's Tropospheric Ozone Assessment Report (TOAR) has been designed to answer these questions and this presentation will show the first results from the TOAR-Climate initiative, summarizing global trends of tropospheric ozone, but focusing on regions where observations are the most developed: North America, Europe and East Asia. In this study, *in situ* ground-based instruments, the In-service Aircraft for a Global Observing System (IAGOS), ozonesondes and lidar are combined to provide an up-to-date picture of tropospheric ozone changes from the surface to the tropopause since the 1990s.

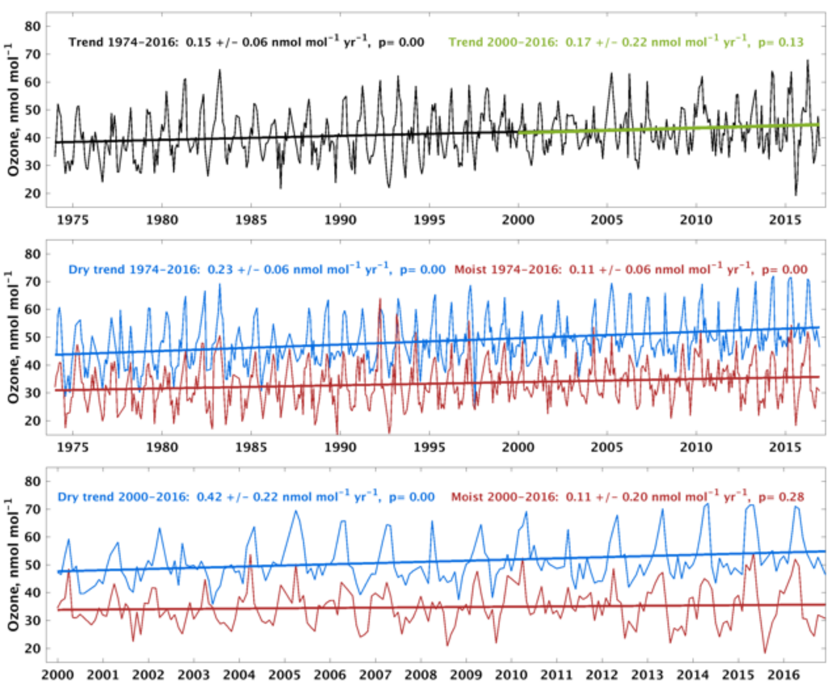

Figure 1. a) Nighttime monthly median ozone values at Mauna Loa Observatory calculated with all available data for months with at least 50% data availability, January 1974 – December 2016. b) Same as in a) but for data split into dry (dewpoint less than the climatological monthly 40th percentile) and moist (dewpoint greater than the climatological monthly 60th percentile) categories. A dry or moist category in any given month must have a sample size of at least 24 individual hourly nighttime observations. c) As in b) but for 2000-2016.