

Causes of Changing Air Quality and Climate: Current Understanding & Relevant Issues
Michael Prather, University of California Irvine

An overview of the components that drive climate change and air quality on a hemispheric scale. Many trace gases and aerosols alter the photochemistry of the atmosphere, and hence their anthropogenic emissions can subsequently change the global abundances of greenhouses including tropospheric ozone. A brief analysis is given of the chemical mechanisms that couple short-lived criteria pollutants (NO_x, CO, VOC, aerosols) to global changes in climate forcing (CH₄, O₃) and air quality (O₃). The link with aerosols - through photolysis rates and heterogeneous chemistry on a global scale - has been recently studied (Martin et al; Bian et al). Recent work has studied the relationship between urban pollution and global change in both directions: e.g., Fiore et al examine factors controlling global-scale changes leading to AQ exceedances; Wild et al study the balance between local AQ and export of O₃ as a hemispheric greenhouse gas. The last IPCC (TAR, 2001) and post-TAR research are reviewed. The SRES scenarios painted a rather grim picture of increasing surface ozone abundances over most of the northern hemisphere during the 21st century. Corrected SRES emissions of criteria pollutants to 2030 (Dentener et al) projects much slower growth in CH₄ and O₃. Currently, a consortium of post-TAR CTMs is being used for these IPCC-AR4 alternative scenarios to look at greenhouse gas forcing and AQ exceedances such as AOT40, and now include coupling with projected climate change.

Air Pollution as Climate Forcing: A Second Workshop
April 4-6, 2005 at East-West Center, Honolulu