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Changing distributions of carbon monoxide (CO) over Africa from climate and land use driven fire patterns

Helen Worden (1), Anthony Bloom (2), and John Worden (2)

(1) National Center for Atmospheric Research, Atmospheric Chemistry Observations and Modelling Laboratory, Boulder, United States (hmw@ucar.edu), (2) Jet Propulsion Laboratory/CalTech University, Pasadena, United States

Satellite measurements of atmospheric carbon monoxide (CO) provide a signature for biomass burning and anthropogenic combustion-related pollution emissions. CO plays an important role in both air quality and climate as a precursor for tropospheric ozone and as a major sink of OH, the atmospheric "detergent" that affects the lifetime of methane and other pollutants. Worden et al., [2013] showed decreasing global CO values in time series of satellite total column CO measurements over the past decade. All of the satellite instruments that measure CO in the thermal infrared showed consistent inter-annual variability due to fires and possibly the global recession in late 2008. Observed decreases in CO over N. America and Europe were consistent with expected decreases in CO emissions inventories [Granier et al., 2011], however, the decrease is not uniform globally. In particular, some regions of Africa show negligible trends in CO. Here we examine the 14-year time series (2002-2015) of surface and total column CO concentrations from MOPITT and fire radiative power (FRP) from MODIS over Africa to study the attribution of changes in CO. We are interested in changes in fires due to climate variability (El Nino) and land-use, including urbanization, and their effect on atmospheric CO burden.