Geophysical Research Abstracts
Vol. 17, EGU2015-8348, 2015
EGU General Assembly 2015

Evolution of aerosol loading in Santiago de Chile between 1997 and 2014

Kristina Pistone (1) and Laura Gallardo (2)

(1) United States (kristina.pistone@fulbrightmail.org), (2) Center for Climate Resilience and Research, Universidad de Chile, Santiago, Chile (lgallard@u.uchile.cl)

While aerosols produced by major cities are a significant component of anthropogenic climate forcing as well as an important factor in public health, many South American cities have not been a major focus of aerosol studies due in part to relatively few long-term observations in the region. Here we present a synthesis of the available data for the emerging megacity of Santiago, Chile. We report new results from a recent NASA AERONET (AErosol RObotic NETwork) site in the Santiago basin, combining these with previous AERONET observations in Santiago as well as with a new assessment of the 11-station air quality monitoring network currently administered by the Chilean Environment Ministry (MMA, Ministerio del Medio Ambiente) to assess changes in aerosol composition since 1997. While the average surface concentration of pollution components (specifically PM2.5 and PM10) has decreased, no significant change in total aerosol optical depth was observed. However, changes in aerosol size and composition are suggested by the proxy measurements.
Previous studies have revealed limitations in purely satellite-based studies over Santiago due to biases from high surface reflection in the region, particularly in summer months (e.g. Escribano et al 2014). To overcome this difficulty and certain limitations in the air quality data, we next incorporate analysis of aerosol products from the Multi-angle Imaging SpectroRadiometer (MISR) instrument along with those from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument, both on NASA's Terra satellite, to better quantify the high bias of MODIS. Thus incorporating these complementary datasets, we characterize the aerosol over Santiago over the period 1997 to 2014, including the evolution of aerosol properties over time and seasonal dependencies in the observed trends.

References: Escribano et al (2014), "Satellite Retrievals of Aerosol Optical Depth over a Subtropical Urban Area: The Role of Stratification and Surface Reflectance," Aerosol and Air Quality Research, doi:10.4209/aaqr.2013.03.0082.