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Columnar aerosol optical properties at AERONET sites in northern, central and southern Mexico

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The column-integrated optical properties of aerosol in the north, central and southern Mexico were investigated based on Sun/sky radiometer measurements made at Aerosol Robotic Network (AERONET) sites. Characterization of aerosol properties in these Mexico regions is important due to natural and anthropogenic significant events that occurred: dust storms from Sonora desert, biomass burning from south forest areas and urban/industrial from Mexico City due to the increases in fossil fuel combustion. Some cities in northern Mexico located near desert areas are affected by the dust from Sonora and Chihuahua deserts. These particles are suspended in the atmosphere due to strong wind activity that creates dust storms. In the central part of the Mexican territory, urban air pollution is one of the biggest problems. Mexico City is the most important urban area that face seriously environmental problem generated by daily anthropogenic emissions from activities of some 21 million people and the vast amount of industry. On the other hand, biomass burning in the Yucatan Peninsula, Southern Mexico, and Guatemala is an important source of anthropogenic aerosol in the troposphere (Crutzen and Andrade, 1990). The pollution from these fires affects air quality locally and is transported over the Gulf of Mexico to the United States (Wang et al., 2006).

The aim of this work is to study the optical properties of different types of aerosols by analyzing a 5-year (2005–2010) data set from AErosol RObotic NETwork (AERONET). Time series of Angstrom exponent (α) and aerosol optical depth (τ) in 7 wavelengths from 340 to 1020 nm are shown. Additionally, a graphical framework to classify aerosol properties using direct sun-photometer observations in the different regions of Mexico is presented. That aerosol classification was made by applying the method described by Gobbi et al (2007), which relies on the combined analysis of α and its spectral curvature $\delta\alpha$.