An Improved Methodology to Calculate the Aerosol Scattering Coefficients for the El Paso-Juarez Airshed.

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An improved methodology for calculating the light scattering from aerosol particles is presented.

The methodology is applied in the El Paso-Juarez Airshed, where the two main aerosol components are mineral dust and soot. The El Paso-Juarez metropolitan area is within the Chihuahuan desert, therefore mineral dust is a major aerosol contributor to the region. We use the T-matrix model to calculate the scattering cross sections from the aerosol particles in conjunction with a laser particle counter, the Climet, and a PAX extinctiometer, located in the city of El Paso.

In this methodology, the parameters of the log normal distributions for mineral dust and for soot are first optimized using Max likelihood estimators for the binned data, obtained with the Climet instrument.

The T-matrix calculations use these optimized log normal parameters and the cross sections are calculated separately for mineral dust and soot. The scattering coefficients are then obtained using the Climet data. Inter-comparisons between the calculated scattering coefficients and the extinctiometer's corresponding values are shown. In addition, the implementation of a bi-modal linearized T-matrix approach is used in the El Paso-Juarez Airshed and the results are presented. This work contributes towards a better understanding and optical characterization of mineral dust.