

Overview of the Physical and Radiative Properties of Atmospheric Particles at Cape San Juan, Puerto Rico (CPR) Station

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Cape San Juan Observatory (CPR, 18° 23' N, 65° 37' W), located in the Caribbean region on the island of Puerto Rico, is supported by the NOAA ESRL Global Monitoring Division, is part of the NASA's AErosol RObotic NETwork (<http://aeronet.gsfc.nasa.gov>), and is one of the contributing stations to the Global Atmosphere Watch (<http://www.empa.ch/gaw/>). Physical and radiative properties of atmospheric particles have been measured since 2005 at CPR. Here we present an overview of the results for year 2007. Three types of air masses predominated in this study, (1) those of marine origin or “clean” (C), (2) those bringing African Dust (AD), and (3) those with the influence of volcanic ash (VA) from the Soufriere Hills in the island of Montserrat.

Preliminary results show that the average values for the total σ_{sp} (Fig. 1) were higher for AD (83 Mm^{-1}) and VA (34 Mm^{-1}) compared to C (17 Mm^{-1}). The same happened for the Aerosol Optical Thickness (AOT) maximum values at 500 nm with 0.92, 0.30, and 0.06 for AD, VA, and C, respectively. The observed increase in the values of the Angstrom exponent (\AA) (Fig. 2) is indicative of a decrease in the size of the particles associated to VA ($\text{\AA}=0.27$) and AD ($\text{\AA}=0.89$) when compared to C ($\text{\AA}=0.24$). The volume size distributions and thus the mass were dominated by the coarse mode ($> 1.0 \mu\text{m}$) especially for the AD case. Results have shown that AD as well as VA has a significant impact on the physical and radiative properties across Puerto Rico and the Caribbean. Additional discussions together with results on the AOT wavelength dependence and on the annual variability of the properties under study will be presented.

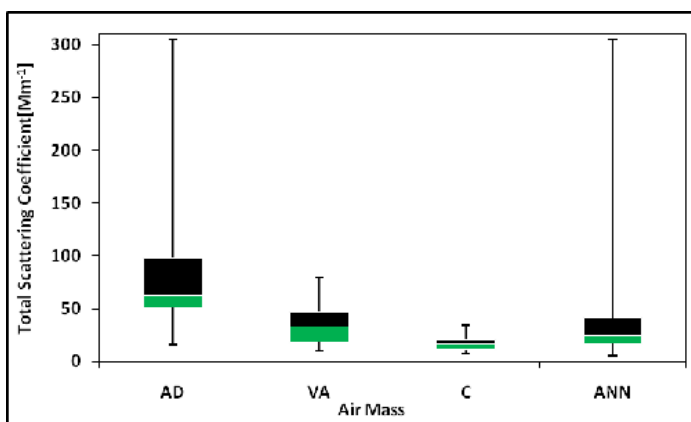


Figure 1. For the total scattering, σ_{sp} , AD shows the larger values and the larger variability, and C shows the lowest. σ_{sp} average values were 83, 34 and 17 Mm^{-1} for AD, VA, and C, respectively.

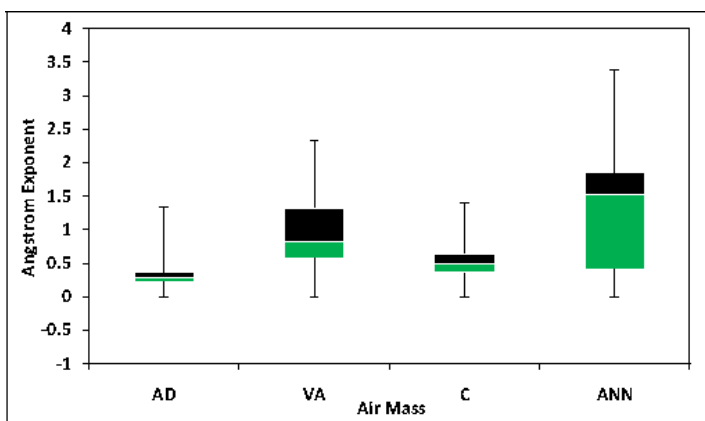


Figure 2. The lowest angstrom exponent (\AA) median values are for AD because coarse dust particles, indeed, reach the island. The highest median values were observed for VA.