# 4.124 Light absorption of PM2.5 in a coastal city Xiamen in Southeast China: temporal variations and implications for brown carbon.

Early Career Scientist

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Abstract:

Light-absorbing carbonaceous aerosols including black carbon (BC) and brown carbon (BrC) play significant roles in atmospheric radiative. A one-year in situ measurements of aerosol light absorption at multi-wavelength were continuously conducted in Xiamen in 2014 to determine the light absorption properties including absorption coefficients ($\sigma_{abs}$) and absorption Ångström exponent (AAE) in the coastal city. Light absorption of BrC were further quantinfied. Mean $\sigma_{abs}$ at ultraviolet wavelength (370 nm) and infrared wavelength (880 nm) were 56.6±34.3 $Mm^{-1}$ and 16.5±11.2 $Mm^{-1}$, respectively. Diurnal variation of $\sigma_{abs}$ presented a double-peaks pattern with the maximum in the morning peak and the minimum in the afternoon. $\sigma_{abs}$ and AAE showed obvious seasonality since it was low in warm seasons and high in cold seasons. AAE ranged from 0.26 to 2.58 with the annual mean value of 1.46, implying that both fossil fuel combustion and biomass burning influenced aerosol optical properties in Xiamen. $\sigma_{abs}$ of BrC at 370 nm was 24.0±5.7 $Mm^{-1}$, contributing 42.1% to the total absorption. The highest AAE (1.52±0.02) and largest BrC contribution (47.4%±3.7%) in winter suggested the significant influence of biomass burning on aerosol light absorption. Long-distance air masses from the Beijing-Tianjin-Hebei (BTH) region and Yangtze River Delta (YRD) region led to high AAE and BrC contribution in Xiamen. High AAE value 1.46 in July indicated that intense biomass

burning in Southeast Asia affected aerosol light absorption in Southeast China.The study will improve the understanding of light absorption properties of aerosols and the impacts of BrC in China.