

# PHOTOACOUSTIC ANALYSIS OF AEROSOL LIGHT ABSORPTION

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Aerosol light absorption measurements have typically been accomplished using filter-based samplers. Here the attenuation of light across the filter is measured as a proxy for light absorption. The problem with this approach is that it greatly overestimates the in-situ aerosol light absorption because these filters are multiple scattering substrates that amplify absorption. Various empirical approaches have been used to try to calibrate these instruments. For example, the calibration model used for the particle soot absorption photometer requires additional measurements of aerosol scattering to reduce the artifact it produces on the measurements. By contrast, the photoacoustic measurement of aerosol light absorption is a direct method based on the simple theory for the instrument. Its calibration can be evaluated with light absorbing gases, something that can not be done with filter samplers. Since light absorption by soot occurs throughout the particle volume, this measurement is an optical proxy for the mass concentration of soot from combustion. The talk will start with a basic discussion of these instruments. Then we'll look at applications ranging from direct sampling of exhaust from cars, diesel trucks, and jet aircraft, and will finish with examples of ambient measurements of aerosol light absorption.