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Black carbon aerosol mass concentration, absorption and single scattering albedo from single and dual spot aethalometers: Radiative implications

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Abstract

Black carbon (BC) is a primary aerosol emitted directly into the atmosphere from incomplete combustion. It absorbs incoming solar radiation and outgoing terrestrial radiation, which has significant implications to aerosol radiative forcing. Aethalometer employs optical attenuation technique to measure real-time BC mass concentrations. BC mass concentration measured using a single spot aethalometer (AE31) can be significantly uncertain due to filter loading effect. A modified version of AE31, namely, a dual spot aethalometer (AE33), uses a real-time loading effect compensation algorithm and measures BC mass concentrations. BC mass concentrations measured using single and dual spot aethalometers over an urban location are analysed. BC mass concentration from AE33 is higher (11%) than BC measured by post processed loading effect compensated AE31 data. Daily averaged BC mass concen-

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