2.110 Derivation of aerosol light scattering coefficient from absorption coefficient measured by a filter-based instrument at a metropolitan area.

Presenting Author:
JEONGHOON LEE, Korea University of Technology and Education, School of Mechanical Engineering, Cheonan, Korea, jlee@koreatech.ac.kr

Abstract:

For the quantification of black carbon concentration in the atmosphere, some filter-based techniques such as an aethalometer and a particle soot absorption photometry (PSAP) can be used with ease. However, those techniques have some issues about overestimation due to the multiple scattering and optical path-length change caused by the filter materials. To alleviate this issue, the aethalometer adopts correction method by considering the scattering effect. But, the aethalometer does not measure the scattering signal but assumes it as a certain value. In this situation, one filter-based technique called as a multi-angle absorption photometry (MAAP) has been developed and the MAAP actually measures the scattering signals at two different positions to compensate the scattering artifacts. Another filter-based technique, a tri-color absorption photometer (TAP), is less artefactual than the aethalometer in that it measures and displays only absorption coefficients rather than the black carbon concentrations which can contain artifacts. To convert the absorption coefficient into the black carbon concentration, mass absorption cross section should be assumed as a constant though the mass absorption coefficient is not a constant. By using the MAAP and the TAP, the black carbon concentration and the absorption coefficient in the atmosphere at Seoul, Korea were monitored for approximately one month. From the conversion scheme imbedded in the MAAP of the scattering signal into the absorption coefficient, one way to derive the scattering coefficient is to be introduced. One example includes that how the correction can be effectively done by scrutinizing the continuously measured data for the absorption coefficient. Discussion and an overview of the absorption coefficient obtained will be presented along with the conversion process applied to the MAAP in detail.