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Measurement of Aerosol Particles Using Incoherent Broadband Cavity-Enhanced Absorption Spectrometer and Lidar in a Coastal Industrialized City

Lingshuo Meng (1,2), Gaoxuan Wang (1), Patrick Augustin (1), Fabrice Cazier (3), Dorothée Dewaele (3), Marc Fourmentin (1), Suzanne Crumeyrolle (4), Benjamin Hanoune (5), Elsa Dieudonné (1), Hervé Delbarre (1), Eric Fertein (1), Cécile Coeur (1), Alexandre Tomas (2), and Weidong Chen (1)

(1) Université du Littoral Côte d'Opale, Laboratoire de Physico-Chimie de l'Atmosphère, France (lingshuo.meng@univ-littoral.fr), (2) IMT Lille Douai, Université de Lille, Département Sciences de l'Atmosphère et Génie de l'Environnement, Lille, (3) Centre Commun de Mesures, Université du Littoral Côte d'Opale, Dunkerque, (4) Laboratoire d'Optique Atmosphérique, Université de Lille 1, Lille, (5) Laboratoire de Physico-Chimie des Processus de Combustion et de l'Atmosphère, Université de Lille 1, Lille

Atmospheric aerosols may have a strong impact on the air quality and climate change, and lead to important effects on human health as well. Lidar devices are useful tools which can provide aerosols optical properties as a function of range in the Atmospheric Boundary Layer (ABL) [1]. In situ measurements of aerosols optical properties are helpful for lidar signal inversion to improve the reliability and accuracy of the retrieved data. Nephelometer, sun photometer and radiometer are the instruments most commonly used simultaneously with lidar but the practical application of such additional devices may induce some technical difficulties. We report in this paper on the development of an in situ measurement instrument based on incoherent broadband cavity enhanced absorption spectroscopy (IBBCEAS), which has been extensively used in lab research and investigation under real atmospheric conditions [2], to improve the reliability and accuracy of for lidar signal inversion.
An inter-comparison campaign for aerosol extinction coefficient measurements has been organized in 2018 summer in an industrialized coastal area in North France. A scanning lidar system integrated in an Atmospheric Mobile Unit [3] and a UV-IBBCEAS instrument operating at 365 nm were deployed. The objective is to use the IBBCEAS combined with the lidar system in the aim at compensating for the lidar measurements in its blind zone. The preliminary results will be presented and discussed.
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