Satellite remote sensing of aerosol layer height from O_2 A and B bands: A critical review

Jun Wang (1), Xiaoguang Xu (2), Pepijn Veefkind (3), and Pieternel Levelt (3)

(1) Univ. of Iowa, Department of Chemical and Biochemical Engineering, Iowa City, Iowa, United States (jun-wang-1@uiowa.edu), (2) University of Maryland - Baltimore County, (3) The Royal Netherlands Meteorological Institute (KNMI)

Aerosol layer height is critical for studying the role of aerosols in atmospheric chemistry and climate change, as well as for deriving surface aerosol concentration from satellite-based aerosol optical depth data. However, while space-borne liars can provide detailed structure of aerosol vertical structure, their spatial sampling is limited on the daily basis, which is insufficient to capture large spatiotemporal variation of ALH with a global coverage. Various techniques for passive remote sensing of ALH have been proposed, and here we will provide a review on the progress of the methods with O_2 A and B bands. Presented in the review are the physical principals, case studies from EPIC/DSCOVR and TROPOMI, and theoretical analysis of information content for aerosol properties in the high spectral resolution measurements of polarization in O_2 A and B bands. The review will end with an outlook for future sensors that are planned in concept or to be launched.