Geophysical Research Abstracts
Vol. 16, EGU2014-7426-1, 2014
EGU General Assembly 2014

New algorithm to derive the microphysical properties of the aerosols from lidar measurements using OPAC aerosol classification schemes

Camelia Talianu (1), Lev Labzovskii (1,2), Florica Toanca (1,2)

(1) National Institute of R-D for Optoelectronics, Laser Remote Sensing, Magurele, Romania (camelia_niv@yahoo.com), (2) University of Bucharest, Bucharest, Romania

This paper presents a new method to retrieve the aerosol complex refractive index and effective radius from multiwavelength lidar data, using an integrated model-measurement approach. In the model, aerosols are assumed to be a non-spherical ensemble of internally mixed components, with variable proportions. OPAC classification schemes and basic components are used to calculate the microphysical properties, which are then fed into the T-matrix calculation code to generate the corresponding optical parameters. Aerosol intensive parameters (lidar ratios, extinction and backscatter Angstrom coefficients, and linear particle depolarization ratios) are computed at the altitude of the aerosol layers determined from lidar measurements, and iteratively compared to the values obtained by simulation for a certain aerosol type, for which the critical component's proportion in the overall mixture is varied. Microphysical inversion based on the Truncated Singular Value Decomposition (TSVD) algorithm is performed for selected cases of spherical aerosols, and comparative results of the two methods are shown.

Keywords: Lidar, aerosols, Data inversion, Optical parameters, Complex Refractive Index

Acknowledgments: This work has been supported by grants of the Romanian National Authority for Scientific Research, Programme for Research- Space Technology and Advanced Research - STAR, project numbers 38/2012 - CAPESA and 55/2013 - CARESSE, and by the European Community's FP7-INFRASTRUCTURES-2010-1 under grant no. 262254 – ACTRIS and by the European Community's FP7-PEOPLE-2011-ITN under grant no. 289923 - ITARS