

Accepted Manuscript

Optical and Radiative-Transfer Properties of Mixed Atmospheric Aerosols

A.R. Degheidy, M. Sallah, A. Elgarayhi, S.M. Shaaban

PII: S0273-1177(15)00059-9
DOI: <http://dx.doi.org/10.1016/j.asr.2015.01.023>
Reference: JASR 12112

To appear in: *Advances in Space Research*

Received Date: 11 September 2014
Revised Date: 11 January 2015
Accepted Date: 22 January 2015



Please cite this article as: Degheidy, A.R., Sallah, M., Elgarayhi, A., Shaaban, S.M., Optical and Radiative-Transfer Properties of Mixed Atmospheric Aerosols, *Advances in Space Research* (2015), doi: <http://dx.doi.org/10.1016/j.asr.2015.01.023>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Optical and Radiative-Transfer Properties of Mixed Atmospheric Aerosols

A. R. Degheidy, M. Sallah*, A. Elgarayhi, S. M. Shaaban

*Theoretical Physics Research Group, Physics Department,
Faculty of Science, Mansoura University, Mansoura 35516, Egypt*

January 11, 2015

Abstract

The optical and radiative-transfer properties of mixed atmospheric aerosols have been investigated. The aerosol medium is considered as a plane-parallel anisotropic scattering medium with diffusive reflecting boundaries and containing an internal radiation source. The basic components are defined by their complex refractive index, a lognormal size distribution and humidity dependence in hygroscopic particles. The aerosol particles are assumed to be spherical, so the scattering parameters in the form of single scattering albedo, asymmetry factor, scattering, absorption, extinction efficiencies and linear anisotropic coefficient are calculated using the Mie theory. The calculations have been performed for individual aerosol particles, internal and external mixing media. Radiation transfer problem through the considered aerosol medium has been solved in terms of the solution of the corresponding source-free problem with simple boundary conditions. For the solution of the source-free problem, the Variational Pomraning-Eddington technique has been employed. The variation of the radiative-transfer properties (partial radiative fluxes at the medium boundaries) have been calculated and represented graphically for the different aerosols with their different mixing states. A comparison of the obtained results versus available published data has been performed and a very good agreement was observed.

keywords: Aerosols optical properties; Mixing states; Radiative-transfer properties; Variational Pomraning-Eddington technique

1 Introduction

Aerosol particles have important influences on Earth's radiative and hydrological balance (Ramanathan 2001). They can modify the microphysical properties of clouds and effect on the cloud formation via cloud condensation nuclei. Aerosol

*E-mail: msallahd@mans.edu.eg

Download English Version:

<https://daneshyari.com/en/article/10694397>

Download Persian Version:

<https://daneshyari.com/article/10694397>

[Daneshyari.com](https://daneshyari.com)