

Review

Atmospheric Particles and Nuclei

By

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This book is devoted exclusively to the physics of the multitude of processes relating to atmospheric aerosols, cloud microphysics and precipitation formation and the role of atmospheric aerosols on climate. The publication contains a comprehensive and rigorous critical analysis of the current understanding of the subject and it will be of invaluable assistance to the research workers.

The book contains the basic concepts of atmospheric aerosols, cloud condensation nuclei, ice nucleation and also the details of techniques and instruments used for the measurement of atmospheric aerosols. It also deals with the theory relating to nucleation, growth of cloud droplets, precipitation formation and radiative transfer in the atmosphere. The authors have also discussed the related and important topics like artificial modification of clouds and the role of atmospheric aerosols on climate.

The publication contains 5 chapters and 4 appendices. Chapter 1 deals with the basic concepts of atmospheric aerosols and their role in cloud and precipitation formation and their influence on climate. Chapter 2 deals with the physical and chemical characteristics of atmospheric aerosols. This chapter is a revised and updated version of the chapter on aerosols of a former book written by one of the authors (E. Mészáros : *Atmospheric Chemistry, Fundamental Aspects*, Elsevier, Scientific Publishing Company, Amsterdam, 1981 and published with the permission of the Elsevier Publishing Company). Chapters 3 and 4 deal with the role of aerosol particles in cloud droplet and ice crystal formations. Also, it

contains discussions relating to the association between Cloud Condensation Nuclei (CCN) and precipitation formation, modification of clouds by artificial CCN, artificial ice nuclei and cloud seeding with ice nucleating materials. Chapter 5 contains a comprehensive discussion of the physical processes involving atmospheric aerosols, radiation budget, role of clouds in the radiation budget, effects of volcano eruptions on climate, effects of large scale nuclear exchange and the basic concepts of the climatic effects of atmospheric aerosols. Appendices I to IV respectively contain discussions relating to the basic concepts of nucleation, theory of the growth of cloud droplets by condensation and coalescence, radiative transfer calculations and the terminology of the terms used in the book.

In the recent past it has been recognised that studies of the atmospheric aerosols are important since they influence the weather and climate. These particles have also influence on the visibility, solar radiation as well as the electric and radioactive properties of the earth's environment. A fraction of these particles plays an important role in the formation of clouds and precipitation. An understanding of the physical and chemical properties of these particles is essential for the evaluation of their role in cloud and precipitation formation and climatic variation.

An important feature of this book is the consistent attempt by the authors to provide a critical appraisal of published work. In general, these analysis are penetrating and balanced. Another impressive aspect is the bibliography which contains about 640 papers, concerning the research carried out up to 1988. The authors have made a comprehensive and rigorous critical understanding of the current research in the subject and thus this book will be of great importance to the researchers connected with several branches of Atmospheric Sciences with central importance to Cloud Physics, Air pollution and Climate Modification.

— A. S. R. Murty