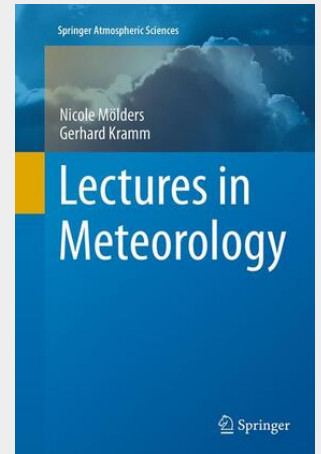


Lectures in Meteorology

Lectures in Meteorology is a comprehensive reference book for meteorologists and environmental scientists to look up material on the thermodynamics, dynamics and chemistry of the troposphere. The lectures demonstrate how to derive/develop equations – an essential tool for model development. All chapters present applications of the material including numerical models. The lectures are written in modular form, i.e. they can be used at the undergraduate level for classes covered by the chapters or at the graduate level as a comprehensive, intensive course. The student/instructor can address chapters 2 (thermodynamics) and 4 (radiation) in any order. They can also switch the order of chapter 5 (chemistry) and 6 (dynamics). Chapter 7 (climatology and climate) requires an understanding of all chapters. Chapter 3 (cloud physics) needs basics from chapter 2 to understand the cloud microphysical processes. The governing conservation equations for trace constituents, dry air, water substances, total mass, energy, entropy and momentum are presented, including simplifications and their application in models. A brief introduction to atmospheric boundary layer processes is presented as well. Basic principles of climatology discussed include analysis methods, atmospheric waves and their analytical solutions, tropical and extra-tropical cyclones, classical and non-classical mesoscale circulations, and the global circulation. The atmospheric chemistry section encompasses photolytic and gas-phase processes, aqueous chemistry, aerosol processes, fundamentals of biogeochemical cycles and the ozone layer. Solar and terrestrial radiation; major absorber; radiation balance; radiative equilibrium; radiative-convective equilibrium; and basics of molecular, aerosol and cloud adsorption and scattering and their use in remote sensing are also presented.

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128,39 €

119,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783319376158

Medium: Buch

ISBN: 978-3-319-37615-8

Verlag: Springer International Publishing

Erscheinungstermin: 22.09.2016

Sprache(n): Englisch

Auflage: Softcover Nachdruck of the original 1. Auflage 2014

Serie: Springer Atmospheric Sciences

Produktform: Kartoniert

Gewicht: 9124 g

Seiten: 591

Format (B x H): 155 x 235 mm

