



The Martian Climate Revisited: Atmosphere and Environment of a Desert Planet (Springer Praxis Books)

By Peter L. Read, Stephen R. Lewis



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The atmosphere and climate of Mars is a crucial factor, both for understanding the planet's past and appreciating the possibilities of its future. Given the high level of current interest in Mars, and the major advances afforded by recent space exploration, this book seeks to examine and review our knowledge and understanding of the meteorology and climate of Mars in its present state. This is based not only upon direct observations, but also on the newer techniques of modelling: numerical simulation and data assimilation. This authoritative discussion of Mars' atmosphere and climate gives a balanced review of some of the hottest issues concerning Mars' environments, its present and past climate and potential to support life, and its possible future following manned exploration.



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- Sales Rank: #5073509 in Books
- Brand: Brand: Springer
- Published on: 2004-03-31
- Original language: English
- Number of items: 1
- Dimensions: 9.66" h x 1.04" w x 7.06" l, 2.10 pounds
- Binding: Hardcover
- 326 pages

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Editorial Review

Review

From the reviews:

"Read and Lewis, physicists at the University of Oxford, have produced an outstanding summary of the current status of our understanding of the climate and meteorology of the planet Mars. General circulation models (GCMs) of the Martian atmosphere have been developed, and used to build a Mars Climate Database (<http://www.lmd.jussieu.fr/mars.html>) predicting features of the Martian atmosphere. Its data compare well with data available from Martian spacecraft, especially the Mars Global Surveyor launched in 1996 and the Viking Landers of the late 1970s. Beginning with the Navier-Stokes equation for fluid dynamics, the authors outline mathematical derivations (grounded in clear physical reasoning) to develop the partial differential equations that are solved numerically in a GCM also dependent on parameterization of physical processes, such as radiative heating and cooling. Model results are mounted in numerous graphical displays, many in full color. Although the bulk of the book is devoted to understanding the current atmospheric dynamics of Mars, a later chapter explores the possible history of Martian climate and cyclic and chaotic climate change. The last chapter discusses the motivations, ethics, and challenges of future, human exploration of Mars. Summing Up: Essential. Upper-division undergraduates through professionals."

(M. Dickinson, Choice, October 2004)

"The authors of this book have addressed our concern of longevity of this book on the library shelf because they have included a range of basic ideas in atmosphere physics and dynamics by using simple theoretical models and then applying to Mars. ... The target readership for this book is undergraduate and graduate students in physics, chemistry, and space sciences. ... The book contains a nice set of color plates, 18 pages of references, and 7 pages of index." (Fernande Grandjean and Gary J. Long, Physicalia Magazine, Vol. 28 (1), 2006)

"Prof Read and Dr Lewis have developed ... climatic model to stimulate the real planet and an important aspect of this book is a detailed description of how that model can succeed in modelling such phenomena as great dust storms. ... In this monograph – of greatest interest to specialists in atmospheric dynamics – the authors discuss in depth the background details of the atmosphere and near-surface environment of Mars. ... it is recommended without hesitation to professionals in the field, and for purchase by University libraries." (Richard McKim, Journal of the British Astronomical Association, Vol. 116 (2), 2006)

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