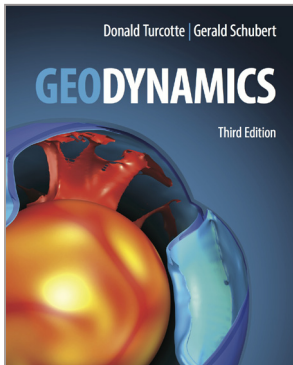




## Geodynamics



By Donald L. Turcotte,  
Gerald Schubert

CAMBRIDGE UNIVERSITY  
PRESS

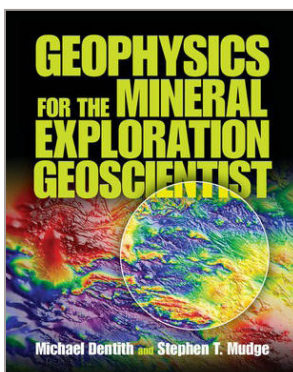
636 pages | Paperback  
3<sup>rd</sup> edition | June 2014  
ISBN 9780521186230

Price: £47.50 (~€60)

### Publisher's summary

Essential reading for any Earth scientist, this [classic textbook](#) has been providing advanced undergraduate and graduate students with the fundamentals needed to develop a quantitative understanding of the physical processes of the solid Earth for over thirty years. This third edition has two completely new chapters covering numerical modelling and geophysical MATLAB applications, and the text is now supported by a suite of online MATLAB codes that will enable students to grasp the practical aspects of computational modelling. The book has been brought fully up to date with the inclusion of new material on planetary geophysics and other cutting edge topics. Exercises within the text allow students to put the theory into practice as they progress through each chapter and carefully selected further reading sections guide and encourage them to delve deeper into topics of interest. Answers to problems available within the book and also online, for self-testing, complete the textbook package.

## Geophysics for the Mineral Exploration Geoscientist



By Michael Dentith, Stephen  
T. Mudge

CAMBRIDGE UNIVERSITY  
PRESS

454 pages | Hardback  
1<sup>st</sup> edition | April 2014  
ISBN 9780521809511

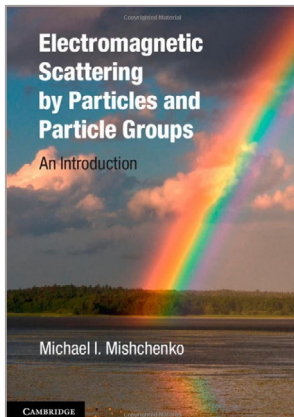
Price: £45 (~€56)

### Publisher's summary

Providing a balance between principles and practice, this state-of-the-art overview of geophysical methods takes readers from the basic physical phenomena, through the acquisition and processing of data, to the creation of geological models of the subsurface and data interpretation to find hidden mineral deposits. Detailed descriptions of all the commonly used geophysical methods are given, including gravity, magnetic, radiometric, electrical, electromagnetic and seismic methods. Each technique is described in a consistent way and without complex mathematics. Emphasising extraction of maximum geological information from geophysical data, [the book](#) also explains petrophysics, data modelling and common interpretation pitfalls. Packed with full-colour figures, also available online, the text is supported by selected examples from around the world, including all the major deposit types. Designed for advanced undergraduate and graduate courses in minerals geoscience, this is also a valuable reference for professionals in the mining industry wishing to make greater use of geophysical methods.

# Electromagnetic Scattering by Particles and Particle Groups

## An Introduction



By Michael I. Mishchenko

CAMBRIDGE UNIVERSITY PRESS

450 pages | Hardback  
1<sup>st</sup> edition | April 2014  
ISBN 9780521519922

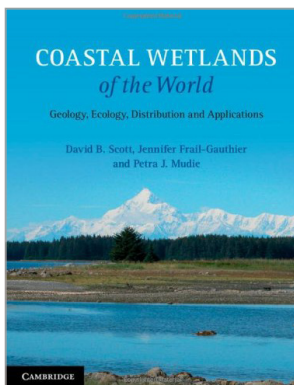
Price: £45 (~€56)

### Publisher's summary

This self-contained and accessible [book](#) provides a thorough introduction to the basic physical and mathematical principles required in studying the scattering and absorption of light and other electromagnetic radiation by particles and particle groups. For the first time the theories of electromagnetic scattering, radiative transfer, and weak localisation are combined into a unified, consistent branch of physical optics directly based on the Maxwell equations. A particular focus is given to key aspects such as time and ensemble averaging at different scales, ergodicity, and the physical nature of measurements afforded by actual photopolarimeters. Featuring over 120 end-of-chapter exercises, with hints and solutions provided, this clear, one-stop resource is ideal for self-study or classroom use, and will be invaluable to both graduate students and researchers in remote sensing, physical and biomedical optics, optical communications, optical particle characterisation, atmospheric physics, and astrophysics.

# Coastal Wetlands of the World

## Geology, Ecology, Distribution and Applications



By David B. Scott, Jennifer Frail-Gauthier, Petra J. Mudie

CAMBRIDGE UNIVERSITY PRESS

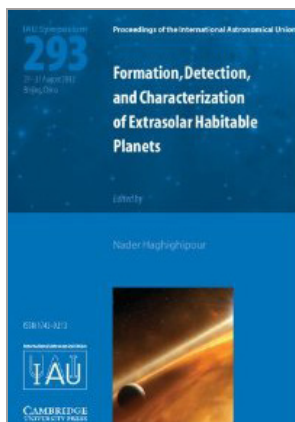
496 pages | Paperback  
1<sup>st</sup> edition | March 2014  
ISBN 9781107628250

Price: £37.50 (~€47)

### Publisher's summary

Salt marshes and mangrove forests, the intertidal wetlands of the world's coastlines, provide key ecological services to all areas of the globe. This cutting-edge, richly illustrated [book](#) introduces the essential elements of coastal wetlands and their applications. The book opens by introducing coastal oceanography, the physical features of wetlands, their ecology, and human impacts upon them, giving all students the necessary background for wetlands studies. It then presents detailed case studies from around the world with extensive illustrations, supplying a wider, global-scale picture of wetlands geomorphology and biodiversity. The final chapters discuss some unique applications of coastal wetlands, including geological monitoring, uses in biotechnology and agriculture, and various experimental mesocosms. This is ideal as supplementary reading to support students on a wide range of Earth and life science courses, from environmental science, ecology and palaeoecology to geomorphology and geography. It will also be a valuable interdisciplinary reference for researchers.

# Formation, Detection, and Characterization of Extrasolar Habitable Planets (IAU S293)



Edited by Nader  
Haghighipour

CAMBRIDGE UNIVERSITY  
PRESS

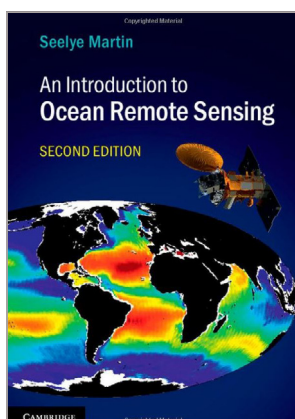
476 pages | Hardback  
1<sup>st</sup> edition | May 2014  
ISBN 9781107033825

Price: £76 (~€96)

## Publisher's summary

This discovery of several Earth-like planets within the habitable zones of their host stars has triggered extensive research on the formation, dynamical evolution, interior dynamics, and atmospheric characteristics of extrasolar habitable planets. IAU Symposium 293 presents a collection of articles on the state-of-the-art research on these topics, including new discoveries of habitable exoplanets. The [volume](#) starts by reviewing the current state of the detection of habitable planets, and after guiding the reader through the most recent theoretical and observational achievements on the discovery and understanding of potential life-harboring bodies, concludes by presenting the reader with a review of the upcoming missions that search for Earth-like planets around other stars, and the likely signatures of extraterrestrial life. This comprehensive, up-to-date and technical volume targets those seeking to understand the origin of life and the possibility and detection of life elsewhere in the Universe.

# An Introduction to Ocean Remote Sensing



By Seelye Martin

CAMBRIDGE UNIVERSITY  
PRESS

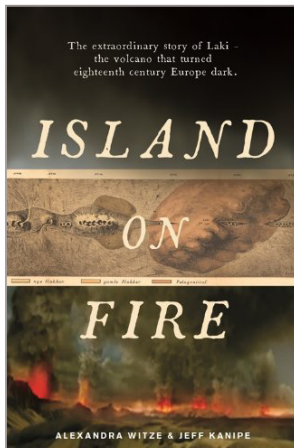
521 pages | Hardback  
2<sup>nd</sup> edition | March 2014  
ISBN 9781107019386

Price: £50 (~€63)

## Publisher's summary

Fully updated, with significant new coverage of advances in satellite oceanography and results from new satellite missions, the [second edition of this popular textbook](#) introduces students to how remote sensing works, how to understand observations from Earth-observing systems, and the observations' importance to physical and biological oceanography. It provides full explanations of radiative transfer, ocean surface properties, satellite orbits, instruments and methods, visible remote sensing of biogeochemical properties, infrared and microwave retrieval of sea surface temperature, sea surface salinity retrieval, passive microwave measurements, scatterometer wind retrieval, altimetry and SAR. Also included are descriptions of the online archives where data can be obtained, and readers can obtain online tools for working with the data – enabling hands-on engagement with real-world observations. This is an ideal textbook for graduate and advanced undergraduate students in oceanography, remote sensing and environmental science, and a practical resource for researchers and professionals working with oceanographic satellite data.

## Book review: Island on Fire



By Alexandra Witze and Jeff Kanipe

PROFILE BOOKS

224 pages | Hardback  
1<sup>st</sup> edition | March 2014  
ISBN 978-1781250044

Price: £7.69 (~€10)

Volcanoes are no unusual sight in Iceland and yet the eruption that started on June 8, 1783 in the southern district of Síða was something never seen before. In the following eight months, an estimated 14 cubic kilometres of lava poured out from 135 fissures opening north of the town of Klaustur covering some 2,500 square kilometres of land and threatening to overrun not only many of the surrounding farms but the town itself. The volcanic ash carried away by the wind poisoned the land, killing half of the Icelandic cattle population and a quarter of the sheep and horse population. In the resulting famine (1783–1784), an estimated nine thousand people, one-fifth of the population of Iceland, died.

But the eruption of Laki – as this new formed chain of volcanoes was named – had possibly even more widespread effects. In the years that followed the event, the climate in Europe deteriorated and the exceptional hot summer of 1783 was followed by long and harsh winters. The resulting crop failures may even have triggered one of the most famous insurrections of starving people in history, the French Revolution of 1789–1799 (though the French peasants had many other, mostly political and financial, reasons to overthrow the government). Other accounts for droughts, exceptional cold winters and floods are known, from North America to Japan, spanning the years 1783 to 1785.

Despite its apparent disastrous impacts on the environment, society and history, the Laki eruption is little known outside Iceland or specific geological publications. Many books (and even movies) have popularised Mount Vesuvius in Italy, Mount St. Helens in the U.S., or the great Krakatoa eruption in Indonesia. However, a popular account of the Laki eruption was missing.

Authors Alexandra Witze and Jeff Kanipe have closed this gap with [Island on Fire](#). In this book, they present Laki's extraordinary story based on the accounts of the eruption found in contemporary documents, letters, newspaper articles and diaries, describing both the terrifying sight of the lava fountains and ash clouds in Iceland, and the years of anomalous weather and increased death rates in Europe. Interviews with volcanologists and climatologists all over the world provide context and explanation to these historic observations. Finally, the authors also visited the modern Síða district in

search of surviving traces, both in the landscape and in the local communities, of the fires of Laki.

The book is subdivided in nine chapters. Every chapter explores in text, black and white images, diagrams and maps how Laki's effects spread over the eighteenth-century world, focusing on the European continent, where its impacts were strongest. A final section with endnotes provides recommended reading and references, including the used historical sources, modern scientific publications and some websites.

Chapter one sets the scene by introducing us to an extraordinary man and eyewitness of the first hour of the developing catastrophe, the clergyman in Klaustur and self-taught naturalist Jón Steingrímsson (1728–1791). His detailed description of the eruption and its aftermath forms the narrative backbone of the book. Chapter two is dedicated to basic geologic concepts, presenting also a short geological history of Iceland. It introduces the volcanoes in Laki's immediate neighbourhood, like Hekla, the 'gateway to hell', or Eyjafjallajökull, a volcano that became famous almost 230 years after the Laki eruption. Chapter three goes beyond Iceland, shortly summarising the most famous historic and prehistoric eruptions worldwide and their impacts on human history and culture.

The following chapters are dedicated to the historic descriptions of seemingly unexplainable phenomena observed all over Europe in 1783, such as a strange haze, sometimes followed by a stench, that appeared in the sky. At the time only few naturalists recognised its composition (fine volcanic ash and gaseous compounds) and origin from an Icelandic volcano. Shading the Earth from the sun and disrupting local weather systems, the arrival of the volcanic ash was usually followed by heavy rain or hail and a marked drop in temperatures. Resulting floods and storms killed people immediately. Long winters and cool summers with lowered productivity of crops had disastrous long-term effects on entire societies, based mostly on agriculture for sustenance, as described in the book.

The final chapters give a detailed overview of how volcanoes can kill, exploring the volcanic threat that our modern society still faces. The authors give examples from old eruptions, such as the one that destroyed the Roman town of Pompeii more than 2000 years ago, focusing then on more recent events and how they can affect us. The eruption of Eyjafjallajökull in 2010, for example, although of relatively moderate dimension, became a political and financial disaster. Planes and passengers were grounded for weeks due to concerns about the possibility that the volcanic ash could damage aircraft engines. The book points out that ash clouds with the characteristics of the 1783 fog could possibly paralyse the entire air traffic of the northern hemisphere and threaten the health and lives of many.

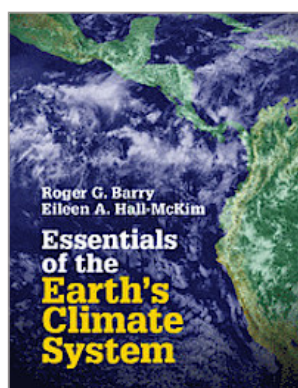
The existing detailed documentation of Laki and its climatic effects is also of great interest for atmospheric scientists. Recent volcanic eruptions with marked cooling effects, like Pinatubo in 1991, where situated near to the tropics, where wind patterns and atmospheric circulations are relatively simple and well understood. However the

rarity of great volcanic eruptions near the poles has posed great problems to scientists, trying to develop climate models fitting the particular atmospheric patterns found there. So it is still controversial whether the exceptional hot and dry summer of 1783 was a direct consequence of the Laki eruption (as the ash adsorbed and scattered both sunlight and moisture) and only later atmospheric circulation dispersed the ash in such a way that the cooling effect, as seen following modern eruptions, prevailed. This is also explored in the book.

In the end one thing is certain – the title of the book could easily be Planet on Fire, rather than Island on Fire, as the two authors take the reader, starting from Iceland, on a great journey around the globe, showing how different civilizations through centuries were, and still are, influenced by volcanoes. I can only recommend this book to geology- and history-enthusiasts alike.

*David Bressan*  
Freelance geologist based in Italy

## Book review: Essentials of the Earth's Climate System



By Roger G. Barry and  
Eileen A. Hall-McKim

CAMBRIDGE UNIVERSITY  
PRESS

271 pages | Paperback  
1<sup>st</sup> edition | March 2014  
ISBN 9781107620490

Price: £35 (~€43)

Understanding the Earth's climate system is a fundamental part of any atmospheric or Earth science curriculum. When talking about climate, it is important to remember that climate science incorporates the description of key variables and concepts, climatic zones as well as climate change and its implications to society.

[Essentials of the Earth's Climate System](#), by Roger G. Barry and Eileen A. Hall-McKim, is a comprehensive introductory textbook that covers all aspects of the climate system. It is specifically written for a one-semester course in climate science and does not assume prior knowledge beyond a basic understanding of scientific principles. Mathematical equations are mostly omitted in favour of a combination of descriptive texts and colour figures that illustrate most concepts.

Designed for coursework, each chapter starts with an outline of the key concepts and finishes with a brief summary as well as review questions. While most questions require the student to explain a specific process or highlight important aspects, there are also questions that encourage students to work with freely available climate data and to explore climate phenomena. The text itself is divided into short sections, each covering one concept, variable or aspect of climate. These paragraphs are densely packed with facts, scientific theory and applications, but remain easy to read due to the accessible language. Even experienced scientists will find new and relevant information in this book, so that it might serve as a short reference. Throughout the book there are a multitude of text boxes

that provide additional information about important scientists or interesting climate features and events such as the Tibetan Plateau or the Dust Bowl. This encourages students to do further reading.

The book contains 12 chapters that can be grouped into four sections. After a brief introduction, chapters two and three introduce climate variables such as energy, moisture and wind. Chapters four to eight, introduce the reader to processes and elements of the climate system, such as microclimates, general circulation, teleconnections, synoptic climatology and land-sea interactions. Chapter nine gives an overview over different climate types and gives examples of the differences within each climatic zone. The last three chapters deal with past and future climates, as well as current applications and implications of climate science. The book also contains an extensive glossary of terms used in the book and links to climate and weather data. There is also an additional information on topics such as monsoons or teleconnections.

To give the reader an impression of the general style of this book, I provide two examples of how topics are covered. The concept of evaporation is addressed on four and a half pages. After a brief introduction to the concept and latent heat, the book provides some history on the work of Penman and modifications of the equations named in his honour, without actually providing the equations, and introduces direct measurement methods, linking them to the [FLUXNET network](#). Then evapotranspiration is introduced and linked to climate classification. The authors provide global maps of evaporation and introduce the concepts of water balance, drought and moisture indices.

The section on monsoons as a climate type establishes the seasonal nature of monsoonal climates and extensively links the upper air circulation over Eastern Asia to rainfall characteristics in the region. Similarly monsoon systems in West Africa, Australia and even North and South America are described.

Compared to other climatology textbooks, the authors present a lot of information that goes beyond the explanation of basic scientific concepts, such as historic overviews and current applications. Additionally, climate classification is treated more extensively than in many other books. It is my impression that the focus of the book is

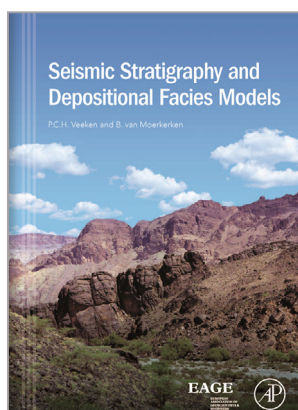
on the description of climate elements, given the amount of information and the focus on classification. As a consequence, sometimes the climate's nature as a complex system of physical processes does not get transported as well as it could.

Overall, the content of Essentials of the Earth's Climate System is very extensive and well researched. It serves well both as a reference and a basis for an introductory class in climatology.

*Tobias Gerken*

*Postdoctoral Researcher, Meteorology Department  
Pennsylvania State University, USA*

## Book review: Seismic Stratigraphy and Depositional Facies Models



By P.C.H. Veeken and B. van Moerkerken

EAGE PUBLICATIONS

496 pages | Hardback  
1<sup>st</sup> edition | 2013  
ISBN 9789073834439

Price: €100 (€80 for EAGE members)

The interpretation of sedimentary deposits from seismic data provides crucial information for a correct evaluation of hydrocarbon reservoirs. During the last few decades, seismic stratigraphy has improved the recognition and reconstruction of the depositional history of basins, saving time and economical resources by optimising the accuracy of subsurface predictions. This improvement in hydrocarbon exploration has led to a significant increase in oil production and estimation of recoverable reserves.

The [Seismic Stratigraphy and Depositional Facies Models](#) textbook by Paul C.H. Veeken and Bruno van Moerkerken, provides a systematic approach for the description and evaluation of subsurface reservoirs. The authors have an extended career as geoscience consultants, having spent over 25 years working in the oil and gas industry. Their experience has contributed to provide a clear and detailed description of the 'hot topics' relating to seismic interpretation and modelling techniques, supplying advanced tools for the recognition of sedimentary facies.

The book represents a reference guide for geologists, geophysicists and engineers working on hydrocarbon exploration. It is subdivided into four main sections full of clarifying figures, diagrams and field examples, following step by step the recipe for a correct and accurate interpretation of depositional sequences and sedimentary

environments from seismic profile data. The textbook provides an introduction to seismic methods, focusing on the basic principles of seismic reflection and the behaviour of seismic waves as they travel through the Earth's interior. It pays particular attention to seismic stratigraphic techniques and the expression of sedimentary units through seismic profiles. To familiarise the reader with the geophysical background, the authors often use visual examples and real-world case studies to describe complex concepts and clarify jargon. The nature of sedimentary units, for instance, is described using case examples and field photographs, including basic rules for the interpretation of potential reservoirs within the different units.

Aiming to reconcile the formation of hydrocarbon reservoirs with major events occurred in our planet, the authors also present parallel issues related to interesting aspects about the origin of life and major events in the geologic history of Earth. These final notes aim to help the reader understand the importance of facies recognition on the evolution and characterisation of oil and gas reservoirs.

The textbook strengths lie in the easy way the authors present key concepts and explanatory notes, establishing useful links between cause- and- effect relationships in seismic interpretation. However, the book lacks a more detailed description of the reservoir characterisation modelling techniques. It limits itself to offering a general overview of the processing techniques and the analysis of seismic markers that may help junior professionals with seismic interpretation.

All in all, the book successfully integrates seismic interpretation techniques and stratigraphic criteria aiming to evaluate, from a practical point of view, the characterisation of potential reservoirs. It includes a large amount of data that is successfully condensed into a useful and easy-to-read book.

*Javier Fernández Lozano*

*Postdoctoral Research Fellow, Department of  
Geology, University of Salamanca*