



Bilingual Dictionary of Earth Sciences

English–French, French–English



By Jean-Pierre Michel,
Michael S. N. Carpenter and
Rhodes W. Fairbridge

DUNOD

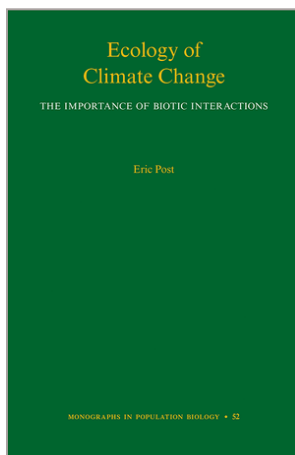
512 pages | Paperback
5th edition | 2013
ISBN 978-2-10059-2913

Price: €49

Publisher's summary

The 5th edition of the [Dictionnaire Bilingue des Sciences de la Terre](#) was launched last year. This fully revised and expanded new edition brings together scientific, technical and general terms that are most used in various fields of the Earth and space sciences. These include mining and petroleum geology, geophysics, geomorphology, climatology, oceanography, palaeontology and geochemistry. This bilingual dictionary is also enriched with new entries in hydrogeology, soil and other environmental sciences. Readers wishing to translate an article from English to French or vice-versa or write a scientific report will find many tips in the introduction of the book.

Ecology of Climate Change



By Eric Post

PRINCETON

408 pages | Hardback
1st edition | August 2013
ISBN 978-0-69114-8472

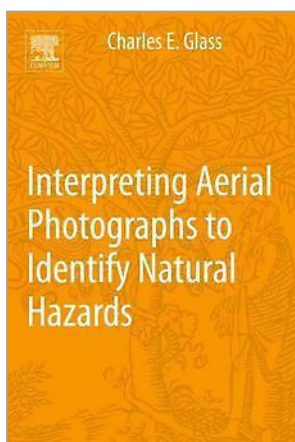
Price: £41.95 (~€51)

Publisher's summary

Rising temperatures are affecting organisms in all of Earth's biomes, but the complexity of ecological responses to climate change has hampered the development of a conceptually unified treatment of them. In a remarkably comprehensive synthesis, [this book](#) presents past, ongoing, and future ecological responses to climate change in the context of two simplifying hypotheses, facilitation and interference, arguing that biotic interactions may be the primary driver of ecological responses to climate change across all levels of biological organisation.

Eric Post's synthesis and analyses of ecological consequences of climate change extend from the Late Pleistocene to the present, and through the next century of projected warming. His investigation is grounded in classic themes of enduring interest in ecology, but developed around novel conceptual and mathematical models of observed and predicted dynamics. Using stability theory as a recurring theme, Post argues that the magnitude of climatic variability may be just as important as the magnitude and direction of change in determining whether populations, communities, and species persist. He urges a more refined consideration of species interactions, emphasising important distinctions between lateral and vertical interactions and their disparate roles in shaping responses of populations, communities, and ecosystems to climate change.

Interpreting Aerial Photographs to Identify Natural Hazards



By Charles E. Glass

ELSEVIER

184 pages | Paperback
1st edition | August 2013
ISBN 978-0-12-420018-0

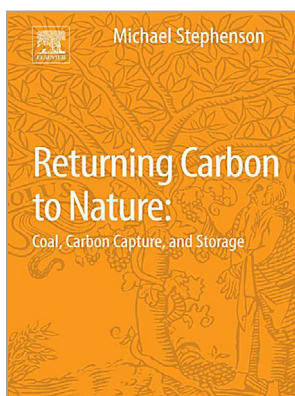
Price: €35.99

Publisher's summary

Authored by a world-renowned aerial photography and remote sensing expert, [Geographic Aerial Photography: Identifying Earth-Surface Hazards Through Image Interpretation](#) is the most practical and authoritative reference available for any professional or student looking for a reference on how to recognise, analyse, interpret and avoid – or successfully plan for – dangerous contingencies.

Whether they are related to natural terrain, geology, vegetation, hydrology or land use patterns, it's critical for you to be able to recognise dangerous conditions when and where they exist. Failure to adequately recognise and characterise geomorphic, geologic, and hydrologic dangers on the ground using aerial photography is one of the major factors contributing to due to natural hazards and disasters, damage to architectural structures, and often the subsequent loss of human life as a result. Aerial photographs provide one of the most prevalent, inexpensive and under-utilised tools to those with the knowledge and expertise to interpret them.

Returning Carbon to Nature: Coal, Carbon Capture, and Storage



By Michael Stephenson

ELSEVIER

150 pages | Paperback
1st edition | August 2013
ISBN 978-0-12-407671-6

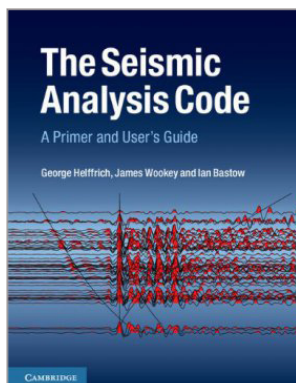
Price: €35.95

Publisher's summary

Carbon capture and storage is one of the main carbon emissions policy issues globally, yet you may know little about it if you're outside the academic community. As the global push to address the impact that carbon emissions has on global warming continues, awareness and knowledge of viable solutions must be communicated in layperson terms. [Returning Carbon To Nature](#) breaks across traditional barriers among history, geology, biology and climate change to address the topic from a multidisciplinary, Earth System Science approach. If you're a policymaker or someone who influences policy, this book will explain carbon capture and storage – a relatively new concept – in easy-to-understand terms. Clearly presented charts, tables and diagrams explain critical concepts, and a range of full-colour photographs will help you visualise the carbon capture and storage process and its principles.

The Seismic Analysis Code: A Primer and User's Guide

A book review



By George Helffrich, James Wookey and Ian Bastow

CAMBRIDGE UNIVERSITY PRESS

183 pages | Paperback
1st edition | September 2013
ISBN 978-1-10761-3195

Price: £30.00 (~€37)

Seismological data are one of the most prominent data-resources in many fields of geophysics. Various codes and libraries are available for seismic data analysis in order to extract information for different applications. The Seismic Analysis Code (SAC), originally developed in the 1980s, is one such code. It is a general purpose programme for basic operations on time series data and, due to its ease of use and suitability for data analysis, it is one of the most widely used analysis packages for regional and teleseismic data.

[The Seismic Analysis Code: A Primer and User's Guide](#), by George Helffrich, James Wookey and Ian Bastow, is the first book that provides users with a complete guide to SAC. Its main target audiences are researchers and graduate students in seismology and geophysics. The book has a practical approach to a wide range of topics: from the essence of SAC processing, basic commands and macro language, to many advanced features, such as its file structure, integration of external processing steps into production-type data analysis schemes and advanced graphical aspects.

This book is based on the authors' decades of experience, both as core contributors to its development and as advanced users. The text is well-written with high-quality illustrations and example outputs of the SAC programme that support the concepts presented in the book. The chapters are short and thoughtfully divided into sub-sections which provide a categorised access to the content. Each section starts with a clear introduction to the key concepts followed by practical examples that represent the main functionalities of SAC.

The Seismic Analysis Code: A Primer and User's Guide is divided into eleven chapters. Chapters 1–3 provide an introduction to history of SAC development, different versions of this code, data formats and SAC processing philosophy. This helps readers familiarise themselves with SAC and the main concepts behind the data format, processing scheme and SAC commands. Chapter 4 introduces the

basic commands. It explains the fundamental features of this code such as reading and writing data, plotting and cutting, picking, file header, trace preparation and resampling, rotation and frequency-domain operations and filtering, all of which are essential in routine processing of seismological data. While using the programme in interactive mode can be very helpful for many applications, SAC's powerful macro capabilities can capture repeated or commonly used commands and execute them with minimal user interaction. This plays an important role in today's seismic data processing and is explained in Chapter 5, which introduces the required elements for writing macros. The book goes one step further in Chapter 6 by describing how to access SAC data and its functionalities from external programs. Chapters 7–10 address more advanced examples of plotting and data processing (array data handling and spectral estimation), as well as three-dimensional data in SAC. Finally, in Chapter 11, SAC implementations for two standard applications, shear wave splitting and receiver function analysis are presented. Additionally, the authors provide a list of SAC commands in alphabetical order as well as SAC command descriptions sorted by a selected set of keywords at the rear of the book.

Perhaps the most impressive aspect of this book is its ability to guide new users through the steps of learning SAC basics in detail, by providing extensive example inputs and outputs, as well as catering for experienced users, by describing hidden features in SAC. However, due to the focus on practical usage of the code and the shortness of the text in introducing the theoretical concepts, it is more a tutorial guide for methods available in SAC rather than a reference book for theoretical aspects of data processing. This is indeed not a disadvantage since the aim of the book, as the book's title suggests, is to be a primer and user's guide for SAC.

All in all, the book is an excellent and complete guide to SAC for users with different levels of expertise. It covers diverse aspects of the Seismic Analysis Code in a concise and clear way and provides a practical description for both fundamental and more advanced features of SAC.

Kasra Hosseini

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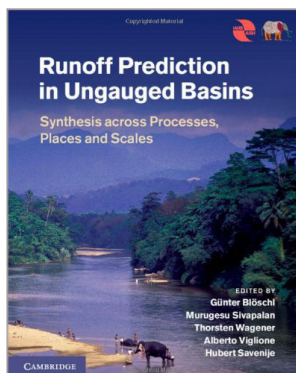
More information

All the examples can be downloaded from the publisher's website:

www.cambridge.org/helffrich

Runoff Prediction in Ungauged Basins: Synthesis across Processes, Places and Scales

A book review



Edited by Günter Blöschl,
Murugesu Sivapalan,
Thorsten Wagener, Alberto
Viglione and Hubert Savenije

CAMBRIDGE UNIVERSITY
PRESS

484 pages | Hardback
1st edition | April 2013
ISBN 978-1-107-02818-0

Price: £90.00 (~€110)

Floods, crop-threatening droughts, water shortages and water contamination are only some of the global problems that require information on the way water runs in drainage basins. Estimates of the space-time variability of runoff are needed for almost every location where people live, but in most catchments around the world runoff is not monitored. Unrecorded conditions in monitored catchments, such as anticipated changes in climate or land use, pose a similar challenge for hydrologists and water managers.

[Runoff Prediction in Ungauged Basins: Synthesis across Processes, Places and Scales](#) is a comprehensive book on runoff prediction. The term prediction stands for the estimation of runoff characteristics – such as the mean annual runoff or the probability of exceeding a certain flood runoff – for unmonitored locations and situations using climate data and catchment properties.

The book is an attempt to overcome the so-called fragmentation problem in hydrology. Hydrology lacks universal theories at the catchment scale, which is the scale of interest for most water problems. Process knowledge has been derived mainly from the point scale, but upscaling from this to the catchment scale is extremely difficult. Today, there is a huge variety of models and approaches for catchment runoff prediction, strongly differing in model concepts, structure and parameters, as well as input used. Many, if not most, runoff predictions follow a pragmatic strand, are not rigorously tested, and aim at local solutions, but do not foster the transfer of knowledge and understanding. As a response to this fragmentation, the International Association of Hydrological Sciences started the global community effort Predictions in Ungauged Basins (PUB) in 2003. Over the last decade, this initiative has successfully worked towards organising knowledge and developing transferable generalisations. This book is a central outcome of the PUB initiative, and attempts to put in order the current practice, experience and range of approaches in this field. It builds, among other things, on a comparative assessment of thousands of studies. The editors have managed to collect more than 130 authors in a coherent book, covering about 25000 catchments from all around the world.

The book is intended for hydrologists and Earth and environmental scientists with an interest in hydrology. The editors put much effort

in laying out how runoff is interwoven with landscape characteristics and catchment history. The concept of co-evolution of landscape processes (i.e. reciprocal evolutionary change of soils, vegetation, and topography in response to climate dynamics, geological processes and human interventions) plays an important role. Thanks to such comprehensive and advanced perspectives, this book will also be a good starting point for early stage researchers. It contains a large number of very illustrative, high-quality figures, schematically depicting the functioning of catchments or exemplifying central statements. Many photographs of rivers and landscape features support the editors' concept of 'reading the landscape', with the aim to better understand the processes underlying spatio-temporal variability of runoff. Even though the volume is not a hydrology textbook, the concepts and many figures will be most valuable in university hydrology courses.

The book addresses the fragmentation of modelling approaches through comparative hydrology – comparing prediction methods and their success across regions, scales and processes. Investigating the differences and similarities between a large number of catchments around the world is used as vehicle to understand how catchments function and why and where prediction methods work. A key to diagnosing catchments are runoff signatures, such as annual runoff or low-flow indicators. The idea is that catchments can be seen as organisms that have reached their current state through co-evolution, and that runoff signatures are the result of the catchment functioning. Hence, the collection of runoff signatures may reveal some aspects of the state and internal dynamics of catchments.

The book is organised around six runoff signatures, and each of the chapters 5 to 10 deals with one of these signatures. Chapter 2 introduces the synthesis framework, Chapter 3 discusses the important issue of data, and Chapter 4 gives the basic understanding of the essential catchment processes. The volume also features case studies collected from around the world and includes a summary of the findings and best-practice recommendations for prediction runoff in ungauged basins.

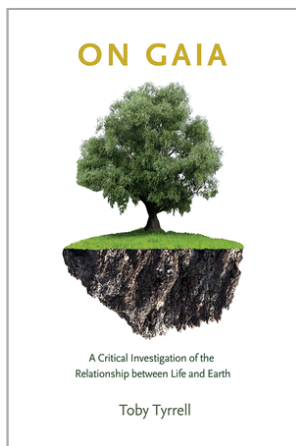
The editors convincingly demonstrate how the comparative hydrology approach helps bring order to the overwhelming variety of prediction methods. Given the large number of authors and the range of concepts and methods, it is amazing that the editors managed to compile such a coherent book. It is truly a unique synthesis of the available knowledge on runoff prediction, and a rich source for scientists and professionals working in ungauged catchments. Its broad perspective and the many attempts to reconcile diverging concepts will certainly stimulate the discussion in areas beyond runoff prediction.

Bruno Merz

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On Gaia: A Critical Investigation of the Relationship between Life and Earth

A book review



By Toby Tyrrell

PRINCETON

183 pages | Hardcover
1st edition | July 2013
ISBN 978-1-40084-7914

Price: £24.95 (~€31)

In the preface Tyrrell writes, “The book maintains a tight-beam focus on evaluating the Gaia hypothesis and includes only topics that contribute to a deeper understanding of its plausibility,” a promise [On Gaia](#) keeps for most of its length.

In the following chapters Tyrrell first explains the concept of Gaia: “life is not solely a passenger on a fortuitously habitable planet, but instead is at the controls of the planetary environment.” He then chooses bio-geological conditions to test the hypothesis. These range from modern evolutionary theory and techniques (selfish genes and recent experimental evidence on kin selection) to the icehouse Earth and evolutionary innovations. It becomes clear after a few chapters that the author does not subscribe to Gaia as an all-encompassing explanation for how our Earth system works, but instead gives us ample (and interesting) support for Stephen Schneider’s co-evolutionary hypothesis. Earth and its biota have co-evolved, but this evolution does not ensure the sort of harmony implied by Gaia.

Still Tyrrell continues to put Gaia in the framework of empirical evidence and more recent modelling. Does Gaia hold in unstable climate conditions? In Tyrrell’s estimation, the instability of the Earth’s climate history is a strike against the theory – in the midst of rapid environmental changes and near extinctions it seems hard to find any evidence of a planet heading towards homeostasis.

Toby Tyrrell approaches the Gaia theory from many different points of view. Multiple subjects are handled in an objective and factual way. To understand the (sometimes complex) topics, the author

gives relevant examples where he provides further explanation. Occasionally Tyrrell indulges in too many repetitions and examples, which lack depth in certain places. Other areas suffer from too much attention, for instance the section on chlorofluorocarbon’s in the concluding chapter.

The use of colour figures would make the book more attractive and understandable, especially for the non-scientific public, as clear illustrations could make the difference in the understanding of the topic. For example, a figure explaining silicate weathering could help readers outside the geosciences have a better grasp on the process.

The book is timely because Tyrrell puts Gaia into the framework of Earth system sciences. The Gaia hypothesis has had forty years of empirical and theoretical scrutiny; *On Gaia* is a welcome check-up on the state of the theory and the evidence used to support or refute its claims.

On Gaia is a rewarding read for the knowledgeable reader. The book is an easy read and accessible to a broad audience. Unlike some science books intended for popular audiences, the book is sophisticated enough to keep the interest of graduate students. Tyrrell’s tendency to repeat might have frustrated us a bit but it will probably help a more general audience better grasp sometimes complicated material. For the more scientific readers, the book offers a section with additional information on different subjects presented in a stimulating way.

*Modern Geo-Ecosystems class, VU University
Amsterdam, MSc Earth Sciences (September 2013)
The class used the book in their graduate course*

More information

On Gaia Errata: In Chapter 4 the description of figure 4.9 talks about “the species richness of reptiles and trees (ectotherms)...”, while there is no figure about the species richness of trees displayed in the figure itself.