Physical Geography
Great Systems and Global Environments

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‘Marsh and Kaufman eloquently link the science of physical geography with the impacts of human activities. As such this text is a perfect tool for encouraging students to become environmentally-informed citizens.’

Professor Dean P. Lambert, Department of Geography, San Antonio College, Texas

‘At last, a textbook that successfully merges a graphic storyline with the text to describe the interconnectedness of Earth’s great physical systems. The authors do a masterful job using this approach to explain the geographic character of the planet. This textbook will be understandable to both science and non-science majors.’

Dr Richard Crooker, Department of Geography, Kutztown University, Pennsylvania

‘Authoritative, useful, balanced, and wise, this is more than a textbook. It is a modernized classic and comprehensive presentation of the physical geography perspective of the great natural systems operating on planet Earth. … should be successful with students and teachers alike as the scientific process and physical science fundamentals are presented with relevance to everyday life.’

Professor Dean Fairbanks, Department of Geography and Planning, California State University, Chico

‘Will Marsh, an excellent scientist and a talented artist, has written the best textbooks in physical geography for three decades, and [this] new offering with Marty Kaufman… continues this tradition. The book’s distinctive features include explanations that start from a comprehensible scale that the student can understand, along with gorgeous illustrations.’

Professor Jeff Dozier, Bren School of Environmental Science and Management, University of California, Santa Barbara
Dedicated to

Walter A. Schroeder
of Missouri
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If you give our planet a hard poke somewhere, it is apt to set off a chain of reactions leading to change somewhere else, maybe in many places, and often far away. We live in a broadly interconnected geographic environment, one laced with multitudes of systems, a veritable planetary network of wiring and plumbing in three-dimensional space.

These interconnections are astounding. Among them are systems linking temperatures of tropical seas with the size and number of hurricanes that strike midlatitude coastlines, dust storms over the Sahara of North Africa with the fertility of soils in the Amazon Basin of South America, soil erosion on the plains of northern China with the quality of air over Seattle, fertilizer applications on cornfields in Iowa with sick and dying ecosystems on the Mississippi Delta, and earthquakes in Indonesia with giant ocean waves capable of killing hundreds of thousands of people on the other side of the Indian Ocean more than 3000 miles away.

Yet we find it difficult to think in broad patterns and networks because we have learned to see the world in geographic compartments. To physical geography, which is interested in the distribution of natural phenomena, this is a dilemma because it implies that the nature operating in one place may have little or nothing to do with the nature operating in another place. This sort of thinking is reinforced again and again in our lives. The way we studied geography and history in school, for example, tended to signify it by drawing stiff boundaries between the pink and green patches on world maps. And international politics has also ascribed artificial significance to national borders, lines that nature can neither see nor follow. In short, we have a habit of defining Earth in terms of its subdivisions rather than its integrated whole.

This book employs a different tactic. It argues the geographic character of Earth is best understood when viewed through the window of systems. The largest of these systems, which we call great systems, operate throughout the planet. They include an energy system that begins when solar radiation enters the top of the atmosphere, systems of water and air circulation that range over the entire planet, systems of currents coursing throughout the vastness of the oceans, systems of running water flowing over the land, and systems of organisms forming a living skin over all the Earth's lands and waters. These systems and their offspring, operating in large spaces or small ones, shape all things geographical, mountain chains, coastlines, plains, watersheds, climates, forests, lakes, and swamps. They are Earth's kinetic elements, the very foundation of physical geography.

Our planet is a geographic wonder and for centuries geographers have documented its diversity, producing maps of virtually every part of the lands, seas, and atmosphere. But we have also discovered that nothing on the planet is truly permanent. The patterns of rainfall, forest cover, river networks, coastlines, virtually everything mapped in one decade turns up different in the next, sometimes dramatically so. But knowing about change does not tell us what produces it. And this brings us to the principal objective of this book: to discover the nature of geographic change on Earth, not only how it takes place but what drives it. And this brings us back to systems, because they are the planet's big geographic drivers.

The content of physical geography is huge and the story told in textbooks can be overwhelming. The maps and diagrams alone can be daunting. The problem facing all writers in the field is how to make the medium, a book, work most effectively in support of the message, the physical geography of a changing planet. This was a real challenge for us, because with new research discoveries appearing almost daily, the message keeps getting bigger and in many ways more complicated. Among the options, we considered simplifying the message, distilling it down to its bare essence, but concluded that would sell our audience short. We also considered amplifying the medium by adding more accessories such as bigger and fancier graphics, special essays and guest commentary, items from the news media, and so on, but decided that would only detract from the central message. What we settled on was a back-to-basics approach based on two main objectives:
The first addresses the medium, which in its simplest form is just words and graphics. We decided to write the text in a somewhat narrative style of prose, and to create a set of graphics that feature single concepts rather than a gang of concepts bunched together in a few large, complex graphics. The resultant graphics not only tend to be small and clear but easy to tie to the storyline in the text. Next, the graphic storyline and the word (text) storyline had to be woven together. This was accomplished by using an “arm-in-arm” page design, that is, one that places most graphics (figures) alongside the related passages in the text.

The second objective addresses the message, and this we reasoned had to feature a story about a planet on which geographic change is the norm rather than the exception, where systems are more significant, extensive, and interconnected than we could possibly have guessed only a few decades ago, and where geography is more central to understanding our magnificent home than at any other time in the long history of the field.

The Book as a Learning and Teaching Tool

The systems approach is capped in each chapter with an eclectic end-of-chapter summary diagram featuring key concepts in a big-picture format, a useful learning and teaching tool.

To further round out each chapter, two sets of summaries are provided: in-chapter summaries at the ends of selected sections, and chapter-end summaries made up of a concluding paragraph followed by a series of overview statements. The overview statements are topped off with a set of review questions, 10 to 15 queries to help the student gauge his/her comprehension of the chapter’s main points.

Systems-based teaching can be a rewarding experience, especially if it is preceded by a little planning, and to help the teacher-scholar focus the learning experience, a companion volume is provided. The online Instructor’s Guidebook highlights the core concepts of each chapter including the relevant graphics in the text, and suggests strategies to help teach the material from a systems perspective.

Online Resources

Online at www.cambridge.org/mk, alongside the Instructor’s Guidebook, you will find Powerpoints of figures from the book, example responses for selected questions and flashcards.

WMM and MMK
Every book benefits from a host of participants and this book is no exception. Although students seldom see how they influence the character of a book, they are a major force in shaping the voice of a textbook, that is, the way the message is communicated. And so we humbly acknowledge the thousands of students who, over several decades of teaching, have helped us understand how to tell the story of physical geography.

The production of a volume such as this one requires an entire team of people and we are indebted to the team at Cambridge University Press not only for the heavy lifting with editing, graphics, and design, but for the constructive project climate they created which has fostered thoughtful exchanges and innovative thinking at many levels.

We acknowledge our colleagues in physical geography and related fields who provided manuscript reviews and suggestions on how to improve the book. The list is long and includes colleagues from colleges and universities in the United States, Canada, and Europe.

Finally, we acknowledge an inner circle of colleagues, friends, and relatives whom we used as sounding boards, who lent a hand when needed, and who willingly altered personal agendas to accommodate writing schedules. Chief among these is Alison Mewett, wife of the senior author. This circle also includes the participants in the chapter opening stories: William Steinhoff, Jeff Dozier, Alison Mewett, Earl Steinhoff, Roberta Steinhoff, Jack Goodnoe, Bruce D. Marsh, William R. Marsh, James G. Marsh, M. Leonard Bryan, John Koerner, Charles Douthitt, Ray Adair, and Vernie Anderson. It was all great fun.

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