

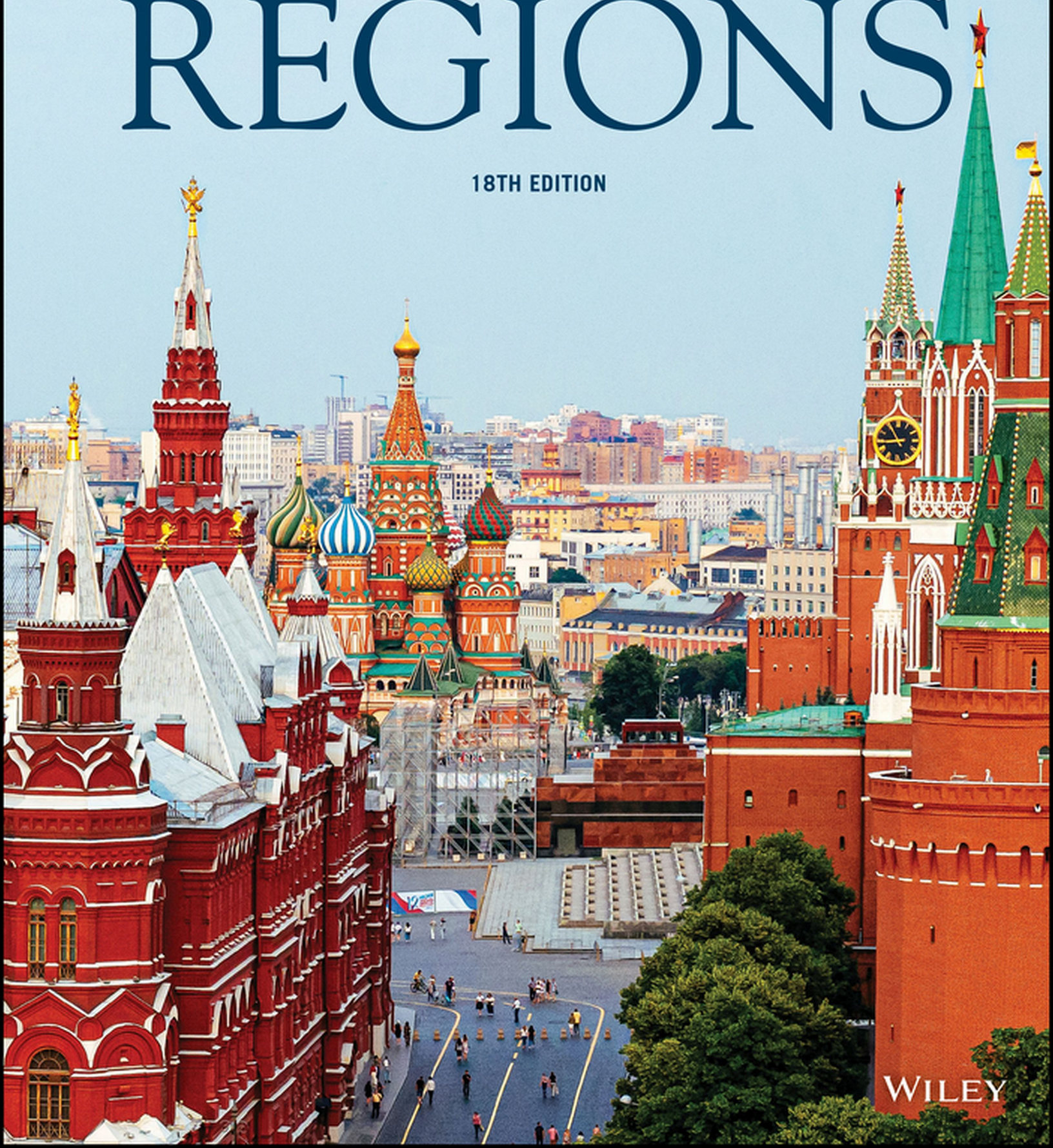
JAN NIJMAN

• MICHAEL SHIN

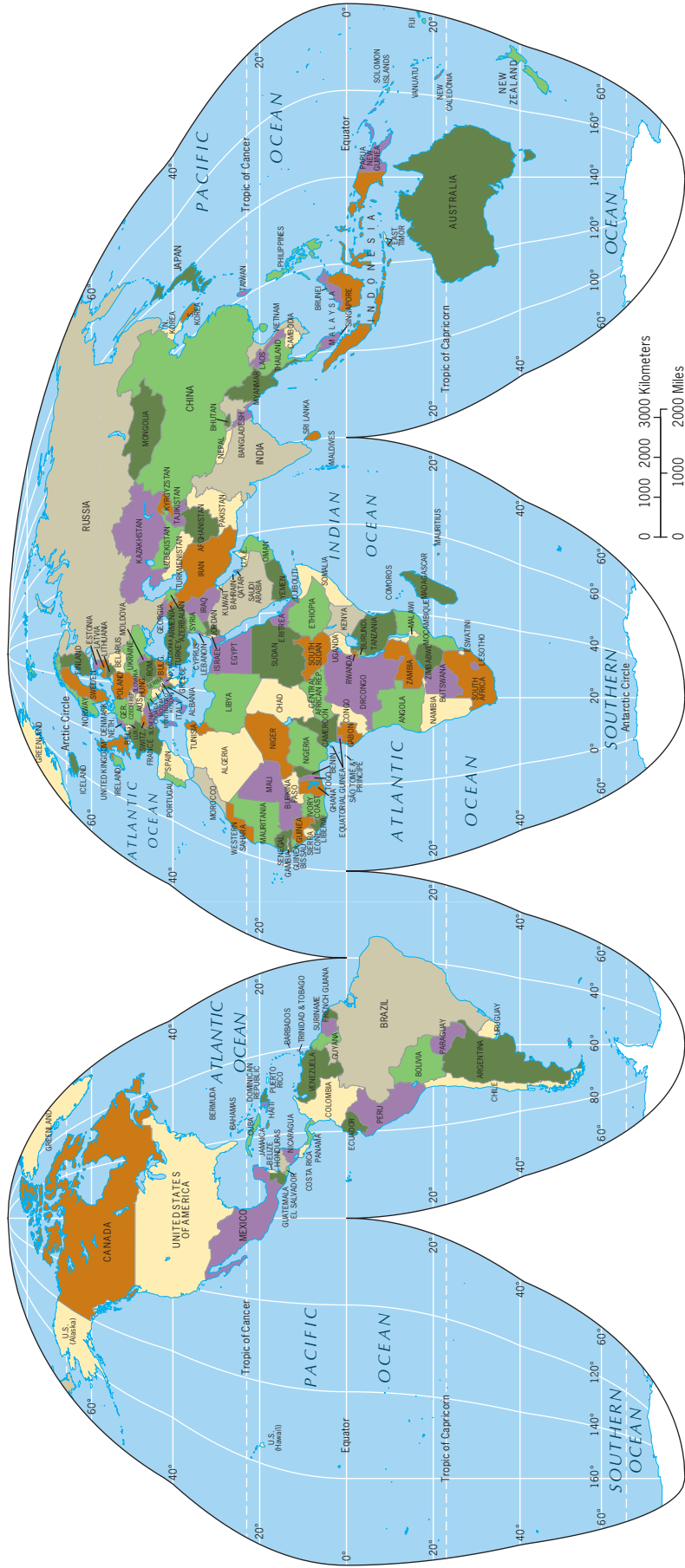
• PETER O. MULLER

REGIONS

18TH EDITION

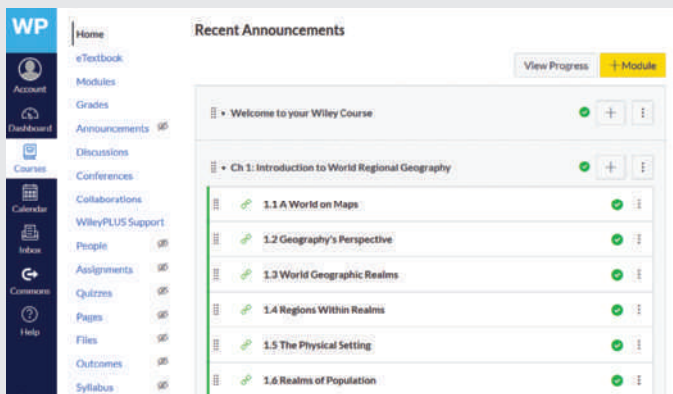


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WILEY

Geography: Realms, Regions, and Concepts

Eighteenth Edition

About the Cover

A view of the Moscow citadel, with the Kremlin walls and towers to the right, the State Historical Museum at the left front, the iconic St. Basil's Cathedral with its colorful onion-shaped domes behind it, and the low-rise marble and granite structure of Lenin's Tomb near the Kremlin walls—all situated around Red Square. The word "Kremlin" means "fortress inside a city." Within it are the official residence of President Putin, various government buildings (others are located elsewhere in the city), and several former czarist palaces, museums, and cathedrals. This is where the city was first settled in the 11th century and from where the Duchy of Muscovy began its massive territorial expansion in the 14th century. The Kremlin walls and towers shown here date from the late 15th century. There is no other place on Earth where highly centralized power is exercised over such an immense territory. What is decided here, reverberates around Russia and, frequently, the world.

Geography: Realms, Regions, and Concepts

Eighteenth Edition

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This book is dedicated to the current generation of college students who are raising awareness about the challenges and consequences of global climate change and who are claiming their rights to the future world.

Preface

This is the 18th edition of a book that, since its first appearance, has consistently broken new ground in the interpretation and teaching of world regional geography. For more than four decades, *Geography: Realms, Regions, and Concepts* has reported (and sometimes anticipated) trends in the discipline of geography and developments in the world at large. *REGIONS*, as the book has come to be called, has explained the contemporary world's geographic realms (the largest regional entities on the face of the Earth) and their natural environments and human dimensions. In the process, this book has become an introduction to geography itself, the discipline that links the study of human societies and natural environments. We look at the ways people have organized their living space, adapted to changing social as well as environmental circumstances, and continue to confront forces largely beyond their control ranging from globalization to climate change.

This book was the first to introduce an approach to geography that meshes theoretical concepts with regional realities. This approach to the integrated treatment of regions and concepts is a constant throughout all editions, but over the years we have adapted to the changing world around us. The evolving regional content of the chapters, and their organization, reflect the dynamic nature of the world's geography; the changing (and growing number of) concepts mirror the progress of the discipline; and the ongoing introduction of new (digital) features reflects the instructional possibilities of new technologies.

As always, we put a premium on top-quality, original maps to accompany our regional analyses, and we rely, in large part, on our own field observations. As geography changes over time, so do many of our maps. Much of our time and research for this book involves field visits and investigations in many of the world's realms. This is expressed most concretely in the numerous field notes, photographs, and videos supplied by the authors throughout the book. For the geographer, there is no substitute for *being there*. Since the 17th edition, the author team has revisited key sites in all of the world realms discussed in this book, from the Arctic to subtropical Australia, from Easter Island to the Gobi Desert, from Cape Town to the Peruvian Andes.

Geographic Knowledge, Global Awareness

The content before you is an information highway to geographic knowledge and global awareness. Universities and colleges prepare their students to become critical thinkers, creative problem solvers, and, increasingly, global citizens. If we are living in a “global village,” then students must get

to know the world as they know their own local areas. But while the influence and interests of the United States reach across the globe, it is no secret that geographic illiteracy at home remains widespread. Much of what students encounter in this content is of immediate, practical value to them—as citizens, as consumers, as voters, as travelers, as job-seekers. North America is a geographic realm marked by intense global connections and relationships. Those involvements require countless, often instantaneous decisions, whether they relate to international business, media, affairs of state, environmental management, disaster relief, and many other spheres. Such decisions must be based on the best possible knowledge of the world beyond our borders. That understanding can be gained by studying the layout of our world, its environments, societies, traditions, resources, policies, development strategies, and other properties—in short, its regional geography.

The New Author Team

REGIONS carries the lifelong imprint of its founding author, Harm J. de Blij. His passing in 2014 brought some important and ongoing changes, but this book will always radiate his passionate belief we all share: that geography is fundamental to our understanding of the world and to our efforts to shape and sustain it. The previous edition already marked a transition toward a new author team and that transition is continued in the present 18th edition.

Long-time co-authors Jan Nijman and Peter Muller are joined by Michael Shin and by authors Ann-Margaret Esnard and Richard Grant. Michael Shin, of the Department of Geography at UCLA, contributes essential digital interactive content to every chapter. He also authors innovative features on *Technology & Geography* and *Geographic Information Analysis*. Michael's combined expertise in online education, GIS, and regional geography are instrumental in taking this book to the cutting edge of digital learning. Ann-Margaret Esnard is a Distinguished University Professor at the Andrew Young School of Policy Studies at Georgia State University. With her international expertise in regional planning, she is ideally positioned to contribute an important feature entitled *Regional Planning Cases*. Richard Grant is responsible for the chapter on Sub-Saharan Africa. Professor of Geography and Regional Studies at the University of Miami, he is one of the discipline's foremost authorities on the geography of contemporary Sub-Saharan Africa. Richard has more than two decades of field research experience in Southern and West Africa and is affiliated with prominent universities across the realm.

Chapter Organization

For convenience, and in response to feedback from our users, we decided to renumber the chapters of the book: in the past, the introductory chapter stood by itself and was not numbered, then the successive chapters on the various realms were numbered 1 to 12. In this new edition, the Introduction is Chapter 1, and the successive realm chapters are numbered 2 to 13.

The internal organization of the chapters, one that has proven so useful over the years to instructors and students, remains the same: aside from the introductory chapter, all chapters are divided roughly in two halves. The first part, *Defining the Realm*, concerns itself with realm-wide geographies (e.g., South America or Europe). The second part, *Regions of the Realm*, focuses on finer-scale and more richly detailed regional and sub-regional geographies within the realm (e.g., the Andean West, or Mediterranean Europe).

We know that many instructors cope with the challenge of covering all of the world in a single semester course. If instructors feel the need to cut material, the structure of our chapters allows for the option to assign only the first half of selected chapters. In that case, students will not be exposed to the detailed and finer-scale issues but they still get a concise and coherent overview at the scale of the realm.

New Features

In this edition, we present two new features and further develop several features that were first introduced in the 17th edition. Some are especially designed for digital interactive platforms, and all have counterparts in print and e-text.

1. *Geographic Information Analysis*

The *Geographic Information Analysis (GIA)* features are guided interactive exercises that foster geographical thinking, spatial awareness, and data literacy. For this edition, they are updated and revised, and new features were created. The 24 GIAs in this edition are carefully designed to interactively engage students through the use of compelling maps and other spatial data visualizations, with the purpose to highlight and reinforce key concepts, issues, and locations in world regional geography. From examining the pattern of carbon dioxide emissions at the global scale in the Chapter 1, to mapping population projections across China's Pearl River Delta in Chapter 10, the variety in content and form of these features will stimulate both student curiosity and learning. Moreover, these features can and should be used as the basis for in-class or online discussions, or for independent or group-based student assignments.

2. *Interactive Maps*

This new edition also offers a new set of interactive web maps. Accessed through WileyPLUS, the interactive maps give students the freedom to navigate and explore the map by panning and zooming into areas and places, thus getting a better sense of the spatial dimensions, at varying scales,

of the phenomenon in question. From examining regional variations in population density to identifying which cities of the world are most prominent when viewed using night-time satellite imagery, giving students the ability to explore and examine the world in detail, independently, across various themes, encourages engagement with the text and enhances student learning. The interactive maps can also be used by instructors to design their own student exercises or assignments.

3. *On-Location Video Material*

We are gradually integrating videos from our field visits into the various chapters in WileyPLUS, often accompanying Field Notes. These videos allow students a more effective and dynamic “place experience.” We are selective with these on-location videos, including them where we think they have most didactic value, either in the illustration or emphasis of a particular concept or problem, or where we feel the students would most benefit from a “feel” for a place that may otherwise seem distant to them. In this edition, we start with eight new videos and we will be expanding their number over time.

4. *Regional Impacts of Global Climate Change*

We created another new feature in this 18th edition to cover the ever-increasing importance of global climate change. The book includes ten new feature boxes, spread across the various chapters, that focus on the impact of climate change in a particular region. For instance, in the chapter on Europe the feature covers extreme weather events; in South America, it focuses on the drying of lakes in Bolivia; in East Asia, it is concerned with flooding in the Pearl River Delta; and in Sub-Saharan Africa the feature concentrates on the increasing frequency and severity of cyclones. Taken together, this new collection of features underscores the reality of global climate change in local contexts around the world.

Besides these new features, we continue two important features that were first introduced in the 17th edition. The *Technology & Geography* feature, repeated in every chapter, illustrates the impact of evolving technologies (digital or otherwise) on geography and geographic regions; it underscores the dynamic nature of the subject matter in this book: regions change, and the role or meaning of geography can change as a result of new technologies. We also continue the *Regional Planning Case* feature. Regional planning represents a deliberate effort to shape or reshape our environment, and as such it is an intrinsic part of geography. The importance of this feature lies in the recognition of the practitioner's perspective: as geographers, we not only seek to better understand the world around us—our knowledge is also applied to actively manage or change it. And, of course, we continue our longer established and proven features *From the Field Notes* (important first-hand observations from the field by the authors); *Major Cities of the Realm* (listings of main cities and population); *Regional Issues* (in selected chapters, a debate forum on critical contentious issues in the realm); and *Among the Great Cities of the Realm* (concise case studies of the realm's major metropolitan areas).

Highlights of Newly Added Content

The entire text has been thoroughly updated in terms of statistics and recent or even current developments. Additionally, we have revised and replaced text, maps, and features in more substantial ways, wherever we observe critical shifts in the geographic makeup of realms and regions.

Since the last edition appeared in early 2017, the world has undergone some momentous changes, all of which have important geographic dimensions. Throughout the text, we emphasize three general trends that are affecting many different realms and regions around the world. The first pertains to global climate change—it has been underway for some time, of course, but the acceleration and deepening of climate change impacts, locally and globally, demand more systematic examination (hence the new feature described above). The second more general trend refers to international migration: a testament to increased global information flows and mobility, but also a reflection of the global disparities in development, standards of living, and political freedom and safety. Furthermore, increased international migration has been a source of tension and reactionary politics, including populism, in receiving countries, particularly in the United States and various European countries. Third, this edition pays close attention to China's growing global footprint, in almost all realms, be it through infrastructure investment, trade, diplomacy, or military involvements.

No summary can adequately encapsulate everything this new edition contains, but here are some chapter-by-chapter highlights of the new content.

Chapter 1, the Introduction, as usual, provides the foundation and sets the stage for the regional chapters, discussing a broad range of basic geographic concepts along with a set of cornerstone world maps. It includes new sections and text on the importance of global climate change and global refugee and migration flows. Look for a new Geographic Information Analysis (GIA) on global migration flows and the first feature box on Global Climate Change that focuses on the Anthropocene; also direct your attention to the first set of interactive maps, one on the concept of scale and the other depicting the world's population distribution.

Chapter 2, North America, has new sections on immigration and shifting demographics, and another on the growing urban–rural divide in the United States. Also, look for new materials on growing urban and regional inequalities, and for updated GIAs on the U.S. presidential election. The climate change feature box (including on-location video material) refers to the recent wildfires in California and flooding events in South Florida.

Chapter 3, Middle America, contains updated and expanded text on the realm's northern boundary with the United

States and on the impact of the expanded Panama Canal. The chapter also provides the latest available geographic information on Middle America's challenges related to the narcotics trade and concomitant drug wars. Also, see a new GIA on migrant remittances from the U.S. to Middle American countries.

Chapter 4, South America, provides an interesting new section comparing race relations in Brazil and the United States and has a new section on the Venezuelan crisis. In addition, look for new material on China's economic footprint in South America and a new feature box on global climate change and vanishing Lake Poopó in Bolivia. The GIAs on income inequalities and wine-producing regions have been updated with increased interactivity.

Chapter 5, Europe, discusses the recent developments (until late 2019) regarding Brexit and contains new sections on geopolitics in the Baltics and on extreme weather events (e.g., record-setting heat waves in 2018 and 2019) induced by climate change. It also presents new text on the challenges of international migration and its political ramifications in various European countries. Also, check out the new interactive maps (on population distribution and climate), on-location video material from Iceland, and updated GIAs on immigration and demography and on the Russian presence in Ukraine.

Chapter 6, Russia/Central Asia, emphasizes the enormous challenges for Moscow (also see the book's cover) to exercise control over a country that stretches across nine time zones and the realms and regions that surround it. The chapter provides important updates on Russia's demographic east–west imbalance, the geopolitical situation vis-à-vis Ukraine, and relations with the Central Asian republics and China. In addition, there is an important new section on Siberia's thawing permafrost; look for new field notes from Lake Baikal, Kamchatka, and Moscow (including on-location video material).

Chapter 7, North Africa/Southwest Asia (NASWA), presents important updates and new material on this highly volatile realm. This includes new sections and maps on the territorial demise of ISIS, the refugee problems resulting from the ongoing war in Syria, and the devastating conflict in Yemen. There is also new text on the steady rise of the Gulf States (with new field notes and on-location video material from Dubai), on evolving women's rights in Tunisia and Saudi Arabia, and a shift of jihadism towards the African Transition Zone. Look for interactive features on the geography of wealth and democracy and on the realm's water crisis.

Chapter 8, Sub-Saharan Africa, offers new sections on the impacts of climate change in the realm, along with a new field note from Cape Town on “Day Zero” (the day when the city's water supply was said to run dry). New interactive features and GIAs focus on the ethnic map of Sub-Saharan Africa, geographies of colonization and decolonization, population distribution, and the geography of Chinese investments across the realm. The chapter contains major updates on China's foothold in the realm and the divergent economic trajectories of various countries.

Chapter 9, South Asia, provides substantial new text on Afghanistan and the complicated triangular geopolitical relationship with Pakistan and India, including an update on the situation in Kashmir. Look for various new field notes (including on-location video material) from Nepal, Bhutan, and India; for a new feature box on climate change and extreme weather events, new maps of Nepal/Bhutan, and Sri Lanka; and for interactive materials on India's demographic gender imbalance and a comparison of megacity Dhaka with Los Angeles.

Chapter 10, East Asia, introduces new sections on China's massive and ongoing Belt and Road Initiative, Mongolia's development challenges, Japan's aging population, the gender pay gap in this realm, and the Demilitarized Zone that divides the two Koreas. Look for new GIAs on Korean missile ranges and on the increasing threats of flooding in the Pearl River Delta, one of China's mega city-regions. There are several new maps, as well as new field notes, with photographic and on-location video from Lhasa (Tibet), the Korean DMZ, Mongolia, and Japan. This is perhaps the most dynamic realm in the world, much of it driven by China; it is reflected in the breadth and currency of this chapter.

Chapter 11, Southeast Asia, introduces the concept of "hybrid warfare" (multifaceted conflict short of all-out military war) as applied to the South China Sea. Hybrid warfare has become an important issue in geopolitical studies, as it is thought to be proliferating in different parts of the world (another example is the conflict between Russia and Ukraine). The chapter also offers new material on the precarious position of Islamic minority communities in Myanmar, Thailand, and the Philippines. The climate change feature focuses on one of the world's most exposed countries, Myanmar, and one of the new GIAs examines the realm's trade patterns and in relation to China. Also, look for new field notes and photographic and video material from Laos, Vietnam, Cambodia, and Myanmar.

Chapter 12, The Austral Realm, includes expanded material on matters of immigration and the challenges of climate change in Australia. It also offers new interactive features on the realm's population distribution and Aboriginal geographies. Look for a new map of the world as seen from Australia and New Zealand, and for the updated Regional Planning Case on Christchurch.

Chapter 13, has been slightly retitled as **The Pacific Realm and Polar Regions**, where we treat the Arctic and Antarctic as individual regions aside from the Pacific Realm. Note a new figure in this chapter that explains the latitudinal positioning of the Arctic and Antarctic Circles and expanded material on the impacts of global warming. The GIA on competition in the Arctic incorporates the latest available records on the extent of melting of the polar ice cap. New material on the Pacific Realm engages with the exposure of low-lying islands to rising sea levels (see the Regional Planning Case on Kiribati), and it draws comparisons with small and isolated Caribbean islands in terms of obstacles to economic development.

WileyPLUS Instructor Resources

A broad spectrum of electronic resources are available to support instructors:

Test Bank—Prepared by Travis Bradshaw of Liberty University. Includes over 1200 multiple-choice, true/false, and fill-in-the-blank short-answer questions.

PowerPoint Lecture Slides—Prepared by Michele Barnaby of Pittsburg State University. These slides highlight key chapter topics to help reinforce students' grasp of essential concepts.

Clicker Questions—Also prepared by Michele Barnaby of Pittsburg State University. A bank of questions is available for instructors who utilize personal-response-system technology in their courses.

Image Gallery—all figures in the text will be extracted as part of a comprehensive image gallery that is available for instructors to isolate and use at their convenience.

WileyPLUS Student Resources

Students also have access to a variety of tools to help gain a better understanding of course concepts and provide further insight to the material:

Geographic Information Analysis Quizzes—Guided assignments use this powerful new tool to engage students through the use of compelling maps and other spatial data visualizations, and is designed to highlight and reinforce key concepts, issues, and locations in world regional geography.

Interactive Graphics—These features present processes, relationships, data, and layers in a dynamic fashion—all controllable by the student. Instead of skipping quickly over static images, students explore Interactive Graphics in ways that allow them to see how the parts relate to the whole, visualize data, build processes, and relate elements to each other.

On-Location Videos—Eight new videos, filmed by the author team during their field work, help to immerse the students and trigger their imagination about distant parts of the world and locations.

Adaptive Practice—Every student has a different learning starting point, and adaptive practice provides new opportunities for practice to effectively prepare for class or quizzes and exams. Adaptive Practice creates a personalized study plan that is focused on an individual's needs which makes study time more efficient. Students begin with a quick, chapter-level diagnostic to determine their initial level of understanding, and they can use the dashboard and quick reports to see what topics they know and don't know. From there students are able to focus on the concepts they need to master.

Acknowledgments

Since the publication of the first edition of *Geography: Realms, Regions, and Concepts*, we have been fortunate to receive advice and assistance from hundreds of people. One of the rewards associated with the publication of a book of this kind is the steady stream of correspondence and other feedback it generates. Geographers, economists, political scientists, education specialists, and others have written us, often with fascinating enclosures. We still make it a point to respond personally to every such email, and our editors have communicated with many of our correspondents as well. Moreover, we have considered every suggestion made, and many who wrote or transmitted their reactions through other channels will see their recommendations in print in this edition.

Student Response

A major part of the correspondence we receive comes from student readers. We would like to take this opportunity to extend our deep appreciation to the several million students around the world who have studied from our books. In particular, we thank the students from more than 150 different colleges across the United States who took the time to send us their opinions. Students told us they found the maps and graphics attractive and functional. We have not only enhanced the map program with exhaustive updating but have added a number of new maps to this 18th edition as well as making significant changes in many others. Generally, students have told us that they found the pedagogical devices quite useful. We continue to develop the study aids the students cited as effective: a list of each chapter's key concepts, ideas, and terms (numbered for quick reference in the text itself); a box that summarizes each realm's major geographic qualities; a chapter-end box of thought questions entitled Points to Ponder; and an extensive and still-expanding glossary.

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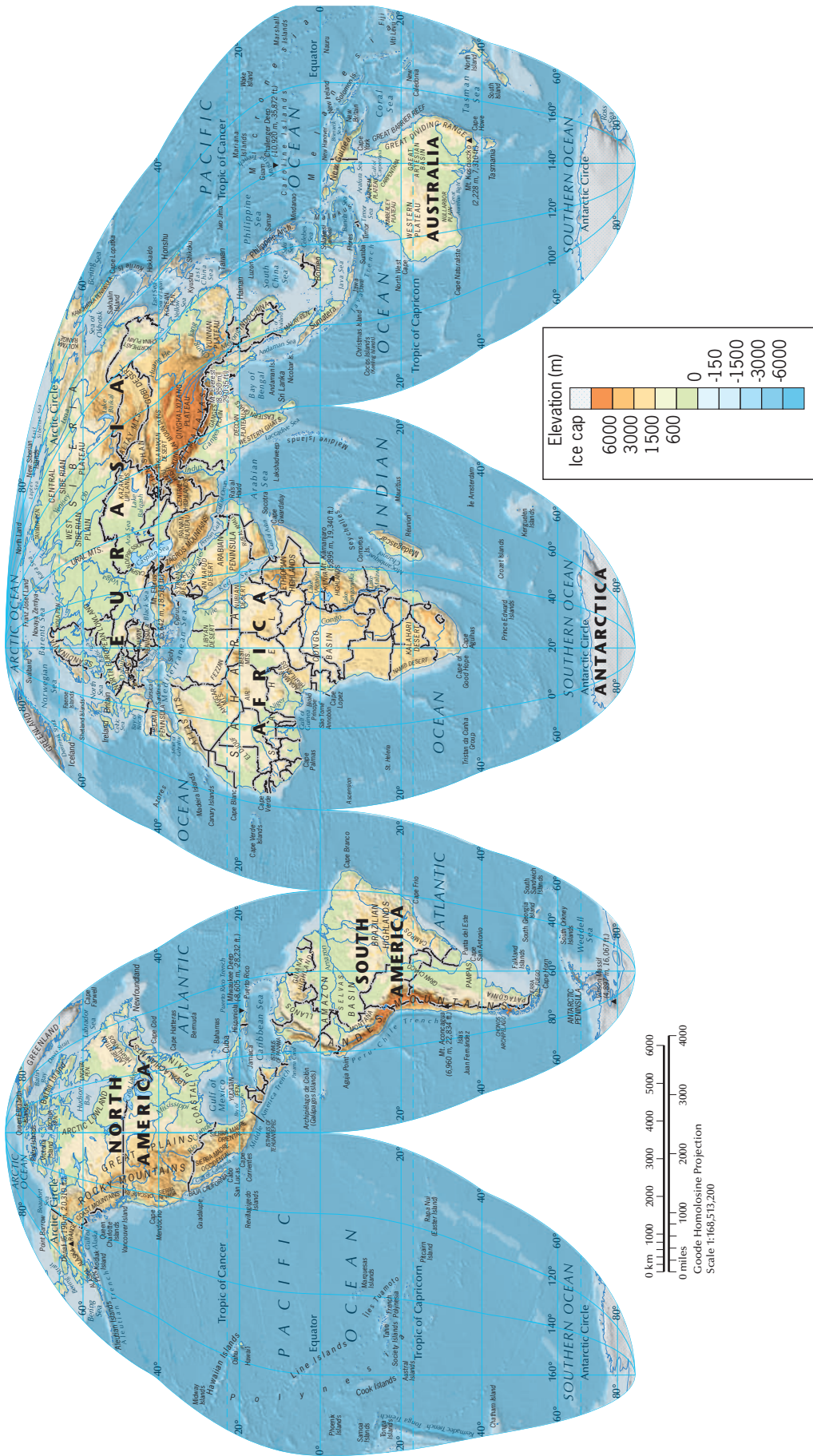
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FIGURE 1-1

Nature and culture, entwined in geography. The Tuscany region in the northwestern corner of peninsular Italy contains some of the most elegant cultural landscapes in the world with its rolling hills, contoured grain fields, olive groves, and vineyards.



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Introduction: World Regional Geography

IN THIS CHAPTER

- The power of maps
- The spatial order of the world
 - Persistent cultural diversity
- Geopolitics and the specter of terrorism
 - Technology and geography
- The challenge of sustainable development
 - Widening global inequalities
 - The threats of global climate change
- Migrants and refugees in an unequal world

CONCEPTS, IDEAS, AND TERMS

Mental maps [1]	Relative location [11]	Global climate change [22]	Sustainable development [33]
Cartography [2]	Formal region [12]	Anthropocene [23]	Inclusive development [34]
Geographic information system (GIS) [3]	Spatial system [13]	Population distribution [24]	Global core [35]
Geospatial data [4]	Hinterland [14]	Urbanization [25]	Global periphery [36]
Spatial perspective [5]	Functional region [15]	Megacity [26]	Core–periphery relationship [37]
Scale [6]	Natural landscape [16]	Cultural landscape [27]	Core area [38]
Geographic realm [7]	Continental drift [17]	State [28]	Uneven development [39]
Transition zone [8]	Tectonic plate [18]	Sovereignty [29]	Globalization [40]
Region [9]	Pacific Ring of Fire [19]	European state model [30]	Migration [41]
Absolute location [10]	Climate [20]	Geopolitics [31]	
	Holocene [21]	Development [32]	

What are your expectations as you open this book? You have signed up for a course that will take you around the world to try to understand how it functions today. You will discover how interesting and challenging the discipline of geography is. We hope that this course, and this book, will open new vistas, bring new perspectives, raise your awareness of place, and help you navigate our increasingly complex and often daunting world.

You could not have chosen a better time to study geography. The world is changing on many fronts and is doing so ever faster in response to the rapid advancement of communication technologies. The world truly is “shrinking,” and the likelihood has never been greater that your professional career will be taking you to places far from home.

Moreover, the United States is still the world’s biggest economy, with political influence to match. Intentionally or not, the United States is affecting nations and peoples, lives and livelihoods, from pole to pole. That power confers on Americans a responsibility to learn as much as they can about those places, nations, and livelihoods, so that the decisions of their government representatives are well informed. But in this respect, the United States is no superpower. Geographic literacy is a measure of international comprehension and awareness, and Americans’ geographic literacy ranks low. That is a liability, for both the United States and the rest of the world, because such geographic fogginess afflicts not only voters but also the representatives they elect, from local school boards to the federal government.

A World on Maps

Just a casual glance at the pages that follow reveals a difference between this and other textbooks: there are almost as many maps as there are pages. Geography is more closely identified with maps than any other discipline, and we urge you to give as much (or more!) attention to the maps in this book as you do to the text. It is often said that a picture is worth a thousand words, and the same applies to maps. When we write “see Figure XX,” we really mean it—and we hope that you will get into the habit. We humans are territorial creatures, and the boundaries that fence off our 200 or so countries reflect our divisive ways. Other kinds of borders—between religions, languages, wealth, and poverty—partition our planet as well. When political and cultural boundaries are at odds, there is nothing like a map to summarize the circumstances. Just look, for example, at the map of the African Transition Zone in Chapter 7: this corridor’s turbulence and challenges are steeped in geography.

Maps in Our Minds

All of us carry in our minds maps of the world around us: the apartment building or house we live in, the streets nearby, the way to school or workplace, the general layout of our hometown or city. You will know what lane to use when you turn into a shopping mall, or where to park at the movie theater. You can probably draw from memory a pretty good map of your hometown.

These **mental maps** [1] allow you to navigate your activity space with efficiency, predictability, and safety. When you arrived as a first-year student on a college or university campus, a new mental map would have started forming. At first you needed the navigation tool on your smartphone or a hard-copy map to find your way around, but soon you dispensed with that because your mental map became sufficient. And it will continue to improve as your activity space expands.

If a well-formed mental map is useful for decisions in daily life, then an adequate mental map is surely indispensable when it comes to decision making in the wider world. You can give yourself an interesting test. Choose some part of the world beyond North America in which you have an interest or about which you have a strong opinion—for example, Israel, Iran, Russia, North Korea, or China. On a blank piece of paper, draw a map that reflects your impression of the regional layout there: the country, its neighbors, its internal divisions, major cities, water bodies, and so forth. That is your mental map of the place. Put it away for future reference, and try it again at the end of this course. You will have proof of your improved mental-map inventory.

Mapping Revolutions

The maps in this book show larger and smaller parts of the world in various contexts. Some depict political configurations; others display ethnic, cultural, economic, or environmental features. **Cartography** [2] (the making of maps) has undergone a dramatic and continuing technological revolution. Earth-orbiting satellites equipped with remote-sensing technology (special on-board sensors and imaging instruments) transmit remotely sensed information to computers on the surface, recording the expansion of deserts, the shrinking of glaciers, the depletion of forests, the growth of cities, and myriad other geographic phenomena. Earthbound computers possess ever-expanding capabilities not only to organize this information but also to display it graphically. This allows geographers to develop a **geographic information system** or **GIS** [3], bringing geospatial data to a monitor that would have taken months to assemble just three decades ago (see **Box 1-1**).

A parallel map revolution is embodied in the astounding proliferation of navigation systems in cars and on mobile phones. Smartphones enable the use of maps on the go, and many of us, in the developed world at least, have already

Box 1-1 Technology & Geography

Geospatial Data: Understanding Our World

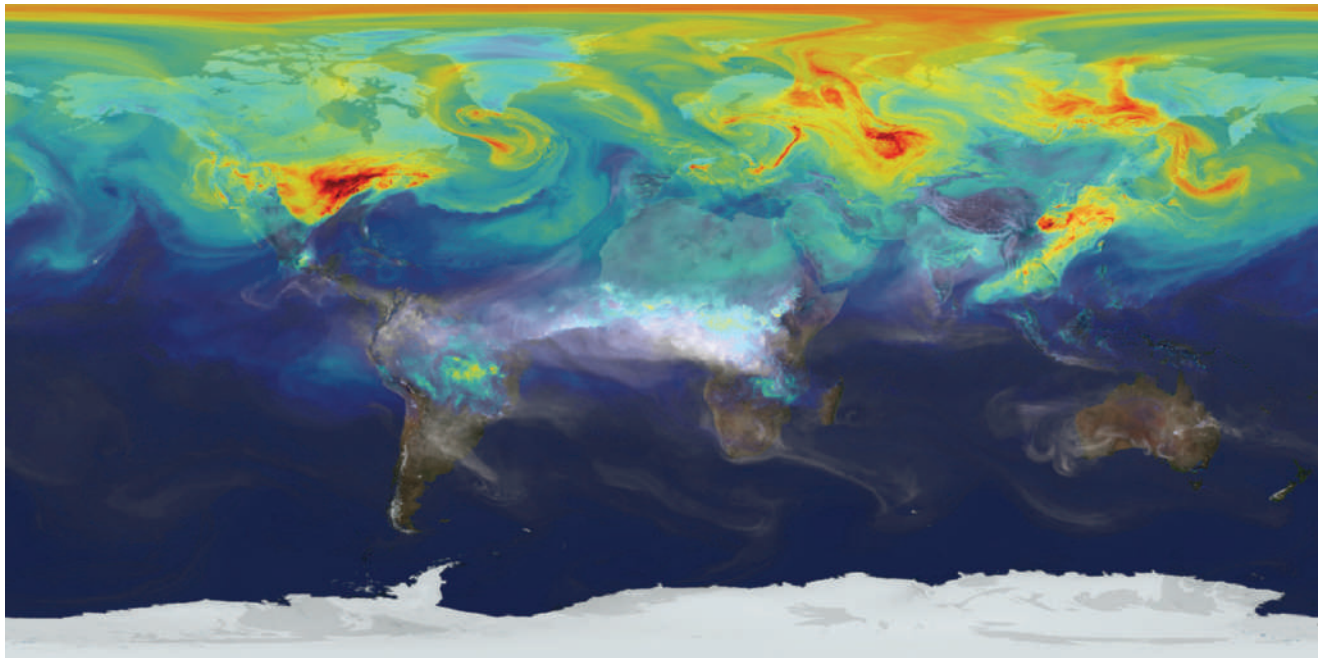
It is estimated that approximately 80 percent of all data contain geographic information that can be mapped. Moreover, the technologies that we use daily, from our automobiles to our cell phones to the Internet, are also aware of our location, and sometimes share it with others without our knowledge. Advances in mapping technology that make use of **geospatial data** [4] are driving innovations such as self-driving cars and trucks; enabling smart cities to improve sustainability; and permitting scientists to monitor the causes and consequences of global environmental change.

The National Aeronautics and Space Administration—NASA—builds instruments and launches satellites to collect and analyze data about the Earth and beyond. By coupling location information to data on wind speed, pollution, and atmospheric conditions, a more complete picture of the Earth's atmospheric dynamics can be obtained. Computer simulations

using such big geospatial datasets reveal temporal and regional variations in the amount of carbon dioxide (CO₂) present in the atmosphere, as well as how pollutants and other emissions (e.g., smoke) travel across North America, China, and Europe.

The image below is a single frame taken from a movie that shows how CO₂ emissions travel around the world. The image shows the situation in January. Emissions of CO₂ (increasing intensities shown from yellow to orange to red) are most visible in the winter months of the northern hemisphere. The integration of geospatial data, technology, and geography increases our understanding of climate change, and can also inform how we respond to this critical issue.

Access your WileyPLUS course to interact with a dynamic version of this map and to engage with online exercises and questions.



NASA's Goddard Space Flight Center

become dependent on them to traverse cities, find a store or restaurant, even to move around shopping malls. While the personalized maps on our smartphones allow us to navigate more efficiently, the maps in this book are aimed at better understanding the world and its constituent parts.

Satellites—even spy satellites—cannot record everything that occurs on the Earth's surface. Sometimes the borders between ethnic groups or cultural sectors can be discerned by satellites—for example, in changing house types or religious shrines—but this kind of information tends to require

on-the-ground verification through field research and reporting. No satellite view of Iraq could show you the distribution of Sunni and Shi'ite Muslim adherents. Many of the boundaries you see on the maps in this book cannot be observed from space because long stretches are not even marked on the ground. So the maps you will be “reading” here have their continued uses: they summarize complex situations and allow us to begin forming durable mental maps of the areas they represent.

There is one other point we should make that is especially important when it comes to world maps: never forget that the

world is a sphere, and to project it onto a two-dimensional flat surface must necessarily entail some very significant distortions. Try peeling an orange and flattening the entire peel on a surface—you will have to tear it up and try to stretch it in places to get the job done. Take a look at **Figure 1-1** and note how the Atlantic Ocean and other segments of the planetary surface are interrupted. You can produce a map like this in many different ways, but you will always end up distorting things. When studying world maps, there is nothing like having a globe at hand to remind you of our three-dimensional reality.

Geography's Perspective

Geography is sometimes described as the most interdisciplinary of disciplines. That is a testimonial to geography's historic linkages to many other fields, ranging from geology to economics and from sociology to environmental science. And, in some ways, geography is in the lead because interdisciplinary studies and research are now more prevalent than ever.

Most disciplines focus on one key theme: economics is about money; political science is about power; psychology is about the mind; biology is about life forms. Geography is about the explanation of space on the Earth's surface, also referred to as terrestrial space. Social space (cities, buildings, political boundaries, etc.) as well as natural space (climates, terrain, vegetation, etc.) are not randomly configured. Instead, there generally prevails a particular order, regularity, even predictability about the ways in which space is organized. Sometimes it is the deliberate work of human beings, and sometimes it is the work of nature, but both produce specific patterns. Geographers consider these spatial patterns and processes as not only interesting but also crucial to how we live and how we organize our societies. This **spatial perspective [5]** has defined geography from its beginning.

Environment and Society

There is another connection that binds geography and has done so for centuries: an interest in the relationships between human societies and the natural environment. Geography lies at the intersection of the social and natural sciences and integrates perspectives from both, being the only discipline to do so explicitly. This perspective comes into play frequently: environmental modification is in the news on a daily basis in the form of worldwide climate change, but this current surge of global warming is only the latest phase of endless atmospheric and ecological fluctuation. Geographers are involved in current environmental issues not only by considering climate change in the context of the past, but also by looking carefully at the implications of global warming for human societies. Geographers are acutely aware that

human beings will always be part of nature, no matter how far technology advances.

More generally, think of this relationship between humans and their environment as a two-way street. On one hand, human beings have always had a transformative effect on their natural surroundings, from the burning of forests to the creation of settlements. On the other hand, humans have always been heavily dependent on the natural environment, their individual and collective behaviors very much a product of it. There are so many examples that it is hard to know where to begin or when to end: we eat what nature provides, and traditional diets vary regionally; rivers allow us to navigate and connect with other peoples—or they serve as natural boundaries like the Rio Grande; wars are fought over access to water or seaports; landlocked countries seem to have different global connections than islands; and so forth.

Spatial Patterns

Geographers, therefore, need to be conversant with the location and distribution of salient features on the Earth's surface (**Fig. 1-2**). This includes the natural (physical) world, simplified in Figure 1-1, as well as the human world; our inquiry will view these in temporal (historical) as well as spatial perspective. The spatial structure of cities, the layout of farms and fields, the networks of transportation, the configurations of rivers, the patterns of climate—all these form part of our investigation. As you will find, geography employs a comprehensive spatial vocabulary with meaningful terms such as *area*, *distance*, *direction*, *clustering*, *proximity*, *accessibility*, and many others that we will encounter in the pages ahead. For geographers, some of these terms have more specific definitions than is generally assumed. There is a difference, for example, between *area* (surface) and *region*, between *boundary* and *frontier*, and between *place* and *location*. Sometimes, what at first may seem to be simple ideas turn out to be rather complex concepts.

Scale and Scope

One very prominent term in the geographic vocabulary is **scale [6]**. Whenever a map is created, it represents all or part of the Earth's surface at a certain level of detail. Obviously, Figure 1-1 displays a very low level of detail; it is little more than a general impression of the distribution of land and water as well as lower and higher elevations on our planet's surface. A limited number of prominent features such as the Himalayas and the Sahara are named, but not the Pyrenees Mountains or the Nile Delta. At the bottom of the map you can see that one inch at this scale must represent about 1650 miles of the real world, leaving the cartographer little scope to insert information.

A map such as Figure 1-1 is called a *small-scale* map because the ratio between map distance and real-world distance,



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FIGURE 1-2 **Interactive** This map is an assemblage of nighttime satellite images that show the dominance of electric lighting in certain parts of the world and darkness in others. What does this spatial distribution suggest about the geography of development?

expressed as a fraction, is very small at 1:168,513,200. Increase that fraction (i.e., zoom in), and you can represent less territory—but also enhance the amount of detail the map can exhibit. In **Figure 1-3**, note how the fraction increases from the smallest (1:14,600,000) to the largest (1:14,500). San Francisco is just a dot on Map A but an urban area on Map C. Does this mean that world maps like Figure 1-1 are less useful than larger-scale maps? It all depends on the purpose of the map. In this chapter, we often use world maps to show global distributions as we set the stage for the more detailed discussions to follow. In later chapters, the scale tends to become larger as we focus on smaller areas, even on individual countries and cities. But whenever you read a map, be aware of the scale because it is a guide to its utility.

The importance of the scale concept is not confined to maps. Scale plays a fundamental role in geographic research and in the ways we think about geographic problems—scale in terms of *level of analysis*. This is sometimes referred to as *operational scale*, the scale at which social or natural processes operate or play out. For instance, if you want to investigate the geographic concentration of wealth in the United States, you can do so at a range of scales: within a neighborhood, a city, a county, a State,* or at the national level. You choose the scale

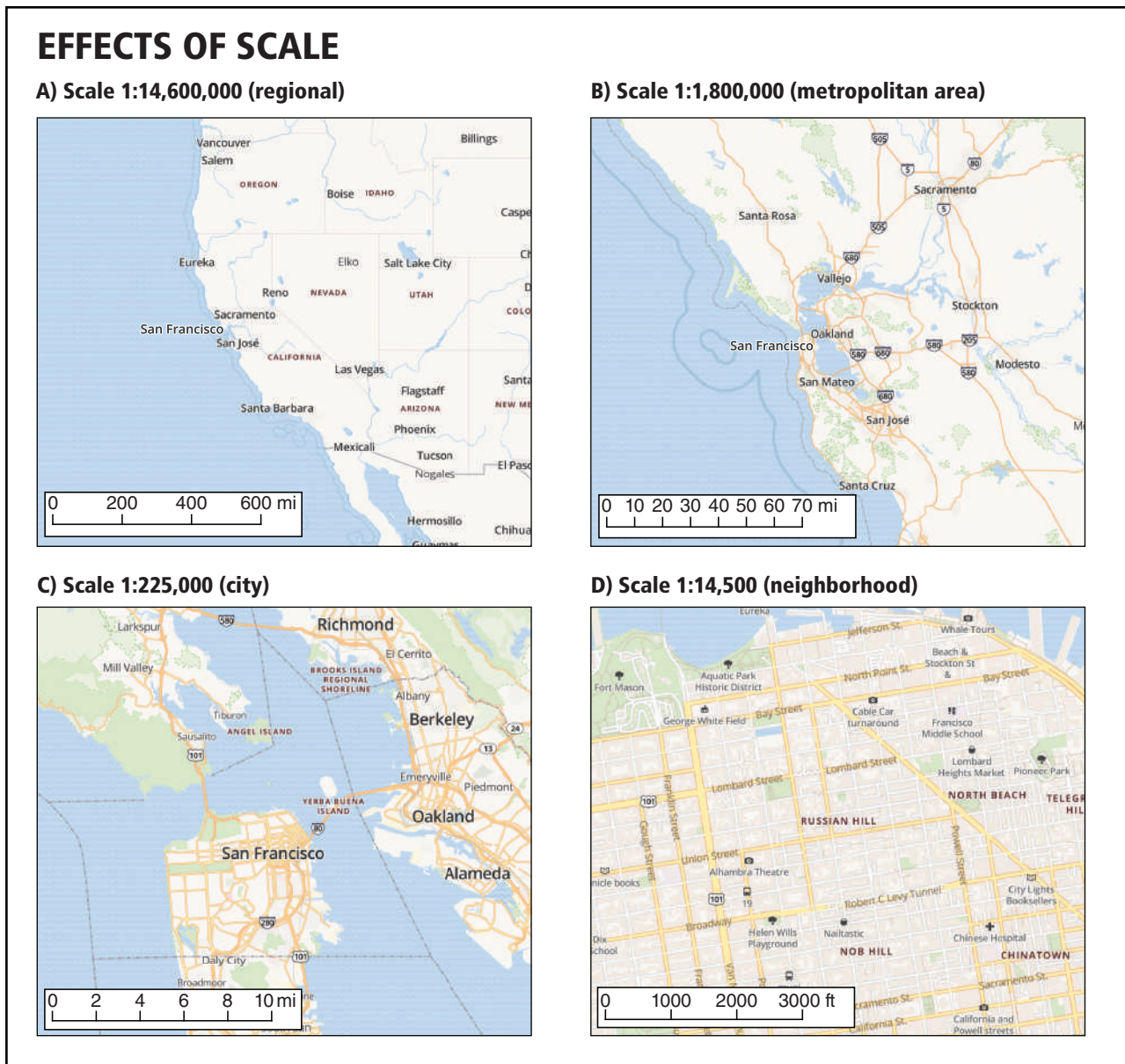
*Throughout this book we will capitalize State when this term refers to an administrative division of a country: for example, the U.S. State of Ohio or the Australian State of New South Wales. Since this term is also synonymous with country (e.g., the state of Brazil), we use the lower case when referring to such a national state.

that is the most appropriate for your purpose, but it is not always that straightforward. Suppose you had to study patterns of ethnic segregation: what do you think would be the most relevant scale(s)?

In this book, our main purpose is to understand the geography of the world at large and how it works, and so, inevitably, we must deal with broad spatial entities. Our focus is on the world's realms and on the main regions within those realms, and in most cases we will have to forgo analyses at a finer scale. For our purposes, it is the big picture that matters most.

World Geographic Realms

Ours is a globalized, interconnected world, a world of international trade and travel, migration and movement, tourism and television, financial flows and Internet traffic. It is a world that, in some contexts, has taken on the properties of a “global village”—but that village still has its neighborhoods. Their names are Europe, South America, Southeast Asia, and others familiar to us all. Like the neighborhoods of a city or town, these global neighborhoods may not have sharply defined borders, but their persistence, after tens of thousands of years of human dispersal, is beyond doubt. We call such global neighborhoods **geographic realms** [7]. Each of the realms possesses a particular combination of environmental, cultural, and organizational properties.



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FIGURE 1-3 Interactive

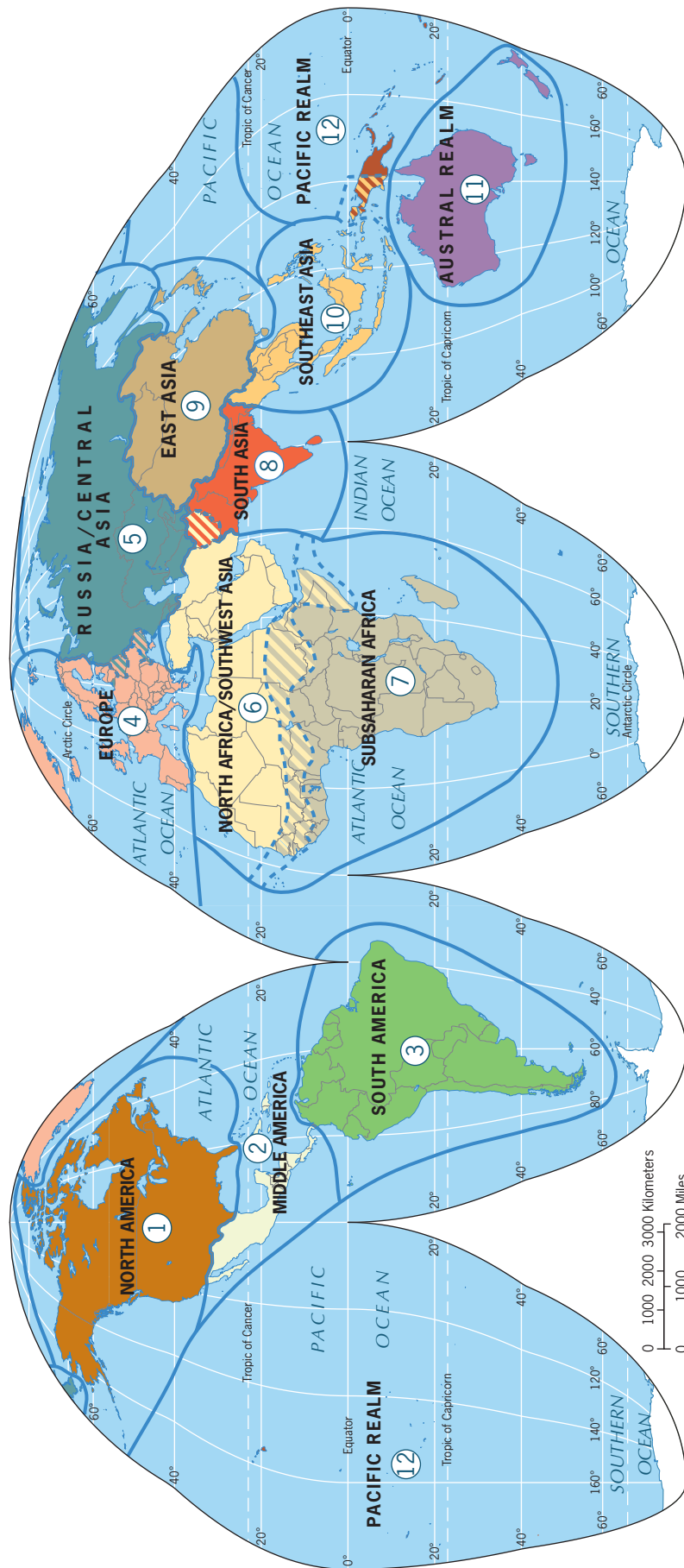
These blended, characteristic qualities are imprinted on the landscape, giving each realm its own traditional attributes and social settings. As we come to understand the human and environmental makeup of these geographic realms, we learn not only where they are located but also why they are located where they are (a central question in geography), how they are constituted, and what their future is likely to be in our fast-changing world. **Figure 1-4**, therefore, forms the overall framework for our investigation in this book.

Criteria for Geographic Realms

The existence and identification of world geographic realms depend on a combination of factors. Our world consists of a highly complex and variable environment of large and small

continents, enormous oceans and countless waterways, innumerable islands, diverse habitats and cultures, and intricate political geographies. What constitutes a realm depends on the circumstances, but we can still identify three main sets of criteria that apply to all realms:

- Physical and Human** Geographic realms are based on sets of spatial criteria. They are the largest units into which the inhabited world can be divided. The criteria on which such a broad regionalization is based include both physical (i.e., natural) and human (or social) yardsticks. For instance, South America is a geographic realm because physically it is a continent and culturally it comprises comparable societies. The realm called South Asia, on the other hand, lies on a Eurasian landmass shared by several other geographic realms; high mountains, wide



WORLD GEOGRAPHIC REALMS

- ① NORTH AMERICA
- ② MIDDLE AMERICA
- ③ SOUTH AMERICA
- ④ EUROPE
- ⑤ RUSSIA/CENTRAL ASIA
- ⑥ NORTH AFRICA/SOUTHWEST ASIA
- ⑦ SUBSAHARAN AFRICA
- ⑧ SOUTH ASIA
- ⑨ EAST ASIA
- ⑩ SOUTHEAST ASIA
- ⑪ AUSTRAL REALM
- ⑫ PACIFIC REALM

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FIGURE 1-4