

Mapping And Modeling Weather And Climate With Gis

Encyclopedia of GIS
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Modelling Interactions Between Vector-Borne Diseases and Environment Using GIS
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Remote Sensing Modeling and Applications to Wildland Fires
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Mapping and Modeling Glacial Lake Algonquin in Northern Michigan and Western Ontario with Models of Uncertainty
Geoinformatics and Atmospheric Science
Global Flood Hazard Attribution of Extreme Weather Events in the Context of Climate Change
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Encyclopedia of GIS

As climate has warmed over recent years, a new pattern of more frequent and more intense weather events has unfolded across the globe. Climate models simulate such changes in extreme events, and some of the reasons for the changes are well understood. Warming increases the likelihood of extremely hot days and nights, favors increased atmospheric moisture that may result in more frequent heavy rainfall and snowfall, and leads to evaporation that can exacerbate droughts. Even with evidence of these broad trends, scientists cautioned in the past that individual weather events couldn't be attributed to climate change. Now, with advances in understanding the climate science behind extreme events and the science of extreme event attribution, such blanket statements may not be accurate. The relatively young science of extreme event attribution seeks to tease out the influence of human-cause climate change from other factors, such as natural sources of variability like El Niño, as contributors to individual extreme events. Event attribution can answer questions about how much climate change influenced the probability or intensity of a specific type of weather event. As event attribution capabilities improve, they could help inform choices about assessing and managing risk, and in guiding climate adaptation strategies. This report examines the current state of science of extreme weather attribution, and identifies ways to move the science forward to improve attribution capabilities.

Topics in Climate Modeling

This book is a printed edition of the Special Issue "Air Quality Monitoring and Forecasting" that was published in Atmosphere

Weather - Climate Modeling for Real-time Applications in Agriculture and Forest Meteorology

During ten years serving with the USDA Soil Conservation Service (SCS), now known as the Natural Resources Conservation Service (NRCS), I became amazed at how millions of dollars in contract monies were spent based on simplistic hydrologic models. As project engineer in western Kansas, I was responsible for building flood control dams (authorized under Public Law 566) in the Wet Walnut River watershed. This watershed is within the Arkansas-Red River basin, as is the Illinois River basin referred to extensively in this book. After building nearly 18 of these structures, I became Assistant State Engineer in Michigan and, for a short time, State Engineer for NRCS. Again, we based our entire design and construction program on simplified relationships variously referred to as the SCS method. I recall announcing that I was going to pursue a doctoral degree and develop a new hydrologic model. One of my agency's chief engineers remarked, "Oh no, not another model!" Since then, I hope that I have not built just another model but have significantly advanced the state of hydrologic modeling for both researchers and practitioners. Using distributed hydrologic techniques described in this book, I also hope one day to forecast the response of the dams I built.

Modelling Interactions Between Vector-Borne Diseases and Environment Using GIS

The expanding application of Concept Mapping includes its role in knowledge elicitation, institutional memory preservation, and ideation. With the advent of the CmapTools knowledge modeling software kit, Concept Mapping is being applied with increased frequency and success to address a variety of problems in the workplace. Supported by business application case studies, Applied Concept Mapping: Capturing, Analyzing, and Organizing Knowledge offers an accessible introduction to the theory, methods, and application of Concept Mapping in business and government. The case studies illustrate applications across a range of industries—including engineering, product development, defense, and healthcare. The authors provide access to a free download of CmapTools, courtesy of the Institute for Human and Machine Cognition, to enable readers to create and share their own Concept Maps. Offering examples from the United States, Canada, Australia, Spain, Brazil, Scotland, and The Netherlands, they highlight a global perspective of this dynamic tool. The text is organized into three sections: Practitioners' Views—supplies narratives, guidance, and reviews of applications from career Concept Mappers Recent Case Studies and Results—presents in-depth examinations of specific applications and their results Pushing the Boundaries—explores what's possible and where the boundary conditions lie Applied Concept Mapping facilitates the fundamental understanding needed to harness the power of Concept Mapping to develop viable solutions to a virtually unlimited number of real-world problems.

Missouri School Journal

A quantitative introduction to atmospheric science for students and professionals who want to understand and apply basic meteorological concepts but who are not ready for calculus.

Remote Sensing Modeling and Applications to Wildland Fires

The weather on planet Earth is a vital and sometimes fatal force in human affairs. Efforts to control or reduce the harmful impacts of weather go back far in time. In this, the latest National Academies'™ assessment of weather modification, the committee was asked to assess the ability of current and proposed weather modification capabilities to provide beneficial impacts on water resource management and weather hazard mitigation. It examines new technologies, reviews advances in numerical modeling on the cloud and mesoscale, and considers how improvements in computer capabilities might be applied to weather modification. *Critical Issues in Weather Modification Research* examines the status of the science underlying weather modification in the United States. It calls for a coordinated national research program to answer fundamental questions about basic atmospheric processes and to address other issues that are impeding progress in weather modification.

Practical Meteorology

Latest research by more than three dozen atmospheric science experts on GIS and weather and climate studies.

Where the Weather Meets the Road

Master GIS Applications on Modelling and Mapping the Risks of Diseases Infections transmitted by mosquitoes, ticks, triatomine bugs, sandflies, and black flies cause significant rates of death and disease, especially in developing countries. Why are certain places more susceptible to vector-borne diseases? *Modelling Interactions Between Vector-Borne Diseases and Environment Using GIS* reveals how using geographic information systems (GISs) can provide a greater understanding of how vector-borne diseases are spread and explores the use of geographical techniques in vector-borne disease monitoring, management, and control. This text provides readers with a better understanding of the vector-borne disease problem and its impact on public health. *Introduces New Spatial Approaches Based on Location and Environment* The book exposes readers to information on how to identify vector hotspots, determine when and where they can occur, and eliminate vector breeding sites. Utilizing simple illustrations based on real data, as well as the authors' more than 20 years of experience in the field, this text combines key spatial analysis techniques available in modern GIS with real-world applications. It offers step-by-step instruction on developing vector-borne disease risk models at different spatial and temporal scales and helps practitioners formulate disease causation hypotheses and identify areas at risk. In addition, it addresses medical geography, GIS, spatial analysis, and modelling, and covers other factors related to the spread of vector-borne diseases. This book: Gives an overview of common

vector-borne diseases, GIS-based mapping and modelling, impacts of climate change on vector distributions, and availability and importance of accurate epidemiologically relevant spatial data Describes modelling and simulating the prevalence of vector-borne diseases around the world Summarizes some key spatial techniques and how they can be used to aid in the analysis of geographical and attributed data Defines the concept of establishing and characterizing spatial data systems, including their quality, errors, references, and issues of scale, and building such a system from often quite separate, disparate sources Shows how to develop weather-based predictive modelling, which can be used to predict the weekly trend of vector abundance Provides a GIS case study for modelling the future potential distribution of vector-borne disease based on different climatic change scenarios Modelling Interactions Between Vector-Borne Diseases and Environment Using GIS combines spatial analysis techniques available in modern GIS, together with real-world applications to provide you with a better understanding of ways to map, model, prevent, and control vector-borne diseases.

The Geography Book

This volume presents recent developments in atmospheric sciences driven by numerical modeling which makes use of geospatial technologies and increasing computational power. It gathers examples of how geoinformatics supports meteorological, climatological and water-related studies. One of the most important features of geospatial technologies is that they provide methods and tools which may be utilized in real time or near real time in order to monitor and predict atmospheric processes. This is particularly crucial in areas where dynamics of atmospheric phenomena is considerable and causes difficulties in accurate forecasting. One of such areas is the transitional zone between oceanic and continental features of the mid-latitude climate. Good examples of investigations into the transitional zone come from Poland and its neighboring countries. The topical volume provides the reader with a selection of papers on physically-based and data-based modelling of weather-related phenomena over Poland. This main theme of the topical volume is extended to cover case studies on the use of geoinformatics in atmospheric studies in other regions at a range of spatial scales.

The Weather Machine

Machine Learning Techniques for Space Weather

Readers will understand how to find, evaluate, and analyze data to solve location-based problems. This guide covers practical issues such as copyrights, cloud computing, online data portals, volunteered geographic information, and international data with supplementary exercises.

Mapping and Modeling Weather and Climate with GIS

This weather guide includes detailed specifications for locating and instrumenting fire weather stations, taking weather observations, and overwintering the Drought Code component of the FWI System. The sensitivity of the FWI System components

to weather elements is represented quantitatively. The importance of weather that is not directly observable is discussed in the context of fuel moisture and fire behavior. Current developments in the observation and measurement of fire weather and the forecasting of fire danger are discussed, along with the implications for the reporting of fire weather of increasingly automated fire management information systems.

American Capitals

The Encyclopedia of GIS provides a comprehensive and authoritative guide, contributed by experts and peer-reviewed for accuracy, and alphabetically arranged for convenient access. The entries explain key software and processes used by geographers and computational scientists. Major overviews are provided for nearly 200 topics: Geoinformatics, Spatial Cognition, and Location-Based Services and more. Shorter entries define specific terms and concepts. The reference will be published as a print volume with abundant black and white art, and simultaneously as an XML online reference with hyperlinked citations, cross-references, four-color art, links to web-based maps, and other interactive features.

Mapping and Modeling Glacial Lake Algonquin in Northern Michigan and Western Ontario with Models of Uncertainty

This book is geared for advanced level research in the general subject area of remote sensing and modeling as they apply to the coastal marine environment. The various chapters focus on the latest scientific and technical advances in the service of better understanding coastal marine environments for their care, conservation and management. Chapters specifically deal with advances in remote sensing coastal classifications, environmental monitoring, digital ocean technological advances, geophysical methods, geoacoustics, X-band radar, risk assessment models, GIS applications, real-time modeling systems, and spatial modeling. Readers will find this book useful because it summarizes applications of new research methods in one of the world's most dynamic and complicated environments. Chapters in this book will be of interest to specialists in the coastal marine environment who deals with aspects of environmental monitoring and assessment via remote sensing techniques and numerical modeling.

Geoinformatics and Atmospheric Science

Spatial Modeling in GIS and R for Earth and Environmental Sciences offers an integrated approach to spatial modelling using both GIS and R. Given the importance of Geographical Information Systems and geostatistics across a variety of applications in Earth and Environmental Science, a clear link between GIS and open source software is essential for the study of spatial objects or phenomena that occur in the real world and facilitate problem-solving. Organized into clear sections on applications and using case studies, the book helps researchers to more quickly understand GIS data and formulate more complex conclusions. The book is the first reference to provide methods and applications for combining the use of R and GIS in modeling spatial processes. It is an essential tool for students and researchers in earth and environmental science, especially those looking to

better utilize GIS and spatial modeling. Offers a clear, interdisciplinary guide to serve researchers in a variety of fields, including hazards, land surveying, remote sensing, cartography, geophysics, geology, natural resources, environment and geography Provides an overview, methods and case studies for each application Expresses concepts and methods at an appropriate level for both students and new users to learn by example

Global Flood Hazard

Resource management in fire-dominated ecosystems requires an understanding of the probability of wildfire occurring & spreading at different points in a landscape. This report describes an approach to evaluating wildfire susceptibility, or burn probability, for fire-prone landscapes such as the boreal forest of North America. The approach involves use of the BURN-P3 (probability, prediction, & planning) landscape-level simulation model, which combines deterministic fire growth based on the Canadian Fire Behaviour Prediction System and spatial data for forest fuels & topography with probabilistic fire ignitions & spread events derived from historical fire & weather data. A case study of the application of BURN-P3 is undertaken for a boreal mixedwood area of central Saskatchewan. The results presented highlight the importance of landscape features to wildfire susceptibility and indicate whether assessments based solely on stand-level characteristics are adequate.

Attribution of Extreme Weather Events in the Context of Climate Change

Weather has broad and significant effects on the roadway environment. Snow, rain, fog, ice, freezing rain, and other weather conditions can impair the ability of drivers to operate their vehicles safely, significantly reduce roadway capacity, and dramatically increase travel times. Multiple roadway activities, from roadway maintenance and construction to shipping, transit, and police operations, are directly affected by inclement weather. Some road weather information is available to users currently, however a disconnect remains between current research and operations, and additional research could yield important safety and economic improvements for roadway users. Meteorology, roadway technology, and vehicle systems have evolved to the point where users could be provided with better road weather information through modern information technologies. The combination of these technologies has the potential to significantly increase the efficiency of roadway operations, road capacity, and road safety. *Where the Weather Meets the Road* provides a roadmap for moving these concepts to reality.

Extreme Hydrology and Climate Variability

From the acclaimed author of *Tubes*, a lively and surprising tour through the global network that predicts our weather, the people behind it, and what it reveals about our climate and our planet The weather is the foundation of our daily lives. It's a staple of small talk, the app on our smartphones, and often the first thing we check each morning. Yet, behind all these humble interactions is the largest and most elaborate piece of infrastructure human beings have ever constructed—a triumph

of both science and global cooperation. But what is the weather machine, and who created it? In *The Weather Machine*, Andrew Blum takes readers on a fascinating journey through the people, places, and tools of forecasting, exploring how the weather went from something we simply observed to something we could actually predict. As he travels across the planet, he visits some of the oldest and most important weather stations and watches the newest satellites blast off. He explores the dogged efforts of forecasters to create a supercomputer model of the atmosphere, while trying to grasp the ongoing relevance of TV weather forecasters. In the increasingly unpredictable world of climate change, correctly understanding the weather is vital. Written with the sharp wit and infectious curiosity Andrew Blum is known for, *The Weather Machine* pulls back the curtain on a universal part of our everyday lives, illuminating our changing relationships with technology, the planet, and our global community.

21st Century Geography

The topics of climate change, weather prediction, atmospheric sciences and other related fields are gaining increased attention due to the possible impacts of changes in climate and weather upon the planet. Concurrently, the increasing ability to computationally model the governing partial differential equations that describe these various topics of climate has gained a great deal of attention as well. In the current book, several aspects of these topics are examined to provide another stepping stone in recent advances in the fields of study and also focal points of endeavor in the evolving technology.

Applied Concept Mapping

Wetlands

Scientists and managers alike need timely, cost-effective, and technically appropriate fire-related information to develop functional strategies for the diverse fire communities. "Remote Sensing Modeling and Applications to Wildland Fires" addresses wildland fire management needs by presenting discussions that link ecology and the physical sciences from local to regional levels, views on integrated decision support data for policy and decision makers, new technologies and techniques, and future challenges and how remote sensing might help to address them. While creating awareness of wildland fire management and rehabilitation issues, hands-on experience in applying remote sensing and simulation modeling is also shared. This book will be a useful reference work for researchers, practitioners and graduate students in the fields of fire science, remote sensing and modeling applications. Professor John J. Qu works at the Department of Geography and GeoInformation Science at George Mason University (GMU), USA. He is the Founder and Director of the Environmental Science and Technology Center (ESTC) and EastFIRE Lab at GMU.

From Maps to Models

Machine Learning Techniques for Space Weather provides a thorough and

accessible presentation of machine learning techniques that can be employed by space weather professionals. Additionally, it presents an overview of real-world applications in space science to the machine learning community, offering a bridge between the fields. As this volume demonstrates, real advances in space weather can be gained using nontraditional approaches that take into account nonlinear and complex dynamics, including information theory, nonlinear auto-regression models, neural networks and clustering algorithms. Offering practical techniques for translating the huge amount of information hidden in data into useful knowledge that allows for better prediction, this book is a unique and important resource for space physicists, space weather professionals and computer scientists in related fields. Collects many representative non-traditional approaches to space weather into a single volume Covers, in an accessible way, the mathematical background that is not often explained in detail for space scientists Includes free software in the form of simple MATLAB® scripts that allow for replication of results in the book, also familiarizing readers with algorithms

Critical Issues in Weather Modification Research

"Wetlands" has become a hot word in the current environmental debate. But what does it signify? In 1991, proposed changes in the legal definitions of wetlands stirred controversy and focused attention on the scientific and economic aspects of their management. This volume explores how to define wetlands. The committee--whose members were drawn from academia, government, business, and the environmental community--builds a rational, scientific basis for delineating wetlands in the landscape and offers recommendations for further action. Wetlands also discusses the diverse hydrological and ecological functions of wetlands, and makes recommendations concerning so-called controversial areas such as permafrost wetlands, riparian ecosystems, irregularly flooded sites, and agricultural wetlands. It presents criteria for identifying wetlands and explores the problems of applying those criteria when there are seasonal changes in water levels. This comprehensive and practical volume will be of interest to environmental scientists and advocates, hydrologists, policymakers, regulators, faculty, researchers, and students of environmental studies.

Mapping Wildfire Susceptibility with the BURN-P3 Simulation Model

A. Townsend Peterson, one of the pioneers of ecological niche modeling, presents a synthesis that illuminates new and more effective infectious disease mapping methods. His workâ€”the culmination of twelve years of refinementâ€”breaks new ground by integrating biogeographic and ecological factors with spatial models. Aimed at seasoned epidemiologists and public health experts, this interdisciplinary book explains the conceptual and technical underpinnings of Peterson's approach while simultaneously describing the potentially enormous benefits of his modeling method. Peterson treats disease transmission areas for what they areâ€”distributions of species. The book argues that complex, fragmented, and highly irregular disease patterns can only be understood when underlying environmental drivers are considered. The result is an elegant modeling approach that challenges static spatial models and provides a framework for recasting

disease mapping. Anyone working in the area of disease transmission, particularly those employing predictive maps, will find Peterson's book both inspiring and indispensable.

Commerce, Justice, Science, and Related Agencies Appropriations for Fiscal Year 2008

Arc Hydro

In 2010, NASA and the National Science Foundation asked the National Research Council to assemble a committee of experts to develop an integrated national strategy that would guide agency investments in solar and space physics for the years 2013-2022. That strategy, the result of nearly 2 years of effort by the survey committee, which worked with more than 100 scientists and engineers on eight supporting study panels, is presented in the 2013 publication, *Solar and Space Physics: A Science for a Technological Society*. This booklet, designed to be accessible to a broader audience of policymakers and the interested public, summarizes the content of that report.

Mapping Disease Transmission Risk

In this study, the committee explores ways the National Weather Service (NWS) can take advantage of continuing advances in science and technology to meet the challenges of the future. The predictions are focused on the target year 2025. Because specific predictions about the state of science and technology or the NWS more than 25 years in the future will not be entirely accurate, the goal of this report is to identify and highlight trends that are most likely to influence change. The Panel on the Road Map for the Future National Weather Service developed an optimistic vision for 2025 based on advances in science and technology.

Commerce, Justice, Science, and Related Agencies Appropriations for 2008

Distributed Hydrologic Modeling Using GIS

The United States faces numerous, varied, and evolving threats to national security, including terrorism, scarcity and disruption of food and water supplies, extreme weather events, and regional conflicts around the world. Effectively managing these threats requires intelligence that not only assesses what is happening now, but that also anticipates potential future threats. The National Geospatial-Intelligence Agency (NGA) is responsible for providing geospatial intelligence on other countries—"assessing where exactly something is, what it is, and why it is important"—in support of national security, disaster response, and humanitarian assistance. NGA's approach today relies heavily on imagery analysis and mapping, which provide an assessment of current and past conditions. However, augmenting that approach with a strong modeling capability would enable NGA to also anticipate and explore future outcomes. A model is a simplified

representation of a real-world system that is used to extract explainable insights about the system, predict future outcomes, or explore what might happen under plausible what-if scenarios. Such models use data and/or theory to specify inputs (e.g., initial conditions, boundary conditions, and model parameters) to produce an output. From Maps to Models: Augmenting the Nation's Geospatial Intelligence Capabilities describes the types of models and analytical methods used to understand real-world systems, discusses what would be required to make these models and methods useful for geospatial intelligence, and identifies supporting research and development for NGA. This report provides examples of models that have been used to help answer the sorts of questions NGA might ask, describes how to go about a model-based investigation, and discusses models and methods that are relevant to NGA's mission.

Space Weather & Telecommunications

Space weather has an enormous influence on modern telecommunication systems even though we may not always appreciate it. We shall endeavor throughout this monograph to expose the relationships between space weather factors and the performance (or lack thereof) of telecommunication, navigation, and surveillance systems. Space weather is a rather new term, having found an official expression as the result of several government initiatives that use the term in the title of programs. But it is the logical consequence of the realization that space also has weather, just as the lower atmosphere has weather. While the weather in space will influence space systems that operate in that special environment, it is also true that space weather will influence systems that we understand and use here on terra firma. This brings space weather home as it were. It is not some abstract topic of interest to scientists alone; it is a topic of concern to all of us. I hope to make this clear as the book unfolds. Why have I written this book? First of all, I love the topic. While at the Naval Research Laboratory (NRL), I had the opportunity to do research on many topics including: Thomson scatter radar and satellite beacon studies of the ionosphere, utilization of the NASA Gemini platform for ionospheric investigations, microwave radar propagation studies, I-IF signal intercept and direction-finding experiments, and multi-disciplinary studies of certain physical phenomena relevant to weapon systems development.

Solar and Space Physics

Extreme Hydrology and Climate Variability: Monitoring, Modelling, Adaptation and Mitigation is a compilation of contributions by experts from around the world who discuss extreme hydrology topics, from monitoring, to modeling and management. With extreme climatic and hydrologic events becoming so frequent, this book is a critical source, adding knowledge to the science of extreme hydrology. Topics covered include hydrometeorology monitoring, climate variability and trends, hydrological variability and trends, landscape dynamics, droughts, flood processes, and extreme events management, adaptation and mitigation. Each of the book's chapters provide background and theoretical foundations followed by approaches used and results of the applied studies. This book will be highly used by water resource managers and extreme event researchers who are interested in understanding the processes and teleconnectivity of large-scale climate dynamics and extreme events, predictability, simulation and intervention measures. Presents

datasets used and methods followed to support the findings included, allowing readers to follow these steps in their own research Provides variable methodological approaches, thus giving the reader multiple hydrological modeling information to use in their work Includes a variety of case studies, thus making the context of the book relatable to everyday working situations for those studying extreme hydrology Discusses extreme event management, including adaption and mitigation

Knowledge and Information Visualization

Weather Guide for the Canadian Forest Fire Danger Rating System

This is a theoretical and practical guide on how to undertake and navigate advanced research in the arts, humanities and social sciences.

Remote Sensing and Modeling

GIS Fundamentals

formation. The basic ideas underlying knowledge visualization and information visualization are outlined. In a short preview of the contributions of this volume, the idea behind each approach and its contribution to the goals of the book are outlined. 2 The Basic Concepts of the Book Three basic concepts are the focus of this book: "data", "information", and "knowledge". There have been numerous attempts to define the terms "data", "information", and "knowledge", among them, the OTEC Homepage "Data, Information, Knowledge, and Wisdom" (Bellinger, Castro, & Mills, see <http://www.system-thinking.org/dikw/dikw.htm>): Data are raw. They are symbols or isolated and non-interpreted facts. Data represent a fact or statement of event without any relation to other data. Data simply exists and has no significance beyond its existence (in and of itself). It can exist in any form, usable or not. It does not have meaning of itself.

A Vision for the National Weather Service

Written for hydrologists, GIS specialists, and scientists from many disciplines who create computer models of water resources, this book presents an improved standard for creating and using data in hydrologic projects. The ArcGIS hydro data model is the latest innovation in GIS modeling and increases the potential to integrate data from many sources to solve a wider range of water resource problems. This guide shows how hydrology projects work and how they can work better: by integrating local, regional, national, and international data to create a deeper understanding of the earth's water problems.

The GIS Guide to Public Domain Data

Get to Know the Earth's Many Forms with Dozens of Fun and Easy Projects From

finding directions by the stars, to mapping your neighborhood, to making an earthquake in a box, you'll have a great time learning about the world with The Geography Book. You'll find out how to determine location on the Earth, how maps can provide us with a wide range of information, how different landforms were created, how water has helped shape the Earth, and much more. Using simple materials you'll be able to find around the house or in your neighborhood, you'll be able to create things like a giant compass rose, a balloon globe, a contour potato, a map puzzle, and a tornado in a jar. So get ready for a fascinating trip around the globe.

Spatial Modeling in GIS and R for Earth and Environmental Sciences

Global Flood Hazard Flooding is a costly natural disaster in terms of damage to land, property and infrastructure. This volume describes the latest tools and technologies for modeling, mapping, and predicting large-scale flood risk. It also presents readers with a range of remote sensing data sets successfully used for predicting and mapping floods at different scales. These resources can enable policymakers, public planners, and developers to plan for, and respond to, flooding with greater accuracy and effectiveness. Describes the latest large-scale modeling approaches, including hydrological models, 2-D flood inundation models, and global flood forecasting models Showcases new tools and technologies such as Aqueduct, a new web-based tool used for global assessment and projection of future flood risk under climate change scenarios Features case studies describing best-practice uses of modeling techniques, tools, and technologies Global Flood Hazard is an indispensable resource for researchers, consultants, practitioners, and policy makers dealing with flood risk, flood disaster response, flood management, and flood mitigation.

Mapping Hacks

State capitals are an indelible part of the American psyche, spatial representations of state power and national identity. Learning them by heart is a rite of passage in grade school, a pedagogical exercise that emphasizes the importance of committing place-names to memory. But geographers have yet to analyze state capitals in any depth. In *American Capitals*, Christian Montès takes us on a well-researched journey across America—from Augusta to Sacramento, Albany to Baton Rouge—shedding light along the way on the historical circumstances that led to their appointment, their success or failure, and their evolution over time. While all state capitals have a number of characteristics in common—as symbols of the state, as embodiments of political power and decision making, as public spaces with private interests—Montès does not interpret them through a single lens, in large part because of the differences in their spatial and historical evolutionary patterns. Some have remained small, while others have evolved into bustling metropolises, and Montès explores the dynamics of change and growth. All but eleven state capitals were established in the nineteenth century, thirty-five before 1861, but, rather astonishingly, only eight of the fifty states have maintained their original capitals. Despite their revered status as the most monumental and historical cities in America, capitals come from surprisingly humble beginnings,

often plagued by instability, conflict, hostility, and corruption. Montès reminds us of the period in which they came about, “an era of pioneer and idealized territorial vision,” coupled with a still-evolving American citizenry and democracy.

Air Quality Monitoring and Forecasting

Since the dawn of creation, man has designed maps to help identify the space that we occupy. From Lewis and Clark's pencil-sketched maps of mountain trails to Jacques Cousteau's sophisticated charts of the ocean floor, creating maps of the utmost precision has been a constant pursuit. So why should things change now? Well, they shouldn't. The reality is that map creation, or "cartography," has only improved in its ease-of-use over time. In fact, with the recent explosion of inexpensive computing and the growing availability of public mapping data, mapmaking today extends all the way to the ordinary PC user. *Mapping Hacks*, the latest page-turner from O'Reilly Press, tackles this notion head on. It's a collection of one hundred simple--and mostly free--techniques available to developers and power users who want draw digital maps or otherwise visualize geographic data. Authors Schuyler Erle, Rich Gibson, and Jo Walsh do more than just illuminate the basic concepts of location and cartography, they walk you through the process one step at a time. *Mapping Hacks* shows you where to find the best sources of geographic data, and then how to integrate that data into your own map. But that's just an appetizer. This comprehensive resource also shows you how to interpret and manipulate unwieldy cartography data, as well as how to incorporate personal photo galleries into your maps. It even provides practical uses for GPS (Global Positioning System) devices--those touch-of-a-button street maps integrated into cars and mobile phones. Just imagine: If Captain Kidd had this technology, we'd all know where to find his buried treasure! With all of these industrial-strength tips and tools, *Mapping Hacks* effectively takes the sting out of the digital mapmaking and navigational process. Now you can create your own maps for business, pleasure, or entertainment--without ever having to sharpen a single pencil.

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