Groundwater Hydraulics And Pollutant Transport Solution

Analytical Modeling of Solute Transport in GroundwaterLand subsidence, storage and hydraulic properties of an aquiferGround-water Flow and Contaminant Transport at a Radioactive-materials Processing Site, Wood River Junction, Rhode IslandHydraulics of GroundwaterGroundwater and Surface Water PollutionGroundwater HydraulicsNBS Special PublicationEnvironmental and Pollution ScienceContaminant HydrogeologyHydrogeologyReliabilitybased uncertainty analysis of groundwater contaminant transport and remediationGround Water ContaminationProceedings of the Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Remediation ConferencePredictive GeologySelected Topics of Computational and Experimental Fluid MechanicsGeographical Information Systems in HydrologyPrinciples of Hydrogeology, Third EditionHydraulic Research in the United States and Canada, 1978Fuzzy Rule-Based Modeling with Applications to Geophysical, Biological, and Engineering SystemsThe Handbook of Groundwater EngineeringFrom Sources to SolutionNumerical Models in Groundwater PollutionExperimental Methods in Hydraulic ResearchReactive Transport in Soil and GroundwaterGroundwater HydrologyGroundwater Contaminant TransportGroundwater Flow and Quality ModellingPermeability and Groundwater Contaminant TransportHydraulic Conductivity and Waste Contaminant Transport in SoilThe Handbook of Groundwater EngineeringModeling Groundwater Flow and Contaminant TransportModeling Groundwater Flow and Contaminant TransportGroundwaterAquifer HydraulicsGroundwater Hydraulics and Pollutant TransportDiffusion in Natural Porous MediaApplied Flow and Solute Transport Modeling in AquifersHydraulic Research in the United States and CanadaWater Pollution: Modelling, Measuring and PredictionHandbook of Applied Hydrology, Second Edition

Analytical Modeling of Solute Transport in Groundwater

This rigorous and comprehensive text provides fundamental information geared to students in either engineering or natural sciences courses dealing with groundwater. The first four chapters consider subsurface fluid flow, while the remaining twelve chapters cover subsurface contamination and pollutant transport. Charbeneau views the application of groundwater hydraulics and pollutant transport as a quantitative field. Although quantitative methods are exact, the fields of study are usually homogeneous; laboratory and field methods provide estimates for ideal (not real) fields. What impact does the use of ideal fields have on model predictions? The unknown answer places the study of subsurface flow of water and chemical mass transport in a prime position for continued researchand this readily accessible text opens the door to that research. Outstanding features include: Comprehensive, rigorous, and highly accessible coverageIncludes information on groundwater flow, well hydraulics, field methods for parameter estimation, hydrologic relationships between surface water and groundwater hydrology, mass transport of contaminants by advection, diffusion and dispersion, and special problems posed by nonaqueous phase liquids (oils). Strong focus on applicationsEmpowers readers with knowledge and

methodologies that they can use in real, day-to-day practices. Includes 66 worked examples and 178 problems integrated throughout. Examination of standard software being used in the industry todayExposes readers to the USGS MODFLOW model (the most widely used numerical simulation model for groundwater flow) and the USGS MOC3D. These models, together with a user interface (MFI), can be downloaded from the Internet.

Land subsidence, storage and hydraulic properties of an aquifer

In many parts of the world, groundwater resources are under increasing threat from growing demands, wasteful use, and contamination. To face the challenge, good planning and management practices are needed. A key to the management of groundwater is the ability to model the movement of fluids and contaminants in the subsurface. The purpose of this book is to construct conceptual and mathematical models that can provide the information required for making decisions associated with the management of groundwater resources, and the remediation of contaminated aquifers. The basic approach of this book is to accurately describe the underlying physics of groundwater flow and solute transport in heterogeneous porous media, starting at the microscopic level, and to rigorously derive their mathematical representation at the macroscopic levels. The well-posed, macroscopic mathematical models are formulated for saturated, single phase flow, as well as for unsaturated and multiphase flow, and for the transport of single and multiple chemical species. Numerical models are presented and computer codes are reviewed, as tools for solving the models. The problem of seawater intrusion into coastal aquifers is examined and modeled. The issues of uncertainty in model input data and output are addressed. The book concludes with a chapter on the management of groundwater resources. Although one of the main objectives of this book is to construct mathematical models, the amount of mathematics required is kept minimal.

Ground-water Flow and Contaminant Transport at a Radioactive-materials Processing Site, Wood River Junction, Rhode Island

This new edition adds several new chapters and is thoroughly updated to include data on new topics such as hydraulic fracturing, CO2 sequestration, sustainable groundwater management, and more. Providing a complete treatment of the theory and practice of groundwater engineering, this new handbook also presents a current and detailed review of how to model the flow of water and the transport of contaminants both in the unsaturated and saturated zones, covers the protection of groundwater, and the remediation of contaminated groundwater.

Hydraulics of Groundwater

In many parts of the world, groundwater resources are under increasing threat from growing demands, wasteful use, and

contamination. To face the challenge, good planning and management practices are needed. A key to the management of groundwater is the ability to model the movement of fluids and contaminants in the subsurface. The purpose of this book is to construct conceptual and mathematical models that can provide the information required for making decisions associated with the management of groundwater resources, and the remediation of contaminated aquifers. The basic approach of this book is to accurately describe the underlying physics of groundwater flow and solute transport in heterogeneous porous media, starting at the microscopic level, and to rigorously derive their mathematical representation at the macroscopic levels. The well-posed, macroscopic mathematical models are formulated for saturated, single phase flow, as well as for unsaturated and multiphase flow, and for the transport of single and multiple chemical species. Numerical models are presented and computer codes are reviewed, as tools for solving the models. The problem of seawater intrusion into coastal aquifers is examined and modeled. The issues of uncertainty in model input data and output are addressed. The book concludes with a chapter on the management of groundwater resources. Although one of the main objectives of this book is to construct mathematical models, the amount of mathematics required is kept minimal.

Groundwater and Surface Water Pollution

This text combines the science and engineering of hydrogeology in an accessible, innovative style. As well as providing physical descriptions and characterisations of hydrogeological processes, it also sets out the corresponding mathematical equations for groundwater flow and solute/heat transport calculations. And, within this, the methodological and conceptual aspects for flow and contaminant transport modelling are discussed in detail. This comprehensive analysis forms the ideal textbook for graduate and undergraduate students interested in groundwater resources and engineering, and indeed its analyses can apply to researchers and professionals involved in the area.

Groundwater Hydraulics

NBS Special Publication

Tremendous progress has been made in the field of remediation technologies since the second edition of Contaminant Hydrogeology was published two decades ago, and its content is more important than ever. Recognizing the extensive advancement and research taking place around the world, the authors have embraced and worked from a larger global perspective. Boving and Kreamer incorporate environmental innovation in studying and treating groundwater/soil contamination and the transport of those contaminants while building on Fetter’s original foundational work. Thoroughly updated, expanded, and reorganized, the new edition presents a wealth of new material, including new discussions of

emerging and potential contaminant sources and their characteristics like deep well injection, fracking fluids, and in situ leach mining. New sections cover BET and Polanyi adsorption potential theory, vapor transport theory, the introduction of the Capillary and Bond Numbers, the partitioning interwell tracer testing technique for investigating NAPL sites, aerial photographic interpretation, geophysics, immunological surveys, high resolution vertical sampling, flexible liner systems, groundwater tracers, and much more. Contaminant Hydrogeology is intended as a textbook in upper level courses in mass transport and contaminant hydrogeology, and remains a valuable resource for professionals in both the public and private sectors.

Environmental and Pollution Science

Proceedings of the NATO Advanced Research Workshop on Advances in Analytical and Numerical Groundwater Flow and Quality Modelling, Lisbon, Portugal, June 2-6, 1987

Contaminant Hydrogeology

The groundwater science and engineering has been closely connected with various fields (1) Groundwater Hydrology, (2) Groundwater Hydraulics or Geohydraulics, (3) Fluid Dynamics in Porous Media, (4) Groundwater Quality Engineering, (5) Soil Physics, and (6) Hydrogeology or Geohydrology. The purpose of the book is to present an update textbook of groundwater hydraulics, which includes all of basic items in above-mentioned fields, to students (of graduate school), researchers and practitioners. The students and beginners who intend to specialize in groundwater hydraulics through one semester will master contents of the book.

Hydrogeology

This text addresses the scientific and engineering aspects of subsurface contaminant transport, analysis, and modeling as well as remediation in ground water. It offers a modern engineering approach to ground water contamination problems of the nineties and beyond.

Reliabilitybased uncertainty analysis of groundwater contaminant transport and remediation

This book contains invited lectures and selected contributions presented at the Enzo Levi and XIX Annual Meeting of the Fluid Dynamic Division of the Mexican Physical Society in 2013. It is aimed at fourth year undergraduate and graduate students, and scientists in the fields of physics, engineering and chemistry who are interested in fluid dynamics from an

experimental and theoretical point of view. The invited lectures are introductory and avoid the use of complicated mathematics. The fluid dynamics applications include multiphase flow, convection, diffusion, heat transfer, rheology, granular material, viscous flow, porous media flow, geophysics and astrophysics. The material contained in the book includes recent advances in experimental and theoretical fluid dynamics and is suitable for both teaching and research.

Ground Water Contamination

Environmental and Pollution Science, Third Edition, continues its tradition on providing readers with the scientific basis to understand, manage, mitigate, and prevent pollution across the environment, be it air, land, or water. Pollution originates from a wide variety of sources, both natural and man-made, and occurs in a wide variety of forms including, biological, chemical, particulate or even energy, making a multivariate approach to assessment and mitigation essential for success. This third edition has been updated and revised to include topics that are critical to addressing pollution issues, from human-health impacts to environmental justice to developing sustainable solutions. Environmental and Pollution Science, Third Edition is designed to give readers the tools to be able to understand and implement multi-disciplinary approaches to help solve current and future environmental pollution problems. Emphasizes conceptual understanding of environmental systems and can be used by students and professionals from a diversity of backgrounds focusing on the environment Covers many aspects critical to assessing and managing environmental pollution including characterization, risk assessment, regulation, transport and fate, and remediation or restoration New topics to this edition include Ecosystems and Ecosystem Services, Pollution in the Global System, Human Health Impacts, the interrelation between Soil and Human Health, Environmental Justice and Community Engagement, and Sustainability and Sustainable Solutions Includes color photos and diagrams, chapter questions and problems, and highlighted key words

Proceedings of the Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection, and Remediation Conference

Featuring the theme, From Sources to Solution, this book is based on the research papers presented during the International Conference on Environmental Forensics 2013. It covers multi-disciplinary areas of environmental forensics featuring major themes: characterization, assessment, and monitoring; new approach, rapid assessment, and analytical techniques; pollution control technology; environmental health risk assessment; and policy, governance and management. It present information for researchers from the science and social sciences disciplines and contribute to the advancement of Environmental Forensics. It also aims at evaluating the environmental damages as the result of indiscriminating discharge of toxic environmental pollutants.

Predictive Geology

Impacts of developed tools of heterogenous characterization on the hydrodynamics of flow and the transport mechanisms are illustrated in this text through a series of extensive numerical simulations consisting of single and multiple-realizations (Monte Carlo method).

Selected Topics of Computational and Experimental Fluid Mechanics

The last few years have witnessed an enormous interest in application of GIS in hydrology and water resources. This is partly evidenced by organization of sev eral national and international symposia or conferences under the sponsorship of various professional organizations. This increased interest is, in a large measure, in response to growing public sensitivity to environmental quality and management. The GIS technology has the ability to capture, store, manipulate, analyze, and visualize the diverse sets of geo-referenced data. On the other hand, hydrology is inherently spatial and distributed hydrologic models have large data requirements. The integration of hydrology and GIS is therefore quite natural. The integration involves three major components: (1) spatial data construction, (2) integration of spatial model layers, and (3) GIS and model interface. GIS can assist in design, calibration, modification and comparison of models. This integration is spreading worldwide and is expected to accelerate in the foreseeable future. Substantial op portunities exist in integration of GIS and hydrology. We believe there are enough challenges in use of GIS for conceptualizing and modeling complex hydrologic processes and for globalization of hydrology. The motivation for this book grew out of the desire to provide under one cover a range of applications of GIS tech nology in hydrology. It is hoped that the book will stimulate others to write more comprehensive texts on this subject of growing importance.

Geographical Information Systems in Hydrology

Principles of Hydrogeology, Third Edition presents important concepts of groundwater hydrology with a strong emphasis on problem-solving and field applications of hydrogeology. With newly added and revised content, this volume maintains a broad and current scope of topics, from the history of hydrogeology to the latest trends in managing groundwater contamination, arranged in the most compact and easy-to-use format available. Topics of interest include the role of groundwater in the hydrologic cycle; the nature of water-bearing formations; drilling boreholes and constructing monitoring wells; aquifers, well hydraulics, and aquifer tests; groundwater chemistry and flow; groundwater pollution, contaminant transport, remediation, and management. The author also provides the most current sources of hydrogeologic information, including professional societies, groundwater organizations, government agencies, industry publications, and Internet sites that provide data, software, techniques, protocols, standards, and training opportunities. Concise and informative,

environmental regulators as well as groundwater and hydrology professionals will find Principles of Hydrogeology, Third Edition a handy and irreplaceable source for looking up definitions, tools, and equations while working on groundwater problems.

Principles of Hydrogeology, Third Edition

Fully Updated Hydrology Principles, Methods, and Applications Thoroughly revised for the first time in 50 years, this industry-standard resource features chapter contributions from a “who’s who” of international hydrology experts. Compiled by a colleague of the late Dr. Chow, Chow’s Handbook of Applied Hydrology, Second Edition, covers scientific and engineering fundamentals and presents all-new methods, processes, and technologies. Complete details are provided for the full range of ecosystems and models. Advanced chapters look to the future of hydrology, including climate change impacts, extraterrestrial water, social hydrology, and water security. Chow’s Handbook of Applied Hydrology, Second Edition, covers: · The Fundamentals of Hydrology · Data Collection and Processing · Hydrology Methods · Hydrologic Processes and Modeling · Sediment and Pollutant Transport · Hydrometeorologic and Hydrologic Extremes · Systems Hydrology · Hydrology of Large River and Lake Basins · Applications and Design · The Future of Hydrology

Hydraulic Research in the United States and Canada, 1978

Water Pollution is a subject of growing concern in our industrial world. The environmental problems caused by the increase of pollutant loads dis charged into natural water systems have led the scientific community to pursue studies capable of relating the pollutant discharge with changes in the water quality. The results of these studies are permitting industries to employ more efficient methods of controlling and treating the waste loads, and water authorities to enforce more strict legislation regarding this matter. The present book contains edited versions of the papers presented at the First International Conference on Water Pollution (Modelling, Measuring and Prediction), held in Southampton, England, in September 1991. Its contents, which reflect the interdisciplinarity of the subject, are divided into four parts, each consisting of a keynote address and several invited and contributed papers: 1. Mathematical models (Keynote speaker: Prof. R.A. Falconer, Univer sity of Bradford, USA) 2. Data acquisition/monitoring/measurement (Keynote speaker: Dr. A. Plata Bedmar, IAEA, Austria) 3. Waste disposal and wastewater treatment (Keynote speaker: Prof. D.R.F. Harleman, MIT, USA) 4. Chemical and biological problems (Keynote speaker: Dr. E.I. Hamil ton, Environmental consultant, UK) Although the papers have been typographically edited they have been re produced directly from material submitted by the authors, and their content is a reflection of the authors' research and opinion.

Fuzzy Rule-Based Modeling with Applications to Geophysical, Biological, and Engineering

Systems

Predictive Geology: With Emphasis on Nuclear-Waste Disposal covers the proceedings of papers presented at sessions sponsored by the International Association for Mathematical Geology. The topics that this book tackles are issues relevant to nuclear-waste disposal. The first chapter discusses the use of plate tectonics as a catastrophe theoretic model, and the second chapter covers geologic predictions and radioactive waste disposal. Chapter 3 also talks about radioactive waste disposal, with emphasis on the application of predictive geology. Chapter 4 discusses salt domes and Chapter 5 tackles the use of fault-tree analysis for probabilistic assessment of radioactive-waste segregation. The sixth chapter covers predictive geology in nuclear-waste management, while the seventh chapter tackles nuclear power on unstable ground. The eighth chapter deals with long-term thermohydrologic behavior of nuclear-waste repositories. Chapter 9 discusses the influence of faulting on groundwater flow and contaminant transport, while chapter 10 covers the influence of microfissures in crystalline rock on radionuclide migration. The eleventh chapter tackles the long-term prediction of the fate of nuclear waste deeply buried in granite, and the twelfth chapter talks about the use of quantitative evaluation of the contribution of geologic knowledge in exploration for petroleum. The last chapter deals with resource-estimation models and predicted discovery. Researchers and professionals concerned with the effects of radioactive materials to the environment will find this book a great source of information.

The Handbook of Groundwater Engineering

From Sources to Solution

Water inside the earth, the groundwater and the invisible resource is the most important source of survival of mankind on this globe. Part of the hydrological cycle between entry (percolation and recharge) and exit (natural or forced extraction and discharge), the groundwater fascinates all: engineers, hydrogeologists, agriculturists, environmentalists, scientists, academia, resource managers and domestic and industrial users. This book is the outcome of efforts of those eminent authors who despite their fascination were able to write upon some important facet of groundwater flow and the transport of pollutants with it. The dimensions covered range from simple descriptive narratives; to expose of analytical methods; to complex mathematical treatment; to numerical simulations and computer modeling. All areas have been touched upon for the sake of general readers, students, professional engineers and scientists.

Numerical Models in Groundwater Pollution

Increasing demand for water, higher standards of living, depletion of resources of acceptable quality, and excessive water pollution due to urban, agricultural, and industrial expansions have caused intense environmental, social, economic, and political predicaments. More frequent and severe floods and droughts have changed the resiliency and ability of water infrastructure systems to operate and provide services to the public. These concerns and issues have also changed the way we plan and manage our surface and groundwater resources. Groundwater Hydrology: Engineering, Planning, and Management, Second Edition presents a compilation of the state-of-the-art subjects and techniques in the education and practice of groundwater and describes them in a systematic and integrated fashion useful for undergraduate and graduate students and practitioners. This new edition features updated materials, computer codes, and case studies throughout. Features: Discusses groundwater hydrology, hydraulics, and basic laws of groundwater movement Describes environmental water quality issues related to groundwater, aquifer restoration, and remediation techniques, as well as the impacts of climate change \ Examines the details of groundwater modeling and simulation of conceptual models Applies systems analysis techniques in groundwater planning and management Delineates the modeling and downscaling of climate change impacts on groundwater under the latest IPCC climate scenarios Written for students as well as practicing water resource engineers, the book develops a system view of groundwater fundamentals and model-making techniques through the application of science, engineering, planning, and management principles. It discusses the classical issues in groundwater hydrology and hydraulics followed by coverage of water quality issues. It also introduces basic tools and decision-making techniques for future groundwater development activities, taking into account regional sustainability issues. The combined coverage of engineering and planning tools and techniques, as well as specific challenges for restoration and remediation of polluted aquifers sets this book apart.

Experimental Methods in Hydraulic Research

Over recent years, important contributions on the topic of solving various aquifer problems have been presented in numerous papers and reports. The scattered and wide-ranging nature of this information has made finding solutions and best practices difficult. Comprehensive and self-contained, Applied Flow and Solute Transport Modeling in Aquifers compiles the scattered literature on the topic into a single-source reference of the most up-to-date information in the field. Based on Dr. Batu's 20 years of practical experience tackling aquifer problems in a myriad of settings, the book addresses essentially all currently applied aquifer flow and contaminant transport solutions, combines theory with practical applications, covers both analytical and numerical solutions, and includes solutions to real world contaminant transport modeling scenarios. Batu approaches the subject from the practicing consultant's point of view and elucidates the difficulties real world professionals have faced in solving aquifer flow and contamination problems. The author simplifies the necessary theoretical background as much as possible and provides all derivational details of the theoretical background as worked examples. He uses this method to explore how the derivations were generated for those who need to know while allowing

others to easily skip them and still benefit and learn from the practical applications of the mathematical approaches. Containing 51 tables and 323 figures, the book covers both the breadth and the depth of currently applied aquifer flow and contaminant transport modeling solutions.

Reactive Transport in Soil and Groundwater

Groundwater Hydrology

Groundwater Contaminant Transport

Groundwater Flow and Quality Modelling

Permeability and Groundwater Contaminant Transport

Hydraulic Conductivity and Waste Contaminant Transport in Soil

The Handbook of Groundwater Engineering

Due to the increasing demand for adequate water supply caused by the augmenting global population, groundwater production has acquired a new importance. In many areas, surface waters are not available in sufficient quantity or quality. Thus, an increasing demand for groundwater has resulted. However, the residence of time of groundwater can be of the order of thousands of years while surface waters is of the order of days. Therefore, substantially more attention is warranted for transport processes and pollution remediation in groundwater than for surface waters. Similarly, pollution remediation problems in groundwater are generally complex. This excellent, timely resource covers the field of groundwater from an engineering perspective, comprehensively addressing the range of subjects related to subsurface hydrology. It provides a practical treatment of the flow of groundwater, the transport of substances, the construction of

wells and well fields, the production of groundwater, and site characterization and remediation of groundwater pollution. No other reference specializes in groundwater engineering to such a broad range of subjects. Its use extends to: The engineer designing a well or well field The engineer designing or operating a landfill facility for municipal or hazardous wastes The hydrogeologist investigating a contaminant plume The engineer examining the remediation of a groundwater pollution problem The engineer or lawyer studying the laws and regulations related to groundwater quality The scientist analyzing the mechanics of solute transport The geohydrologist assessing the regional modeling of aquifers The geophysicist determining the characterization of an aquifer The cartographer mapping aquifer characteristics The practitioner planning a monitoring network

Modeling Groundwater Flow and Contaminant Transport

Teaches, using simple analytical models how physical, chemical, and biological processes in the subsurface affect contaminant transport Uses simple analytical models to demonstrate the impact of subsurface processes on the fate and transport of groundwater contaminants Includes downloadable modeling tool that provides easily understood graphical output for over thirty models Modeling tool and book are integrated to facilitate reader understanding Collects analytical solutions from many sources into a single volume and, for the interested reader, shows how these solutions are derived from the governing model equations

Modeling Groundwater Flow and Contaminant Transport

It is clear that hydraulic research is developing beyond traditional civil engineering to satisfy increasing demands in natural hazards assessment and also environmental research. Our ability to describe processes in nature rests on the observation and experimental methods as well as on theoretical basics of various disciplines. Under such conditions experimental methods draw from various areas of human activities and research, i.e. from physics, biology, chemistry, aerospace research, oceanic research etc. The current volume is the result of a meeting that took place during the 30th International School of Hydraulics in Poland and presents both the state-of-the-art and ongoing research projects in which experimental methods play a key role. Authors from numerous leading laboratories and from various countries guarantee a representative sample of different studies at the frontier of the field

Groundwater

This text explores the laws governing the flow and storage of groundwater in aquifers and provides all the necessary tools to forecast the behavior of a regional aquifer system. 1979 edition.

Aquifer Hydraulics

Groundwater and Surface Water Pollution contains almost all the technical know-how required to clean up our water supply. It provides a survey of up-to-date technologies for remediation, as well as a step-by-step guide to pollution assessment for both ground and surface waters. The book defines groundwater, aquifers and surface water and discusses

Groundwater Hydraulics and Pollutant Transport

Diffusion in Natural Porous Media

This book presents in a systematic and comprehensive manner the modeling of uncertainty, vagueness, or imprecision, alias "fuzziness," in just about any field of science and engineering. It delivers a usable methodology for modeling in the absence of real-time feedback. The book includes a short introduction to fuzzy logic containing basic definitions of fuzzy set theory and fuzzy rule systems. It describes methods for the assessment of rule systems, systems with discrete response sets, for modeling time series, for exact physical systems, examines verification and redundancy issues, and investigates rule response functions. Definitions and propositions, some of which have not been published elsewhere, are provided; numerous examples as well as references to more elaborate case studies are also given. Fuzzy rule-based modeling has the potential to revolutionize fields such as hydrology because it can handle uncertainty in modeling problems too complex to be approached by a stochastic analysis. There is also excellent potential for handling large-scale systems such as regionalization or highly non-linear problems such as unsaturated groundwater pollution.

Applied Flow and Solute Transport Modeling in Aquifers

In this book, the authors focus on the improvement of the scientific base for the development of environmental risk indicators measured by the presence of pollutants in water and porous media. In pursuit of a correct and complete numerical approach, they deliver insight into the understanding of integrated process, and also of modeling capabilities.

Hydraulic Research in the United States and Canada

Praise for Aquifer Hydraulics . . . "Very easy to understand and follow, even for complicated applications . . . this book will be a significant addition to the library of individuals who are practicing in the field of geohydrology." -Professor M. M. Aral, Georgia Institute of Technology "A valuable source of information for every student and practitioner of quantitative

hydrogeology. I commend Dr. Batu for the thorough research and dedicated effort that went into the preparation of this book." -Stavros S. Papadopulos, Chairman, S. S. Papadopulos & Associates, Inc. This book offers the most detailed and comprehensive coverage available of aquifer hydraulics, testing, and analysis for a wide range of aquifer and well types under differing conditions. It presents the theoretical foundations and limitations of existing analytical models for each ground water system, along with an in-depth examination of hydrogeologic data analysis methods. Translating theory into practice, detailed examples illustrate the real-world application of well test techniques-an invaluable aid to readers in the design, execution, and analysis of their own field tests. With an accompanying computer disk packed with data analysis programs, Aquifer Hydraulics is an essential tool for practicing and aspiring hydrogeologists, environmental engineers, and others involved in aquifer evaluation and protection.

Water Pollution: Modelling, Measuring and Prediction

Mathematical models are powerful tools used in the prediction of pollutant movement. This book discusses the Finite Element Method (FEM) and Boundary Element Method (BEM), and takes a look at the advantages of these methods in groundwater hydrology. The combination of the BEM and the random-walk particle tracking method is also presented. The book includes computer programs, source code, and examples developed on the basis of the theoretical backgrounds of these methods. These Visual C++ programs are compatible with the Windows platform.

Handbook of Applied Hydrology, Second Edition

Diffusion in Natural Porous Media: Contaminant Transport, Sorption/Desorption and Dissolution Kinetics introduces the general principles of diffusion in the subsurface environment and discusses the implications for the fate and transport of contaminants in soils and groundwater. Emphasis is placed on sorption/desorption and the dissolution kinetics of organic contaminants, both of which are limited by the slow speed of molecular diffusion. Diffusion in Natural Porous Media: Contaminant Transport, Sorption/Desorption and Dissolution Kinetics compiles methods for calculating the diffusion coefficients of organic compounds (in aqueous solution or vapor phase) in natural porous media. The author uses analytical solutions of Fick's 2nd law and some simple numerical models to model diffusive transport under various initial and boundary conditions. A number of these models may be solved using spreadsheets. The book examines sorption/desorption rates of organic compounds in various soils and aquifer materials, and also examines the dissolution kinetics of nonaqueous phase liquids in aquifers, in both the trapped residual phase and in pools. Diffusion in Natural Porous Media: Contaminant Transport, Sorption/Desorption and Dissolution Kinetics concludes with a discussion of the impact of slow diffusion processes on soil and groundwater decontamination and the implications of these processes for groundwater risk assessment.

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY
HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION