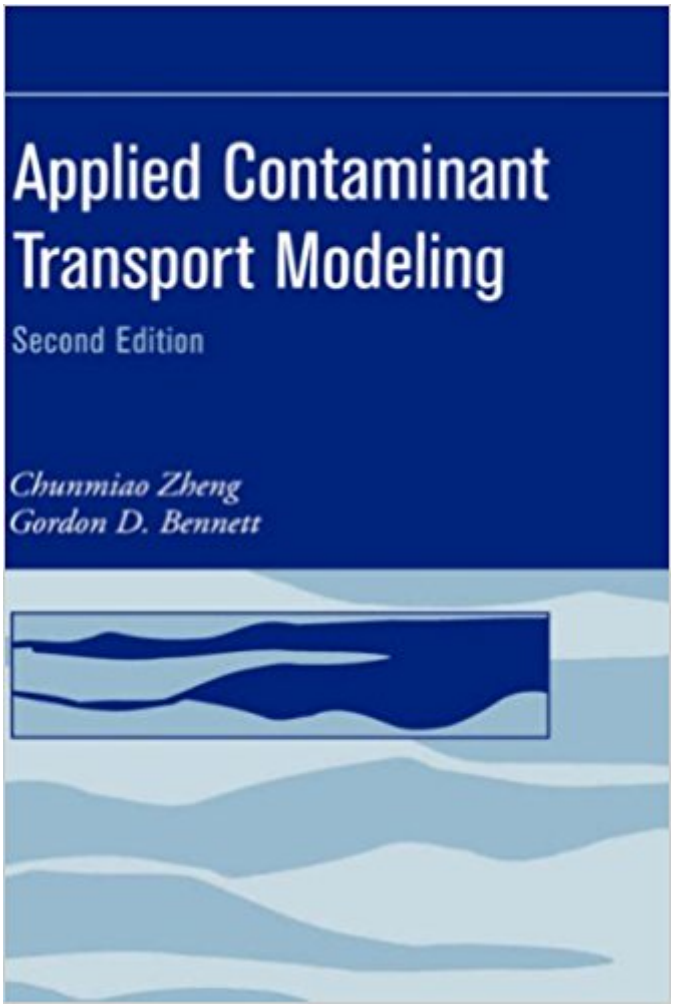
Applied Contaminant Transport Modeling



Synopsis

The challenges facing groundwater scientists and engineers today demand expertise in a wide variety of disciplinesÃ¢â ¬â œgeology, hydraulics, geochemistry, geophysics, and biology. As the number of the subdisciplines has increased and as each has become more complex and quantitative, the problem of integrating their concepts and contributions into a coherent overall interpretation has become progressively more difficult. To an increasing degree transport simulation has emerged as an answer to this problem, and the transport model has become a vehicle for integrating the vast amount of field data from a variety of sources and for understanding the relationship of various physical, chemical, and biological processes. Applied Contaminant Transport Modeling is the first resource designed to provide coverage of the disciplineÃ¢â ¬â„¢s basic principles, including the theories behind solute transport in groundwater, common numerical techniques for solving transport equations, and step-by-step guidance on the development and use of field-scale modeling.Ã Â The Second Edition incorporates recent advances in contaminant transport theory and simulation techniques, adding the following to the original text: -An expanded discussion of the role of aquifer heterogeneity in controlling solute transport -A new section on the dual-domain mass transfer approach as an alternative to the classical advection-dispersion model -Additional chemical processes and reactions in the discussion of reactive transport -A discussion of the TVD (total-variation-diminishing) approach to transport solution -An entirely new Part III containing two chapters on simulation of flow and transport under variable water density and under variable saturation, respectively, and a third chapter on the use of the simulation-optimization approach in remediation system design Applied Contaminant Transport Modeling, Second Edition remains the premier reference for practicing hydrogeologists, environmental scientists, engineers, and graduate students in the field. In 1998, in recognition of their work on the first edition, the authors were honored with the John Hem Excellence in Science and Engineering Award of the National Ground Water Association

Book Information

Hardcover: 621 pages
Publisher: Wiley-Interscience; 2 edition (February 5, 2002)
Language: English
ISBN-10: 0471384771
ISBN-13: 978-0471384779
Product Dimensions: 6.4 x 1.3 x 9.4 inches

Shipping Weight: 2.4 pounds (View shipping rates and policies)

Average Customer Review: 4.7 out of 5 stars 5 customer reviews

Best Sellers Rank: #591,448 in Books (See Top 100 in Books) #38 inÃ Â Books > Engineering & Transportation > Engineering > Civil & Environmental > Environmental > Groundwater & Flood Control #136 inÃ Â Books > Engineering & Transportation > Engineering > Civil & Environmental > Hydrology #218 inÃ Â Books > Engineering & Transportation > Engineering > Civil & Environmental > Environmental > Water Quality & Treatment

Customer Reviews

"Introduces theory...then applies...to practical contaminant transport problems." (SciTech Book News, Vol. 26, No. 2, June 2002) "...well-written, lucid, well-structured, informative, thorough, and above all provides a good balance between theoretical rigor and practical model application...a must for a hydrogeologist's and transport specialist's bookshelf..." (Journal of Environmental Quality, Vol. 32, July-August 2003)

An authoritative treatment of contaminant transport modeling now significantly revised and expanded The challenges facing groundwater scientists and engineers today demand expertise in a wide variety of disciplines–geology, hydraulics, geochemistry, geophysics, and biology. As the number of the subdisciplines has increased and as each has become more complex and quantitative, the problem of integrating their concepts and contributions into a coherent overall interpretation has become progressively more difficult. To an increasing degree transport simulation has emerged as an answer to this problem, and the transport model has become a vehicle for integrating the vast amount of field data from a variety of sources and for understanding the relationship of various physical, chemical, and biological processes. Applied Contaminant Transport Modeling is the first resource designed to provide coverage of the discipline’s basic principles, including the theories behind solute transport in groundwater, common numerical techniques for solving transport equations, and step-by-step guidance on the development and use of field-scale modeling. The Second Edition incorporates recent advances in contaminant transport theory and simulation techniques, adding the following to the original text: An expanded discussion of the role of aquifer heterogeneity in controlling solute transport A new section on the dual-domain mass transfer approach as an alternative to the classical advection-dispersion model Additional chemical processes and reactions in the discussion of reactive transport A discussion of the TVD (total-variation-diminishing) approach to transport solution An entirely new Part III containing two

chapters on simulation of flow and transport under variable water density and under variable saturation, respectively, and a third chapter on the use of the simulation-optimization approach in remediation system design Applied Contaminant Transport Modeling, Second Edition remains the premier reference for practicing hydrogeologists, environmental scientists, engineers, and graduate students in the field. In 1998, in recognition of their work on the first edition, the authors were honored with the John Hem Excellence in Science and Engineering Award of the National Ground Water Association.

This is an awesome material for contaminant transport modeling. The author breaks down the topic into easy to understand manner. For those that want to pursue a career in Contaminant Modeling: get this book!

Excellent!

I am involved in modelling saturated-unsaturated flow and multi-species reactive transport and transformations of effluent (nitrogen species) under agricultural land. We have been using FEMWATER for this. I have a math background and enjoyed the level of this book and its comprehensive yet compact and clear explanation of a fairly difficult (and, to me, unfamiliar) area of theory and application.My two minor gripes are that it is pretty wordy in the first two chapters, and gets a bit boring to read, but after ch 2 things pick up nicely. Also that he prefers repeated subscript notation whereas I prefer del/div (guess I’m old fashioned).The book provides an excellent background for understanding the FEMWATER code I am using as well as the FDM models Zheng is more associated with. As you would expect coverage of flow modelling is limited, but all the basic transport stuff is here. Well written and easy to read. I am looking forward to seeing the expanded 2nd edition hopefully with more up-to-date commentary on the various codes. Recommend it.

This book provided an excellent explanation of the modeling of solutes and groundwater that conveyed a very good understanding of the challenges and methods used without resorting to the use of mathematical sophistication that actual ground water modelers no doubt possess.In other words, I think that this book would benefit both those that are hydrologists and geologists as well as those that have had some training in environemental site assessment and remediation but have not been exposed to the actual number crunching that is essential for doing actual simulations.

It’s quite an elaborate book with a nice description of the theoretical background. But it also describes practical problems that you might face when you use solute transport models such as MT3D, RT3D etc. as well as how to calibrate the models.

Applied Contaminant Transport Modeling Groundwater Optimization Handbook: Flow, Contaminant Transport, and Conjunctive Management Flow and Contaminant Transport in Fractured Rock Introduction to the Numerical Modeling of Groundwater and Geothermal Systems: Fundamentals of Mass, Energy and Solute Transport in Poroelastic Rocks (Multiphysics Modeling) Applied Groundwater Modeling, Second Edition: Simulation of Flow and Advective Transport Applied Groundwater Modeling: Simulation of Flow and Advective Transport Contaminant Hydrogeology Contaminant Hydrogeology (2nd Edition) Hydrology for Engineers, Geologists, and Environmental Professionals, Second Edition: An Integrated Treatment of Surface, Subsurface, and Contaminant Hydrology Advanced Transport Phenomena: Fluid Mechanics and Convective Transport Processes (Cambridge Series in Chemical Engineering) The Transport System and Transport Policy: An Introduction Freight Forwarding and Multi Modal Transport Contracts (Maritime and Transport Law Library) ASTNA Patient Transport: Principles and Practice, 4e (Air & Surface Patient Transport: Principles and Practice) Nurse Neonatal Transport C-NPT: Practice Questions for the Neonatal Transport Nurse Exam ASTNA Patient Transport - E-Book: Principles and Practice (Air & Surface Patient Transport: Principles and Practice) Transport Nursing (CTRN) Review (Certification in Transport Nursing Book 1) An Introduction to Modeling of Transport Processes: Applications to Biomedical Systems (Cambridge Texts in Biomedical Engineering) Advanced Transport Phenomena: Analysis, Modeling, and Computations Modeling Groundwater Flow and Pollution (Theory and Applications of Transport in Porous Media) Environmental Modeling: Fate and Transport of Pollutants in Water, Air, and Soil