intrusions upon the formation of seepage-face boundaries at the ground-water-surface water interface under steady-state conditions was also investigated. Dense intrusions are shown to dominate the pattern of ground-water flow under mild recharge conditions and the outflow beneath the seepage-face boundary is largely controlled by recharging conditions. Therefore, the formation of seepage-face boundaries and dense intrusions are unlikely to coincide with the conditions examined in this study.


Fundamentals of Ground-water Modeling Jacob Bear 1992

The Handbook of Groundwater Engineering John H. Cushman 2016-11-15 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 edition of the popular reference book on groundwater engineering for environmental engineers and students is timely and appropriate. The analysis of 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.

Numerical Models of Groundwater Flow and Solute Transport in Three-dimensional Heterogeneous Aquifers Jia-Ling Wu 1999

Seepage in Soils Lakhmi N. Reddi 2003-05-21 up-to-date coverage of fundamental seepage principles, closed-form solutions, and applications Seepage in Soils combines a broad range of applications with rigorous quantitative skills to give insight into the fundamental principles and mathematical solutions of seepage. A wealth of closed-form analytical solutions are provided to solve a variety of problems, minimizing the use of computer software and numerical models. Completely up to date with coverage of new developments in separators, filters, and levees, this textbook is the best method for learning seepage principles. Complete coverage is useful in all subdivisions of civil engineering. Material is divided into three modules: "Fundamentals of seepage principles and equations of seepage problems"; "Application of seepage principles to actual engineering problems in mathematics and soil mechanics is required for Seepage in Soils to serve as an invaluable resource for civil engineering students across many subdivisions. In addition, it serves as a useful reference for geotechnical, environmental, and structural engineers, hydrologists, geologists, agronomists, and soil scientists.

Using Flux Information at Surface Water Boundaries to Improve a Groundwater Flow and Transport Model 2000 We investigated the performance of a groundwater flow and solute transport model when different configurations of hydraulic head, seepage flux, and horizons were used. A synthetic example was presented to test the model. Using additional calibration data, beyond traditionally-based head data, improved performance of the model was indicated. A new approach to the seepage problem is required from the calibration period. This confirms the merit of collecting seepage flux and concentration data, and using them together with head data in parameter estimation for a numerical groundwater model. Our work also contributed to improvement of the Army Groundwater Modeling System (GMS), by identifying numerous software problems and working with GMS developers to correct them.


Finite Element Techniques in Groundwater Flow Studies I. Kanda 2012-12-02 The finite element method (FEM) is one of those modern numerical methods whose rise and development was incited by the rapid development of computer technology. This book is an introduction to the finite element method for students of engineering and applied science. It will provide the reader with fundamental knowledge to understand and use the finite element method in geotechnical, environmental, and biomedical engineering. The book will also be useful for graduate students, researchers, and professionals working in these areas. The book covers the basic principles of the finite element method, the solution of various types of problems, and the application of the finite element method to practical problems in engineering.


A quantitative understanding of ground water flow characteristics in unconfined aquifers is needed because of the dominance of horizontal flow of unconfined aquifers used for recharge to streams. The method of horizontal flow transport is an important tool because it allows for a quantitative understanding of the flow of water and the transport of contaminants both in the unsaturated and saturated zones. This method is useful for the protection of groundwater and the remediation of contaminated groundwater.

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Numerical Simulation of Groundwater Flow and Contaminant Transport at the K, L, and P Areas of the Savannah River Site, Aiken, South Carolina - 1980

This report describes the development, calibration, and simulation results of the groundwater flow and contaminant transport model developed for this task. It includes all of the basic items in above-mentioned fields, to students (of graduate school), researchers and practitioners. The students and beginners who intend to specialize in groundwater hydrology through one semester will master contents of the book.

Groundwater Hydrology

Groundwater Hydrology is a vital source of water throughout the world. As the number of groundwater investigations increases, it is important to understand how to develop computer-based groundwater flow models. The text is intended for undergraduate and graduate level courses in applied groundwater modeling and as a comprehensive reference for groundwater scientists and engineers in industry and governmental agencies. It explains the principles and formulation of a conceptual model of a groundwater system and translates it into a numerical model that allows the user to readily evaluate the effects of different management scenarios on the groundwater system. It presents the fundamental concepts of groundwater hydrology that are essential to any groundwater modeling project.

Groundwater Resource Development

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