

Influence Of The Infiltration Process On Properties Of

This book provides essential background knowledge on a wide range of hydrological processes governing contaminant transport from soil to surface water across a range of scales, from hillslope to watershed. The mathematical description of these processes is based on both well-known and unique analytical solutions of different initial and boundary problems (primarily using methods from the kinematic wave theory and the reservoir/lumped-parameter concept), supported by numerical modelling studies. Some research topics, in particular several case studies, are illustrated by monitoring and experimental data analysis to show the importance of the research's applications in environmental practice and environmental education. Specific results concern the recognition of: (a) the effect of transient rainfall–runoff–infiltration partitioning on the chemical response of drainage areas to excess precipitation under certain field conditions related to the soil, hillslope characteristics, and contaminant properties; (b) soil erosion as a key factor that enhances the potential of adsorbed chemical transport in runoff; and (c) common tendencies in radionuclide behaviour in the near-surface environment contaminated by radioactive fallout from the Chernobyl (1986), Fukushima (2011) and the less known Kyshtym (1957) accidents, as well as from nuclear weapon tests in the atmosphere since 1952. The book's goal is to provide a conceptual foundation enabling readers to apply scientific knowledge to solve practical problems in environmental hydrology and radiology. More specifically, the book presents the state-of-the-art approaches that scientists and natural resources experts need in order to significantly improve the prediction of changes in the soil–water system chemistry due to human activities.

This book contains more than 300 papers presented at the 28th International Conference on Coastal Engineering, held in Cardiff, Wales, in July 2002. It is divided into five parts: coastal waves; nearshore currents, swash, and long waves; coastal structures; sediment transport; and coastal morphology, beach nourishment, and coastal management. The papers cover a broad range of topics, including theory, numerical and physical modeling, field measurements, case studies, design, and management. Coastal Engineering 2002 provides engineers, scientists, and planners with state-of-the-art information on coastal engineering and coastal processes.

The technological advances of recent years include the emergence of new remote sensing and geographic information systems that are invaluable for the study of wetlands, agricultural land, and land use change. Students, hydrologists, and environmental engineers are searching for a comprehensive hydrogeologic overview that supplements information on hydrologic processes with data on these new information technology tools. Environmental Hydrology, Second Edition builds upon the foundation of the bestselling first edition by providing a qualitative understanding of hydrologic processes while introducing new methods for quantifying hydrologic parameters and processes. Written by authors with extensive multidisciplinary experience, the text first discusses the components of the hydrologic cycle, then follows with chapters on precipitation, stream processes, human impacts, new information system applications, and numerous other methods and strategies. By updating this thorough text with the newest analytical tools and measurement methodologies in the field, the authors provide an ideal reference for students and professionals in environmental science, hydrology, soil science, geology, ecological engineering, and countless other environmental fields.

Interfacial Phenomena in Composite Materials '91 is a collection of papers dealing with the science of composite interfaces, with emphasis on theoretical modeling, test methods, and characterization methods of polymer matrix, metal, or ceramic matrix composites. One paper reviews the micromechanical test methods used in evaluating mechanical properties of fiber-matrix interface. Another paper shows that the critical fiber length cannot always be considered a material constant in the framework of load transfer models based on the shear lag theory. Microwave plasma treatment is a quick technology to change fiber surface structure as the oxidation or the roughening of the fiber increases fiber-matrix adhesion. Another paper evaluates the effect of improved adhesion on mechanical performance under static, dynamic, and impact conditions. It also examines the role of fiber anisotropy on the performance of high performance polyethylene/epoxy composites. By using the Laser Raman Spectroscopy, the investigator can analyze the effects of the fiber surface treatment, the fiber modulus, the curing temperature on the Shear strength, and the fracture mechanics of the interface. The collection can be read profitably by chemists, biochemists, and academicians involved in material compound research. The goal of Interface Science and Composites is to facilitate the manufacture of technological materials with optimized properties on the basis of a comprehensive understanding of the molecular structure of interfaces and their resulting influence on composite materials processes. From the early development of composites of various natures, the optimization of the interface has been of major importance. While there are many reference books available on composites, few deal specifically with the science and mechanics of the interface of materials and composites. Further, many recent advances in composite interfaces are scattered across the literature and are here assembled in a readily accessible form, bringing together recent developments in the field, both from the materials science and mechanics perspective, in a single convenient volume. The central theme of the book is tailoring the interface science of composites to optimize the basic physical principles rather than on the use of materials and the mechanical performance and structural integrity of composites with enhanced strength/stiffness and fracture toughness (or specific fracture resistance). It also deals mainly with interfaces in advanced composites made from high-performance fibers, such as glass, carbon, aramid, and some inorganic fibers, and matrix materials encompassing polymers, carbon, metals/alloys, and ceramics. Includes chapter on the development of a nanolevel dispersion of graphene particles in a polymer matrix Focus on tailoring the interface science of composites to optimize the basic physical principles Covers mainly interfaces in advanced composites made from high performance fibers

Climate change imposes new challenges on agricultural practices due to extreme and rapid changes in the environmental conditions. Soil conservation becomes a primarily task due to its importance for supporting agricultural sustainability and food security. This thesis deals with the analysis and simulation of the effect of biochar amendments on soil water dynamics. In a microscale, infiltration at the topsoil is analyzed; in a macroscale, its impact in catchment hydrology is assessed. An analysis of the main soil parameters affected by the biochar amendments is presented. The role of the biochar chemical characteristics on the soil amendments and the effect of the biochar dosage as a function of the soil type are exposed. The impact of biochar of two different soil materials is analyzed in terms of the effect of the main soil physical and hydraulic properties. Simulation of intense and repetitive extreme climate conditions (by means of wetting and drying periods) are considered as a critical environmental parameter influencing the dynamics of soil

aggregate formation in the topsoil. The effect of biochar amendments on the soil water balance equation considers the infiltration process as a key factor on the surface runoff formation. The water infiltration response by the amendments is tested by conventional infiltration equations and a statistical regression model in order to determine the main parameters and mechanisms that deals with the transport of water at the surface and in the soil matrix. Several scenarios of the complexity of the addition of biochar, as a soil conservation management option, at a macroscale level are evaluated. In this case, all the soil water balance parameters are included and the discharge outputs reveal that biochar as a source of organic carbon alters soil aggregation and pore characteristics enhancing or reducing the capacity of the soil matrix to conduct water; and these bulk changes are a function of intense periods of wetting and drying. It is shown that application of biochar as amendment as an option for soil conservation and water management has a complex relation of the biomass composition, application dosage, soil type and environmental conditions.

The persistence of 'Ndrangheta activities around the world show that deterrence efforts alone directed against organized crime fall short in significantly reducing or preventing 'Ndrangheta organized crime. Additional approaches derived from the Rational Choice Perspective (RCP) are discussed, which include Routine Activities (RA) and Situational Crime Prevention (SCP). These practical approaches are applied to 'Ndrangheta for the purpose of identifying required changes in the environment i.e., political, economic, social, technological, legal that are inclusive of environmental (PESTLE) in a framework using Dynamic Operational Design Planning and Assessment Approach (DODPAA). This approach offers a process for designing actions and measuring results for confronting 'Ndrangheta organized crime. An example framework model using cocaine transiting through the port of Gioia Tauro is created as an illustration to assist in developing a law enforcement, judicial and legislative plans of action in order to measure, evaluate, and have results integrated into more detailed comprehensive plans of action for reducing and eventually preventing overall 'Ndrangheta organized crime. This book presents a unique practical method, process, and model for security practitioners, criminologists and policy makers to consider for designing plans of action to confront, challenge, and assess future counter 'Ndrangheta efforts.

This book is a collection of papers from The American Ceramic Society's 35th International Conference on Advanced Ceramics and Composites, held in Daytona Beach, Florida, January 23-28, 2011. This issue includes papers presented in the Mechanical Behavior and Performance of Ceramics & Composites Symposium on topics such as processing-microstructure properties correlations; fracture mechanics, modeling and testing; tribological properties; applications; and processing.

Rainfall infiltration is an important component of the hydrologic cycle and plays a crucial role in the formation of surface runoff, providing subsurface water that governs the water supply for agriculture, the transport of pollutants through the vadose zone, and the recharge of aquifers. The spatiotemporal evolution of the infiltration rate under natural conditions cannot currently be deduced by direct measurements at any scale of interest. Therefore, the use of infiltration modeling is of fundamental importance in applied hydrology and allows this process to be described through measurable quantities. In spite of the continuous development of infiltration modeling in recent decades, the estimation of infiltration at different spatial scales, i.e., from the local to watershed scales, remains a complex problem because of the natural spatial variability of both soil hydraulic characteristics and rainfall. For many years, research activity has been limited to the development of local or point infiltration models for vertically homogeneous soils with flat surfaces. Recent scientific literature has extended infiltration modeling to many other involved elements whose representation, however, still represents an open problem. In this context, this volume attempts to make a contribution to the modeling of point infiltration into vertically non-uniform soils or soils modified by human activities, infiltration over horizontal heterogeneous areas, infiltration into soil surfaces with significant slopes, interaction between the infiltration process and the groundwater system, and infiltration due to irrigation and the surface water-groundwater dynamics.

This book summarises the main results of many contributions from researchers worldwide who have used the water infiltration process to characterize soil in the field.

Determining soil hydrodynamic properties is essential to interpret and simulate the hydrological processes of economic and environmental interest. This book can be used as a guide to soil hydraulic characterization and in addition it gives a complete description of the treated techniques, including an outline of the most significant research results, with the main points that still needing development and improvement.

In this research, we investigate complex infiltration processes in commonly existing sloping and/or layered soils by developing a series of physically-based models. This dissertation consists of four topically related but scientifically independent parts. First, a Green-Ampt type model for sloping layered soils (GASLS) is developed to represent the effects of layered soil formation and slope effect on infiltration using a hydraulic conductivity factor c and a slope factor. Guidelines to estimate the factor c are established and the effects of the slope are discussed. Second, a new analytical infiltration model is proposed to determine water flow dynamics around layer interfaces during infiltration process in layered soils, including the unsaturated flow in the coarse soils underlying fine soils and the water backfill effect. The easily determined dynamic steady state effective water content profiles are used to predict the saturation state of all layers. Results demonstrate that the arrangement of contrasting soil layers significantly affects infiltration process. Third, an infiltration model based on the traveling characteristics of wetting front (TCWF model) is presented to simulate infiltration process on any slope angle, including the evolution of wetting front. The TCWF model accurately predicts the infiltration process by solving an ordinary differential equation, which avoids numerically solving the highly non-linear Richards equation and reveals two traveling characteristics of wetting front. Fourth, an infiltration and runoff model is developed for surface crust soils under unsteady rainfall events. The model extends the flux-concentration relation and adopts time compression concept with consideration of the unsaturated flow in subsoil layer. The model

predicts well actual runoff comparing to measured data from field experiments.

To face the threats to the water supply and to maintain sustainable water management policies, detailed knowledge is needed on the surface-to-subsurface transformation link in the water cycle. Recharge flux is covered in this book as well as many other groundwater issues, including a comparison of the traditional and modern approaches to determine groundwater recharge. The authors also explain in detail the fate of groundwater recharge in the subsurface by hydraulic and geologic means, in order to stimulate adapted groundwater-management strategies.

Arid and semi-arid regions can be defined as environments in which water is the limiting factor for bio-systems. This means that survival of life in these regions involves a constant struggle to obtain this limited commodity and draw the maximum benefit out of it. However, despite the difficulties for plants, animals, and man to live in, these regions, they are being utilized more and more because of the pressure of world population growth. This is expressed in the expansion of agricultural activities in desert lands as well as by the formation and rapid growth of urban and industrial centers. These trends result in a growing demand for water on the one hand, and the disposal of vast amounts of waste water, as well as other types of refuse, on the other. Meeting the first demand, namely, supplying water to the agricultural communities and urban centers, involves, in many instances, the over-exploitation and misuse of natural water resources. The surplus of waste water, sometimes highly loaded with toxic compounds, is likely to cause irreversible damage to the environment. The geoscientists and engineers face a challenge on two conflicting fronts. Success on one front, namely, in answering the full demand for water, may lead to an increase in the pollution of the environment by waste water.

The major factors which determine the shape and size of a hydrograph are presented to set the stage of the infiltration process. The HEC-1 methodology for representing that infiltration process is described. Modelers are cautioned not to over-emphasize one aspect of the runoff process at the expense of the components before and after it. Finally, the spatial and temporal definition of the runoff process by the models was discussed.

Surface Runoff and Infiltration Processes in the Volta Basin, West Africa Observation and Modeling Cuvillier Verlag Rainfall Infiltration Modeling MDPI

The National Center for Intermedia Transport Research (NCITR) was established at UCLA in 1982 by EPA as one of six Centers of Excellence for the study of environmental pollution problems. One of the functions undertaken by the NCITR has been to hold periodic workshops and to provide a forum for the discussion of current topics in the environmental pollution arena. To this end, two other workshops have previously been held. The first, held in November 1982, was chaired by H. R. Pruppacher, R. G. Semonin and W. G. N. Slinn on Precipitation Scavenging, Dry Deposition and Resuspension. The second, held in January 1986, was chaired by Y. Cohen on Pollution Transport and Accumulation in a Multimedia Environment. The present workshop, chaired by D. T. Allen, Y. Cohen and I. R. Kaplan, was held on August 24-26, 1988 in Santa Monica, California. The title of the workshop was Intermedia Pollutant Transport: Modeling and Field Measurements. Approximately one hundred individuals participated and twenty five papers were given, mostly by invitation. The workshop was divided into the following four broad topics: 1) Transport of Pollutants from the Atmosphere, 2) Transport of Pollutants from Soils and Groundwaters, 3) Transport of Pollutants from Lakes and Oceans, and 4) Multimedia Transport of Pollutants. The last afternoon was reserved for a Panel Discussion.

The availability and distribution of water resources in catchments are influenced by various natural and anthropogenic factors. Human-induced environmental changes are key factors controlling the hydrological flows of semi-arid catchments. Land degradation, water scarcity and inefficient utilization of available water resources continue to be important constraints for socio-economic development in the headwater catchments of the Nile river basin in particular over the Ethiopian Catchments. This research investigates the impact of landscape anthropogenic changes on the hydrological processes in the Upper Tekeze basin (A tributary of the Nile). The hydrology of the basin is investigated through analysis of hydro-climatic data, remote sensing techniques, new field measurements and parsimonious hydrological models. The empirical evidence provided in this book confirms that human-induced environmental changes can significantly change the hydrology of catchments, both in negative (degradation) and in positive (restoration) ways. This book also shows that rainfall-runoff relationships in semi-arid catchments are non-uniform and hence the application of hydrological models in such catchments need special attention. Moreover, parsimonious dynamic hydrological model improves our understanding of the hydrological response to dynamic environmental changes.

This Encyclopedia of Agrophysics will provide up-to-date information on the physical properties and processes affecting the quality of the environment and plant production. It will be a "first-up" volume which will nicely complement the recently published Encyclopedia of Soil Science, (November 2007) which was published in the same series. In a single authoritative volume a collection of about 250 informative articles and ca 400 glossary terms covering all aspects of agrophysics will be presented. The authors will be renowned specialists in various aspects in agrophysics from a wide variety of countries. Agrophysics is important both for research and practical use not only in agriculture, but also in areas like environmental science, land reclamation, food processing etc. Agrophysics is a relatively new interdisciplinary field closely related to Agrochemistry, Agrobiology, Agroclimatology and Agroecology. Nowadays it has been fully accepted as an agricultural and environmental discipline. As such this Encyclopedia volume will be an indispensable working tool for scientists and practitioners from different disciplines, like agriculture, soil science, geosciences, environmental science, geography, and engineering.

In arid and semi-arid areas, the main contributions to land surface processes are precipitation, surface evaporation and surface energy balancing. In the close-to-surface layer and root-zone layer, vapor flux is the dominant flux controlling these processes - process which, in turn, influence the local climate pattern and the local ecosystem. The work reported in this thesis attempts to understand how the soil airflow affects the vapor transport during evaporation processes, by using a two-phase heat and mass transfer model. The necessity of including the airflow mechanism in land surface process studies is discussed and highlighted.

Water Conservation in the Era of Global Climate Change reviews key issues surrounding climate change and water resources. The book brings together experts from a variety of fields and

perspectives, providing a comprehensive view on how climate change impacts water resources, how water pollution impacts climate change, and how to assess potential hazards and success stories on managing and addressing current issues in the field. Topics also include assessing policy impacts, innovative water reuse strategies, and information on impacts on fisheries and agriculture including food scarcity. This book is an excellent tool for researchers and professionals in Climate Change, Climate Services and Water Resources, and those trying to combat the impacts and issues related to Global and Planetary Change. Covers a wide range of theoretical and practical issues related to how climate change impacts water resources and adaptation, with extended influence on agriculture, food and water security, policymaking, etc. Reviews mathematical tools and simulations models on predicting potential hazards from climate change in such a way they can be useful to readers from a variety of levels of mathematical expertise Examines the potential impacts on agriculture and drinking water quality Includes case studies of successful management of water and pollutants that contribute to climate change

Along with windstorms, floods are the most common and widespread of all natural disasters. Although they can often be predicted, they cause loss of life, damage and destruction, as many urban communities are located near coasts and rivers. In terms of victims, floods are responsible for more than half the deaths caused by natural catastrophes. As flood events appear to be rapidly increasing world-wide, an advanced and universal approach to urban flooding and how to manage will help reduce flood impact. This textbook integrates expertise from disciplines such as hydrology, sociology, architecture, urban design, construction and water resources engineering. The subject is approached from an international perspective and case studies, exercises, expert advice and literature recommendations are included to support the theory and illustrations. Developed by a team of specialists, this volume is intended for urban flood management education of hydrology, geography, civil and environmental engineering, and management students at university level. Moreover, professionals will find this book useful as a reference. More information on flood resilience and urban flood management can be found at www.floodresiliencigroup.org For a preview, please go to http://issuu.com/crcpress/docs/urban_flood_management

This volume is part of the Ceramic Engineering and Science Proceeding (CESP) series. This series contains a collection of papers dealing with issues in both traditional ceramics (i.e., glass, whitewares, refractories, and porcelain enamel) and advanced ceramics. Topics covered in the area of advanced ceramic include bioceramics, nanomaterials, composites, solid oxide fuel cells, mechanical properties and structural design, advanced ceramic coatings, ceramic armor, porous ceramics, and more.

A complete treatment of the theory and practice of groundwater engineering, The Handbook of Groundwater Engineering, Second Edition provides 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 production of groundwater and the remediation of contaminated groundwater.

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