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KEY=INFILTRATION - HESTER RAYMOND

Surface Runoff and Infiltration Processes in the Volta Basin, West Africa

Observation and Modeling

Cuvillier Verlag

Fire Effects on Soils and Restoration Strategies

CRC Press This book has been published a decade after Fires Effects on Ecosystems by DeBano, Neary, and Folliott (1998), and builds on their foundation to update knowledge on natural post-fire processes and describe the use and effectiveness of various restoration strategies that may be applied when human intervention is warranted. The chapters in this book, written by leading scientists, have been compiled to provide relevant and accessible information to students, land managers, and policy-makers as well as other scientists.

The Handbook of Groundwater Engineering

CRC Press 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.

Encyclopedia of Agrophysics

Springer Science & Business Media 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.

Selected Water Resources Abstracts

Intermedia Pollutant Transport

Modeling and Field Measurements

Springer Science & Business Media 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 Web of Geological Sciences

Advances, Impacts, and Interactions

Geological Society of America "This volume covers many of the important advances in the geological sciences from 1963 to 2013. These advances include understanding plate tectonics, exploration of the Moon and Mars, development of new computing and analytical technologies, understanding of the role of microbiology in geologic processes, and many others"--Provided by publisher.

The Handbook of Groundwater Engineering

CRC Press 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.

Soil Hydrology, Land Use and Agriculture

Measurement and Modelling

CABI Agriculture is strongly affected by changes in soil hydrology as well as changes in land use and management practices and the complex interactions between them. This book aims to develop an understanding of these interactions on a watershed scale, using soil hydrology models and addresses the consequences of land use and management changes on agriculture from a research perspective. It includes case studies that illustrate the impact of land use and management on various soil hydrological parameters under different climates and ecosystems. It is suitable for researchers and students in soil sc

Wetting-induced Changes in Near Surface Soil Physical Properties Affecting Surface Irrigation

Intermittent application of water into many soils produces changes in soil structure and hydraulic properties, resulting in faster advance with less volume of applied water as compared with continuous application. Two distinct soils, a Millville silt loam and a Red-yellow oxisol, were used to study the susceptibility of soil structure to the effects of wetting and drying. Ethanol was used to characterize the condition prior to water application and to distinguish between effects of wetting and drying (by water) on the structure of an unstable soil. The objective of this study was to quantify and show structural changes that affect soil hydraulic properties. Air entrapment effects on infiltration processes during intermittent and continuous water application were also studied. Laboratory and field experiments were carried out to achieve the objectives of this study. Important aspects of soil structural changes were identifyied by measurements with water and ethanol. The major changes were (a) reduction in porosity and (b) pore size distribution. Results reconfirmed that intermittent application of water is an efficiency way to decrease intake rates. An accentuated reduction in intake during the first surge was followed by a smaller reduction in subsequent surges. Similar trends were observed between first and second irrigations for continuous application. The Philip's infiltration model parameters (sorptivity and the parameter A), obtained from the best-fit-of-all measured infiltration data, were used to indicate effects of wetting and drying on soil structure, hence on soil physical properties. Using a Millville silt loam pre-wetting characterization, we verified that ethanol showed little or no effect on soil structure. This allowed study of differential effetcs on the saturated hydraulic conductivity for an unstable soil under wetting and drying conditions. The excepcional predictability of advance trajectories under intermittent and continnuous flow, based on infiltration information only, was demonstrated by a simple advance model. This model emphasized the dominant role of the infiltration process on the performance of surface irrigation systems. The major advantages of the model reside in modest parameter requirements and simplicity, while retaining the main features of the physical process.

The role of physical and biological soil crusts on the water balance in semiarid ecosystems

Influencia de la costra física y biológica del suelo en el

balance de agua en ecosistemas semiaridos

Universidad Almería In arid and semiarid areas, the interplant spaces are usually covered by physical and biological soil crusts. These crusts, though representing an almost negligible portion of the soil profile, have a number of crucial roles. Soil crusts form the boundary between soil and atmosphere and therefore control gas, water and nutrient exchange into and through soils. Concretely, in the last decade, the study of biological soil crusts (BSCs) (complex communities of cyanobacteria, algae, fungi, lichens, mosses and other microorganisms in intimate association with soil particles) has drawn the attention of a growing number of researchers due to the key role they play in numerous processes in the ecosystems where they appear. Unlike physical crusts, BSCs protect soils against erosion by water and wind, and increase soil fertility by fixing atmospheric C and N, synthesising polysaccharides and reducing nutrient losses by runoff and erosion. Through their influence on numerous properties that affect how water moves though soils such as roughness, porosity, hydrophobicity, cracking, and albedo, BSCs play a key role in water processes, such as infiltration and runoff, evaporation and soil moisture. It is widely known the role of physical crusts in decreasing soil porosity and hydraulic conductivity, thus decreasing infiltration. However, there is controversy regarding the role of BSCs in infiltration and runoff processes. Some studies indicate that BSCs increase infiltration, and consequently, decrease runoff, whereas others have reported that they decrease infiltration and increase runoff or that they have no effect on either of them. In addition, the influence of BSCs on other soil water balance components such as evaporation and soil moisture has hardly been studied and the scarce existing studies also show contradicting results. With the aim of enlightening the role that BSCs play in the water balance in semiarid areas, in this thesis it has been analysed the influence of different soil crust types, physical crusts and various developmental stages of BSCs, on key soil water balance components such as infiltration-runoff, evaporation and soil moisture, at plot scale. Furthermore, to better understand how these crusts affect hydrological processes, the influence of the type of crust and developmental stage of the crust on different properties that affect water movement and retention in soils has been analysed. Last, spectral characteristics of the different crust types, as well as of vegetation, have been examined with the aim of developing a spectral classification system for differentiation of these common ground covers in semiarid areas that allows their mapping and the modelling of the effects of the crusted areas on hydrological and erosion processes on larger spatial scales (hillslope and catchment). To conduct this research, two areas where BSCs are widespread and that represent key spatial distributions of BSCs in semiarid ecosystems were chosen in the province of Almeria (SE Spain): El Cautivo (in the Tabernas Desert), a badlands catchment with silty-loam textured soils, and Las Amoladeras (in the Cabo de Gata-Níjar Natural Park), a flat area with sandy-loam textured soils. Our results show that BSCs increase aggregate stability, water retention capacity, and organic carbon and total nitrogen content compared to physical crusts and, within BSCs, these properties increase in the crust and the underlying soil as the crust is more developed (in terms of greater biomass and later-successional species composition). The increase in soil properties with the presence of BSCs is especially noticeable in the top layer of soil (0.01 m) and decreases with depth (0.01-0.05 m) (Chapter I). Through their effect increasing surface roughness and physico-chemical soil properties, BSCs increase infiltration and decrease runoff compared to physical crusts. In general, infiltration increases with greater BSC development (Chapter II). However, there are exceptions to this general pattern that are conditioned by other factors such as the spatial scale under study or the type of rainfall. At small plot sizes (0.25 m2) and after 1h-high intensity simulated rainfall (50 mmh-1), we found that well-developed BSCs such as lichens, generate higher runoff rates than less developed BSCs as cyanobacteria, and similar runoff rates to physical crusts (Chapter II). Thus, at microplot scales and under extreme events, the effect of well-developed BSCs in enhancing infiltration due to their greater roughness can be overcome by their ability to clog soil pores when wet, thus increasing runoff. However, when the influence of BSCs on infiltration and runoff is analysed under natural rain events and at larger spatial scales (1-10 m2), we found that, in low intensity rainfalls, runoff decreases with the cover of well-developed BSCs (lichens) and this effect is higher as the plot size increases (Chapter III). Such decrease in runoff with the presence of well-developed BSCs is due to the microtopography that these crusts confer to soils. Under high intensity rainfalls, BSC cover has no significant effect on runoff yield and the main factor acting to determine runoff generation is rainfall intensity (Chapter III). The removal of the crust initially causes infiltration to increase. But this effect diminishes over time as raindrop impact reseals the surface and a new physical crust is formed that increases runoff (Chapter II). Moreover, crust disturbance by trampling but, especially by removal, causes a dramatic increase in erosion (Chapter II). Erosion also depends on the type of BSC. Well-developed crusts as lichens and mosses generate lower erosion rates than less developed crusts as cyanobacteria. Regarding the influence of BSCs on soil evaporation, under saturation conditions and warm ambient temperatures, soil water loss is quick in all types of surfaces and no significant differences are found in soils with or without BSCs (Chapter V). However, during long cold wet periods, soil water loss is faster in soils devoid of BSCs than in those covered by them. Thus, BSC-crusted soils maintain more soil moisture at the upper soil layer (0.03 m) than adjacent soils where the BSC has been removed, during wet periods. At deeper soil (0.10 m), soil moisture is similar in both BSC-crusted and uncrusted soils. The removal of the BSC causes a higher decrease in soil moisture in fine-textured soils (Cautivo), where the presence of BSCs has a stronger influence on increasing porosity and infiltration, than in coarse-textured soils (Las Amoladeras). During dry soil periods, soil moisture is similar in soils with or without BSCs (Chapter V). Last, a quantitative analysis of spectral characteristics of vegetation, physical crusts and BSC developmental stages has demonstrated the possibility of classifying these common ground covers in semiarid areas based on distinctive spectral features (Chapter VI). The application of the classification system developed to multi and hiperspectral provides the possibility for future mapping of spatial distribution and temporal dynamics of BSCs, which is crucial to incorporating the effects of crusted surfaces in current hydrological and erosion models. Summarizing, compared to physical crusts, the presence of BSCs increase physico-chemical properties of underlying soils, especially in the first centimeters of soil, and this enhancement is greater as the BSC is more developed. Due to this increase in soil properties and the higher roughness that BSCs provide to soils, BSCs increase water input by increasing infiltration and soil moisture, and soil moisture, and reduce water output by reducing soil evaporation. Hence, compared to physical crusts, the presence of BSCs and, especially the presence of well-developed BSCs, have an overall positive effect on the local water balance in semiarid ecosystems, in addition to having a major role in protecting soils from erosion.

Scale Problems in Hydrology

Runoff Generation and Basin Response

Springer Science & Business Media A special workshop on scale problems in hydrology was held at Princeton University, Princeton, New Jersey, during October 31-November 3, 1984. This workshop was the second in a series on this general topic. The proceedings of the first workshop, held in Caracas, Venezuela, in January 1982, appeared in the Journal of Hydrology (Volume 65:1/3, 1983). This book contains the papers presented at the second workshop. The scale problems in hydrology and other geophysical sciences stem from the recognition that the mathematical relationships describing a physical phenomenon are mostly scale dependent in the sense that different relationships manifest at different space-time scales. The broad scientific problem then is to identify and for mulate suitable relationships at the scales of practical interest, test them experimen tally and seek consistent analytical connections between these relationships and those known at other scales. For example, the current hydrologic theories of evaporation, infiltration, subsurface water transport and water sediment transport overland and in channels etc. derive mostly from laboratory experiments and therefore generally apply at "small" space-time scales. A rigorous extrapolation of these theories to large spatial and temporal basin scales, as mandated by practical considerations, appears very difficult. Consequently, analytical formulations of suitable hydrologic theories at basin wide space-time scales and their experimental verification is currently being perceived to be an exciting and challenging area of scientific research in hydrology. In order to successfully meet these challenges in the future, this series of workshops was initiated.

Soil Biochemistry

|:

CRC Press Provides up-to-date reviews on the conditions that affect the quality of soil and on the methods to measure the effects of soil management and bioremediation--focusing on indigenous or introduced microorganisms with the capacity to remediate pollutants.

Rainfall Infiltration Modeling

MDPI 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.

Modeling Processes and Their Interactions in Cropping Systems

Challenges for the 21st Century

John Wiley & Sons Modeling Processes and Their Interactions in Cropping Systems A complete discussion of soil-plant-climate-management processes In Modeling Processes and Their Interactions in Cropping Systems: Challenges for the 21st Century, a team of distinguished researchers delivers a comprehensive and up-to-date scientific textbook devoted to teaching the modeling of soil-plant-climate-management processes at the upper undergraduate and graduate levels. The book emphasizes the new opportunities and paradigms available to modern lab and field researchers and aims to improve their understanding and quantification of individual processes and their interactions. The book helps readers quantify field research results in terms of the fundamental theory and concepts broadly generalizable beyond specific sites, as well as predict experimental results from knowledge of the fundamental factors that determine the environment and plant growth in different climates. Readers will also discover: An introduction to water and chemical transport in the soil matrix and macropores Explorations of heat transport, water balance, snowpack, and soil freezing Discussions of merging machine learning with APSIM models to improve the evaluation of the impact of climate extremes on wheat yields in Australia Examinations of the quantification and modeling of management effects on soil properties, including discussions of tillage, reconsolidation, crop residues, and crop management The book will be essential reading for anyone interested in the 2030 breakthroughs in agriculture identified by the National Academies of Sciences, Engineering, and Medicine.

Nuclear Science Abstracts

Urban Flood Management

CRC Press 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.floodresiliencegroup.org For a preview, please go to http://issuu.com/crcpress/docs/urban_flood_management

New Metropolitan Perspectives Post COVID Dynamics: Green and Digital Transition, between Metropolitan and Return to Villages Perspectives

Springer Nature The book aims to face the challenge of post-COVID-19 dynamics toward green and digital transition, between metropolitan and return to villages' perspectives. It presents a multi-disciplinary scientific debate on the new frontiers of strategic and spatial planning, economic programs and decision support tools, within the urban–rural areas networks and the metropolitan cities. The book focuses on six topics: inner and marginalized areas local development to re-balance territorial inequalities; knowledge and innovation ecosystem for urban regeneration and resilience; metropolitan cities and territorial dynamics; rules, governance, economy, society; green buildings, post-carbon city and ecosystem services; infrastructures and spatial information systems; cultural heritage: conservation, enhancement and management. In addition, the book hosts a Special Section: Rhegion United Nations 2020-2030. The book will benefit all researchers, practitioners and policymakers interested in the issues applied to metropolitan cities and marginal areas.

Virtual Modelling and Rapid Manufacturing

Advanced Research in Virtual and Rapid Prototyping Proc. 2nd Int. Conf. on Advanced Research in Virtual and Rapid Prototyping, 28 Sep-1 Oct 2005, Leiria, Portugal

CRC Press Virtual Modelling and Rapid Manufacturing presents essential research in the area of Virtual and Rapid Prototyping. It contains reviewed papers that were presented at the 2nd International Conference on Advanced Research in Virtual and Rapid Prototyping, held at the School of Technology and Management of the Polytechnic Institute of Leiria, Portugal, from September 28 to October 1, 2005. The volume covers a wide range of topical subjects, such as medical imaging, reverse engineering, virtual reality and prototyping, biomanufacturing and tissue engineering, advanced rapid prototyping technologies and micro-fabrication, biomimetics and materials, and concurrent engineering

Mechanical Properties of Metallic Composites

CRC Press Provides coverage of dispersion-hardened and fibre-reinforced alloys, addressing principal mechanisms, processing and applications. Mechanical behaviour based on dislocation theory and elastic-plastic mechanics is dealt with and data on advanced composites are provided.

Wilderness Planning Amendment/environmental Impact

Statement for the Dillon Resource Area, Beaverhead and Madison Counties, Montana

Final

Selected Water Resources Abstracts

Interacting Processes in Soil Science

CRC Press Interacting Processes in Soil Science focuses on coupled processes in soil. Topics covered in this important volume include the effects of inorganic salts upon water flow, modeling of sorption, transport and transformation of organic solutes, and the effects of microorganisms on silicate clay minerals. The book presents studies and approaches that can be extended and complemented by innovative work in the future. Interacting Processes in Soil Science will be an essential reference for all researchers and students in soil science, soil and water engineering, civil and environmental engineering, earth sciences, and hydrology.

Overview and Bibliography of Methods for Evaluating the Surface-water-infiltration Component of the Rainfall-runoff Process

Structure and Properties of Braided Sleeve Preforms for Chemical Vapor Infiltration

In all composites the properties and structure of the reinforcement strongly influence the performance of the material. For some composites, however, the reinforcement also affects the fabrication process itself exerting an additional, second order influence on performance. This is the case for the chemical vapor infiltration (CVI) process for fabrication of ceramic matrix composites. In this process the matrix forms progressively as a solid deposit, first onto the fiber surfaces, then onto the previous layer of deposit, ultimately growing to fill the inter-fiber porosity. The transport of reactants to the surfaces and the evolved morphology of the matrix depend on the initial reinforcement structure. This structure can vary greatly and is controlled by such factors as fiber size and cross-section, the number of filaments and amount of twist per tow or yarn, and the weave or braid architecture. Often the choice of reinforcement is based on mechanical performance analysis or on the cost and availability of the material or on the temperature stability of the fiber. Given this choice, the composite densification process--CVI--must be optimized to attain a successful material. Ceramic fiber in the form of cylindrical braided sleeve is an attractive choice for fabrication of tube-form ceramic matrix composites. Multiple, concentric layers of sleeve can be placed over a tubular mandrel, compressed and fixed with a binder to form a freestanding tube preform. This fiber architecture is different than that created by layup of plain weave cloth--the material used in most previous CVI development. This report presents the results of the investigation of CVI densification of braided sleeve preforms and the evolution of their structure and transport properties during processing.

Handbook of Irrigation System Selection for Semi-Arid Regions

CRC Press The Handbook of Irrigation System Selection for Semi-Arid Regions compares the various types of available irrigation systems for different regions and conditions, and explains how to analyze field data to determine the suitability of the land for surface, sprinkle, or drip irrigation systems. The book focuses on strategies for irrigation development and management and examines deficit irrigation and partial root-zone drying systems. Also, solute leaching modeling under different irrigation systems, soil moisture conditions, and organic fertilizer application in arid areas are discussed. Further, it examines multi-criteria decision making for irrigation management and the appraisal of agricultural lands for irrigation in hot, sub-humid regions. Features: Presents comparative analysis to aid in the selection of the most appropriate types of irrigation systems according to land characteristics. Includes numerous practical case studies. Offers parametric evaluation systems for irrigation purposes. Considers data from semi-arid zones, each with different sub-climates. Focusing on semi-arid land, the book highlights parametric evaluation systems for irrigation purposes, along with the use of analytical hierarchy processes integrated with GIS to determine which systems are best suited. This comprehensive and well-illustrated handbook will be of great interest to students, professionals, and researchers involved with all aspects of irrigation in semi-arid regions.

ERDA Energy Research Abstracts

Soil Processes and Current Trends in Quality Assessment

BoD – Books on Demand Natural processes and human activities alter the properties and quality of soils over time. Nowadays, the growing interest in soil protection prompts abundant research to estimate soil quality in wide-ranging environmental scenarios. The assessment of soil quality entails the evaluation of the capability of a soil to perform its functions in present scenarios but also how those functions can be preserved for future land use. Currently, soil processes, physical, chemical, and biological properties are recognized as indicators to estimate soil quality. Soil processes and current trends in quality assessment provides a wide depiction of current research conducted in soil quality assessment, encompassing general studies on soil processes, evaluation of significant indicators of soil quality such as soil organic matter dynamic and soil-plant interaction, while presenting diverse strategies for soil fitness amelioration.

Proceedings RMRS.

Natural Resources Conservation and Advances for Sustainability

Elsevier Natural Resources Conservation and Advances for Sustainability addresses the latest challenges associated with the management and conservation of natural resources. It presents interdisciplinary approaches to promote advances in solving these challenges. By examining what has already been done and analyzing it in the context of what still needs to be done, particularly in the context of latest technologies and sustainability, the book helps to identify ideal methods for natural resource management and conservation. Each chapter begins with a graphical abstract and presents complicated or detailed content in the form of figures or tables. In addition, the book compares the latest techniques with conventional techniques and troubleshoots conventional methods with modifications, making it a practical resource for researchers in environmental science and natural resource management. Discusses the pros and cons of past and current endeavors related to natural resource management Presents recent technologies and methods for management and conservation, particularly with applications for sustainability Covers a variety of disciplines, from environmental science to life science Includes a graphical abstract as well as a section on significant achievements in the field and future perspectives

Understanding the Impact of Human Interventions on the Hydrology of Nile Basin Headwaters, the Case of Upper Tekeze Catchments

CRC Press 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.

Cross-scale effects of biological soil crusts on runoff generation and water erosion in semiarid ecosystems. Field data and model approach

Efectos de las costras biológicas del suelo en la

generación de escorrentías y en la erosión hídriica a diferentes escalas

Universidad Almería CD-ROM Water availability is one of the main limiting factors that control ecosystem functions and productivity in semiarid regions. Vegetation of these regions usually presents a patchy distribution where sparse plant cover is interspersed over a bare soil. During the few rainfall events, runoff is generated in non-vegetated areas and redistributed towards vegetation, which act as surface obstruction for water, sediments and nutrients. Thus, non-vegetated areas are more susceptible to water erosion processes. Non-vegetated areas from semiarid ecosystems around the world, are often covered by Biological Soil Crusts (BSCs). BSCs result from an intimate association between soil particles and cyanobacteria, algae, microfungi, lichens and bryophytes. These communities live within, or immediately on top of, the uppermost millimeters of soil, influencing soil surface properties involved in infiltration, runoff generation and water erosion. Several papers have demonstrated that BSCs are one of the most important soil stabilizing factors in drylands. There are, however, contradictory results on the role that BSCs play in regulating soil water fluxes. Some studies point BSCs as runoff sources that may increase downslope erosion or on the contrary may represent an additional supply of water for downslope vegetation allowing its survival. The impact of this additional runoff should be evaluated at less detailed scales than the patch and to analyze all interactions in terms of water, sediments and nutrients between areas covered by BSCs and vegetated patches in order to establish the real effects of BSCs on both runoff and erosion. Also, to correctly predict the impact of future climate changes or antropic disturbances on hydrological behavior and water erosion in systems dominated by BSCs their effects should be included on spatially distributed runoff and erosion models. Until now, the influence of BSCs on these processes has been addressed almost exclusively at patch scale, despite the fact some authors have pointed the need of upscaling their effects, and even more their influence on runoff generation and water erosion was never considered in spatially implicit medelling. The goal of this thesis is to determine BSC effects on runoff and water erosion from plot to catchment scale in a typical semiarid ecosystem. To achieve this objective, first direct and indirect effects of BSCs at patch scale must be clearly defined under natural rainfall conditions to solve the controversy about BSCs effects on runoff generation. To know the direct and indirect relationships among soil surface characteristics, BSC cover and type, topography, rainfall characteristics (duration, amount and intensity) and runoff, structural equation models (SEM) were applied. Our results reveal the critical importance of BSCs on runoff and water erosion. Both processes in biologically crusted areas are directly controlled by crust type and cover. BSCs also modified some soil surface properties involved in runoff generation and water erosion, such as microtopography, surface stability or water repellency. The final interaction of both, direct and indirect BSCs effects, determine the hydrological behavior of these surfaces under natural rainfall conditions. Moreover, the final effect of BSCs on runoff generation is strongly driven by rainfall properties, which determined the set of complex interactions among BSCs, type and developmental stage and soil surface properties: on one hand, during low intensity rains, BSC-induced microtopography increases the amount of surface micro-depressions, which act as temporal water sinks, reducing the connectivity among source areas, delaying runoff initiation and reducing runoff rates; on the other hand, during intense rainfall events, BSCs type and water repellency are the main factors determining runoff generation. When the effects of BSCs are analyzed at coarser scales, including all interactions among BSCs and vegetated areas on a whole catchment, our results reveal the importance of the interactions between areas with BSCs and areas with vegetation on runoff generation and water erosion. We show the capacity of vegetated areas to retain runoff waters generated by upslope biologically crusted areas as an important driver for the hydrological and erosional response at catchment scale. However, the capability of vegetated areas to trap and retain water and sediments is limited and can be exceeded during high magnitude events, increasing catchment connectivity, as well as runoff and water erosion at the catchment outlet. Even during high-magnitude events, when the runoff generated in BSC areas reaches the channel network, the local protection provided by BSCs also affects downslope areas and the catchment response. These results confirm that BSCs must be included in runoff and soil erosion models to obtain reliable predictions of the spatial pattern of runoff and water erosion in catchments with abundant BSCs. In order to correctly introduce the effects of BSCs in these models, it is necessary to have an accurate spatial characterization of BSCs. It is shown that a spectral mixture analysis is required for the precise characterization of the complex spatial distribution of BSCs, due to the intrinsic spatial heterogeneity of semiarid ecosystems and to the spectral similarities among BSCs, dry vegetation and bare soil. Due to the methodological and practical application problems of spectral mixture analysis when it is applied to spectrally complex areas or when some surface elements only appear in specific areas of the image, we needed to develop a novel methodology for BSCs classification and quantification (lichen and cyanobacteria-dominated CBS), based on hyperspectral images. Support vector machine classification was applied for spectral and ecological classification of homogenous areas to solve the mentioned problems inherent to spatial heterogeneity. Inmediately afterwards, spectral mixture analysis (SMA) was applied to each SVM class to quantify the proportion of each type of surface cover within each pixel. Relative abundance images obtained with this methodology achieve a relatively high accuracy for different types of BSCs, and have demonstrated to be an adequate source of spatially distributed information, to correctly characterize surface properties in biologically crusted drylands systems. Moreover, to have the spatial distribution of type and abundance of BSCs allows to increase the accuracy of modeled runoff and erosion. Thus, when BSCs effects are not included in the LISEM model, an important increase in modeled water erosion was observed in areas where BSCs was not considered.

Geotechnical Aspects of Underground Construction in Soft Ground

Proceedings of the Tenth International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground, IS-Cambridge 2022, Cambridge, United Kingdom, 27-29 June 2022

CRC Press Geotechnical Aspects of Underground Construction in Soft Ground comprises a collection of 112 papers, four general reports on the symposium themes, the Fujita Lecture, three Special Lectures and the Bright Spark Lecture presented at the Tenth International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground, held in Cambridge, United Kingdom, 27-29 June 2022. The symposium is the latest in a series which began in New Delhi in 1994, and was followed by symposia in London (1996), Tokyo (1999), Toulouse (2002), Amsterdam (2005), Shanghai (2008), Rome (2011), Seoul (2014) and Sao Paulo (2017). This was organised by the Geotechnical Research Group at the University of Cambridge, under the auspices of the Technical Committee TC204 of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE). Geotechnical Aspects of Underground Construction in Soft Ground includes contributions from more than 25 countries on research, design and construction of underground works in soft ground. The contributions cover: Field case studies Sensing technologies and monitoring for underground construction in soft ground Physical and numerical modelling of tunnels and deep excavations in soft ground Seismic response of underground infrastructure in soft ground Design and application of ground improvement for underground construction Ground movements, interaction with existing structures and mitigation measures The general reports give an overview of the papers submitted to the symposium, covered in four technical sessions. The proceedings include the written version of the five invited lectures covering topics ranging from developments in geotechnical aspects of underground construction, tunnelling and groundwater interaction (short and long-term effects), the influence of earth pressure balance shield tunnelling on pre-convergence and segmental liner loading (field observations, modelling and implications on design). Similar to previous editions, Geotechnical Aspects of Underground Construction in Soft Ground represents a valuable source of reference on the current practice of analysis, design, and construction of tunnels and deep excavations in soft ground. The book is particularly aimed at academics and professionals interested in geotechnical and underground engineering.

Materials Processing Technology, AEMT2011

Trans Tech Publications Ltd This work covers surface-engineering/coatings, modeling, analysis and simulation of manufacturing processes, materials forming, materials machining, welding and joining, mechanical behavior and fracture, materials design, computer-aided tooling testing and evaluation of materials, microwave processing of materials, laser processing technology, theory and application of friction and wear, dynamic mechanical analysis, precision manufacturing technology and measurements, waste engineering and management, CAD/CAM/CAE, product design and development, engineering optimization, measure control technologies and intelligent systems, mechanical control and information processing technology, transmission and control of fluid, quality monitoring and control of the manufacturing process, advanced manufacturing technology etc. A thorough handbook-like guide to the topics. Volume is indexed by Thomson Reuters CPCI-S (WoS).

Modeling Agricultural, Forest, and Rangeland Hydrology

Proceedings of the 1988 International Symposium, December 12-13, 1988, Hyatt Regency Chicago in Illinois Center, Chicago, Illinois

American Society of Agricultural & Biological Engineers

Materials Processing Technology II

Trans Tech Publications Ltd This work comprises papers selected from the 2nd International Conference on Advanced Engineering Materials and Technology (AEMT 2012) which was held on the 15th to 17th June 2012 in Zhuhai, China. The peer-reviewed papers are grouped into sixteen chapters: Thin Films; Surface Engineering/Coatings; Modeling, Analysis and Simulation; Materials Forming; Materials Machining; Welding and Joining; Mechanical Behavior and Fracture; Computer Aided Material Design; Laser Processing Technology; Theory and Application of Friction and Wear; Dynamic Mechanical Analysis, Optimization and Control; Thermal Engineering Theory and Applications; Precision Manufacturing Technology and Measurements; Material Physics and Chemistry; Dynamic Analysis of Processing; Advanced Design Technology.

Forest Soils

Properties and Management

Springer Science & Business Media Forest soil characteristics are not only unique but their interpretation also differs from cropland soils. Just as there are diverse forest types, there are many soil variants that need different management. Today, forest plantations are being intensively managed for profitable timber, pulpwood and energy production. Site selection, species selection, site productivity evaluation, silvicultural treatments, and soil amendments need crucial soil information. This book provides a comprehensive overview of the physical, chemical and biological properties of forest soils and their implications on forest vegetation. Topics discussed include: major forest types of the world and their associated soils; forest biomass and nutrient dynamics; organic matter turnover and nutrient recycling; forest soil disturbance; forest soil and climate change; and forest soil management and silvicultural treatments.

Soil Analysis

An Interpretation Manual

CSIRO PUBLISHING Soil Analysis: An Interpretation Manual is a practical guide to soil tests. It considers what soil tests are, when they can be used reliably and consistently, and discusses what limits their application. It is the first nationally accepted publication that is appropriate for Australian soils and conditions. The first three chapters review the general principles and concepts of soil testing, factors affecting soil test interpretation and soil sampling and handling procedures. The next two chapters describe morphological indicators of soil and include colour plates of major Australian agricultural soils. These are followed by a series of chapters which present soil test calibration data for individual elements or a related group of tests such as the range of soil tests used to interpret soil acidity. Each of these chapters also summarises the reactions of the particular element or parameter in the soil and describes the tests commonly used in Australia. The final chapter presents a structured approach to nutrient management and making fertiliser recommendations using soil test data. The manual will be of particular interest to soil and environmental scientists, farm advisers, consultants and primary producers who will find the manual an essential reference to understanding and interpreting soil test data. Many of the soil tests evaluated in the book are used throughout the world. Soil Analysis: An Interpretation Manual was commissioned and developed by the Australian Soil and Plant Analysis Council (ASPAC). It comprises the work of 37 experts, which has been extensively peer reviewed.

Rainwater Infiltration in Urban Areas

Springer Nature The book presents a comprehensive study of the percolation of water from surface runoff with a focus on the retention capacity and intensity of precipitation. Discussing the state of the art in scientific knowledge and solutions for the infiltration of water from surface runoff, the book addresses a wide variety of rainwater management issues, from precipitation, surface runoff and water infiltration, to impact on the drainage system. Although modern urban hydrology has improved the management of rainwater runoff for flood protection, public health, and environmental protection, current methods of drainage in urban areas mean that there is a continued threat to the regime of water flow and water resources. In this context, the book presents a new approach to rainwater management based on a unique fusion of hydrology, hydrogeology, urban engineering, and water management. It also includes research findings that are helpful in developing recommendations and technical guidelines for the use of infiltration systems in urban areas.

Research and Cumulative Watershed Effects