Scale Problems In Hydrology Runoff Generation And Basin Response

Scale Problems in HydrologyModelling surface runoff generation and flow. A literature reviewRunoff Generation and Implications for River Basin ModellingFactors Influencing Runoff Generation, and Estimates of Runoff in a Semi-arid Area, SE SpainMethodology in HydrologyInvestigation of Effective Factors on Runoff Generation and Sediment Yield of Loess Deposits Using Rainfall SimulatorHandbook of Applied Hydrology, Second EditionCross-scale effects of biological soil crusts on runoff generation and water erosion in semiarid ecosystems. Field data and model approachThe Hydrological CycleRunoff Generation and Implications for River Basin ModellingDistributed Hydrological ModellingStormwater Runoff Generation and Control in the Urbanising Upper Klang River CatchmentIntegrated Water Resources Assessment and Management in a Drought-prone Watershed in the Ethiopian HighlandsOptimal Water Management Under Tank Cascade System of Sri LankaRunoff Generation During Heavy Rainfall EventsHydrological and Limnological Aspects of Lake MonitoringRunoff Generation and Implications for River Basin ModellingChannel Initiation and Landscape EvolutionSoils and FertilizersLatin American Regional Conference: Se□ão principal: Simpósios e mesas redondas V.K. Gupta R. Ragab Erling Nitter Dalen Liliang Ren S. Feiznia Vijay P. Singh Emilio Rodríguez Caballero Igor Alekseevich Shiklomanov Christian Leibundgut K. J. Beven Wan Mokhtar Nawang Oloro Vahid McHugh Shinogi Yoshiyuki Manuel Antonetti Pertti Heinonen Christian Leibundgut David R. Montgomery

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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

investigation of effective factors on runoff generation and sediment yield of loess deposits using rainfall simulator

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

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

the current popularity of the rainfall runoff model topmodel is a direct result of the widespread availability of catchment gis systems and particularly of digital terrain maps water flows downhill therefore topography must be hydrologically significant therefore how can the digital terrain data be used in hydrological modelling to improve the realism of the predictions there are not many choices available

topmodel is one of them but the concepts on which it is based will not be applicable everywhere see some of the papers in this volume indeed one of the most important aspects of the use of topmodel is the possibility of mapping the simulations back into space so that the distributed predictions can be compared with field observations the experiences reported here in applications from around the world represent an excellent summary of the success and limitations of the concepts in a wide variety of environments topmodel was never intended to be a fixed model structure but rather a set of concepts that could be modified if required as such it is important that the experiences of other uses can be gathered together and passed on

description of thirappane cascade hydrological modeling of tcs groundwater movement in meegassagama command area optimal cropping mixture and water management discussion and recommendations

provides an extensive overview of all the most important aspects oflake monitoring studies describing methods of water sampling analytical determination and data interpretation now that all ec countries must receive the ec directive on waterquality there is a greater need to improve the quality ofmeasurements both in chemical and biological fields and this bookdescribes the best practices in measuring water quality standardprocedures and quality assurance in relation to current legislationand guidelines the book provides coverage of abiotic processes and harmful substances in lakes biocoenosis in evaluating the ecological status of lakes new lake monitoring techniques quality assessment managing of results the book also addresses the most important problems currentlyimpacting lake resources eutrophication water acidification and its impact on biodiversity the presence of endocrine disrupters the bioaccumulation of mercury in the food chain this is an essential guide to the subject for postgraduate studentsin environmental science and analytical chemistry laboratoriesinvolved in water analysis industrial companies producing effluentand regional environmental agencies hydrological and limnological aspects

of lake monitoring is thefirst book in the water quality measurement series which providesa comprehensive coverage of the analytical techniques used for themeasurement of substances in water from sampling through tolaboratory analysis the series aims to offer practical answers tospecific issues related to measurements of the water cycle quality using a scientifically sound approach

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