Sedimentation Engineering Garcia

Sediment dynamics in fluvial systems is of great ecological, economic and human-health-related significance worldwide. Appropriate management strategies are therefore needed to limit maintenance costs as well as minimize potential hazards to the aquatic and adjacent environments. Human intervention, ranging from nutrient/pollutant release to physical modifications, has a large impact on sediment quantity and quality and thus on river morphology as well as on ecological functioning. Truly understanding sediment dynamics requires as a consequence a multidisciplinary approach. River Sedimentation contains the peer-reviewed scientific contributions presented at the 13th International Symposium on River Sedimentation (ISRS 2016, Stuttgart, Germany, 19-22 September 2016), and includes recent accomplishments in theoretical developments, numerical modelling, experimental laboratory work, field investigations and monitoring as well as management methodologies. The book is divided into six topics: A - Integrated sediment management at the river basin scale B - Sediment transport C - River morphodynamics D - Hydromorphology meets ecology E - Reservoir sustainability F - Social, economic and political aspects of sediment management The book also includes five special topics: 1 - Hydropower and sediment management, 2 - Navigation and river morphology, 3 - Innovative measurement techniques, 4 - SEDITRANS – Sediment transport in fluvial, estuarine and coastal environment, 5 - Sustainable land management. The aforementioned subject areas will be of interest to academics, engineers and professionals.

Sediment transport is a book that covers a wide variety of subject matters. It combines the personal and professional experience of the authors on solid particles transport and related problems, whose expertise is focused in aqueous systems and in laboratory flumes. This includes a series of chapters on hydrodynamics and their relationship with sediment transport and morphological development. The different contributions deal with issues such as the sediment transport modeling; sediment dynamics in stream confluence or river diversion, in meandering channels, at interconnected tidal channels system; changes in sediment transport under fine materials, cohesive materials and ice cover; environmental remediation of contaminated fine sediments. This is an invaluable interdisciplinary textbook and an important contribution to the sediment transport field. I strongly recommend this textbook to those in charge of conducting research on engineering issues or wishing to deal with equally important scientific problems.

The lack of knowledge about sedimentation processes taking place in a watershed or a waterbody hinders practical progress in addressing problem-solving. To assist the reader in putting sediment quantity and quality issues into perspective, sedimentation engineering features the most state-of-the-art contributions from a number of researchers working in the fields of water resources and soil erosion. The book contains 10 chapters selected among a great number of submitted manuscripts. The main topics are sedimentation processes in marshes, harbor estuaries, gulf, hydraulic turbine, and volcanic area. Sediment contamination and few other topics are included as well. The case studies cover a sequence for integrated solutions where watershed management and sedimentation engineering are not decoupled. This book on sedimentation engineering is designed for researchers and professionals and for course use in environmental science.

This book, Advances in Water Resources Engineering, Volume 14, covers the topics on watershed sediment dynamics and modeling, integrated simulation of interactive surface water and groundwater systems, river channel stabilization with submerged vanes, non-equilibrium sediment transport, reservoir sedimentation, and fluvial processes, minimum energy dissipation rate theory and applications, hydraulic modeling development and application, geophysical methods for assessment of earthen dams, soil erosion on upland areas by rainfall and overland flow, geofluvial modeling methodologies and applications, and environmental water engineering glossary.

Despite the mechanisms of reservoir sedimentation being well known for a long time, sustainable and preventive measures are rarely taken into consideration in the design of new reservoirs. To avoid operational problems of powerhouses, sedimentation is often treated for existing reservoirs with measures which are efficient only for a limited time.Th

Coastal, estuarine, fluvial and submarine morphodynamics encompass some of the leading processes shaping our planet. They stem mainly, but not only, from the interaction of water in motion and movable sediment boundaries, resulting in morphological changes produced by erosion, transport and deposition of sediments that generate a variety of landsca

MARCELO GARCIA—considered by many to be the best pound-for-pound Brazilian jiu-jitsu fighter in the world—has proven time and again that his unique style of grappling is one of the most effective forms of Brazilian jiu-jitsu in existence. In Advanced Brazilian Jiu-Jitsu, Marcelo unveils the system of techniques that allowed him to conquer the world of BJJ. As a five-time BJJ World Champion and a four-time ADCC Submission Grappling World Champion, Marcelo has shown that his style of fighting translates to both gi and no-gi competitions, making his system a must for all who train in the grappling arts. Through detailed narrative and more than 2,000 step-by-step color photographs, Marcelo breaks down the arm drag, methods for taking and sustaining back control, finishes from the back, and a plethora of takedowns and guard passes. Leaving no stone unturned, he also sheds new light on the guillotine choke and omoplata submissions. To avoid watering down the pages with redundant transitions and submissions that are well known and widely taught in jiu-jitsu schools across the globe, Marcelo only covers the techniques that are unique to his system. Unlike a lot of jiu-jitsu systems, which include techniques that are limited in range and application, each submission covered in this technical manual is practical and guaranteed to work on opponents both large and small. Having competed in the Absolute Open Weight Division his entire life, Marcelo discarded the techniques that didnÆt work on larger, stronger opponents. What you are left with is a highly effective and efficient system of grappling that works for and on everyone. Let Advanced Brazilian Jiu-Jitsu elevate your grappling game to the next level.

With contributions from key researchers across the globe, and edited by internationally recognized leading academics, Gravel-bed Rivers: Processes and Disasters presents the definitive review of current knowledge of gravel-bed rivers. Continuing an established and successful series of scholarly reports, this book consists of the papers presented at the 8th International Gravel-bed Rivers Workshop. Focusing on all the recent progress that has been made in the field, subjects covered include flow, physical modeling, sediment transport theory, techniques and instrumentation, morphodynamics and ecological topics, with special attention given to aspects of disasters relevant to sediment supply and integrated river management. This up-to-date compendium is essential reading for geomorphologists, river engineers and ecologists, river managers, fluvial sedimentologists and advanced students in these fields.

Scour and Erosion includes four keynote lectures from world leading researchers cutting across the themes of scour and erosion, together with 132 peer-reviewed papers from 34 countries, covering the principal themes of: - internal erosion - sediment transport - grain scale to continuum scale - advanced numerical modelling of scour and erosion - terrestrial scour and erosion- river and estuarine erosion including scour around structures, and - management of scour/erosion and sediment, including hazard management and sedimentation in dams and reservoirs. Scour and Erosion is ideal for researchers and industry working at the forefront of scour and erosion, and has applications in both the freshwater and marine environments. The 8th International Conference on Scour and Erosion (ICSE 2016, Oxford, UK, 12-15 September 2016) was organized by HR Wallingford

under the guidance of the Technical Committee 213 for Scour and Erosion of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE). This biennial conference draws together leading academics, scientists and engineers engaged in scour and erosion research to present and exchange their latest scientific findings. Scour and Erosion, together with the eight previous proceedings dating from 2002, present a solid collection of technical and scientific developments in scour and erosion research which have been established over the last 14 years.

Draining the volcanic, glaciated terrain of Mount Rainier, Washington, the Puyallup, White, and Carbon Rivers convey copious volumes of water and sediment down to Commencement Bay in Puget Sound. Recent flooding in the lowland river system has renewed interest in understanding sediment transport and its effects on flow conveyance throughout the lower drainage basin. Bathymetric and topographic data for 156 cross sections were surveyed in the lower Puyallup River system by the U.S. Geological Survey (USGS) and were compared with similar datasets collected in 1984. Regions of significant aggradation were measured along the Puyallup and White Rivers. Between 1984 and 2009, aggradation totals as measured by changes in average channel elevation were as much as 7.5, 6.5, and 2 feet on the Puyallup, White, and Carbon Rivers, respectively. These aggrading river sections correlated with decreasing slopes in riverbeds where the rivers exit relatively confined sections in the upper drainage and enter the relatively unconstricted valleys of the low-gradient Puget Lowland. Measured grain-size distributions from each riverbed showed a progressive fining downstream. Analysis of stage-discharge relations at streamflow-gaging stations along rivers draining Mount Rainier demonstrated the dynamic nature of channel morphology on river courses influenced by glaciated, volcanic terrain. The greatest rates of aggradation since the 1980s were in the Nisqually River near National (5.0 inches per year) and the White River near Auburn (1.8 inches per year). Less pronounced aggradation was measured on the Puyallup River and the White River just downstream of Mud Mountain Dam. The largest measured rate of incision was measured in the Cowlitz River at Packwood (5.0 inches per year). Channel-conveyance capacity estimated using a one-dimensional hydraulic model decreased in some river reaches since 1984. The reach exhibiting the largest decrease (about 20–50 percent) in channel-conveyance capacity was the White River between R Street Bridge and the Lake Tapps return, a reach affected by recent flooding. Conveyance capacity also decreased in sections of the Puyallup River. Conveyance capacity was mostly unchanged along other study reaches. Bedload transport was simulated throughout the entire river network and consistent with other observations and analyses, the hydraulic model showed that the upper Puyallup and White Rivers tended to accumulate sediment. Accuracy of the bedload-transport modeling, however, was limited due to a scarcity of sediment-transport data sets from the Puyallup system, mantling of sand over cobbles in the lower Puyallup and White Rivers, and overall uncertainty in modeling sediment transport in gravel-bedded rivers. Consequently, the output results from the model were treated as more qualitative in value, useful in comparing geomorphic trends within different river reaches, but not accurate in producing precise predictions of mass of sediment moved or deposited. The hydraulic model and the bedload-transport component were useful for analyzing proposed river-management options, if surveyed cross sections adequately represented the river-management site and proposed management options. The hydraulic model showed that setback levees would provide greater flood protection than gravel-bar scalping after the initial project construction and for some time thereafter, although the model was not accurate enough to quantify the length of time of the flood protection. The greatest hydraulic benefit from setback levees would be a substantial increase in the effective channel-conveyance area. By widening the distance between levees, the new floodplain would accommodate larger increases in discharge with relatively small incremental increases in stage. Model simulation results indicate that the hydraulic benefit from a setback levee also would be long-lived and would effectively compensate for increased deposition within the setback reach from increased channel-conveyance capacity. In contrast, the benefit from gravel-bar scalping would be limited by the volume of material that could be removed and the underlying hydraulics in the river section that would be mostly unaffected by scalping. Finally, the study formulated an explanation of the flooding that affected Pacific, Washington, in January 2009. Reduction in channel-conveyance capacity of about 25 percent at the White River near Auburn streamflow-gaging station between November 2008 and January 2009 was caused by rapid accumulation of coarse-grained sediment just downstream of the gage, continuing an ongoing trend of aggradation that has been documented repeatedly.

This book presents peer-reviewed articles from the 1st International Conference on Dam Safety Management and Engineering (ICDSME 2019), organized by the Malaysian National Committee on Large Dams (MYCOLD), Tenaga Nasional Berhad (TNB), Department of Irrigation and Drainage (DID) and Universiti Tenaga Nasional (UNITEN). With the theme “resilient dams for resilient communities,” the conference highlighted the latest developments in the area and provided a platform for researchers and professionals to exchange ideas and to address dam safety and engineering issues with the environment in mind. The topics covered included, but was not limited to, best practices in dam safety, reservoir management, dam health monitoring, risk assessment, emergency management and sustainable dams.

Climate and anthropogenic changes impact the conditions of erosion and sediment transport in rivers. Rainfall variability and, in many places, the increase of rainfall intensity have a direct impact on rainfall erosivity. Increasing changes in demography have led to the acceleration of land cover changes in natural areas, as well as in cultivated areas, and, sometimes, in degraded areas and desertified landscapes. These anthropogenized landscapes are more sensitive to erosion. On the other hand, the increase in the number of dams in watersheds traps a great portion of sediment fluxes, which do not reach the sea in the same amount, nor at the same quality, with consequences on coastal geomorphodynamics. This book is dedicated to studies on sediment fluxes from continental areas to coastal areas, as well as observation, modeling, and impact analysis at different scales from watershed slopes to the outputs of large river basins. This book is concentrated on a number of keywords: “erosion” and “sediment transport”, “model” and

“practice”, and “change”. The keywords are briefly discussed with respect to the relevant literature. The contributions in this book address observations and models based on laboratory and field data, allowing researchers to make use of such resources in practice under changing conditions.

A study of the geomorphology of rivers draining Mount Rainier, Washington, was completed to identify sources of sediment to the river network; to identify important processes in the sediment delivery system; to assess current sediment loads in rivers draining Mount Rainier; to evaluate if there were trends in streamflow or sediment load since the early 20th century; and to assess how rates of sedimentation might continue into the future using published climate-change scenarios. Rivers draining Mount Rainier carry heavy sediment loads sourced primarily from the volcano that cause acute aggradation in deposition reaches as far away as the Puget Lowland. Calculated yields ranged from 2,000 tonnes per square kilometer per year [(tonnes/km2)/yr] on the upper Nisqually River to 350 (tonnes/km2)/yr on the lower Puyallup River, notably larger than sediment yields of 50–200 (tonnes/km2)/yr typical for other Cascade Range rivers. These rivers can be assumed to be in a general state of sediment surplus. As a result, future aggradation rates will be largely influenced by the underlying hydrology carrying sediment downstream. The active-channel width of rivers directly draining Mount Rainier in 2009, used as a proxy for sediment released from Mount Rainier, changed little between 1965 and 1994 reflecting a climatic period that was relatively quiet hydrogeomorphically. From 1994 to 2009, a marked increase in geomorphic disturbance caused the active channels in many river reaches to widen. Comparing active-channel widths of glacier-draining rivers in 2009 to the distance of glacier retreat between 1913 and 1994 showed no correlation, suggesting that geomorphic disturbance in river reaches directly downstream of glaciers is not strongly governed by the degree of glacial retreat. In contrast, there was a correlation between active-channel width and the percentage of superglacier debris mantling the glacier, as measured in 1971. A conceptual model of sediment delivery processes from the mountain indicates that rockfalls, glaciers, debris flows, and main-stem flooding act sequentially to deliver sediment from Mount Rainier to river reaches in the Puget Lowland over decadal time scales. Greater-than-normal runoff was associated with cool phases of the Pacific Decadal Oscillation. Streamflow-gaging station data from four unregulated rivers directly draining Mount Rainier indicated no statistically significant trends of increasing peak flows over the course of the 20th century. The total sediment load of the upper Nisqually River from 1945 to 2011 was determined to be 1,200,000±180,000 tonnes/yr. The suspended-sediment load in the lower Puyallup River at Puyallup, Washington, was 860,000±300,000 tonnes/yr between 1978 and 1994, but the long-term load for the Puyallup River likely is about 1,000,000±400,000 tonnes/yr. Using a coarse-resolution bedload transport relation, the long-term average bedload was estimated to be about 30,000 tonnes/yr in the lower White River near Auburn, Washington, which was four times greater than bedload in the Puyallup River and an order of magnitude greater than bedload in the Carbon River. Analyses indicate a general increase in the sediment loads in Mount Rainier rivers in the 1990s and 2000s relative to the time period from the 1960s to 1980s. Data are insufficient, however, to determine definitively if post-1990 increases in sediment production and transport from Mount Rainier represent a statistically significant increase relative to sediment-load values typical from Mount Rainier during the entire 20th century. One-dimensional river-hydraulic and sediment-transport models simulated the entrainment, transport, attrition, and deposition of bed material. Simulations showed that bed-material loads were largest for the Nisqually River and smallest for the Carbon River. The models were used to simulate how increases in sediment supply to rivers transport through the river systems and affect lowland reaches. For each simulation, the input sediment pulse evolved through a combination of translation, dispersion, and attrition as it moved downstream. The characteristic transport times for the median sediment-size pulse to arrive downstream for the Nisqually, Carbon, Puyallup, and White Rivers were approximately 70, 300, 80, and 60 years, respectively.

Libro de abstracts del congreso celebrado en Santander en junio de 2013.

Sediments in aqueous systems are of increasing interest to academics, researchers, practitioners and stakeholders around the world. This book not only covers the characteristics of the sediments themselves, but also their physico-chemical impact on aquatic habitats and subsequent management implications. There is a strong focus on methods and instrumentation for collecting data and monitoring of environmental sediment quality and as a result, a wide range of environments are considered - from urban areas to freshwater estuaries and marine ecosystems. The chapters have been written by international specialists in the field, ensuring a good breadth of examples, experiences and case studies throughout. This book will appeal to a broad spectrum of interests from geographers, to engineers and environmental scientists, and at undergraduate to post graduate and academic researcher levels.

This book presents practical hydraulic and river engineering research along with fluvial geomorphological concepts, and links the theoretical and practical knowledge of people working every day with rivers, streams, and hydraulic structures to fluvial geomorphology. Besides providing a guide for professionals, this book also provides material for students to acquire the knowledge and skills to rehabilitate rivers, streams, and waterways.

After publishing the famous “Fluvial Processes in Geomorphology” in the early 1960s, the work of Luna Leopold, Gordon Wolman, and John Miller became a key for opening the door to understanding rivers and streams. They first illustrated the problem to geomorphologists and geographers. Later, Chang, in his “Fluvial Processes in River Engineering”, provided a basis for engineers, showing this group of professionals how to deal with rivers and how to understand them. Since then, more informative studies have been published. Many of the authors started to combine fluvial geomorphology knowledge and river engineering needs, such as “Tools in Fluvial Geomorphology” by G. Mathias Kondolf and Hervé Piégay, or focused more on river engineering tasks, such as “Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches” by Andrew Simon, Sean Bennett, and Janine Castro. Finally, Luna Leopold summarized river and stream morphologies in the beautiful “A view of the river”. It appears that we continue to explore this subject in the right direction. We better understand rivers and streams, and as

engineers and fluvial geomorphologists, we can establish tools to help bring rivers alive. However, there is still a hunger for more scientific tools that we could use to further understand rivers and to support the development of healthy streams and rivers with high biodiversity in the present world, which has started to face water scarcity.

Reservoir Sedimentation: Assessment and Environmental Controls appraises the issues of sedimentation in reservoirs and discusses measures that can be employed for the effective management of sediment to prolong the operational life of reservoirs. It provides information for professional consultants and policymakers to enable them to manage dams in the best possible way, in order to ensure their sustainability as well as the sustainability of water resources in general. It examines the effects of anthropogenic intervention and management of sediment in dams and reservoirs, as water resources become more sensitive and the demand for clean water continues to increase. Features: Examines the issue of sedimentation in dams and reservoirs and presents water management strategies to alleviate environmental issues Presents methods to help ensure the environmental sustainability of dams and reservoirs, as well as the sustainability of water resources- with consideration of climate change and increased demand Illustrates the spatial distribution of sedimentation characteristics for several dams using geographic information systems (GIS) Explains the relationships between loss in capacity and catchment characteristics Examines regional variation in sediment yield, defines geomorphic regions on the basis of similar hydrometeorology, physiography, geology, and vegetation affecting reservoirs

This is the first volume of a two-volume guide to designing, conducting and interpreting laboratory and field experiments in a broad range of topics associated with hydraulic engineering. Specific guidance is provided on methods and instruments currently used in experimental hydraulics, with emphasis on new and emerging measurement technologies and methods of analysis. Additionally, this book offers a concise outline of essential background theory, underscoring the intrinsic connection between theory and experiments. This book is much needed, as experimental hydraulicians have had to refer to guidance scattered in scientific papers or specialized monographs on essential aspects of laboratory and fieldwork practice. The book is the result of the first substantial effort in the community of hydraulic engineering to describe in one place all the components of experimental hydraulics. Included is the work of a team of more than 45 professional experimentalists, who explore innovative approaches to the vast array of experiments of differing complexity encountered by today’s hydraulic engineer, from laboratory to field, from simple but well-conceived to complex and well-instrumented. The style of this book is intentionally succinct, making frequent use of convenient summaries, tables and examples to present information. All researchers, practitioners, and students conducting or evaluating experiments in hydraulics will find this book useful.

The sinuous form and peculiar evolution of meandering rivers has long captured the imagination of people. Today, meandering rivers exist in some of the most densely populated areas in the World, where they provide environmental and economic wealth and opportunities, as well as posing hazards. Through geological time, the ancestors of these modern meanders built deposits that are now host to mineral resources, groundwater, and hydrocarbons. This Special Publication illustrates the breadth of current research on meandering rivers and their deposits. The collection of research papers demonstrates the state of science on fluvial process–product relationships. The articles cover fundamental and applied studies of both modern and ancient rivers, are based on state-of-the-art technology, include complementary philosophical approaches, and span a wide range of spatial and temporal scales. This book includes some of the most recent advances in the study of the morphodynamics and sedimentology of meandering rivers, and is an important resource for those who want to investigate fluvial systems and their deposits.

Siltation in reservoirs has become an important problem when dams are getting older and stop functioning when the sediment has accumulated to a certain extent. With proper sediment management techniques, negative effects of sediment can be avoided and reservoir life and performance can be improved. This volume deals with reservoir sedimentation, deposition and removal. It provides the principles of sediment transport and gives guidelines to predict reservoir life. It presents several removal techniques, accompanied with detailed operation descriptions. With the help of the RESCON open source software, cost analysis tools to determine the optimum method for maintenance and operation of a reservoir can be applied. To illustrate practice and to assist the reader in setting up a sediment management operation, a number of case studies of existing large dams are included. Written by two experts on reservoir operation, this volume is intended for professionals and advanced students working on dam and reservoir design, construction, operation, maintenance and rehabilitation.

Alluvial fans are ubiquitous geomorphological features that occur throughout the world, regardless of climate, at the front of mountains as the result of erosion and deposition. They are more prominent in semi- and arid climates simply because of the lack of vegetative cover that masks their fan shapes in more humid areas. From both engineering and geological viewpoints, alluvial fans present particular fluvial and sedimentation hazards in semi- and arid regions because episodic rainfall-runoff events can result in debris, mud, and fluvial flows through complex and, in some cases, migratory channel systems. Further, in semi- and arid climates alluvial fans often end in terminal or playa lakes. Given the uniform topography of playa lakes, these features often present ideal locations for facilities such as airports; however, regardless of the engineering advantages of the topography, the episodic and often long-term flooding of these lakes attracts migratory birds. The purpose of this volume is to summarize the current state-of-the-art, from the viewpoint of engineering, in the identification and mitigation of flood hazard on alluvial fans; and to accomplish this a fundamental understanding of geology is required.

Using the latest mapping techniques, J.A.A. Jones, Chair of the IGU Commission for Water Sustainability, examines water availability, the impact of climate change and the problems created for water management worldwide as well as possible solutions. Water Sustainability: A Global Perspective is one of the first textbook to meld the physical and human aspects affecting the world's water resources. Part One outlines the challenges and investigates the human factors: population growth; urbanization and pollution; the commercialization of water, including globalization and privatization; and the impacts of war, terrorism and the credit crunch. Part Two examines the physical aspects: the restless water cycle, the impact of past and future climate change and the problems change and unreliability create for water management. Part Three discusses current and future solutions including improved efficiency and water treatment systems, desalination, weather modification and rainwater harvesting, and improved legal and administrative frameworks. Jones concludes by asking how far technical and financial innovations can overcome the limitations of climatic resources and examining the human and environmental costs involved in such developments. This book is the ideal text for any student of water sustainability whether approaching the subject from the point of view of international relations, geography or environmental management.

With the growth of urbanization, industrialization, and intensive agricultural practices, all superficial, inland, and marine water bodies have become the repository for large quantities of every

type of substance extraneous to the natural aquatic environment. The knowledge of hydrodynamics becomes crucial in this context, as it is the driving mechanism for the movement and transport of these matters and of sediments that become collectors of these substances, in a surface water system. The best way to understand these natural processes is via examples and case studies. This book deals with practical studies of hydrodynamic processes through physical and numerical models. Researchers, together with practicing engineers, will find this book useful in making a rapid assessment of different environmental water body problems.

Gravel-Bed Rivers: Processes, Tools, Environments presents a definitive review of current knowledge of gravel-bed rivers, derived from the 7th International Gravel-bed Rivers Workshop, the 5-yearly meeting of the world's leading authorities in the field. Each chapter in the book has been specifically commissioned to represent areas in which recent progress has been made in the field. The topics covered also represent a coherent progression through the principal areas of the subject (hydraulics; sediment transport; river morphology; tools and methods; applications of science). Definitive review of the current knowledge of gravel-bed rivers Coverage of both fundamental and applied topics Edited by leading academics with contributions from key researchers Thoroughly edited for quality and consistency to provide coherent and logical progression through the principal areas of the subject.

This is the second volume of a two-volume guide to designing, conducting and interpreting laboratory and field experiments in a broad range of topics associated with hydraulic engineering. Specific guidance is provided on methods and instruments currently used in experimental hydraulics, with emphasis on new and emerging measurement technologies and methods of analysis. Additionally, this book offers a concise outline of essential background theory, underscoring the intrinsic connection between theory and experiments. This book is much needed, as experimental hydraulicians have had to refer to guidance scattered in scientific papers or specialized monographs on essential aspects of laboratory and fieldwork practice. The book is the result of the first substantial effort in the community of hydraulic engineering to describe in one place all the components of experimental hydraulics. Included is the work of a team of more than 45 professional experimentalists, who explore innovative approaches to the vast array of experiments of differing complexity encountered by today's hydraulic engineer, from laboratory to field, from simple but well-conceived to complex and well-instrumented. The style of this book is intentionally succinct, making frequent use of convenient summaries, tables and examples to present information. All researchers, practitioners, and students conducting or evaluating experiments in hydraulics will find this book useful.

An expert review of recent progress in the study of turbulentflows with a focus on recently identified organizedstructures. This book reviews the recent progress in the study of the turbulentflows that sculpt the Earth's surface, focusing inparticular on the organized structures that have been identified inrecent years within turbulent flows. These coherent flowstructures can include eddies or vortices at the scale ofindividual grains, through structures that scale with the flowdepth in rivers or estuaries, to the large-scale structure of flowsat the morphological or landform scale. These flow structuresare of wide interest to the scientific community because they playan important role in fluid dynamics and influence thetransport, erosion and deposition of sediment andpollutants in a wide variety of fluid flowenvironments. Scientific knowledge of these structures has improved greatlyover the past 20 years as computational fluid dynamics hascome to play an increasing important part in building ourunderstanding of coherent flow structures across a broad rangeof scales. Chapters comprise a series of major, invited papers and aselection of the most novel, innovative papers presented atthe second Coherent Flow Structures Conference held August 3-5,2011 at Simon Fraser University in Burnaby, BritishColumbia. Chapters focus on six major themes: Dynamics of coherent flow structures (CFS) in geophysicalflows Interaction of turbulent flows, vegetation and ecologicalhabitats Coherent structure of atmospheric flows Numerical modeling of coherent flow structures Turbulence in open channel flows Coherent flow structures, sediment transport and morphologicalfeedbacks.

Geomorphology is the study of the Earth's diverse physical land-surface features and the dynamic processes that shape these features. Examining natural and anthropogenic processes, The SAGE Handbook of Geomorphology is a comprehensive exposition of the fundamentals of geomorphology that examines form, process, and applications of the discipline. Organized into five substantive sections, the Handbook is an overview of: • Foundations and Relevance: including the nature and scope of geomorphology; the origins and development of geomorphology; the role and character of theory in geomorphology; geomorphology and environmental management; and geomorphology and society • Techniques and Approaches: including observations and experiments; geomorphological mapping; the significance of models; process and form; dating surfaces and sediment; remote sensing in geomorphology; GIS in geomorphology; biogeomorphology; human activity • Process and Environment: including the evolution of regolith; weathering; fluids, flows and fluxes; sediment transport and deposition; hill slopes; riverine environments; glacial geomorphology; periglacial environments; coastal environments; aeolian environments; tropical environments; karst and karst processes • Environmental Change: including landscape evolution and tectonics; interpreting quaternary environments; environmental change; disturbance and responses to geomorphic systems • Conclusion: including challenges and perspectives; and a concluding review The Handbook has contributions from 48 international authors and was initially organized by the International Association of Geomorphologists. This will be a much-used and much-cited reference for researchers in Geomorphology, Physical Geography and the Environmental Sciences.

Environmental Fluid Mechanics (EFM) studies the motion of air and water at several different scales, the fate and transport of species carried along by these fluids, and the interactions among those flows and geological, biological, and engineered systems. EFM emerged some decades ago as a response to the need for tools to study problems of flow and transport in rivers, estuaries, lakes, groundwater and the atmosphere; it is a topic of increasing importance for decision makers, engineers, and researchers alike. The

second edition of the successful textbook "Fluid Mechanics of Environmental Interfaces" is still aimed at providing a comprehensive overview of fluid mechanical processes occurring at the different interfaces existing in the realm of EFM, such as the air-water interface, the air-land interface, the water-sediment interface, the surface water-groundwater interface, the water-vegetation interface, and the water-biological systems interface. Across any of these interfaces mass, momentum, and heat are exchanged through different fluid mechanical processes over various spatial and temporal scales. In this second edition, the unique feature of this book, considering all the topics from the point of view of the concept of environmental interface, was maintained while the chapters were updated and five new chapters have been added to significantly enlarge the coverage of the subject area. The book starts with a chapter introducing the concept of EFM and its scope, scales, processes and systems. Then, the book is structured in three parts with fifteen chapters. Part one, which is composed of four chapters, covers the processes occurring at the interfaces between the atmosphere and the surface of the land and the seas, including the transport of dust and the dispersion of passive substances within the atmosphere. Part two deals in five chapters with the fluid mechanics at the air-water interface at small scales and sediment-water interface, including the advective diffusion of air bubbles, the hyporheic exchange and the tidal bores. Finally, part three discusses in six chapters the processes at the interfaces between fluids and biotic systems, such as transport processes in the soil-vegetation-lower atmosphere system, turbulence and wind above and within the forest canopy, flow and mass transport in vegetated open channels, transport processes to and from benthic plants and animals and coupling between interacting environmental interfaces. Each chapter has an educational part, which is structured in four sections: a synopsis of the chapter, a list of keywords that the reader should have encountered in the chapter, a list of questions and a list of unsolved problems related to the topics covered by the chapter. The book will be of interest to graduate students and researchers in environmental sciences, civil engineering and environmental engineering, (geo)physics, atmospheric science, meteorology, limnology, oceanography, and applied mathematics.

Following years of research, the first bored tunnel in soft soil in the Netherlands, the Tweede Heinenoord tunnel, was completed in 1998. Since then, Dutch engineers have increased their knowledge of soft soil tunnelling, with a significant and important part of this research being carried out by GeoDelft, the Dutch National Institute of Geo-Engineering. This book contains the most important publications by GeoDelft on the subject of soft soil tunnelling, focusing on the period from 1992 to the present, it is divided into four main headings: field measurements; grout behaviour; model testing; and numerical analysis. This impressive overview of the progress made in the Netherlands in soft soil tunnelling research over more than a decade is a valuable resource to those working in soft soil tunnelling worldwide.

This book is used as a required text for undergraduate, graduate, and short courses in many countries. It represents the most updated material in the field of erosion/sediment control and the recovery of degraded land, being a handy tool for researchers, educators, consultants, expert witnesses, and students in general. TABLE OF CONTENTS UNIT I. INTRODUCTION TO EROSION PROCESSES Chapter 1. The phenomenon of soil erosion Chapter 2. Agents and types of erosion Chapter 3. Factors affecting soil erosion Chapter 4. Measurement of soil erosion UNIT II. HYDROLOGY AND DESIGN RUNOFF Chapter 5. Watershed hydrology Chapter 6. Precipitation and return period Chapter 7. Determining the design runoff UNIT III. METHODS AND PRACTICES Chapter 8. Geosynthetics Chapter 9. Fiber rolls Chapter 10. Silt fences Chapter 11. Hydroseeding Chapter 12. Design and implementation of turbidity curtains Chapter 13. Biotechnical and bioengineering techniques Chapter 14. Design of check dams Chapter 15. Design of stable non-vegetated channels Chapter 16. Design of stable vegetated channels Chapter 17. Design of stable channels with rip-raps Chapter 18. Design of terraces and infiltration trenches Chapter 19. Stabilization of bridges Chapter 20. Design of gabions Chapter 21. Design and implementation of groynes Chapter 22. Soil reinforcement Chapter 23. Lining of channels and riverside defenses Chapter 24. Rock slope stabilization Chapter 25. Post-fire erosion control Chapter 26. Coastal erosion control Chapter 27. Wind erosion control Chapter 28. Mine tiling remediation and phytoremediation Chapter 29. Dirt road stabilization and drainage Chapter 30. Land restoration in arid environments Chapter 31. Reservoir sediment management

This book presents observations on the phenomena of fine sediment transport and their explanations under process-related divisions such as flocculation, erosion, and deposition. The text is a compilation of the author's lecture notes from nearly four decades of teaching and guiding graduate students in civil and coastal engineering. Illustrations of fine sediment transport processes and their complexities given in the book are taken from field and laboratory-based observations by the author and his students, as well as numerous investigators. The wide-ranging composition of particles (of inorganic and organic matter), their universal presence and their complex interactions with hydraulic forces make this branch of science a difficult one to deal with in a single treatise. It is therefore essential to study fine sediment transport as an independent subject rather than cover it in no more than a single chapter as many texts on coarse sediment transport have done. Even though the entire coverage is “introductory”, the twelve chapters collectively include more material than what can be reasonably dealt with in a one semester, three-credit course. The book includes an extensive description of the components of fine-grained — especially cohesive — sediment transport. It covers the development of the subject in scientific and engineering applications mainly from the 1950s to its present state. Solved examples and chapter-end exercises are also included. This text is aimed at senior civil engineering undergraduates and graduate students who, in the normal course of their study, seldom come across the subject of fine sediment transport in their curricula. Interested students should have a basic understanding of the mechanics of fluid flow and open channel hydraulics.

Fluvial Geomorphology studies the biophysical processes acting in rivers, and the sediment patterns and landforms resulting from them. It is a discipline of synthesis, with roots in geology, geography, and

river engineering, and with strong interactions with allied fields such as ecology, engineering and landscape architecture. This book comprehensively reviews tools used in fluvial geomorphology, at a level suitable to guide the selection of research methods for a given question. Presenting an integrated approach to the interdisciplinary nature of the subject, it provides guidance for researchers and professionals on the tools available to answer questions on river restoration and management. Thoroughly updated since the first edition in 2003 by experts in their subfields, the book presents state-of-the-art tools that have revolutionized fluvial geomorphology in recent decades, such as physical and numerical modelling, remote sensing and GIS, new field techniques, advances in dating, tracking and sourcing, statistical approaches as well as more traditional methods such as the systems framework, stratigraphic analysis, form and flow characterisation and historical analysis. This book: Covers five main types of geomorphological questions and their associated tools: historical framework; spatial framework; chemical, physical and biological methods; analysis of processes and forms; and future understanding framework. Provides guidance on advantages and limitations of different tools for different applications, data sources, equipment and supplies needed, and case studies illustrating their application in an integrated perspective. It is an essential resource for researchers and professional geomorphologists, hydrologists, geologists, engineers, planners, and ecologists concerned with river management, conservation and restoration. It is a useful supplementary textbook for upper level undergraduate and graduate courses in Geography, Geology, Environmental Science, Civil and Environmental Engineering, and interdisciplinary courses in river management and restoration.

Understanding and being able to predict fluvial processes is one of the biggest challenges for hydraulics and environmental engineers, hydrologists and other scientists interested in preserving and restoring the diverse functions of rivers. The interactions among flow, turbulence, vegetation, macroinvertebrates and other organisms, as well as the transport and retention of particulate matter, have important consequences on the ecological health of rivers. Managing rivers in an ecologically friendly way is a major component of sustainable engineering design, maintenance and restoration of ecological habitats. To address these challenges, a major focus of River Flow 2016 was to highlight the latest advances in experimental, computational and theoretical approaches that can be used to deepen our understanding and capacity to predict flow and the associated fluid-driven ecological processes, anthropogenic influences, sediment transport and morphodynamic processes. River Flow 2016 was organized under the auspices of the Committee for Fluvial Hydraulics of the International Association for Hydro-Environment Engineering and Research (IAHR). Since its first edition in 2002, the River Flow conference series has become the main international event focusing on river hydrodynamics, sediment transport, river engineering and restoration. Some of the highlights of the 8th International Conference on Fluvial Hydraulics were to focus on inter-disciplinary research involving, among others, ecological and biological aspects relevant to river flows and processes and to emphasize broader themes dealing with river sustainability. River Flow 2016 (extended abstract book 854 pages + full paper CD-ROM 2436 pages) contains the contributions presented during the regular sessions covering the main conference themes and the special sessions focusing on specific hot topics of river flow research, and will be of interest to academics interested in hydraulics, hydrology and environmental engineering.

The challenges facing submarine mass movement researchers and engineers are plentiful and exciting. This book follows several high-profile submarine landslide disasters that have reached the world’s attention over the past few years. For decades, researchers have been mapping the world’s mass movements. Their significant impacts on the Earth by distributing sediment on phenomenal scales is undeniable. Their importance in the origins of buried resources has long been understood. Their hazard potential ranges from damaging to apocalyptic, frequently damaging local infrastructure and sometimes devastating whole coastlines. Moving beyond mapping advances, the subaqueous mass movement scientists and practitioners are now also focussed on assessing the consequences of mass movements, and the measurement and modelling of events, hazard analysis and mitigation. Many state-of-the-art examples are provided in this book, which is produced under the auspices of the United Nations Educational, Scientific and Cultural Organisation Program S4SLIDE (Significance of Modern and Ancient Submarine Slope LandSLIDEs).

MOP 110 presents extensive advances in methods of investigation, measurement, and analysis in the specialized field of sedimentation engineering.

Research on reservoir sedimentation in recent years has been aimed mainly at water resources projects in developing countries. These countries, especially in Africa, often have to cope with long droughts, flash floods and severe erosion problems. Large reservoir capacities are required to capture water provided by flash floods so as to ensure the supply of water in periods of drought. The problem arising however is that these floods, due to their tremendous stream power, carry enormous volumes of sediment which, due to the size of reservoirs, are virtually deposited in toto in the reservoir basin, leading to fast deterioration of a costly investment. Accurate forecasting of reservoir behaviour is therefore of the utmost importance. This book fills a gap in current literature by providing in one volume comprehensive coverage of techniques required to practically investigate the effects sediment deposition in reservoirs has on the viability of water resources projects. Current techniques for practically estimating sediment yield from catchments, estimating the volume of sediment expected to deposit in reservoirs, predicting sediment distribution and calculating scour downstream of reservoirs are evaluated and presented. The liberal use of diagrams and graphs to explain the various techniques enhances understanding and makes practical application simple. A major feature of the book is the application of stream power theory to explain the process of reservoir sedimentation and to develop four new methods for predicting sediment distribution in reservoirs. The book is primarily directed at practising engineers involved in the planning and design of water resources projects and at post-graduate students interested in this field of study.

This book is one out of 8 IAEG XII Congress volumes and deals with river basins, which are the focus of many hydraulic engineering and hydrogeological studies worldwide. Such studies examine river systems as both a resource of the fluvial environment, and also explore river-related hazards and risks. The contributions of researchers from different disciplines focus on: surface-groundwater exchanges, stream flow, stream erosion, river morphology and management, sediment transport regimes, debris flows, evaluation of water resources, dam operation and hydropower generation, flood risks and flood control, stream pollution and water quality management. The contributions include case studies for advancing field monitoring techniques, improving modeling and assessment of rivers and studies contributing to better management plans and policies for the river environment and water resources. The Engineering Geology for Society and Territory volumes of the IAEG XII Congress held in Torino from September 15-19, 2014, analyze the dynamic role of engineering geology in our changing world and build on the four main themes of the congress: environment, processes, issues and approaches. The congress topics and subject areas of the 8 IAEG XII Congress volumes are: Climate Change and Engineering Geology. Landslide Processes. River Basins, Reservoir Sedimentation and Water Resources. Marine and Coastal Processes. Urban Geology, Sustainable Planning and Landscape Exploitation. Applied Geology for Major Engineering Projects. Education, Professional Ethics and Public Recognition of Engineering Geology. Preservation of Cultural Heritage.

The purpose of this book is to help engineers and scientists better understand contaminated sediment sites and identify and design remedial approaches that are more efficient and effective. Contaminated sediment management is a difficult and costly exercise that is rarely addressed with easily identified and implemented remedies. It is hoped that this book can help identify and implement management approaches that provide an optimal, if not entirely satisfactory, solution to sediment contaminant problems.?