
Flood Vulnerability Analysis And Mapping In Vietnam

Compilation from Volume 1 to Volume 9

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ICDSME 2019

LILIAN JAYLIN

Compilation from Volume 1 to Volume 9 Springer Science & Business Media

This book is published open access under a CC BY 4.0 license. Over the past decades, rapid developments in digital and sensing technologies, such as the Cloud, Web and Internet of Things, have dramatically changed the way we live and work. The digital transformation is revolutionizing our ability to monitor our planet and transforming the way we access, process and exploit Earth Observation data from satellites. This book reviews these megatrends and their implications for the Earth Observation community as well as the wider data economy. It provides insight into new paradigms of Open Science and Innovation applied to space data, which are characterized by openness, access to large volume of complex data, wide availability of new community tools, new techniques for big data analytics such as Artificial Intelligence, unprecedented level of computing power, and new types of collaboration among researchers, innovators, entrepreneurs and citizen scientists. In addition, this book aims to provide readers with some reflections on the future of Earth Observation, highlighting through a series of use cases not just the new opportunities created by the New Space revolution, but also the new challenges that must be addressed in order to make the most of the large volume of complex and diverse data delivered by the new generation of satellites.

Groundwater Vulnerability Assessment and Mapping Springer

Even though flood damage cannot be fully controlled, its effect can be minimized to some extent by careful planning, flood mitigation measures, and an effective flood warning system. Therefore, flood warning systems with flood travel time and inundation area information, derived from accurate model prediction, can be very effective to reduce potential flood damage. While a one-dimensional (1D) model was developed in the former research for the flood warning system, there has not been many comparative assessment of model performance among 1D, two-dimensional (2D), and coupled one-dimensional and two-dimensional (coupled 1D/2D) models particularly in HEC-RAS. Therefore, this research is an extension of the prior research and was especially conducted to calculate and compare the predictive capability of 1D, 2D, and coupled 1D/2D HEC-RAS models for the computation of travel time of flood and extent of flooded area needed for a flood warning system. The research was carried out in the Grand River in Lake County, Ohio. The model performance of 1D, 2D and coupled 1D/2D models were evaluated and sensitivity analysis was conducted using the same set of flow conditions and geometric conditions. The analysis suggested that 2D model could incredibly improve the model performance compared to 1D and coupled 1D/2D models, which were evaluated through the model evaluation indicators for the observed and simulated model outputs. Additionally, sensitivity analysis of input parameters, including discharge and Manning's roughness, revealed that the 2D model was comparatively less sensitive to the changes in model inflow and Manning's roughness compared to the coupled 1D/2D and 1D models. Furthermore, the flood travel time computed using 1D model was more predicted than that of the 2D model, indicating that the 2D model would be most appropriate to provide a safe evacuation time for the community before flood events. The 1D model consistently over predicted than that of the 2D model, which was also true for the estimation of the inundation flood zone (4.1% higher). In addition, the appropriate

assessment of flood damage in the aftermath of major flooding is crucial for flood management agencies, emergency responders, and insurance companies. Therefore, damage assessment is an important step in the evaluation of the flood mitigation measures, vulnerability analysis and flood risk mapping. This is particularly true in a context that the damage assessment so far has been primarily relying on either the coarse resolution, 30m digital elevation model (DEM), or 1D hydraulic model. As this researcher is not aware of any explicit incorporation of 2D HEC-RAS model for the damage assessment among the scientific communities, another major objective of this analysis is to outline the effects of some of the key factors including the mode of hydraulic simulation (1D vs 2D), the effect of inventory data, and the effect of topography on the flood loss estimation. This was accomplished using the 1D and 2D HEC-RAS models to produce the flood depth grids from the varying degree of topographic resolutions including 30m, 10m and LiDAR-derived DEM with and without incorporating actual field survey of the river in each case. The flood loss was estimated using Hazards United States Multi-Hazards (HAZUS-MH) loss estimation software developed by Federal Emergency Management Agency (FEMA) software, for each building within study area for flood events of various recurrence intervals from 10 to 500-year return periods. This was accomplished by updating the default-building inventory within Lake County to represent the actual building information in the model. The analysis indicated that 1D model consistently overestimated the loss in general by 61.48% for the default database and 86.12% for updated inventory. The estimation of the 1D model was consistently larger compared to the 2D model for different set of topographic resolutions and recurrence intervals. These loss estimations significantly increased when analyzed using a coarse resolution terrain, which was true regardless of selecting 1D or 2D models. Furthermore, the 2D model showed a lesser percentage increase (10.45% in 10m DEM, and 25.49% in 30m DEM), whereas the 1D model exhibited a larger increment (23.17% in 10m DEM and 76.81% in 30m DEM). This analysis suggested that the loss estimation would decrease in general by 76.21% after incorporating additional local building data into the HAZUS-MH database. More specifically, this analysis concludes that 2D model with high-resolution topographic data, including the additional incorporation of local data, in HAZUS-MH database are tremendously essential for appropriate flood damage assessment.

Flood Hazard Identification and Mitigation in Semi- and Arid Environments Behanzin, Idelbert Dagbegnon

This book shows the effectiveness of DRASTIC model in a geographical setting for validation of vulnerable zones and presents the optimization of parameters for the development of precise maps highlighting several zones with varied contamination. Impact of vadose zone has also been assessed by considering every sub-surface layer. Exclusive title covering effectiveness of DRASTIC model for groundwater vulnerability assessment Reviews of the strengths and limitations of assessment methods Presents multi-criteria evaluation of hydro-geological and anthropogenic factors Discusses integration with geographic information system (GIS) and remote sensing (RS) Includes application of groundwater governance framework with a case study study of a geographical setting
Geospatial Techniques for Managing Environmental Resources WIT Press

This is a comprehensive resource that integrates the application of innovative remote sensing techniques and geospatial tools in modeling Earth systems for environmental management beyond

customary digitization and mapping practices. It identifies the most suitable approaches for a specific environmental problem, emphasizes the importance of physically based modeling, their uncertainty analysis, advantages, and disadvantages. The case studies on the Himalayas with a complex topography call for innovation in geospatial techniques to find solutions for various environmental problems. Features: Presents innovative geospatial methods in environmental modeling of Earth systems. Includes case studies from South Asia and discusses different processes and outcomes using spatially explicit models. Explains contemporary environmental problems through the analysis of various information layers. Provides good practices for developing countries to help manage environmental issues using low-cost geospatial approaches. Integrates geospatial modeling with policy and analysis its direct implication in decision making. Using a systems' approach analysis, *Geospatial Modeling for Environmental Management: Case Studies from South Asia* shall serve environmental managers, students, researchers, and policymakers.

Geo-information for Disaster Management Cloud Publications

Flooding is one of the most devastating natural hazards in the world. Available records suggest that both flood frequency and severity are on the rise and this is likely to worsen in the context of climate change. As population, infrastructure and poverty grow rapidly in developing countries, particularly in urban agglomerations of 10 million people or more, floods could cause widespread devastation, economic damage and loss of life. Assessment of vulnerability and risk from naturally occurring phenomena is therefore imperative in order to achieve urban sustainability. This book uses geospatial techniques to evaluate hazards, risk and vulnerability at a metropolitan scale in a data-scarce country. An empirical study was performed using remote sensing, GIS and census data. This research offers a new approach to mapping population, infrastructures and communities at risk which can greatly contribute to the deeper understanding of flood disasters in a rapidly expanding megacity. Examples shown in this book are from Dhaka Megacity, however, the techniques and methods can easily be implemented in medium to large cities of similar characteristics. The book is essential reading for hazard researchers, geospatial scientists, disaster management professionals, geographers, urban planners, and social scientists. Ashraf M. Dewan is currently a Lecturer in the Department of Spatial Sciences at Curtin University, Western Australia (on leave from his substantive position as Associate Professor in the Geography & Environment Department at the University of Dhaka, Bangladesh).

Springer Nature

This volume constitutes the refereed post-conference proceedings of the First IFIP TC 5 DCDRR International Conference on Information Technology in Disaster Risk Reduction, ITDRR 2016, held in Sofia, Bulgaria, in November 2016. The 20 revised full papers presented were carefully reviewed and selected from 52 submissions. The papers focus on various aspects and challenges of coping with disaster risk reduction. The main topics include areas such as big data, cloud computing, the Internet of Things, natural disasters, mobile computing, emergency management, disaster information processing, disaster risk assessment and management, and disaster management simulation.

Proceedings of the 1st International Conference on Dam Safety Management and Engineering
Springer Nature

Raging floods, massive storms and cataclysmic earthquakes: every year up to 340 million people are affected by these and other disasters, which cause loss of life and damage to personal property, agriculture, and infrastructure. So what can be done? The key to understanding the causes of disasters and mitigating their impacts is the concept of 'vulnerability'. *Mapping Vulnerability* analyses 'vulnerability' as a concept central to the way we understand disasters and their magnitude and impact. Written and edited by a distinguished group of disaster scholars and practitioners, this book is a counterbalance to those technocratic approaches that limit themselves to simply looking at disasters as natural phenomena. Through the notion of vulnerability, the authors stress the importance of social processes and human-environmental interactions as causal agents in the making of disasters. They critically examine what renders communities unsafe - a condition, they argue, that depends primarily on the relative position of advantage or disadvantage that a particular group occupies within a society's social order. The book also looks at vulnerability in terms of its relationship to development and its impact on policy and people's lives, through consideration of selected case studies drawn from Africa, Asia and Latin America. *Mapping Vulnerability* is essential reading for academics, students, policymakers and practitioners in disaster studies, geography, development studies, economics, environmental studies and sociology.

Floods in a Megacity Springer Science & Business Media

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.

Evaluation of One-dimensional and Two-dimensional HEC-RAS Models for Flood Travel Time Prediction and Damage Assessment Using HAZUS-MH Elsevier

Flood is the major disaster affecting many countries in the world from time immemorial. The impacts of flood have been increased due to a number of factors such as population growth and climate change. Bangladesh is extremely vulnerable to flooding because of its geographical setting. It is a low-laying deltaic flat country with big inland water bodies, including some of the biggest rivers in the world. The book provides hazard and vulnerability assessment of riverine flood prone area of Bangladesh using Remote Sensing (RS) and Geographic Information System (GIS). In the hazard vulnerability assessment task, Flood frequency analysis is considered to assess flooding for different flood magnitudes. Flood inundation maps are prepared based on DEM and satellite images for different risk elements using Integrated Land and Water Information System(ILWIS) software.

LANDSAT satellite images are collected to develop land use map. The land use map is used for mapping of settlement and fishery. The book mainly focuses on the development of vulnerability functions for preparing vulnerability maps for settlements and fisheries in a riverine flood prone area of Bangladesh.

An Introduction to Applying Satellite Remote Sensing to Disaster Management Springer Science & Business Media

In recent years, a considerable volume of technical literature has been published on flood hazard analysis, and more recently, on flood vulnerability and resilience. Nevertheless, there is still a shortage of scientific studies and practical experience of real flood risk assessment (both social and economic), including hazard, exposure and vulnerability analyses and their integration. As there are so few references available, applications of flood risk assessment to the design of preventive measures and early warning systems, landscape and urban planning, civil protection, insurance systems, and risk-based information and education, cannot reach their full potential development. This is because the research products available, such as hazard data and maps, do not serve to ensure the efficient prioritization of mitigation measures or communities at risk. Meanwhile, flooding is the natural disaster that causes the greatest loss on a global scale, and due to climate change, this situation is expected to continue. The research manuscripts involved in this book try to offer flood risk managers new tools, data and maps to improve risk mitigation, both preventive and corrective. A wide variety of topics have been covered, including: flood risk data sources; techniques and methodologies for flood risk analysis; flood risk mapping; or flood risk analysis calibrations.

International Journal of Advanced Remote Sensing and GIS World Scientific

Understanding Disaster Risk: A Multidimensional Approach presents the first principle from the UNISDR Sendai Framework for Disaster Risk Reduction, 2015-2030. The framework includes a discussion of risk and resilience from both a theoretical and governance perspective in light of ideas that are shaping our common future. In addition, it presents innovative tools and best practices in reducing risk and building resilience. Combining the applications of social, financial, technological, design, engineering and nature-based approaches, the volume addresses rising global priorities and focuses on strengthening the global understanding of vulnerability, displaced communities, cultural heritages and cultural identity. Readers will gain a multifaceted understanding of disaster, addressing both historic and contemporary issues. Focusing on the various dimensions of disaster risk, the book details natural and social components of risk and the challenges posed to risk assessment models under the climate change paradigm. Addresses the current challenges in policy and practice for building resilience strategies Follows the global frameworks for disaster risk reduction and sustainability, specifically the UNISDR Sendai Framework for DRR, 2015-2030 Aids in understanding the natural and social components of risk in a diverse and globalized world Presents the challenges posed to risk assessment models under the climate change paradigm

Cities and Flooding Springer

The book *Dhaka Megacity: Geospatial Perspectives on Urbanisation, Environment and Health* presents the use of geospatial techniques to address a number of environmental issues, including land use change, climatic variability, urban sprawl, population density modelling, flooding, environmental health, water quality, energy resources, urban growth modelling, infectious diseases

and the quality of life. Although the work is focused on the Megacity of Dhaka in Bangladesh, the techniques and methods that are used to research these issues can be utilized in any other areas where rapid population growth coupled with unplanned urbanization is leading to environmental degradation. The book is useful for people working in the area of Geospatial Science, Urban Geography, Environmental Management and International Development. Since the chapters in the book cover a range of environmental issues, this book describes useful tools for assisting informed decision making, particularly in developing countries.

Applications and Uncertainties CRC Press

This book is the second in a series that examines how geographic information technologies (GIT) are being implemented to improve our understanding of a variety of hazard and disaster situations. The main types of technologies covered under the umbrella of GIT, as used in this volume, are geographic information systems, remote sensing (not including ground-penetrating or underwater systems), and global positioning systems. Our focus is on urban areas, broadly defined in order to encompass rapidly growing and densely populated areas that may not be considered "urban" in the conventional sense. The material presented here is also unabashedly applied – our goal is to provide GIT tools to those seeking more efficient ways to respond to, recover from, mitigate, prevent, and/or model hazard and disaster events in urban settings. Therefore, this book was created not only with our colleagues in the academic world in mind, but also for hazards professionals and practitioners. We also believe graduate students will find the material presented here of interest, as may upper division undergraduate students.

Resilient Urban Futures Cambridge Scholars Publishing

In recent years, a considerable volume of technical literature has been published on flood hazard analysis, and more recently, on flood vulnerability and resilience. Nevertheless, there is still a shortage of scientific studies and practical experience of real flood risk assessment (both social and economic), including hazard, exposure and vulnerability analyses and their integration. As there are so few references available, applications of flood risk assessment to the design of preventive measures and early warning systems, landscape and urban planning, civil protection, insurance systems, and risk-based information and education, cannot reach their full potential development. This is because the research products available, such as hazard data and maps, do not serve to ensure the efficient prioritization of mitigation measures or communities at risk. Meanwhile, flooding is the natural disaster that causes the greatest loss on a global scale, and due to climate change, this situation is expected to continue. The research manuscripts involved in this book try to offer flood risk managers new tools, data and maps to improve risk mitigation, both preventive and corrective. A wide variety of topics have been covered, including: flood risk data sources; techniques and methodologies for flood risk analysis; flood risk mapping; or flood risk analysis calibrations.

Flood-related health risk assessment: a case study in Hoi An City, Quang Nam province, Vietnam CRC Press

ABSTRACT: The hydrologic cycle of south Florida frequently produces rain events that include thunderstorms, tropical depressions and hurricanes. During 1999-2000, south Miami-Dade was struck by two intense rain events that severely inundated local agricultural operations for over a week. In the final assessment, agricultural losses sustained from these storms totaled to nearly \$430

million. Flood hazard mapping has traditionally relied on paper maps that display the flood extent with only polygon boundaries. Unfortunately, paper maps are greatly limited in use, because they fail to show the extent, magnitude and duration of flooding. Recent advances in airborne laser swath mapping, ALSM, and satellite sensor technology have provided alternative types of data needed to more accurately map flood vulnerability. The general scope of this project is to improve mapping flood vulnerability in the southern C-111 basin by combining a variety of remotely sensed data sets. The procedure for mapping a severe flood condition following Hurricane Irene involved the combination of ALSM, Landsat7 ETM+ and Geographic Information Systems (GIS). Band 8, vegetation index two and vegetation index three derived from the Landsat 7 ETM+ image were useful for mapping cloud cover, and the normalized differential vegetation index (NDVI) was useful for mapping inundation produced by Hurricane Irene. The primary limitations of vegetation index maps include the 30 meter spatial resolution, and the obstruction of the spectral signature of water caused by vegetation and clouds. Project inundation maps created with regional surface water and airborne laser swath mapped (ALSM) data displayed the flood duration, magnitude and extent of the flood condition resulting from Hurricane Irene.

Natural Risk and Civil Protection Earthscan

This valuable edition brings together 25 peer reviewed articles on technical, socio-economic, environmental and policy aspects of flood risk management. Some emerging technologies are presented and several future challenges are identified. Thus the book forms an excellent reference for the engineers, scientists, planners, policy-makers, researchers, insurance industry and all the practitioners involved in flood risk management.

Understanding Disaster Risk Earth Observation Open Science and Innovation

The mathematics involved in describing the attributes of precipitation are embodied in the technical fields of Hydrology and Hydrometeorology. In this book, multiple experts present their work on

various engineering characteristics of rainfall. The topics presented will update the readers on the recent developments and their applications across different regions of the world.

Using Remote Sensing and Geographic Information Systems for Flood Vulnerability Mapping of the C-111 Basin in South Miami-Dade County Springer Science & Business Media

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.

Societal Implications BoD - Books on Demand

This thesis aimed to improve understanding of flood disaster causative factors, risk profile of the affected community and human security issues in Benin Niger River Valley. A GIS-Base mapping and theory-driven indicator approach is applied to map the risk profile of the affected community and analyse the human insecurity dimension related to it.

Information Technology in Disaster Risk Reduction CRC Press

This book forms the Proceedings of the International Conference organised by the Commission of European Communities. The first part covers earthquakes, volcanoes, storms, floods, landslides and wildfires. The second part deals with key themes in civil protection: risk communication, planning, organisation and crisis management. A detailed Rapporteur-General's report is also included. Future developments regarding information sources and research and development conclude the book.

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