

Flood Inundation Modeling And Hazard Mapping Under Uncertainty In The Sungai

Flooding is a Major Concern: Learn How Flood Inundation Modeling Can Assess Hazards in Sungai River

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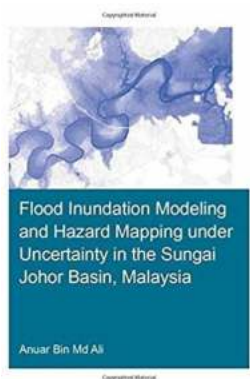
Flood Inundation Modeling
and Hazard Mapping under
Uncertainty in the Sungai
Johor Basin, Malaysia

Anuar Bin Md Ali

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Flooding is a natural disaster that can cause significant damage to infrastructure and human lives. Malaysia, with its tropical climate and heavy rainfall, is no stranger to flooding incidents. The Sungai River, one of the major rivers in the country, is particularly vulnerable to flooding due to its large catchment area and proximity to urban centers.

Understanding the potential flood risks in the Sungai River is crucial for disaster preparedness and mitigation. Flood inundation modeling and hazard mapping play a vital role in assessing the extent and severity of flooding events. These techniques allow experts to predict the areas that are likely to be affected by flooding, helping authorities to make informed decisions and develop effective flood management strategies.



Flood Inundation Modeling and Hazard Mapping under Uncertainty in the Sungai Johor Basin, Malaysia (IHE Delft PhD Thesis Series)

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What is Flood Inundation Modeling?

Flood inundation modeling refers to the process of simulating and predicting the water levels, flow velocities, and flood extents during a flooding event. This modeling is typically based on topographic data, hydrological information, and weather forecasts. By integrating these inputs into a computer-based model,

experts can forecast how the floodwaters will propagate and spread over the floodplain.

Understanding Hazard Mapping

Hazard mapping is the process of identifying and mapping areas that are prone to flooding. It involves the analysis of various factors, including historical flood data, river gauge observations, and topographic features. The goal of hazard mapping is to delineate flood-prone areas and categorize them based on the severity and frequency of flood events.

By combining flood inundation modeling with hazard mapping, experts can develop flood hazard maps that provide valuable information for emergency response planning, land-use planning, and public awareness campaigns.

Uncertainty in Flood Inundation Modeling

It is important to note that flood inundation modeling is subject to uncertainties. These uncertainties can arise from various sources, such as inaccurate data inputs, limitations in modeling techniques, and difficulties in accurately predicting extreme weather events. Therefore, it is crucial for flood modelers to assess and communicate the uncertainties associated with their modeling results.

The Sungai River Case Study

The Sungai River presents an interesting case study for flood inundation modeling and hazard mapping under uncertainty. With its complex topography and significant urban development along its banks, accurately predicting flood extents and identifying flood-prone areas in the Sungai River is a challenging task.

However, advances in remote sensing technologies, improved data collection methods, and enhanced modeling techniques have greatly improved the accuracy and reliability of flood inundation modeling in recent years. These advancements have allowed researchers and policymakers to better understand the flood risks in Sungai River and devise effective flood management strategies.

The Role of Community Engagement

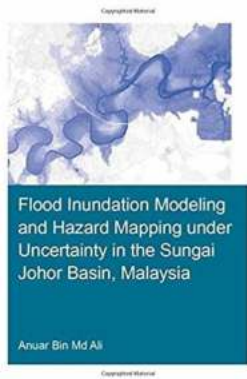
While flood inundation modeling and hazard mapping provide valuable insights for flood risk management, community engagement is equally important in mitigating the impacts of flooding. Involving local communities in the planning and response processes helps to raise awareness, improve preparedness, and ensure the implementation of appropriate measures to protect lives and properties.

Efforts such as public education campaigns, early warning systems, and community-based flood monitoring initiatives can significantly contribute to reducing the vulnerability to floods and enhancing disaster resilience for Sungai River residents.

In

Flood inundation modeling and hazard mapping under uncertainty constitute crucial tools in understanding and addressing flood risks in Sungai River. By combining scientific modeling techniques with community engagement, stakeholders can work together to reduce the impacts of flooding, protect communities, and build resilience in the face of future flood events.

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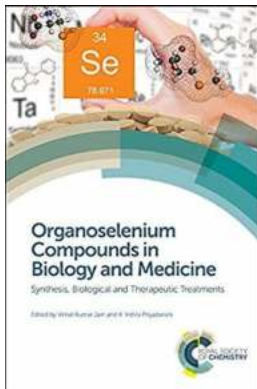
Flooding can have devastating impacts on people's livelihood, economy and the environment. An important instrument in flood management is floodplain maps, which assist land planners and local authorities in identifying flood-prone areas, and provide useful information for rescue and relief agencies for their operations. Developing floodplain maps often involves flood inundation modeling. This typically requires precipitation and stream flow data, topographic information, building a hydraulic model and calibration of its parameters. Often however, floodplain maps are built on a single model outcome without an explicit consideration of all the sources of uncertainty in the modeling process.

The research presented in this thesis addresses the uncertainty in flood inundation modeling, which may arise from input data and hydraulic modeling approach. The study area is the Sungai Johor basin in Johor, Malaysia, an agriculture-dominated area. The present study analyses the modelling uncertainties arising from estimations of design flow, terrain data sets, geometric description in hydraulic models and different modeling approaches, and develops recommendations for practitioners. Explicit account for uncertainties and studying their impact in flood inundation mapping allow for more informed and effective decision making.



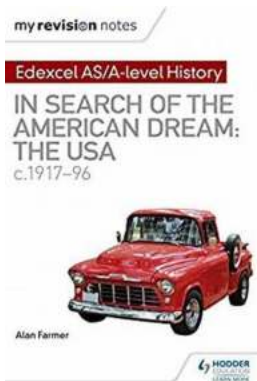
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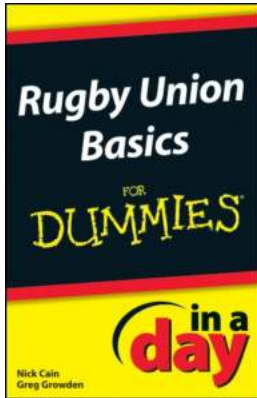
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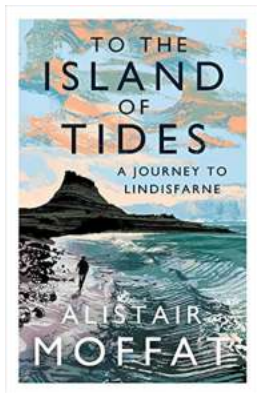
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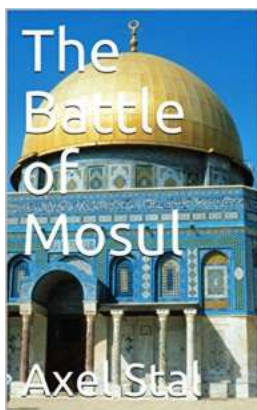
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