

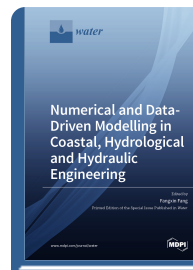
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## **Numerical and Data-Driven Modelling in Coastal, Hydrological and Hydraulic Engineering**

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The book presents recent studies covering the aspects of challenges in predictive modelling and applications. Advanced numerical techniques for accurate and efficient real-time prediction and optimal management in coastal and hydraulic engineering are explored. For example, adaptive unstructured meshes are introduced to capture the important dynamics that operate over a range of length scales. Deep learning techniques enable rapid and accurate modelling simulations and pave the way towards both real-time forecasting and overall optimisation control over time, thus improving profitability and managing risk. The use of data assimilation techniques incorporates information from experiments and observations to reduce uncertainties in predictions and improve predictive accuracy. Targeted observation approaches can be used for identifying when, where, and what types of observations would provide the greatest improvement to specific model forecasts at a future time. Such targeted observations are important as they will allow the most effective use of available monitoring resources. The combination of deep learning and data assimilation enables a rapid and accurate response in emergencies. The technologies discussed here can be also used to determine the sensitivity of outputs to various operational conditions in engineering and management, thus providing reliable information to both the public and policy-makers

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