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Nota di contenuto	Local downscaling of shallow water simulations -- SW2D-LEMON: a new software for upscaled shallow water modelling -- 1D numerical tool for real time modelling of a complex river network -- Rapid simulations of large scale flood inundations using porosity functions -- Numerical and methodological developments in 1D+ ISM models for operational purposes -- Application of a modified parareal method for speeding up the numerical resolution of the 2D shallow water equations -- Validation of a general-purpose erosion-sedimentation model on a laboratory experiment -- Modelling culverts in Basilisk -- Uncertainty quantification in hydrodynamic modelling using the example of a 2D large-scale model of the River Elbe -- Quantification of historical skew surges : challenges and method -- Sensitivity analysis of the digital twin of the canal of Calais to the outlet gate modelling -- Integrated hydraulic-hydrological assimilation chain:

towards multisource data fusion from river network to headwaters -- Meandering of the Venoge River at Bois-de-Vaux: in-situ measurements versus 2D numerical predictions -- How to optimally represent riverbed geometry with a simplified cross-section shape in shallow water models? -- Evaluate the influence of groynes system on the hydraulic regime in the ha thanh river, binh dinh province -- Comparison of streamflow estimated by image analysis (LSPIV) and by hydrologic and hydraulic modelling on the French Riviera during 2019 floods -- Analysis of Triple Rectangular Plates Configurations Impacts on Local Scour around Cylindrical Single Bridge Pier -- 2-D simulation of flow entering a building -- Investigation of the hydraulics in flooded housing estate. -- Benefit of coupling 1d-2d model over an urban area to assess runoff during a storm event -- Stream Rehabilitation Design In A Potentially Protected Forest Catchment In Singapore -- Application of a physics based distributed integrated hydrological model in flood risk management -- Risk Analysis for Flash Flood Hazards in China -- Determination and application of dynamic rainfall threshold for flash flood warning -- Optimized Reservoir Prior Release Operation for Flood Control Considering Operational Weekly Ensemble Hydrological Forecast -- Geographical cluster of flash flood hazards in Jiangxi, China: a spatial analysis perspective -- Analysis of extreme precipitation during the Mediterranean event associated with the Alex storm in the Alpes-Maritimes: atmospheric mechanisms and resulting rainfall -- Are hydrologic-hydraulic coupling approaches able to reproduce Alex flash-flood dynamics and impacts on southeastern French headwaters? -- Improving the efficiency of Flash Flood Forecasting and Warning System in Thailand -- Study on Forecasting and Alarming Model of Flush Flood Based on Machine Learning -- Numerical assessment of sediment supply impacting flash flood propagation in mountainous confluences -- Wood debris risk analysis and protection scenarios of Lourdes city using Iberwood model -- A study on flood inundation mapping of surma river floodplain under extreme flood scenario nature based solutions -- A framework for evaluating performance of large-scale Nature-Based Solutions to reduce hydro-meteorological risks and enhance co-benefits -- Managing droughts in Northern Germany Ð The RECONECT NBS Approach and Water resources model for Vier- und Marschlande Area, Hamburg, Germany -- Opportunities and challenges of Natural-Based Solutions in urban areas - French case studies -- The 1915 mud-debris flow at san fruttuoso di camogli: modeling the collapse effects in the portofino pilot area of the h2020 reconect project -- Benefits of green infrastructure for flood mitigation in small rural watersheds - Case study of the Tamnava River in Serbia -- Modelling Nature-Based Solutions with quasi-2D model -- Bregana river basin: hydrodynamic modeling and analysis of nbs suitability within the reconect project.

| Sommario/riassunto | This book includes a collection of extended papers based on presentations given during the SIMHYDRO 2021 conference, held in Sophia Antipolis in June 2021 with the support of French Hydrotechnic Society (SHF). It focused on "Models for complex and global water issues—Practices and expectations". The water field is continuously mobilizing models for addressing complex issues and new challenges. Within the context of the climate change, the water issues are exacerbated with the competition among uses. The limited water resources request from the modern societies to review some of the historical paradigms traditionally used and to promote new approaches for a sustainable management. The combined complexity and vulnerability of large urban environments request a deep understanding of water uses and environmental synergy. At the same time, water- |

related natural hazards are contentiously straightening modern societies that must adapt and implement a more resilient environment. In parallel, in the industrial sector, the search for a high level of efficiency for hydraulic machinery requests to simulate complex processes. Under all these situations, the models currently used represent only partly the physical phenomena involved, the scale of the processes, the hypothesis included within the different numerical tools, etc. The design and the operation of relevant models represent a challenging task for the modeller who is responsible of the knowledge part of a global system that is dedicated to support the decision makers. The book explores both the limitations and performance of current models and presents the latest developments based on new numerical schemes, high-performance computing, multi-physics and multi-scales methods, and better interaction with field or scale model data. It addresses the interests of practitioners, stakeholders, researchers, and engineers active in this field.