

TABLE OF CONTENT

List of Contributorsxiii

Preface.....xix

Chapter 1

A Comprehensive Investigation of Trend Variations in Streamflow and TN, TP Concentrations: A Case Study in Baihe River, Northern China..... 1

• Abstract 1

• Introduction 2

• Study Area and Data Source..... 4

• Methods..... 5

• Results and Discussion..... 9

• Conclusions 14

• Acknowledgements..... 15

• References 15

Chapter 2

A Novel Integrated Modelling Framework To Assess The Impacts of Climate and Socio-Economic Drivers on Land Use and Water Quality 17

• Abstract 17

• Introduction 18

• Material and Methods 21

• Results 35

• Discussion 44

• Conclusions 47

• Acknowledgement 49

• References 49

Chapter 3

Regional Water Resources Assessments Using An Uncertain Modelling Approach: The Example Of Swaziland 61

• Abstract 61

• New Hydrological Insights For This Region	62
• Introduction	62
• Modelling Methods	64
• The Study Area	68
• Quantifying The Constraint Indices and Parameter Ranges	71
• Modelling Results And Validation	75
• Summary Of Constraint Changes and Model Performance	82
• Discussion And Conclusions	83
• Acknowledgements	85
• References	86

Chapter 4	Hydro-Morphological Modelling Of Small, Wave-Dominated Estuaries	91
•	Abstract	91
•	Introduction	92
•	Model Formulation	94
•	Application To The Great Brak Estuary, South Africa	104
•	Discussion	115
•	Conclusion	117
•	Acknowledgements	117
•	References	122

Chapter 5	A Distributed Data Component For The Open Modeling Interface	129
•	Abstract	129
•	Introduction	130
•	Methods	136
•	Performance Study	151
•	Case Study: A Groundwater Sustainability Challenge	161
•	Conclusions	167
•	Acknowledgments	170
•	References	170

Chapter 6	Modeling The Potential Effects Of Sea-Level Rise On The Coast of New York: Integrating Mechanistic Accretion And Stochastic Uncertainty	175
•	Introduction	175

• Materials And Methods	177
• Results	193
• Discussion	200
• Conclusions	202
• Acknowledgements.....	203
• References	204

Chapter 7 Effect Of Baseline Meteorological Data Selection on Hydrological Modelling of Climate Change Scenarios..... 209

• Summary	209
• Introduction	210
• Study Area and Methods	213
• Results and Discussions	220
• Discussion and Conclusion.....	233
• Acknowledgements.....	235
• References	236

Chapter 8 Evaluating The Simulation Times And Mass Balance Errors Of Component-Based Models: An Application Of Openmi 2.0 To An Urban Stormwater System 245

• Abstract	245
• Introduction	246
• Background	249
• Methods.....	255
• Results And Discussion	267
• Summary And Conclusions	276
• Acknowledgments	279
• References	279

Chapter 9 A Generalized Optimization Model of Microbially Driven Aquatic Biogeochemistry Based On Thermodynamic, Kinetic, And Stoichiometric Ecological Theory..... 285

• Abstract	286
• Introduction	286
• Model Description	289
• Model Configuration and Testing.....	304
• Model Test Results and Interpretation	311

• Discussion	316
• Summary And Conclusions	322
• Acknowledgements.....	322
• Appendix A. : Code For The Linear Optimization	323
• References	323

Chapter 10	An Operational, Multi-Scale, Multi-Model System For Consensus-Based, Integrated Water Management And Policy Analysis: The Netherlands Hydrological Instrument	329
•	Abstract	330
•	Introduction	330
•	The Five Hydrological Models In The NHI.....	333
•	The Connectors Between The Hydrological Models	340
•	Data And Workflow Management.....	344
•	Pre And Post-Processing.....	345
•	Sharing Data With Stakeholders	346
•	Calibration and Validation.....	347
•	Overview of Output of The Nhi.....	348
•	Discussion	350
•	Concluding Remarks.....	352
•	Acknowledgments	352
•	References	353
	Citations.....	359
	Index	363