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Hydrogeophysics



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The book is divided into four sections, each of which contain multiple chapters that range in nature from tutorials to case studies. Individual authors, each of who are experts within their field, will write the chapters. Section 1 will introduce the concepts associated with hydrogeophysics, and will also cover the fundamentals of hydrogeology. Section 2 will focus on the fundamentals of the various geophysical methods used for near surface characterization and monitoring, with an emphasis towards acquisition modes and interpretation approaches important for hydrogeological investigations. The concepts presented in Section 1 and Section 2 will be incorporated within Section 3, where many hydrogeophysical case studies, categorized by the spatial scale of observation and hydrological domain, will be presented. Finally, Section 4 will take a look forward by describing emerging technologies and stochastic methods for fusing hydrogeological and geophysical data sets. The cohesiveness of the book will be ensured by using consistent nomenclature and by extensive cross-referencing between the chapters.

Section I: Background and Fundamentals of Hydrogeology

- Chapter 1: Hydrogeophysics Overview - Susan Hubbard and Yoram Rubin
- Chapter 2: Hydrological Measurement Techniques - Jim Butler
- Chapter 3: Geostatistics for Hydrogeological Site Characterization and Inverse Modeling - Peter Kitanidis

Section II: Fundamentals of Geophysical Methods

- Chapter 4: The Relationships between the Electrical and Hydrological Properties of Rocks and soil - David Lesmes and Schmulik Friedman
- Chapter 5: DC resistivity and Induced Polarisation Methods: Fundamentals - Andrew Binley and Andreas Kemna
- Chapter 6: Near-surface Controlled-Source Electromagnetic Induction (CSEM) - Mark Everett and Max Meju
- Chapter 7: GPR Methods for Hydrogeological Studies - Peter Annan
- Chapter 8: Relationships between seismic and hydrogeological properties - Steven Pride
- Chapter 9: Seismic Methods for Hydrogeological Studies: Fundamentals - Don Steeples
- Chapter 10: Geophysical Well logging - Miroslav Kobr, Stanislav Mares and Fred Paillet
- Chapter 11: CPT methods - Peter Dietrich
- Chapter 12: Remote Sensing - Jeffrey Paine and Brian Minty

Section III: Hydrogeophysical Case Studies

- Chapter 13: Hydrogeophysical Case Studies at the Regional Scale - Mark Goldman, Vladimir Shtivelman, Max Meju and Haim Gvirtzman
- Chapter 14: Hydrogeophysical Case Studies at the Local Scale: the Saturated Zone- Dave Hyndman and Michael Knoll
- Chapter 15: Vadose Zone Applications - Jeff Daniels, Andrew Binley, Doug LaBrecque, and David Alumbaugh

- Chapter 16: Hydrogeophysical Case Studies at the Lab Scale - Ty Ferre, Andrew Binley, Jil Geller, Ed Hill and Tissa Illangasekare

Section IV: Looking Forward

- Chapter 17: Emerging Technologies -Ugar Yaramanci, Andreas Kemna, and Harry Vereecken
- Chapter 18: Stochastic Framework for the Integration of Hydrogeological and Geophysical Data
-Yoram Rubin and Susan Hubbard