

BOOK TO BE PUBLISHED BY WILEY

**Applied Multidimensional
Geological Modelling:
*Enabling the Sustainable Use of
the Shallow Subsurface***

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**Applied Multidimensional Geological Modelling:
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BOOK HAS 26 CHAPTERS IN 5 PARTS

1 – INTRODUCTION AND BACKGROUND

▪ **4 CHAPTERS**

2 – BUILDING AND MANAGING MODELS

▪ **11 CHAPTERS**

3 – USING AND DISSEMINATING MODELS

▪ **2 CHAPTERS**

4 – CASE STUDIES

▪ **8 CHAPTERS**

5 - FUTURE POSSIBILITIES AND CHALLENGES

▪ **1 CHAPTER**

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PART 1: INTRODUCTION AND BACKGROUND

There are FOUR Chapters - they describe the economic, technological and institutional factors that influence geological modeling projects:

- CHAPTER 1: Introduction
Why “Multidimensional” – fundamental technical and economic drivers – defines purpose, scope, and audience for book.
- CHAPTER 2: Geological Survey Data and the Move from 2-D to 4-D
The GSO viewpoint – from several GSO’s
- CHAPTER 3: Legislation, Regulation and Management
Explains how modeling affects, and is affected by, laws and regulations.
- CHAPTER 4: The Economic Case for establishing Subsurface Ground Conditions and the Use of Geological Models
The Economic value of modeling – the viewpoint of the geotechnical industry
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PART 2: BUILDING AND MANAGING MODELS

There are ELEVEN Chapters covering the entire spectrum of scientific, technical and economic issues that influence the creation of models:

A) FOUR CHAPTERS ON INITIAL TOPICS

- CHAPTER 5: Overview and History Of 3-D Modeling Approaches
History of 3-D modeling; Mahomet Aquifer model sequence; overview Chapters 9-12.
- CHAPTER 6: Setting Up Effective and Efficient Workflows
Custom 3-D modeling workflows produce significant gains in modeling efficiency, reliability, and meet goals.
- CHAPTER 7: Data Sources for building Geological Models
Data source review: legacy vs new, elevations, surface vs subsurface, geophysics
- CHAPTER 8: Data Management Considerations
Data management methods: managing data & models, properties, integrated models, transboundary issues

PART 2: BUILDING AND MANAGING MODELS

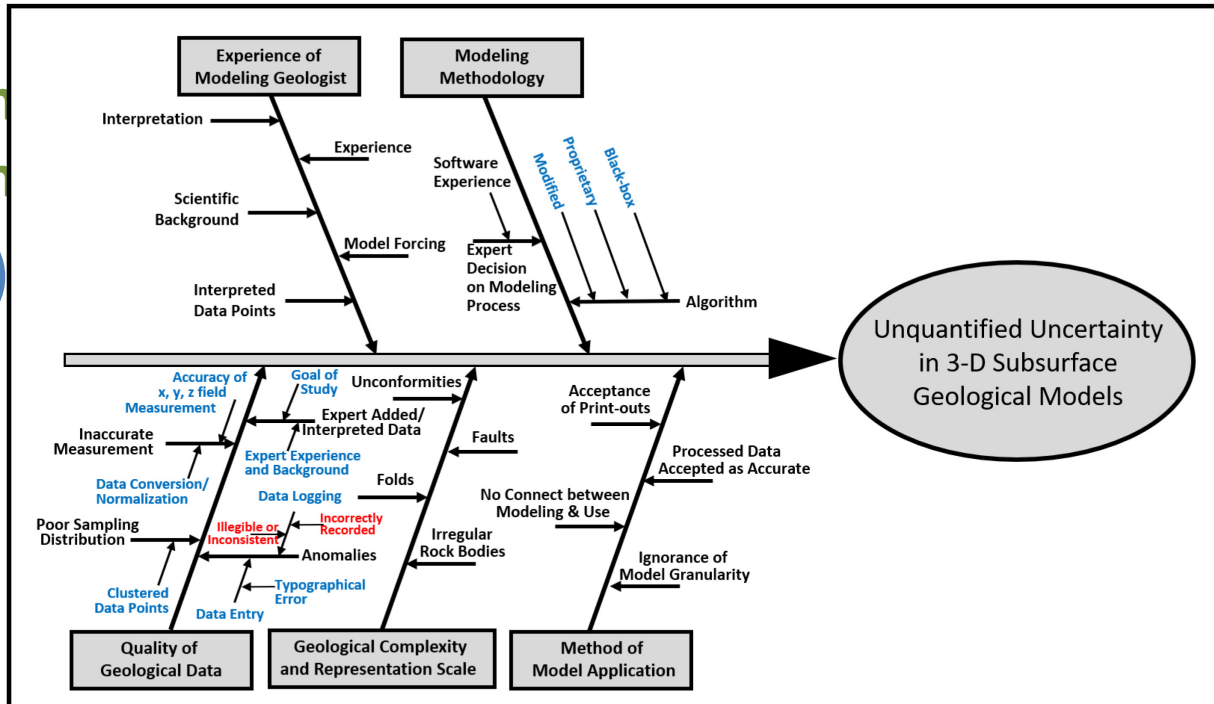
There are ELEVEN Chapters covering the entire spectrum of scientific, technical and economic issues that influence the creation of models:

B) FOUR CHAPTERS ON ALTERNATIVE MODEL-BUILDING APPROACHES

- CHAPTER 9: Model Creation Using Stacked Surfaces
Using GIS-related data & methods (ArcGIS etc.)
- CHAPTER 10: Model Creation Based on Digital Borehole Records and Interpreted Geological Cross-sections
Subsurface data from Boreholes & cross sections (GSI3D, SubsurfaceViewer, and similar products)
- CHAPTER 11: Models Created as 3-D Cellular Voxel Arrays
Techniques and uses of cellular models – examples from GEOTOP from the Netherlands
- CHAPTER 12: Integrated Rule-Based Geomodeling – Explicit and Implicit Approaches
Modeling with surface fitting and implicit methods (GOCAD, GOCAD-SKUA, GeoModeller, etc)

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PART 2: BUILDING AND MANAGING MODELS



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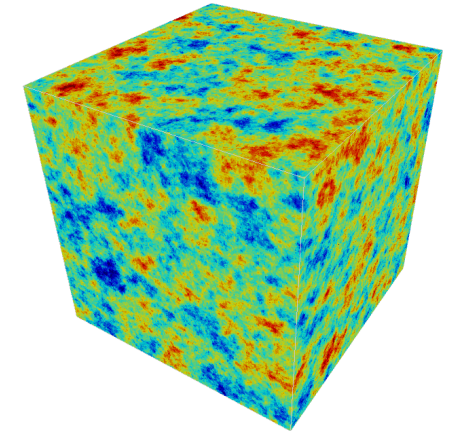
spectrum of scientific, technical
of models:

N & EVALUATION

Property Modeling

ing Processes

geotechnical applications, assessing



CHAPTER 15: Uncertainty in Geological Models

Identifying and assessing all sources of uncertainty in models – how to communicate uncertainty

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PART 3: USING AND DISSEMINATING MODELS

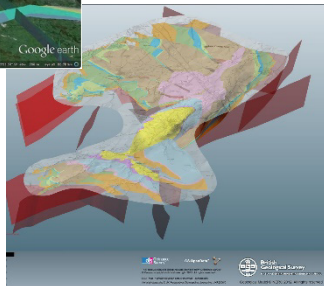
There are TWO Chapters - they include information derived from the COST SUB-URBAN project:

- CHAPTER 16: Emerging User Needs in Urban Planning
Overview of urban planning, resilient cities, challenges for urban modeling, New Orleans example
- CHAPTER 17: Providing Model Results to Diverse User Communities
Visualization, static printed products, data distribution, animations, interactive digital models, interactive physical models

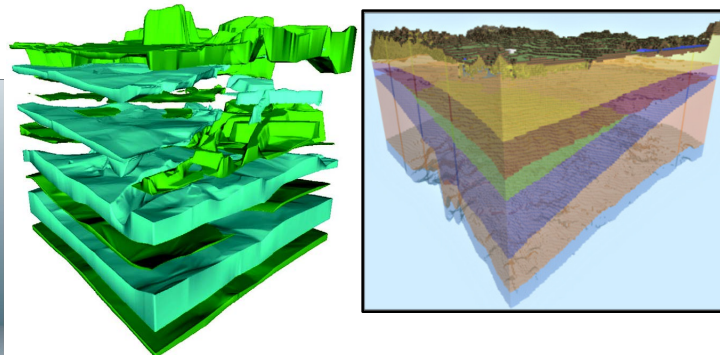


Google Earth

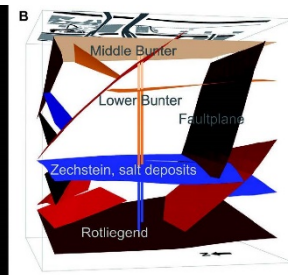
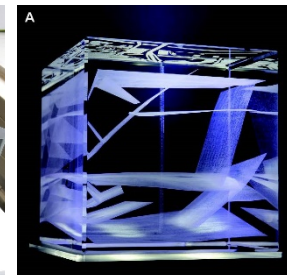
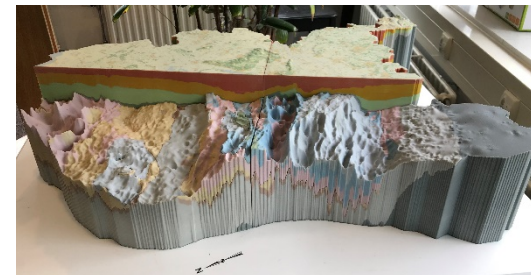
3D PDF



interactive digital models



interactive physical models



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PART 4 – CASE STUDIES

Each Chapter has 2-5 (average 3) Case Studies related to Theme.

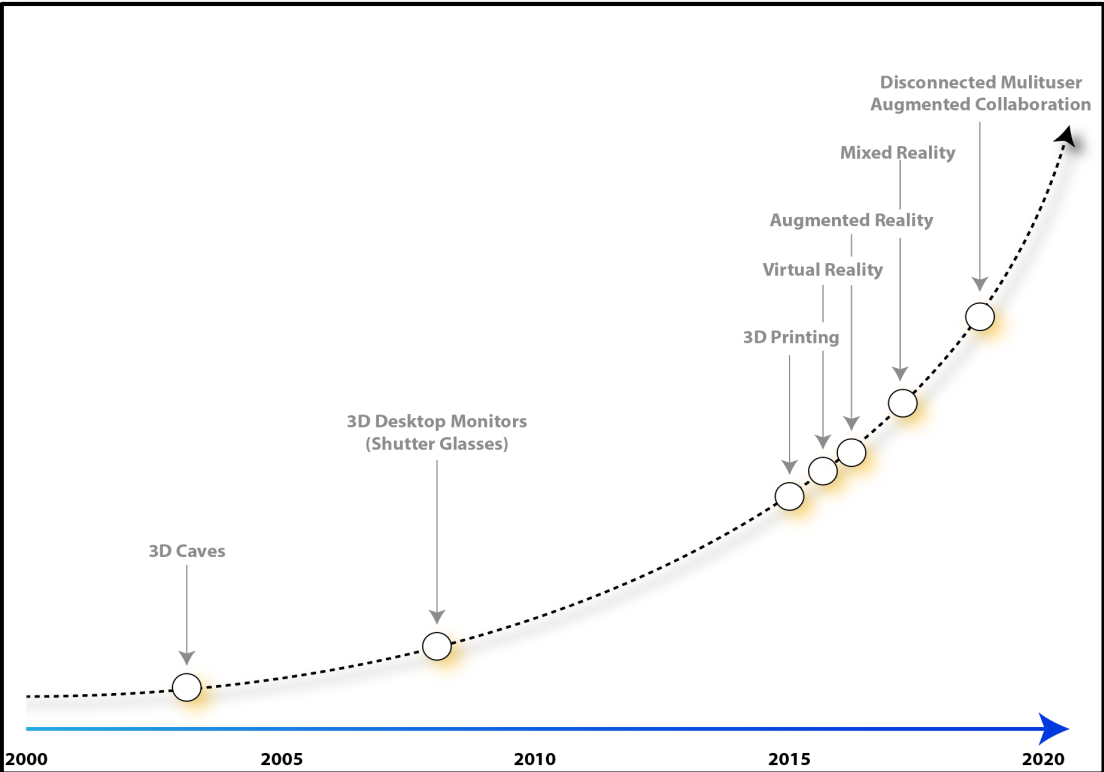
- CHAPTER 18: Application Theme 1: Urban Planning
- CHAPTER 19: Application Theme 2: Groundwater Evaluations
- CHAPTER 20: Application Theme 3: Geothermal Heating/Cooling
- CHAPTER 21: Application Theme 4: Legislative and Regulatory Support
- CHAPTER 22: Application Theme 5: Geohazard Identification
- CHAPTER 23: Application Theme 6: Infrastructure
- CHAPTER 24: Application Theme 7: Construction Resources
- CHAPTER 25: Application Theme 8: Archeology & Historical Preservation

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PART 5 – FUTURE POSSIBILITIES AND CHALLENGES

CHAPTER 26: Anticipated Technological Advances

Final Chapter summarizes the status quo and future possibilities.



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SUMMARY:

- **Book will total around 450 pages**
- **It will be published as both hard copy and E-book (digital)**
- **Individual chapters may be selected/purchased for university courses**
- **Manuscript is 98% complete – in process of being transferred to JOHN WILEY (publisher)**
- **Copyright approvals being completed (please sign if asked!)**

GOAL: to see book available in 2019!