

**PROPOSED BOOK
TO BE PUBLISHED
BY WILEY**

Proposed Book Title

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

EDITORS: A.K. TURNER, H. KESSLER, M. VAN DER MEULEN

CONTACT: kturner@mines.edu

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

BOOK WILL HAVE 5 SECTIONS

1 – INTRODUCTION AND BACKGROUND

- 5 CHAPTERS

2 – BUILDING AND MANAGING MODELS

- 10 CHAPTERS

3 – USING AND DISSEMINATING MODELS

- 4 CHAPTERS

4 – CASE STUDIES

- 6 CHAPTERS

5 - FUTURE POSSIBILITIES AND CHALLENGES

- 3 CHAPTERS

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

SECTION 1 – INTRODUCTION AND BACKGROUND

THE 5 PROPOSED CHAPTERS ARE:

- CHAPTER 1: Introduction (General introduction to book, its objectives, its contents, purpose & scope, expected audiences, etc.)
- CHAPTER 2: Role of Geological Survey Organisations and Other Practitioners of 3D Modelling.
- CHAPTER 3: The Need for Subsurface Regulation and Management.
- CHAPTER 4: Economic Case for Understanding Subsurface Ground Conditions
- CHAPTER 5: Impact of Environmental Change and Population Pressures. (Role of Models in Resolving Impacts)

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

SECTION 2 – BUILDING AND MANAGING MODELS

THE 6 PROPOSED CHAPTERS ARE:

- CHAPTER 6: Overview of the Entire Modelling Process
*Summary of 3D modelling developments (i.e. “from maps to models” concept),
Including brief historical review*
- CHAPTER 7: Supporting Efficient Modelling
Includes Data Management Issues and Establishing Appropriate Workflows
- CHAPTER 8: Data Sources for Geological Models
- CHAPTER 9: Geological Modelling Based on Stacked Stratigraphic Surfaces
Commonly used with legacy data & with ESRI or Rockware tools
- CHAPTER 10: Explicit Approach to Geological Modelling (i.e. GSI3D Approach)
- CHAPTER 11: 3D Cellular Voxel Models (i.e. TNO Approach for Shallow Subsurface)
- CHAPTER 12: Implicit Geological Models (i.e. GoCAD approach)
- CHAPTER 13: Discretization of Geologic Framework Models
- CHAPTER 14: Linkages to Process Models
- CHAPTER 15: Evaluating Uncertainty in Geology Models

SECTION 3 – USING AND DISSEMINATING MODELS

THE 4 PROPOSED CHAPTERS ARE:

– ALL DEPEND ON INPUTS FROM COST SUB-URBAN PROJECT

- CHAPTER 16: Community/Cultural Aspects of Model Use
Identifying User Needs & Linkages to Current Decision-making Processes
- CHAPTER 17: Model Delivery Technologies
Technical discussion of dissemination technologies
- CHAPTER 18: Translation of Models to meet User Needs
Promoting Trust and Transparency in Models
- CHAPTER 19: Onward Model Dissemination to Entire User Community
Web-Based Collaboration Technologies

SECTION 4 – CASE STUDIES

THE 6 PROPOSED CHAPTERS ARE:

Each Chapter will contain ~3 Case Studies related to Theme.

Total Chapter length about 20 pages – each case study = 3-5 pages

- CHAPTER 20: Application Theme 1: Urban Planning
- CHAPTER 21: Application Theme 2: Groundwater Evaluations
- CHAPTER 22: Application Theme 3: Geothermal Heating/Cooling
- CHAPTER 23: Application Theme 4: Legislative and Regulatory Support
- CHAPTER 24: Application Theme 5: Geohazard Identification
- CHAPTER 25: Application Theme 6: Urban Infrastructure

SECTION 5 – FUTURE POSSIBILITIES AND CHALLENGES

A final 2-3 chapters summarizing the status quo and future possibilities.

THE 3 PROPOSED CHAPTERS ARE:

- CHAPTER 26: Linking Subsurface Information with Above-Ground Building and Land-Use Information
The Building Information Model (BIM) concept used by architects in building design is becoming a required standard in the UK. The borehole data storage standards developed by the AGS in the UK and a parallel application underway in the USA already propose a link between BIM and geological subsurface models.
- CHAPTER 27: The Role of Subsurface Models in Ensuring Sustainability of Urban Areas
One important topic is the Assessing the Underworld project led by the University of Birmingham, which includes sustainability of urban areas as a component. Additional concepts are Future Cities and the Shared Earth Model.
- CHAPTER 28: Anticipated Technological Advances
A final chapter devoted to advances in visualization, database design, and web-based collaborations; and how they may be profitably applied to the distribution of geological models.

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

STATUS:

- **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**
- **COMPLETED DRAFTS of Chapters 1-15 by August 2016**
- **COMPLETED DRAFTS of Chapters 16-28 by December 2016**

GOAL: To publish book in 2017!!

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

HOW TO PARTICIPATE:

- **Chapters may be developed by individuals or by teams led by an individual**
- **All contributors will be recognized**
 - **After the chapter title.**
 - **Short Biographies will be included in book**
- **If requested, EDITORS will assist individuals in preparing chapters**
 - **For example: If contributors provide EDITORS with a series of source documents, EDITORS will prepare an initial draft for contributors to review and edit.**

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

**YOUR COMMENTS
and SUGGESTIONS
ARE WELCOMED!**

SEND COMMENTS TO:

Keith Turner at kturner@mines.edu