## Contents

Preface ................................................................. xii  
Acknowledgments ................................................ xiii  

Chapter 1  
**Introduction** ................................................. 1  
What is geophysical interpretation? .......................... 1  
The ideal interpreter ............................................. 2  
Rock properties and geophysical surveys ..................... 3  
Suggested reading ............................................... 3  
References .................................................... 5  

Chapter 2  
**Petroleum Reservoirs** .................................... 7  
Source rock .................................................... 7  
Migration path .................................................. 9  
Trap ............................................................... 9  
References .................................................... 14  

Chapter 3  
**Potential Fields** .......................................... 15  
Gravity .......................................................... 18  
Gravity modeling .............................................. 23  
Other gravity models of interest ............................. 26  
Modeling and inversion ....................................... 28  
Magnetics ....................................................... 28  
Aerial surveys ................................................ 29  
Conclusions ................................................... 29  
References .................................................... 29
# Chapter 22

**Multicomponent Seismology** .............................................. 213
- P-waves and S-waves .......................................................... 213
- Why use S-waves? .............................................................. 214
- Converted-wave exploration ............................................... 215
- Conclusions ........................................................................ 216
- References .......................................................................... 217

# Chapter 23

**Vertical Seismic Profiles** .................................................. 219
- Introduction ........................................................................ 219
- Types of VSP ....................................................................... 219
- VSP acquisition .................................................................... 221
- VSP processing and interpretation ....................................... 224
- References .......................................................................... 230

# Chapter 24

**Cooperative Inversion of Geophysical Data** ....................... 231
- Abstract ............................................................................. 231
- Philosophy of cooperative inversion ...................................... 231
- Joint inversion and sequential inversion ............................... 232
- Least-squares estimation ..................................................... 234
- The buried fault block — A synthetic test example ............... 236
- Cooperative inversion of a real-data case ............................. 238
- Sequential-inversion strategy ............................................. 238
- Seismic-traveltime fitting .................................................... 239
- Gravity inversion ............................................................... 243
- Model consistency and verification ...................................... 249
- Conclusions ....................................................................... 251
- Acknowledgments ................................................................ 252
- References ......................................................................... 253
- References for general reading ............................................ 254
Chapter 25
Geostatistics ............................................................... 255
Prediction using a single-variable type ....................... 255
Multivariable prediction ........................................... 256
Conclusions .............................................................. 258
References ............................................................... 259

Chapter 26
The Art and Science of Contouring ............................... 261
Contouring — An interpretive process ......................... 262
Caveats about machine contouring ............................. 262
Pitfalls in contouring ................................................. 263
Maps for prospect generation ..................................... 264
Conclusions .............................................................. 265
References ............................................................... 265

Chapter 27
Conclusions .............................................................. 267

Index ................................................................. 269