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## Preface

The favorable reception of the first edition of this book (seismic Exploration, published by Birkhauser Verlag in 1980) stimulated my belief in the need of an updated book that includes the advances in the techniques which have taken place during the past three decades. In preparing the present updated volume, I have taken into consideration the remarks and suggestions of the users of the 1980 edition from both of the academic and industrial work domains.

Since 1980, when the first edition of this book was published, great developments in the seismic exploration technology have taken place. These developments have occurred in all of the three exploration phases: acquisition, processing, and interpretation techniques. The most prominent advances which have taken place in these years are the widespread implementations of the 3D surveying, pre-stack migration, and growing interpretation techniques in both structural and stratigraphic exploration. As it is familiar with the exploration geophysicists, this subject (seismic exploration) is fully dealt with in many original and authentic internationally known text books. In this publication, no new subjects added to those found in the other standard books which are well known in the geophysical library. In fact, these and other related scientific papers and research reports formed solid references for the present book. There are, however, differences in the design and presentation approach.

In its design, the book is intended to be a comprehensive treatise of the seismic exploration tool, addressing audiences in both of the academic and industrial establishments. It is made up of 12 chapters covering the basic aspects of the seismic reflection exploration subject, starting with the basic theory, followed by the applied data acquisition technology, and ending with the processing and interpretation. In presenting the subject matter, emphasis is made on the practical aspects of the subject, using clear and simplified presentation, avoiding excessive descriptions and unnecessary lengthy comments. Numerous illustration figures (>390 figures) have been used throughout the book to aid in clarifying the concepts and procedures involved in any standard seismic exploration survey. In this way, the book can be considered as a very useful introductory teaching manual for university students taking seismic reflection exploration as part of a postgraduate course.

The chapters of the book are sequenced in the order of the activities normally executed in a standard seismic exploration survey: field acquisition, processing, and interpretation. Chapter 1 is an introductory chapter in which a brief historical note and short review of the geophysical exploration methods are given. This is followed by four chapters covering the theoretical aspect of the subject including basic principles and definitions of seismic waves, with a special chapter assigned for the seismic wave propagation velocity. The propagation phenomena, reflection, diffraction, transmission, and refraction, are dealt with in Chaps. 4 and 5. The following two chapters are devoted to the two main tools applied in seismic exploration, namely the 2D and 3D surveying techniques.

Due to its important role in understanding of the processing steps applied in seismic data processing, a chapter (Chap. 8) is assigned solely for the seismic signal. This chapter is structured on the theme of considering the seismic reflection wavelet as a propagating signal in the same way as the electromagnetic signal is treated by the communication theory applied in electromagnetic wave propagation. Including a chapter on seismic signals, preceding the processing chapters, is a feature by which this book has deviated from other conventional publications. Data processing is presented under two headings: processing tools (Chap. 9) and the normally applied processing sequence (Chap. 10). Chapter 11 covers some specialized seismic exploration tools sometimes used in support of the conventional seismic reflection and refraction surveying. The book is concluded with Chap. 12 on interpretation.

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