Book Review

Surface Wave Methods for Near-Surface Site Characterization, by Sebastiano Foti, Carlo G. Lai, Glenn J. Rix and Claudio Strobbia, CRC Press, Taylor & Francis Group, 2015; ISBN-13: 978-0-415-67876-6 (Hardback)

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Seismologists have been using surface waves to estimate physical properties such as shear wave speed within the shallowest part of the Earth's crust for more than half a century. Depending on how seismic wave field is initiated, surface wave techniques can be grouped into two classes: active- and passive-source methods. In practice, application of both of these methods may require some knowledge about the linear and non-linear inversion schemes, signal analysis/processing, and how seismic waves propagate within various types of mediums. Hence, understanding the philosophy behind near surface site characterization surveys using surface waves, associated error analysis, and limitations in data interpretation may appear excessively complicated for students, or for researchers from different fields. The authors aim to fix this problem by providing a complete overview of surface wave methods and by describing every single step of data analysis including the field equipment and data acquisition in detail.

The book is divided into eight chapters and after reading the first one, readers know what to expect from the rest of the book. Starting with the theory of wave propagation, every important aspect of surface wave analysis for near surface structure is covered with thorough explanations. Data collection in the field and subsequent dispersion and attenuation analyses are included as separate chapters. As expected from the logical flow of the book, the next chapter focuses on the final step of data interpretation, which

tries to explain collected data in terms of subsurface structures. This operation is known as the inversion and it is perhaps the most challenging and complicated part of the geophysical studies. In the context of this book both linear and non-linear inversion approaches are evaluated and valuable information about different strategies is provided. The last two chapters are reserved for case studies with different goals and targeting various structural complications. It is very interesting and enlightening to read these sections since they show how subjects covered in this book can be applied to real life problems.

In general, the book is written in a clear and an objective way. Both advantages and drawbacks associated with the choice of different schemes during the data acquisition, data processing, and inversion are adequately explained. Moreover, readers are not required to have advanced mathematical or physical knowledge to follow the manuscript. In other words, it is not difficult to understand the development and the application of the theory. Since almost the complete story of the development of surface wave methods is included in the book, the reference list may also be used as a good starting point for scientists who want to contribute to the solution of geophysical site characterization problem. For the next editions, however, I would consider adding toy examples with sample computer codes to this book to provide a good opportunity for readers to strengthen their understanding as they learn new concepts.

Overall, this book will be a very good source of knowledge for graduate students and engineers, but also for researchers from different fields who want to study site characterization using surface waves.

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