

Book Review

“Routine Data Processing in Earthquake Seismology: With Sample Data, Exercises and Software”,
by Jens Havskov and Lars Ottemöller, Springer, 2010; ISBN: 978-90-481-8696-9

PAWEL WIEJACZ¹

The authors of the book have taken up a difficult task: to describe modern routine data processing in earthquake seismology on 326 pages (not counting the preface and references). Only extremely experienced authors may have succeeded in this. For comparison, the previous publication covering the same issue, the “New Manual of Seismological Observatory Practice” (NMSOP; edited by P. Bormann, 2002), consists of two bulky A4 size volumes. Another modern textbook on earthquake seismology, the “Introduction to Seismology, Earthquakes and Structure” by Stein and Wysession (2003), is not aimed to focus on routine data processing. The book by Havskov and Ottemoller falls between these two books.

The limited size of the book did not allow the authors to go deep into the details of seismological data processing. What is presented is the concept of the issues, in many cases it is discussed over an example or over several examples. This situation has its positive and negative effects. The positive effect is that the book presents the knowledge in a relatively timeless manner—over many years the information will require only minor updates rather than thorough revisions caused by future software (and possibly hardware) developments. The negative effect is that without going deep into software details, it is difficult to imagine someone starting routine data processing in earthquake seismology, without knowledge from other sources such as NMSOP or from colleagues

willing to share their experience. However, the book by Havskov and Ottemoller handles this problem by redirecting the reader to a plentiful list of reference sources. It is, therefore, also a very important and comprehensive list of the most important publications on earthquake seismology, state-of-the-art 2010.

The book is divided into 10 chapters.

The first two chapters make a form of an introduction—although only Chap. 1 is called “Introduction”—defining the basic concepts and giving the basic information on Earth structure. The information is given clearly from the seismic network operator point of view. Attention is given to how to find the relevant information from the observed seismograms rather to interpretation of this information, which is what most textbooks usually do.

The further four chapters, Chaps. 3–6, discuss the real basics of routine data processing and constitute the clue of this book. Chapter 3 deals with instruments, their concepts, responses and data formats. Chapter 4 deals with phase picking and the related issues of signal filtering. Chapter 5 is on event location; discusses the various methods used. For practical application, the reader is directed to several types of software. Chapter 6 is on magnitude, or perhaps more generally, on determination of earthquake size. It contains comparison of the various magnitude types and the discussion of their applicability.

Chapters 7, 8 and 9 deal with advanced data processing in earthquake seismology. Although definitely a part of the data processing, determination of focal mechanism (Chap. 7) can be considered routine only at the datacenters that handle seismic networks of sufficient number of high quality stations, or covering

¹ Institute of Geophysics, Polish Academy of Sciences, Ks. Janusza 64, 01-452 Warsaw, Poland. E-mail: pwiejacz@igf.edu.pl

a local area of high seismic activity, or—of global coverage. Spectral analysis (Chap. 8) is often limited by uncertainties and complexity of the local geological structure and therefore is not always performed. Chapter 9 deals with seismic array data. Although the authors point out that a local or regional network can be used as an array, in practice it is seldom done so. The number of seismic arrays in the world is still far less than the number of seismic networks (least speaking of the number of seismic stations), so an array installation are still more of an exception than a subject to routine. Nevertheless, there are four seismic arrays on Norwegian territory, Norwegian datacenters participate in data processing from a few other similar installations. As the authors are experts in array data processing, the book gives important basic information on the issue—an information which is not obvious to everybody of the routine data processing community.

The last Chap. 10, called “Operation” again focuses on the most important aspects of routine data processing such as data exchange and distribution, data archival, use of databases and particular analysis software. The tasks covered in Chaps. 4–9 would have not been possible— or at least would have been severely hampered—if the issues discussed in Chap. 10 had not been properly handled. In a way, this chapter could find its place after Chap. 3, only at that placement, the purpose of all its issues would have been unclear. Chap. 10 presents an interesting discussion of the various methods of data exchange and distribution. It also abolishes some common myths. One of these myths is about the use of databases for

storing earthquake parameters. Usually a data center storing its data in a flat file system is considered less professional. However, for relatively small data centers the effort of database maintenance proves greater than the extra effort required when working with a flat file system. One of the basic reasons is that, contrarily to waveform input, which usually comes in one of several standardized formats, there is no standard for output parameter data. The call or quest for standardized output data formats may be considered a side-result of the book.

Chapter 10 also discusses the most commonly used data analysis packages, namely the Geotool, Seismic Handler, Giant-Pitsa, Sac and Seisan. The availability of various program features is discussed, leaving it to the reader to decide which package is best for particular needs. A slight edge is given to the Seisan package, which is no wonder, because Seisan is a development of the authors of the book.

Altogether, the book presents a very good overview of the routine data processing in earthquake seismology. It should find its place at every seismological data center, serving as a general guide, a reminder of the issues that are not part of the data center’s everyday routine and an overview for the data center’s beginners or for visitors.

Open Access This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.