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Book reviews

Meissner, R.: The continental crust, a geophysical approach. International Geophysics Series, Vol 34, Academic Press, 426 p., 1986

“The past 20 years have yielded a wealth of new data on the continental crust from all branches of geosciences and from many diverse regions of our planet earth. Thus the time appeared right for an attempt to a comprehensive treatment of the new data and insights gained so far.” These are the first sentences in the preface of this highly welcome book.

For almost two decades the author has played an important part at the scientific frontier in geophysical research of the continental crust. This guarantees a competent treatment of the very broad and complex subject. The intention of the author is to introduce the reader to the research methods and aspects of the state and the evolution of the continental crust, and to lead him up to our present knowledge and scientific concepts on the subject. So, elements of a basic text book are combined with those of a scientific monograph in a smooth and didactically elegant way which makes the book a educative and exciting source of information for students as well as for researchers in geosciences.

The content of the book may be indicated by some key words: the crust as the product of the planetary differentiation processes; how to collect data on physical properties of the earth's crust, with particular emphasis on controlled-source seismology; seismicity, thermal state and strength of the crust; combined evaluation of seismic and gravity data; anelastic absorption, brittle and ductile regimes. A short account is given on the composition of the continental crust, rock-forming processes and geochronology. In the central and most important chapter, on more than 100 pages, the many new data on the crustal structure as derived from near-vertical and wide-angle seismic reflections are systematically analysed and classified with respect to various geological provinces such as Precambrian shields and platforms, Paleozoic and Mesozoic areas, Cenozoic mountain belts, grabens, rifts, active and passive margins, special features like low-velocity zones and fault zones. The book concludes with a short chapter on the evolution of the continental crust.

Perhaps a geologist would like to see more on the modern but mostly speculative concepts of crustal interaction. The author, however, has concentrated on the “hard facts” which geophysics can provide.

It was a tremendous and meritorious task to evaluate critically almost 700 widely scattered publications to arrive at a well-balanced picture of our present knowledge on the continental crust. Important contributions and original ideas published by the author and his co-workers in more than 40 papers are the backbone of the concept of the book and responsible for its authentic character.

The book can be highly recommended as a modern and reliable source of information on the nature of the continental crust. It may also be a very useful guide for higher seminars with students of geosciences.

H. Berckhemer

Berkhout, A.J., Ridder, J., van der Wal, L.F. (eds.): Acoustical imaging, Vol. 14. Plenum Press, New York, 801 p., 1985

This volume contains the proceedings of the 14th International Symposium on Acoustical Imaging which was held in April 1985 in The Hague, Netherlands. A total of 53 normal contributions (average length 12 p.), 35 poster papers (average length 4 p.) and 6 abstracts is printed, including a subject index. The contributions are grouped into sections entitled modeling, inversion, instrumentation and information extraction; spatial resolution was, according to the preface, the key subject of the symposium and hence is addressed in quite a number of the papers. Nevertheless, acoustical imaging is a very broad field: besides papers dealing with basic questions of object reconstruction from transmitted or reflected wavefields, several more technical presentations of medical applications of ultrasound, nondestructive testing, transducer theory, tissue characterization etc. are given.

It is probably impossible to write a balanced review of such a volume. I appreciated the general overview that one obtains by reading through it, and in particular I found the following papers so informative that I have to read them again:

- Spatial resolution of migration algorithms (Beylkin, Oristaglio and Miller)
- Numerically efficient full wavefield approach to synthetic seismogram calculation (Schmidt and Tango)
- Generalized tomography as an unified approach to linear inverse scattering (Langenberg and Schmitz)
- Image reconstruction fidelity using the Born and Rytov approximations (Zapalowski, Leeman and Fiddy)
- Combined shear-compression ultrasound reflection tomography (Moshfegi and Hanstead)
- Phase tomography, velocity and temperature measurement (Jones, Mieszkowski and Berry)

The volume also has a few clearly negative aspects. Some of the review papers are rather narrow, and a few of the other papers are just computational exercises or premature progress reports. Much of the material presented would never have passed the normal reviewing process of a scientific journal; it is just this which makes symposium proceedings so popular among scientists who want to add to their publication list. This scientifically unsound style is supported today by many publishers who prefer to produce quantity rather than quality.

It is certainly desirable that the publication of symposium proceedings on acoustical imaging continues, but concentration on the highlights of the meetings and on completed work would be a viable alternative to current practice.

G. Müller