

Book Review

Science

Author: Stein & Wyssession

Title: *An Introduction to Seismology: Earthquakes and*

Earth Structure

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The Earth is a unique planet and seismology is a unique way to find out what's inside. Seth Stein and Michael Wyssession have put together a text-book-cum-reference work that helps make seismology both interesting and fun. I find myself looking it up increasingly and relying on it more and more. It is all-inclusive, flexible, useful, and reasonably priced.

The book is designed primarily as a textbook for seniors and first-year graduate students. Stein and Wyssession wrote this book in response to a definite need. Consider the alternatives: Aki and Richards wrote their compact, classical textbook to challenge current ideas on how to teach a complex and difficult subject. "Seismology," they wrote, "is the science based on data called seismograms." Is it really? It sounded cute when they wrote it in 1980, but the data have left behind the book.

How about Press and Siever? This massive work published in 1982 proposed to teach geology and geophysics in a single course. It sounded like a good idea at the time. But the two sciences have continued to grow apart so that even a Darwin would be unable to master both. Moreover, in the last two or three decades the field of seismology has changed considerably. A new text has to be more inclusive and more versatile.

The book by Stein and Wyssession solves your problem. The way to use it is by building your own course, selecting the sections you like best. You cannot teach all of it—forget it. But every chapter reflects the diversity of the whole. This book lets you cover different aspects of seismology from year to year. For example, you can build your course around the normal modes one year, and around tomography the next.

This makes sense. Seismology has expanded so much it no longer represents a field but an academic environment. You may need at least two copies of the book, one for the office and one for the lab—or one for the reference shelf and one (full of tabs sticking out) for your course.

I have not found any misprints, but you may discover some slight tendency to overkill. This is because the authors are experienced teachers who

want to make sure that the student gets the point. This is fine with me. Jeffreys' *The Earth* was a flawed textbook, yet it went through five editions.

This is a flexible book that expects an active input from students and users and hopes to go through many editions. The book has seven chapters and an appendix on mathematical and computational tools. The structure is as follows: first an introduction presents ideas on engineering and other societal goals; then a broad chapter on theory, then "seismology and earth structure," next "earthquakes" (i.e., waveform modeling, magnitudes and moments), plate tectonics, signal processing, and inverse problems. It is self-contained without making a fuss about it.

Do you happen to have a Physics Department with some Landau-Lifschitz type who would enjoy teaching a semester on elastic waves? Why not harness such a valuable resource? Now you can do it, with this book. Eigenvalue problems, guided waves, the works: you can't really understand surface waves without going into this. You might even want to teach it yourself. Good luck!

An Introduction to Seismology is clearly and handsomely printed. The layout is modern. Figures are plentiful and appropriate. The problems found at the end of each chapter connect the student with situations encountered in the field. Best of all, your questions (or the student's) never butt into a brick wall. When the going gets rough there are well-chosen and useful references. I find that my copy tends to get a bit dog-eared from use, but I expect that there will be a second edition soon. Luckily, the book is reasonably priced and would still be a good value at twice the price.

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