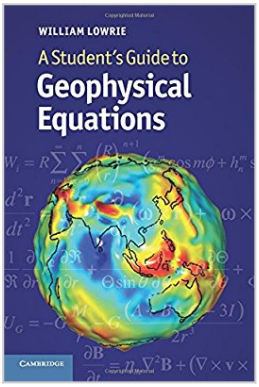

A Student's Guide to Geophysical Equations

By William Lowrie

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The advent of accessible student computing packages has meant that geophysics students can now easily manipulate datasets and gain first-hand modeling experience - essential in developing an intuitive understanding of the physics of the Earth. Yet to gain a more in-depth understanding of physical theory, and to develop new models and solutions, it is necessary to be able to derive the relevant equations from first principles. This compact, handy book fills a gap left by most modern geophysics textbooks, which generally do not have space to derive all of the important formulae, showing the intermediate steps. This guide presents full derivations for the classical equations of gravitation, gravity, tides, earth rotation, heat, geomagnetism and foundational seismology, illustrated with simple schematic diagrams. It supports students through the successive steps and explains the logical sequence of a derivation - facilitating self-study and helping students to tackle homework exercises and prepare for exams.

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Editorial Review

Review
"The book is concise yet it contains the derivations of many geophysical equations that allow the reader to examine underlying physical assumptions..All in all, this is a good introduction to books dealing with foundations of quantitative geophysics."
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"Figures are small, simple, and clear, and largely devoted, to illustrating dimensions or coordinate systems relating to the equations under discussion...succeeds as a supplemental work to either a more general introductory textbook (most naturally Lowrie's own Fundamentals of Geophysics, which maintains continuity in mathematical notation) or as an introduction to several more advanced, subject- specific works. As such, it is a worthy addition to the shelf (or eBook reader) of serious students of geophysics, or indeed faculty preparing lecture courses on related subjects."
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"... a basic resource for anyone who needs to revisit the basic theory of classical geophysics ... I wish this book had been available when I was preparing my own set of geophysics lecture notes ... the fundamental geophysical equations are presented here in an informative and intuitive way, which makes this relatively inexpensive book an excellent investment for any geophysicist's library."
Geological Magazine

About the Author
William Lowrie was born in Hawick, Scotland, and attended the University of Edinburgh, where he graduated in 1960 with first class honors in physics. He achieved a masters degree in geophysics at the University of Toronto and in 1967 a doctorate at the University of Pittsburgh. After two years in the research laboratory of Gulf Oil Company he became a researcher at the Lamont-Doherty Geological Observatory of Columbia University, New York. In 1974 he was elected Professor of Geophysics at the Swiss Federal Institute of Technology in Zürich, Switzerland, where he taught and researched until retirement in 2004. His research in rock magnetism and paleomagnetism consisted of deducing the Earth's magnetic field in the geological past from the magnetizations of dated rocks. The results were applied to the solution of geologic-tectonic problems and to analysis of the polarity history of the geomagnetic field. Professor Lowrie has authored 135 scientific articles, and a second edition of his acclaimed 1997 textbook Fundamentals of Geophysics was published in 2007. He has been President of the European Union of Geosciences (1987-9) and Section President and Council member of the American Geophysical Union (2000-2). He is a Fellow of AGU and a Member of the Academia Europaea.

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