



The Magnetotelluric Method: Theory and Practice

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The magnetotelluric method is a technique for imaging the electrical conductivity and structure of the Earth, from the near surface down to the 410 km transition zone and beyond. This book forms the first comprehensive overview of magnetotellurics from the salient physics and its mathematical representation, to practical implementation in the field, data processing, modeling and geological interpretation. Electromagnetic induction in 1-D, 2-D and 3-D media is explored, building from first principles, and with thorough coverage of the practical techniques of time series processing, distortion, numerical modeling and inversion. The fundamental principles are illustrated with a series of case histories describing geological applications. Technical issues, instrumentation and field practices are described for both land and marine surveys. This book provides a rigorous introduction to magnetotellurics for academic researchers and advanced students and will be of interest to industrial practitioners and geoscientists wanting to incorporate rock conductivity into their interpretations.

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Editorial Review

About the Author

Alan D. Chave is a Senior Scientist at Woods Hole Oceanographic Institution. He has also been a Chartered Statistician (UK) since 2003 and has taught a graduate level course in statistics in the MIT/WHOI Joint Program for 20 years. For over 30 years, he has conducted research utilizing the magnetotelluric method, primarily in the oceans, and has pioneered research into producing modern MT processing methods. Dr Chave has also designed instrumentation for optical and chemical measurements in the ocean and has played a leadership role in developing long-term ocean observatories worldwide. He has been an editor of Journal of Geophysical Research and editor-in-chief of Reviews of Geophysics.

Alan G. Jones is Senior Professor and Head of Geophysics at the Dublin Institute for Advanced Studies and has been using magnetotellurics since the early 1970s. He has undertaken MT in Europe, southern Africa, Canada and China, for problems ranging from the near-surface (groundwater contamination) to mining, geothermal studies and tectonics of the deep mantle (to 1200 km). He has been instrumental in many developments of MT, from processing to analysis to modelling/inversion to interpretation. He was awarded the Tuzo Wilson Medal of the Canadian Geophysical Union in 2006, appointed to Academia Europaea in 2009 and made a member of the Royal Irish Academy in 2010.

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