

Aeromagnetic surveys: principles, practice & interpretation

by Colin Reeves

e-Published by GEOSOFT (<http://www.geosoft.com/knowledge>), 2005, 155 pp.

This book review departs from tradition in several important ways. First as a review it has not been solicited by the publisher, in the usual manner of sending a complimentary copy of the book to a society (such as the ASEG) to encourage a review to be published in the society columns. Second, the book carries the publication date of 2005, now several years ago. Third, it is an e-book, available as a 'free download'. In this characteristic it may very much be an introduction to the literature of the future.

If not particularly recent the book has, however, just recently come to the attention of this reviewer, and possibly to others, in an email circulated to ASEG members from the book's publisher, GEOSOFT. Perhaps others, like this reviewer, have taken the opportunity of the free download (<http://www.geosoft.com/knowledge>) and so already have the book electronically on their computers. Perhaps some already have printed a hard-copy. Nevertheless, a description of the book may be useful to those who have not yet taken such a step, and for whom aeromagnetism is important.

And, in fact, for whom is aeromagnetism not important? It is surely one of the big success stories of geophysics in the second half of the twentieth century, a period when the number of geophysical success stories is impressive indeed.

The author Colin Reeves will be well known to many ASEG readers, though the reviewer was surprised to realize that it is now almost twenty years since Dr Reeves was employed in Australia by the Bureau of Mineral Resources (which became the Australian Geological Survey Organisation and then Geoscience Australia). His career has specialized particularly in aeromagnetism, in many parts of the world, and in all aspects of the subject, from survey operations, to interpretation, to teaching and training students internationally.

This text reflects that wide experience. Also the book has the smooth flow of those good text books that have benefitted, in draft form, from much teaching work. Students contribute invaluable in their questions and discussion, revealing gaps and perhaps correcting mistakes.

Aeromagnetism, at one level, can be a geologist looking qualitatively at an aeromagnetic map of a field area, and qualitatively associating geological units and boundaries with aeromagnetic patterns. There are many who use aeromagnetic maps to great effect in this way, with no deeper understanding of what underlies their production.

However, if one is involved in actually carrying out an aeromagnetic survey, one will very soon come up against a wide range of questions which beg the understanding of much of geomagnetism. Questions arise which concern the characteristics of the geomagnetic field as a dipole, to its geologic history of reversals, to the origins of the magnetic daily variation, and to the character of micropulsations and of magnetic storms. For people meeting these topics for the first time, they are fundamental and very fascinating physics, on a grand scale. The experience behind the book is evident where, in the first five chapters, Reeves introduces all these matters thoroughly, including the subject of the magnetic properties of rocks.

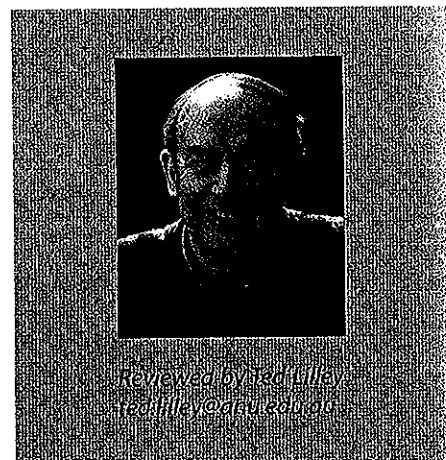
Then, a survey flown, data reduction and interpretation tasks come next, and the five chapters comprising the second half of the book take us through these tasks, with clarity. There is a context of rigour, with critical assessment regarding where the limitations of potential methods lie, and where benefits come from combining different geophysical methods.

The book has been in development for some decades, and its tone of thoroughness will hopefully be a counter trend of proceeding in geophysics by 'pressing a button', to apply someone

else's computer program to data provided by someone else again. It may be hoped the book will help to balance such 'blind computing' fashions. For example it is salutary for all to remember the art of contouring maps by hand, with the recognition that arbitrary contouring can affect the final results. Also, it is instructive to remember how by measuring the slopes of profiles by hand, one can obtain a sense of the subject which is not obtained by other means.

As its title clearly states the book is a manual for the practice of aeromagnetic surveying and it deals with what is established. However the foundation it provides may encourage the interested reader to explore many active and related research topics. These topics may be as diverse as electromagnetic induction in the Earth and oceans by natural source fields; the mapping of the geomagnetic field from space; and the magnetic fields of other planets.

In a foreword to the book, the author advises that it is still work in progress. A benefit of such e-publication is that revisions and updates can, in principle, be made easily, should the author wish to do so in the future. The book represents a generous and valuable sharing by the author of his accumulated experience. It is a distinctive resource for the geophysical profession and the wider public generally, including students of all levels.



Calling all book reviewers

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