

LITERATURE REVIEWS

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A REFERENCE ON RADIOMETRIC DATING

PRINCIPLES OF ISOTOPE GEOLOGY. Gunter Faure. 1977. NY: John Wiley & Sons. 464 p.

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Radiometric age data must be taken into account in the development of a suitable model for the history of Earth or the solar system. A survey of creationist literature reveals that many of its authors have not understood radiometric techniques well enough to satisfactorily relate radiometric age data to their premises. Examples that bring discredit to efforts toward Earth history modeling from a creationist viewpoint are not difficult to find. Because of the extraordinary difficulty of obtaining adequate information for an understanding of radiometric techniques, these authors should not be criticized unsympathetically. The availability of *Principles of Isotope Geology* now makes it possible for a competent writer to readily obtain an adequate understanding of radiometric techniques.

Principles of Isotope Geology was designed for use as a textbook and is written with extraordinary clarity. The author is Professor of Geology at Ohio State University and is one of the world's best-recognized authorities on isotope geology and radiometric dating.

The theoretical foundation and practical techniques for each of the various radiometric dating methods, excepting the recently developed Samarium-Neodymium method, are explained with care. Although Samarium-Neodymium dating is not discussed, references to this method are provided into 1976. The assumptions and restrictive conditions that must be satisfied to interpret radiometric age in terms of real calendric time are fully explained for each method. The discussion of each dating method concludes with an illustrative application to a set of data from the original research literature.

The book also traces the historical development of the scientific principles on which radiometric dating is based. Approximately one-third of the text is given to the geologic significance of variations in the stable

isotope composition of hydrogen, carbon, oxygen, sulphur, strontium and lead. Since stable isotope geochemistry is closely related to radiometric dating, there is great advantage in having both topics treated in the same volume.

Each chapter provides an extensive list of references that can enable the reader to readily find access to the authoritative literature on any topic he may wish to pursue further. The text of all but two chapters concludes with a few problem exercises that enable the reader to test his comprehension of the preceding material. Data for these problems are frequently taken from investigations reported in the research literature. Answers are given for most of the problems. Chapters that treat specific techniques are summarized.

Two minor comments may be of assistance to users of this book. The presentation on p 217 would have been improved by specifying the slope age of the thorium-lead isochron shown in Fig. 12:10(a). An appropriate value is 2.64×10^9 years. On p 306-307 it is stated that steady-state equilibrium of carbon-14 is maintained in the atmosphere and hydrosphere, and in living green plants, by "continuous decay" of carbon-14 balanced by continuous production of carbon-14 in the atmosphere and continuous absorption from the atmosphere. Radioactive decay of carbon-14 is a negligible factor in these equilibrating processes. In living plants uniform or equilibrium concentration of carbon-14 is maintained by continuous exchange with the atmosphere. In the atmosphere and upper hydrosphere essentially uniform concentration of carbon-14 is maintained by continuous transfer of carbon-14 to the deep ocean and sediments.

An individual who is seeking for an interpretation of radiometric age data that is compatible with a short history of Earth's present geologic features or of the solar system will not find it in this book. But he will find unsurpassed convenience of access to an understanding of radiometric age data that is essential for the development of credible models for Earth and solar system history, whatever the premises of these models may be.