

Book review

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The Nature of the Lower Continental Crust. Papers read at a Joint Meeting of the Metamorphic Studies Group of the Geological Society and the Mineralogical Society, the Joint Association for Geophysics and the 3rd Alfred Wegener Conference at Burlington House, London, 24–26 October, 1984. Edited by J. B. Dawson, D. A. Carswell, J. Hall and K. H. Wedepohl. Published by Blackwell Scientific Publications, Oxford, for the Geological Society. Geological Society Special Publication No 24, VIII + 394 pp., £47.50.

Knowledge of the lower crust comes from four main sources: (1) Geophysical studies, (2) Study of deeply eroded crustal terrains, (3) Study of magmatic rocks formed by melting of deep crustal sources, and (4) Study of xenoliths from the deep crust in basalts and kimberlites. The book under review contains 31 papers with contributions in all these fields and as such gives the reader a welcome overview of present knowledge on this topic.

A striking feature of the book is the lack of agreement between the various authors. Apparently nobody knows for certain what the deep crust consists of. This is most clearly expressed by a table with recent estimates of the average chemical composition of the lower crust in the paper by Shaw et al. (p. 275). Estimates for SiO₂ vary from 54–61.5%, for Al₂O₃ from 15–19%, Zr from 30–174 ppm, U from 0.05–1.1 ppm, and Rb from

8–41 ppm. This is due to the manner in which these averages have been calculated. Some authors assume that the earth crust as a whole has an andesitic composition, and calculate the composition of the lower crust by mass balance using the relatively well-known mass and composition of the upper crust. Others use the average composition of exposed granulite facies terrains, and others again the average of deep crustal xenoliths in basalts and kimberlites (which on average are considerably more mafic than most exposed granulites). The geophysical data are of no great help: there is much recent evidence for deep crustal seismic reflectors and deep zones of enhanced electrical conductivity, but there is no certainty as to what they mean.

The diversity of opinion expressed in the various papers is not in itself a deficiency of the book. However, it would have gained considerably in value if a proper overall discussion had been included to outline on which topics there is a general agreement and which are the main unsolved problems, and how these problems eventually could be solved. Without such a discussion the book remains just a collection of papers which (almost) as well could have been published elsewhere. In summary: a valuable book for geological libraries, but hardly for individual geologists.

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