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BOOK REVIEW

Short Course in Burial Diagenesis, edited by I. E. Hutcheon, *Short Course Handbook Volume* **15,** Mineralogical Association of Canada, Toronto, Ontario, 1989, 409 pp., softbound, CN$25.00.

The stated intention of the Mineralogical Association of Canada's *Short Course in Burial Diagenesis,* edited by I. E. Hutcheon, is to "...introduce the diversity of techniques that can be applied to diagenetic problems and give a starting-off point to get the interested person headed in at least one, hopefully the right direction." This intention is well met in a very readable, well-illustrated, information-rich, inexpensive paperback that is sure to find wide use among students and professionals alike. The book is not an all-encompassing treatise on modern methods and models of sandstone diagenesis and purposely avoids inclusion of numerous case studies. In this regard, it is very different from some older familiar diagenesis monographs (e.g., *Aspects of Diagenesis,* SEPM Special Pub. 26, 1979, or *Clastic Diagenesis,* AAPG Memoir 37, 1984) that focus more on case studies and less on integration of information. The Burial Diagenesis volume is more of a training aid than these former publications; it is a good handbook for methodologies and references and presents insightful and, sometimes, controversial diagenetic models.

The book is organized into 10 chapters consisting of papers by various authors published from camera-ready manuscripts that were not subjected to open review or extensive editing. This results in some overlap between chapters and the inclusion of some speculative models, but not enough to detract from the overall effectiveness of the book. The first two chapters discuss diagenesis of organic matter in sediments and have considerable overlap. Chapter 1 (R. M. Bustin) presents kerogen diagenesis in terms that a non-organic geochemist can follow, discusses advantages and disadvantages of various techniques, and provides excellent references. Chapter 2 (L. R. Snowdon) repeats much of what was discussed in Chapter 1, is not as concise in its organization, and suffers several editing mishaps (e.g., the next to the last paragraph on page 53 is cut off in mid sentence). Thankfully, such editing glitches are infrequent (Longstaffe's paper suffers a similar omission, p. 218) and don't detract from the general good quality of the publication.

The remaining eight chapters of the book cover a wide range of topics of interest to sedimentary petrologists and clay mineralogists. Chapter 3 (R. C. Surdam *et al.*) holds the distinction of being the longest chapter in the book (95 pages) and presents the gospel of Surdam pertaining to the modeling of porosity evolution in sedimentary rocks. This chapter was laborious to wade through and contains some material that probably would not have survived critical editing, but, nonetheless, it contains much food for thought and represents a great deal of effort on the part of Surdam and company. D. L. Gautier and J. W. Schmoker (Chapter 4) discuss porosity decline in sandstone as a power function of time-temperature exposure and suggest that chemical/mathematical diagenetic models might be directly tied to empirical observations of porosity evolution. P. D. Lundegard (Chapter 4) discusses the temporal reconstruction of sandstone diagenetic hsitory in a concise manuscript that stresses integration of petrography, isotope geochemistry, and basin modeling data. While not intended as a comprehensive methodological review, this paper is an exellent guide for those embarking into the realm of detailed diagenetic studies.

F. J. Longstaffe's chapter on stable isotopes as tracers during diagenesis is a classic review. Second longest of the papers in the book (76 pages), it includes 20 pages of references and comprehensive listings of mineral-water fractionations for various isotopes. Numerous case studies are cited that discuss the applications and pitfalls of stable isotope geochemistry in low-temperature diagenesis. The discussion of water-rock interaction is continued in the chapter by Hutcheon (Chapter 7), which considers the applicability of various geothemometers based on fluid composition and the importance of clay-carbonate reactions as potential mechanisms for generating CO_2 from carbonate minerals. The last three chapters consist of an example of numerical modeling of porosity evolution that considers compaction, cementation, and dissolution processes (J. R. Wood), and two detailed case studies. The first case study (by F. Walgenwitz) demonstrates in somewhat excessive detail the application of fission track chrono-thermometry in the appraisal of burial history. The final chapter (M. Thomas *et al.*) attemps to integrate multiple geologic data sets into a comprehensive 2D model of basin evolution. This chapter places burial diagenesis in its true basinal context and is exemplary of the direction diagenetic research will take in the next decade, where multiple geologic data bases are integrated with basin geohistory to develop a dynamic model of diagenesis.

Certain analytical techniques that have important implications to assessment of burial diagenesis were not well treated in this text, among them fluid inclusions and luminescence petrography. In spite of these omissions, I enjoyed reading this book. As a clay mineralogist, I found the chapters by Lundegard, Longstaffe, Hutcheon, and Thomas *et al.* extremely helpful. I refer to this book on a regular basis for information and references. This is the test of a worthwhile addition to one's library. My biggest worry is that the book will fall apart before I'm ready to bury it in the shelf (the soft cover binding doesn't appear very durable). Most of the MAC short course handbooks have been valuable contributions to the literature of geology, and this volume is no exception. At $25.00 (Canadian), it's quite a bargain and should easily be within the reach of all but the most impoverished graduate student.

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