

***Sedimentary Basins - Evolution, Facies, and Sediment Budget (2<sup>nd</sup> Edition)***

by G. Einsele, 2000; Springer, Tiergartenstrasse 17, 69121 Heidelberg, Germany; 792 pages, hardbound; DM 149.00, GBP 51.50, \$ 84.95; ISBN 3-540-66193-X.

Several books on sedimentary basins and related subjects have been published in the past few years. Most of them claim to be the ideal textbook but, in my opinion, Einsele's book is the most complete and useful for teaching at an academic level. Whereas the other books either focus on part of the problems or address only a limited readership, this book describes all relevant aspects in an adequate way and for a wide spectrum of readers.

The general style of the second edition is almost the same as that of the first edition, but the new edition can be considered as an entirely new book, because the first edition was completely revised and substantially enlarged. The organization of the text is much better now: parts I through IV have become integrated in a more logical way, guiding the reader from the introduction (chapter one with a presentation of the main types of basins) through depositional systems and facies models to basin evolution. The author provides detailed analysis of sediments, which he uses to deepen the insight into sedimentary conditions, to end with more general conclusions. This logical structure makes the book a handsome tool. Finally, the last part of the book is devoted to secondary processes such as diagenesis, compaction, the thermal history of basins, and hydrocarbon generation, thus going beyond sedimentological analysis in its strictest sense.

Part I, which can be considered an introduction, presents a classification of sedimentary basins, taking into account tectonics and basin-filling processes. A useful overview of the various sedimentary environments is also provided.

Part II focuses on facies analysis of continental, coastal and marine sediments. This part is largely similar to the first edition, but has gained clarity through some innovations, for instance, a separation of carbonate buildups and lagoonal sediments on the one hand from shallow-marine clastic ones on the other hand. Many new figures have been added, among them a simple but significant table of the climatic conditions needed for carbonate buildups (Fig. 3.23), and a model of carbonate-platform evolution (Fig. 3.27). The chapter on oceanic sediments has been enriched with a new subchapter about paleo-oceanography in its modern sense. The last chapter of this part discusses sequences and sequence stratigraphy as well as cycle and event stratigraphy. The main concepts of sequence stratigraphy are presented clearly, with brief definitions of the basic terms used. The many abbreviations used here do not facilitate the reading, but once the reader has familiarized with them the reading goes smoothly. The sequence stratigraphy of the principal siliciclastic and carbonate marine sedimentary environments and of continental systems are presented. All discussions are supported by examples, including Quaternary sequences in terrigenous sediments. The last part of this chapter discusses the advantages and limitations of working with these models, and discusses the problems that researchers can meet when working with such models.

Part III deals with the conditions required for, and the limitations to, basin sedimentation, i.e. subsidence, sediment supply, denudation, sedimentation rates, and interrelationships among these parameters. These complex topics are clearly explained. Short presentations on subsidence in different model basins follow an introduction to the

physical basis and methods needed for determining subsidence. The characteristics of denudation are presented in a similar way, but descriptions of weathering and soil types are necessarily restricted to a few major aspects, and this topic could, in my opinion, have better been deleted, as it seems a bit out of scope. Undoubtedly the most important chapter in this part of the book is the one that deals with sediment supply, subsidence and basin-fill interplays; most of the denudation/ accumulation systems, both static and dynamic, are presented here, as well as distribution patterns of chemical and clastic material. Some convincing examples illustrate the text. The references in this chapter to the facies models previously presented facilitate an evaluation of the earlier described basins from another point of view, thus widening the perspective.

Part IV presents basin evolution as a logic continuation of the previous parts. Many fragmentary pieces of information on basin evolution are, obviously, to be found in the first parts of the book, but part IV provides a useful recapitulation. It also presents models of the development of the main types of basins, illustrated - as I believe - by the most representative examples from all over the world. I like this part of the book in particular, because it sorts out the information. Moreover, the models are presented in a clear way, in spite of the huge amount of data. The accompanying illustrations are to the point and most helpful.

Part V consists of two chapters. The first one is devoted to diagenesis, and refers also to metamorphism and the thermal history of basins. The second one is about hydrocarbons and coal, which may be of interest particularly for petroleum and coal geologists.

With regard to the book as a whole, I like the organization of the chapters. The second edition is, in addition, more easily usable as a textbook by the application of simple layout 'tricks' such as a clear division into chapters and subchapters, the use of two sizes of type (for more detailed data, references to literature, and regional aspects of the subject dealt with). Short, concise summaries in frames at the end of each chapter contribute to the usability. Furthermore, the new edition contains several valuable new additions (sometimes subchapters), commonly explaining relatively complex problems. They are particularly useful for less experienced readers, students or researchers wanting to enlarge their general geological knowledge.

The book has two great advantages. The first is the fact that it matches theory perfectly with regional geology: theories are supported by examples from all over the world. Among the tremendous number of examples, those from modern sedimentary environments dominate, but older ones (though particularly post-Paleozoic ones) are present and even some Precambrian are briefly dealt with. The second advantage is that readers of fairly different levels of knowledge will, if they have some basic knowledge of sedimentology, think the book useful. It is also a vast source of information with over 2200 citations. Whatever you want to know about sedimentary basins, you will probably find it; if not, you will find a reference to literature about it. It is therefore recommended to both undergraduate and graduate students, as well as to researchers.

The book is well illustrated. Over 350 figures, most of which are complex, complement the text, and facilitate understanding. I think, however, that taking into account that undergraduate students will be a significant group of readers, the figures indicating the basins' locations could have been printed at a smaller scale. The language is easy to follow, also for non-English readers; even complicated problems are explained

clearly. All this makes the new edition well suited for teaching. There is not much wrong with the book. I would have only liked more attention to methodology; in addition, the applicability might gain from two different indexes, one general and one with geographical and basin names only.

When I started a new course for students on basin analysis two years ago, I found the previous edition the most suitable textbook. The new edition is even better; I dare to state that it is one of the best.

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