

There are several minor omissions and a few creases that could have been ironed out. For example, in Chapter 1, the Rocky Mountain Foothills and northwestern Alberta (see text) seem to be called the Southern Alberta Foothills and the NorthWest Plains on Enclosure 1(A). Figure 6 is a nice colour pull-out with no explanation of what the colours mean, whilst Figs. 10–11, 14–16 and 18–20 are palaeogeographic maps which contain no key to explain the significance of the ornaments on the map. Amusingly, the Cypress Hills conglomerate was apparently “resedimented by magmatic intrusions”. In Chapter 10, Figs. 15 and 17 have no captions.

In summary, Chapters 1–10 contain a great deal of information about the WCFB; you probably could not do without this book if you were involved in research in this area. Most of it is extremely well presented and fairly accessible to readers unfamiliar with the region, and the authors should be congratulated on bringing together papers on such a wide variety of topics. Make your own mind up about tectonics and regional setting!

The rest of the chapters deal with other (presumably less typical?) foreland basins. In general they deal with the tectonic setting, the structural and sedimentological history, the hydrocarbon reserves, source rocks, reservoir rocks, maturation history and exploration history.

Chapter 11 describes the Zagros Basin, emphasizing the vast hydrocarbon reserves and variety of source rocks of the region. The chapter is very readable and serves as an excellent introduction to the Zagros Basin for those unfamiliar with the region. The chapter also contains a great deal of information. Chapters 12 and 13 are, again, very good introductions to the Venezuela Foreland Basin and North Slope Foreland Basin. Chapter 14 is concerned with the Rocky Mountain Foreland. The border between the Rocky Mountain Foreland and the WCFB is shown in Fig. 1 of the introductory chapter to run roughly along the border between the U.S.A. and Canada. This does not seem to be a very good geological reason for separating these basins. Surely, the Rocky Mountain Foreland is just the southern continuation of the WCFB but with a different structural style? Nevertheless, this chapter is another of the very informative and readable chapters which typify this book. Chapter 15 deals with a foreland basin which is older (Pennsylvanian–Permian) than the other basins described: the Quachita Foredeep.

This is a large book, containing a lot of information. However, not all of the chapters have abstracts, which makes a quick flick through to get the essential information very difficult. The review of the contents of chapters presented in the introductory chapter is rather difficult to take in, as the comments contained are a little out of context.

According to the Foreword, the book is aimed at the explorationist looking for analogues to aid assessment of frontier foreland basins. I will be surprised if many explorationists have the time to consume this much information. Will anyone looking for analogues have time to read the whole of the text concerning the WCFB? What I suspect they need are summaries like the Zagros chapter (Chapter 11), which tells me practically everything I need to know without extending to 10 chapters (cf. WCFB). The summary and conclusions chapter should help in cutting down the time needed to read the book, but I found this chapter disappointing. The emphasis is on facts and figures which, although nicely tabulated, leave it up to the reader to ponder the underlying processes behind the vital statistics of foreland basins. This is symptomatic of the whole volume. The chapters achieve the goal set out in the Foreword and Introduction, that is, to establish a set of analogues. However, very little discussion of the underlying processes in foreland basins occurs either in the individual chapters or as a theme of the book. As the book is really a database of hydrocarbon occurrences in foreland basins rather than being about foreland basins, perhaps the book should have been called *The Petroleum Geology of Foreland Basins*. Should explorationists buy the book? Probably yes. I think they will find the wealth of information of great interest. I am not sure how useful it will be in terms of analogues, as many of the chapters suggest that play types, source and reservoir characteristics and maturation histories vary not only between portion of the foreland basin stratigraphy, but, between the different geographical areas of individual basins! Researchers of any of the areas discussed will benefit from the information presented in chapters. However, if readers are looking for the underlying principles of foreland basin evolution, then they must be prepared to make up their own mind, as these are not stated in this volume. The depth of information contained in the volume will give buyers value for money.

One final criticism is that very little seismic data is contained in this volume. As seismicity is without doubt one of the main exploration tools, the book is crying out for a wealth of seismic lines which illustrate the points made in the text. If no seismic information was available from the WCFB, as suggested in the introductory chapter,

then it must be asked whether it was the best example to pick for a detailed study.

So in summary, I think the volume, with its wealth of information will prompt many people to buy it. However, just imagine the same book with informative abstracts and seismic data from 15 different foreland basins (truly ‘worldwide’) and more discussion of the underlying processes. Now that would be good!

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Basin fill and sequence stratigraphy

Williams, G. D. and Dobb, A. (editors) 1993. *Tectonics and Seismic Sequence Stratigraphy*. Special Publications of the Geological Society of London 71. 226 pp. Price £45 (U.K.), \$75 (U.S.) (hardback) (members £21 and \$35).

Sedimentation and tectonics has always been an area popular for geological investigation. Vacant studentships to research on their interactions seem always to attract dozens of well-qualified candidates. There have been countless conferences over the decades. But it always struck me that, until a few years ago, the majority of these studies didn't solve much. The problem is always one of scale. Depositional systems like deltas are large compared with the traditional field areas. Consequently it's rarely possible to isolate, say, those variations in depositional architectures that have been triggered tectonically from those resulting from climatic or eustatic fluctuations. Additionally the tacit confusion between lithostratigraphic and biostratigraphic nomenclature that plagues maps and memoirs even today commonly lead into downward spirals of circular arguments. In the past two decades two linked advances have changed all this.

First, the acquisition of seismic reflection and borehole data through wide swathes of sedimentary basins alleviate the problems of scale. Second, the rediscovery of sound stratigraphic practice and common sense has reinvigorated the regional analysis of sedimentary successions. Peter Vail and colleagues then at Exxon formalized the concepts of sequence stratigraphy and opened the door not only to describing vast tracts of basin fill but also to a hornet's nest of reactionary diatribe! Their early studies related marine depositional architectures directly to changes in relative sea level, then extrapolated these to chart global variations in sea level through geological time. Such a bold attempt at global correlation was bound to attract hostility and since then there's been a tendency to sink the Vail approach merely on this basis. For half of the intervening 15 years the descriptive rigor of the first step in Vail's work has had pretty short shrift. Presumably the traditional standard-bearers of stratigraphic analysis in dusty academic corners didn't like the brash new jargon emanating from oil geologists who use strange things called seismic sections.

More rational criticisms of the Vail approach point out that relative sea-level variations can be induced by tectonics on a variety of scales and so eustatic charts may be ambiguous. Conferences on these aspects tend, even today, to push one way or the other: depositional architectures relate either to eustatic changes or to tectonics. But the common ground is gradually being occupied. *Tectonics and Seismic Sequence Stratigraphy* is a selection of papers resulting from a conference of the same name held in February 1991. The meeting has 21 papers but the editors, Graham Williams and Angela Dobb, acquired just nine contributions for the volume itself. Consequently interested readers would be well advised to seek out other recent works on the subject (MacDonald 1991, Seyfried 1993) to develop a broader base. But what does the Geological Society's volume contain?

The book kicks off with a review by Graham Williams that touches on many of the key topics from the importance of seismic resolution to a reprise of basin fill architectures. The review covers little new ground but provides excellent supplementary reading to support undergraduate courses. There follows a stimulating piece by Jo Cartwright and colleagues on the lateral extent of sequence boundaries. Although not addressing the topic of the book, the article is a clear illustration of the importance of seismic resolution and its potential pitfalls.

Sarah Prosser's article takes the descriptive aspect of sequence stratigraphy and adapts it for rift basins. There are similarities with the preceding contribution: both place great store on likely depositional architectures and their probable seismic signature. These iterations between field-based appreciations of geological complexity and the interpretation of seismic data contrast with the approach of Dave

Waltham and colleagues. They take a broader view of basin fills and present forward models of sedimentary architectures in half graben. This theoretical approach is also followed by the paper by Alan Roberts and colleagues, also using domino normal faulting to model the structure but with the added refinement of variable sediment supply. But the variations between different stratigraphic architectures appear lower than the resolutions of most seismic data, leading the authors to question "the ability of the seismic stratigraphic technique to address successfully the full history of an evolving half-graben"!

Appropriately then, seismic data do not feature in Aidan Joy's discussion on post-rift subsidence in the North Sea. By using one-dimensional burial history analysis from boreholes, he suggests that the accelerating subsidence of the basins is not predicted by conventional 'thermal' mechanisms, nor can be explained by eustatic variations. But the tectonics responsible remain a mystery. Not so in the sandbox models from Bill Higgs and Ken McClay. They are also concerned with North Sea examples but only address the seismically-resolvable scale of stratigraphy, as compared with analogue experiments.

The glossiest contribution in the volume takes us away from the north sea and south to offshore Namibia. M. Light and colleagues overview the seismic stratigraphy of the region with lots of coloured-up profiles and facies maps. It's almost an unashamed sales pitch to drill holes in this particular continental margin, but I was left wondering how much of the volume's price went to cover the rather gratuitous colour printing.

To conclude the book comes another regional paper, by Jo Deramond and colleagues. This is a real fish out of water, dealing not with extensional tectonics in submarine settings but thrust tectonics and related basin fills using Pyrenean examples. It is good to see that the field-based approach has a role, provided the example of these geologists is taken and a large enough view is taken. They also show how the rigor of sequence stratigraphic concepts leads to sound regional correlation and an understanding of basin fills that allows deformation rates to be determined.

So overall this is a short but varied collection of articles. Its balance seems to have been achieved by accident, although the number of papers must be at the critical minimum for such a volume. Nevertheless it is a worthy addition to the vast collection of sequence stratigraphic, basin fill and basin tectonics books. And even if you're only interested in the structural geology of sedimentary rocks without regard for their stratigraphy, there's something here for you.

References

- Macdonald, D. I. M. (editor) 1991. *Sedimentation, Tectonics and Eustasy: Sea Level Changes at Active Margins. Spec. Publs Int. Ass. Sediment.* **12**.
 Seyfried, H. (editor) 1993. Sea level changes—processes and product. *Geol. Rdsch.* **82**, 159–377.

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