

Reviews

MENZIES, JOHN, ed. 1995–96. *Glacial environments Vol. 1. Modern glacial environments: processes, dynamics and sediments.* xxvi + 621 pp., 246 × 198 mm. ISBN 0-75062-351-9 PB. £40. Oxford, etc., Butterworth–Heinemann.

MENZIES, JOHN, ed. 1996. *Glacial environments, Vol. 2. Past glacial environments: sediments, forms and techniques.* xxiv + 598 pp., 246 × 198 mm. ISBN 0-75062-352-7 PB. £40. Oxford, etc., Butterworth–Heinemann.

ALTHOUGH this book is sold as two separate volumes, each currently retailing at £40, it effectively forms one large introductory text to glacial environments. As such, it is probably best reviewed as a single entity. Volume 1 is concerned with modern glacial environments and is subtitled “processes, dynamics and sediments”. It covers subjects such as global glacial chronologies; ice-sheet modelling, dynamics of ice flow, hydrology of glaciers, processes of erosion, processes of transportation, processes of terrestrial deposition, glaciotectionism, sedimentary and hydrologic processes within valley glaciers, proglacial terrestrial environments, glaciolacustrine environments, glaciomarine environments and the diagenetic histories of quartz grains inferred from scanning electron microscopy. Together with an introductory chapter on glacial environments, reference list and subject index, this results in a 15 chapter, 621 page book. The companion volume 2 is subtitled “sediments, forms and techniques” and contains chapters on subglacial environments, Pleistocene supraglacial and ice-marginal deposits and landforms, ice scour as an indicator of glaciolacustrine environments, glaciomarine environments, glacio-acolian processes, sediments and landforms, pre-Pleistocene glacial environments, glacial stratigraphy, lithofacies associations for terrestrial glacial successions, paleosols, glacio-isostasy, glacio-eustasy and relative sea-level change, micro-morphology, scanning electron microscopy, the geochronology of glacial deposits, drift exploration and the geology of placer deposits in glaciated environments. These chapters are sandwiched between an introductory chapter on past glacial environments and a concluding chapter on problems and perspectives. Together with a reference list and index, this produces an equally weighty 17 chapter, 598 page second volume.

In essence, the first volume is an attempt to describe and explain the processes and sediments which one encounters in today’s glacial environments, whilst the second volume is very much a series of chapters demonstrating how these principles can be enforced. Vol. 1 seems to fit together quite neatly in this way but vol. 2 is much more diverse. This is a very sensible way of dealing with such an enormous and ever-expanding discipline such as glacial geology. Unfortunately, the “two-volume” concept is not fully utilized. The study of glaciers and the disciplines of glacial geology and geomorphology now encompass just about every subject from archaeology to zoology. Given this diversity, it is the job of an editor to draw some boundaries around the subject area. It is therefore easy to quibble with Menzies’ choice of subject matter and to accuse vol. 2 of being rather odd in its selection of material for individual chapters. For example, I should question the assertion that developments in scanning

electron microscopy are so central to our understanding of glacial environments that they warrant a separate chapter in each volume (“glacial crushing, weathering and diagenetic histories of quartz grains inferred from scanning electron microscopy” in vol. 1, and “scanning electron microscopy” in vol. 2). Granted, this may be an important technique for the analysis of glacial sediments but it is only one of a large array of such techniques and is included at the expense of others. For example, nowhere in the two volumes is there a synthesis or thorough explanation of the landforms produced by glacial deposition — precisely the sort of material required by a student reader. Likewise, chapters 15 and 16 in vol. 2: (one on drift exploration and one on the geology of placer deposits in glaciated environments) appear out of place in a general student-level text such as this. Where the “two volume” concept works best is where complicated subjects such as glaciomarine environments can be considered as a process in the modern glacial environment (Powell and Domack, vol. 1), and then as a discrete facies producing its own sediments and landforms (Elverhøi and Henrich, vol. 2) Unfortunately, this concept is not rigorously applied. Why, for example, is the chapter in vol. 2 by Derbyshire and Owen (entitled “glacioacolian processes, sediments and landforms”) not included in vol. 1 (itself subtitled “processes, dynamics and sediments”). It is hard to see why this particular chapter is included in the second volume and *not* the first. A final criticism on this front is the treatment of glaciofluvial environments. In vol. 1, there is an excellent chapter by Maizels on this aspect of the proglacial environment, yet there is scarcely a word on the recognition and interpretation of glaciofluvial sediments and landforms in the companion volume on past glacial environments. Perhaps, this merely reflects the current level of development of such a process-dominated discipline. However, it does seem to me to be a missed opportunity to develop the principles laid out in the first volume.

As with all edited books, the content and style of individual chapters varies with the authors involved. Personally, I found the chapters by Iverson (processes of erosion), Kirkbride (processes of transportation), van der Wateren (processes of glaciotectionism) and Maizels (sediments and landforms of modern proglacial terrestrial environments) to be the highlights of vol. 1. All these chapters were well constructed, thorough and comprehensive reviews of their respective fields. I found fewer highlights in vol. 2, although it is worth mentioning the chapters by Rose and Menzies (on glacial stratigraphy) and by van der Meer (micro-morphology) as a good introduction to topics normally not explicitly addressed in textbooks on glacial geology. Reading through the two volumes, it appears that Menzies has allowed individual chapter authors freedom in their writing and used his editorial role mainly as that of ensuring content and consistency. I found this a positive aspect of the book, making it possible to dip into individual chapters without the need to refer constantly to other chapters or sections. Others may wish for more cross-referencing between chapters, but surely this negates the underlying principle of a multi-authored book. Menzies himself has contributed four chapters to vol. 1 and no less than five chapters in vol. 2 are

written or co-written by Menzies. This may reflect a desire to influence the content of these chapters or an inability to locate suitable contributors.

The aim of the text, according to the preface to vol. 1, is to provide “a current and comprehensive survey of the glaciology, geomorphology and sedimentology of modern glaciers and ice sheets through an appreciation of the processes, dynamics and sediments found in these environments”. The aim of vol. 2 is to provide a “contemporary and extensive survey of the sediments and landforms of past glacial environments”. If a book is to be judged solely against its explicit aims, then both of these volumes are undoubtedly successful in fulfilling their objectives. Both are comprehensive in their treatment of the subject and appear up-to-date in their use of the literature. As with all textbooks, however, the volume has a limited shelf life and will soon date. Given that the most recent references in vols 1 and 2 are from 1992 and 1993, respectively, and given the sheer volume of glacial literature that is appearing, I fear that an update will be required sooner rather than later. The contributors to this book are in no way to blame for this; it is merely a reflection of the health of our subject. This criticism can be levelled at all textbooks.

Reading through the two volumes, there are few in the way of typographical or scientific errors; however, a rather unfortunate mistake in the running head for the introductory chapter to vol. 2 has made *past* glacial environments become *past* glacial environments... Also, in this chapter, it is strange that in table 1.1 (titled “developments in glacial studies up to 1951”) there is a list of developments in the field running up to 1986. Even more strange, that this table should include no developments subsequent to 1986, at a time when Menzies tells us of a “burgeoning of literature”. Are we to believe that no developments have taken place in the subject since 1986 or is it merely that such developments can only be seen with greater hindsight? For the price, the two books are not particularly well presented. The presentation is unfortunately let down by the standard of reproduction of many of the figures and plates. Examples of this are figure 4.21 (vol. 1), plates 6.1, 11.7, 12.7, 14.6 and 14.8 (all vol. 1) and plate 4.8 (vol. 2). Many of these are poorly reproduced photographs which do little to illustrate the features under discussion — plate 6.1B (vol. 1) is a prime example of an out-of-focus photograph which should not have been used. A second example is that of plate 14.6 (again, vol. 1), a poorly reproduced and highly confusing view of the grounding line beneath an Alaskan glacier. The scale of the photograph appears to bear little or no resemblance to the caption (which claims that the grounding line is 15 cm long, yet the sediment beneath is composed of gravel- to boulder-size clasts). Neither can the 15 cm refer to the size of the feature as reproduced in the photograph, since the entire frame measures less than 12 cm across. Again, in vol. 1, attention to detail is lacking in the photomicrograph of crescentic fractures or chattermarks (*sic*) on p. 245. To me, the features appear to be anything other than crescentic and some further explanation is required for this. I should also question the need for over 40 SEM photomicrographs in chapter 15 of vol. 1. Perhaps a little more time and effort could therefore have been spent in assessing the suitability of photographs

and in ensuring the quality of the photographs is maintained during reproduction. Photographs are a valuable addition to any textbook but only if the chosen plates do the subject matter justice. Most of the figures are reproduced well, although figure 4.21 (vol. 1) is a notable exception; a large and complicated diagram crammed on to a single page with virtually no explanation, no key and no mention of the locations involved. Very few of the diagrams used as figures appear to have been redrafted or modified; most are direct reproductions of published material. Some loss of quality is therefore inevitable but, on the whole, this does not detract significantly from the overall appearance of the two volumes.

Both volumes are aimed solidly at the University market and are therefore written with the student in mind. In many places, the content treads a fine line between research-oriented material and basic explanation of glacial systems. On the whole, however, the authors are successful in stitching modern glacial research into a student-level text, and should be congratulated for this none-too-easy task. Both volumes are therefore broad in their appeal and should attract students and researchers alike. Equally, both should make suitable University-level course texts for those of us teaching courses involving glacial geology and geomorphology, elementary glaciology and glacial sedimentology. I suspect that the purchasing public will treat the two texts as separate books and that, as a result, vol. 1 (modern glacial environments), which assumes this role quite comfortably, will be more in demand than vol. 2 (past glacial environments). The level of detail and explanation across both volumes is probably similar to that of Sugden and John's (1976) classic *Glaciers and landscape*. Together, these volumes should make a good replacement for this book, only lacking the coherence and single-minded approach which two authors (as opposed to numerous authors) can provide. Measured against more recent competition, these two volumes probably introduce more primary research material directly into the text than Bennett and Glasser's (1996) *Glacial geology* and, as such, are probably not as “student-friendly” as the latter. The treatment of glaciology is nowhere near as theoretical or detailed as Paterson's (1994) *The physics of glaciers* (but what could be?), nor is the discussion of glacial sediments as accessible or focused as that of Hambrey's (1994) *Glacial environments*. All of the above textbooks have their good and bad points and none is perfect. Menzies' volumes fill a niche in the market for a good overview of glacial geology and geomorphology, aimed at the more advanced undergraduate and postgraduate market and for those with research interests in these fields.

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