



BOOK AND MAP REVIEWS

Sediments in deformation

The Geological Deformation of Sediments. Chapman & Hall (1994). 362 pp. ISBN: 0-412-40590-3. Price £69.00 (Hardback only)

This book deals with many of the theoretical principles of sediment deformation and their application to geological problems. The book is a collection of papers by internationally recognised researchers covering much of the aspects of sediment deformation.

The introductory chapter by A. Maltman is an overview of terminology, a review of mechanical aspects of sediment deformation and the causes of such deformation. The last section deals with melanges. Chapter 2 by M. E. Jones takes a more in depth look at the mechanical principles of sediment deformation. Both Chapters 1 and 2 provide well-written and accessible information on the physical nature of sediment deformation, the ways in which deformation is experimentally measured, and something on rheological models for deforming media. Glacial deformation is considered in Chapter 3 by T. Murray. In many respects, I found this chapter rather weak, particularly given the amount of information available on glacial deformation and deformational features. This chapter would have benefited from more illustrations, a more quantitative approach to deformation resulting from ice-movement, a discussion of ice shelves and, for example, the formation of subaqueous gauge features produced by grounded sea ice and icebergs.

Chapter 4 concerns sedimentary deformational structures (J. Collinson), and Chapter 5, mass movements (O. Martinson). Together, these chapters cover most aspects of wet-sediment deformation structures linked to sedimentary processes and sedimentary environments. A notable absence, however, is any significant discussion of volcanic deformational structures, for example those associated with pyroclastic flows. A further disappointing aspect of both Chapters 4 and 5 is the lack of illustrated descriptions and explanations of some of the really impressive continental-margin sediment slides and debris flows documented in the marine geological literature; for example off the continental margin of West Africa and from the slopes of the Hawaiian volcanic edifices. Admittedly, there is an over-reduced diagrammatic interpretation of a transect across the Niger Delta, showing growth faults, a planform sketch of sediment-slide scars from the Mississippi Delta, and a seismic line across a differentially-compacted submarine channel from the northern North Sea. A few more seismic sections with line interpretations would have served to emphasise both the diversity and the large scale of many of these deformational features. Additionally, there are excellent sidescan sonar examples of mud diapirs and mud volcanoes from accretionary prisms and trenches, and sidescan sonar pictures of sediment slides on the seafloor, but the book contains no sidescan sonar images.

The next three chapters (and large parts of the last chapter) appear designed for aficionados of thrust-and-fold belts, particularly accretionary prisms. Chapter 6 concerns tectonic deformation stress paths and strain histories (D. Karig and J. Morgan); Chapter 7, fluids in deforming sediments (K. Brown); Chapter 8, sediment deformation, dewatering and diagenesis, with examples from selected melanges (T. Byrne), and Chapter 9, deformation structures preserved in rocks (A. Maltman). I particularly enjoyed reading Chapter 6, probably because I found this to be the most philosophical approach and, whilst adopting a quantitative approach where possible, emphasised the uncertainties in our current understanding of sediment deformation. Here, I would like to quote a couple of sentences which resonated with me to all those who seek research grants or adjudicate on research grant-awarding committees: "*The principal conclusion to be drawn from this review of tectonic deformation of sediments is that, despite the recognition of and interest in the mechanical behaviour of sediments, much more quantitative information is needed from in situ observations and from experimental deformation. Moreover, this information must come from focused and problem-oriented investigations.*"

Overall, the chapters are well chosen to contribute to a nicely balanced set of papers with minimal overlap of content. The line drawings are generally clear and useful. However, given the importance of a well-illustrated text, it is a pity that many of the photographic plates are of poor quality.

This is a book that will appeal to researchers and teachers who require an overview of the nature and origin of deformed sediments. The target readership of postgraduates and professionals in the fields of structural geology, sedimentology, glaciology, engineering geology and geomorphology, will find this book useful. There is a comprehensive bibliography at the back of the book. It is a well-presented and well-illustrated. The price is definitely on the high side (£69.00), something that will almost certainly guarantee that only the most wealthy of students might acquire a personal copy. Despite the price tag, this is a book that Earth Science libraries should have available on their shelves.

London, U.K.

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Compilation map: Pakistan Himalaya

Searle, M. P. and Asif Khan, M. (editors) 1996. *Geological map of North Pakistan, and adjacent areas of northern Ladakh and western Tibet*, M. P. Searle, Oxford University, Oxford. Price (nominally) £40 or US\$60. Rolled or folded.

The general lack of precedent for the review of a map in this and other journals perhaps reflects the indifference of map publishers in a traditionally limited market and their failure to supply material for review. The bandwagon of entrepreneurship that is creeping into the sciences seems not to have rolled over Searle and Asif Khan who have edited and produced a "self-published" compilation map of northern Pakistan. The map is a bit larger than a square metre and is printed in high colour. At 1: 650 000, it extends from the Salt Range thrust (the lowermost thrust of this part of the Himalaya) approximately 500km to the Kunjerab pass (south of the Karakoram Fault; a nominal boundary of the Tibet plateau) thereby encompassing the Pakistan Himalaya *sensu lato*. The map is a compilation with twelve named as principal authors: M. P. Searle, (Oxford, U.K.); M. Asif Khan and M. Qasim Jan, (Peshawar, Pakistan); J. A. DiPietro, (Southern Indiana, U.S.A.); K. R. Pogue, (Whitman College, U.S.A.); D. A. Pivnik and W. J. Sercombe, (Amoco Inc, U.S.A.), C. N. Izatt, (British Gas, Pakistan); P. M. Blisnik (Dartmouth College, U.S.A.); P. J. Treloar, (Kingston, U.K.); M. Gaetani and A. Zanchi, (Milano, Italia). These, along with their students and co-workers, represent a significant portion of the research in the Pakistan Himalaya. The author list (and the main sources list) probably reflects feedback to a call for contributors by the editors about sixteen months ago via a now-expired Himalayan researchers internet newsgroup. It is perhaps telling that many of those included have published their maps elsewhere, and the more conspicuous absences (such as recent unpublished Italian and French mapping) reflect an unwillingness on the part of the 'unpublished' to see their work amalgamated in such a manner. The notable exceptions here are the inclusions of the detailed mapping represented by six unpublished English Ph.D. theses (Pudsey, Sullivan, Peterson, Williams, Izatt and Chambers) along with mapping and other data from industry and the Pakistan Geological Survey. It is in making such datasets available that map compilations such as these have their advantage. A longer time period, however, between the call for contributions and publication (early 1996) might have enabled a fuller agreement amongst the Himalayan community working in this area and hence encouraged more 'unpublished' to come on board.