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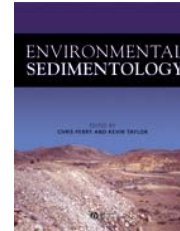
Colin P. North and Kitty L. Milliken, Editors

A.J. (Tom) van Loon, Associate Editor for Book Reviews

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*Environmental Sedimentology*, edited by Chris Perry & Kevin Taylor, 2007. Blackwell Publishing Ltd, 350 Main Street, Malden, MA 02148-5020, USA. Paperback, 441 pages. Price GBP 39.99; USD 89.95. ISBN 1-4051-1515-7.



The title of the recently published book “Environmental Sedimentology” is quite intriguing and we wondered what the title could mean precisely. Our guesses with respect to the contents of this book were quite different, so we started reading it with great curiosity.

We soon found that the book is well organized and that its concept is clearly explained. It consists of ten large chapters. Each of them contains 2-4 short case studies in which examples of selected problems are presented on the basis of recent publications. The writing style is lucid and concise. The text is illustrated with numerous diagrams and black-and-white photographs. Unfortunately, most of the pictures are of relatively low quality, which makes the visualization of the issues and processes under discussion not very successful.

The book starts with an “Introduction” that contains general information on erosion, transport and deposition in various environments. Reading this part of the book gave only little satisfaction. The section devoted to “Sediment Transport” did not really change our impression, because it is too superficial, for which judgement we will give her some reasons. Sediment transport in the outlet zones of rivers embouching into lakes and seas is limited to underflows and overflows, whereas interflows are neglected. Mass flows, both subaqueous and subaerial types, are dealt with as one entity, in spite of their considerably different characteristics. Rheological distinctions between debris flows and grain flows are not explained. Such superficial chapters have, in our opinion, little value, and we would not consider it as a great loss if they would have been omitted altogether.

The chapter “Mountain Environments” provides, among other topics, good hydrological characteristics of outburst floods (so-called jökulhlaups). Natural mass movements are presented by examples of present-day rock falls in the Alps. Unfortunately, the precise differences between avalanches, debris flows and hyperconcentrated flows are not dealt with, neither with respect to their dynamic processes, nor regarding their sedimentary records. The section on possible forecasting of mass-movement hazards is comprehensive. In our opinion, it was a good idea that this chapter places emphasis on mass movements.

The chapter on “Fluvial Environments” starts with “River classification, but this part is not entirely satisfactory. For example, information about pseudomeandering in wandering channel patterns is lacking, while the straight channel pattern (very rare in natural rivers) is dealt with. The section on hydrological reactions of rivers on climatic changes does not result in a clear model of relationships between fluvial sedimentology and climate. On the other hand, the problem of the reaction by rivers and catchment areas on tectonic uplift events is distinctly stressed and explained. To summarize, most of the sections in this chapter could have been written with greater accuracy. We want, however, also emphasize that the section “Processes and impacts of anthropogenic activities” is a very valuable part of book. This problem has, as far as we are aware, never before been discussed in detail in any fluvial monography. In this respect, the book should be acknowledged as a leading one.

The chapter “Lake Environments” pays too little attention to clastic deposition. Turbidity currents are characterized too superficially and the traction currents are not dealt with at all. In our opinion, this part of book has been written by an author (Lars Hakanson) who was only interested in riding his hobby-horse. This can be easily deduced from the references. Works by the author of this chapter himself constitute 30% of the reference list, while other, generally acknowledged specialists (such as R. Gilbert, K. Chikita and J.R. Desloges) are not cited at all.

The “Arid Environments” chapter is organized in a proper order. For instance, the chronology of the following sections: “Causes of aridity,” “Weathering character,” “Types of transport,” and “Comparison of ephemeral and perennial channel hydrology” is very logical: next sections use information from the previous ones. The content is presented in a clear and simple manner—quite properly, as for a manual. These are the first pages in this book where comprehensive information on deposits is provided. The section about fans is, however, too short in our opinion: mass-flow-dominated fans are neglected. The section on eolian dunes contains a classification of forms and a general description of the deposits. Then follow the characteristics of soils and crusts. A section “Anthropogenic impacts” finishes this part of the book, with sub-sections about resources in arid regions and the hazards that typify this climatic zone. To summarize, this chapter is probably the most sedimentological one of the entire book.

Chapter 6 (Urban Environments) places urban-derived sediments in two groups: subaerial (road-deposited) sediments and subaqueous ones. The transport and accumulation of these sediments are analyzed. For example, sedimentation and chemical processes in the gully pot are described. In the section “Urban rivers”, the impact of towns on chemistry, discharge and suspended load of rivers is detailed, but nothing is written about specific features of mineral sedimentation in urban rivers, but—on the other hand—there is a valuable description of the post-depositional changes of urban sediments. Urban sedimentology is quite a new field of geology. Present-day studies are concentrated on deposition and redeposition of Pb-rich and Zn-rich road-derived sediments. This is an interesting development, and we are curious about what will be the next steps regarding research in this field.

The chapter on “Deltaic and Estuarine environments” starts with a section on “Classifications and differences of deltas and estuaries,” in which interrelationships between sedimentation and nearshore vegetation are emphasized. On the other hand, the reader cannot find comprehensive information about depositional and erosional agents and mechanisms (i.e. slumps, mass flows, turbidites) that modify well-known, classic models of deltaic sedimentation. Human impact on nearshore deposition is considered as far as geochemical changes (metal contaminants in sediments) and oil pollution are concerned. The reaction of floras on sea-level changes is discussed, too. Next, the influence of dams and weirs on deltaic and estuarine environments is explained. Finally, the effects of sea-level rise and human impact on both environments are analyzed.

Within the marine realm, the book focuses on coastal and shallow-water depositional systems, and outlines sedimentary processes, sediment budget and environmental change in response to anthropogenic impacts, sea-level fluctuations and climate change. Some minor points of criticism could be that there is a strong focus on sedimentary processes, but that information on sedimentary structures and accumulation forms is almost entirely absent. Coastal environments are described in two chapters, dealing with coasts in temperate and tropical latitudes, respectively.

The chapter “Temperate Coastal Environments” describes temperate coastal environments associated with beaches, barriers and barrier islands. They include reworked terrigenous, mostly sandy material characterized by a non-cohesive nature of the constituent clasts. This part of book encompasses characteristics of open ocean coasts (swell- or storm-wave dominated), sheltered seas and areas subjected to tropical storms. Controls on the sediment transport and accumulation are explained in detail. This is followed by sections dealing with responses to storms and tsunamis, and with the impacts of engineering works and other anthropogenic activities on sediment supply and coastal morphology. Recent examples from the coasts of Texas, Ireland, and California supplement this approach. Finally, three major threats to temperate coasts are highlighted as the most critical for coast development and stability in the future. These are sea-level fluctuations, climate change, and the increase of human population.

The chapter “Tropical Coastal Environments: Coral Reefs and Mangroves” provides a critical review of the two environments and the characteristics of their sediments. They are both very susceptible to a wide range of disturbances, among which the anthropogenic ones are the most critical today. Therefore this part of the book presents useful reviews of potential anthropogenic disturbances and also describes the effects of global climatic and environmental change on coral-reef and mangrove sedimentary systems. Several case histories from the Caribbean and the Great Barrier Reef illustrate the impacts of sediment flux, contaminants, and increased nutrients on the reef system and on the carbonate sediment composition. A special section deals with managing natural hazards. The description of reef types and their morphology, however, is very superficial and includes only examples studied by the author.

The last (10th) chapter (“Continental Shelf Environments”) outlines shelves dominated by tides, storms, waves, riverine transport, oceanic currents, or winds. The sedimentary consequences of sea-level change and of human activity are shown in recent offshore examples from South Africa, Australia, and North America. A long section deals with the impact of anthropogenic disturbances on the sea-floor, among which trawling seems to be the most destructive. Some information on the influence of windfarms on the sedimentary environment is also included. The main deficiency is that this chapter overlaps considerably with the two chapters on coastal environments.

Our overall conclusion is that this book is essential reading for anyone starting with the study of environmental managing sedimentary environments; it is also a valuable reference work for those who are already involved in this type of work. It is, however, not a textbook for students who want to learn about fundamental sedimentology. The title suggests that the book is strictly directed at sedimentology. Detailed descriptions of sedimentary processes and sediments are, however, relatively limited. Some chapters include characteristics of depositional and erosional phenomena, but the reader longs for more information about the facies and their lateral and vertical successions. A title such as “Present-day changes of sedimentary environments” or “Human impact on sedimentary environments” would therefore have been much more appropriate.

Zdzislaw Belka & Tomasz Zielinski  
Institute of Geology  
A. Mickiewicz University  
Maków Polnych 16  
61-606 Poznan  
Poland  
E-mail addresses: [zbelka@amu.edu.pl](mailto:zbelka@amu.edu.pl) and [zielu@amu.edu.pl](mailto:zielu@amu.edu.pl)



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