

outside the US it is not so comprehensive, for example Germany could have been usefully sub-divided.

The most helpful aspect is the annotation, usually a sentence or two saying what aspect of salt geology is discussed in the publication. It is surprising how many titles of papers give nothing away about their contents. It is for searching out many of these that the compilers should be congratulated. One major area of omission would appear to be salt weathering, very few papers on this subject are included.

Of use to libraries. The price is offputting. I have a sneaking suspicion that this will be a much xeroxed, little purchased volume. A computer-based version allowing continual updates would be welcome.

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North Sea Dynamics, edited by J. Süderman and W. Lenz, 1983, Springer-Verlag, Berlin, xvi + 693p. \$US 35.00, ISBN 0-262-07056-1.

This volume contains 45 out of the 58 presentations made at the International Symposium on North Sea Dynamics, Hamburg, 1981. The aim of the volume is to deliver a representative survey of research on currents and water balance, waves and storm surges, transport of momentum, energy and matter and ecosystem dynamics within the North Sea basin. The book is targetted at researchers in oceanography and marine biology although it may also be of some limited interest to coastal researchers. In spite of the inevitable overlaps in content, the book is well-ordered into the four sections mentioned above.

The book opens with a historical review of international North Sea Research thus providing a general backdrop to the more detailed presentations which follow. It would be counter-productive to detail all the papers in the book but, by way of a sample, the following papers caught this reviewer's attention. A good introduction to North Sea currents and water balance is provided by L. Otto who usefully balances observation with modeling. Taken in conjunction with the modeling paper by A.M. Davies, it is clear that even at the large scale, difficulties in quantifying the mean circulation of the North Sea have not been fully resolved. At a much smaller scale, S. Tryggstad *et al.* show that some tidal currents are subject to substantial wave-forcing with velocities up to 90 cm s^{-1} being measured during a storm off Teesside in 1978. Bottom currents of this magnitude have clear implications for the

erosion and transport of fine grained sediments. A useful paper by A.H. Taylor *et al.* serves as a reminder that variability in oceanographic conditions in a partly enclosed basin owes much to the seasonality of fluvial runoff!

The continuing concern with the prediction of storm surges is reflected in the balance of the section on waves and surges with J.T. Duun-Christensen demonstrating the limitations of traditional surge forecasting models. He considers that the inclusion of the latest tide gauge data will allow more accurate forecasting, a view also held by R.A. Flather and R. Proctor. Their paper also shows how double generation of wind-fields can be partly avoided by the use of input data based on up-dated meteorological analyses.

G. Kullenberg gives a balanced review of the mixing processes of the North Sea and of the modeling problems encountered. Surprisingly, given the volume of research, only three papers address sediment transport problems in the North Sea. J.F. Venn and B. D'Olier suggest that trapped waves are responsible for the stability of linear sand ridges and suggest the possibility of coupling between sand ridges and surface waves. On a similar topic of surface waves creating linear phenomena, P.P.G. Dyke and S.F. Barstow's discussion of Langmuir circulation and its relationship to pollution and marine biology is both stimulating and, for those who doubt its validity in marine situations, speculative.

The section on North Sea ecosystems has much less of a modeling flavor, being mainly concerned with papers reporting the results of the Fladen Ground Experiment (FLEX '76). As such, the section sits somewhat uneasily amidst a sea of modelers, the most graphic example being C. Joiris's paper on seabird distributions which seems to have been added almost as an afterthought.

Conference proceedings are generally a mixed bag, and this one is no exception. With so much of North Sea research being concentrated on modeling it is inevitable that the volume is mathematical in bias yet several of the authors could have profitably spent more space in explaining the implications of their models. This reviewer's main criticism, however, lies in the lack of perspective offered by the editors. There was a great need in this volume for editorial comment aimed at helping the reader navigate his way through each section. The volume is also slightly unbalanced with major areas of research such as remote sensing and offshore sediment dynamics left relatively untouched although, in fairness, this is a reflection of the symposium

itself. Nevertheless, the book will be a useful addition for those interested in oceanographic modeling and wishing to reach for an up to date statement of North Sea research in the fields covered.

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Late Quaternary Environments of the United States, edited by H.E. Wright, Jr., 1983, University of Minnesota Press, Minneapolis, Minnesota. V. 1 The Late Pleistocene (S.C. Porter, editor), 407p. V. 2 The Holocene (H.E. Wright, Jr., editor), 277p. ISBN 0-8166-1169-6 and 0-8166-1171-8.

These volumes contain a wealth of data that will be invaluable to Quaternary specialists. Each contains a chapter by Arthur L. Bloom on sea level and coastal morphology. There is little or no discussion on morphological dynamics and both articles are seriously flawed by Bloom's simplistic models of sea-level change that make no provision for known climatic fluctuations. They are useful, however, for bringing the different types of coasts in the United States into a convenient synthesis and reviewing their paleogeographic evolution.

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Coasts: Institutional Arrangement for Management of Coastal Resources, by Jens C. Sorensen, Scott M. McCreary, and Marc J. Hershman, 1984, Research Planning Institute, Columbia, South Carolina, 165p. \$US 21.00, ISBN 0-9315-310-4.

The extensive environmental legislation passed in the U.S. during the 1970s has often been exported to developed and developing countries, yet little has been written comparing coastal zone management efforts on the national levels. Sorensen, McCreary and Hershman's monograph *Coasts: Institutional Arrangements for Management of Coastal Resources* is one of the first such attempts. The volume addresses coastal management efforts and institutional arrangements which coastal nation-states and their sub-entities (colonies, commonwealths, possessions, etc.) have created to deal with coastal resources.

This monograph totalling no more than 165 pages is divided into nine chapters and three appendices. The reader who seeks specific answers to particular

management problems will find few concrete answers to help him with day-to-day problems. Instead, this volume will be invaluable to those who may be charged with developing a coastal resources program on the national and sub-national levels. In fact, it should be required reading for both present and aspiring consultants, bureau officials, and academicians involved with international marine resource program implementation.

The nine chapters move logically from defining the coastal zone geographically through several chapters discussing the evolution of coastal zone management, specific issues confronting coastal zone managers, to an analysis of the management and governance system responsible for coastal zone resources and processes.

The authors' objectives are, by any standard, ambitious yet it is surprising how well they have succeeded. The volume is well organized describing and categorizing the problems confronting the coastal zone manager and planner. This is especially difficult considering the often complex interacting systems characterizing this environment. By the authors' own account a monograph undoubtedly could have been written on each of the topics covered in the nine chapters. Their success in summarizing the lessons learned in national and international coastal zone management is no less an accomplishment, particularly since it is well written even by those with only limited experience in coastal zone management.

A brief introductory chapter describes "the institutional arrangement that has been used to both conserve and develop coastal resources and environments." This is followed by a discussion of the coastal zone as defined from a spatial point of view. The numerous definitions which have described the coastal zone outside the U.S. closely follow the developments in the U.S. (ARMSTRONG, *et al.*, 1974), and have been nicely summarized by several interesting graphs and tables. Brief descriptions of integrated versus topical planning concludes this chapter.

The significance of the coastal zone as an environment with substantial resources located within it (fishing, mining, mangroves, wetlands, etc.) and as an area of transit (commercial shipping, warehousing, and manufacturing) is discussed in Chapter 3. Two coastal evaluation models are also presented which are of potential use when assessing the socio-environmental value of the coastal zone. The absence of coastal demographic information is noted in *Coasts*, a phenomenon that prevails in