

***Paleogeographic development of the Rhine-Meuse delta, The Netherlands*, by H.J.A. Berendsen & E. Stouthamer, 2001. Van Gorcum, P.O. Box 43, 9400 AA Assen, The Netherlands (for USA and Canada: Books International Inc., P.O. Box 605, Herndon, VA 22070, USA); 268 pages, three maps and a CD-Rom; NLG 75.00; ISBN 90-2323695-5.**

This book provides a state-of-the-art overview of the data and interpretations concerning the paleogeographic evolution of the fluvial part of the Rhine-Meuse deltaic plain in The Netherlands. The study area is situated in between the terrace intersection at the Dutch/German border and the estuarine and tidally influenced areas near the coast. The results presented in the book are the final product of 40 years of work by 1400 students, 50 graduate students, 10 PhD students, and scientific staff at the Physical Geography Department of Utrecht University. The dataset collected consists of over 200,000 boreholes, mostly collected by students during their first fieldwork course. The boring density is at least 30 per km², but locally the density is up to 350 per km². In addition, 1200 ¹⁴C ages data were used to determine the ages of the Holocene channel belts. This huge dataset is probably unique in the world.

The aim of the book is making available the details of the work that has been carried out, including the ¹⁴C dating and the paleogeographic reconstructions. In this respect, the authors have been very successful. The resultant text is at places hard to read, however, because the book is also intended to document a huge research effort. In addition, the chapters that could provide insight into the delta evolution from a process-based point of view are very short and condensed, among other reasons because this part of the research is just starting. Yet, I can recommend the book to anyone interested in deltaic river systems and to those interested in the details of the Late Quaternary history of the Netherlands, particularly because the book is a truly unique document. One may wonder, however, why the book has been published on paper. After all, more than half of the book consists of paper-consuming listings, and the remaining part is a compilation of Berendsen's previous papers and books. In my opinion, dissemination of this material through a website would have sufficed.

The book is subdivided in eleven, relatively small chapters. The first chapter gives a brief overview of the objectives, background and history of the research. Chapter two describes the geological development of the Rhine-Meuse delta. The focus of this chapter is on the Holocene and historic evolution of the fluvial system. The Miocene and Pliocene evolution is described in only one paragraph, and one page is devoted to the complex evolution during the Pleistocene. This is insufficient and not representative for the state of knowledge of the delta evolution during these time periods. Furthermore, not all the locations mentioned in the text are plotted in the location figure, which reduces the readability of the chapter. Chapter 3 provides a short summary of fluvial morphology, sedimentation and style, and explains some of the assumptions on river-type classification used in this research. The research methods for the paleogeographic reconstructions are presented in the fourth chapter. These include ¹⁴C dating, mapping, construction of gradient lines, pollen analysis, historical evidence and archeological artifacts. The next chapter serves as an introduction to the maps, and describes an E-W cross-section through the delta. The river systems and their paleogeographic evolution are described in chapters 6, 7 and 8. Chapter 9 addresses briefly the factors influencing the Holocene river evolution, like pre-existing topography, substrate composition, sea-level rise, neotectonics and earthquakes, changes in discharge and sediment load, the evolution of the coastal zone, and anthropogenic influences. The style of this chapter is characterized by the presentation of

examples; both quantifications and discussions on relative contributions are lacking. Most attention is paid to the neotectonic factors, probably because this factor is relatively new for the authors. Avulsions are addressed separately in chapter 10. Finally, chapter 11 provides a brief summary and overview of the results.

An extensive reference list of 17 pages follows. The first four appendices include all the ^{14}C dates, details of the ^{14}C samples, a description of the channel belts and the ^{14}C and calibrated ages of the Holocene channel belts (pp. 130). Finally, a list of all the contributors to the research is included as appendix 5. Indeed, half of the book is taken-up by the appendices. The three enclosed sheets consist of a large geological/geomorphological overview map, a sheet of smaller maps with reconstructed fluvial systems at 500 year intervals, and a large longitudinal cross-section through the Holocene delta, also showing vertical positions of archeological levels with artifacts. The CD-Rom contains all the information presented in the book in digital format, supplemented with non-relevant, undocumented material.

The purpose of the authors was apparently making the data available for other researchers so that they may verify and improve models of fluvial architecture. The paleogeographic information in the detailed maps can be used indeed for further study on fluvial dynamics, sedimentology and geomorphology. The data collection can also be used to investigate numerous other aspects of the delta, for example the hydrology, archeology and engineering geology. Additionally, the Rhine-Meuse delta offers a unique paleo-environment to study avulsion, a key process in the paleogeographic evolution of the delta.

To conclude, this book is in general well presented with clear text and nice figures. The contents of the book are valuable for researchers in deltaic fluvial systems. But, since it is not intended to serve as a study book, it is in places hard to read. Therefore, I advise to start reading the book beginning with chapter 11, the summary chapter. The book, maps and CD-Rom are sold together in a big box, which takes up a lot of space. However, since all the relevant information is on the CD, the publisher should consider publication of the CD alone, or publication via the internet. Although the complet is fairly cheap now, publishing solely an electronic version could result in a further reduction of the price, and certainly in a considerable saving of paper.

Ronald T. van Balen
Fac. of Earth and Life Sciences
Vrije Universiteit
Amsterdam, Netherlands