

Atlas of Deep Water Environments: Architectural style in turbidite systems

edited by **K.T. Pickering, R.N. Hiscott, N.H. Kenyon, F. Ricci Lucchi, and R.D.A. Smith**, published by Chapman & Hall, 2-6, Boundary Row, London SE1 8HN, UK in 1995, ISBN 0-412-561107

Review by Christopher G. Kendall

This book is a magnificent atlas of modern and ancient deep water turbidite systems. It includes extensive and detailed panoramic views of turbidite channels and systems in outcrop, seismic cross sections, and side scan sonar mosaics and individual traces. For geologists working in the oil industry with deep water oil and gas reservoirs, and for academic geologists interested in deep water turbidite systems, this atlas is an incredibly complete compilation of data. The size of this book (16.5 by 11.5 inches) means that the illustrations are clear and really do justice to the size of these deep water features. The quality of the diagrams, photographs, and seismic is sharp and clear; some color pictures are used. Though the images don't match the National Geographic in quality, the sharpness of the photographs and the line drawings are in the top 5 percentile. Anyone with the need to understand turbidite depositional systems should have this book at hand. The main importance of the volume it enables one to view turbidite geometries in cross section and map view, using an approach also seen in the AAPG seismic volumes. There are some 49 papers within the atlas and authors include most of the major earth scientists associated with present day turbidite research.

The book is divided into five sections, beginning with some 11 papers on slope aprons and slide deposits. These include descriptions of modern examples from the Grand Banks; Labrador Slope, Rise and Basin; Georges Bank; the Hawaiian Ridge; Lake Baikal; and offshore Japan. Ancient examples encompass the Jurassic-Cretaceous Bluff Group of Alexander Island, Antarctica; the carbonate slope aprons of the Cambrian of North Greenland; the Plio-Pleistocene trench-slope deposits of Burica Peninsula, Central America; and the Aptian-Turonian of Xigaze, Tibet.

The second section deals with modern channel and levee systems, focusing on the Monterey Fan; the Rhône Fan; the Almeria Canyon; the Indus Fan; the Mississippi Fan; and the architectural elements of the Amazon Deep Sea Fan. All of these papers are illustrated with side scan sonar traces and some seismic cross sections, all of which are of excellent quality. Section three deals with ancient canyon and channel fills, including examples from the Silurian of North Greenland; the Ainsa II Channel of the Pyrenees; the Rapitan turbidite channel of the Eocene Hecho Group, south-central Pyrenees; the Eocene Charo-Arro system of the Pyrenees; the Tabernas Basin in Spain; the Neuquen Basin of Argentina; and a splendid paper on the Permian Delaware Mountains of Texas. This latter paper contains an incredible series of photographs which trace what has been interpreted as a stacked fans extending from the Guadalupe mountains out into the Delaware basin in exposures in the Delaware mountains. This set of photographs are outlined with line drawings which trace the interpreted fan geometries. These are accompanied by numerous other line drawings and small scale photographs which, superimposed on the cross sections, show their different sedimentary structures and depositional relationships. For sheer wealth of detail, this paper is outstanding. This section of the book ends with a paper on the latest Ashgill to Llandovery slope of the Welsh Basin, UK.

Next is a section on the mesotopography and geometry of sand lobes and packets, in terms of the deep sea depositional systems of the Bering Sea, the Hueneme Fan of the California Borderland; the Ordovician Tourelle Formation of Quebec; the Rhone cone, the Albian Black

Flysch of northern Spain; the Tertiary SW Alpine Foreland Basin of the Annot basin, SE France; the Montagne de Chalufy turbidites of Hautes Provence, SE France; the Castelnuovo member, Rocchetta Formation of the Tertiary Piedmont Basin in NW Italy; the Silurian turbidite system of Welsh Basin; the Gabon basin; and the Dampier Sub-basin of North-West Shelf in Australia, largely illustrated by well logs; and then the section ends with a paper on the Kongsfjord Formation, Finmark in North Norway.

The final papers of the book focus on long-distance correlation, distal lobes and basin floor/plains, and megaturbidites, including the Mid-Ocean channel, Labrador Sea; the Mississippi Fan, Gulf of Mexico; the Canary Basin; the Mississippi fan as seen by Gloria sidescan images; the Miocene foredeep; Campanian Zementmergel Formation of the East Alps; the Cloridorme Formation of Quebec; the Permian Eccca Group of Western Karoo basin in South Africa; and finally a paper on the Proterozoic Zerrissene turbidite of Damara Orogen in Namibia.

This beautiful book will be of interest to geologists and geophysicists who are working with deep water sandstones and turbidite systems. No other book on deep water systems can be compared to the quality of this book or the quality of the papers. These are relatively short, seldom longer than 4 or 5 pages, but it is the accompanying illustrations that give the book its impact. It will make armchair geologists of many of us: we can sit home sipping our beer, coke, or coffee and open this book and dream that we are actually on site looking at the great localities shown in the photographs or cruising the oceans with access to side scan radar. The editors, Chapman and Hall, and Conoco (who supported the development of this atlas) should be congratulated. The book should end up in most university and oil company libraries and certainly should be on the shelves of anybody who is exploring in sediments of the deep water environment.