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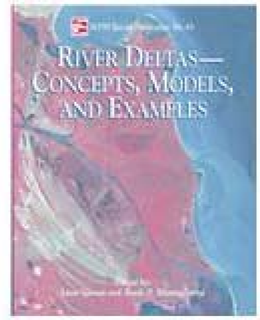

River Deltas—Concepts, Models, and Examples, edited by Liviu Giosan & Janok P. Bhattacharya, 2005. SEPM Special Publication 83. Society for Sedimentary Geology (SEPM), 6128 E. 38th Street, Suite 308, Tulsa, OK 74135-5814, USA. Hardbound, 502 pp. Price USD 134.00; SEPM members USD 96.00; SEPM student members USD 68.00. ISBN 1-56576-113-8.

River deltas—Concepts, Models, and Examples arose from the conference session *Deltas: Old and New* at the 2002 meeting of the Geological Society of America. The book is subdivided in three parts: Concepts and Reviews [4 papers], Ancient Deltas (Pre-Holocene) [6 papers], and Modern Deltas (Holocene) [10 papers].

I wrote this review from my perspective as a practising petroleum geologist whose main professional interest is in the application of sedimentological models and concepts in the modelling of oil and gas reservoirs. What I looked for in this book is simple: (1) is the subject coverage comprehensive, balanced and up-to-date? (2) are any new concepts/technologies/insights presented? (3) is the book professionally edited and produced? The answer to all three questions is a clear "yes", and the book in my view represents good value for money. If you are seriously involved in research on deltas or, alternatively, an active user of those research results, these symposium proceedings are worth buying. If your involvement with deltaic depositional systems is more at arms' length, I recommend you make sure that you have access to it via your institutional library.

For conference proceedings, the subject coverage is reasonably comprehensive and balanced. Focus of the book is very much on sedimentological concepts and on examples of Holocene deltas, plus some examples of shallow subsurface, and/or outcropping pre-Holocene deltaic deposits. Missing though are convincingly documented examples of deltaic deposits from the deeper subsurface. I would have loved to see the new sedimentological insights that are presented, applied to the analysis of subsurface data from an oil or gas field.

To me, the most useful part of the book is the "Concepts and Reviews" section. Overeem et al. review the issues to be considered when building 3-D quantitative models of deltas. Key problems for modellers include the scarcity of accurate and reliable input data and the inadequate understanding of processes to be modelled. Clearly, given these problems with model inputs, any modelling outputs should only be used with caution. Gani & Bhattacharya convincingly argue that chronostratigraphic correlations are key to the delineation of realistic 3-D sedimentary architectures in deltaic deposits. Lithostratigraphic correlations misleadingly suppress the depositional complexity that is evident in all well-documented large-scale outcrops and in present-day deltas. Realistically capturing this depositional complexity is of critical importance when building 3-D fluid-flow models of the subsurface. MacEachern et al. discuss the ichnology of deltaic deposits. This is a very useful overview of the complex controls on ichnofacies that characterise deltaic sequences. I wish I had had this paper at hand when I recently worked on an oil field in northwest Borneo. It would have helped to make better sense of those complex Tertiary deltaic reservoirs. The paper by Willis highlights how limited our understanding of tide-influenced deltas really is. On the positive side: plenty of scope for challenging Ph.D. projects. On the negative side: plenty of uncertainty when building reservoir models of tide-influenced deltaic reservoirs! In the part "Ancient Deltas," two papers describe parts of the well known Cretaceous deltaic sequences of the Book Cliffs in Utah (USA). Hampson & Howell present a detailed analysis of the palaeogeographic development of a wave-dominated deltaic system. A key conclusion is that river processes were very important in this overall wave-dominated setting, but that river-influenced deposits are nevertheless volumetrically insignificant. Olariu et al. used ground-penetrating radar (GPR) to map the internal architecture of some sand bodies behind the outcrop face. Being familiar with the outcrops described, I find it rather disappointing that their results are not integrated with the well-exposed 3-D architecture of lateral equivalent parts of the Panther Tongue Sandstone. Plink-Bjørklund & Steel describe spectacular, seismic-scale outcrops of Eocene deltaics on Spitsbergen. A key message, viz. that the classical sequence-stratigraphic model that links low-stand deltas to deposition of basin-floor turbidites, is too simplistic. Davies et al. describe the Miocene-Pliocene palaeo-Amur deltaic deposits of northern Sakhalin. Kroonenberg et al. compare the present-day delta of the Volga delta of the North Caspian with the Miocene-Pliocene Productive Series deposited by the palaeo-Volga in the South Caspian. Unfortunately, the linkage with oil field equivalents is rather tenuous in both papers. Not even a single example of a core or well log from the subsurface reservoirs in Sakhalin or the South Caspian is included in either paper. The relevance of the outcrop data as analogues for the equivalent subsurface reservoirs is therefore impossible to judge. An important message from the Kroonenberg et al. paper is the need to exercise caution when selecting an analogue for a subsurface reservoir. Though both the Neogene Productive Series and the present-day Volga delta were deposited in the Caspian by the same river, this is no guarantee that the modern delta is a good analogue for the subsurface. The Productive Series formed as a low-stand wedge in a very rapidly subsiding (2-4 mm/year!) basin, whereas the modern delta of the Volga formed on a platform during a period of rapidly fluctuating sea-level. Anderson describes the Late Quaternary deltaic systems of the Gulf of Mexico. During falling sea-level the various delta systems built-out across the shelf, with some (e.g. the Rio Grande system) being associated with lowstand, turbidite slope-fans. Others, (e.g. the Brazos system) abandoned their deltas prior to the lowstand and are not associated with slope turbidite fans. As a result, the location of the sequence boundary and the correlative conformity, relative to the shelf-margin stratigraphic package, varies form one deltaic system to the next.

The third and last part of the book -Modern Deltas (Holocene) - consists of papers that describe the Burdekin, Danube, Ganges-Brahmaputra, Godavari, Mekong, Mississippi, Rhine-Meuse, Po, and William River (Lake Athabasca) deltas. The common denominator of all ten papers is the complex interplay between the various processes that control delta building. What fascinates me in particular is the way in which the outflow from delta distributaries can act as a "hydraulic groin" or "jetty" that cuts across a longshore drift system. Such a "hydraulic groin" can be a key control on coastal progradation by deposition of sandy beach ridges up-drift of the distributary channel, with mud-rich deposits forming on the down-drift side. The Lafourche lobe of the Mississippi delta, as well as the Danube and Godavari deltas, provide clear examples of the importance of this process. The practical significance of this concept is that it has a major impact on the way one interprets the palaeogeography of an ancient deltaic system and hence on the predicted distribution of sandy reservoir

The book is well edited and produced, as I have come to expect from SEPM. Apart from a few typos, I noticed only two minor editorial glitches. On p. 236, the finesses of Russian grammar with respect to the correct transcription of a stratigraphic name (Pereryv Suite rather than Pereriva Suite) are discussed, whilst on the opposing page the incorrect spelling "Pereriva Suite" is used in a prominent position in Figure 7. On p. 242, Figure 19 is mislabelled as Figure 11. All-in-all, the book represents a job well done by the authors, as well as the scientific and technical editors!

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