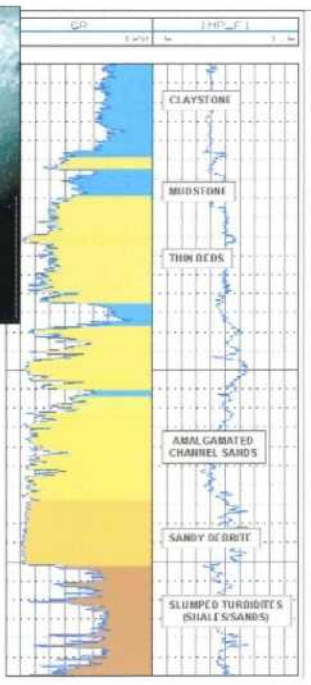
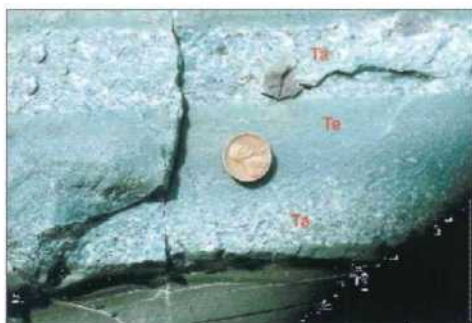
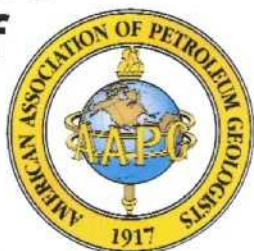
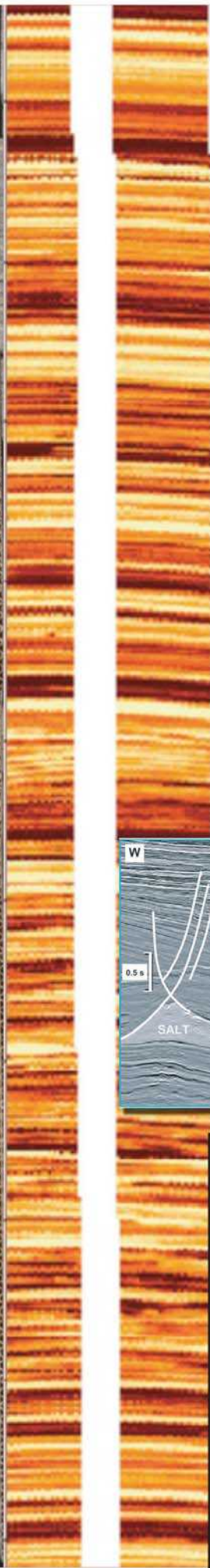
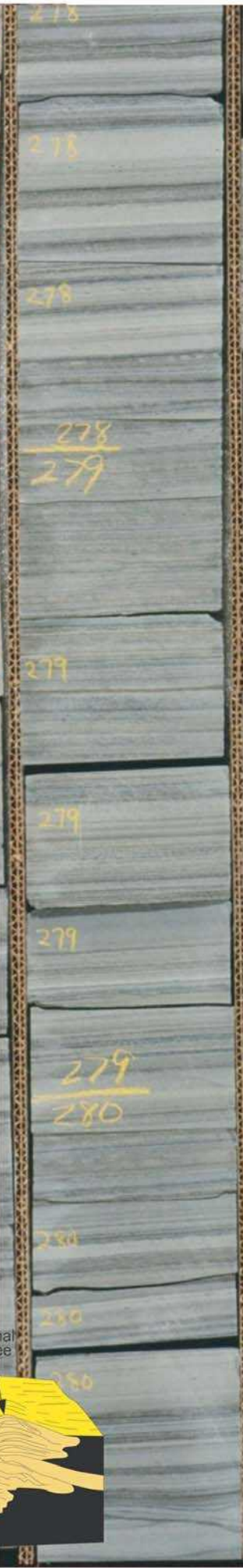
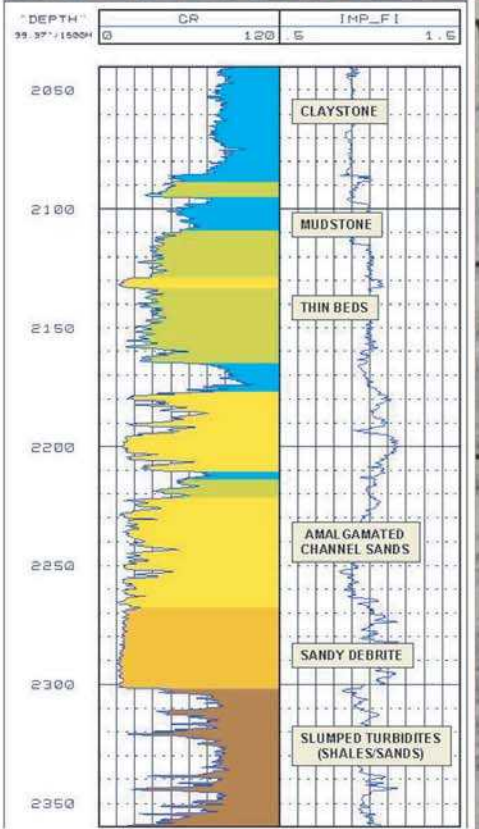
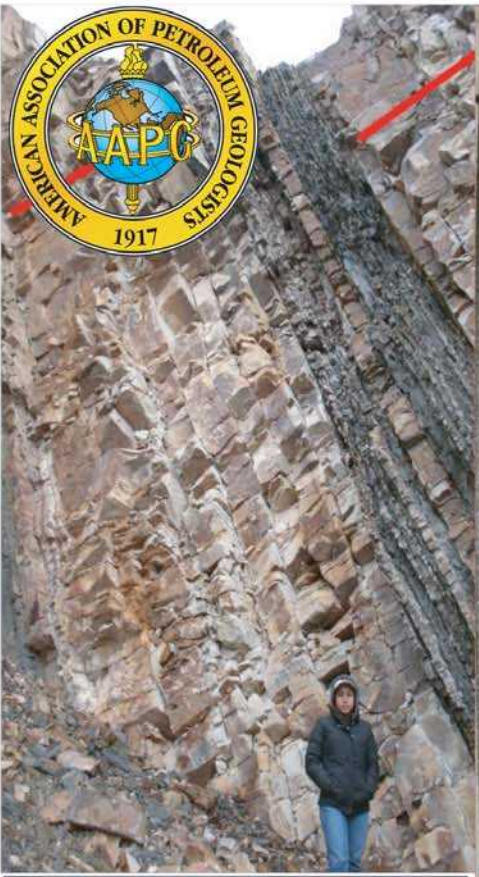
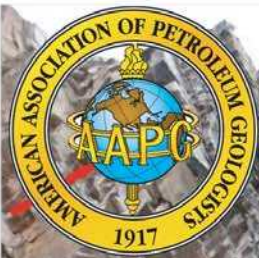


AAPG Studies in Geology No. 57
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Petroleum Geology of Deepwater Settings

by Paul Weimer and Roger M. Slatt,
*with contributions by Renaud Bouroullec,
Richard Fillon, Henry Pettingill, Matthew Pranter,
and Gabor Tari*



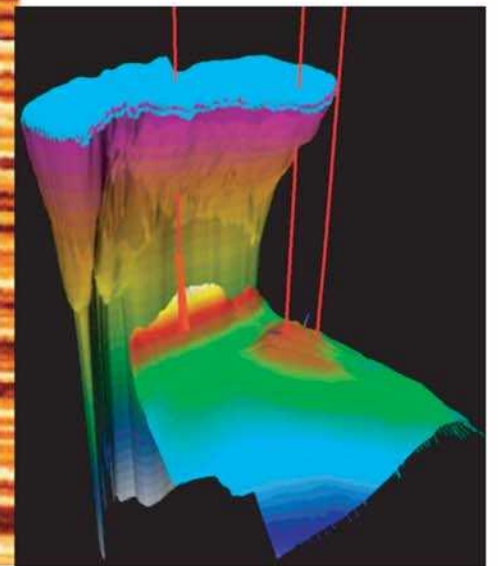
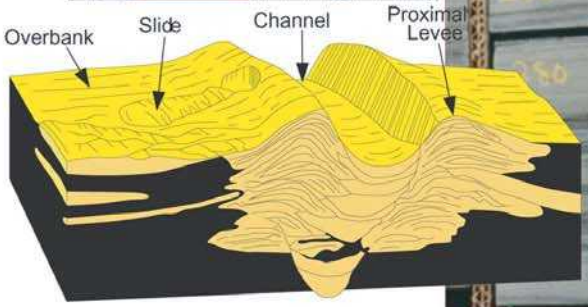
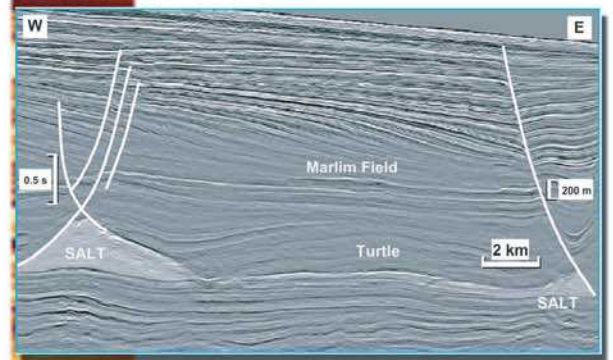


Introduction to the Petroleum Geology of Deepwater Settings

Paul Weimer and Roger M. Slatt

with contributions by
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Cover images: from top left clockwise: (a) Outcrop photograph of the thinning-upward sheet sandstones, Lower Pennsylvanian Jackfork Group, Baumgartner Quarry, Arkansas. (b and c) Core photograph and image log are from the Upper Cretaceous Dad Sandstone, Lewis Shale, Wyoming. Images are from the CSM Strat Text #61 core (Chapters 6, 7, 12). (d) Seismic profile across the Marlim Field, Campos Basin (Chapter 15). Figure courtesy of Carlos Bruhn and AAPG. (e) 3-D image of the reservoir interval at the Thunder Horse and Thunder Horse North Fields, northern deep Gulf of Mexico. Surface dipping to lower right shows the top reservoir interval. Allochthonous salt body and the three well paths are shown. Figure is courtesy of Cindy Yeilding and BP. (f) Schematic 3-D block diagram of a migrating channel levee-system (Chapter 7). Figure is courtesy of Mike Roberts (g) Wireline log from offshore Angola (Chapters 6-9). Figure is courtesy of Gulf Coast Section SEPM Foundation.

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Preface

The past twenty-five years have brought a significant increase in the exploration and production of deepwater reservoirs globally. A sizable amount of information from producing fields now exists that can be used to help in the future development of these reservoirs, especially as industry moves into the ultra-deepwater.

The purpose of this book is to provide a broad overview of the petroleum geology of deepwater settings for the working geoscientist. The salient and important points will be covered that can be integrated into one's daily work flow. Because of the almost constant influx of new published material on deepwater deposits, we consider what we present to be at the 70-75th percentile of information. The chapters are complemented with extensive bibliographies of key publications. A master reference list is included at the end of the book, including all references from the text. The book covers the applied geologic aspects of the deepwater; some of the more academic aspects are not included. Many of the current state-of-art problems cannot be discussed for proprietary reasons.

This book has an unusual origin. Several of the first ten chapters were published by the SEG/EAGE as part of their 2004 Distinguished Instructor Short Course. The agreement between SEG/EAGE and AAPG was for AAPG to publish the second edition of that book with seven additional chapters. We thank both societies for their willingness to cooperate in such a publishing task.

Construction of a book reflects the efforts, contribution, and cooperation of many outstanding colleagues and organizations. A special thanks to all organizations and professional societies, publishers, and individuals that allowed us to reproduce their figures in this book: American Association of Petroleum Geologists (AAPG), American Geophysical Union (AGU), Chapman and Hall, European Association of Geoscientists and Engineers (EAGE), Exploration Consultants, Limited (ECL), Elsevier, Gulf Coast Association of Geological Societies (GCAGS), Geologic Society of London, GeoMark, Houston Geological Society (HGS), IES, Indonesian Geological Association (IGA), Journal of Petroleum Technology (JPT), New Orleans Geological Society (NOGS), New Zealand Institute of Geological and Nuclear Sciences, Norwegian Institute of Technology, Offshore Technology Conference (OTC), Oil and Gas Journal, Pacific Section-SEPM, Petroleum Exploration Society of Australia (PESA), Petroleum Exploration Society of Great Britain (PESGB), Society of Exploration Geophysicists (SEG), Society for Sedimentary Geology (SEPM), Sovereign Oil and Gas Company, Schlumberger, Society of Petroleum Engineers (SPE), Society for Professional Wireline Log Analysts (SPWLA), Springer-Verlag, WesternGeco, and Woodside Petroleum.

Individuals include Marco J. J., Arreguin (Pemex), Carlos Bruhn, Gary Cole, Geoff Dorn, Doug Evans, Jim Fox, Brad Field, Miki Gardosh, Alfredo Guzman, Mads Huuse, Nick Holmes, Tom Homza, David Jennette, Robert Jones, T. A. Jones, Neil Kenyon, Todd Lapinski, Gunn Mangerud, Ole Martinsen, Mike Mayall, Brian O'Neill, Simon Payne, Kevin Pickering, Henry Posamentier, Dorrik Stow, and John Zumberge.

A special heartfelt thanks is in order to Dr. Norman Rosen (Executive Director, Gulf Coast Section-SEPM Foundation) for permission to reprint so many figures from the outstanding Bob F. Perkins Annual Research Conferences of 1994, 2000, 2001, 2002, and 2003. These figures compose the bulk of the book's figures. Ken Abdulah kindly shared figures for the Falcon Field in Chapter 7. Andrew Hurst kindly allowed us access to unpublished materials and figures for Chapter 10. Gabor Tari, Jim Molnar, and Vanco Energy supplied figures for Chapters 12 and 15. Henry Pettingiill kindly supplied figures for Chapter 16. Joe Studlick was most helpful in providing outcrop information for helping us compile tables for some of the outcrops examples in Chapters 7 and 9.

We invited five colleagues to help us write four chapters because their expertise clearly improved the quality and content: Henry Pettingill (Chapter 2), Richard Fillon (Chapter 12), Matthew Pranter (Chapter 14), and Renaud Bouroullec and Gabor Tari (Chapter 15). We thank them profusely for all of their time and help. To all of them, we owe our greatest thanks.

We thank the following colleagues for their timely, insight, and thorough reviews of the book's chapters: David Bowen (Montana State University), Frank Brown (BEG-Austin), Bret Dixon (ExxonMobil), Eric Eslinger (Eric Geosciences), Jim Fox (consultant), Tim Garfield (ExxonMobil), Mitch Harris (ChevronTexaco), Andrew Hurst (University of Aberdeen), Roy Kligfield (consultant), Laurie Lamar (consultant), Robert Loucks (Bureau of Economic Geology), Robert Mitchum, Jr. (consultant), Hans Nelson (consultant), Jory Pacht (consultant), Ed Picou (consultant), David Pyles (Colorado School of Mines), Mike Sweet (ExxonMobil), Anne Tomas (consultant), Alex van den Berg (retired-Shell), Berend van Hoorn (retired-Shell), and Craig Shipp (Shell International). Many of these reviews were done on extremely short notice and deadline, and we express our sincerest and thanks and deepest gratitude for their help.

In addition, we thank the following for their technical input while we were writing these chapters: Minarou Aziwa (MCX), Ken Abdullah (Pioneer), Ed Colling (Chevron), Steve Crews (Anadarko), Erik Bartsch (Shell), Rick Beaubouef (ExxonMobil), Jim Booth (Shell), Kevin Bohacs (ExxonMobil), Greg Browne (New Zealand Survey), Bob Bruce (BHP-Billiton), Mike Clarke (Chevron), John Clayburn (Petronas), Steve Cossey (consultant), Paul Crevello (consultant), Herman Darman (Royal Dutch), Jed Damuth (University of Texas-Arlington), Bret Dixon (ExxonMobil), Aziz Effat (Agiba Petroleum), Jim Fox (consultant), Brad Field (New Zealand Institute for Geophysics), Jose Frey (BG), Tim Garfield (ExxonMobil), Miki Gardosh (IGG), Phil Hirst (bp), Bo Henk (consultant), David Jennette (BEG-Austin), Marek Kacewicz (Unocal-now Chevron), John Kendrick (Shell), Rob Kirk (consultant), Jay and China Leonard (Platte River), Lidia Lonergan (Imperial College), Ole Martinsen (Norsk Hydro), Veit Matt (Platte River), Mike Mayall (bp), Trey Meckel (Shell), Webster Mohriak (Petrobrás), Paul Nadeau (Statoil), M. Nashaat (Egyptian General Petroleum), Hans Nelson (consultant), Carlos Pirmez (Shell), Henry Posamentier (Anadarko), David Pyles (Colorado School of Mines), Mike Roberts (ChevronTexaco), Art Saller (Unocal), Kevin Schofield (BHP-Billiton), Jerry Siok (bp), John Snedden (ExxonMobil), Joe Studlick (Maersch), Scott Thornton (Shell), Marshal Titus (Platte River), Peter Varnai (ExxonMobil), Bruno Vendeville (University of Lille), Pedro Zalan (Petrobrás), and John Zumberge (GeoMark).

The final version of every chapter of this book survived the scrutiny and incisive editing of Anne Thomas, Laurie Lamar, and M. S. Wacker. We are forever grateful for their help.

We offer our eternal gratitude to the following for their Herculean efforts in digital drafting and editing. Paul Weimer thanks Rick Couture, John Roesink, and Jay Austin; Roger Slatt thanks Andrew Slatt.

Our special thanks to Gail Bergan for her continued Jobian patience in assembling this digital publication. She has been a *great* editor.

Most importantly, we thank our families for their support during the trying times that this book was written: Rudy, Lou, Laurie, Linda Gay, and a cast of one thousand animals. Paul Weimer thanks Bruce Benson for the endowment of funds used to create this book, and the University of Colorado for advising him that the publication of this book has no impact on his annual performance review. Roger Slatt extends his sincere appreciation to Robert Stephenson (Potts Exploration) for providing the incentive to take up residence at the University of Oklahoma to enhance its energy program, and to he and Lew and Myra Ward (Ward Petroleum) for providing the financial support through endowed funds to complete his chapters of this book.

Finally, the senior author would like to apologize again, in perpetuity, to Huck Finn.

Paul Weimer, Boulder, CO

Roger M. Slatt, Norman, OK

“Writing a book is easy... just go sit at the typewriter and open up a vein.”

Attributed to many people, including Gene Wolfe, Philip K. Dick and Ernest Hemingway.

