

Linking Diagenesis to Sequence Stratigraphy

Edited by Sadoon Morad, J. Marcelo Ketzer and Luiz F. De Ros

Special Publication
Number 45 of the
International Association
of Sedimentologists

Sea-level fall
Sea-level 2



Special Publication Number 45 of the International Association of Sedimentologists

Linking Diagenesis to Sequence Stratigraphy

Edited by

Sadoon Morad

Department of Petroleum Geosciences, The Petroleum Institute, P.O. Box 2533, Abu Dhabi, United Arab Emirates Department of Earth Sciences, Uppsala University, 752 36 Uppsala, Sweden

J. Marcelo Ketzer

CEPAC Brazilian Carbon Storage Research Center, PUCRS, Av. Ipiranga, 6681, Predio 96J, TecnoPuc, Porto Alegre, RS, 90619-900, Brazil

Luiz F. De Ros

Instituto de Geociências, Universidade Federal do Rio Grande do Sul - UFRGS, Av. Bento Gonçalves, 9500, Porto Alegre, RS, 91501-970, Brazil

SERIES EDITOR

Thomas Stevens

Department of Geography Royal Holloway, University of London Egham, Surrey TW20 0EX UK





This edition first published 2012 © 2012 by International Association of Sedimentologists

Cover images: Reproduced with permission of Sadoon Morad, J. Marcelo Ketzer, Luiz F. De Ros

Blackwell Publishing was acquired by John Wiley & Sons in February 2007. Blackwell's publishing program has been merged with Wiley's global Scientific, Technical and Medical business to form Wiley-Blackwell.

Registered office: John Wiley & Sons, Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial offices: 9600 Garsington Road, Oxford, OX4 2DQ, UK

The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

111 River Street, Hoboken, NJ 07030-5774, USA

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell.

The right of the author to be identified as the author of this work has been asserted in accordance with the UK Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book. This publication is designed to provide accurate and authoritative information in regard to the subject matter covered. It is sold on the understanding that the publisher is not engaged in rendering professional services. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

Library of Congress Cataloging-in-Publication Data

Linking diagenesis to sequence stratigraphy / edited by Sadoon Morad, Marcelo Ketzer, Luis F. De Ros.

pages cm. – (Special publication number 45 of the International Association of Sedimentologists)

Summary: "Sequence stratigraphy is a powerful tool for the prediction of depositional porosity and permeability, but does not account for the impact of diagenesis on these reservoir parameters. Therefore, integrating diagenesis and sequence stratigraphy can provide a better way of predicting reservoir quality"—Provided by publisher.

Includes bibliographical references and index.

ISBN 978-1-118-48539-2 (hardback)

- 1. Diagenesis. 2. Reservoir sedimentation. 3. Sequence stratigraphy.
- I. Morad, Sadoon, editor of compilation. II. Ketzer, Marcelo, editor of compilation. III. De Ros, Luiz Fernando, editor of compilation.

QE571.L56 2012 552'.03-dc23

2012031369

A catalogue record for this book is available from the British Library.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Cover design by Code 5 Design

Set in 10/12pt Melior by Thomson Digital, Noida, India. Printed and bound in Malaysia by Vivar Printing Sdn Bhd

Contents

Preface

Diagenetic and epigenetic mineralization in

systems of sequence stratigraphic relevance

H.G. Dill

Central Europe related to surfaces and depositional

carbonate in a falling-stage delta-front sandstone succession: Upper Cretaceous Panther Tongue Linking diagenesis to sequence stratigraphy: an integrated tool for understanding and predicting Member, Book Cliffs, Utah reservoir quality distribution P.G. Machent, K.G. Taylor, S. Morad, J.M. Ketzer and L.F. De Ros J.H.S. Macquaker and J.D. Marshall The occurrence of glaucony in the stratigraphic Dolomite-rich condensed sections in overbank record: distribution patterns and sequencedeposits of turbidite channels: the Eocene Hecho Group, south-central Pyrenees, Spain stratigraphic significance 37 R. Marfil, H. Mansurbeg, D. Garcia, M.A. Caja, A. Amorosi E. Remacha, S. Morad, A. Amorosi and J.-P. Nystuen Sequence architecture and palaeoclimate controls on diagenesis related to subaerial exposure of An integrated stratigraphic, petrophysical, icehouse cyclic Pennsylvanian and Permian geochemical and geostatistical approach carbonates 55 G.J.A. Buijs and R.H. Goldstein to the understanding of burial diagenesis: Triassic Sherwood Sandstone Group, 231 Sequence stratigraphic influence on regional South Yorkshire, UK diagenesis of a mixed carbonate-siliciclastic J.M. Mckinley, A.H. Ruffell and R.H. Worden passive margin, Eocene, N.C., USA 81 B.P. Coffey Geochemical evidence for meteoric diagenesis and cryptic surfaces of subaerial exposure in Upper Ordovician peritidal carbonates from the Stratigraphic controls on the distribution of diagenetic processes, quality and heterogeneity of Nashville Dome, central Tennessee, USA fluvial-aeolian reservoirs from the Recôncavo L.B. Railsback, K.M. Layou, N.A. Heim, S.M. Holland, Basin, Brazil 105 L.F. De Ros and C.M.S. Scherer M.L. Trogdon, M.B. Jarrett, G.M. Izsak, D.E. Bulger, E.J. Wysong, K.J. Trubee, J.M. Fiser, J.E. Cox and Diagenesis at exposure surfaces in a transgressive systems tract in a third order sequence (Lower D.E. Crowe Carboniferous, Belgium) 133 A. Smeester, P. Muchez, R. Swennen and Distribution of diagenetic alterations in relationship to depositional facies and E. Keppens

vii

Distribution and petrography of concretionary

sequence stratigraphy of a wave- and tide-

dominated siliciclastic shoreline complex:

Wyoming and Utah, USA

P. Plink-Björklund

K. Al-Ramadan, S. Morad and

Upper Cretaceous Chimney Rock Sandstones,

271

Linking diagenesis and porosity preservation versus destruction to sequence stratigraphy of gas condensate reservoir sandstones; the Jauf Formation (Lower to Middle Devonian), Eastern Saudi Arabia 297

K. Al-Ramadan, S. Morad, A.K. Norton and M. Hulver

Petrographic, stable isotope and fluid inclusion characteristics of the Viking sandstones: implications for sequence stratigraphy, Bayhurst area, SW Saskatchewan, Canada 337 C. Walz, G. Chi and P.K. Pedersen

Diagenetic alterations related to falling stage and lowstand systems tracts of shelf, slope and basin floor sandstones (Eocene Central Basin, Spitsbergen) 353

H. Mansurbeg, S. Morad, P. Plink-Björklund, M.A.K. El-Ghali, M.A. Caja and R. Marfil

Diagenetic controls on porosity preservation in lowstand oolitic and crinoidal carbonates, Mississippian, Kansas and Missouri, USA 379 M.E. Ritter and R.H. Goldstein

Diagenetic salinity cycles: a link between carbonate diagenesis and sequence stratigraphy

407

A.É. Csoma and R.H. Goldstein

Linkages between tapho-diagenesis and sequence stratigraphy in cool-water limestones from a Pliocene forearc seaway, New Zealand 445 V. Caron, C.S. Nelson and P.I.J. Kamp

Recognition and significance of paludal dolomites: Late Mississippian, Kentucky, USA 477

A.J. Barnett, V.P. Wright and S.F. Crowley

Index 501