

Coastal and Shelf Sediment Transport

The Geological Society of London
Books Editorial Committee

Chief Editor

BOB PANKHURST (UK)

Society Books Editors

JOHN GREGORY (UK)

JIM GRIFFITHS (UK)

JOHN HOWE (UK)

PHIL LEAT (UK)

NICK ROBINS (UK)

JONATHAN TURNER (UK)

Society Books Advisors

MIKE BROWN (USA)

ERIC BUFFETAUT (FRANCE)

RETO GIERÉ (GERMANY)

JON GLUYAS (UK)

DOUG STEAD (CANADA)

RANDELL STEPHENSON (NETHERLANDS)

Geological Society books refereeing procedures

The Society makes every effort to ensure that the scientific and production quality of its books matches that of its journals. Since 1997, all book proposals have been refereed by specialist reviewers as well as by the Society's Books Editorial Committee. If the referees identify weaknesses in the proposal, these must be addressed before the proposal is accepted.

Once the book is accepted, the Society Book Editors ensure that the volume editors follow strict guidelines on refereeing and quality control. We insist that individual papers can only be accepted after satisfactory review by two independent referees. The questions on the review forms are similar to those for *Journal of the Geological Society*. The referees' forms and comments must be available to the Society's Book Editors on request.

Although many of the books result from meetings, the editors are expected to commission papers that were not presented at the meeting to ensure that the book provides a balanced coverage of the subject. Being accepted for presentation at the meeting does not guarantee inclusion in the book.

More information about submitting a proposal and producing a book for the Society can be found on its web site: www.geolsoc.org.uk.

It is recommended that reference to all or part of this book should be made in one of the following ways:

BALSON, P. S. & COLLINS, M. B. 2007. *Coastal and Shelf Sediment Transport*. Geological Society of London, Special Publications, **274**.

SOUZA, A. J., HOLT, J. T. & PROCTOR, R. 2007. Modelling SPM on the Northwest European shelf seas. In: BALSON, P. S. & COLLINS, M. B. *Coastal and Shelf Sediment Transport*. Geological Society of London, Special Publications, **274**, 000–000.

GEOLOGICAL SOCIETY SPECIAL PUBLICATION NO. 274

Coastal and Shelf Sediment Transport

EDITED BY

P. S. BALSON

British Geological Survey, UK

and

M. B. COLLINS

University of Southampton, UK

and AZTI Tecnalia, Spain

2007

Published by
The Geological Society
London

THE GEOLOGICAL SOCIETY

The Geological Society of London (GSL) was founded in 1807. It is the oldest national geological society in the world and the largest in Europe. It was incorporated under Royal Charter in 1825 and is Registered Charity 210161.

The Society is the UK national learned and professional society for geology with a worldwide Fellowship (FGS) of over 9000. The Society has the power to confer Chartered status on suitably qualified Fellows, and about 2000 of the Fellowship carry the title (CGeol). Chartered Geologists may also obtain the equivalent European title, European Geologist (EurGeol). One fifth of the Society's fellowship resides outside the UK. To find out more about the Society, log on to www.geolsoc.org.uk.

The Geological Society Publishing House (Bath, UK) produces the Society's international journals and books, and acts as European distributor for selected publications of the American Association of Petroleum Geologists (AAPG), the Indonesian Petroleum Association (IPA), the Geological Society of America (GSA), the Society for Sedimentary Geology (SEPM) and the Geologists' Association (GA). Joint marketing agreements ensure that GSL Fellows may purchase these societies' publications at a discount. The Society's online bookshop (accessible from www.geolsoc.org.uk) offers secure book purchasing with your credit or debit card.

To find out about joining the Society and benefiting from substantial discounts on publications of GSL and other societies worldwide, consult www.geolsoc.org.uk, or contact the Fellowship Department at: The Geological Society, Burlington House, Piccadilly, London W1J 0BG: Tel. +44 (0)20 7434 9944; Fax +44 (0)20 7439 8975; E-mail: enquiries@geolsoc.org.uk.

For information about the Society's meetings, consult *Events* on www.geolsoc.org.uk. To find out more about the Society's Corporate Affiliates Scheme, write to enquiries@geolsoc.org.uk

Published by The Geological Society from:

The Geological Society Publishing House, Unit 7, Brassmill Enterprise Centre, Brassmill Lane, Bath BA1 3JN, UK

(Orders: Tel. +44 (0)1225 445046, Fax +44 (0)1225 442836)

Online bookshop: www.geolsoc.org.uk/bookshop

The publishers make no representation, express or implied, with regard to the accuracy of the information contained in this book and cannot accept any legal responsibility for any errors or omissions that may be made.

© The Geological Society of London 2007. All rights reserved. No reproduction, copy or transmission of this publication may be made without written permission. No paragraph of this publication may be reproduced, copied or transmitted save with the provisions of the Copyright Licensing Agency, 90 Tottenham Court Road, London W1P 9HE. Users registered with the Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, USA: the item-fee code for this publication is 0305-8719/07/\$15.00.

British Library Cataloguing in Publication Data

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

ISBN 1-86239-217-X

ISBN 13 978-1-86239-217-5

Typeset by The Charlesworth Group

Printed by The Cromwell Press, Wiltshire, UK.

Distributors

North America

For trade and institutional orders:

The Geological Society, c/o AIDC, 82 Winter Sport Lane, Williston, VT 05495, USA

Orders: Tel +1 800-972-9892

Fax +1 802-864-7626

Email gsl.orders@aidcvt.com

For individual and corporate orders:

AAPG Bookstore, PO Box 979, Tulsa, OK 74101-0979, USA

Orders: Tel +1 918-584-2555

Fax +1 918-560-2652

Email bookstore@aapg.org

Website <http://bookstore.aapg.org>

India

Affiliated East-West Press Private Ltd, Marketing Division, G-1/16 Ansari Road, Darya Ganj, New Delhi 110 002, India

Orders: Tel. +91 11 2327-9113/2326-4180

Fax +91 11 2326-0538

E-mail affiliat@vsnl.com

CONTENTS

COLLINS, M. B. & BALSON, P. S. Coastal and shelf sediment transport: an introduction	1
VINCENT, C. E. Measuring suspended sand concentration using acoustic backscatter: a critical look at the errors and uncertainties	7
SPENCER, K. L., JAMES, S. L., TAYLOR, J. A. & KEARTON-GEE, T. Sorption of lanthanum onto clay minerals: a potential tracer for fine sediment transport in the coastal marine environment?	17
BASS, S. J., MCCAVE, I. N., REES, J. M. & VINCENT, C. E. Sand and mud flux estimates using acoustic and optical backscatter sensors: measurements seaward of the Wash, southern North Sea	25
COOPER, J. A. G. & PILKEY, O. H. Field measurement and quantification of longshore sediment transport: an unattainable goal?	37
ALDRIDGE, J. N. Simple analytical results for bedload transport due to tides	45
SCHMITT, T., MITCHELL, N. C. & RAMSAY, T. S. Use of swath bathymetry in the investigation of sand dune geometry and migration around a near shore 'banner' tidal sandbank	53
SOULSBY, R. L., MEAD, C. T. & WILD, B. R. A model for simulating the dispersal tracks of sand grains in coastal areas: 'SandTrack'	65
BLACK, K. S., ATHEY, S., WILSON, P. & EVANS, D. The use of particle tracking in sediment transport studies: a review	73
HINTON, C. L. & NICHOLLS, R. J. Shoreface morphodynamics along the Holland coast	93
MCDOWELL, J. L., KNIGHT, J. & QUINN, R. Mesoscale changes in present-day nearshore surface sediments and bedforms of the north coast of Ireland	103
COOPER, B. & MCLAREN, P. An application of sediment trend analysis to Carmarthen Bay, Bristol Channel	117
VELEGRAKIS, A. F., COLLINS, M. B., BASTOS, A. C. & PAPHITIS, D. & BRAMPTON, A. Seabed sediment transport pathway investigations: review of scientific approach and methodologies	127
SOUZA, A. J., HOLT, J. T. & PROCTOR, R. Modelling SPM on the NW European shelf seas	147
<i>Index</i>	159