Contents

VOLUME 1

Conference Organizing Committee xii
Conference Technical Committee xii
Sponsoring Bodies xii
Foreword xiii
Jim Brooks
Opening address xiv
Jim Brooks
General Introduction xvi
J. R. Parker

New plays in established areas: the Tertiary

Introduction and review 3
B. A. Vining

Historical overview of exploration of Tertiary plays in the UK North Sea 5
J. S. Bain

Revision of North Sea lithostratigraphic nomenclature: Paleogene 15
British Geological Survey

Stratigraphic relationships of some Tertiary lowstand depositional systems in the Central North Sea 17
B. A. Vining, N. S. Ioannides and K. T. Pickering

Sedimentation and basin evolution in the Paleogene of the Northern North Sea and Faeroe-Shetland basins 31
R. Anderton

Sequence stratigraphic and depositional framework of the Cenozoic fill, Central and Northern North Sea Basin 33
W. E. Galloway, J. L. Garber, Xijin Liu and B. J. Sloan

Log-motif analysis of Paleogene depositional systems tracts, Central and Northern North Sea: defined by sequence stratigraphic analysis 45

Evolution of Paleogene submarine fans of the North Sea in space and time 59
D. Den Hartog Jager, M. R. Giles and G. R. Griffiths

Stratigraphic evolution of sand provenance during Paleocene deposition in the Northern North Sea area 73
A. C. Morton, C. R. Hallsworth and G. C. Wilkinson

Acquisition and processing techniques to improve the seismic resolution of Tertiary targets 85
H. Crook, J. E. Palmer, D. J. Painter and R. C. Uden

The role of Paleocene magmatism in the Tertiary evolution of basins on the NW seaboard 97

Sandstone architecture of the Balder Formation depositional system, UK Quadrant 9 and adjacent areas 107
G. Timbrell

The geology of the Gryphon Oil Field 123

Origin of complex mound geometry of Paleocene submarine-fan sandstone reservoirs, Balder Field, Norway 135
A. I. Jenssen, D. Bergslien, M. Rye-Larsen and R. M. Lindholm

Paleocene reservoirs of the Everest trend 145
S. J. O’Connor and D. Walker

The Alba Field: evolution of the depositional model 161
S. K. Newton and K. P. Flanagan
The Cretaceous

The Lower Cretaceous chalk play in the Danish Central Trough 175
J. R. Ineson

Complex deformation and fluidization structures in Aptian sediment gravity flow deposits of the Outer Moray Firth 185
R. A. Downie and C. I. Stedman

The Jurassic: from regional models to field development; the impact of sequence stratigraphy on hydrocarbon geology

Introduction and review 191
A. J. Fraser

Jurassic exploration history: a look at the past and the future 195
W. G. Cordey

High and low resolution sequence stratigraphy in lithological prediction—examples from the Mesozoic around the northern North Atlantic 199
F. Surlyk, N. Noe-Nygaard and G. Dam

Sequence stratigraphy of a failed rift system: the Middle Jurassic to Early Cretaceous basin evolution of the Central and Northern North Sea 215
R. P. Rattey and A. B. Hayward

Sequence stratigraphic control on Middle and Upper Jurassic reservoir distribution within the UK Central North Sea 251
A. D. Donovan, A. W. Djakic, N. S. Ioannides, T. R. Garfield and C. R. Jones

Middle to Late Jurassic basin evolution and sandstone reservoir distribution in the Danish Central Trough 271
P. N. Johannessen and J. Andsbjerg

Potential reservoir and source rocks in relation to Upper Triassic to Middle Jurassic sequence stratigraphy, Atlantic margin basins of the British Isles 285
N. Morton

Triassic–Jurassic megasequence stratigraphy in the Northern North Sea: rift to post-rift evolution 299
R. J. Steel

Application of sequence stratigraphy and trace fossil analysis to reservoir description: examples from the Jurassic of the North Sea 317
A. M. Taylor and R. L. Gawthorpe

Jurassic thermal doming and deflation in the North Sea: implications of the sequence stratigraphic evidence 337
J. R. Underhill and M. A. Partington

Genetic sequence stratigraphy for the North Sea Late Jurassic and Early Cretaceous: distribution and prediction of Kimmeridgian–Late Ryazanian reservoirs in the North Sea and adjacent areas 347
M. A. Partington, B. C. Mitchener, N. J. Milton and A. J. Fraser

Biostratigraphic calibration of genetic stratigraphic sequences in the Jurassic–lowermost Cretaceous (Hettangian–Ryazanian) of the North Sea and adjacent areas 371
M. A. Partington, P. Copestake, B. C. Mitchener and J. R. Underhill

The interaction of structure and sedimentary process controlling deposition of the Upper Jurassic Brae Formation Conglomerate, Block 16/17, North Sea 387
S. T. J. Cherry

Miller Field: reservoir stratigraphy and its impact on development 401
C. R. Garland

Stratigraphic, structural and depositional history of the Jurassic in the Fisher Bank Basin, UK North Sea 415
D. N. Clark, L. A. Riley and N. R. Ainsworth

Evolving depositional geometries in the North Sea Jurassic rift 425
N. J. Milton
CONTENTS

Effective stratigraphical subdivision of the Humber Group and the Late Jurassic evolution of the UK Central Graben 443
J. Price, R. Dyer, I. Goodall, T. McKie, P. Watson and G. Williams

Late Jurassic plays along the western margin of the Central Graben 459
L. L. Wakefield, H. Droste, M. R. Giles and R. Janssen

Structural controls on the Late Jurassic age shelf system, Ula Trend, Norwegian North Sea 469
I. J. Stewart

The genetic sequence stratigraphy of the Hettangian to Oxfordian succession, Inner Moray Firth 485
K. J. Stephen, J. R. Underhill, M. A. Partington and R. J. Hedley

The Triassic: recent advances, discoveries and developments

Introduction and review 545
M. A. Stephenson

Salt control on Triassic reservoir distribution, UKCS Central North Sea 547
R. I. Smith, N. Hodgson and M. Fulton

Physical modelling of North Sea salt diapirism 559
P. J. Weston, I. Davison and M. W. Insley

Low-angle faulting in the Triassic of the South Viking Graben: implications for future correlations 569
R. K. Morgan and P. L. Cutts

Sedimentation of Upper Triassic reservoirs in the Beryl Embayment: lacustrine sedimentation in a semi-arid environment 581
K. P. Dean

F15-A: a Triassic gas field on the eastern limit of the Dutch Central Graben 583
J. M. Fontaine, G. Guastella, P. Jouault and P. de la Vega

A review of the Triassic play in the Roer Valley Graben, SE onshore Netherlands 595
A. M. Winstanley

Heavy mineral stratigraphy in the UK Trias: Western Approaches, onshore England and the Central North Sea 609
C. V. Jeans, S. J. B. Reed and M. Xing

Clay mineral stratigraphy of Mesozoic and Paleozoic red beds, Northern North Sea 625
J. R. Glasmann and G. C. Wilkinson

Permo-Carboniferous and older plays

Introduction and review 639
T. J. Wheatley

Permo-Carboniferous and older plays, their historical development and future potential 641
J. Gérard, T. J. Wheatley, J. S. Ritchie, M. Sullivan and M. G. Bassett

Geology and hydrocarbon prospects of the Paleozoic in the Baltic region 651
A. P. Brangulis, S. V. Kanev, L. S. Margulis and R. A. Pomerantsev

Late Paleozoic plays in East Greenland 657
F. G. Christiansen, H. C. Larsen, C. Marcussen, S. Piasecki and L. Stemmerik

The case for exploration of deep plays in the Variscan fold belt and its foreland 667
N. J. P. Smith
Carboniferous depositional systems of the Southern North Sea  677
J. D. Collinson, C. M. Jones, G. A. Blackbourn, B. M. Besly, G. M. Archard and A. H. McMahon

Structural development and hydrocarbon occurrence of the Carboniferous in the UK Southern North Sea Basin  689
J. M. Hollywood and C. V. Whorlow

Interpreting the Upper Carboniferous of the Dutch Cleaver Bank High  697
D. G. Quirk

Permo-Carboniferous plays of the Silver Pit Basin  707
J. B. Bailey, P. Arbin, O. Daffinoti, P. Gibson and J. S. Ritchie

The evolution and hydrocarbon potential of the Northumberland–Solway Basin  717
R. A. Chadwick, D. W. Holliday, S. Holloway and A. G. Hulbert

The late Carboniferous ‘Barren Red Bed’ play of the Silver Pit area, Southern North Sea  727
B. M. Besly, S. D. Barley and P. Turner

The Rotliegend in northwest Germany, from frontier to fairway  741
P. Burri, J. Faupel and B. Koopmann

Pseudo-reefs beneath Zechstein salt on the northern flank of the Mid North Sea High  749
J. C. M. Taylor

The Caister Fields, Block 44/23a, UK North Sea  759
J. S. Ritchie and P. Pratsides

Structural and sedimentological controls on diagenesis in the Ravenspurn North gas reservoir, UK Southern North Sea  771
P. Turner, M. Jones, D. J. Prosser, G. D. Williams and A. Searl

Appendix: A list of common abbreviations  xvii
Index  xix

VOLUME 2

Irish Sea basins

Introduction and review  789
R. E. Dunay

Tectonic and stratigraphic aspects of the East Irish Sea Basin and adjacent areas: contrasts in their post-Carboniferous structural styles  791
D. I. Jackson and P. Mulholland

Geochemical modelling of the East Irish Sea Basin: its influence on predicting hydrocarbon type and quality  809
M. Hardman, J. Buchanan, P. Herrington and A. Carr

Controls on reservoir quality in the Triassic Sherwood Sandstone of the Irish Sea  823
N. S. Meadows and A. Beach

The Fleetwood Dyke and the Tynwald fault zone, Block 113/27, East Irish Sea Basin  835
G. Arter and S. W. Fagin

The Kish Bank Basin, offshore Ireland  845
D. Naylor, N. Haughey, G. Clayton and J. R. Graham

The tectonic history of the East Irish Sea Basin with reference to the Morecambe Fields  857
R. Knipe, G. Cowan and V. S. Balendran

The use of dipmeter logs in the structural interpretation and palaeocurrent analysis of Morecambe Fields, East Irish Sea Basin  867
G. Cowan, C. Ottesen and I. A. Stuart

The geology of the North Morecambe Gas Field, East Irish Sea Basin  883
I. A. Stuart
Atlantic margin exploration: Cretaceous–Tertiary evolution, basin development and petroleum geology

Introduction and review  899
A. M. Spencer and O. Eldholm

Evolution of North Atlantic volcanic continental margins  901
K. Hinz, O. Eldholm, M. Block and J. Skogseid

The southern West Greenland continental margin: rifting history, basin development, and petroleum potential  915

Late Mesozoic–Cenozoic evolution of the southwestern Barents Sea  933
J. I. Faleide, E. Vagnes and S. T. Gudlaugsson

The Norwegian continental margin from the Northern North Sea to the Senja Fracture Zone  951
B. T. Larsen, J. Skogseid, H. Brekke, P. Blystad, O. Rise and M. Larsen

Mesozoic to Cenozoic plate reconstructions of the North Atlantic and hydrocarbon plays of the Atlantic margins  953
S. D. Knott, M. T. Burchell, E. J. Jolley and A. J. Fraser

Subsidence patterns in western margin basins; evidence from the Faeroe–Shetland Basin  975
J. D. Turner and R. A. Scrutton

Development of the Rockall Trough and the northwest European continental margin  985
R. S. White

The tectono-stratigraphy of the Solan Basin, west of Shetland  987
J. Booth, T. Swiecicki and P. Wilcockson

Structuring and transfer zones in the Faeroe Basin in a regional tectonic context  999
B. Rumph, C. M. Reaves, V. G. Orange and D. L. Robinson

Paleogene sequence stratigraphic framework of the Faeroe Basin  1011

Late Paleocene to Miocene compression in the Faeroe–Rockall area  1025
L. O. Boldreel and M. S. Andersen

Preliminary observations of Neogene–Quaternary depositional processes in the Faeroe–Shetland Channel revealed by high-resolution seismic facies analysis  1035
J. E. Damuth and H. C. Olson

Seismic structure of the Hatton–Rockall area: an integrated seismic/modelling study from composite datasets  1047
J. Keser Neish

Cretaceous and Tertiary basin development west of Ireland  1057
P. M. Shannon, J. G. Moore, A. W. B. Jacob and J. Makris

Elevated palaeotemperatures prior to Early Tertiary cooling throughout the UK region: implications for hydrocarbon generation  1067
P. F. Green, I. R. Duddy, R. J. Bray and C. L. E. Lewis

Crustal extension, subsidence and inversion in NW Europe  1075
A. H. Ruffell and M. P. Coward

Evolution of the English Channel Basin  1077
A. H. Ruffell, M. Harvey and G. D. Wach

Structural styles and their evolution in the North Sea area

Introduction and review  1081
I. D. Bartholomew

Structural models for the evolution of the North Sea area  1083
G. D. Williams

The effect of Late Caledonian and Variscan continental escape tectonics on basement structure, Paleozoic basin kinematics and subsequent Mesozoic basin development in NW Europe  1095
M. P. Coward
Regional structural evolution of the North Sea: oblique slip and the reactivation of basement lineaments 1109
I. D. Bartholomew, J. M. Peters and C. M. Powell

Mesozoic extension in the North Sea: constraints from flexural backstripping, forward modelling and fault populations 1123
A. M. Roberts, G. Yielding, N. J. Kusznir, I. Walker and D. Dorn-Lopez

Tectonic evolution and structural styles of the East Shetland Basin 1137
M. J. Lee and Y. J. Hwang

A fundamental reappraisal of the structure of the Cormorant Field and its impact on field development strategy
R. R. A. Demyttenaere, A. H. Sluijk and M. R. Bentley

The structural evolution of the Snorre Field and surrounding areas 1159
N. Dahl and T. Solli

Controls on the development and evolution of structural styles in the Inner Moray Firth Basin 1167
K. Thomson and J. R. Underhill

The structural evolution of the eastern end of the Halibut Horst, Block 15/21, Outer Moray Firth, UK North Sea 1179
M. J. Hibbert and D. S. Mackertich

Mesozoic evolution of the Jæren High area, Norwegian Central North Sea 1189
O. Hoiland, J. Kristensen and T. Monsen

Extension and salt tectonics in the East Central Graben 1197
J. Penge, B. Taylor, J. A. Huckerby and J. W. Munns

Relationships between basement faulting, salt withdrawal and Late Jurassic rifting, UK Central North Sea 1211
D. Erratt

Comparison of Permo-Triassic and deep structure of the Forties–Montrose and Jæren highs, Central Graben, UK and Norwegian North Sea 1221
N. H. Plat and P. Philip

Structural styles from the Central Graben in the UK and Norway 1231
R. A. Sears, A. R. Harbury, A. J. G. Protoy and D. J. Stewart

The structure of the Norwegian Central Trough (Central Graben area) 1245
M. B. Gowers, E. Holtar and E. Swensson

Structural styles in the Danish Central Graben 1255
G. O. Sundsbe and J. B. Megson

Mesozoic structural evolution of the UK Southern North Sea: insights from analysis of fault systems 1269
T. J. Arthur

Fault reactivation and oblique-slip in the Southern North Sea 1281
B. C. Oudmayer and J. de Jager

**Fluids: migration, overpressure and diagenesis**

Introduction and review 1293
A. J. Fleet and W. G. Cordey

Distribution of sub-surface pressure in the Norwegian Central Graben and applications for exploration 1295
R. C. Leonard

Overpressures in the Central North Sea: implications for trap integrity and drilling safety 1305
L. Gaarenstroom, R. A. J. Tromp, M. C. de Jong and A. M. Brandenburg

Deep prospects—imaging, overpressure and associated problems in the UK Central North Sea 1315
J. A. Henderson and M. J. N. Pepper

Source rock permeability and petroleum expulsion efficiency: modelling examples from the Mahakam delta, the Williston Basin and the Paris Basin 1317

Submarine gas seepage in the North Sea and adjacent areas 1333
M. Hovland