

## Contents

The Technical and Editorial Committee      viii

Preface      x

The Petroleum Geology of NW Europe: 50 years of learning – a platform for present value and future success.

An overview

*B. Levell & M. Bowman*      1

### Plays and Fairways

Tectonostratigraphic framework and depositional history of the Cretaceous–Danian succession of the Danish Central Graben (North Sea) – new light on a mature area

*F. S. P. van Buchem, F. W. H. Smit, G. J. A. Buijs, B. Trudgill & P.-H. Larsen*      9

Multiple episodes of regional exhumation and inversion identified in the UK Southern North Sea based on integration of palaeothermal and palaeoburial indicators

*P. F. Green, I. R. Duddy & P. Japsen*      47

3D basin and petroleum system modelling of the NW German North Sea (Entenschnabel)

*J. Arfai & R. Lutz*      67

New insights into the unexploited reservoir potential of the Mid North Sea High (UKCS quadrants 35–38 and 41–43): a newly described intra-Zechstein sulphate–carbonate platform complex

*S. Patruno, W. Reid, C. A.-L. Jackson & C. Davies*      87

Regional study of controls on reservoir quality in the Triassic Skagerrak Formation of the Central North Sea

*M. Akpokodje, A. Melvin, J. Churchill, S. Burns, J. Morris, S. Kape, M. Wakefield & R. Ameerli*      125

Regional distribution and controls on the development of post-rift turbidite systems: insights from the Paleocene of the eastern North Viking Graben, offshore Norway

*E. Dmitrieva, C. A.-L. Jackson, M. Huuse & I. A. Kane*      147

Old challenges, new developments and new plays in Irish offshore exploration

*P. M. Shannon*      171

Petroleum systems and results of exploration on the Atlantic margins of the UK, Faroes & Ireland: what have we learnt?

*I. C. Scotchman, A. G. Doré & A. M. Spencer*      187

Deep structure of the Porcupine Basin from wide-angle seismic data

*L. Watremez, M. Prada, T. Minshull, B. O'Reilly, C. Chen, T. Reston, P. Shannon, G. Wagner, V. Gaw, D. Klaeschen, R. Edwards & S. Lebedev*      199

Challenges of future exploration within the UK Rockall Basin

*N. Schofield, D. Jolley, S. Holford, S. Archer, D. Watson, A. Hartley, J. Howell, D. Muirhead, J. Underhill & P. Green*      211

Exploration challenges along the North Atlantic volcanic margins: the intra-volcanic sandstone play in subsurface and outcrop

*M. Larsen, B. Bell, P. Guarnieri, H. Vosgerau & R. Weibel*      231

Controls on the reservoir quality of Late Cretaceous Springar Formation deep-water fan systems in the Vøring Basin

*A. Finlayson, A. Melvin, A. Guise & J. Churchill*      247

## Play Assessment

The challenge of unbiased application of risk analysis towards future profitable exploration

*G. P. Citron, P. Jeffrey Brown, J. MacKay, P. Carragher & D. Cook* 259

Exploration well failures from the UK North Sea

*C. J. H. Mathieu* 267

The edges of the wedges: a systematic approach to trap definition and risking for stratigraphic, combination and sub-unconformity traps

*E. J. Stirling, E. M. G. Fugelli & M. Thompson* 273

## Recent Successes and Learnings from Failures

New exploration discoveries in a mature basin: offshore Denmark

*G. Goffey, M. Attree, P. Curtis, F. Goodfellow, J. Lynch, D. Mackertich, T. Orife & W. Tyrrell* 287

Petroleum geology of the Cygnus gas field, UK North Sea: from discovery to development

*R. Catto, S. Taggart & G. Poole* 307

The Bacchus development: dealing with geological uncertainty in a small high-pressure–high-temperature development

*P. Rose, G. Byerley & O. Vaughan* 319

The 35/9-7 Skarfjell discovery: a genuine stratigraphic trap, NE North Sea, Norway

*J.-O. Koch, A. Frischbutter, K. Øygard & J. Cater* 339

Rhyl Field: developing a new structural model by integrating basic geological principles with advanced seismic imaging in the Irish Sea

*G. Ward & D. Baker* 355

The influence of volcanic rocks on the characterization of Rosebank Field – new insights from ocean-bottom seismic data and geological analogues integrated through interpretation and modelling

*S. Poppitt, L. J. Duncan, B. Preu, F. Fazzari & J. Archer* 373

The Lancaster Field: progress in opening the UK's fractured basement play

*A. Belaidi, D. A. Bonter, C. Slightam & R. C. Trice* 385

## Infrastructure-led Exploration and Development

A hydrodynamic model and associated spill-point map for the Huntington Field, UK Central North Sea

*S. Green, S. O'Connor, R. Swarbrick & K. Waters* 399

Lateral accretion in a straight slope channel system: an example from the Forties Sandstone of the Huntington Field, UK Central North Sea

*C. Edwards, S. McQuaid, S. Easton, D. Scott, A. Couch, R. Evans & S. Hart* 413

The Shearwater Field – understanding the overburden above a geologically complex and pressure-depleted high-pressure and high-temperature field

*D. W. Jones, B. J. Taylor, C. E. Gill, M. Bevaart, P. F. van Bergen, J. S. Watson, S. de Gennaro & M. Hodzic* 429

The Knarr Field: a new development at the northern edge of the North Sea

*S. S. Skarpeid, J. M. Churchill, J. P. J. Hilton, C. N. Izatt & M. T. Poole* 445

Beyond Laggan–Tormore: maximizing economic recovery from gas infrastructure West of Shetland

*P. Noel & N. Taylor* 455

## **Late-life Fields, Redevelopment and the Next Life**

Unlocking 4D seismic technology to maximize recovery from the pre-salt Rotliegend gas fields of the Southern North Sea

*J. Brain, T. Lassaigne, M. Darnet & P. Van Loevezijn* 465

Re-saturation targets identified from 4D seismic softening responses in the Forties Field

*L. Singer, G. Byerley & P. Rose* 473

Aviat: a Lower Pleistocene shallow gas hazard developed as a fuel gas supply for the Forties Field

*P. Rose, G. Byerley, O. Vaughan, J. Cater, B. R. Rea, M. Spagnolo & S. Archer* 485

The Beryl Field area: increasing production in a mature asset

*J. Pyle, G. Farquharson, J. Gibson, D. Helgeson & J. Towart* 507

Spectral decomposition: an aid in characterizing field architectures of the Laggan and Tormore fields, Faroe–Shetland Basin

*K. A. Wright, R. Nice, M. Tazzi, K. Purnell & V. Penasse* 525

Future directions in reservoir modelling: new tools and ‘fit-for-purpose’ workflows

*M. Bentley & P. Ringrose* 537

Goldeneye: Tomorrow Never Dies (or a field Only Lives Twice)

*J. D. Marshall, O. D. Tucker, C. E. Lovelock, S. J. Darker, C. E. Annia & J. B. Hognestad* 547

North Sea – next life: extending the commercial life of producing North Sea fields

*J. Gluyas, S. Mathias & S. Goudarzi* 561

## **Onshore Exploration and Development**

Shale prospectivity onshore Britain

*A. L. Harvey, I. J. Andrews & A. A. Monaghan* 571

The application of elemental geochemistry to UK onshore unconventional plays

*D. A. Riley, T. J. Pearce, E. Mathia, K. Ratcliffe & J. Martin* 585

An assessment of the Upper Succession and the related secondary reservoirs in the Welton Field, onshore UK

*J. Steventon & M. Bowman* 595

The unconventional Carboniferous reservoirs of the Greater Kirby Misperton gas field and their potential: North Yorkshire’s sleeping giant

*F. Hughes, D. Harrison, M. Haarhoff, P. Howlett, A. Pearson, D. Ware, C. Taylor, G. Emms & A. Mortimer* 611

Index 627