Petroleum Exploration & Development in Papua New Guinea

Compiled and edited by
George J Carman and Zina Carman

# Table of Contents

## Part One
### Introduction
- **Exploration in Papua New Guinea: Some aspects of the human impact**  
  *J. Sinclair*  
  3
- **Relations with the community: A proactive approach for the resource industry**  
  *D. Henton*  
  17
- **Investments and Reserves in the Papuan Basin, Papua New Guinea**  
  *B. Pawih and P.H. Halstead*  
  27

## Part Two
### Palaeontology
- **Marine stratigraphic units in Central Province, Papua New Guinea: Age and depositional environments**  
  *D.W. Haig, R.C.B. Perembo, D.A. Lynch, G. Milner and M. Zammit*  
  47
- **The Maastrichtian-Danian Disconformity in the Mendi-Nipa region, Southern Highlands Province, Papua New Guinea**  
  *D.A. Lynch and G.J. Milner*  
  61
- **The Kimmeridgian problem in Papua New Guinea and other parts of the Indo-southwest Pacific**  
  *G. Francis and G.E.G. Westermann*  
  75

## Part Three
### Stratigraphy and Sedimentology
- **Miocene-Pleistocene deep sea to alluvial fan delta sedimentation in the Markham Basin, Papua New Guinea: Sedimentary response to arc-continent collision**  
  *K. Liu and K.A.W. Crook*  
  97
- **Occurrence and character of outcropping limestones in the Sepik Basin: Implications for hydrocarbon exploration**  
  *C. Wilson, R. Barrett, R. Howe and L.K. Leu*  
  111
- **The sedimentology, reservoir potential and seal integrity of the Pale Sandstone at the Aure Scarp, Papua New Guinea**  
  *P.J. Boult and G.J. Carman*  
  125
- **A revised sequence stratigraphic and depositional model for the Toro Formation, with implications for reservoir distribution and prediction**  
  *T.D. Varney and A.C. Brayshaw*  
  139
- **The sequence stratigraphy of the Mesozoic reservoirs of the Gobe Anticline, Papuan Thrust Belt**  
  *G.D. Powis*  
  155
- **Stratigraphic thickness variations and depositional systems of the Ieru Formation, Southern Highlands and Western Provinces, Papua New Guinea**  
  *J.C. Phelps and C.N. Denison*  
  169
The reservoir potential of the Imburu, Toro and Ieru Formations in the Ok Menga area, PNG

*P.J. Boul* ............................................................... 191

Relationship of the Toro Sandstone Formation and the Alene Sands of Papua to the Woniwogi Formation of Irian Jaya

*J. Granath and S. Hermeston* ........................................ 201

**Part Four**

**Regional Structure and Palaeogeography**

The South East Asia Gravity Project: Papua New Guinea

*D.C. Manton and J.D. Fairhead* ........................................ 209

Eastern Papuan Basin: A new model for the tectonic development and implications for petroleum prospectivity

*C.J. Pigram and P.A. Symonds* ....................................... 213

The Bamaga Basin: A new exploration target

*V.L. Passmore, P.E. Williamson, A.R.G. Gray and P. Wellman* ........................................ 233

An alternative model for the Oligo-Miocene evolution of northern PNG and the Sepik-Ramu Basins

*K.C. Hill, A. Grey, D. Foster and R. Barrett* ......................... 241

Mesozoic to Cainozoic plate tectonic and palaeogeographic evolution of the New Guinea Region

*H.I.M. Struckmeyer, M. Yeung and C.J. Pigram* ...................... 261

Palaeogeography of the Coral Sea, Darai and Foreland Megasequences in the eastern Papuan Basin

*G.J. Carman* ........................................................... 291

**Part Five**

**Papuan Fold Belt Structure and Field Geology**

Structural interpretations based on strontium isotope dating of the Darai Limestone, Papuan Fold Belt, New Guinea

*S. Hornafius and R.E. Denison* ...................................... 313

Structural styles and hydrocarbon prospectivity around the Northern Muller Anticline, PNG


The use of magnetotelluric surveying as a risk reduction tool for hydrocarbon exploration in the Papuan Foldbelt

*J.K. Bennett and M. Parish* ........................................... 335

Evolution of structural models of two anticlines in the Papuan Thrust Belt by application of magnetotellurics

*L. Ross* ................................................................. 351

Leading edge architecture of the Papuan Fold Belt

*R.H. LaRue* .............................................................. 371

A geological evaluation of the Pangia Anticline, Southern Highlands Province, PNG

*D.M. Medd* ............................................................... 385

Detailed analysis from seismic data of the structure within the Aure Fold and Thrust Belt, Gulf of Papua, Papua New Guinea

*K.A. Kugler* ............................................................. 399

P'nyang Field: Discovery and geology of a gas giant in the western Papuan Fold Belt, Western Province, Papua New Guinea

*G.L. Valenti* ............................................................. 413

The South East Gobe oilfield: Technical aspects of a significant discovery in Papua New Guinea

*E. Surka* ................................................................. 431
Part Six
Petroleum Geology and Geochemistry

Hydrodynamic character of the Toro Sandstone, Iagifu/Hedinia area, Southern Highlands Province, Papua New Guinea
L.I. Eisenberg .................................................. 447

Petrographic and fluid inclusion evidence for the timing of diagenesis and petroleum migration in the Papuan Basin

Hydrocarbon and pore water migration history in relation to diagenesis in the Toro and Iagifu Sandstone, S.E. Gobe-2
M. Lisk, J. Hamilton, P. Eadington and T. Kotaka .................................................. 477

Cainozoic oil in Papua New Guinea: Evidence from geochemical analysis of two newly discovered seeps
A.P. Murray, R.E. Summons, J. Bradshaw and B. Pawih .................................................. 489

An overview of the petroleum geology of the Eastern Papuan Fold Belt, based on recent exploration
A. Slater and F. Dekker .................................................. 499

Hydrocarbon prospectivity of the Papuan Foreland
P. Barndollar .................................................. 517

Recent developments in prospect mapping in the Hides/Karius area of the Papuan Foldbelt
A. Grainge .................................................. 527

Part Seven
Exploration and Field Operations

Land, marine and transition zone seismic operations in PPL123, Papua New Guinea
A.G. Fenwick and R.J. Paul .................................................. 541

Cost effective seismic acquisition in the Papuan Foreland Basin
A. Garcia, J.D. Schneider, and F.E. Doughty .................................................. 559

Slim hole drilling: A place in PNG oil exploration
T. Gurney and H.T. Brady .................................................. 573

Formation pressure measurements and their use in oil exploration in Papua New Guinea
M.C. Daniels .................................................. 579

Exploration well testing in Papua New Guinea
D.E. Corwin .................................................. 589

Laboratory and simulation contribution to the design of a gas injection strategy for the Kutubu Project
M.V. Langston .................................................. 595

Optimisation of well targeting and completion interval selection in the Kutubu Project
T.N. Magner, M.V. Langston and W.I. McKay .................................................. 605

Development of the Kutubu Project Reservoirs: Production Development Licence through First Oil
W.I. McKay, M.V. Langston and T.N. Magner .................................................. 611

Case Study: Evaluation of multiphase flow hydraulics in the Kutubu Development field gathering system
W.I. McKay .................................................. 617

Use of horizontal wells in the development of the Agogo Toro reservoir
T.N. Magner, M.V. Langston and W.I. McKay .................................................. 625

The Kutubu Project export system
M.M. Friese and C.L. Rottier .................................................. 637