INTRODUCTION

TIMOR IS LOCATED IN THE TIMOR SEA REGION, NORTH OF AUSTRALIA.

THE HYDROCARBON PROSPECTIVITY OF TIMOR-LESTE IS PROVEN BY EXISTING FIELD OFFSHORE AND NUMEROUS HYDROCARBON SEEPS ONSHORE WHICH REFLECT AN ACTIVE PETROLEUM SYSTEM. THE QUALITY OF THE OIL FROM ONSHORE SEEPS HAS BEEN ANALYSED TO BE SWEET CRUDE, WITH 30 DEG TO 36 DEG API.
Java Trench
Deformation front of Banda Orogenic Belt
Outer Banda Arc (non-volcanic)
Active Inner Banda Arc (volcanic)
Inactive

155 Ma
Continental margin

Banda Embayment
Bonaparte Basin
Browse Basin
Arafura/Money Shoal Basins
Australia

© 2014 TIMORGAP. All right reserved.
4. Aseismic domal uplift – ~1500 m in eastern Timor-Leste – mid to late Pleistocene
3. Slab tear – high-angle faulting – uplift – late Pliocene to mid Pleistocene
2. Jamming of subduction – tectonically quiet – latest Miocene to mid Pliocene
1. Subduction: chaotic shortening – late Miocene

Collision from ~ 8 Ma

Australian Passive Margin

Timor Collision Zone

Exmouth Plateau

Breakup and formation of Indian Ocean in Timor region at ~ 165 Ma

East Gondwana Interior Sag–Rift

Carboniferous–Permian

Triassic–Early Jurassic

Source: Prof. David H., 2014
• EARLY EXPLORATION DRILLING FOCUSED MAINLY ON THE LATE NEogene LIGHTLY COMPACTED SANDSTONE FORMATIONS
• BANLI-1 INTERSECTED U.TRIASSIC TO M.JURASSIC SHALLOW MARINE SANDSTONES.
• PRIMARY SEAL: M.JURASSIC WAI LULI SHALE, UP TO 1000M THICK
GEOLOGICAL & SEISMIC CROSS SECTION – Offshore to Onshore

North Savu Sea
Allochthon

Timor Island
Banli-1
Mola-1

Timor Trough

Northern Bonaparte Basin
Flamingo High

Cretaceous - Neogene
Jurassic
Permian

OCEANIC CRUST
CONTINENTAL CRUST

Fold & Thrust belt
Timor Trough
Foreland Area

SOURCE KITCHEN

WWW.TIMORGAP.COM
The first detailed geological study of Timor was conducted by Hirschi (1907) who recognized complex structures in the region.

A reconnaissance work from an oil company led by Weber from 1910-1911 ("but never published"). After that was recognized later by Wanner (1956).
EXPLORATION HISTORY - GEOPHYSICS

GEOPHYSICAL EXPLORATION PROJECT:

- Seismic geophysical survey along the southern coastline of Portuguese Timor in 1966 include area:
  - The Betano-Suai-Provincial Border Project,
  - The Beaco-Luka Project,
  - The Aliambata Project.
  - There also three tie lines I, II and III spacing almost 3 miles.

- A seismic survey was conducted by C.G.G. during 1968. This survey found an anticline under Cape Tafara. A well was drilled to around 6,000 feet. Timor Oil Limited attempted to find commercial quantities by drilling a number of wells near the seeps and another.

- Offshore Tafara-Suai, Beaco-Mati Boot and Aliambata areas in 1970 from Timor Oil Limited.

Source: Timor Oil Limited
1970
- **FIRST DRILLED AT ALIAMBATA (TOTAL DEPTH 100 M, FLOWED 37 BOPD, DRILLED IN 1911-1914).**

- **ALIAMBATA-1 (TOTAL DEPTH 4165 FEET, DRILLED IN 1957 & 1958)**

Source: Boutakoff (1967)
- **MATAI-1 IN SUAI AREA-** (TOTAL DEPTH 621M, FLOWED 180 BOPD, DRILLED IN 1960 & 1961).
- **COTA TACI-1 IN SUAI AREA** (TOTAL DEPTH 2800M, FLOWED 200 BOPD, DRILLED IN 1971).
PETROLEUM SYSTEMS: COMPARISON WITH SERAM

HYDROCARBON PLAYS

Permian Atahoc & Cribas

Triassic Babulu

Jurassic Wailuli

Plio-Pleistocene Viqueque

Tertiary strata

S R

Reservoir Rock

Source Rock

(Modified from Pertamina - Beicip, 1996)
STRATIGRAPHIC CORRELATION : SERAM AND TIMOR - STRATIGRAPHY AND PETROLEUM PLAY

Seram Stratigraphy and Petroleum Play

Timor Stratigraphy and Petroleum Play

Andang Bactiar 2014 ppt Onshore Petroleum Geology of Timor-Leste (Learning from Onshore Oil Fields in Indonesia)
Seram Production History

- First Oil field discovered in 1865 and first produced in 1897 by BPM from Bula field
- Initial produced 200 bpd
- Oseil Field:
  - Cumulative 13,349,199 bbl
  - Reserves 4.74 mmbbl
- Lofin Field:
  - GIIP: 3,070 Bcf
  - Recoverable gas: 2,020.1 Bcf
  - Recoverable Condensate: 18.25 MMbbl
  (Source: Report By Order of the Board CITIC Resources Holdings Limited Kwok Peter Viem Chairman)

- Source rock: The main potential source rock are believed to be Late Triassic-Jurassic restricted marine mixed carbonate and clastic sequence.

- Reservoir rock: For exploration in East Timor up to 1975, the primary reservoir target were lightly compacted sandstone within the late Neogene post orogenic basins along the south coast, while the deeper drilling failed to establish reservoir sequences, however Sani et al (1995) only described the Plover equivalent in Banli-1, indicating as shallow Marine siliciclastic facies.

- Seal: the primary sealing horizon in Timor is middle Jurassic Shales of the Wailuli Formation which immediately succeeds the main potential reservoir sequences of the Malita and Plover equivalent.

(Charlton, 2002b)
Timor Thrust & Fold Zone – Seeps & Source Rocks
(adapted from T Charlton 2002)

- **Oil and gas seeps in East Timor**
- **Known Upper Triassic to Lower Jurassic restricted marine source rocks; ‘world class’ sources for oil comparable to proven source rocks in the geologically similar and Seram hydrocarbon system**
- **Upper Triassic bituminous shales in Timor locally contain up to 23% TOC.**
- **Geochemical studies suggest similarities between Jurassic source rock sequences in Timor and Australian Northwest Shelf.**
POSSIBLE PLAY TYPES:
- INVERSION ANTICLINES
- NON-INVERTED ANTICLINES
- SIMPLE ROLLOVER ANTICLINES
- SEDIMENTARY PINCH-OUTS
- HORST BLOCKS (FAULT BLOCKS)

Summary

- TIMOR-LESTE IS A COMPLEX TECTONIC AREA, THEREFORE THE STRUCTURES ARE CAPABLE OF HOSTING COMMERCIAL VOLUMES OF HYDROCARBON ACCUMULATION.

- ONSHORE AREA HAS AN ACTIVE PETROLEUM SYSTEM AND THE EARLIER DISCOVERIES IN THE SOUTH COAST CAN BE COMMERCIALLY ATTRACTIVE DUE TO THE CURRENT INFRA-STRUCTURE DEVELOPMENT IN SUAI (SSB).

Recommendation

- REQUIRES HIGH QUALITY, HIGH RESOLUTION GRAVITY & MAGNETIC DATA TO IDENTIFY REGIONAL STRUCTURES.

- REQUIRES DETAILED SEISMIC SURVEY

- DETAILED GEOLOGICAL MODELLING TO INTERPRET STRUCTURAL EVOLUTION AND HYDROCARBON MIGRATION PATHWAYS, PROSPECT INVENTORY & DRILLABLE TARGET
THANK YOU