

MEMOIRS OF THE GEOLOGICAL SOCIETY OF LONDON

no. 4

THE GEOLOGY OF
PORTUGUESE TIMOR

MEMOIRS OF THE GEOLOGICAL SOCIETY OF LONDON

no. 4

THE GEOLOGY OF
PORTUGUESE TIMOR

MICHAEL GEOFFREY AUDLEY-CHARLES

PH.D. F.G.S.

Published by the

GEOLOGICAL SOCIETY OF LONDON

BURLINGTON HOUSE · LONDON · W 1

1968

Submitted 8 October 1965; revised typescript received 19 April 1966

This *Memoir* was presented and discussed at the Geological Society meeting on 6 April 1966; the discussion at this meeting was published in *Proc. geol. Soc. Lond.* no. 1634, pp. 133–6.

Published by the Geological Society of London
Burlington House, London W 1

September 1968

Printed by John Wright & Sons Limited, Bristol

© Geological Society of London 1968

ABSTRACT

Portuguese Timor forms the eastern half of Timor which is the largest of the Lesser Sunda Islands. Timor is that island of the Indonesian Archipelago nearest to Australia, being separated from the Sahul Shelf by only 120km (75 miles). The geology of Timor is therefore particularly relevant to the problems of the geological relationships between Asia and Australia.

This Memoir deals mainly with the stratigraphy and structure of Portuguese Timor, an area of 16000km² (7500 square miles). It is based upon 28 months of field mapping and three years of laboratory studies, mainly petrography and geochemistry. Two-thirds of the area was mapped on a scale of 1:40000 and the remainder on 1:100000. This detailed reconnaissance is supported by the palaeontological reports of several specialists.

Twenty-four formations are distinguished, four of which are wholly allochthonous. The autochthonous formations range in age from Lower Permian to Recent, and make up a

section of 8000m thickness. Of the wholly allochthonous formations one is pre-Permian, two are Permian, and the other a mid-Miocene gravity slide deposit.

Four separate periods of folding are recognized, two of which, the Timorean and the Ramelaean, are of major importance and were accompanied by large-scale overthrusting. Two unconformities in the Lower Tertiary are recognized but no associated folding can be distinguished. Immediately following both the Timorean and Ramelaean orogenies there were periods of uplift.

The geological history of Portuguese Timor is described, and in broad terms an attempt is made to correlate events in eastern Timor with those in western Timor, the other islands of the Indonesian Archipelago, New Guinea, and northern Australia. A regional tectonic sequence emerges.

The seepages of petroleum and natural gas are described and their origin briefly discussed.

CONTENTS

ABSTRACT	v
1 INTRODUCTION	1
(a) Regional setting	1
(b) Geography	1
(c) History of exploration	1
(d) Photogeology	3
(e) Limestone nomenclature	3
(f) Acknowledgements	3
2 STRATIGRAPHY	4
(A) AUTOCHTHONOUS FORMATIONS	4
(1) <i>Permian</i>	4
Atahoc Formation	4
Cribas Formation	7
(2) <i>Triassic</i>	9
Aitutu Formation	9
Tallibelis Member	13
(3) <i>Jurassic</i>	14
Wai Luli Formation	14
(4) <i>Cretaceous</i>	16
Wai Bua Formation	16
Borolalo Limestone	18
Seical Formation	19
(5) <i>Eocene</i>	21
Dartollu Limestone	21
(6) <i>Oligocene</i>	24
Barique Formation	24
(7) <i>Lower Miocene</i>	25
Cablac Limestone	25
Aliambata Limestone	27
(8) <i>Upper Miocene</i>	28
Viqueque Formation	28
Lari Gutu Limestone	33
(9) <i>Pliocene</i>	35
Dilor Conglomerate	35
Seketo Block Clay	37
(10) <i>Post-Pliocene</i>	37
Baucau Limestone	37
Poros Limestone	39
Suai Formation	39
Ainaro Gravels	40
(B) ALLOCHTHONOUS FORMATIONS	40
(1) <i>Pre-Permian</i>	40
Lolotoi Complex	40
(2) <i>Permian</i>	42
Aileu Formation	42
Maubisse Formation	43
(3) <i>Upper Cretaceous</i>	45
Borolalo Limestone	45
(4) <i>Middle Miocene</i>	46
Bobonaro Scaly Clay	46

3	TECTONICS	50
	(A) STRUCTURES OF THE AUTOCHTHONOUS FORMATIONS	50
	(a) Introduction	50
	(b) Structures in the pre-Eocene formations	50
	(c) Minor folding in the pre-Eocene formations	53
	(d) Structures in formations of Middle Eocene to Lower Miocene age	53
	(e) Structures in formations of mid-Miocene to Pliocene age	54
	(f) Structures of the post-Pliocene formations	57
	(B) EMPLACEMENT OF THE ALLOCHTHONOUS FORMATIONS	57
4	SUMMARY OF THE GEOLOGICAL HISTORY	59
5	PETROLEUM AND NATURAL GAS	67
	(a) Oil and gas seepages in the Quaternary formations	68
	(b) Oil and gas seepages in the Tertiary formations	68
	(c) Oil and gas seepages in the Mesozoic formations	69
	(d) Oil and gas seepages in the Permian formations	71
6	REFERENCES	72
7	UNPUBLISHED REPORTS REFERRED TO IN THE TEXT	74

PLATES

(following p. 76)

Plates 1-6	Photographs
Plates 7-8	Photomicrographs
Plate 9	Stratigraphical columns of the Aitutu Formation and Wai Luli Formation
Plate 10	Stratigraphical columns of the Viqueque Formation, Lari Gutu Limestone and Dilor Conglomerate
Plate 11	Geological cross-sections 1 to 3
Plate 12	Geological cross-sections 4 to 7
Plate 13	Geological map of Portuguese Timor

TABLES

Table 1	Table of lithostratigraphical units in eastern Timor	between pp. 4 and 5
Table 2	Tentative correlation between eastern and western Timor	61
Table 3	Oil and gas seepages in eastern Timor	67

MEMOIRS OF THE GEOLOGICAL SOCIETY OF LONDON

1. Ring-complexes in the Younger Granite province of Northern Nigeria,
by R. R. E. JACOBSON, W. N. MACLEOD & R. BLACK (1958)
2. Geological results of petroleum exploration in Britain 1945–1957,
by N. L. FALCON & P. E. KENT (1960)
3. The Barr and Lower Ardmillan Series (Caradoc) of the Girvan district, south-west Ayrshire, with
descriptions of the Brachiopoda, *by ALWYN WILLIAMS (1962)*