

# **THE GEOLOGY OF THE OMAN MOUNTAINS**

## **An outline of their origin**

second edition, Spring 2005

list price: US\$95

AAPG/Geol. Soc./IAS/PESGB: US\$75



## **K. W. GLENNIE**

Scientific Press Ltd  
PO Box 21, Beaconsfield  
Bucks HP9 1NS, UK  
fax: +44 (0) 1494 670155  
[www.jpg.co.uk](http://www.jpg.co.uk)

ISBN 0 901360 35 X

# THE GEOLOGY OF THE OMAN MOUNTAINS

## An outline of their origin

by **K. W. Glennie**

second edition, Spring 2005

ISBN 0 901360 35 X

110 pages (A4) plus *xiv*, 24 colour figures

*The First Edition of this book (1995) introduced the geological history of the Oman Mountains to both general readers and oil company staff. The book focusses on the plate-tectonic origins of the Oman Mountains and links them with Oman's considerable oil and gas reserves. This fully revised and reformatted Second Edition brings the book up to date with more recent plate-tectonic hypotheses on the origin of the Mountains, and gives a fuller outline of the petroleum resources that underlie the desert interior.*

### Contents:

Introduction  
Some basic facts about the Mountains  
Brief history of research on the Oman Mountains  
Some important geological processes  
Rock units of the Oman Mountains  
Brief history of the Greater Oman Mountains area  
The Zagros Crush Zone and the Inner Makran of Iran  
The final stage in building the Oman Mountains  
Petroleum potential of the Oman Mountains & Interior Basins  
Summary and Conclusions  
References/ Glossary/ Index



*K.W.G.  
Oman Mountains  
March 1967*



## ORDER FORM

Please send me \_\_\_ copies of “**The geology of the Oman Mountains, 2nd edition**”

List price: US\$95 (+ \$10 postage)

US\$75 (+ \$10 postage) AAPG/Geol. Soc./IAS/PESGB members

I wish to pay by credit card: Visa      MasterCard      American Express

Name on card: \_\_\_\_\_ Expiry date: \_\_\_\_\_

Number: \_\_\_\_\_

Billing address: \_\_\_\_\_

email: \_\_\_\_\_

Send your order to:

Scientific Press Ltd, PO Box 21, Beaconsfield, Bucks, HP9 INS, UK

fax: +44 (0) 1494 670155

## Preface to the Second Edition

**O**UR KNOWLEDGE and understanding of the geology of the Oman Mountains and adjacent areas has not been static during the ten years since publication of the first edition of this book; the rocks don't change but, with time, our knowledge and understanding improves. Many of these advances are the outcome of continuing exploration by oil company geologists and, importantly, permission from their managements and the Oman Ministry of Oil and Gas to publish their findings; the science continues to advance and leads the way to new finds of oil or gas and to improved production techniques.

From my own point of view, I think I now have a better idea of some of the processes that led to crustal separation and to the development of a new oceanic area northeast of Oman. This, in turn, allows us to speculate on the effects that the development and demise of that ocean, and the resulting building of the Oman Mountains, had on essentially Mesozoic deposition and erosion in the oil-producing areas over the adjacent platform. Understanding those relationships still involves a lot of speculation while waiting on more challenging evidence from oilfields.

I have been told that the first edition of this booklet has been of value to geologists joining the oil industry in Oman for the first time, as well as to other non-geologist scientists and engineers involved in the Oman sub-surface. I hope that the second edition will be of even greater use. With improvements in the reproduction techniques of maps and photographs, illustrations in the second edition are of a much higher quality than those of the first. In this respect, I thank PD Oman draughtsman Ali Al Busaidi for finding the originals of many of the included maps and diagrams, and Barry Fulton of Aberdeen University for modifying a couple more at my request.

**K. W. G.**  
July, 2005

---

*This booklet is dedicated to my former KSEPL colleagues of the “Oman Mountains” team (some of whom are pictured below), not forgetting the draughtsmen who prepared the figures and maps in our 1974 Memoir and the typists who wrestled with the text in the days before word-processors; to the past and present staff of PD Oman, for their help and encouragement in trying to unravel the secrets of the Mountains; and to those numerous geologists world-wide who have laid the basis for our understanding of plate tectonics and mountain building.*

*The booklet is also dedicated to the memory of my deceased wife, Margaret, who put up with my long periods of absence from home; and to my children, who reached adulthood with a father who was, and still is, often away “in the field”.*

---



**The Oman Mountains field team, Jabal al Sumayni (Sumeini) area, February 1967. From left: Michel Boef, Ben Reinhardt, Omar (vehicle mechanic), Mahommed (field assistant), John D’Olier Lees (liaison officer) and (at far right) Pit Pilaar. Other members of the team include camp guards and assistants.**

## CONTENTS

<b>Chapter 1</b>	Introduction .....	<b>1 - 4</b>
<b>Chapter 2</b>	Some basic facts about the Mountains .....	<b>5 - 6</b>
<b>Chapter 3</b>	Brief history of research on the Oman Mountains .....	<b>7 - 10</b>
<b>Chapter 4</b>	Some important geological processes .....	<b>11 - 26</b>
	Plate tectonics	
	Processes of sedimentation	
	Dating the rock record	
<b>Chapter 5</b>	Rock units of the Oman Mountains .....	<b>27 - 50</b>
	A Basement	
	B Late Precambrian and Older Palaeozoic sedimentary rocks	
	C Hajar Supergroup	
	D Aruma Group	
	E Hawasina	
	Sumeini/Hamrat Duru Groups	
	Al Aridh/Kawr Groups	
	Umar Group	
	F Semail Nappe	
	G Maastrichtian and Early Tertiary rock units	
<b>Chapter 6</b>	Brief history of the Greater Oman Mountains area: Permian to Present .....	<b>51 - 68</b>
	Review of Permo-Triassic continental break-up in Iran	
	Permian to Late Cretaceous Oceans in Oman	
	India, Masirah Island and the Batain Coast	
	Subduction and obduction	
	Post-obduction sedimentation and tectonics in the Oman Mountains area	

<b>Chapter 7</b>	The Zagros Crush Zone and the Inner Makran of Iran .....	<b>69 - 76</b>
<b>Chapter 8</b>	The final stage in building the Oman Mountains .....	<b>77 - 82</b>
<b>Chapter 9</b>	Petroleum potential of the Oman Mountains and Interior Basins .....	<b>83 - 88</b>
	Source rocks	
	Maturation and migration	
	Reservoir and cap rocks	
	Traps	
	Oil- and gasfields	
	Lack of potential within the Mountains and along the Batinah & Batain Coasts	
<b>Chapter 10</b>	Summary and Conclusions .....	<b>89 - 91</b>
<b>References</b>	and suggestions for further reading .....	<b>93 - 98</b>
<b>Glossary</b>	of geological terms .....	<b>99 - 106</b>
<b>Index</b>	.....	<b>107 - 109</b>