

HYDROCARBON POTENTIAL IN MAKRAN OFFSHORE



By

MUHAMMAD FURQAN

BS GEOPHYSICS

2012-2016

**DEPARTMENT OF EARTH & ENVIRONMENTAL SCIENCES
BAHRIA UNIVERSITY
KARACHI**

ACKNOWLEDGEMENT

In the name of Allah, the most Beneficent, the most Merciful. All praises to Almighty Allah, the Creator of universe. I bear witness that Holy Prophet Muhammad (PBUH) is the last messenger, whose life is a perfect model for the whole mankind till the Day of Judgment. Allah blessed me with knowledge related to the earth. I am enabled by Allah to complete my work. Without the blessings of Allah, I could not be able to complete my work as well as to be at such a place.

I am especially indebted to my honorable supervisor **SIR JHANGIR KHAN** for giving me an initiative to this study. His inspiring guidance, dynamic supervision and constructive criticism, helped me to complete this work in time.

I pay my thanks to whole faculty of my department especially the teachers whose valuable knowledge, assistance, cooperation and guidance enabled me to take initiative, develop and furnish my academic carrier.

Thanks to Malik jawwad ashraf, ainal jabeen, faheem khan, umair ali khan , abid rizvi, Imran abbasi and all class fellows for their cooperation, love, critical support and assistance in my dissertation

I also acknowledge the help, the encouragement, endless love, support and prayers of my family (**especially my mother, my brother and sister and my father**) which have always been a source of inspiration and guidance for me all the way.

ABSTRACT

During the past ten years the Makran offshore area has attracted considerable attention of national and international scientists, exploration, and petroleum companies to have a better understanding of the peculiar geological and oceanographic setting and to considerably broaden the geological knowledge about Pakistan's EEZ off the Makran margin and its resource potential.

The morphological structure of the Makran, which is strongly influenced by deformation during the subduction processes, is very complex. On the continent and on the upper part of the slope, there are five to seven E-W striking, folded, and elevated accretionary ridges which have been thrust northward, these ridges are separated by ponded slope basins filled with turbidites and hemipelagic sediments, which are horizontal or dip downslope. The large part of the accretionary wedge is well exposed on the continent. A morphologically characteristic deep-sea trench associated with active convergent margins does not exist in Makran.

The Makran continental margin is in an area of high biological productivity in the surface water controlled by monsoonal upwelling. This is one of the causes for the formation of an oxygen minimum zone resulting in a high accumulation rate of predominantly marine organic matter in the marine sediments. Seismic data collected recently from the Makran offshore area provided preliminary identification of some hydrate deposits both at and underneath the sea floor. A bottom-simulating reflector (BSR), caused by the impedance contrast at the base of the gas hydrate zone was observed off Makran at about 400 m below the sea floor in the single channel seismic profiles. The presence of the hydrate indicates that large volumes of methane are being generated at depth in these regions. Offshore, gas expulsions and turbid

waters are reported to occur in places along the Makran continental shelf and slope area. Localized presence of small gas seeps/vents has been noted at the seabed, which perhaps is related to the presence of mud diapir or mud volcano structures in the Makran upper slope sediments. Mud charged with methane gas and traces of heavier hydrocarbon oozes through active mud volcanoes along the Makran Coast, which is of special interest in relation to probable oil deposits. Geological, geophysical, and geochemical studies of the Makran zone may eventually lead to delineating the potential resources of the area including petroleum deposits.

History of Petroleum in Makran.....	25
Chap#4: Geophysical Surveys for hydrocarbon exploration.....	29
Chapter#5: Conventional & Unconventional Drilling.....	36
Conclusions.....	45

Table of contents

	Page#
Objective.....	1
Chapter#1:	
Introduction to area.....	2
Chapter#2:	
Geology of the Makran Region.....	17
Chapter#3:	
History of Petroleum in Makran.....	25
Chap#4:	
Geophysical Surveys for hydrocarbon exploration.....	29
Chapter#5:	
Conventional & Unconventional Drilling.....	36
Conclusion.....	45