Environmental Science and Engineering

Abdelfatah Abomohra
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Advances in Energy Resources and Environmental Engineering

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Environmental Science and Engineering

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Advances in Energy Resources and Environmental Engineering

Springer

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ISSN 1863-5520 ISSN 1863-5539 (electronic)
Environmental Science and Engineering
ISBN 978-3-031-42562-2 ISBN 978-3-031-42563-9 (eBook)
https://doi.org/10.1007/978-3-031-42563-9

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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Preface

The 2022 8th International Conference on Advances in Energy Resources and Environment Engineering (ICAESEE 2022) took place in Guangzhou, China, during 23 to 25 December 2022 (virtual form). The conference series started in 2015 as an academic conference and gradually expanded to include many other topic fields as well. Now the International Conference on Advances in Energy Resources and Environment Engineering is an annual international conference based in China with topics encompassing the whole area of energy and environment.

The aim of the conference is to bring different scientific communities together; facilitate the contacts between science, technology, and industry; and provide a platform for the exploration of both fundamental topics and new applications of related areas. Everyone interested in these fields was welcomed to join the online conference and to give comments and raise questions to the speeches and presentations.

More than 250 attendees from 10 countries participated in the conference. We have invited four expert professors to perform keynote speeches. Among them, Dr. Abdelfatah Abomohra participated as the main editor for this book. His major is interdisciplinary of microbiology and environmental engineering and has stupendous research experiences and finite vision in the field of biofuel production. According to Web of Science, he has published more than 150 SCI papers, and most of them are in Q1 journals with 4 papers as "Highly Cited Paper". It is really a great opportunity for participants to learn new ideas and to promote academic communication and collaboration worldwide.

This volume of Springer ESE gathers papers from regular contributions of ICAESEE 2022; each contribution submitted for publication has been peer-reviewed, and the editors are very grateful to the referees for their careful support in improving the original manuscripts. The manuscripts accepted for publication cover different topics of energy resources and environment engineering: Energy Saving Technologies, Coal Mine Engineering and Technology, Electrical Engineering Technology, Analog and Digital Circuits, Power Electronics and Electric Drives, Power System and Automation, etc.

It is a great honor to present this volume of Springer ESE, and we deeply thank the authors for their enthusiastic and high-grade contribution.

Finally, we would like to thank the conference chairs, the publication chair, the members of the Organizing Committee and Technical Program Committee, the conference secretariat, and the financial support from the conference sponsors that allowed the success of ICAESEE 2022.

Chengdu, China — Dr. Abdelfatah Abomohra
Selangor, Malaysia — Dr. Razif Harun
Changsha, China — Dr. Jia Wen

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Part I
Coal Mining Utilization and Energy Management

Chapter 1
Critical Factors in Oilfield Exploration and Development: Analysis of Reservoir Sand Body Configuration

Bingkun Lu, Feng Guo, Jiale Quan, and Yankai Zhu

Abstract The detailed study of reservoir sand body configuration is significant to the rational exploration and development of oil fields. In order to clarify the sand body configuration of Chang 7 in Wuqi Oilfield of Ordos Basin, the sand body of Chang 7 is analyzed by core, logging and field outcrop profile data. The results show that Chang 7 mainly develops lake delta front subfacies, and the microfacies are mostly underwater distributary channels, distributary bays and estuary sand bars. The sand body structure mainly includes three types: isolated type, multi-stage vertical superimposition type and lateral superimposition type. Sedimentary microfacies are a critical factor controlling the sand body configuration. The base level change will affect the vertical stacking mode of sand bodies, and the supply rate of material source will affect the vertical connectivity of sand bodies.

Keywords Delta front · Sand body configuration · Chang 7 · Ordos basin

1.1 Introduction

Sand body architecture, also known as reservoir building structure, was proposed by Allen for the study of fluvial facies, and sand body characteristic analysis is usually carried out in terms of geometric shape and internal structure, which expresses various levels of architectural elements The shape, scale, orientation and spatial superposition relationship between the interface and configuration interface (Wu et al. 2012). This research method was proposed by Miall in (1985), guided by the idea of hierarchical structure analysis, and is mainly applied to the anatomical research level of field outcrops, such as configuration element identification, division, and spatial tracking and comparison (Miall 1985, 1988, 1991). The current sand body architecture research is mainly carried out by using cores, logging, seismic and analysis

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A. Abomohra et al. (eds.), *Advances in Energy Resources and Environmental Engineering*, Environmental Science and Engineering,
https://doi.org/10.1007/978-3-031-42563-9_1

tests, and analyzes different types of architecture elements from the perspective of sedimentary genesis ().The shallow water delta front subfacies formed in Chang 7 under the background of gentle slopes, resulting in the formation of complex internal structures of sand bodies under the control of various depositional factors, resulting in many problems similar to structural heterogeneity (Yuan et al. 2021; Wu et al. 2022; Ma et al. 2022). Therefore, describing the sand body architecture type and spatial distribution pattern is necessary to point out the direction for good reservoir prediction.

1.2 Geological Setting

The Ordos Basin is a large-scale multi-cycle craton basin with overall lifting and a simple structure. The Wuqi Oilfield is the study area and is located in the central part of the Ordos Basin (Fig. 1.1). The deposition of the Yanchang Formation belongs to a complete set of sizeable inland lake basins, and Chang 7 is the deposition in its heyday. It develops high-quality source rocks such as large-scale black mudstone and oil shale and gravity flow sandstone such as turbidity current and sandy debris flow. It is rich in oil resources (Ma et al. 2022). With the progress of unconventional oil and gas exploration and development, Chang 7 in Ordos Basin has become one of the critical targets of oil and gas exploration and development.

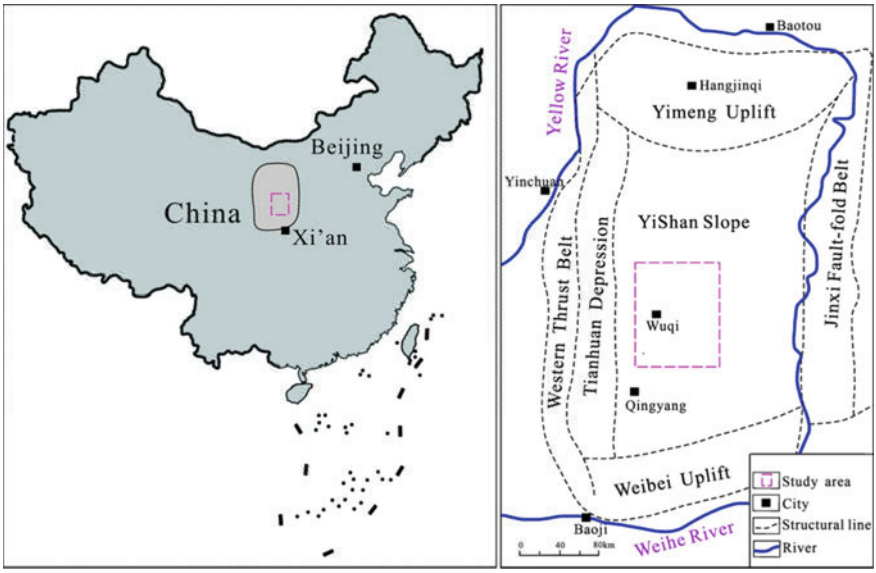

Fig. 1.1 The location of the study area, Wuqi Oilfield, Ordos Basin