

中国岩相古地理丛书之二

鄂尔多斯地区 早古生代岩相古地理

冯增昭 陈继新 张吉森 著



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**BOOK SERIES ON LITHOFACIES
PALEOGEOGRAPHY OF CHINA**

2

**LITHOFACIES
PALEOGEOGRAPHY
OF EARLY PALEOZOIC
OF ORDOS**

Feng Zengzhao

Chen Jixin Zhang Jisen

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序

鄂尔多斯地区位于华北地台的西部,是华北地台的一部分。

1975年,我和我校的师生以及校外的广大协作者一起,开始华北地台早古生代岩相古地理研究,至今已16年。其研究成果《华北地台早古生代岩相古地理》^①业已出版。

1980年,开始鄂尔多斯地区早古生代岩相古地理研究,至今已10年。开始时,是把它作为华北地台早古生代岩相古地理的一部分进行研究的,这一成果已反映在《华北地台早古生代岩相古地理》中。

1985年,麒参1井和洲1井的工业气流,终于冲开了鄂尔多斯地区早古生代碳酸盐岩地层这块长眠的处女地的阀门。1987年,鄂尔多斯地区早古生代岩相古地理研究又东山再起。这是华北地台和鄂尔多斯地区早古生代岩相古地理研究的继续和深入。本书《鄂尔多斯地区早古生代岩相古地理》就是这3年研究成果的总结,是《华北地台早古生代岩相古地理》的补充和完善,是它的续篇。

积此3年、10年和16年的经验,知鄂尔多斯地区早古生代岩相古地理的基本格局为:

陆外为坪,坪外有滩。

滩外为海,滩外为槽。

坪包括泥砂坪、砂泥坪、泥坪、云坪等;滩包括鲕粒滩、竹叶滩等;海为开阔海;槽为深水海槽,即祁连海槽和秦岭海槽。当然,有的时期,如张夏期,无坪,即古陆之外即为滩和滩间海;有的时期,如苏峪口期,无滩,坪外即为开阔海;有的时期,如马二、马四、马六期,开阔海广布,坪和滩都相当不发育;然而,这个十六字的四重结构的格局仍是基本的。

关于鄂尔多斯地区早古生代岩相古地理与油气以及其他沉积矿产的关系,亦可用十六个字来概括:

坪中有膏,坪中有盐,

坪中有油,坪中有气。

这里所说的坪主要是指准同生白云岩发育的云坪。诚宝坪也。

在以前,我总自觉或不自觉地把本区早古生代的油气潜景寄托在高能量的滩上;现在,我也不否定滩中有油气的可能性,但是,滩的油气潜景远不如坪。以前和现在,也有一些人把本区油气潜景寄希望于礁(?)或什么“丘状体”的礁(?)上,我也希望能如此。但是,从造礁生物的发展情况看,从岩相古地理的基本格局及其演化规律看,在早古生代,在鄂尔多斯地区,还难以出现规模可观的礁体,那些“丘状体”很可能并不是什么礁,而是滩或其他沉积岩体。另外,在其他的古地理单元如在深水斜坡带的重力流沉积岩体中,也可以有油气。但总的看来,还是以云坪中的油气潜景最大,最好。因此,要想使鄂尔多斯地区早古生代的油气勘探有新的大的突破,应当把勘探和研究的重点放在坪上,把坪研究透,把这个宝坪(瓶)的盖子打开。这就是我从沉积学和岩相古地理学这一侧面对于鄂尔多斯地区早古生代油气勘探工

① 《华北地台早古生代岩相古地理》为中国岩相古地理丛书之一

作的看法和建议。

这两个十六字律来之不易,是在近 3 年、10 年以及 16 年的广大志同道合者的辛勤劳动的基础上,总结提炼出来的。一得之见,或有利于鄂尔多斯地区油气勘探工作乎?是所愿也。

冯增昭

1990 年 3 月于石油大学(北京)

PREFACE

Ordos is in the west of North China Platform and itself is a part of the platform.

In 1975, with many teachers and students from our university and many other co-workers from other institutions, I began the study of the lithofacies paleogeography of Early Paleozoic of North China Platform. Since then, sixteen years has past. The result of this study, 《Lithofacies Paleogeography of Early Paleozoic of North China Platform》, has now come out.

In 1980, we began to study the lithofacies paleogeography of Early Paleozoic of Ordos, since then, ten years has past. At the beginning, it was studied as a part of the lithofacies paleogeography of Early Paleozoic of North China Platform, and the results have also been reflected in the 《Lithofacies Paleogeography of Early Paleozoic of North China Platform》.

In 1985, the commercial gas flow of Well Qican 1 and Well Zhou 1 finally gushed out of the virgin land of the carbonate rocks of Lower Paleozoic of Ordos.

In 1987, the study of the lithofacies paleogeography of Early Paleozoic of Ordos was renewed. This is a continuation and deepening of the study of the lithofacies paleogeography of Early Paleozoic of North China Platform and Ordos. This book, 《Lithofacies Paleogeography of Early Paleozoic of Ordos》, is the generalization of the study results in the past three years. It is the supplement and perfection and hence a sequel of 《Lithofacies Paleogeography of Early Paleozoic of North China Platform》.

Based on the experience of the three years, ten years and sixteen years, I know that the basic pattern of the lithofacies paleogeography of Early Paleozoic of Ordos is:

Outside the land were flats;
Outside the flats were banks;
Outside the banks were seas;
Outside the seas were troughs.

The flats include mud sand flats, sand mud flats, mud flats, dolomite flats, etc.; banks include ooid banks, bambo-leaves banks, etc.; seas were open seas; troughs were deep marine troughs, i. e., the Qilian Trough and Qinling Trough. Certainly, in some ages, such as in Zhangxia Age, there were no flats, and outside the land were immediately banks and interbank seas; in some ages, such as in Suyukou Age, there were no banks, and outside the flats were immediately open seas; in some ages, such as in Majiagou Age 2, 4 and 6, both flats and banks were not developed. However the fourfold-structure pattern was still fundamental.

The relationship between the lithofacies paleogeography of Early Paleozoic of Ordos and the oil and gas and other sedimentary mineral deposits can be generalized as follows:

In the flat, there is gypsum;
In the flat, there is halite;
In the flat, there is oil;
In the flat, there is gas.

The "flat" mentioned here, is meant dolomite tidal flats where penecontemporaneous dolostones are developed. Truly, it is a precious flat indeed!

In the past, I always consciously or unconsciously thought that high energy banks had high potential of oil and gas in the Lower Paleozoic of Ordos; now I still do not deny this possibility. But the oil and gas potential of banks is much lower than that of flats. Previously and now, some people think that oil and gas in Ordos are reserved in reefs (?) or so-called "mound-shaped body reefs (?)". I also hope it could be. Nevertheless, from the evolution of reef-building organisms in geological history and from the basic pattern and evolution of lithofacies paleogeography of the Early Paleozoic in Ordos, the large-scale reefs were difficult to develop. The "mound-shaped bodies" in seismic sections are probably not reefs, but banks or other sedimentary bodies. In addition, it is also possible to find oil and gas in other paleogeographic units, such as gravity flow sediments on deep water slopes. But on the whole, the oil and gas potential of dolomite flats is the largest and best. Therefore, in order to make a breakthrough in oil and gas exploration in the Lower Paleozoic of Ordos, the focus of exploration should be on flats. The flats should be thoroughly studied. The cover of the precious flat (bottle *) should be opened.

It is not easy to get the above two generalizations. They were derived through our hard works in the past three years, ten years and sixteen years. Would my humble opinion be beneficial to the oil and gas exploration in Ordos. This is my hope.

Feng Zengzhao

University of Petroleum (Beijing)

March, 1990

* The "flat(坪)" and "bottle(瓶)" are both pronounced as "ping" in Chinese.

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