

鄂尔多斯盆地延长探区奥陶纪末古地貌恢复与储层预测

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Reconstruction of the Late Ordovician palaeogeomorphology and reservoir prediction in Yanchang exploration area, the Ordos Basin

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摘要

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摘要 延长探区下古生界奥陶系马家沟组天然气勘探获得重大突破, 勘探显示含气层的发育和分布与奥陶系顶沟槽古地貌关系密切。通过马家沟组钻井小层的精细划分与对比、制作不整合面上具填平补齐作用的本溪组厚度图、侵蚀沟谷正演模拟结果进行地震剖面沟谷识别以及地震反演等技术手段, 综合编制前上古生界古地质图, 在探区内识别出了两个北西-南东向奥陶系顶面侵蚀沟槽。综合分析古地貌图与波阻抗平面图显示, 奥陶系低波阻抗显示的有利储层分布与侵蚀沟谷及其两侧的侵蚀斜坡位置吻合, 也与目前的奥陶系产气井和有利油气显示井的位置吻合; 甘泉地区的Y112井附近、工区西北方向的Y113-Y101井及工区中部Y118-Y119-Y108井一带有利储层发育, 应为奥陶系下一步勘探部署的重点区域。

关键词: 古地貌 侵蚀沟谷 正演模拟 波阻抗反演 马家沟组 鄂尔多斯盆地

Abstract: Major breakthroughs have been achieved in gas exploration in the Ordovician Majiagou Formation in Yanchang exploration area. These discoveries show that the development and distribution of gas-bearing layers have a close relationship with the furrow erosion palaeogeomorphology on top of the Ordovician. By using such techniques such as fine subdivision and correlation of the Majiagou Formation, thickness mapping of the Benxi Formation on the unconformity, forward modeling-based identification of eroded furrows on seismic section, and seismic inversion, we mapped the paleogeology of the pre-Upper Paleozoic and recognized two NW-SE trending eroded furrows on top of the Ordovician. The comprehensive analysis of the paleogeomorphologic map and wave impedance map shows that the distribution of favorable reservoirs with low wave impedance in the Ordovician is consistent with the locations of erosion furrows and the eroded slopes on both sides. Moreover, it is also consistent with the locations of wells that produce gas from the Ordovician and that have favorable oil/gas shows. The research indicates that favorable reservoirs occur near Y112 well in Ganquan area, Y113-Y101 wells in the northwest of the study area and Y118-Y119-Y108 wells in central of the study area. These areas should be the major target areas for further exploration of the Ordovician.

Keywords: palaeogeomorphology eroded furrow forward modeling impedance inversion Majiagou Formation Ordos Basin

Received 2010-05-20;

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引用本文:

韩敏强, 蒲仁海, 刘海娟, 郭向东, 刘宝平. 鄂尔多斯盆地延长探区奥陶纪末古地貌恢复与储层预测[J] 石油与天然气地质, 2011, V32(5): 760-767

Han Minqiang, Pu Renhai, Liu Haijuan, Guo Xiangdong, Liu Baoping. Reconstruction of the Late Ordovician palaeogeomorphology and reservoir prediction in Yanchang exploration area, the Ordos Basin[J] Oil & Gas Geology, 2011, V32(5): 760-767

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