中国中西部四大盆地碎屑岩油气地质与勘探技术新进展

郑和荣*

中国石化 石油勘探开发研究院, 北京 100083

New advances in petroleum geology and exploration techniques of clastic reservoirs in the four large-sized basins in central-western China

Zheng Herong*

SINOPEC Exploration & Production Research Institute, Beijing 100083, China

摘要 晚古生代以来,中西部四大盆地成盆演化具有"同序异时"特征,碎屑岩层系具有自生自储和海生陆储两大勘探领域。压性构造背景下碎屑岩沉积充填层序具有"二元"体系域结构,决定了碎屑岩层系具有良好的生储盖组合。碎屑岩层系可划分内源、外源和混源3大类6个亚类成藏体系。四大盆地构造变形的差异性决定了成藏体系分布的差异性。针对裂缝性储层预测,形成了三维三分量地震采集、处理和解释技术系列;针对致密储层和隐蔽圈闭识别,形成了实用的黄土塬地震采集处理技术等;针对川西坳陷致密裂缝性储层,形成了一系列压裂改造技术;针对鄂南致密砂岩储层,形成了补偿压裂技术方法。油气地质理论新认识与技术新进展推动了该领域大中型油气田(如川西须二气田、塔河碎屑岩油气藏和鄂南镇泾油田)和规模储量的发现。

关键词: 储层预测技术 储层改造技术 成藏体系 碎屑岩层系 中国中西部

Abstract: Since Late Paleozoic,the four large-sized petroliferous basins (i.e.Ordos,Sichuan,Junggar and Tarim) in central-western China have experienced similar evolution processes during different geologic time,and have two kinds of petroleum exploration plays in clastic strata,i.e.self-source and self-reservoir type and marine-source continental-reservoir type.The clastic sequences deposited in compressional environments have "dual system tract structure",which determines the high quality of the exploration plays.Three types(inner-sourcing,out-sourcing and hybrid-sourcing)and six subtypes of petroleum accumulation systems can be identified in the clastic sequences.The differences in tectonic deformation among these four basins result in the differences in their petroleum accumulation system distributions.A technique series consisting of 3D 3C seismic acquisition,processing and interpretation has been developed for fractured reservoir prediction.Seismic acquisition and processing techniques for loess tableland are developed to identify tight reservoirs and subtle traps.Fracturing techniques are developed for stimulation of the fractured tight reservoirs in western Sichuan depression.Compensation fracturing techniques are developed for stimulation of the tight sands in southern Ordos Basin.The advances in petroleum geologic theories and exploration techniques have promoted the discovery of the large- to medium-sized oil and gas fields (such as gas reservoirs in the 2nd member of Upper Triassic Xujiahe Formation,the classtic oil reservoirs in Tahe area,the Zhenjing oil field in southern Ordos Basin).

Keywords: reservoir prediction reservoir stimulation petroleum accumulation system clastic strata central-western China

Received 2012-04-15;

Fund:国家科技重大专项(2008ZX05002)。

About author: 郑和荣(1962-),男,博士、教授级高级工程师,油气地质与勘探。

引用本文:
郑和荣.中国中西部四大盆地碎屑岩油气地质与勘探技术新进展[J] 石油与天然气地质, 2012,V(4): 497-505

Zheng Herong.New advances in petroleum geology and exploration techniques of clastic reservoirs in the four large-sized basins in central-western China[J] Oil & Gas Geology, 2012,V(4): 497-505

链接本文:
http://ogg.pepris.com/CN/ 或 http://ogg.pepris.com/CN/Y2012/V/I4/497