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川东北地区中三叠统雷口坡组四段古岩溶作用与储层分布

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摘要:

四川盆地东北部雷口坡组四段中的油气突破显示了其重要的油气地质意义。本文通过岩芯观察、薄片鉴定、测井和录井资料以及包裹体、碳氧同位素和锶同位素等分析测试资料的综合分析,在雷口坡组顶部不整合面剥蚀残余地层雷四段中识别出了同生岩溶、表生岩溶和埋藏岩溶三种类型的古岩溶作用,认为它们是控制川东北地区雷口坡组四段储层形成的关键要素。同生岩溶作用控制了早期储层的形成和分布,平面展布具有局限性,受到高能滩相带展布的控制。表生岩溶作用是该储层形成的关键作用,与其有关的储层在垂向上主要局限于不整合面以下90m的深度范围内。根据风化壳岩溶的垂向与横向发育特征,认为其储层在垂向上主要分布于地表岩溶带呈碎屑支持的角砾灰岩和云岩、垂直渗流带半充填的高角度溶缝以及中小型溶蚀孔洞和水平岩溶带半充填的中小型溶蚀孔洞、溶缝、洞顶破裂缝和河成角砾中,平面上主要发育于岩溶斜坡区,又以岩溶残丘为最有利微地貌单元。埋藏岩溶与热液及有机酸溶蚀碳酸盐矿物有关,是储层优化改造的关键因素。

英文摘要:

The hydrocarbon breakthrough in the 4<sup>th</sup> member of the Leikoupo Formation shows important geological significance for petroleum exploration. Through comprehensive analysis of drilling cores, thin section, well logging data, fluid inclusion, carbon, oxygen and strontium isotope, three types of paleokarstification, including syndepositional, epigenetic, and buried ones, are identified in the residual deposits under the unconformity surface at the top of Leikoupo Formation. They are considered as the key factors that control the reservoir formation of the 4<sup>th</sup> member of the Liekoupo Formation. The distribution of the reservoirs formed in the early stage is controlled by syndepositional paleokarstification. These reservoirs are limited in lateral by distribution of high-energy beach facies. Epigenetic paleokarstification is a critical geologic event that leads to the formation of the reservoir. The related reservoirs are vertically limited within 90m below the unconformity surface. Based on vertical and lateral distribution patterns of weathering karstification, it is suggested that karst-related reservoirs are commonly occurred vertically in debris-support breccia limestones and dolostones that distributed within surface karst area, or along half-filling high-angle dissolved seams and in small to medium-sized solutional pores in the vertical direction, and half-filling small to medium-sized solutional pores, dissolved seam, broken crack in the cave top and river breccia. Laterally, these reservoirs generally developed at karst slope, and karst hammock are found as the most advantageous geomorphic units for the formation of reservoirs. Burial karstification is related with dissolution of carbonate minerals resulted from hydrothermal fluids and organic acid, and it is considered as the key factor for reservoir optimization.

关键词: [同生岩溶](#) [表生岩溶](#) [埋藏岩溶](#) [储层分布](#) [雷口坡组四段](#) [川东北](#)

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