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深水浊积朵叶储层构型模式研究

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Research on Reservoir Architecture Models of Deep-water Turbidite Lobes

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摘要/Abstract

摘要 :

深水沉积是世界油气增储上产的重要领域之一。目前,国外学者针对深水沉积的构型模式开展了大量研究,但研究对象多为浊积水道,而对于浊积朵叶的关注则甚少。为此,以西非尼日尔三角洲盆地某深水区块地下储层和中国甘南西秦岭地区某深水露头作为原型,采用地震相分析、地震沿层切片、露头观察描述等多种手段相结合的方法,分级次开展了浊积朵叶的构型模式研究。研究表明,浊积朵叶的构型单元可划分为7级,其中3~5构型单元分别为:单一朵叶、复合朵叶和朵叶体系。朵叶体系由多个复合朵叶叠置而成。复合朵叶内部发育树枝状的下切水道,底部发育块体搬运沉积,其常常对下伏地层有明显侵蚀。单一朵叶由受平行、亚平行界面约束的多期板状砂岩垂向加积而成,依据其内部沉积特征的差异,可进一步分为近朵叶端、中朵叶端和远朵叶端3部分。通过研究不仅可以深化浊积朵叶的地质理论,而且可以有效降低此类油气田的勘探开发风险,具有重要的实际意义。

关键词: 浊积朵叶, 构型模式, 原型, 发育样式, 充填样式

Abstract:

Deep-water sediments are the main field which increases oil & gas reserve and production around the world. Although extensive researches on architecture models of deep-water sediments have been carried out, most of them focus on turbidite channels rather than turbidite lobes. In this study, taking the subsurface reservoirs of deep-water area in the Niger Delta Basin and the outcrops of submarine fan in West Qingling Mountains of Gannan area as prototypes, architecture models of turbidite lobes is constructed from different hierarchies. These researches are based on outcrop observations and descriptions, seismic facies analyses, seismic horizon slices and so on. The results show that architecture units of turbidite lobes can be divided into seven hierarchies. Lobes, lobe complexes and lobe systems are architecture units from 3rd hierarchy to 5th hierarchy. Generally, a lobe system contains several overlying lobe complexes. Incised channel deposits showing treelike shape and mass transport deposits (MTDs) erode strongly underlying strata are widely developed at lobe complexes. A lobe consists of multi-period tabular sandstones confined by sub-parallel or parallel interfaces and can be divided into three parts according to internal sedimentary differences. These parts are the proximal, the middle and the distal parts. This study brings deep understandings to the geological theory of turbidite lobes and it also reduces the risk on exploration and development about this type of reservoir. Thus, it has significant theory and practice meanings.

Key words: Turbidite lobes, Architecture models, Prototypes, Development patterns, Filling patterns

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