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Tenan south sag of bedrock buried hill fracture development law relationship with oil and gas distribution

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Abstract: In this paper, integration of the basic principles of geology and tectonics, comprehensively used of seismic, well logging, logging, core and production testing to study relationship between the development rules the Tenan depression bedrock buried hill and hydrocarbon distribution. Through the study of target bedrock buried hill oil and gas reservoir characteristics, to explore the law of bedrock buried hill development, and provide exploration value of exploration targets. Using numerical simulation methods, combined with a large number of facts, this paper has been studied the relationship of the law of Tenan depression bedrock buried hill development and hydrocarbon distribution. The results show that: type of bedrock buried hill reservoir space in Tenan depression is mainly construct seam. The Tenan depression related to fold—related fracture developed area is widely distributed, and related to fracture cracks developed area is distributed of smaller. Fault system in the bedrock buried hill is good for hydrocarbon accumulation, and the closer away from the fracture, the crack is more development. Predicted a favorable exploration area, mainly near the Te19-29 well and Te19-66 well.

Keywords: Tenan depression; base rock buried hill; fracture prospect; hydrocarbon distribution.

Introduction

Tenan south sag is tam secondary tectonic units of the basin, tam basin, located in the eastern part of Mongolia, north to extend into the territory of China, and China of hailaer basin belong to a tectonic unit. Basin, a total area of 79610 km², of which China covers an area of 44210 km², Mongolia area of 35400 km². Hailar - tam basin, located in Mongolia-greater hinggan mountains rift basin group in the east of the east in the greater hinggan mountains uplift, apart from big poplar adjacent basin, songliao basin; On the other side of the west to northwest uplift, and Mongolia choibalsan basin; Northern connected with blah darling basin; Israeli-palestinian sound treasure force in southeastern uplift is bounded, and the erlian basin, is relatively.

Tenan is located in the south sag in hailaer - tam basin, south central fault belt, is one of the most important oil and gas exploration area in the basin. Due to geological conditions of bedrock buried hill and hydrocarbon accumulation conditions are very complicated, the geological understanding of bedrock buried hill reservoir such as bedrock buried hill hydrocarbon reservoir characteristics, formation mechanism and distribution law of bedrock buried hill fracture problem is unclear, limiting the pace of exploration and development in this region. Therefore, the objective of the study, not only has theoretical significance, for guiding the exploration of bedrock

buried hill reservoirs also has important practical significance.

In this paper, comprehensive utilization of seismic, well logging, mud logging, core, production test and other geological information, the Tenan of the south sag of bedrock buried hill fracture development law to study the relationship between hydrocarbon distributions. With evidence proves that the bedrock buried hill reservoir space for oil and gas reservoir structural fractures is given priority to, bedrock buried hill are analyzed causes and the main control factors of the development, predicted the development rule of the bedrock buried hill fracture and analysis of the bedrock buried hill of predict fracture development regularity and the relationship between the distribution of oil and gas, points out favorable exploration blocks, lays the foundation for Tenan south sag of bedrock buried hill exploration [1].

Regional geological conditions

Tenan south sag is tam secondary tectonic units of the basin, tam basin, located in the eastern part of Mongolia, north to extend into the territory of China, and China of hailaer basin belong to tectonic units. Basin, a total area of 79610km², of which China covers an area of 44210km², Mongolia area of 35400km². Hailar-Tam basin, located in Mongolia - greater hinggan mountains rift basin group in the east of the east in the greater hinggan mountains uplift, apart from

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Reservoir characteristics

Reservoir space type system

Method according to the classification of clastic rock pore and pore types of identification standards. By ordinary sheet casting slice scanning electron microscope and image analysis, a comprehensive study will Tenan south sag of bedrock buried hill reservoir space is divided into three basic types of pore, cave and fracture, the so-called hole seam effective reservoir space, and further classified according to their size or scale, some throat as 4 types. Pore and cave near axis of pore types, such as for pore diameter is less than 2 mm, greater than 2 mm for the cave; Crack is external form of flake space, it cut rock structure; Throat is connected the narrow channel between pore and caves [2-3].

Effective space geometric features and recognition

Bedrock buried hill in the south sag of the main Tenan of light metamorphic volcanic clastic rock, tuffaceous sandstone and sandy conglomerate, mudstone, etc., at the rock up stage, namely the bedrock reservoir experienced multiphase and various types of diagenesis superposition and transformation, effective porosity is given priority to with diagenesis formation of secondary porosity, statistics regarding the core observation and microscope identification to identify the effective pore characteristics and genetic analysis.

Usually bedrock buried hill reservoir space types in a variety of causes of the secondary solution pores, caves and cracks. But for Yu Haida basin in central zone, the study found that reservoir space types of the reservoir is given priority to with cracks, especially in the "formed by the tectonic stress, the stress properties and influence factors such as lithology, rock mass structural fractures. Therefore, this study in order to predict the structure of the controlled by the tectonic stress action forms joint distribution as the main target.

Bedrock buried hill formation and the main control factors of the development

Bedrock buried hill reservoir fracture

Bedrock buried hill reservoir belongs to fractured buried hill reservoir; reservoir lithology is given priority to with conglomerate, shallow metamorphic mudstone, volcanic rock. Average effective porosity 5.3%, average $0.3 \times 10^{-3} \mu\text{m}^2$ [4-5].

Bedrock buried shallow metamorphic rock crack formation of the reservoirs are mainly associated with the tectonic movement of experienced, hailar basin structure, sedimentary history research shows that: the bedrock buried hills mainly experienced hinggan mountains after sedimentation period, south tuen date

fault rapid subsidence, big turn mill river tension, the sensitive period fault atrophy and yi min late in brief depression develops five stages of tectonic movement. Not only in different periods of tectonic movement formed central Tenan sea basin downfaulted oilfield complicated buried hill structure form, the formation and development of buried hill fracture reservoir.

Bedrock buried hill reservoir crack control factors

Degree of fracture development and distribution characteristics are influenced by many factors, genetic types and controlling factors can effectively clear cracks the crack distribution, prediction the distribution of fractured reservoir, reservoir evaluation and development work.

Fault control of the buried hill fracture reservoir distribution is mainly manifested in three aspects:

- Long-term inherited fault near the fracture density. According to the 3d seismic data and the data of exploration Wells and development Wells bedrock buried hill structure main fracture belt in the north east to distribution, from north to south is divided into four bands, top of the buried hill of budate article explain fault size 106, structural history further research shows that: the sea Tenan basin development buried hill oil field in central zone, article 8 T1 - T5 long-term active fault, the fault controlling multiphase tectonic cracks formation.
- Active fault near the fracture relative development, reservoir permeability is good. Analysis the change of fault in the geologic period, it can be seen from the west to the east fault growth index, fault activity intensity gradually increased.
- The nearer to the fault is, the more crack development, well testing, production is higher. Sea - central Tenan basin with buried hill oil Wells, high appraisal well mostly near fault fault block area, 19 well test data can be seen that the nearer to the fault is, test the strength of oil production, the greater the control effect to the fracture development degree and fault [6-7].

Bedrock buried hill fracture distribution and prediction

Related to fold zones for the development of fracture prediction

Fold in the structure of the different causes of different distribution characteristics, mainly for the structure of the wing, deflection, pitching end, axis (figure 1). Distribution in the anticline structure wing of flexural cracks, mainly appeared in the structure by extrusion is given priority to, often occurs in the steep wing; Anticline or syncline pitching the cracks, mainly compressive shear anticline formed by pitching end,

also can develop in the pitching end of the extrusion forming anticline, and give priority to in order to rise to form a wide flat short axis anticline dome pitching end; Usually in the brittle fracture development strong cracks strata in the axis; Role in the construction of the is given priority to with lifting movement zone, fracture development good parts in the anticline function of wing rather than the top. Zones for the development of

the cracks were because of strata fold deformation generated intense, strong deformation zone of development in the fold, can be quantitatively characterized with curvature values, areas of high curvature value represents the strong deformation of strata fold zone, is relatively the area of the development.

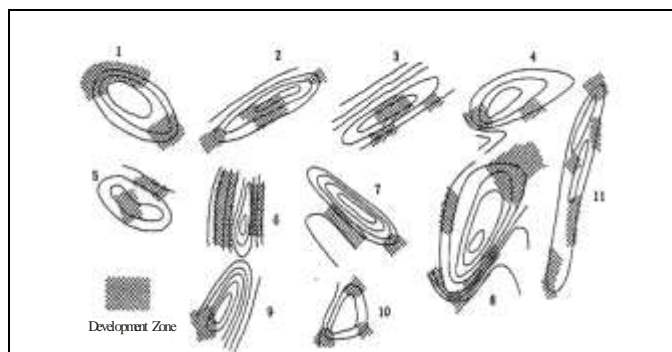


Fig-1: fracture development favorable structural parts of the diagram

Related to the fracture zones for the development of fracture prediction

Related to the fracture of crack is one of the important types: local structural cracks within the fault zone is given priority to with associated fractures, and near the fracture is induced fracture development areas. Under the action of tectonic stress field, tend to produce a series of parallel to fracture shear failure, the density of cracks in the middle of the fault zone area, the largest crack band width is generally not more than dozens of meters. In addition, the fracture derived from local stress field in the process of activities also can produce some cracks, its distribution caused by the fault activity of secondary tectonic stress field and rock mechanics properties, the nearer the fracture, the greater the density. Additional stress release in the end of the fault zone, cross, branch of fault and outer convex part of the bending stress is relatively high; tend to form complex fracture system.

Distribution analysis

Comprehensive "associated with fold fracture development zone" and "related to the fracture crack growth belt" predicted results can be the central Tenan sea basin relative fracture development zone.

The south depression associated with fold fracture development zone distribution of a wide range, but scattered distribution regularity is not strong. Northern Slope zone are mainly distributed in the western, the western buried fault zone, the buried fault belt in central and eastern fault nose structure belt.

Bedrock buried hill fracture development regularity and relationship analysis of oil and gas Hydrocarbon distribution properties

Bedrock buried hill reservoir is mainly located in the depression in the lung and the fault terrace zone as shown in figure 2. Tenan of bedrock weathering crust reservoirs are mainly distributed in central south sag; Tenan of internal crack fracture zone gas reservoirs are mainly distributed in the south sag of concave, Tenan south sag of east concave.

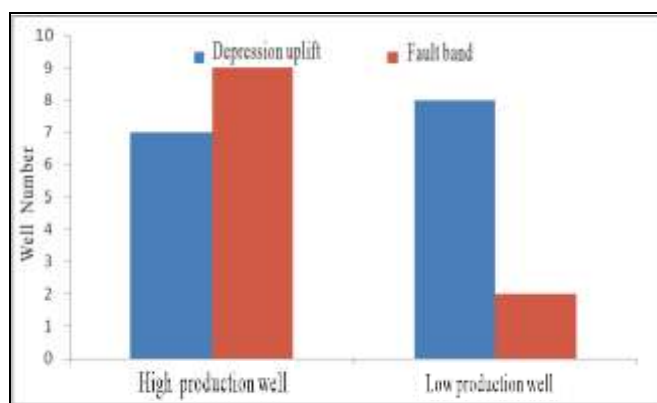


Fig-2: central Tenan sea basin downfaulted depression in lung and fault terrace zone of oil and gas distribution

Fracture and reservoir formation

Bedrock buried hill exists only for hydrocarbon source rock window also not line, the source rock generated gathered in bedrock buried hill oil will enter into hiding, also we will move the conducting channel must exist, one can move the source rock generated oil conducting to assemble in bedrock buried hill in accumulation.

Bedrock buried hills and special lithologic among rock side joint mode can be divided into one-way side joint and double side, so the special lithology among rocks for hydrocarbon method can be divided into one-way for hydrocarbon and bidirectional way for hydrocarbon two for hydrocarbon. In central Tenan Sea basin rift with Mr 12 Wells in oil Wells, bei 14 Wells and the 4 Wells are two-way for hydrocarbon industrial oil Wells, the rest of the oil Wells are one way for hydrocarbon. Thus, the bidirectional for hydrocarbon is superior to the one way for hydrocarbon, make a big supply of oil and gas; Oil Wells are mainly composed of one-way for hydrocarbon, hydrocarbon two-way for way less. Both one-way for hydrocarbon and two-way for hydrocarbons are caused by fracture dislocation, so the fracture provides a window for oil-gas accumulation.

Formed with accompanying cracks, physical simulation experiment results can be seen in the field data and field data, the closer apart, crack development. "Accordingly, cracks in the formation of bedrock buried hill reservoirs have control effect.

Prediction of the favourable exploration areas

Central Tenan in analysis shows that sea basin rift belt bedrock buried hill oil reservoir mainly by buried hill type, for hydrocarbon window, whether the reservoir development and fracture control of four factors, according to the main controlling factors on the main Tenan Sea basin downfaulted predict areas favorable for accumulation and predict areas favorable for Tenan south sag of bedrock buried hill reservoir. Tenan of bedrock buried hill reservoir prediction of favorable area is located in the south sag buried syngenetic uplift, the region has commercial oil Wells, but the exploitation degree is not high, more to find of mining strength help bedrock buried hill reservoirs in this area.

CONCLUSION

- The Tenan the south sag of bedrock buried hill fracture reservoir types are mainly composed of structural fractures.
- The south depression associated with fold fracture development zone distribution of a wide range, but scattered distribution regularity is not strong. Northern Slope zone are mainly distributed in the western, the western buried fault zone, the buried fault belt in central and eastern fault nose structure belt.

Related to the fracture of the fracture development zone distribution is smaller.

- Bedrock buried hill reservoir is mainly located in the depression in lung and order with you. Tenan of bedrock weathering crust reservoirs are mainly distributed in central south sag; Tenan of internal crack fracture zone gas reservoirs are mainly distributed in the south sag of concave, Tenan south sag of east concave. The bedrock weathering crust reservoir and the top of the buried hill fracture reservoir internal are distributed in the range of 100 m from T5 reflector.
- Fracture system is beneficial to bedrock buried hill hydrocarbon accumulation, the closer apart, crack development. Cracks in the formation of bedrock buried hill reservoirs have control effect.

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