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Abstracts

Geochemical characteristics of the Upper Triassic Bagong Formation mudstones in Eastern Qiangtang Basin and its petroleum geological significance /2022 ,46(2);1-12

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Abstract: The Upper Triassic black mudstones are considered to be one of the most significant hydrocarbon source rocks in the Qiangtang Basin , but its quality and hydrocarbon generation potential is obviously different . The organic and elemental geochemical characteristics of the Upper Triassic turbidite mudstones from the Dongqu Section have been studied to estimate their petroleum potential and discuss their depositional conditions . The result shows that the Bagong Formation black mudstones from the Dongqu Section are interpreted as being fair to moderate source rocks . Mixed organic matter sources with land plants and plankton are characterized by type II_2-III kerogen . The organic matter in the mudstones belongs to matured to highly matured evolution and were deposited in the oxic water column , which may be unappropriate for the organic matter preservation . In general , the Upper Triassic Bagong Formation black mudstones from Dongqu Section are of poor hydrocarbon generation potential and mainly in gas generation , which is less than those from the adjacent Quemocuo Section , Eertuolongba Section , and well QZ$^-$7 . Based on previous data , we deduced that the Bandaohu-Duogecuoren Areas in the northwest of the study area may have good hydrocarbon generation potential and seem to be the significant target for future oil-gas exploration .

Key words: characteristics of mudstone ; source rocks ; hydrocarbon generation potential ; turbidity environment ; Bagong Formation ; Dongqu Section ; Upper Triassic ; Qiangtang Basin

Sedimentary characteristics and model of coarse-grained shallow-water delta: a case study of Jurassic Sangonghe Formation in Mobei Area , Junggar Basin /2022 ,46(2);13-22

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Abstract: Take the Jurassic Sangonghe Formation in Mobei Area , Junggar Basin as the example , the sedimentary characteristics and models of the Jurassic Sangonghe Formation were analyzed based on core data , logging , thin sections , well logs and 3D seismic data . The results show that the coarse-grained shallow water delta deposits , which are mainly coarse and medium-coarse sandstone , are widely developed in the Mobei Area .Two grade slope breaks and three zones controlling sedimentation are developed in the western depression of well Pen 1 . Coarse-grained shallow braided river delta-lake system develops in the uplift-slope area , forming two sub-facies of the inner and outer front , which distribute vertically or obliquely along the lakeshore as a whole in the shape of flowers or birds feet . The underwater distributary channel sandbody which are mainly coarse and medium-coarse grained feldspar lithic sandstone is the frontal skeleton . Block and traction flow origin structures are well developed , and their physical properties are relatively good . Multi-stage sand bodies are well developed in the vertical and cut and overlap each other in the lateral , and continuous distribution . Four front underwater distributary channels which are widely distributed and extends far away are developed in the plane near east-west direction . The type is the transgressive-regressive , coarse-grained shallow water delta which has a large area and abundant source supply in wet climate . The results may serve as a reference for deepening exploration and development in the Mobei Area and similar fields in the Junggar Basin .

Key words: coarse-grained deposits ; shallow-water delta ; sedimentary model ; Sangonghe Formation ; Jurassic ; Mobei Area ; Junggar Basin

Characteristics and sedimentary environment of stromatolite bioherms in oolitic shoal of Zhangxia Formation in Zhucaoying Section , Qinhuangdao , Hebei/2022 ,46(2):23-32

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Abstract: The Cambrian strata of Zhucaoying Section in Qinhuangdao , Hebei are intact and continuous , and stromatolites are developed in the top of Zhangxia Formation of Miaoling Series . Based on field data and microscopic observation , the characteristics and sedimentary environment of columnar (domal) stromatolites are studied . The results show that stromatolite bioherms and high energy oolitic shoal limestones are developed in the forced regressive system at the top of the Cambrian Zhangxia Formation in Qinhuangdao , Hebei , which are produced in an interactive manner , representing the carbonate deposition during the slow sea level decline in the North China Platform during the Cambrian . The well-pre-

served filamentous calcified cyanobacteria sheath fossils and window -like fabrics can be found in the dense micrite of the stromatolites from the Zhangxia Formation , suggesting that the stromatolites were formed by the complex calcification of photosynthetic microbial mats or microbial membranes . A small amount of pyrite residue associated with precipitation induced by sulfate reducing bacteria was observed . The results provide an important case for studying the sedimentary environment of Cambrian stromato - lites .

Key words：stromatolitic bioherm ; calcified cyanobacteria ; microbial carbonate ; Zhangxia Formation ; Cambrian ; Zhucaoying Section ; Qinhuangdao

Main controlling factors of shale oil enrichment and optimization of favorable enrichment intervals of Fengcheng Formation in Mahu Sag /2022 ,46（2）;33-44

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Abstract：Take Maye 1 Well in Mahu Sag shale Fengcheng Formation as the research object , using core and scanning electron microscope , and the rock pyrolysis , determination of total organic carbon （TOC）, gas adsorption , high-pressure mercury injection experiment and whole rock methods of X ⁻ray diffrac- tion , physical property test , research of manasseh lake sag Fengcheng Formation of shale oil enrichment main control factors , forecast Fengcheng Formation of shale oil enrichment zone . The results show that the main controlling factors of shale oil enrichment in Fengcheng Formation in Mahu Sag are of organic matter abundance , porosity , permeability , fracture density and pressure coefficient . When w（TOC）> 1 .30% , porosity is greater than 6 .50% , permeability is greater than $1 .000 \times 10^{-3}$ μm^2 , fracture density is greater than 32 per meter , pressure coefficient is greater than 1 .5 , shale oil is highly enriched ; shale oil enrichment occurs when w（TOC）is 0 .60% —1 .30% , porosity is 4 .00% —6 .50% , permeability is （0 .020 —1 .000）$\times 10^{-3}$ μm^2 , fracture density is 10 —32 per meter , and pressure coefficient is 1 .2 —1 .5 . Longitudinally , the shale of Fengcheng Formation in Maye 1 Well can be divided into three types : non- enrichment area , enrichment favorable area , high-efficiency enrichment area and six enrichment inter- vals . The results are of great significance for clarifying the enrichment mechanism of shale oil and guid -

ing shale oil exploration and development .

Properties of diagenetic fluid systems and their influences : taking Ahe Formation reservoir in Yiqikelike Structural Belt of the Kuqa Depression Tarim Basin as an example /2022,46(2):45-57

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Abstract: Based on the data of thin section , scanning electron microscope , X-ray diffraction of clay minerals , formation water and physical property parameters , we systematically analyzed the petrology , diagenesis and formation water of the Lower Jurassic Ahe Formation sandstone in the Yiqikelike Structural Belt of Kuqa Depression , Tarim Basin , combined with the thermal-burial history and the distribution law of fractures and faults of the Ahe Formation in the Yiqikelike Structural Belt , the sealing characteristics of diagenetic fluid , and the oil and gas preservation conditions of the Ahe Formation sandstone reservoirs in the axis and limb of Yiqikelike Anticline are discussed . The results show that volume fraction of authigenic kaolinite in the Ahe Formation sandstone is relatively high in the anticline axis , but relatively low in the limb . The difference of diagenetic evolution sequence between the axis and limb of the Yiqikelike Anticline is about 5 Ma ago . Compared with the anticline limb , the sodium chloride coefficient and desulfurization coefficient in the formation water of Ahe Formation in the anticline axis are higher , and the metamorphic coefficient is lower ; the sealing property of diagenetic fluid system of the Ahe Formation sandstone in the anticline axis is weaker than that in the anticline limb , which affects the accumulation of natural gas . The results have great significance for predicting the distribution of oil and gas reservoirs in Yiqikelike Structural Belt .

Multilevel architectural characteristics of reservoirs and remaining oil distribution of nearshore subaqueous fan: taking the Lower Cretaceous oil layer of X Oilfield in Bongor Basin as an example /2022,46(2):58-71

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Abstract: The sedimentary body of nearshore subaqueous fan developed in continental faulted lake basin has complex structure of thick sand body , and the distribution law of remaining oil is not clear . According to the data of core observation , dense well pattern logging and production performance , the sedimentary sequence of typical thick layer nearshore subaqueous fan of Lower Cretaceous in X Oilfield of Bongor Basin is studied , and the reservoir architecture at different levels and its control effect on the distribution of remaining oil in the sedimentary body are analyzed . The results show that the study area can identify two types of interfaces : sedimentary discontinuity and channel scouring /erosion surface . The architecture unit of nearshore subaqueous fan is divided into seven levels (level 1 to level 7). On the basis of lithofacies division , four types of four level configuration units are identified : distributary channel , inter channel , sheet sand and end channel , and the composite distributary channel is five level architecture unit . The plane distribution characteristics of four-level and five-level architecture units are quantified , and two models of architectural interface interlayer vertical oil control and distributary channel sand body horizontal oil control are proposed . The plane connectivity and interface barrier of architecture units are the main factors controlling oil-water connectivity . The results provide reference and guidance for remaining oil displacement in the later stage of oilfield production .

Key words: nearshore subaqueous fan ; reservoir architecture ; architectural interface ; remaining oil distribution ; Lower Cretaceous ; X Oilfield ; Bongor Basin

Preservation mechanism and model of primary pore diagenesis in deep reservoirs : taking the Enping Formation and Wenchang Formation in the south of Huizhou Sag , Pearl River Mouth Basin as examples /2022 , 46(2):72-85

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Abstract: In order to study the formation conditions of deep high-quality reservoirs , taking the Enping Formation and Wenchang Formation in the Southern Huizhou Sag of the Pearl River Mouth Basin as examples , the characteristics of the reservoirs in the study area were analyzed according to the data of rock thin section , cathodoluminescence , scanning electron microscope , reservoir physical properties , and burial history , then to discuss the preservation mechanism and model of primary pore diagenesis in deep

reservoirs . The results show that feldspar lithic quartz sandstone is mainly developed in Enping Forma-tion in the Southern Huizhou Sag , and feldspar lithic sandstone is mainly developed in the Wenchang Formation in the Southern Huizhou Sag . The pore types are mainly primary pores , and the porosity ranges from 1.9% to 17.3% , with an average of 13.3% , the permeability is between $(0.034-152.683)\times 10^{-3}\ \mu m^2$, with an average of $18.050\times 10^{-3}\ \mu m^2$. The preservation of primary pores in the reservoir is controlled by many factors . Among them , the lower geothermal gradient inhibits the compaction , the long-term shallow burial in the early stage and the rapid burial in the later stage make the compaction in-sufficient , and the differential cementation of carbonate and the early oil and gas charging hinder the compaction and the formation of the reservoir . The cementation in the sand body leads to the widespread development of primary pores in the reservoir . The results provide a basis for establishing a deep explo-ration and development plan and predicting the horizontal and vertical distribution of high-quality reser-voirs .

Key words: Pearl River Mouth Basin ; Huizhou Sag ; deep reservoirs ; primary pore ; diagenesis ; preser-vation mechanism

Calculation model of annular pressure in injection and production wells of underground gas storage rebuilt from gas reservoir and its application /2022,46(2):86-97

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Abstract: To deal with the pressure in the closed A-annular space caused by temperature and pressure fluctuations during injection and production of gas storage wells , based on the heat-transfer theory , the elastic plane strain theory of tubular strings and the volume compatibility principle , a multi-unit pressure calculation model of annular A considering the inonlinear properties of annulus protection fluid was es-

tablished . Based on this subsection calculation method , the effect of isothermal compression coefficient and isobaric expansion coefficient of the annular protection fluid , the linear expansion coefficient , elastic modulus and Poisson's ratio of tubing on the annulus pressure were analyzed . The results show that the accuracy of annular pressure prediction can be improved by using subsection computing method . To estimate the annulus pressure without considering the temperature distribution will cause the result to devi - ate from the actual value , and the higher the temperature , the greater the deviation . The non-linear property of annulus protection fluid has a relatively great impact on annulus pressure , ignoring the change of its properties with temperature will lower the annulus pressure . The pressure calculation mod - el is in good agreement with the on-site monitoring value , which can provide reference for engineering application .

Key words: underground gas storage rebuilt from gas reservoir ; injection-production wells ; closed A⁻an- nular ; annular pressure ; subsection computing

Analysis of the effect of floating platform motion on the lateral dynamic characteristics of deepwater drilling riser during installation /2022 ,46(2) :98-106

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Abstract: The mechanical characteristics of deepwater drilling riser during installation have an important impact on its safe and efficient installation . Considering the effect of the dynamic drift of the top floating platform during riser installation , the lateral dynamic characteristic analysis model and control equation during riser installation have been established . The control equation has been numerically solved by the finite difference method , and the effects of the static offset , drift amplitude and drift period of the top floating platform on the lateral dynamic characteristics during riser installation have been discussed . The results show that during the installation of deepwater drilling riser , the maximum value of lateral dis - placement appears at the bottom of riser , and the maximum value of bending moment and stress appears at the top of riser near the sea surface . In a platform drift period , the maximum lateral displacement at the bottom of the riser occurs at the same time as the maximum bending moment at the top , and the maximum stress at the top lags behind the maximum bending moment at the top . Platform static offset mainly affects the lateral displacement during riser installation , and the static offset and lateral displace - ment are positively correlated . The amplitude drift of platform is the main factor affecting the lateral dy - namic characteristics of riser installation . With the increase of the amplitude drift , the lateral displace-

ment , bending moment and stress of riser increase . The drift period of the platform has little effect on the bending moment , and has no obvious effect on the lateral displacement and stress . This research is of engineering guiding significance for the installation process of deepwater drilling riser .

Analysis and application of horizontal well extension limit based on sectional friction factor /2022 ,46(2):
107-116

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Abstract: The whole borehole is divided into several well sections with different friction factors by using system cluster analysis . Combined with the drill string friction torque model , the simulated annealing algorithm is used to inverse and calculate the optimal value of friction factor of each well section . Based on the sectional friction factor , considering the bearing capacity of the drilling rig , rock crushing conditions , friction conditions , drill string strength conditions and drill string stiffness conditions , the judgment criterion and prediction model of horizontal well extension limit are established . The field application results show that the predicted values of hook load and wellhead torque obtained by the segmented friction factor inversion method have a good correlation with the measured data . The average absolute error values are 3 .72% and 3 .45% respectively , which are 54 .8% and 51 .8% higher than the prediction accuracy of the traditional inversion method . With the increase of friction factor , the extension limit of horizontal well decreases obviously . The results can provide a reference for the prediction of extension limit of horizontal wells .

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