1. The gas content of continental Yanchang Shale and its main controlling factors: A case study of Liuping-171 Well in ordos basin

**Accession number:** 20141417548639  
**Authors:** Zeng, Wei-Te (1, 2, 3); Zhang, Jin-Chuan (1, 2, 3); Ding, Wen-Long (1, 2, 3); Wang, Xiang-Zeng (4); Zhu, Ding-Wei (1, 2, 3); Liu, Zhu-Jiang (5)  
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**Corresponding author:** Zhang, J.-C.(zhangjc@cugb.edu.cn)  
**Source title:** Natural Gas Geoscience  
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**Issue date:** 2014  
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**Language:** Chinese  
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**Document type:** Journal article (JA)  
**Publisher:** Science Press  
**Abstract:** The direct desorption method and indirect method were used for calculating the free gas content, adsorbed gas content and total gas content of Chang 7 Shale, Chang 8 Shale and Chang 9 Shale in Liuping-171 Well respectively. By analyzing the mineralogy, geochemical characteristics, pore structure and pore volume of Yanchang shale, the main controlling factors of gas content had been confirmed, which had been analyzed qualitatively or semi-quantitatively. The results show that, the gas content of Yanchang shale is dominated by adsorbed gas content. In particular, the gas content of Chang 7 shale is 3.71-6.26m³/t of which the free gas content is 22.53%-35.29%, with an average of 29.22%. The gas content of Chang 8 shale is 3.68-5.19 m³/t of which the free gas content is 24.43%. The gas content of Chang 9 shale is 5.57-7.80 m³/t of which the free gas content is 31.64%. With the increase of organic carbon content, the specific surface area available for gas adsorption increases accordingly, therefore, the adsorbed gas content increases. The organic carbon content shows positive correlation with the total pore volume, moreover, high maturity promoted the development of organic nanopores which caused the increase of shale gas reservoir space. Hence, TOC and vitrinite reflectance show positive correlation with the gas content respectively. Different from marine shale, the source of quartz in continental Yanchang shale is the detrital material of terrigenous origin, therefore, the quartz content is negatively correlated with gas content. The clay content has weak positive correlation with the gas content, which mainly manifested as the adsorption capacity of illite smectite mixed layer clay and illite for shale gas. The correlation between gas content and micropore volume is not obvious. While the motion state of methane molecules changed because of which the thermodynamic state changed, the macropore and mesopore with a greater pore size and pore throat are easier to be filled by methane molecules, therefore, the macropore and mesopore volume show positive correlation with the gas content.  
**Number of references:** 37  
**Main heading:** Gases  
**Controlled terms:** Clay minerals - Gas adsorption - Metamorphic rocks - Methane - Minerals - Molecules - Petroleum reservoirs - Quartz - Shale  
**Uncontrolled terms:** Controlling factors - Gas content - Geochemical characteristic - Main controlling factors - Ordos Basin - Organic carbon contents - Vitrinite reflectance - Yanchang Formation  
**Classification code:** 481.1 Geology - 481.1.2 Petrology (Before 1993, use code 482) - 482.2 Minerals - 522 Gas Fuels - 931.2 Physical Properties of Gases, Liquids and Solids - 931.3 Atomic and Molecular Physics  
**DOI:** 10.11764/j.issn.1672-1926.2014.02.0291  
**Database:** Compendex  
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**Data Provider:** Engineering Village

2. Ordovician paleokarst cave system and it's controlling factor in Xekar, Tarim Basin

**Accession number:** 20141417548623  
**Authors:** Shi, Shu-Yuan (1); Hu, Su-Yun (1); Liu, Wei (1); Liang, Dong-Xing (1); Qiao, Hui (2)
Based on the outcrop and satellite image, this paper discussed the characteristics of Ordovician cave system and its main controlling factors in Xekar, Tarim Basin. As paleokarst cave system was distributed grouped and layered, view of cavern system groups is put forward. And cavern system groups of the research area were divided into a single fracture-cavity system and cavern group system based on the detailed observation of cavern fillings. On the planar, the shape of single fracture-cavern was as single hole and hall, but the shape of cavern group was the combination of multiple single cave system. On the cross section, cavern system group is the combination of multiple single cave system distributed into a layer regularly. Different karst caves were connected by multiple scale fractures, in which shape of a single cavity body is mainly circular, elliptic and lenticular. With the analysis of fracture-cavern shape and their distribution characteristics, also various geochemical analysis data, such as carbon and oxygen isotopes, strontium isotope (87Sr/86Sr), we conclude that the distribution of paleokarst cave system in study area is dominated by climate, unconformity, channel system and fault system. Climate and unconformity are foundation for the development of fracture-cavity system, and the channel system and fault system, especially fault system, play significant role in later reformation of cave. The development model and mechanism of fracture-cavity system dominated by unconformity-channel system and the development process and model of fracture-cave dominated by fracture system are generalized systematically, which is expected to provide theoretic basis for paleokarst cave system reservoir predication in the subarea of north Tarim Basin.

Number of references: 23

3. Production prediction of partially completed horizontal well in gas reservoir

Accession number: 20141417548638
Authors: Xiong, Jun (1); He, Han-Ping (2); Xiong, You-Ming (1); Pang, Hao (3); Zhu, Lin (4); Li, Qin-Yang (1)
Author affiliation: (1) Southwest Petroleum University, Chengdu 610500, China; (2) SINOPEC Research Institute of Petroleum Engineering, Beijing 100101, China; (3) Natural Gas Business of PetroChina Tarim Oilfield Company, Korla 841000, China; (4) CNOOC Panyu Operating Company, Shenzhen 518067, China
Corresponding author: Xiong, J. (michaelxj@outlook.com)
Source title: Natural Gas Geoscience
Abbreviated source title: Nat. Gas Geosci.
Volume: 25
Issue: 2
Issue date: 2014
Publication year: 2014
Pages: 286-290
Language: Chinese
ISSN: 16721926
Document type: Journal article (JA)
Abstract: The application of partially completed horizontal well is very promising, but the relevant researches worldwide are only based on oil reservoir. According to the stable percolation theory of gas and three dimensional seepage characteristics of horizontal well, the pseudopressure distribution of infinitesimal horizontal section influenced by non-Darcy flow was derived by introducing skin factor related to flow rate. Furthermore, based on the superposition principle of pseudopressure drop, the gas reservoir model for partially completed horizontal well was established. And the coupling model for production prediction was founded by coupling gas reservoir model and wellbore model. The verification for this model against reality case indicates a high accuracy. Utilizing this coupling model, the predicted production and the distribution of flow rate, axial production and flowing pressure in wellbore along horizontal well of partially completed horizontal well are obtained.

Number of references: 16

Main heading: Horizontal wells

Controlled terms: Couplings - Flow rate - Forecasting - Low permeability reservoirs - Oil field equipment

Uncontrolled terms: Coupling modeling - Gas reservoir - Horizontal section - Percolation theory - Production prediction - Pseudopressure drops - Superposition principle - Three dimensional seepage

Classification code: 511.2 Oil Field Equipment - 512.1 Petroleum Deposits - 512.1.1 Oil Fields - 602 Mechanical Drives and Transmissions - 631 Fluid Flow - 921 Mathematics

DOI: 10.11764/j.issn.1672-1926.2014.02.0286

Database: Compendex

Compilation and indexing terms, Copyright 2013 Elsevier Inc.

Data Provider: Engineering Village

4. Tectonic evolution of salt rock in Kwanza Basin and its relation with hydrocarbon accumulation

Accession number: 20141417548629
Authors: Xue, Bao-Shan (1); Zhang, Shu-Lin (2)
Author affiliation: (1) China University of Geoscience, Wuhan 430074, China; (2) China National Offshore Oil Corp., Beijing 100027, China
Corresponding author: Xue, B.-S.(xuebs@cug.edu.cn)
Source title: Natural Gas Geoscience
Abbreviated source title: Nat. Gas Geosci.
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Issue: 2
Issue date: 2014
Publication year: 2014
Pages: 221-227
Language: Chinese
ISSN: 16721926
Document type: Journal article (JA)
Publisher: Science Press
Abstract: Kwanza Basin is a typical salt basin superimposed by rift in the early stage and passive continental margin in the late stage. The formation of the basin underwent three stages of tectonic evolution: rift stage, transition stage and passive continental margin stage. During the transition stage, thick layers of rock salt were deposited. Tectonic evolution after rock salt deposition was mainly controlled by three driving factors (dynamics), and in general the rock salt was thick in the west and thin in the east. To a certain extent, the evolution after rock salt deposition controlled the distribution of upper sedimentary formations, the formation of salt traps and the distribution of salt window. According to the dynamics of rock salt evolution and current rock salt characteristics, Kwanza Basin is divided into salt extension region and salt compression region. The two regions are of different migration and accumulation conditions, and thus are of different exploration potentials and directions.

Number of references: 12

Main heading: Salt deposits

Controlled terms: Deposition - Tectonics

Uncontrolled terms: Exploration potential - Hydrocarbon accumulation - Kwanza Basin - Migration and accumulation - Passive continental margin - Rock salt - Sedimentary formation - Tectonic evolution

Classification code: 484.1 Earthquake Measurements and Analysis - 505.1 Nonmetallic Mines - 813.1 Coating Techniques

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Database: Compendex

Compilation and indexing terms, Copyright 2013 Elsevier Inc.
5. Recognizing oil shale fracture of Chang 7 Member in Ordos Basin using logging data

Accession number: 20141417548634
Authors: Liu, Zhi-Di (1); Zhao, Jing-Zhou (1)
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Source title: Natural Gas Geoscience
Abbreviated source title: Nat. Gas Geosci.
Volume: 25
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Issue date: 2014
Publication year: 2014
Pages: 259-265
Language: Chinese
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Document type: Journal article (JA)
Publisher: Science Press

Abstract: There is no effective porosity in oil shale, and fracture network provides main flow path for oil product in this kind of reservoir, thus the development degree of natural fracture system directly affects the exploitation efficiency of oil shale reservoirs. Therefore, the study on oil shale's fracture is particularly important. Logging curves can identify oil shale accurately, but it is still a challenge to evaluate the development degree of fracture in oil shale. In this work, five logging indexes which could reflect the degree of fracture development in Chang 7 Member in Ordos Basin were chosen after analyzing the different logging response of oil shale in this area, and the probability model of oil shale was established based on the five defined indexes and their weights which was determined using analytic hierarchy processes. The automatic-quantitative identification of oil shale fractures by computer is realized. Compared the recognition results with the image logging, it shows that this method can accurately recognize the fractures in oil shale, and it can satisfy the identification accuracy requirements of fracture in oil shale formation using logging data.

Number of references: 15

6. A study of the controlling factors on the resistivity of fractured reservoir using the numerical simulation

Accession number: 20141417548633
Authors: Zhang, Zhao-Hui (1); Gao, Chu-Qiao (2); Gao, Yong-De (3)
Author affiliation: (1) Research Institute of Petroleum Exploration and Development-Northwest (NWGI), Lanzhou 730020, China; (2) Geophysics and Oil Resource Institute, Yangtze University, Jingzhou 434023, China; (3) Research Institute, West of South Sea of CNOOC, Zhanjiang 524057, China
Corresponding author: Zhang, Z.-H. (zhangzhao123@163.com)
Source title: Natural Gas Geoscience
Abbreviated source title: Nat. Gas Geosci.
Volume: 25
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Issue date: 2014
Publication year: 2014
Pages: 252-258
Language: Chinese
ISSN: 16721926
Document type: Journal article (JA)
Publisher: Science Press
Abstract: Many factors affect the resistivity of fractured reservoir, and the reservoir conductive mechanism is complex. Based on the dual laterolog principle, through the construction of reasonable geological model, the resistivity of water saturated fractured rock and oil saturated fractured rock was simulated theoretically, and the factors are analyzed. The factors include resistivity of formation water, resistivity of matrix, fracture dip, fracture width, porosity of matrix, M value, and so on. At last, the affecting degree to resistivity of reservoir is discussed. The simulated results showed that: (1) With the increasing of the resistivity of matrix, the resistivity of reservoir gradually increases, and the increasing degree of oil saturated fractured rock is bigger than that of the water saturated fractured rock. The affecting degree of fluid properties for the resistivity of reservoir increases gradually with the increase of the resistivity of matrix. (2) The resistivity of matrix is fixed. With the increasing of the resistivity of formation water and fracture dip, the resistivity of reservoir gradually increases, but for the fracture width, the condition is opposite. The affecting degree of water saturated fractured rock is bigger than that of the oil saturated fractured rock, and the affecting degree of fluid properties for the resistivity of reservoir increases gradually with the reduction of the resistivity of formation water and fracture dip and the increasing of fracture width. (3) The resistivity of matrix was determined by Archie formula. With the increasing of the porosity of matrix, the resistivity of reservoir gradually reduced, but for the M value, the condition is opposite. The affecting degree of oil saturated fractured rock is bigger than that of the water saturated fractured rock, and the affecting degree of fluid properties for the resistivity of reservoir increases gradually with the reduction of the porosity of matrix and increasing of M value. (4) The affecting degree of M value and the resistivity of matrix for the resistivity of reservoir are the largest, followed by the factors including fracture dip and fracture width, and the influence of the resistivity of formation water is the smallest.

Number of references: 14

Main heading: Fracture

Controlled terms: Electric conductivity - Electric logging - Geologic models - Porosity - Rocks

Uncontrolled terms: Conductive mechanisms - Controlling factors - Fractured reservoir - Geological modeling - Porosity of matrixes - Resistivity of formation water - Simulated results - Theoretical simulation


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Database: Compendex

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Data Provider: Engineering Village

7. Rate decline of multiple fractured horizontal well and influence factors on productivity in tight gas reservoirs

Accession number: 20141417548637

Authors: Wang, Jun-Lei (1); Jia, Ai-Lin (1); He, Dong-Bo (1); Wei, Yun-Sheng (1); Qi, Ya-Dong (1)

Author affiliation: (1) PetroChina Research Institute of Petroleum Exploration and Development, Beijing 100083, China

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Pages: 278-285

Language: Chinese

ISSN: 16721926

Document type: Journal article (JA)

Publisher: Science Press

Abstract: To investigate rate decline and influence factors on gas well productivity, a mathematical model was established based on new definitions of pseudo pressure and time incorporating the slippage effect. Rate solution for model was presented through applying Newman product principle, Laplace transform, substitution method and superposition method. The effect of fracture length, number, conductivity and length on rate decline was analyzed respectively, and the influence degree was measured based on orthogonal experimental design. The result shows that the value of elastic energy recovery is constant, but the maximal production time is the function of fracturing parameters. Better development effect means higher productivity and smaller maximal production time. It is realized by larger conductivity, fracture length, and equivalent drainage area controlled by fracture length and number. In orthogonal experimental design, fracture number owns the most obvious effect on maximal production time, and
fracturing length takes second place, fracture length third, fracture conductivity forth. In practical application, the optimization of MFHW is that fracture number equals to 3, fracture length equals to 97.6m, fracturing length equals to 279.2m, fracture conductivity equals to 2446.8×10³µm³.

Number of references: 19
Main heading: Fracture
Controlled terms: Fracturing (oil wells) - Laplace transforms - Mathematical models - Natural gas wells - Petroleum reservoirs - Productivity - Statistics
Uncontrolled terms: Development time - Multiple fracture - Orthogonal experimental design - Production declines - Tight gas
DOI: 10.11764/j.issn.1672-1926.2014.02.0278
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Data Provider: Engineering Village

8. Mechanism of reservoir quality difference of lacustrine carbonate in lower member 1 Shahejie Formation in Qikou Sag

Accession number: 20141417548627
Authors: Li, Yan (1, 2); Jin, Zhen-Kui (1, 2); Yang, You-Xing (3); Guan, Quan-Sheng (1, 2); Li, Peng (1, 2)
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Corresponding author: Jin, Z.-K.(Jinzhenkui@188.com)
Source title: Natural Gas Geoscience
Abbreviated source title: Nat. Gas Geosci.
Volume: 25
Issue: 2
Issue date: 2014
Publication year: 2014
Pages: 201-211
Language: Chinese
ISSN: 16721926
Document type: Journal article (JA)
Publisher: Science Press
Abstract: The lacustrine carbonate reservoirs with multi-type reservoir spaces are strongly nonhomogeneous in the Lower Member 1 of Shahejie Formation in Qikou Sag. It is difficult to understand the oil pool distribution and predict favorable reservoirs in the study area. In order to solve this problem, this paper comprehensively applied drilling data, logging data, core observation, thin section identification and analysis assay data to study characteristics and formation mechanism of lacustrine carbonate reservoirs. Primary pore, secondary dissolution pore and fracture are developed in the medium porosity and medium permeability carbonate reservoirs. The reservoir quality difference includes three aspects. Firstly, porosity and permeability are obviously different in the space. Secondly, the dominant reservoir space partition is evident. Thirdly, porosity and permeability are various in different lithologies. The particle limestone is of the highest porosity and permeability, micritic dolomite is the second, and micritic limestone is the lowest. Reservoir quality difference is evidently controlled by sedimentary facies, heterogeneous dissolution and tectonics. Organic bank and oolitic bank are favorable sedimentary facies for high quality reservoirs in this area. Micritic dolomite near the faults is inclined to fracture. Heterogeneous dissolution caused by different components and the development degrees of primary pore and fracture is the basic factor that caused the reservoir quality difference.

Number of references: 27
Main heading: Quality control
Controlled terms: Dissolution - Fracture - Limestone - Petroleum reservoirs - Porosity - Sedimentology
Uncontrolled terms: Carbonate reservoir - Formation mechanism - Forming mechanism - High quality reservoir - Medium permeability - Qikou Sag - Reservoir quality - Shahejie formation
DOI: 10.11764/j.issn.1672-1926.2014.02.0201
Database: Compendex
9. The controlling of structure fractures on the accumulation of tight sand gas reservoirs

**Accession number:** 20141417548625

**Authors:** Wang, Peng-Wei (1, 2); Chen, Xiao (3); Pang, Xiong-Qi (1, 2); Jiang, Zhen-Xue (1); Jiang, Fu-Jie (1, 2); Guo, Ying-Chun (1, 2); Guo, Ji-Gang (1, 2); Dai, Qi-Wen (1); Wen, Jing (1)

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**Corresponding author:** Pang, X.-Q. (pangxq@cup.edu.cn)

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**Pages:** 185-191

**Language:** Chinese

**ISSN:** 16721926

**Document type:** Journal article (JA)

**Publisher:** Science Press

**Abstract:** Tectonic fractures developed widely in the tight-sand reservoir in Kuqa Depression, Tarim Basin. The formation and distribution of these fractures exerted great impact on the tight sand gas reservoirs. Based on the analyses about the formation time, distribution and intensity of fractures with the core and logging data in Ahe Formation of Yinan 2 reservoirs, this paper holds that the fractures were developed in tight sand reservoirs later than the time that Yinan 2 gas reservoirs formed, and they spread both in the internal and boundary of the reservoirs with different intensity. As a result, the impact of fractures developed in the tight sand reservoir on the tight sand gas reservoirs are as follows: (1) After the formation of fractures, the accumulation dynamics were changed. Buoyancy was the main dynamic for natural gas to move in the fractures, while the molecular swelling force was the chief one in the basic porosities. (2) When fractures developed later than the gas reservoir and occurred within the reservoir, fractures improved the property of tight reservoir, acting as main migration pathway as well as storage space. (3) When fractures developed later than the gas reservoir and occurred on the boundary of the original tight-sand gas reservoirs, fractures can change the critical condition of tight sand gas reservoirs, resulting in the destruction and shrinkage of reservoirs.

**Number of references:** 28

**Main heading:** Fracture

**Controlled terms:** Digital storage - Petroleum reservoirs

**Uncontrolled terms:** Critical condition - Kuqa depression - Migration pathway - Tectonic fractures - Tight reservoirs - Tight sand gas - Tight sand gas reservoirs - Yinan 2 gas reservoirs

**Classification code:** 421 Strength of Building Materials; Mechanical Properties - 512.1.1 Oil Fields - 722.1 Data Storage, Equipment and Techniques - 951 Materials Science

**DOI:** 10.11764/j.issn.1672-1926.2014.02.0185

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**Data Provider:** Engineering Village

10. High resolution turbidite fan reservoir prediction of Shahejie Formation in Qikou18-1 Oilfield, Bohai Bay Basin

**Accession number:** 20141417548635

**Authors:** Yin, Nan-Xin (1); Xu, Hua-Min (1); Tan, Lü (2); Tan, Jian-Cai (3); Li, Ming-Ying (4); Long, Kun (5)

**Author affiliation:** (1) College of Geosciences, China University of Petroleum, Beijing 102249, China; (2) Department of Development, Tianjin Company, CNOOC, Tianjin 300452, China; (3) Zhanjiang Branch of CNOOC Ltd., Zhanjiang 524000, China; (4) Puguang Gas Field Branch, Dazhou 635000, China; (5) Nanchong Heneng Compressed Natural Gas Company Limited, Nanchong 637000, China

**Corresponding author:** Yin, N.-X. (yinnanxin236237@163.com)

**Source title:** Natural Gas Geoscience

**Volume:** 25

**Issue:** 2
Abstract: Shahejie Formation reservoir in QK18-1 Block belongs to turbidite fan deposition, with high heterogeneity and rapidly lateral changed sand bodies. High resolution superior quality reservoir prediction of Shahejie Formation turbidite fan reservoir in Qikou 18-1 Oilfield was carried out through seismic attributes analysis, log constrained inversion and geostatistical inversion, which provides a geological basis for the oilfield development plan. The scope of turbidite fan and its geometry were determined with the distribution of root-mean-square amplitude, one of the preferred seismic attributes, and as a result, the favorable sedimentary facies zone is targeted within the study area. Then, the compound sandstones within the turbidite fan were predicted with three dimensional wave impedance data volume derived from log constrained inversion based geological model; Finally, geostatistical inversion, which collaboratively simulated the wave impedance and shale content, was applied to improve the resolution and credibility of the seismic reservoir prediction. Therefore the internal architecture of the compound turbidite fan sandstones was able to be characterized clearly. Thus the distribution of superior quality reservoir was predicted reliably. The methodology of seismic reservoir prediction, with steadily increasing accuracy from favorable deposition facies, to compound sandstones, finally till internal sandstone architecture, is particularly suitable for turbidite fan reservoir study in the condition of wide spaced wells.

Number of references: 18

Main heading: Quality control

Controlled terms: Deposition - Oil field development - Sandstone - Seismic prospecting - Seismology

Uncontrolled terms: Constrained inversions - Geological modeling - Geostatistical inversion - Internal architecture - Reservoir prediction - Seismic attribute analysis - Seismic attributes - Shahejie formation

Classification code: 482.2 Minerals - 484.1 Earthquake Measurements and Analysis - 512 Petroleum and Related Deposits - 512.1.2 Petroleum Deposits : Development Operations - 813.1 Coating Techniques - 913.3 Quality Assurance and Control

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Data Provider: Engineering Village

11. Multiple suppression technology using iteration combination in multi-domain step by step method

Accession number: 20141417548632

Authors: Wang, Yan-Xiang (1); Zhang, Jun-Duo (1); Wang, Sheng (2); Su, Qin (1); Shao, Xi-Chun (1)

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Document type: Journal article (JA)

Publisher: Science Press

Abstract: In Sudan 3/7 block, when we do seismic data processing, especially the processing of multiple, it is suppressed. There are some problems. For example, the multiple cannot be suppressed completely, or some of the primary reflection energy is lost. These problems can be solved by iteration combination technology in multiple domains step by step: (1)According to the periodicity of multiple, we use predictive deconvolution to suppress near offset multiple firstly. (2)Using Radon transform in shot-gather domain, detection domain and CMP domain respectively to suppress the multiple of far offset. (3)Finally, we use high precision Radon transform to suppress the residual multiple in CRP gather. Through the application of the technology, we suppressed the multiple in this block very well,
the seismic data quality has been improved, and we obtained high S/N ratio seismic data, so we provide credible seismic data for the research of the oil gas distribution pattern and identification of oil and gas accumulation zone.

**Number of references:** 23

**Main heading:** Iterative methods

**Controlled terms:** Data processing - Mathematical transformations - Seismic response - Seismic waves

**Uncontrolled terms:** CRP gather - Multi domains - Multiple - Predictive deconvolution - Radon Transform

**Classification code:** 408 Structural Design - 484 Seismology - 723.2 Data Processing and Image Processing - 921.3 Mathematical Transformations - 921.6 Numerical Methods

**DOI:** 10.11764/j.issn.1672-1926.2014.02.0243

**Database:** Compendex

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**Data Provider:** Engineering Village

### 12. Irreducible water saturation models of tight sandstone gas reservoirs with low porosity and permeability and its application-taking a block of Shanxi Formation tight sandstone reservoir in Sulige Gas field as an example

**Accession number:** 20141417548636

**Authors:** Chen, Ke-Gui (1); Wen, Yi-Na (1); He, Tai-Hong (2); Sun, Wan-Ming (3); Wang, Chao (4); Wu, Tao (1); Fu, Jian-Guo (5)

**Author affiliation:** (1) Southwest Petroleum University, Chengdu 610500, China; (2) Xibu Drilling Engineering Company, Urumqi 830026, China; (3) Tuha Division of China Petroleum Logging Company, Hami 839000, China; (4) Petroleum Eng and Tech Supervision Div of Qinghai Oilfield Supervision and Project Management Comp, Dunhuang 736202, China; (5) Zhundong Drilling Division of Xibu Drilling Company, Fukang 831500, China

**Corresponding author:** Chen, K.-G.(chenkegui@21cn.com)

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**Pages:** 273-277

**Language:** Chinese

**ISSN:** 16721926

**Document type:** Journal article (JA)

**Publisher:** Science Press

**Abstract:** Reservoirs in the study area have characteristics of low porosity, low permeability, low pressure, low abundance, and high water saturation. Irreducible water saturation is related to the pore structure, rock properties, and formation condition. So for different types of reservoirs, there have different factors influencing the irreducible water saturation, and the way to calculate are also different. According to the actual situation of the study area, we establish three models to calculate irreducible water saturation on the basis of NMR and well-logging data: porosity model which is very bad for low porosity, low permeability, and pore structure complex reservoirs; multiple linear regression analysis for pore structure index and shale content to get irreducible water saturation, which achieved good results; Pore structure index model which has high degree of agreement with NMR analysis and good effect. Therefore, according to the reservoir characteristics of the study area, the model established by pore structure index improves the accuracy of interpretation model, and provides a reliable basis for the post-logging interpretation.

**Number of references:** 12

**Main heading:** Reservoirs (water)

**Controlled terms:** Gas industry - Linear regression - Low permeability reservoirs - Nuclear magnetic resonance - Petroleum reservoir engineering - Pore structure - Porosity

**Uncontrolled terms:** Different types of reservoirs - Interpretation model - Irreducible water saturation - Low porosity and permeability - Multiple linear regression analysis - Reservoir characteristic - Structure index - Tight sandstone reservoirs

**Classification code:** 441.2 Reservoirs - 512.1 Petroleum Deposits - 512.1.2 Petroleum Deposits : Development Operations - 522 Gas Fuels - 922.2 Mathematical Statistics - 931.2 Physical Properties of Gases, Liquids and Solids

**DOI:** 10.11764/j.issn.1672-1926.2014.02.0273

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**Data Provider:** Engineering Village
13. Formation mechanism and enrichment regularities of Kelasu subsalt deep large gas field in Kuqa Depression, Tarim Basin

**Accession number:** 20141417548622  
**Authors:** Wang, Zhao-Ming (1)  
**Author affiliation:** (1) Tarim Oilfield Company, PetroChina, Korla 841000, China  
**Corresponding author:** Wang, Z.-M. (wzm-qlm@petrochina.com.cn)  
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**Abstract:** It is well known that there were rich gas resources in Kuqa Depression. Since the discovery of Kela-2 large gas field, Dabei gas field and Keshen gas field have been discovered in the down block of Kelasu fault in Keshen structural zone. Taking Keshen and Dabei gas fields as an example, formation mechanism and enrichment regularities of Kelasu subsalt deep large gas field were discussed in detail in this paper. It was considered that the Jurassic-Triassic coal-measure source rocks were a high effective gas kitchen, gas generation intensity and rate reached the maximum (corresponding to (160-320)×108m3/km2 and 15-20mg/gTOC·Ma, respectively) in recent 5Ma. Kelasu structural zone overlapped the hydrocarbon supplying centers, and sufficient gas source supplied a material basis for gas accumulation of Dabei-Keshen gas field. Regionally distributed thick gypsum rock restricted structure thrust breakthrough, protected reservoirs effectively and preserved oil and gas with high-efficiency, which provided an important assurance. Bedding-delamination contractional deformation, subsalt imbricated thrust structures and widely distributed low porosity sandstone reservoir provided a favorable storage space for oil and gas accumulation in Dabei-Keshen area. The formation of subsalt deep structure is related to compressional deformation as a result of later Himalayan episodic strong thrust compression. Pliocene-Quaternary is the main stage for the formation of Kelasu structural zone and the main structure finalized in Middle-Later Kuqa Formation. Gas generation history research showed the main gas generation stage began in sedimentary period of Kuqa Formation. Later high-efficiency oil and gas accumulation of Kelasu subsalt structural zone was determined by a better match of main gas generation stage and structure forming stage, which is an important reason for the formation of deep large gas field in Kelasu play zone.  

**Number of references:** 51  
**Main heading:** Subsalt strata  
**Controlled terms:** Energy resources - Gas generators - Gas industry - Oils and fats - Petroleum deposits  
**Uncontrolled terms:** Coal-formed gas - Compressional deformation - Hydrocarbon accumulation - Imbricated thrust structure - Keshen Gasfield - Kuqa depression - Oil and gas accumulation - Sandstone reservoirs  
**Classification code:** 481.1 Geology - 512.1 Petroleum Deposits - 522 Gas Fuels - 525.1 Energy Resources and Renewable Energy Issues - 804.1 Organic Compounds  
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14. Tectonic evolution of the Leshan-Longnvsi paleo-uplift and reservoir formation of Neoproterozoic Sinian gas

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**Source title:** Natural Gas Geoscience  
**Abbreviated source title:** Nat. Gas Geosci.  
**Volume:** 25  
**Issue:** 2
Taking Dengying Formation of Neoproterozoic Sinian of Leshan-Longnvsi paleo-uplift as a target, relationship between the evolution of paleo-uplift and hydrocarbon accumulation has been studied. It has undergone several periods of tectonic movements during the Leshan-Longnvsi paleo-uplift: Tongwan movement, including episode I and episode II, controlling the development of paleo-karsting; Caledonian movement, controlling the formation of embryonic paleo-uplift; Hercynian movement, Indo-China movement and Yanshanian movement, controlling the oil and gas reservoir process. During these periods, paleo-uplift generally inherently developed, while paleo-uplift axis continuously migrated from northwest to southeastward and finally set in Himalayan. Based on the researches on fluid inclusions and burial history, it was recognized that there were three key generation or expulsion periods, i.e., Silurian, early Triassic and Jurassic-Cretaceous sedimentary stages, respectively. There were seven periods during the Sinian Dengying Formation: initial charge, hydrocarbon stagnation, secondary charge, formation, migration and cracking of paleo-oil reservoir, and formation of gas reservoir. Combined numerical simulation with oil and gas exploration, gas reservoir modeling of Dengying Formation in Sinian was established. Gas reservoir group were distributed as a cluster block in the slope of paleo-uplift where Well Gaoshi1 existed. They showed as layered distribution in plane. The slope of paleo-uplift was an important gas exploration area. And it was also recognized that petroleum system of neoproterozoic in China would play a significant role for oil prospecting.

15. Geological and resource evaluation in tight sandstone gas plays of low exploration degree: a case of Jurassic tight sandstone gas in east Kuqa Basin

According to the characteristics of tight sandstone gas plays of low exploration degree, two methods such as geological analogy in resource abundance and stochastic modeling based on reservoir volume were chosen to assess tight sandstone gas resources. Based on the geological analogy of some typical tight sandstone gas reservoirs, criteria of geological evaluation and resource abundance analog were established. The Jurassic tight sandstone gas in East Kuqa Basin has been taken as an example. Firstly, using the multi-factor congregating method, favorable zones of tight sandstone gas were predicted, and geological evaluation and parameters were studied for each zone. Then, using
resource abundance analogy method and stochastic simulation method, gas resources of each tight sandstone gas zone were calculated. The results show that Jurassic tight sandstone gas resource in East Kuqa Basin is about 1.4 trillion square, which has great exploration and development potential.

Number of references: 21
Main heading: Petroleum reservoirs
Controlled terms: Energy resources - Stochastic models
Uncontrolled terms: Geological analogy - Kuqa Basin - Resource evaluation - Stochastic simulations - Tight sandstone gas
Classification code: 512.1.1 Oil Fields - 525.1 Energy Resources and Renewable Energy Issues - 922.1 Probability Theory
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16. Salt tectonics and its control on play of Gabon coastal basin, West Africa

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Abbreviated source title: Nat. Gas Geosci.
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Abstract: In recent years, West African passive continental margin basins become the rapid growth area of global oil and gas resources. To reveal the hydrocarbon accumulation regularity of Gabon coastal basin, the basin's structural characteristics, salt sequence, play and hydrocarbon accumulation model were researched. The results show that: two near-vertical fault systems, north west-south east fault system and north east-south west fault system, which was formed in the period of rift, transitional and passive continental margin stages, make the basin have the tectonic framework of east-west zoning and north-south blocking. Salt sequence is the key factor to hydrocarbon enrichment. Salt structural traps formed by its flow deformation are favorable to hydrocarbon accumulation of the post-salt sequence, and salt rock remains a contiguous sequence because of no sliding window of salt, which provide a good seal to pre-salt sequence. Salt tectonic evolution is different during different periods. Coniacian-early Eocene is the main formation period of salt structures, which corresponds to the active period of hinge belt III. Lots of extensional genetic salt structures were formed, and salt diapirism rate approximately equal deposition rate, which controlled facies distribution and favorable traps. During Late Eocene-Early Oligocene, rootless salt plug of extrusion genesis was developed by tectonic inversion in some areas. In post Oligocene, salt diapirism rate was slow, which influenced sedimentation weakly, and favorable traps were few. Comprehensive analysis shows that favorable play of pre-salt sequence developed in fault-block and faulted anticline of hinge belt I, and favorable play of post-salt sequence distributed in the superimposed area of turbidite fan and salt structural traps on the west side of hinge belt III.
Number of references: 35
Main heading: Salt tectonics
Controlled terms: Energy resources - Faulting - Hydrocarbons - Petroleum deposits - Petroleum prospecting
Uncontrolled terms: Comprehensive analysis - Gabon - Hydrocarbon accumulation - Passive continental margin - Passive margin basins - Play - Structural characteristics - West Africa
Classification code: 484.1 Earthquake Measurements and Analysis - 512.1 Petroleum Deposits - 512.1.2 Petroleum Deposits : Development Operations - 525.1 Energy Resources and Renewable Energy Issues - 803 Chemical Agents and Basic Industrial Chemicals
DOI: 10.11764/j.issn.1672-1926.2014.02.0228
Database: Compendex
17. Adsorption characteristic and influence factors of Longmaxi Shale in southeastern Chongqing

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**Abstract:** Adsorption gas in shale is the main component of shale gas. With different adsorption characteristics, shale in different areas has diverse influence factors. Therefore, it is significant to carry out further study on adsorption gas of shale for forecasting the shale gas content and evaluating the shale gas resource. Longmaxi shale rich in organic matter develops greatly well in southeastern Chongqing. It is characterized by high maturity, shallow burial depth and wide distribution. In order to study the adsorption capacity and influencing factors of shale, shale cores from two wells are selected to do the organic carbon content, thermal maturity, X diffraction rock analysis, nitrogen gas adsorption experiment, scanning electron microscopy and isothermal adsorption experiments. Through the data, the relationship between adsorption capacity and pore structure, TOC, mineral composition, moisture content or pressure is figured out. Based on the results, the organic matter content is the key factor in affecting the adsorption capacity and the specific surface area is the fundamental factor to enhance the capacity.  
**Number of references:** 25  
**Main heading:** Shale  
**Controlled terms:** Biogeochemistry - Biological materials - Energy resources - Experiments - Gas adsorption - Organic compounds - Petroleum deposits - Scanning electron microscopy - Specific surface area  
**Uncontrolled terms:** Adsorption capacities - Adsorption characteristic - Adsorption experiment - Chongqing - Influence factors - Organic carbon contents - Organic matter content - Shallow burial depths  
**DOI:** 10.11764/j.issn.1672-1926.2014.02.0302  
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**Data Provider:** Engineering Village

18. Reservoir geological conditions and exploration prospects of low mature oil and gas/bio-gas in Hepu Basin, Guangxi

**Accession number:** 20141417548628  
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**Source title:** Natural Gas Geoscience  
**Abbreviated source title:** Nat. Gas Geosci.
Abstract: This paper discussed the amount, type, and maturity of low mature source rocks as well as the conditions of source-reservoir-caprock association, trap, and hydrocarbon migration and preservation in Hepu Basin. The results indicate that the Hepu Basin is a sedimentary basin of great hydrocarbon potential in the continental block of south China, with good reservoir geological conditions of low mature oil and gas/bio-gas and processes of their formation, mobility and accumulation. The exploration direction of low mature oil and gas/bio-gas resources in Hepu Basin was suggested.

19. Absorption properties of mixed-phase wavelet and prediction of gas reservoir: Taking Qianmiqiao buried hill as an example

Abstract: The reservoir of Qianmiqiao buried hill developed fracture systems, whose anisotropies in vertical and horizontal are strong. Horizontal prediction of gas reservoir is difficult. Using absorption properties of seismic wave to predict reservoir, the congruency between reservoir and well-drilling data can be improved. In this text, a new approach is used to extract mixed-phase wavelet, then the change features of the extracted wavelet in different band powers are analyzed, and the horizon absorption parameter is picked up. With these properties and other seismic properties, the result of gas reservoir prediction is good.
20. Relationship between methane adsorption capacity of clay minerals and micropore volume

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Publisher: Science Press
Abstract: The pore size, surface area and methane adsorption isotherm of clay-rich rocks are measured. Clay minerals mainly contain micropore of 3-100nm, and have two main intervals of 3-6nm and 20-70nm. Smectite is of micropore-dominant. Illite-smectite mixed layer developed micropore and macropore in the same time, and kaolinite, chlorite and illite are of mesopore and macropore. Smectite, illite-smectite mixed layer and kaolinite are the polyporous type, their total pore volume and surface area are more than 0.04 mL/g and 11.47 m2/g, respectively. Adsorption capacity of clay rocks is quite different. The maximum methane adsorption capacity of smectite, illite-smectite mixed-layer, kaolinite, chlorite, illite, sandstone and quartzite in the granularity of less than 270 mesh sequentially are 8.12 mL/g, 3.66 mL/g, 2.70 mL/g, 2.28 mL/g, 1.72 mL/g, 0.97 mL/g and 0.70 mL/g. Surface area of clay minerals depends not only on the total pore volume and porosity, also on the pore size distribution closely. There is a good linear relationship between the micropore volume of clay minerals and the maximum amount of methane adsorption. Therefore, the micropore volume of shale reflects its adsorption capacity for natural gas. The adsorption capacity is controlled by the development degree of internal micropores, in particular less than 20nm micropores. The difference of clay minerals in morphological structure, pore size and porosity results in the differences of their adsorption capacity. This difference is associated not only with the clay type, also with its causes and the diagenesis experienced.

Number of references: 21
Main heading: Microporosity
Controlled terms: Adsorption - Clay minerals - Coal tar - Isotherms - Kaolinite - Methane - Pore size
Uncontrolled terms: Adsorption capacities - Development degree - Linear relationships - Methane adsorption - Methane adsorption capacity - Micropore volumes - Morphological structures - Total pore volume
Classification code: 411.2 Coal Tar - 482.2 Minerals - 522 Gas Fuels - 802.3 Chemical Operations - 931.2 Physical Properties of Gases, Liquids and Solids
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