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Sedimentary Facies Characteristics of Chang 6 and Chang 7 Members of Yanchang Formation in Heshui Area, China

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Abstract

This paper takes Chang 6 and Chang 7 of Yanchang Formation in Heshui area of China as the research object. This study first divides the strata of Chang 6 and Chang 7. According to the review data, significant geological activities have caused a large settlement of the strata in this area. During the Chang 6 period, a lacustrine basin sedimentary system developed, reaching its peak in the Chang 7 period. The Chang 6 and Chang 7 members primarily feature deep-water gravity flow sedimentary systems, which can be categorized into three subfacies: outer fan, middle fan, and inner fan. These systems also exhibit turbidite fan sedimentary patterns, ranging from deep lake to semi-deep lake facies. By examining these sedimentary models, we can identify different types of turbidite deposits. Understanding the process of gravity flow deposition and the evolution of ancient lakes is crucial for guiding oil and gas exploration and conducting paleogeographic research.

Keywords

Stratigraphic Division, Gravity Flow Deposition, Turbidity Fans, Oil and Gas Exploration

1. Introduction

Gravity flow has always been a hot issue in sedimentology research. In recent years, with the development of international deep-water sedimentary theory and the achievements made in this field in China, the progress of oil and gas exploration technology has been promoted. The research on deep-water sediments in lake basins has progressed rapidly, and a large number of new achievements and new understandings have emerged.

Through investigation, it was found that the study of deep-water sediments began in the 1870s (Ge et al., 2014). The main research results are the establishment of the Bouma sequence and multiple deep-water sedimentary fan models based on the Bouma sequence. Gravity flow deposition, as a special type of deposition, usually occurs in slope or deep water environment, which is formed by gravity-driven material flow. The analysis of gravity flow deposits by sedimentary facies markers is used as a step and theoretical basis for studying the combination characteristics and development model of gravity flow deposits in deep lakes.

In this paper, the Chang 6 and Chang 7 oil layers in Heshui area are taken as the research objects. Combined with the research results and data of Che Yuheng and Wei Qinlian (Wei et al., 2024), and using logging, core observation and other related materials for comparative analysis, the sedimentary facies markers are studied, the types of turbidity current sedimentary microfacies in gravity flow deposits are divided, and their characteristics are summarized to provide reference evidence for oil and gas exploration and development in the study area.

2. Geological Background of the Study Area

In this paper, the capillary pressure curve is measured by the mercury intrusion method, and the original oil saturation in the study area is determined by the J function method(as shown in **Figure 1**). The lithology of the Chang 6 reservoir in the study area is feldspar sandstone, and the pore throat is mainly medium and small pore throat. The throat is poorly sorted, and has a weak micro-small pore throat system that allows fluid to pass through, which occupies a considerable proportion in the whole pore system, resulting in the characteristics of less oil saturation in oil and gas reservoirs. Using the mercury intrusion data of 17 rock samples in Chang 6 of the study area, the J-S_{Hg} relationship of the stratum was plotted by J function conversion method, and the average value of J function of the stratum was fitted. According to the relationship between J function and capillary pressure Pc: The Ordos Basin is a large multi-cycle craton basin, with overall subsidence and depression migration. In the late Triassic sedimentary stage, the formation, development, heyday and atrophy of the lake basin formed multiple sets of source-reservoir-cap assemblages, which are the basic geological conditions for oil and gas accumulation in this area (Zhang et al., 2016). In the long river of sedimentary evolution, the period of Chang 6 and Chang 7 of Yanchang Formation is undoubtedly a very critical stage, which indicates that the development of lake basin has reached its largest peak period. Especially in the semi-deep lake to deep lake sedimentary environment, a set of unique sedimentary system dominated by oil shale has been formed. This discovery has a milestone significance for understanding the Mesozoic continental oil generation theory.

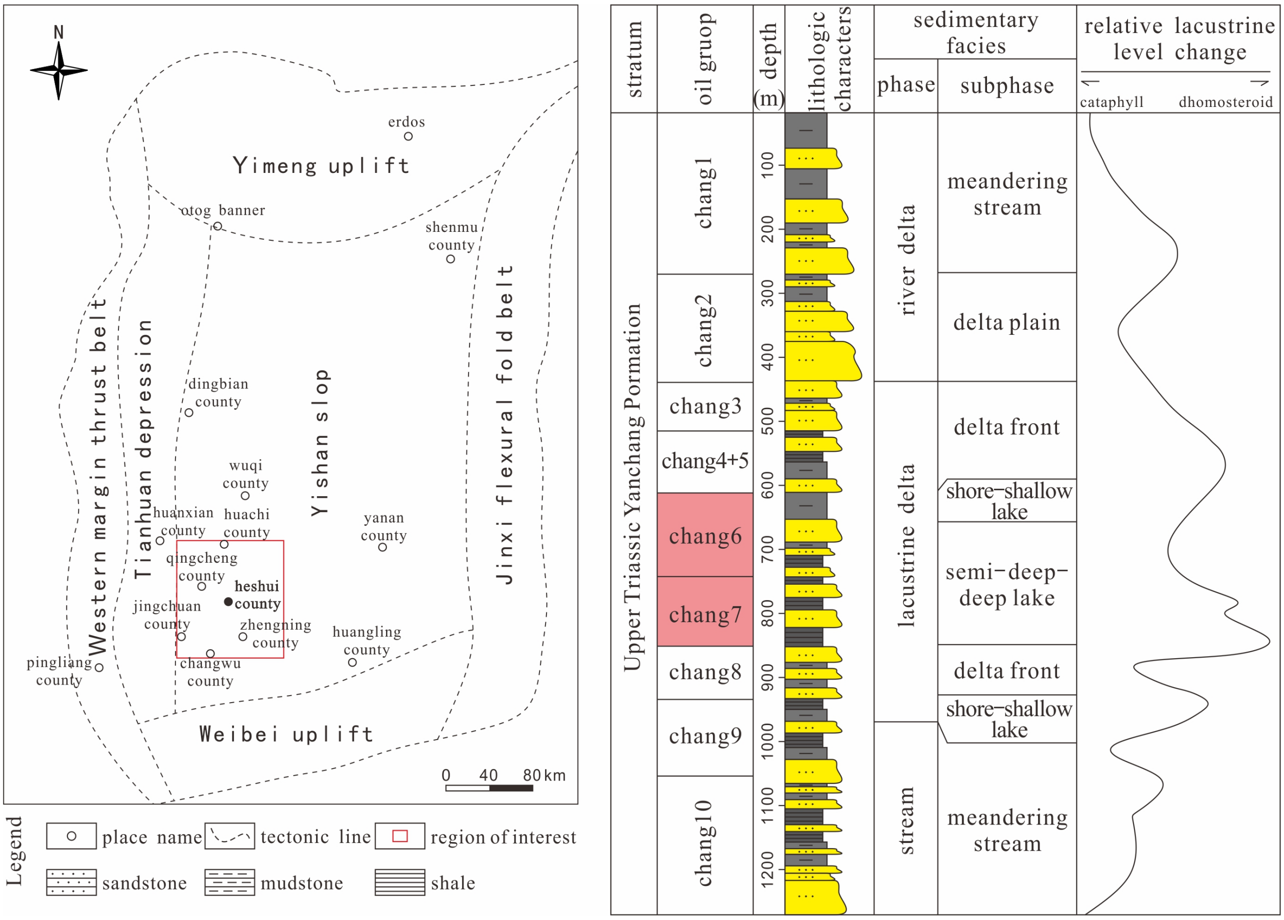


Figure 1. The structural position of the study area and the stratigraphic histogram of the Yanchang Formation.

3. Division and Correlation of Chang 6 and Chang 7 Strata in Yanchang Formation

According to the characteristics of stratigraphic combination, Yanchang Formation is divided into ten oil layers. In this paper, only the stratigraphic correlation and division of Chang 6 and Chang 7 of Yanchang Formation are carried out.

3.1. Stratum Division Basis

This study mainly adopts the following small layer division and comparison method.

1) "Big before small". "Large first and then small" means that a large range and coarse-grained stratigraphic division is first carried out, and then gradually refined to a smaller stratigraphic unit.

2) Mark layer division. There are 10 basic marker layers of K0-K9 in the Yanchang Formation. The important marker layers of the target layer in the study area are K1-K4. Through the identification and tracking of these main marker layers, the strata can be effectively divided into different units, which provides a basis for subsequent geological research.

3) Comparison of formation thickness. The sand bodies formed in the same

period usually show similar or consistent thickness and lithologic characteristics due to the similar sedimentary environment and sedimentary process. Therefore, by comparing the thickness and lithologic characteristics of sand bodies in different locations, the development status of individual sand bodies can be effectively analyzed.

4) Adjacent well comparison method. In view of the continuity and inheritance of sedimentary facies on the plane, the sedimentary characteristics between adjacent wells.

3.2. Identify the Marker Layer

1) The K1 marker layer is located at the bottom of the Chang 7 oil layer group, mainly developing shale and black mudstone, also known as Zhangjiatan shale. The stable distribution of K1 marker layer and the characteristics of high natural gamma (GR) and high acoustic time (AC) shown by logging curves are important basis for identifying the sedimentary environment and lithological characteristics of this period (as shown in Figure 2).

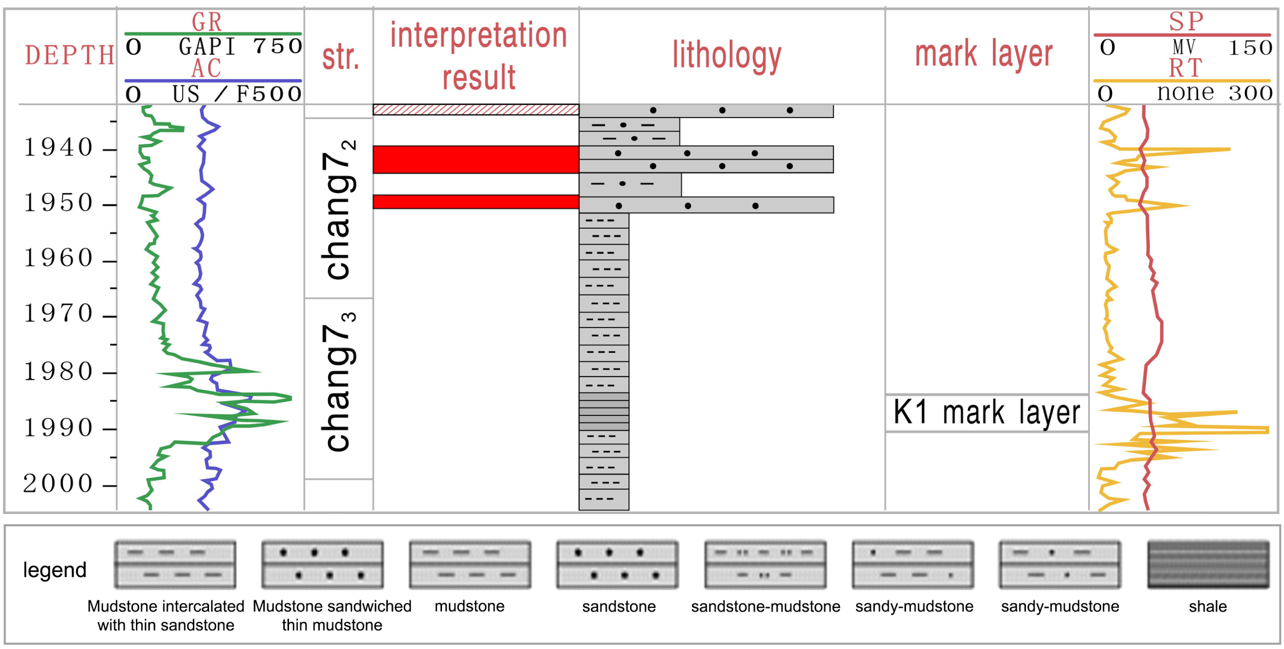


Figure 2. The K1 marker layer of X well in the study area.

2) The K2 marker layer is the boundary of Chang 7 and Chang 6 strata, which is at the bottom of Chang 6, and the lithology is dominated by silty argillaceous sandstone and gray black mudstone. The logging curve shows the characteristics of high natural gamma peak, high resistance, and natural potential close to the mudstone reference line (as shown in Figure 3).

3) K3 marking layer, the boundary of Chang 63 and Chang 62, lithology is given priority to with spot off rock, gray black mudstone, etc., the thickness is about 2 to 3 meters thick, the characteristics of the logging curve mainly has high resistance,

high natural gamma. The boundary is generally placed at its tip (as shown in Figure 4).

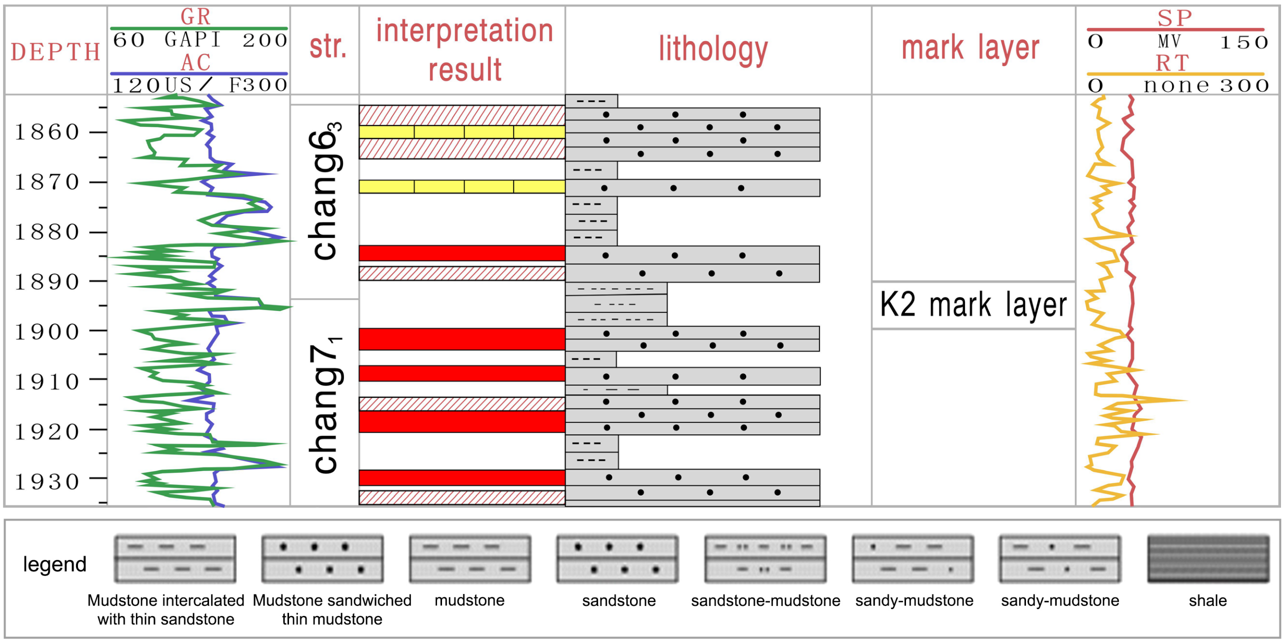


Figure 3. The K2 marker layer of X well in the study area.

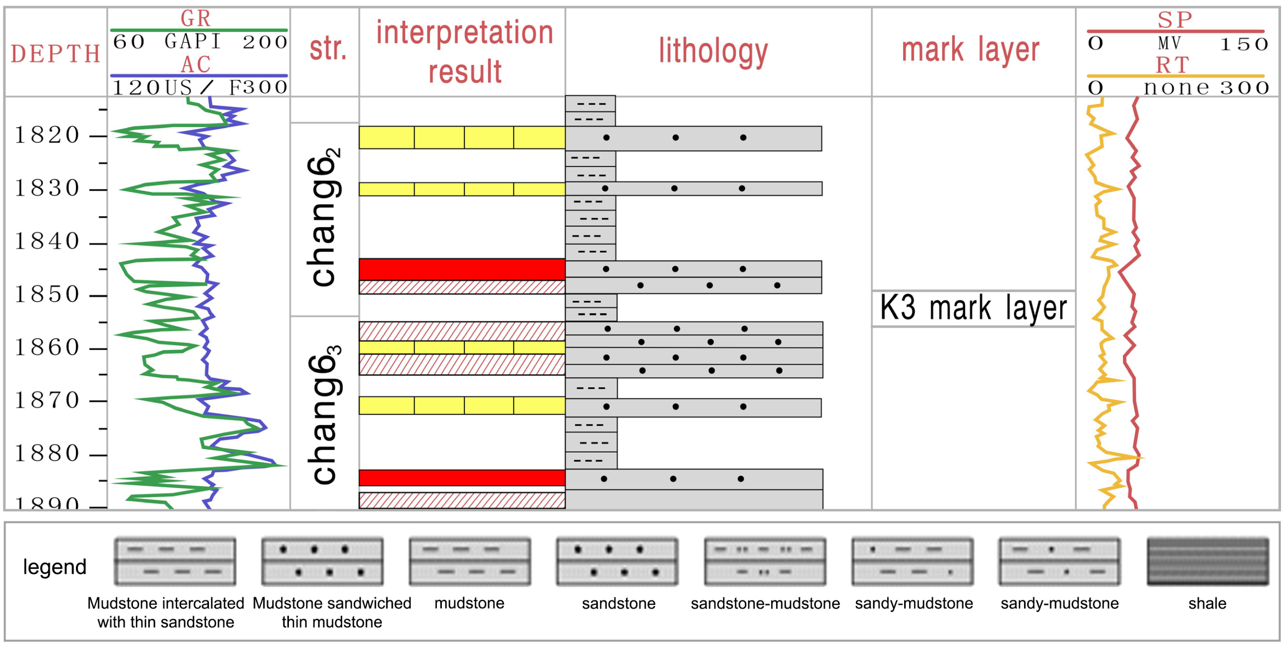


Figure 4. The K3 marker layer of Ban 15 well in the study area.

4) The K4 marker layer is the boundary between Chang 4 + 5 and Chang 6 in the study area. The lithology is gray-green fine sandstone and dark mudstone. The logging shows that the well diameter is large, the resistivity is low, and the natural gamma is high (as shown in Figure 5).

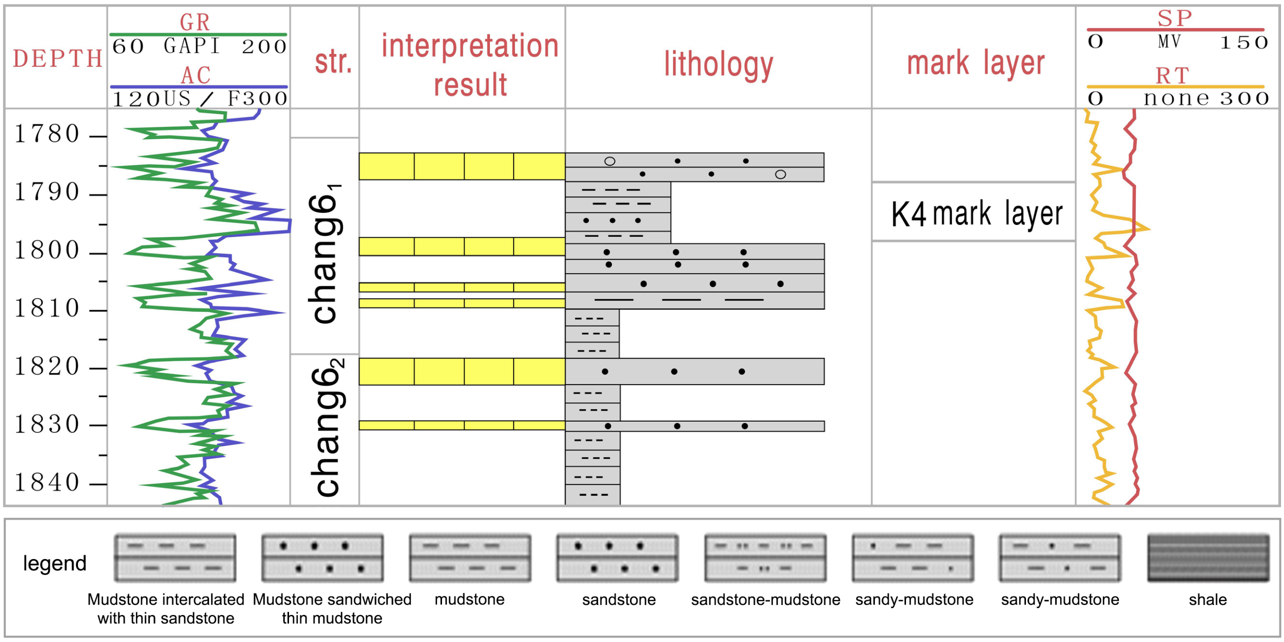


Figure 5. The K4 marker layer of X well in the study area.

3.3. Stratigraphic Division and Correlation Results

Combined with the marker layer, the Chang 6 and Chang 7 strata in the Heshui area are divided, and the sub-layers are further compared and analyzed according to the sedimentary cycle and the equal thickness method. The two strata are divided into three sub-layers. The thickness of Chang 7 reservoir group is about 75 m - 130 m, and the average thickness of Chang 71 section is 35.5 m. The lithology is mainly argillaceous siltstone mixed with fine sandstone and gray black shale. The average thickness of Chang 72 section is 33.7 m, and its lithology is similar to that of Chang 73 section. The average thickness of the Chang 71 section is 37.4 m, and the lithology is mainly gray black-deep gray mudstone. The thickness of Chang 6 reservoir group is about 65 m - 120 m, and the average thickness of Chang 63 section is 38.1 m. The lithology is mainly silty fine sandstone interbedded and local tuffaceous mudstone. The average thickness of Chang 62 and Chang 61 is 34.3 m and 37.8 m respectively, and the lithology is mainly composed of light gray green siltstone with dark gray mudstone and gray green-dark gray fine sandstone with dark mudstone.

4. Sedimentary Characteristics of Gravity Flow

A large number of lake delta-slump-sublacustrine fan sedimentary systems are developed in the Chang 6 and Chang 7 sections of Heshui area. After observing the sediments in this area, it is found that there are obvious large-scale deep-water sedimentary phenomena. Erosive traces including groove molds and groove molds exist at the contact interface between sand and mudstone. The color of mudstone is gray black to dark black, and the texture is pure. In addition, well-preserved animal fossils or plant fragments can be occasionally observed. These sedimentary characteristics indicate that the semi-deep lake-deep lake sedimentary facies are developed in this area.

4.1. Types of Gravity Flow Deposits

4.1.1. Slump Deposit

Slump deposition is a sedimentary phenomenon formed under specific geological conditions. It mainly occurs in the slope zone. Especially when the terrestrial materials on the slope are affected by other external triggering mechanisms, these materials will suddenly collapse and slide. During the sliding process, the collapsed material interacts with the surrounding water body, and may mix or liquefy, resulting in plastic deformation and forming a series of unique sedimentary structures (Ouyang, 2022).

In the study area, the characteristics of the slump rock are consistent with the typical performance of the slump deposition. These slump rocks mainly occur in the middle and upper parts of the slope zone, which is due to the fact that the strata in the middle and upper parts of the slope are more likely to lose stability and collapse when subjected to external forces. The lithology of slump rock is mainly gray fine sandstone and silty mudstone. These rock types usually have low shear strength and high plasticity, so they are prone to deformation during sliding.

4.1.2. Sandy Debris Flow Deposition

Sandy debris flow is classified as non-Newtonian fluid. A significant feature of non-Newtonian fluids is that they may have a certain yield strength, that is, when subjected to external forces, they need to reach a certain stress level to begin to flow. In the deposition process of sandy debris flow, the sediment does not simply accumulate layer by layer, but sinks as a whole at the same speed under the action of blocking mechanism. This deposition method can make the sediments closely combine together to form massive sand bodies. The sandstone debris flow is widely developed in the study area, which is mainly composed of massive fine sandstone and siltstone, and the sandstone contains irregular broken sandstone (Chang et al., 2022).

4.1.3. Muddy Debris Flow Deposition

The formation process of muddy debris flow deposits is usually closely related to slope instability, seismic activity or other tectonic events. Under the action of these events, loose sediments were transported to the lower slope or low-lying areas, and formed a flowing debris flow under the action of gravity. With the continuous deposition and consolidation of the debris flow, the current muddy debris flow deposits were finally formed. In general, argillaceous debris flow deposition is a sedimentary type with unique composition and characteristics. Its high argillaceous content, certain yield strength and complex structure composed of argillaceous sandstone, sand block, gravel and silt rock make it have important indicative significance in geological records and paleoenvironmental restoration.

4.1.4. Turbidity Current Deposition

Turbidity flow is a special gravity flow, which is characterized by a large number of suspended substances, including sand, silt, mud, and sometimes gravel. Due to the presence of suspended matter, the turbidity current has a higher density than the surrounding water body, so it can migrate downstream and maintain a certain speed and stability. These characteristics of turbidity currents make it play an important role in geological history, especially in lakes and marine environments.

During the migration process, the turbidity current has a significant erosion effect on the lake bottom or seabed topography due to its high energy and density. This erosion not only smoothes the original topographic relief, but also may form new geomorphological features, such as sublacustrine fans and submarine canyons. When the turbidity current stops flowing, the suspended matter it carries will deposit down to form a sediment with a specific grain size sequence. These sediments are called turbidites after diagenesis.

The turbidite is widely developed in the study area. There are a large number of erosion mark structures such as impressions and grooves in the bottom of turbidite, which not only confirms the existence of turbidity current, but also provides us with important information on turbidity current erosion and deposition process. These structural features have important application value in geological exploration and paleoenvironmental restoration.

The core observation shows that the fish fossils and the development of biological activities in the core are the direct evidence of the deep lake sedimentary environment. The existence of these fossils and remains indicates that the region was once a deep-water lake during the geological history, providing a good living environment for aquatic organisms. The sedimentary structures include: massive structure, bottom structure, deformation bedding, parallel bedding and horizontal bedding. In the bottom structure, the groove mode, impression mode, groove mode and load mode are the most representative. The rolling bedding in the deformation bedding reflects the complexity of the sedimentary environment. In addition, the incomplete development of the Bouma (as shown in **Figure 6**) sequence indicates that the region has undergone a turbidity current deposition process, but it may not be completely preserved due to the influence of various factors (such as changes in water flow velocity, sediment supply rate, etc.).

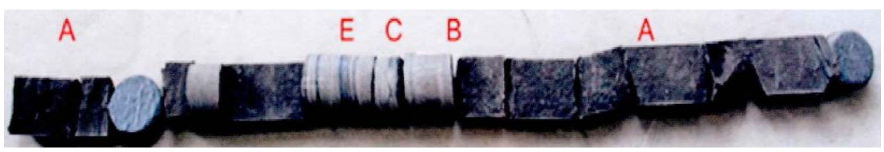


Figure 6. The incomplete Bouma sequence of Heshui Chang 7 formation.

In summary, the core observation results of Chang 6 and Chang 7 reservoirs in Longdong area reveal the characteristics of deep lacustrine sedimentary environment in this area, including pure black mudstone, gray to gray-white sandstone, abundant fossils and relics, and various sedimentary structures. These characteristics provide an important geological basis for us to understand the ancient sedimentary environment and hydrocarbon accumulation conditions in this area (Wu et al., 2015).

4.2. Division of Turbidity Current Sedimentary Microfacies

Turbidite fan deposits usually occur in areas with large topographic slopes. When a large number of sediments move and collapse under the action of gravity, and eventually transport to deep-water lakes in the form of turbidity currents, turbidite fans will be widely formed at the bottom of the lake (Li, Shao, & Wei, 2001). Through the detailed division of sedimentary facies of turbidite fan sedimentary system in Chang 6 and Chang 7 layers of Yanchang Formation in Heshui area, it can clearly reflect the transport and deposition process of sediments under gravity and the evolution history of ancient lakes, which will be of great guiding significance for oil and gas exploration and paleogeographic research. Later, the three subfacies of inner fan, middle fan and outer fan and their internal microfacies will be further divided and described (**Table 1**).

Table 1. Chang 6 and Chang 7 turbidite fan sedimentary microfacies division in Heshui area.

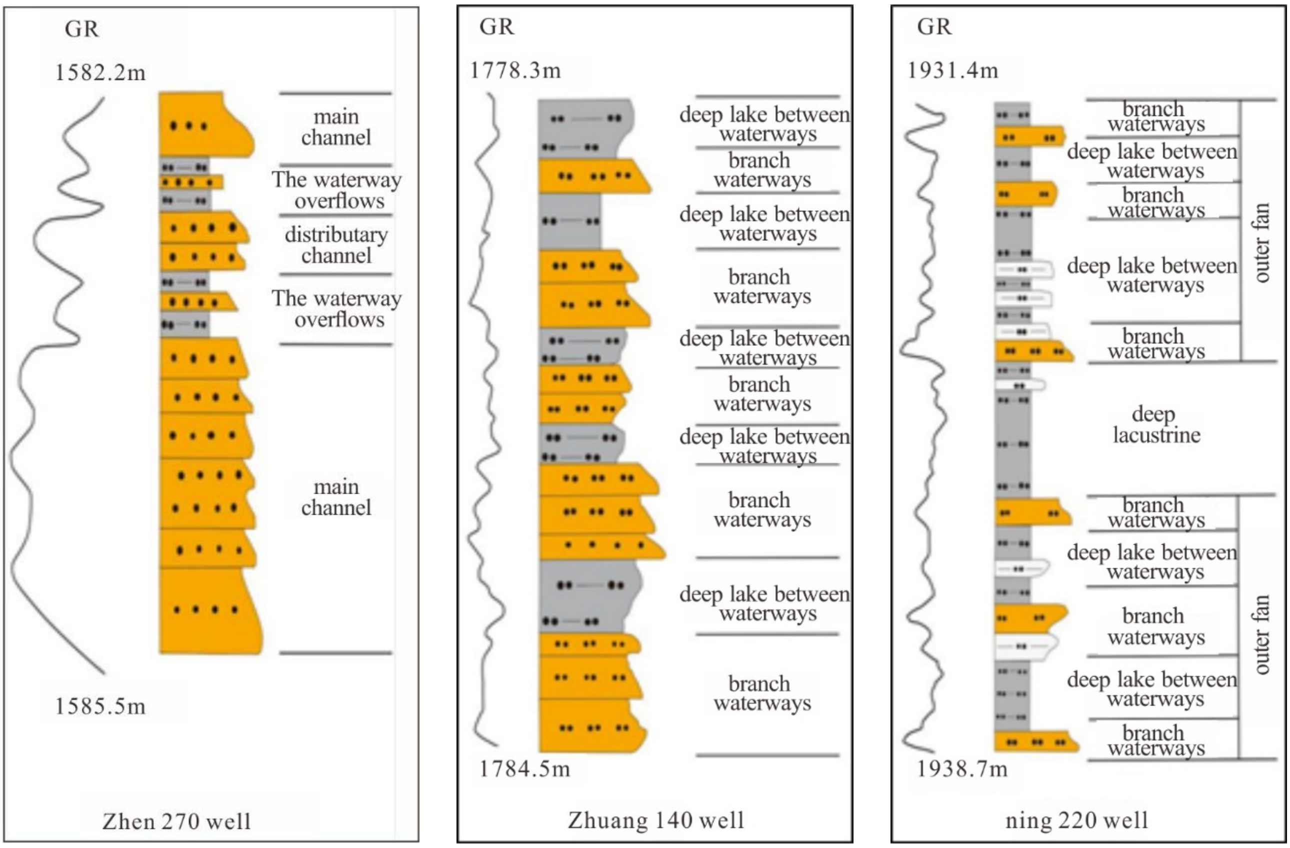
Facies	Subfacies	Microfacies
turbidity fan	inner fan	The main channel of turbidite
		The waterway overflows
	middle-fan	Turbidity integral flow channel
		Turbidity integral flow channel between deep lakes
	outer fan	Turbidity integral flow channel
		Turbidity integral flow channel between deep lakes

4.2.1. Inner Fan Subfacies

In general, in the turbidite fan sedimentary system, the inner fan subfacies are the closest part of the turbidite fan to the source area, rather than located behind the turbidite fan. It is located at the proximal end of the fan body, adjacent to the source area, which is the first area of sediment accumulation (Liu, Wan, & Lin, 2003). The inner fan subfacies are connected to the source area through recharge channels (also known as main channels), which are the main channels for sediment transport. The inner fan subfacies can be further divided into turbidite main channel and channel overflow microfacies (Wu, Li, & Li, 2004).

1) Turbidity main channel

The main channel of the Chang 6 layer turbidite in the Heshui area is located in the core area of the inner fan. It is the main channel for sediment transport. It mainly develops thick turbidite. The lithology is medium-grained fine sandstone. The sediment grain size is the thickest, mainly composed of conglomerate, gravelbearing sandstone and other coarse clastic materials. The sediment accumulation rate is fast, and a thick block structure is often formed. There may be a scour surface at the bottom, indicating a strong water erosion (Chen, Hu, & Sun, 2012). Among them, due to the fast flow rate and high energy, there are often graded bedding, parallel bedding and other sedimentary structures reflecting the direction of water flow in the main channel. At the same time, cross bedding may also occur, especially in the area where the flow velocity changes greatly. On the natural potential curve, the overall performance is medium-amplitude toothed box or bell shape (as shown in **Figure 7(a)**).



(a) (b) (c)

Figure 7. Columnar section of sedimentary microfacies in different parts of turbidite fan in Heshui area.

2) Channel overflow microfacies

The channel overflow microfacies are mainly developed on both sides of the main channel or when the water flow energy is weakened, the sediment overflows the area formed by the channel. These areas are close to the main channel, but the flow velocity has been significantly reduced, and the sediment grain size is slightly finer than that in the main channel. The sediments of the channel overflow microfacies are mainly sandstone and siltstone, often accompanied by argillaceous interlayers. These interlayers may be formed when the water flow is intermittent or the velocity decreases. In the sedimentary structure, there may be wavy bedding, horizontal bedding and other structures that reflect the slowing down of water flow. In addition, due to the instability of the flow direction, cross-bedding or lenticular bedding may also occur (Deng, Fu, & Yao, 2011).

4.2.2. Middle Fan Subphase

Compared with the inner fan subfacies, the middle fan subfacies occupy most of the distribution area of turbidite fan sand bodies. The grain size of sandstone in the middle fan subfacies is obviously finer, and the mudstone components or interlayers are increased, which can be further divided into two sedimentary microfacies: turbidity integral flow channel and deep lake between turbidity integral flow channels (Niu & Liu, 2019).

1) Turbidity integral flow channel microfacies

Turbid integral flow channels are the main sedimentary units in the middle fan subfacies. They extend in a certain direction and are the main channels for sediment transport. The grain size of the sediments in these channels is relatively coarse, but it is still dominated by sandstone. The sandstone is mostly fine sandstone, which may contain a small amount of gravel, slightly positive grain sequence. In sedimentary structures, there are often structures that reflect the direction of water flow, such as graded bedding and parallel bedding. The formation of the turbidity integral flow channel is closely related to the strong turbidity current. When a large number of sediments are transported rapidly along the slope under the action of gravity, a high-speed turbidity current will be formed. These turbidity currents will converge into channels and continue to move forward when they encounter low-lying terrain. The electrical characteristics are low curve value and box shape, with small jagged ups and downs (as shown in **Figure 7(b)**).

2) Deep lake microfacies between turbidity integrated flow channels

The deep lake between the turbidity integral flow channels is located between the channels, which is an area with relatively weak water flow and relatively stable sedimentary environment. The grain size of the sediments here is very fine, mainly mudstone, with a small amount of siltstone or silty mudstone. In the sedimentary structure, there are often horizontal bedding and bioturbation structures that reflect the characteristics of deep-water sedimentary environment. The deep lake between the turbidity integral flow channels represents the deepwater area in the lake basin. The water depth is large and the water body is relatively calm. This environment is conducive to the preservation of organic matter and the generation of oil and gas. Therefore, it is one of the important target areas for oil and gas exploration. The electrical characteristics are medium and low amplitude microdentate, straight (as shown in **Figure 7(c)**).

4.2.3. Outer Fan Subfacies

The outer fan subfacies usually develop in the sublacustrine plain. This location determines the characteristics of its sedimentary environment and sediment. Because it is located in the lake plain on the outer edge of the middle fan, and is usually distributed in the deepest part of the depression, the terrain is flat and the water body is relatively quiet, and the sedimentation becomes slow. The sediments of the outer fan subfacies are mainly composed of low-density turbidity current deposits, which reflects the weakening of water flow energy during the deposition process. Due to the weakening of turbidity channel energy, the sediments formed are mostly thin layers of turbidity. The emergence of thin sand-mudstone interbeds is an important feature of the outer fan subfacies sediments.

5. Sedimentary Evolution and Sedimentary Model

5.1. Sedimentary Evolution

In summary, lake facies, braided river delta, meandering river delta and gravity flow deposits are developed in Chang 6 and Chang 7 oil layers of Yanchang Formation in Heshui area (Zhao, Li, & Shen, 2008). These diverse sedimentary environments constitute the complex reservoir structure of the Chang 6 and Chang 7 oil layers in the Heshui area. The underwater distributary channels and gravity flow deposits of the braided river delta and the meandering river delta front provide favorable conditions for the migration and accumulation of oil and gas (as shown in Figure 8).

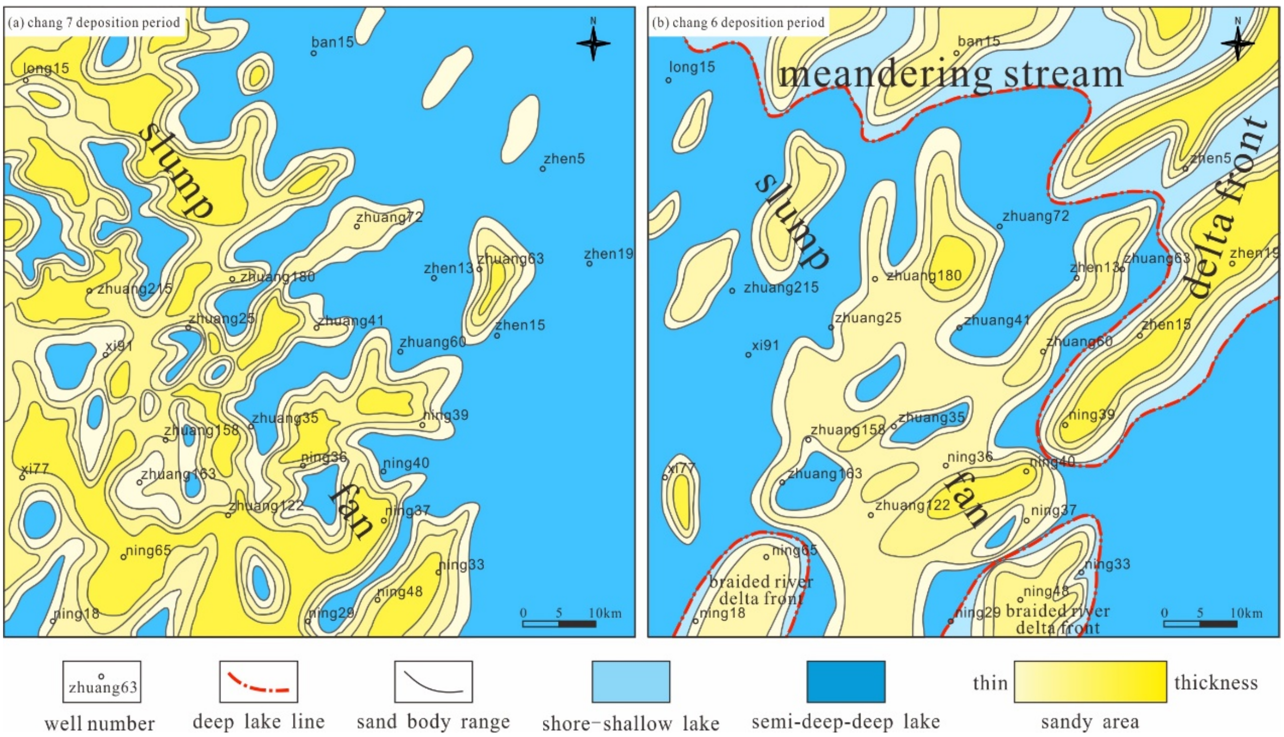


Figure 8. Comparison of sedimentary facies of Chang 6 and Chang 7 in Heshui area.

5.1.1. Chang 6 Sedimentary Period

In the sedimentary period of Chang 6, although the lake basin area has expanded in the longer 7 periods, it has not yet developed to the heyday. During this period, significant progradation occurred in the southwest braided river delta and the northeast meandering river delta, which continuously advanced to the center of the lake basin and developed the front subfacies in the Heshui area. This progradation not only changed the sedimentary environment pattern of the lake basin, but also promoted the accumulation and preservation of different types of sediments.

The progradation of the southwest braided river delta and the northeast meandering river delta is particularly significant in the Chang 6 sedimentary period. The braided river delta has formed a wide sedimentary body at the edge of the lake basin due to its strong hydrodynamic conditions and rapid accumulation rate. The meandering river delta has formed a finer sedimentary structure in the lake basin due to its complex sedimentary process and various sediment types. These delta front subfacies are important target areas for oil and gas exploration, because they usually have good reservoirs (Li, Liu, & Chen, 2010).

Gravity flow deposits usually have unique bedding structure and lithological combination, such as massive bedding and graded bedding. These characteristics make the sand bodies of gravity flow become an important type of oil and gas reservoirs. During the sedimentary period of Chang 6, especially Chang 6_3, the thickness of sand body reaches the maximum, and the distribution range of delta and slump fan is also the most extensive. The development of these sand bodies not only increases the thickness and scale of the reservoir, but also increases the possibility of hydrocarbon accumulation.

5.1.2. Chang 7 Sedimentary Period

During the Chang 7 sedimentary period, the lake basin experienced a rapid geological subsidence process, which led to a significant expansion of the lake basin and a deepening of the water body. This process not only changed the original sedimentary environment pattern, but also contributed to the formation of the largest lake flooding deposition in the Yanchang Formation. This marks the peak period of lake expansion, when the lake area is the largest and the water body is the deepest, which provides extremely favorable conditions for the preservation and accumulation of sediments. With the rapid subsidence of the lake basin and the deepening of the lake water, the sedimentary environment of the Chang 7 sedimentary period is dominated by semi-deep lake-deep lake subfacies. This sedimentary environment usually has the characteristics of low energy and quiet, which is conducive to the deposition and preservation of fine-grained sediments. Therefore, dark mudstone is more developed in this period. These mudstones are rich in organic matter and are important material basis for oil and gas generation (Liao, Zhu, & Deng, 2013).

The maximum lake flooding deposits and gravity flow sandstones formed in the sedimentary period of Chang 7 are of great significance to oil and gas accumulation. The extensive development of dark mudstone provides a rich material basis for oil and gas generation. The gravity flow sandstone has good reservoir properties, which provides a good space for the migration and accumulation of oil and gas. In addition, due to the relatively stable sedimentary environment and deep water body in this period, it is conducive to the preservation and enrichment of oil and gas. Therefore, abundant oil and gas resources can often be found in the Chang 7 oil layer group of Yanchang Formation in Heshui area.

5.2. Sedimentary Model

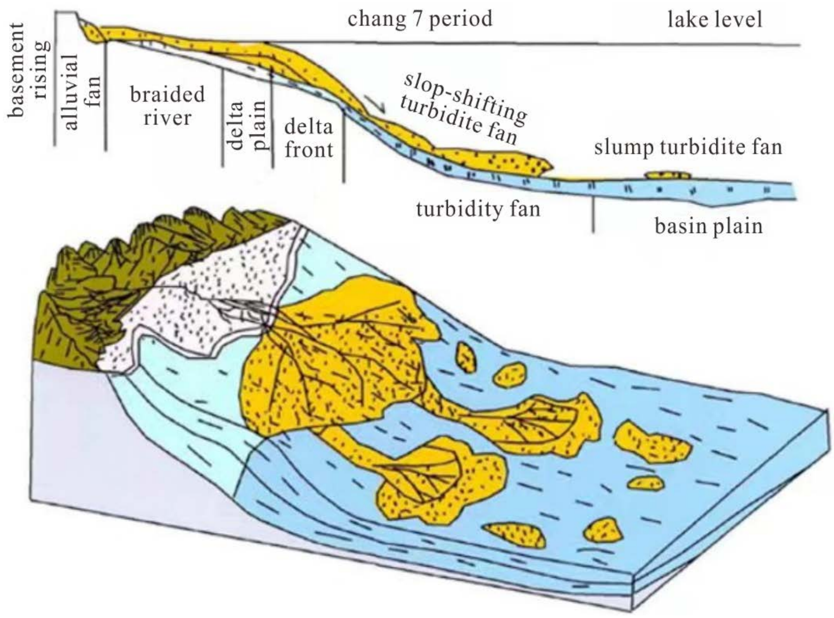


Figure 9. Sedimentary model diagram of Heshui area, China.

According to the sedimentary model map of Heshui area (as shown in **Figure 9**), from the sedimentary period of Chang 6 to Chang 7, the lake basin shrank and the basement rose, forming alluvial fan and braided river sedimentary environment. The sediments were further transported by the river and other water systems, and continued to move along the direction of water flow, entering a broader sedimentary environment, such as delta plain. When the sediment enters the delta plain, due to the influence of topography, water flow velocity, sediment supply and other factors, the sediment begins to divert. These shunts may continue to migrate downward along different paths to form a complex sedimentary network. With the continuous migration and deposition of sediments, the slope of the terrain gradually changes from steep to slow. This topographic change has an important influence on the migration velocity and deposition mode of sediments. Sediments collapse due to gravity or other external forces. These slumped sediments usually have large mass and momentum and begin to migrate downward. Eventually into the semi-deep lake or deep lake environment. In these environments, the water flow rate is further reduced, and the sediments begin to deposit in large quantities. Because the deep lake environment usually has relatively calm hydrodynamic conditions, sediments can form a relatively thick sedimentary layer here. In the semi-deep-deep lake environment, due to the continuous accumulation and compaction of sediments, some sedimentary layers may collapse again due to gravity, forming a slump fan at the bottom of the lake. These slump fans usually have a steep leading edge and a relatively flat trailing edge.

6. Conclusion

1) As the main oil layers, Chang 6 and Chang 7 oil layers of Yanchang Formation can be divided into three small layers, but the formation thickness is slightly different. Chang 7 formation (about 75 - 130 m) is slightly thicker than Chang 6 formation (about 65 - 120 m), and the lithology is also different. The lithology of Chang 7 oil layer is mainly argillaceous siltstone mixed with fine sandstone, gray black mud shale and deep black-deep gray mudstone. The lithology of Chang 6 reservoir group is mainly silty fine sandstone interbed, local tuffaceous mudstone, light gray-green silty fine sandstone with dark gray mudstone and gray green-dark gray fine sandstone with dark mudstone.

2) The gravity flow deposits in the study area are not the result of a single event, but the product of multi-stage gravity flow deposits superimposed on each other. Therefore, with the help of logging profiles, core photos, sedimentary facies and their models, the combination characteristics and formation process of gravity flow deposits can be more intuitively understood.

3) Due to the complex environment of deep-water deposits, the fan model has been affected to varying degrees. Through comprehensive analysis of logging facies and core, the turbidity current deposits in the study area can be divided into two types: slump and slope movement according to whether there is a channel.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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