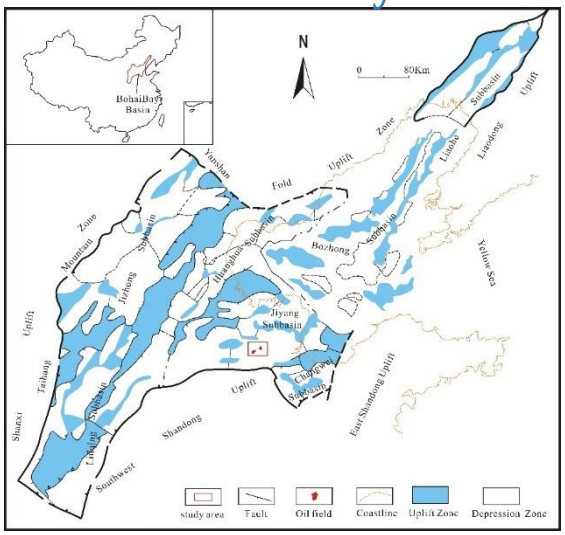
Reservoir Character and Main Control Factors in the Upper Second Member of Shahejie Formation(Es2) in the Linnan Subsag

Reporter: Feng Yuelin
Co-supervisor: Song Guoqi
Major: Hydrocarbon Accumulation

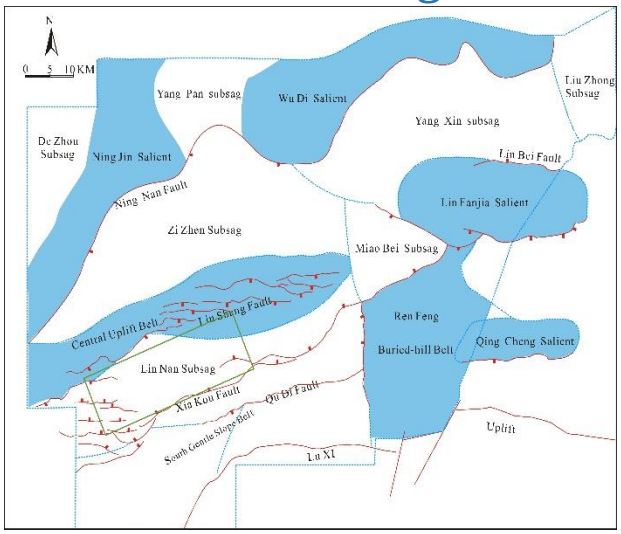
Contents

1 Introduction

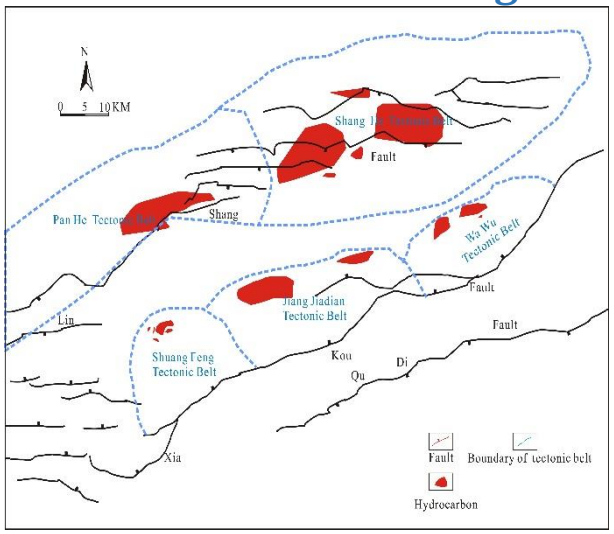
The Bohai Bay Basin



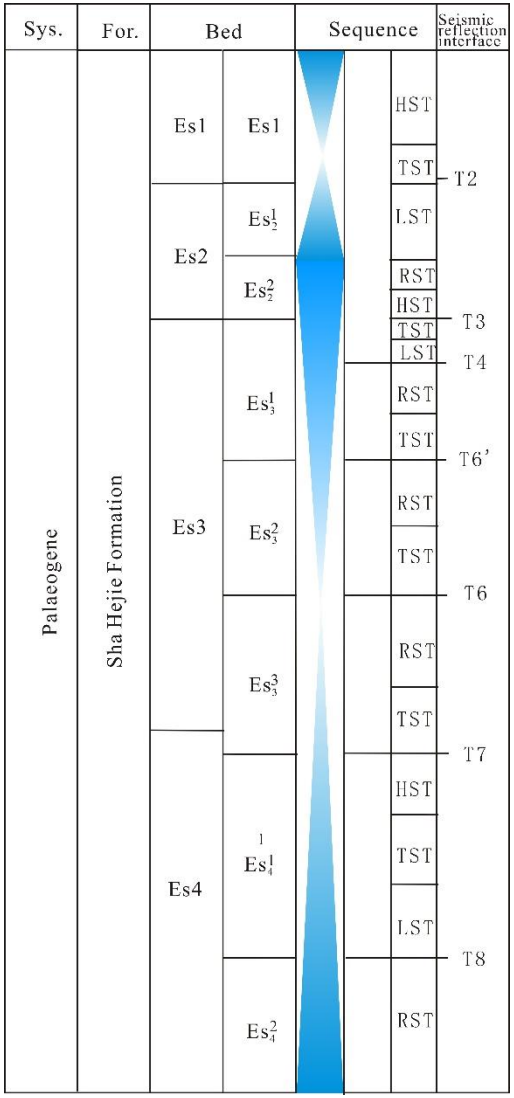
The Huimin sag



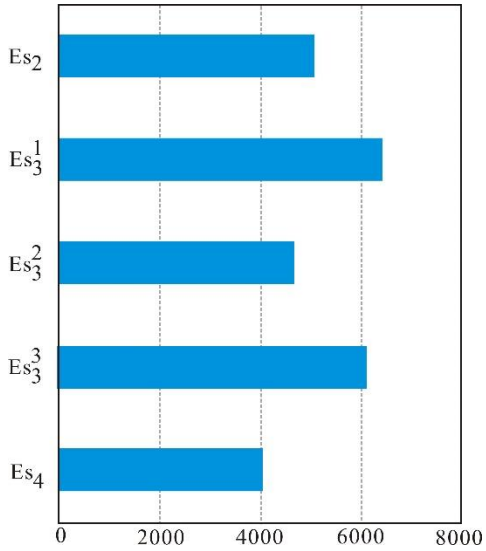
The Linnan subsag



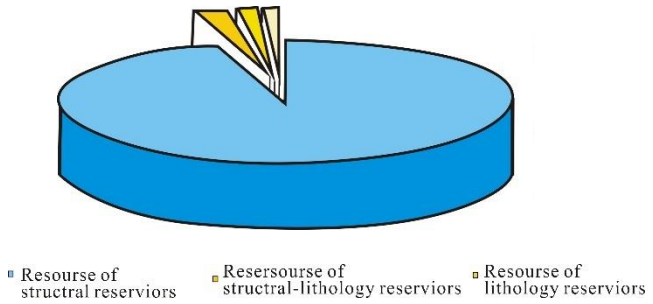
Lin nan subsag located in the west of Huimin sag, the southeast of the Bohai Bay basin, which an important petroliferous basin of China.



Proved reserves of each member in Linnan Susag



Proved reserves of Es2



Contents

2 Sedimentary Character

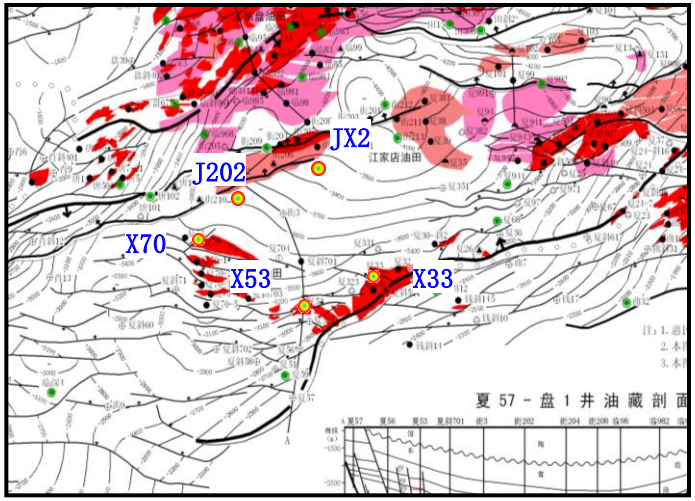
X33 3256.6m
Coarse sand

X53 2980.33m
Parallel bedding

X53 2980.53m
Cross bedding

X70 3266.46m
Wavy ripple
cross-bedding

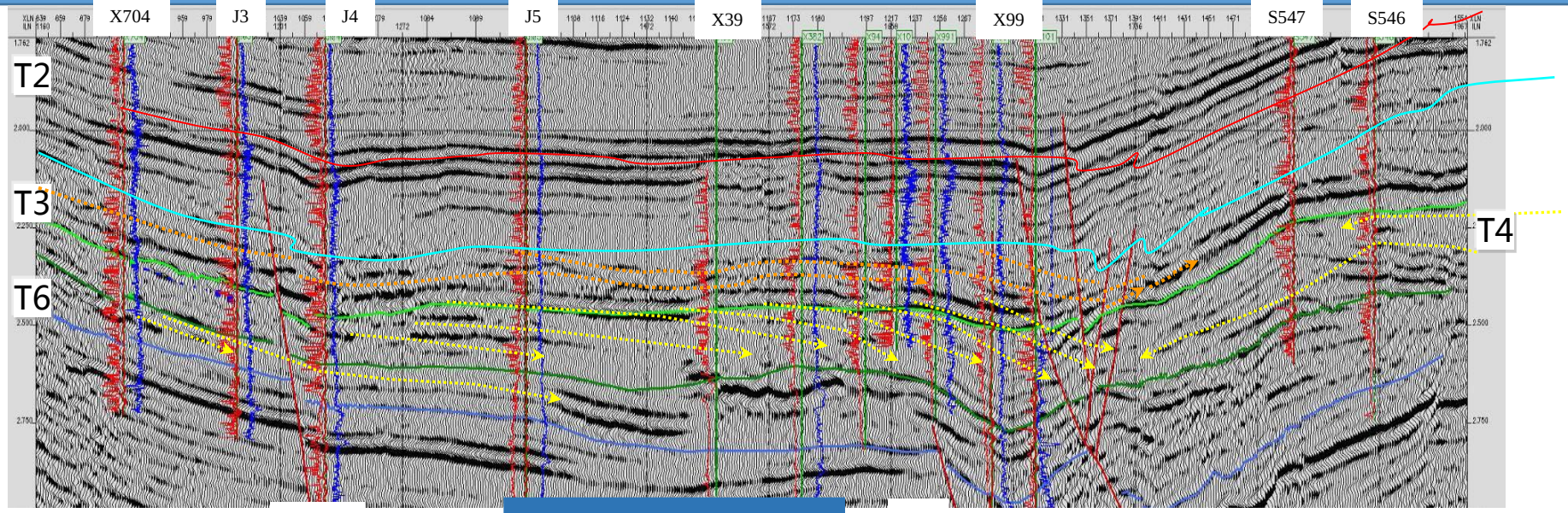
JX2 3818.51m
Parallel bedding

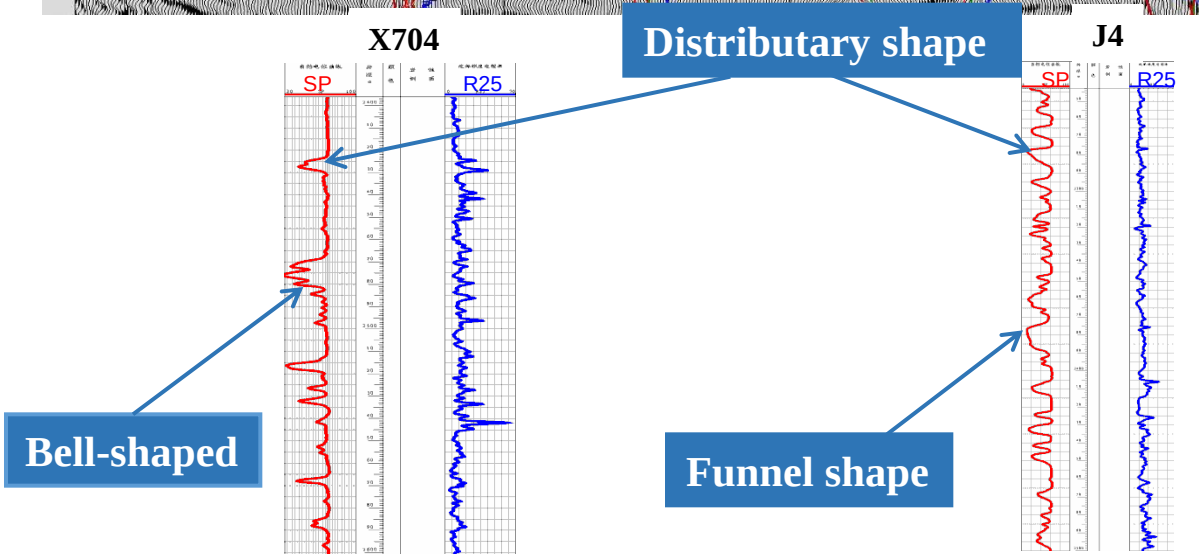


J202 3704.55m
Parallel bedding

J202 3680.77m
Parallel bedding

J202 3763.5m
Boring porisity





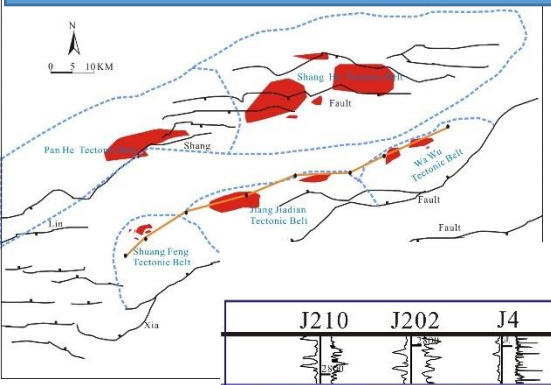
Distributary shape

Bell-shaped

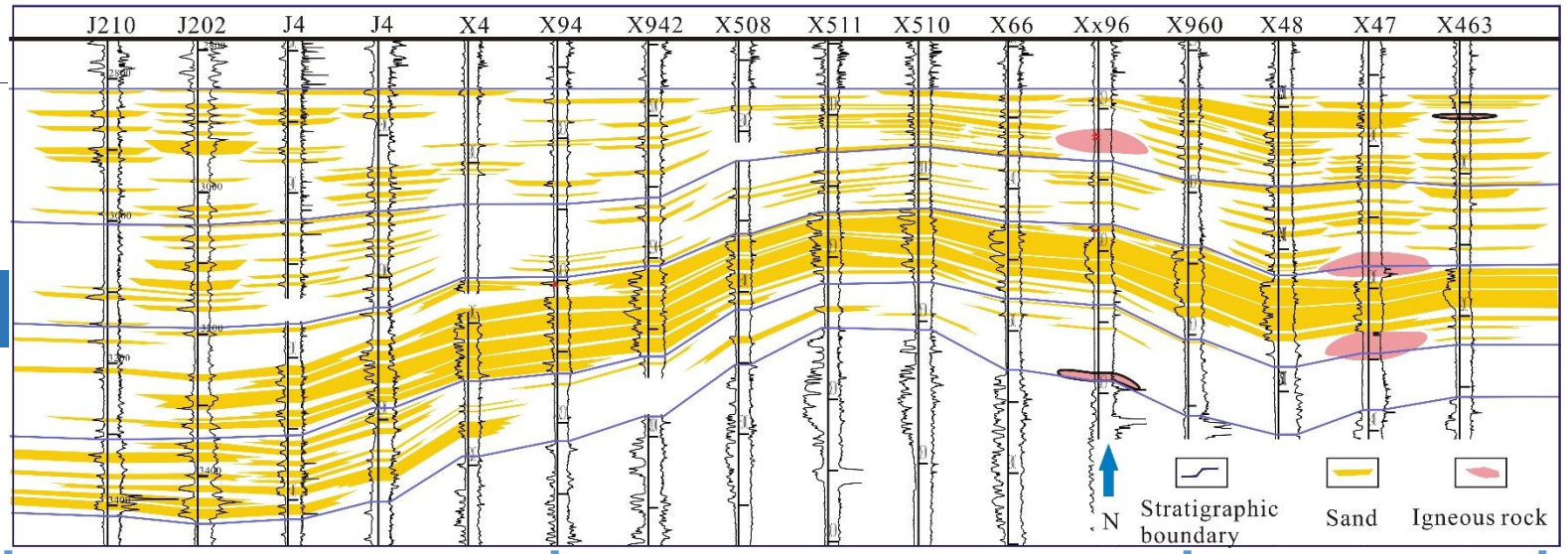
Funnel shape

Fluvial facies

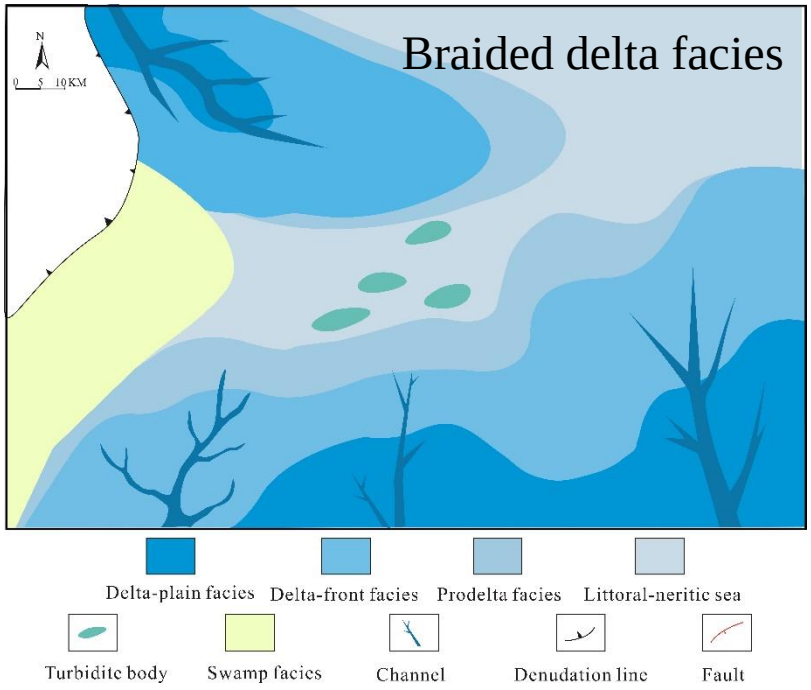
Delta sedimentary facies

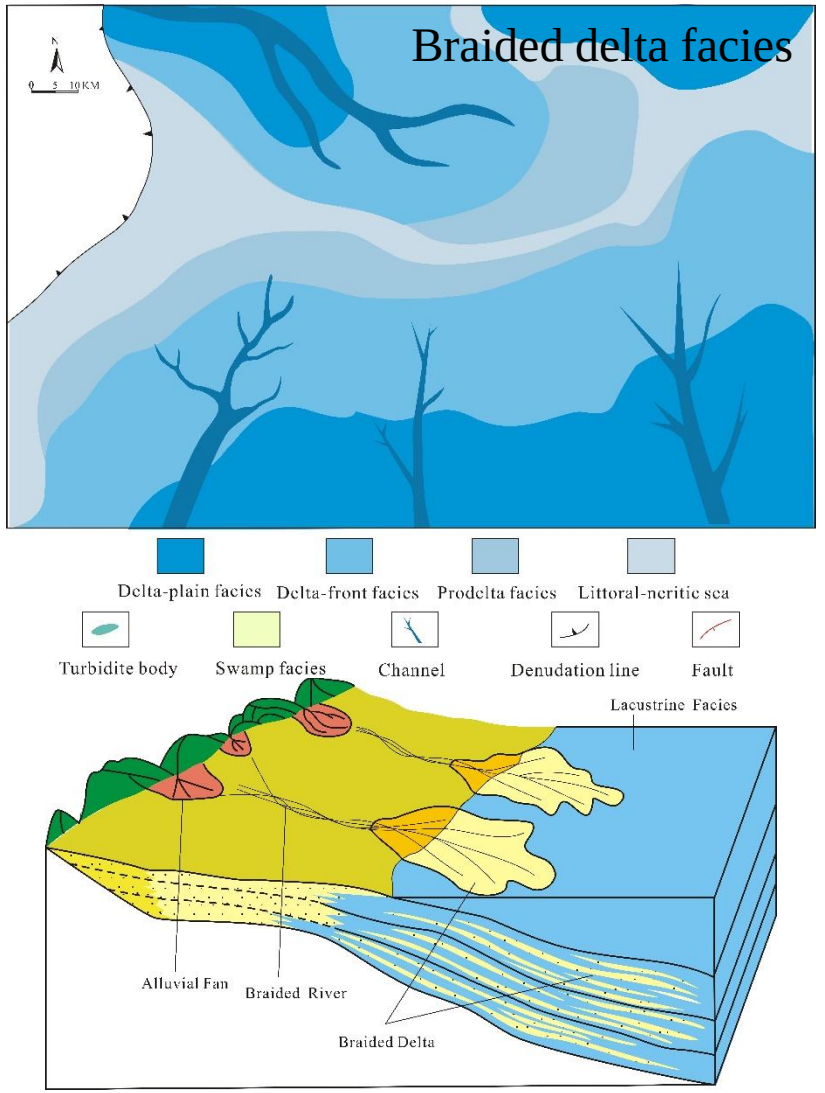


Es2

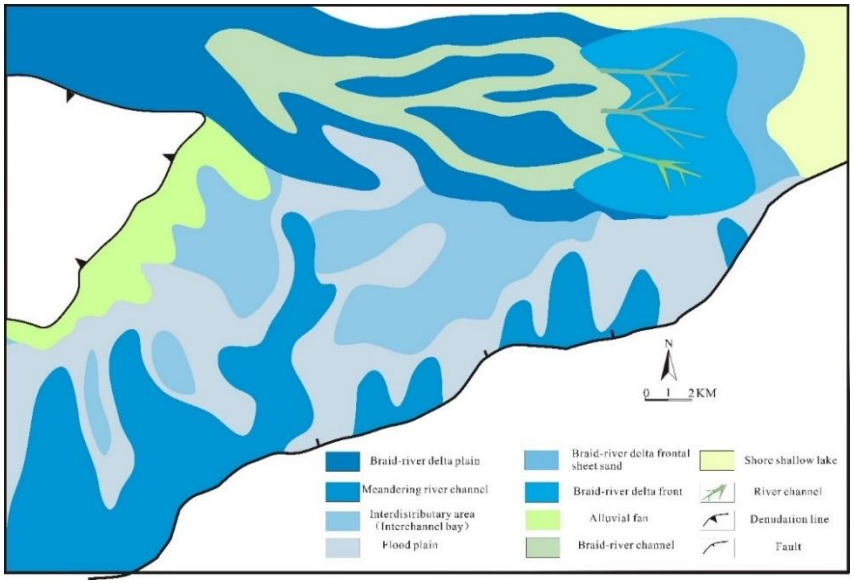


Shuang Feng Area | **Jiang Jiadian Area** | **Wa Wu Area**

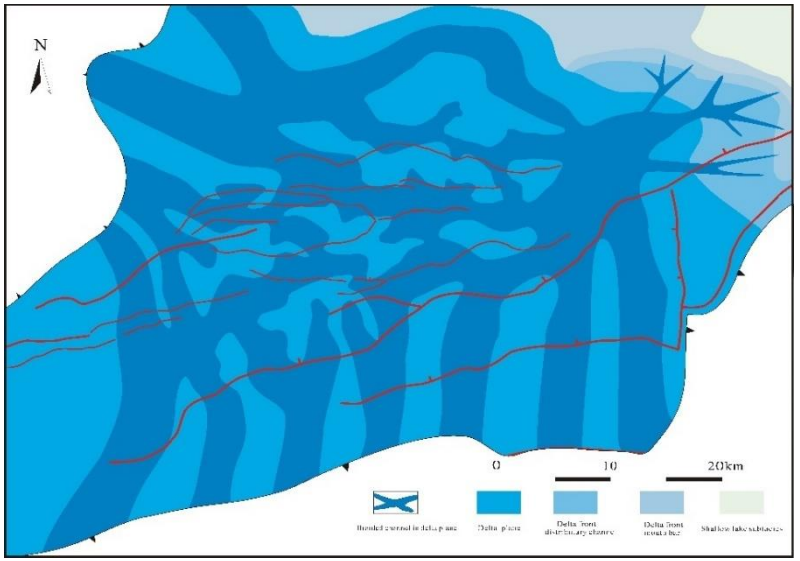




Braided delta facies progradating to the central depression



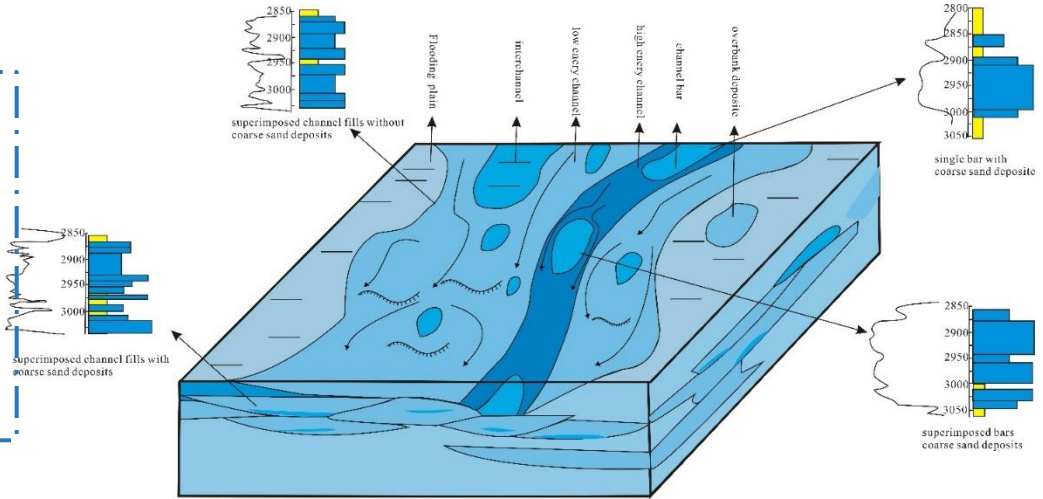
Braided delta facies



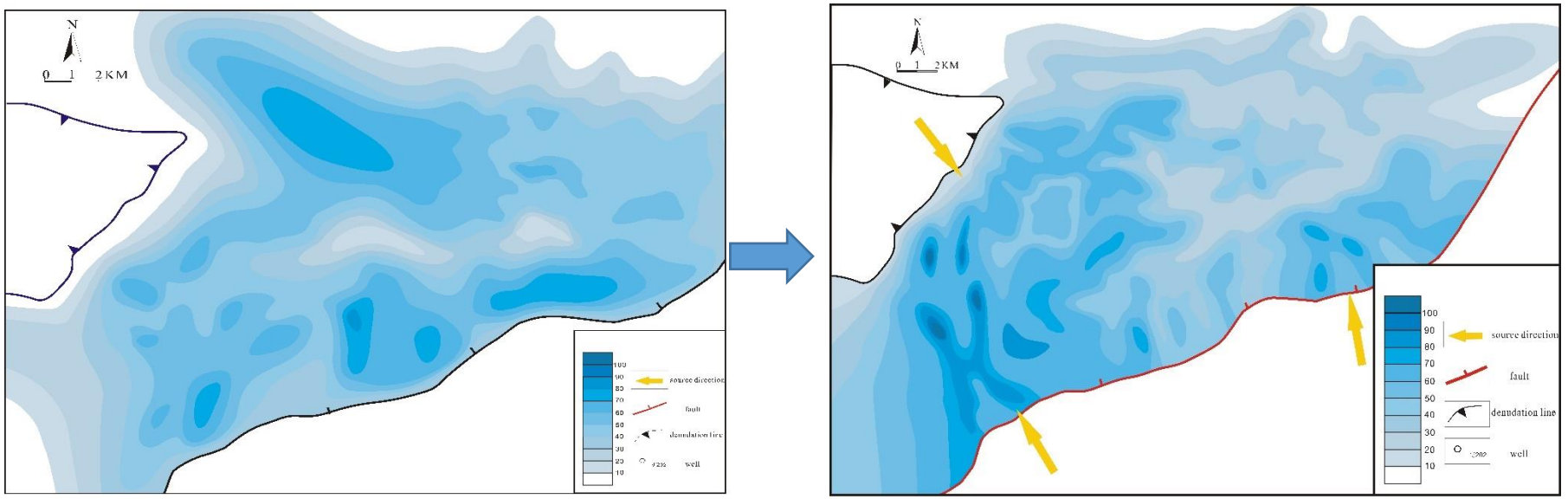
Braided fluvial facies

Early stage: braided fluvial facies, the sandbody connected well

Later stage: covered by channel sand, vertical overlay but lateral connected poor



Sand thickness isopach map



The thickness of sand increased especially at the Shuang Feng district

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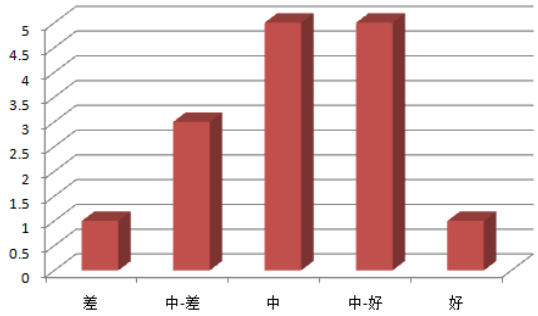
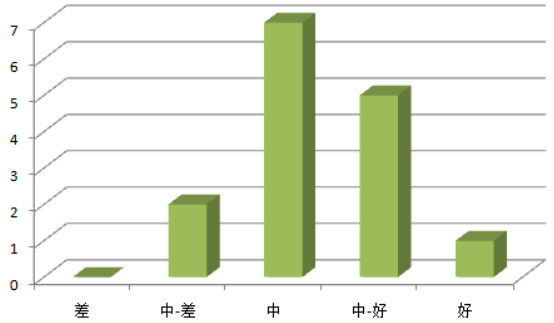
3 Reservoir Assessment

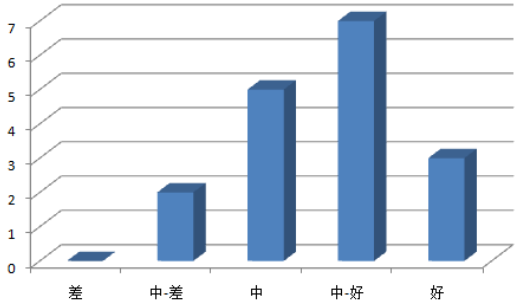
Sorting



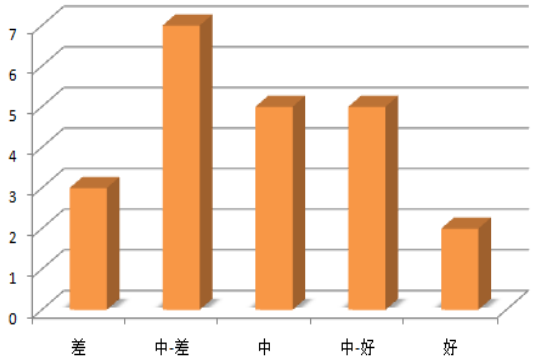
Delta front mouth bar



Overwater distributary channel



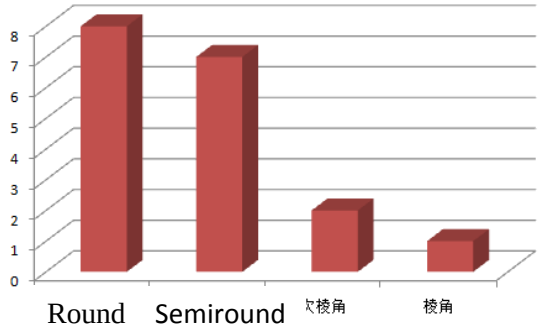
Underwater distributary channel



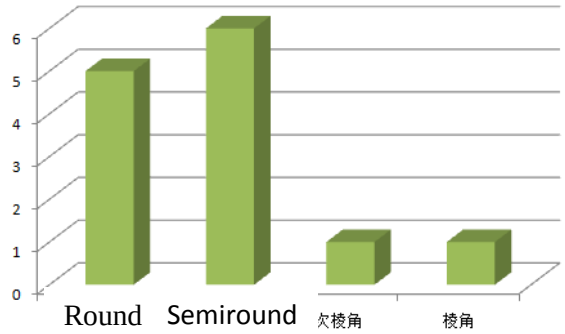
Braided river channel sand

3 Reservoir Assessment

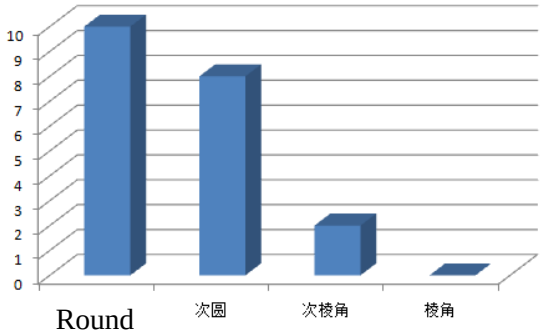
Psephicity



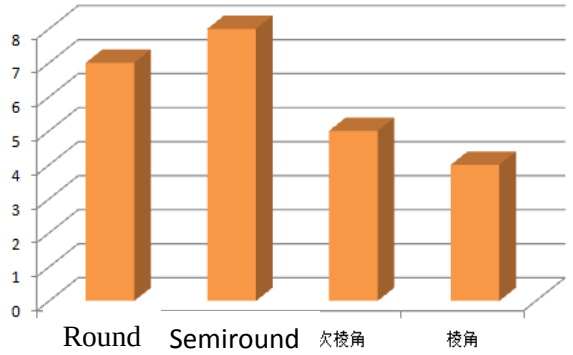
Delta front mouth bar



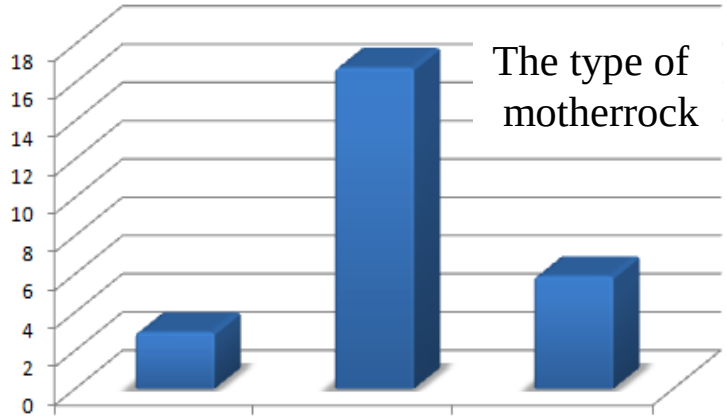
Underwater distributary channel

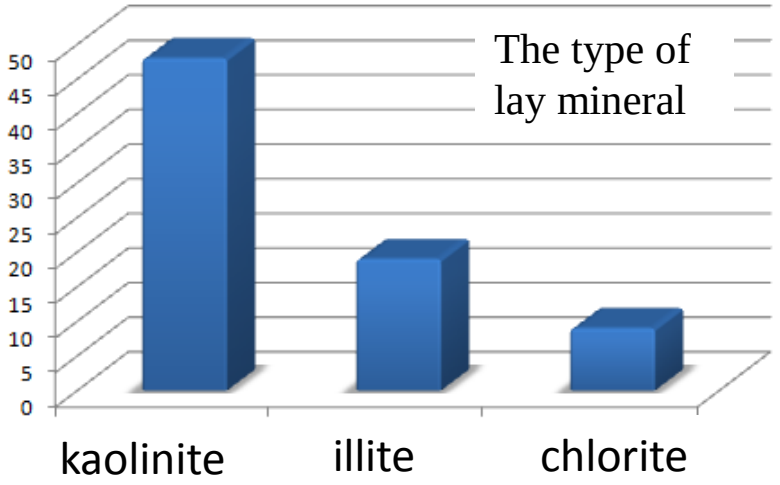


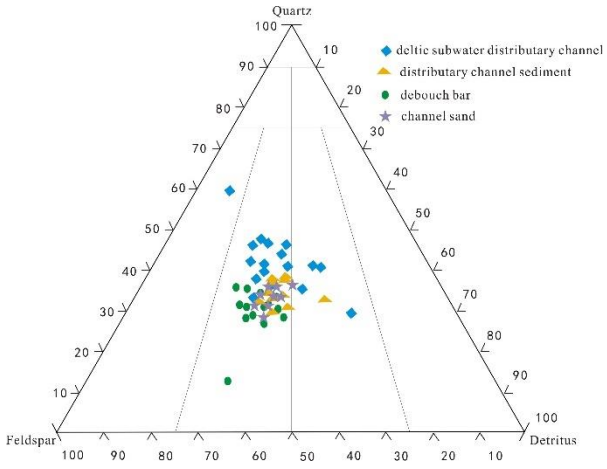
Overwater distributary channel



Braided river channel sand







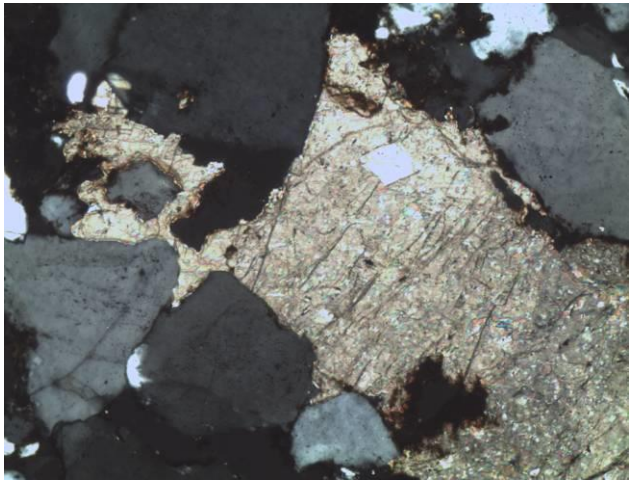
Overwater distributary channel: lithic feldspar sandstone and feldspar lithic sandstone

Underwater distributary channel: lithic feldspar sandstone

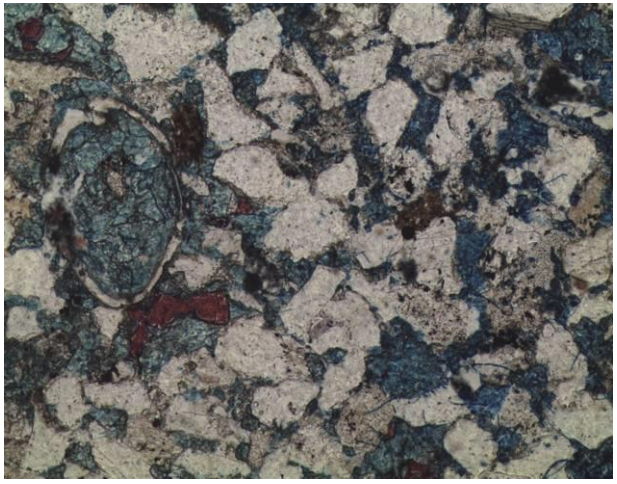
Delta front mouth bar: lithic feldspar sandstone

Braided river channel sand:lithic feldspar sandstone

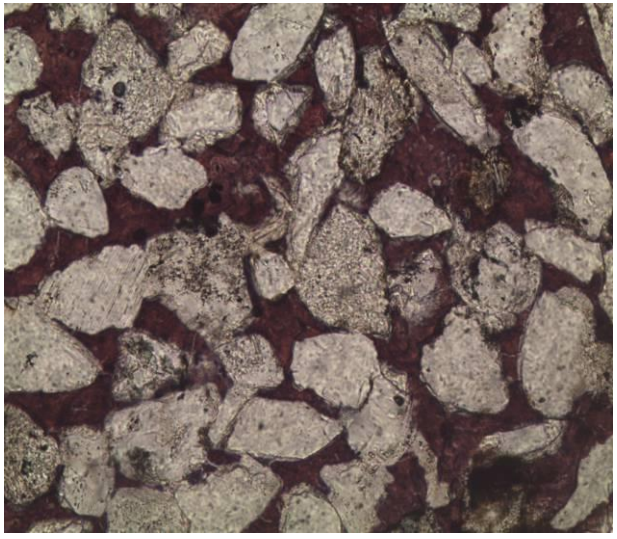
cementation



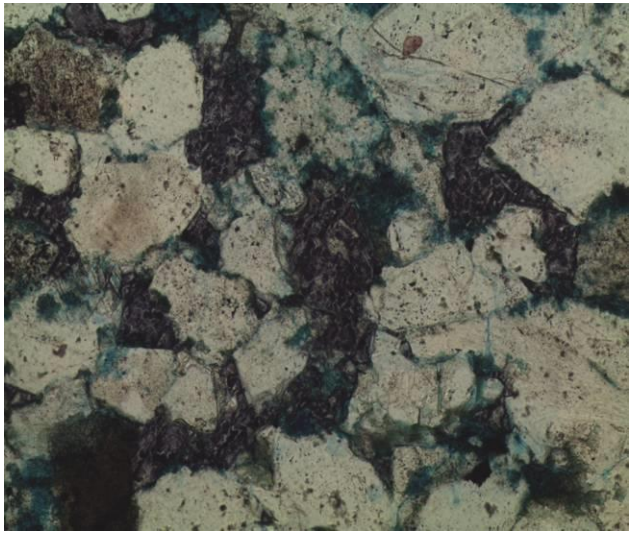
X33，3293.12m-Dolomite cementation



X70-3074.3m-Ankerite cement



X70-2687.6m-Calcite cementation

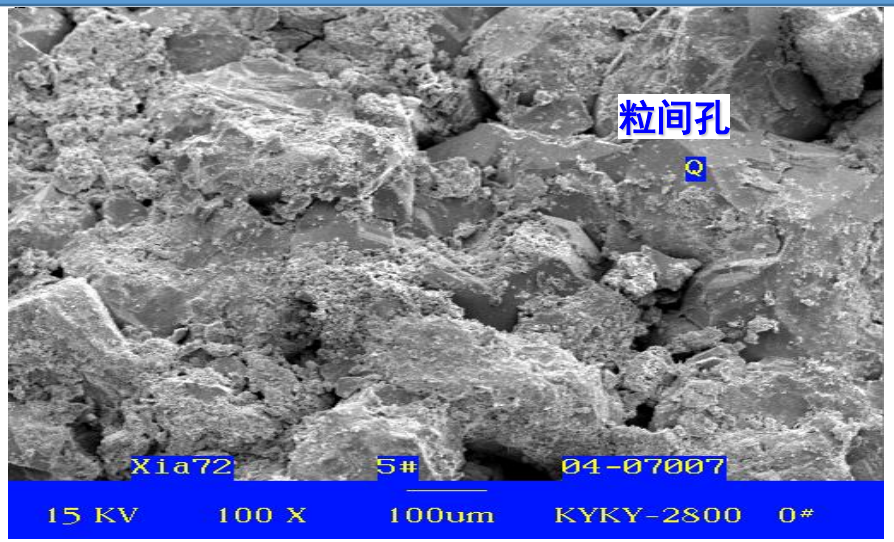


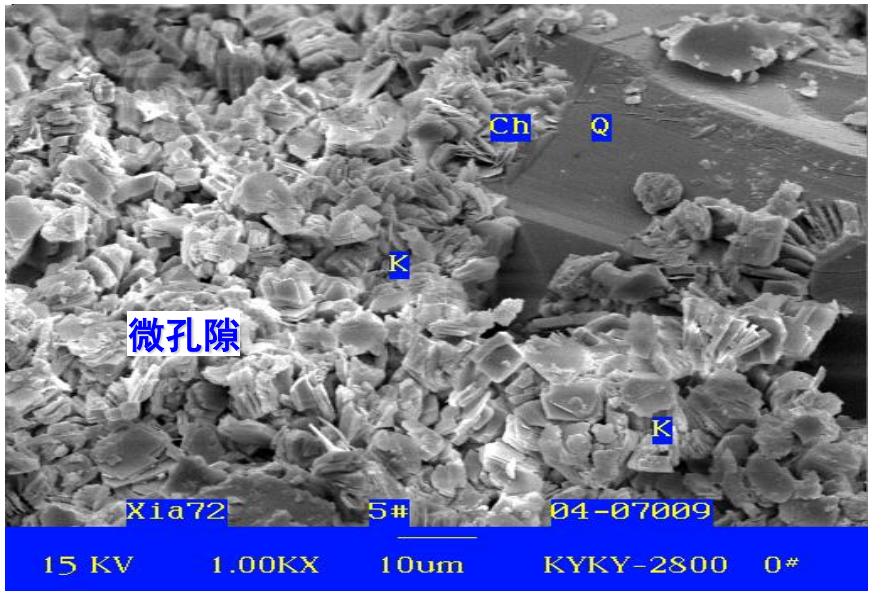
J3，3713.7m-Ankerite cement

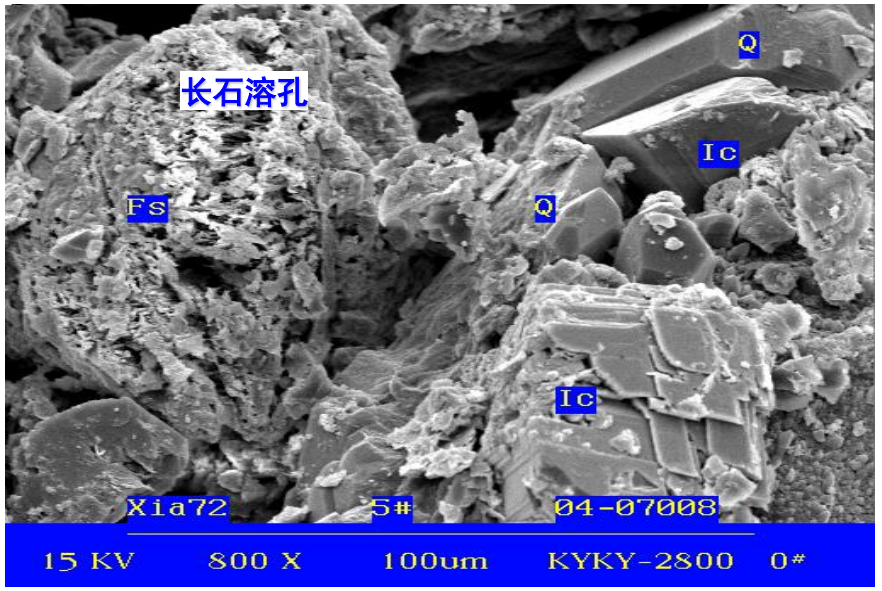
Classification of pore

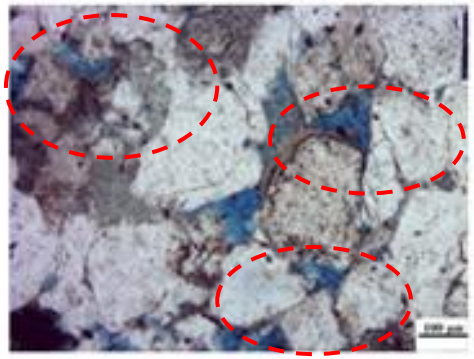
Macropore：interparticle porosity、intercrystalline pore、dissolved pore

Micropore：Kaolinite intercrystal pore
Feldspar dissolved pore

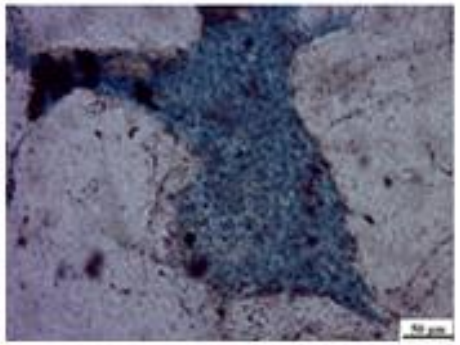




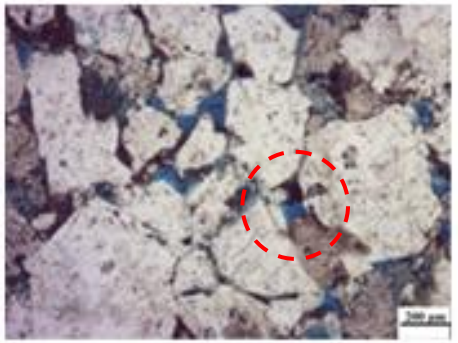




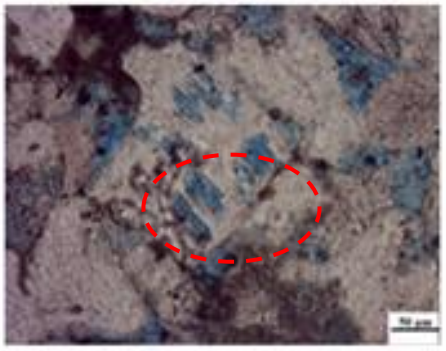
J202,3767.1m, residual primary interparticle porosity pore,100×（-）



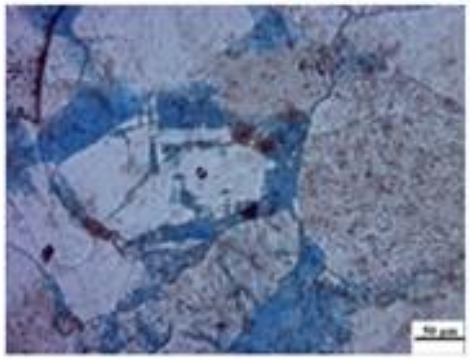
X33,3295.5m, kaolinite intercrystalline pore,200×（-）



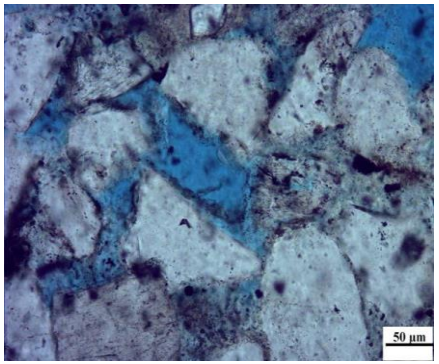
J202,3773.4m, primary interparticle porosity pore,200×（-）



J3,3716.8m, kaolinite intercrystalline pore,200×（-）

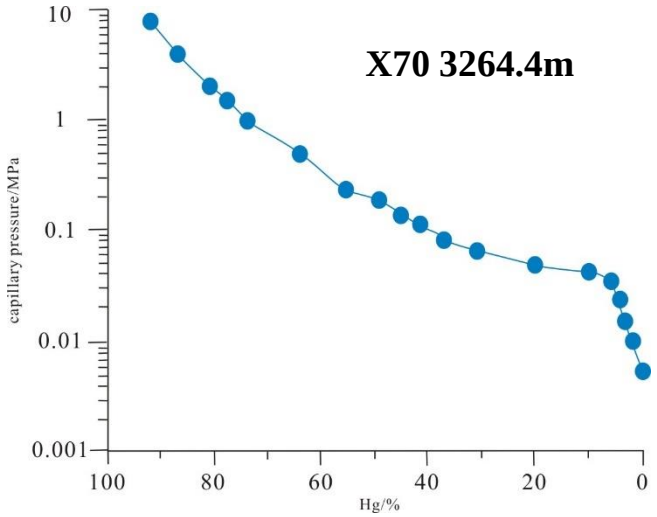


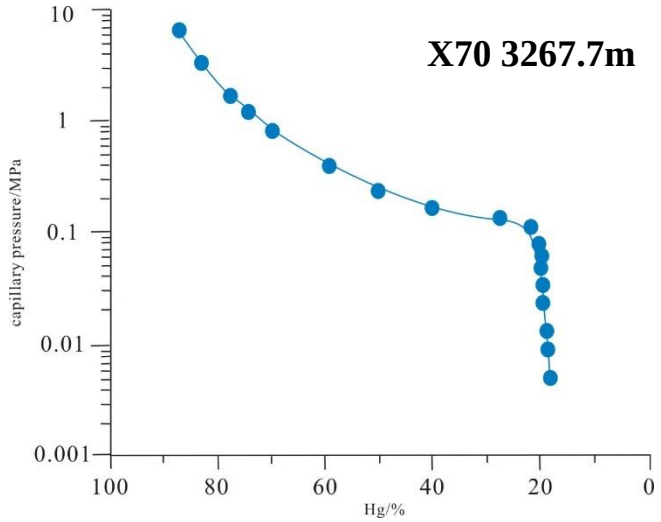
J202,3795.6m, kaolinite marginal solution pore,200×（-）



Jx2,3779.4.6m, kaolinite solution pore,200×（-）

Abundant of primary porosity, the solution porosity occurred in Yingzijie area





well	Depth m	Prosity (%)	permeability $\times 10^{-3}\mu m^2$	The pore radius μm	Max of pore radius μm	Hg(50%)MPa	Hg(max)%	average coefficient of variation
X70	3264.4	16.2	211	6.83	22.03	0.29	86.09	0.99
	3267.71	17.9	34.6	2.39	5.95	0.56	80.37	0.75
	3268.58	17.8	87.8	3.65	10.02	0.44	82.17	0.84
X32	3290.52	18.9	113.7	4.48	13.53	0.38	84.15	0.88
	3291.39	19.6	289.3	6.43	13.99	0.26	83.96	0.83

Section conclusion

1. Sedimentary facies of Es2 is from braided river delta change into braiding river

2. The main reservoir types are Overwater distributary channel reserviors, underwater distributary channel reservoirs, delta front mouth bar reservoirs and braided river channel sand reservoirs.

3. The five types of reservoirs have good condition to accumulate hydrocarbons or to become the migrate pathways.

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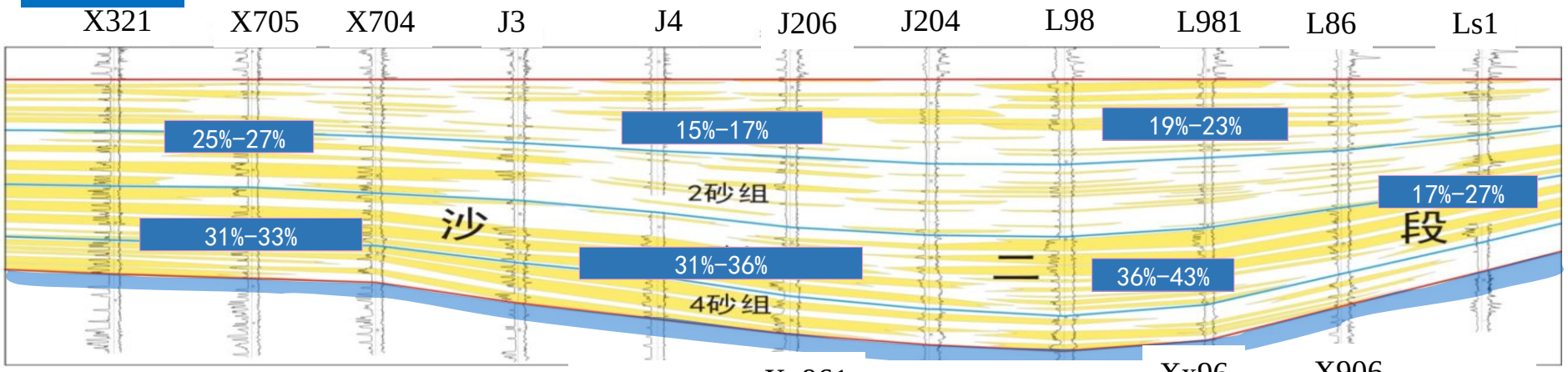
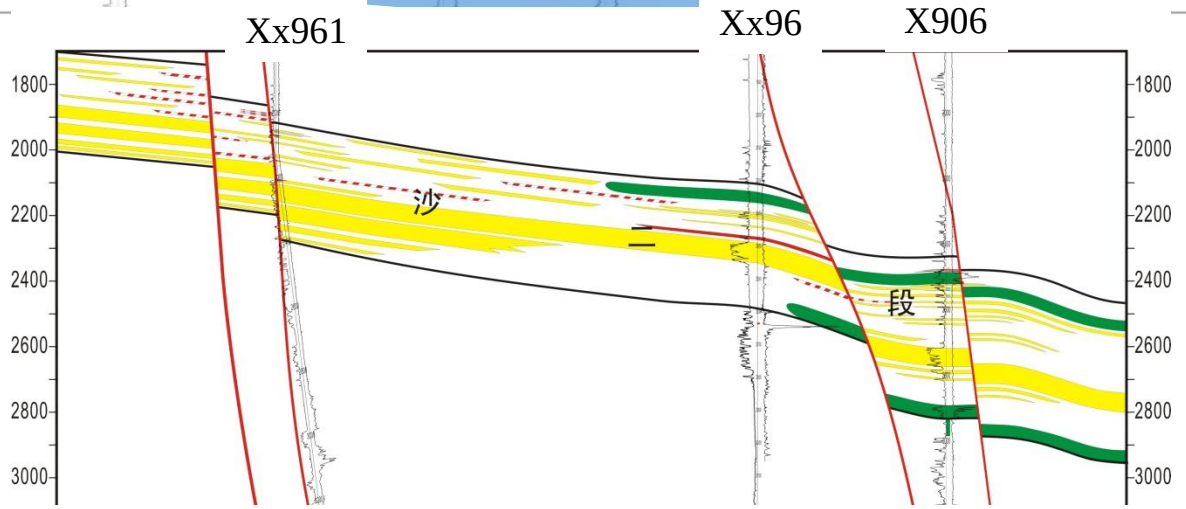
4 Conclusion and thought

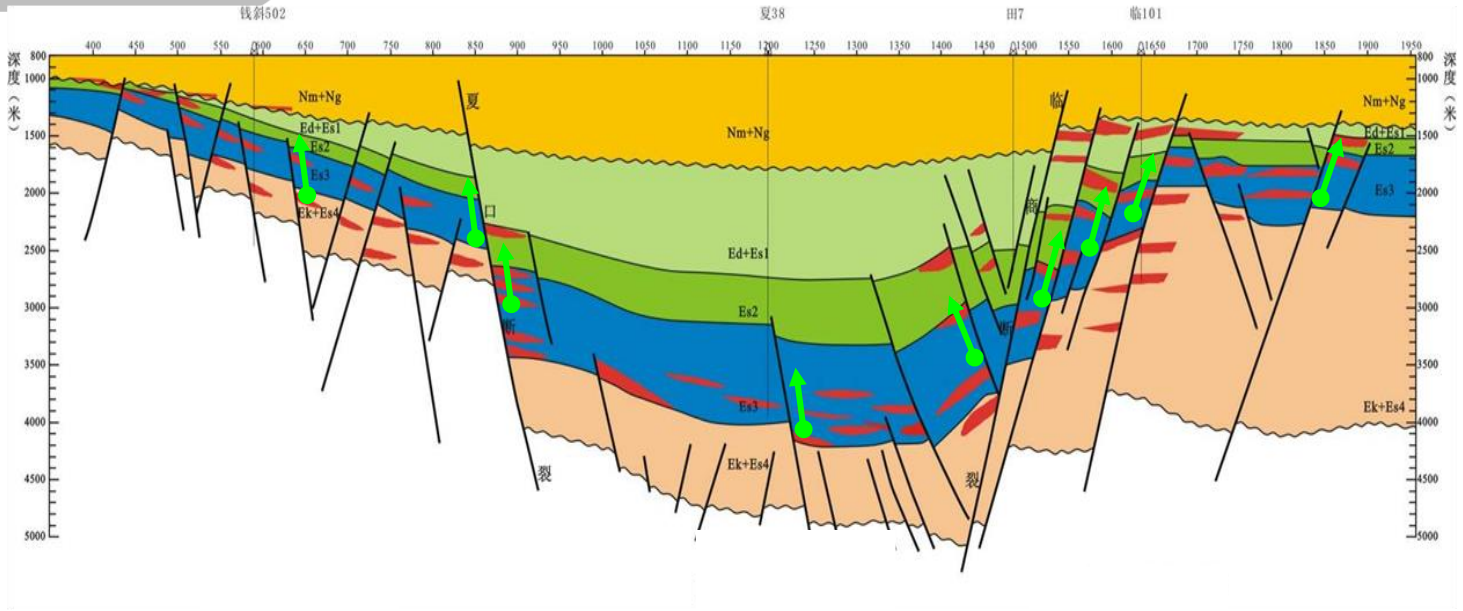


The sand in upper Es2 connected well and good physical property. The connected sandbody can become the good hydrocarbon migration layer .



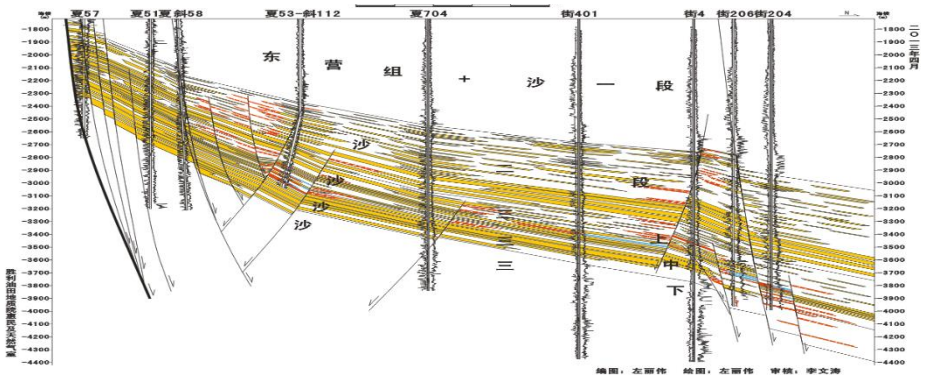
Fault
- 1、transporting
- 2、sealing

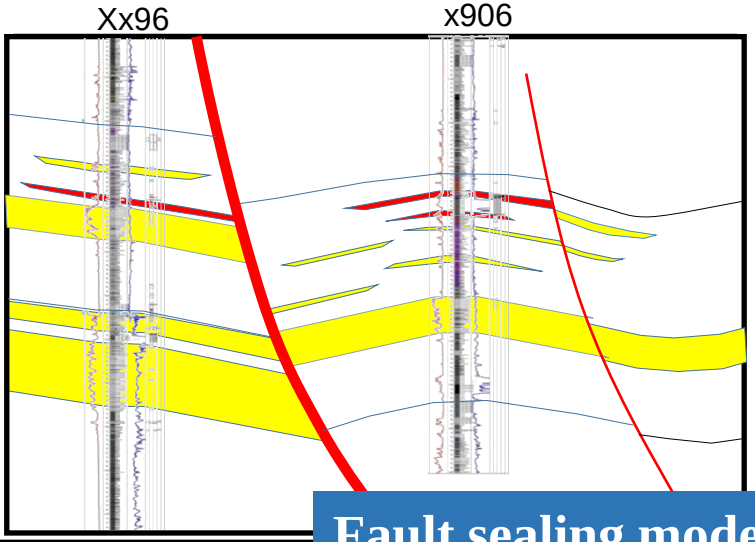
Hydrocarbon accumulation model



Hydrocarbon migrate along the fault and accumulate in the traps.

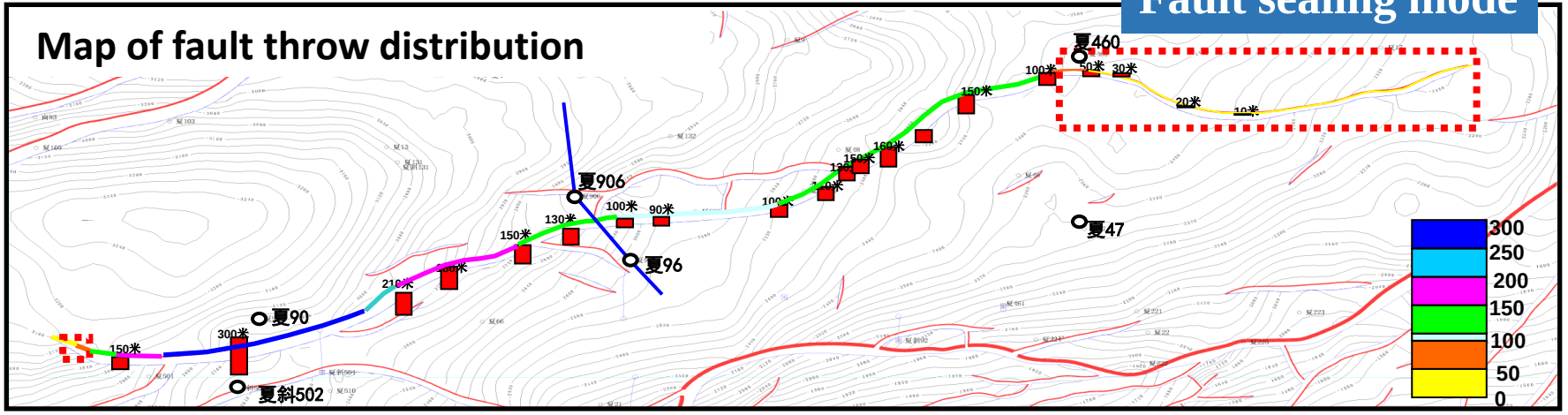
Oil Reservoirs Profile in Linan Subsag





Fault sealing mode

Map of fault throw distribution



The sedimentary facies in the Linnan subsag of Es2 changes from braided delta facies to braided fluvial facies. There exist five types of reservoirs, each reservoir has its own character. In the center Linnan subsag, the layers besides the fault vertically has great conducting condition, in the frontier of the basin, hydrocarbon migrate laterally along the sand. The burial of Es2 is relative shallow. Under the effect of the fault sealing, the thin sand is more liable to accumulate the hydrocarbon and the thick sand is more liable to become the hydrocarbon migration pathways.

Thanks for your attention !

Looking for your suggestion!