Sequence Stratigraphic For III Member In San-Gonghe Formation (Early Jurassic), Baolang Oil-Field, Yanqi Basin. Northwest China

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Abstract:- Problem statement **.** The Yanqi Basin is located in the xinjaing district NW of China, Sangonghe formation (Early Jurassic) consists mainly of several layers which are characterized by a complex geological landscape. The aim of the research is the characterization of sand Sequence stratigraphic for III member in Sangonghe Formation .Method Through create thickness maps which are essentially information well logs with data well , and using petrel software was introduced information for a number 124 wells in the study area and by identifying the limits of sand vertical (top and base) per lithology unit In each well, then investigate a correlation between these wells and then build maps sand thickness of the III member part in Sangonghe Formation. Result determines the five layers of small sand which clearly show the well logs curves return to main classes sand layers III_1 and III_2 that make up this part of the sangonghe formation. Characterized layer III_1^1 continuity good cover most of the study area and up to a maximum thickness of have to 32 m. Also layer III_1^2 covers most of the study area up to a maximum thickness of have to 48 m while the layer III_1^3 is composed of two parts of the first located in the north of the study area and up thickness to 32 m and the second part in the south have a maximum thickness of 20 m, up to a maximum thickness III_2^1 to 26 m also III_2^2. Overall, All layers of sand accounts for 90% of the total content of classes that make up the third part of the composition of sangonghe formtion. the difference rapid levels thickness caused by the presence of a series of faults affected the structure of synthetic layers. That a gradual decrease in the thickness of the layers of sand and down the thickness to zero or nearly it suggests that the direction of flow of the river will be mainly from the northeast toward the southwest.

Index Terms:-Baobei Anticline, Baobei District , Baolang Oilfield, Sangonghe Formation, Sequence stratigraphic, III member , Yanqi Basin.

1 INTRODUCTION

The thickness maps is one of the most important means that used in the studies of stratigraphy and based on the translation of geological information measured during the drilling process (core, cutting rock samples, well logs). Which gives a good knowledge of the extension of surface stratigraphy units , that thickness mapping of sand layers important to know the environment situation during deposition. Including sediment supply and aggregation rate [4,8,3],climate and base-level [16,12; 14] tectonics [17; 2;18, 13; 19], and channel-belt avulsion [16; 5; 10; 6] . The difference record levels in the thickness of the sand layers indicating the situation structural and that by observing the horizontal plane of the thickness maps can learn the differences structural's. That's the important part interpretation of thickness maps is knowing edge original sedimentation basin. Which are often zero, that a series of thickness maps to sequence a number of units Layering gives the history of this region and was accompanied by structural deformities, especially with the presence of faults.This is important in oil exploration operations for its information about the possibility of oil migration. Thickness maps are useful to know the current distribution of the rock units where to include the thickness downward to indicate the direction of facies changes as the difference in the degree of change the thickness profile is important to know the rates of sedimentation. In general, the thickness maps showing topography unit rocky in terms of the presence of higher elevations resulting from uplift or low-lying areas, According to maps thickness in estimating power reservoir oil and estimating reservoir oil.

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Also that the thickness sand layers in the braided river reflect degree accumulation sand channels and also indicate to view these channels where the relationship proportionally greater thickness of the layers of sand whenever evidence of increased display sand channels. Sangonhe formation (J1s) in Baobei district of Baolang oilfield ,Yanqi basin ,is braided river delta-lacustrine depositional system of shallow gentle slope with coarse grains[15,11,20]. upper Sangonghe formation, can be divided into 17 small layer of sands (I_1^1, I_1^2 I_1^3, I_2^1, I_2^2,II_1^1, II_1^2, II_1^3, II_2^1, II_2^2, II_2^3, II_3^1, II_3^2, III_1^1, III_1^2, III13, III_2)[9].

Formation	Oil group layers	Main layers	Small layer
Upper Sangonghe formation	I	I_1	I_1^1, I_1^2 I_1^3
		I_2	, I_2^1, I_2^2
	II	II_1	II_1^1, II_1^2, II_1^3
		II_2	II_2^1, II_2^2, II_2^3
		II_3	II_3^1, II_3^2
	III	III_1	III_1^1, III_1^2, III_1^3
		III_2	III_2^1, III_2^2

Table 1: The division upper sangonhe formation.

2 GEOLOGICAL SITUATIONS

The Sangonghe Formation of the study area is mainly composed of gray sandstone, conglomerate, dark mudstone, and coal. The formation is deposited in braided river deltas under a humid climate, and the evidence includes: 1.The lithology is coarse on the whole. Fine conglomerate is common, and the total content of sandstone and conglomerate is high, reaching 50%-60%, which is a typical characteristic of a braided river delta [21] 2. Parallel bedding and trough cross bedding are common in sandstone and conglomerate. This reflects high current velocities, also a typical characteristic of a braided river delta; 3.The roundness

of grains is poor, mostly sub angular, which reflects the short transportation distance and near-provenance deposition;4.Sandstone and conglomerate are frequently interbedded with lacustrine mudstone and coal and mudstone deposited on land, showing upward-coarsening sedimentary succession, which is another characteristic of delta deposition.

stratigraphy						Code	Thicness (m)	Lithology
	System period	Series Epoch	Group Age	Formation	Section			
Cenozoic		Pleistocene Series					178.3	
	Neogene System	Pliocene series		putaogou		N2p	1480	
		Miocene series		Hetaoyuan		N1t		
	Paleogene System	Pliocene	Shanshan group			Esh	330	
Mesozoic	Jurassic	Middle	Shuixigou group	Xishanyao		J2x	280.5-466	
		Lower		Sangaoghe	Upper	J1s upper	174-181	
					Lower	J1s lower	292-432	
				Badaowan		J1b	811	
	Trassic	Middle Upper	Xiaoquangua group			T2+3xq	124	
Paleozoic	Carboniferous	Middle Upper		Kaladaban		c	322.1	

Table 2: The stratigraphy division for Yanqi basin.

3 MATERIALS AND METHODS

Data have been collected to create thickness maps , which are essential information well logs with data well.Using petrel software was introduced an information for a number 124 wells in the study area. By identifying the limits of sand vertical (top and base) per lithology unit in each well, then make a correlation between these wells, then build the sand thickness maps of the III member part in Sangonghe Formation.

4 MEMBER III IN SANGONGHE FORMATION

Sangonghe formation (J1s) has five microfacies including underwater distributary channel, underwater distributary interchannel crevavasse channel(fan),overband flood deposit and laksher swamp deposit.[Liu ben,et,al.2001]The sand body of underwater can be classified into filled channel, abandoned channel and progradational channel, This type of reservoir in the channels of content with a grain size thick and are laterally heterogeneous these channels and vertically, and that the shape of the well logs curves are cubic wide and thick, and these channels are well developed . And generally take the form of grooves broad and thick with a few channels of thickness of the medium and the top of minutes and asymmetrical laterally and through the analysis of the well logs and core and Balls was possible to identify three to six cycles of sedimentary channels are folding vertical overlap valuable each other greatly and be of contact both sides of the well and up thickness layers of sand to more than 20 meters and a width of more than 400 meters.III Memmber Include two sand layer ($III_1$and III_2).

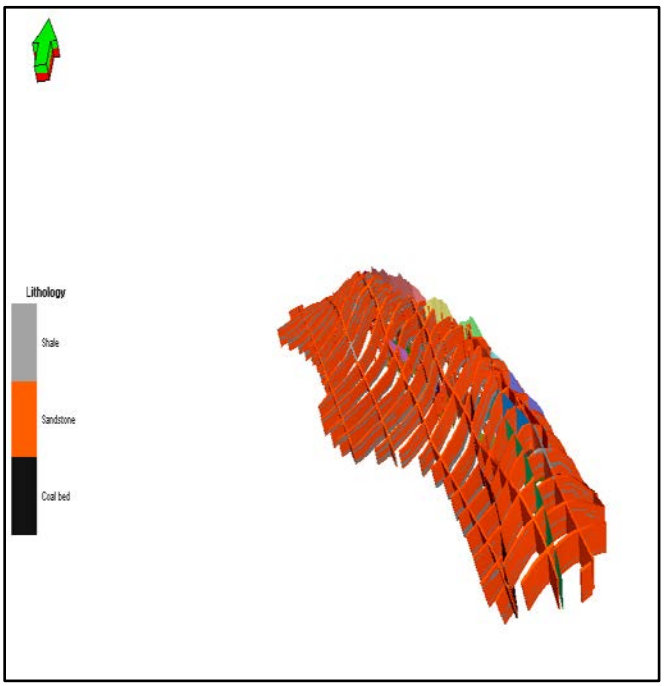


Figure 3 : Three Dimensions stratigraphy.

4.1 III_1 SAND LAYER : INCLUDE THREE SMALL SAND LAYER (III_1^1, III_1^2 AND III_1^3):

4.1.1 III_1^1 SMALL SAND LAYER:

This layer covers most of the study area, In the southern parts thickness ranges between 23 m near the well 7-12 in the center of the channel and up to 2 m in the edges . The northern parts range between 8 m and 2 m. This layer is characterized by continuity of its channels and connected to the good side, by observing the thickness map (Figure 6B) can identify the main channel in the southern region (Figure 5), Channels, consisting of the layer has dimensions (W / thickness) in the range of 800/6.4 m,These are porosity 14.67% layer and the permeability 40.16 x 10-3mm.

4.1.2 III_1^2 SMALL SAND LAYER:

This is the layer of the distinctive terms of thickness and continuity for all the layers constituting the upper part of the sangonghe formation ,With a thickness of 48 m near the well 2-5 and which is located well in the center of the main channel and up thickness to 2 m at the edges (Figure 6C). The channels that are this layer is the channel cylindrical wide and thick and with a connection the sides of the

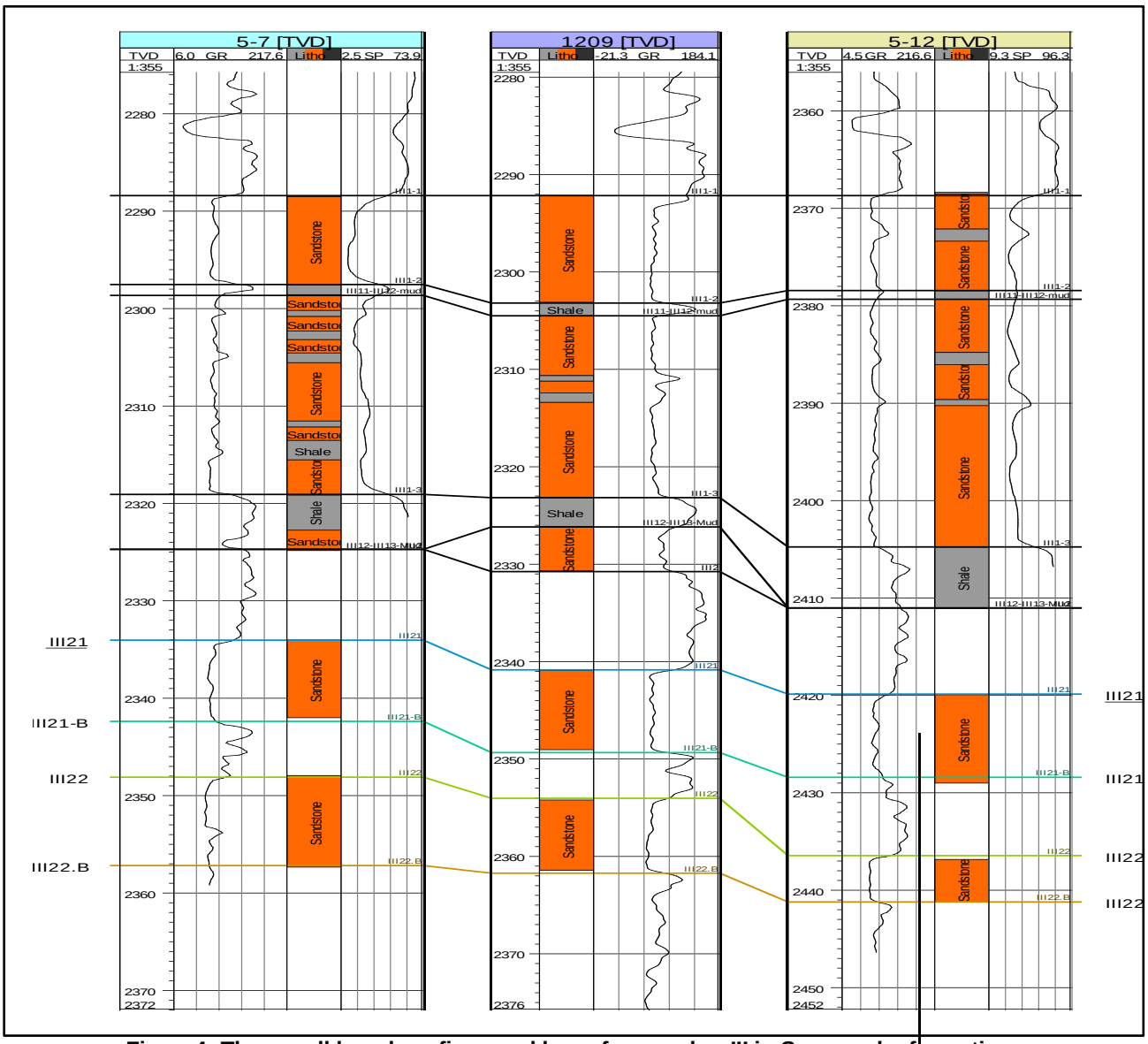


Figure4 :Three well log show five sand layer for member III in Sangonghe formation.

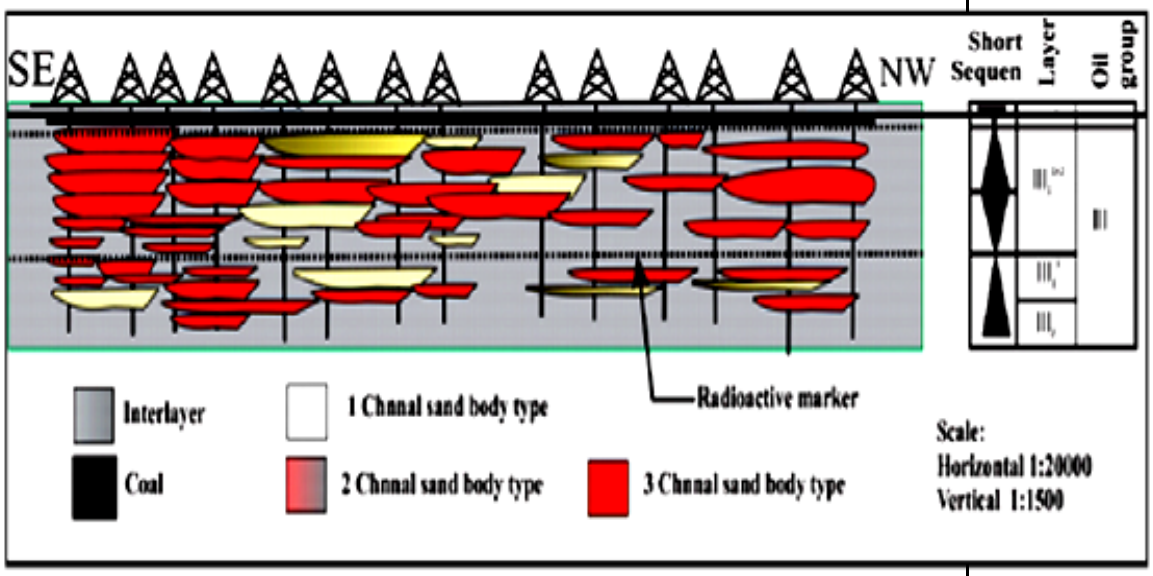


Figure 5: Cross section show sand channel property for III member in Sangonghe Formation

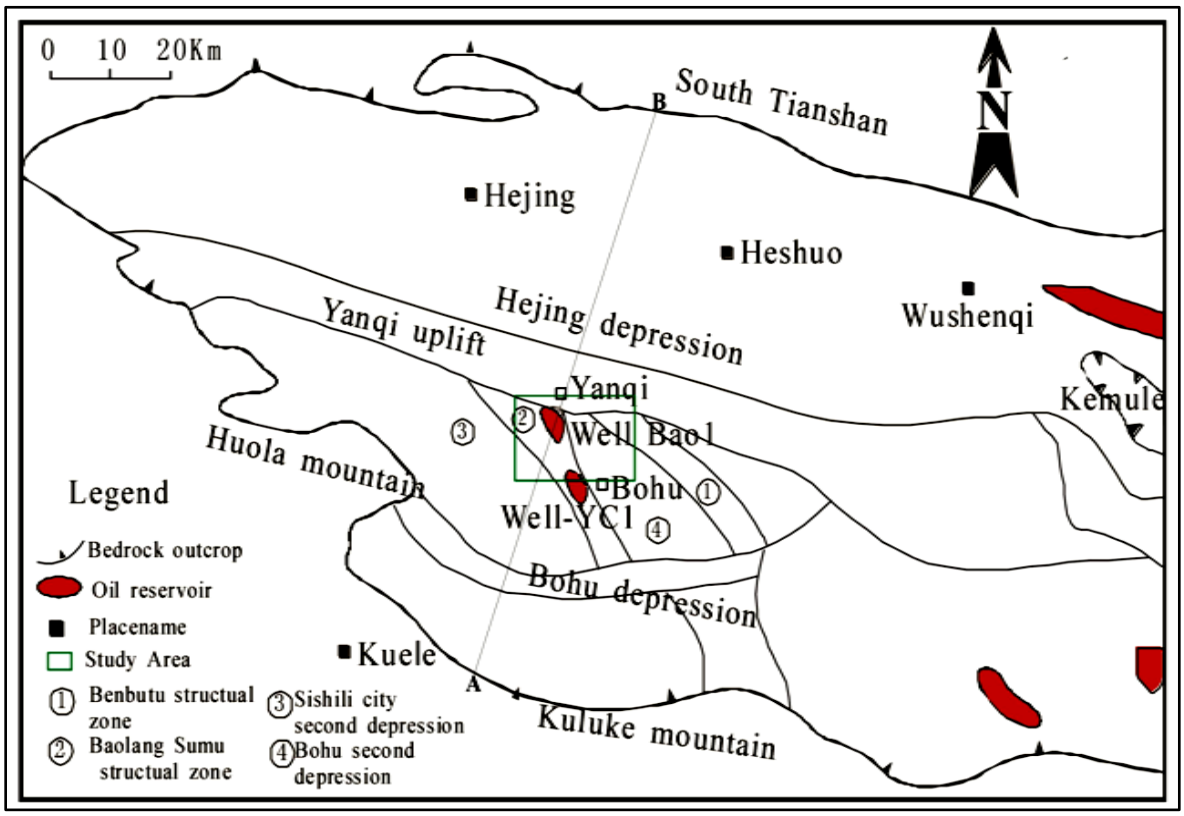
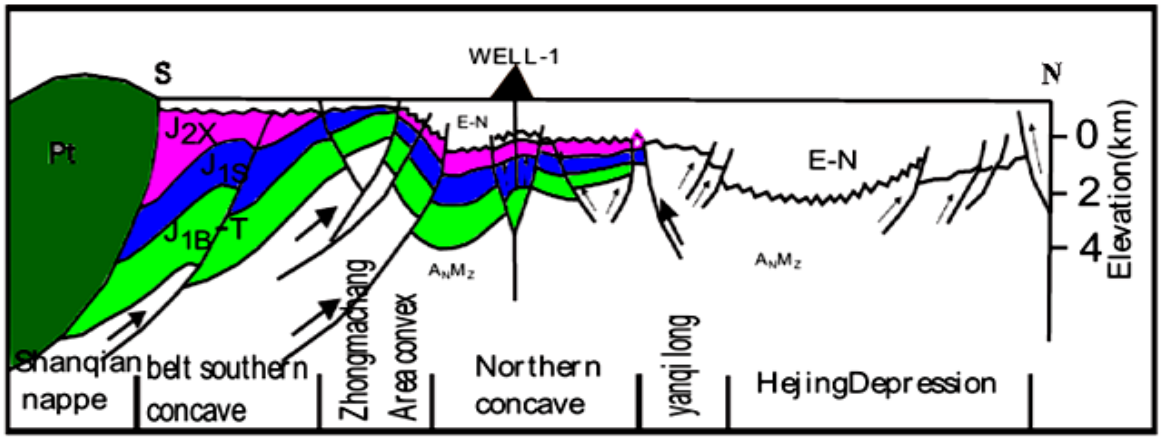


Figure 1: Location and structural map for Yanqi Basin.



J2x: Xishanyao formation ,J1s: Sangonghe formation , J1b Badaowan formation.

Figure 2:North-South Cross section in Yanqi Basin

vertical well enabled the class to continue horizon and the composition of the thickness of a large vertically. Through the observation thickness map note that the masses of sand are the same thickness distinctive in have three areas of protozoan near the well 2-5 and the second from the well near well 3.9 and near the well 5-12, which indicates the existence of have three main channels of the river braided .Channels that have this layer with previous layer(III_1^{1+2}) have dimensions (W / thickness) in the range of 800/6.4 m have dimensions (W / thickness) in the range of > 4000/32.8 m .These are porosity 15.14% layer and the permeability 49.96 x 10-3mm.

4.1.3 III_1^3 SMALL SAND LAYER:

In this layer it was noticed decline in the number of channels and their characteristics from the previous layer, where the channels of small dimensions and be in the form of lenses separately or with a contact side of a limited and in general (Figure 5). The distribution of these channels and the ways they relate to the side may valley to form two blocks separate from the sand the first in the north up to a maximum thickness near the well Z3 has a thickness of 32 m in the center channel and 2 m at the edges. Second block in the south of the study area and be of a smalle

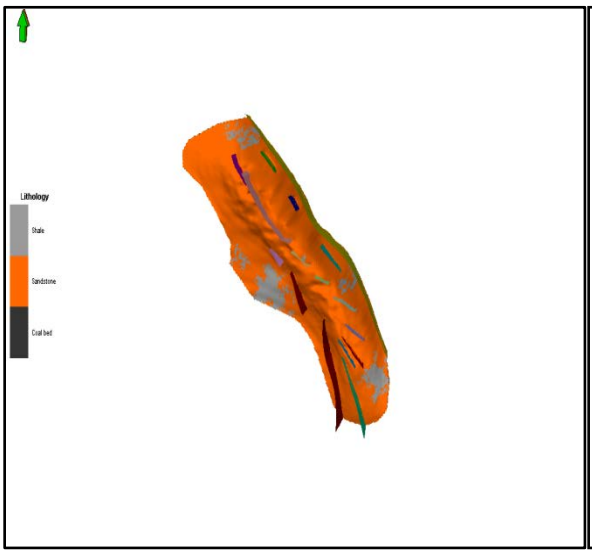


Figure 6A: 3D Lithology and fault model.

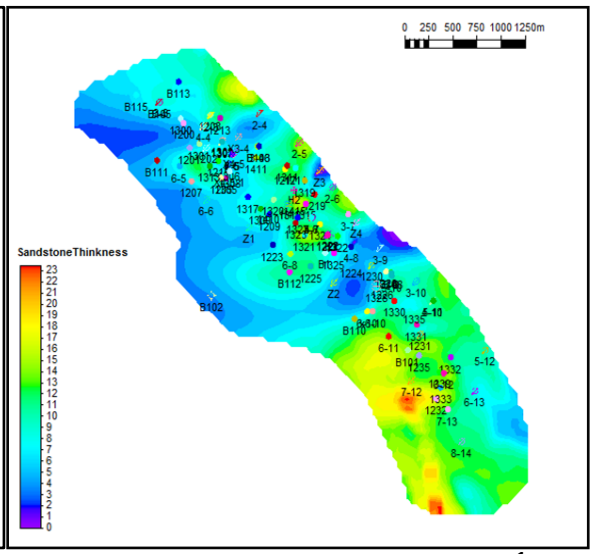


Figure 6B: Theckness map for layer III_1^1

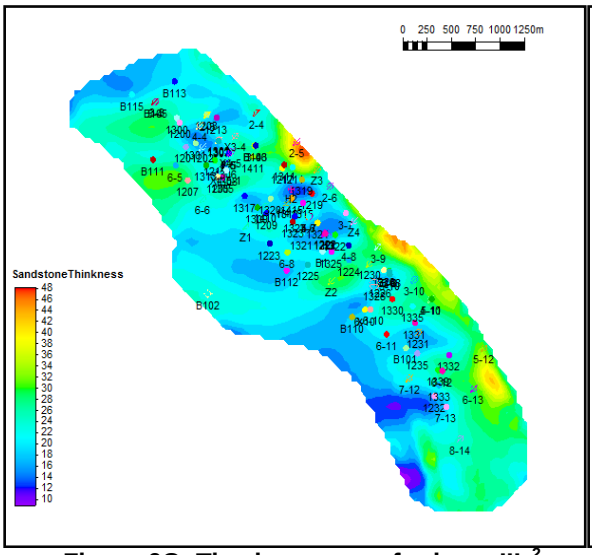


Figure 6C: Theckness map for layer III_1^2

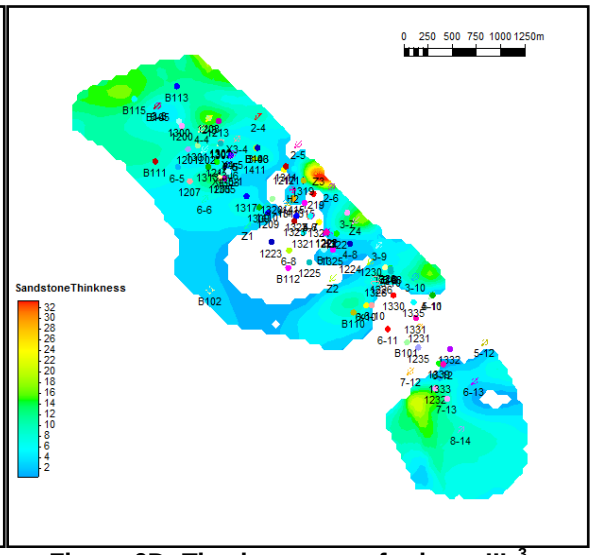


Figure 6D: Theckness map for layer III_1^3

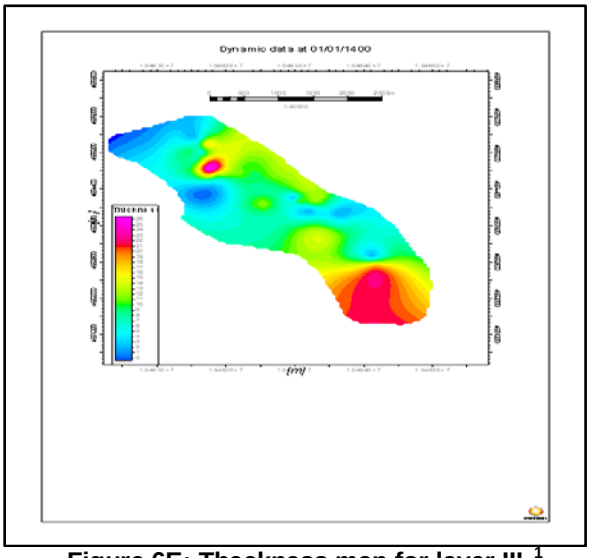


Figure 6E: Theckness map for layer III_2^1

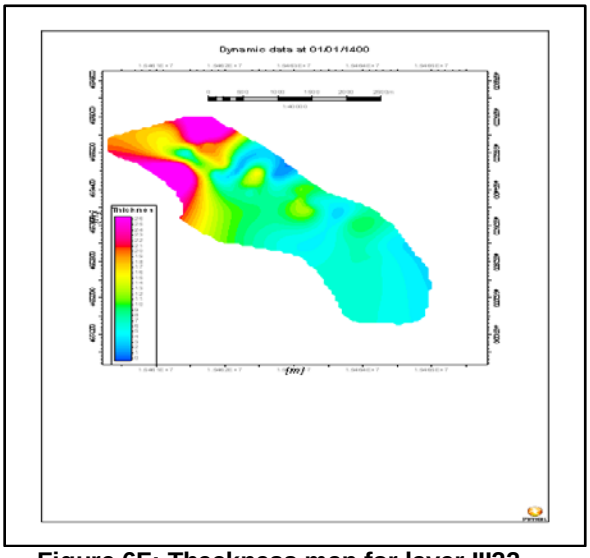


Figure 6F: Theckness map for layer III22

space for the cluster in the north and reaches maximum thickness.

5 DISCUSSION

The key component of sand layers in the braided river is an accumulation containing sedimentary these channels, so the layers properties of sand from where the thickness and horizontal extension affected by the properties of these channels, the more blocks were sand with large size and Contact the sides and vertical well whenever given the layers of sand thickness large and along the sides of this broad to find in the study area where sand layers constitute 90% of the total content of classes that make up III member in Sangonghe Formation. The wide spread layers of sand indicates the river flow is intermittent, the weakening of the upper part of the energy overflow sedimentary development, the most widely used in the study area segments. That different levels of standard thickness of the sand layers indicate compositional situation, which indicate the presence of a total of faults led to the sudden difference in the thickness of the layers of sand. The series of maps thickness that make up III member in Sangonghe Formation give the history of this region and was accompanied by distortions structural especially with the presence of faults, which refers to conditions depositional well for layer III_1^1 and III_1^2 and observed during the continuance of layers of sand in most parts of the study area, while receding in the northern part and the southern in layer III_1^3 . As can be observed parts thickness High fall sideways largely refers to the difference in the rates of sedimentation, as battiy thickness higher index to Center flow channels. And thickness low grade to zero indicates that most edges the river are one in the south-west and the other edge in the north-weste ther along the canals indicate that line the river run in general is from the north-west south-easterly direction. That the boundaries between the different layers of sand can be easily distinguished through focal well curves and be sequence stratigraphy by the class between the sand and shell. We have been divided into the upper part of configure Sangulw before several researchers (type references) adopted in this research for rating published by the Yongwang ,Q,et al,(2007) with the creation a new layer is III_2^2 so as to contain physical properties independent of the layer above it and we can show this layer in log curve very clearly.

6 CONCLUSIONS

In this study for the III member to form sangonghe formation, it could be to determine the five layers of small sand which clearly show the well logs curves return to main classes sand layers III_1 and III_2 that make up this part of the sangonghe formation. Characterized layer III_1^1 continuity good cover most of the study area and up to a maximum thickness of III_2 m. Also layer III_1^2 covers most of the study area up to a maximum thickness of 48 m while the layer III_1^3 is composed of two parts first one of located in the north of the study area and up thickness to 32 m while the second part in the south which has maximum thickness of 20 m, up to a maximum thickness III_2^1 to 26 m also III_2^2. overall, layers of sand accounts for 90% of the total content of classes that make up the third part of the composition of sangonghe formtion. the difference rapid levels thickness caused by the presence of a series of faults affected the structure of synthetic layers. That a gradual decrease in the thickness of the layers of sand and down thickness to zero or nearly it suggests that the direction of flow of the river will be mainly from the northeast toward the southwest.

7 ACKNOWLEDGEMENTS:

We are grateful to all professors in the Department of petroleum Engineering. China University of Geosciences (Wuhan) china.

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