

# 26<sup>th</sup> World Gas Conference

1 – 5 June 2015 – Paris, France



## *TS. WOC 1 2*

GEOLOGIC CHARACTERISTICS OF DEEP RESERVOIRS IN KELASU  
STRUCTURAL BELT, KUQA DEPRESSION, TARIM BASIN, NW CHINA

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# OUTLINE

1

**Introduction**

2

**Characteristics of deep reservoirs**

3

**Present situation of development**

4

**Challenges**

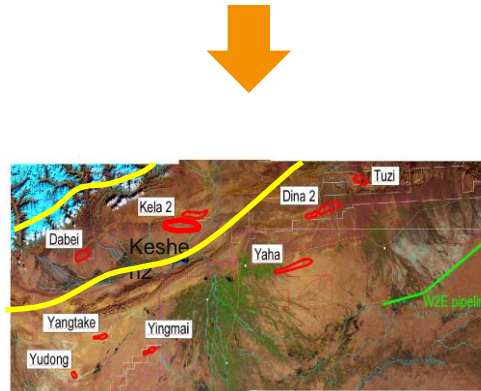
5

**Conclusions**

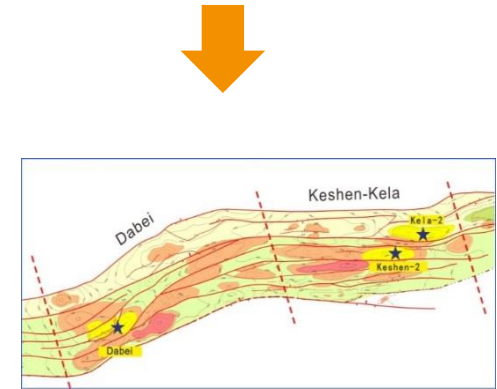
# 1. Introduction



Tarim Basin



Kuqa Depression



Kelasu Structural belt

# 1. Introduction

## Source rock

Upper Triassic to Middle-Lower Jurassic  
Lake swamp coal measures

## Seal rock

KM Formation in Early Tertiary  
Gypsiferous salt

## Reservoir

Bashijiqike in Lower Cretaceous  
Lithic-feldspar siltstone

Strata			Lithology	Combination		
System	Series	Formation		Source	Reservoir	Seal
E	E <sub>3</sub>	Suweiyi	Gypsum-Mudstone			
			Siltsand			
	E <sub>1-2</sub>	KM	Mudstone			
			Gypsiferous Salt Rock			
			Dolomite			
			Gypsiferous Marl			
K	K <sub>1</sub>	Bashijiqike	Glutenite			
			Siltstone			
	K <sub>1</sub>	Baxigai	Granule roundstone			
			Conglomerate			
			Siltstone			
			Mudstone			
			Mudstone			
			Siltstone			
			Siltstone			
			Conglomerate			
J	J <sub>3</sub>	Qigu	Mudstone			
			Siltpelite			
	J <sub>2</sub>	Qiakemake	Mudstone			
			Limestone			
			Glutenite			
	J <sub>2</sub>	Kezilenuer	Mudstone			
			Siltstone			
J <sub>1</sub>	Yangxia	Mudstone				
		Siltstone				
T	T <sub>3</sub>	Ahe	Coal			
			Mudstone			
	T <sub>3</sub>	Taliqike	Glutenite			
			Mudstone			
			Siltstone			
T <sub>1-2</sub>	Huangshanjie	Mudstone				
		Siltstone				
		Siltstone				
C-P	Kelamayi	Ehuobulake	Sandstone			
			Mudstone			
C-P			Limestone			

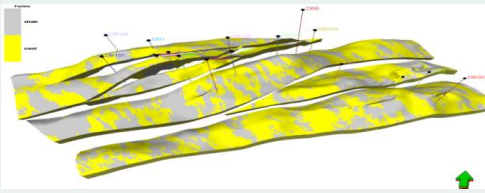
Source: ZHAO Wenzhi. Geological analysis and physical modeling of structural pumping in high effective formation of Kela 2 gas field. Science in China Series D: Earth Sciences, 2006

## 2. Characteristics of deep reservoirs

### Three types' reservoirs in Kelasu structural belt

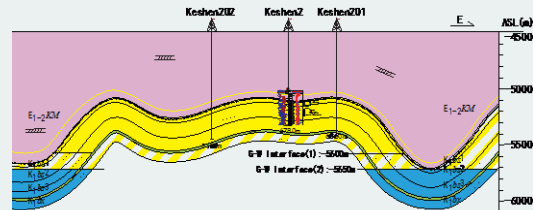
#### Dabei Gas Field

- ◆ HTHP
- ◆ Deep Burial
- ◆ Poor Property
- ◆ Complex Structure



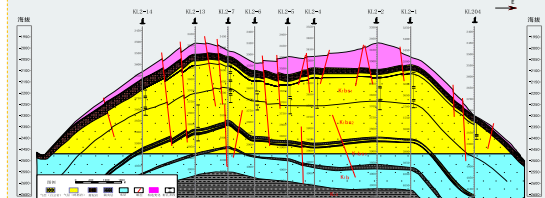
#### Keshen-2 Gas Field

- ◆ HTHP
- ◆ The Deepest Burial
- ◆ Poor Property
- ◆ Giant thickness reservoir



#### Kela-2 Gas Field

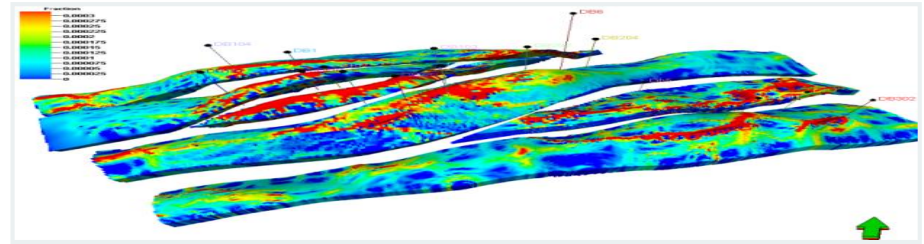
- ◆ HTHP
- ◆ Relative Shallow Burial
- ◆ Good Property
- ◆ Giant thickness reservoir



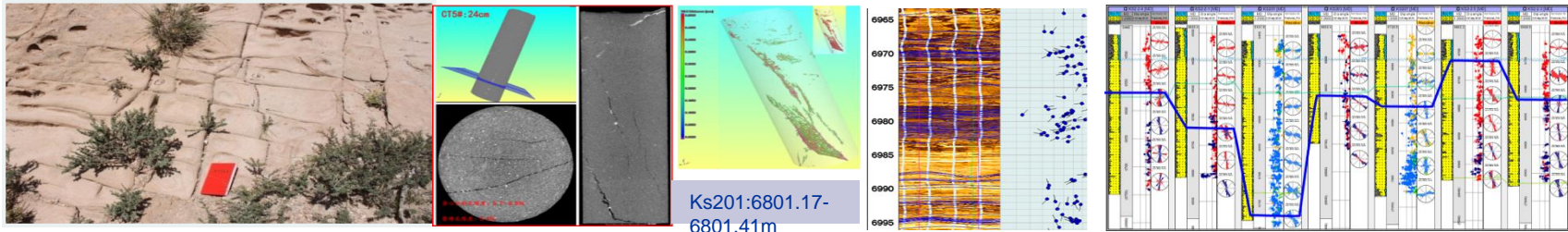
# 2. Characteristics of deep reservoirs

## Connectivity of reservoir

- ◆ Fractures
- ◆ Inner Faults
- ◆ Barrier and interlayer
- ◆ Well testing



DFN (Discrete Fractures Network) model



Outcrops

Cores

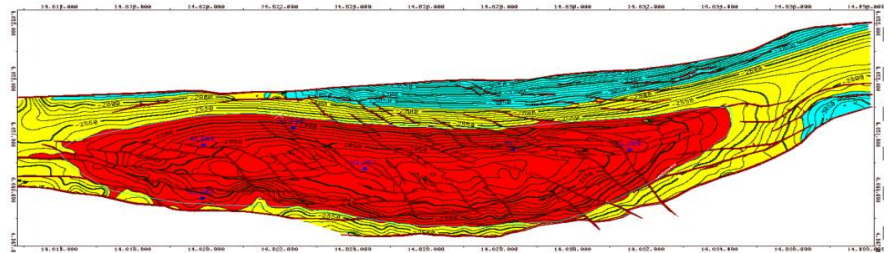
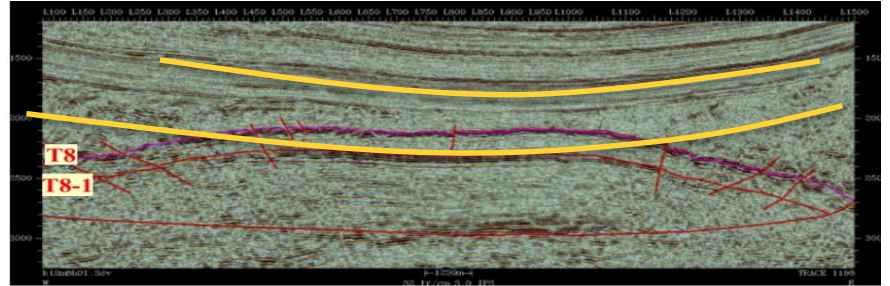
Imaging logging

Well interpretation

## 2. Characteristics of deep reservoirs

### Connectivity of reservoir

- ◆ Fractures
- ◆ Inner Faults
- ◆ Barrier and interlayer
- ◆ Well testing



Seismic interpretation in Kela-2 gas field

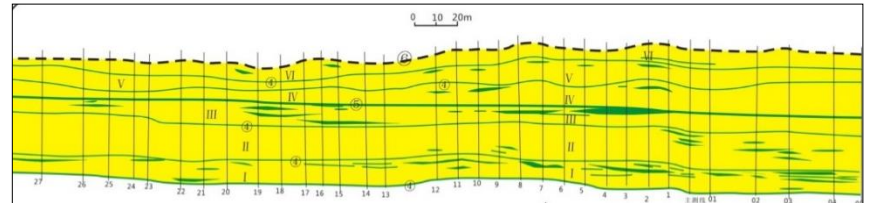
## 2. Characteristics of deep reservoirs

### Connectivity of reservoir

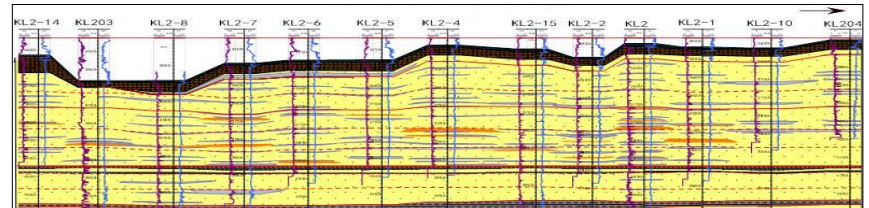
- ◆ Fractures
- ◆ Inner Faults
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Outcrops



Model of outcrops



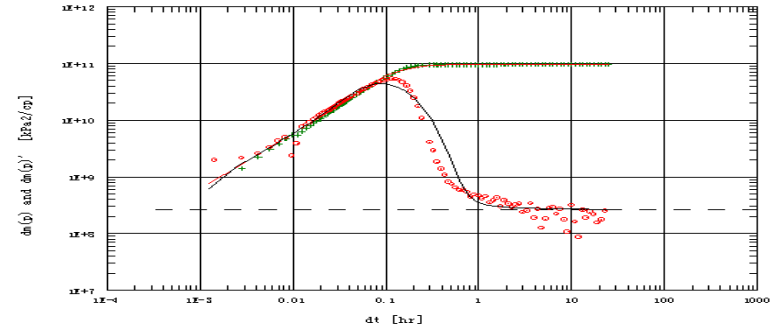
Profile of Kela-2 gas field



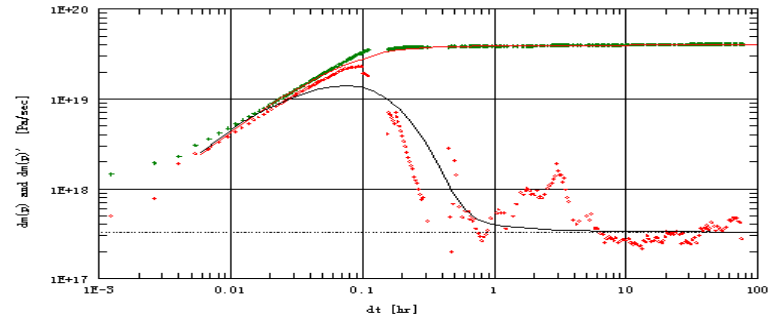
## 2. Characteristics of deep reservoirs

### Connectivity of reservoir

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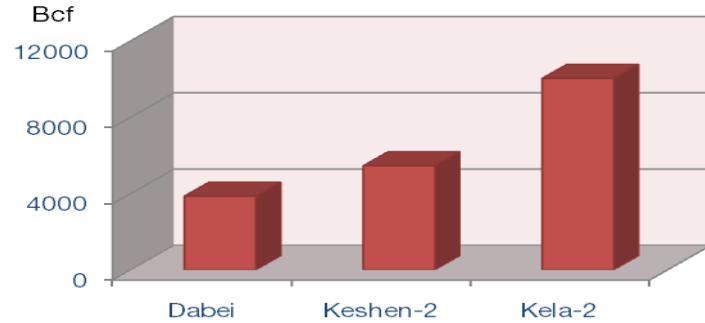
Dabei db-2 well



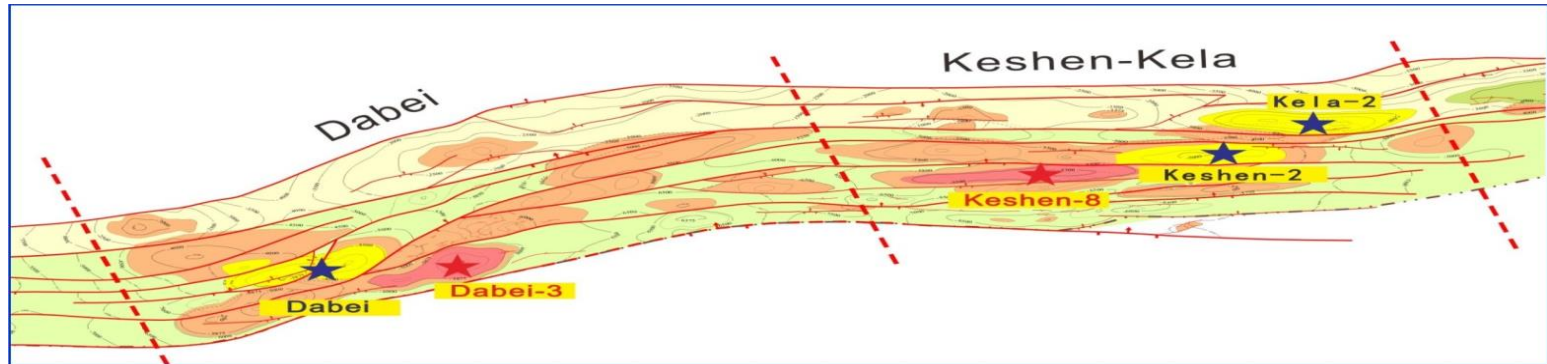
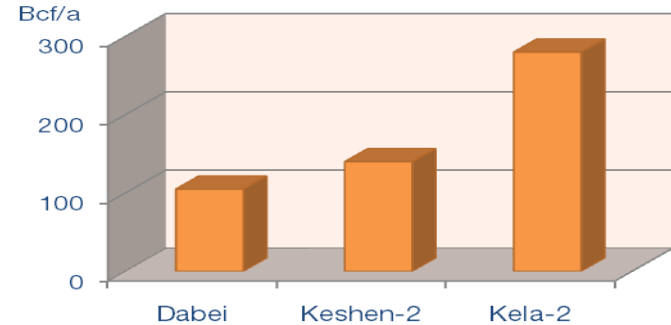
Keshen202 well

# 3. Present situation of exploration and development

Proven reserves

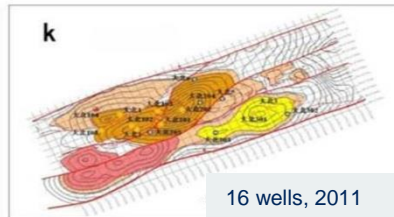
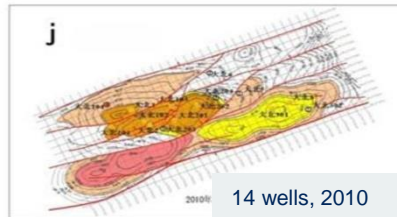
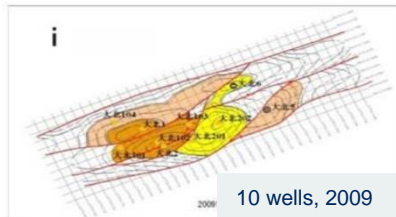
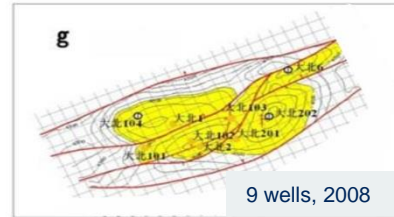
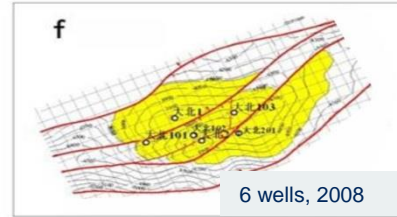
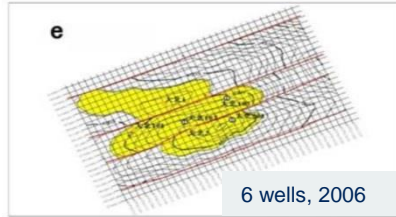
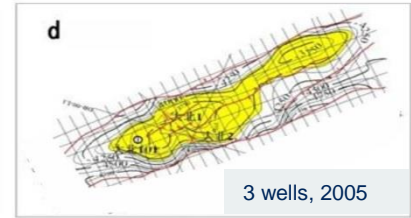
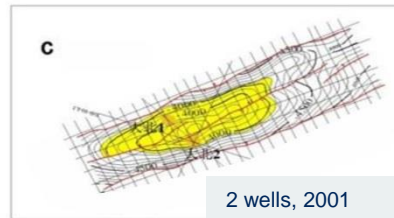
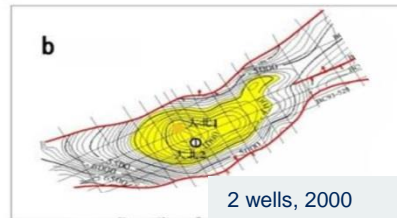
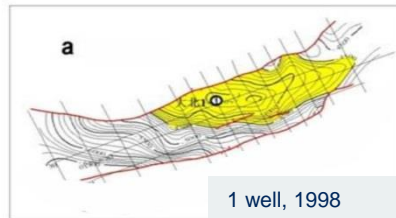


Annual production



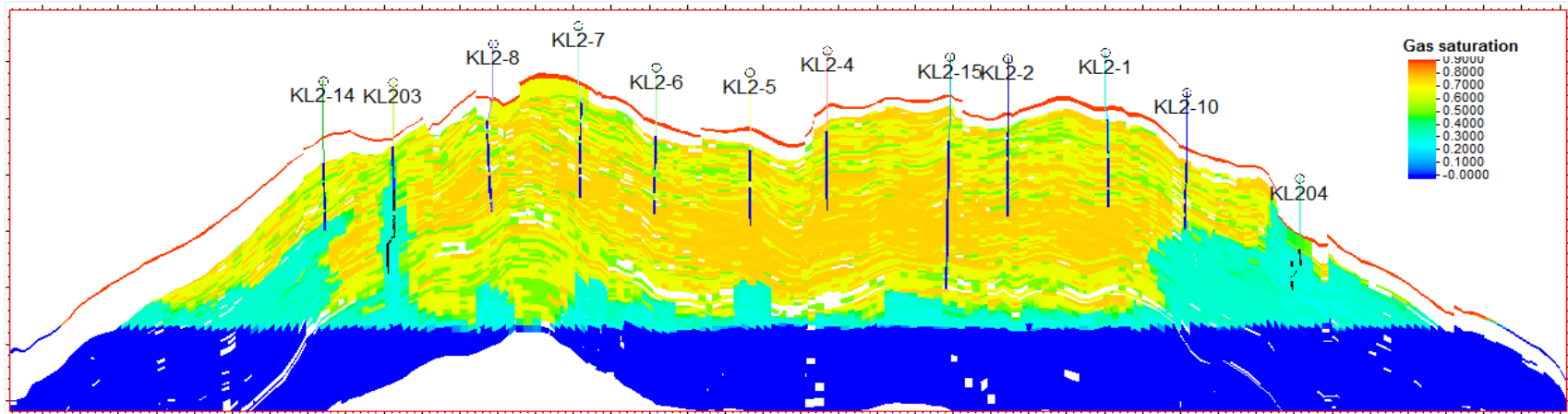
# 4. Challenges

## 1. Complex structures



# 4. Challenges

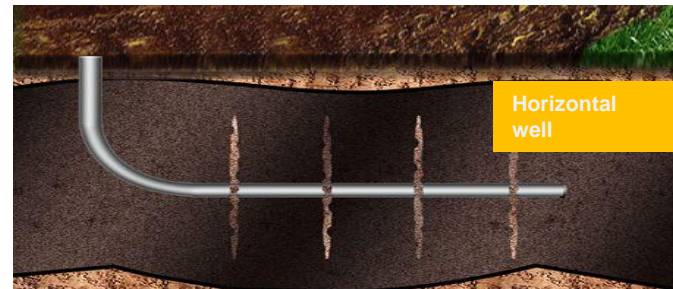
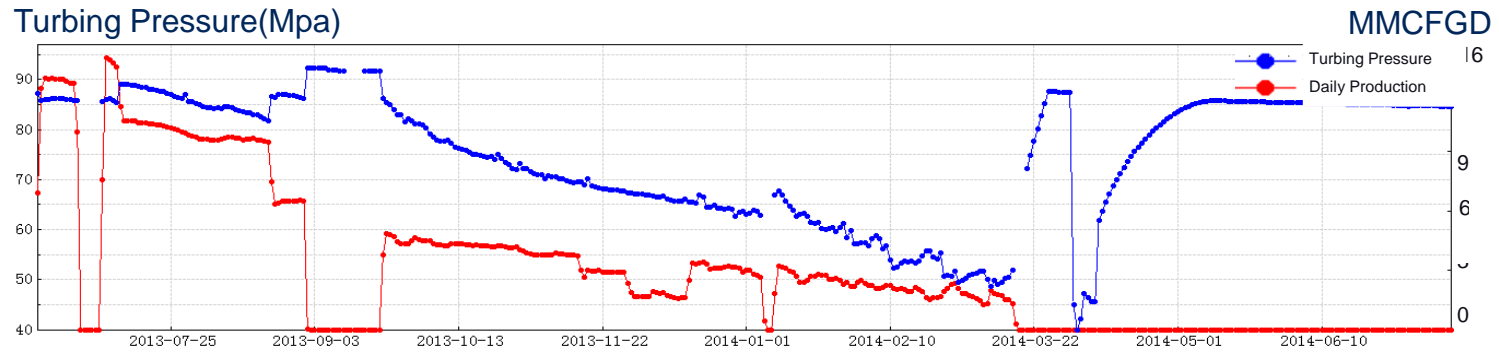
## 2. Formation water



Gas-water distribution in Kela-2 gasfield

# 4. Challenges

## 3. Low individual well production



## 5. Conclusions

- ◆ The giant thickness of seal rock
- ◆ Physical properties
- ◆ Inner faults and fractures
- ◆ Challenges for the exploration and development



**Thanks for your  
attention!**

### **Acknowledgement**

- ◆ Thanks to our company CNPC for supporting us on this paper.
- ◆ Thanks to my working team for their great job.

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