



An overview of geology for CO₂ Storage in China

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China Geological Survey**

Contents



1.Introduction

2.Geology of main basins in China

3.Suitable assessment of basins

4.Challenges



- **Chinese government launched National Action Plan on Climate Change in June 2007.**
- **Chinese government also pledged “Carbon emission of per GDP will be reduced 40-45% in 2020 comparison to 2005” in 2009.**

“Research on CO₂ Geological Storage in China(2009-2010)” project— Conducted by CGS

- **The project aims to methodology research for geological exploration, storage capacity evaluation, geophysical exploration, monitoring, safety and economy evaluation of CO₂ Geological Storage; establish Chinese site evaluation and rank standards; Provide experiences for CO₂ Geological Storage in China.**

To further enhance the capability of CO₂ Geological storage, CGS draw the program “**strategy for CO₂ Geological Storage (2010-2020)**”

Strategy Objectives:

- 1.Theoretical capacity evaluation**
- 2.Basins assessment**
- 3.Sites assessment**
- 4.Project Practice**



Contents

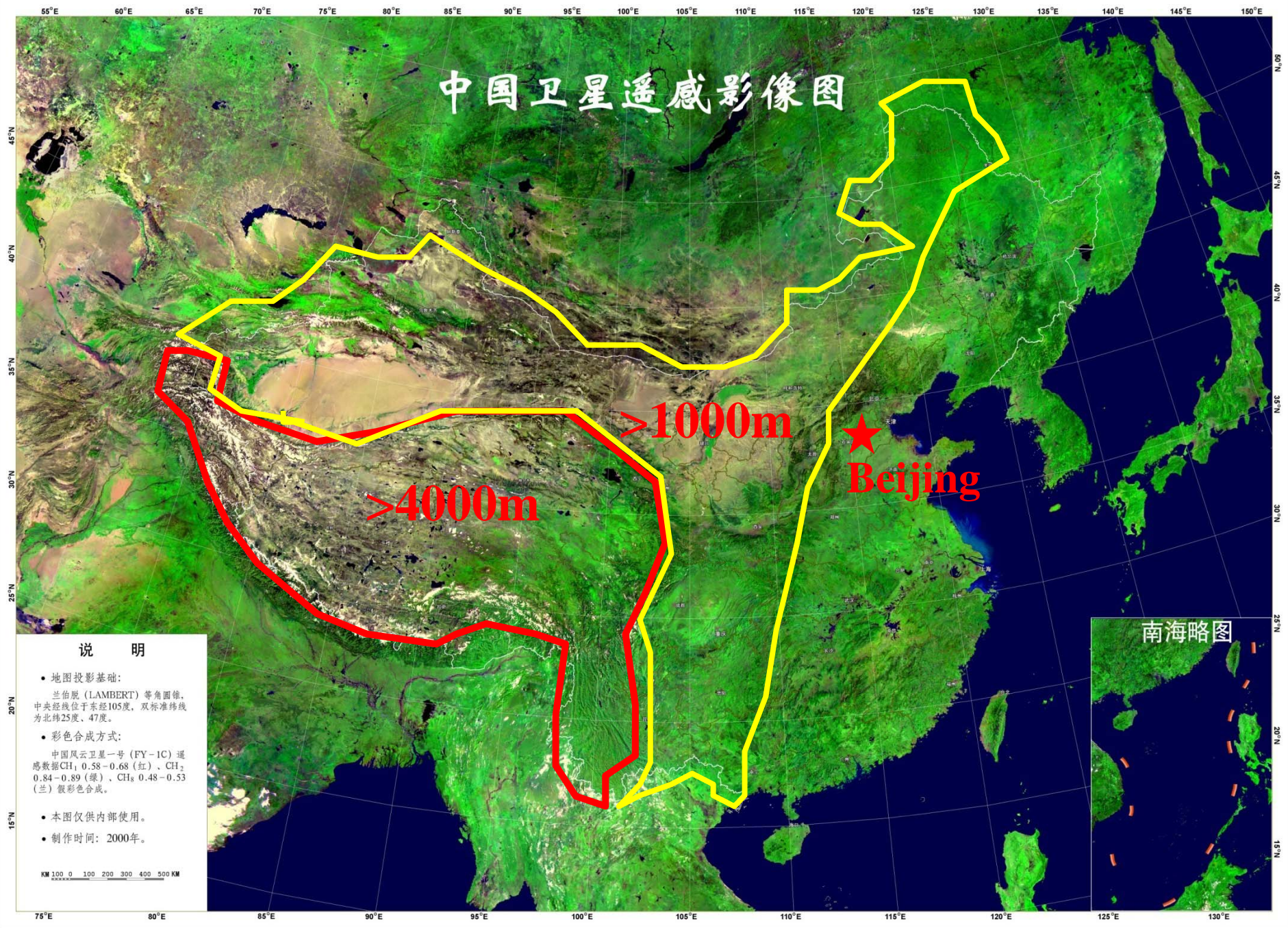
1. Introduction

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中国卫星遥感影像图

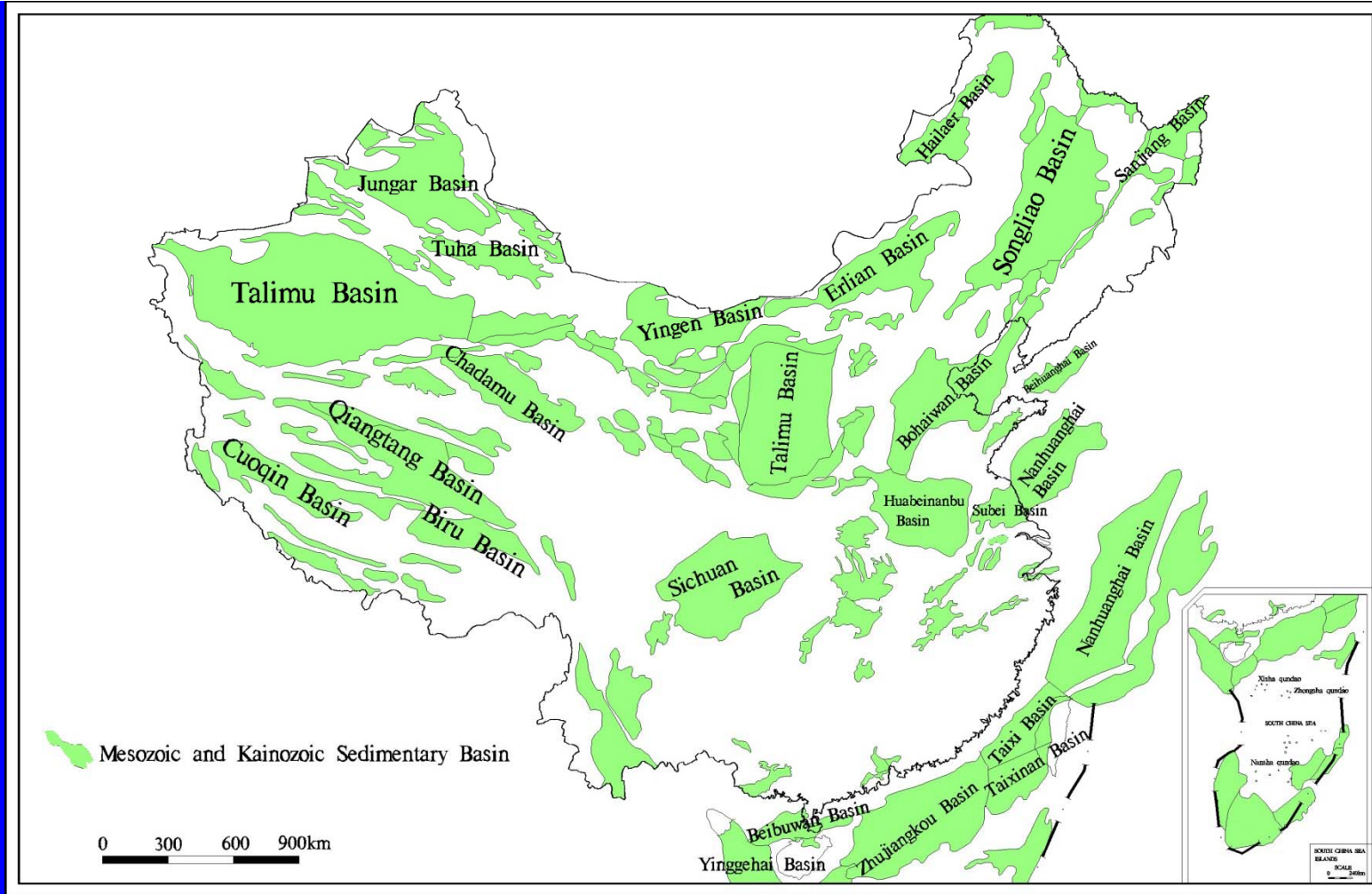


说明

- 地图投影基础:
兰伯特 (LAMBERT) 等角圆锥,
中央经线位于东经105度, 双标准纬线
为北纬25度、47度。
- 彩色合成方式:
中国风云卫星一号 (FY-1C) 遥
感数据CH₁ 0.58-0.68 (红)、CH₂
0.84-0.89 (绿)、CH₃ 0.48-0.53
(蓝) 假彩色合成。
- 本图仅供内部使用。
- 制作时间: 2000年。

KM 100 0 100 200 300 400 500 KM

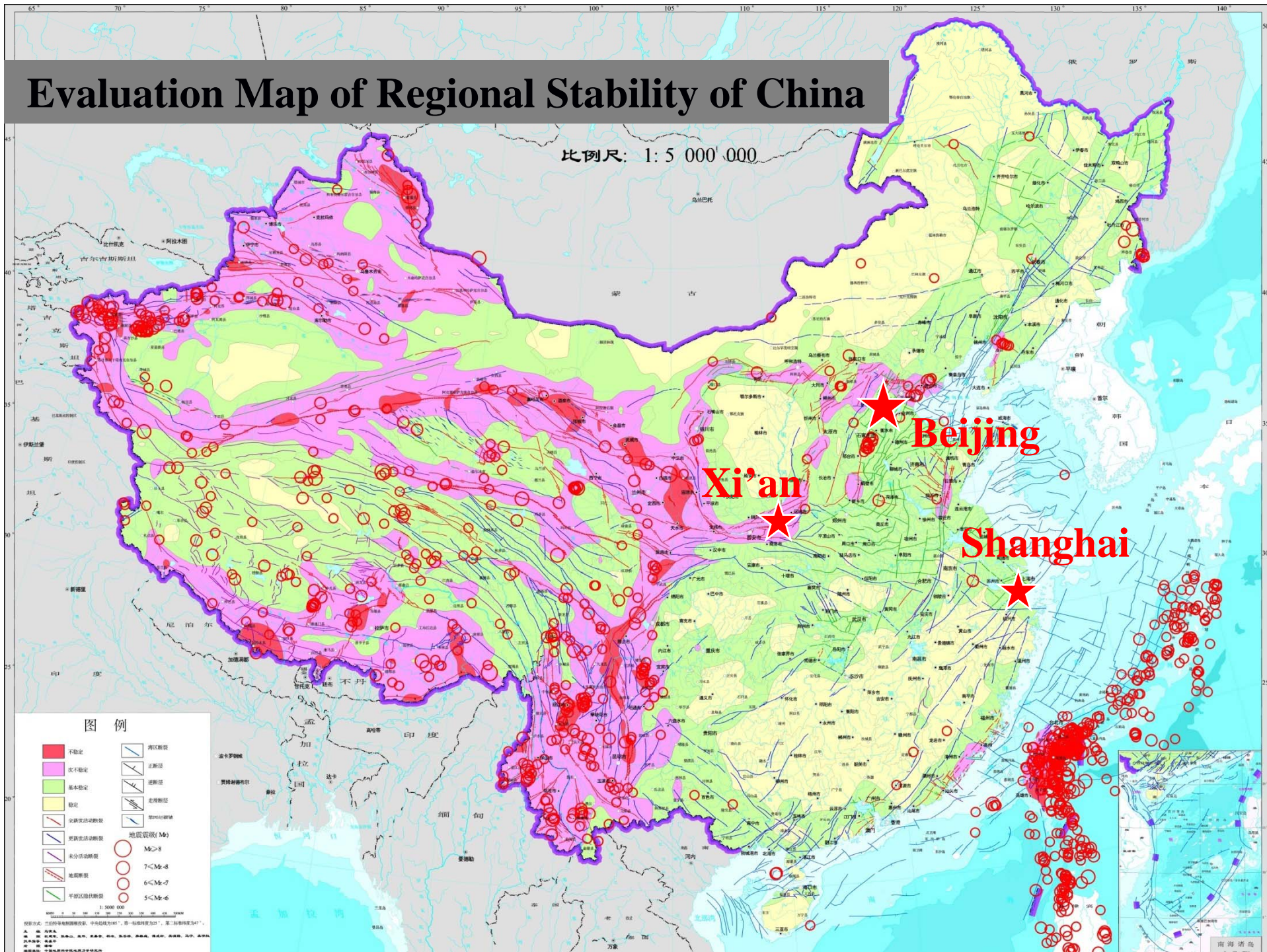
南海略图



In China, There are totally more than 417 Basins with more than 200km²; the 417 basins cover more than 5.7million km², including 27 offshore basins; 50 basins are hopeful for CO₂ Storage.

Evaluation Map of Regional Stability of China

比例尺: 1:5 000 000



图例

- | | |
|--|--|
| 不稳定 | |
| 次不稳定 | |
| 基本稳定 | |
| 稳定 | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
- 地震震级 (M)
- M₀ > 8
 - 7 < M₀ < 8
 - 6 < M₀ < 7
 - 5 < M₀ < 6

比例尺: 1:5 000 000
 投影方式: 中国标准地图院编制的国家大地坐标系2000, 第一高斯投影带23°, 第二高斯投影带34°。
 编 者: 高德
 编 绘: 高德
 审 核: 高德
 出版: 高德
 中国标准地图院编制的国家大地坐标系2000

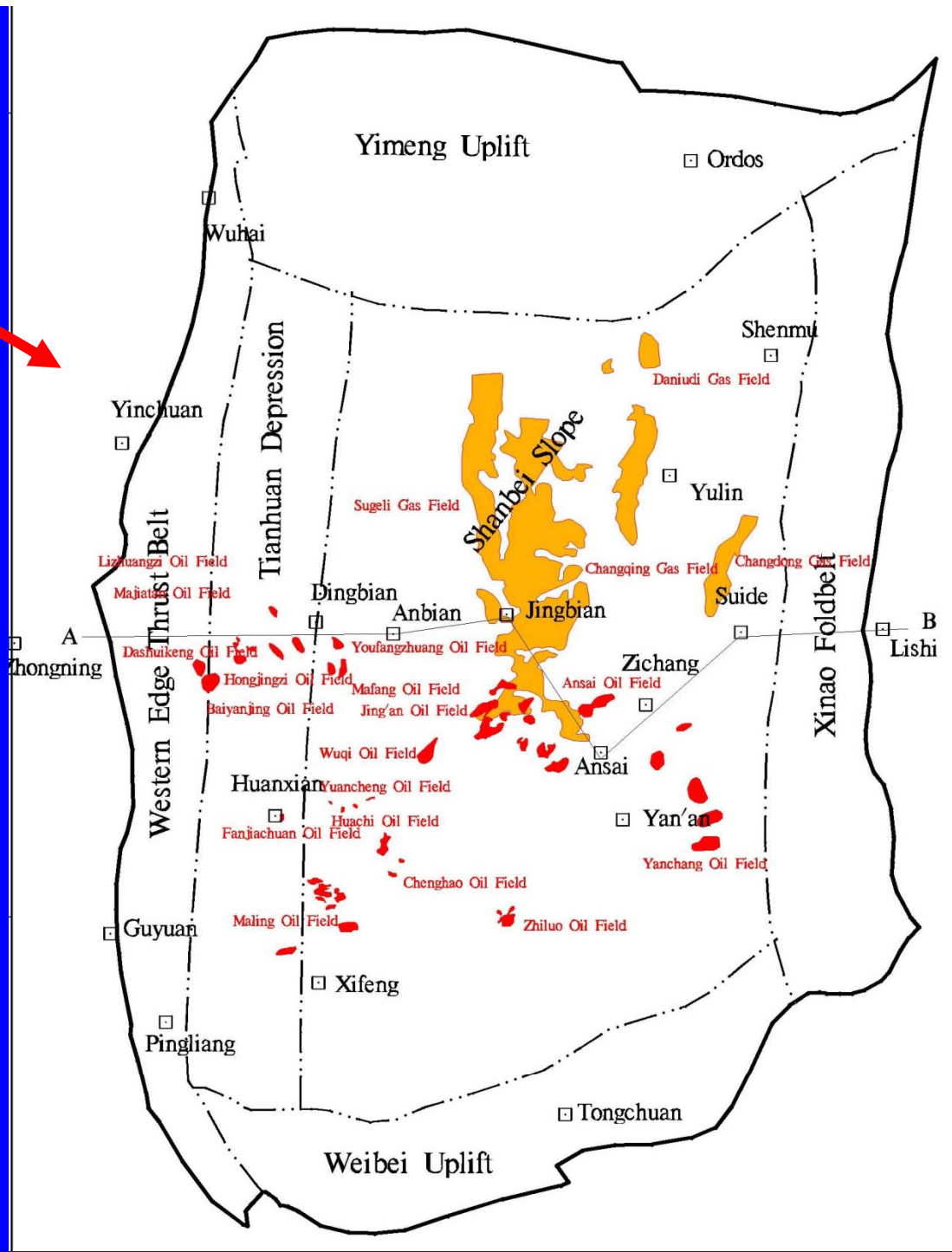
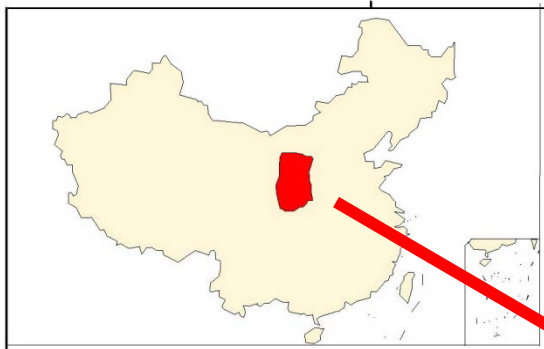
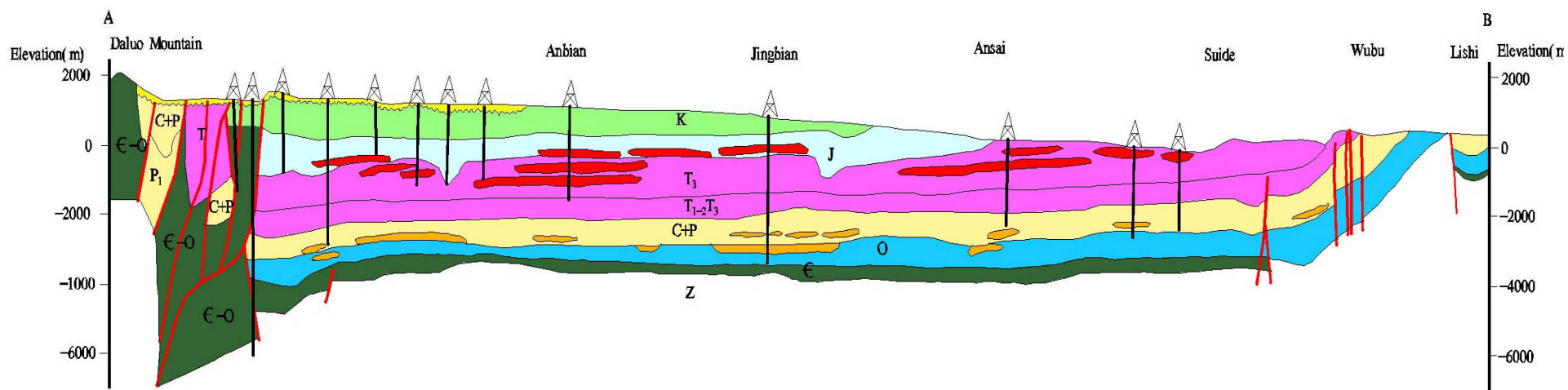
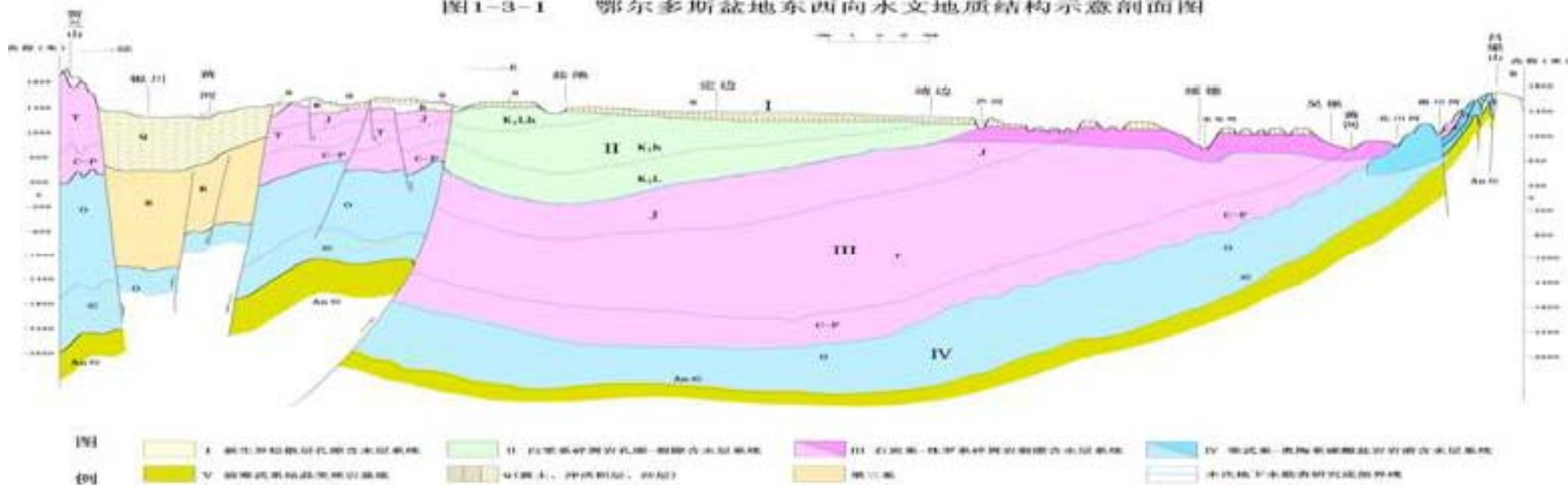
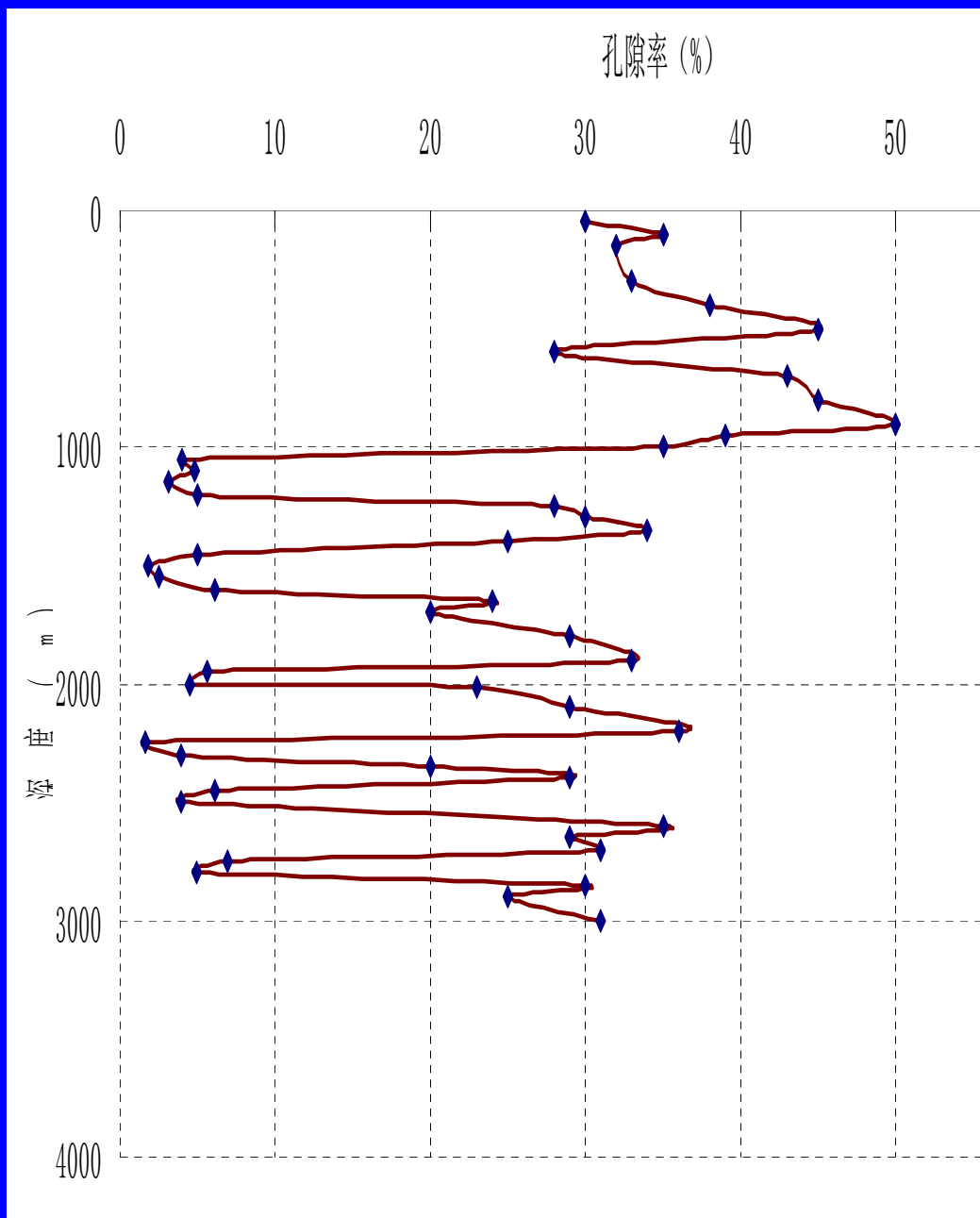


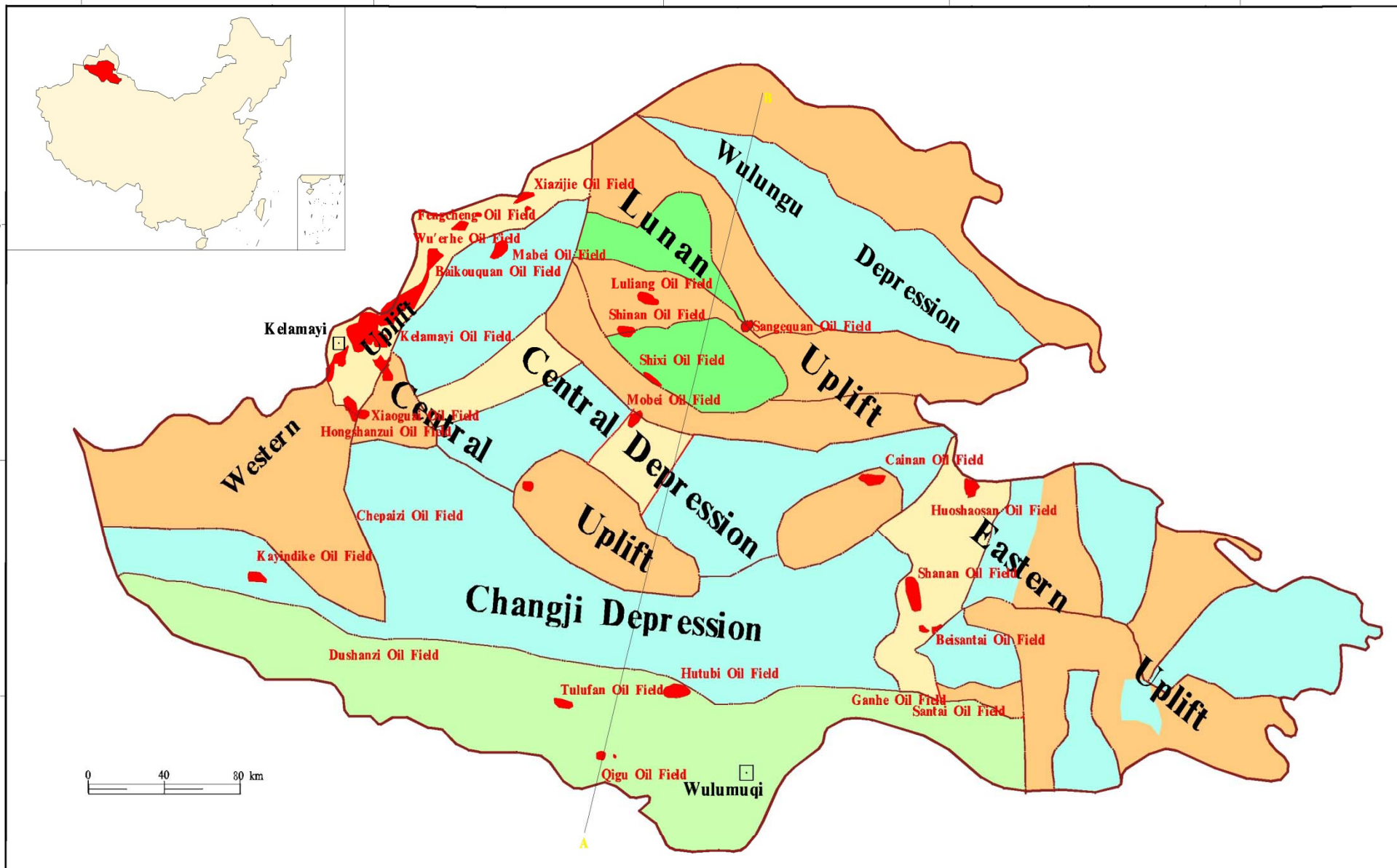
图1-3-1 鄂尔多斯盆地东西向水文地质结构示意剖面图





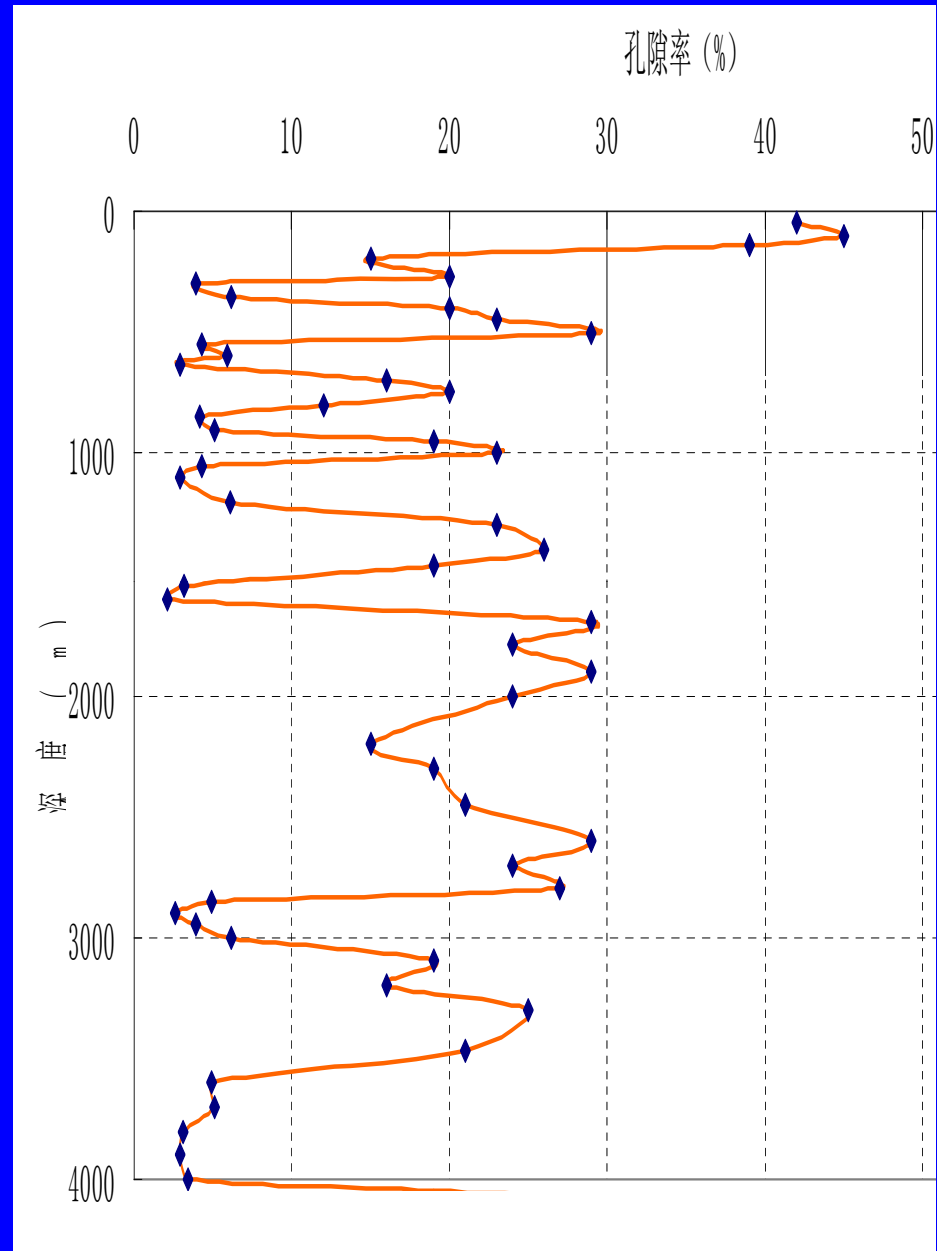
Curve between porosity and depth in Ordos Basin

System	Group	Age (Ma)	Profile
Quaternary			
Tertiary		1.61	
		65	
Cretaceous	Zhidan		
		135	
Jurassic	Fenfanghe		
	Anding		
	Zhiluo		
	Yan'an		
	Fuxian		
		200	
Trias	Yan'an		
	Zhifang		
	Heshanggou		
	Liujiagou		
		215	
		241	
Permian	Shiqianfeng		
	Shangshihezi		
	Xiashihezi		
	Shanxi		
		250	
		260	
Carbonic	Taiyuan—Beixi		
	Jingyuan		
		290	
Ordovician	Pingliang—Fengfeng		
	Majagou		
	Liangjashan		
	Yeli		
		300	
		310	
Cambrian	Upper		
	Middle		
	Lower		
		323	
		326	
Sinian	Luoquan		
		570	
		699	

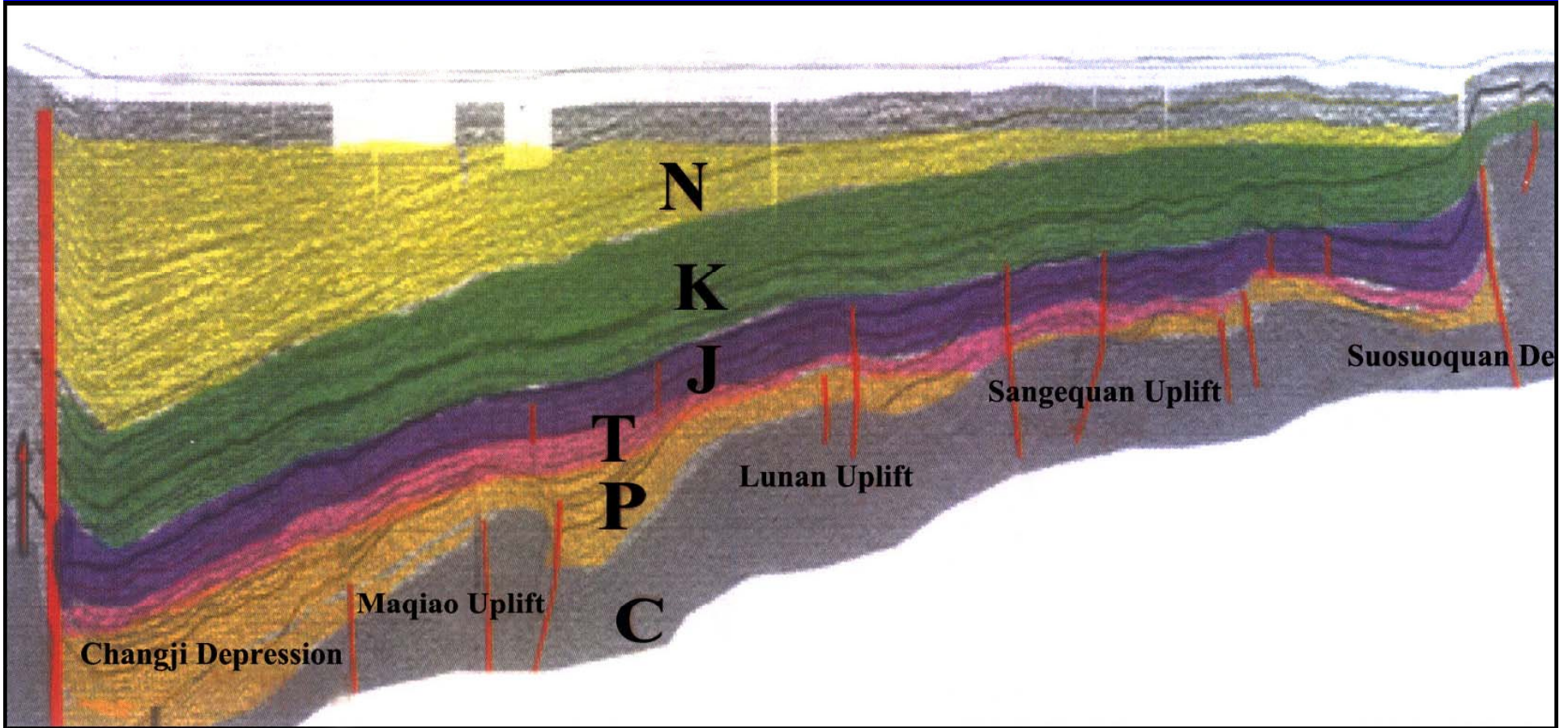


Location map of Zunggar Basin

地层	层底深度	厚度	柱状图	岩性
N	136	136		泥岩
K	268.6	132.6		砂岩
J	350	81.4		泥岩
	500	150		砂砾岩
	632.6	132.6		泥岩
	800	167.4		砂岩
	900	100		泥岩
	1000	100		砂岩
	1200	200		泥岩
	1465.6	265.6		砂岩
T	1600	134.4		泥岩
	1785.6	185.6		砂岩
	2435.6	650		砂砾岩
P	2800	364.4		砂砾岩
	3000	200		泥岩
	3473.6	473.6		砂砾岩
	4000	526.4		泥岩
	4200	200		砂岩
	4352.4	152.4		泥岩



Curve between porosity and depth in Zungar Basin

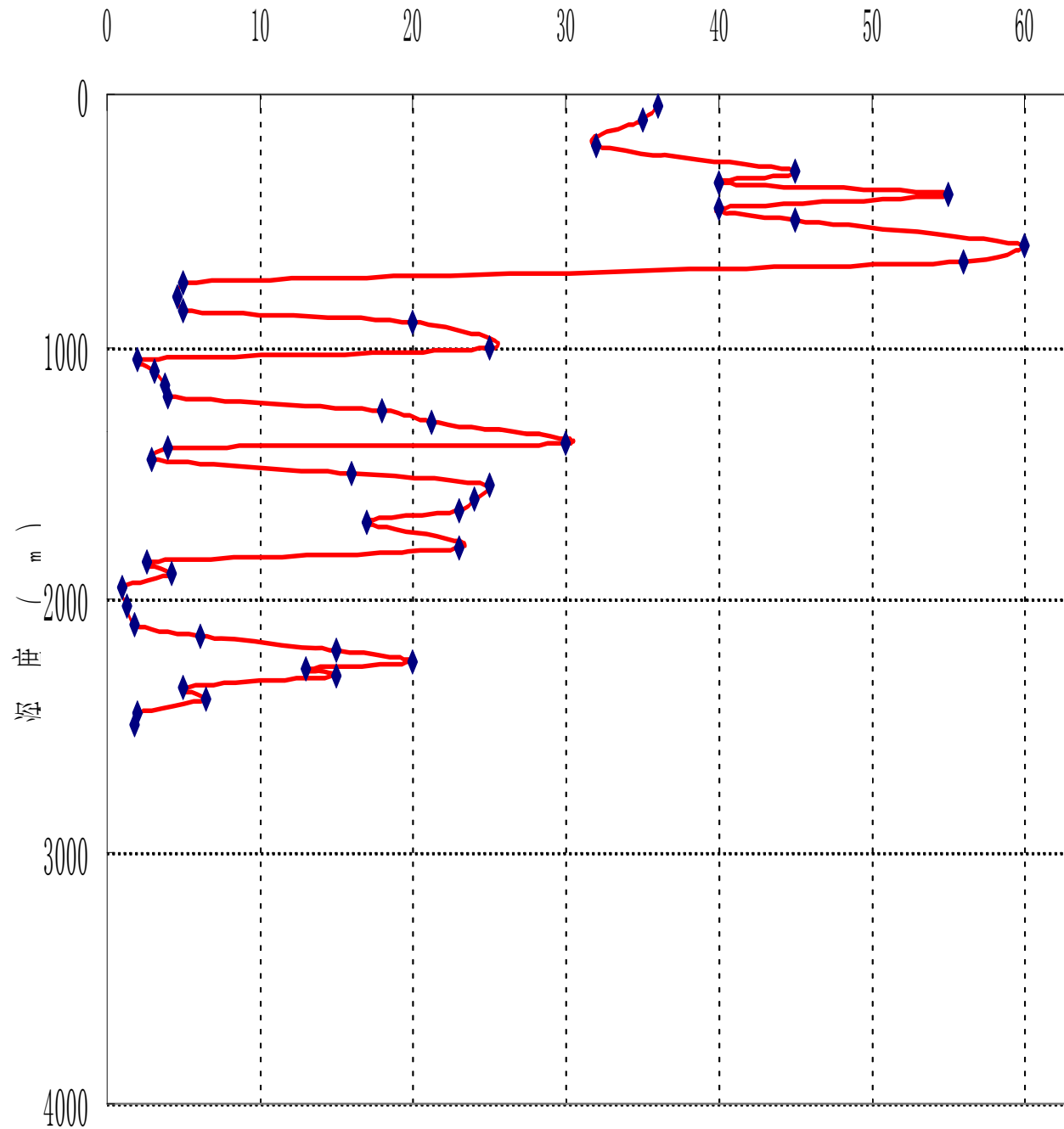


Seismic profiles from South to North

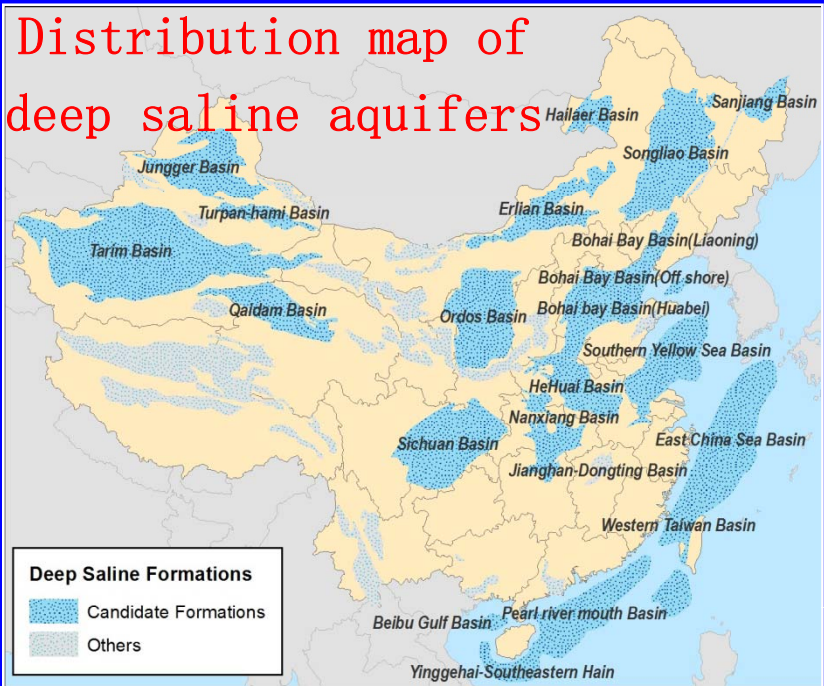


地层代号	层底深度(m)	厚度(m)	岩性柱状图	岩性
Q	660.0	660.0		砂
				粘土
				砂
R	1795.5	1135.5		泥岩
				砾砂岩
				泥岩
				砾砂岩
				泥岩
				砂岩
				角砾岩
				角砾岩
O	2178.0	382.5		灰岩
				白云岩
€	2384.0	206.0		白云岩
	2500.0	116.0		白云质灰岩

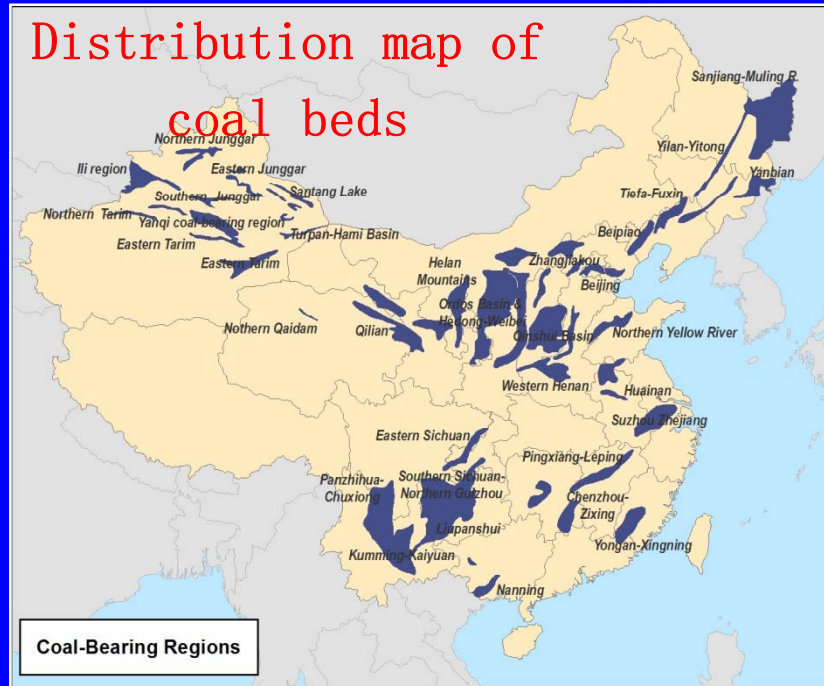
孔隙率 (%)



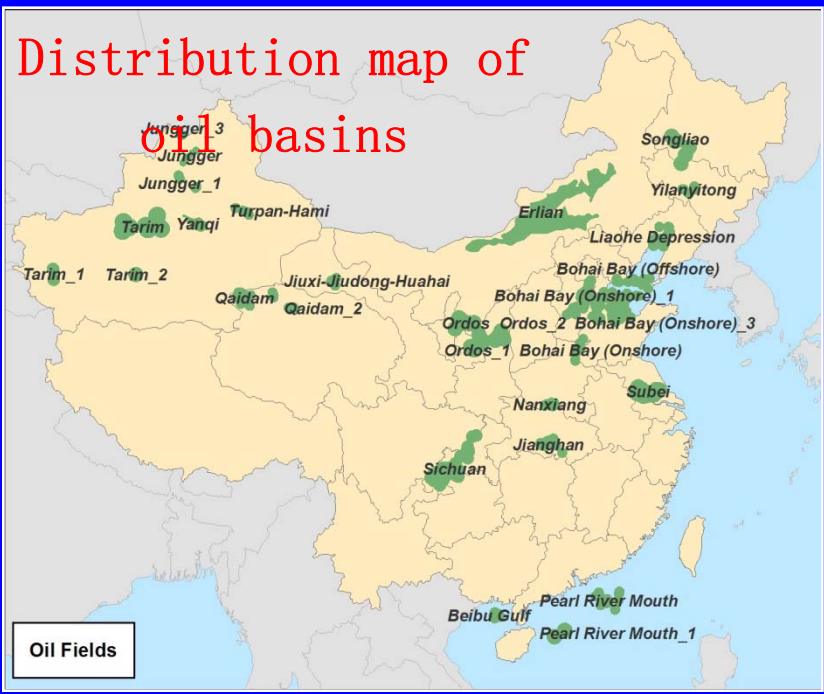
Distribution map of deep saline aquifers



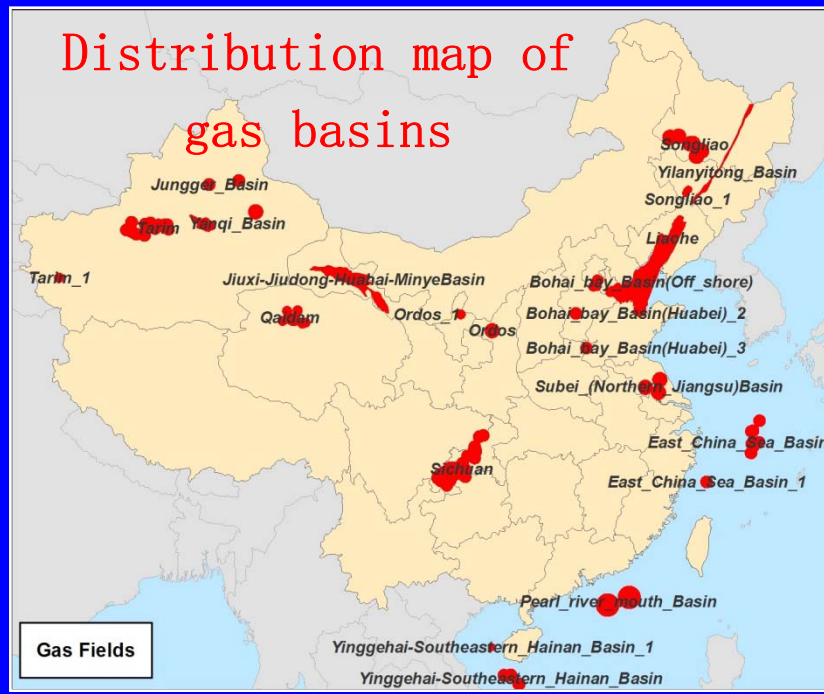
Distribution map of coal beds

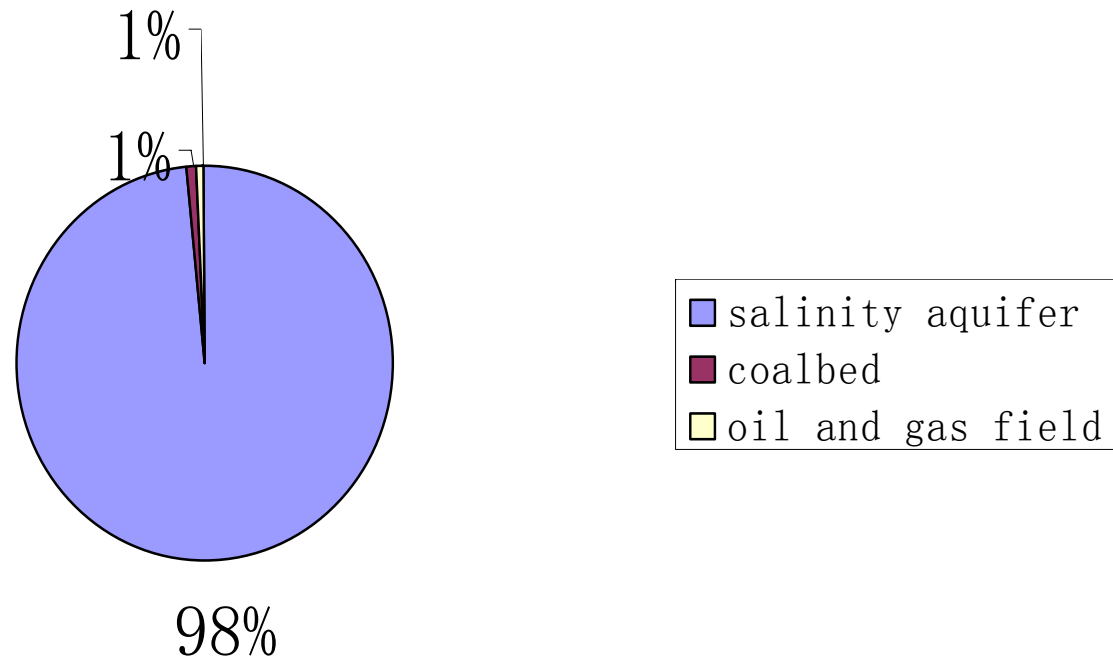


Distribution map of oil basins



Distribution map of gas basins





Totally CO₂ storage capacity of three types in China: 1455 billion tons.

- Deep Saline Formations (24 Basins): 1435 billion tons.
- Coal Bearing region (68 coal areas): 12 billion tons.
- Oil and gas fields (46 basins): 8 billion tons.



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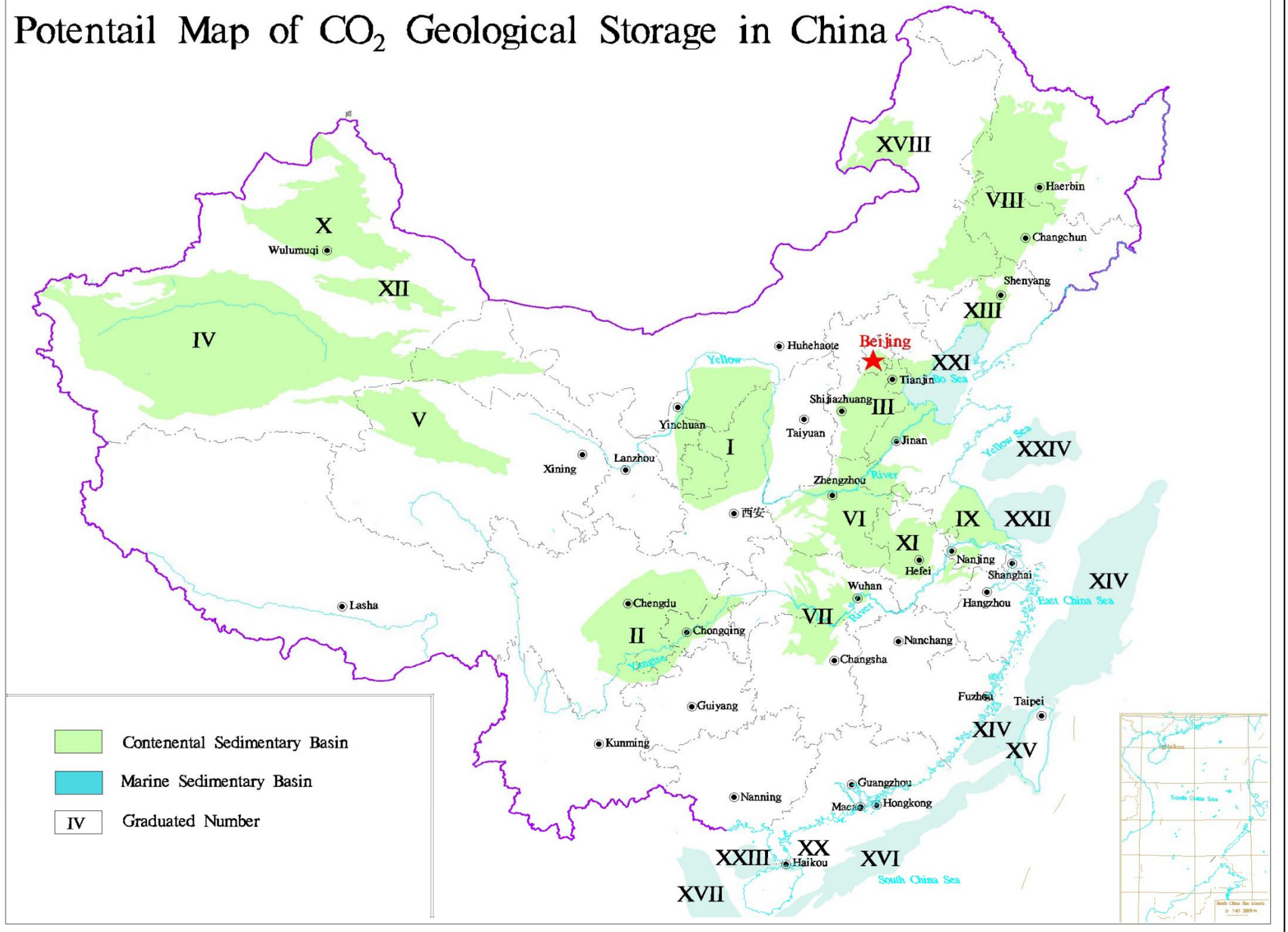
3. Suitable assessment of basins

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The suitable basins for CO₂ geological storage

Basin	Area* (10 ⁴ km ²)	Maximum Thickness(m)	Stability**	Storage Capacity(Gt)
Tarim	59.19	>14000	r	2793.37
North China plain	18.58	>6000	r	810.26
Ordos	20.35	>4000	s	760.01
Songliao	27.11	>6000	s	449.71
Pearl River Mouth	8.30	>10000	r	2372.78
East China Sea	27.13	>10000	r	1849.59
Sichuan	18.49	>9000	r	649.96
Qaidam	10.23	>17000	r	1097.40
Zunggar	15.64	>16000	r	475.97

Potentail Map of CO₂ Geological Storage in China





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- 1. Data Share and multi-department cooperation**
- 2. Capacity building for CO₂ geological storage in China**
- 3. Key techniques research**
- 4. International cooperation**



**Thank you for
your attention!**