PSUplift History of the Bogda Range retrieved from the Foredeep Sequences, Northwestern China*

Wei Dongtao¹, Zhao Yingcheng², Wei Pingsheng², Pan Jianguo², Wang Yanjun², Liu Zhenhau², Huang Linjun², Zho Junfeng², Wang Shengil³, and Jia Dong³

Search and Discovery Article #50364 (2010) Posted December 17, 2010

Abstract

The Bogda Range is the highest mountains of the eastern segment of the Tianshan, extending east-west more than 2000 km in central Asia, which is a Paleozoic orogen and reactivated later. Based on seismic data carried out for hydrocarbon exploration of the foredeep to the north the Bogda Range, we divided the foredeep sequences into three wedged units separated by two obvious unconformities, which indicate evidently three uplift events of the Bogda Range since Late Paleozoic. The upper unit is composed of the Miocene Dushanzi and Quaternary Xiyu Formations. The lower part of the Dushanzi Formation is light yellow coarse sandstone and the upper part is light yellow conglomerate coarsening upward intercalated with sandstone layers. The Quaternary Xiyu Formation is dischronous, gray or dark gray conglomerates. The middle unit comprises the Jurassic Toutunhe, Qigu and Kalazha Formations. The Toutunhe and Qigu Formations are fluvial coarse clastic sandstone intercalated with mudstone. The Kalazha Formation and the base of the Cretaceous are red, brown, unsorted, sub-rounded conglomerate and gritstone. The lower unit consists of the Upper Carboniferous and Lower Permian, which are composed of a series of sequences from marine flysch to terrestrial molasse. The upper rock unit is the result of compressional uplift of the Tianshan since the Oligocene and contributed to the collision between India and Asia. The middle was maybe induced by collage of the Qiangtang terrain with Asia in Jurassic and/or closure of the Mongolia-Okhotsk Ocean. In the Tiansha, compressional structures formed during the Jurassic exist. The lower is ascribed to the closure of the Tanshan Ocean and collision orogeny in the late Paleozoic.

^{*}Adapted from poster presentation at AAPG International Conference and Exhibition, Calgary, Alberta, Canada, September 12-15, 2010

¹Research Institute of Petroleum Exploration & Development – Northwest (NWGI). PetroChina, Lanzhov, China (weidt6611@sina.com)

²Research Institute of Petroleum Exploration & Development – Northwest (NWGI). PetroChina, Lanzhov, China

³Department of Earth Sciences, Nanjing University, Nanjing, China



Uplift history of the Bogda range retrieved from the foredeep sequences, northwestern China



Wei Dongtao1, Zhao Yingcheng1,Wei Pingsheng1,Pan Jianguo1, Wang Yanjun1, Liu Zhenhua1,Huang Linjun1, Zhou Junfeng1 Wang Shengli2, Jia Dong2 (1. Research Institute of Petroleum Exploration & Development –Northwest (NWGI), PetroChina, Lanzhou, China 2. Department of Earth sciences, Nanjing University, Nanjing, China)

The Bogda range is the highest mountain of the eastern segment of the Tianshan, extending east—west more than 2000 km in central Asia, which is the Paleozoic orogen and reactivated in the late Cenozoic due to the India indentation into Eurasia.

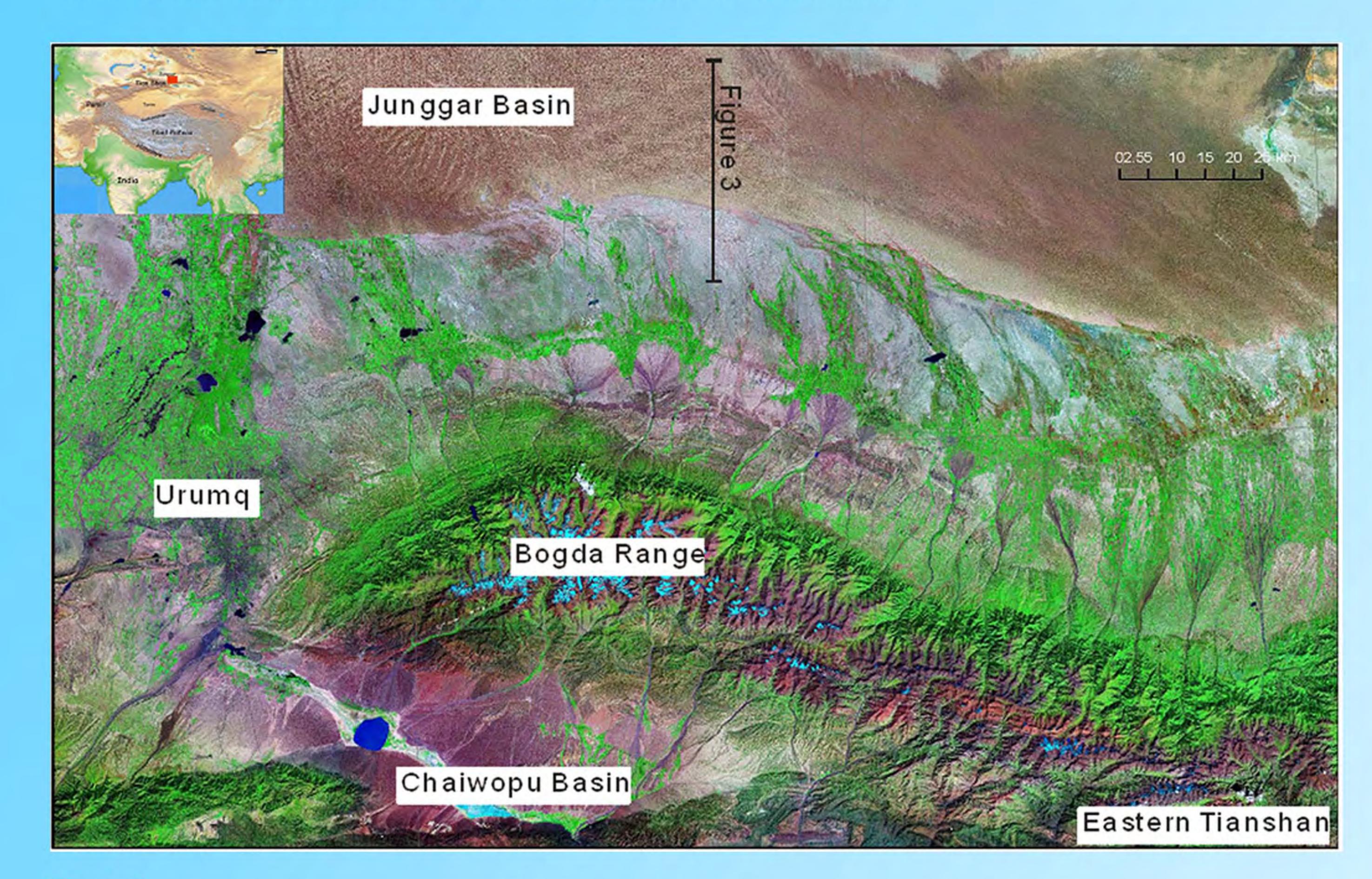


Figure 1
Location of the Bogda range. The index map shows locus of the Bogda range in the Cenozoic India–Eurasia collision system. the thick line is the location of the Figrue 3.

Lithology												M										man white
Depth (m)	1200-2400	1300-2000	250-300	150-500	150-400	0-800	680	-850	-970	170	300	-810		1000	312			90 -1102	890	1374	718	>3000
Formation	Xiyu F.	Dushanzi F.	Taxihe F. Shawan	F. Anjihai F.	Ziniqu -anzi F. Dona	-gon F.	Tugulu F.	Kalaz -ha F.	Qigu F.	Toutun -he F.	Xishan -yao F.	Sangon -ghe	Badao -wan F,	Xiaoquan gou F.	Upper Cangfan -ggou F.	Lower Cangfan -ggou F.	Hongya -nchi F.	Lucao -gou F.	Jingzi -gou F.	Wulabo F.	Xiajijicao G.	
System	Quaternary Tertiary			(Cre	eatceous		Ju	rassic		Triass	sic				P	ermian	Carboniferous				

Figuire 2

Strata column of the foredeep to the northern piedmont of the Bogda range, based on well data. Three highlighted strata on this strata column present three wedge sequences shown in the seismic profile of Figure 3.

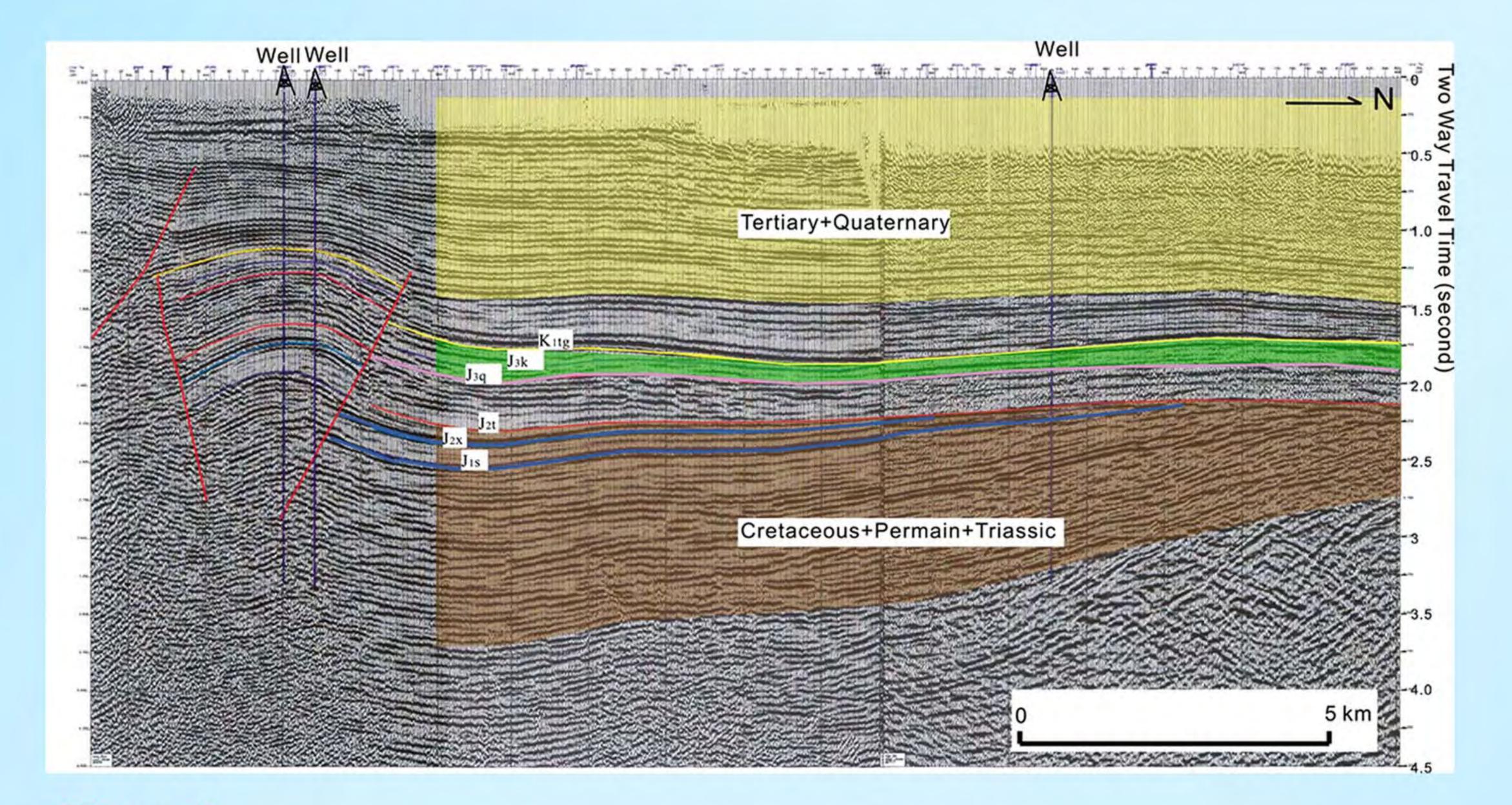


Figure 3
Cross section through foredeep of the Bogda range. For location see Figure 2.
Three wedge sequence units are exhibited, divided by two unconformities.

Based on seismic data carried out for hydrocarbon exploration of the foredeep to north the Bogda range, we divided the foredeep sequences into three wedged units separated by two obvious unconformities, which suggest evidently three uplift events of the Bogda range since the Late Paleozoic.

The first unit is composed of the Miocene-Pliocene Dushanzi and Quaternary Xiyu Formations. The lower part of the Dushanzi Formation is light yellow coarse sandstone and the upper part is light yellow conglomerate coarsening upward intercalated with sandstone layers. The Quaternary Xiyu Formation is dischronous, gray or dark gray conglomerates.

The second unit comprises the Jurassic Toutunhe, Qigu and Kalazha Formations. The Toutunhe and Qigu Formations are fluvial coarse clastic sandstone intercalated with mudstone. The Kalazha Formation and the base of the Cretaceous are red, brown, unsorted, sub-rounded conglomerate and gritstone.

The third unit consists of the Upper Carboniferous and Lower Permian, which are composed of a series of sequences from marine flysch to terrestrial molasse.

The first unit is the result of uplift of the Tianshan since Oligocene, contributed to the collision between India and Asia. The middle wedge unit was maybe induced by collage of the Qiangtang terrain with Asia and/or closure of the Mongolia-Okhotsk Ocean in Jurassic. In the Tianshan, the Jurassic contractional structures exist largely. The third wedge sequence is ascribed to the closure of the Tanshan Ocean and collisional orogeny in the Late Paleozoic.

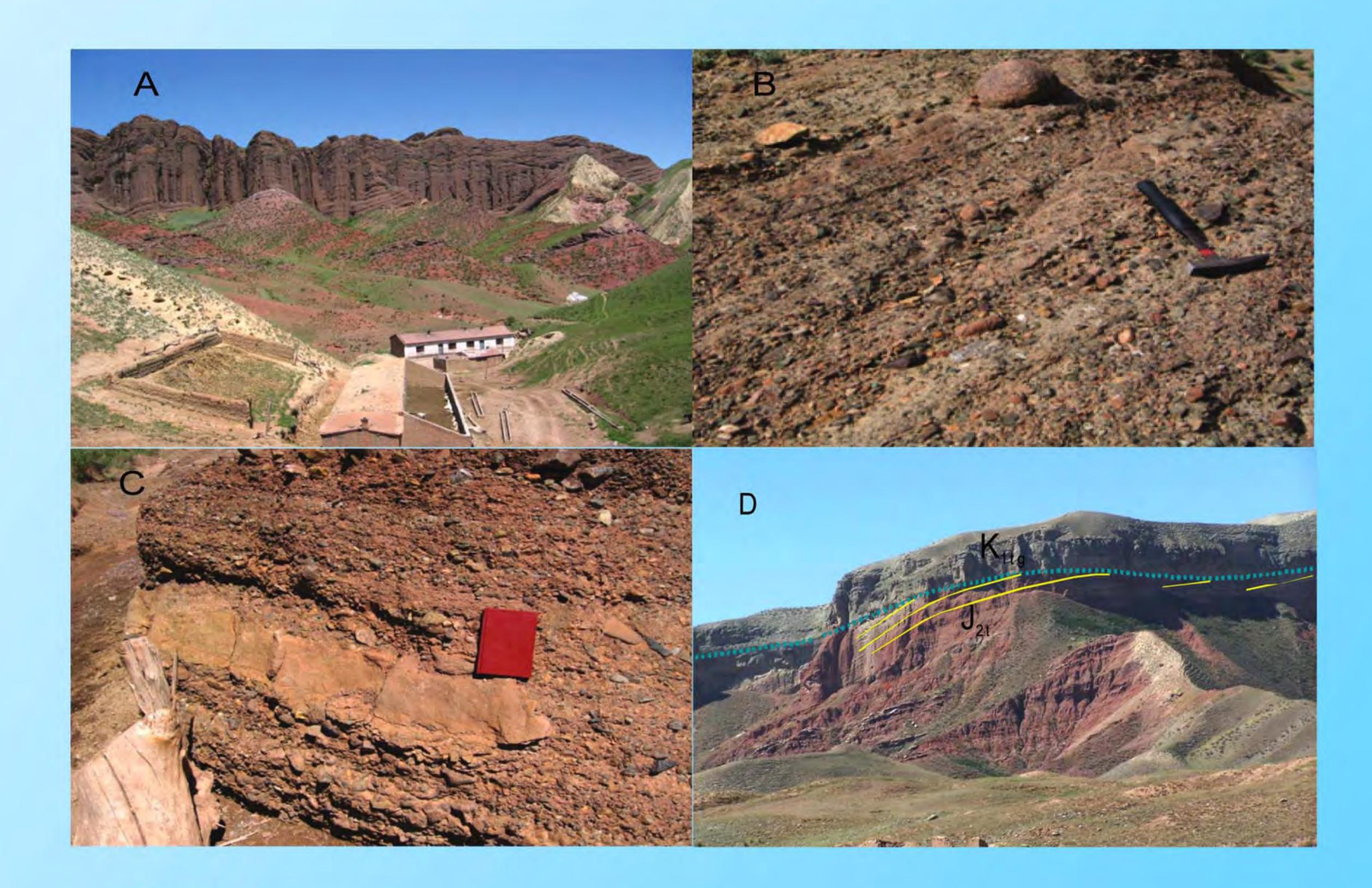


Figure 4
The unconformity between the Tugulu Group (K1tg) and the Toutunhe
Formations (J2t). A, Long range view of the Kalaza Formation (J3k). B,
the Cretaceous base conglomerate. C, the Late Jurassic conglomerate.
D, Long range view of the unconformity between the Tugulu group (K1tg)
and the Toutunhe Formation (J2t)