Uplift 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 Shengli³, and Jia Dong³

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

*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, Lanzhou, China (weidt6611@sina.com)
²Research Institute of Petroleum Exploration & Development – Northwest (NWGI). PetroChina, Lanzhou, China
³Department of Earth Sciences, Nanjing University, Nanjing, China

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.

Copyright © AAPG. Serial rights given by author. For all other rights contact author directly.
The Bogda range is the highest mountain of the eastern segment of the Tian Shan, 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 indention into Eurasia.

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 wedge 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 Xiyou 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 Xiyou Formation is dischronous, gray or dark gray conglomerates.

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

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 Tianshan Ocean and collisional orogeny in the Late Paleozoic.

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