



Partition of the Cenozoic deformation along the Hotan-Mazatagh transect, the Western Kunlun thrusts belt: implications for deformation propagation from the NW Tibetan Plateau into the interior of Tarim Basin

Yuqing Zhang (1,2), Xiubin Lin (1,2), Xiaogan Cheng (1,2), Hanlin Chen (1,2), Rong Yang (1,2)

(1) Zhejiang University, School of Earth Sciences, Hangzhou, China (yqzhangzj@126.com), (2) Research Center for Structures in Oil- and Gas-bearing Basins, Ministry of Education, Hangzhou 310027, China (linxiubin1984@163.com)

The Western Kunlun ranges and its foreland basin, the Tarim Basin, define the northwest margin of the Tibetan Plateau, and provide important information on the Cenozoic expansion of the plateau after the India-Asia collision. In this study, we present a high-resolution seismic reflection profile along the Hotan-Mazatagh transect of the Western Kunlun thrusts belt in order to decipher the distribution of deformation and its propagation. Deformation in this transect can be separated into three roughly east-west striking structures from the south to the north: the Hotan anticline, the Manan anticline, and the Mazatagh thrust belt. The Hotan anticline is a fault-bend fold, mainly formed by the hanging wall sliding from the lower decollement along the lower Cambrian units over a pre-existing fault ramp into the upper decollement that is located at the base of the Cenozoic strata. The Manan anticline, located ~100 km north to the Hotan anticline, is a reactivated low-amplitude fold with decreasing deformation upwards, the formation of which is mainly controlled by the lower decollement. The Mazatagh thrust belt, located ~230 km north to the Hotan anticline, is controlled by both the upper decollement and the lower decollement with the former ramping to the surface and the latter building the Mazatagh anticline. The balanced cross-section reveals a total deformation of ~28.93 km along this transect, with most deformation (~25.0 km) transmitted by the upper decollement among which at least 7.7 km of shortening has been accommodated by the layer parallel compaction. The rest of shortening has been absorbed by the Manan anticline (0.17 km) and the Mazatagh anticline (~3.7 km), respectively, transmitted along the lower decollement. Our study highlights the effects of decollement layer on transmitting deformation from the orogen into the intracontinental region, the pre-existing structures on localizing distribution, and the penetrative strain on accommodating relatively homogeneous shortening.