

Quaternary active folding in the Tian Shan, China

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The Tian Shan, east-west trending more than 2000 km, is one of most active intracontinental mountain building belts resulted from India-Eurasia collision during Cenozoic. In this study, Quaternary folding related to intracontinental mountain building of the Tian Shan orogenic belt is documented based on geologic interpretation and analyses of the satellite remote sensing images (Landsat TM/ETM, SPOT HRV and IRS Pan) combined with field geologic and geomorphic observations and seismic reflection profiles. Analyses show that Quaternary deformation is mainly characterized by folding and thrusting. Spatial-temporal features of Quaternary folds indicate that the early Quaternary folds are widely distributed in both piedmont and intermontane basins of the Tian Shan, whereas late Quaternary active folds are mainly concentrated on the northern and southern range-fronts. Quaternary deformation appears to migrate toward both the northern and southern margins of the Tian Shan. The formation and migration of Quaternary folding are likely related to decollement surfaces beneath the fold-and-fault zone as revealed by seismic reflection profiles. Finally, tectonic evolution model of the Quaternary folding in the Tian Shan is presented. This model shows that the Quaternary folding and faulting gradually migrate toward both the northern and southern piedmonts due to the continuous compression related to India-Eurasia collision during Quaternary time.