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Evolution of fold-thrust belts and Cenozoic uplifting of the South Tianshan

Mountain range in the Kuqa region, Northwest China

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Abstract: The evolution of the Kuqa fold-thrust belt is accompanied with the Cenozoic uplifting of South Tianshan Mountain range. The critical Coulomb wedge theory can be well applied to the structural evolution of the Kuqa fold-thrust belt where the décollement structures are well developed. Following the initial hypotheses of this theory, with the base of the taper wedge (not the sea level) as the reference level, we propose a geometric relationship between the evolution of fold-thrust belt and tectonic uplifting of orogen, and deduce a calculation formula between orogen tectonic uplifting amount (very different from the topographic uplifting) (∂H), fold-thrust belt extending distance (∂S) and crustal shortening amount (∂L):

$$\partial H = (\partial S - \partial L) \cdot \tan(\alpha + \partial\alpha) + [\tan(\alpha + \partial\alpha) / \tan\alpha - 1] \cdot H_0.$$

In this paper we select two representative seismic profiles across the Kuqa fold-thrust belt to reconstruct the

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