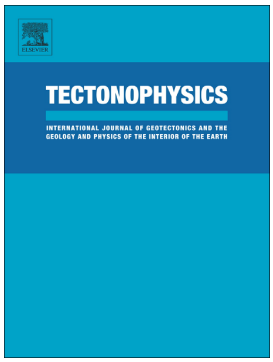

Effect of basement structure and salt tectonics on deformation styles along strike: An example from the Kuqa fold–thrust belt, West China

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Effect of Basement Structure and Salt Tectonics on Deformation Styles Along Strike: An Example from the Kuqa Fold–Thrust Belt, West China

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Abstract: The Kuqa fold–thrust belt (KFTB) has a complex thrust-system geometry and comprises basement-involved thrusts, décollement thrusts, triangle zones, strike-slip faults, transpressional faults, and pop-up structures. These structures, combined with the effects of Paleogene salt tectonics and Paleozoic basement uplift form a complex structural zone trending E–W. Interpretation and comprehensive analysis of recent high-quality seismic data, field observations, boreholes, and gravity data covering the KFTB has been performed to understand the characteristics and mechanisms of the deformation styles along strike. Regional sections, fold–thrust system maps of the surface and the sub-salt layer, salt and basement structure distribution maps have been created, and a comprehensive analysis of thrust systems performed. The results indicate that the thrust-fold system in Paleogene salt range can be divided into five segments from east to west: the Kela-3, Keshen, Dabei, Bozi, and Awate segments. In the easternmost and westernmost parts of the Paleogene salt range, strike-slip faulting and basement-involved thrusting are the dominant deformation styles, as basement uplift and the limits of the Cenozoic evaporite deposit are the main controls on deformation. Salt-core detachment fold–thrust systems coincide with areas of salt tectonics, and pop-up, imbricate, and duplex structures are associated with the main thrust faults in the sub-salt layer. Distribution maps of thrust systems, basement structures, and salt tectonics show that Paleozoic basement uplift controlled the Paleozoic foreland basin morphology and the distribution of Cenozoic salt in the KFTB, and thus had a strong influence on the segmented structural deformation and evolution of the fold–thrust belt. Three types of transfer zone are identified, based on the characteristics of the salt layer and basement uplift, and the effects of these