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GEODYNAMICS OF THE KAZAKHSTAN OROCLINE, CENTRAL ASIA

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Curved mountain belts, commonly referred as to oroclines that result from bending of quasi-linear orogenic belts, have fascinated generations of geologists. Such structures are widely recognized in modern and ancient orogens, and are fundamentally important for understanding geodynamics of convergent plate boundaries. However, how and why orogenic belts become bent has been in debate. Here we investigate the Kazakhstan Orocline in the Central Asian Orogenic Belt with an aim at understanding the geodynamics of oroclinal bending in accretionary orogens. The Kazakhstan orocline is defined by a series of U-shaped arc systems, and paleomagnetic studies have shown that the arc systems were quasi-linear prior to the Late Devonian. The formation of the curved arc systems was previously attributed to bucking of originally linear orogenic belts in response to the convergence of the Siberian and Tarim cratons. Such a model, however, is not supported by geological observations that show a latest Carboniferous collision of the Siberian Craton with the northern limb of the Kazakhstan Orocline, which was post to the major phase of oroclinal bending in the Late Devonian to Early Carboniferous as constrained by paleomagnetic data. Alternatively, we suggest that major phase of oroclinal bending was likely due to along-strike variation in the rate of rollback of the subducted Junggar oceanic plate, which was further tightened during the Late Carboniferous to Permian amalgama-

tion of Siberian, Tarim and Baltic cratons. This new geodynamic model explains the occurrence of rift basins, the spatial migration of magmatic arc, and the development of large-scale strike-slip fault systems during oroclinal bending.

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