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Post Late Cretaceous faulting and crustal stress field in Southeastern Mongolia

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The objectives of our study include assessment of the post Late Cretaceous faulting and state of crustal paleostresses in the East Gobi and South Gobi basins, identification of stages and mechanisms that activate the structures of different strikes, and discussion of the tectonic sources. The analysis of the available data suggests a common history of the study area in the Late Jurassic – Early Cretaceous (rifting) and Late Cretaceous – Paleogene (subplatform regime). In the Cenozoic, the depression experienced activation of a completely different style. In addition to active left-lateral strike-slip displacements in the Tertiary, thrusting took place in the East Gobi basin along the northeastern faults on the northern slope of the Totoshan uplift. In the Early Cenozoic, the NW and submeridional compression was dominant as evidenced by the deformed Late Cretaceous sediments, fault control of the Early Cenozoic sedimentation, and reconstructed stress tensors typical of the compression and transpression regimes. The published regional data and our observations give grounds to conclude that deformation in the study area may be driven by (1) the Indo-Asian collision (the submeridional compression in the Oligocene – the beginning of Miocene,) and/or (2) the impact of the Western Pacific subduction zone (the NW compression at the beginning of the Paleocene and in the Middle Miocene). In the second half of the Cenozoic, this area was low active.

Activation of the South Gobi basin (in contrast to the East Gobi basin) began in the Late Cenozoic (Late Miocene – Early Pliocene). In this region, young uplifts and forbergs develop actively and represent the eastern termination of the Gobi Altai. The sublatitudinal and NW strike-slip faults and thrusts were active in the Pliocene–Quaternary stage and also in Holocene. Stress fields reconstructed in our study show compression, transpression and strike-slip faulting regimes with the NE-trending compression axis. Deformation in the study area (as well in the western and southwestern regions of Mongolia) is driven by the processes caused by Indo-Eurasian collision.

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