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Mesozoic Intracontinental Deformation and Reactivation of the Southern Central Asian Orogenic Belt

Continents are a mosaic of cratons, orogens and accreted terranes of various natures. They can either remain stabilized or become prone to reactivation or reworking. The Alxa region, at the southern margin of the Central Asian Orogenic Belt (CAOB), has undergone complex multistage Mesozoic deformation. Through structural mapping, paleostress inversion and low-temperature thermochronological techniques, six deformation phases were identified in the central Alxa, revealing a close correlation between intracontinental deformation and plate-margin interactions. A 240–200 Ma cooling event in the Alxa region, coinciding with regional exhumation, occurred within a large overlap zone formed by two synchronous sinistral shear systems traversing the CAOB. This suggests an intracontinental transpressional setting during the Middle–Late Triassic. The Triassic deformation was driven by the collision between the Yangtze and North China Cratons and the accretion of the Qiangtang Block to southern Eurasia continent. During the Jurassic to Cretaceous, the Alxa region experienced repeated episodes of extension and shortening reactivation. Paleostress data reveal Middle-Late Jurassic N–S synsedimentary shortening, Early Cretaceous syn-rifting extension and Late Cretaceous shortening. The Middle-Late Jurassic N–S shortening is related to the closure of the Mongol-Okhotsk Ocean and the collision of the Lhasa Block with southern Eurasia. Late Cretaceous NW–SE compression in the southern CAOB is ascribed to stress transmitted from the eastern margin of Eurasia. The multidirectional and multiphase intracontinental deformation in the southern CAOB was shaped by the combined effects of far-field effects, upper mantle modifications due to protracted subduction along the convergent plate margins and inherited structures.

Keywords: Central Asian Orogenic Belt, Intracontinental Deformation, Mesozoic, low-temperature thermochronological data

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