Geophysical and geological constraints for the crustal structures of the Mongolian Orocline and the adjacent sutures

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Résumé

Magnetic and gravity analyses combined with a synthesis of high-pressure metamorphic and arc-related magmatic rocks characterize the crustal structures of the Mongolian Orocline and its adjacent sutures. The spatial distribution and the orientation trend of the geophysical fabrics are specific to the defined tectonic zones. Furthermore, the magnetic and gravity signatures, associated with the deep-seated continuity of the lineaments at the crustal-scale of the Precambrian blocks and the Mongol-Okhotsk oceanic domain, unveil the 3D geometry of the Mongolian Orocline. Thus, its distinct U-shape is observable in lithospheric magnetic and gravity fields, implying the involvement of the entire crust and possibly the upper mantle in the Mongolian Orocline's bending processes. Moreover, the examination of adjacent sutures, using conventional geophysical and geological markers, tends towards the absence of sutures between Precambrian blocks, suggesting therefore a single curved ribbon composed of microcontinents around the Mongol-Okhotsk oceanic domain. In contrary to previous interpretations, the study proposes separate traces for the Mongol-West Sayan and Baikal-Sayan sutures and enhances the predominance of the northern northward-dipping Mongol-Okhotsk suture. Finally, geophysical and geological data from the Mongolian Collage are consistent with the occurrence of an oroclinal bending at the lithospheric-scale of an originally near-linear Precambrian continental ribbon during late Palaeozoic to Mesozoic.

Mots-Clés: Orocline, suture, potential field analysis, Metamorphic and magmatic constraints, geodynamics

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