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Tectonic evolution of the Transbaikal region (Siberia) from Late Jurassic to Present. Implications for the Mongol-Okhotsk orogeny.

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The Transbaikal region extends over several hundreds of kilometres east of the Baikal Rift System. It is characterized by a number of sub-parallel Mesozoic grabens or half grabens generally filled with late Jurassic to Early Cretaceous clastic sediments interbedded with coal layers (1). Similar basins occur on an even larger area spanning from the Transbaikal region down to Korea implying a large-scale extensional process affecting most of the Amuria plate during the Mesozoic. In the Transbaikal region, the normal faults controlling the edges of the Mesozoic basins are generally superimposed to Palaeozoic ductile shear zones implying a strong localisation of the extensional deformation on inherited structures. Recent studies, associated to our own fieldwork demonstrated that some of the faults were again activated (2), still as extensional faults, during the Tertiary or Quaternary, and that some of them are presently active.

The closure of the Mongol-Okhotsk ocean separating the Siberian plate from the Amurian block during the Mesozoic corresponds to a major event in the growth process of the East Asian continent. The oceanic suture zone is situated on the southern edge of the Transbaikal region and its roughly SW-NE direction is parallel to the basins (3). The timing of the closure of the Mongol-Okhotsk ocean is still highly debated: while sedimentological and tectonic data suggest that the oceanic closure and the following collision occurred in early Middle Jurassic (4), paleomagnetic studies advocate for a Early Cretaceous collision (5). Furthermore, several other questions remain on the localization, the size and the fate of the relief that most probably formed during the collision between the Amuria block and the Siberian craton.

In order to answer those questions we used low temperature thermochronology data associated to tectonic, sedimentology and palinology to investigate the evolution of the Transbaikal grabens from Mesozoic to Present. Tectonic and thermochronology data provide evidences of exhumation and erosion along the eastern edge of the Siberian craton during the Middle Jurassic as well as a potential continuum of deformation between the Mesozoic extension and the initiation of the Baikal Rift System (6). Sedimentology and palinology reveals that the sediments deposited in the Transbaikal basin did not registered large-scale compressive deformation during or after their Late Jurassic – Early Cretaceous deposition and that they do not correspond to the dismantling of a strong compressive relief.

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