



PROPAGATION OF THE PRIMORSKY FAULT IN THE CENTRAL PART OF LAKE BAIKAL AND THE EVOLUTION OF MALOE MORE

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The Primorsky Fault is one of the two major western boundary faults in the central part of Lake Baikal. According to the existing fault growth model (e.g. Agar and Klitgord, 1995), this fault has propagated gradually in a southward direction. During this propagation, the Primorsky Fault has cut through the footwall of the Ol'khon Fault, which is the other major boundary fault 35–40km to the south-east. This propagation has controlled the submergence of the Ol'khon Region which forms a large tilted block between both faults.

Based on the interpretation of high-resolution reflection seismic profiles of the submerged part of the Ol'khon Region (ie. Maloe More), different depocentres have been identified in the hanging-wall region of the Primorsky Fault. These depocentres correspond to small basins that are separated from each other by distinct basement ridges, with an orientation that strikes almost perpendicularly to the Primorsky Fault. The occurrence of the oldest sedimentary deposits (Unit A, Miocene age) in depocentres in the southern part of Maloe More, indicates that old sedimentary traps and lacustrine environments must have existed in the area. This finding contradicts the existing growth model for the Primorsky Fault, which assumes that only a recent (ca. 1Ma) and gradual propagation of the fault is responsible for the increasing subsidence in Maloe More. In the different sub-basins, younger sediments (Unit B, Upper Pliocene) overlie the deposits of Unit A. Nevertheless, the upper parts of Unit B are also present on the different basement ridges. The thickness of Unit B is on the northeastern ridges in Maloe More considerably greater than on those more to the south-west, indicating that they have been submerged for a longer time.

Careful investigation of a RESURS satellite image of the area has revealed a possible segmentation of the Primorsky Fault, with segment boundaries occurring at the location of the different basement ridges in Maloe More. We believe that the growth of the Primorsky Fault can therefore be described in two different stages. A first stage, during the deposition of Unit A, was characterised by the evolution of 5 different (isolated) segments that defined small basins in Maloe More. The observed basement ridges corresponded at that time to *intrabasin highs* that resulted from the displacement deficit between the different fault segments. Increasing extension led to the further growth of the segments, causing a final linkage between them. This linkage marks the onset of a second stage, which was achieved during the deposition of Unit B. Linkage between fault segments caused a displacement increase (mainly at the former location of the segment boundaries), resulting in the submergence of the basement ridge. Seen the thicker deposits of Unit B on the northeastern ridges in Maloe More, we believe that the segment linkage was first established between the northernmost fault segments of the Primorsky Fault. Subsequent linkages between other segments more to the south, and the associated post-linkage displacement increases, caused the further submergence of Maloe More towards the southwest in later stages.

References

Agar, S. M. and Klitgord, K. D. (1995). Rift flank segmentation, basin initiation and propagation: a neotectonic example from Lake Baikal. *Journal of the Geological Society of London*, 152:849–860.