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SCALED PHYSICAL MODELS OF CONTINENTAL RIFTING: APPLICATION TO THE BAIKAL RIFT ZONE

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Scaled physical models constructed with dry sand layers have proven to be a useful tool for the simulation of the structural patterns that are commonly observed in natural rift systems. With this study we have tried to simulate the evolution of the Baikal Rift Zone as to get better insight in the importance of some of the processes controlling its development. For this purpose, models have been constructed with different baseplate geometries. These models allowed us to observe the possible basement controls on the present-day fault structures in the Baikal Rift Zone.

Baseplates having similar shapes as the Siberian Craton caused in the models the development of the stepwise fault deflection that is characteristic for the western border fault system of Lake Baikal. During the initial evolution of the modelled faults, several relay zones were formed between isolated fault segments. Such relay zones are also common in the border fault system of Lake Baikal. In later stages of the modelling, further extension lead to the linkage between fault segments, causing the eventual disappearance of the different relay zones.

The development of the models was continuously monitored using digital photographs. Animating the sequence of these photographs allowed to carefully study the kinematic evolution of the experiments. After certain amounts of extension (usually 1 or 2cm) the different basins that had formed in the models were filled with syn-kinematic sand layers. Completed models have subsequently been impregnated and sectioned either vertically or horizontally in 1cm intervals. This technique reveals

the internal geometry of the formed fault structures. 3D reconstructions of the models have been produced by digitising certain reference levels on the different cross-sections. Such 3D images clearly illustrate the variations in fault displacements in the different parts of the models. Moreover, 3-dimensional representations of the experiments can easily be compared with the available digital terrain models of the Baikal Rift Zone, to test the validity of the modelling results.

In this study we have examined in detail the kinematic evolution and the growth of faults in different sandbox experiments, and we have compared our observations with structural interpretations that have already been made for the Baikal Rift Zone.