

REACTIVATION OF TERRANE SUTURE DURING LATERAL SPREADING – ANALOGUE EXPERIMENTS OF SVECOFENNIAN OROGENY

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Abstract

When an orogenic belt with high mountain ranges and thick lithosphere has reached a substantial thickness, the orogen grows laterally. This results in deformation and lateral extrusion of the accreted blocks. The deformation and lateral flow is driven by the differential horizontal pressure between the thick orogenic crust and thin hinterland. In accretionary belts, the merging terranes/blocks are surrounded by similar derivation and thus other continental blocks and lateral flow may not pass sutures/boundaries between individual blocks. Instead the material moves toward thinner areas in the orogenic front or to the sides, but the suture may have implication to the behavior of the flow.

We have used analogue centrifuge modeling to simulate lateral spreading of thickened crust comprising two rheologically different blocks: warm (P) and cold (A). The experiments were made with a large centrifuge in the Hans Ramberg Tectonic Laboratory at Uppsala University. The composition of the individual layer materials were chosen to reflect temperature effect on rheological properties of the different blocks. Both blocks had three layers representing upper brittle, middle ductile, and lower more viscous (than the middle layer) layers. The models were 3 cm thick replicas of 60 km thick crust mimicking a paleosuture within thick Svecofennian crust after FIRE deep seismic reflection lines.