



## **Lateral spreading of the Svecofennian Orogen**

A. Korja (1), P. Kosunen (2), and P.J. Heikkinen (1)

(1) University of Helsinki, Institute of Seismology, Helsinki, Finland (annakaisa.korja@helsinki.fi, +358 9 19151598), (2) Posiva, Eurajoki

Svecofennian Orogen is a Paleoproterozoic analogue of laterally spreading orogens at double sided convergent margins. It is a typical Precambrian orogen with a 10-15 km deep erosion level characterized by granitoids and highly deformed supracrustal units metamorphosed under upper amphibolite or lower granulite facies conditions at 1.89-1.87 Ga. Recently, a high resolution deep seismic survey (FIRE) across the Paleoproterozoic Svecofennian orogen in Central Finland revealed a layered crust with deformational features characteristic of collision followed by extension.

The coeval continental convergence from both east and south probably resulted in extreme over-thickening of the Svecofennian crust and lithosphere. Over-thickening was partially compensated by frontal and sideways spreading of the orogen away from the triple point. The layers of the crust - upper, middle and lower - were decoupled and they extended in different fashions. In the middle crust, spreading is traced as ductile flow structures – mid-crustal thrust ramps on FIRE3a and fishbones on FIRE 1&2 profiles. In the upper crust, the material slid via the listric shear zones and associated transfer zones and via low angle normal faults. In Central Finland Granitoid Complex, sequential overlapping of listric shear zones, the formation of extensional duplexes, the regional averages of the plunging directions of lineations and kinematic observations image persistent movement away from the triple point suggesting that the upper crust was moving upwards and westwards. The spreading and thermal relaxation associated with melting resulted in the development of superstructure-infrastructure which enhanced the initial layering of the crust. The current surface exposure is an interplay between upper crustal superstructure and anticlinal extrusion of the middle crust. Where the infrastructure extrudes to the surface, it forms the anticlinal cores of core complexes such as Kyyjärvi deformation zone and Vaasa migmatite complex.