



## **Crustal structure of the collapsed Palaeoproterozoic Svecofennian Orogen**

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The Palaeoproterozoic Svecofennian orogen has been formed by accretion of island-arcs and microcontinents with the margin of the Archaean Karelian continent ca. 1.9 Ga ago, followed by extensional collapse (1.88-1.87 Ga). Today, 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.

The recently acquired seismic tomographic (SVEKALAPKO) and reflection data sets FIRE (Finnish Reflection Experiment) show how the collisional structure, characterized by thick-skin and thin-skin thrusting, has later been modified by collapse structures. Below the Central Finland granitoid complex the upper crust shows a detachment surface to which the low angle listric shear zones are flattening out, middle crust is thinned and lower crust has bulged upward. The thinning of the crust was compensated by upwarping of the mantle and magmatic intra- and underplating ( $v_p/v_s > 1.72$ ,  $v_p = 6.8 - 7.4$  km/s). The magmatic intra- and underplating induced post-kinematic A-type granitoid magmatism and intrusion of mafic bodies and dykes.

With its outcropping low-angle shear zones, transtensional subvertical shear zones and the combination of two series of granitoids, related volcanic rocks as well as metamorphic block structure at the edges, the Central Finland granitoid complex is interpreted as a deeply exhumed core complex that formed during the collapse of the Svecofennian orogen. The thick lithospheric roots ( $> 250$  km) suggest that the heat required for the magmatism and partial melting is inherited from the colliding

lithospheric plates.