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The origin of layering of the Svecofennian crust

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(1) University of Helsinki, Institute of Seismology, Helsinki, Finland (annakaisa.korja@helsinki.fi, +358 9 19151598), () The origin of layering of the Svecofennian crust

The FIRE1-3 seismic reflection sections display a frozen image of orogenic thickening followed by lateral spreading that took place during the Svecofennian Orogeny (2.0-1.8 Ga) in the Fennoscandian Shield. The decoupling of the upper, middle and lower crust during spreading resulted in the formation of layered superstructure-infrastructure of the crust.

The FIRE profiles display three crustal layers with different reflection properties: upper, middle and lower. The upper crust is associated with velocities of 5.8-6.2 km/s and vp/vs ratios of 1.68-1.70, the middle crust with 6.3-6.6 km/s and 1.71-1.74 and the lower crust with 6.8-7.6 km/s and 1.74-1.76, respectively. The layers of the crust - upper, middle and lower (crust) - were decoupled along subcontinuos subhorizontal reflective boundaries and they extended in different fashions. The upper crust spread in a brittle to ductile regime along listric, low angle and transfer shear zones. The middle crust thinned via ductile flow and extrusion. It displays typical large scale extensional flow structures: herringbone and anticlinal ramps. Both structures are rooted to large scale listric surfaces that probably originated as collisional stacking surfaces and evolved to extensional spreading surfaces later. The lower crust, Moho and upper mantle rose to fill the space created by the thinning middle crust. Later, this structure was modified by intrusion of mantle-derived magmas.