Formation mechanism and age of the Särkilahti garnet-cordierite leucogranite, SE Finland

H. Mäkitie[1]*, H. O'Brien[1], O. Selonen[2] and S. Lukkari[1]

[1]*Geological Survey of Finland. P.O. Box 96, 02151, Espoo, FINLAND (*correspondence: hannu.makitie@gtk.fi*

[2]*Åbo Akademi University, Department of Natural Sciences, Geology and Mineralogy, 20500, Turku, FINLAND*

A Svecofennian Grt-Crd leucogranite (~80 km^2) is located in the Särkilahti region, 35 km south of the town of Savonlinna in SE Finland (Nykänen 1988; Selonen 1988; Lavikainen et al. 1992). It occurs in a granulite terrain, which is composed of Grt-Crd migmatites with lesser Grt-Opx gneisses, Opx-Bt metatonalites and granite pegmatite dykes. The leucogranite is slightly heterogeneous and coarse-grained, having Grt, Crd, Bt and reddish alteration product as mafic minerals (~5%). This granite was injected into the migmatites on its southern and western margins, as veins often parallel to the banding of the country rocks. In the same areas, it contains supracrustal restites and metatonalite inclusions. The NE margin involves a shear zone. U-Pb ages made by LA-ICP-MS on monazite for two leucogranite samples yielded 1793±10 Ma and 1786±10 Ma.

We suggest that the leucogranite represents a late Svecofennian magma layer below the "melting interface" (MI, Chen and Grapes 2007), which divides the convection (below MI) and conduction (above MI) heat flow modes in the crust. The layer has replaced its roof migmatites by partial melting. Compositional differences between the leucogranite and the country rocks evidently are due to gravitational sinking of restitic roof rock fragments in the partial melting region, supported by upward displacement of granite magma. The Särkilahti Grt-Crd leucogranite could be a new lithodeme in the plutonic suites of Finland.

References:

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