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Development of an in-situ magmatic dome (Svecofennian accretionary orogen, Finland)

Francis Chopin (1), Annakaisa Korja (1), and Pentti Hölttä (2)

(1) University of Helsinki, Institute of Seismology, Department of Geosciences and Geography, University of Helsinki, Finland (francis.chopin@helsinki.fi), (2) Geological Survey of Finland, Espoo, Finland

This study focuses on the formation of the 100 km wide Vaasa magmatic dome (Svecofennian orogen, Finland). It is cored by diatexite migmatites and granitoids and gradually mantled by metatexite migmatites and mica schist. Geochemical data have demonstrated that the later are the sources of the melted core. This is an agreement with new petrological modeling showing an increase of temperature from 500°C to up to 800°C at constant pressure (5-6 kbar) from the border to the core of the dome (peak). Field work studies highlights the initial formation of a layered middle crust with a strong lateral increases of in-situ melt content towards the core of the dome. It is followed by a regional shortening and exhumation along sub-vertical shear zone during a persistent high-temperature thermal anomaly. This may be the result of distributed thickening competing with regional shortening and perturbed by lateral increase of in-situ melting within middle crust towards the dome core. Sub-crustal continuous underplating of magma in this accretionary orogen might be responsible for the origin of the thermal anomaly and formation of this 1.87 Ga in-situ magmatic dome.