Geophysical Research Abstracts
Vol. 15, EGU2013-10231, 2013
EGU General Assembly 2013

Tectonometamorphic evolution of a large dome in the Svecofennian Paleoproterozoic accretionnary orogeny

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Dome structures are cored by granitoids to high-grade rocks and mantled by lower grade metamorphic rocks. The evolution of this kind of structure displays the thermal evolution of the orogenic crust and its complex rheological behavior in various tectonic setting.
This study focuses on the tectonometamorphic evolution of the Paleoproterozoic Bothian Belt situated in the central part of the Svecofennian accretionnary orogen (Fennoscandian Shield). There, the Vaasa Dome is made of a granitoid core, which is mantled by the eastern metamorphic Bothnian Belt. It is in contact with the older Central Finland Granitoid Complex to the east. The Bouguer and aeromagnetic datas as well as the seismic profiles are in agreement with a domal architecture. The Bothian Belt exposes HT metamorphic rocks with increasing metamorphic grade from low amphibolite facies to high grade diatexite (metasediments, metavolcanits) towards the core of the dome where the amount of syn- to late stage granitoids/pegmatites increase.
A detailed field study has revealed complex tectonometamorphic evolution of the dome. The tectonic contact between the Vaasa Dome and the Central Finland Granitoid Complex is a N–S directed steeply dipping shear zone whose kinematics is uncertain. Nevertheless, we suggest a general uplift of the whole western Vaasa Dome. Close to the tectonic contact, the Bothian Belt suffered a first tectonometamorphic event increasing from east to west. Where preserved, the first metamorphic foliation is roughly moderately to flat lying. It records only low amphibolites facies metamorphism in eastern most part, whereas a first stage of melting is present closer to the western core. The second event is causing N–S to NNW–SSE directed shortening and results in the formation of E–W to WSW–ENE trending steep axial planar cleavage to pervasive, subvertical foliation. The intensity of this deformation seems to increase as we approach granitoid dome core in the west. At first order, the grade of metamorphism increases also in the same direction: i.e. from low amphibolites facies to metatexite/diatexite with more syn-tectonic granitoids within the Bothian Belt as closer to the core. Late deformation has localized at the boundary between the Bothian Belt and the granitic core of the dome. Within the boundary zone, the intense deformation of soft high-grade metatexite to diatexite produces a NNW–SSE striking sub-vertical shear zone. In the core of the dome, some syntectonic intrusions show sub-horizontal direction of flow close to this contact, but a minor vertical component could be also present. Late to post- tectonic pegmatites and granitoids are widespread in the whole massif.
Consequently, after the formation of a first flat lying foliation, a general N–S shortening is observed within the western part of the dome. This is associated with late N–S trending shear zones at its boundaries. All those events are associated with HT metamorphism increasing toward the core of the dome whereas no detachment related tectonic is observed.