Formation of the granite-migmatite belt i S Finland by transtensional tectonics

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The term Late Svecofennian granite-migmatite zone (LGMZ) of southern Finland was coined by Ehlers et al. (1993) who defined it as a 500 km long and 100 km wide belt transecting the southern Svecofennides from WSW to ENE. The zone comprises rocks of varying origin subjected to high temperature and low pressure (HTLP) metamorphosis forming various types of migmatites. These migmatites were intruded by so called late-orogenic granites at 1.85 – 1.82 Ga.

Based on structural field evidences and analogue modelling, Cagnard et al. (2006) suggest that the LGMZ formed as a consequence of lateral flow during compression of hot and weak lithospheres. A situation in favour of HTLP metamorphism, migmatization and granite formation.

Given the variability of potential source rocks (e.g. metavolcanites, various types of metasediments and granitoids), the geochemistry of the late orogenic granites is diverse and attempts to classify the late orogenic granites geochemically is challenging. ious types of metasediments and granitoids.

L et al. (1998) presented a geochemical method to distinguish granitoids formed by melting of a hot and weak lithosphere and granitoids formed in more cratonic environments. The rocks formed from a hot weak lithosphere are High-K- Calk-alkaline (HKCA) rocks typically occuring in post-collisional setting during large relative movements of terranes along major shear zones.

We treated a geochemical data set with about 150 so called late orogenic granites (1.85 – 1.82 Ga) with the method presented by Liegeois (1998) and found out that these rocks plotted in the field of HKCA and Shoshonites. According to Liegeois (1998) these type of rocks series were generated by melting a K-rich andesitic lower crust or from a subduction enriched phlogopite K-richterite bearing lithospheric mantle.

To produce HKCA magmas, a hot and weak lithosphere is required in combination with displacement of terranes along deep shear zones, that also allowed magma bodies to rise.

It seems that there is no need to look at the late-orogenic event as a period of crustal thickening, but as a long-lived lateral flow during the post-collisional period.

References

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