

CLOSED SYSTEM PROCESSES IN GRANITIC SYSTEMS: THE JÄMSÄ PLUTON OF CENTRAL FINLAND

Brent A. Elliott, University of Helsinki, P.O. Box 11, 00014 Helsinki, Finland

The 1.878 Ga granite pluton at Jämsä is one of over thirty 1.88 - 1.87 Ga post-kinematic plutons that comprise part of the Central Finland Granitoid Complex (CFGK) of central Finland. The Jämsä pluton is a classic example of a hot, relatively anhydrous, granitic magma formed at depth, emplaced at a shallower level, and crystallized in situ during fractionation / differentiation in a closed magmatic system. The Jämsä pluton is composed of three phases: 1) a marginal olivine-opx- cpx-bearing biotite hornblende quartz monzonite; 2) a biotite hornblende granite, which forms the majority of the pluton; and 3) an evolved quartz-rich granite in the east central part of the pluton. Segregation and differentiation in the upper part of the pluton represent dynamic crystal-liquid processes during the later stages of crystallization. A zone below the quartz-rich granite rich in mafic mineral segregates represent areas where fluid rich liquids were pressed away from early alkali feldspar megacrysts along channels of weakness, forming schlieren-like mafic segregations and cumulate-like areas of alkali feldspar. The quartz-rich granite forms a ponded cap of differentiated granitic liquid. All three phases are Fe-rich and show typical fractionation/differentiation trends from the margin toward the center. REE patterns for all three phases are similar, with Eu-anomalies shifting from slightly positive to slightly negative to moderately negative, for the marginal assemblage, the biotite hornblende granite, and the quartz-rich granite, respectively. The shift in Eu-anomaly is attributed to a change in oxidation state from margin to center, reflective of a relatively reduced magma, undergoing progressive oxidation with an increase in water activity during cooling.