
CONNECTING DEFORMATION, METAMORPHISM AND GRANITE EMPLACEMENT: AN EXAMPLE FROM THE CONTACT AUREOLE OF THE MOOSELOKMEGUNTIC PLUTON

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The rocks in the contact aureole of the Mooselookmeguntic pluton were multiply deformed and metamorphosed during the Acadian orogeny. The metamorphism occurred at low pressure and high temperature with isograds following the pluton contours. A maximum temperature of $\sim 600^{\circ}\text{C}$ at around 4 Kbrs has been determined from rocks from the lower sillimanite zone. The widespread assemblage $\text{Grt}+\text{St}+\text{And}$ suggests that the pressure must have been in the 3-4 Kbr interval while the temperature varied with the pluton proximity. The sporadic appearance of cordierite porphyroblasts towards the SE indicates slight decompression and possibly the beginning of exhumation. Most porphyroblasts have been variably prograde or retrograde pseudomorphed. The nature of pseudomorphism occurred as a function of pluton proximity while the distribution of pseudomorphs was strictly controlled by the structural fabric. Pseudomorphs have formed only in rocks with steeply dipping foliation trending at high angle to the pluton. Measurement of the foliation inflexion/intersection axes (FIAs) in garnet and staurolite porphyroblasts has revealed that at least five successive periods of growth of these phases have occurred. A succession of 5 different FIA sets for garnet and staurolite porphyroblasts have been

interpreted using samples that preserve changes in FIAs trend from core to rim and trend successively NNW-SSE, ESE-WNW, E-W, ENE-WSW and NE-SW. Staurolite cores with NW-SE trending FIAs are succeeded by N-S, E-W and ENE-WSW rims. N-S trending FIA cores and pre-FIAs are succeeded by NE-SW rims. E-W trending FIAs cores are succeeded by ENE-WSW medians/rims and NE-SW rims. ENE-WSW trending cores are succeeded by NE-SW trending rims. The inclusion trail pitches have been measured in 3D from all staurolite porphyroblasts using vertically oriented thin sections. Most staurolite porphyroblasts overgrew steeply dipping foliations that have similar trends to the FIAs. Monazite dating of staurolite porphyroblasts from each FIA set revealed a continuous period of growth of this phase from ~ 420 Ma to less than 350 Ma. Individual age peaks have been determined at 408 ± 10 Ma for FIA set 2, at 388.0 ± 8.8 Ma for FIA set 3, at 372.1 ± 5.5 Ma for FIA set 4 and at 352.7 ± 4.2 Ma for FIA set 5. Although, the age of FIA set 1 could not be measured it is assumed to have formed between 430 and 415 my. The peaks for each FIA set correlate very well with regional pluton ages suggesting that there must have been a direct connection between deformation, metamorphism and pluton emplacement.