U-Th-Pb EPMA GEOCHRONOLOGY ON MONAZITE, IMPLICATION ON DATING MAGMATISM AND METAMORPHISM IN THE HERCYNIAN FRENCH MASSIF CENTRAL

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Monazite is an accessory REE-bearing phosphate mineral in magmatic and metamorphic rocks. Though conditions at which the mineral crystallizes during metamorphic events are not fully understood, monazite becomes a useful phase for assessing geochronological information from magmatic and metamorphic rocks, especially since more than one generation of monazite can be expressed in a single rock. In addition, monazite commonly displays complex chemical zoning so that interpretation of the monazite age data requires reliable tectonic analyses and thin-section textural-relationship determinations. EPMA (Electron Probe Micro Analyzer) dating of monazite combining BSE (Back scattered Electron) information has been carried out on migmatite and granitoid samples from the Hercynian Belt in the French Massif Central (south of ca 300 Ma Velay dome). Monazites from the migmatites and granite dykes record three main ages: (i) a $315 \pm 10$ Ma $(2\sigma)$ age determined from dykes suggests that these intrusions were coeval with the Cévennes granitic plutons; (ii) a $329 \pm 6$ Ma $(2\sigma)$ corresponding to the migmatization; (iii) a $560 \pm 18$ Ma to $543 \pm 19$ Ma age obtained on inherited monazite cores from migmatized orthogneiss. EPMA geochronology of monazite thus appears to be a significant tool for deciphering overlapping geologic processes.