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# Evolution of melt-bearing shear zones during cooling within an upper crustal aureole: the Calamita Schists (Island of Elba, Italy)

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The Calamita Schists in the aurole of the Late Miocene Porto Azzurro pluton underwent partial melting and HT metamorphism at P < 0.2 – 0.3 GPa and T > 650 – 700 °C, coeval with regional deformation. Deformation produced a network of shear zones that evolved from melt-present conditions to the brittle-ductile transition. Shearing at high temperature in the presence of melt allowed deformation to remain relatively distributed in wide high-strain zones. As the thermal pulse associated with the intrusion progressively faded away, deformation localized into anastomosing, mylonitic greenschist-facies shear zones surrounding lozenges of high-grade migmatitic schist. Mylonitic shear zones formed at low-angle with respect to the well-established high grade foliation preserved as a relic, oblique foliation. We show that such an extreme strain localization was determined by strain hardening of the no longer melt-bearing quartz-feldspar schist, localized embrittlement on precursory shear bands, and fluid-enhanced reaction softening that caused the breakdown of Al-silicates and the development of phyllosilicate-rich mylonitic bands. Consequently, tectonic structures with different orientation developed under the same kinematic regime, as a result of the changing physical and mechanical properties of the cooling rock volume.