Transient Feedbacks between fluid flow, metamorphic-metasomatic mineral changes, and deformation style (Osor LP/HT complex; Guilleries massif, Catalan Coastal Ranges, NE Spain)

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Data from a metapelitic, metatexitic sequence in the Osor Variscan LP/HT complex, Guilleries suggest interaction between fluid/melt infiltration, metamorphic-metasomatic evolution and strain style changes. The bulk of the sequence contains the surmicaceous porphyroclastic retrograde assemblage bi - ms - pl ± sil ± g ± q where g, sil and q can be characterized as relict-metaestable phases. The peak upper amphibolite-lower granulite facies assemblage (mz U-Pb age: 327±5 Ma from Martínez et.al., 2016) preserved only in minor semi-pelitic layers is: g - bi - sil - q ± crd ± pl where g grow as a sin-D2 peritectic phase resulting from incongruent melting producing pl-q rich stromatic/centimetric subconcordant leucosomes. A near peak fluid flow episode is suported also by the presence of H₂O-rich fluid and carbonatitic fluid inclusions located near melt inclusions inside garnet or by local fibrolitization. D3, characterized by C' type shear bands is clearly visible in the micaceous part of the complex. The complex is intruded by a pre-syn D3 swarm of aplitic/pegmatitic S-type laminar leucogranite dikes (305±1.9 Ma. Martínez et.al., 2008, 2016) and all data point to an alkali-type metasomatic event related to increased magmatic component in fluids as main factor of increasing blastesis of micas in an increasing K-rich bulk composition. As responsible for major changes in mineralogy, this alkali-metasomatism could have produced changes in rock rheology properties and thus in deformation style, triggering increasing exhumation velocities of the complex via nucleation and development of the D3 shear bands.
