Granite emplacement at the termination of a major Variscan transcurrent shear zone: the late collisional Viseu batholith

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A major event of plutonic activity occurred in the Viseu region at the end of Late Paleozoic Variscan collisional tectonism (299.4 ± 0.4 to 296.0 ± 0.6 Ma). A detailed anisotropy of magnetic susceptibility (AMS) survey on the Viseu batholith suggests that pluton emplacement occurred at the extensional termination of a regional-scale, ENE-WSW trending, sinistral shear zone – the Juzbado-Penalva Shear Zone (JPSZ). A dilational opening model involving the development of transtensional jogs located along the trace of the fault, followed by progressive opening and widening of north-south trending fractures (perpendicular to the maximum stretching direction) provided the space into which the successive magma batches arriving from below were emplaced. Vertical inflation was accommodated by depression of the pluton floor. The proposed model is consistent with the asymmetric wedge-shaped geometry of the intrusion (steep root zone on the northern side, discordant subvertical walls and a shallowing pluton floor towards the south).

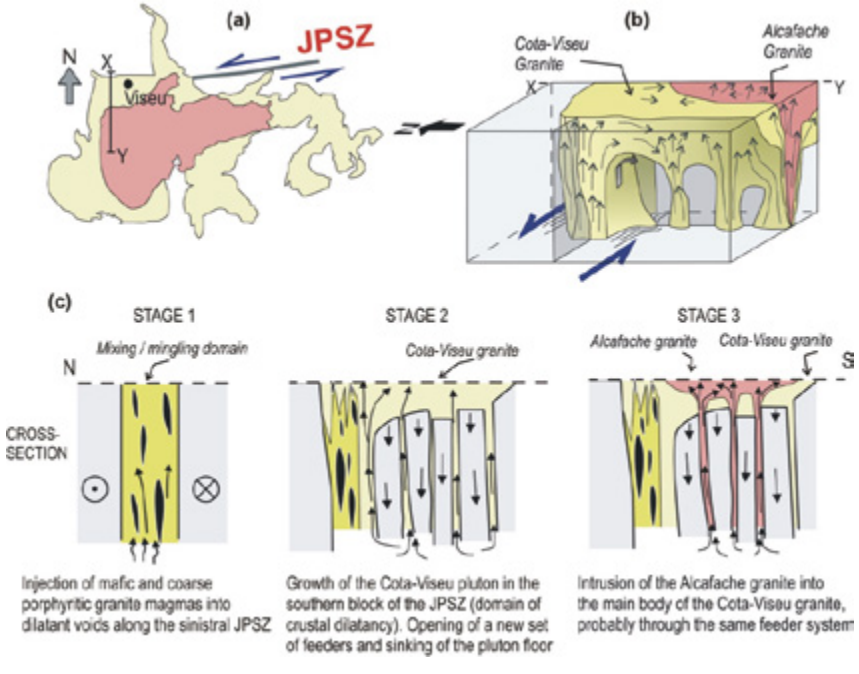

FIGURE 1
Proposed emplacement model for the Viseu Batholith. (a) General map of the batholith; (b) Three dimensional schematic representation of the batholith; (c) N-S cross section along the western side of the intrusion showing the successive stages of pluton growth. JPSZ: Juzbado-Penalva sinistral Shear Zone.