



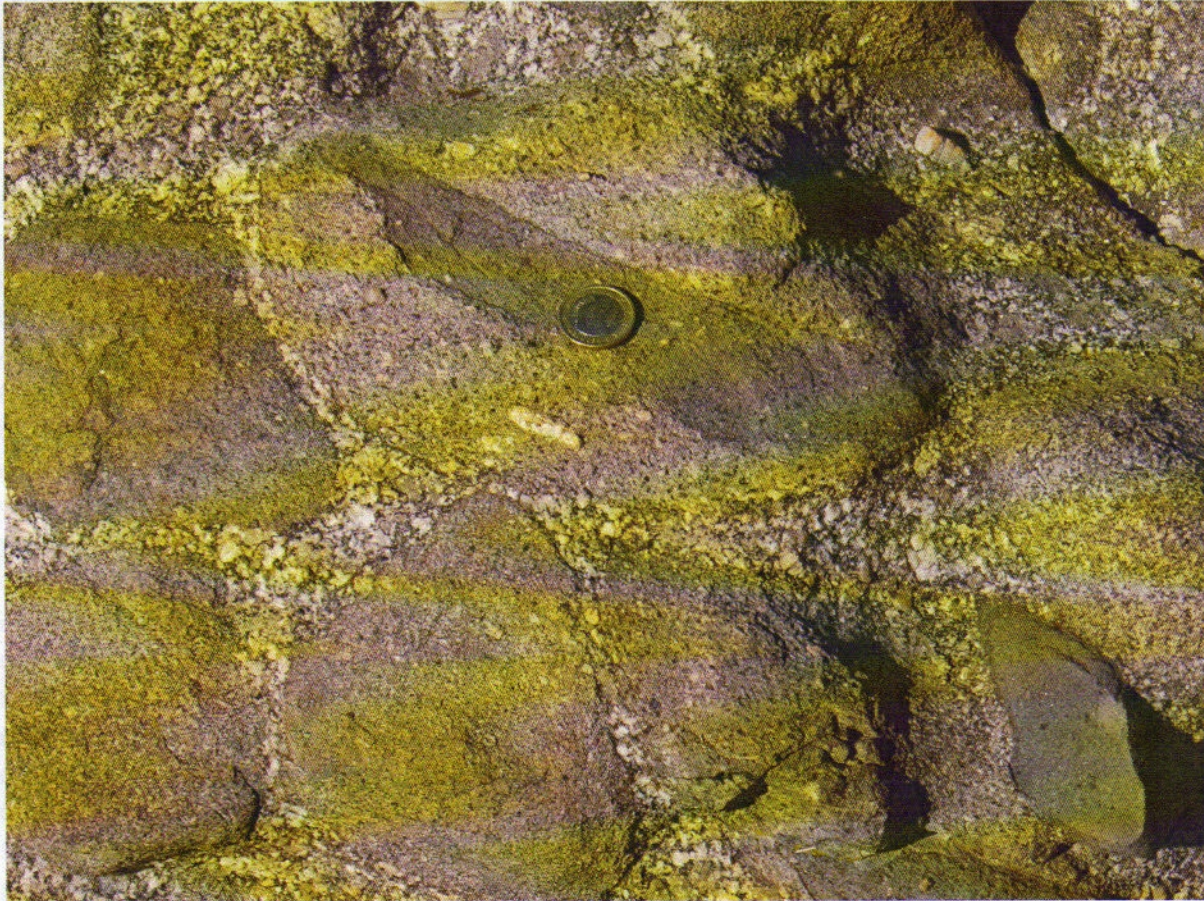
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AMS study of two late-post-kinematic Variscan granitoids from the Viseu area (Northern Central Portugal)

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The Cota and Alcafache granite plutons are part of a large late-post-tectonic composite batholith emplaced into metasediments of Late-Proterozoic to Paleozoic ages, at the end of the Variscan orogeny. The Cota massif is a coarse porphyritic biotite monzogranite occurring in the periphery of the complex, as a large irregularly shaped intrusion. At plan view, it comprises a central body, bounded by N-S and E-W rectilinear contacts, and a northern branch with a dominant N-S orientation. Along the margins of the Cota massif, minor bodies of igneous basic and intermediate rocks, ranging from gabbro-norites to granodiorites are frequently present. The Alcafache pluton crops out in the inner part of the complex, as a NE-SW elongate body consisting of a medium porphyritic biotite-muscovite granite with a distinctly more evolved chemical character. An extensive study of magnetic susceptibility anisotropy (AMS) revealed that the magnetic susceptibilities of the Cota and Alcafache granites are typical of paramagnetic granites. Their K values range from 60×10^{-6} to 376×10^{-6} SI in the Cota granite and from 41×10^{-6} to 194×10^{-6} SI in the Alcafache granite, allowing a good discrimination of the different petrographic types. Both granitoids show low total anisotropy values ($P\% < 7\%$) consistent with their late-post-kinematic character. In the Cota massif, the magnetic-magmatic foliations are generally steep ($> 70^\circ$) and define a dominant N-S trend, concordant with the N-S margins of both the main central body and the northern branch, but oblique to the E-W contact in the centre. At the northernmost end of the intrusion, the foliation bends gradually, becoming subparallel to a NW-SE sinistral shear zone that crosses the northern sector of the studied area. The presence of steeply plunging magnetic foliations and lineations suggests that the roots of the Cota massif are exposed at the present erosion level. This is particularly evident along two well-defined corridors with E-W and N-S strikes, interpreted here as feeding zones. The Alcafache granite displays more scattered magnetic foliations and gently dipping magnetic lineations pointing to a laccolith shaped intrusion.

Pluton emplacement took place in a tectonically complex area affected by three crustal-scale transcurrent shear zones during the last Variscan ductile deformation event (D3): the NNW-SSE Porto-Tomar, the ENE-WSW Penalva and the NW-SE Douro-Beira shear zones. In the southern sector of the area, the Penalva sinistral shear zone appears to have controlled the location of the E-W feeders of the Cota massif. The main body of this granite may therefore have been emplaced in an extensional regime related to the western termination of the Penalva shear zone. Space was created by the opening of N-S tension gashes along which the least differentiated magmas intruded (Cota granite and associated basic rocks). For the northern branch of the Cota granite, it is proposed that magma ascent was facilitated by a N-S antithetic fault, sub-concordant to the axial planes of D3 folds in the country rocks. At a later stage and lower pressure level, the more evolved Alcafache magma was supplied upwards to the top of the Cota feeding zone and emplaced as a sheet-like body.