

MAGMATIC EVOLUTION AND EXHUMATION OF THE CRETACEOUS CALEU PLUTON IN THE COAST RANGE OF CENTRAL CHILE: GEODYNAMIC IMPLICATIONS

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The Caleu pluton (33°S-71°W) is a zoned body emplaced into a thick pile of flood basalts and andesites of the Veta Negra Formation. This intrusion resulted from two magma injections. The first injection gave rise to an hornblende-pyroxene gabbro zone (GbZ), which evolved upwards to an hornblende-biotite tonalite zone (ToZ). The second injection is represented by a biotite-hornblende granite zone (GrZ). The rocks of the GrZ synplutonically intrude both the GbZ and ToZ. Based on mafic mineral compositions as well as on whole-rock chemistry the GrZ had an origin from a different source than that of the GbZ and ToZ. The cooling history of the pluton is directly controlled by its exhumation rate evolution. Two episodes of exhumation of the Caleu pluton were recognized from Ar-Ar cooling ages on hornblende and biotite, and apatite fission track ages. Between 109 and 94 Ma a mean exhumation rate of about 0.7 mm/yr was calculated. This rate decreased to about 0.2 mm/yr between 93 and 82 Ma. The high rate of exhumation for the 109-94 Ma interval indicates an orogenic peak that interrupted the flood basalt effusion, and gave rise to the formation of molassa-type deposits represented by the Upper Cretaceous Las Chilcas Formation (Fondecyt project 1990980).