# Magmatic Architecture and Dynamics of the Cerro Blanco Volcanic Complex, Catamarca, Argentina

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Substantial volumes of ignimbrites construct the Neogene stratigraphy of the Central Volcanic Zone of the Andes. While most attention has been focused on the late supereruptions in the region, little is known about the smaller arc-related caldera forming volcanic systems that characterize the modern arc. In this work, we present new geochemical data from the ~50 $km^3$ Cerro Blanco volcanic complex (CBVC), Argentina, the youngest (late Pleistocene to Holocene) rhyolitic complex known in the southern portion of the Central Andes. To investigate why small-caldera systems do not evolve to produce supereruptions we have analyzed volatiles, major and trace elements in quartz-hosted melt inclusions from the older (~73 ka) Campo Piedra Pumice (CPP; fall and ignimbrite) and from the Intra-Caldera deposit.

Dissolved water contents in phenocryst-hosted melt inclusions vary between 2.6 and 8.6 wt%, with a mode at ~5.5 wt%, while dissolved $CO_2$ ranges from 9 to 244 ppm. Interestingly, Cl defines two magmatic groups: the high Cl group (1200 to 2000 ppm) represented by all CPP fall samples and the lower Cl group (260 to 1250), which includes the CPP Ignimbrite and the Intra-Caldera deposit.

These volatile characteristics are in marked contrast with data from “supervolcanic” ignimbrites from the Central Andes and elsewhere that show a wide range of $CO_2$ for a much more restricted range of water. Moreover, co-variation of $CO_2$ with incompatible trace element ratios suggests decompression-induced degassing, rather than crystallization-induced degassing. We propose that the smaller volume eruptions in the Central Andes are likely triggered by overpressure-driven failure of the magma chamber producing typical two-phase (fall and flow) plinian eruptions, while the pressure evolution of supereruptions is buffered and may require an external trigger.