Biotite major elements composition as a tool to fingerprint ignimbrites, southern Central Volcanic Zone

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In the southern Central Volcanic Zone (25-27°S) there is a huge number of ignimbrites that cover areas over 2000 km^2 and reach volumes of 2500 km^3 [1, 2]. Detailed mapping carried out by the Chilean Geological Survey (SERNAGEOMIN) made possible to elucidate its stratigraphy and evolution [2]. To understand ignimbrites stratigraphy, distribution and lateral relationship a set of unique characteristics is needed. This is known as ignimbrites fingerprinting and includes 5 main criteria: lithologic, magnetic, petrographic, chemical and isotopic-dating [3]. In this work, detailed petrography and geochemical studies of biotites are presented for two cases of this area: Río Frío and Pajonales ignimbrites.

Río Frío ignimbrite (22-16 Ma) has very high crystal content (Pl+Opx+Cpx±Bt±Amp). Biotites major elements composition in the ignimbrite are enriched in Ti and Mg but depleted in Mn, Al and Fe compared to surrounding ignimbrites with similar ages and characteristics. Pajonales ignimbrite (17-15 Ma) has coarse glass shards and Pl+Amp+Bt±Px crystal assemblage. These biotites have lower Fe and Ti than those in Rió Frío ignimbrite, but still higher than other ignimbrites in the zone.

Both ignimbrites are from Aguilar-Infieles caldera system [2] therefore chemical and petrographic changes reflect variations in a single magma body system. The main mafic minerals of Pajonales ignimbrite are Amp-Bt instead of Px. The biotites composition were clearly different between both ignimbrites showing a trend of increment in Mn and slightly Al (iv) and a lower content of Fe, Ti and Mg. These differences can be explained due to differentiated magmas process on hydrated mineral phases, resulting from the Andean uplift that leads a thicker continental crust from early Miocene to present [4].

[1] Schnurr *et al.* (2007) *J Volcanol Geoth Res* **166**, 17-46. [2] Naranjo *et al.* (2015) *Plutons,* submitted resume. [3] Hildreth & Mahood (1985) *Geol Soc Am Bull* **96**, 968-974. [4] Charrier et al. (2013) *Int J Earth Sci* **102**, 235-264.