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Source area and emplacement conditions of Riscos Bayos Ignimbrites, Caviahue-Copahue Volcanic Complex (Argentina)

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The Caviahue-Copahue Volcanic Complex (CCVC, Argentina) composes one of the most active volcanic centers in the Southern Volcanic Zone (SVZ) of the Andes, characterized by the presence of voluminous explosive and effusive deposits. Despite its young age (< 5 Ma), CVCC deposits were strongly affected by two glaciations, leading to the removal of a considerable volume of the original deposits, requiring alternative techniques for the reconstruction of this volcanic center. The Riscos Bayos Ignimbrites (RBI) consist of a sequence of non-welded ignimbrites, located approximately 15 km southeast of the CVCC. This unit is commonly associated with the putative collapse of Caviahue caldera (15 x 20 km, 1 km deep) during the Pleistocene, although the source area and emplacement conditions of RBI still poorly constrained. In this work, we combine fieldwork, anisotropy of magnetic susceptibility (AMS, 23 sites) and rheological analyses (17 samples) in order to trace RBI source region and constrain its emplacement conditions, addressing its relevance to CVCC evolution. Rheological parameters, including viscosity, glass transition temperature, and liquidus temperatures were obtained using numerical models available from the literature, while AMS samples were measured using a Kappabridge MFK1-A (Agico) and the data processed using Anisoft5 (Agico). The magnetic mineralogy was characterized using several experiments, including isothermal remanet magnetization, thermomagnetic curves, hysteresis loops, first-order reversal curves and scanning electron microscopy. Our data indicate liquidus temperatures ranging from 969 to 1100 ºC, glass transition temperatures from 653 to 721 ºC, and viscosity (at liquidus temperature) from 3.4 to 7.3 log Pa.s. The absence of welding features in the samples implies RBI emplacement at temperatures below the glass transition temperature, suggesting a fast and effective cooling of the pyroclasts before their settling. The low crystal content of the samples suggests eruption temperatures close to the calculated liquidus temperature of the melt. AMS directional analyses indicate a consistent transport sense to SSE (Az of approximately 100º), implying the southern rim of the CVCC as the main source region of RBI. Magnetic experiments show primary, multi-domain, high curie temperature (580 ºC) titanomagnetites as the main carriers of the AMS signal. Most ellipsoids display oblate to triaxial geometry, with a low degree of anisotropy (< 5%) and magnetic susceptibility (1.0 x 10^{-2} SI). The low

welding degree of RBI units and its geographic distribution outside the Caviahue depression contributes to the Caviahue caldera hypothesis in the region, suggesting its emplacement as an ‘extra-caldera’ pyroclastic unit.