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Petrological constraints on the Source and the evolution of magmas of Yucamane-Calientes Volcanic Complex (South Peru)

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In order to gain some insights into magmatic process responsible of the geochemical diversity of the Yucamane-Calientes volcanic complex, we conducted a petrological and geochemical study of rock samples from the main growth stages. This volcanic complex is composed of two successive edifices that have experienced discontinuous volcanic activity from Middle Pleistocene to Holocene times. Calientes is a stratovolcano that was formed less than 400 ka ago that was currently formed through at least four stages, during which it presented mainly effusive activity . growth and destruction of domes. At the end of its construction a partial collapse occurred of the upper cone which only the Northwest side of the volcano intact. The Yucamane volcano is a compound cone, consisting of various andesitic and dacitic lava flows covered by ash fall deposits emitted during the Holocene. A lava from the lower cone was dated at 23 ± 1 ka and a lava from the upper cone yielded 3 ± 2 ka. One of the latest subpliniaa explosive eruptions of this volcano occurred by ~ 3270 yr AP (Vela et al, 2015). The whole rock composition falls in the andesitic to dacitic fields (53.9-66.9 wt.% SiO2) and belongs to a medium- to high-K calk-alkaline magmatic suite (1.4-3.7 wt.% K2O). Samples from the Yucamane-Calientes volcanic complex are characterized by high LILE (e.g. K, Rb, Ba, Th) and low HFSE (e.g. Nb, Zr) and HREE (e.g. Yb) concentrations, consistent with the subduction zone setting. The ratios 87Sr/86Sr (0.7065-0.7075) and 143Nd/144Nd (0.51229-0.51243) suggest that the composition of the samples is significantly affected by contamination and/or assimilation processes during their evolution into the upper crust, likely due to the presence of a thick (65-70 km) continental crust beneath the CVZ in South Peru. The differentiation trend is inferred from the 87Sr/86Sr vs. SiO2 pattern and the behavior of other incompatible elements (Ba, Th). This indicates that the magmatic evolution is mostly controlled by Assimilation-Fractional crystallization (AFC) mechanisms.