New juvenile glass chemistry from Colli Albani, Italy and its use in understanding petrogenesis

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Colli Albani is a quiescent caldera complex located within the Roman Comagmatic Province, Italy. The recent Via dei Laghi phreatomagmatic eruptions led to the formation of nested maars. The largest is Lago Albano (ca 70-20ka) which has erupted at least seven times. The highly explosive nature of the eruptions from Colli Albani and contrasting alkali-rich, silica under-saturated magma compositions has resulted in several contrasting petrogenetic models [1].

Results are presented from a petrological and geochemical study of the Lago Albano deposits. Juvenile clasts in the deposits display evidence for mingling of different melt fractions. The juvenile (magmatic) fragments from explosive (base surge and fall deposits) and effusive (lava flows) episodes provide an opportunity to constrain the temporal magmatic and volatile history of the system. New WDS-EPMA and LA-ICPMS data for interstitial glass in magmatic cumulates (pre-eruptive), and melt within juvenile clasts (syn-eruptive) reveal extreme sub-volcanic fractionation generating distinct magma compositions (K-rich foidites).

[1] Conticelli *et al*. (2010), *IAVCEI Sp Pub*

Oxidative weathering fractionates chromium isotopes

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Cr isotopes hold great promise for use as a paleoredox proxy, but the processes that induce Cr isotope fractionation remain speculative. The reduction of Cr(VI) favours the light Cr isotope, causing residual Cr(VI) to become progressively heavier [1], but we do not know if fractionation accompanies the oxidation of Cr(III) to Cr(VI). We present Cr isotope ratio measurements of a lateritic soil profile from Indonesia. Our measurements reveal that the Cr isotopic composition of the soil becomes progressively lighter with increased weathering up the profile. The uppermost unit, the topsoil, possesses the lightest composition, $\delta^{53}Cr = -1.19 \pm 0.25$ ‰ ($\delta^{53}Cr = 1000 \times [(^{53}Cr/^{52}Cr)_{sample}/(^{53}Cr/^{52}Cr)_{SRM979})-1]$), whereas the unaltered peridotite bedrock has Cr isotope ratios consistent with mantle-derived igneous rocks [2]. Our measurements demonstrate the preferential retention of light Cr in the soil and the release of heavy Cr(VI) to runoff, supporting the hypothesis that the marine Cr isotope record tracks the oxygenation of the atmosphere through geological time [3].

[1] Ellis, Johnson, & Bullen (2002) *Science* **295**, 2060-2062. [2] Schoenberg *et al*. (2008) *Chem. Geol*. **249**, 294-306. [3] Frei *et al*. (2009) *Nature* **461**, 250-254.