# Magmatic and Meteoric Fluids in the Italian Apennines: Geochemistry of the Epithermal Environments of Vulcano and Campi Flegrei Volcanoes

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Vulcano (V) and Campi Flegrei (CF) are alkaline volcanoes resulting from the eastward retreat of the Apennine subduction. At Vulcano, samples of fresh and altered 1739 and 1888 AD trachytes and aliquots of 200-300°C volcanic vapors and condensates (pH 1.2) from two fumaroles were collected. At CF, fresh and altered trachytes of Santa Maria scoria, Monte Olibano lava and Solfatara cryptodome and samples of 150°C volcanic vapors and condensates (pH 6.6) were collected from Bocca Nuova and Bocca Grande fumaroles. All samples were analyzed for major and trace elements to elaborate mass action models for the acidic alteration at Vulcano and the acid-sulfate alteration from Campi Flegrei. Laser ablation ICP-MS of melt inclusions, fresh- to altered matrix glasses and silicified pseudomorphs, and XRD / micro-XRD analyses of the fresh and altered rocks were obtained. Characterisation of the $^{7}Li/^{6}Li$ signatures of magmatic and hydrothermal products is underway. At Vulcano, the silicification is accompanied by enrichment in Nb-Hf-Ta, Sn-W and U whereas at CF, Au, Hg, Pb, As and Cu increased throughout de-silicification, hydrolysis and opalisation. The stronger remobilisation of alkali-, REE and HFSE elements at Campi Flegrei than at Vulcano results from progressive acid dissociation at decreasing T during mixing with groundwater and subsequent neutralization by fluid-rock interactions. By contrast at Vulcano, magmatic fluids are still at relatively high-T, acidic species have not completely dissociated and the fluid/rock ratio is still relatively high. The elevated Au-Cu-Hg-Pb-As in alterations from CF is indicative of precious and base metal mineralisation at depth.