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Interactive comment on "The acid-sulfate zone and the mineral alteration styles of the Roman Puteolis (Neapolitan area, Italy): clues on fluid fracturing progression at the Campi Flegrei volcano" *by* Monica Piochi et al.

Franco Pirajno (Referee)

franco.pirajno@uwa.edu.au

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The manuscript does provide good technical data and is quite interesting. However, the authors use wrong words and/or terminology as well incomprehensible English in some cases. The English language need to be carefully edited.

Figure 1 should have an inset to show where the Campi Flegrei are located in Italy

Other comments and corrections are given in the attached annotated pdf

Printer-friendly version

Discussion paper

kind regards

Franco Pirajno

Please also note the supplement to this comment:
https://www.solid-earth-discuss.net/se-2019-53/se-2019-53-RC2-supplement.pdf

Interactive comment on Solid Earth Discuss., https://doi.org/10.5194/se-2019-53, 2019.

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Discussion paper

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The acid-sulfate zone and the mineral alteration styles of the Roman Puteolis (Neapolitan area, Italy): clues on fluid fracturing progression at the Campi Flegrei volcano.

Monica Piochi[1], Angela Mormone[1], Harald Strauss[2], Giuseppina Balassone[3]

[1]Osservatorio Vesuviano, Istituto Nazionale di Geofisica e Vulcanologia, Naples, I-80124, Italy
[2]Institut für Geologie und Paläontologie, Westfälische Wilhelms-Universität, Münster, 48149, Germany
[3]Dipartimento di Scienze della Terra, dell'Ambiente e delle Risorse, Università Federico II, Naples, I-80134, Italy

Correspondence to: Monica Piochi (monica.piochi@ingv.it)

Abstract. Active fumarolic solfataric zones represent important structures of dormant volcanoes, but unlike emitted fluids, their mineralization are omitted in the usual monitoring activity. This is the case for the Campi Flegrei caldera in Italy, among the most hazardous and best-monitored explosive volcanoes in the World, where the landscape of Puteolis is characterized by acid sulfate alteration that is active at least since Roman time. This paper provides temperature, mineralogical, textural, compositional and stable isotope data for those solfataric terrains sampled at the crater and Pisciarelli slope of the Solfatara volcano between 2012 and 2019. Temperatures vary between 40 ° and 95 °C. Minerals include alunite with grain sizes generally larger than 20 μm, alunogen, native sulfur, well-ordered kaolinite, and, common at Pisciarelli, pyrite and NH_4-sulfates. Sulfate terrains have higher contents of Ti, Ba, Au, As Hg and Tl relative to their parent substrate. The Pisciarelli slope is anomalous in terms of the presence of NH_4. $\delta^{34}S$ values for sulfides and native S range between -3.00 and 0.49 ‰ and from -4.42 to 0.80 ‰, respectively. Sulfates show $\delta^{34}S$ and $\delta^{18}O$ values in the range of -3.35 to 3.80 ‰ and between 0.3 and 31.33 ‰, respectively. The style of mineralization and the stable isotope geochemistry do produce complex and not completely consistent classifications and genetic information. We merge our data with volcanological information, data from exploration drillings and geophysical results. With the conceptual model we suggest a series of shallow and deep aquifers interconnected like "communicating vessels" through a main fault system that downthrows Solfatara with respect to Pisciarelli. Fluid outflow from the different discrete aquifers hosted in sediments – and possibly bearing biological imprints – is the main dataset that allows determination of the steam-heated environment with a supergene settings superimposed. Supergene conditions and high-sulfidation relicts, together with the narrow sulfate alteration zone buried under the youngest volcanic deposits, point to the existence of a paleo-conduit. The data will contribute to monitor and evaluate the volcanic hazards.

Fig. 1.