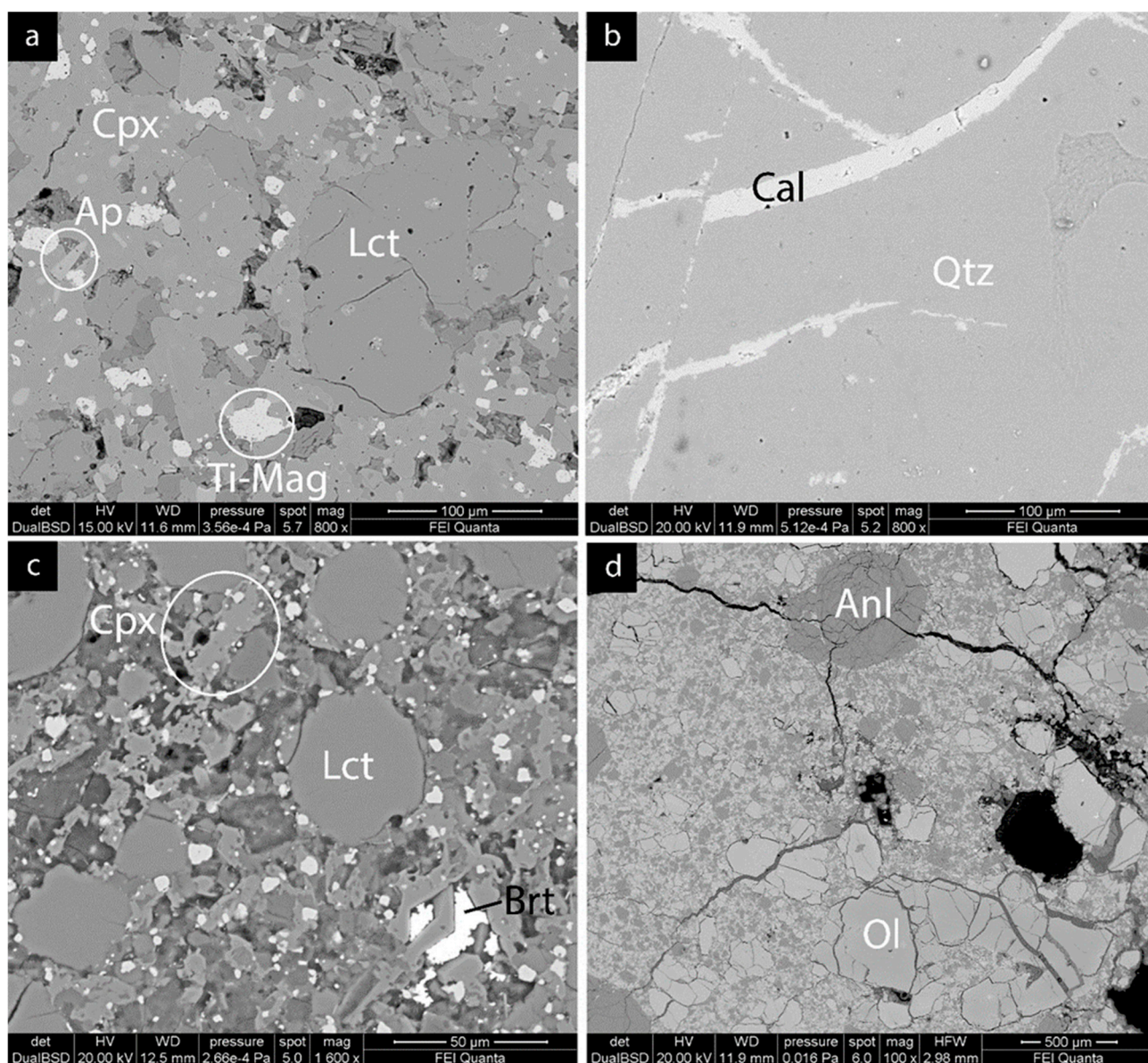


**Figure S2.** SEM-EDS analysis on aggregates.

Concerning the type of aggregate that at OM has been described as volcanic rock fragments with holocrystalline groundmass of clinopyroxene and opaques, and phenocrysts of leucite with concentric inclusions, present in the majority of samples but not abundant, SEM-EDS analyses has shown that also in this case the crystals attributed to leucite at OM are in some cases analcime. The presence of clinopyroxene has been confirmed by EDS analyses, showing (in order of intensity) Si, Ca, Mg, Al, Fe and Ti. It was also possible to identify the opaques: EDS analyses on the small white areas at SEM show Fe as main peak, followed by a high peak of Ti, and a small one of Mn, which are compatible with Ti-magnetite. In one of these volcanic rock fragments (sample VIR14), it was also possible to detect the presence of apatite (Figure S2a).

Concerning some peculiar types of aggregate, in sample VIR1 one lava fragment has been characterized, showing the presence of leucite phenocrysts with euhedral habit, rarer clinopyroxene and a groundmass composed of (in order of intensity) Si, Ca, Al, Mg, Fe, K, Na, Ti and P. In sample VIR7 the fragment of flint in layer 3 has been analysed, showing the presence of only Si peak, except for the cracks which are composed of only Ca (Figure S2b). In sample VIR13, the analysis on the whitest small area detected inside Pozzolane Rosse scoria clast including leucite-bearing granular rock shows the presence of S and Ba, suggesting the presence of baryte, whereas other of this white area are composed of Fe oxide (Figure S2c). Another particular small holocrystalline rock fragment has been analysed in sample VIR14, layer 2: it is composed of alkali feldspar and vermiculite. Finally, in sample VIR16, 2<sup>nd</sup> layer, the fragment of volcanic rock, characterized by phenocrysts of clinopyroxene, olivine and leucite in a cryptocrystalline groundmass has been analysed, showing that leucite is instead analcime (Figure S2d).



**Figure S2** Aggregates constituted by rock fragments, analysed at SEM-EDS. (a) volcanic rock fragment from sample VIR14, 2<sup>nd</sup> layer, with holocrystalline groundmass of clinopyroxene (Cpx), Ti-magnetite (Ti-Mag), and apatite (Ap), and phenocrysts of leucite (Lct) with concentric inclusions. (b) Flint fragment in sample VIR7, 3<sup>rd</sup> layer, showing the presence of quartz and veins of calcite. (c) Pozzolane Rosse scoria clast including leucite-bearing granular rock in sample VIR13, exceptionally containing baryte (Brt). (d) rock fragment in sample VIR16, 2<sup>nd</sup> layer, composed by phenocrysts of analcime (Anl) and olivine (Ol).