B, Pb, Sr isotopic imprint of crustal and mantle rocks from the slab-mantle interface: The Cima di Gagnone example (Central Alps)

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In subduction zones, the slab-mantle interface represents a key setting for tectonic mixing of slab- and mantle-derived materials and for fluid-mediated mass transfer from the slab to the overlying mantle. Element exchange between different lithologies and element release to fluids in this envronment can be traced by B, Pb, Sr isotopic systems. Here we focus on the Cima di Gagnone case-study, where pelitic schists and gneisses enclose peridotite lenses, like in a top-slab mélange [1]. The ultramafic rocks, hosting eclogitized and rodingitized MORB mafic rocks, derive from serpentinized oceanic peridotites that underwent subduction dehydration [1,2]. Serpentinization also occurred during prograde exchange with fluids derived from the host rocks, once the oceanic serpentinized peridotites were accreted to the mélange [3]. Potential precursors for Gagnone, e.g. Alpine HP serpentinized peridotites from Erro-Tobbio (ET), display high B (20 ppm), δ^{11}B (13-20‰), B/Nb > 140 [4] and scarce enrichments in radiogenic Pb, Sr. At Cima di Gagnone ^{87}Sr/^{86}Sr and ^{206}Pb/^{204}Pb ratios of ultramafites (0.7055-0.7109 and 17.7030-18.4939, respectively) indicate exchange with the host rocks (^{87}Sr/^{86}Sr up to 0.7208; ^{206}Pb/^{204}Pb up to 18.9846). Negative δ^{11}B of ultramafic rocks (-1 to -10 ‰) point to a mixed effect of (1) dehydration of serpentinized precursors, leading to heavy ^{11}B loss into fluids and to light B isotopic compositions of residual rocks, combined with (2) exchange with fluids from the host crustal rocks. Several ultramafic samples with relatively low Pb and Sr isotopic ratios, like in the ET, and with low B/Nb (<45) and δ^{11}B (-9 ‰), may represent the dehydration products of serpentinized peridotites less affetcted by crustal exchange. These data document the rock and fluid compositions attained in a top-slab mélange and point to release to fluids of δ^{11}B, radiogenic Sr and Pb, which may strongly affect mantle wedge meatsomatism and arc magmatism.

[1] Trommsdorff (1990) *Mem. Soc. Geol. It.* **45**, 39-49. [2] Evans *et al.* (1979) *American Mineralogist* **64**, 15-31. [3] Scambelluri *et al.* (submitted). [4] Scambelluri and Tonarini (2012) *Geology* **40**, n.10, 907-910.

Source of magmas that generated eruptive products at Mt. Somma-Vesuvius and Campi Flegrei based on melt inclusions data

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Mt. Vesuvius and Campi Flegrei volcanic systems are located in the Campanian Volcanic District, and are considered among the most hazardous volcanic areas in the world. They lie in the proximity of the densely populated area that comprises the city of Naples, with more than 3 million people at immediate risk if an eruption occurs. The goal of this study is to understand the origin of magmas that have generated the eruptive products of these volcanic systems, by studying the major and trace element systematics of melt inclusions trapped in phenocrysts.

Melt inclusions were selected based on host rock age and provenance, i.e. all of the eruptive products of Vesuvius (from 25ky to 1944AD), Campi Flegrei (18-0.5ky) and Campanian Ignimbrite (from 250ky to 39ky) have been investigated. Incompatible elements (Zr, Th, Hf, etc) show an inverse variation with MgO, in particular Th/Hf ratios show a constant trend, indicating a genetic link between the magmas over time. More evolved melt inclusions in Vesuvius pre-1631 products (first, second and part of the third cycle) show compositions that overlap with those of the most evolved melt inclusions in Campanian Ignimbrites. Less evolved magma compositions of Campi Flegrei (Solchiaro, Fondo Riccio and Minopoli 1) overlap with compositions of magma trapped in less evolved Campanian Ignimbrite-hosted melt inclusions and Vesuvius 1906-hosted melt inclusions eruptive products.

Similarities in the trace element systematics for the melt inclusions in Vesuvius, Campi Flegrei and Campanian Ignimbrites phenocrysts lead to the conclusion that these magmas likely originated from the same deep source.

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