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The magmatic system of Ischia island: another piece in the puzzle of the fluid-saturated, CO_2-sustained, Neapolitan volcanism (Southern Italy)

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Melt inclusions in phenocrysts from some shoshonite to latite eruptive products of Ischia Island (Southern Italy) provide a window on the deep magmatic feeding system. Together with similar products from the other Neapolitan volcanoes (Procida, Campi Flegrei and Somma-Vesuvius), they probe the deep physico-chemical conditions of magmas generated in a mantle contaminated by slab derived fluids/melts largely dominated by CO_2.
The analyzed melt inclusions bear clear evidence for CO_2 dominated gas fluxing and consequent dehydration of magma portions stagnating at major crustal discontinuities. In general, magma differentiation at Ischia takes place under very oxidized conditions determined by an unusual, nearly equimolar, proportion of divalent and trivalent iron in the melt.
Budgets of magma degassing show that at Ischia there is much less magma than that needed to directly supply the amount of magmatic fluids released at surface, thus constraining the role of CO_2 rich deep fluids in originating the volcanism and generating caldera resurgence.
The acquired data, together with those from the other Neapolitan volcanoes, show that, despite the compositional and eruptive style differences within the poorly extended Neapolitan Volcanic area, the different kinds of volcanism are linked by supercritical CO_2 fluids produced by devolatilization of subducted terrigenous-carbonatic metasediment, that infiltrate the mantle wedge, generate magmas and control their ascent up to eruption. In particular, fluid upraise and accumulation at crustal levels beneath Neapolitan volcanoes occurs with different flow-rates that depend on the major geological structures, particularly NW-SE normal and NE-SW transfer regional fault systems.