Constraining slab recycling under Vesuvius volcano from combined U-series and non-traditional stable isotope (Mo, $^{238}U/^{235}U$) data

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The fate of deeply subducted oceanic crust and overlying sediments is of great importance for its role in the generation of magmas in subduction-related geodynamic settings. Italian volcanoes, and Vesuvius in particular, are good laboratories to investigate these processes due to their strong enrichment in K and incompatible trace element that requires a significant amount of sediment material recycled into the mantle. Volcanic rocks from Vesuvius display ubiquitous ^{238}U excesses (up to 27%), a feature that is unusual in such enriched subduction-related magmas. In addition they have among the highest ($^{231}Pa/^{235}U$) and ($^{226}Ra/^{230}Th$) reported for arc rocks. These characteristics require a recent addition of a high-U component to the mantle beneath the Italy. In order to constrain the origin and nature of this slab-related component we present new data on non-traditional stable isotopes (Mo, $^{238}U/^{235}U$) on both volcanic rocks and possible sedimentary end-members. Non-traditional isotope systems such as Mo and $^{238}U/^{235}U$ are sensitive to redox-related isotopic fractionation on the Earth's surface, hence they may provide key information on the type of material recycled from the subducting slab to the mantle wedge.

The combined use of these different isotope systematics will provide a wider picture of the mechanism and timescales of the processes occurring from slab subduction to magmas generation and ascent above subduction zones.