Non-traditional isotope tracers ($^{238}U/^{235}U$ and $^{98}Mo/^{95}Mo$) of subduction processes in the central-Mediterranean magmatism

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Non-traditional isotope systems such as Mo and $^{238}U/^{235}U$ are notably fractionated by redox-related processes on the Earth's surface. Such distinctive signatures may be carried into the mantle wedge via subduction and provide valuable tracers of components involved in magma genesis. Thus we measured Mo isotopes and $^{238}U/^{235}U$ on a suite of central-western Mediterranean calc-alkaline to ultra-potassic rocks (both silica-oversaturated and under-saturated). The studied rocks are associated with destructive plate margins, showing strong depletions in Nb and Ta, highly radiogenic Sr isotopes and most notably extreme enrichment in incompatible trace elements with respect to other volcanic arcs. These features have been long related to recycling of sedimentary material of different compositions into their mantle sources, making these rocks particularly suitable to investigate the role and nature of recycled sediments in subduction related magmatism. The data show an extremely wide spread of $^{98}Mo/^{95}Mo$ values, especially for the silica under-saturated products, that is significantly larger than any volcanic rocks suites reported so far. Smaller variations have been measured for $^{238}U/^{235}U$.

We discuss the isotope composition of the studied volcanic rocks and possible sedimentary end-members with the aim of constraining the lithology of the recycled sediments as well the mechanism of element transport from the slab to the mantle (i.e. fluids vs. melts).