TRACING SUBDUCTION COMPONENTS WITH MOLYBDENUM ISOTOPES: THE CASE OF ROMAN MAGMATIC PROVINCE MAGMAS

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Understanding the fate of recycled material into the convecting mantle is a key aspect to provide new constraints on the chemical budget of subduction zones. Molybdenum isotopes have been shown to fractionate in the oceans during the incorporation into sediments, being perceptive to redox conditions. Indeed, the variable composition of Mo isotopes recorded in different geochemical reservoirs offers the opportunity to use these isotopes as tracers of recycled material into the mantle.

The products of the Middle Latin Valley volcanic region within the Roman magmatic province (Italy) show extremely variable and well distinct geochemical and isotopic signatures, which are referred to a change in the subduction-recycled component (e.g., sediment lithology), making this area an interesting case study to tackle the role of different subduction-related metasomatic agents using Mo isotopes.

We thus performed Mo isotope analysis on magmatic rocks and sedimentary end-members as proxy of the recycled component. The heavy Mo isotopic signatures, reveal a sort of “Mo anomaly”, which is not observed in the nearby magmatic regions. Such heavy composition, along with the pronounced sediment-dominated character, suggests the presence of an isotopically heavy component (i.e., anoxic organic-rich sediments) in the subducted material. Thus, the application of Mo isotopes to complex subduction settings show the potential of Mo isotopes as tracers of the fate of organic carbon in subduction zones.