Extreme HFSE fractionation in Italian magmas: metasomatism *vs.* different mantle domains

A. BRAGAGNI[1]*, F. MASTROIANNI[2], R. AVANZINELLI[2], S. CONTICELLI[2], C. MÜNKER[1]

[1] Institut für Geologie und Mineralogie, Universität zu Köln, Germany (*correspondence: abragagn@uni-koeln.de)

[2] Dipartimento di Scienze della Terra, Università degli Studi di Firenze, Italy

Central and Southern Italy hosts a wide range of volcanic rocks. Magmatism in the circum-Thyrrenian area is mostly related to the subduction of the Adriatic and Ionian plates. It started in the Miocene, in Corsica and moved eastward to Tuscany, following the roll-back of the Adriatic slab. In the Quaternary, the magmatism shifted southeastward, from the Roman Province (Latian) to the Neapolitan area (e.g., Vesuvius) and the Aeolian arc (e.g., Stromboli). Overall, the erupted magmas show large chemical variations, from calc-alkaline to ultra-potassic, and variable degrees of silica saturation, from over- to under-saturated. In addition to subduction related volcanism, within-plate magmatism occurs in the Sicily Channel (e.g., Pantelleria), whilst Vulture and Etna show intermediate character. The compositional, chronological and spatial variations in the circum-Tyrrhenian volcanism have been explained by different types of slab-derived components (silica-rich *vs.* carbonate-rich) and different mantle domains (depleted *vs.* fertile).

To better constrain the processes responsible for this geochemical variability we determined HFSE, W, U, Th concentrations by isotope dilution, and $^{176}Hf/^{177}Hf$ on rocks from Tuscan and Roman Provinces, Stromboli, Vulture, Etna, and Pantelleria.

Our results show selective enrichment in W relative to U and Th in Vesuvius magmas, pointing towards enhanced W flux from subducted carbonate-rich material. Potassium-rich lavas from the Roman Province show the highest Nb/Ta among subduction related rocks, whilst K-rich Tuscan lavas are close to normal mantle values (ca. 15). Unusually high Nb/Ta (ca. 20) and sub-canonical W/U and W/Th are observed at Vulture and Etna. Tholeiitic magmas from Etna display the most extreme Nb/Ta and W/Th ever found in within-plate rocks. Collectively, this compositional spectrum is explained by fertile mantle domains enriched in Nb/Ta and depleted in W/Th being overprinted by variable amounts of sediment-derived subduction components with lower Nb/Ta.