Allanite *in situ* dating in mylonite: Case study at the Mt Mucrone, Italy

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Allanite occurs in meta-granodiorite showing different amounts of strain, from undeformed (a) to mylonitic (f). This body intruded the polycyclic Sesia basement at Permian times and underwent HP metamorphism during the Alpine convergence. We study the effects of deformation on allanite U-Th-Pb apparent ages.

Relics of Permian magmatic monazite are found exclusively in the undeformed samples where the magmatic textures and minerals are largely preserved. Coronas of allanite, thorite and apatite surround monazite relics indicating the reaction: monazite + plagioclase + fluid $\rightarrow$ allanite + apatite + thorite.

In the mylonite, allanite forms mm-size grains in a strongly recristallised matrix, whereas it is restricted to tiny (ca. 50 μm) rims around monazite in the undeformed samples. Allanite is generally associated to the HP assemblage garnet + phengite. Its chemical zonation patterns are not altered in the deformation profile (a)-(f).

Preliminary LA-ICPMS dating of allanite does not indicate the expected metamorphic Alpine age based on petrographic and structural observations. All allanite grains show Permian ages independent of the degree of mylonitisation, recrystallisation and grain size. Despite drastic textural variations, allanite isotopic composition is uniform!

Allanite is a robust chronometer. A deeper look into textures and structures – that can be misleading at a first glance – is necessary to understand the significance of U-Th-Pb *in situ* ages in polycyclic rocks.

Effect of pyroclastic atmospheric fallout on YREE distribution in human bronchial washing solutions

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The eruption occurring during the 2001 on Mount Etna was characterised by the largest production of pyroclasts in the last 300 years. The fall out affected the urban area of Catania where YREE contents in bronchial alveolar wash solutions have been investigated to assess bioavailability of these elements in body fluids of people exposed to pyroclasts inhalation.

Obtained results evidence high YREE contents, Y-Ho decoupling and HREE enrichments in bronchial alveolar wash solutions. Y/Ho decoupling usually occur in F-rich hydrothermal fluids [1] due to the different dissolved behaviour of yttrium and holmium during complexation. At the same time increasing stability of REE dissolved complexes with several ligands, apart from Cl^-, along the lanthanide series is a suitable explanation for observed HREE enrichment [2-3]. Furthermore, pyroclastic products are formed by a solid silicate fraction and soluble salts coating silicate surface. The last fraction has high trace element contents being formed during ash uprising inside the volcanic plume where trace elements are enriched as high temperature volatile complexes. Salt coating is highly soluble and quickly dissolves when exposed to aqueous media. Such features suggest dissolution of labile YREE-rich sublimates can provides large YREE bioavailability to body fluids. A comparison with YREE pattern in leaching solution from interaction between ash and seawater [4], excludes a contribution of YREE from leaching of silicate fraction.

[1] Bau (1996) *Contrib. Miner. Petrol*. **123**, 323-333. [2] Wood (1990b) *Chem. Geol.* **88** 99–125. [3] Haas *et al*. (1995) *GCA* **59** 4329–4350. [4] Censi *et al*. (2007) *GCA* **71**, 5405-5422.