U-Pb geochronology and geochemistry of the granulite-amphibolite complex in the Asinara Island (Italy)

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In Sardinia, the Posada – Asinara mylonitic mélange zone gathers eclogitic relicts with N-MORB affinity, high-grade and medium-grade continental complexes (Carmignani *et al*, 1992, 1994), interpreted as the southern margin of Armorica and northern margin of Gondwana, respectively. In the Asinara Island, an intermediate to high-grade granulite crust section (Oggiano and Di Pisa, 1988) attains the deepest exposed level at Punta Scorno, where a basic complex, interleaved by cm to m thick felsic layers occurs. The felsic layers were selected for U-Pb radiometric dating by ELA-ICP-MS on zircons at CNR – IGG Pavia. In the granulite-amphibolite complex, each felsic layer yielded different ranges of Concordia ages, from Neoproterozoic (672 ± 12 to 588 ± 16 Ma) until a Cambrian system closure (514 ± 22 to 506 ± 15 Ma). Early Ordovician ages spans between 491 ± 13 and 474 ± 12 Ma. Late Ordovician – Early Silurian ages fall in the 461± 10 to 435 ± 12 Ma interval; Devonian and Carboniferous age values also result. This points to a long-lasting, sequence of metamorphic events with episodes of partial melting, in the lower crust.

Investigation of the methanotrophic activity in the soils of a geothermal site of Pantelleria Island (Italy)

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Yearly, 22 Tg of CH_4 are released in to the atmosphere from several natural and anthropogenic sources [1]. The total CH_4 emission from geothermal/volcanic areas is not well defined since the balance between emission through degassing and consumption through soil microbial oxidation is poorly known.

Our pourpose was to explore the methanotrophic potential and the bacterial diversity of the soils of Favara Grande, the main geothermal area of Pantelleria island, (Italy), whose emissions are in the order of 2.5 Mg/y [2]. Two of the three sites analysed, show high methane consumption (up to 950 ng/g/h), temperatures from 58 to 75 °C and pH from 5 to 6.

The total bacterial diversity analysed by PCR-TTGE of the 16rRNA gene revealed similar profiles in these two sites. The culturable methanotrophic alphaproteobacterium Methylocystis sp. was isolated by enrichment cultures from soil samples of the most active site. The isolated species shows a wide range of tolerates pH values from 3 to 8 and temperatures tolerance a least up to 37 °C and has a methane oxidation rate of 450 ppm/h. A larger diversity of (α- and γ-) proteobacterial and verrucomicrobial methanotrophs was detected by using a culture-independent approach based on the the amplification of the methane mono-oxygenase gene (*pmoA*).

Understanding the ecology of methanotrophy in geothermal sites will increase our knowledge of the role of soils in methane emissions to the atmosphere.

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