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U-Pb zircon dating (LA-ICP-MS) of the Ordovician felsic volcanism through the Variscan Units in Sardinia (Italy)

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The structural pattern of Sardinia exposes a crustal section from 1) an External anchimetamorphic Zone characterised by folds and thrusts, 2) a Nappe Zone equilibrated under greenschist facies, and represented by a pile of tectonic units with south – west sense of transport, 3) an Internal Zone formed by metamorphic rocks equilibrated under medium-P amphibolite facies and a high-grade metamorphic complex.

An extensive *in situ* U-Pb zircon dating of felsic volcanic rocks (8 samples) from Nappe Zone and Internal Zone has been carried out by laser ablation - inductively coupled plasma - mass spectrometry (LA-ICP-MS). The results enable us to describe a succession of igneous events occurred in different and subsequent geodynamic environments. In the Sardinia Lower Paleozoic basement, three igneous events can be distinguished on the ground of stratigraphy, isotope geochemistry (Di Pisa et al., 1992; Buzzi et al., 2007) and U-Pb radiometric dating: 1) a Cambro-Ordovician intermediate to felsic calc-alkaline volcanism, 2) an Early Ordovician bimodal, alkalic, volcanic and hypabissal magmatism and 3) a Late Ordovician alkalic, basic plutonism and felsic volcanism.

In the Internal Zone, the Ordovician diamictic metapelite and oolitic ironstones sequence is interbedded with peraluminous rhyolites and dacites (Li Trumbetti and Canaglia Units). The spots carried out on the magmatic textural sites of zircons yielded ages of about 485 Ma.

In the Nappe Zone, the thick sedimentary sequence of Middle Cambrian – Early Ordovician metasandstones (San Vito Fm.) is covered by volcanic rocks: peraluminous trachyandesites and subordinate, mildly peraluminous rhyolites associated with subalkaline basaltic pillow lavas. A radiometric age of $\sim$ 490 Ma has been obtained on zircons from the rhyolite. The sequence continues with reworked andesitic and dacitic lavas, topped by andesitic volcanites of about 465 Ma (Gerrei Unit).

The Upper Ordovician – Silurian metasediments of the Gerrei Unit are interbedded with epiclastites of dacitic composition; the U-Pb dating of zircons from the dacite gives the age of $\sim$ 440 Ma.

The peraluminous trachyandesitic, dacitic to rhyolitic volcanism occurring throughout the Sardinia Lower Paleozoic basement probably attained a Cambro-Ordovician arc setting, on the basis of trace element and Sr - Nd isotopic contents of the associated calc-alkaline intermediate rocks (Buzzi et al., 2007) and also in accordance with recent paleogeographic recontructions (von Raumer et al., 2003). The Early Ordovician alkaline basic rocks likely represent an early phase of the major rifting event at the Northern Gondwana margin, that probably attained the formation of the Rheic ocean (von Raumer et al., 2003; Buzzi et al., 2007). Finally, the geochemical data of the Late Ordovician alkalic, basic plutonism and dacitic volcanism reflect the onset of the paleo-Thethys rifting event (Buzzi et al., 2007).

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