Geophysical Research Abstracts, Vol. 7, 01502, 2005
SRef-ID: 1607-7962/gra/EGU05-A-01502

The Mount E'Senes Magmatic Complex (NE Sardinia, Italy): an example of Late Variscan granitoid's emplacement, syntectonic to a sinistral strike slip shear zone

G.Muzio

Dip.Te.Ris.,University of Genova – Italy

elter@dipteris.unige.it / fax: +39 010 352169

The Variscan Sardinia belt could be subdivided, in four oriented NW-SE zones (Elter et al., 1999, 2004), in relation to their structural-metamorphic frame.The foredeep zone that outcrops in the southwestern corner of the island, with the lowest metamorphic grade; the nappe zone subdivided in internal zone and external zone, which crops out in the central island; it's characterized by increment of metamorphic grade towards NE, from chlorite zone to biotite+albite zone (Internal Nappe Zone). The Axial Zone or High Grade Metamorphic Complex (HGMC, Elter & Corsi, 1995, Elter et al., 1999, 2004) outcrops in the northern part of the island and many types of migmatites are recognizable, belonging to the sillimanite+muscovite and k-feldpar+sillimanite zones. Between the Nappe zone and the Axial Zone is present a condensed isogrades zone namely Posada Valley Zone (PVZ – Elter et al., 2004). All the four zones are intruded by the large Variscan batholith: on the whole, three main "suites" are recognizable (Bralia et al., 1981): I) pre-tectonic granitoids (Mg-K suite; 330 – 325 Ma), that represent 1% of total activity and is characterized by isolated spots; II) syn- late tectonic granitoids (diorites, granodiorites and monzogranites; 325 –306 Ma), represent 75% of total activity; III) post-tectonic granites (leucogranites; up to 275 Ma), represent 24% of the total activities).

In the Mount E Senes area outcrops the Mount E Senes Magmatic Complex (MSMC) and is composed by a sequence of metaluminous calc-alkaline granodiorites (Cuile

Is Furros Granodiorite, CFG) and peraluminous monzogranitic to leucogranitic rocks (Punta Su Grabellu two-mica Granites, PGMG; Mount E'Senes garnet-bearing Leucogranite, LMS and minor aplo-pegmatitic dikes). The CFG and PGMG are both characterized by pervasive foliation which developed during the magmatic stage (MF) and under solid-state/ ductile conditions through the coeval association of pure shear and simple shear (Muzio, 2003). The MF is pointed out by the Lattice Preferred Orientation of feldspars or by the orientation of the maximum axis of the abundant microgranular mafic enclaves (MME). The LMS bodies and related dikes are the youngest intrusions and they are characterised by a isotropic fabric.

The CFG/PGMG structural frame is as follows: their density plot of MF shows a orientation of N40 in the western/eastern marginal area and N100 in the central area.

New geochrological data about CFG, made by an Ar/Ar analysis on Ms and Bt, allow to define an emplacement time span between 315 – 306 Ma (Muzio, 2003). The structural relationships between CFG and PGMG point out the coeval emplacement of these two granititoids: infact the FM cross the contact between the two granitoids: the 315 ± 3 Ma can be extended also to the PGMG emplacement. The P emplacement is confined to 2,5 – 3 kbar (Di Vincenzo & Ghezzo, 1996).

Structural relationships allow me to define that the MF pattern could be related to a NE-SW sinistral strike slip shear zone (namely, Monte E Senes Shear Zone, MSSZ, Muzio, 2003), developped during the late Variscan phase in Sardinian Belt.

The MSSZ could be coeval with the Posada Valley Shear Zone, (Elter et al., 2004), and it belongs to the Late Shear Event network that developped during the late Variscan orogenetic tectonicism (Elter et al., 1990, 1999, 2004).

The analysis of the MSSZ stress-axis, define that T axis is oriented N80 while the shortening P axis is oriented N160.

The analysis of finite strain MME pointed out that the noncoaxial deformation, syn tectonic to the emplacement, could fall in the field of transpression, (Fossen e Tikoff 1983).

The known relationships (Elter et al., 1990, 1999, 2004) between the Sardinia-Corsican Massif and the Maures Massif (MM, S France) allow me to define a coeval shear pattern with syntectonic emplacement of granitoids. In the MM the Grimaud Fault (GF) crops out with the Plan de la Tour syntectonic granodiorite (PTG). The age of emplacement of PTG is at 320 Ma (Onezime et al. 2002). The relationships between PVSZ and GF (Elter, 1990, 1999, 2004) allow to define the coeval emplacement between CFG and the PTG during the same late Variscan tectonicism.

Nevertheless, in relation with Edel 2000, the Late Carboniferous position of the Corsican-Sardinian Massif allow me to make new considerations.

In according with Edel, 2000, the Sardinian-Corsica Massif could be positioned with the HGMC towards W and the Foredeep Zone in eastwards direction. So the direction of PVSZ becames N-S direction while the MSSZ in NW-SE direction.

The MSSZ could be inserited in a more complex shear system that characterized all the European Variscan belt.

Concluding I'am able to affirm that the MSSZ is a shear zone that develops at 325 – 310 Ma and at a low depth about 6-7 km.

Beside the study of Mount E'Senes Complex an analysis of a monzogranitic complex outcropping in the Calangianus area in the NE of Sardinia is carried out. This study has been necessary to define the structural frame-relationships between the syn and late granitoids. In this site, in fact; outcropping a monzogranites belonging to the Late intrusions and it cut the Granodiorite suite. In this area is made a same investigation like a Mount E'Senes Complex, with an analysis of data of the MF.

It is Possibile to observe that the magmatic structuration in the complex is related to a presence of a transpressional environment despite the vacancy of a shear zone evidence. Neverless the axis of the transpressional event shows a same P-T orientations like ones recognizable in the Mount E'Senes Complex.

This allow me to hyphotize that the stress present during the emplacement of GCF continuing also at the time of monzogranitic emplacement (300-290 Ma, Di Vincenzo et Ghezzo, 1992) and is possibile to hyphotize that this transpressive event continued during an age period comprising 325 to 290 Ma.