sheet embedded in rocks composed of amphibole and/or pyroxene, feldspars, biotite and quartz. The country rocks originated through a high level thermal metamorphism of a clinopyroxene-plagioclase-biotite rock (vaugnerite) and their mineral assemblages indicate a decrease of temperature of this metamorphism outwards the granodiorite. At the contact the granodiorite gradually passes into its country rock through a few meters wide transitional zone. The granodiorite and the transitional zone exhibit well pronounced deformational structures (shear zones, foliation) generated at both magmatic and post-magmatic stages, whereas the rocks situated outside are not deformed.

The granodiorite was emplaced and crystallized during deformation of embedding series. The magma and the hot granodiorite soon after its crystallization were soft elements in an exposed in Koźmice rock assemblage, and the deformation was concentrated in them. The transitional zone between the granodiorite and its wall rocks is therefore indicative of processes taking place at the contact of magma and solid country rock during deformation. This zone might have been produced by magma contamination by grains coming from the disintegrated country rock and, further outside, by penetrative infiltration of magma into weakened and loosened country rock. The action of tectonic stress (shearing) seems to be a prerequisite for the formation of the transitional zone. Similar transitional zones occurring at contacts of magmatic intrusions with rocks lacking thermal markers (e.g. quartz-feldspathic ones) may be much more difficult to interpret.

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ROTTURA A.*, BARGOSSI G.*, CAIRONI V.**, D'AMICO C.*, MACCARRONE E.*** - *Petrology and geochemistry of late-Hercynian granites from the Western Central System, Iberian Massif*

A geological, petrographic and geochemical study involving mineral chemistry, zircon typology, whole-rock major, trace and rare earth element data, has been carried out on the granites occurring NNW of Bejar in the western zone of the Spanish Central System. These consist mainly of hydiomorphic and porphyritic-textured biotite monzogranites-granodiorites, with minor muscovite ± cordierite-bearing types, cleary intrusive at high-level into a thick sequence of greywackes and pelites metamorphosed at greenschist facies and cordierite ± K-feldspar-rich migmatites. Spatial distribution of the muscovite ± cordierite-bearing granites shows no correlation with proximity to the migmatite contact. Magmatic textured mafic microgranular enclaves commonly occur in the granites.

The textural and compositional evidence indicates a magmatic origin for plagioclase (well zoned up to An61; synneusis associations; etc.), biotite and partly for muscovite; cordierite may be primary and partly exogenic in origin.

The chemical data show the following: 1) moderately peraluminous typology for both granite types, more pronounced in the muscovite ± cordierite facies (A/CNK = 1.9 vs. 1.13; normative C = 2.36 vs. 1.99), which is also more acidic (SiO_2 = 70% vs. 68%); 2) different variation trends rather scattered in the muscovite ± cordierite granites, linear and in some instances compatible with a fractional crystallization process in the dominant biotite granites; 3) LREE-enriched patterns with moderate to pronounced negative Eu-anomaly (0.5 to 0.25), total REE decreasing with differentiation and higher HREE fractionation (Gd_N/Yb_N = 2.26 vs. 1.84) in the muscovite ± cordierite granites.

In the zircon typologic grid (after PUPIN, 1980) the biotite granites plot in the domain of the hybrid calc-alkaline granitoids and the muscovite ± cordierite types in that of the aluminous anatectic granites. Biotite granites enclosing xenocrystic cordierite do also occur.

The field, petrographic and chemical data rule out genetic processes involving a unique homogeneous source and suggest, in agreement with available initial Sr-isotopic composition (0.7094) for granites from the Eastern Central System, an origin via mantle-crust mixing processes. Further data, especially isotopic, are necessary to constrain the granite genesis in terms of source material and to choose between: (i) an intracrustal melting process triggered by the coeval ascent of mantle derived magmas (Appinitic suite of Spanish Authors) and involving an igneous-sedimentary composite source and, (ii) an interaction of differentiated mantle-derived magmas with crustal materials.

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ROTTURA A.*, BARGOSSI G.*, CAIRONI V.**, DEL MORO A.***, GRASSI G.*, MACCARRONE E.****, MACERA P.***, PAGLIONICO A.*****, PETRINI R.***, PICCARRETA G.******, POLI G.******* - *Petrology, geochemistry and petrogenesis of late Hercynian granitoids from the Southern Calabrian «Arc» (Southern Italy)*

The late Hercynian (295-270 Ma; Rb/Sr and U/Pb mineral ages) granitoids occurring in the Southern Calabrian «Arc» have been studied for phase chemistry, major and trace elements, REE, zircon typology and Sr and Nd isotopes.

Two distinct granitoid associations, both in time and space related and generally intruded at high level, have been distinguished: i) calcalkaline, compositionally-expanded (SiO_2 = 48-72%) and biotite-dominated; 75% of the plutonic rocks; ii) peraluminous,

compositionally-restricted (SiO_2 = 67-76%) and two micas ± Al-silicates-bearing; 25% of the plutonites.

Rock compositions range from Bi-Hbl-quartz gabbro/diorite (~ 5%), Bi ± Hbl tonalite (~ 30%), Bi-granodiorite (~ 50%) to two mica fine-grained and porphyritic granodiorite (~ 10%; core facies) in the calcalkaline association; from leucotonalite to monzogranite in the peraluminous one. Both granitoid types are ilmenite-bearing.

Mafic microgranular enclaves are widespread in the former, whereas in the latter only metasedimentary enclaves occur.

The granitoids display distinct major and trace elements variation trends, which cannot be explained by simple fractionation processes.

REE concentrations and patterns show a wide variability, both at local and regional scale, not correlated with the SiO_2 content; some correlations with K_2O, unrelated to the areal distribution of the sample, can be observed.

The LREE-HREE ratio is highly variable in the calcalkaline association (La_N/Yb_N = 2.5-110) and very high in the peraluminous one ($La_N/Yb_N > 30$).

LREE and HREE fractionations are variable in the calcalkaline rocks and moderate to high in the peraluminous ones. Significant Eu anomalies are developed only in quartz diorite/gabbro cumulates.

In the zircon typologic grid (PUPIN, 1980), the peraluminous rocks plot in the field of aluminous anatectic granites, whereas the calcalkaline rocks plot in the field of hybrid calcalkaline granitoids.

In the peraluminous granites $(^{87}Sr/^{86}Sr)_{290}$ and ε_{Nd}^{290} range from 0.7078 to 0.7173 and from —5,5 ot —8.4 respectively; they are indicative of heterogenous crustal sources, in agreement with zircon typology also. The source materials could have been the granulite facies matasedimets from the Serre.

For the calcalkaline association, $(^{87}Sr/^{86}Sr)_{290}$ ranging from 0.7083 to 0.7123, ε_{Nd}^{290} from —7.5 to —0.2, zircon typology and geochemical features suggest a component of mantle derived magma.

ε_{Nd} - ε_{Sr} relationships are not consistent with a simple crustal contamination process of a chondritic or depleted mantle derived magma.

Nd model ages are in the range 1100-1900 Ma for the peraluminous granites and 900-2500 Ma for the calcalkaline granites.

The occurrence of two porphiritic and fine-grained granodiorites in the core zones of the calcalkaline plutonic bodies, showing relatively high ε_{Nd} and high ε_{Sr} must be still explored.

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SACCHI R.*, SANDRONE R.**, CORDOLA M.***, FONTAN D.***, VILLA I.M.**** -

Meta-diorites/tonalites in the Dora-Maira polymetamorphic basement (Cottian Alps)

Previously unreported bodies of metamorphic diorites and tonalite occur within the polymetamorphic basement of the north-central part of the Dora-Maira Massif in Val Pellice (Cottian Alps), their size being no more than hectometric.

The relation of these intrusive to the country rock is obscured by low-angle tectonics; the rock can be either massive or schistose and displays anundant melanocratic inclusions, as well as mafic and aplitic dikes; when unfoliated, it preserves igneous textural features, whereas the mineralogy was re-equilibrated during Alpine-age metamorphism. The paragenesis includes, quartz, albite, zoisite and/or clinizoisite, amphibole (both relict and newly grown), chlorite, white mica ± biotite and garnet; accessory minerals are rutile and/or sphene, apatite, zircon and ore. Major elements chemistry confirmed the classification of the intrusives as mainly diorite, The REE patterns show very uniform trends with LREE enrichement, no Eu anomaly and no substantial fractionation of HREE.

Similar rocks in nearby Val Chisone intrude the Carboniferous sequence and are thought to be Permian on general geological grounds. The crowding of pre-Alpine diorite/tonalite bodies in a small area, both in a supposedly allochtonous basement unit and in the underlying Carboniferous cover imposes critical assessement of the Nappe Tectonics model for Dora-Maira, especially the existence of large-scale displacement.

As an alternative, the age of intrusion could be doubted. Two samples of amphibole have been analysed by the $^{39}Ar/^{40}Ar$ method. The spectra are internally discordant and probably have no immediate chronological values. The prevailing ages are different in the two samples (55-67 Ma and 89-149 Ma). The Ca/K ratios are also erratic. We suppose, therefore, that the step-ages reflect the geochemistry of the individual microstructural domains, rather than a geochronological memory. We note, however, that the presence of step-ages of 19 Ma in both samples suggest a final disturbance in the Lower Miocene.

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SANCHEZ CELA V.* - *Oval Spanish structures in relationship with dynamic emplacement of granitic masses*

Generally many structural features in the sialic crust are analyzed independently of their petrological featuress.

In this paper we wish to emphasize the importance of the granitic masses, during their emplacement, in the formation of certain structures and in the origin of some rocks variously interpreted.

In this way the origin of many Hercynian-Spanish-