

compositionally-restricted ($\text{SiO}_2 = 67-76\%$) and two micas \pm Al-silicates-bearing; 25% of the plutonites.

Rock compositions range from Bi-Hbl-quartz gabbro/diorite (~ 5%), Bi \pm 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 ($\text{La}_N/\text{Yb}_N = 2.5-110$) and very high in the peraluminous one ($\text{La}_N/\text{Yb}_N > 30$).

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 ($^{87}\text{Sr}/^{86}\text{Sr}$)₂₉₀ and $\epsilon_{\text{Nd}}^{290}$ range from 0.7078 to 0.7173 and from -5.5 to -8.4 respectively; they are indicative of heterogeneous crustal sources, in agreement with zircon typology also. The source materials could have been the granulite facies metasediments from the Serre.

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

$\epsilon_{\text{Nd}} - \epsilon_{\text{Sr}}$ 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 porphyritic 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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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 abundant 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 clinzoisite, amphibole (both relict and newly grown), chlorite, white mica \pm 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 enrichment, 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 allochthonous basement unit and in the underlying Carboniferous cover imposes critical assessment 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 $^{39}\text{Ar}/^{40}\text{Ar}$ 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 features.

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-

oval structures is related to the emplacement of granitic masses. Such morphologies appear to represent the «skin» manifestations of early dynamic granites that outcrop in some zones. These granites, in later reactivation processes, together with others of new generation, can reach the Earth's surface.

The relationship between these oval structures and the dynamic emplacement of granitic masses was mainly deduced through petrological studies on various petrographic facies associated to these structures, such as: brecciated quartz-feldspathic rocks, sedimentary limestones, «kaoliniferous» minerals, etc.

Although the physical stage (melted or solid) of emplacement of these oval granitic masses is not considered here, we relate the origin of these granites with crustal thickening phenomena in such zones. Both, granites and interrelated thickening phenomena, could be related to some mechanism of «sialic-mantle segregation» (not well understood) or transformation of the Upper Mantle in sialic crust (according to a particular expansion theory) with more or less participation of suitable sedimentary materials.

These oval granitic morphologies appear to represent the most suitable structures of the plutons for their mobilization and later emplacement, since they require the minimum of energetic conditions.

The structural-petrological resemblance of these Spanish oval structures with other foreign counterparts could suggest the existence, in many places, of a similar relationship between oval structures and the origin of certain rocks with dynamic emplacement of granitic masses.

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SANCHEZ CELA V.*, ORTIGA M.*, GARCIA R.*, APARICIO A.*, LAPUENTE M.P.* - *Lamprophyric rocks in Central Pyrenees (Panticosa, Spain). Structural and petrological features*

In the Panticosa Massif, associated to Hercynian circumscribed granites, there exist abundant dikes of lamprophyric rocks with two structural arrangements. The earliest placed dikes show Northern bearings (N 10-20° E), whereas the most recent, probably of a late Hercynian age, are arranged approximately in an E-W direction (N 90-110° E).

The N-S dikes, not properly defined as lamprophyres, can be included among «protodiabases» and similar rocks. They consist of Na-plagioclase, quartz, chloritic and Fe-Ti mineral, as well as a great deal of carbonatic-argillaceous minerals, which are very interesting from a petrogenetic point of view.

The W-E dikes, of a mainly kersantitic nature, show typical lamprophyre features. They are composed of plagioclase (andesine types), kaersutite, Ti-augite Fe-Ti oxides, as well as carbonates and other accessory minerals. Their texture varies from a trachytic type on the borders, to doleritic in the centre.

The origin of Panticosa lamprophyric rocks is suggested to have a certain connection with their structural emplacement. The N-S dikes, with the fewest igneous features, are found to be associated with Hercynian secondary structural accidents, where uplifting phenomena were not important. On the contrary, the W-E dikes happen to be related to the main Hercynian structures, where important uplifting phenomena and mylonitic-shear-friction processes have taken place. In this way the anatexis induced by mechanic processes together with crustal materials of diverse nature could have a certain importance in the origin of these lamprophyric rocks.

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SANTOS OLIVEIRA J.M.* - *Geochemical features of Hercynian granites of Portugal. Considerations on their metallogenetic importance*

The Hesperic massif, which occupies the western and central part of the Iberian Peninsula, makes up the most continuous fragment of the Hercynian Chain of Europe.

The Hercynian orogenesis was accompanied, in this region, by regional metamorphism and some phenomena of synorogenic magmatism, producing two main types of granitoid rocks:

- alkaline and peraluminous leucogranites, emplaced during the tectogenesis (probably by humid anatexis of the middle part of the crust) and controlled by regional metamorphism (mesocrustal granites);
- monzonitic calcalkaline and metaluminous granites, with associated basic rocks, emplaced during and after the tectogenesis from a dry fusion of the lower part of the crust (deep crustal granites).

The geochemical analysis of W, Sn, Li, Rb, Ba, Sr, Nb, Zr, Y and F in some granitoids of the north of Portugal led to the distinction of those groups of rocks.

Fluorine revealed to be important element showing an enrichment in the deep crustal granites (average of 1275 ppm) in comparison with the mesocrustal granites (average of 992 ppm). The trend of variation of this element in a granitic system indicates a progressive enrichment until the calcalkaline granitic series.

The contents of Rb, Li, Ba and Sr and some selected parameters, such as Rb/Sr, K/Rb and Mg/Li, also appeared to be useful to distinguish the two types of granites.

In metallogenetic terms, both granitic series contain specialized rocks, i.e., susceptible to be associated with mineralisation of granitophile elements, although the deep crustal serie has revealed values of higher geochemical and metallogenetic specialization.

Fluorine, together with the alkaline elements Rb and Li, the Rb/Sr, K/Rb and Mg/Li parameters and also Sn and W can be used as litogeochemical guides for mineral prospecting, either at a regional scale of province, or at a local scale of little plutons. The following values