Congresso di Verbania

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Riassunti

ANDERSSON UFL B.* - *An example of plutonic magma-mixing, Southern Sweden*

A proterozoic rock association of coarse-porphyritic granite and quartz-dioritic basites, has been investigated. The rocks occur in the Trans-scandinavian Granite-Porphyry belt (around 1750-1830 Ma), which mostly cross-cuts the main svecokarelian structures. Intermediate, hybrid rocks constitute a part of the association and show characteristics of both the granite and the basic end members. Both the bulk chemistry, minerlogy-mineral chemistry, magnetic characteristics and field observations suggest mixing of magmas or crystal-mushes.

The bulk chemistry of the hybrids generally plot linearly between the end members, with varying degrees of mixing displayed. Mixing is also reflected in the mineralogy. The hybrid rocks contain variable amounts of megacrystic K-feldspar and quartz as well as clinopyroxenes zoned plagiolcases rich in inclusions usually observed in the granite and quartz-diorite respectively. Cores of zoned plagiolcases and pyroxenes have the same composition as those in the quart-diorite, suggesting mechanical mixing of crystal containing magmas.

However, from the mineral chemical analysis of biotites and amphiboles a reequilibration of their composition is apparent in the hybrids, adjusting to the new chemical environment.

In addition, field evidences for mixing is the occurrence of dark rounded enclaves in the hybrides as well as in the granite. They often contain megacryst of K-feldspar and quartz similar to those observed in the granite. Quartz-diorite sometimes forms more or less diffuse pillowlike structures in contact with the hybrids and the granite. Textures of the enclaves are very hybridic in character with components from the surroudings in a finegrained quartz-dioritic matrix. These features imply a first stage of mixing with a high degree of homogenization and a second stage involving the formation of pillows and enclaves.

In large parts of the area, however, the hybrids are rather homogenous indicating thorough mechanical mixing enhanced by diffusion processes operating during slow cooling in the plutonic environment.

Magnetic anomalies can be directly correlated with the magnetite content of the rock. There is a very pronouneed positive aeromagnetic anomaly in the main mixing area as well as smaller anomalies in the surrounding granite. This pattern is confirmed by outcrop susceptibility measurements, which show that hybrids have higher susceptibility than granite. Parts of the granite associated with the smaller magnetic anomalies have higher susceptibility values. This indicates that the anomalies are not entirely due to basic, magnetite rich rocks at depth but also reflect hybridization and also a mixing component in the granite itself.

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APARICIO YAGÜE A.*, SÁNCHEZ CELA V.** - *Petrological meaning of garnets in granitic rocks (Cabo Ortegal, NW of Spain)*

The Cabo Ortegal area is formed by different types of metamorphic rocks as schits amphibolites, granulites, eclogites, serpentinites... etc. (Fig. 1).

Granitic rocks appear as small stocks, from a few to several hundred meters long. They are, in many cases,

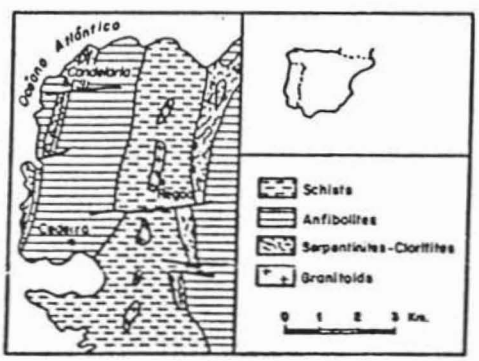

Fig. 1

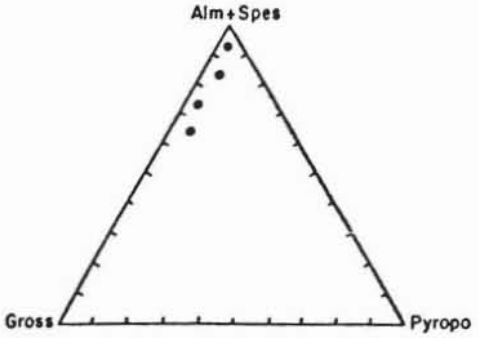

Fig. 2

enclosed within garnet-bearing schists, orientated towards the same direction. This association generates some metamorphic enclaves. Both, enclaves and host rocks are transformed by subsequent feldspathization processes, originating «lit par lit» structures.

The intrusion was synchronical with the principal Hercynian tectonic phase described for this zone.

These granitic rocks correspond to leucogranites with quartz, microcline, plagioclase, as well as to smaller amounts of muscovite ±, biotite ±, turmalire ± garnet. They can be defined as «S» types, representing the most evolved cal-alkaline series in the Iberian Plateau.

Garnet analitical determinations show great proportions in almandine-spessartine (Fig. 2), typical of per-aluminic granitic series. The geological, petrological and geochemical data appear to indicate a close realtionship between the emplacement of these later granitic masses and the origin of the garnets.

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APONTE F.*, BALASSONE G.*, BONI M.*, COSTAMAGNA L.*, DI MAIO G.* - *The Hercynian skarn ores in SW Sardinia: their relationships with the lower paleozoic MVT deposits*

In SW Sardinia are well known some skarn occurrences, resulting from the conctact-metamorphic phenomena related to multiple intrusions of hercynian granites. The intruded and metamorphosed rocks are Cambrian and Ordovician sediments, often containing stratabound ore deposits of Mississippi Valley type. Very frequently to the skarn are also related some small ore bodies whose main metallic content is as follows: Fe, Zn, Pb, Cu, Ba, F. Only Cu and F are not to be found in the Cambrian and Lower Ordovician metallogenesis. There are traces of Bi W, Sb, Ag and As. In this preliminary study we will consider only three main occurrence areas with distinct characteristics: 1) Fluminese; 2) Oridda; 3) South Eastern Sulcis.

1) Fluminese (Su Zurfuru, Gutturu Pala, S. Lucia)

In this area outcrop mostly the Gonnesa Fm limestones and the Cabitza Fm slates, both in contact with the Ordovician clastic sediments.

Actually there are no granites outcropping, but a small apex might be present underneath the Su Zurfuru mine. The control of the skarn phenomenon is both stratigraphic and tectonic: when the two effects are superimposed, the skarn are particularly well developed. At Gutturu Pala the thermal metamorphic effects are restricted mostly to the metallic minerals. At Su Zurfuru and S. Lucia we can observe higher temperature paragenesis, ranging from real skarns to hydrothermal veins. We can distinguish between metamorphic skarn and vein skarn. In the metamorphic skarn there are: Ca-garnet, hedembergite, chlorite, epidote, quartz and calcite, with less wollastonite, diopside and actinolite. Metallic minerals consist of: pyrite, sphalerite, galena, chalcopirite and magnetite with less marcasite, pyrrotite, haematite and sulphosalts. In the vein skarns we have two distinct association: a) hedembergite, chlorite, quartz, calcite and b) wollastonite, chlorite, epidote. The ore minerals are mostly galena, pyrite, marcasite and heamatite. The general paragenesis shows that the first minerals to be formed are wollastonite, hedembergite, garnet and diopsite, followed by a hydrothermal phase, to which the ore deposition is ralated, with chlorite, epidote, fluorite, calcite, quartz, barite (and in Su Zurfuru the extremely rare mineral armenite).

2) Oridda (Perda Niedda, Tiny, Sa Duchessa)

In this area the most important geologic features are the karstified contract between the Gonnesa Fm and the Ordovician clastic sediments, often acting as channelways for the metamorphic fluids, as well as some important tectonic lines. We should point out, however, that in the whole region a shallow degree of thermal metamorphism is always present, as observed in the ore minerals association (Barrasciutta, Perdu Carta, Reigraxius). At higher temperatures we can distinguish between barren (vein) and mineralized (mostly metamorphic) skarns. In the first case the mineralogical association is: Ca-garnet, tremolite, epidote, chlorite. In the second we have different types in relation to the originary lithology, the nature of the fluids and the importance of the late hydrothermal phase. At Tiny and P.ta Nebidedda the paragenesis contains Ca-garnet, wollastonite, andalusite, chlorite, sericite, quartz, calcite, dolomite. The ore minerals consist of galena, sphalerite, pyrite. At Perda Niedda and Sa Duchessa we have a lower temperature paragenesis: sericite, chlorite, quartz, calcite, fluorite and relicts of altered amphiboles. The metals contained in pyrite, magnetite, chalcopyrite, sphalerite, galena and traces of pyrrotite and arsenopyrite. The paragenetic sequence shows also in the Oridda region a first phase of higher temperature skarns with only small metallic deposition a second phase, with hydrothermal characteristics, to which the main ore depostion is related.