

the Southern part of the French Massif Central (Bonds, Mt. Lozère) which are similar to those observed in Sn-W veins (RAMBOZ et al., 1985; WEISBROD, 1986; DUBESSY et al., 1987). These fluids have rather low fO_2 , controlled by equilibrium in the C-O-H-N system (\pm graphite).

III. After cooling, most granites are again submitted to fluid circulations induced either by their own peculiarities (HHP granites, FEHN and CATHLES; 1978 for instance) or by subsequent thermal disturbance (late magmatic intrusions, for instance). Fluids developed local to relatively pervasive subsolidus alterations. Quartz dissolution together with K or Na metasomatism, pervasive chloritization, and structured crystallization of phyllosilicates (phengites) are the main observed processes. In most cases, fluids are meteoric, have aqueous compositions and low salinities, and temperatures range from 250 to 400°C. pH controls largely at this stage the nature of the mineralogical assemblages.

Low temperature (80-120°C) alteration of granites give diffuse and extended alteration of feldspars and phyllosilicate into smectites (CATHÉLINEAU, 1987). The chemical modelling shows that smectitization is genetically distinct of kaolinization. Kaolinite crystallizes in highly microfaulted and early altered zones, and forms either in hydrothermal or supergene conditions.

Concluding remark:

- 1) careful studies of selected examples of numerous kinds of granite — related mineralization clearly demonstrate that ore deposition may occur at any stage of the long — lived evolution of fluid circulations which have just been presented. Thus, it appears that the orthomagmatic models of ore generation are too simple and cannot explain the observed occurrences;
- 2) most observed trapped fluids appear to be of late generation more or less associated with rather low temperature fluid circulations (< 400°C) and earlier stages have often been more or less overprinted, and may be difficult to recognize. As a consequence, there is also a general overprint of low temperature assemblages, generally weak, but sometimes quantitatively significant. The significance, of such processes for the recognition of magmatic features, especially the trace elements distributions should not be ignored.

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CHERCHI G.P.*, ELTER F.M.*, GHEZZO C.*, MARCELLO A.***, MUSUMECI G.*** - *Intrusive sequence and structural pattern of the granitic Hercynian complex from the Calangianus region (Northern Sardinia)*

The Hercynian Sardinia - Corsica Batholith in the Calangianus region is composed by two granitic suites:

— Several monzogranitic plutons and stocks belonging to a late-tectonic sequence. They are constituted by pinkish coarse-grained biotite monzogranite characterized by K-feldspar megacryst and microgranular mafic magmatic xenoliths. A planar magmatic flow structure is usually recognizable at a mesoscopic scale.

— Several leucogranitic plutons, stocks and dykes belonging to a post-tectonic intrusive event. They are constituted by coarse and fine-grained biotite leucogranites.

All these plutonic bodies are extensively affected by tectonic fracture systems (mainly with N 10°-50°, N 80°-90°, N. 110°-150° trending directions).

From field observations on pluton shape and contacts, their planar fabric and fracture systems, it follows that:

- Within the monzogranitic intrusions a sequence of emplacement at relatively shallow levels towards more leucocratic types is pointed out; the planar fabric shows variable trajectories which a main N 70° trend and clearly defines a multiple intrusion pattern.
- The post-tectonic shallow level younger leucogranitic intrusions were emplaced mainly along NE-SW directions.
- The fracture pattern is due to a complex superposition of joints of variable nature and age (from late-Hercynian to Alpine).

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COCIRTA C.*, MICHON G.* - *Mafic microgranular enclaves of Northern Sardinia granitoids: the existence of two different acid-basic associations*

The carboniferous calc-alkalics granitoids (280-230 M.a.) of the northern Sardinia are regrouped in three units: G1 tonalgranodiorites rich in decimetrical microgranular basic enclaves (E1); G2 monzogranites poorer in enclaves (E2); G3 leucogranites with very few enclaves (E3). Usually these enclaves have a various and heterogenous chemistry, where contamination phenomena are obvious for some of them. The little (or none) contaminated enclaves are divided into two populations (Fig. 1): the one (E1) characterised by a FeO enrichment and a MgO impoverishment, and the other one, (E2 and E3) by a FeO, MgO, CaO impoverishment. The evolution of little (or non) contaminated enclaves are comparable to those of Punta Falcone composite basic stock (Northern Sardinia) where one observes (Fig. 1) a leucogabbroic trend with a calc-alkalic tendency, and a gabbroic trend which is characterised by an FeO enrichment; mingling and hybridation phenomena are present at the periphery of this massif.

The magmas that produced the enclaves E1 (included in the infracrustal granitoids G1) are close to initial stages of a the presupposed tholeiitic trend of a basic liquid. The magmas that produced the enclaves E2 and E3

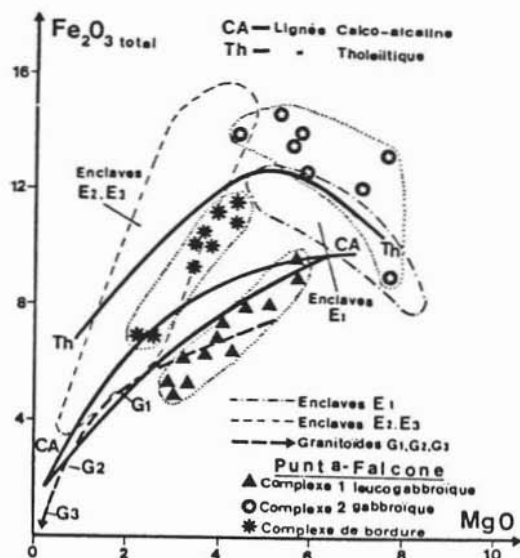


Fig. 1. — Fe_2O_3 total versus MgO diagram for the enclave-granitoids pairs and for Punta Falcone gabbros (after C. COCIRTA and G. MICNON, 1987).

(included in more superficial granitoids G2) and G3) may represent either the most evolved terms of a tholeiitic trend or the hybridation products of a ferrous basic magma.

In that way the non-contaminated microgranular enclaves may define the evolution of basic magmas associated to the granitoids, and permit us to separate in the Northern Sardinia, the existence of two different acid-basic associations:

- E1 enclaves associated habitually with G1 granitoids.
- E2 and E3 enclaves associated regularly with G2) and G3) granitoids.

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CONFORTO-GALLI C.*, GOSSO G.**,
MONTRASIO A.***, SPALLA M.I.* - *Structure of the Bergell tonalite and its roof pendants in Val Sissone (Val Malenco, Central Alps, Italy)*

The intrusive tertiary Massif of Val Masino-Bregaglia is composed of a wide range of calc-alkaline rock types cross-cutting the pile of Pennine and Austro-alpine nappes in the Rhaetic Alps (Adula, Tambò, Suretta, Malenco-Forno and Margna). The easternmost and more surficial of these nappes display a contact metamorphic aureole which postdates the regional Alpine metamorphism and the post-nappe deformation.

A 1:10:000 scale map of the eastern margin of the

intrusion shows a severe parallelism of a persistent foliation of the intrusive types with the axial surfaces of the folded roof pendants.

The structure of a single roof pendant, composed of calcsilicate marbles with contact metamorphic assemblage, has been compared in detail with that of the embodying intrusives. The mesoscale structure within the roof pendant is dominated by a fold system with an axial plane foliation parallel to that of the flanking intrusives. These folds overprint an earlier group of isoclinal meter scale folds occurring exclusively in the pendant. The intrusives, here of quartzdioritic composition (Bergell Tonalite or «Serizzo»), are foliated and the included felsic dykes are folded and boudinaged conformably both in the quartzdiorite and in the pendant. The foliation is located at low angle to the pendant margins and cuts across mesoscopic relics of magmatic layering. Folds of later deformation are geometrically distinguished and their axial surfaces cut at high angle across the roof pendant and the quartzdiorite.

This deformational scheme is coherent with the scheme delineated by TROMMSDORFF & NIEVERGELT (1983).

Qualitative microstructural observations of the quartzdiorite foliation are here added to clarify its conditions of deformation. The quartzdiorite is dominated by a planar biotite layering. Its granular fabric shows overgrowths of biotite grains with (001) parallel to the layering at the expenses of biotite lying in mechanically unfavourable positions. Plagioclase is often cataclastically deformed or is replaced by multigranular aggregates of recrystallized plagioclase II; this recrystallization must have taken place at very high temperature, shortly after the primary solidification of this mineral, as indicated by experimental work. Interstitial quartz gives rise to subgrain structure or to recrystallized aggregates, when localized within intense deformation microzones involving also deformations of biotites and plagioclase.

The meso- and microstructures of the country rocks and of the quartzdiorite indicate that compressional pulses took place during the intrusion. The quartzdiorite, while deforming into a foliated rock during its emplacement, was able to induce deformation effects on its roof pendants.

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CORAZZA M.*, CORSINI F.*, LATTANZI P.*,
TANELLI G.** - *The granite-associated Sn-polymetallic deposits of Dachang (P.R. China): sulfide chemistry and fluid inclusion data*

Several important mineral deposits of Sn, Zn, Cu, Pb and other metals are known in the Dachang district (Guangxi), in association with Devonian sediments and