



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.

* Laboratoire de Géologie, Université de St. Etienne, 42100 Saint Etienne Cedex (France).

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.

* Dipartimento di Scienze della Terra - Via Botticelli, 23 - 20133 Milano. ** Istituto di Geologia - Corso Tukory, 131 - 90134 Palermo. *** Centro di Studio per la Stratigrafia e la Petrologia delle Alpi Centrali (C.N.R.) - Via Botticelli, 23 - 20133 Milano.

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

Yanshanian (Cretaceous) granitic rocks. Early genetic hypotheses related the origin of the deposits entirely to the Yanshanian granites. Recently, it was suggested that in Devonian times an earlier syngenetic metal concentration may have occurred, later overprinted by the Yanshanian metallogeny.

The present contribution is aimed at placing constraints on the physicochemical conditions during the Yanshanian ore formation / remobilization, by study of the sulfide chemistry (arsenopyrite, sphalerite, stannite) and fluid inclusion data on the two major deposits in the area: the cassiterite-polymerallic deposit of Changpo, and the Zn-Cu-skarn deposit of Lamo.

Sphalerite and arsenopyrite are quite diffuse in both deposits; stannite is present especially at Changpo. They are accompanied by pyrite, pyrrhotite, galena, chalcocopyrite, cassiterite, fluorite and a large variety of other sulfides and sulfosalts. The main compositional data for sphalerite and arsenopyrite are summarized as follows:

Changpo: arsenopyrite associated with pyrrhotite: 31.4 to 35.9 at% As; associated with pyrite: 32.1 to 34.9 at% As; associated with pyrite: 32.1 to 34.9 at% As; sphalerite associated with pyrrhotite: 18 to 22% mol FeS; associated with pyrite: 11 to 22% mol FeS; Lamo: arsenopyrite associated with pyrrhotite: 32.9 to 35.3 at% As; associated with pyrite: 30.6 to 31.7 at% As; sphalerite associated with pyrrhotite: 17 to 24% mol FeS; associated with pyrite: 4 to 19% mol FeS.

Partitioning of Fe and Zn between coexisting sphalerite and stannite from Changpo indicates temperatures of 300°-350°C. For Lamo, the following fluids inclusion data are available: fluorite: salinities mostly of 3 to 9% wt. NaCl eq., and homogenization temperatures between 160° and 250°C; quartz: moderate salinities (1-4% wt. NaCl), and homogenization temperatures mostly of 240°-260°C.

Combining the mineralogical evidence with the compositional and fluid inclusion data, it is suggested that the evolution of the environment during the Yanshanian event was characterized by the following parameters:

- pressure was relatively low (in the order of 1 kb);
- temperature may have been as high as 500°C during deposition of the As-richest arsenopyrites, but eventually dropped below 200°-250°C in the latest stages;
- an increase in sulfur activity and/or the decrease of temperature made pyrrhotite non longer stable in the latest stages of mineralization.

* Dipartimento di Scienze della Terra, Università di Firenze - via La Pira, 4 - Firenze (Italy). ** Dipartimento di Scienze della Terra, Università di Napoli, via Mezzocannone, 8 - Napoli (Italy).

CORTESOGNO L.*, GAGGERO L.*, VANNUCCI R.** - *Petrochemical data and petrogenetic hypothesis on the Calizzano Massif granitoids (Western Liguria)*

The Calizzano Massif consists mainly of: 1) a polymetamorphic complex of paragneisses and

micaschists with orthoamphibolites and subordinate orthogneisses; 2) granitoids rocks.

The granitoids rocks occur as large bodies (granitic orthogneisses) or as dykes; the intrusive relations of the granitic orthogneisses with paragneisses (micaschists and others) only rarely survive to a later metamorphic schistogenous phase whereas dykes are parallelized along the later prealpine schistosity in the polydeformed micaschists.

All the granitoids show more or less developed gneissic fabrics and recrystallization under amphibolite facies conditions (327 M.y. from biotites and white micas Rb-Sr isotopic dating).

The granitic orthogneisses are generally coarse grained with large (up to 10 cm) K-feldspar megacrysts; zircon, apatite, allanite are rather frequent accessory phases; biotite is a primary, more or less recrystallized phase, whereas the primary or metamorphic genesis of muscovite and garnet are doubtful.

The dykes show aequigranular texture with recognizable biotite, plagioclase, K-feldspar, quartz crystallization sequence.

All the granitoids have a peraluminous characterization (A/CNK always \gg 1.1, normative corundum \gg 1) and calcalkaline geochemical affinity.

The granitic orthogneisses are monzonitic in composition and the representative points plot in the «mobilizates and related granitoids» field as defined by LAMEYRE & BOWDEN (1982). In Winkler's diagrams they fall near the cotectin surface, suggesting a minimum melting temperature of 700°C about ($pH_2O = 5Kbars$).

The dykes show granodioritic composition and low-K calcalkaline trend; in the Winkler's diagrams they represent higher T melts ($T > 730°C$ for $pH_2O = 5Kbars$).

The granitic orthogneisses represent possibly a synorogenic melt from a deep crustal source whereas dykes are better consistent with a crystal fractionation origin from a more mafic (diorite?) primary magma.

The available trace elements data suggest a syncollisional geotectonic environment for the granitoid which were likely emplaced during an eo-hercynian tectonomagmatic phase.

* Istituto di Petrologia, Università di Genova (Italy). ** Dipartimento di Scienze della Terra, Università di Pavia (Italy).

CROZE V.* - *Preliminary study of the granites from Longobucco, Calabria, Italy*

The area under is located in Calabria on the NE border of the Sila Massif. Two main types of granites may be distinguished and form massifs:

- i) a biotite granodiorite;
- ii) a peraluminous granite.

At the contact of the massif two important dykes intrude the schists (Bocchigliero serie).

Two kinds of facies may be seen within the coarse grained biotite granodiorite, which forms the principal mass. The first contains megacrysts of K-feldspar (10 cm \times 2 cm) and is poor in microgranular enclaves; the