matrix, but by iron oxides and/or epidote, and hydrothermal alteration is always present in the surrounding rock.

About the genesis of the breccia, an origin by explosive phenomena in an epiplutonic magma chamber is consistent with the high crustal level reached by the magmas (see SERRA & ENRIQUE companion abstract) and can also account for many observed features of the breccia.

Sudden release of energy as a consequence of volatile exsolution from magma in a low pressure subvolcanic reservoir can cause the fracture failure of its roof allowing gas to escape. If the internal overpressure is sufficiently high, streaming gas carrying solid particles can form a fluidized system capable of abrasively erode the fracture walls. This would result in an enlargement of the total void volume and the formation of rounded pebbles. If rising magma flows follow the gas surge then a cleaning of the channels from previously formed fragmentary material is to be expected. As this is not in accord with the observed relationships, it must be accepted that gas was not followed by ascending magma. To explain the igneous nature of the pebble masses' matrix, let us hypothesize that the present day exposition level is close to the top of the magma chamber from which gas was released. As void volume has been enlarged by the fluidized system, gas-suspended solids will collapse when pressure falls donw. Rocks at the base of the column will, in this way, enter into the underlying magma chamber and will force the injection of the liquid into the inter-pebble spaces at the same time that clasts will be more closely packed. Such a collapse injection can also account for the arcuate dyke that embraces the breccia provided that both the dyke-forming rock and these composing the pebble masses' matrix come from the same source. If this is the case then the non-porphyritic texture of the matrix as opposed to the porphyritic one of the dykes can be explained by a filter effetc exerted by the pebble packing over phenocryst suspended in the liquid of the underlying reservoir. A closure of the chamber after collapse can have prevented magma from more volatile lossing and can have maintained the required conditions for the crystallization of rocks with phaneritic equigranular textures as those observed in the matrix of the pebble masses.

Inter-pebbles spaces occupied not by igneous matrix but by oxides and other minerals are regarded as gas bubbles equivalent to miarolitic cavities.

In such a scenario, the interconnected network of pebble masses is regarded as an anastomosed system of enlarged fractures that was subsequently filled by collapsed fragmentary material and then was embedded in magma. The big tonalitic blocks isolated by pebble masses are believed to represent inter-fracture remnants of the failed roof. Tonalitic lithologies present as pebbles also derive from the fragmented roof. Leucogranitic and porphyritic clasts are believed to be fragemts of dyke rocks intruded and crystallized in the host tonalite prior to the explosive event. Some pebbles have been foud that are composed of two lithologies (e.g. tonalite and leucogranite) showing sharp contact relationships between them.

The zoned structure of the breccia appears to be due to a non-homogeneous release of energy throughout the body. The observed relationships indicate that the energy release was more intense in the inner than in the outer zone.

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SERRA P.R.*, ENRIQUE P.* - *The subvolcanic nature of the late-Hercynian calc-alkaline plutonics from Southern Catalonian Coastal Ranges (NE. Spain)*

Intrusives from Southern Catalonian Coastal Ranges from an I-type series that compositionally expands from diorite to biotitic leucogranites. They occur both as voluminous, irregularly shaped plutonic bodies ans as dykes of identical composition. Their wall-rocks are composed of an anchimetamorphic Palaeozoic sedimentary sequence that ranges in age from Silurian to Middle Carbonoferous. All these formations are covered by Triassic sediments.

Evidence supports the epizonal character of the intrusives; in addition, many features strongly suggest that the complex is subvolcanic, that is to say that magmas were emplaced in a very low-pressure environment and were able to eventually reach the surface. Unfortunately, erosion has removed any related volcanic cover.

Contacts between intrusives and their host-rocks are sharp and cross-cut the structures generated in these latter by the main Hercynian tectonic pulses. This sharpness together with the angularity of the contact surfaces, indicate a brittle behaviour of the host during magma emplacement. Intrusions are surrounded by contact metamorphic aureoles that reach — at least locally — the pyroxene hornfelds facies.

Plutonic masses are composed of several distinct bodies that record a multiple intrusion history. Preferentially they crop out in relatively depressed areas in which their enclosing rocks can be seen lying above them, with flat, nearly horizontal contact surfaces. This tendency is believed to be indicative that today's exposition level is close to the top of a much bigger batholith that outcrops only in its most apical parts.

A well developed dykes swarm is present and is especially impressive in the l'Argentera-Riudecanyes area: just above of the plutonics, NE.-SW. trending composite dykes of varied compositions and recording a multiple emplacement history, intrude into the sedimentary host-rocks occupying more than 50% of the surface and, in many cases, confining the Palaeozoic sediments to thin septas between dykes. Well formed chilled margins and fairly cystalline interiors characterize the porphyritic texture of these dykes. Their inner parts have just the phenocrystic content needed to maintain phenocryst in contact; the interstices are occupied by finer-grained material or, sometimes, by granophyric quartz-feldspar intergrowths. It is intersting to note, at

this point, that many bodies belonging to the plutonic masses, have inequigranular to porphiritic textures that closely resemble those observed in the interiors of the thickest dykes. These inequigranular plutonics also frequenly develop chilled margins against their older enclosing rocks. Chilled margins of the dykes have low phenocrystic contents and their matrices are fine-grained in some cases. spherulitic in others. Spherulitic matrices are regarded as devitrification products of igneous glasses.

Prismatic or columnar disjunction is often present in dykes and their development is especially good in the chilled margins. Although not as clearly seen, prismatic disijunction is also locally present in the marginal parts of some inequigranular to porphyritic plutonic bodies.

Scantly distributed breccia bodies attributable to explosive phenomena in magma chambers are present and support a very low-pressure of final emplacement. The Alforja breccia body is the best exposed and is decribed by SERRA in a companion abstract. This body occurs inside of the plutonics, others occur outside. Some of them are located at the intersection of two or more porphyritic dykes, others are simply pebble-dykes with rock-flour matrix or with rock-flour plus igneous material in their matrices.

The proposed high level of emplacement can only be explained if magmas reached it essentially as mobile liquids that can have carried with them minor amounts of suspended solids. This can have been the case if the water content of the magmas was so low that the slopes of their solidus curves were positive in P-T. Actually in many (but not in all) igneous bodies of the complex, minor amounts of an anhydrous mafic silicate, orthopyroxene, coexists in equilibrium with hydrated ones such as biotite and/or amphibole in rock composition from dioritic to granodioritic. Such assemblage are water buffers that demostrate that no sufficient water was available to hydrate all femic components of the magmas. This also results in expectable high temperatures of formation.

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SIAL A.N.*, FERREIRA V.P.* - *Brasiliano age peralkalic plutonic rocks of the central structural domain, Northeast Brazil*

The Precambrian, SW-NE trending, central structural domain, Northeast Brazil, comprises three segments, namely the Seridó Fold Belt (SFB), the Cachoeirinha-Salgueiro Fold Belt (SFB) and the Riacho do Pontal Fold Belt (RPF). Peralkalic plutonic rocks are widespread in the CSF, where they were emplaced between 450 and 510 Ma and around 660 Ma. They constitute two syenite groups: a) sodic to potassic, quartz-normative, which from ring-dikes, dike sets and small stocks; b) potassic to ultra-potassic, nepheline-normative synites, aligned along the Southern boundary of the CSF, forming a syenitoid line, and two dikes swarms with about 50 dikes each. They are sphene and magnetite-bearung and aegirine-augite and riebeckite-arfvedsonite-rich. Fluorite amounts to less than 1% in the first gruop. In its northern extension, the syenitoid line changes into monzonites with shoshonitic affinities.

The silica-saturated gruop in the CSF is extremely high in K, Sr, Ba, high in P, Ti and low in Zr, Nb. MORB-normalized spidergrams show Ce, Y and Sm positive anomalies and Nb and Ti negative anomalies. The oversaturated group displays negative P and positive Zr anomalies. High Ba, Sr, K, P, REE contents of alkali-pyroxenite inclusions in the first gruop suggest an anomalously enriched mantle source. Both groups show similar REE patterns, LREE-enriched and HREE-depleted, with discrete or absent Eu anomaly, due either to the high fO_2 during crystallization or to a possible cummulate nature of these rocks. Alkali-pyroxenite inclusions display LREE-enriched and HREE-depleted patterns. MORB-normalized spidergrams for rocks with shoshonitic affinities show P, Ti, and Nb negative anomalies, and Zr, Rb positive anomalies. REE patterns are LREE-enriched and approximately flat in HREE.

W.R. $\delta^{18}O$ values for the saturated group (+6 to +8 $permil_{SMOW}$) suggest differentiation from a mafic magma with minor, if any, post-magmatic alteration, or straight mantle whith minor crustal assilimation. $\delta^{18}O$ values for the oversaturated gruop (+8 to +10 $permil_{SMOW}$), suggest interaction with meteoric water and more significative crustal contamination.

The regional geographic patterns displayed by the peralkaline plutons in the central structural domain in which they seem to follow major sigmoidal fault zones are parhaps related to pull-apart along these zones, connected with Patos-Aurora and Pernambuco lineaments.

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SING R.P.* - *Chemical evaluation of the mica-pegmatites of Gaya-Hazaribagh belt, Bihar (India)*

Recent investigations of the extreme South-Western part of the mica-pegmatite belt, occuring around Chatara in Souht Bihar have revealed that emplacement of the pegmatites has been along a weaker tectonic zone, lying along the border od two Archeans cratons, one to the West and the other to the East of the mica belt. The present paper discussed the applications of geochemical data on the regional distribution-behaviour of the alkali metals leading to enrichment of K, in the extreme South-Western part of the belt; of Na, in the central zones; and of Li, in the extreme North-Eastern part of the belt. The present results show that the mica pegmatites belonging to this belt are undoubtedly derived through the evolution of partial melt from the deeper substratum