puderam ser classificados, segundo TROEGER (1969, 1982), como pertencentes à família da tschermaquita e à família da actinolita.

GEOQUÍMICA As análises com microssonda mostraram que os anfibólios estudados pertencem ao grupo dos anfibólios cálcicos (LEAKE 1978). Os cristais analisados foram classificados como membros do grupo da actinolita, do grupo da Hornblenda tschermaquítica e do grupo da tschermaquita.

Utilizando o diagrama de FOSTER (in TROEGER, 1982), os cristais de biotita analisados puderam ser identificados como meroxênio. Já a análise de cristais de clorita permite classificar este mineral como sendo ripidolita (TROEGER E TROCHIM, in TROEGER 1969). Dentre os carbonatos predominam cristais do grupo Fe-dolomita-ankerita.

SOUZA & MUELLER (1988) estudando as rochas carbonáticas da Formação Gandarela da região entre Ouro Preto e Mariana, utilizando o par geotermométrico Calcita-Dolomita, determinaram a temperatura de cerca de 545°C para o metamorfismo dinamotermal desta região. As paragêneses minerais descritas no presente trabalho são características do grau médio, fácies anfibolito.

As análises químicas via úmida de elementos químicos maiores, de amostras dos anfibolitos da região do Taquaral, Ouro Preto, mostram em termos de composição média, os seguintes valores:

SiO_2 = 50,10%, TiO_2 = 3,02%, Al_2O_3 = 12,30%, Fe_2O_3 = 15,71%, MnO = 0,25%,MgO = 4,78%, CaO = 4,78%, Na_2O = 1,71%, K_2O = 0,27%.

A soma total sem a perda por calor é de 97,01%, enquanto que o valor médio desta perda é de 2,61%. A análise de alguns elementos traços fornece:

Ba = 80 ppm; Rb = 7 ppm; Sr = 156 ppm; Zr = 337 ppm; V = 263 ppm.

Segundo WALKER *et alii* (1960) os anfibolitos aqui analisados são classificados como ortoanfibolitos.

A utilização do diagrama de VAN DER KAMP (1968) confirma o caracter ortogênico para estas rochas.

A aplicação do método de DE LA ROCHE *et alii* (1980) para a determinação do educto dos anfibolitos estudados na presente pesquisa, sugere uma rocha de composição andesítica a basalto andesítica.

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HIGH-GRADE MAFIC MIGMATITE FROM SW MINAS GERAIS: AN EXAMPLE OF AMPHIBOLITE MELTING

Asit Choudhuri; Renata M. Medeiros - Instituto de Geociências/UNICAMP; **Edison D.R. Carvalho** - Grupo de Aplicação Interdisciplinar de Aprendizagem - GAIA; **Gergely A.J. Szabó** - Instituto de Geociências/USP

Choudhuri and Szabó (1982) reported the occurrence of discordant melt veins of dioritic to trondhjemitic composition transecting host metabasic rocks. Here we describe and discuss the formation of narrow bands similar to the melt veins which, however, form a part of mafic migmatites southeast of Guaxupé.

The mafic migmatites consist of light and dark bands as well as blocks and schollen of metabasics. The banding is frequently contorted and folded in a fashion typical of migmatite. These are at places injected by pink granitic material which at times shows cross-cutting relations, and there is little doubt that we are dealing with tonalitic and granitic melts derived from different source rocks. It is easy to see that the common occurrence of such rocks can account for the calc-alkaline nature of high-grade terrains as shown by chemical analyses presented by Oliveira (1982).

In thin sections, amphibolites are medium to fine-grained, granoblastic and almost equigranular with mainly olive-green hornblende and plagioclase, and late cross-cutting brown biotite. In contrast the tonalite leucosome bands, which may vary from millimetres to a few centimetres, show distinct hypidiomorphic granular igneous texture with well-formed plagioclase and anhedral quartz; plagioclase varies from An_{42} in amphibolite to An_{33-28} in the leucosome. Some bands may also contain anhedral perthite and these might represent mixing with granitic melts. The mafic minerals in the tonalite portions are light green skeletal hornblende, rare colourless skeletal clinopyroxene with overgrowths of the same light green hornblende, both intergrown poikilitically with quartz and plagioclase; skeletal light brown biotite is seen replacing hornblendes. Percival (1991) has recently described similar textutes with poikilitic orthopyroxene instead of clinopyroxene and amphibole. Where quartz and plagioclase predominate, the mafic minerals are left as schlieren, and one striking feature is the occurrence of "channels" made up of new, skeletal hornblende and sheaves of skeletal biotite between and around "islands" of older olive green hornblendes like those from amphibolite. These texture taken together strongly suggest crystallization from melts, and find confirmation in recent literature on melting of amphibolite and the formation of tonalitic melts in consequence (Clemens and Vielzeuf, 1987; Rutter and Wyllie, 1988; Pattison, 1991). Thus, the mafic migmatite was formed by in situ melting of amphibolite and the generation of tonalitic leucosome. There are places where it appears that the tonalitic melts were generated elsewhere and may not represent in situ melt formation, however.

Considering the increasing evidence in recent literature it is now clear that fluids play an important role in the formation of melts under conditions of high-grade metamorphism. Generally speaking, the availability or acess of aqueous fluids promotes partial melting in rocks undergoing metamorphism in amphibolite facies. In Guaxupé high grade metamorphism took place under water deficient conditions, and the dilution of fluid by CO_2 (Choudhuri and Carvalho, 1991; Choudhuri et al., 1991). Melting can also take place under vapour-absent conditions where the necessary fluid is provided by hydrous minerals, commonly biotite and hornblende (Rutter and Wyllie, 1988; Rushmer, 1991). Reactions for melt formation are: 1) hornblende + plagioclase + quartz = clinopyroxene + plagioclase + melt + ilmenite, and 2) hornblende + plagioclase = clinopyroxene + orthopyroxene + plagioclase + melt + ilmenite + sphene; reaction 1) can be proposed for the textures reported here, whereas reactions 2) was not observed. Rather, a reaction which seems likely can be written as hornblende + plagioclase + K^+ + H_2O = hornblende + biotite + melt. In this case the access of potassium-bearing fluids might lower melting temperatures to values (850 - 1050°C) recorded by Rushmer compared to higher temperatures reported by Rutter and Wyllie (op. cit.). Formation of tonalitic melts from mafic precursors might account in part for the calc-alkaline nature of many high-grade terrains. As a rule much less melt is produced from amphibolites compared to pelites, and the effect on the latter of decompression consequent on uplift is even more pronounced. These effects would explain the large amount of granitic material relative to tonalitic material in the region under study. In a larger context, it can not be ruled out that the formation of melts accompanied by small amounts of H_2O-CO_2 fluids might favour local gold mineraliation as has been observed is some high-grade terrains.

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CRITÉRIOS DISCRIMINANTES PARA IDENTIFICAR ROCHAS METABÁSICAS (ANFIBOLITOS) PARA OU ORTO-METAMÓRFICAS

Dirceu Cavalcanti Macêdo - Depto. de Engenharia de Minas UFPE-RECIFE

Uma das questões fundamentais, para os geólogos, que estudam as rochas metamórficas, é a identificação da origem dos metabasitos, magmáticos, metassomáticos ou sedimentares. Em nossos estudos sobre estas rochas no Nordeste do Brasil, além das nossas próprias observações, e da bibliografia, identificamos uma série de parâmetros discriminantes, para