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THE DEPOSITION AGE AND EVOLTION OF THE VILA NOVA METAMORPHIC SUITE AND THE CONNECTION BETWEEN THE GUYANA SHIELD AND THE WEST AFRICAN CRATON

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The Vila Nova metamorphic suite crops out in Amapá and Pará states in northern Brasil. An important part of the suite is composed of ultramafic to mafic metaigneous rocks,which have been linkened to komatiites or basaltic komatiites and transitional MORBs, respectively (Montalvão, 1985; Faraco, 1990; Faraco et al., 1992). An ocean floor depositional environment was suggested for de Vila Nova rocks in the Serra do Ipitinga, NW Pará while Issler et al. (1974) called attention to the ophiolite-like association of igneous rocks. The Vila Nova occurrences form one of the many meta-volcano-sedimentary deposits found in the Guyana shield, some of which have been dated as late Paleoproterozoic (2.1-2.2 Ga: Gibbs and Olsewski, 1982; Gruau et al. 1985). An early attempt (Lima et al.1974) to date the Vila Nova rocks by the Rb-Sr whole rock isochoron method, including analyses presented by Hurley et al. (1968), yielded an age of 2,090 Ma. Texeira et al. (1989) showed that the Vila Nova suite was metamorphosed at ca. 2.0 Ga.

Prelimirary Nd isotopic results obtained in the laboratories of CPGeo-USP using procedures described by Sato et al. (1985) yielded model ages (T_{DM}) between 2.26 Ga for a sample of amphibolite and 2.19 Ga for a sample of epidotite derived from amphibolite. A second sample of amphibolite would have $\varepsilon = -1.6$, perhaps indicating the presence of an enriched source region or of a shallow-leved crustal component. Chondrite-normalised REE patterns show slightly LREE enriched characteristics for, which could invalidate the *depleted mantle* model, making the inferred model ages too high. Gruau et al. (1985) suggested, however, that an enrichment event probably occurred immediately before mafic magma genesis at a similar time in French Guyana. In this case, the depleted mantle model remains valid.

Caen-Vachette (1988) proposed that the Guyana shield and the West African craton formed a large unit during Archaean and Paleoproterozoic times, and that correlations between the Ivory Coast and Venezuela are possible. Similar reasoning would lead to a possible correlation between the Vila Nova suite and Birrimian greenstone belts in the Ivory Coast and Ghana. Mortimer (1992) has described a high-Mg subalkaline basaltic suite from central Ivory Coast, noting that similar rocks have been found in other Birrimian belts. Leube et al. (1990) found MORB-like tholeiitic rocks together with a few examples of komatiite-like in Ghana. The Vila Nova suite, on the other hand, seems to lack the intermediate - felsic component present in many other areas. The extent of the Transamazonian mafic volcanism reinforces the idea that the ~ 2.1 Ga event was large-scale (Abouchami et al., 1990).

A model for the metamorphic evolution of the Vila Nova suite (Faraco,1990; Faraco et al.1992) proposed that the meta-igneous rocks underwent a first phase of ocean floor metamorphiam (M1) with development of hydrothermal systems. To this phase is ascribed the formation of quartz-chlorite rocks. Associated oxide type BIFs represent contemporaneous volcanogenic chemical sediments. MI was followed firstly by prograd regional metamorphism (M2) of amphibolite facies, when part of quartz-chlorite rocks was transformed to cordierite-orthoamphibole rocks, and basic volcanics to amphibolites. Present-day mineralogical associations of BIFs and clastic metasediments were formed during that metamorphism. All the metavolcano-sedimentary sequence was deformed by brittle-ductile shearing and transformed in present-day NW-SE trending shear belts with subvertical-NE dip (M3). Finally, local thermal metamorphism (M4), with some material introduction from intrusions into country rocks, occurred in aureoles around granite intrusions.

The model Sr isotopic composition at 2.2Ga ($I^{2.2Ga}$)of one amphibolite is 0.7038, semewhat higher than linear whole earth or sea water (Veizer, 1989) at that time. Another amphibolite (with $\varepsilon^{2.2Ga}$ = -1.6) has $I^{2.2Ga}$ = 0.6974, although it has a higher Rb (and K_2O) content than most other amphiobolite. $I^{2.2Ga}$ values for other amphibolite, hornblend hornfels, epidotite and cordierite-orthoamphibole rocks, are very much higher.The hornblend hornfels has $I^{2.2Ga}$ = 0.7083, while the epidotite with T_{DM} - 2.19 Ga has a very much higher Sr content (859 ppm) than the typical amphibolites (100-200 ppm) and $I^{2.2Ga}$ = 0.7148. The cordierite-orthoamphibole rock has $I^{2.2Ga}$ = 0.7110. Such high isotopic ratios are likely to arise only through the extensive envolment of old, crustally derived Sr. This suggests that Sr isotopic characteristics were largely aquired during the M3 and M4 events,when open system chemical behaviour would have favoured extensive exchanges.

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