spectrometry showed disequilibrium between ^{226}Ra and ^{238}U.

The obtained (^{238}U/^{232}Th) and (^{230}Th/^{232}Th) activity ratios allowed to estimate a 140,000 y age for the Morro Vermelho Formation. — (*December 14, 2001*) .

METAHALLOYSITE CLAYS OF POÇOS DE CALDAS ALKALINE COMPLEX, MG-BRAZIL

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Based on field work and mineralogical-petrographical optical, XRD and SEM methods, we compared a clay deposit (Mineração Varginha) located in the western part of the domain of 'potassic rock' hydrothermal alteration hosting the Osamu Utsumi uranium mine, SE-Poços de Caldas Complex (PAC), to the unweathered hydrothermalized protoliths. The deposit occurs in the swampy upper hillside of an S-to-N-draining open valley within an area of moderately hilly morphology with gentle slopes, open valleys and altitudes of 1280-1380m. Here, different generations of mutually intrusive leuco-to-hololeucocratic nepheline syenites and phonolites were transformed by potassic-pyritic alteration into hydrothermalites referred to as 'potassic rocks' (with K_2O of 12.5-13.8wt.-%), having low-grade U-Th-REE-Zr-F-Mo mineralization. Deep chemical weathering originated the clay deposit and exhumed this part of PAC to a subvolcanic level.

Studied deposit hosts two types of clays: one is grey with millimetric to centimetric white argillized pseudoleucite phenocrysts (ACP) representing a weakly porphyritic pseudoleucite phonolite of fine matrix weathered in situ to clay, with preserved magmatic structure; the other is a homogeneous white clay (ABM) formed from a fine hololeucocratic aphyric phonolite. Combined optical, XRD and SEM studies of ACP and ABM clays and of unweathered 'potassic rocks' (hydrothermalites of hololeucocratic aphyric and pseudoleucite phonolites), considered as analogous to the clay protoliths, always showed highly crystalline hydrothermal kaolinite with the same habit of fine idiomorphic plates and booklets ($\emptyset \leq 5\mu$m); equivalent idiomorphic hydrothermal illite is also omnipresent yet much coarser ($\emptyset \geq$ 15-50μm), practically representing fine sericite/muscovite. Feldspar occurs only in the hydrothermalites, being a low-temperature pure K-feldspar of maximum triclinicity formed by hydrothermal alkali-exchange reactions (K for Na) and structural readjustments from magmatic sanidine.

Kaolinite and illite of low crystallinity occur only in the clay samples; the former predominates by far over the kaolinite of high crystallinity and proved to be in fact tubular metahalloysite (SEM). XRD studies with heating techniques at 60°C showed the illite of low crystallinity to be in fact (hydrated) halloysite partially preserved from dehydration (to metahalloysite) due to water-saturation in the clay deposit. — (*December 14, 2001*) .

LATE PALEOZOIC EXHUMED GLACIAL EROSIVE LANDSCAPE IN SALTO, SP*

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Outcrops of the Itu granite (early Paleozoic) in the Tietê river valley, in Salto, SP, expose a variety of glacial erosional landforms of meso-scale extremely well preserved. Structures occur on land or eventually emerge above the water inside the river channel.

The most notable landforms correspond to streamlined bedrock (whalebacks) and stoss and lee features (roches moutonnées). The first category includes the classic roche moutonnée from Salto. Another reported occurrence of glacially abraded granite in the area could not be properly examined. Submerged depressions in the granite that separate landforms inside the river may correspond to rock basins.

Exposed dimensions of landforms vary from 1-15m of length to 1-1.5m of height. Their plan view shape is roughly elliptical. Micro-scale erosional features on the structures include striae, grooves, polishing and quarrying. Orientation of micro-features varies locally, but is in general SE-NW, parallel to elongation of landforms. They indicate a sense of movement of glacier towards NW.

Areal distribution of landforms over a distance of at least 1.2km in the Tietê river valley configures an extensive, exhumed, well preserved late Paleozoic landscape of glacial erosion.

The glacially eroded features of Salto indicate the action of a warm based glacier with subglacial meltwater. The ice mass probably flowed on an irregular, fractured granite floor, generating a complex pattern of effective ice pressure that resulted in different erosional landforms.

Itararé Subgroup rocks overlying the glacially eroded basement in the area vary from lodgement and meltout tillites, and lacustrine (?) rhythmites and sand-