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Abstracts

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LATERITIC EVOLUTION OF THE JACUPIRANGA ALKALINE COMPLEX

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In the Jacupiranga alkaline complex, dunites and jacupirangites are the predominant rocks, covering an area of about 70% of the complex. Such rocks, altered by weathering, have developed a thick lateritic cover which can exceed 40 m. The dunite areas correspond to a plateau up to 190 m of altitude, whereas the jacupirangite areas present a more segmented morphology at lower topographic levels (15-50 m).

Overlying dunites (olivine, serpentine, chromite and magnetite), a profile down to 39 m depth has been sampled. It consists from bottom to top of a saprolite layer (serpentine, smectite and quartz). The geochemical evolution of this profile can be characterized by total loss of Mg, retention of Si and residual concentration of Fe. Al, Cr, Ti, P and Zr are enriched towards the upper levels of the profile and Co, Ni, Mn, Ba and Ce show higher contents at intermediate levels. The weathering evolution from fresh rock to saprolite is lateritic. The Si-boxwork evolution zone represents an episode of silicification and, finally, the lateritic cover, enriched in elements untypical of dunites (Al, Ti, Zr, V and P) must be the result of allochtonous contribution.

Two weathering alteration profiles overlying jacupirangites (titanoaugite, magnetite and perovskite) have been investigated down to 30 and 40 m depth, respectively. In such profiles two horizons could be distinguished, from bottom to top: saprolite (titanoaugite, smectite, magnetite and anatase) and laterite (goethite, kaolinite, anatase and quartz). They have been formed by total loss of Ca and Mg, partial loss of Si and residual concentration of Fe, Al and Ti. V, Cr and Zr are gradually enriched from the fresh rock to the laterite. Ba, Zn, Cu, Ni, Co, Ce and Mn are concentrated in the early stages of weathering, being depleted onwards. This lateritic "in situ" evolution has had an initial stage of 2:1 phyllosilicates formation, further replaced by the crystallization of 1:1 phyllosilicates plus goethite. In the upper levels of the laterite, mechanical reworking of the soil by colluvial transport seems to have happened.

The investigation of weathering profiles overlying dunites and jacupirangites led to the hypotheses of a policyclic weathering evolution for the Jacupiranga alkaline comples. During an initial phase of weathering under climatic conditions with alternating drier and more humid periods, the alteration of dunites led to the formation of a weathering profile with silicaaccumullation at its bottom, whereas the jacupirangites developed a smectitic cover. During a second phase, erosion processes related to a tectonic uplift removed the alteration blanket down to the Si-boxwork horizon inthecase of dunites and to

deeper levels in the case of jacupirangites. The weathering under a following period of humid climate resulted in very thick lateritic profiles. In this period, colluvial detritus of Al-Si-rich composition derived from more acid lithologies covered the "in situ" weathering products. The intense intermixing led to the formation of the partially allochtonous blanket found today. Taking into account the supergene evolution of other ultramafic massifs in Brazil, the erosion cycle above mentioned can be correlated to the Velhas Cycle (Upper Tertiary), thus yielding a maximum age for the laterites of Jacupiranga.

METHODOLOGY OF EXTRACTION OF LIPIDS, HUMIC COMPOUNDS, LIGNINS AND METALS FROM THE SAME SAMPLE OF DRY SEDIMENT

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Abstract

The isolation and quantification of a range of organic compounds such as hydrocarbons, fatty acids, sterols, polyalcohols, terpenes and glycerol and of macromolecules such as lignins and humic compounds was realized from a single 50 g sample of dry sediment, using an integrated extraction method, consisting of 83 sequential steps. The main consideration is the isolation of each fraction without destruction of the other fractions existing in the sediment.

Introduction

Many organic compounds are used in geochemical studies as environmental indicators or tracers, however most of the usual methods do not give accurate analytical results because of the lower concentration of organic matter in the sediment. A sediment considered organically rich can present a 5 to 10% concentration of organics, corresponding to concentrations in the order of ppm for a specific class.

This low concentration demands a large volume of sample (not always possible or economically feasible) or the improvement of analytical techniques to allow a