SEDIMENTOLOGY OF THE SÃO FRANCISCO RIVER FOSSIL DUNES (NORTHERN PART), STATE OF BAHIA, BRAZIL.

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Along the mid-course of the São Francisco river (state of Bahia), there are huge fossil dunefields of probable quaternary age. The biggest, presenting an area of about 6.000 km², is situated between the towns of Barra and Pilão Arcado (fig.1). A geological-geomorphological map of its northern part, in 1:100,000 scale, was made and surface samples for their sedimentological studies were collecte.

Compound parabolic dunes (draas) form is the main morphological pattern exhibited by eolian deposits presently covered by caatinga-type vegetation (Barreto, 1993). Their original morphologies have been more-or-less modified by pluvial, fluvial and pedological processes. Probably, sediments have been polycyclically supplied through the Quaternary, mostly during drier paleoclimatic episodes.

Seventy one dune, twenty seven interdune and sixty eolian sheet sediments, totalizing 158 samples, have been collected. These samples have been submitted to the following laboratory procedures: color determination,and grain size, morphometric and light and heavy mineralogical analyses. The morphometric and mineralogical analyses have been done only on 20 of the collected samples, but it was sufficient to demonstrate their homogeneity throughout the studied area.

The mineralogical studies have been done upon fine (0.250-0.125 mm) and very fine (0.125-0.062 mm) sand fractions. The heavy minerals were separated from the light minerals using the bromoform, and both mineral groups were studied on non-permanent grain mountings.

The mean diameters of dune and interdune sediments are mainly represented by fine (0.250-0.125 mm) and medium sands (0.500-0.250 mm), being distinguished only by differences in frequencies of silt + clay fractions. On the other hand, the eolian sand sheets are characterized mostly by fine and subordinated medium sands.

Concerning to sorting degrees, interdune sands are moderately sorted, eolian sand sheets are poorly to moderately sorted, and dune sands are moderately to well sorted.

The colours of sands collected from the eastern portion of the area are dominantly yellowish to brownish, while whitish to grayish colours characterize the samples collected from the western part of the area. These differences in colours are attributable to the abundance of iron supplied by ferriferous quartzites of the Xique-Xique Complex, and to the fluctuations of higher groundwater level at the eastern part.

As the frequencies of rounded and frosted grains increase from east to west, probably they have been transported eastwestwardly, which is in agreement with the direction of the paleowinds (SE-NW), obtained from the orientation of fossil dunes. Very high quartz/feldspar ratios could be related to low frequency of feldspar within the source rocks.

The frequencies of heavy minerals are, in general, very low varying between 0.01 and 0.7 %, and the identified assemblages are relatively poor in species, being mainly composed of ultra-stable (zircon, tourmaline and rutile), and meta-stable (kyanite and staurolite), and more rarely of unstable (epidote and amphibole) minerals, the last one occurring only in very small frequencies within samples closer to the São Francisco river.

The mineralogical assemblages compared with the São Francisco river catchment basin suggest that the studied sands, have been mostly supplied by metasedimentary rocks of the Santo Onofre and Chapada Diamantina groups.

REFERENCE

BARRETO, A. M. F. (1993) Estudo morfológico e sedimentológico da porção norte do mar de areia fóssil do médio Rio São Francisco, Bahia. São Paulo (Dissertação de Mestrado - Instituto de Geociências-USP). 98 p.

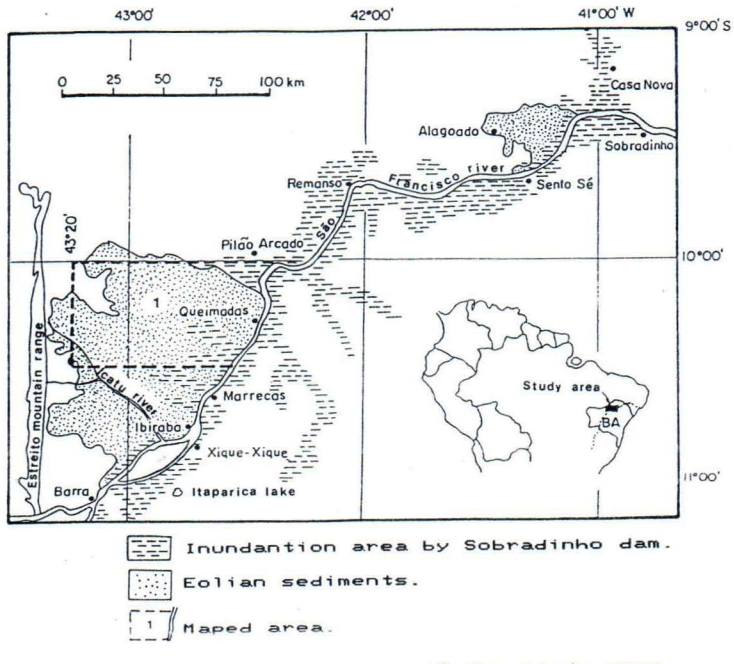

Figure 1. Location map of the study area.