

fluorescence X-ray spectrometry (FRX). The element boron was analyzed using an inductively emission coupled plasma spectrometry (ICP-AES).

The analyzed major elements were:  $\text{CO}_3\text{Ca}$ ,  $\text{P}_2\text{O}_5$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{K}_2\text{O}$ ,  $\text{MnO}$ . These molecules were measured in percentage. Trace elements analyzed were: Rb, Cs, Ga, Zr, Ta, Nb, Sr, Ba, Cr, Ni, Zn, Pb, Cu, V and boron.

CORTELEZZI et al. (1997) believe that concretions are of continental origin on the basis of geological setting and some trace elements relationships.

TORRA (1998, 1999, 2000) interpreted the hosted mudrocks as belonging to littoral shallow marine origin (tempestites facies). The high concentration in barium (9,500 ppm in average), vanadium (546 ppm in average) and lead (355 ppm in average) mark a geochemical anomaly. No significant values in gallium and cesium were found in the context of regional geochemical background although cesium values are slightly greater (RANKAMA & SAHAMA 1954). TUCKER (1991) said "the deep-ocean floors are usually well-oxygenated. The reason for this is that cold, dense oxygen-rich waters are produced in the polar region, and these descend and flow to lower latitudes, thus keeping the ocean floor ventilated. These deep-sea currents are locally responsible for erosion of the sea floor, so that skeletal lags and oriented fossils may form in these areas, and Fe-Mn oxides may be precipitated there".

PROTHERO & SCHWAB (1997) explained these concretions, in a general way, as belonging to supratidal facies in a peritidal environment.

Preliminary geochemical conclusions are that shallow marine origin might be a more satisfactory explanation for rich-iron manganese concretions of the Ituzaingó Formation.

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## Chaco-Paraná Intracratonic Basin (Argentina): Exploration Oil Possibilities

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The Chaco Paraná intracratonic basin is one of the most large sedimentary basin situated at South America of about 550,000 km<sup>2</sup> (CHEBLI et al. 1989, RUSSO et al. 1979).

Few exploration tasks were carried out in recent years. However, one of the most outstanding productive oil drill-hole -the Palmar Largo oil hole-, is just located in the northwestern edge of the Chaco-Paraná intracratonic basin at the northwestern foreland-folded trend basin.

It is assumed that the 'contact' between Chaco-Paraná intracratonic basin and the high productive 'Cuenca del Noroeste' (northwestern foreland-folded trend basin, Argentina-Bolivia), is a significant and very potential place for exploration in order to began the surveying for oil and fuel gas. Almost never was tested by the drill.

The extensive effusive flow-beds of the so called 'tholeiitic basalt flows', aged Lower Cretaceous-Upper Jurassic, situated at a depth of 600 meters, covers an immense sector of this basin. These sismical-reflective basalt-beds constitute a significant problem for the 2D seismography. The new 3D exploration tasks performed under these depths may bring out invaluable results.

The continental (Permian and Carboniferous) and the marine (Cambric to Devonian) Paleozoic sequence are present. They are covered by at least by 600 meters of Cenozoic littoral shallow marine sediments join to the above mentioned tholeiitic-basalt beds, ranging 0 to 1,500 m in thickness, commonly interstratified with colian supermature sandstones. The Paleozoic sequence constituted an extraordinary potential focus for exploration.

We think, that it is necessary to stake on pilot exploration areas near the productive northwestern foreland-folded trend basin in order to examine with more detail (3D seismography) sedimentology and structures at depths and subsequent oil possibilities at the giant Chaco-Paraná intracratonic basin. On the other hand, it is imperious to perform a detailed sedimentological and structural study at the adjoining areas.

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## Geochemical characterization of loessial sediments of the Chaco Province, Northeastern Argentina

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Eight selected samples were picked out from loessial sediments and studied geochemically. They were cited at the Tres Isletas, Laguna Blanca and Colonia Benítez villages (Chaco Province). The studied material belongs to the loessial Middle Holocene country rocks. After civil engineering works, the samples were obtained from the outcrop rocks in the site; the depths of the samples varying from 1 to 4 meters in depths.

The samples were analyzed by means of X-ray fluorescence spectrometry (FRX). The major elements analyzed were:  $\text{CO}_3\text{Ca}$ ,  $\text{P}_2\text{O}_5$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{K}_2\text{O}$ ,  $\text{MnO}$ . The trace elements analyzed were: Rb, Cs, Ga, Zr, Ta, Nb, Sr, Ba, Cr, Ni, Zn, Pb, Cu and vanadium.

Three types of "test-set" were made out on the samples.

The T-set 1 embraces the sample particle ranging between 100/44 microns. These samples are constituted for a mixture of alictonous unaltered minerals. Also, it is present the frequent product of pedogenetic weathering including clay minerals.

The T-set 2 embrace all the grains ranging minor than 44 microns but cleaned by means of  $\text{CH}_3\text{COOH}$  0.5 N.

The T-set 3 embrace the particles ranging minor than 44 microns without clean. This is the alictonous material plus weathering products, clay minerals, silicofitcs, pollen, pollen grain, etc.

Using the T-set 1, for example, we found it a significant relative concentration (movement) in the major and trace elements in the alictonous material with the weathering products and clay minerals