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A P A H I G H  
(NORTHERN PRECAMBRIAN)

by  
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October 1980

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## LOCATION AND DESCRIPTION OF AREA

The Apa High is a province of Precambrian rocks located in the northwestern part of the Concession area (Fig. 1).

Ground access to the area is provided by roads from Concepción (via Paso Horqueta or Paso Barreto) in the south, from Puerto Fonciere on the Paraguay river to the west, and from Bella Vista in the east. A sparse network of poor quality roads and numerous airstrips suitable for light single or twin-engined aircraft are present throughout the area.

The topography is in general characterized by low relief. In the northwest, a series of isolated low rugged hills and arcuate ridges are separated by flat plains; in the southwest a gently undulating limestone plateau is interrupted in places by ridges of crystalline basement; the eastern part of the region is composed of a gently rolling to hilly landscape.

Vegetation consists mostly of sparse to thick savannah forest or large areas of natural grassland. In places, patches of thick sub-tropical rain forest are present.

The climate is sub-tropical with a short mild winter and a long hot summer. Rainfall averages 1300 mm per year and falls mainly during the warm months. The period July to September is distinctly drier than the remainder of the year. The climate becomes progressively drier and the vegetation more sparse towards the northwest.

## GEOLOGY

The Apa High consists of a series of Precambrian crystalline rocks overlain unconformably by a limestone sequence of Cambrian or Cambro-Ordovician age (Fig. 2).

The crystalline rocks can be divided into two provinces:

- (1) The eastern part of the region is composed of an ancient metamorphic complex (consisting of gneiss, granitic gneiss, gneissic granite, amphibolite, migmatite, schist, and minor meta sandstone) intruded by younger bodies of granite.
- (2) In the northwest, the Centurión high consists of low-grade metasedimentary and metavolcanic rocks

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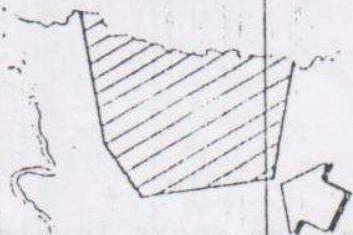
58°

57°

56°

55°

54°



APA HIGH

PEPE JUAN  
EABELLEROS

CONCEPCION

SA. JOS DEL  
GUINA

EL ALTO

ASUACION

CHEL OVIEDO

RIO DE  
STRECHEREN

RIO

RIO

VILLA RICHIE

OTUM

IN. LUNACION

N



Scale bar and other faint markings at the bottom of the map.

(quartzite, phyllite, schist, meta-lava, meta-tuff) intruded by unmetamorphosed granitic bodies. The ridges of metavolcanic and granitic rocks in the limestone to the south are correlated with the Centurión rocks.

Unconformably overlying the crystalline rocks along the western, south-western and southern flanks of the high; is a sequence of weakly metamorphosed re-crystallized compact limestone. The base of this unit is marked by a thin horizon of arkosic sandstone and conglomerate.

Apart from recent surficial deposits, the youngest rocks in the region are a series of small alkaline plugs, located to the east of the Centurión high. These are probably of Cretaceous age.

#### PREVIOUS WORK

Previous TAC work in the area is summarized as follows:

- (1) 1977-78: Brief 4-wheel drive reconnaissance trips through the area; reconnaissance and detailed airborne radiometric/magnetic surveys in 1978.
- (2) 1979: Reconnaissance geological mapping and surface prospecting, reconnaissance geochemistry (stream sediment, heavy mineral, rock), preliminary ground evaluation of airborne radiometric anomalies, ground magnetic surveys at San Alfredo.

The 1979 reconnaissance stream drainage survey (stream sediment, heavy mineral) detected some weak to strong anomalous uranium concentrations, and reconnaissance prospecting discovered one strong radiometric anomaly (4000 cps). These anomalies are shown in Figure 3. The stream sediment and heavy mineral data indicates two areas of possible interest; the Estancia San Luis area in the northwest, and the Retiro San Luis - Estancia Machuca Cué area in the southeast.

Sampling of the 4000 cps radiometric showed that the source of most of the radioactivity was thorium (up to 2701 ppm Th and 9 ppm U). Preliminary ground follow-up of airborne radiometric anomalies discovered no areas of significant interest; most anomalies could be attributed to lithological variations.

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## 1980 WORK COMPLETED AND RESULTS

During 1980 the only ground work carried out in the Apa High was follow-up of the San Luis stream sediment anomaly. The original anomalous stream was resampled and all other streams in the area were sampled on a detailed basis. The results are shown in Figures 4-12.

The original anomaly was not confirmed by the follow-up survey, and no other streams in the area were found to be anomalous in uranium. This result is difficult to explain, as a concentration of 25 ppm uranium in the original sample constitutes a very strong anomaly and was confirmed by a repeated analysis at Skyline. One possible explanation is that the original sample contained, either a few grains of uranium-bearing resistate minerals (e.g., zircon) or some uranium-bearing organic matter, which were not present in the second sample. However, follow-up sampling was very carefully carried out by compositing 32 sub-samples over a stream length of some 50-75 m, and it is unlikely that had such uranium-bearing material been present that it would be missed.

A second possible explanation is analytical variability between Skyline's and Geosol's laboratories. However, both labs used fluorimetry and it is difficult to reconcile the 25 ppm to 3 ppm difference in their respective results.

Careful re-sampling will be needed to resolve this problem but the results of the follow-up survey suggest that no uranium mineralization is present in the area.

## CONCLUSIONS

Exploration to date in the Apa High has not detected the presence of significant uranium mineralization, but the results of reconnaissance stream drainage sampling indicate two areas of possible interest -- Estancia San Luis and Retiro San Luis -- Machuca Cué. However, follow-up sampling failed to confirm the presence of the strongest stream sediment uranium anomaly in the Retiro San Luis-Machuca Cué area.

## RECOMMENDATIONS FOR FUTURE WORK

Although results to date are not encouraging, it is recommended that the following work be carried out in order to complete a full evaluation of the area:

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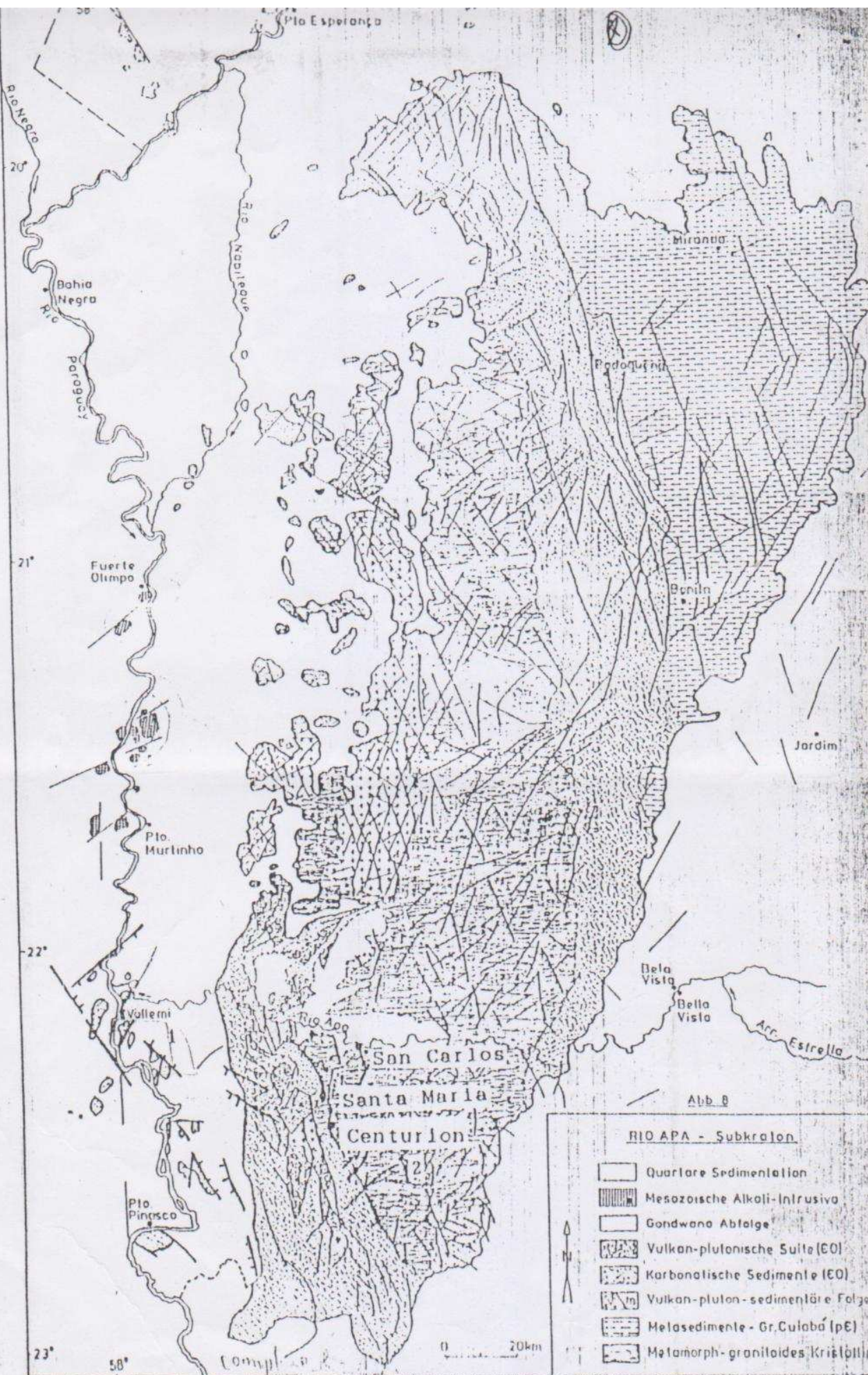


Fig. 5. O Alto do Rio Apa, no Arco do Asunción, de Wiens (1986) com algumas modificações. Em destaque a posição do probable "rift". As ocorrências de rochas ígneas alcalinas no interior do alto aparecem com o numero 2 e as da borda do alto com o numero 1.