

## UPDATING ON THE GEOLOGICAL MAPPING OF THE SW ECUADORIAN SHORE, BETWEEN GUAYAQUIL AND THE SANTA ELENA PENINSULA, WITH A TM LANDSAT IMAGE

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### INTRODUCTION

The geological maps 1:100000 of the Ecuadorian shore were published in the 60's and 70's. A general geological map 1:1000000 of the Ecuador gave a first regional approach.

Recent works (80's - 90's) in Petroleum Geology has developed the geological knowledge of this part of the Ecuador. Then, a geological map updating seems necessary.

#### 1. Study area description and Digital Methodology

This study is placed in an area between Guayaquil and the Santa Elena Peninsula known as the Progreso Bassin, that for many years has represented petroleum interest.

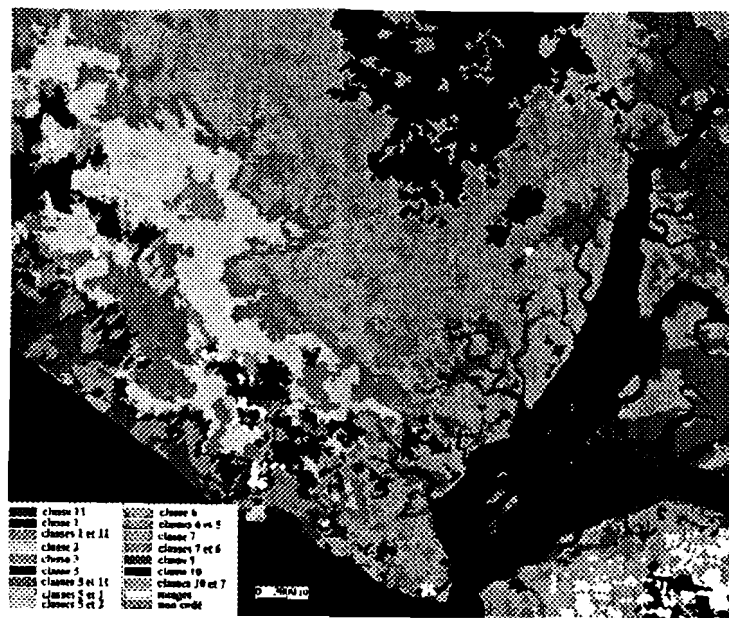
The original image used in this work is an extraction of a TM Landsat from 21 February 1990.

We used the following digital methodology:

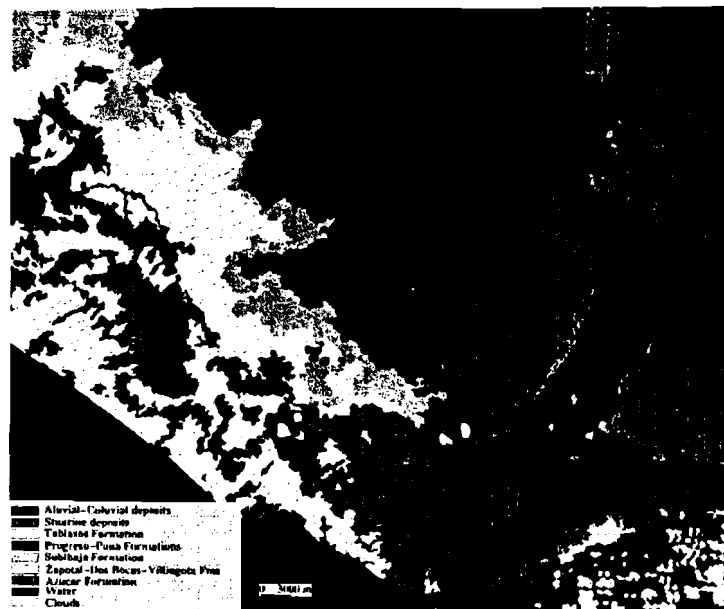
- colour composite produced from the 3, 5, 4 TM Landsat channels;
- principal component analysis of the 3, 5, 4 TM Landsat channels;
- unsupervised classification by *Nuees dynamiques* of the first and the second principal components and application of the method of mathematical morphology to obtain an automatic map (figure 1);
- supervised classification by *Moyenne Euclidienne* of the colour composite of the 3, 5, 4 channels and application of the method of mathematical morphology to obtain another automatic map (figure 2).

#### 2. Geological Cartography

The results of the geological interpretation of figures 1a and 2a after a field revision are in figures 1b and 2b respectively.

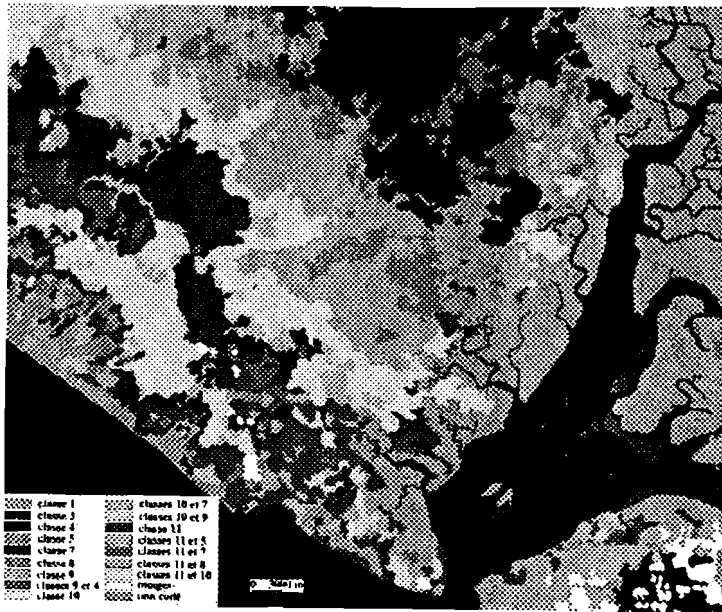


a

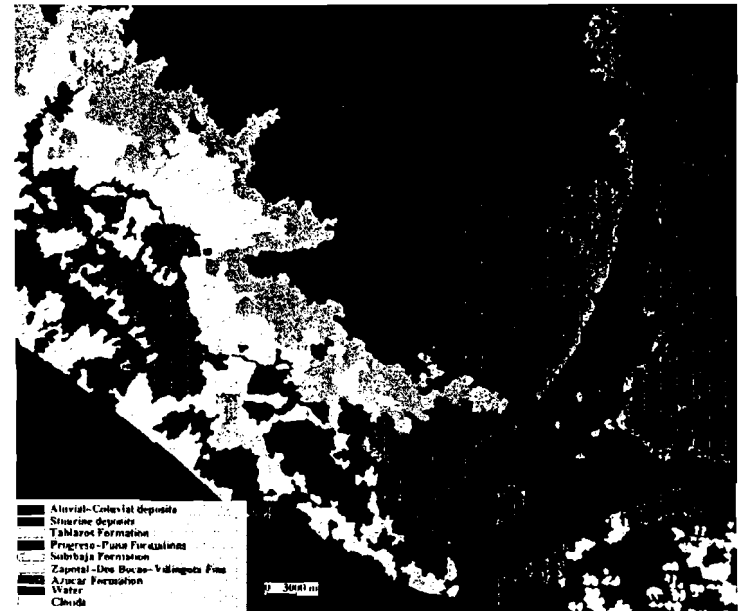


b

Figure 1 : Unsupervised classification by *Nuees Dynamiques*. **a** - automatic mapping; **b** - interpreted mapping with field data



a



b

**Figure 2 :** Supervising classification by *Moyenne Euclidienne*. **a** - automatic mapping; **b** - interpreted mapping with field data

In general terms, in the two maps (figures 1b and 2b) we can distinguish the great stratigraphic sets of:

- Paleocene-Eocene: Azucar Formation;
- Miocene-Pliocene: Zapotal-Dos Bocas- Villingota Formations;
- Quaternary: Tablazos Formation, Alluvial-Colluvial deposits, estuarine deposits.

## CONCLUSIONS

The automatic processing of the TM Landsat image with the two classification methods gave similar results with little differences because of the treatment techniques.

We could make the great stratigraphic sets cartography, but we could not make the small units detailed mapping mainly because of the vegetation covering.

The cartography results are in concordance with the recent researches (Benitez, 1995) in the South Ecuadorian shore Lithostratigraphy and Geodynamic Evolution.

## REFERENCES

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