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**INVESTIGATIONS USING DATA FROM EARTH RESOURCES TECHNOLOGY SATELLITE IN THE FIELDS OF AGRICULTURE/GEOGRAPHY. (TIMBER INVENTORY - LAND USE) IN THE PROVINCE OF HUELVA-SPAIN**

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**ABSTRACT**

A test-site was chosen in the area object of this study, with the purpose of elaborating the patterns for the future total use of the satellite photographs.

The election of the test-site was made having in mind the following criteria.

- A flat terrain for eliminating the dangers of shadows produced by a difficult topography.
- Searching of well defined natural limits for the test site.

The elaboration of a card showing the different uses of the terrain at a 1:100.000 scale, the agrarian structures of the same at a 1:100.000 scale, both purposes as a reduction of the cartography of the inventory.

The study of the remission curves of the various species and phytological associations, of the soil and the hydrography of the zone.

Due to the lack of satellite-photographs from the study-area, a number of photos from the northern area of Spain have been studied, these from the point of view of obtaining answers from the spectra of the vegetation masses.

**BACKGROUND**

The area purpose of this study is one of the most interesting forestal zones of Spain, this study being made more interesting due to the fact of this zone being the site of an important cellulose factory, which is of great importance for the agroeconomical structure of the province.

During the decade of the 60's a forestry inventory at a regional scale was made, in the year 1.970 an inventory at commercial scale was made with the aid of aerial photography.

The zone has been completely covered with photos of the 1:35.000 and 1:10.000 scales; pan-chromatic and infra-red emulsions.

Yearly flights have been made to control the evolution of the forests.

The above information has been used for the confection (elaboration) of a card showing the different uses of the land, special care has been had in not making generalizations for avoiding loss of information.

The eight most important structures have been studied, so that they could be of importance for answering spectra.

These were established by the genus Pinus, Quercus, Eucaliptus, characteristic vegetation of the tindeland, mold-vegetation, the water-resources of two rivers characteristically different due to the nature of their pourings, and finally by the sea-water.

The remission curves were obtained with the aid of a Beckmann DK-2 specterphotometer.

#### SATELLITE-PHOTOGRAPHS

The study has been made with the only photos available, those of the basin from the river Ebro.

Theoretically, and with the help of the remission curves, the idoneus filtration processing for each of the spectral bands found.

With the aid of a multispectral projection camera, the photos were obtained using the additive methods, following also the processing above described, with the help of empirical methods depending on the background of the zone.

With all these criteria all the theoretic end empirical compositions were defined, later they were developed in the laboratory.

The filtrations were made with a series of gelatin-filters from Kodak C.P.: Yellow-15; green-50; red-50; light-blue-50.

Once the working material ready as described end with the aid of eight views an interpretation was established by eight specialists in photo-interpretation, each had access to the same source of documentation.

The number 8 is the basis over which a complete comparison can be made.

The results of the interpretation were exploited having in mind the obtaining of those correlations which should have the greatest warranty, a resume is as follows.

Comparative study between the same band of the two processes described.

- MSS-4 ● Without filtration. Residing areas very diffuminated. Better definition of the relief as with filtration. Better definition of the grey tones as with filtration.
- With yellow - 15 filtration. Generally, less definition as without filtration.
- MSS-5 ● Without filtration. Generally, less definition as with filtration.
- With green - 50 filtration. Greater range of grey tones. The best definition of the vegetation of all the 4 bands.
- MSS-6 ● Without filtration. Better tonality of greys as with filtration.
- With light-blue - 50 filtration. Bad definition.
- MSS-7 ● Without filtration. Residing areas clearly defined. The best definition of the drainage of all the 4 bands. The best definition for studying the shadow areas.
- With red - 50 filtration. Mediocre definition, considerable loss of tonality.

Comparative study between the 4 bands of the two processes described.

A difficult orography presents a heavy masking due to the shadows produced. This causes a notable loss of information from the tone-factors. The orography is projected with a good hypsometric definition.

The best information is obtained with the following composition:

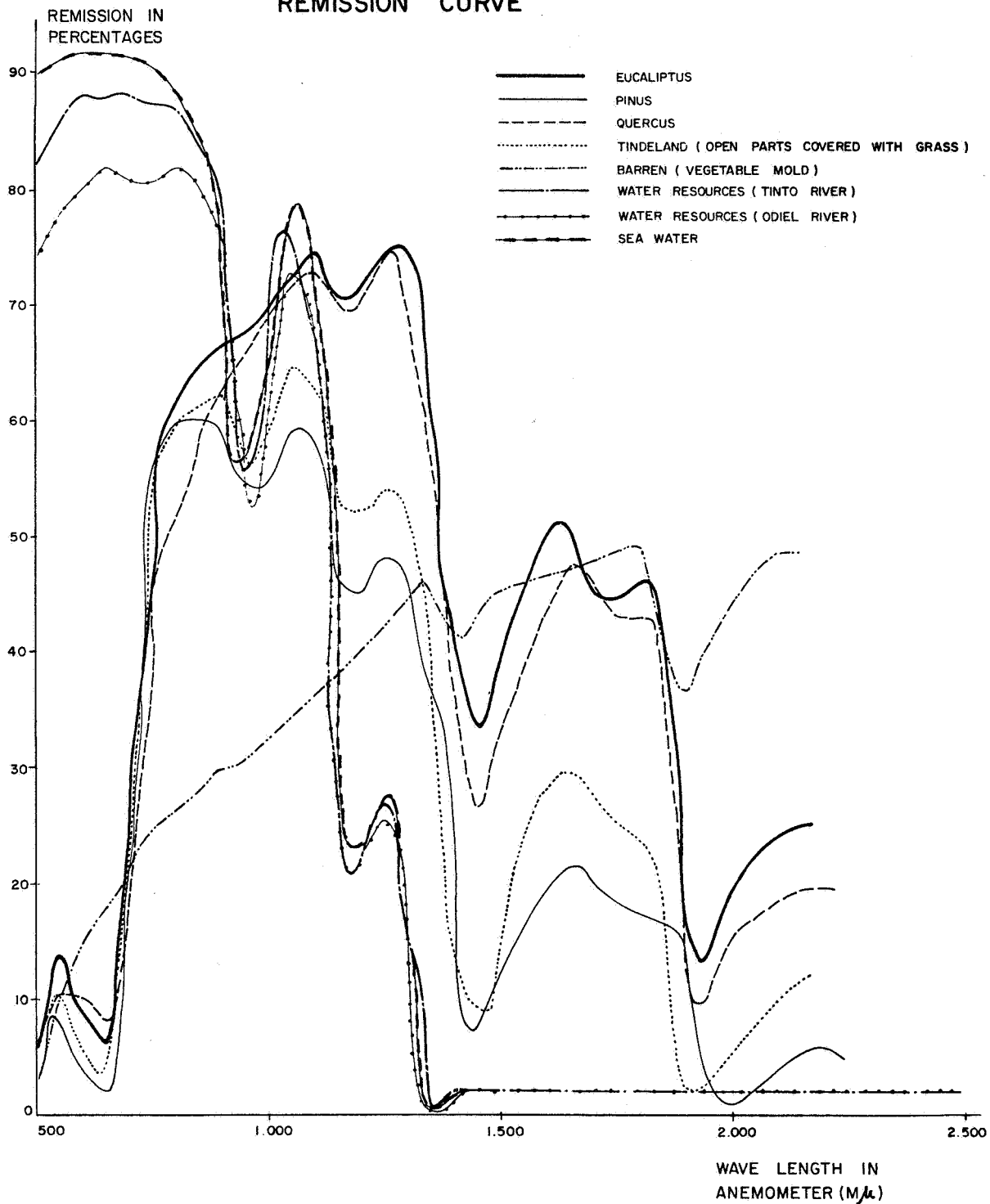
MSS-4 — Without filtration

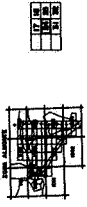
MSS-5 — With green - 50 filtration.

MSS-6 — Without filtration.

MSS-7 — Without filtration.

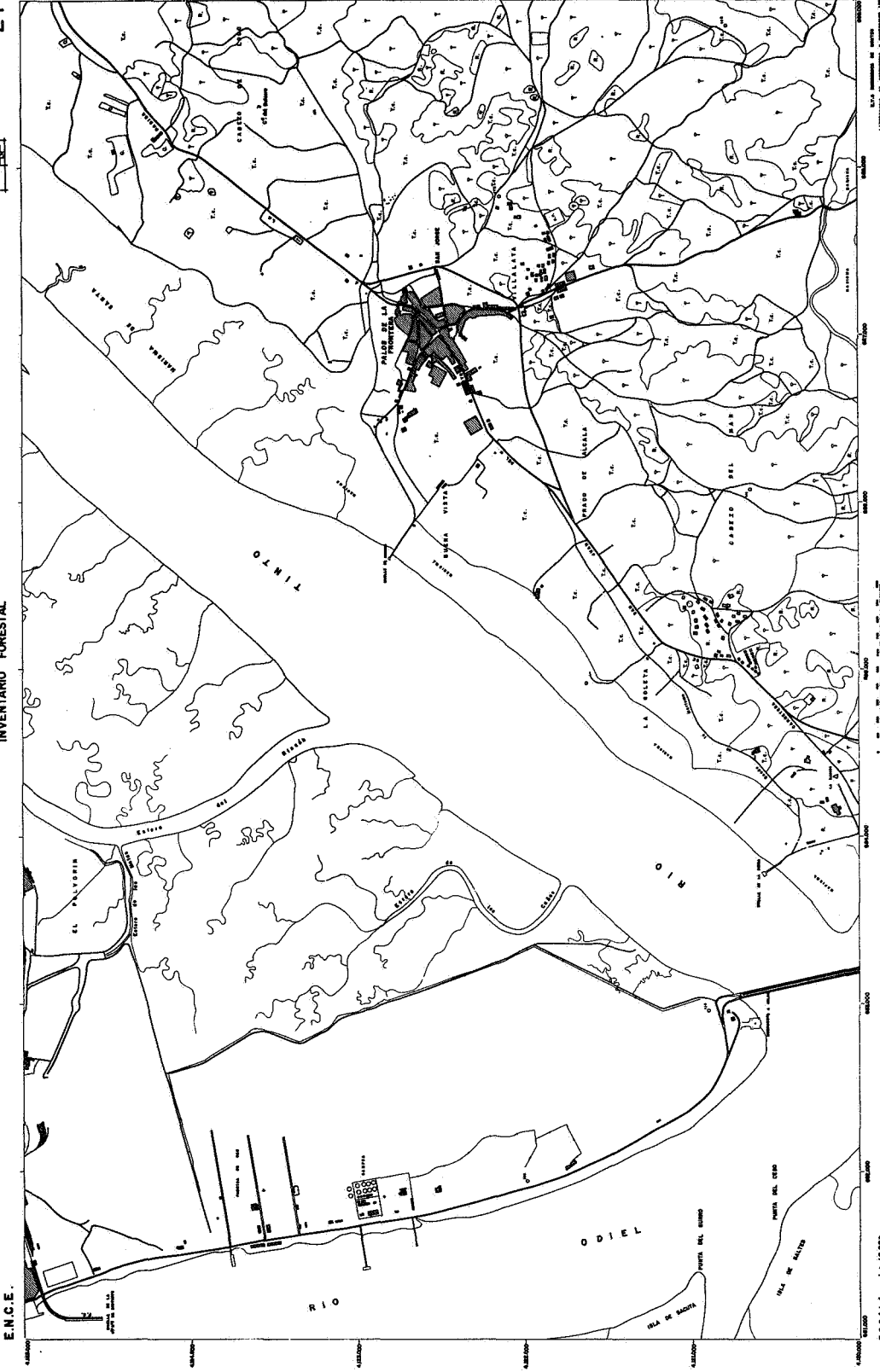
# REMISSION CURVE





# HUELVA

INVENTARIO FORESTAL



E.N.C.E.

ESCALA 1:10,000