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EVALUATION OF ERTS IMAGERY APPLICATIONS TO  
VARIOUS EARTH RESOURCES PROBLEMS OF TURKEY  
Progress Report, 1 Oct. - 31 Dec. 1975  
(Maden Tetkik ve Arma Enstitusu, Ankara)

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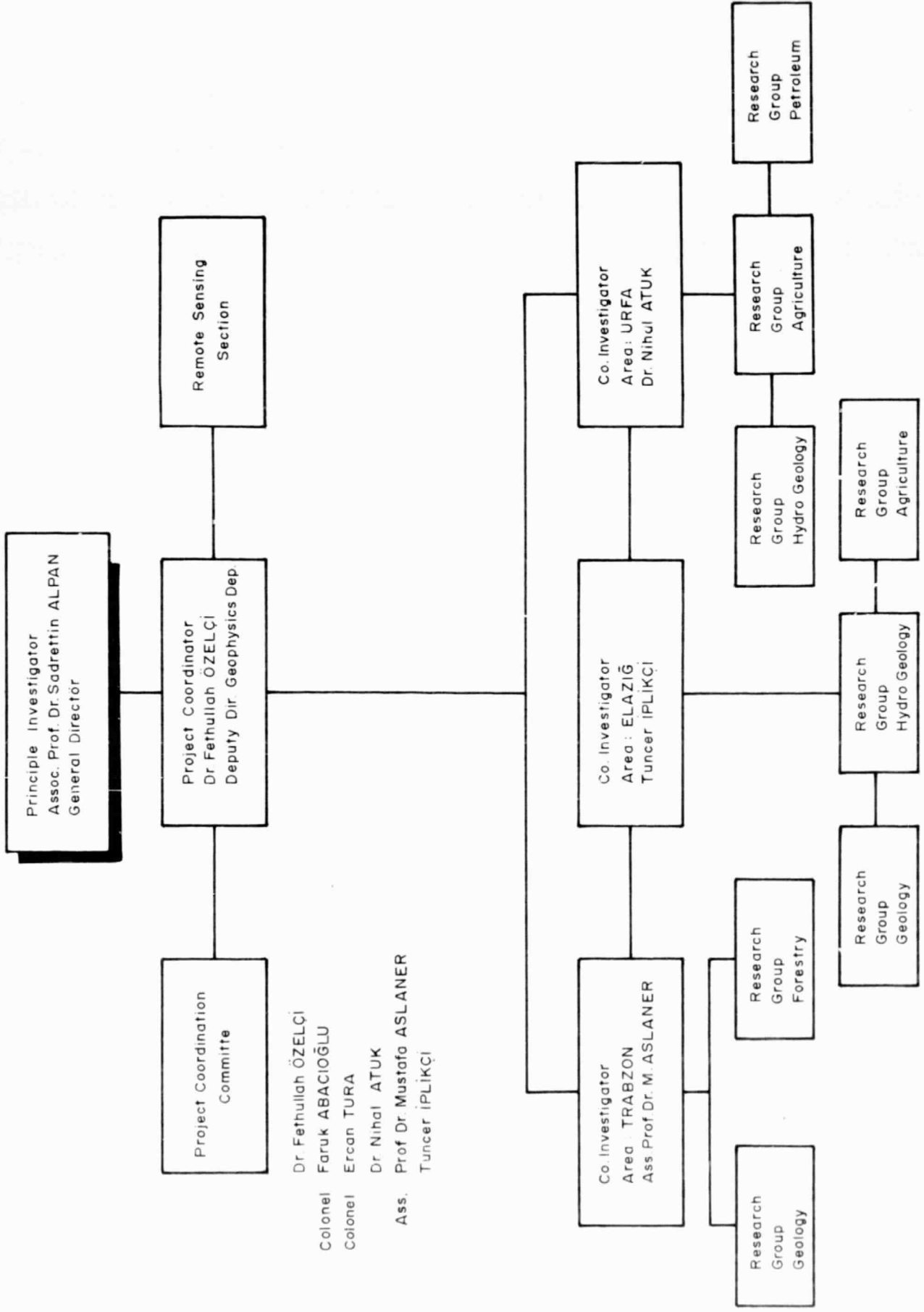
NATIONAL PROJECT FOR THE EVALUATION OF ERTS  
IMAGERY APPLICATIONS TO VARIOUS EARTH RESOURCES  
PROBLEMS OF TURKEY

(PROJECT NUMBER 28320)

FIRST PROGRESS REPORT  
OCT. 1, 1975 - Dec. 31, 1975

PRINCIPLE INVESTIGATOR.

Asse. Prof Dr. Sadrettin ALPAN *ato*  
MTA Enstitüsü - ANKARA



## Introduction

The purpose of the project is to evaluate the various ground resource problems of Turkey. Using ERTS images. The main object of the studies to be carried out within this region is primarily to establish research methods to use the underground water found in the limestone formations in the agricultural irrigation activities and also evaluate the procedures used to determine the location of fracture zones within the calcereous formations by making correlations with the available data. In so far as the studies in the agricultural field are concerned, this project will be of great assistance to analyse the selection of agricultural fields land use, soil-water relation, natural vegetation cover, planted and fallow areas, irrigated and non irrigated areas, controlling efforts for disease control and pest control and finally to evaluate the applicability of ERTS data to oil exploration in the Urfa Region.

## Technique

Twenty two black and white images in four separate bands of Urfa region have been received as required by the projects.

There is no color composites in hand at present of any field related to the project. The studies performed on the existing images once more showed that the geological studies are carried out best on the 5 th band, the Hydrogeological studies on the 6 th and 7 th bands. However, the color composites should be obtained for agricultural activity studies.

## Hydrogeologic Studies:

A photo mosaic was prepared from the 6 th and 7 th bands of the following images: 2194-7285, 2140-7292, 2193-7231, 2228-7171, 2228-7165, 2228-7162, 2175-7233, 2174-7175, 2175-7240, 2209-7113 In addition false color images were obtained by using 70 mm. positive films of the above numbered images on the viewer and these were then used together with the original images in studies. During the interpretation stage of hydrogeologic studies ground truth information was obtained from a careful study of previous investigations of ground water in the limestone areas. In addition aerophotos were used to locate the trace of fractures.

Agricultural Studies:

A photomosaic map similar to the one mentioned above has been the major part of the studies at present. In Urfa region the photo mosaic map was studied together with the existing geological and soil maps as well as the meteorological informations. The correlation of above studies with the false color images is in process.

Petroleum Studies:

These studies are presently carried out on the photo mosaic map as well as on the viewer. Color composites are being extensively used and the previous investigations relating to oil exploration in the Urfa region are utilized as the ground truth for the results obtained from the images.

Problems:

The main problem encountered up to now is at the stage of obtaining images from the Eros Data Center making extra number of copies for distribution. As an example an image sent from EROS Data Center in the middle of September as reached the investigators in the first part of November. However it can now be stated that the data flow is now quite normal and no more delays during distribution of images is anticipated.

Publications:

In the studies carried out up to now, the scientific correspondence between the investigators is successfully managed by formal or informal written or verbal communications.

Data quality and delivery:

The information concerning the delivery conditions was pointed out under the heading of "Problems". It can in general said that the quality of data is between good and very good. It is understood that very detailed studies of the Urfa region can be carried out by the images in hand.

Conclusions:

The following conclusions can be drawn from the studies on the photomosaic maps.

- a. Fracture trace maps can be prepared
- b. The number of fracture traces, their extensions, their locations and intersections obtained from the photo mosaic maps, can be compared with those obtained from panchromatic photographs.
- c. The relationship of fracture to springs can be investigated.
- d. The correlation between fracture zones and well productivity can be utilized to improve the choice of drilling locations.
- e. Useful information can be provided for the construction of irrigation systems.
- f. Information can be supplied to efforts control the plant disease.
- g. The pestiside damage to plant and agricultural products can be determined.
- h. Tectonic map which can be used to locate the petroleum provinces of the region can be constructed.

2832 B

Co-Investigator : TUNCER IPLIKÇI

Geology	: Nurettin Büyükyanbolu	ETİBANK
	Muhterem Bolgün	"
	Orhan Uzluk	"
	Assoc.Prof.Teoman Norman	O.D.T.Ü.
	İsmail Özkaya	"
	Ural Tümer	M.T.A.
	Gülten Mumcuoğlu	M.T.A.
	Mustafa Aslaner	K.T.Ü.
	Yusuf Tatar	"
	Remzi Dilek	"
Hydrogeology	: Dr.Nihal Atuk	D.S.İ.
Agriculture	: Prof.Nuri Munsuz	A.Ü.Z.F.
	Ekrem Kün	A.Ü.Z.F.



## Introduction

The purpose of the project is to evaluate the various ground resource problems of Turkey, using ERTS images. The main object of the studies is primarily to establish research methods to locate the known or new copper ore mineralization zones in this region, to prepare fracture zone maps in the limestone formations and to study other karst problems of the area.

In the studies of agriculture, land-use soil characteristic, soil-water relation, drainage pattern, natural vegetation cover, planted and fallow areas, irrigated and nonirrigated areas will be studied. Also the environmental hazard maps will be prepared.

## Technique

Nineteen black and white images in four separate bands of Elazığ region have been received and rest of images are expected. There is no color composites in hand at present of any field related to the project. The studies performed on the existing images once more showed that the geological studies are carried out best on the 5th band, the hydrogeological studies on the 6th and 7th bands. However, the color composites should be obtained for agricultural activity studies. In this region geological, hydrogeological and agricultural studies have been carried out.

## Geology

For studies, a photomosaic was prepared from the 5th band of the following images: 2194-7285, 2194-7282, 2193-7224, 2175-7231, 2174-7172, 2229-7220. An attempt is made to determine any relationship between the mineralization zones and the regional tectonic framework. A photomosaic is prepared using the 5th bands of images, numbered above. It is then attempted to draw the formation boundaries using these false color images. In all these studies, photogeological information available were utilized to a great extent.

## Hydrogeology

A photomosaic was prepared from the 6th and 7th bands of the above images. ERTS images were mainly used to seek the relationship between the previously determined faults and frac-

tures and newly developed water springs. (in the Ke'an dam area) Additional work was carried out on the false color images, prepared using the viewer.

### Agriculture

On the photomosaic maps following work were carried out: Available agricultural fields, soil-water relationship, drainage pattern, natural vegetation, planted and fallow areas, irrigated and nonirrigated areas, vegetation pattern and epidemic plant disease and pest control.

### Problems

The main problem encountered, up to now is at the stage of obtaining images from the EROS Data Center and making extra number of copies for distribution. As an example an image sent from Eros Data Center in the middle of september has reached the investigators in the first part of November. However, it can now be stated that the data flow is now quite normal and no more delays during distribution of images is anticipated.

### Publications

In the studies carried out up to now, the scientific correspondence between the investigators is successfully managed by formal or informal written or verbal communications.

### Data Quality And Delivery

The information concerning the delivery conditions was pointed out under the heading of "problems". It can be in general said that the quality of data is between good and very good. It is understood that very detailed studies of the Elazığ region can be carried out by the images in hand.

### Conclusions

The following conclusions can be drawn from the studies on the photomosaic maps:

- a. Important tectonic trends can be located,
- b. Geological contacts can definitely be drawn,
- c. Karstic problems of the region can be shown,
- d. The fracture zones in the limestone formations can be mapped,
- e. Correlation between the copper deposit areas and surface alteration zones can be made.

2832 J

Co-Investigator : Prof.Altan Gümüş K.T.Ü.

Research Groups:

Geology : Mustafa Aslaner K.T.Ü.  
Yusuf Tatar "  
Remzi Dilck "  
Orhan Uzluk ETİBANK  
Nurettin Büyükyanbolu "  
Muhterem Bolgün "  
Ural Tümer M.T.A.  
Büke Tansel "  
Teoman Norman O.D.T.Ü.  
Vedat Doyuran "

Forestry : Cemal Alptekin ORMAN EAK.  
Mehmet Sümer "  
Burhan Soykan K.T.Ü.  
Yılmaz Öztan "  
Rahim Anşin "

## Introduction

The purpose of this project is to evaluate the various earth resources problems of Turkey using ERTS images. The main object of the studies on this region is to locate the known or new copper deposits in the Trabzon area. The other object is determination and classification of the dense forest cover in the same region.

## Technique

The studies have not been carried out as they should be due to the cloud coverage and delay in the delivery of images. In this region the studies of geology and forestry have been attempted. The studies had been carried out using the image, with ID number 2176-7282 on four bands. The North Anatolian Fault zone had been clearly observed on this frame it is shown that the most important problem is, clouds and cloud shadows on the studies of Forestry

## Conclusion

The following conclusions can be drawn from the studies on the photomosaic.

- A good tectonic map of this region can be prepared
- It is understood that if the cloud free images are received, more detailed studies can be carried out about vegetation coverage and Forest classification.