ABSTRACT

Visual Interpretation of LANDSAT imagery of Eastern Ghats--Godavari delta area on scale 1:1,000,000 on spectral bands 5 and 7 was attempted. A neotectonic and geomorphic map was prepared from these images showing among other features major and minor lineaments. The importance of some of these lineaments for sedimentation, oil migration and localisation of ore bodies is discussed.

INTRODUCTION

Gelogy has traditionally been a field science. Nevertheless, remote sensing has found innumerable applications in geological sciences. A common example is the gravimeter which has contributed to the solution of many geological problems. Aerial photography which underwent rapid advancement during World War I, was shortly after applied to geologic mapping. Similarly remote sensing techniques developed rapidly during World War II but soon after the war they were applied to exploration geophysics.

The first pictures of the Earth were obtained from orbital altitude by small automatic cameras carried by sounding rockets to heights of 100 200 miles after the World War II. The results from these photographs generated so much interest that several manned flights were planned by the U. S. A. for obtaining orbital photography. These flights started in 1962 with Mercury flight I followed by Gemini and Apollo missions and Nimbus satellite observations. All these missions provided data ranging from small scale photographs to multispectral imagery which have had a marked synergistic effect.

The NASA earth resources programme began in 1963 to conduct a series of airborne remote sensing experiments using sensors that might have eventual space application. This work greatly stimulated the development of remote sensing in general. Further stimulus was provided by growing public
awareness in the late 1960s of environmental problem. These various developments culminated in the decision by NASA to develop a dedicated earth resources satellite, eventually named the Earth Resources Technology Satellite (ERTS) which has been renamed recently as LANDSAT, and a set of earth resources experiments for the first U.S. space station, now SKYLAB.

LANDSAT (ERTS) PROGRAMME

LANDSAT-1 is the first space platform designed specifically to observe the Earth repetitively with sensors that produce high resolution, multiband imagery and digital data. The satellite which was launched on July 23, 1972 orbits at an altitude of 496 nautical miles and is Sun synchronous. With the period of orbit as 103 minutes (approx.), it covers the same area on the earth every eighteen days, the area of coverage being about 100 by 100 nautical miles. The payload includes a Return Beam Vidicon Camera subsystem (RBV), a Multispectral Scanner Subsystem (MSS) and a Data Collection System (DCS). The RBV and MSS furnish independent views of the Earth beneath the observatory while the DCS relays local environmental information from remote platforms to the ground stations for processing and delivery to users. The RBV records data on three separate spectral bands i.e. .475 to .575, .580 to 6.80 and .690 to .830 micrometers wavelength. The MSS on the other hand is a 4-band scanner operating in solar reflected spectral bands which are (1) .5 to .6, (2) .6 to .7, (2) .7 to .8 and (4) .8 to 1.1 micrometer wavelength. The last two are in the near Infra Red range.

The unique advantage of LANDSAT MSS data is its synoptic coverage. It extends the assessment of contextual relationships to regional and sub-continental proportions by mosaicing these images. Even though the resolution is 13 to 100 times lower than normal for conventional aerial photography, the amount of geological information that can be derived is a satisfying surprise.

DISCUSSION

For the interpretation of the area under report, LANDSAT imagery in bands 5 and 7 (IR) with identification numbers of NASA ERTS-1181-04260-5 and NASA ERTS-1181-04260-7 respectively taken on 20 January 1973 have been used. The interpretation was done on 1:1,000,000 scales but enlargements on 1:500,000 scale were also consulted.

Figure 1 shows a part of the wealth of data that can be derived from LANDSAT imagery. Only those data that are relevant to the discussion have been presented. To emphasise once again the resolution capabilities of the LANDSAT MSS data, one may note details like the railway and the barrage over the Godavari river which have been identified in the imagery.

Lineaments: A number of lineaments are recorded from the imagery. For the purpose of discussion here, lineaments are those features on the surface of the