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Mineral Mapping in Parts of Konijerla Mandal, Khammam using RS and GIS Techniques

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ABSTRACT
GIS is a scientific database, which facilitates the integration of various datasets for spatial analysis and modeling with a common spatial coordinate system. GIS is very useful for handling images, maps, data tables, visualization, analysis, modeling and spatial decision support. GIS can be used to identify mineral potential zones. GIS is a logical device for breaking down topographical, geochemical, remote detecting information and so on. It is very useful in generation of mineral potential maps. GIS works with in sorting out a few variable datasets for questioning, examination and is in this way valuable in drawing significant deductions from the information produced. It is also useful in the identification of various parameters, which help in decision-making. It emphasizes on the spatial context by focusing on geological features that may have localized mineral deposition.

Keywords: *GIS, mineral exploration, mineral potential maps, digital database*

INTRODUCTION

Remote sensing, and GIS are important in the study of mineralized areas to evaluate different thematic layers (Viz., geology, structure, and geomorphology) using spectral anomalies.

Remote detecting extrapolates surface openings to under covered regions making sensible allowances concerning which stowed away units are probably going to happen beneath the surface. GIS forms the perfect tool in integrating and analyzing various geo referenced geosciences data and selecting the best sites of mineral deposits as practiced in the present area (Konijerla, Khammam, Andhra Pradesh).[1]

The above technique was ably supported by AUTOCAD and techniques in digitization.

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METHODOLOGY

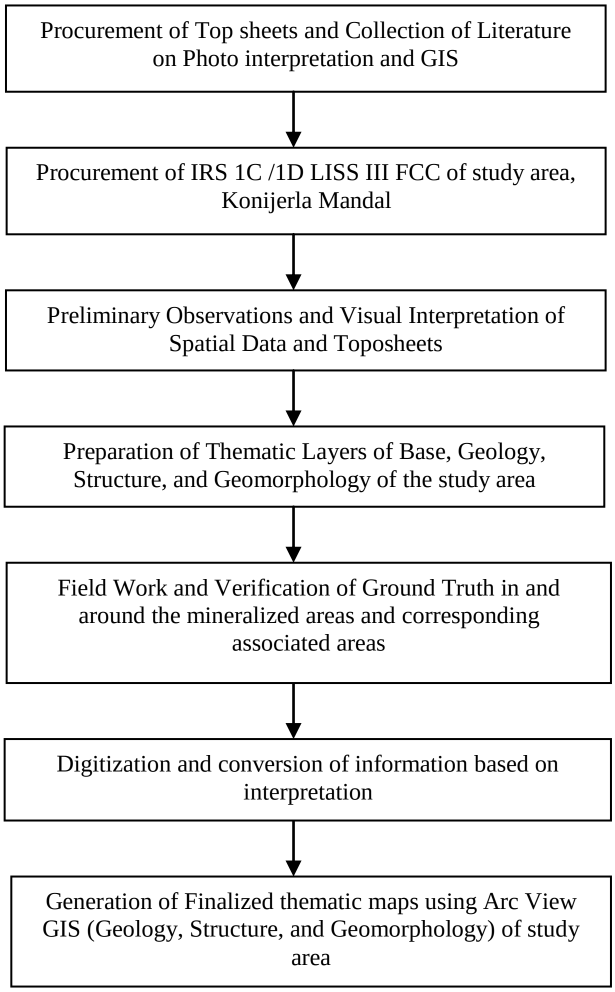

Fig. 1: *Flow Chart for Generation of Thematic Maps.*

The Procedure for Generation of GIS based Maps of the Area

The thematic maps (completed) brought out using parts of the Survey of India Toposheets of 65 C/7 and 65 C/8, IRS 1C/ID LISS III geocoded False Colour Composite (FCC) image (1:50,000 scale) and existing maps / literature were scanned at appropriate dots per inch. (DPI).

The scanned resource maps were digitized in Auto Cad (point, line and polygon features). The digitized resource maps were edited, and later the process of map composition was executed. (Arc View GIS). Finally, each thematic map with details of respective units and legend was brought out using Arc View GIS 3.2. The resulted thematic maps contains the title of the map, latitude / longitude values (Study area), scale of map, north direction, map units and legend with description of units.[2]

MINERAL MAPPING ON GIS PLATFORM

The generation of thematic maps requires data from different disciplines which needs to be integrated for this purpose. The zonation, incorporation and displaying of

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geo-scientific information is significant for setting up the topical layers.

The technology is widely utilised for ground-based data acquisition, information extraction and analytical GIS.

It develops theoretical understanding of those fundamental geologic processes, which control the nature of the Earth's surface and near surface environments depending upon the preparation of different layers.

Remote detecting and GIS add to fast and proficient planning of geography, design, and geomorphology nearby with restricted IT foundation and information utilizing present day strategies and utilizing geoinformation advances.[3]

GEOLOGIC MAPPING

It involves identification of rock types and configuration of geologic units on a map in their correct spatial relationship with one another. Corundum event and investigation is a significant action nearby as there is no unmistakable technique so far took on for geologic planning.

The geological map of the study area was prepared using the SOI Toposheet Nos.65 C/7 and 65 C/8 on 1:50,000 scale, and IRS 1C/ID LISS III geocoded FCC image.

The various rock types / geological units were marked using the SOI toposheets and IRS 1C/ID LISS III geocoded FCC image. Field check/ground truth as for the stone sorts was completed exhaustively to lay out the rightness of the deciphered land units and wide connections were made with the current guides. The lithological units subsequently deciphered out from the definite examinations are stone gneisses/biotite gneisses, amphibolites. Anorthosites, gabbroic anorthosites, pegmatites, schistose rocks of various types and basic rocks as pyroxene granulites and met dolerites

Geomorphological Mapping[4]

From the Air photo interpretation, landform identification and evaluation was made and studied stereoscopically for topography, drainage pattern and texture, erosion, photo tone, and vegetation.

Topography

Each landform and bedrock type has its own characteristic topographic form including a typical size and shape. There is in many cases an unmistakable geological change at the limit between two different landforms.

Preparation of geomorphological map

The Geomorphological Guide of the review region was ready through an examination of the components of photograph understanding (geography, seepage example and surface, disintegration, photograph tone, and vegetation) utilizing the SOI toposheet, IRS 1C/ID LISS III and existing guides/writing.

The different landforms were deciphered and checked through field confirmations/ground truth. The geomorphological units subsequently inferred incorporate slopes (Denudational, Remaining and underlying slopes), pediplains (shallow endured and reasonably endured), inselbergs and valleys (Shallow fill material)

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Fig. 2: *'Geomorphological Map of Study Area.*

Structural Mapping[5]
Tonal features in many areas are the surface expressions of fractures or fault zones. Major lineaments range from a few to hundreds of kilometers in length. The planning of lineaments is significant in mineral assets studies on the grounds that the vast majority of the mineral stores are restricted along primary snares. Several factors influence the detection of lineaments. One of the most important is the angular relationship between the linear fracture and the illumination source. By and large, includes that pattern lined up with the light source are not recognized as promptly as those that are situated oppositely.

Preparation of structural mapping
A Structural Map of the study area was prepared using the IRS 1C/ID LISS III geocoded FCC image and the various structural trends were marked. Field verifications / ground truth was carried out in establishing the presence of all the structural features in the study area. The structural units observed included lineaments (major and minor), fault zones, fractures, joint patterns, structural trends, and zones of mineralization of corundum.

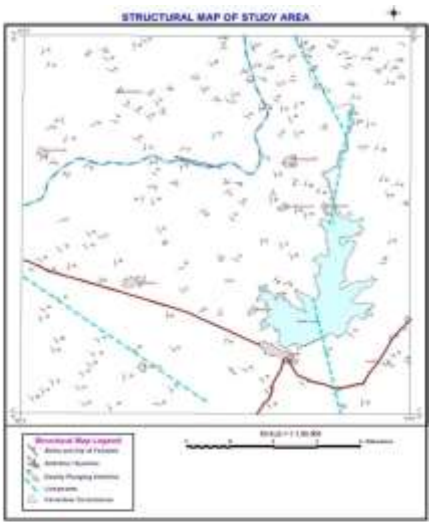

Fig. 2: *Structural Map of Study Area.*

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CONCLUSION

Remote sensing helps extrapolate surface exposures to underneath covered areas making logical deductions as to which hidden units are likely to occur below the surface. GIS works with in sorting out a few variable datasets for questioning, examination and is consequently useful in drawing significant surmisings from the information produced. Both Remote Sensing and GIS contribute to rapid and efficient mapping of geology, structure, and geomorphology in the area with limited IT infrastructure and data using modern methods and using geo information technologies. The structural units observed included lineaments (major and minor), fault zones, fractures, joint patterns, structural trends, and zones of mineralisation of corundum within the geological formations of granite gneisses / biotite gneisses, amphibolites. An orthosites, gabbroic an orthosites, pegmatites, schistose rocks of various types and basic rocks as pyroxene granulites and met dolerites.

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