PDF - STRUCTURAL INTERPRETATION AND MINERAL POTENTIAL USING REMOTE SENSING DATA AND GIS TOOL - researchcub.infoCHAPTER ONE

INTRODUCTION

The use geographic information system for hydro-geologicalpurposes has become widely acceptable in most of the developed countries.Although it is a recent technology or it is only appreciated recently, most ofits foundation has been used for quite a long time. The age of computer andinformation technology has made acquisition of data through remote sensing,interpretation and display of the result (obtained) through GIS a veryreliable, simple and standard source of important information. In some countriessuch as Canada and India, research centers have been established for the studyand applications of GIS to various fields and the result been achieved so farhas been commendable. Remote sensing provides a platform for much environmentaldata while GIS remain the most outstanding means of interpreting, manipulatingand storage of this data. Ground water resources are dynamic in nature as theygrow with the expansion of irrigation activities, industrialization,urbanization etc. (Das, 2008). Thus GIS with its advantages of spatial,spectral and temporal availability of data covering large and inaccessibleareas within short time become a very handy tool in accessing, monitoring andconserving ground water resources.

Dangermond (2011)underscored the importance of GIS applications in our dynamic contemporaryworld characterized with rapid changes and facing many challenges and difficultproblems such as climate change, urbanization, security, poverty and mineralexplorations etc, which are affecting us as individual as well as impacting ourorganizations and governments.

DEFINITIONS FROM DIFFERENT STANDPOINT

Like the field of geography, the term Geographic InformationSystem (GIS) is hard to define. It represents the integration of many subjectareas. Accordingly there is no absolutely agreed upon definition of a GIS(deMers, 1997). A broadly accepted definition of GIS is the one provided by theNational Centre of Geographic Information and Analysis; defines GIS as a systemof hardware, software and procedures to facilitate the management,manipulation, analysis, modeling, representation and display of geo-referenceddata to solve complex problems regarding planning and management of resources(NCGIA, 1990).

Rhind (1989) proposes that GIS is a computer system that canhold and use data describing places on the Earth’s surface. Fuller definitionsgive more idea of what GIS can do, as well as what they are. Burroughs (1986)defined GIS as ‘a set of tools for collecting, storing, retrieving at will,transforming, and displaying spatial data from the real world for a particularset of purposes.

ARONOFF (1989) defines GIS as a computer-based system thatprovides the following four sets of capabilities to handle geo-referenced data:

1. Input,
2. Data management (data storage and retrieval),
3. Manipulation and analysis, and
4. Output.

Geographic information systems have emerged in the lastdecade as an essential tool for urban and resource planning and management.Their capacity to store, retrieve, analyze, model and map large areas with hugevolumes of spatial data has led to an extraordinary proliferation ofapplications. Geographic information systems are now used for land useplanning, mineral exploration and exploitation, utilities

management, ecosystemsmodeling, flood control, fire hazard control, hazardous materials, stormcontrol, landscape assessment andplanning, transportation and infrastructure planning, market analysis, visualimpact analysis, facilities management, tax assessment, real estate analysisand many other applications, its relevance to our day to day life cannot beoveremphasized.

The use of remote sensing and geographic information systemfor hydrogeological purposes has become widely acceptable in most of thedeveloped countries (Longley et.al 2005; Asiyanbola 2017; Khodaei and Nassery 2011).

Groundwater is the water present beneath Earth's surface insoil pore spaces and in the fractures of rock formations. A unit of rock or anunconsolidated deposit is called an aquifer when it can yield a usable quantityof water. The depth at which soil pore spaces or fractures and voids in rockbecome completely saturated with water is called the water table. Groundwateris recharged from and eventually flows to the surface naturally; natural dischargeoften occurs at springs and seeps, and can form oases or wetlands. Groundwateris also often withdrawn for agricultural, municipal, and industrial use byconstructing and operating extraction wells. Groundwater is widely distributedand is used for domestic, industrial and agricultural purposes throughout theworld. Groundwater is a valuable natural resource that is essential for humanhealth, socio-economic development and functioning of ecosystems. Groundwateris often cheaper, more convenient and less vulnerable to pollution than surfacewater. Therefore, it is commonly used for public water supplies. For example,groundwater provides the largest source of usable water storage in the UnitedStates (Abdulazeez, et. al 2016; Sander P., Chesley M. and T. Minor 1996; IAEA1994).

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Regards!!!