Theory

The magnetic method measures variation in the earth's magnetic field. Anomalies may be caused by subsurface geologic formation, such as basic igneous rocks and magnetic ore bodies. Strong local magnetic fields or anomalies are produced by buried ferromagnetic object, such as tanks, drums, piles, and reinforced concrete foundation. Such magnetic anomalies are interpreted in terms of shape and extent or size of the causative bodies.

A Geometrics type G-856 used to collect all magnetic data. The instrument measures the magnetic field from the earth and local rock. The result will be described as distribution of magnetization rock and very good for minerals exploration to get the body and dimension of minerals.

Main Applications
- Minerals Exploration (Iron Ore, Manganese, Gold, etc)
- Andesite and Vulcanic Rocks Exploration
- Coal Exploration

Processing and Modeling
- Horizontal Investigation (fault modeling, horizontal separation, interest zoning)
- Vertical Investigation (Depth estimation, Thickness, vertical separation)
- Solid Model (resources estimation, fault modeling 3-D)

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Ground Gravity Survey

Theory

The Gravty method measure rock density in the subsurface. The result of data will be described lateral and vertical density distribution. Main target from gravity survey is basement configuration and get the view of where is source rock and geological structure like anticline, sincline, fault and formation of stratigraphy.

A Gravitymeter type Lacoste and Romberg to collect all gravtiy data. The LaCoste and Romberg G-meter is designed to measure the changes in the earth's gravitational field from station to station.

Main Applications
- Oil and gas exploration
- Fluid and geothermal investigation

Processing and Modeling
- Basement configuration for oil and gas
- Source rock of geothermal
- Geological Structures
Geophysical resistivity techniques are based on the response of the earth to the flow of electrical current. In these methods, an electrical current is passed through the ground and two potential electrodes allow us to record the resultant potential difference between them.

Very much type to collect the data as Naniura, Area, Supersting and Zonge but every type have advantage for each measurement. The resistivity-IP survey will be described vertical distribution of resistance rock. Every rock have range value of resistance and the result will be identify and distribution of resistance and every resistance correlate with a rock.

Main Applications
- Minerals Exploration (Iron Ore, Manganese, Gold, etc)
- Groundwater Investigation
- Andesite and Vulcanic Rocks Exploration
- Archeological Investigation

Processing and Modeling
- Vertical Investigation (Distribution of rock and minerals)
- Distribution of rock with 3-D view

Ground Penetration Radar Survey

Theory
Ground Penetrating Radar is an electromagnetic (EM) geophysical method for high resolution detection, imaging and mapping of subsurface soils and rock conditions. The idea of using the propagation of high frequency EM waves for subsurface can be traced back to the beggining of the century. A typical GPR system has three main components; transmitter, receiver, that are directly connected to an antenna, and a control unit (timing). The transmitting antenna radiates a short high-frequency EM pulse into the ground, where it is refracted, diffracted, and reflected primarily as it encounters changes in dielectric permittivity and electric conductivity.

The latest technology from Ground Radar we used. We use Ultra GPR with frequency 30MHz and can be identifying target till 120 meter. The technology very good for minerals exploration as iron ore, manganese, nickel laterite and geological subsurface.

Main Applications
- Minerals Exploration (manganese, iron ore, nickel laterite)
- Archeological Investigation
- Geotechnic (Road, Pipe, Contruction)

Processing and Modeling
- Lateral and vertical continuity of mineral deposite
- Depth of bedrock
- Subbottom profiling for river or lake investigation

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Seismic Survey

Theory

Seismic methods illuminate the subsurface using acoustic waves. The signal of interest arise from the reflection, refraction and scattering of waves at boundaries where abrupt changes in elastic properties occur. Recording from propagation of wave will be described as layering of stratigraphy rocks. Seismic survey very important for lateral distribution as coal, nickel laterite and geological subsurface.

We use seismic equipment form geometric 48 channel with geophones 10Hz and 30Hz and weight drop and air gun for source. The technology very appropriate for shallow target with depth target 100m-500m.

Applications

- Minerals Exploration (Nickel laterite)
- Coal Exploration
- Geological Subsurface (Sedimentation)

Processing and Modeling

- Horizontal Investigation (fault modeling)
- Vertical Investigation (Depth estimation, Thickness)
- Well Tie (correlation with Log Data)

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