

GEOPHYSICAL METHODS QUICK REFERENCE

Collier Geophysics provides expertise in most contemporary geophysical methods as summarized below.

Table 1: List of Common Geophysical Methods and Applications			
Method	What it Measures:	Mode of application	Typical Uses
ELECTRICAL METHODS			
Electrical Resistivity	Electrical Conductivity	Surface and Marine	Stratigraphy, Saltwater Intrusion, Fracture Zones
Induced Polarization (IP)	Electrical Chargeability	Surface	Sulfide Mineralization, Clay Content
Spontaneous Potential (SP)	Electrokinetic Potential	Surface	Fluid Flow
Mise a la Masse	Electrical Conductivity	Surface	Conductive Bodies
SEISMIC METHODS			
Seismic Refraction	Seismic Velocity	Surface	Depth to Bedrock or Confining Units
Seismic Reflection	Acoustic Impedance	Surface and Marine	Stratigraphy, Structure, Faulting
Multi-Channel Analysis of Surface Waves (MASW)	Shear Wave Velocity	Surface	Depth to Bedrock, Voids, Incometent Zones
Full Wave-Form Tomography	Seismic Wave Propagation	Surface	Stratigraphy, Structure, Karst
Horizontal to Vertical Spectral Ratio (HVSR) Method	Shear Wave Velocity	Surface	Depth to Bedrock
ELECTROMAGNETIC METHODS (EM)			
Frequency Domain Electromagnetic Induction (FDEM)	Electrical Conductivity	Surface, Marine & Airborne	Stratigraphy, Saltwater Intrusion, Fracture Zones
Time Domain Electromagnetic Induction (TEM)	Electrical Conductivity	Surface, Marine & Airborne	Stratigraphy, Saltwater Intrusion, Fracture Zones
Ground Penetrating Radar (GPR)	Dielectric Constant	Surface & Marine	Stratigraphy, Buried Targets
Controlled Source Audio Frequency Magnetotellurics (CSAMT)	Electrical Conductivity	Surface	Stratigraphy, Saltwater Intrusion, Fracture Zones
Very Low Frequency Induction (VLF)	Electrical Conductivity	Surface	Bedrock Fractures, Depth to Bedrock
Metal Detectors	Electrical Conductivity	Surface & Marine	Buried Metal, Utilities
POTENTIAL FIELD METHODS			
Magnetometry	Magnetic Suceptibility	Surface, Marine and Airborne	Ferrous Bodies
Gravity Surveys	Density	Surface, Marine and Airborne	Depth to Bedrock, Voids, Structure
Geothermal Methods	Thermal Conductivity	Surface	Fluid Flow
BOREHOLE METHODS			
ELECTRICAL LOGS			
Spontaneous Potential Log	Electrokinetic Potential	Fluid Filled Borehole	Sand vs Shale, Water Quality
Resistivity Logs	Electrical Conductivity	Fluid Filled Borehole	Stratigraphy, Water Quality
Resistance Logs	Electrical Resistance	Fluid Filled Borehole	Formation Contacts
Induction Logs	Electrical Conductivity	Fluid or Airfilled Borehole	Stratigraphy, Water Quality
Gamma Logs	Gamma Ray Emmission	Fluid or Airfilled Borehole	Clay Content
POROSITY LOGS			
Nuclear Magnetic Resonance Log (NMR)	Hydrogen Ion Content	Fluid or Airfilled Borehole	Porosity and Permeability
BOREHOLD IMAGING LOGS			
Down Hole Televising Log	Borehole Image	clear fluid or air filled	borehole condition, stratigrpahy
Acoustic Televiewer	High Frequency Sonic Scan	fluid filled borehole	borehole condition, fractures
Optical Televiewer	Optical Light Scan	clear fluid or air filled	borehole condition, stratigraphy, fractures
Caliper Log	Borehole Diameter	any borehole	borehole diameter, fractures
Alignment Logs	Borehole Deviation	any borehole	hole alignment
FLOW METERS			
Temperature Logs	Fluid Temperature	Water Filled Borehole	Flow in Open Borehole
Borehole Fluid Conductivity Logs	Electrical Conductivity	Water Filled Borehole	Flow in Open Borehole
Spinner Logs	Fluid Flow	Water Filled Borehole	Flow in Open Borehole
Heat Pulse Flow Meters	Fluid Flow	Water Filled Borehole	Flow in Open Borehole
Electromagnetic Flow Meters	Fluid Flow	Water Filled Borehole	Flow in Open Borehole
Fluid Displacement Logs	Fluid Flow	Dionized Water Filled	Flow in Open Borehole
WATER QUALITY LOGS			
Geochemical Logs	Ionic concentration	Water Filled Borehole	Concentration of Specific Ions like Chloride or Nitrate
Downhole Samplers	Water Quality	Water Filled Borehole	Collecting Water Smaples from Specific Depths in a Water Filled