

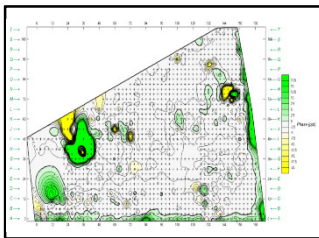
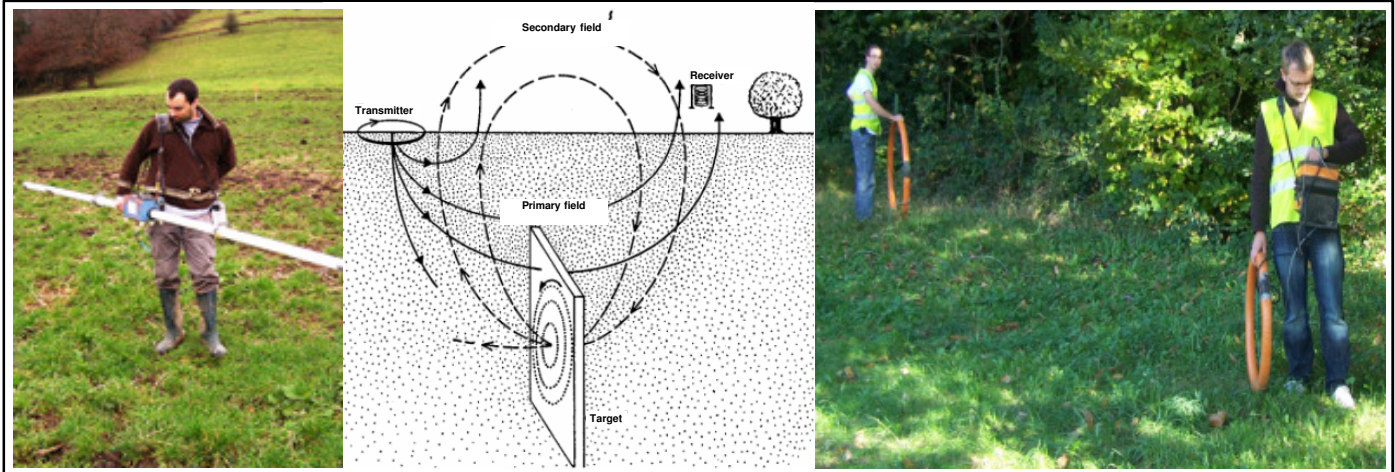


**SOLDATA**  
GEOPHYSIC

# ELECTROMAGNETISM



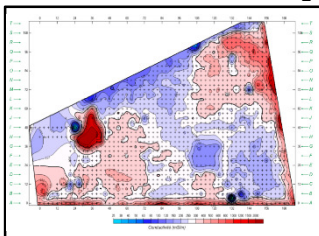
**AGAP Approval of Quality: Electromagnetism with close transmitters**  
**ASTM Standard D6639-01**



Electromagnetism is a non-destructive method of investigation, carried out without contact with the ground (no electrodes). By measuring the apparent electrical conductivity, variations in facies and other heterogeneities at different depths in the ground can be distinguished.

**Applications**

- Determination of the geology at a site (coupled with drilling investigations)
- Investigation of water tables, water circulation and location of catchment zones
- Determination of areas at risk of karst cavities



The principle of the method is based on the variation of a primary magnetic field,  $H_p$ , caused by an alternating current in the transmitter coil at a frequency,  $f$ , which induces weak currents in the soil. These currents create a secondary magnetic field,  $H_s$ , measured by a receiver located at a given distance from the transmitter.

Under the right conditions - no metal and / or electrified objects (fences, cars, power lines, etc.) in the proximity - the ratio of these components provides a measure of apparent conductivity at a certain depth. This depth may vary depending on the orientation of the coils and the distance between them (see table below).

| METHOD | DISTANCE BETWEEN REELS (m) | INVESTIGATION DEPTH (m) |
|--------|----------------------------|-------------------------|
| EM31   | 3.6                        | 2.5 – 5.5               |
| EM34   | 10.0 – 40.0                | 7.5 – 60.0              |
| EM38   | 1.0                        | 0.75 – 1.5              |

The final result is shown in the form of plans of apparent conductivities of the soil (one or two plans depending on the axis of the reels).

At the end of the study, SOLDATA Geophysic is able, coupled with the control drilling investigation, to specify geology, the presence of groundwater or risk cavity.



**Legend**

- 1. Theoretical principle and material in use EM31 (left) and EM34 (right)
- 2. & 3. Results in the form of conductivity plans

**Key figures**

- Depth of investigation: from 0.5m to 60m
- Speed of implementation: many hectares per day

**SDG Equipment**

- Geonics EM31, EM34, EM38
- Automated coupling with GPS