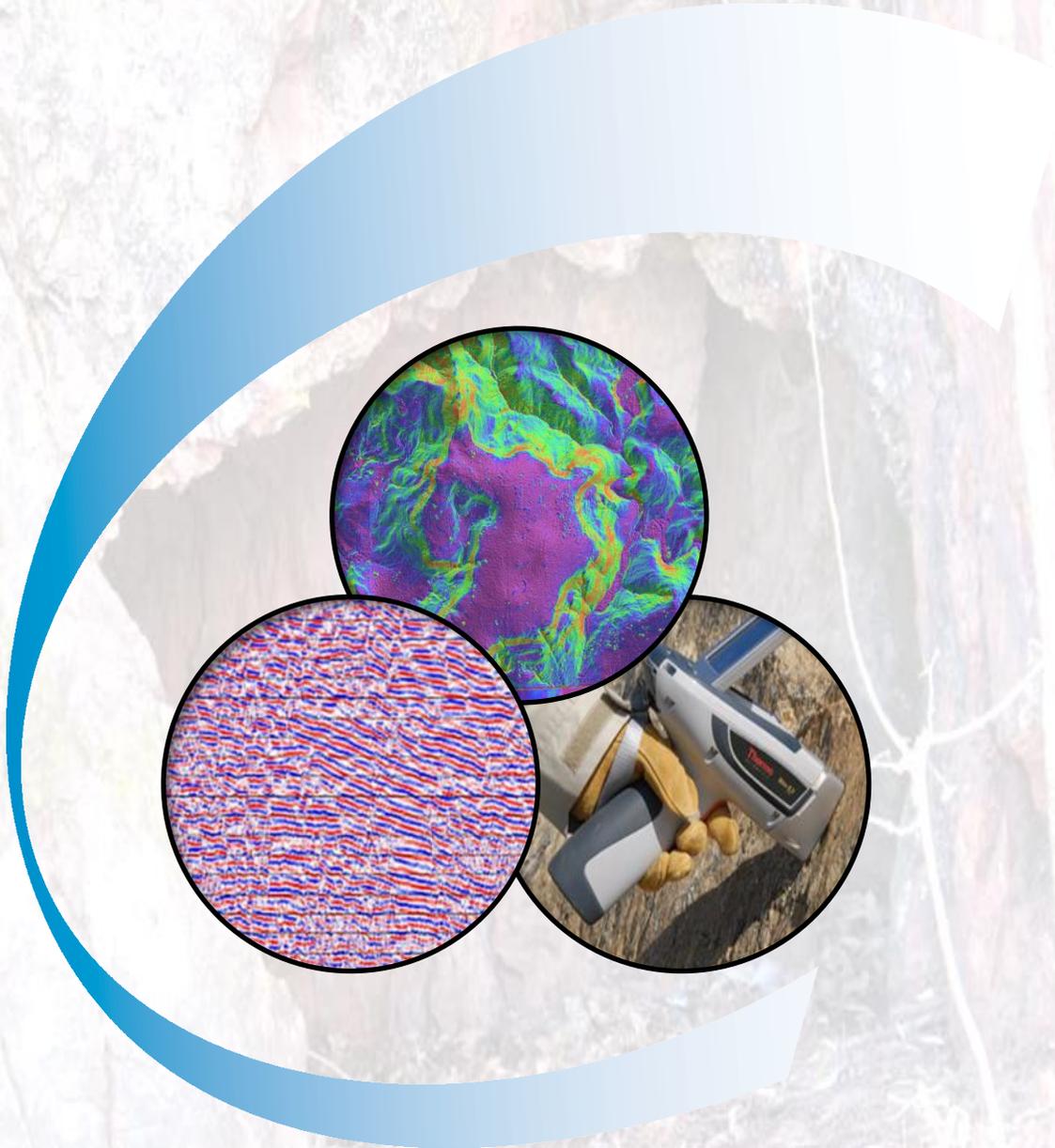


MINING EXPLORATION SERVICES

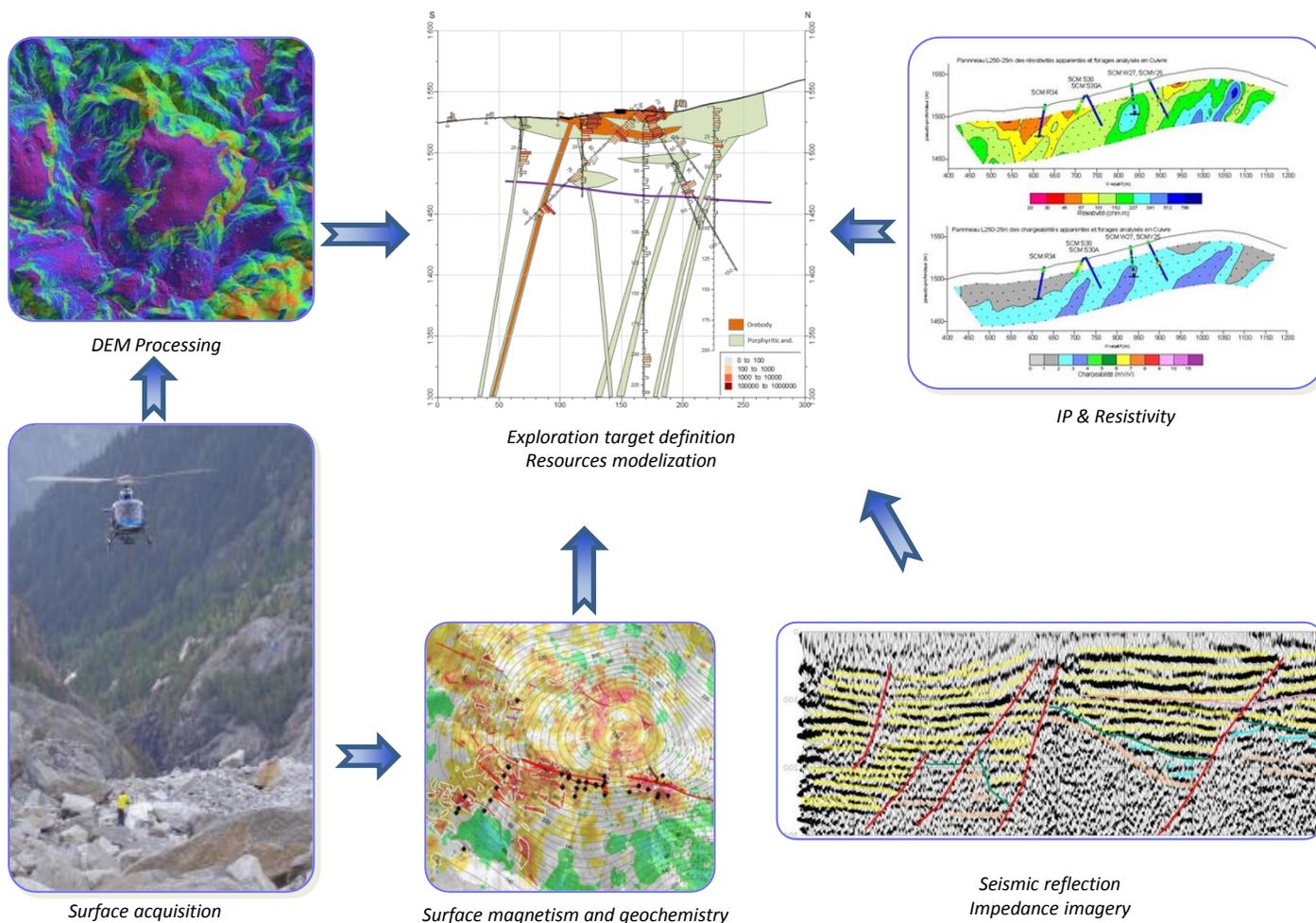


BACKGROUND & TECHNOLOGIES

EOSYS is a geoscience engineering company offering specialized services to mining exploration companies. Founded in 1993, it has offices in Paris (France) and in Guadalajara (Mexico).

EOSYS services are aimed at 2 objectives :

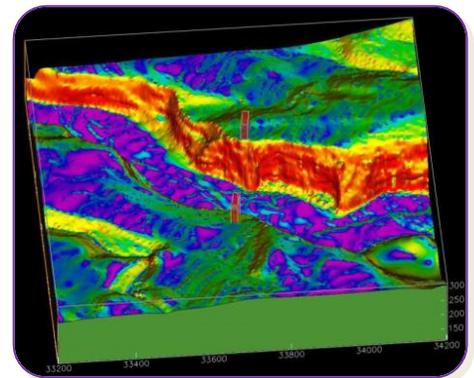
- **high precision geological and geochemical mapping** : the combined use of satellite, airborne and drone technologies with ground based geological observations supported by tactic or systematic geochemical sampling allows to survey rapidly and with a high accuracy zones spanning from a few hectares to thousands of km². This is essential in order to know if mineralization indices could be the expression of major and economic mineralized bodies.
- **integration of geophysical surveys with surface or drill-hole geological and geochemical data** : this often neglected step is fundamental in order to make full use of investments made in geophysical surveys. In many cases, a reprocessing based on the latest geological information brings new hindsight in the project. EOSYS also advocates for a more developed use of the seismic methods in mining and has been developing since 10 years project based processing sequences, using information brought by refraction, reflection and direct wave propagation. This has allowed to investigate near surface features (such as old mine workings) in the upper 20m as well as complex structural situations between surface and a depth of more than 1000m.



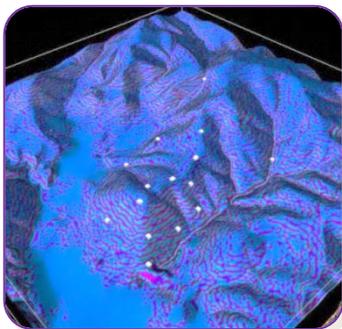
SURFACE DATA ANALYSIS

EOSYS offers the following services:

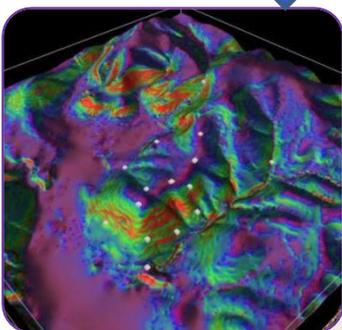
- **Field works:**
 - Geological mapping
 - Petrophysical and geochemical analyses
 - Structural analyses
- **Remote sensing**
 - Satellite, aerial and drone data can be programmed and used in order to perform structural interpretations and litho-geochemical mapping as well as to detect certain alteration or mineralization signatures.
 - Geological interpretation of aerial stereophotos and thermography
- **Photogrammetry**
 - DEM and orthophoto calculation based on SPOT scenes or aerial photographs
 - Morphological analysis of bathymetric and topographic data



3D DEM used for geological mapping and 3D geological model

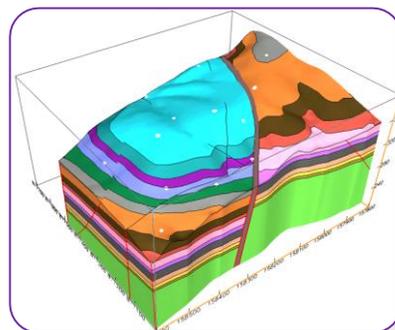
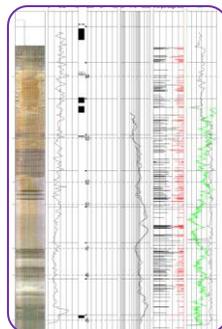


DEM from drone or aerial photographs



DEM morphological processing

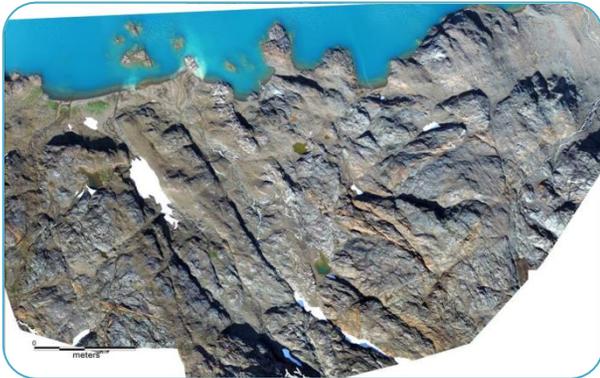
Field geological mapping and borehole



3D geological model



AUTOMATIC RECOGNITION AND MAPPING OF GEOLOGICAL STRUCTURES



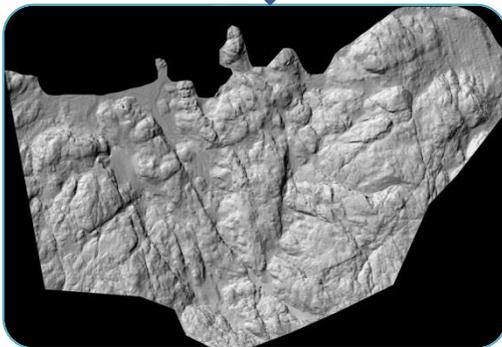
EOSYS developed a methodology for the recognition of geologic structures (fractures, joints, lithological contacts and unconformities) from images acquired by UAV's (Unmanned Aerial Vehicles) or drones. These images, generally of centimeter resolution, can be acquired quickly and at a lower cost than other airborne images.

The methodology developed by EOSYS consists on automatic or semi-automatic extraction of information on geological structures in the study area.

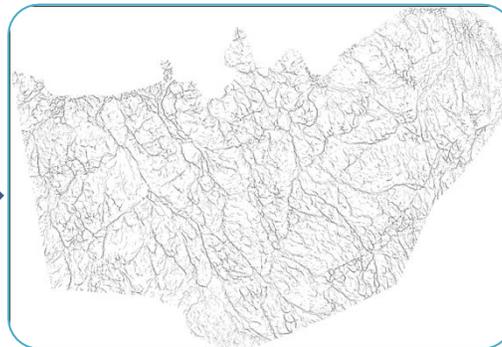
It allows to define:

- Lineament location, geometry and length
- Lineament azimuth and dip
- Lineament density and frequency

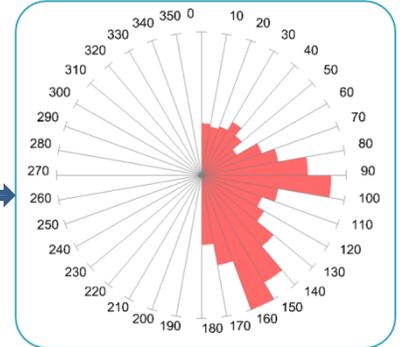
In mining and quarrying management, in addition to classic stockpile and volumetric surveys, this methodology allows a better lithological description of working fronts and an a better estimation of block volumes that can be extracted from the rock mass.



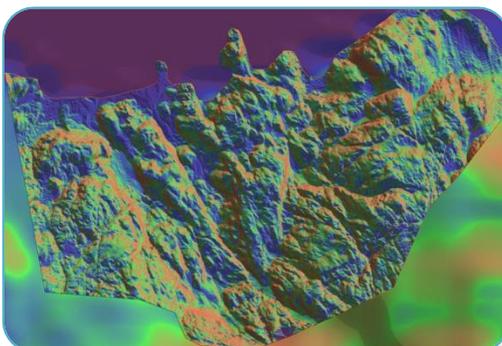
DEM extracted from UAV images



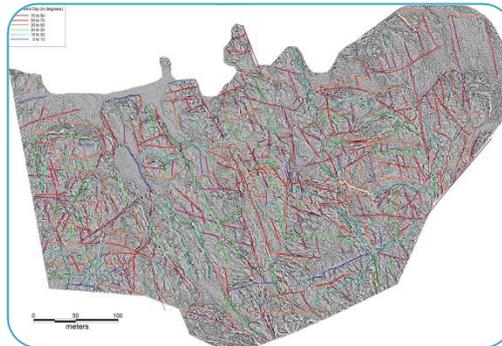
Automatic extraction of faults and fractures



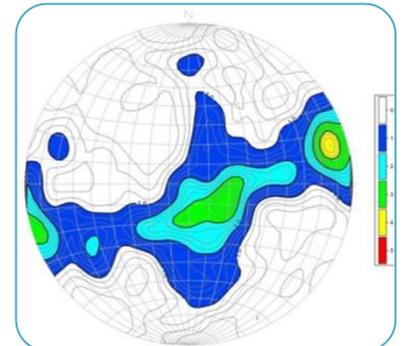
Rose diagram of fracture data



Morphological processing of elevation data



Thematic map of fracture data by dip



Density stereogram

GEOCHEMISTRY

EOSYS provides a range of services for geochemical studies including:

EXPLORATION SUPPORT

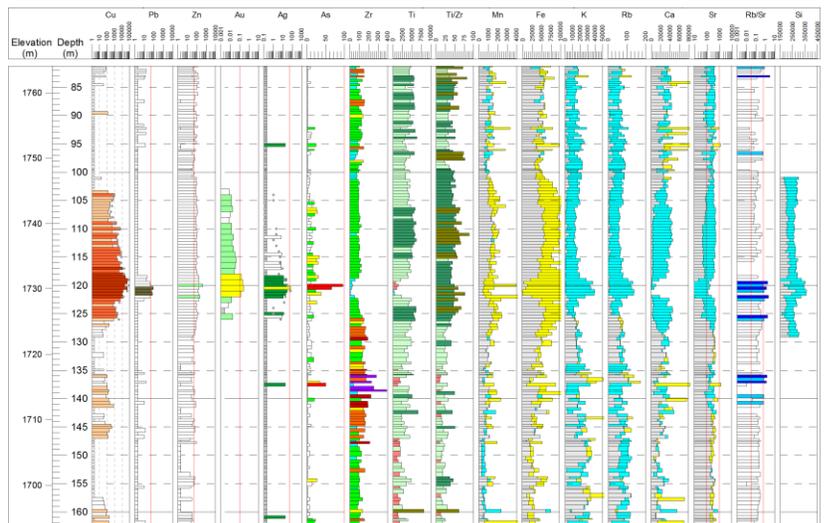
- Design and realization of stream, rock, soil and channel geochemical surveys
- Geochemical analyses of a vast array of rock matrices
- Soil, rock and core analysis
- Calculation of geochemical spatial maps using kriging methods
- Methods to locate and define deep orebodies

LABORATORY ANALYSIS

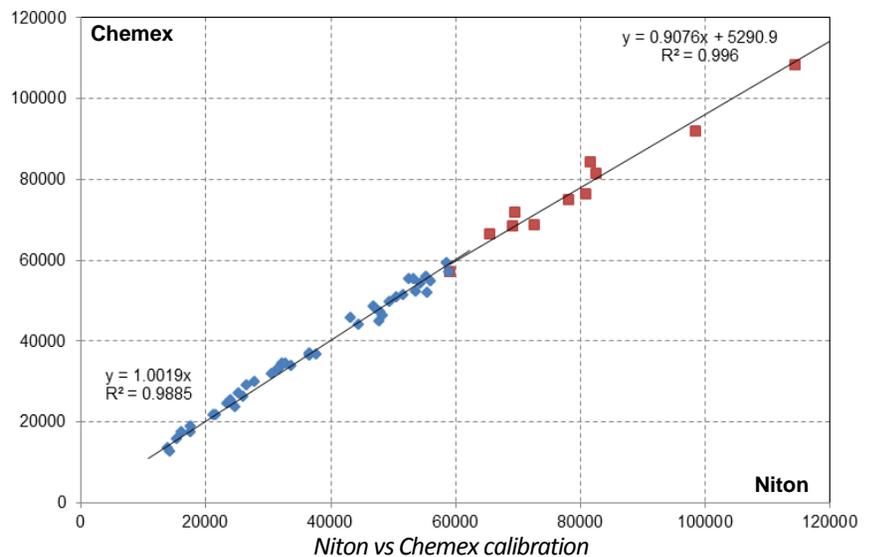
- Sample preparation
- XRF analysis for +40 elements in rock matrices
- Mineralogical definitions

INSTRUMENTATION

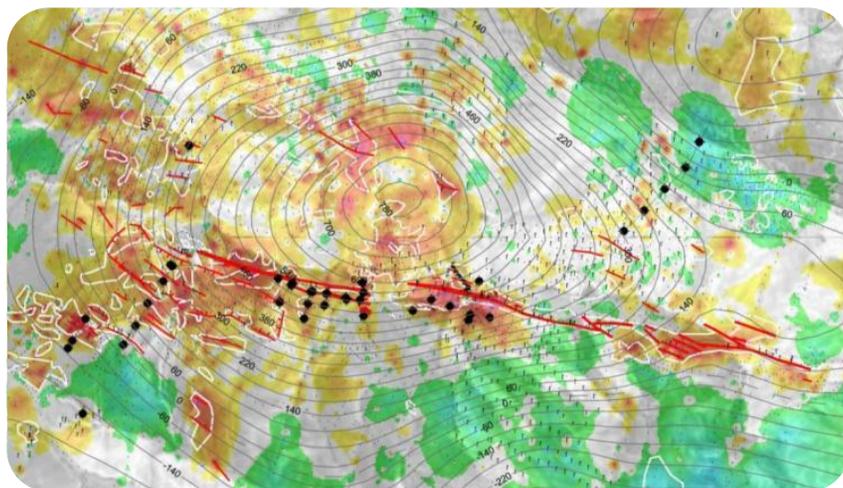
- NITON XRF Portable Analyzer
- Sample preparation facilities (crushers, grinders, sieves)



Geochemical log



Niton vs Chemex calibration



Alteration map & Magnetic field



Niton XRF Analyzer

GEOPHYSICS

EOSYS performs or manages onshore or offshore acquisitions with adapted sources and equipment.

- **Seismic surveys**

- 2D Seismic Reflection;
- Crustal investigations/ ECORS;
- Seismic Refraction;
- Mini-VSP (Vertical Seismic Profile);
- Drilling;
- Topography;
- Real-time quality control acquisition.

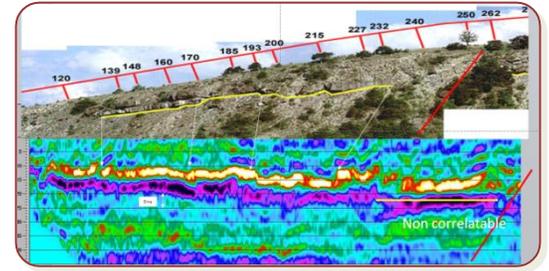
- **Processing & Interpretation**

- Vertical seismic data (VSP) processing;
- 2D/3D seismic data at different resolutions (HR/VHR) at regional or local scale processing;
- Refraction seismic data processing;
- Transcoding, transcription and reading of old tapes (21 tracks and 9 tracks)

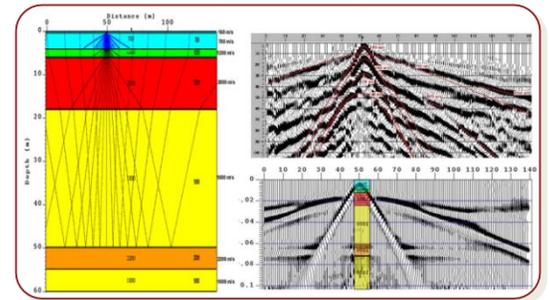
EOSYS has performed/supervised surveys in difficult acquisition conditions such as plant sites or equatorial swamp zones. Missions aim to:

- Analyze in detail the first 500 meters depth;
- Identify the presence of faults or fractured zone
- Identify possible areas of communications with surrounding aquifers or between different aquifer units.

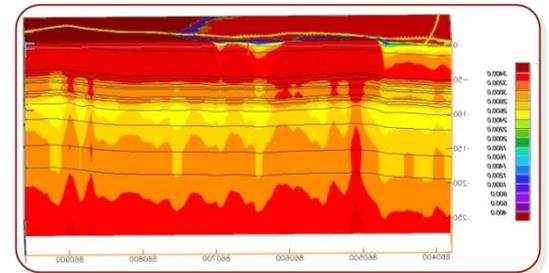
Depending on the objectives, EOSYS can implement directly or through certified subcontractors, other geophysical methods: electric, electromagnetic, gravity, magnetic, geo-radar.



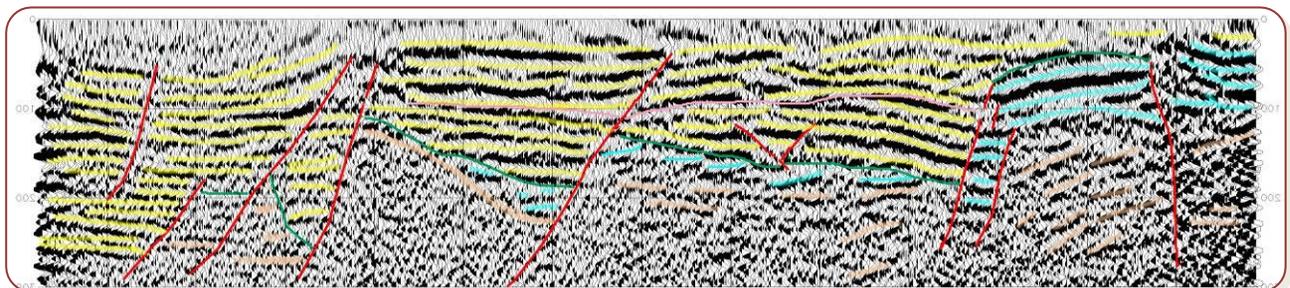
Shallow seismic reflection (0-50m)



Synthetic Seismic



Detecting density changes by modeling the impedance



Sismique réflexion peu profonde (0-500m)

Present in Mexico since 2006, EOSYS helps to facilitate and secure the flow of foreign investments allowed now in the country in order to develop its hydrocarbon industry.
With its offices in France and Mexico, EOSYS may help independent operators and investors in their projects in Europe, Africa or Latin America.

Customers:

- TOTAL
- ENGIE (GDF SUEZ)
- STORENGY
- EDF-EN
- PERENCO
- IFPEN
- GEOSTOCK
- VENCOREX
- SOLVAY (RHODIA)
- LUNDIN (COPAREX)
- EGIS
- COMPANIA MINERA DE ATENGO
- Private investors



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