TERRAVOX
GEOPHYSICAL TECHNOLOGIES

Improving Exploration Efficiency

We use microseismic-based technologies to help oil and gas, mining, construction and energy companies reduce drilling costs by up to 50%.

Terravox: we listen to the voice of the Earth

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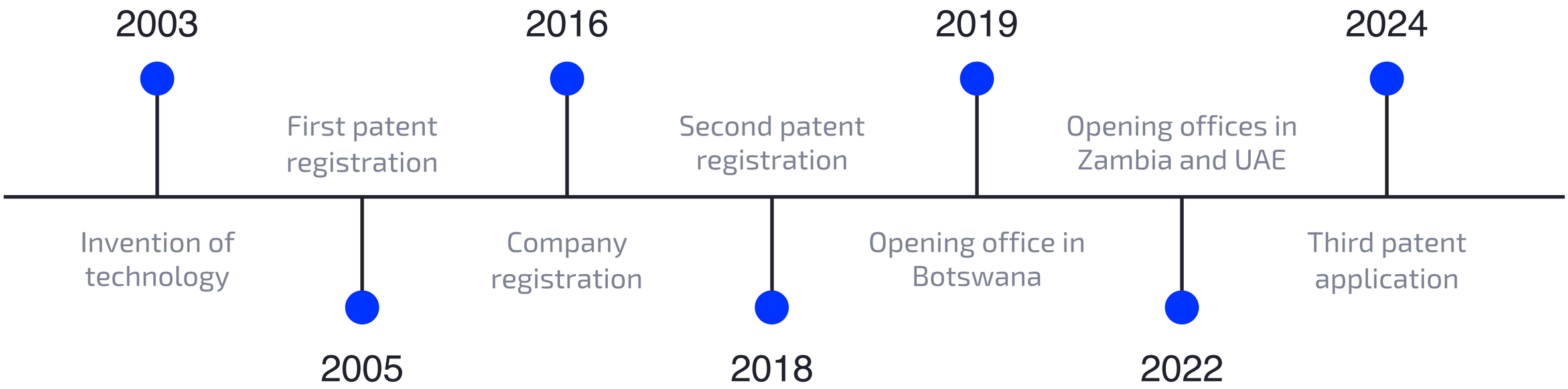
Our goal with Terravox technology in mineral exploration is simple: to reduce risks and enhance accuracy. By studying fault tectonics and mineral deposits, we're uncovering hidden treasures in both new and familiar territories. Our compact and efficient microseismic technology enables us to detect overlapping extensions of ore-bearing structures, revolutionizing prospecting.

With Terravox, we're not just exploring; we're pioneering a future of sustainable resource management and unparalleled geological insights.

Company's History



Terravox: quality subsurface data

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A model of meaningful signal formation in GEMS

The analogue of a microseismic field can be a random wave field at the water surface:

• Rocks do not rise to the surface, but they introduce distortions into the random field from which the presence and position of rocks can be judged.

Using Terravox's GEMS technology solutions, our customer was able to complete a five-year exploration program in just six months and reduce drilling volumes by 50%.

GEMS: business advantages

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Cost-Effective

Early risk assessment tool, eliminates the need for expensive and complex fracturing methods, reduces the volume of drilling

Fast

Real-time data interpretation during fieldwork enables swift decision-making. Final reports are delivered within 2-4 weeks of fieldwork completion, ensuring rapid insights

Sustainable

Has zero environmental impact and requires no additional research permits, streamlining exploration processes and reducing regulatory hurdles

Accurate

Provides accurate delineation of the ore body, depths, and recommended drilling targets

GEMS: technological advantages

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GEOPHYSICAL TECHNOLOGIES

Unlimited Exploration Depth

penetrates the ground at any point and depth, eliminating exploration depth limitations, unlike other methods..

Versatile Equipment Solutions

Adaptable equipment allows for seismic surveys in any terrain, including areas with established infrastructure.

Real-Time Monitoring

Enables continuous real-time monitoring of underground spaces, tracking changes in objects like cracks, folds, movements, or deformations.

Environmentally Friendly

Does not generate noise, vibration, or electromagnetic disturbances, ensuring compliance with environmental regulations and minimal impact on ecosystems

Without GEMS

ore body & size
unknown

drilling is
a gamble

exploration
can cost 10x more

With GEMS

can see exact location
of drilling targets

can assess risks
before major expenses

get accurate &
fast results

GEMS: project stages

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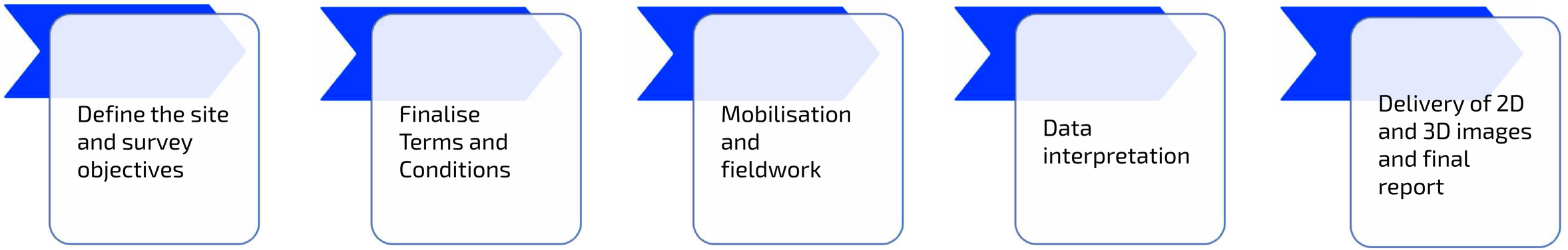

- Profiles are determined together with the customer’s geologists based on the recommendations of Terravox technical team to achieve best results and optimise the number of survey points.
- Mobilisation can be arranged fast depending on weather and site conditions and equipment availability.
- Data interpretation is made by Terravox's proprietary software using big data analysis and AI algorithms.
- Technical report with 2D image is delivered within 48 hours after completion of fieldwork for each profile.
- Final report with geophysical recommendations is submitted within 2-4 weeks after completion of the fieldwork for all profiles.

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Geothermal Energy

Company Experience

Geothermal Energy. Company experience

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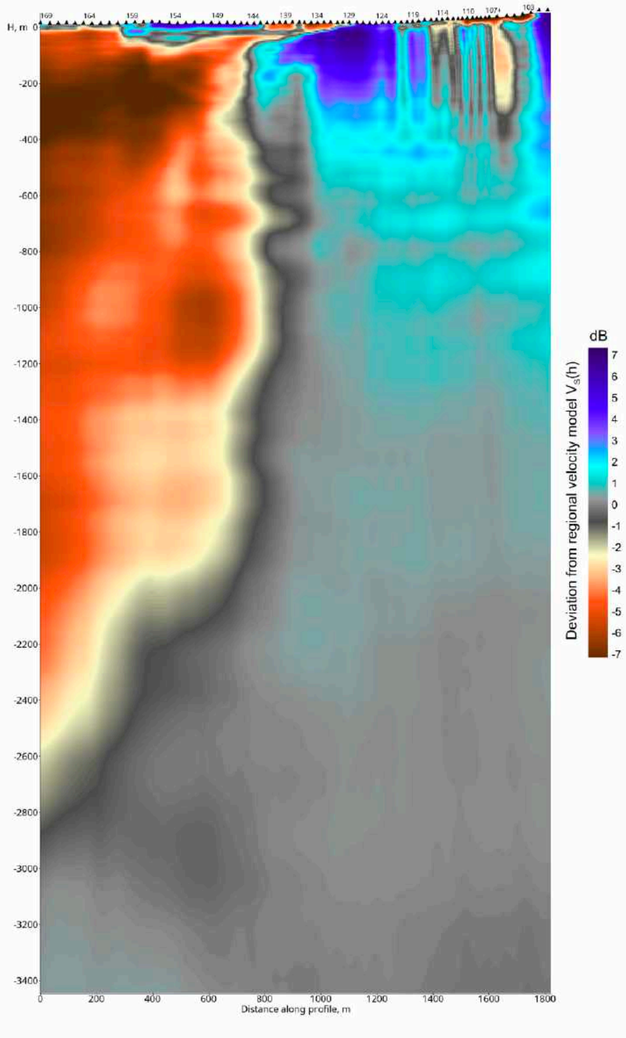
GEOPHYSICAL TECHNOLOGIES

2023 | Iceland



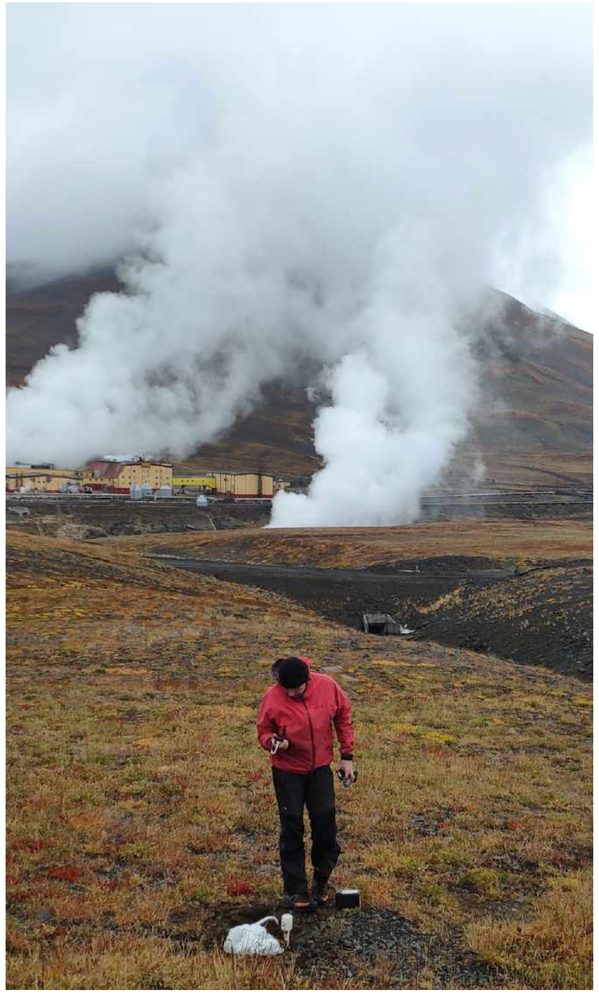
The purpose of the work was to demonstrate the capabilities of the technology in geothermal field.

GEMS results showed geological information unknown to the operator. A joint report is being prepared with further recommendations.

Geothermal Energy. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

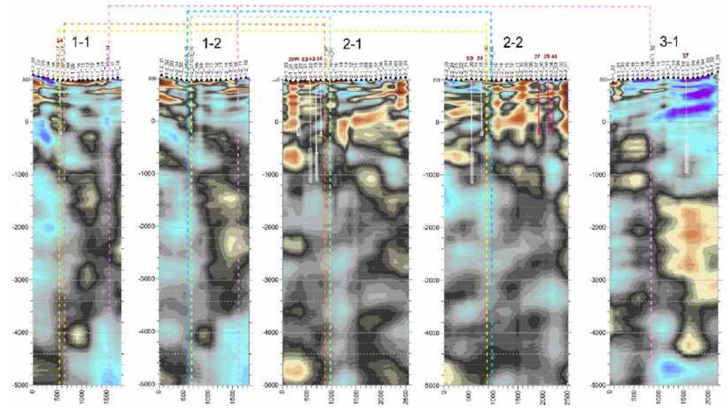
2023 | Iceland

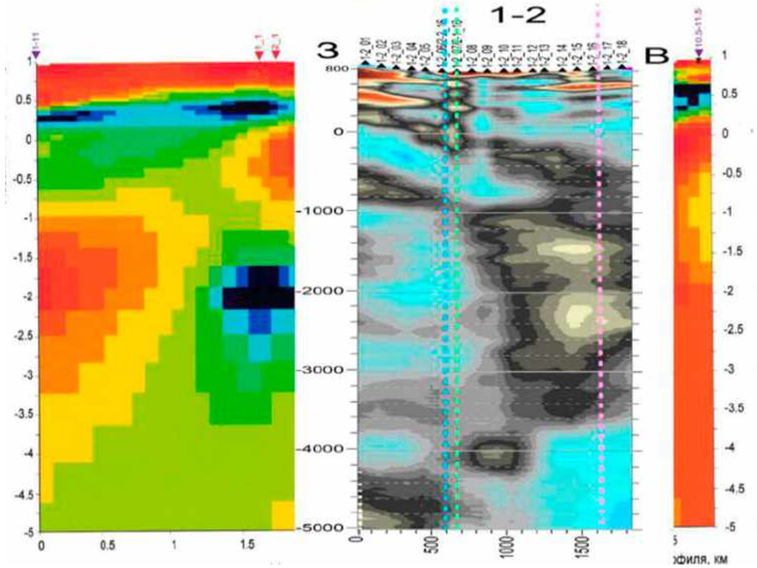


The purpose of the work:

to identify fracture zones and existing deep faults, as well as spatial linking of these zones with the submission of technical documentation of the field to the plans.

GEMS accurately determined the areas of increased and decreased seismic wave velocities, which mark zones of possible increased fracturing and porosity.





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Ores

Company Experience

Li Lithium. Company experience

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GEOPHYSICAL TECHNOLOGIES

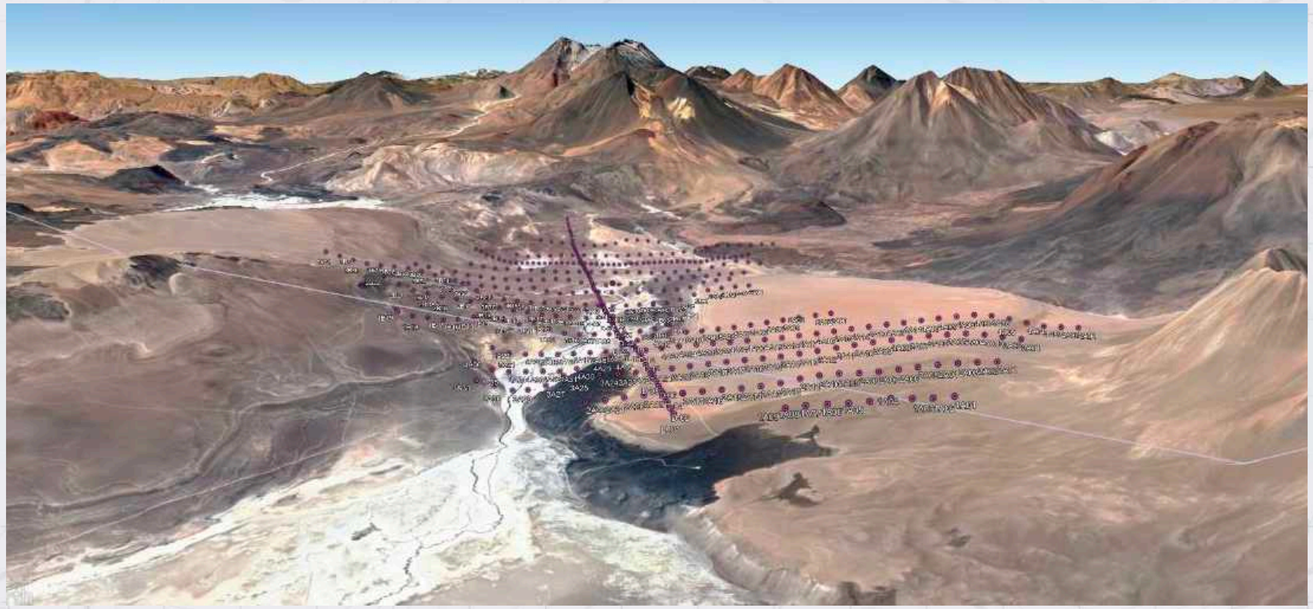
2023 | Lithium field, Rio Grande Salar, Argentina

The survey was performed at the greenfield lithium field at 4,000 meters above the sea level.

The main objective of the work was to map structures (faults) at depth in order to avoid additional costs for the planned drilling, as well as to study resources in more detail and generally expedite project deliverables.

2D image of the long profile was generated by Terravox's proprietary software using big data analysis and AI algorithms within 1 day after completion of the field survey.

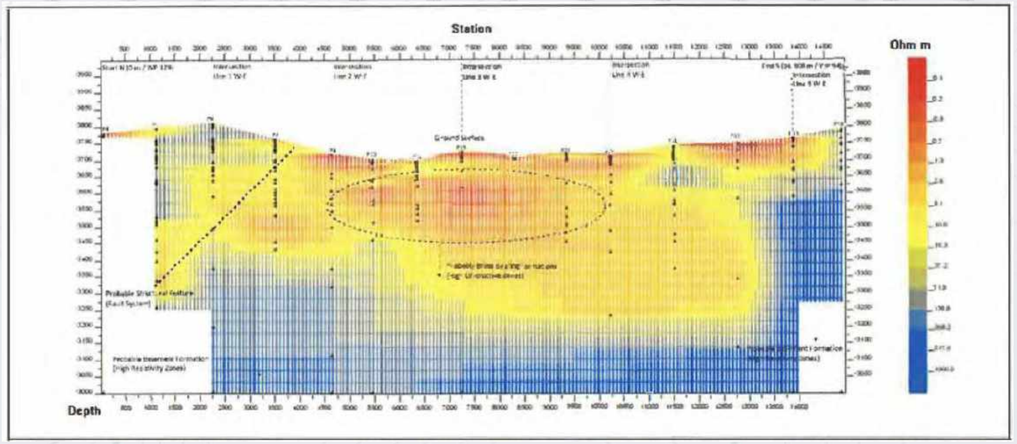
It revealed areas of interest (in the center and on the left of the image) at various depths.

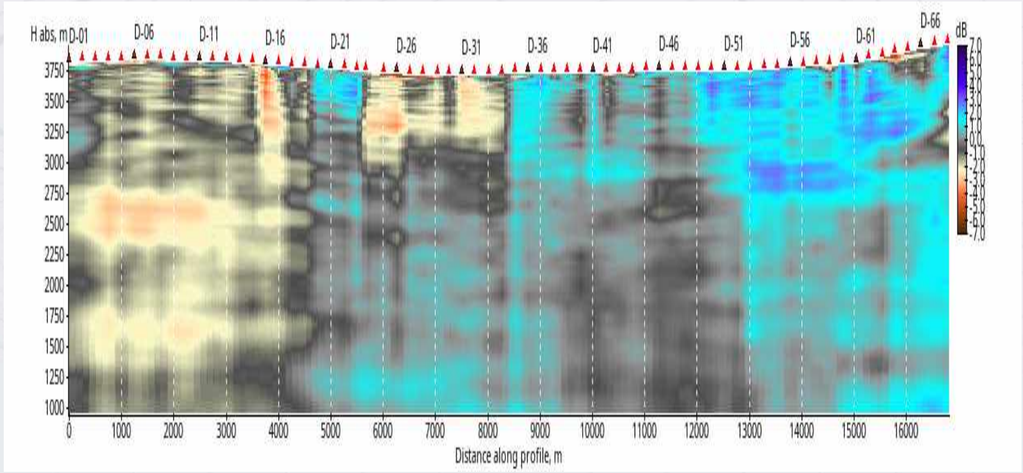


Lithium. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2023 | Lithium field, Rio Grande Salar, Argentina





Magnetotelluric method showed approximate location of lithium while GEMS give much more precise information about the lithium lenses and their depth.

Magnetotelluric were shared by the customer after completion of GEMS imaging. It can be seen that the anomaly on the right identified by the magnetotelluric method is most likely not lithium as GEMS shows that it is possibly some hard structure due to higher wave velocity.

Au Gold. Company experience

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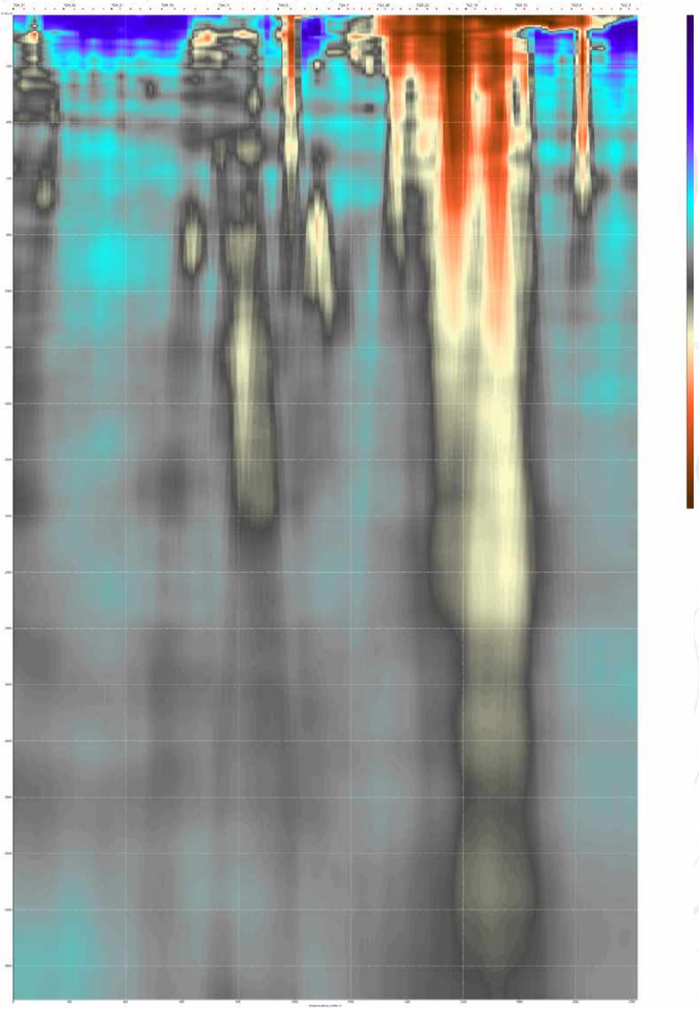
GEOPHYSICAL TECHNOLOGIES

2023 - 2024 | Gold deposit, Tanzania



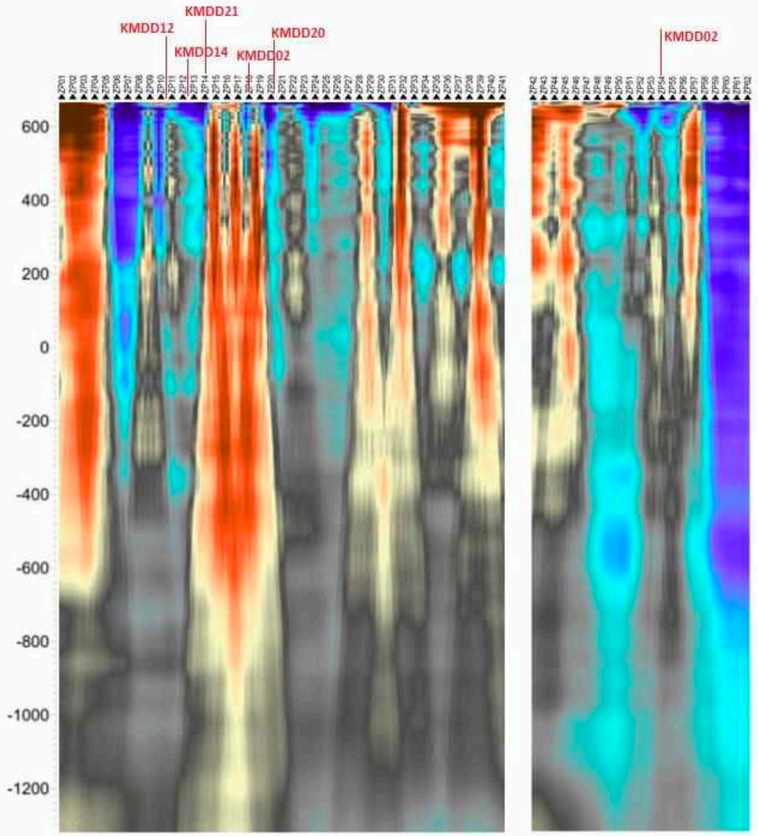
The preliminary survey was made in the gold rich area. It showed potential ore deposits which were then confirmed by drilling and lab analysis.

Further survey identified the ore body and volume. The deposit is now moving to the development stage in less than a year from the beginning of exploration.

Au Gold. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2023 | Refunsa gold area, Zambia



The main objective of the work was to demonstrate the capabilities of GEMS technology for Zambia Gold Ltd along the Refunsa fault, the oldest fault in area.

Zambia Gold compared their results with the report prepared by Terravox.

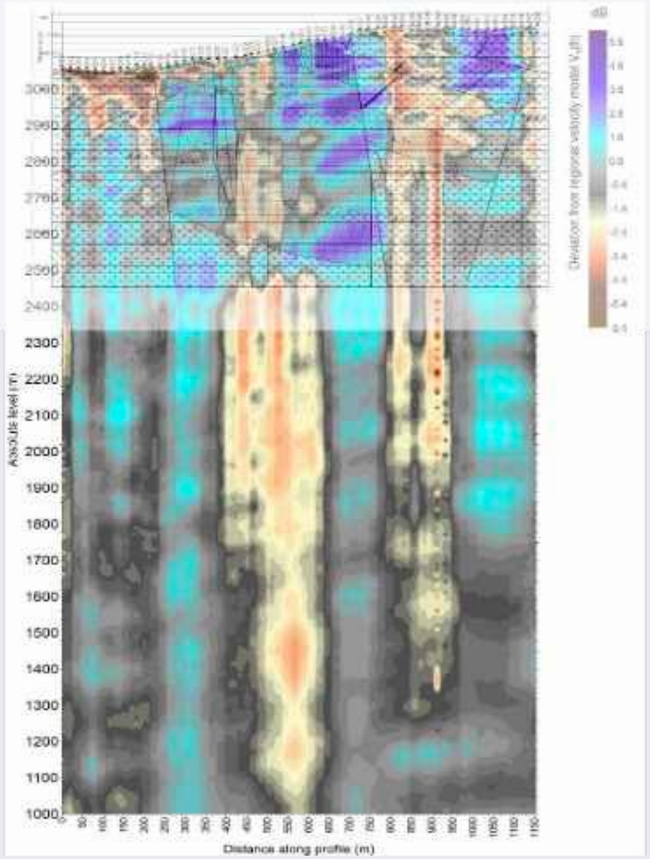
With the limited data from Zambia Gold, GEMS survey shows that certain areas are sites that need to be investigated further with drilling or closer station spacing profiles to better define the optimised drill sites for exploration.

Terravox's two-week blind test showed more data than 2 years of previous geophysical studies and drilling.

Au Gold. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2020 | Jerui gold mine, Kyrgyz Republic



The work was carried out in the highlands with absolute heights of 3050 – 3300 m, in conditions of rock-scree relief.

The main objective of the work was to reduce the amount of exploration drilling.

Based on the results of the GEMS survey, exploratory drilling was carried out which revealed a thick fault zone.

Cu Copper. Company experience

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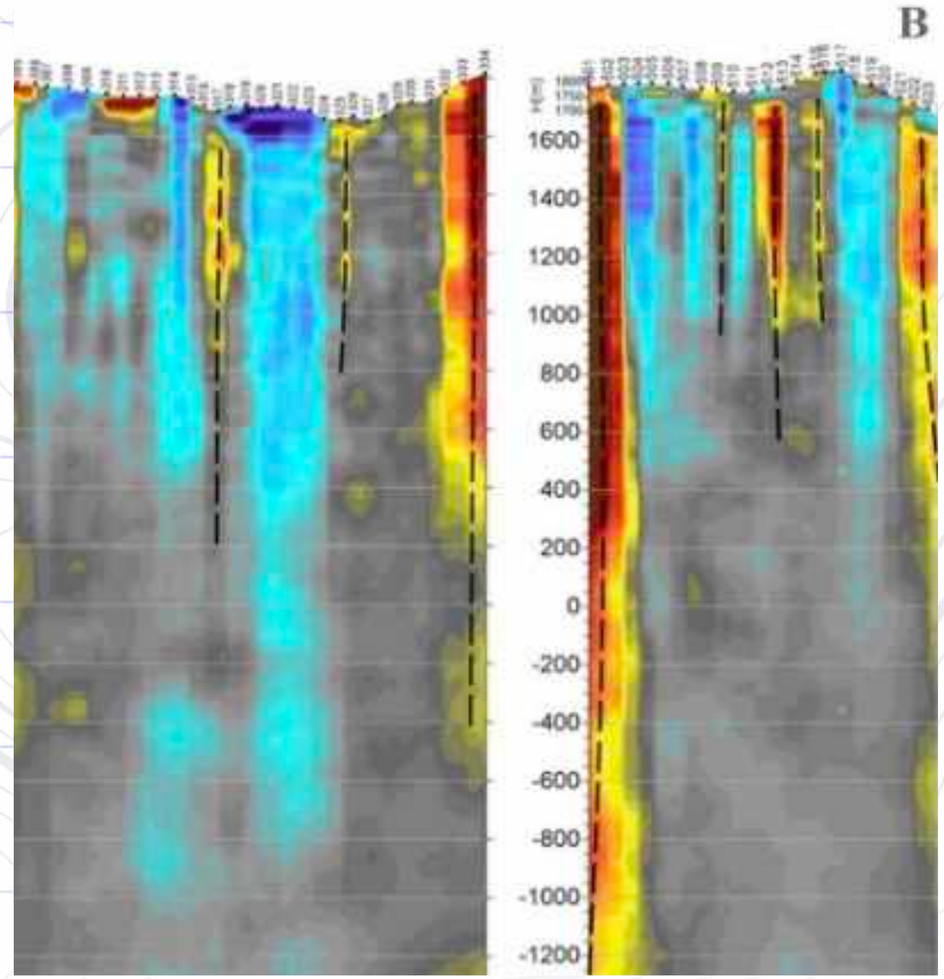
GEOPHYSICAL TECHNOLOGIES

2015 | Copper Ore Deposit



GEMS data was used to construct a fault zone based genesis model of the deposit. The advantages of GEMS application were as follows:

- Other methods and drilling proved insufficient to accurately locate faults.
- GEMS allowed the number of exploration wells to be reduced and their location optimised.
- Survey results helped to build a model of the genesis of accumulation necessary for the correct direction of mineral exploration activity.

U Uranium. Company experience

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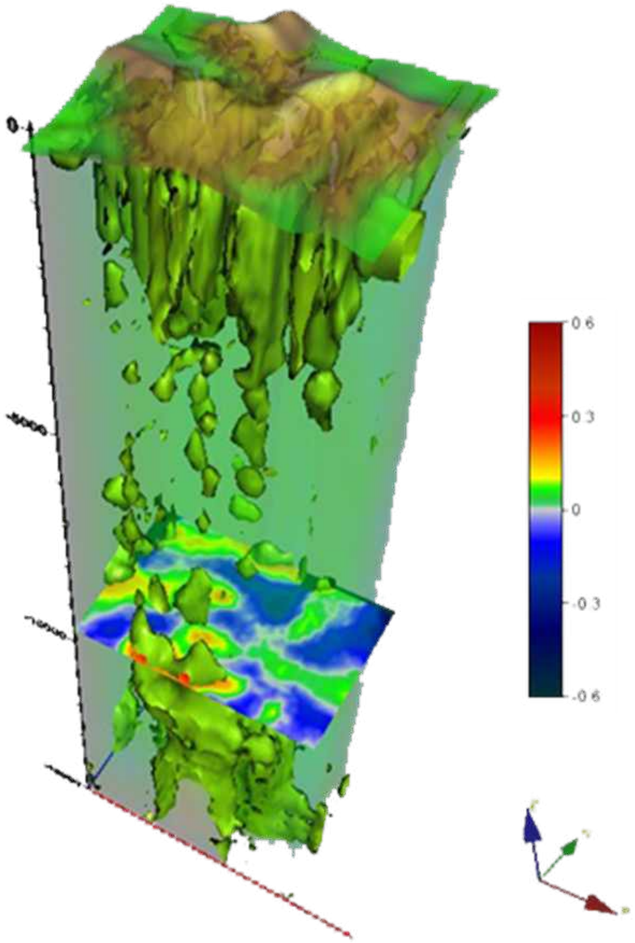
2011 | Uranium Ore Field



A 30kms regional profile was surveyed by GEMS and 3D model of promising area was made using the results of the survey.

Based on the GEMS data, exploratory drilling was performed (6 wells per 1000 m each). All 6 wells crossed the uranium mineralization in the faults predicted by GEMS.

GEMS discovered a previously unknown volcano within the boundaries of the deposit.

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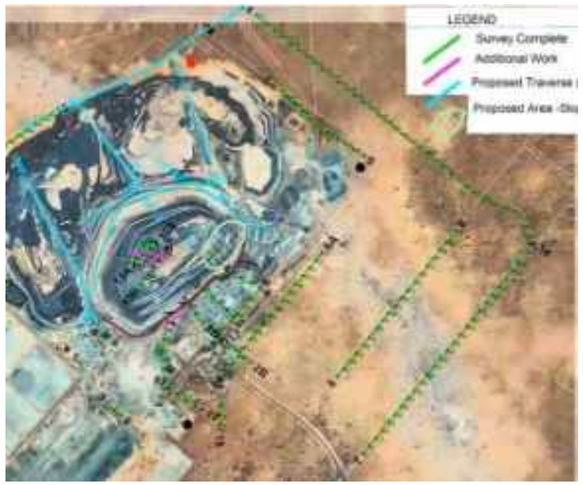
Kimberlite Pipes

Company Experience

Kimberlites. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2020-2023 | Jwaneng Mine, Botswana



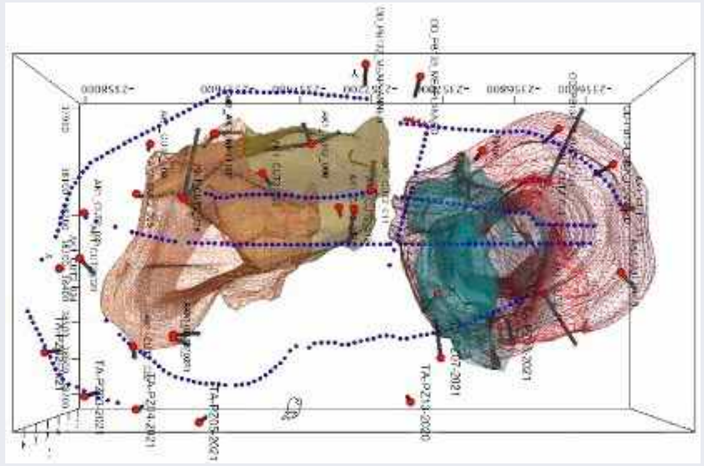
Terravox executed several contracts at the Jwaneng Mine. The main results of the work are:

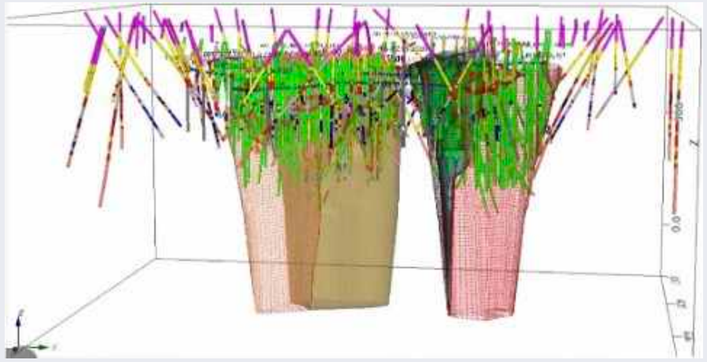
- The structure of diatremes, fault zones and fracture zones in the 0-6 km depth range have been obtained. In particular, a quasi-3D image of the DK7 diatreme was obtained, showing that it reaches a depth of 2-2.5 km (from the surface).
- Based on the GEMS data, the exploration drill programme was adjusted (including a 50% reduction from the original plan).
- Ten new exploration drill targets have been identified.
- In addition, a groundwater body and its limits were identified by GEMS and confirmed by drilling.

Kimberlites. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2022 | Orapa Mine, Botswana





The primary objective of this project was defined as the delineation of structural geologic elements in the geologic context of the Orapa Mine area.

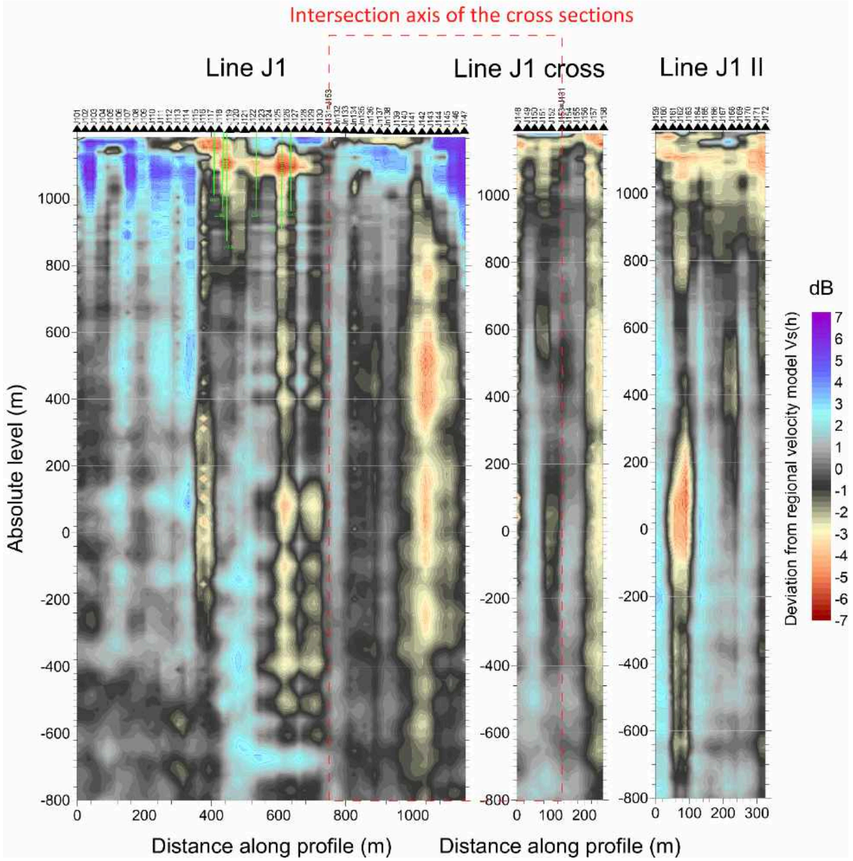
The main results of the work are:

- The structure of the diatreme, fault and fracture zones in the 0-6km depth range were obtained.
- In the 0-400m depth range, current GEMS data is fully consistent with previous drill data.
- The deep roots of two kimberlite pipes have been discovered.

Kimberlites. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2022-2023 | Private kimberlite deposit, Botswana



The main objective of the work was to estimate the potential volume of the kimberlite mass.

The main results of the work are:

- At the first stage, it was demonstrated that GEMS reflects the position and shape of kimberlite embeddings.
- At the second stage, the survey lines of the first stage were slightly expanded and it was shown that kimberlite embeddings have a more complex shape at this site than the classic “carrot".
- At the third stage, a survey allowed getting upper and lower estimates of the potential volumes of kimberlite.

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Oil & Gas

Company Experience

Oil & Gas. Company experience

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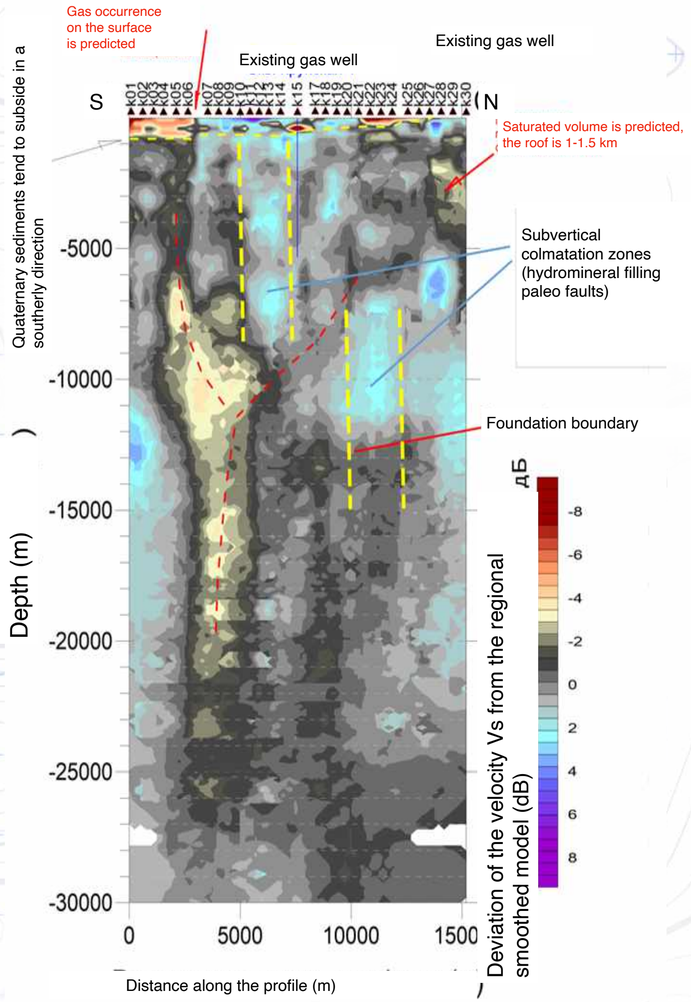
GEOPHYSICAL TECHNOLOGIES

2019 | Oil Field



GEMS data clarified the deep structure of the deposit (the geometry of fracturing and colmatation zones) and gave a forecast of the fluid dynamic activity of the prospective interval, complementing the existing data of seismic exploration and drilling

GEMS data was used to make a decision to continue drilling, adjust the geological model and conduct additional detailed studies in order to reduce geological and technological risks.

Oil & Gas. Company experience

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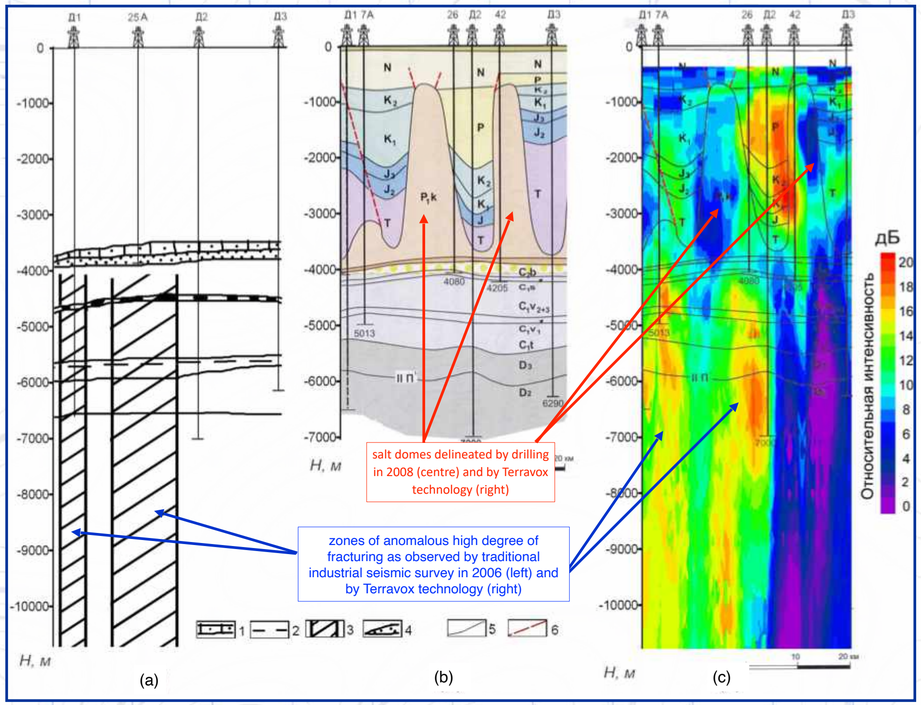
GEOPHYSICAL TECHNOLOGIES

2004-2006 | Existing gas condensate deposit



(a) Geologic-geophysical section of the Earth crust in the area of the dome (2006):
1-chert-argillaceous rocks;
2-argillaceous rocks;
3-zones of anomalous high degree of fracturing;
4-main body of the deposit.

(b) Geological section along the drillhole line D1-D3 (2008);
5-boundaries of stratigraphic units and reflecting horizons;
6-presumed tectonic fault.

(c) TERRAVOX microseismic section

Terravox analysis confirmed tectonic fault zones detected by traditional seismic survey, and correlated well with salt domes location in terrigenous deposit.

Drilling vs GEMS comparison demonstrated that areas with high microseism amplitude could be observed even at relatively large spacing of 2.5 km between the measurement points correlate well to the areas of high porosity detected by drilling.

Even at relatively large spacing of 2.5 km, conducting GEMS area survey prior to choosing drilling locations would improve the exploratory drilling success rate to 74% in comparison to 42% of random choice, reducing survey spacing would improve the accuracy even more.

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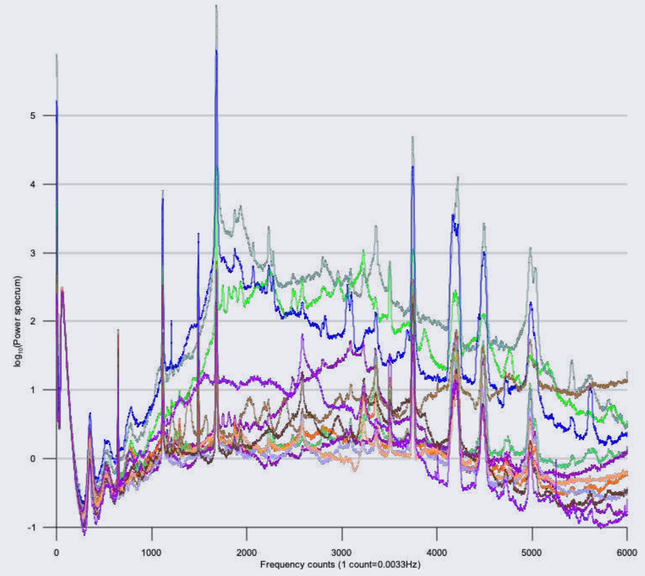
Geological Safety

Company Experience

Geological Safety. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2022 | Jwaneng mine, Botswana



Open pit slope stability is critical to the achievement of a mine's business objectives. Loss of stability can result in a serious/catastrophic slope failure that could result in loss of life, environmental degradation, reputational damage, or loss of business.

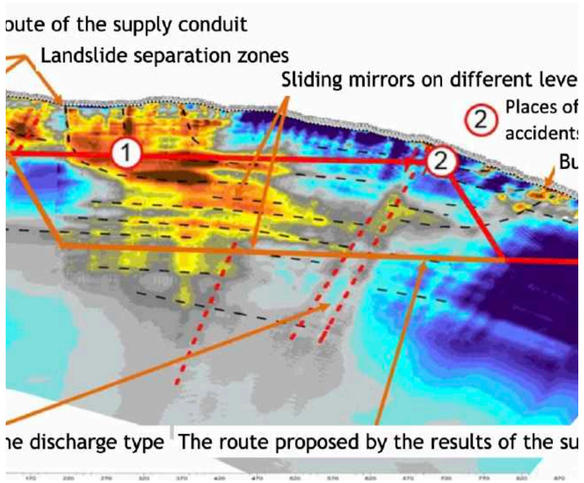
One of the most important elements affecting stability are weak zones such as faults and lithological boundaries. Activity monitoring along these structures is necessary for early detection of deep movements.

In the course of surveying the zones adjacent to the Jwaneng quarry, porosity zones were established. During the completion drilling, it was confirmed that these zones are water-saturated. Work is currently underway to drain them.

Geological Safety. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2018 | Landslide slope, Xekaman-3 HPP, Laos



Since 2012, ruptures of the supply conduits began to occur at the hydro power station. The operation of the hydroelectric power station was stopped, VietLaoPower suffered heavy losses. Several previous surveys could not provide reliable information about the nature of the ongoing processes.

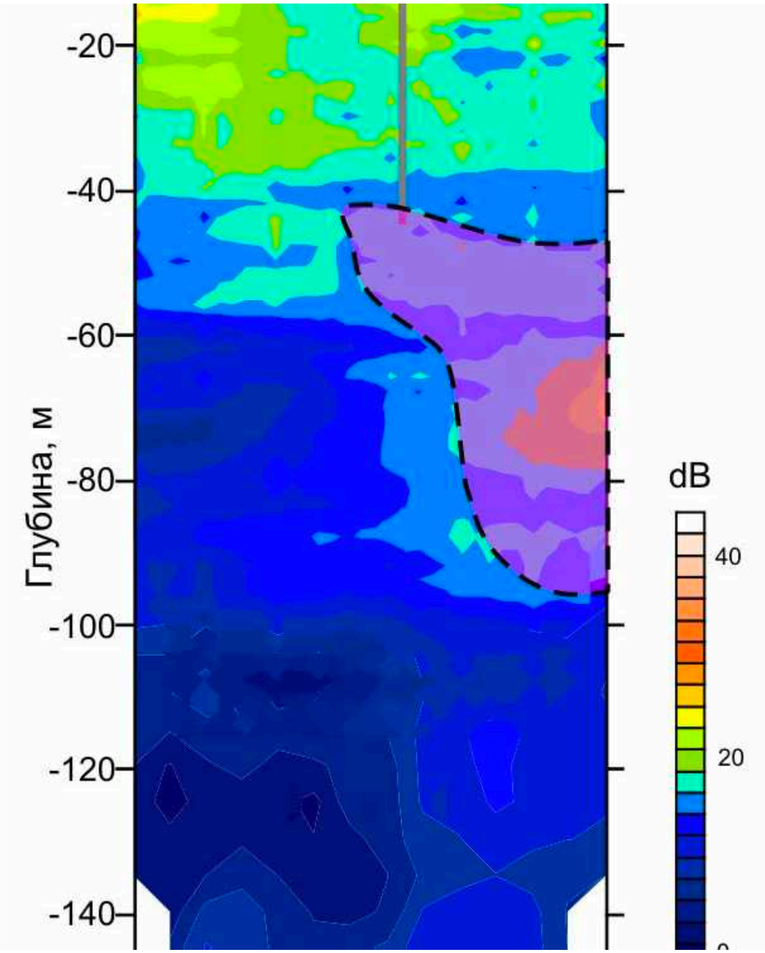
As a result of the GEMS research, a detailed geological and geophysical section was compiled to a depth of up to 450 m, with the visualization of separation zones, multi-tiered slickensides, a bulging zone of a landslide slope and watering of a rock mass.

The sliding mirror of the landslide and its size (~1.5 million tons) were determined, which allowed to predict the behaviour of the landslide for a long period and prepare engineering solutions to ensure the smooth operation of the HPP.

Geological Safety. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2010 | Karsts



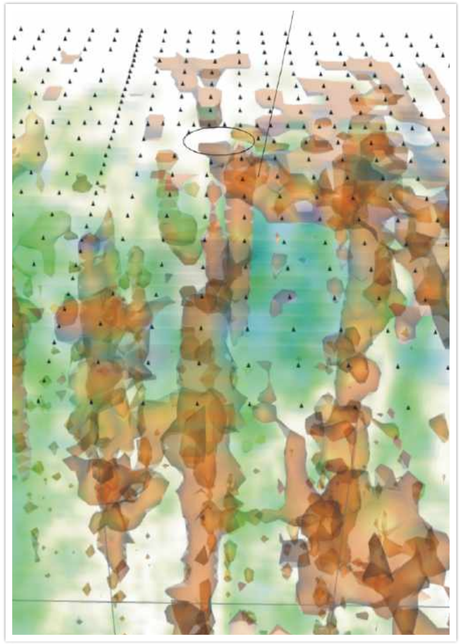
The karst sinkhole was found by accident during drilling.

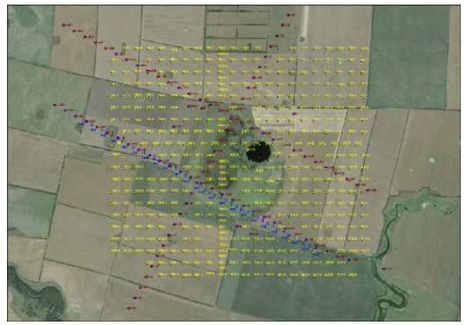
GEMS allowed outlining the karst funnel without additional costs, determine its position and depth.

Geological Safety. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

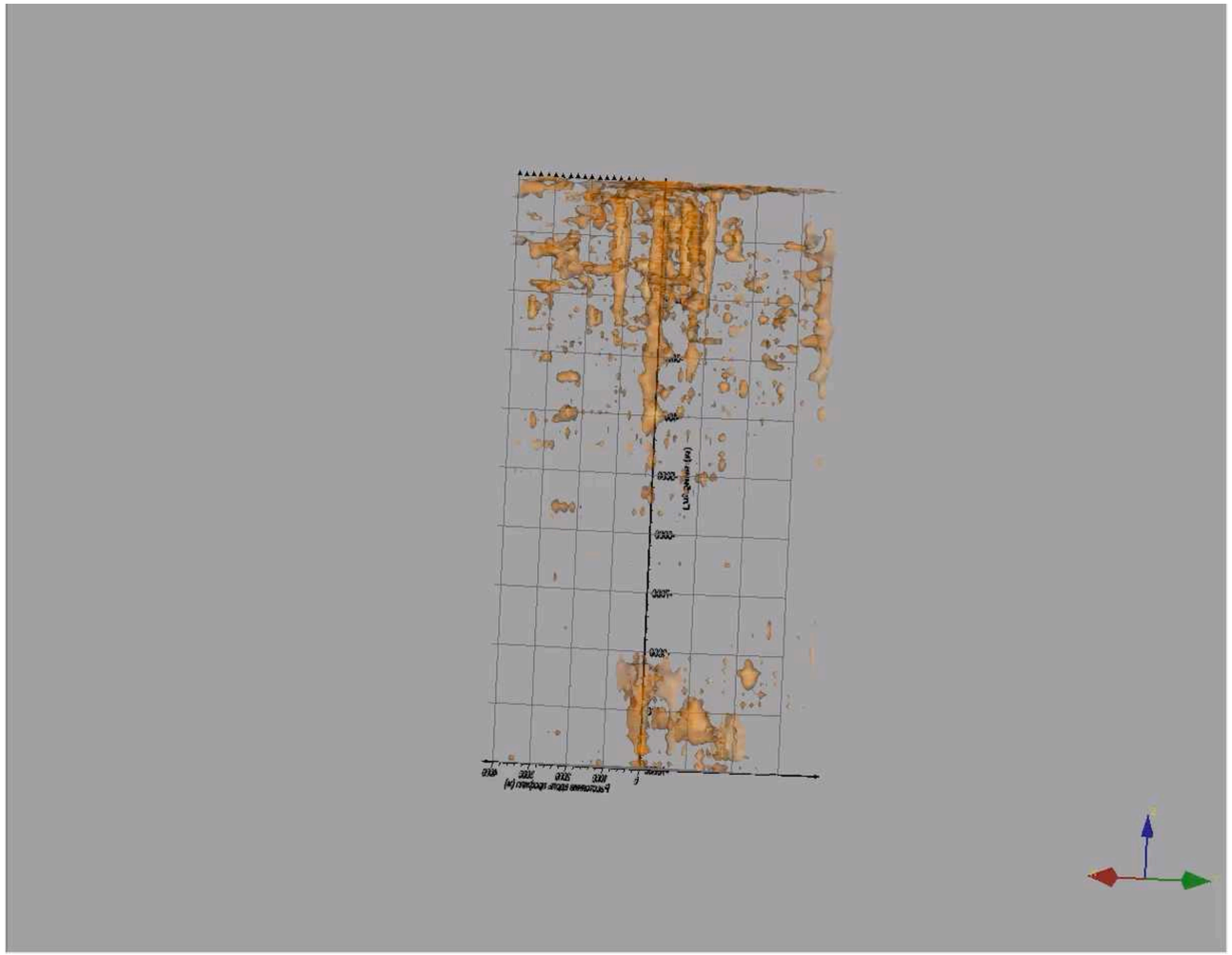
2010 | Karsts

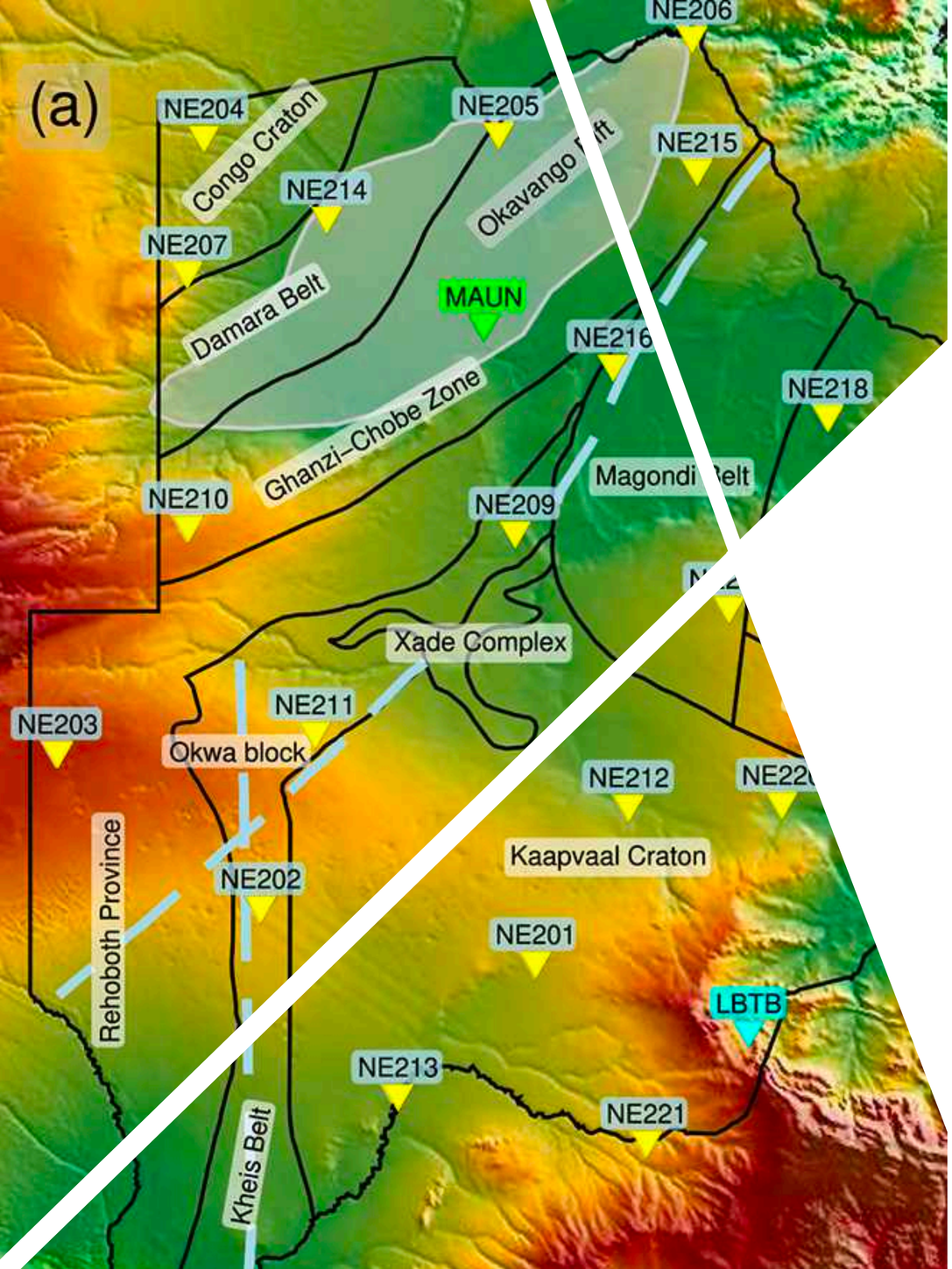




The customer requested to determine the nature of the non-drying pond on the surface.

GEMS area survey showed that the pond was on top of the karst sinkhole.





TERRAVOX
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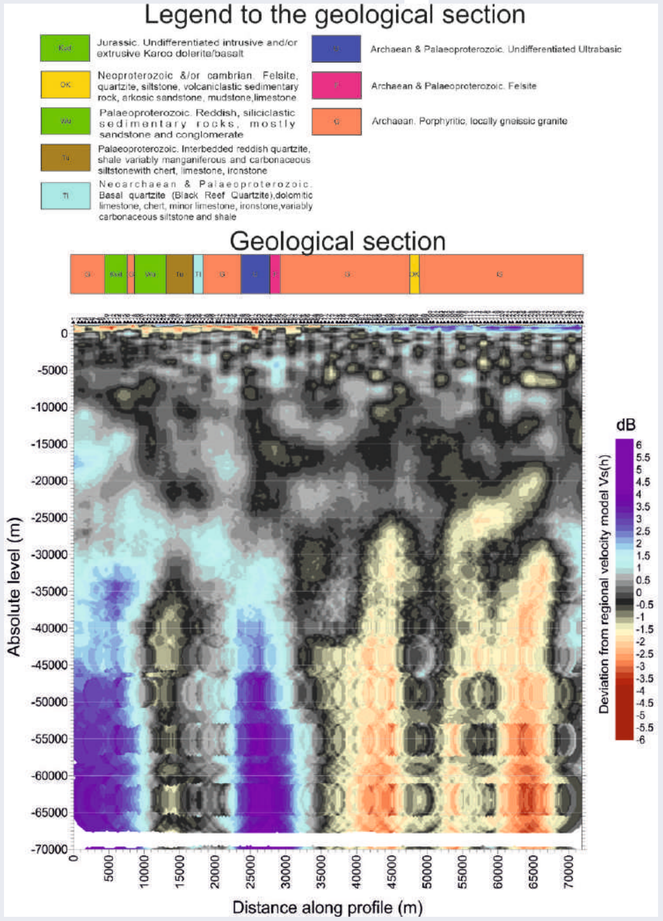
Regional Profiling

Company Experience

Regional Profiling. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2022 | Botswana regional profile



In-depth study of the structure of regional faults and magmatic channels performed in cooperation with the Botswana Geoscience Institute with the following purpose:

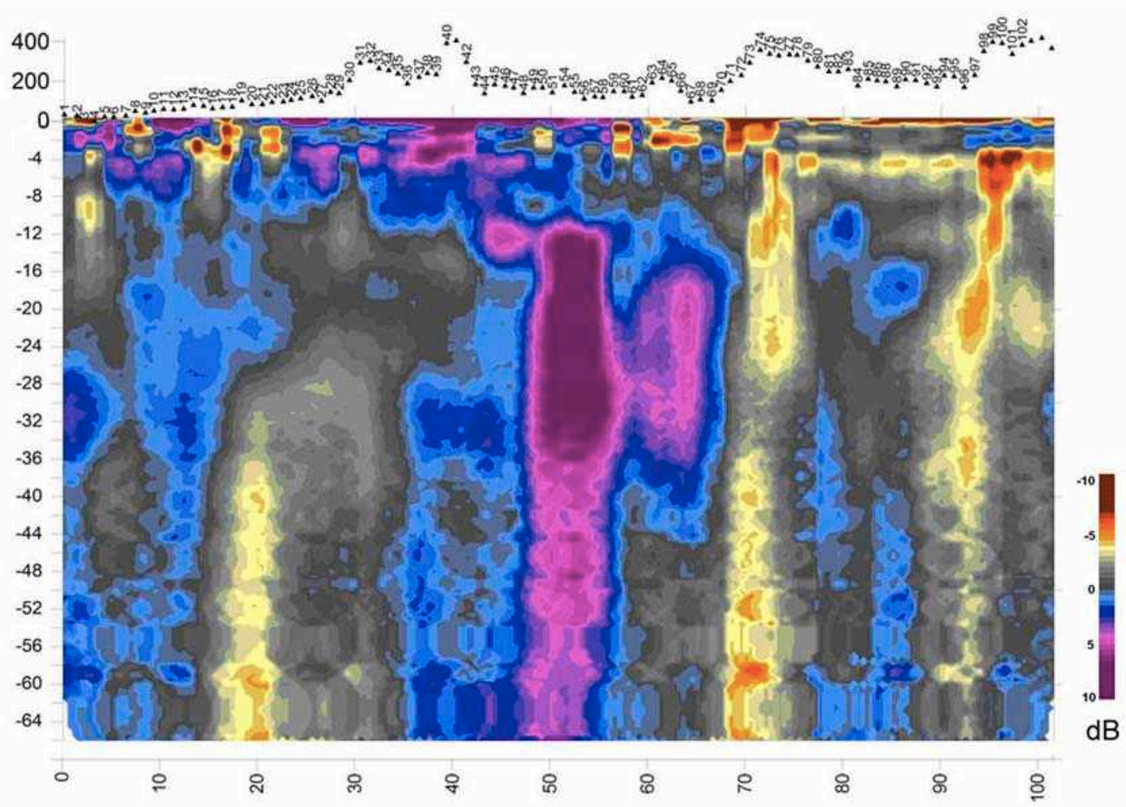
- obtaining information about the geological structure which allows to see the geodynamics of phenomena at great depths and their transformation into events on the surface of the earth

- identification of potential ore rich plots for further detailed survey

Regional Profiling. Company experience

TERRAVOX
GEOPHYSICAL TECHNOLOGIES

2022 | Botswana regional profile

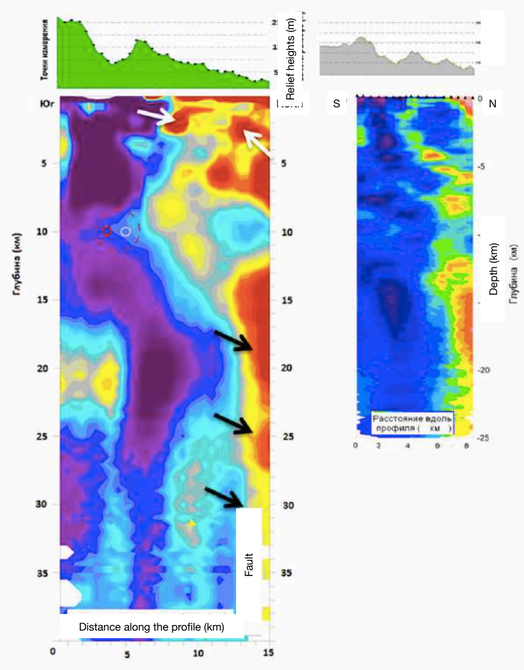


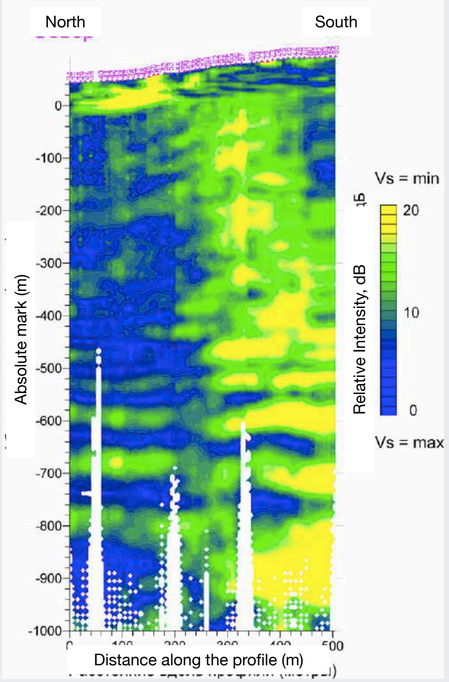
The purpose of the work was to validate Terravox microseismic sounding technology in the oil rich region:

- fieldwork performed in the mountainous area with elevation of up to 400m.
- Regional 100km long profile was planned so that it crossed several exploited oil fields to validate findings.
- All known and explored oil fields alongside planned profile were detected by GEMS. Moreover, unknown perspective deposit hidden by a screen covered by a high-velocity cap at 4.5km depth was identified (see red circle).

Regional Profiling. Company experience

2004-2006 | Oil and gas area regional profile





2 1 3

The purpose of the work was to test GEMS technology in large regional profiling.

- Profile 2 crosses exploited oil fields in the north. For profile 2, microseismic signal interpretation correlates with the previous study of the oil region performed by an independent research group in 1987.
- 500m detailed profile 3 revealed high relative intensity of the microseismic signal (yellow). For profile 3 high relative intensity of the microseismic signal is well correlated with the multiple occurrence of the visible hydrocarbon outflows directly above the fault zone.

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REDUCE EXPLORATORY DRILLING COSTS
AND IMPROVE EXPLORATION EFFICIENCY

info@terravoxglobal.com

www.terravoxglobal.com

+357 9779 0517 (Cyprus) +971 58 541 9566 (UAE)