USE TECH
Innovative solutions for your business

HYDROCARBON EXPLORATION

VECTORIAL ANALYSIS

(PASSIVE SEISMIC METHOD)



ABOUT USETECH

20

Years of legacy

Since 2006, we have been creating working solutions for your business.

1000+

Completed project

Telecom, IT, Oil & Gas, Manufacturing, FinTech, Retail, Agriculture, etc.

1500+

Experts with proven expertise

3

Years of successful work in Dubai, UAE

AWARDS

Best Business AI Solutions Company 2025 by MEA Markets

Top IT Companies Worldwide (UAE, Dubai) 2025

Top Big Data Analytics Companies in 2025 in the UAE, 1000+ Company Size

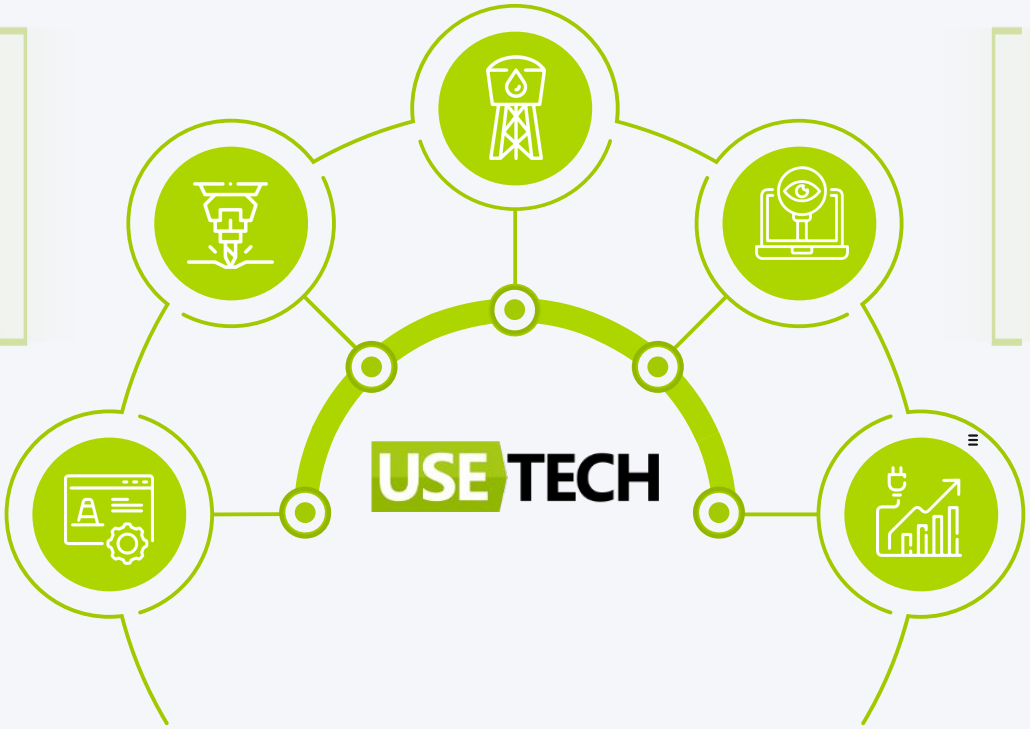
Top Business Intelligence Service Providers 2025

WHY USETECH FOR OIL & GAS EXPLORATION?

Patented passive seismic methodology
(registration number 2016150544).

Broader Oil & Gas Capabilities

Digital twins, AI/ML analytics, energy optimization, and computer vision for HSE and predictive maintenance.



Proven Government & NOC Experience

Successful delivery of projects for government entities and national oil companies.

10 +

successful cases of HEVA worldwide

20 YEARS

of experience with oil & gas companies

ADVANTAGES OF PASSIVE SEISMIC VS. ACTIVE SEISMIC

Criteria	USETECH's Hydrocarbon Exploration Vectorial Analysis	Traditional Active Seismic
Hydrocarbon Detection	**Direct detection** of hydrocarbons via natural low-frequency seismic emissions (2–5 Hz), reducing dry wells and uncertainty.	Identifies structural traps but d**oes not confirm** hydrocarbon presence, requiring additional costly interpretation and drilling.
Cost Efficiency	**30-50% lower costs** - Minimal equipment and personnel required. **No need for seismic sources** like vibrators or explosives.	**High costs** - Requires extensive crew deployment, seismic sources (vibrators, explosives, air guns), and large-scale field operations.
Applicability in Complex Geology	**Highly effective in fractured reservoirs, deep structures, and carbonates,** detecting hydrocarbons in challenging settings.	**Limited accuracy in complex geology** - Seismic wave scattering and signal loss reduce reliability in fractured and carbonate reservoirs.

ADVANTAGES OF PASSIVE SEISMIC VS. ACTIVE SEISMIC

Criteria	USETECH's Hydrocarbon Exploration Vectorial Analysis	Traditional Active Seismic
Environmental Impact	**Non-invasive and eco-friendly** - No artificial energy sources or explosions, eliminating regulatory and ecological concerns.	**High impact** - Uses vibrators, explosions, or air guns, leading to environmental and regulatory challenges.
Survey Time & Data Processing	**Faster results** - Data acquisition in weeks, results within months.	**Longer process** - Weeks to months of acquisition and interpretation, delaying decision-making.
Exploration Risk	**Significantly reduces risk** - Direct hydrocarbon indicators before drilling, lowering dry well rates and exploration costs.	**Higher risk** - Structural interpretations do not confirm hydrocarbon presence, leading to potential dry wells.
Integration with Existing Data	**Optimizes seismic workflows** - Can be used before or after seismic to prioritize high-potential zones, reducing unnecessary drilling.	Typically used independently but often **requires complementary geophysical methods** for accurate reservoir characterization.

WHAT IS HEVA (PASSIVE SEISMIC CONCEPT)

The technology is an advanced method for hydrocarbon exploration that utilizes the detection and vector analysis of **low-frequency microseismic emissions.**

Specifically, it focuses on analyzing the **full three-dimensional (3D) microseismic** fields generated naturally by the Earth's subsurface activities.

This method leverages the phenomenon that hydrocarbon reservoirs emit distinctive low-frequency seismic waves, typically in the range of 2 to 5 Hz.

By capturing and analyzing these emissions, geoscientists can identify and characterize potential oil and gas deposits without the need for traditional active seismic sources.

SmartSolo IGU-BD3C-5
3-Component Broadband
Smart Seismic Sensor



5 KEY PARAMETERS OF SEISMIC SIGNAL ANALYSIS (HEVA)

Unlike conventional seismic methods, we analyze not only signal energy, but also its behavior as a nonlinear dynamic system.

Parameters:

01

f1 — Horizontal P-wave component

Provides sensitivity to lateral heterogeneity and structural boundaries.

02

f2 — Vertical S-wave component

Captures vertical energy distribution linked to subsurface layering.

03

e1 — Horizontal curl components

Reveals rotational behavior of the wave field caused by structural complexity.

04

e2 — Vertical curl component

Acts as a key indicator of fluid type due to changes in field ordering.

05

Correlation Dimension (D) & Attractors

Transforms seismic data into a dynamic system, enabling detection beyond conventional spectral analysis.

- Analysis of nonlinear signal dynamics, beyond amplitude-based methods
- Detection of hidden order within seemingly random noise
- Reduced sensitivity to anthropogenic (industrial) noise
- Ability to differentiate fluid types (oil vs gas)

CASE STUDIES & RESULTS

MOROCCO

Works in Morocco were carried out during the period in the northern and north-eastern regions of the country, an area of about 6 thousand square kilometers. under a contract with an American company. Works were carried out during the spring and summer seasons in the mountain semi-desert. In accordance with the forecast, a well was drilled that produced a gas inflow.

Area	6000 km^2
Number of sensors	15
Result	Opened a field for 1 well

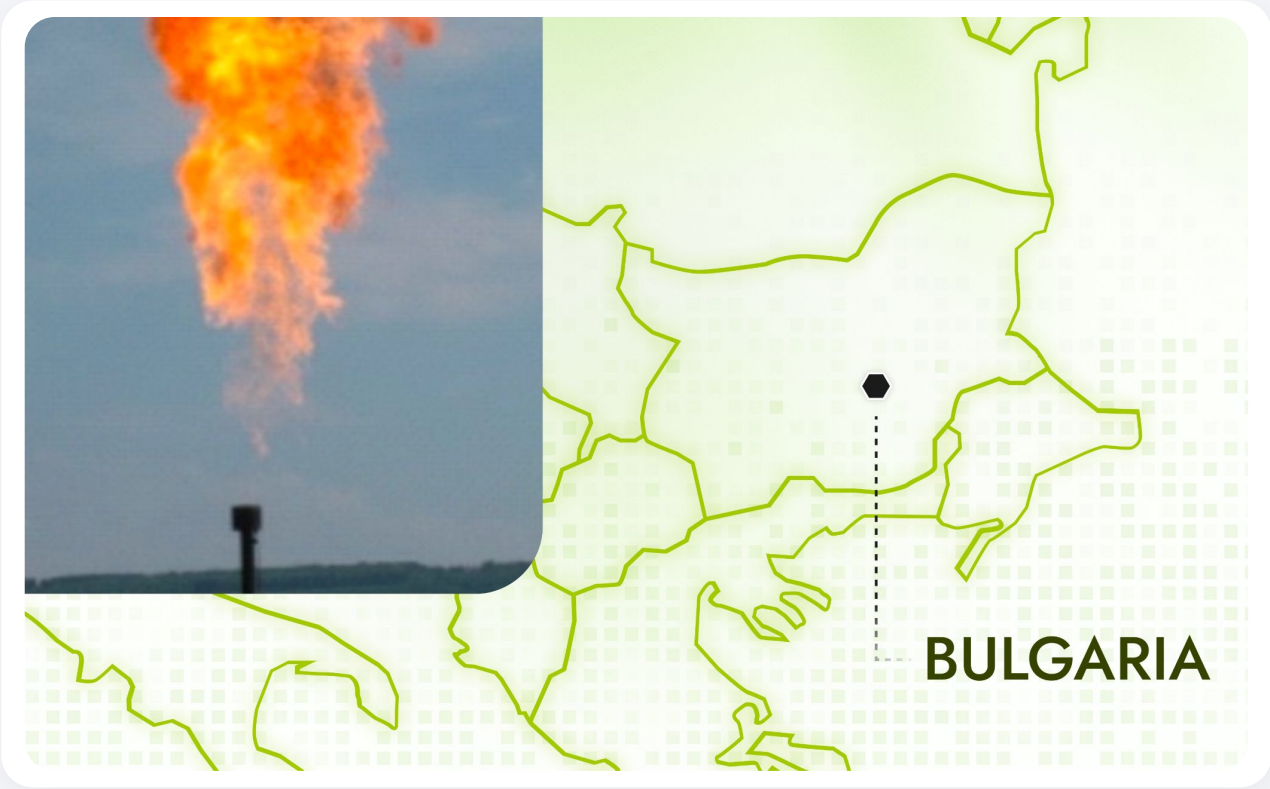


CASE STUDIES & RESULTS

BULGARIA

In Bulgaria, the work was carried out in the north-eastern part of the country on an area of about 5 thousand square kilometers under a contract with the American company DPE. The work areas are forested foothills. As a result, a deep well was drilled (depth of about 6 km), an industrial gas flow was obtained from unconventional reservoirs and a gas field was discovered, the first in the new Bulgaria.

Area	5000 km^2
Number of sensors	12
Result	Opened a field for 1 well

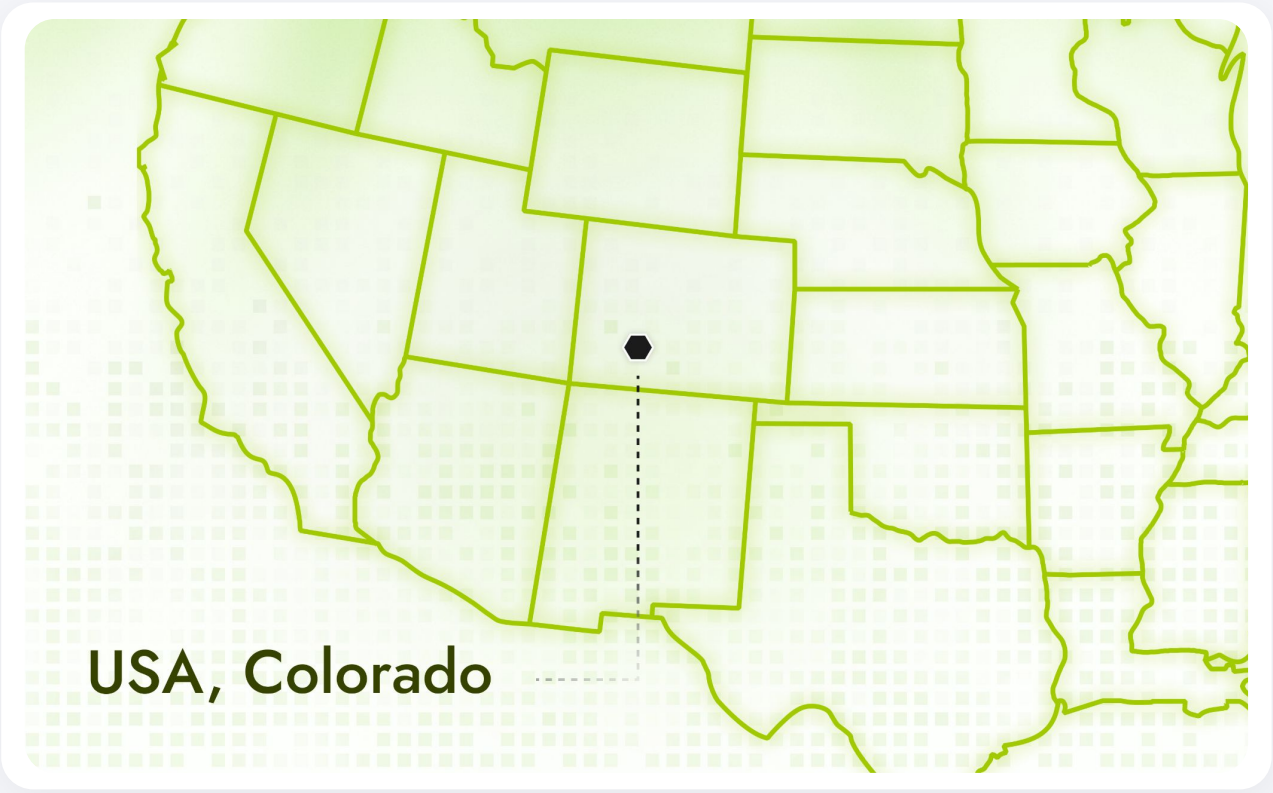


CASE STUDIES & RESULTS

USA / COLORADO

In the USA, the work was carried out in the state of Colorado under a contract with the American company DPE. The work areas are prairie; the work was carried out mainly in the autumn and summer periods. As a result, a well was drilled that produced a gas inflow.

Area	8000 km^2
Number of sensors	40
Result	Plenty of small wells about 30

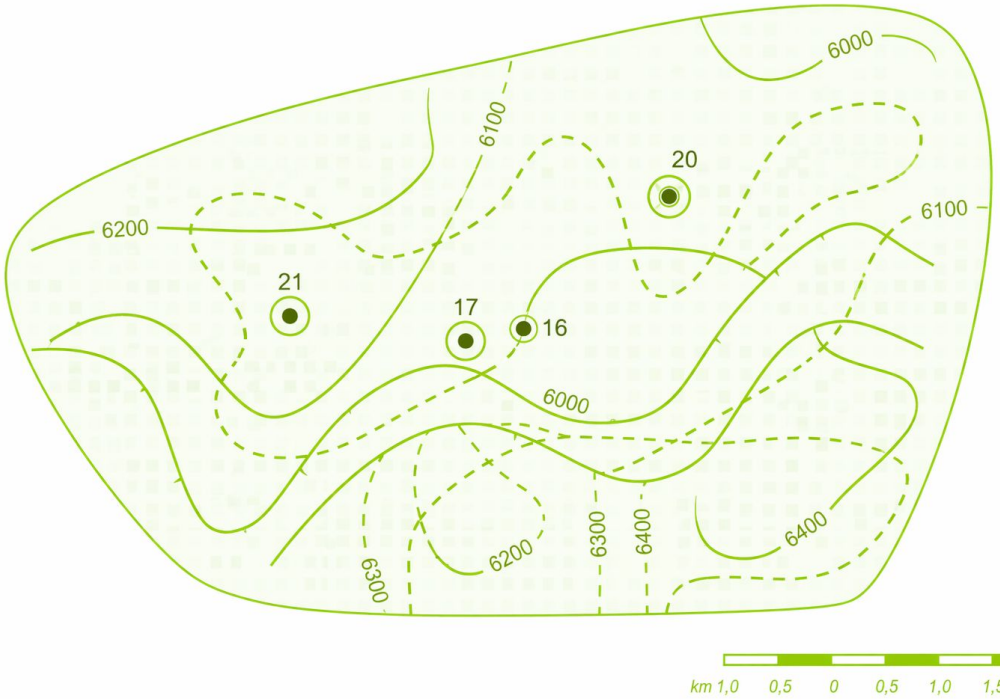


CASE STUDIES & RESULTS

NORTH-EAST OF THE CASPIAN SYNECLISE

A seismic survey mapped an organogenic structure in Artinsk carbonates at the Peschanaya area.A passive seismic method was used to forecast oil and gas potential, which localized promising areas of the exploration object.The drilled exploration well 17 yielded industrial inflows of oil and gas condensate at a depth of about 3.5 km, confirming the forecast. The forecast was also confirmed by the “dry” well 20 in the zone of absence of anomalies according to the parameters of our method.

Area	16 000 km^2
Number of sensors	6
Result	Lots of small wells

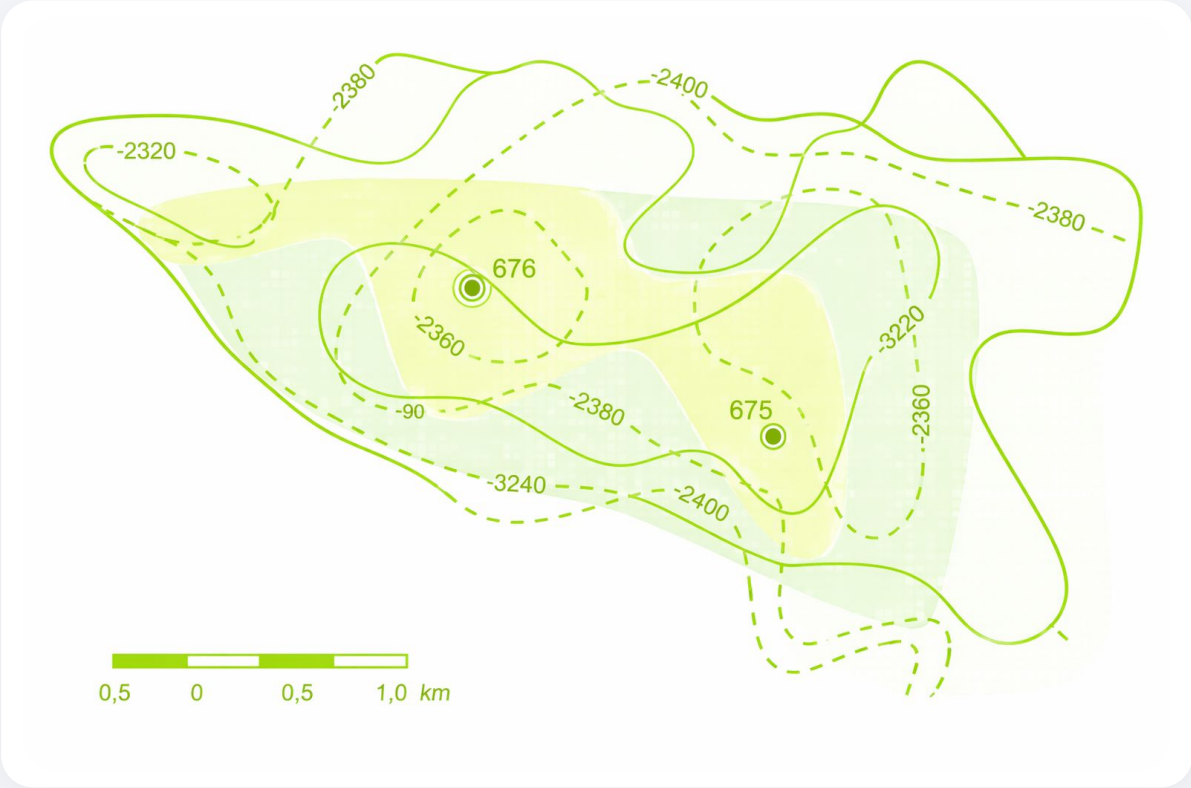


CASE STUDIES & RESULTS

NORTHERN PART OF BUZULUK DEPRESSION

At the Bogolyubovskaya exploration area, it was established that the low-frequency field anomaly characterizes both the eastern part of the arch of the Bogolyubovskaya structure, where the productive well 675 is located, and its western closure.

In this regard, well 676 was drilled here, which confirmed the forecast using the passive seismic method from Devonian limestones from a depth of about 2800 m, an industrial oil flow was obtained.

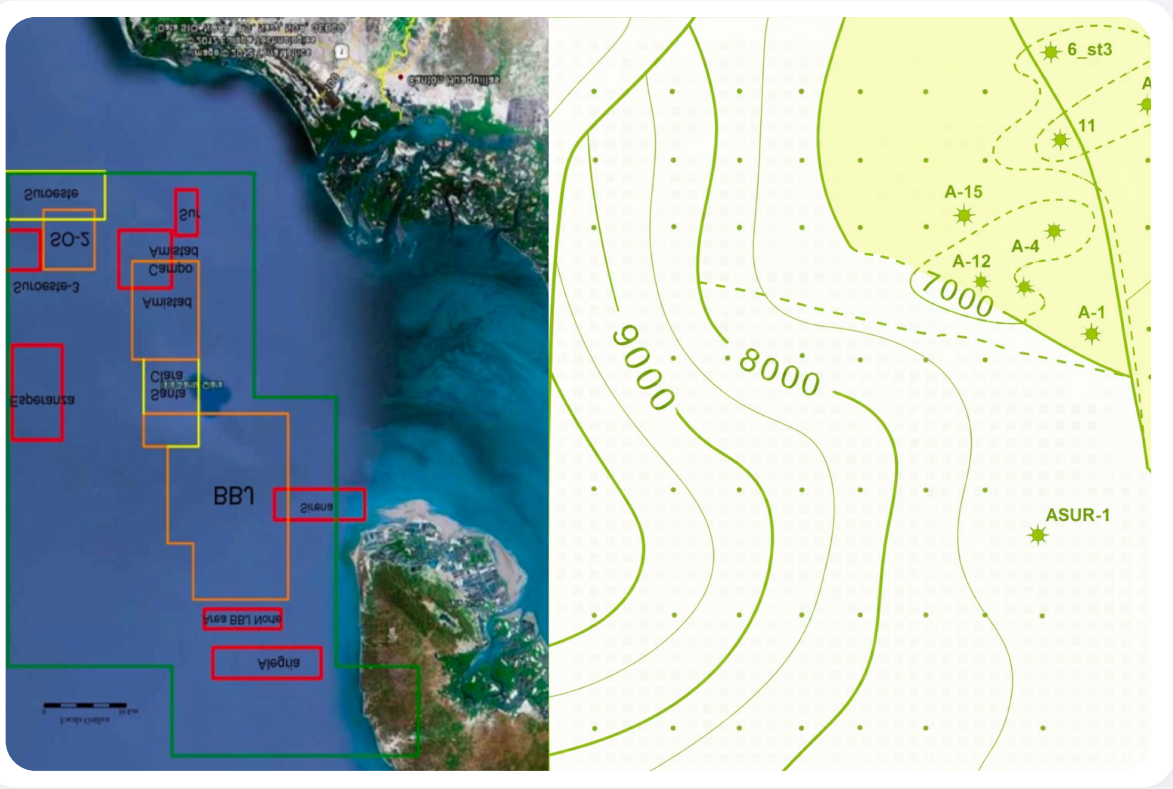


CASE STUDIES & RESULTS

ECUADOR

Three anomalies measuring approximately 2 to 4 square kilometers have been identified in the Amistad area. The two northern ones are part of a structural block bounded by northeast-trending faults. The western one is located in the most elevated part of the block. The southeastern anomaly is controlled by a latitudinal-trending structural block that is most complicated by faults.

Area	4 000 km^2
Number of sensors	20
Result	Lots of small wells



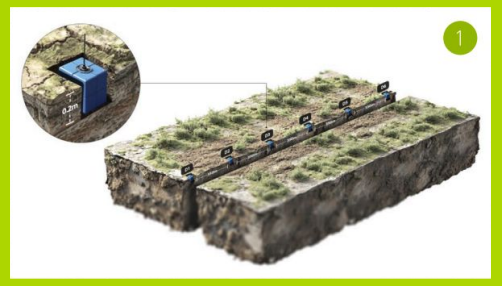
TYPICAL PROCEDURE &
DATA ACQUISITION METHODOLOGY

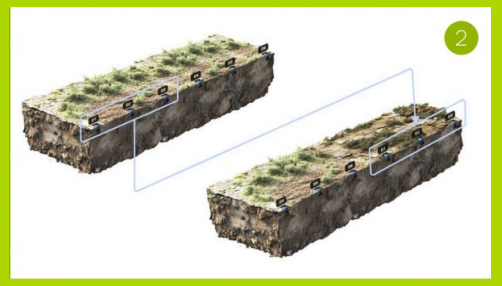
Sensors are systematically relocated every 250–300 meters to ensure full area coverage.

The sensors are installed at a depth of approximately 20 cm, or adjusted based on actual ground conditions. Waterproof sensors are used, allowing deployment in swampy and wet terrains.

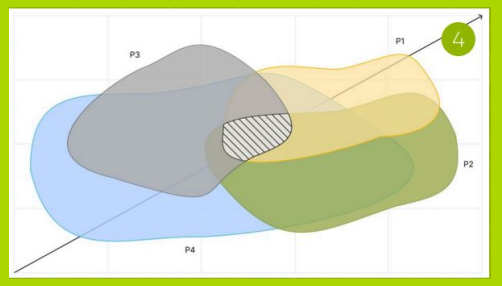
Each recording session typically lasts 45–60 minutes, while real-time data monitoring ensures high data quality and minimizes noise. This structured approach enables the delivery of reliable exploration insights while maintaining cost and operational efficiency.











DATA PROCESSING WORKFLOW

Data Processing

Noise Filtering (2–5 Hz)

We isolate the 2–5 Hz frequency band linked to hydrocarbon emissions.

3D Vector Analysis

Our 3D seismic analysis identifies directional patterns associated with hydrocarbons.

Interpretation & Integration

Anomaly Mapping

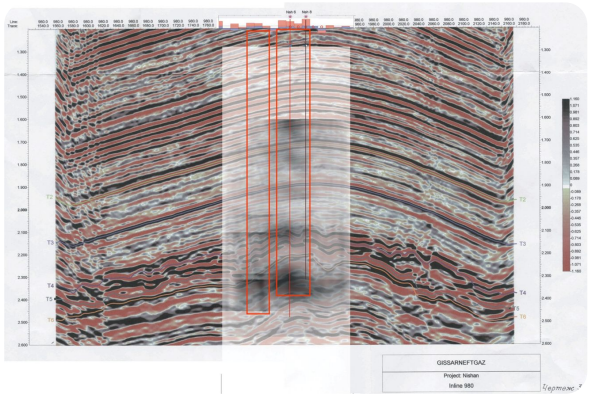
HEVA anomaly maps are correlated with geological models and 2D/3D seismic data.

Geological & Seismic Integration

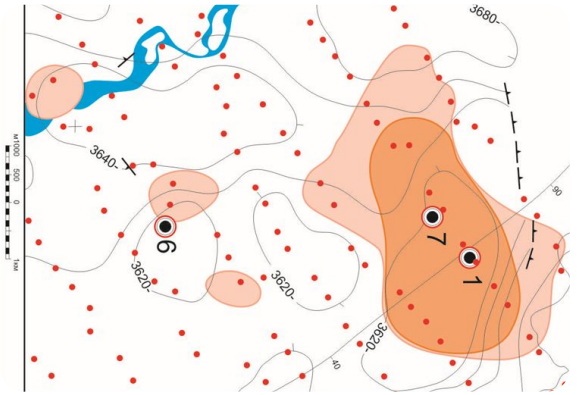
Processed low-frequency signals are transformed into maps of statistically significant hydrocarbon-related anomalies.

Decision Support

Integration of geological data and anomaly maps supports informed exploration decisions.







DELIVERABLES AND TYPICAL RESULTS

Comprehensive Technical Report

A consolidated report describing the methodology, survey parameters, data processing, interpretation, and key findings, suitable for technical, management, and regulatory review.

Anomaly Maps

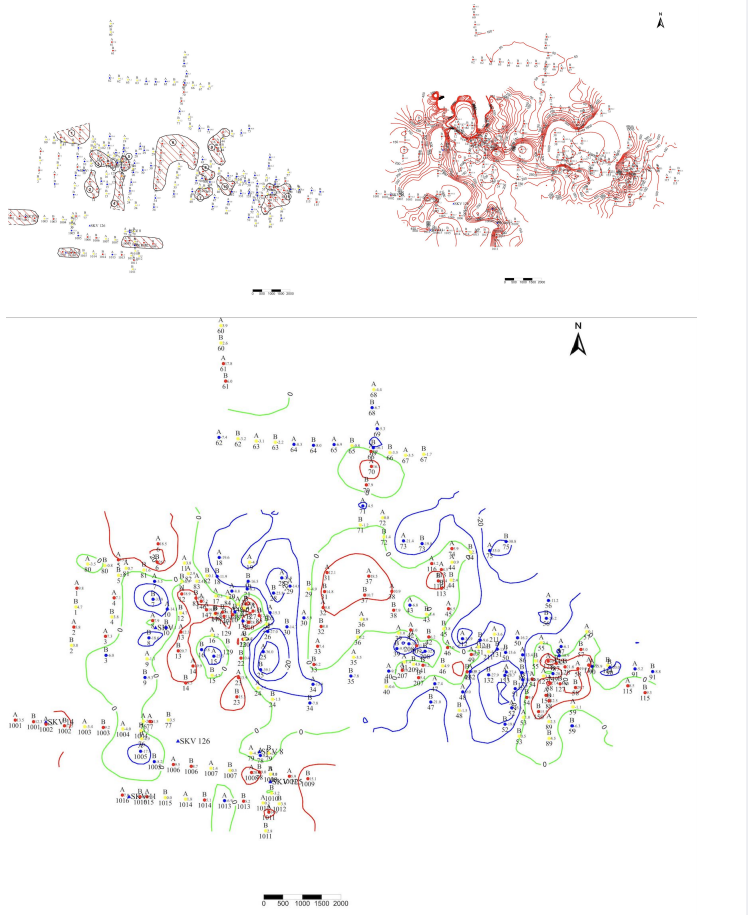
Subsurface maps highlighting low-frequency anomalies associated with potential hydrocarbon accumulations.

Vector Field & Directionality Maps

3D vector maps showing the direction and intensity of microseismic energy flows to support identification of migration paths and accumulation zones.

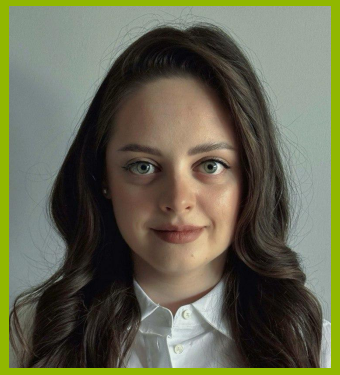
Prospect Ranking & Zoning

Classification of surveyed areas into high-, medium-, and low-prospectivity zones for drilling prioritization.



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THANK YOU FOR YOUR ATTENTION!



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