

Illuminating the architecture of epithermal gold mineralisation

Client

Lundin Gold, headquartered in Vancouver, Canada, is focused on continued exploration of its extensive and highly prospective land package to identify and develop new resource opportunities for long-term sustainability and growth. Dedicated to operational excellence while simultaneously providing economic and social benefits to impacted communities, Lundin Gold is committed to fostering a healthy and safe workplace and minimizing environmental impact.

Project

Fruta del Norte (FDN) is Lundin Gold's 100%-owned gold mine in southeastern Ecuador and one of the world's highest-grade, lowest costing operating gold mines. The deposit sits within a 150-kilometre copper-gold metallogenic sub-province in the Cordillera del Cóndor region.



Image Credit: Lundin Gold Fruta Del Norte [Project Overview](#)

Unmatched resolution and increased confidence at tier 1 gold deposit

Challenge

The main deposit is “blind”, buried under more than 200 metres of post-mineralisation volcano-sedimentary cover, making traditional surface exploration ineffective.

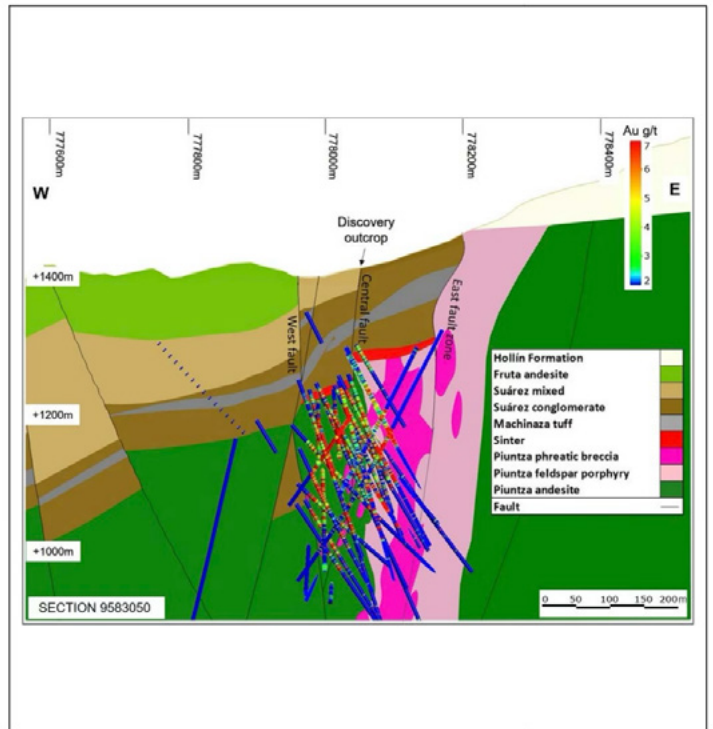
The mineralisation is hosted primarily in Jurassic-aged andesitic volcanic rocks, feldspar porphyry, and phreatic breccias. This complex epithermal gold-silver mineralisation is structurally controlled by steep, second-order faults within a larger regional fault zone. To find more, LundinGold needed to understand the key structures in the area with better resolution geophysics.

This is incredibly difficult in a remote jungle which complicates access and logistics. Other methods like IP have proven useful but have limited resolution, particularly for deeply buried or subtle targets.

Traditional surface exploration methods are ineffective here.

Key Challenges:

- The complex nature of the major structures controlling the mineralisation require high-resolution geophysics to accurately delineate the faults
- Mapping variations in post-mineralisation cover thickness
- Operating in remote, rugged jungle terrain with limited access
- Integrating diverse datasets to improve confidence at depth



Representative E-W geological section of the FDN deposit, showing the host rocks, volcano-sedimentary cover and gold grades. Source: Lundin Gold 2022

Goal

- Build a high-resolution structural framework to improve geological models
- Map the post mineralisation cover
- Identify and prioritise new exploration targets
- De-risk future 3D seismic programs by optimising acquisition parameters

Solution

Acquire a new active seismic, high-resolution dataset across the project area to refine Lundin Gold's existing geological and assay records.

This integration of datasets will provide a more granular understanding of the structural and geological model, revealing critical features that are currently obscured. Resulting interpretations will provide not just a clearer picture of the subsurface, but actionable intelligence, enabling Lundin Gold to target drilling with greater precision, prioritise high-value opportunities, and move forward with decisions backed by data-driven confidence.

Execution

In late 2024, Lundin Gold engaged HiSeis (acquired by Fleet Space Technologies in 2025) to execute a 2D active seismic survey at FDN. Fleet's recent acquisition of HiSeis brought world-leading active seismic expertise under one roof, combining decades of seismic innovation with Fleet's cutting-edge space-enabled geoscience solutions. This project marked one of the first flagship programs to benefit from this combined capability.

The program covered five seismic lines totalling 26.44 km, with dense 10 m source and receiver spacing to achieve exceptional resolution. The acquisition began in November 2024, with processing and interpretation completed in May 2025.

- 5 2D seismic (active) lines
- 26.4km total
- 2,639 geophones
- 2,597 source points (1,184 vibrator; 1,413 explosive)
- Station spacing: 10m
- Average Depth: 4km

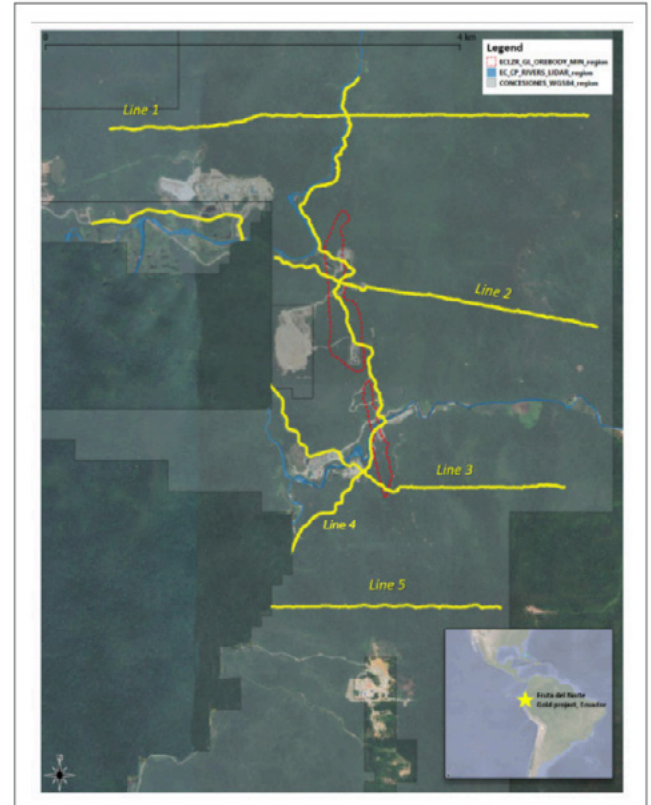


Figure 1: Location of 2D seismic lines

Results

Clearer subsurface insights lead to actionable targets and smarter drilling

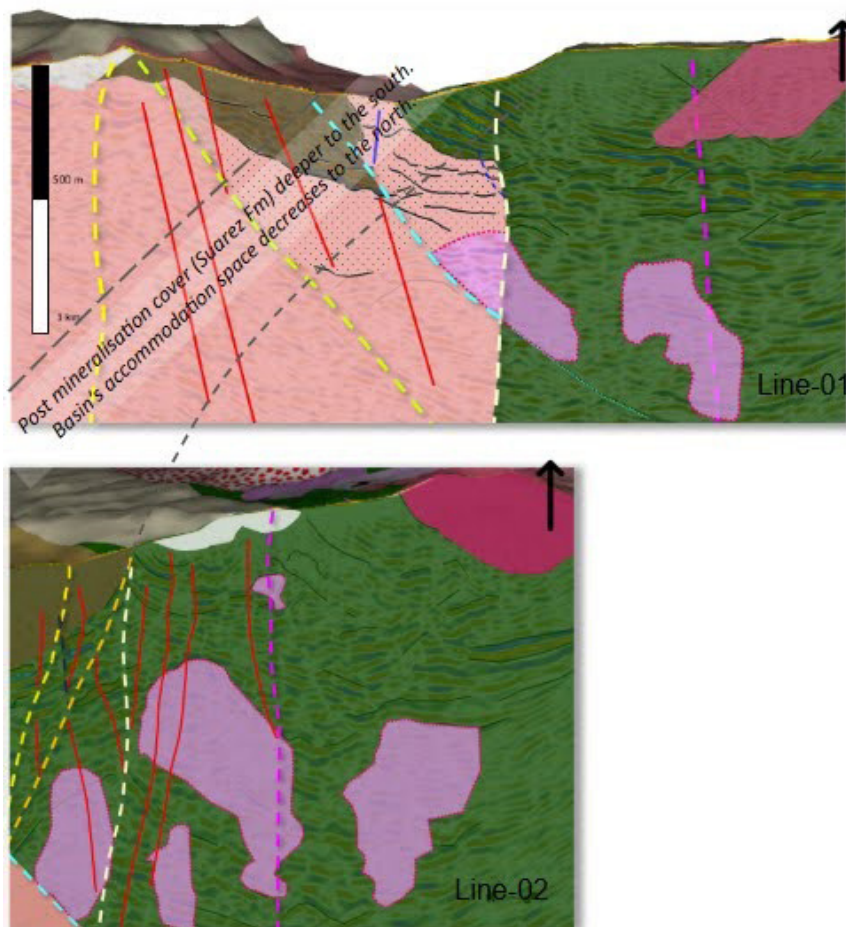
This project went beyond simply mapping the subsurface. It provided decision-ready insights that directly addressed Lundin Gold's commercial and exploration goals.

The survey identified two areas of interest characterised by specific seismic textures correlating with potential zones of intense fracturing/brecciation. By integrating with existing geological and assay data, the seismic results directly contributed to defining new drill targets. Within weeks after delivering our results, Lundin Gold's exploration team began drilling based on the provided interpretation. Initial results from the drill program have been promising. This exemplifies smarter drilling, which uses a clear structural model to target optimal locations, thus reducing the risk and cost of drilling in un-prospective areas.

- Increase resolution and validated previous findings and identified new features
- Provided new insights into the primary controls on mineralisation and the basin development history.
- Seismic data enhanced the structural model mapped and refined major faults (East, West, Central, Cuenca) and identified new complex features, and clarification of fault truncations and continuities
- Suarez Basin imaging precisely defined the basin contact and thickness variations (400–580 m) with depth trends to the south.
- Extended depth and added granularity. Achieved high-resolution imaging of East fault to >3.5km (previously traced to only 500m) far exceeding traditional methods.
- Direct drill targeting: Two new high-priority target zones identified, correlating seismic textures with zones of intense fracturing and brecciation.
- Smarter drilling within weeks of delivery, Lundin Gold began drilling based on the model, with initial results proving promising.
- Significantly de-risks future exploration program and enables confident investment decisions

Impact

Increased confidence	Providing a more detailed view of the subsurface validating existing models to reveal new information and insight.
Reduced risk	Clearer fault geometry and basin modelling reduced uncertainty and improved investment confidence
Accelerated timelines	Enabled immediate targeting of high-potential zones, avoid unprospected drilling
Long-term value	Data forms a foundation for ongoing exploration, future 3D seismic surveys, and system-wide geological learning



Gignac, L., Com, G., Schlyter, G., & Com, G. (n.d.). NI 43-101 Technical Report. Technical Report.

Sources

Leary, S., Sillitoe, R. H., Stewart, P. W., Roa, K. J., & Nicolson, B. E. (2016). Discovery, Geology, and Origin of the Fruta del Norte Epithermal Gold-Silver Deposit, Southeastern Ecuador. *Economic Geology*, 111(5), 1043–1072. <https://doi.org/10.2113/econgeo.111.5.1043>

Leary, S., Sillitoe, R. H., Lema, J., Téliz, F., & Mena, D. (2020). Chapter 21: Geology of the Fruta del Norte Epithermal Gold-Silver Deposit, Ecuador. In R. H. Sillitoe, R. J. Goldfarb, F. Robert, & S. F. Simmons (Eds.), *Geology of the World's Major Gold Deposits and Provinces* (pp. 431–450). Society of Economic Geologists. <https://doi.org/10.5382/SP.23.21>