

Greenfield Exploration in Data-rich Northern Quebec: Azimut's perspective

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Greenfield Exploration in Data-rich Northern Quebec

- 1) Data-rich province
- 2) Azimut's approach
- 3) Results
- 4) **Challenges:** government's plan to ban industrial activities in 50% of Northern Quebec

Azimut: who are we?

AZM : TSXV

- Quebec-based company exploring for major deposits
- Largest claim holder in the Far North region of Quebec
 - 6,892 claims
 - 3,168.5 km²
 - 4.6% of active claims
- 30 strategic and option agreements in 11 years
 - \$94 million in expenditures
 - \$9 million in cash & shares
- >400 new prospects discovered since 2004
- \$1.8 M working capital, no debt
- 37.6 million shares outstanding
- 48.2% insiders and institutional funds











Geologic Province or Subprovince

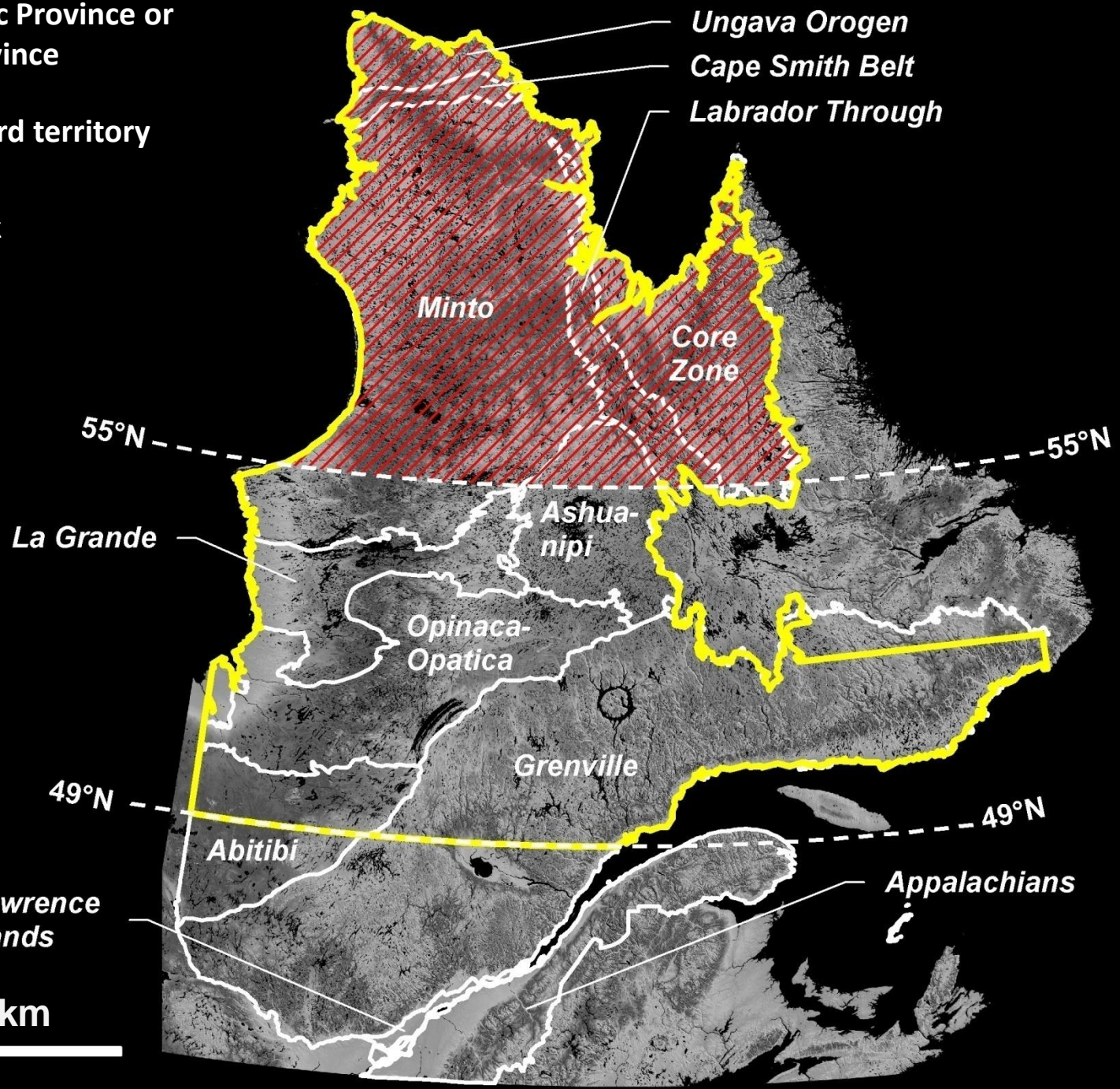


Plan Nord territory



Nunavik

Ungava Orogen
Cape Smith Belt
Labrador Through



Greenfield exploration in Northern Quebec

Definitions used in this presentation

- **Northern Quebec** = Plan Nord territory (above the 49th parallel and north of the Saint Lawrence River)
- **Nunavik** = above the 55th parallel
- **James Bay** = region underlain by the Opatica, Opinaca and La Grande geologic subprovinces
- **Far North**: region north of the Grenville Province and the La Grande Subprovince

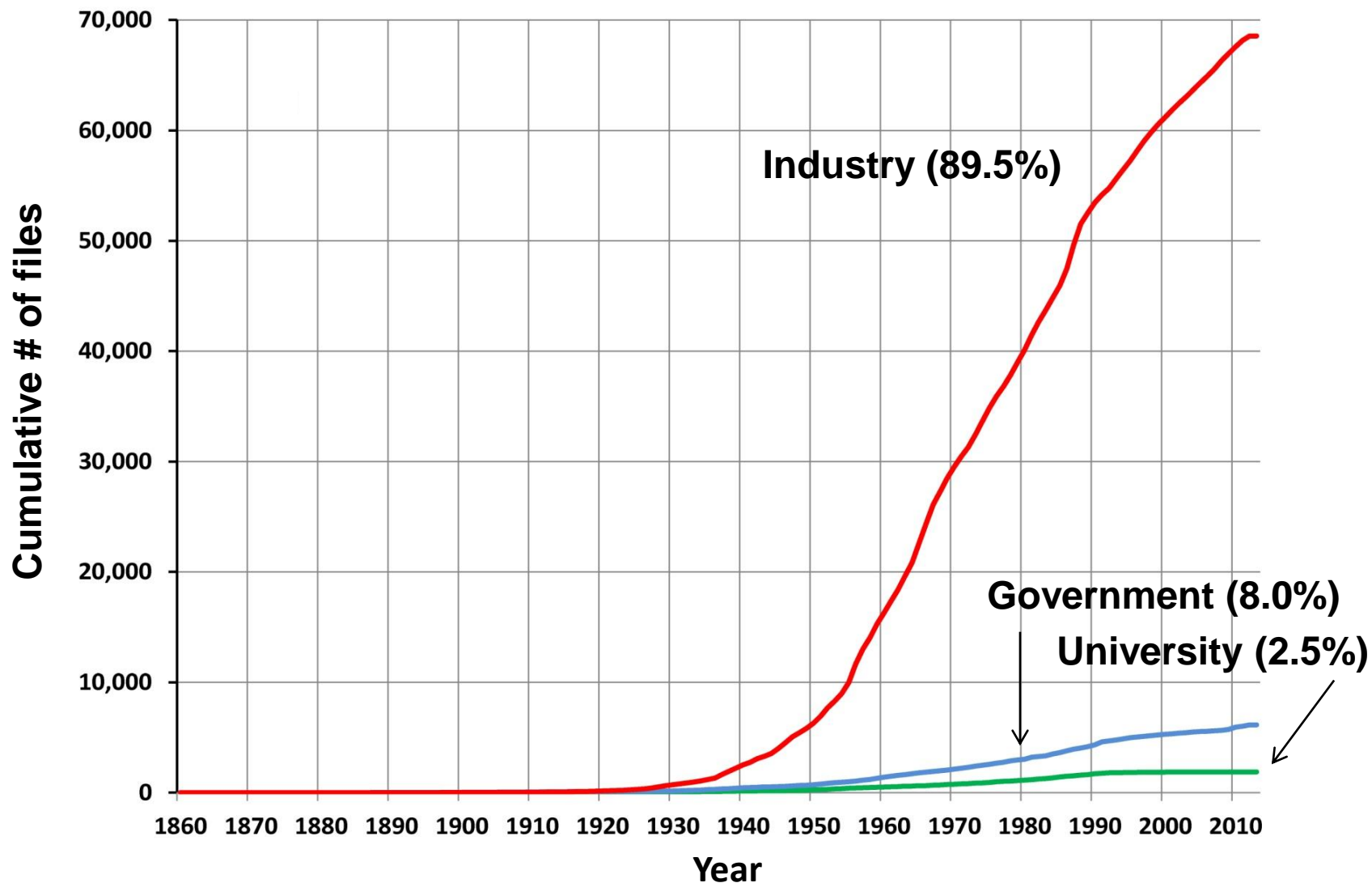
Data-rich Quebec

Multi-source information collected and managed by Quebec's Ministry of Energy and Natural Resources (MERN)

	# of files
Industry surveys	68,638 (89.5%)
Government documents	6,157 (8.0%)
➤ Geochemistry of surficial sediments: LBS*, stream	
➤ Mapping and rock sampling	
➤ Geophysics: magnetics, gravity, etc.	
➤ Mineral occurrence inventory	
University theses	1,878 (2.5%)
Total	76,673

* = Lake bottom sediment

Number of indexed files (1860 – 2013)

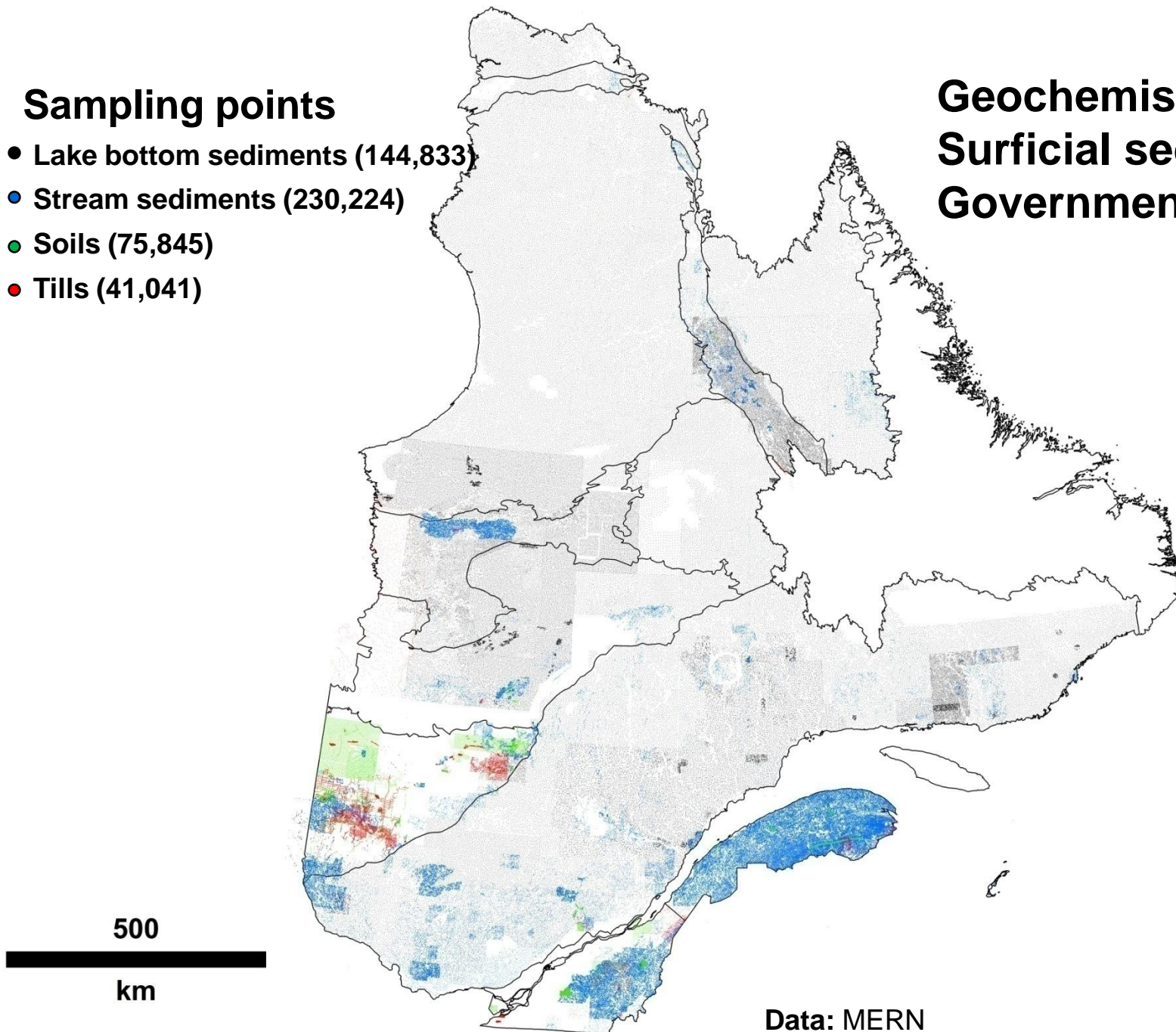


Data: MERN
Processing: Azimut

Sampling points

- Lake bottom sediments (144,833)
- Stream sediments (230,224)
- Soils (75,845)
- Tills (41,041)

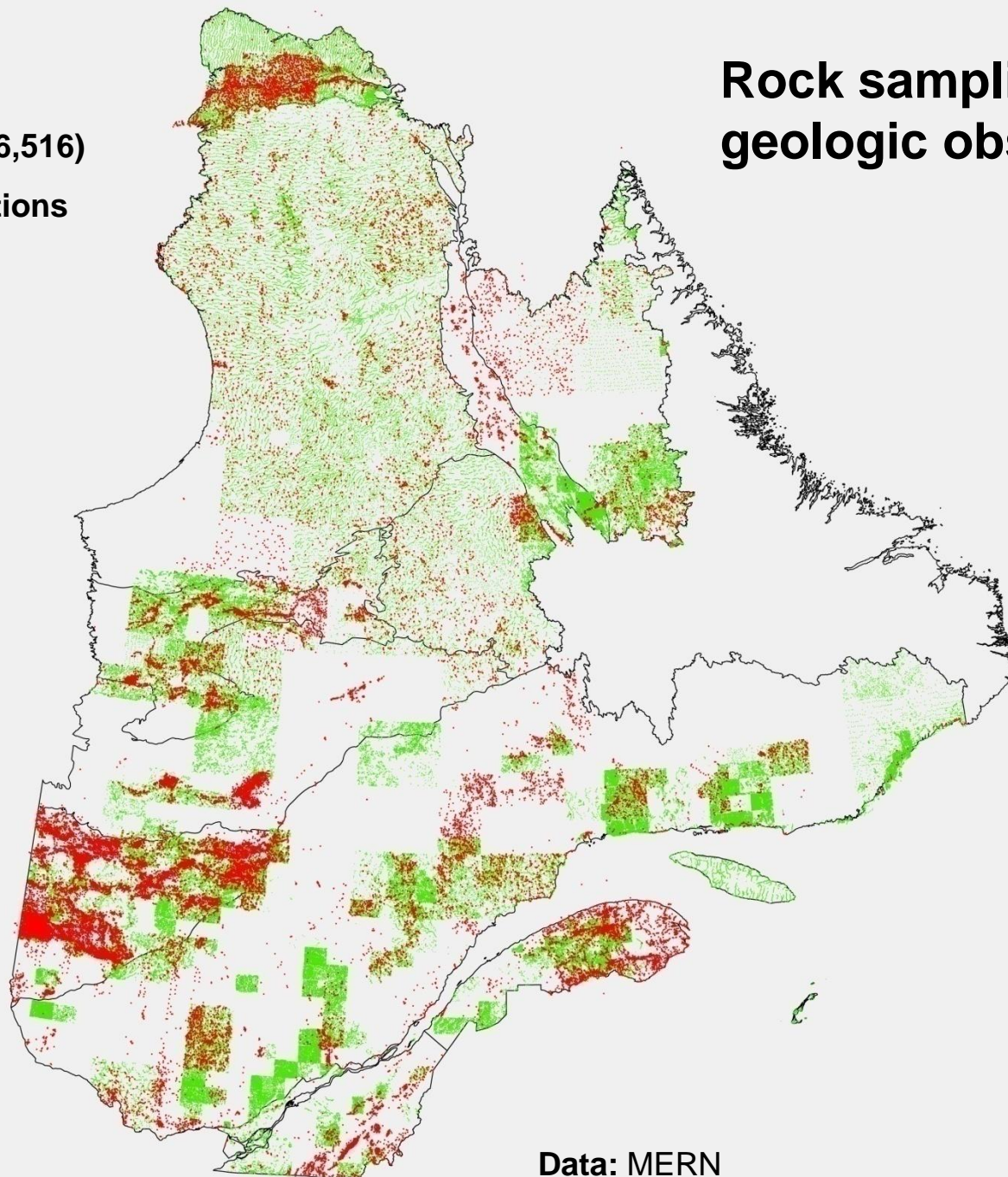
Geochemistry
Surficial sediments
Government surveys



Data: MERN
Processing: Azimut

Rock sampling & geologic observations

- Rock samples (276,516)
- Geologic observations (731,991)

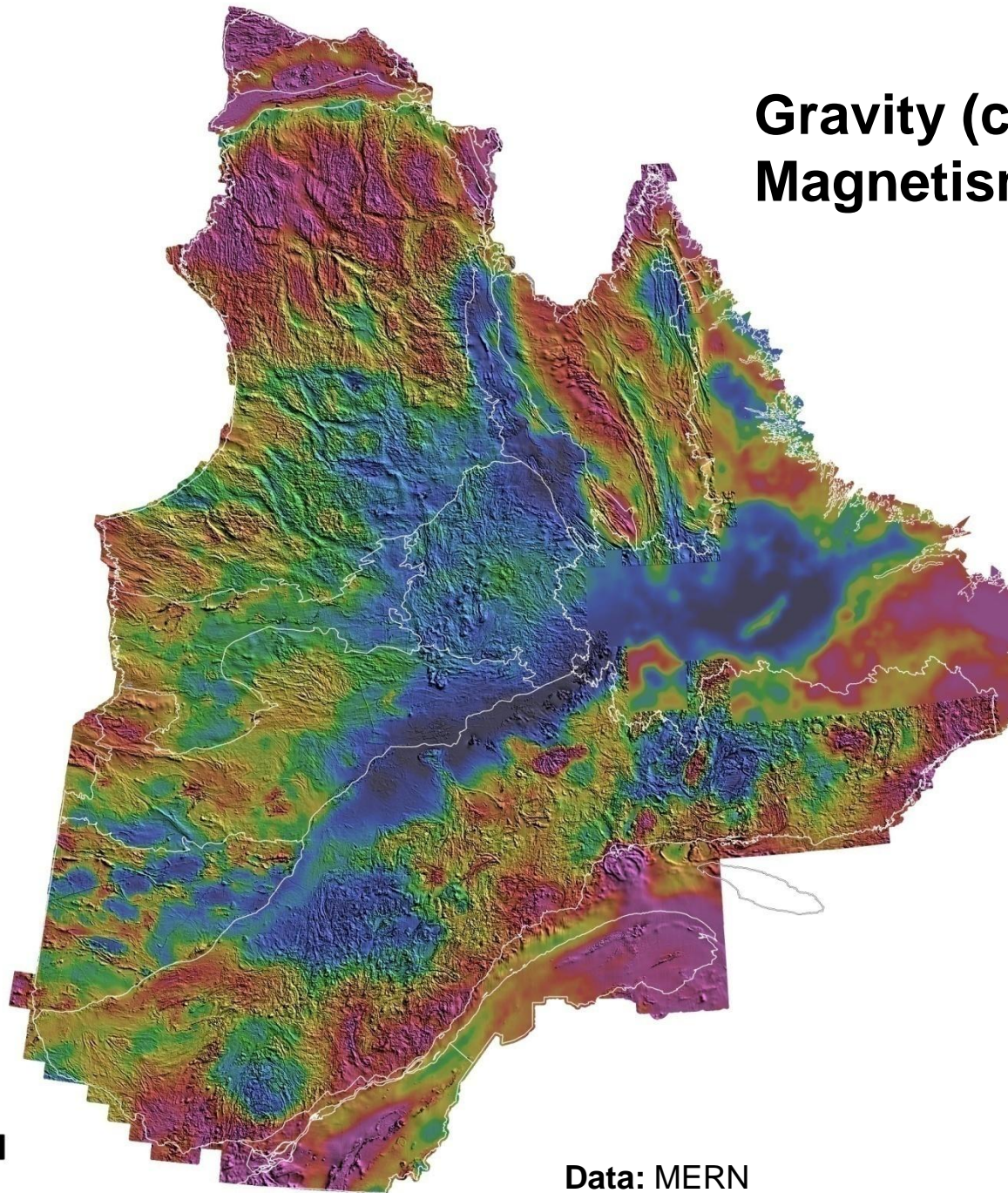


500

km

Data: MERN
Processing: Azimut

Gravity (colours) & Magnetism (shadow)



500

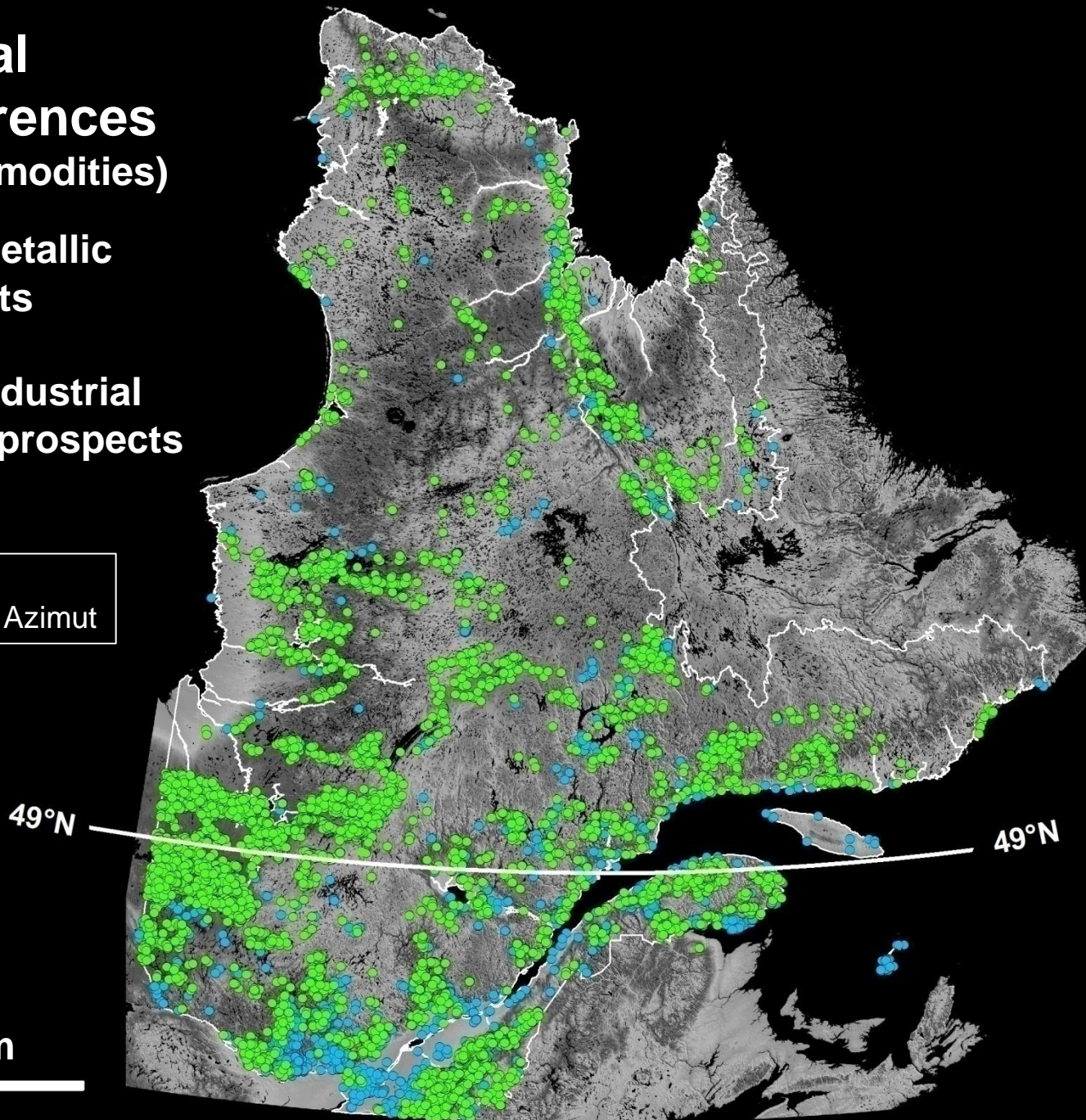
km

Data: MERN
Processing: Azimut

Mineral occurrences (all commodities)

- 6,735 metallic prospects
- 2,669 industrial mineral prospects

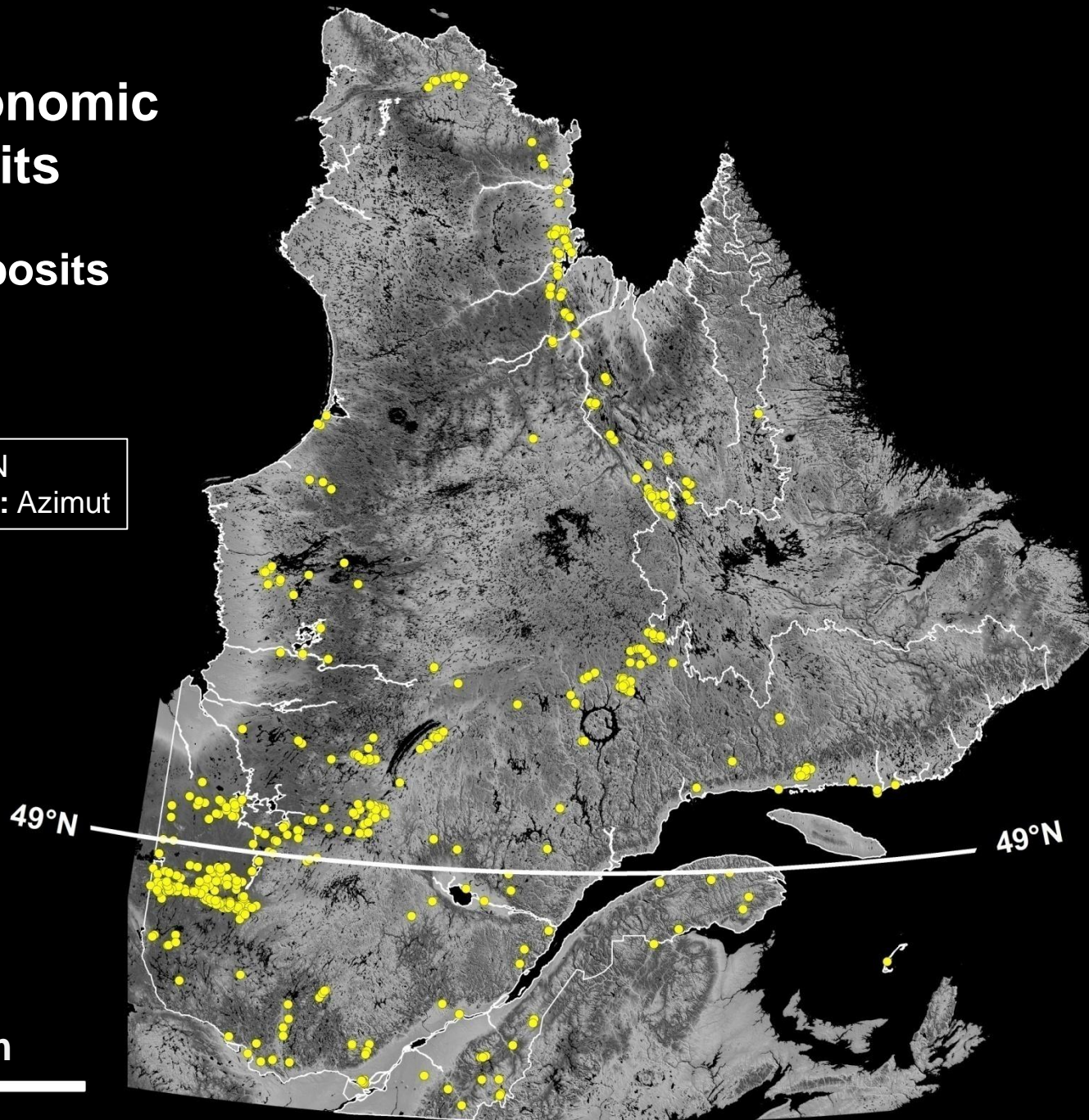
Data: MERN
Processing: Azimut



Uneconomic deposits

- 554 deposits

Data: MERN
Processing: Azimut

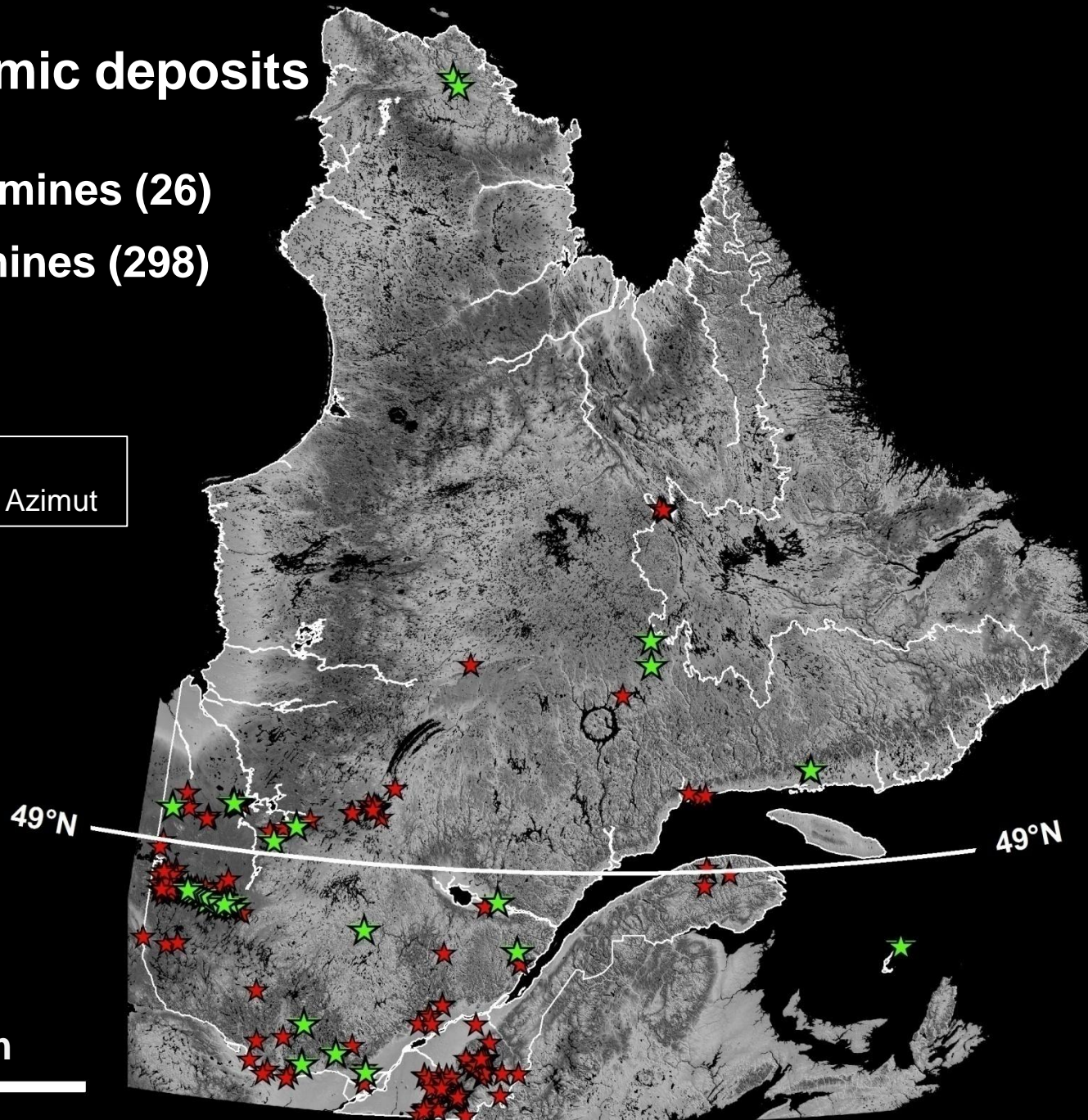


Economic deposits

★ Active mines (26)

★ Past mines (298)

Data: MERN
Processing: Azimut



500 km

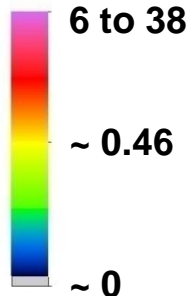
Data-rich Quebec

But...

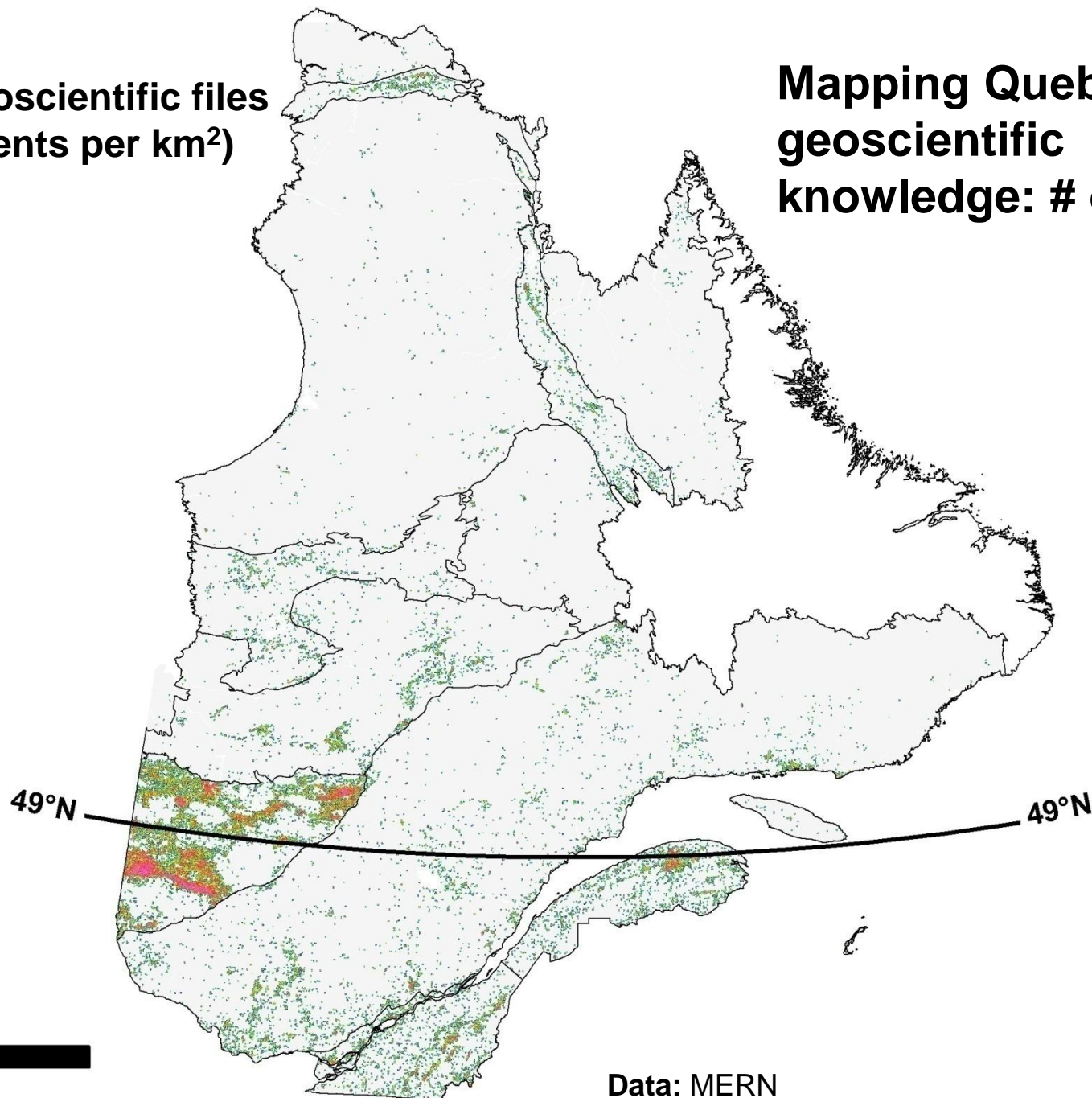
Geoscientific knowledge is incomplete and unequally distributed

- Geographically: 2D
- At depth: 3D

**Public geoscientific files
(# documents per km²)**



**Mapping Quebec's
geoscientific
knowledge: # of files**



500

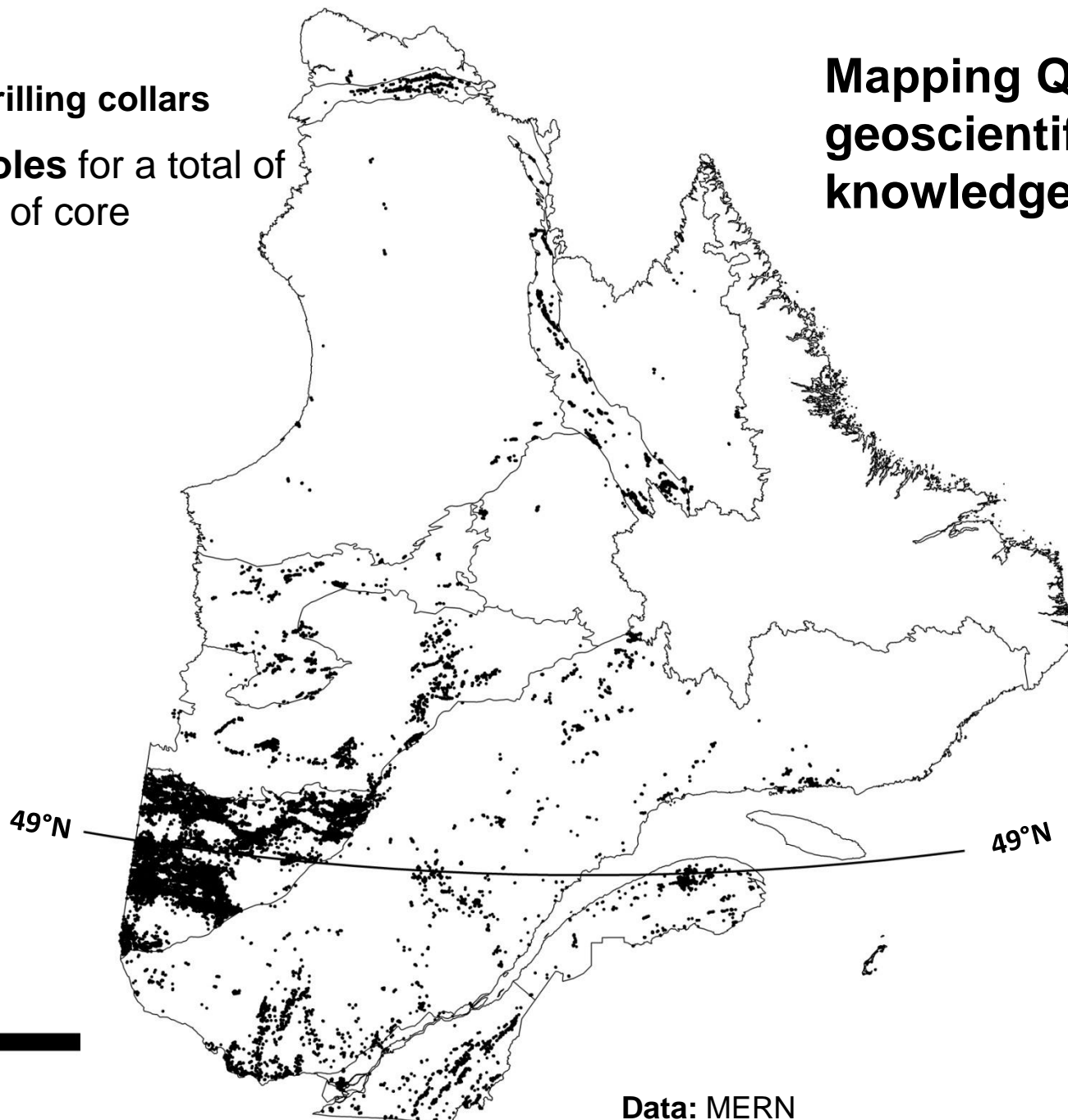
km

Data: MERN
Processing: Azimut

Diamond drilling collars

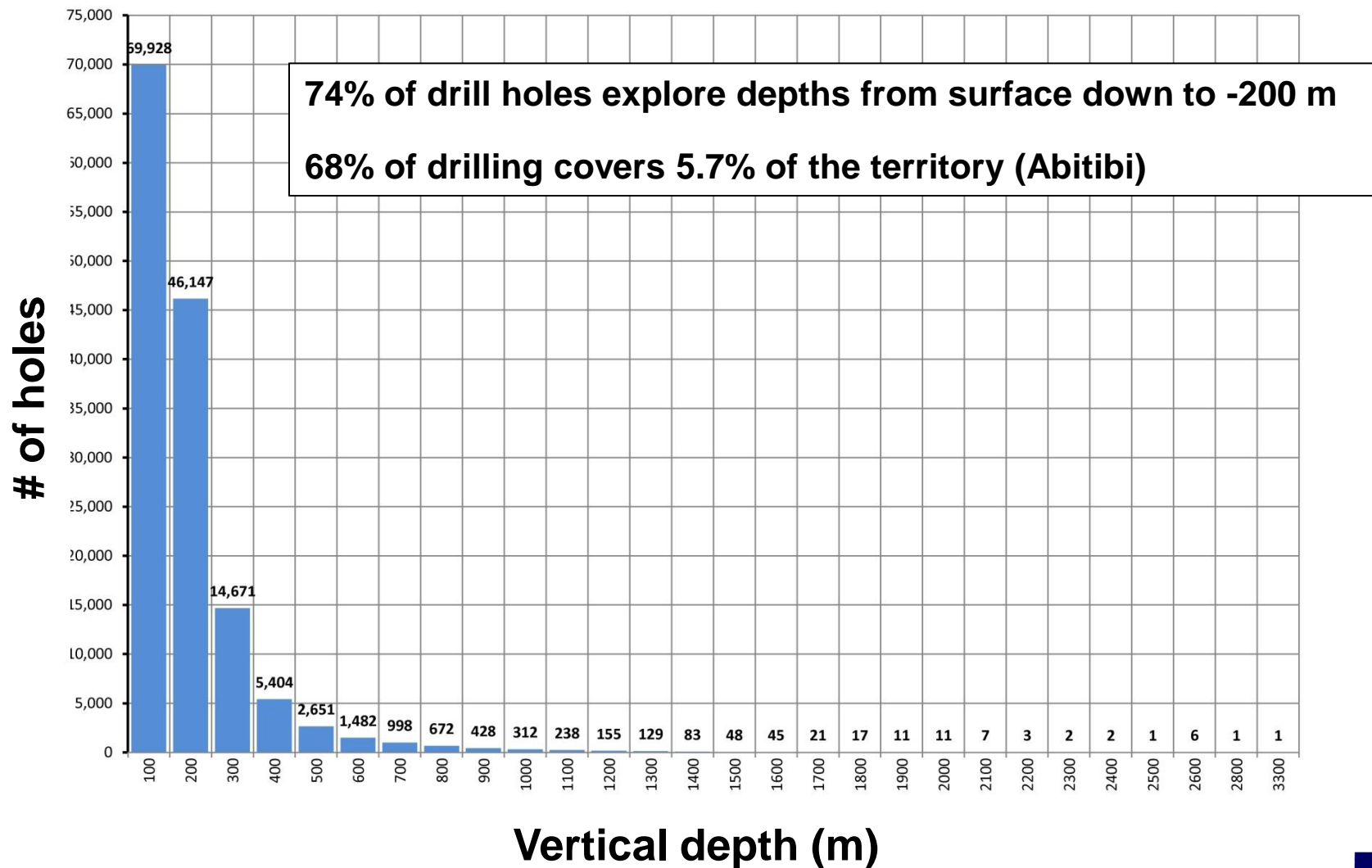
147,506 holes for a total of
24,280 km of core

Mapping Quebec's geoscientific knowledge: Drilling



Data: MERN
Processing: Azimut

Diamond drilling: # of holes *versus* vertical depth



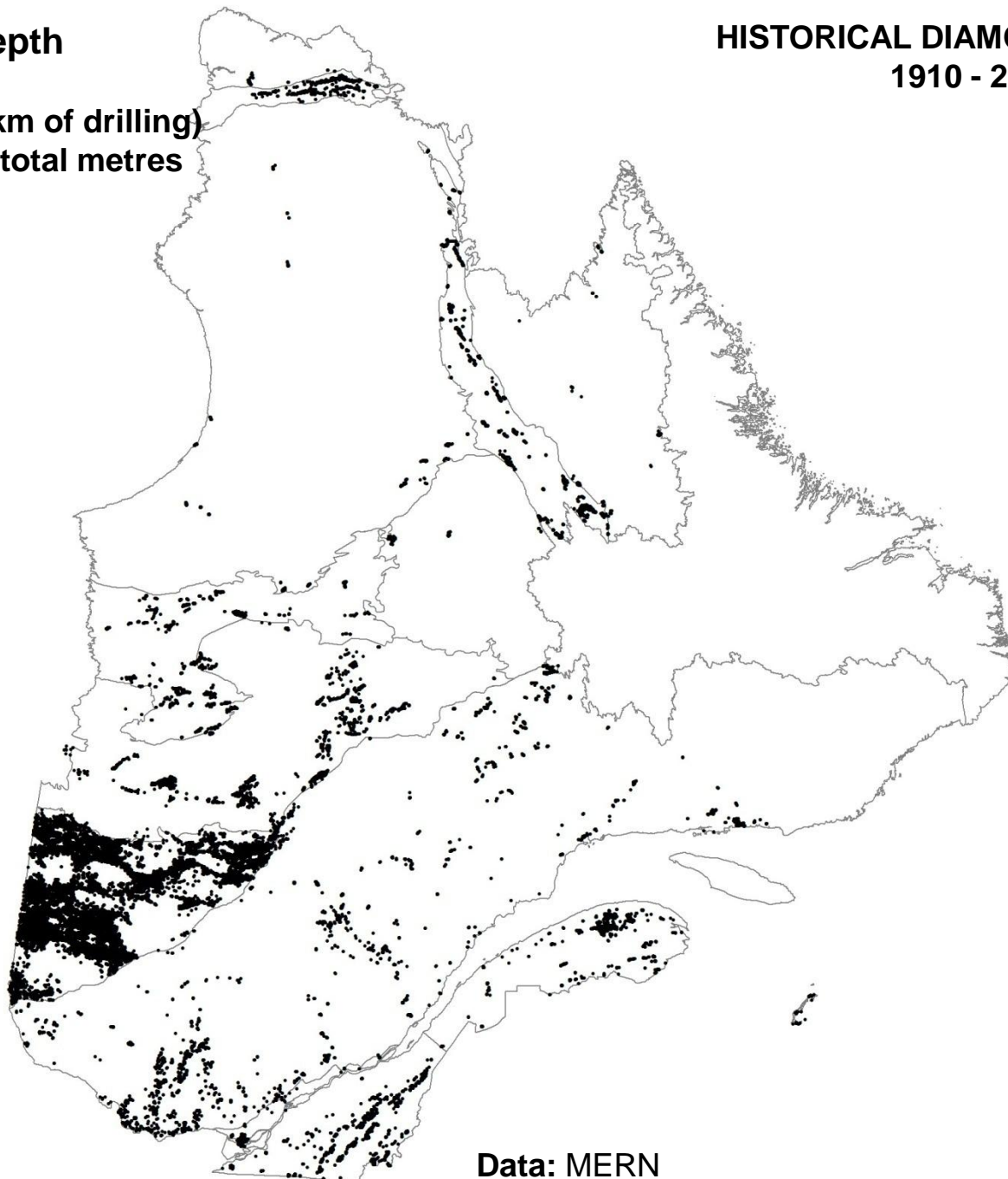
Data: MERN

Processing: Azimut

All holes: > 50 m depth

HISTORICAL DIAMOND DRILLING 1910 - 2012

**110,998 holes (19,500 km of drilling)
77% of holes = 96% of total metres**



500

km

**Data: MERN
Processing: Azimut**

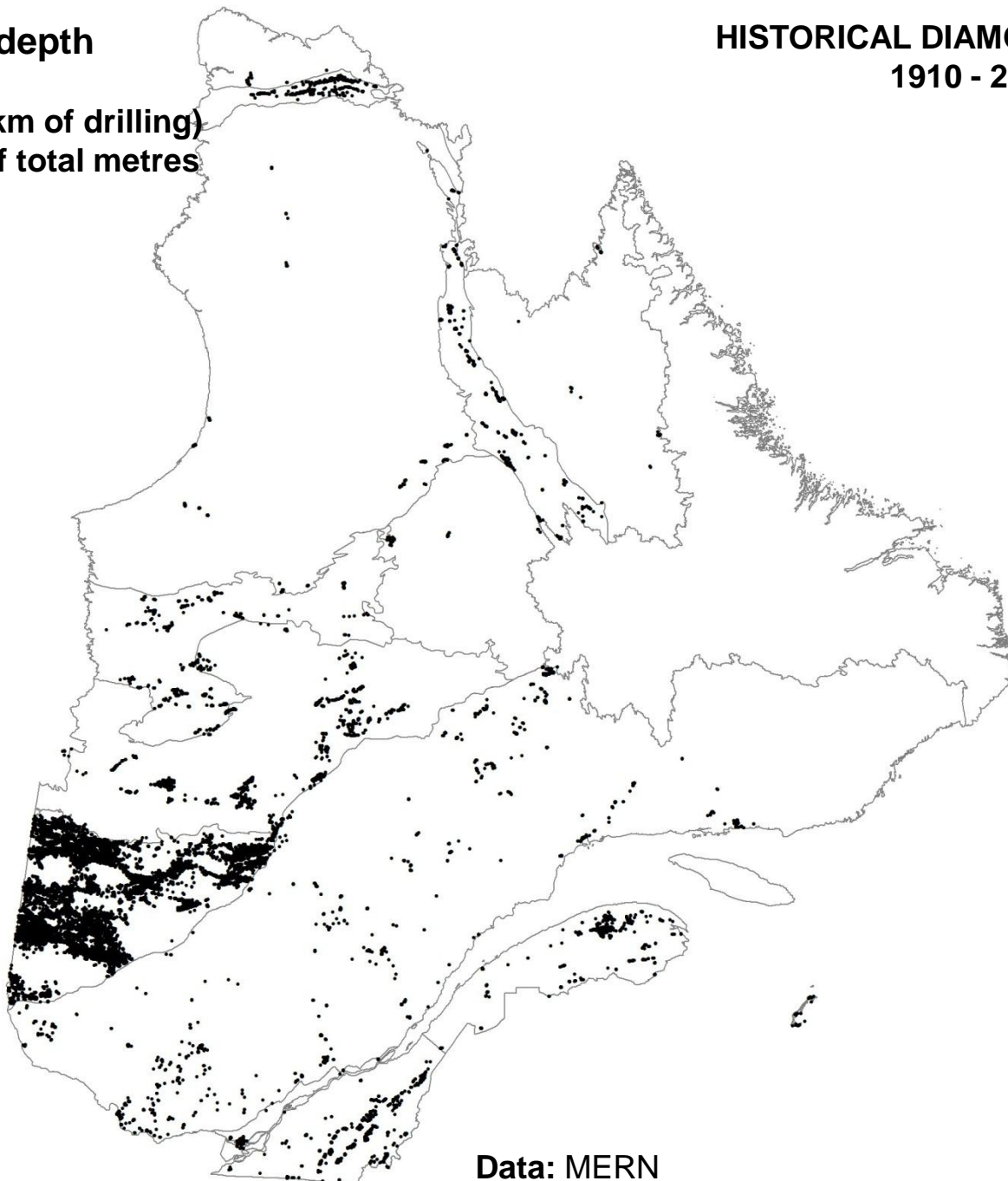
All holes: > 100 m depth

73,680 holes (16,700 km of drilling)

51% of holes = 82% of total metres

HISTORICAL DIAMOND DRILLING

1910 - 2012



500

km

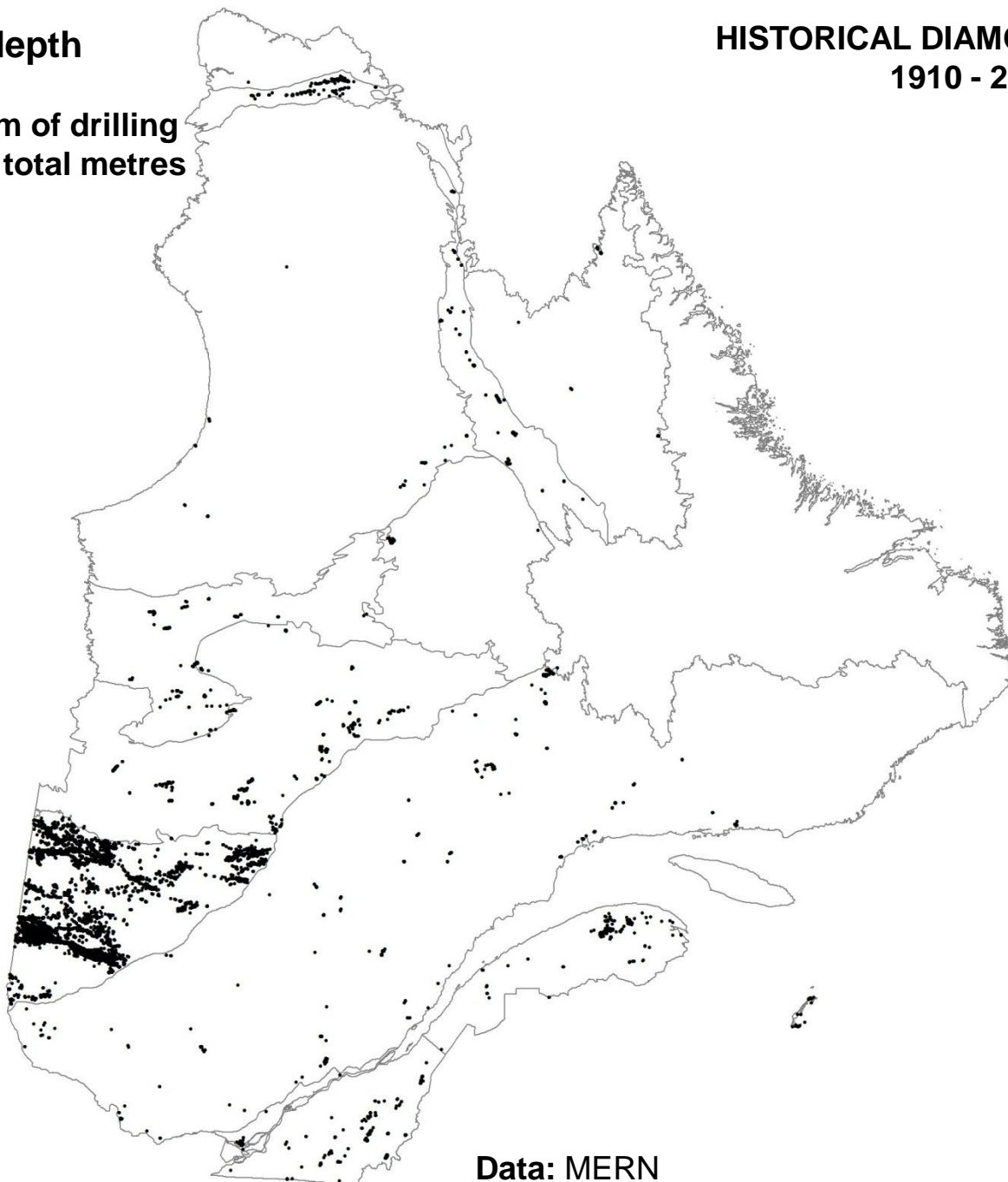
Data: MERN

Processing: Azimut

All holes: > 200 m depth

HISTORICAL DIAMOND DRILLING 1910 - 2012

**27,439 holes (10,200 km of drilling
19% of holes = 50% of total metres**



500

km

**Data: MERN
Processing: Azimut**

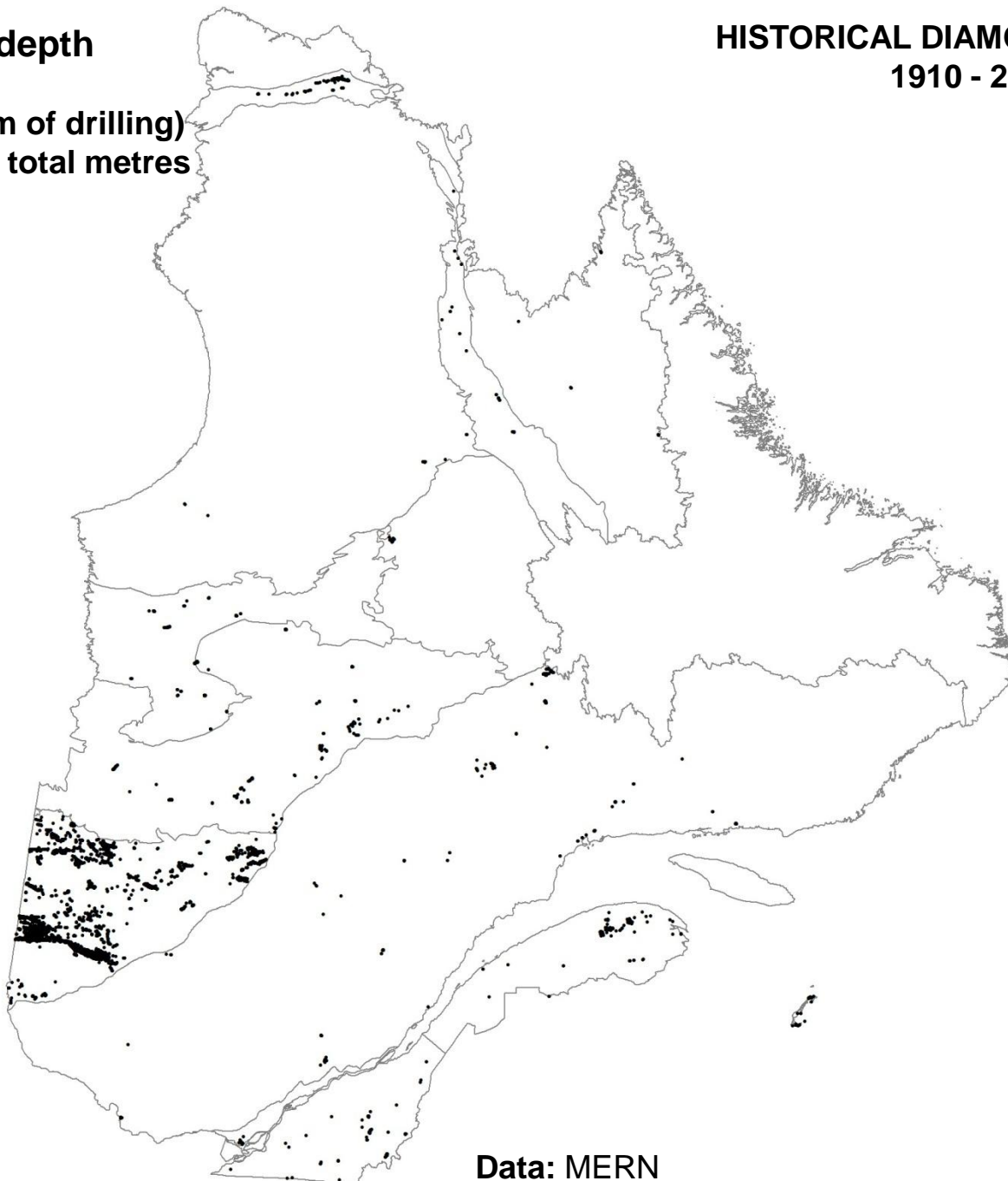
All holes: > 300 m depth

12,742 holes (6,600 km of drilling)

9% of holes = 32% of total metres

HISTORICAL DIAMOND DRILLING

1910 - 2012



500

km

Data: MERN

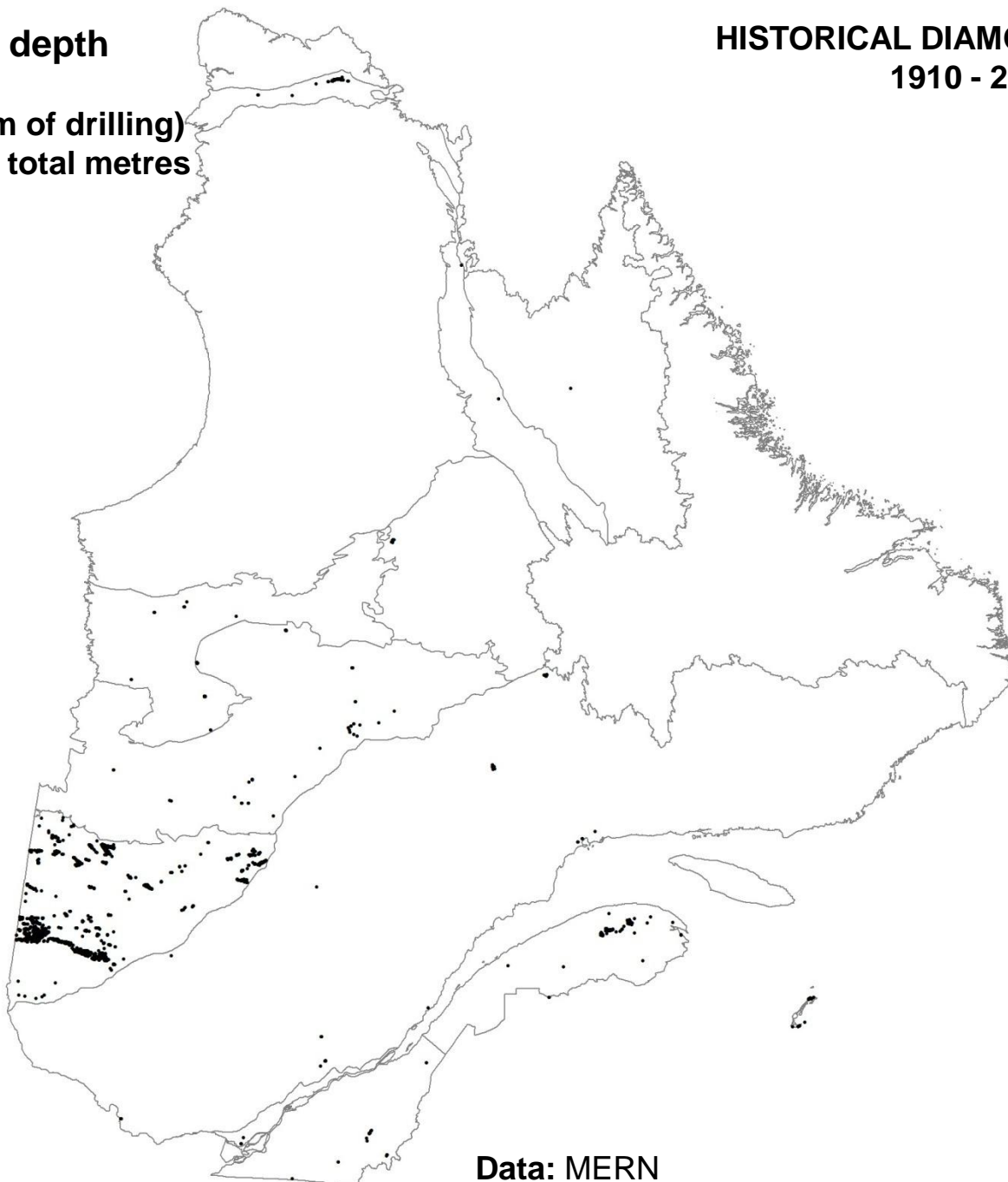
Processing: Azimut

All holes: > 500 m depth

4,674 holes (3,600 km of drilling)

3% of holes = 18% of total metres

HISTORICAL DIAMOND DRILLING 1910 - 2012



500

km

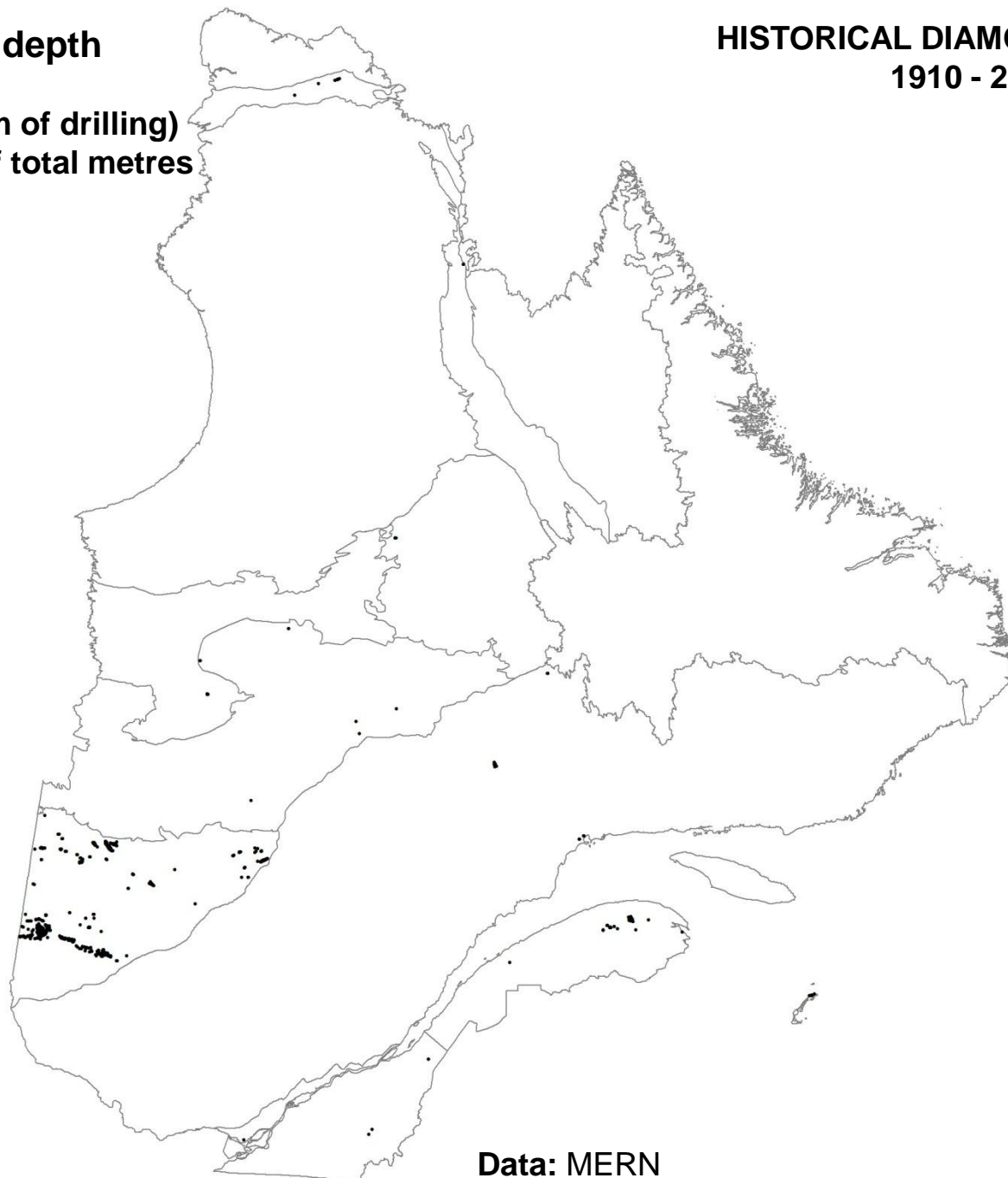
**Data: MERN
Processing: Azimut**

All holes: > 800 m depth

1,524 holes (1,700 km of drilling)

1.1% of holes = 8% of total metres

HISTORICAL DIAMOND DRILLING 1910 - 2012



500

km

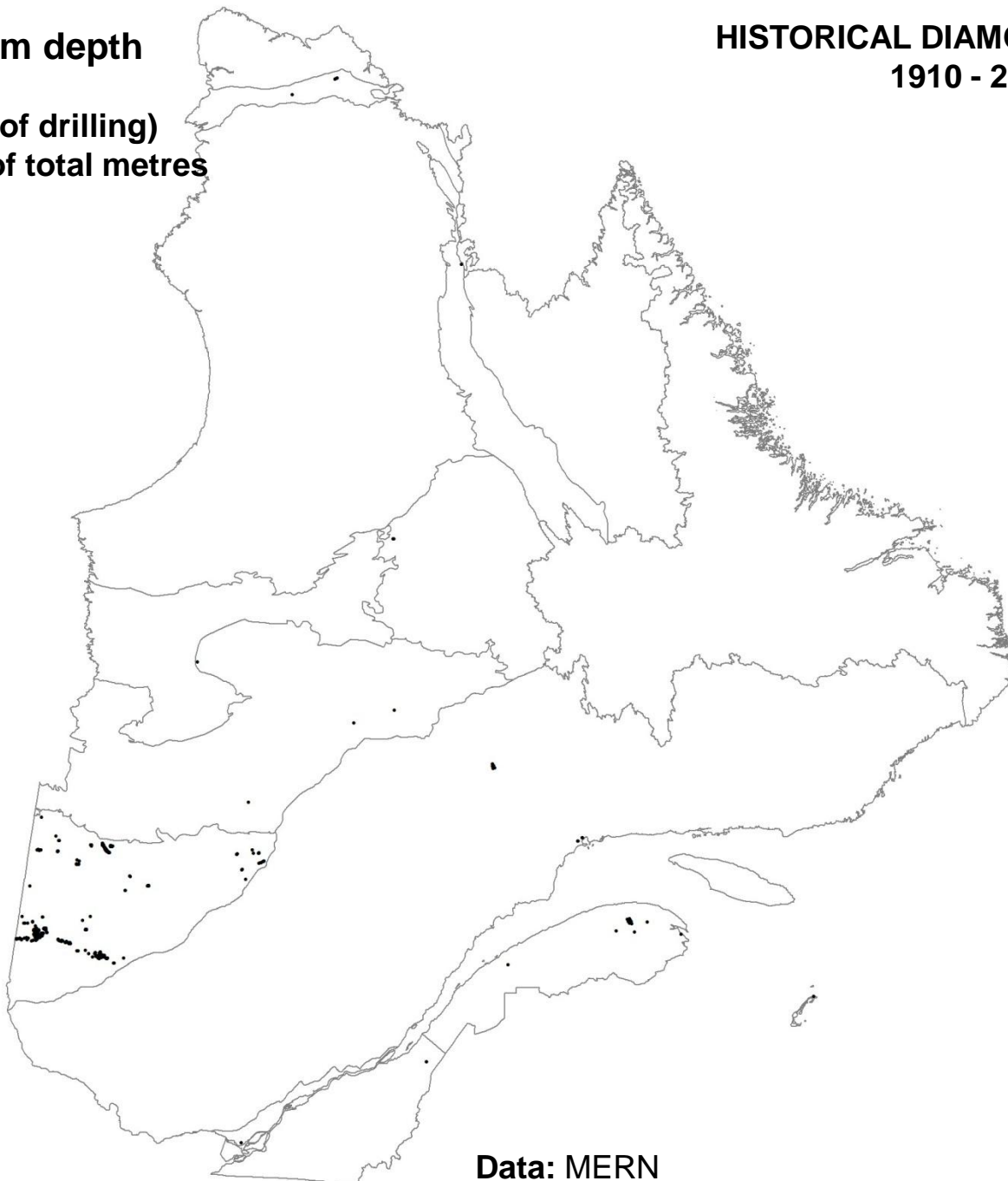
Data: MERN
Processing: Azimut

All holes: > 1,000 m depth

782 holes (1,000 km of drilling)

0.5% of holes = 5% of total metres

HISTORICAL DIAMOND DRILLING 1910 - 2012



500

km

Data: MERN
Processing: Azimut

Knowledge Density per Region – Quebec



Geologic Province or Subprovince	Surface area km ² (%)	Information density # files / km ²	Drill holes # holes (%)	Meterage drilled km (%)	Drilling density # metres / km ²
Abitibi	86,456 (5.7%)	0.38	97,077 (67.7%)	18,700 (77.0%)	216.2
St. Lawrence Low. / Appalachians	94,216 (6.2%)	0.10	9,454 (6.6%)	1,300 (5.5%)	14.0
Grenville	497,958 (32.6%)	0.02	14,695 (10.2%)	1,200 (5.1%)	2.5
James Bay	227,648 (14.9%)	0.02	9,767 (6.8%)	1,400 (5.9%)	6.3
Far North	623,347 (40.8%)	0.004	12,375 (8.6%)	1,600 (6.5%)	2.5
TOTAL	1,529,625 (100%)	0.037	143,368 (100%)	24,300 (100%)	15.8

Northern Quebec *versus* Abitibi: roughly 25x the knowledge gap for James Bay, 100x for Far North

Data-rich Quebec

Quebec's government: visionary data integrator and provider

- Major, well-organized quality data warehouse
- Easily accessible
- Inexpensive

Geoscientific knowledge

- Large contribution from the mining industry
- Direct relationship with economic discoveries
- Large discrepancies in data density



Azimut's approach

Capitalize on core expertise

- Ability to extract value from advanced database processing
- Practical exploration know-how on the territory

Where in Quebec?

Northern Quebec (“Plan Nord” territory)

High quality regional data
Numerous large-scale targets at surface
Largely underexplored
Potential for new mining districts
(Au, IOCG, Ni, Cr, PGE, REE, U, diamonds)

versus

Southern Quebec

Deeper exploration in mining camps
Incremental targets (can be large size!)

Azimut's approach

How do we do it?

- Basic assumption: quantitative & qualitative relationship between geochemical-geophysical footprints and mineralized systems
- Building of regional-scale predictive models for selected mineral deposit types / commodities
- Acquisition through staking of unexplored quality targets
- Partnership development with major and junior companies

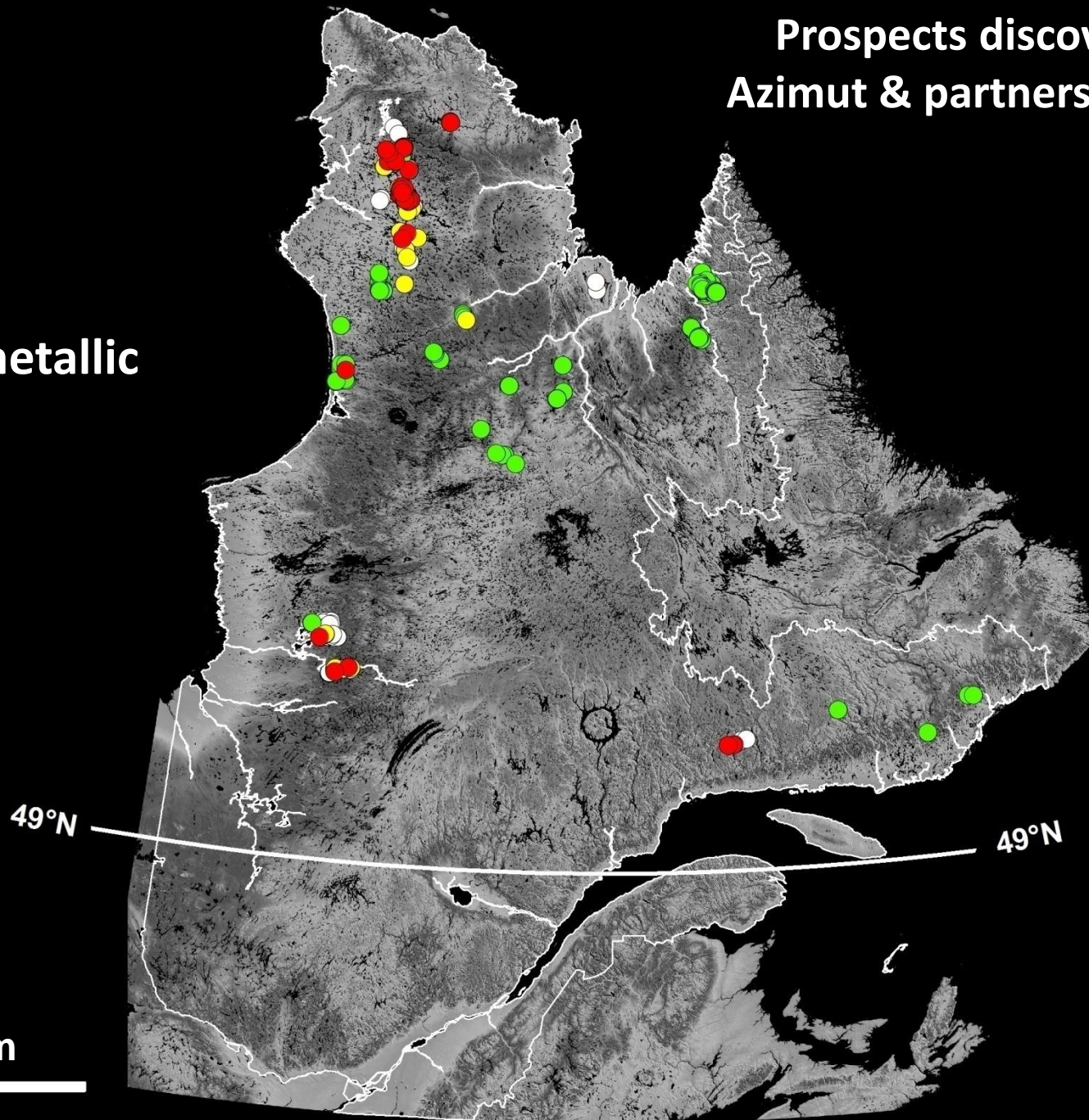
Azimut's results (since 2003)

Discovery of 2 new mineral provinces in Northern Quebec

- **Rex Trend:** 330 x 30-50 km polymetallic Cu-Au-Ag-Te-Bi-W-Sn province (5 IOCG systems and 2 intrusion-related systems)
- **Ungava Bay uranium province:** 200 x 80 km region with km-long pegmatite sills (~ Rössing type) near an Archean-Proterozoic unconformity: 12 mineralized zones totalling 17 km
- 400 new prospects discovered accross Quebec (Nunavik, James Bay and Grenville regions)

Prospects discovered by Azimut & partners since 2003

- Cu
- Au
- U
- Polymetallic

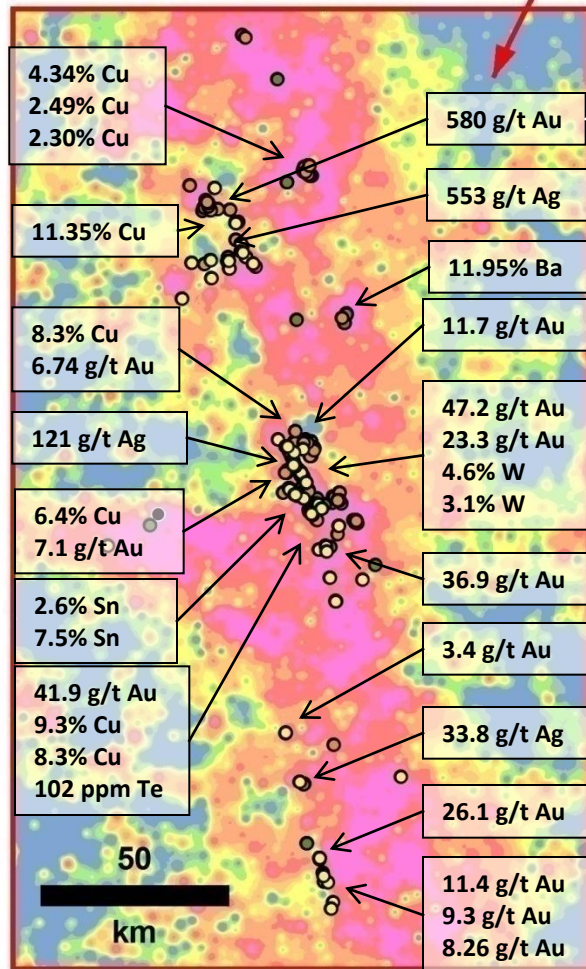


Exploration in Northern Quebec by Azimut & partners since 2003

Rex Trend Polymetallic Province

(330 x 30 to 50 km)

linked to a strong regional Cu anomaly in LBS

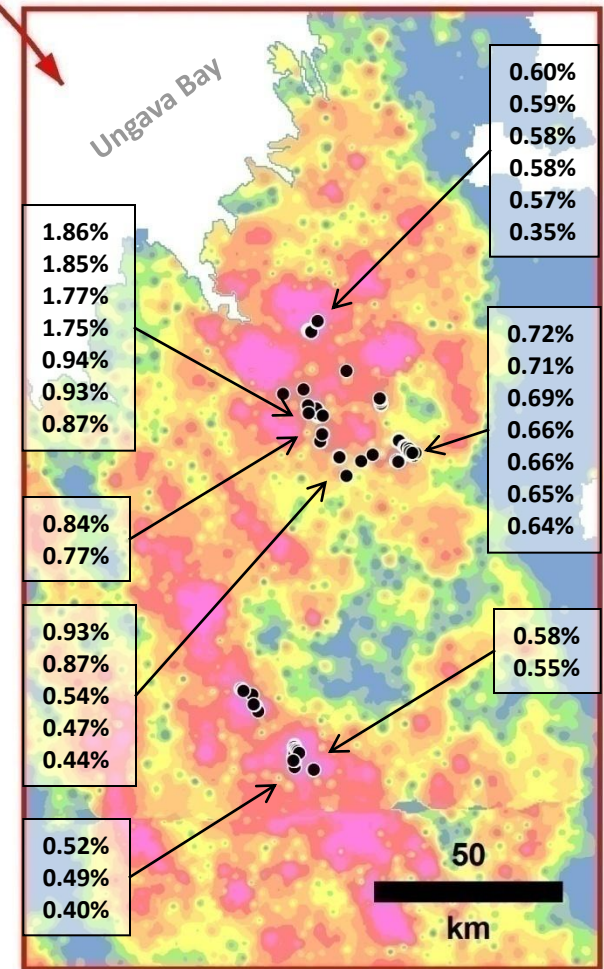


• Au • Cu • W • Other

Ungava Bay Uranium Province

(200 x 80 km)

linked to a strong regional U anomaly in LBS



• U (U₃O₈ grades)



AZIMUT

Challenges

Northern Quebec

- Very large underexplored region (1.2 million km²)
- Climatic constraints reduce prospecting window (2 to 4 months)
- Lack of infrastructure requires large and/or high-grade discoveries to convert potential into economic wealth: “**founding discoveries**”

Mining development dynamics of Southern Quebec (Abitibi : 86,456 km²) can be used as a benchmark for Northern Quebec:

- 100 years of exploration has led to 174 mines within 0.5% of the territory
- Abitibi still highly prospective: recent major discoveries (Osisko), ongoing large development projects (Royal Nickel, Falco)



Challenges

Northern Quebec (James Bay + Far North) *versus* Abitibi

- ~10 times larger
- 25 to 100 times less geological knowledge
- Early exploration stage **versus** 100+ years exploration history
- Therefore unrealistic to appraise the mineral potential within the next 20 years as proposed. Location of future discoveries difficult to predict, related to too many factors: unexpected discoveries, innovations, changes in market demand...

Plan to ban industrial activities in 50% of Northern Quebec by 2035

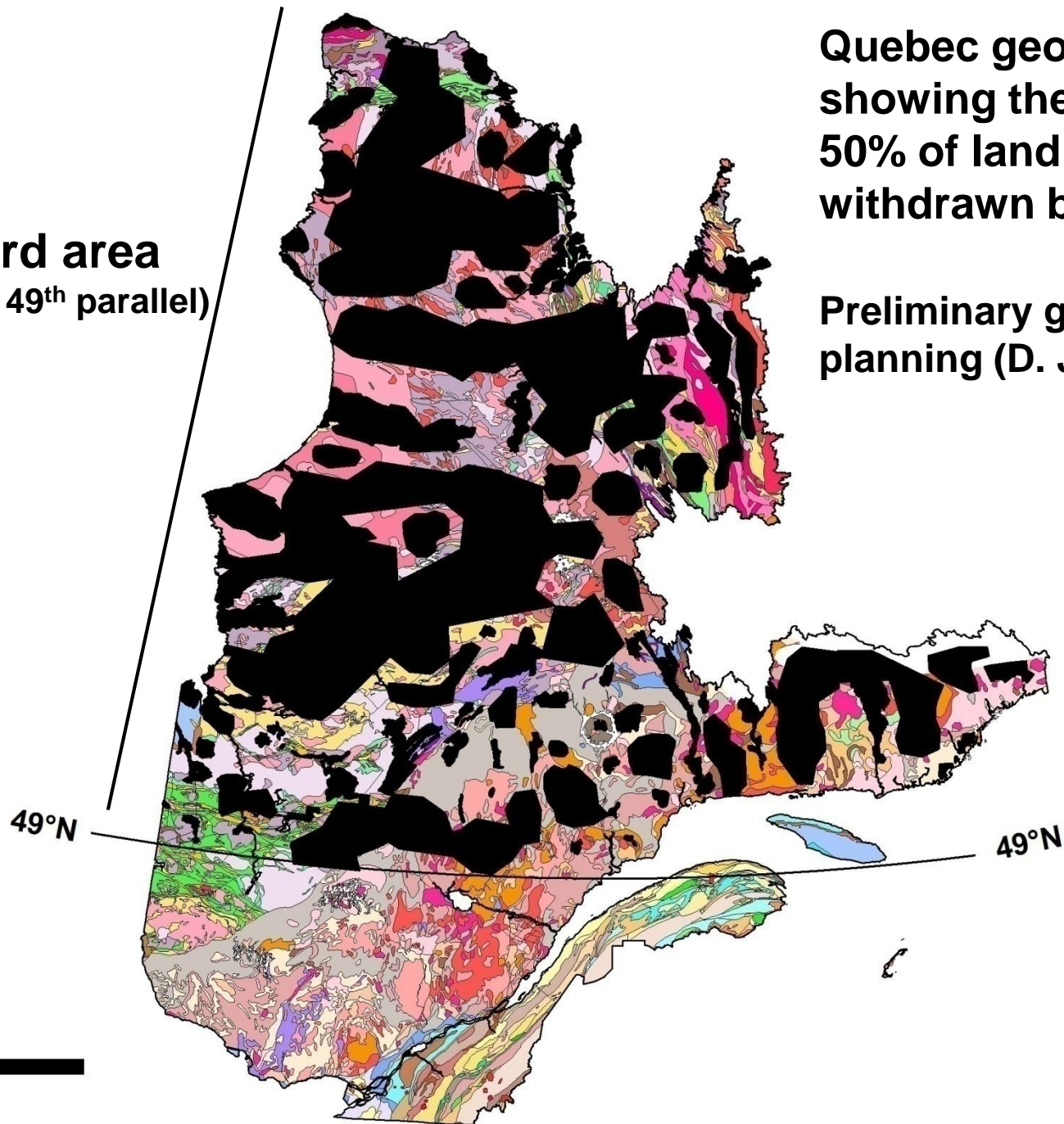
- This proposal will jeopardize the future mineral development of Quebec
- Large prospective regions will be fragmented and sterilized for future generations



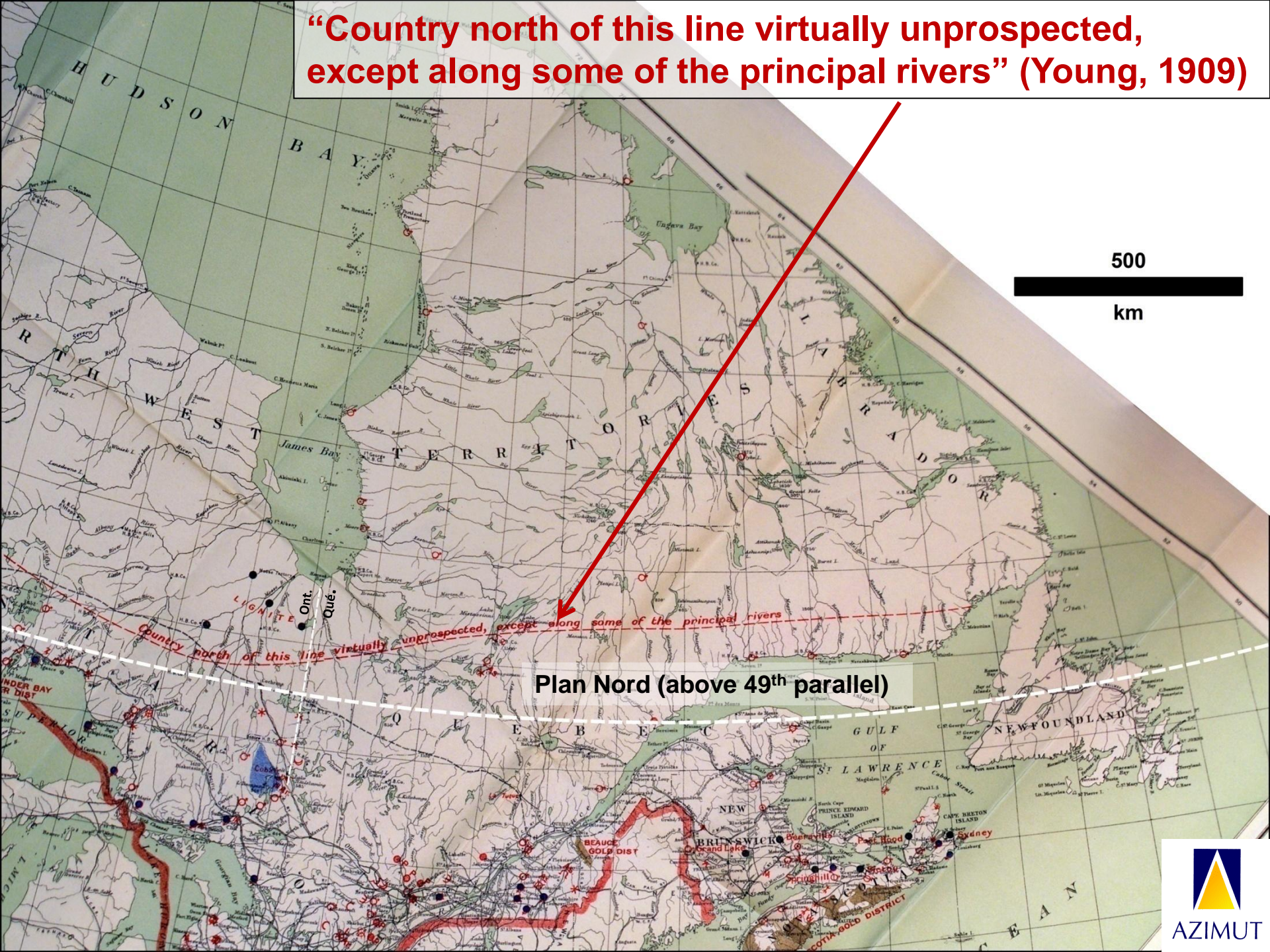
Plan Nord area
(above the 49th parallel)

**Quebec geology map
showing the proposed
50% of land to be
withdrawn by 2035**

**Preliminary governmental
planning (D. Jean, 2012)**



“Country north of this line virtually unprospected, except along some of the principal rivers” (Young, 1909)



Conclusion

- Greenfield exploration corresponds to knowledge acquisition with negligible impact on the territory: **right to explore must be kept**
- Active mines: tiny land footprint (0.005% of Quebec)
- In the case of a new mine project, conservation areas of similar size could be established as compensation

50% ban: a major issue for Quebec's future mineral development

Three conditions appear critical to unlock Northern Quebec's mineral potential and the success of Plan Nord:

- 1) Data availability
- 2) Access to the territory
- 3) Time (to overcome economic cycles)

References

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