



A NEW ERA OF SYSTEMATIC GEOPHYSICAL SURVEYS FOR THE ENERGY TRANSITION IN BRAZIL

IAGO COSTA

Serviço Geológico do Brasil

Ouro Preto, May 17 – 20, 2026

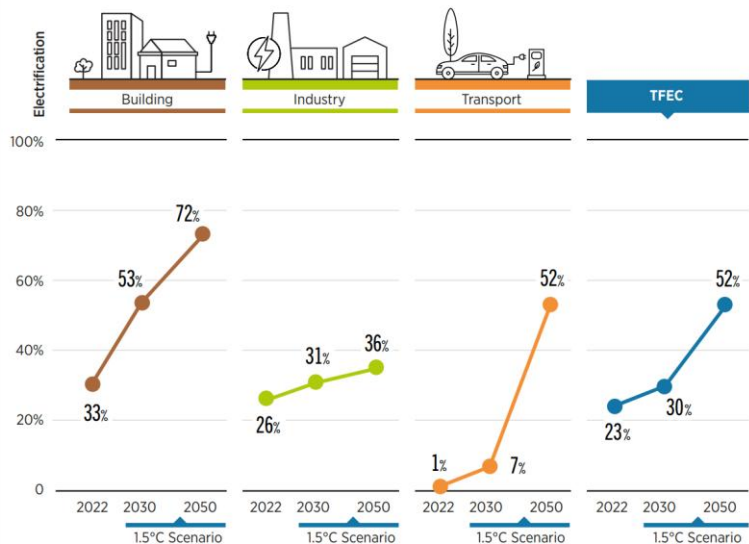


MINISTRY OF
MINES AND ENERGY



“The Age of Electricity is here”

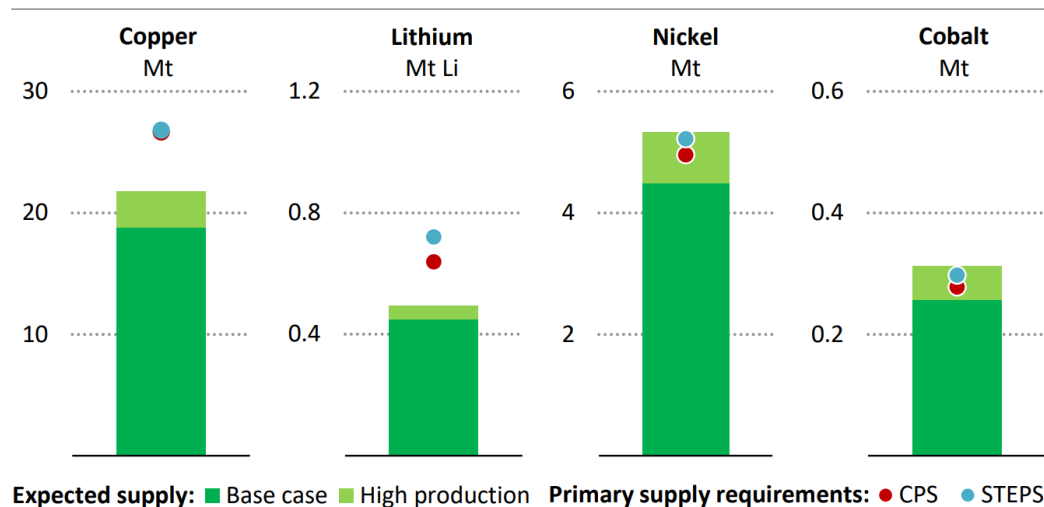
FIGURE 1.5 Global electrification in end-use sectors and TFEC, 2022, 2030 and 2050 under the 1.5°C Scenario



Source: Historical data from (IEA, 2024b)
Note: TFEC = total final energy consumption

Source: IRENA, World Energy Transitions Outlook 2024

Figure 5.16 ▶ Primary supply requirements for critical minerals and expected supply from existing and announced projects by scenario, 2035



Source: IEA, World Energy Outlook 2025

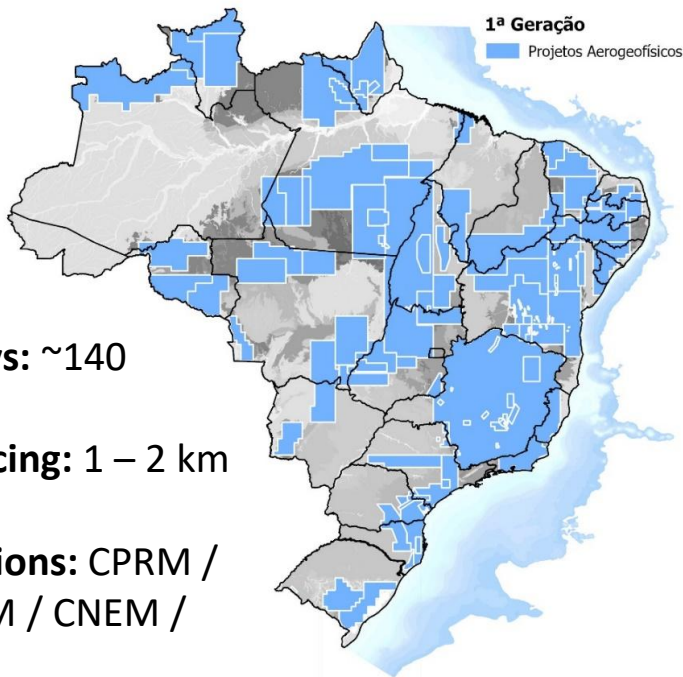
The Energy Transition Starts Underground

Strategic Role of the Subsurface in the Energy Transition

ENERGY TRANSITION PILLAR	ENERGY TRANSITION DRIVERS	SUBSURFACE REQUIREMENTS
 ELECTRIFICATION	 Evs, batteries, power grids, renewable energy infrastructure	 Copper, lithium, nickel, REE and grafite and others strategic minerals
 EMERGING ENERGY RESOURCES	 Geothermal energy and Geologic Hydrogen	 Reservoir characterization, structural mapping and deep geophysical imaging
 DECARBONIZATION & ENERGY STORAGE	 CCUS and underground hydrogen storage	 Geological storage systems, basin structure, and subsurface monitoring

Airborne Geophysical Surveys

1st Generation (1953 – 2000)

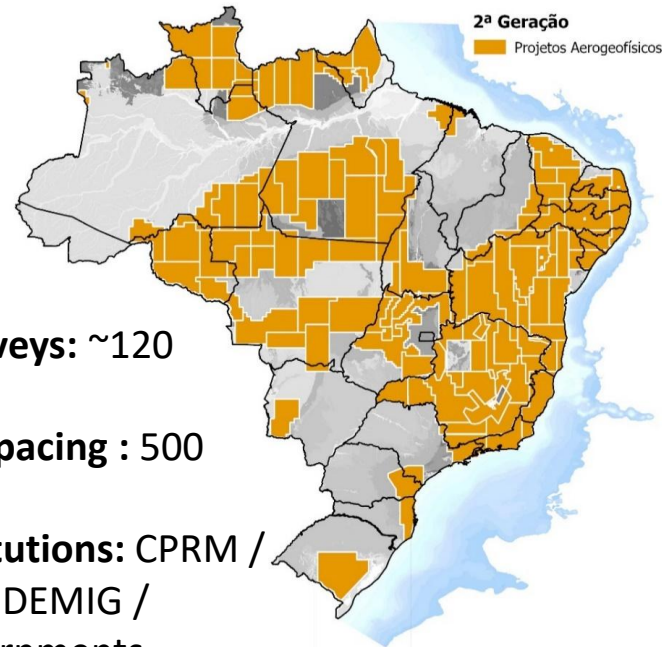


No. of Surveys: ~140

Std. Line Spacing: 1 – 2 km

Main institutions: CPRM /
CBPM / DNPM / CNEM /
NUCLEBRÁS

2nd Generation (2000 – 2014)

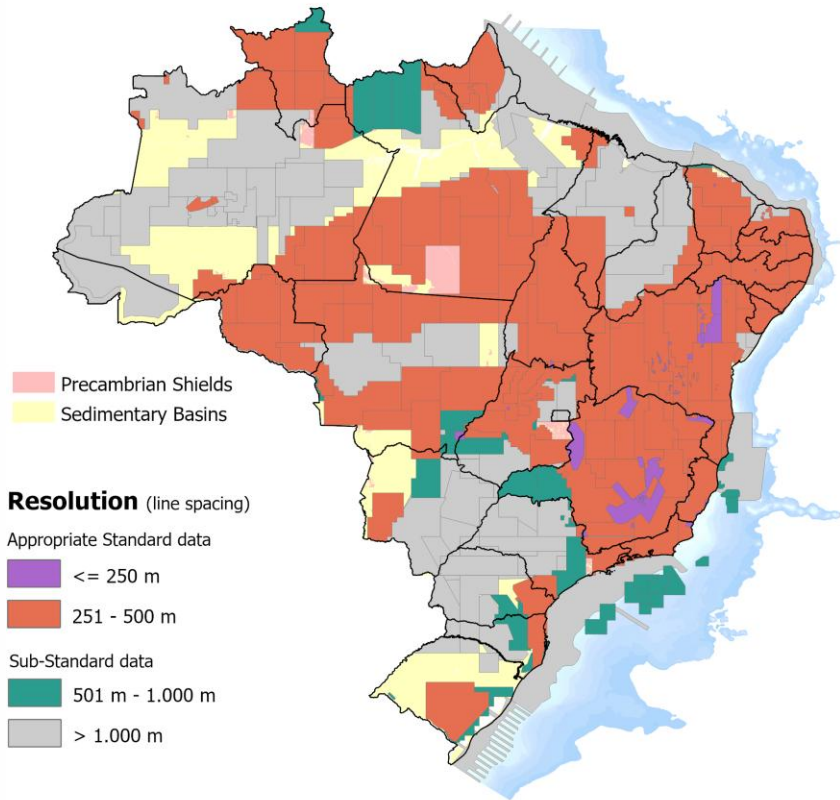


No. of Surveys: ~120

Std. Line Spacing : 500

Main institutions: CPRM /
CBPM / CODEMIG /
State Governments

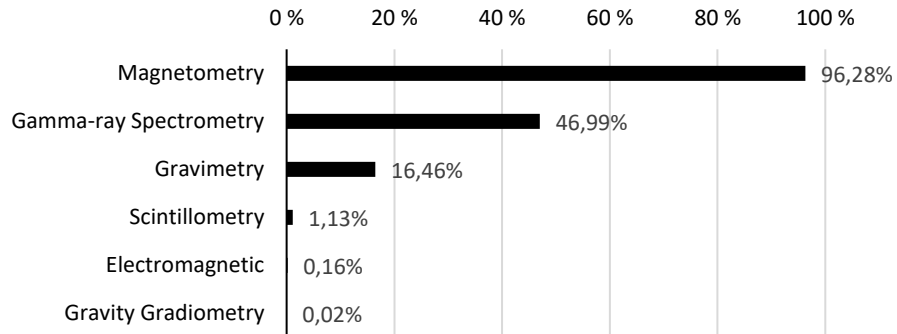
Current Status of Public Airborne Geophysical Data in Brazil



Appropriate Standard Data

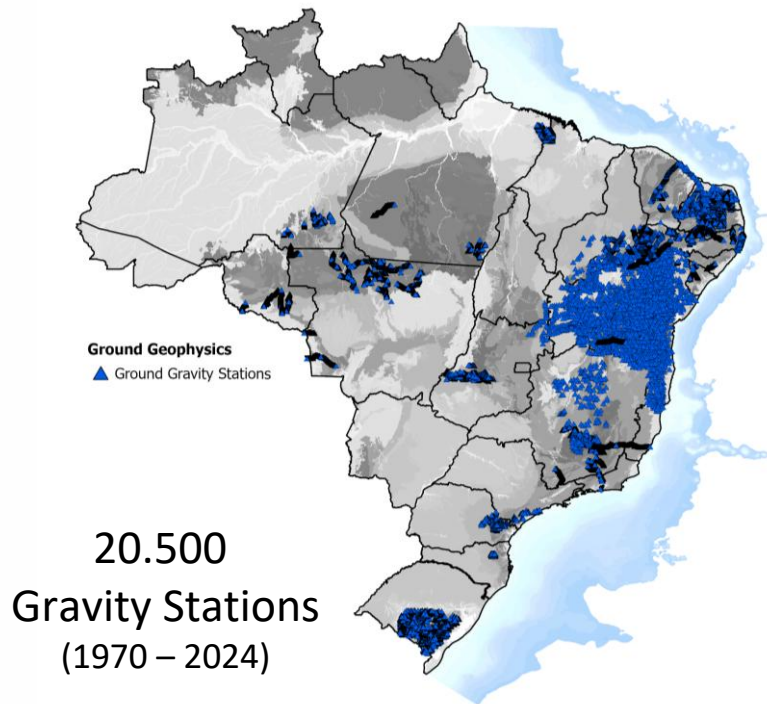
- 51 % of Brazil
- 86 % of Precambrian Terrains

Percentage of Area Covered According to Geophysical Method

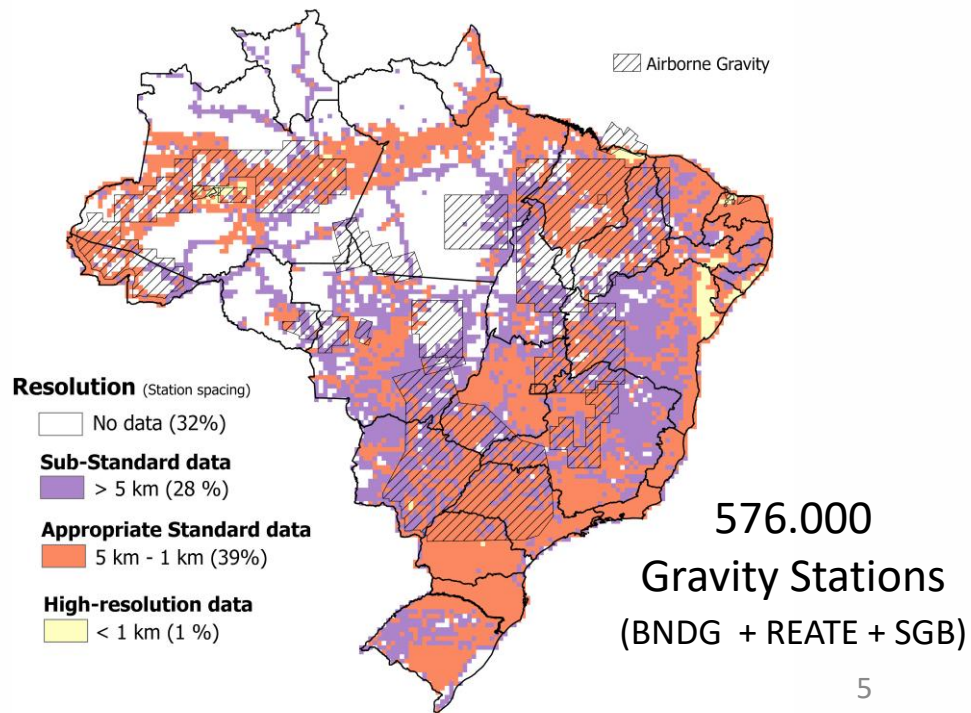


Ground Gravity Stations

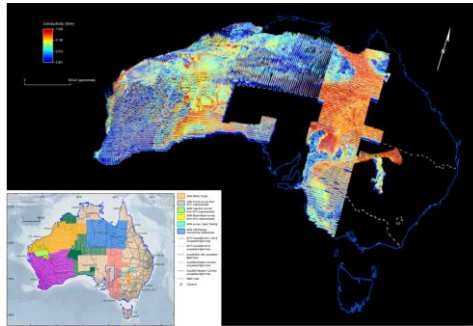
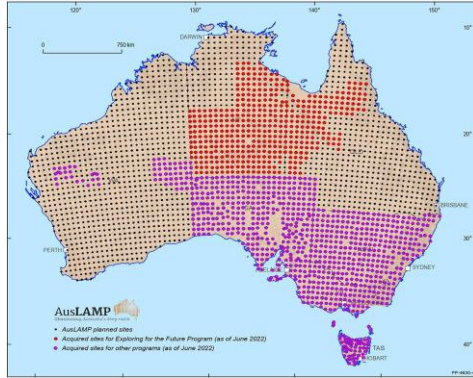
SGB Ground Gravity Data



National Gravity Data Coverage



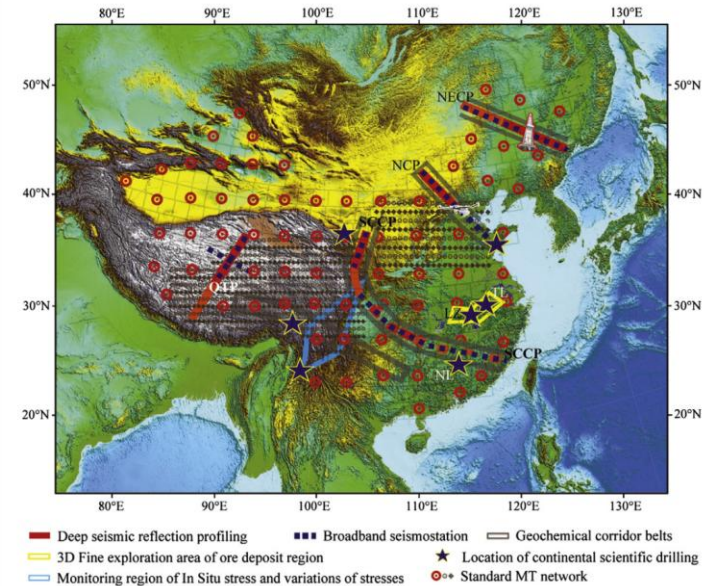
Meanwhile, Over the Last Decade...



Exploring for the Future
(Australia)



EarthScope / Earth MRI
(USA)



SinoProbe
(China)

PROGRAMA DE EXPLORAÇÃO GEOFÍSICA PROFUNDA DO BRASIL

DEEP BRAZIL

Deep Earth Exploration Program of Brazil



New Airborne Geophysical Survey

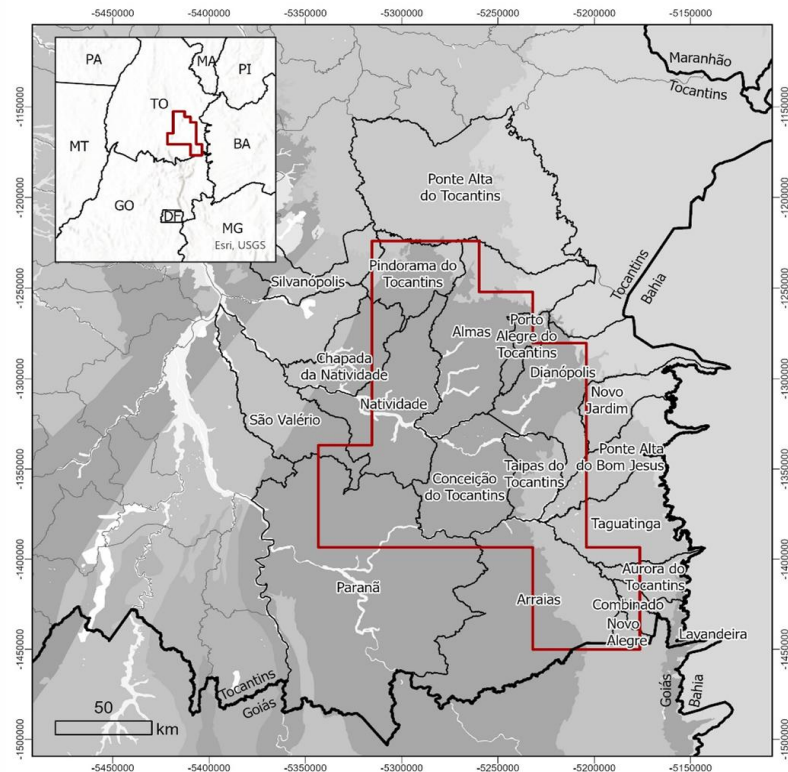
Airborne Geophysical Survey – Sudeste do Tocantins

Methods: Mag / Gamma / Strapdown Grav

Flight Line Spacing: 250 m*

Area: 20,329 km²

Cost: R\$ 10.3 million



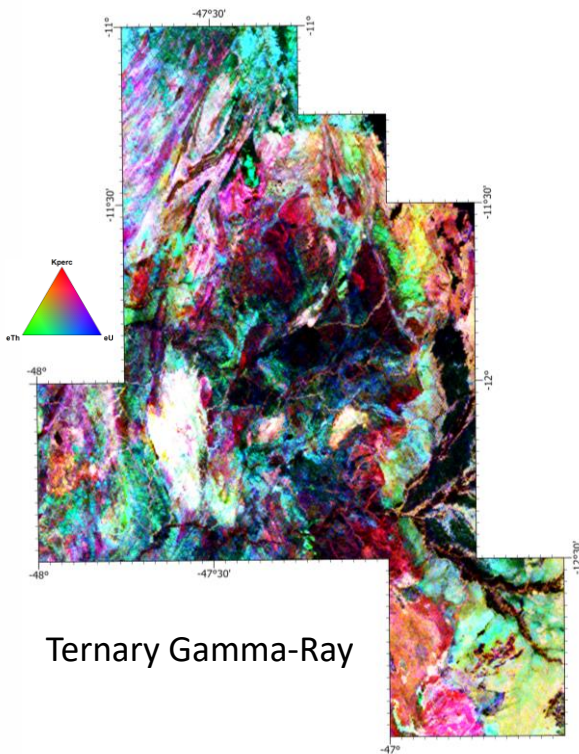
Project Area

Acquisition Stage: 100% completed

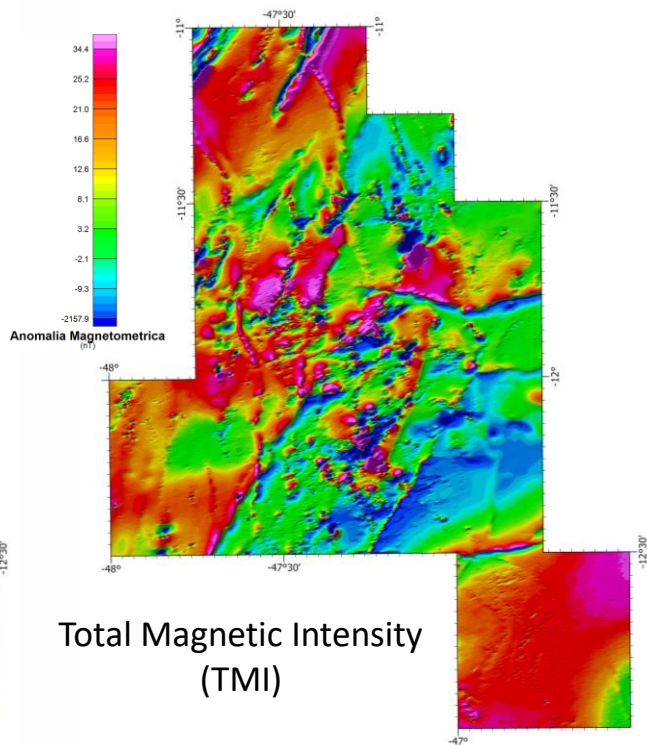
Data Release: May 2026

New Airborne Geophysical Survey

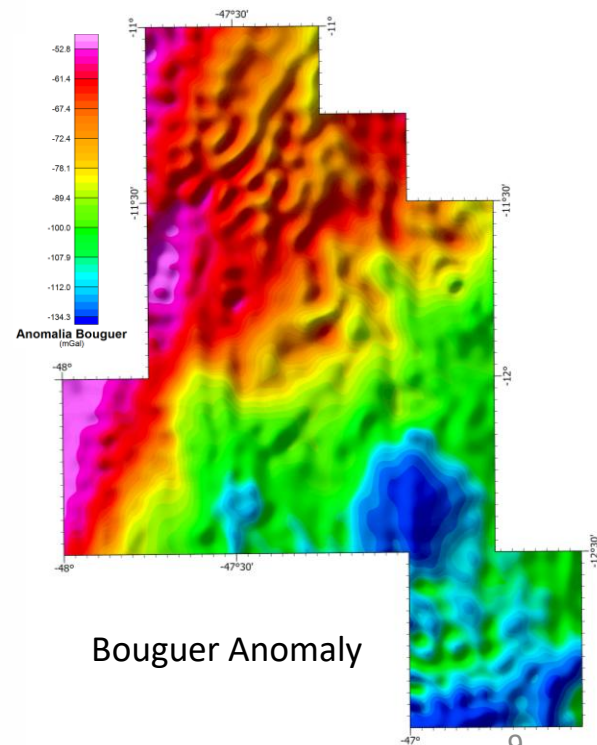
Airborne Geophysical Survey – Sudeste do Tocantins



Ternary Gamma-Ray



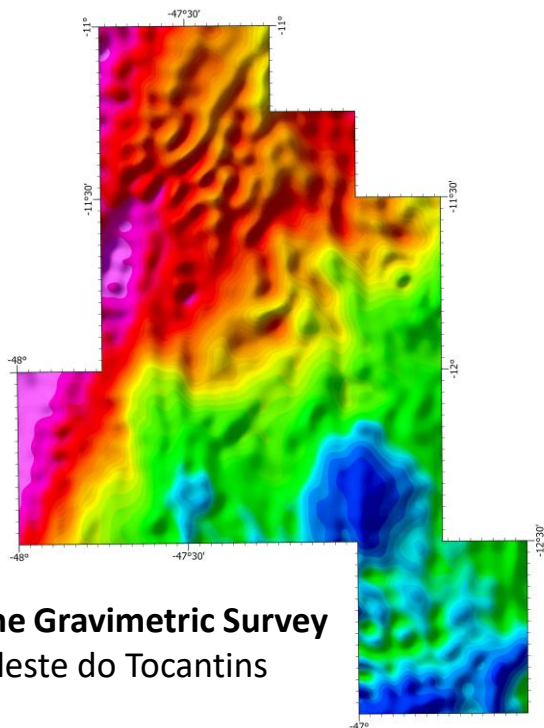
Total Magnetic Intensity
(TMI)



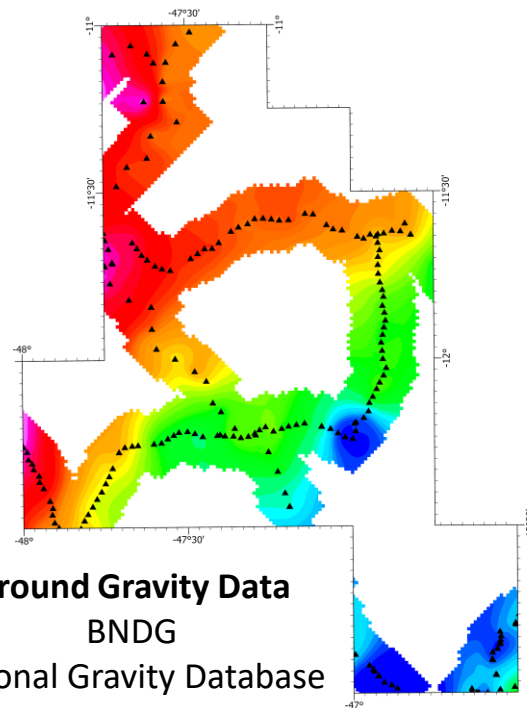
Bouguer Anomaly

New Airborne Geophysical Survey

Airborne vs. Ground Gravity Data Comparison



Airborne Gravimetric Survey
Sudeste do Tocantins



Ground Gravity Data
BNDG
National Gravity Database

Upcoming Aerogeophysical Surveys

Airborne Geophysical Survey– Leste de Goiás - Fase I

Methods: Mag / Gamma / Strapdown Grav

Flight Line Spacing: 500 m

Area: 13,286 km²

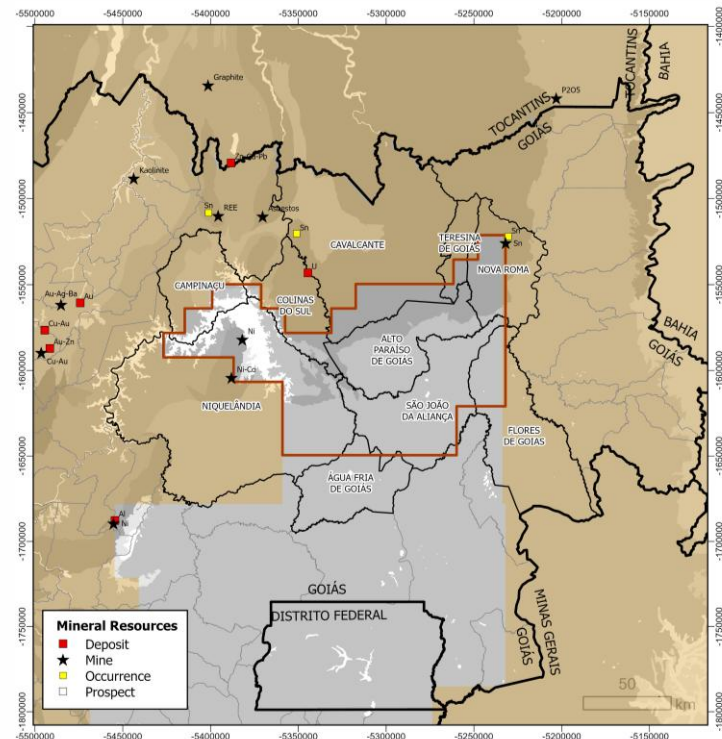
Cost: R\$ 6.7 million



Minaçu (GO)



Acquisition Stage: 66% completed
Estimated Data Release: July 2026



Current Airborne Geophysical Coverage

Project Area

Upcoming Aerogeophysical Surveys

Airborne Geophysical Survey– Leste de Goiás - Fase II

Methods: Mag / Gamma / Strapdown Grav

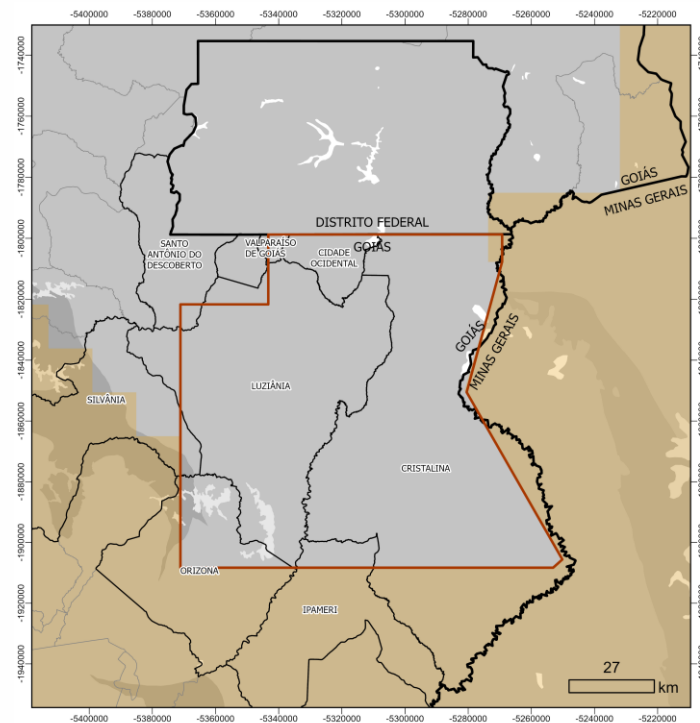
Flight Line Spacing: 500 m

Area: 9.694 km²

Cost: R\$ 5.2 million

Acquisition Stage: Expected to start in June

Estimated Data Release: October 2026



Current Airborne Geophysical Coverage

Project Area

New Ground Gravity Surveys

Grav Brasil – Rondônia

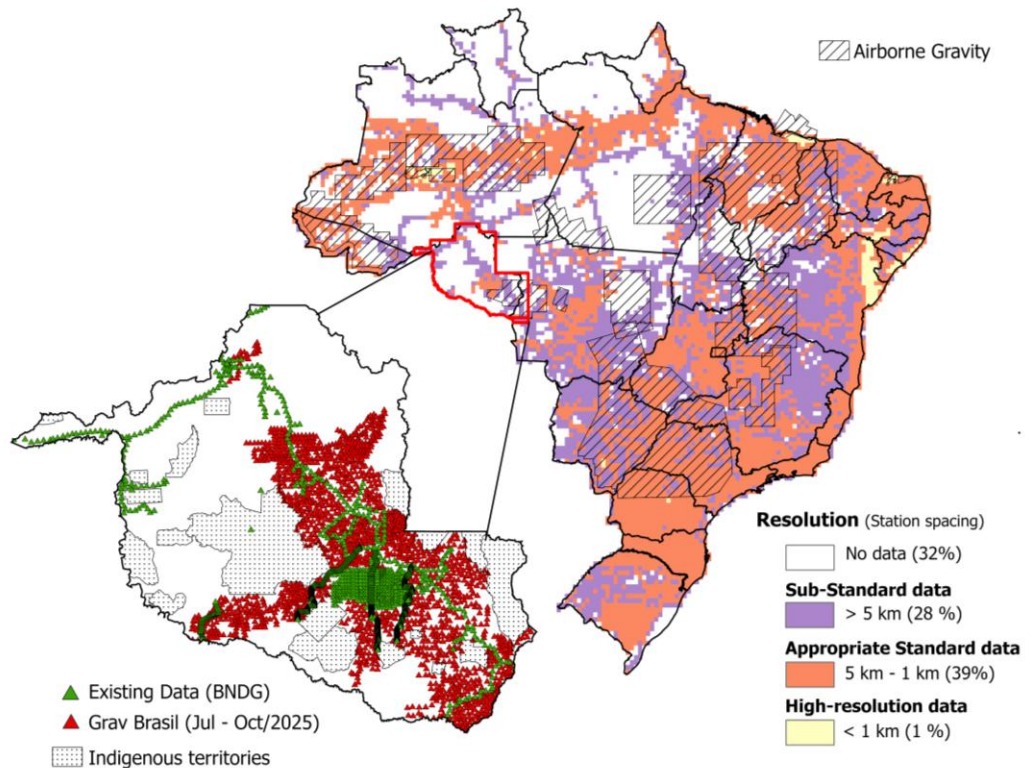
Methods: Ground Gravity

Station Spacing: 5 km grid

Number of stations: 1835 stations

Area: 96.000 km²

Cost: R\$ 165.000

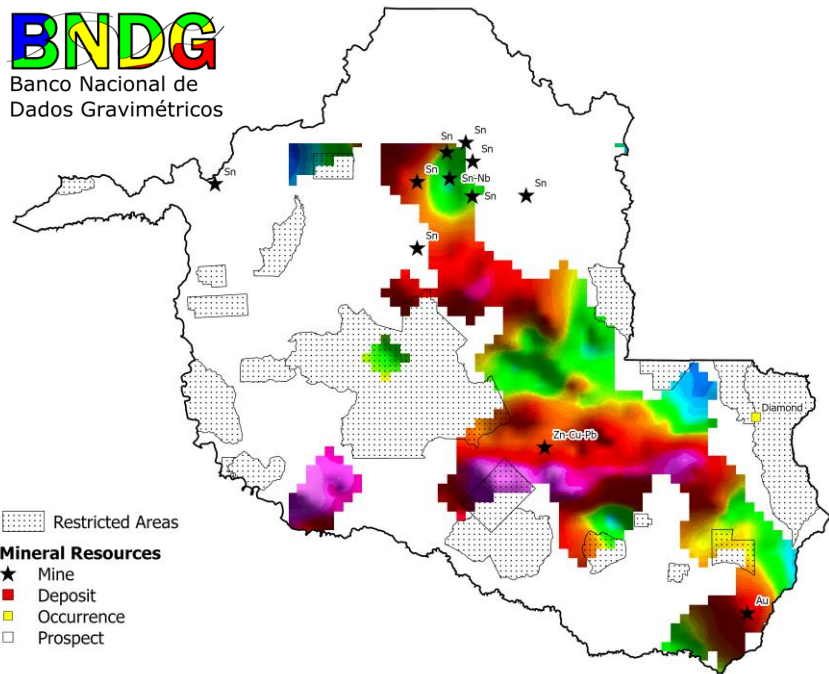


New Ground Gravity Surveys

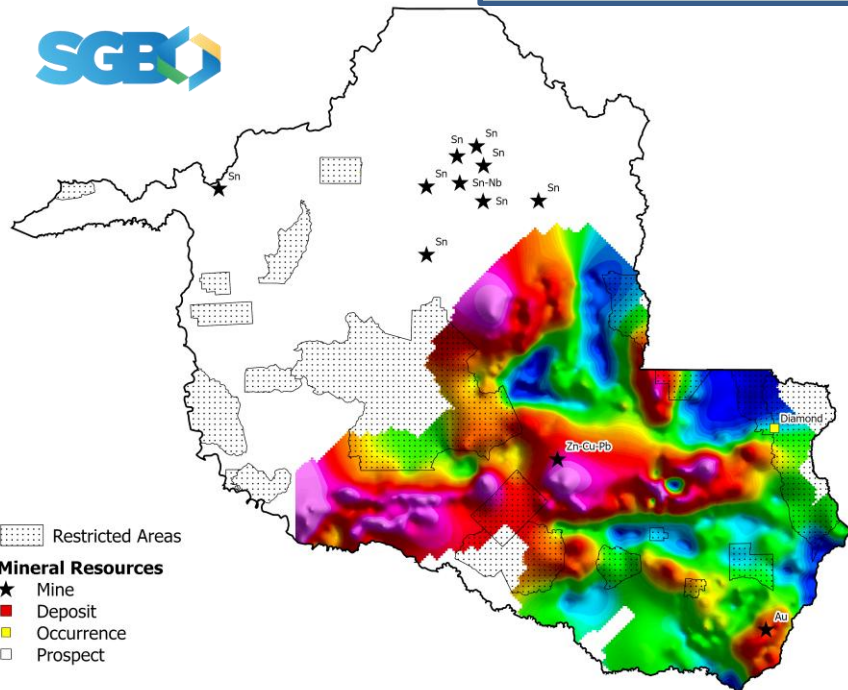
BNDG (National Gravity Database) vs. New SGB Ground Gravity Data

+ 3,000 gravity stations
available now at
<https://geosgb.sgb.gov.br>

BNDG
Banco Nacional de
Dados Gravimétricos



SGE



Upcoming Ground Gravity Surveys

1) Rondônia

Station Spacing: 5 km grid
Acquisition Progress (%): 70%
Estimated Data Release: Late 2026

2) Roraima

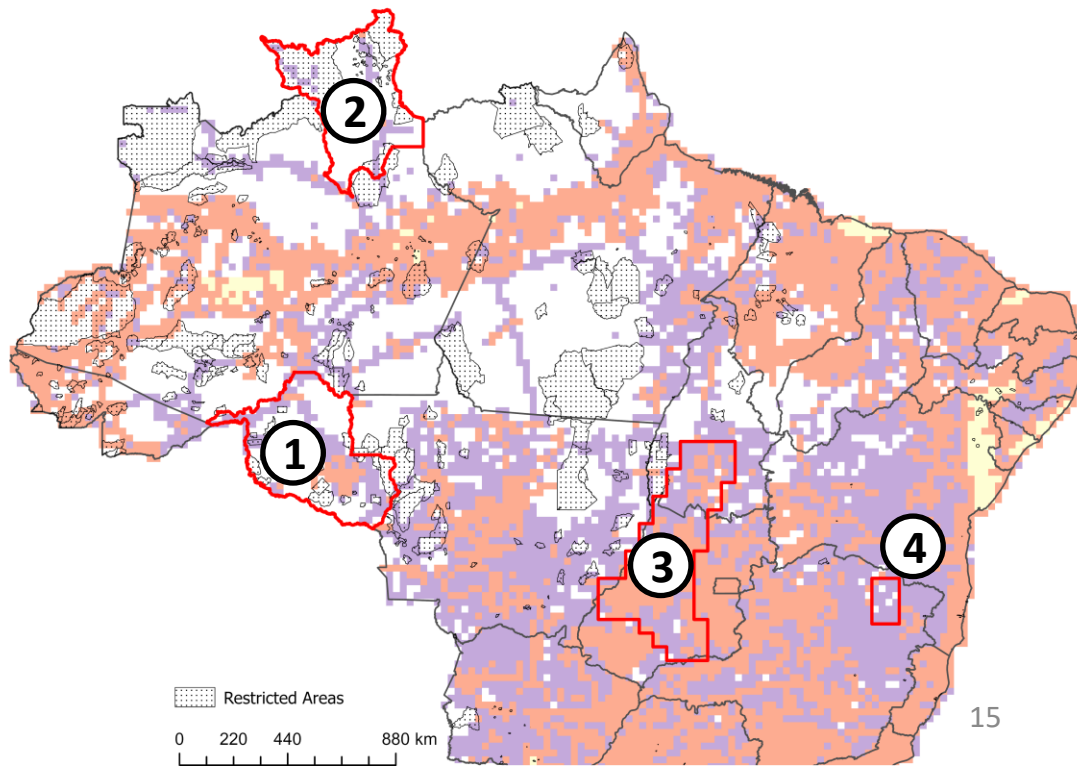
Station Spacing: 5 km grid
Acquisition Progress (%): 0 %
Estimated Data Release: Late 2027

3) Arco Magmático de Goiás

Station Spacing: 5 km grid
Acquisition Progress (%): 0 %
Estimated Data Release: Late 2027

4) Vale do Jequitinhonha

Station Spacing: 5 km grid
Acquisition Progress (%): 60 %
Estimated Data Release: Late 2027



New Magnetotelluric Surveys

MT Brasil – Arco Magmático de Goiás

Methods: Magnetotellurics

Station Spacing: 55 km grid

Number of stations: 122 LMT stations

Area: 340.000 km²

Cost: R\$ 610.000



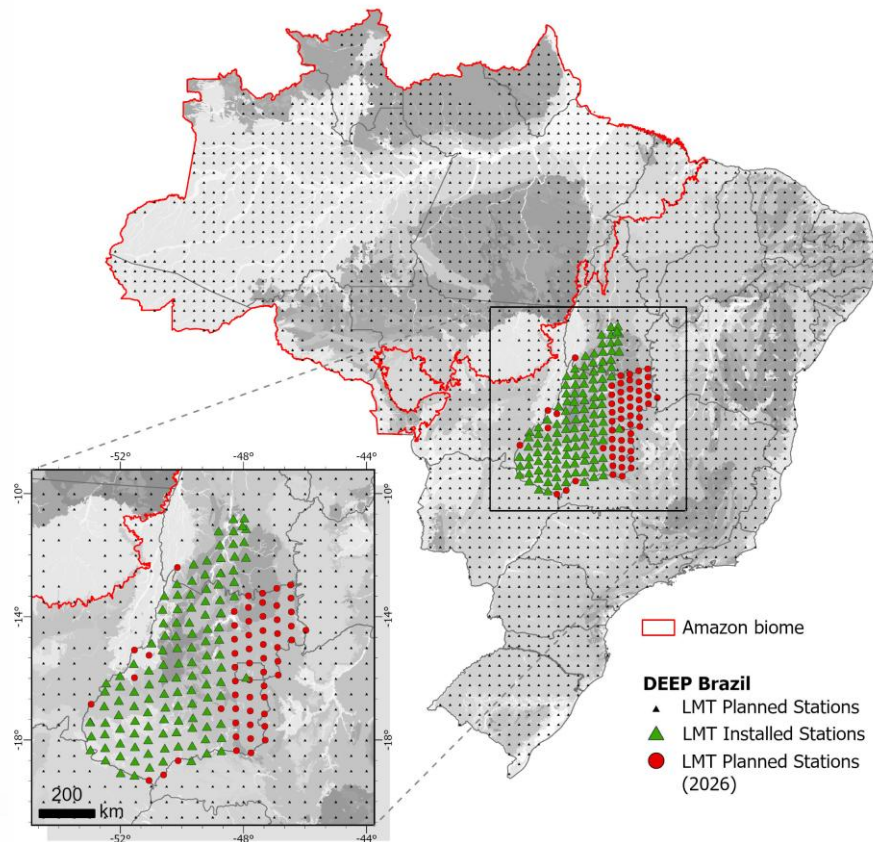
Program Partners

Prof. Roberta Vidotti (UnB)

Prof. Sérgio Fontes (ON)

Prof. Artur Benevides (ON)

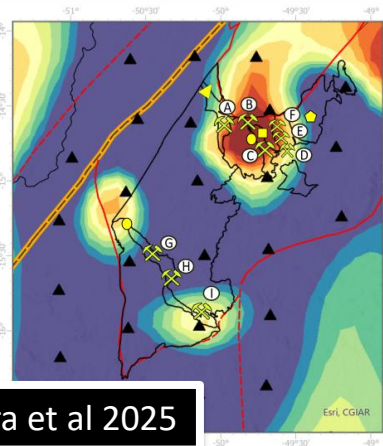
Equipment



New Magnetotelluric Surveys

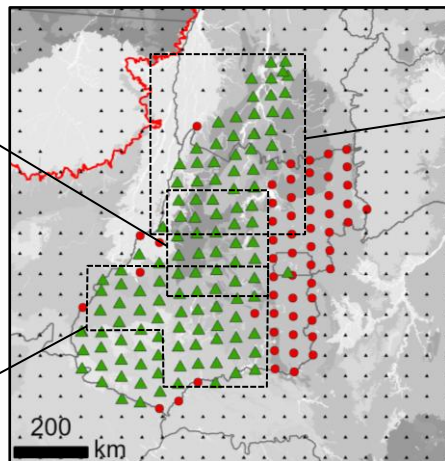
+ 20 MT stations
available now at
<https://geosgb.sgb.gov.br>

Vidotti et al 2025

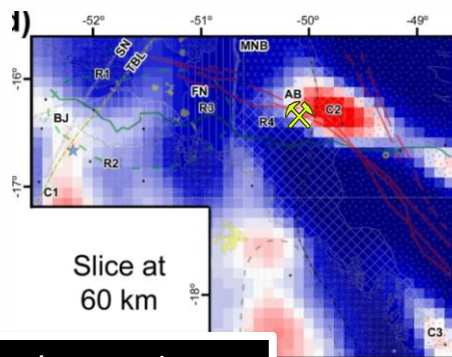
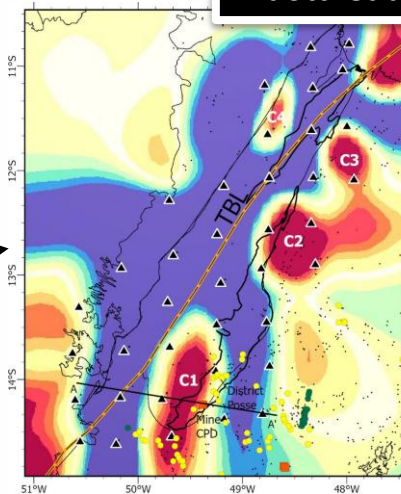


Oliveira et al 2025

MT Brasil

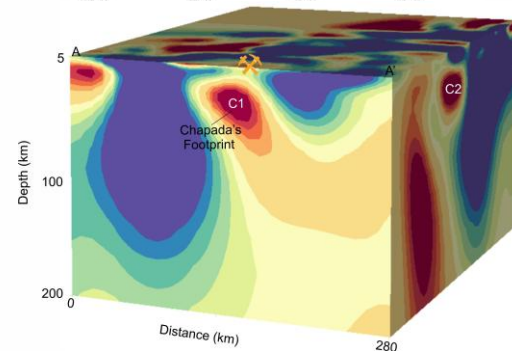


- ▲ LMT Planned Stations
- ▲ LMT Installed Stations
- LMT Planned Stations (2026)



Slice at
60 km

Inácio et al 2025



Guidelines and Strategic Planning



Funding Resources



Scientific research projects



407272/2022



▪ 00193-00002313/2022-60



Key Takeaways

- The energy transition is increasingly dependent on subsurface knowledge.
- Robust and high-resolution geoscientific datasets are becoming essential for strategic public policy and long-term resource planning.
- Brazil is entering a new era in the generation of nationwide geophysical data, strengthening productive sectors and expanding geological understanding.
- Significant challenges remain, including infrastructure, logistics, workforce capacity, and long-term funding, requiring strategic planning and strong collaboration among government, academia, and industry.

The energy transition starts underground!

Thank you!

Iago Costa

Chefe da Divisão de
Sensoriamento Remoto e Geofísica

iago.costa@sgb.gov.br



**LANÇAMENTO
DOS RESULTADOS
PROJETO
AEROGEOFÍSICO
SUDESTE DO TOCANTINS**

DATA: 20/05/2026 **HORA:** 11h20

LOCAL: AUDITÓRIO B, CENTRO DE ARTES
E CONVENÇÕES DA UFOP

NOVO PAC  SERVIÇO
GEOLOGICO
DO BRASIL MINISTÉRIO DE
MINAS E ENERGIA  GOVERNO DO
BRASIL
DO LADO DO POVO BRASILEIRO