PDAC MARCH 2-5 2025

Hard rock lithium deposits: A global perspective

Eastern Brazilian Pegmatite Province and Lithium Ionic's Bandeira project

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and Lithium Ionic's Exploration Team

LITHIUM IONIC

TSX.V: **LTH** | OTCQX: **LTHCF** | FSE: **H3N**

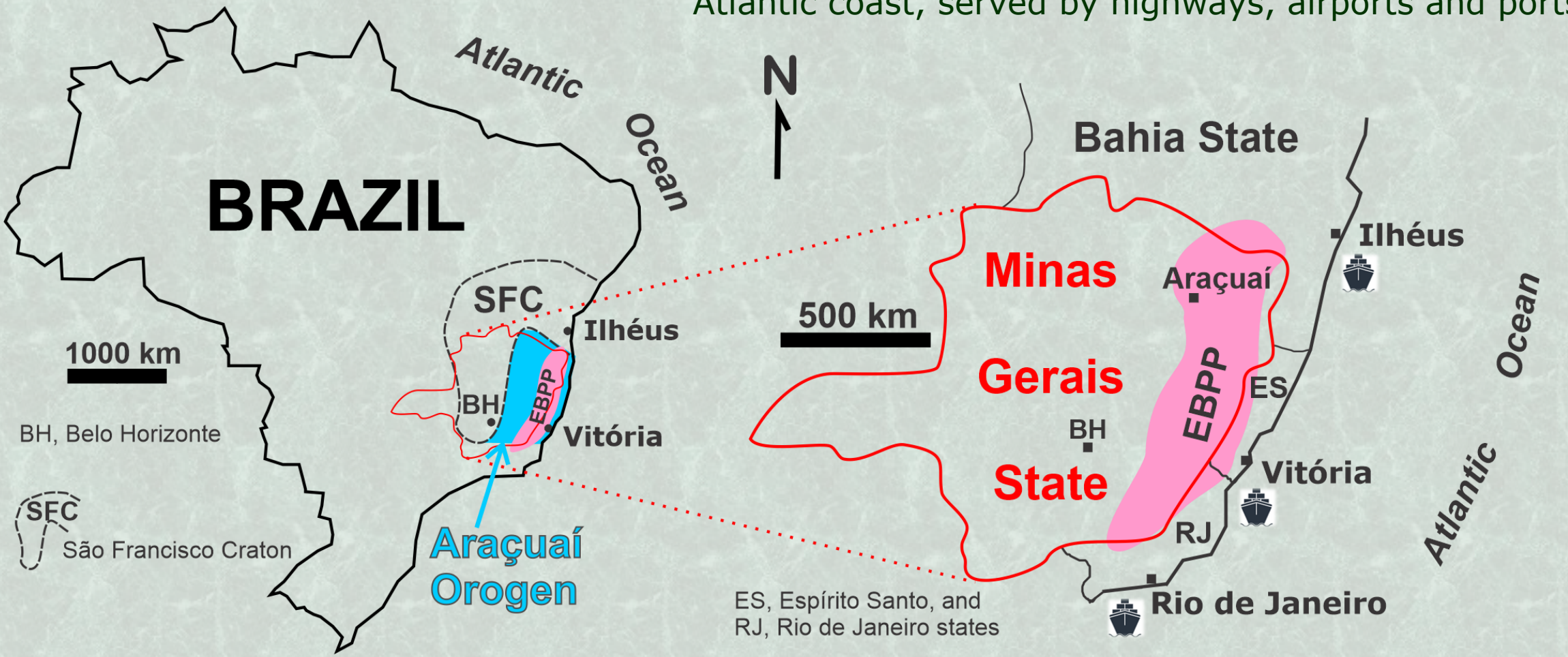
March 4, 2025

mglit

Location

Eastern Brazilian Pegmatite Province (EBPP)

Pegmatite clusters are found along a 150,000 km² large region in Southeastern Brazil near the Atlantic coast, served by highways, airports and ports.

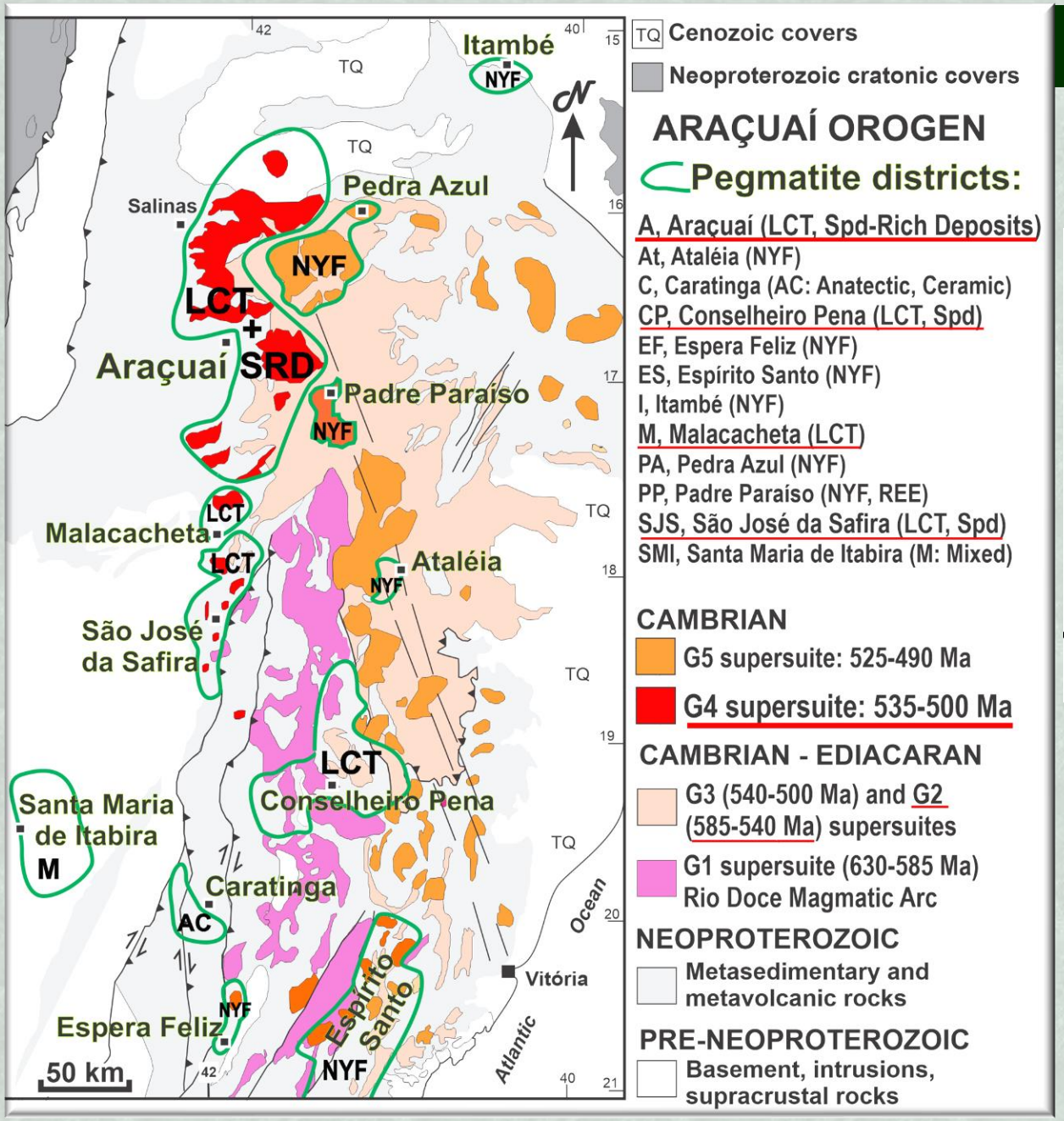


EBPP is an outcome of the Araçuaí Orogen developed from Early Ediacaran to Late Cambrian.

EBPP

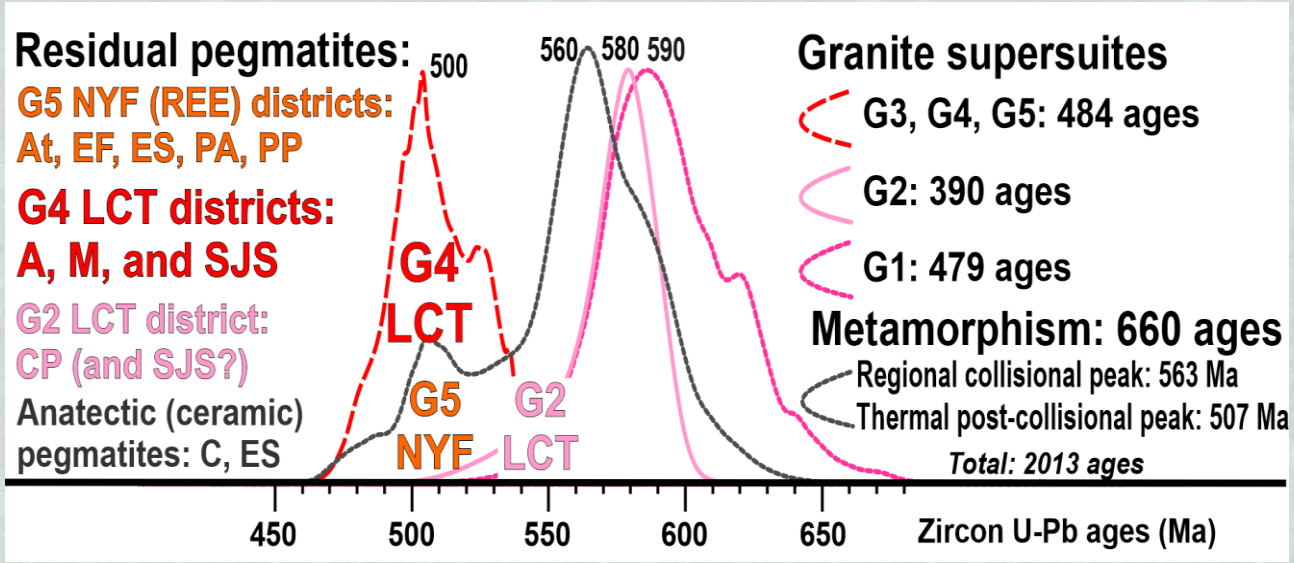
Source: Pedrosa-Soares et al.(2025, Economic Geology, Lithium spec. vol.)

Eastern Brazilian Pegmatite Province



Source: Pedrosa-Soares et al.(2025, Economic Geology, Lithium spec. vol.)

12 pegmatite districts, only 4 are LCT, but only one is rich in spodumene: The Araçuaí District!



G5: A-type biotite granites produced **NYF** (Niobium-Yttrium-Fluorine ± REE) pegmatites

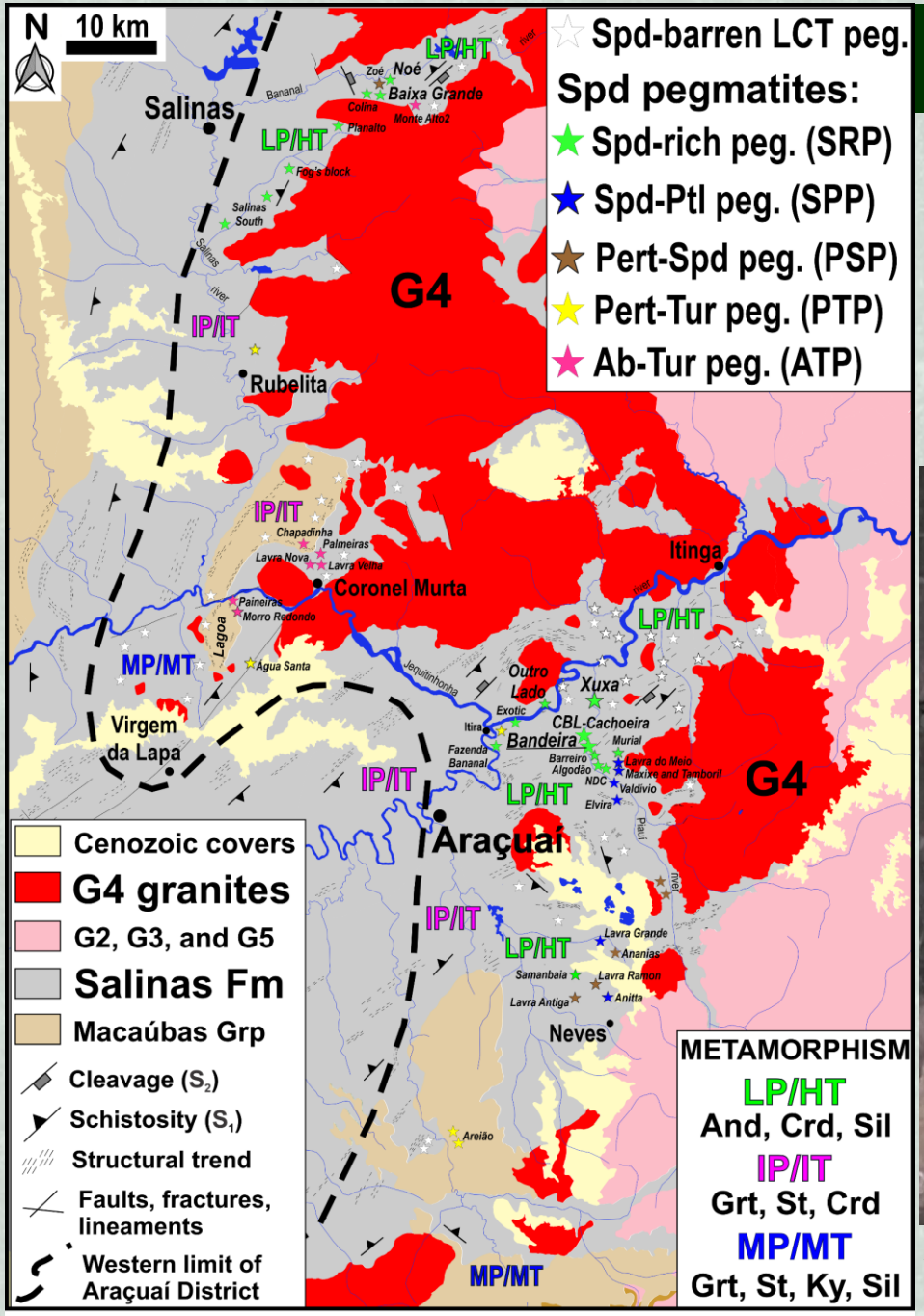
G4 and G2: S-type two-mica leucogranites produced **LCT** (Lithium-Cesium-Tantalum) pegmatites, **including the spodumene-rich deposits (SRD) of the Araçuaí District.**

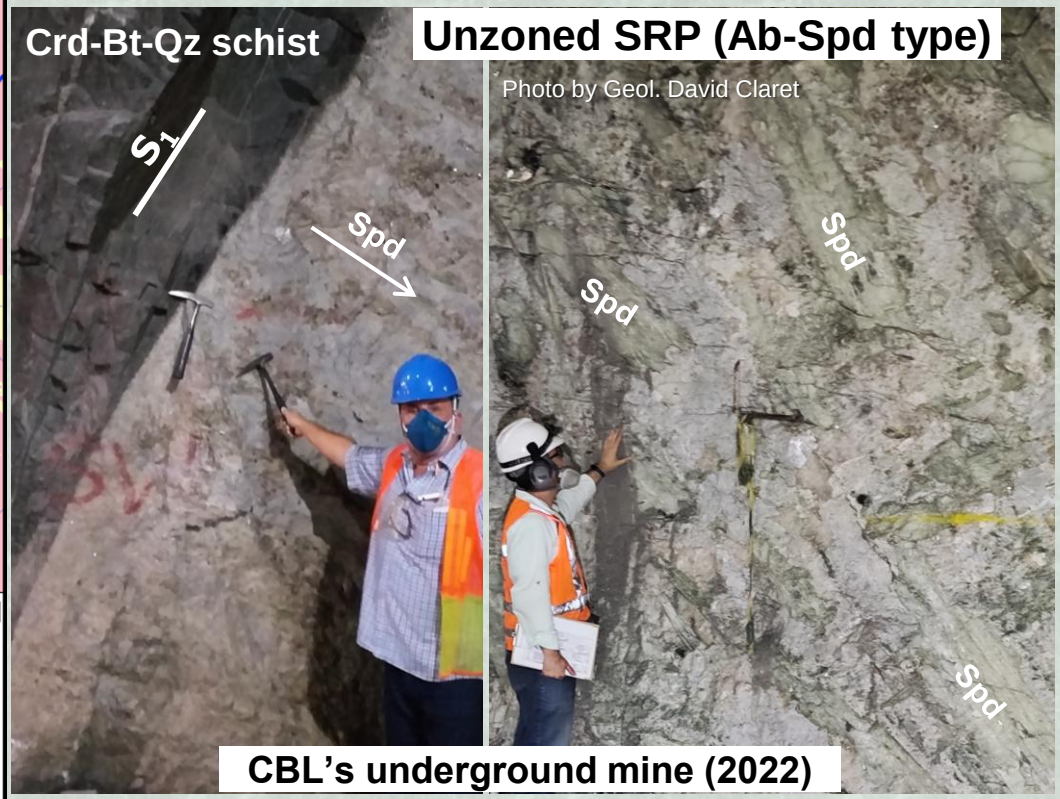
Araçuaí District

The Araçuaí Pegmatite District

> 90% lithium ore produced in Brazil since the 1960s

Spodumene pegmatites are post-tectonic, unzoned (with disseminated Spd) to complex zoned bodies, hosted by mica schists and metarenites; show sharp intrusive contacts with the host rocks; and are located at ca. 1 to 5 km far from G4 intrusions composed of two-mica, muscovite and pegmatoid leucogranites.

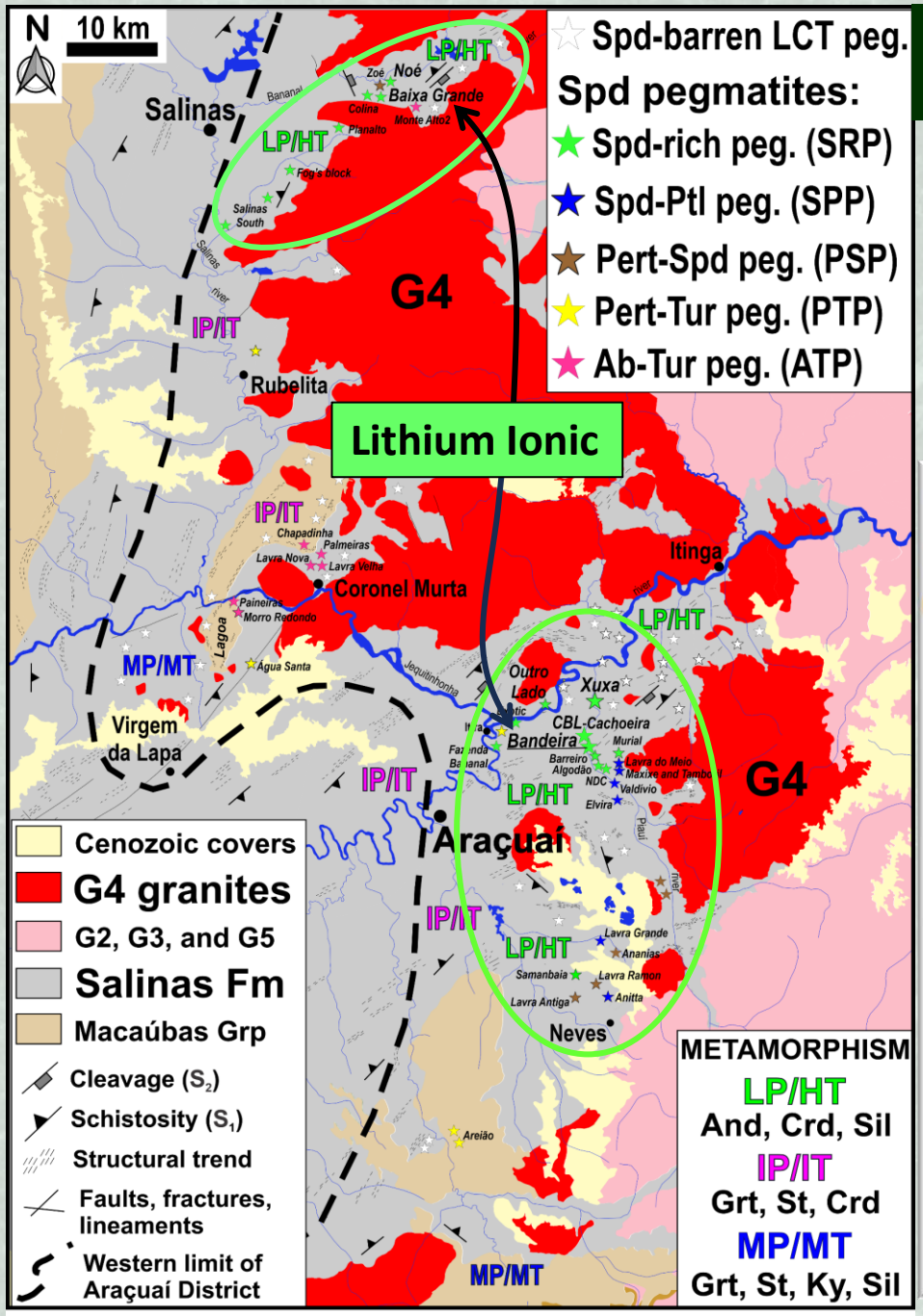




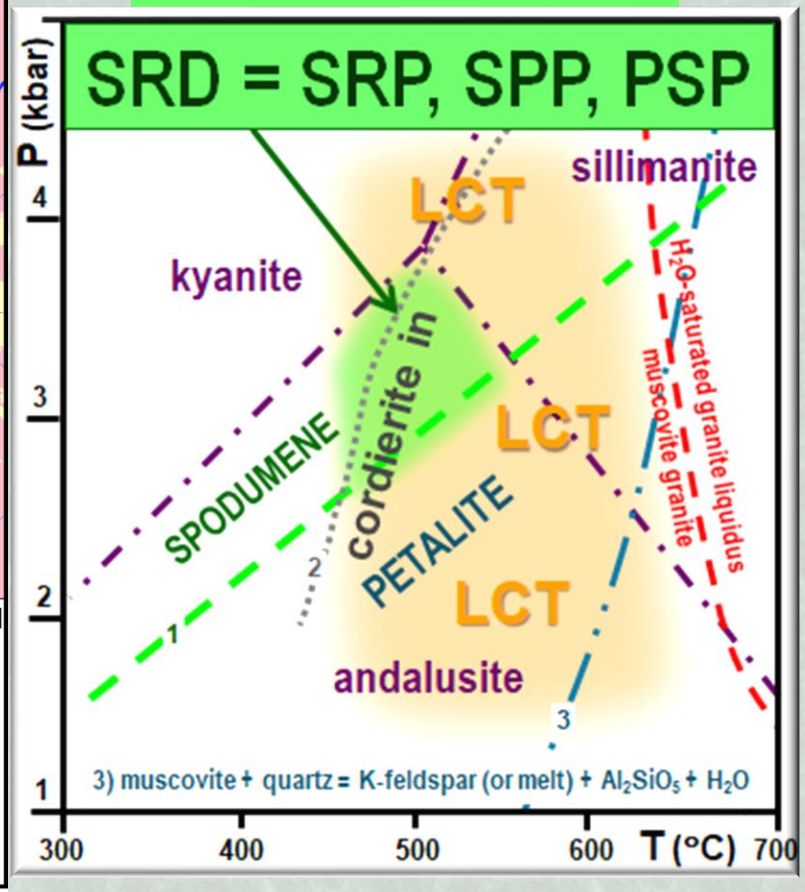
Source: Pedrosa Soares et al.(2025; Economic Geology, Lithium spec. vol.)

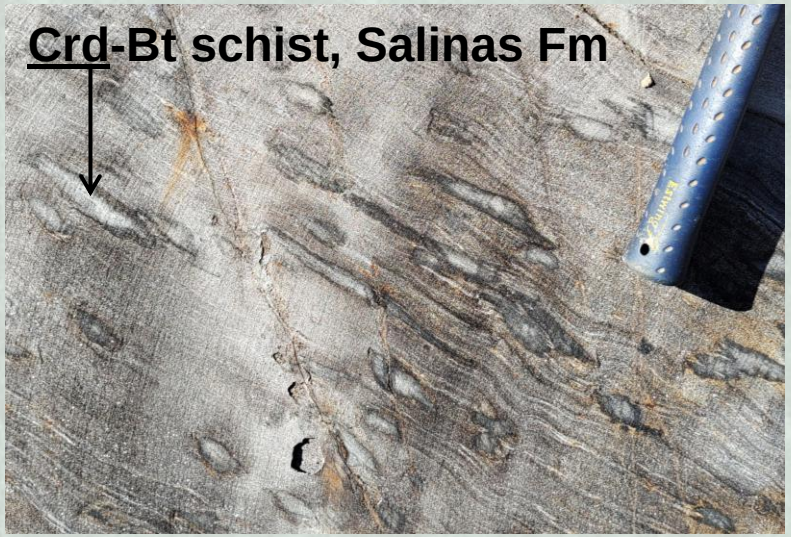
The Araçuaí Pegmatite District

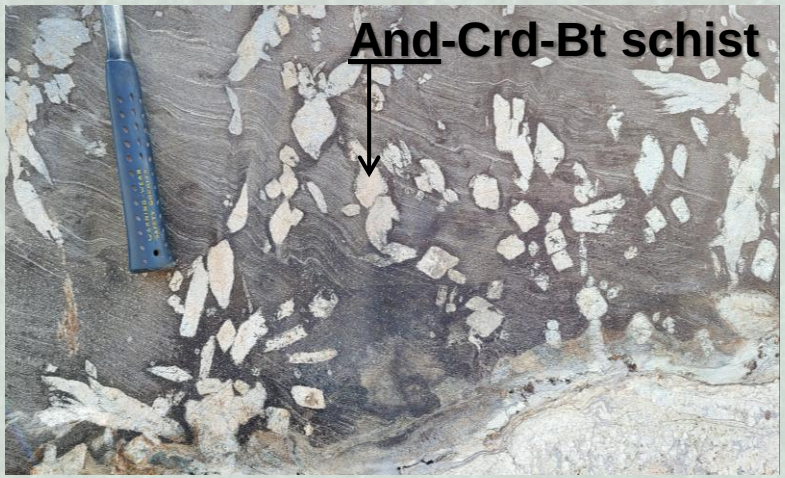
Spd-rich deposits (SRD) are hosted by rocks within the **cordierite zone** of the **low-P / high-T** (LP/HT) regional and/or contact **metamorphism**.



P-T window for SRD crystallization:
3.8 - 2.5 kb at 550 - 450 °C

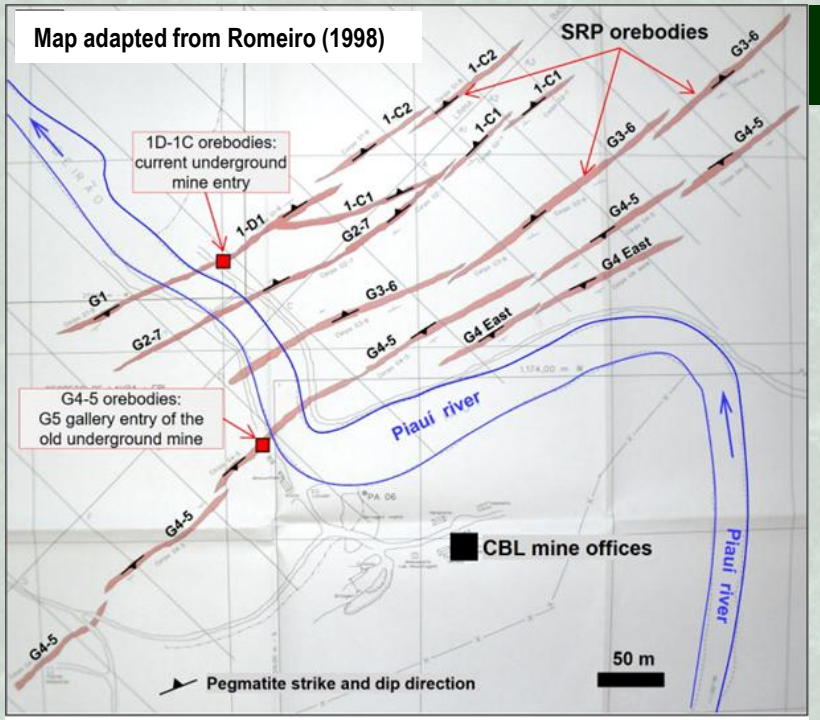






Source: Pedrosa Soares et al.(2025; Economic Geology, Lithium spec. vol.)

CBL-Cachoeira underground mine producing Spd since 1993



CBL
COMPANHIA BRASILEIRA DE LÍTIO

SRP swarm with 3D staggered (*en echelon*) and branched pattern.

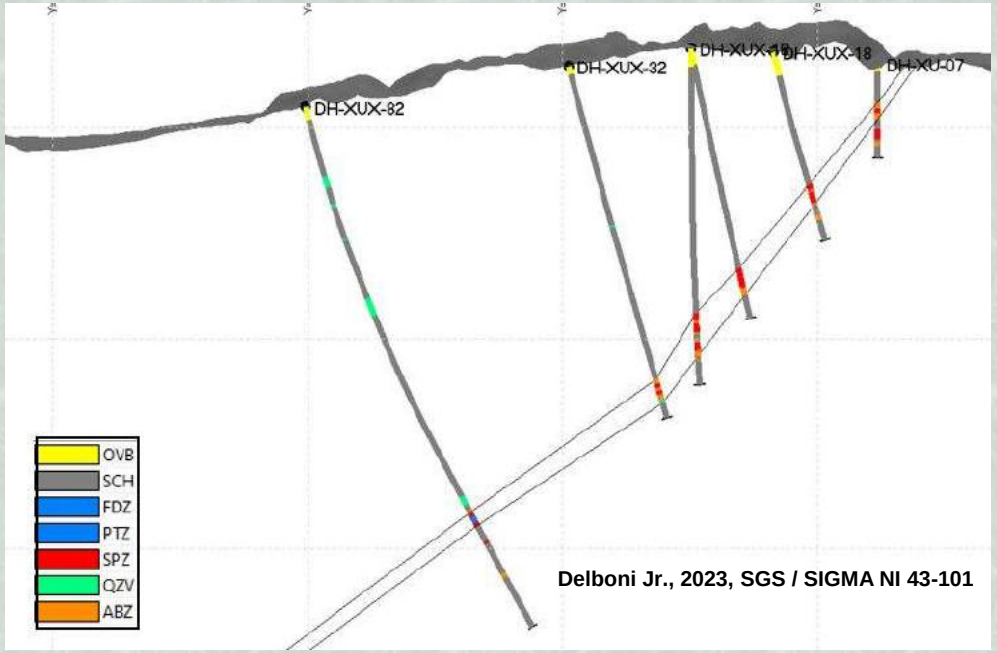
(Photos by Geol. David Claret, 2022)

Sigma

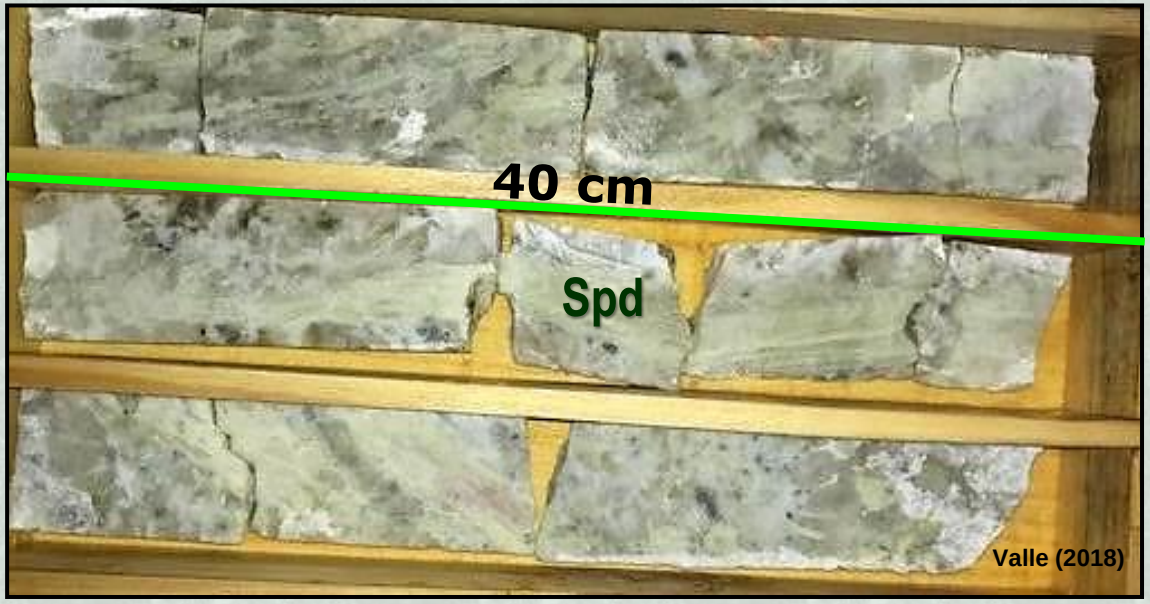
Xuxa Pegmatite, a single large SRP: 1700 m long x 15 m thick x >300 m downdip

Valle (2018)

Producing Spd from open pit mine since 2023.

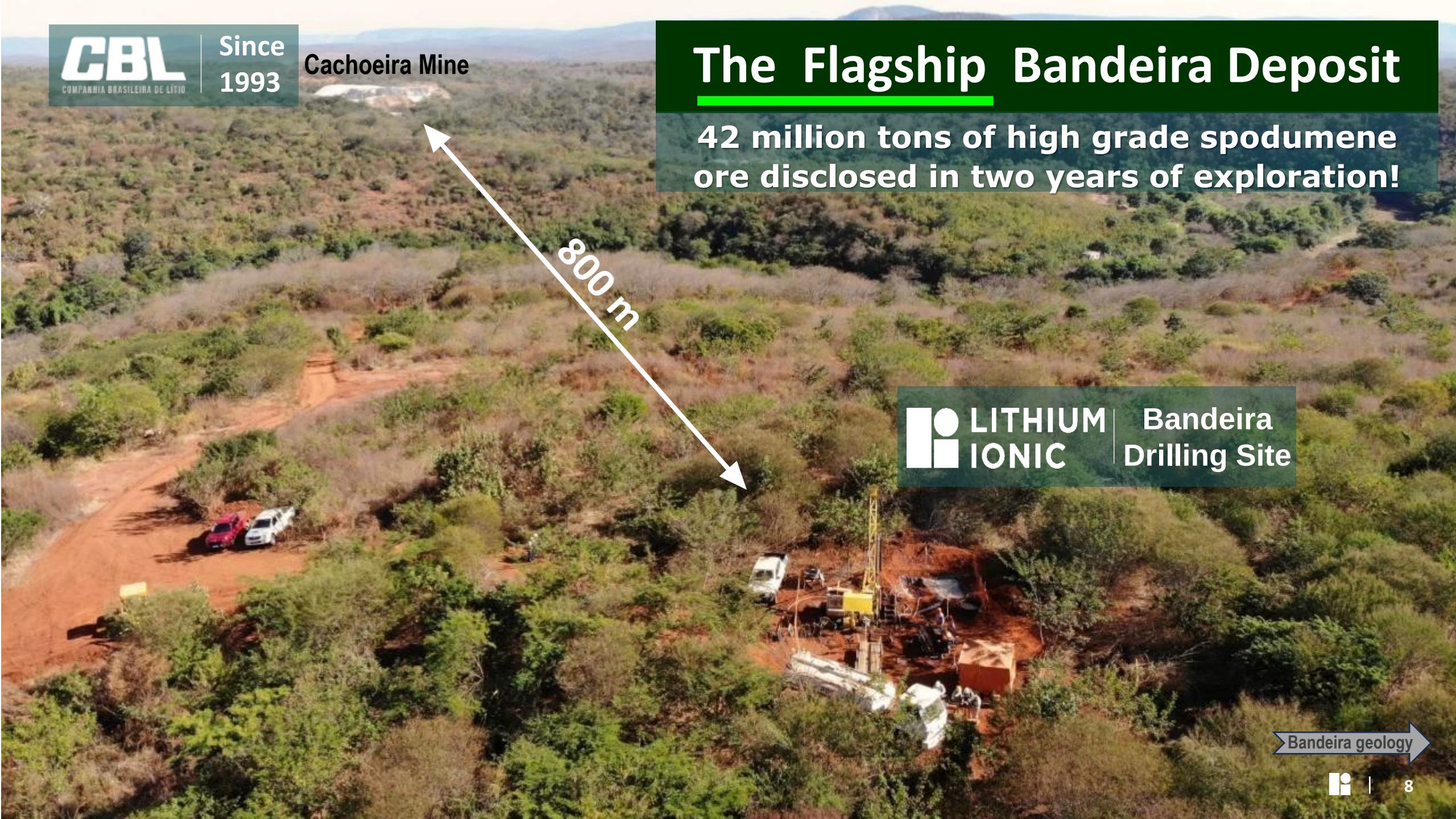


Delboni Jr., 2023, SGS / SIGMA NI 43-101



Valle (2018)

Xuxa's high grade Spd ore



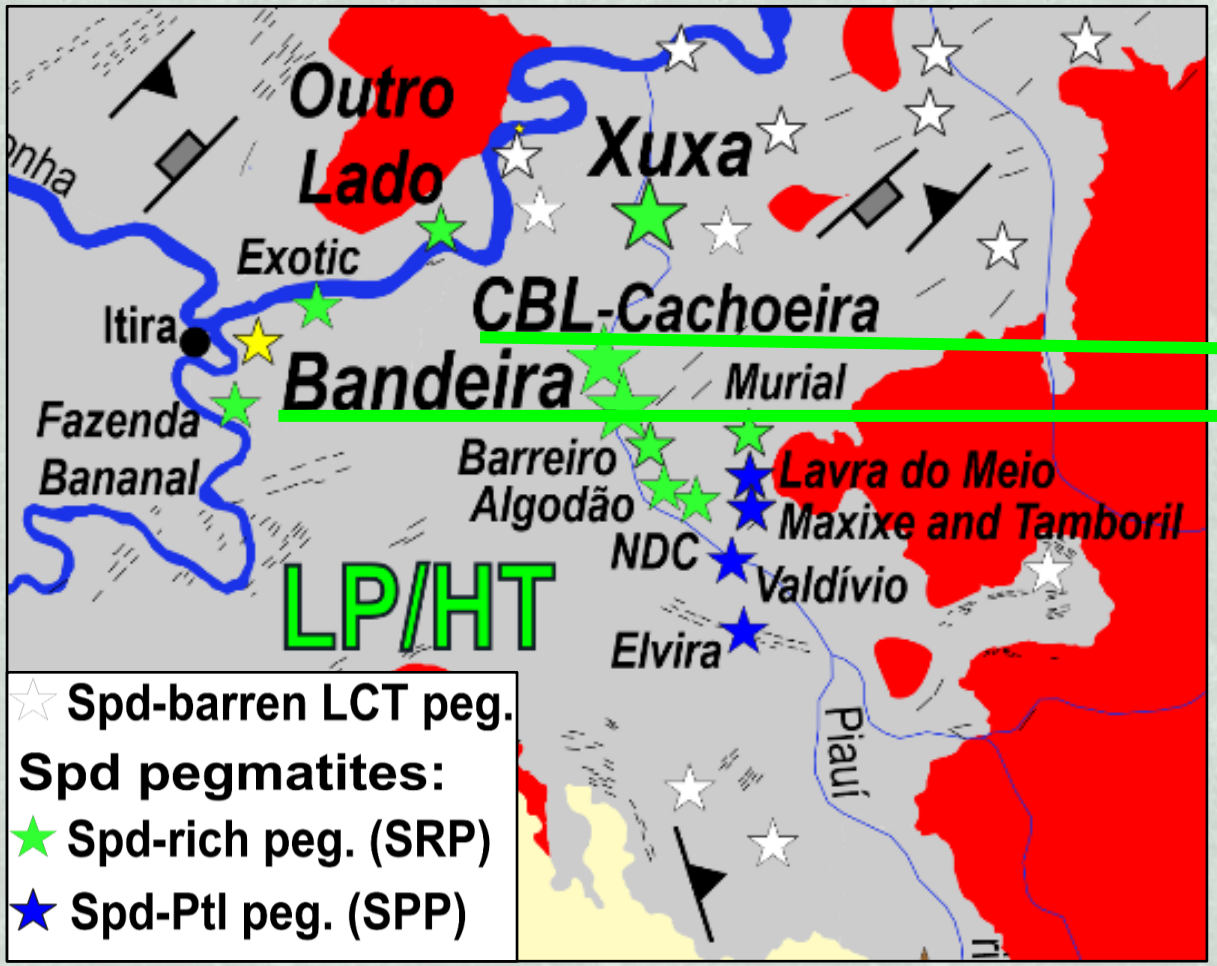
The Flagship Bandeira Deposit

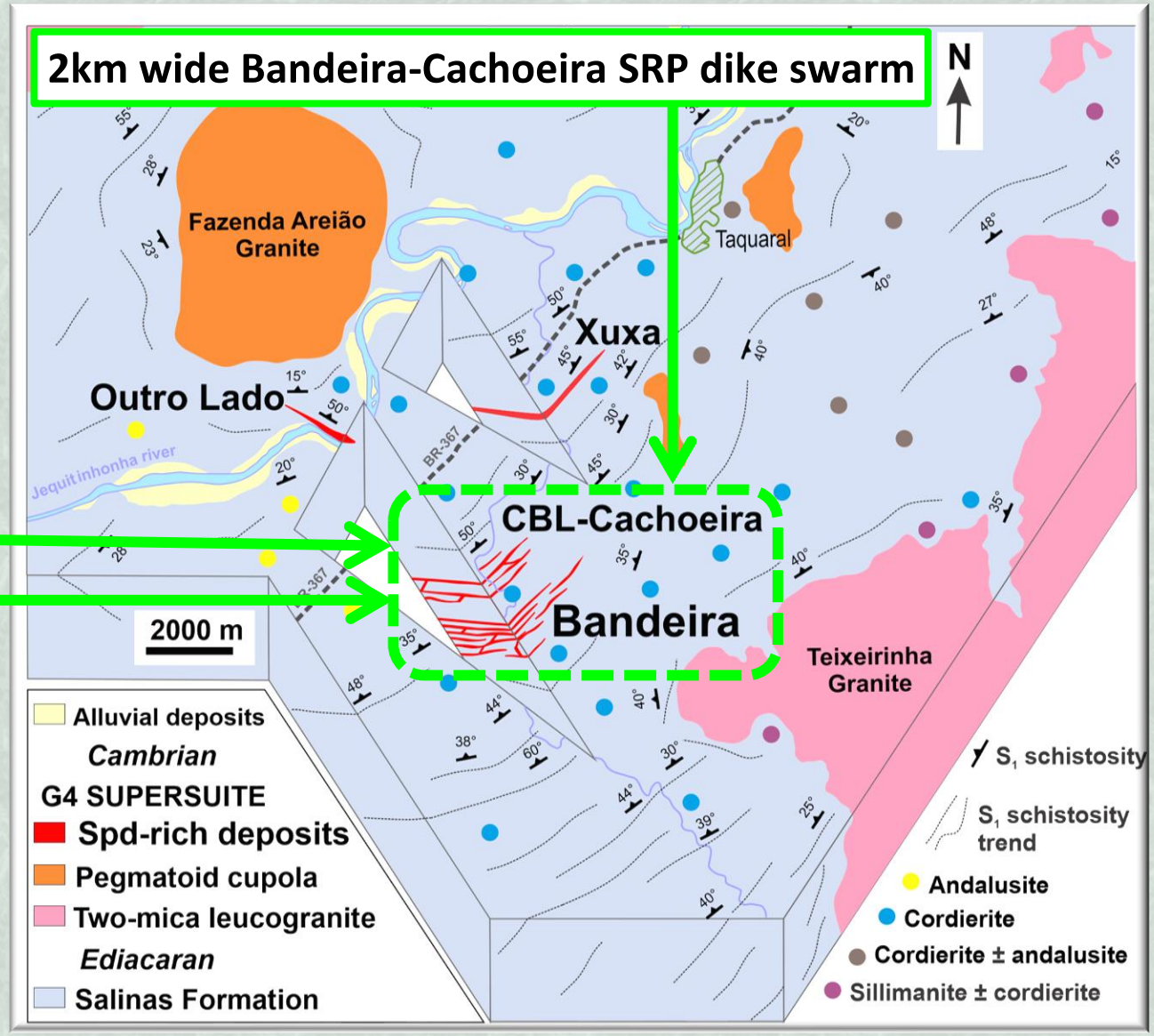
42 million tons of high grade spodumene ore disclosed in two years of exploration!

Bandeira geology

Bandeira Deposit in the best regional scenario for large Spd deposits

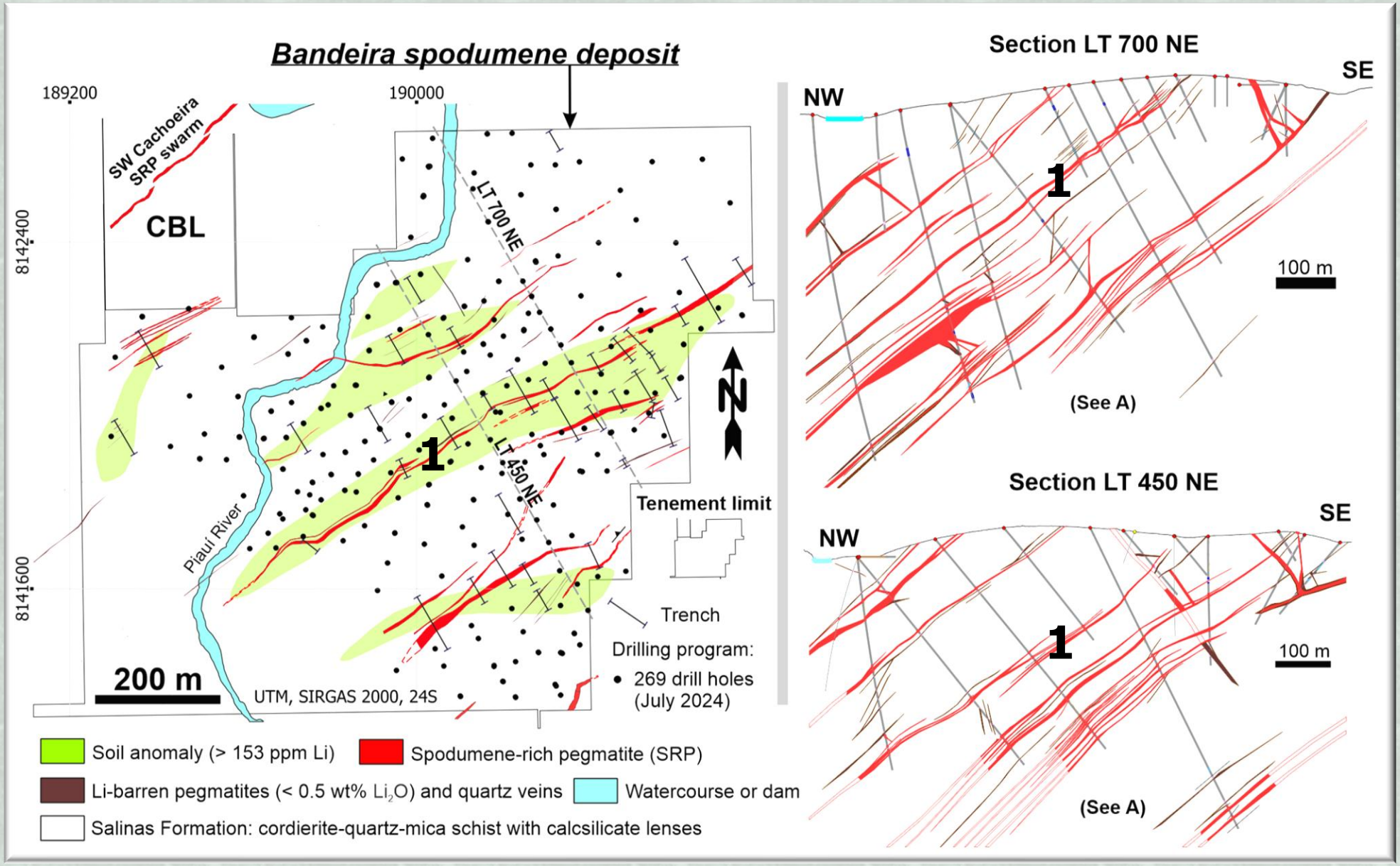
- ✓ **Low-P/High-T metamorphism at cordierite zone** (ideal P-T window for SRP crystallization)
- ✓ **Li-anomalous G4 intrusions** exposing cupolas with muscovite-albite and pegmatoid leucogranites





Adapted from Pedrosa Soares et al.(2025; Economic Geology, Lithium spec. vol.)

Bandeira Deposit: A pegmatite swarm with > 14 SRP dikes



EXPLORATION DATA

550 soil samples

44 trenches: 3100 m

297 DDH: 60,000 m

10,200 analyzed core samples

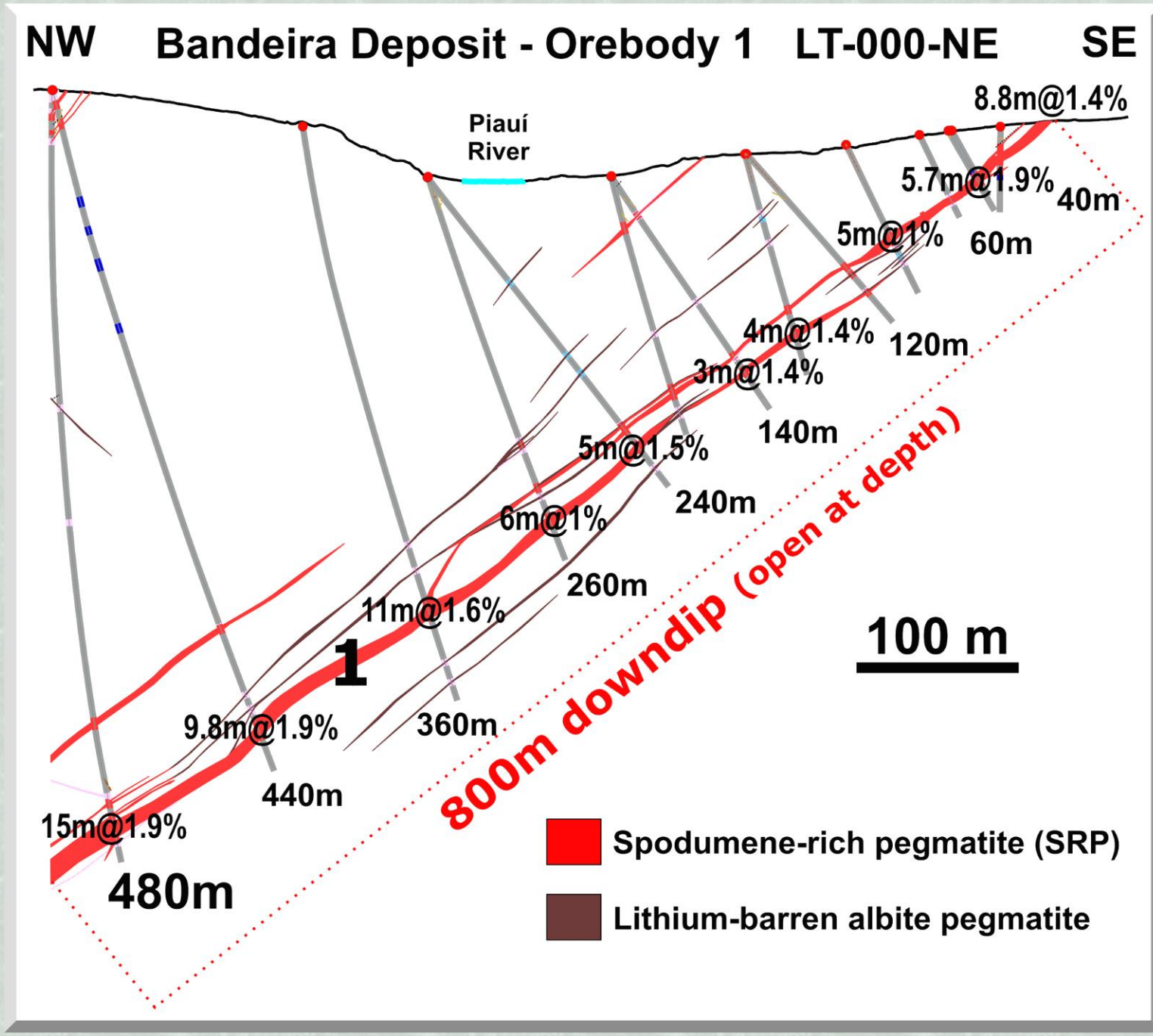
OREBODY DIMENSIONS

Thickness range: 4 m to 9 m

Strike length up to 1,000 m

Downdip width up to 800 m

Figure source: Pedrosa Soares et al.(2025; Economic Geology, Lithium spec. vol.)



Bandeira Deposit: An example

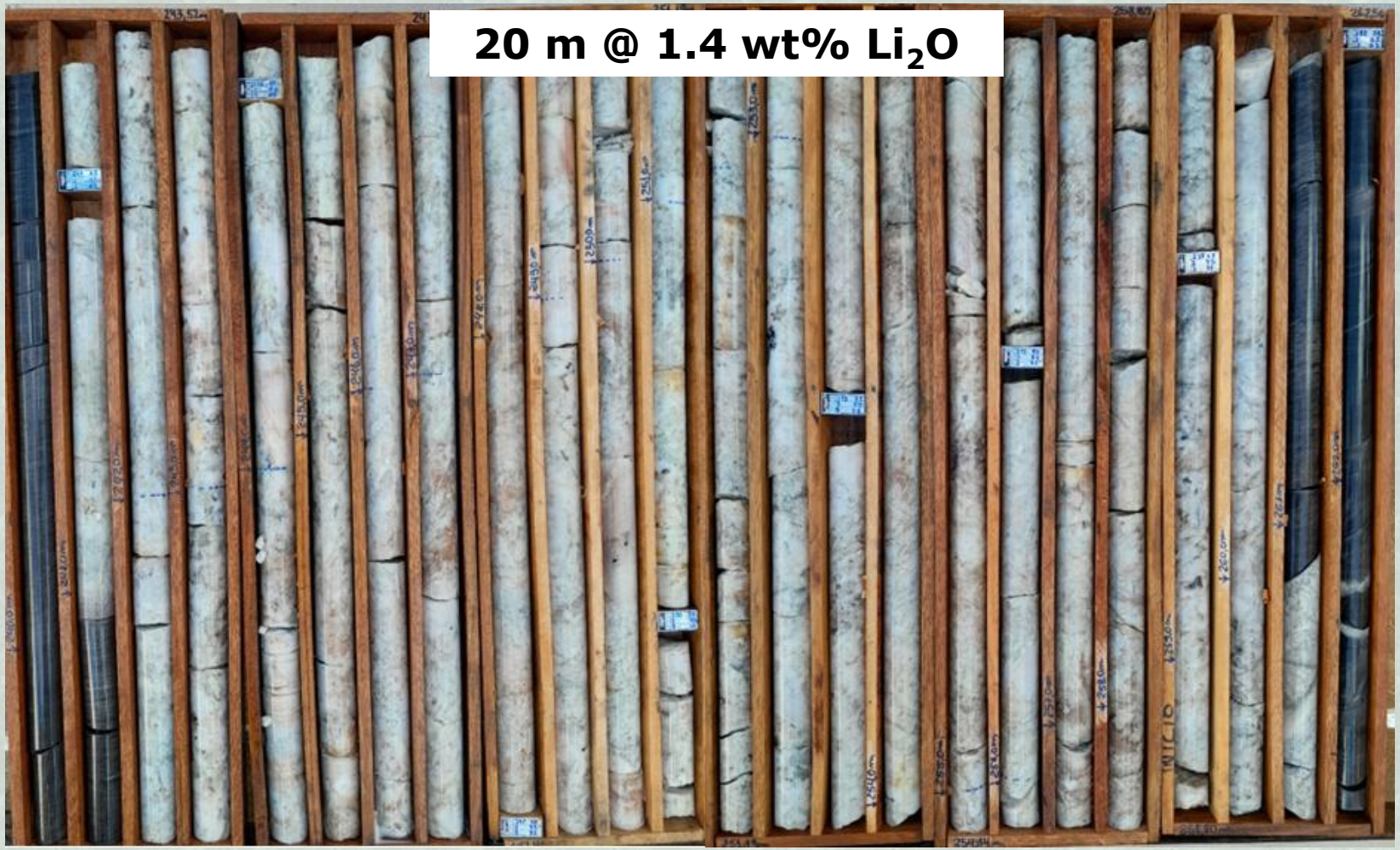
Orebody 1

Spodumene Resources:

Total: ~10 Mt @ 1.4% Li_2O

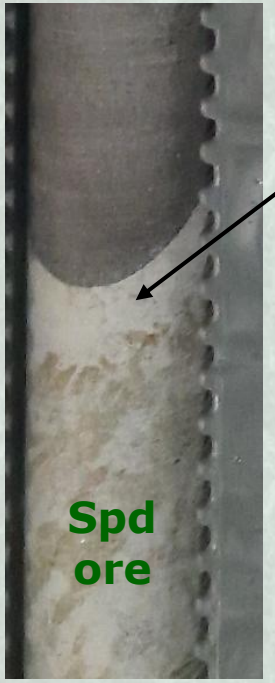
Macroscopic features of Bandeira's spodumene ore

- ✓ **Coarse-grained** (up to 50 cm) **greenish spodumene (hiddenite)** laths largely **disseminated** in **unzoned SRP dikes**.
- ✓ Bandeira's orebodies are **free of quartz cores, and very poor in secondary units and miarolitic cavities**.
- ✓ Thin and discontinuous spodumene-barren border domains rich in albite may occur at bottom and/or top contacts.
- ✓ Orebodies are generally completely free of weathering in depths below ~ 30 m from surface.



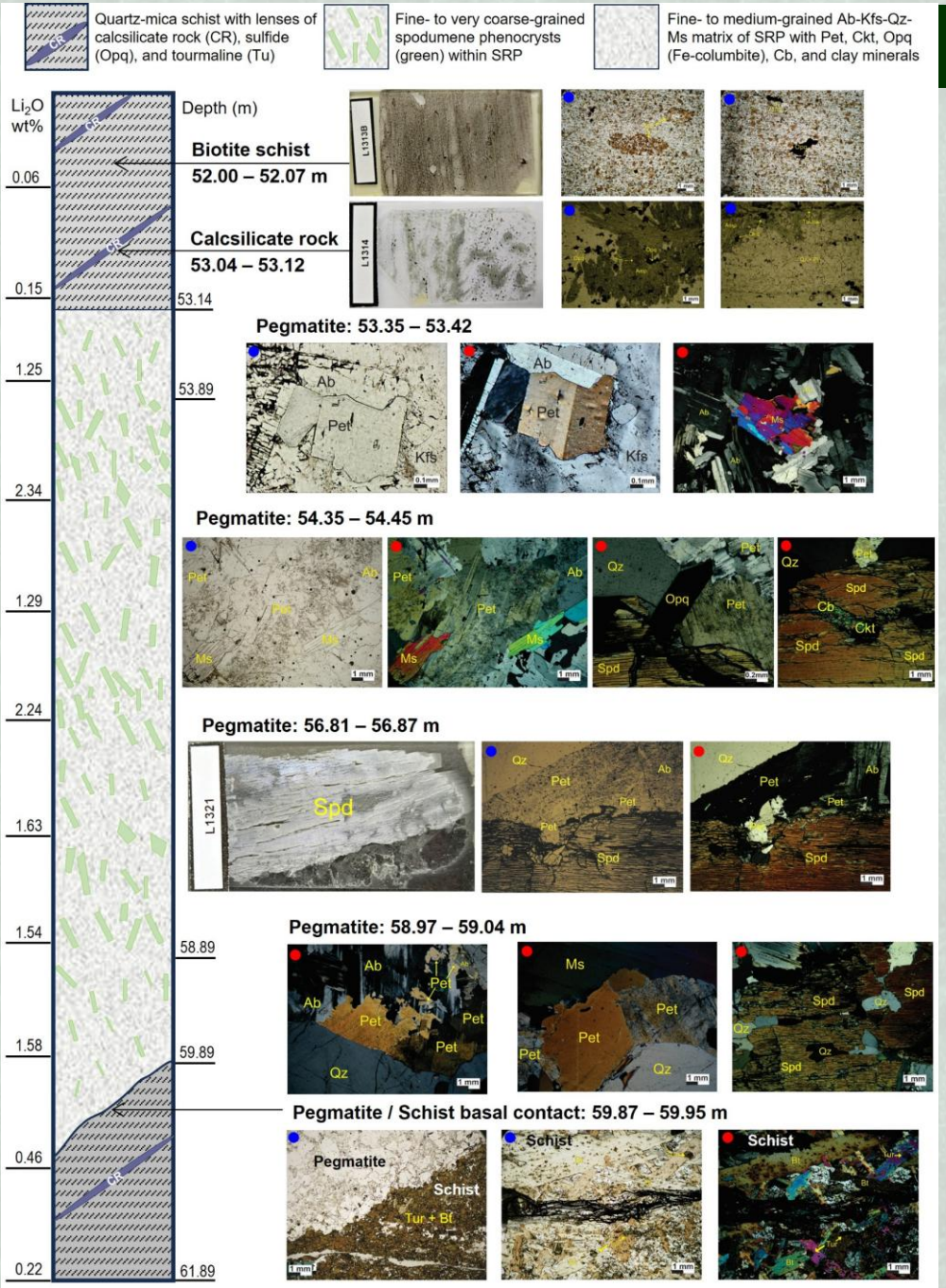
Large hiddenite (green Spd) crystal

Concordant contact to S_1 with Spd-free/Ab-rich thin border on top of Spd ore

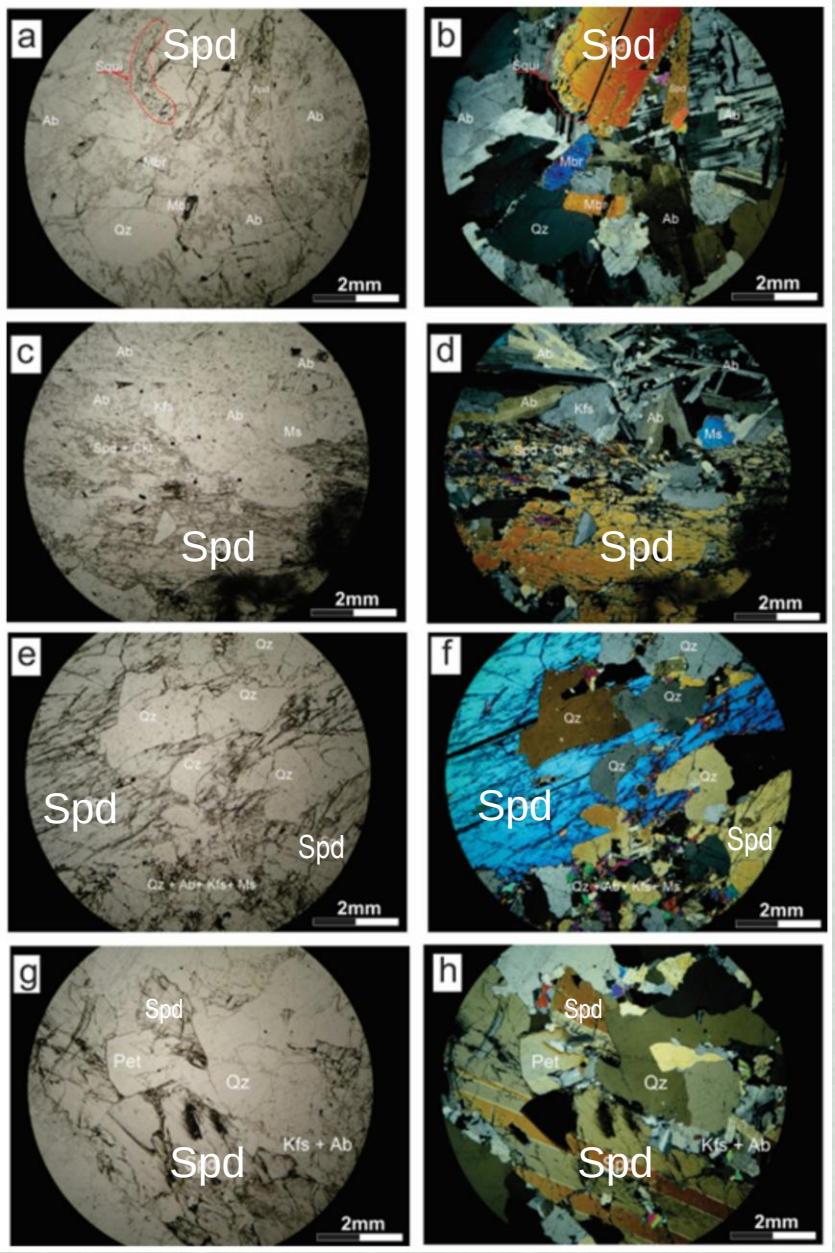


Discordant to S_1 (S_2) contact with Spd-free/Ab-rich border

Microscopic features of Bandeira's Spd ore



Lithium Ionic's microscopic characterization chart



plane polarized light | crossed polarizers light

115 polished thin sections from 9 core intercepts cutting distinct SRP bodies

Spodumene features:

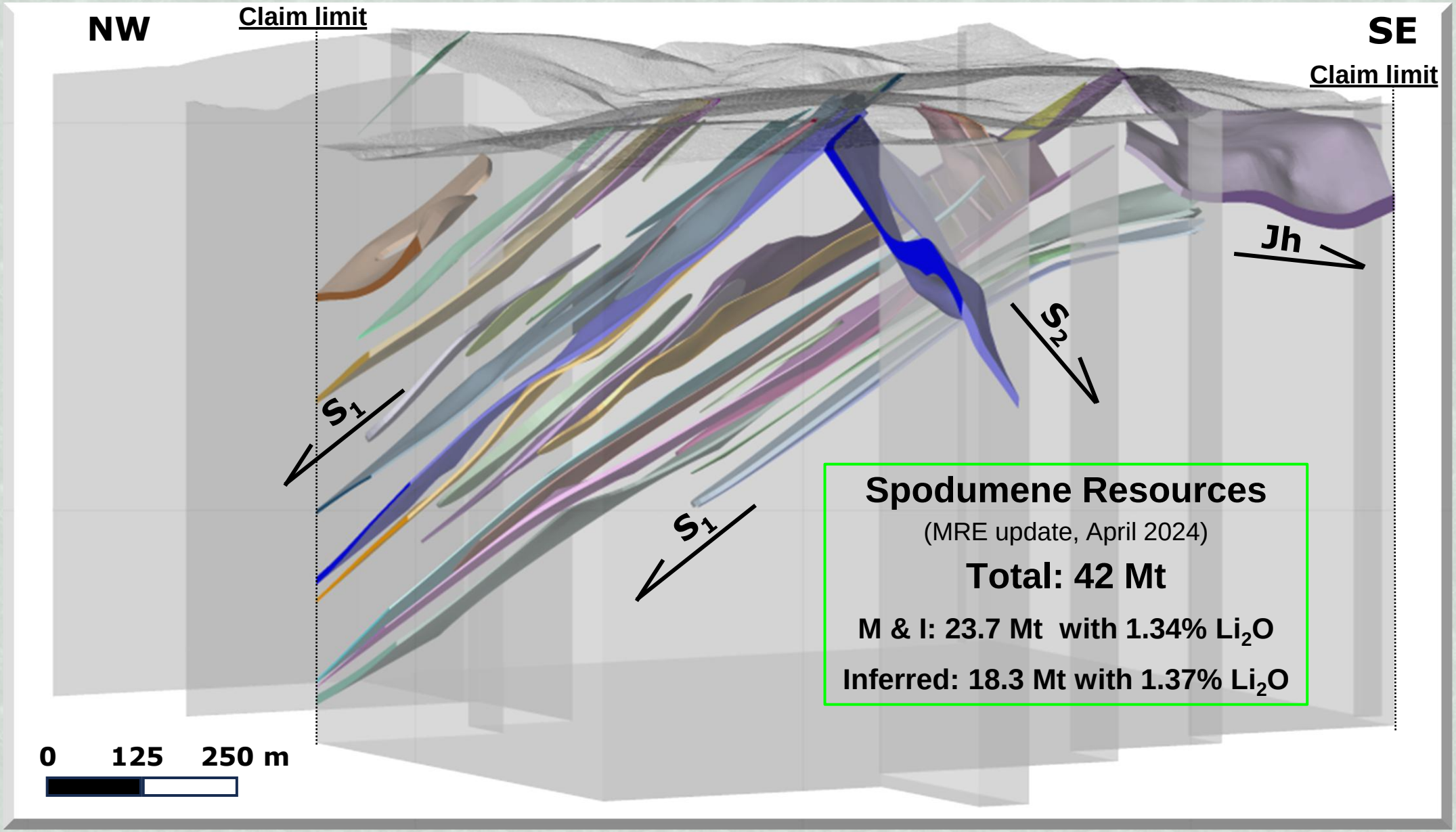
- ❑ Idiomorphic crystals
- ❑ Sharp contacts with matrix
- ❑ Poor to free of alteration
- ❑ Dominant clean surfaces
- ❑ Poor in inclusions and Squi
- ❑ Rare cataclastic deformation
- ❑ No ductile deformation

Matrix features:

- Fine-to-medium-grained (mm-dm)
- > 90 vol% Ab + Kfs + Qz
- < 10 vol% accessory minerals
- < 5 vol% Al-Li mica
- < 3 vol% petalite
- < 2 vol% Li-phosphates
- < 2 vol% Nb-Sn-Ta oxides
- < 1 vol% cookeite + zabuyelite
- < 1 vol% Fe-Mn hydroxides + clay

Bandeira Deposit – 3D Resources Model

A dense swarm of SRP dikes concordant to S_1 schistosity, with some discordant but thicker SRP dikes emplaced along the S_2 spaced cleavage or sub-horizontal joints (Jh).



Spodumene Resources

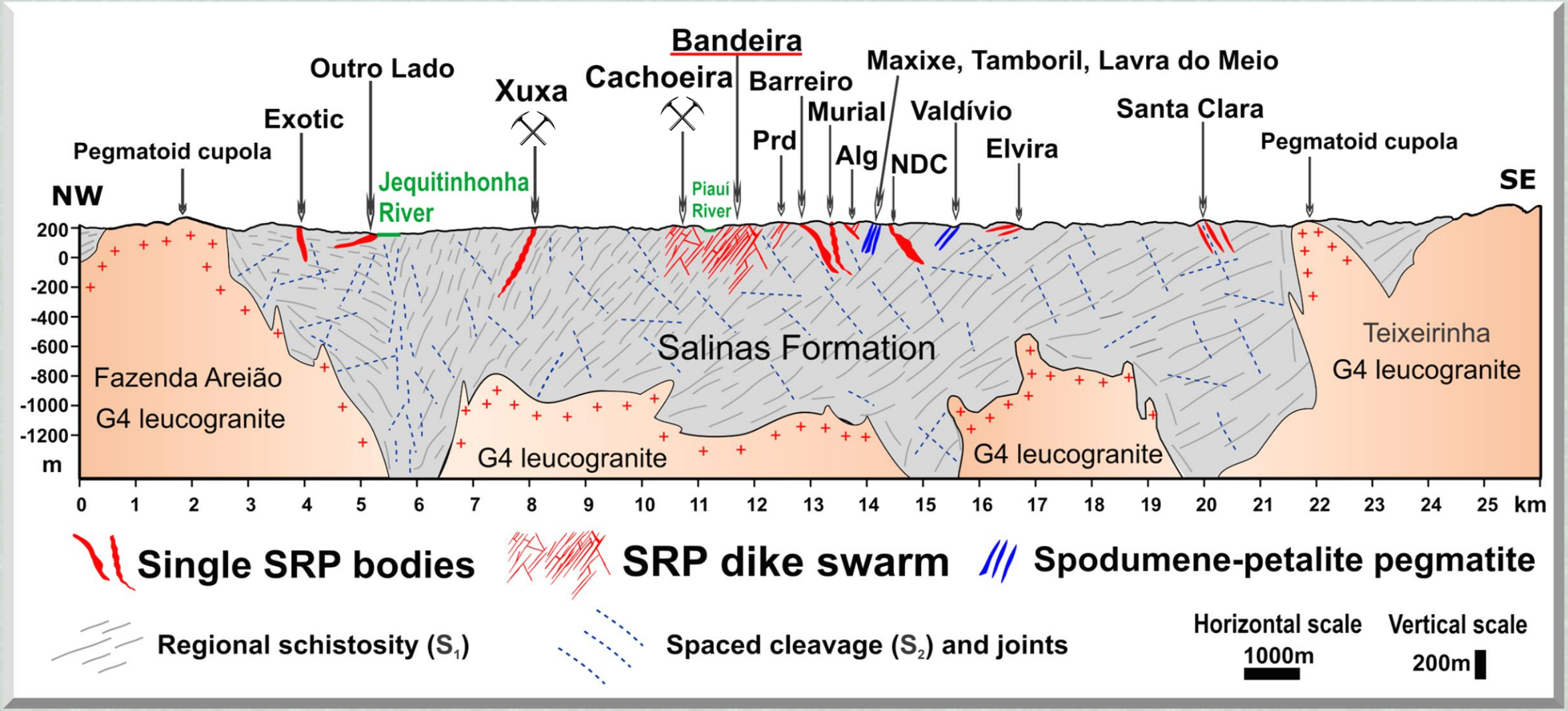
(MRE update, April 2024)

Total: 42 Mt

M & I: 23.7 Mt with 1.34% Li_2O

Inferred: 18.3 Mt with 1.37% Li_2O

Towards 1 billion tons of lithium ore in the Brazilian Lithium Valley?



Currently, Li resources can be realistically estimated to be around 500,000 million tons, including Spd and Ptl, in the whole Brazil Lithium Valley.

The End

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March 4, 2025