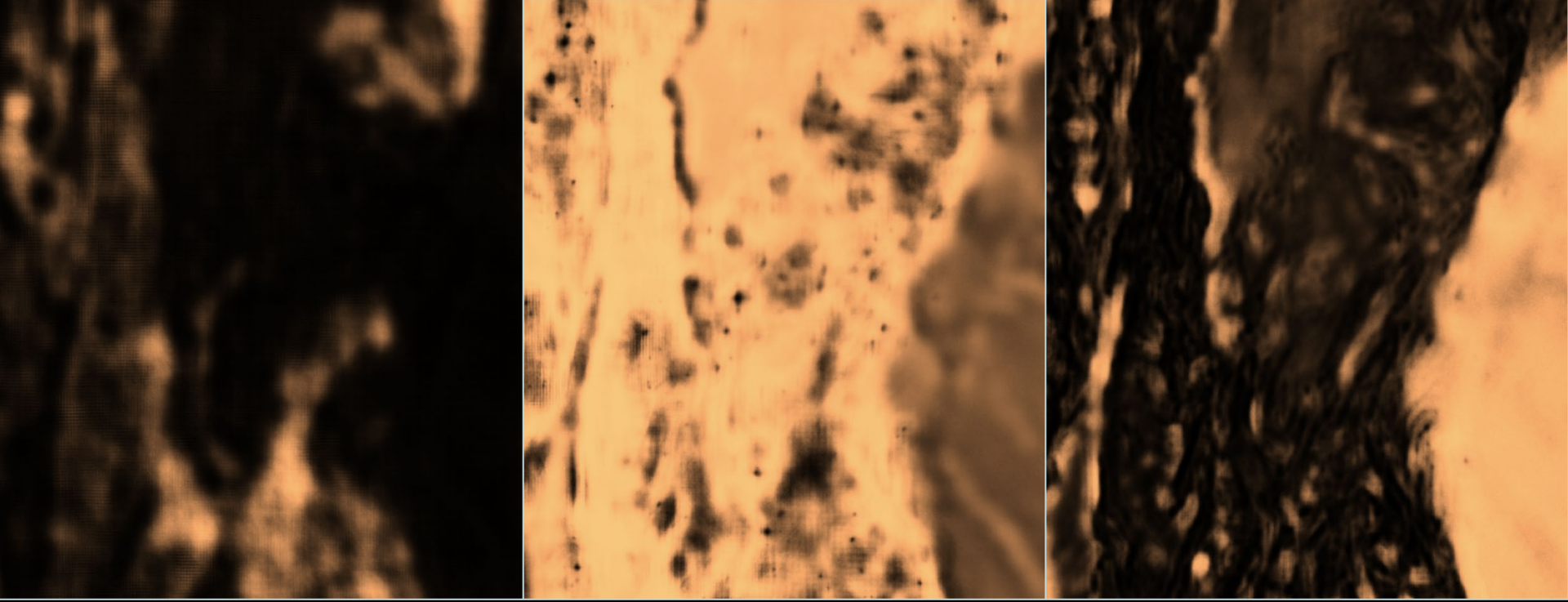


Caldera Analytics

CEI Round 5: Deep Learning Basement Interpretation for the Isa Region

Results and Outcomes

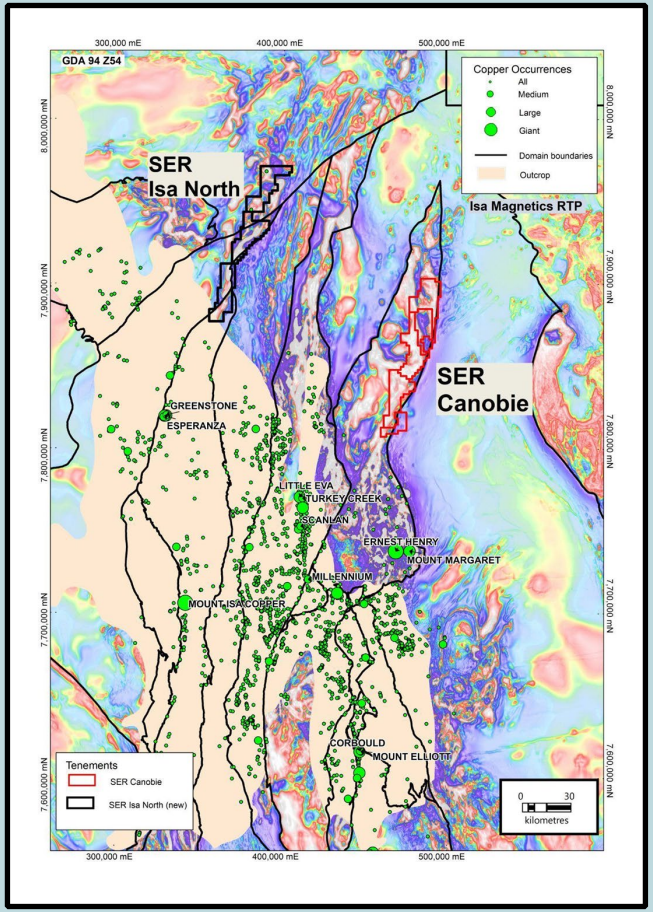
Michael Rodda

CEI Project Details Overview

Caldera Analytics

Where?

- SER's (Strategic Energy Resources) Isa North and Canobie Project in northern Mt Isa region



CEI Project Details Overview

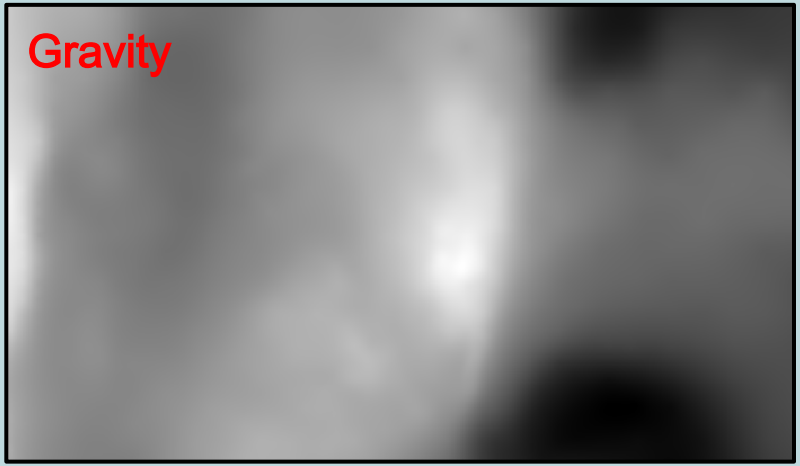
Caldera Analytics

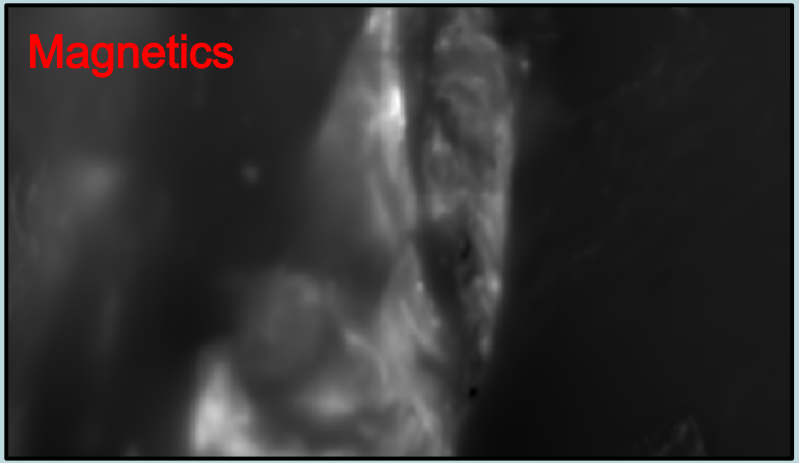
Where?

- SER's (Strategic Energy Resources) Isa North and Canobie Project in northern Mt Isa region

What?

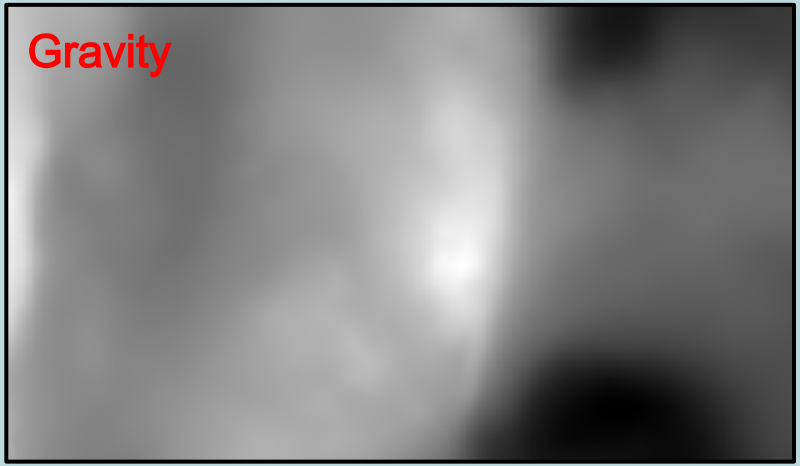
- Probabilistically predict what is the cause of the gravity and magnetic geophysical responses of the basement

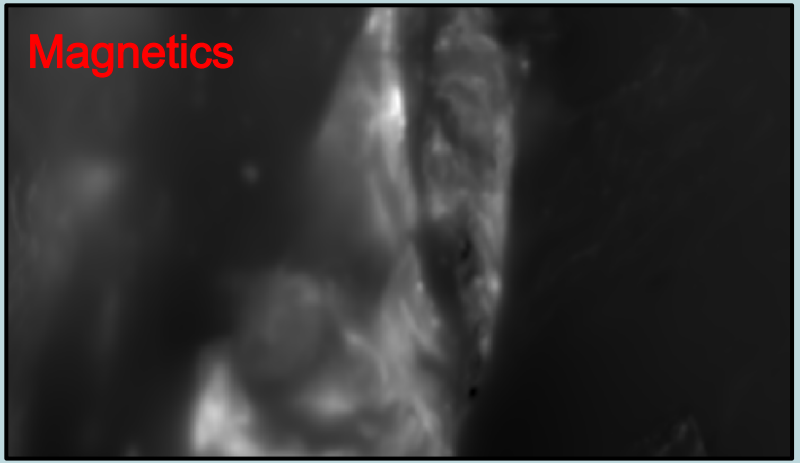




CEI Project Details Overview

Caldera Analytics





Prediction Groups

- Felsic Intrusives
- Intermediate <-> Mafic Intrusives
- Mafic Dykes
- Metamorphic Magnetite
- ++ Hydrothermal Magnetite
- Remaining / Other

CEI Project Details Overview

Caldera Analytics

Where?

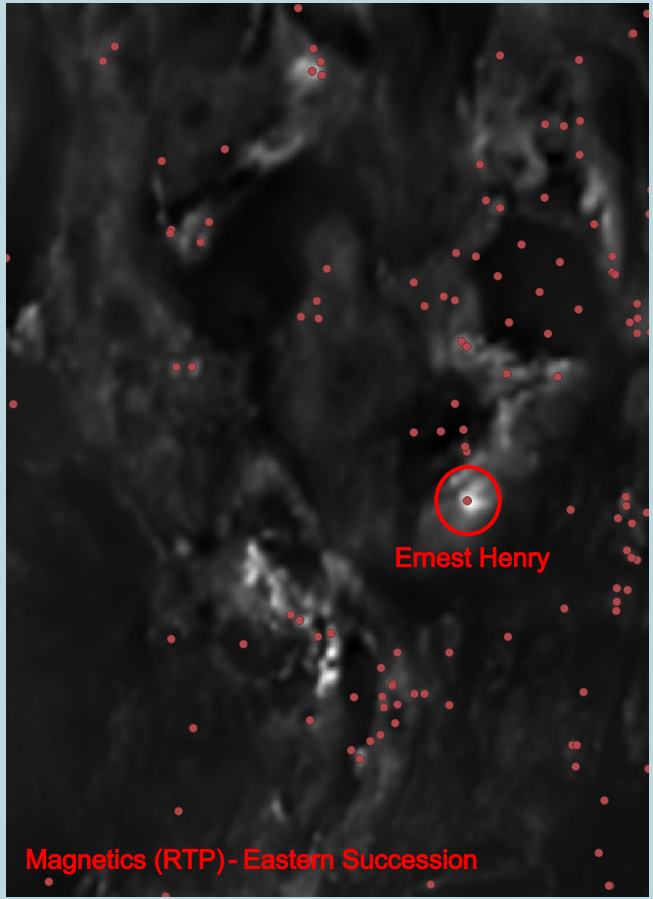
- SER's (Strategic Energy Resources) Isa North and Canobie Project in northern Mt Isa region

What?

- Probabilistically predict what is the cause of the gravity and magnetic geophysical responses of the basement

How?

- Use a deep learning machine learning model
- Model learns from historical basement drilling and mapped basement exposures



CEI Project Details Overview

Caldera Analytics

Where?

- SER's (Strategic Energy Resources) Isa North and Canobie Project in northern Mt Isa region

What?

- Probabilistically predict what is the cause of the gravity and magnetic geophysical responses of the basement

How?

- Use a deep learning machine learning model
- Training data sourced from historical basement drilling and mapped basement exposures

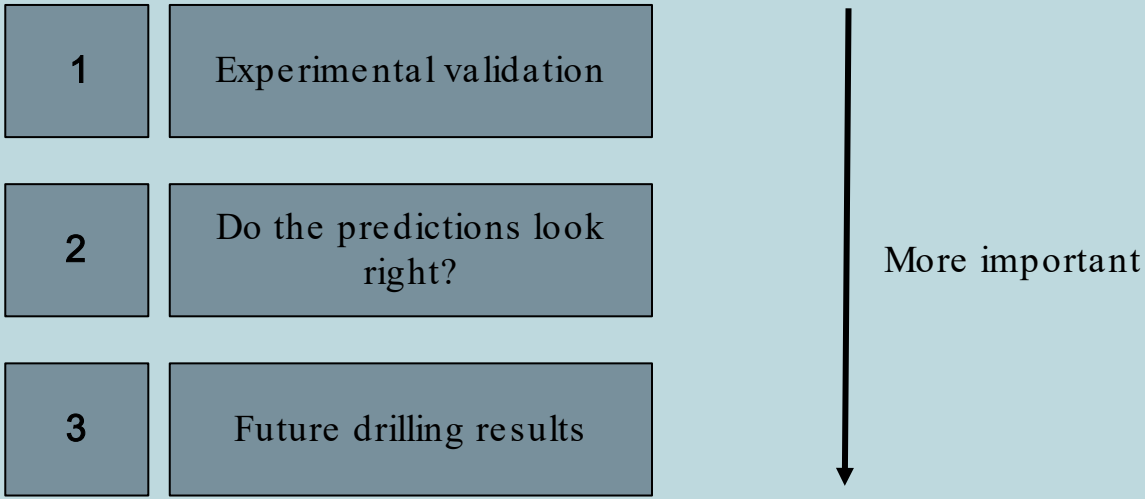
Why?

- Exploration under-cover is hard with limited decision making tools
- ML adds one extra layer to use for decisions
- ML has natural synergies for data heavy geophysical exploration

Target Name	Geophysical Modelling	Machine Learning Predictions	Priority
A	Possible Hydrothermal Magnetite	20% Hydrothermal magnetite	3
B	Possible Hydrothermal Magnetite	80% Hydrothermal magnetite	1
C	Possible Hydrothermal Magnetite	50% Hydrothermal magnetite	2

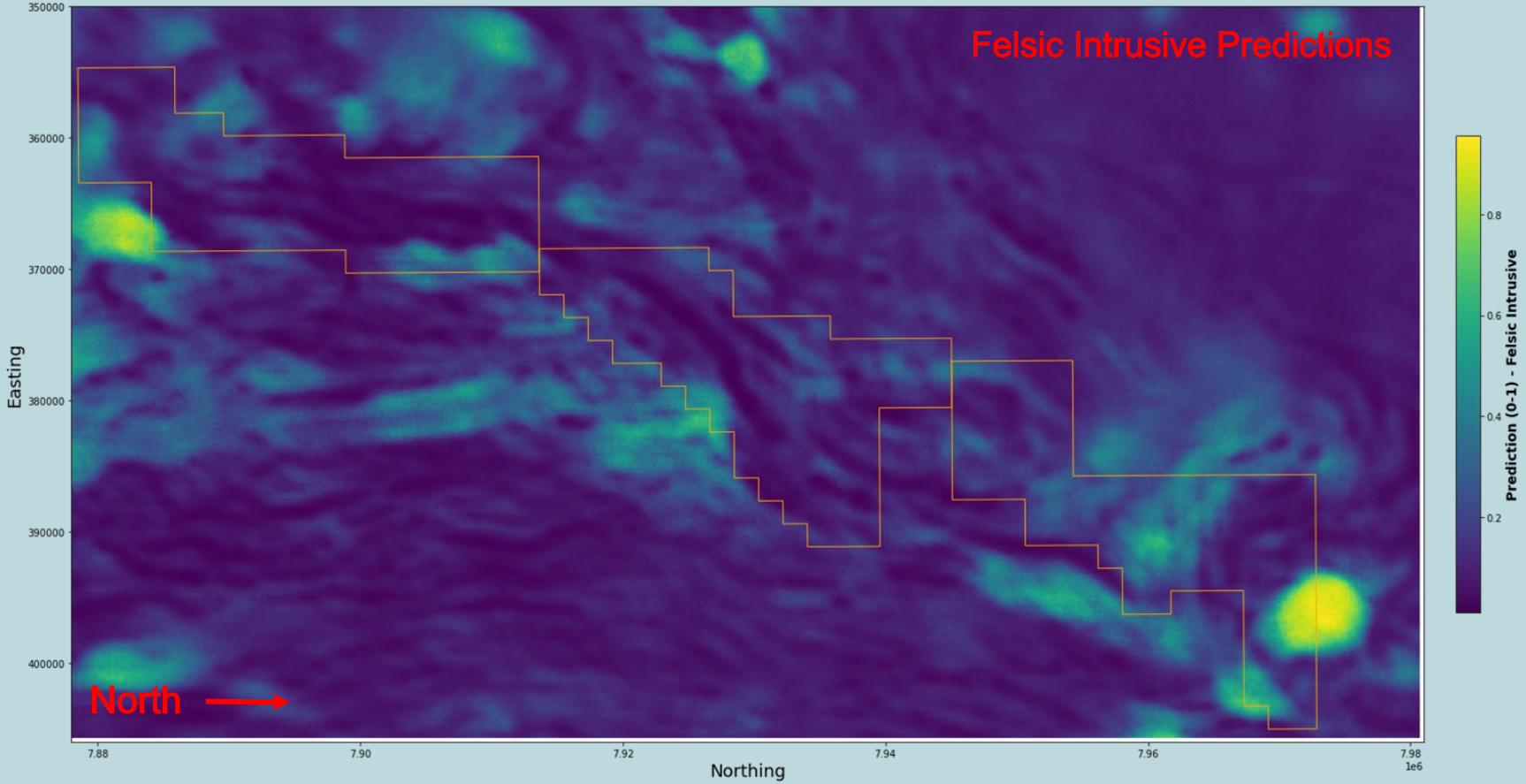
CEI Project Details How to validate?

Caldera Analytics



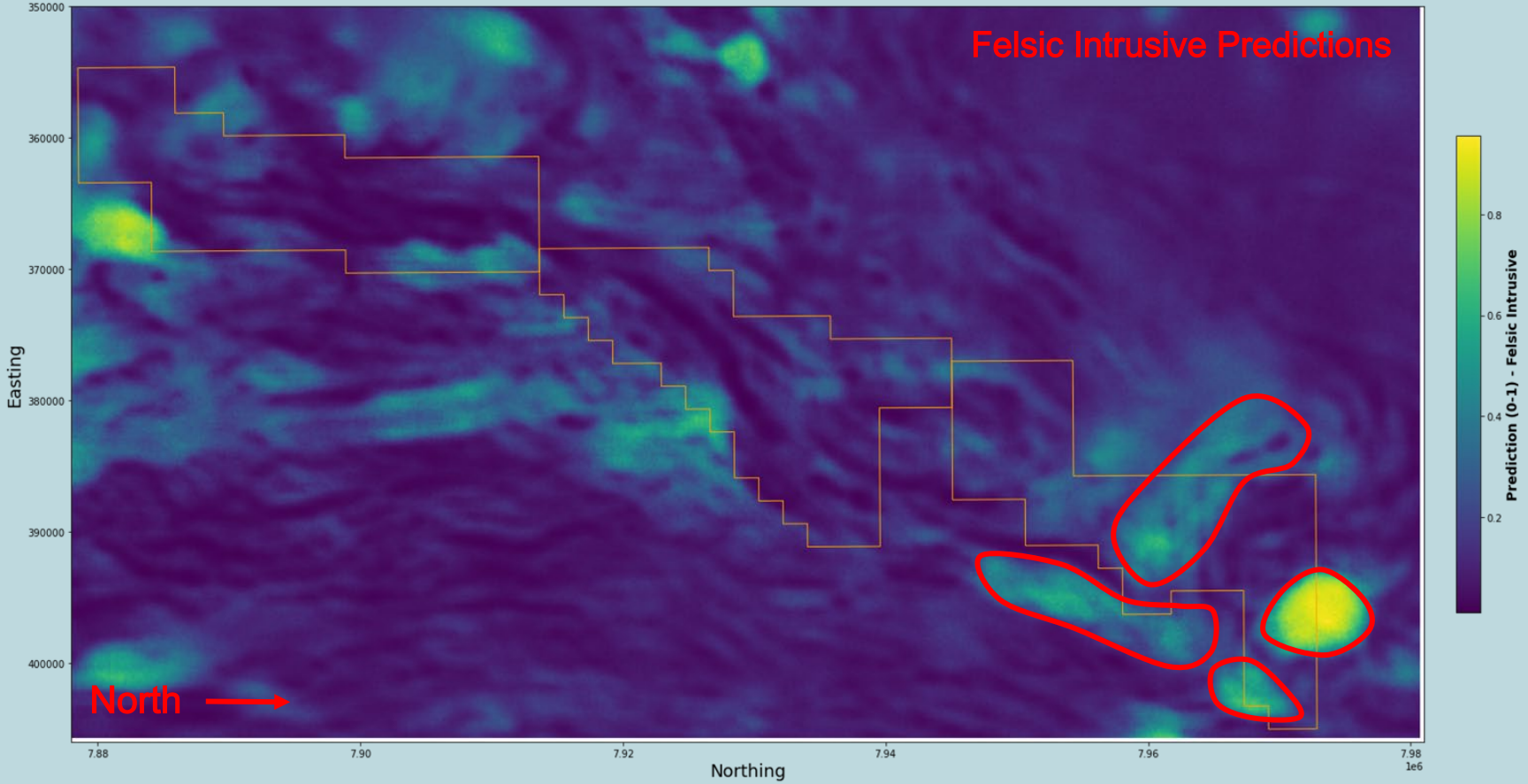
Predictions Isa North Felsic Intrusives

Caldera Analytics



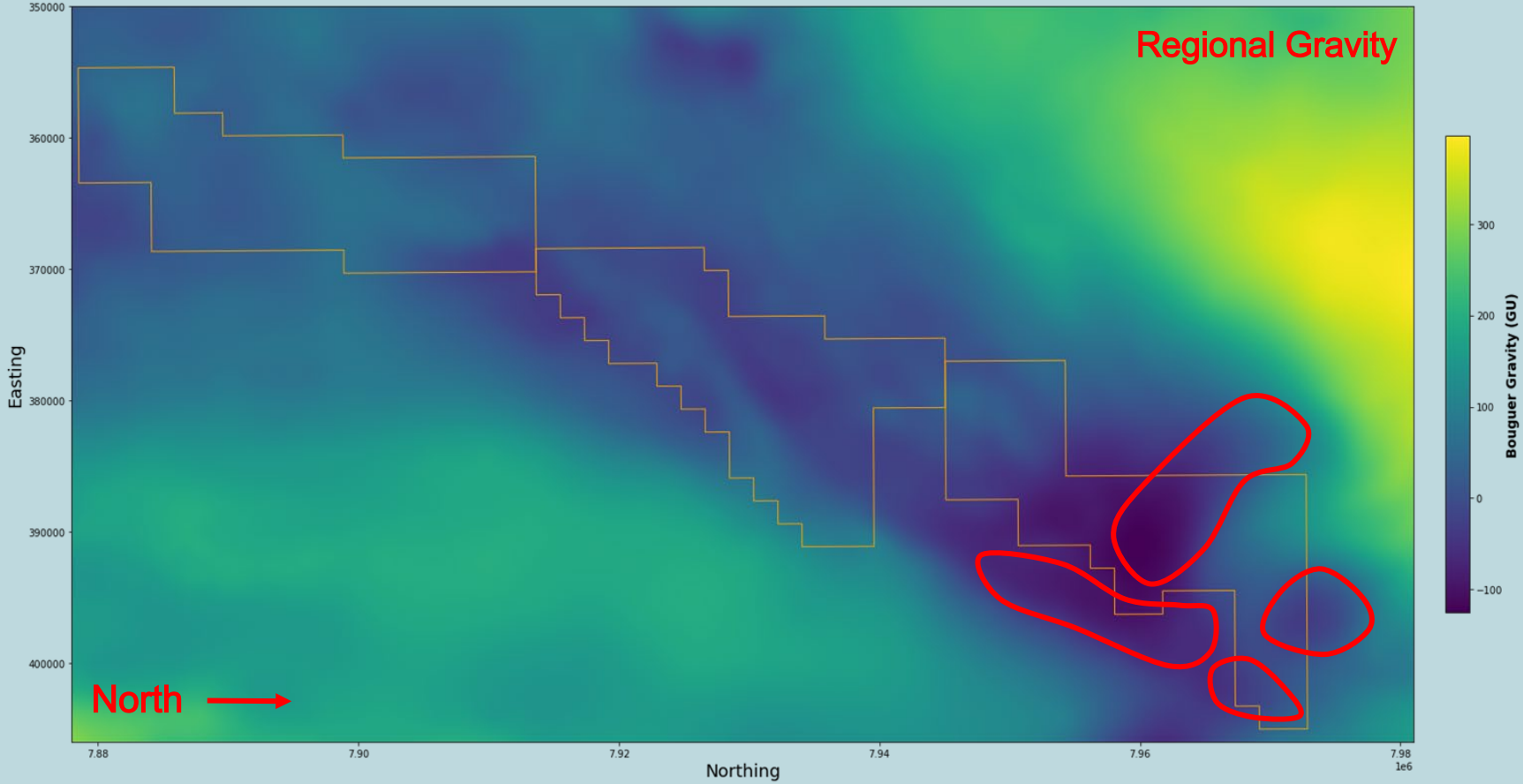
Predictions Isa North Felsic Intrusives

Caldera Analytics



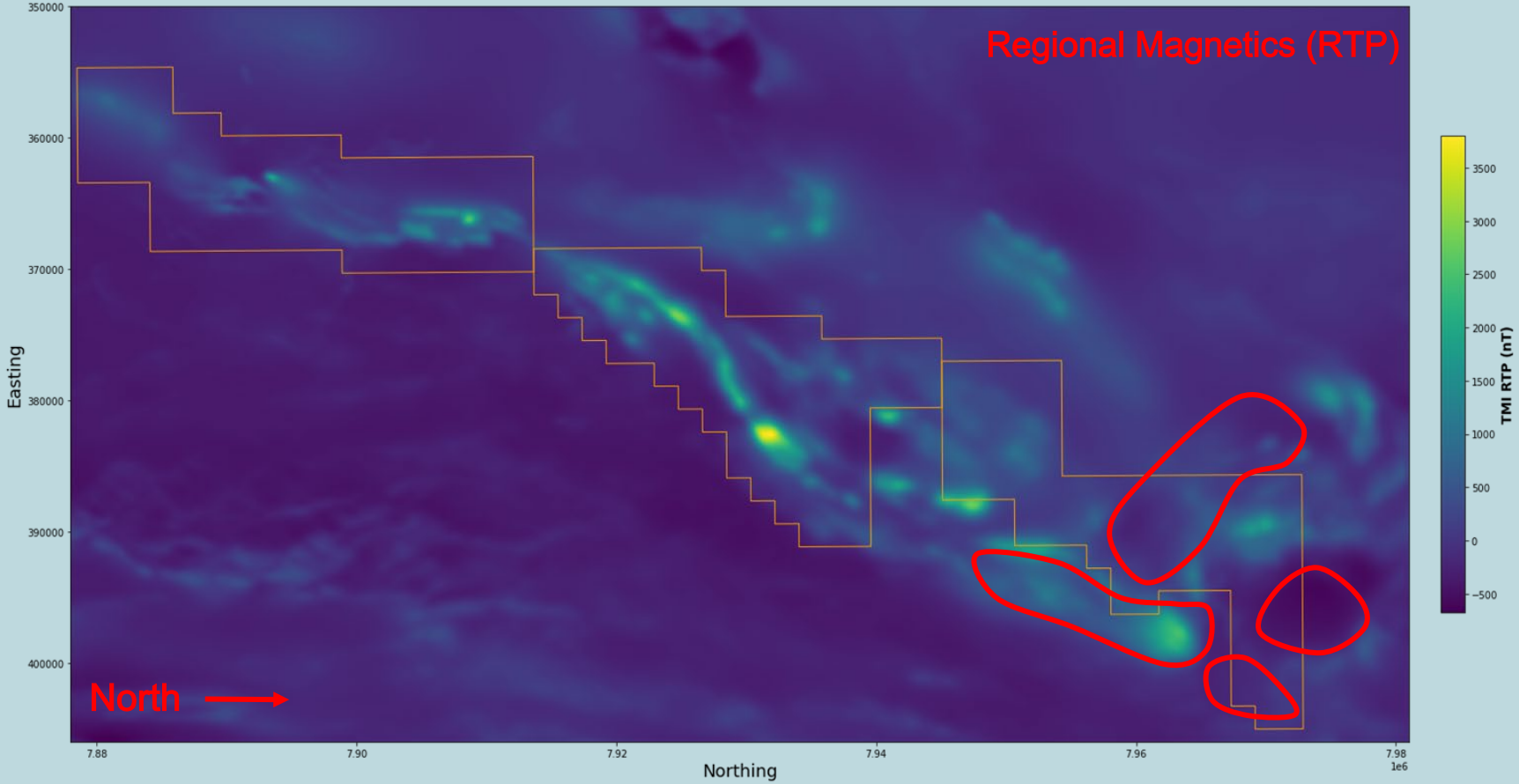
Predictions Isa North Felsic Intrusives

Caldera Analytics



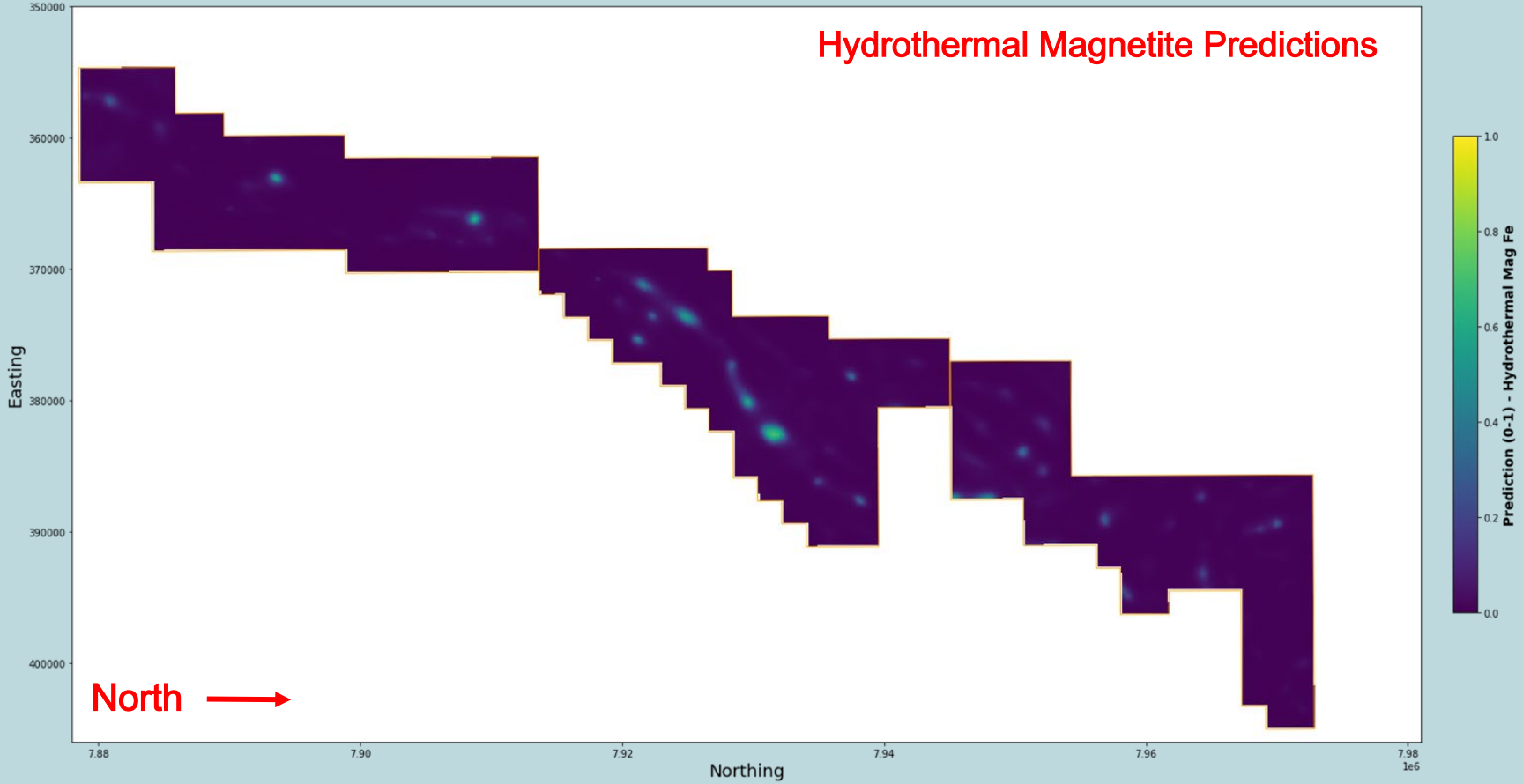
Predictions Isa North Felsic Intrusives

Caldera Analytics



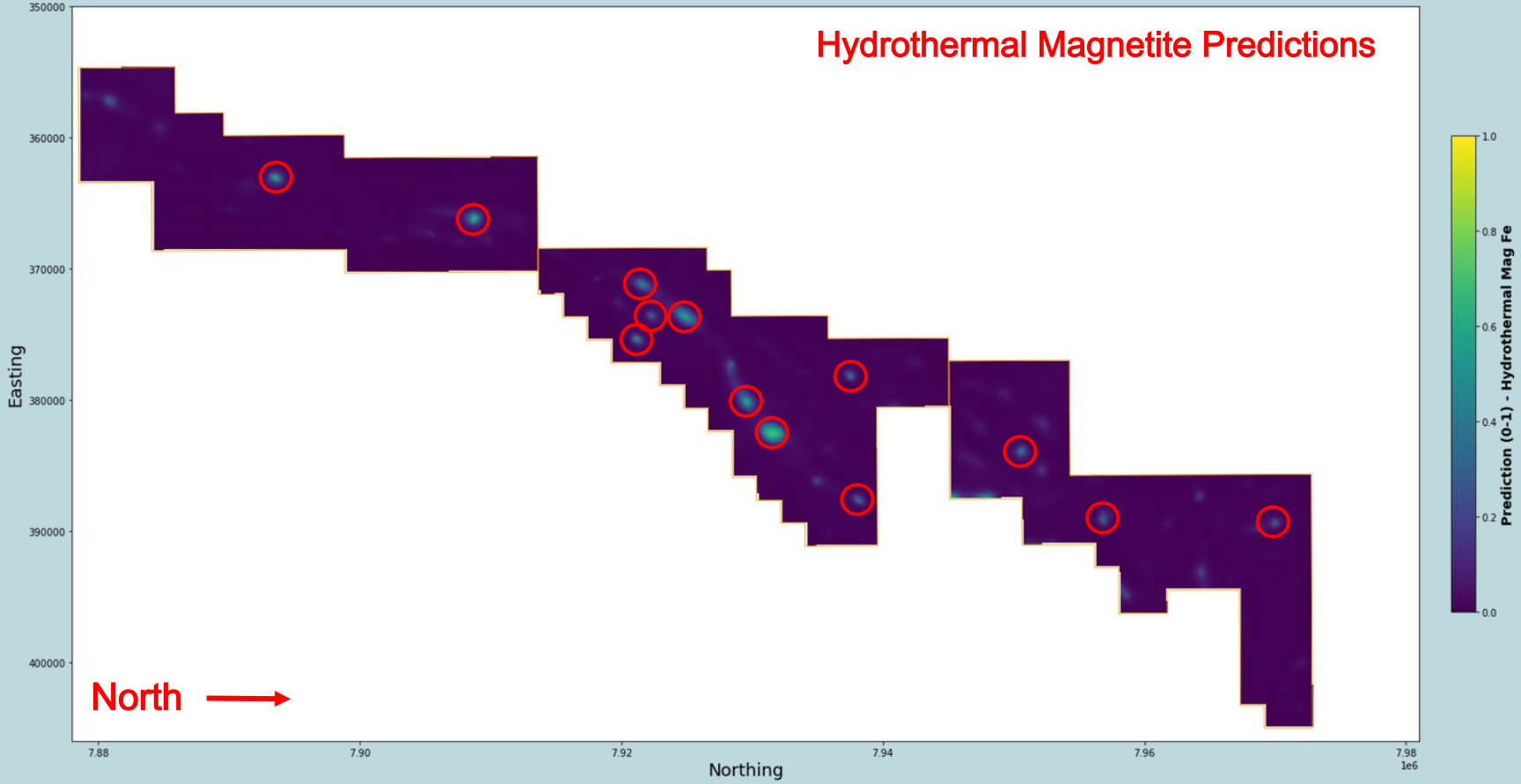
Predictions Isa North Hydrothermal Magnetite

Caldera Analytics



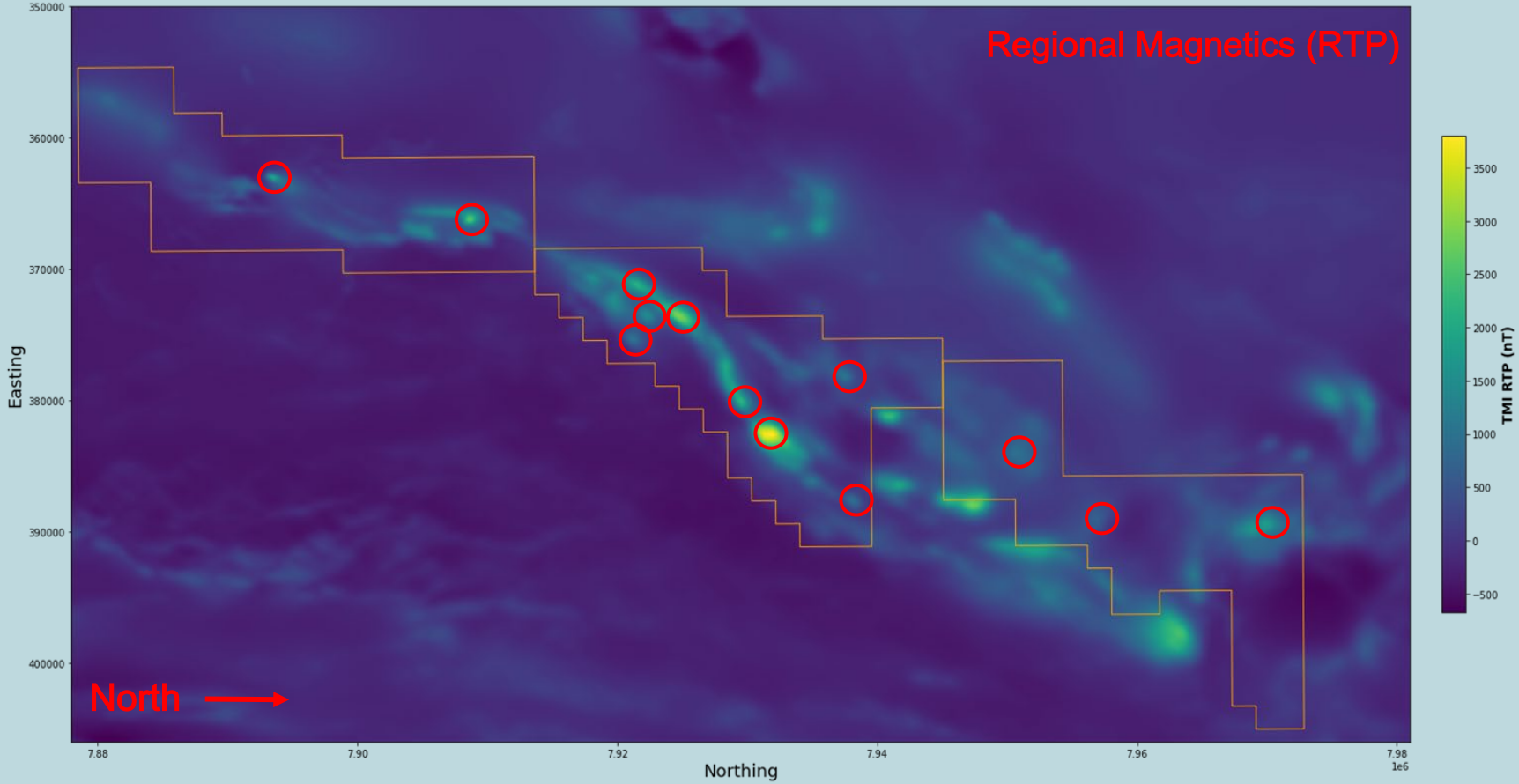
Predictions Isa North Hydrothermal Magnetite

Caldera Analytics



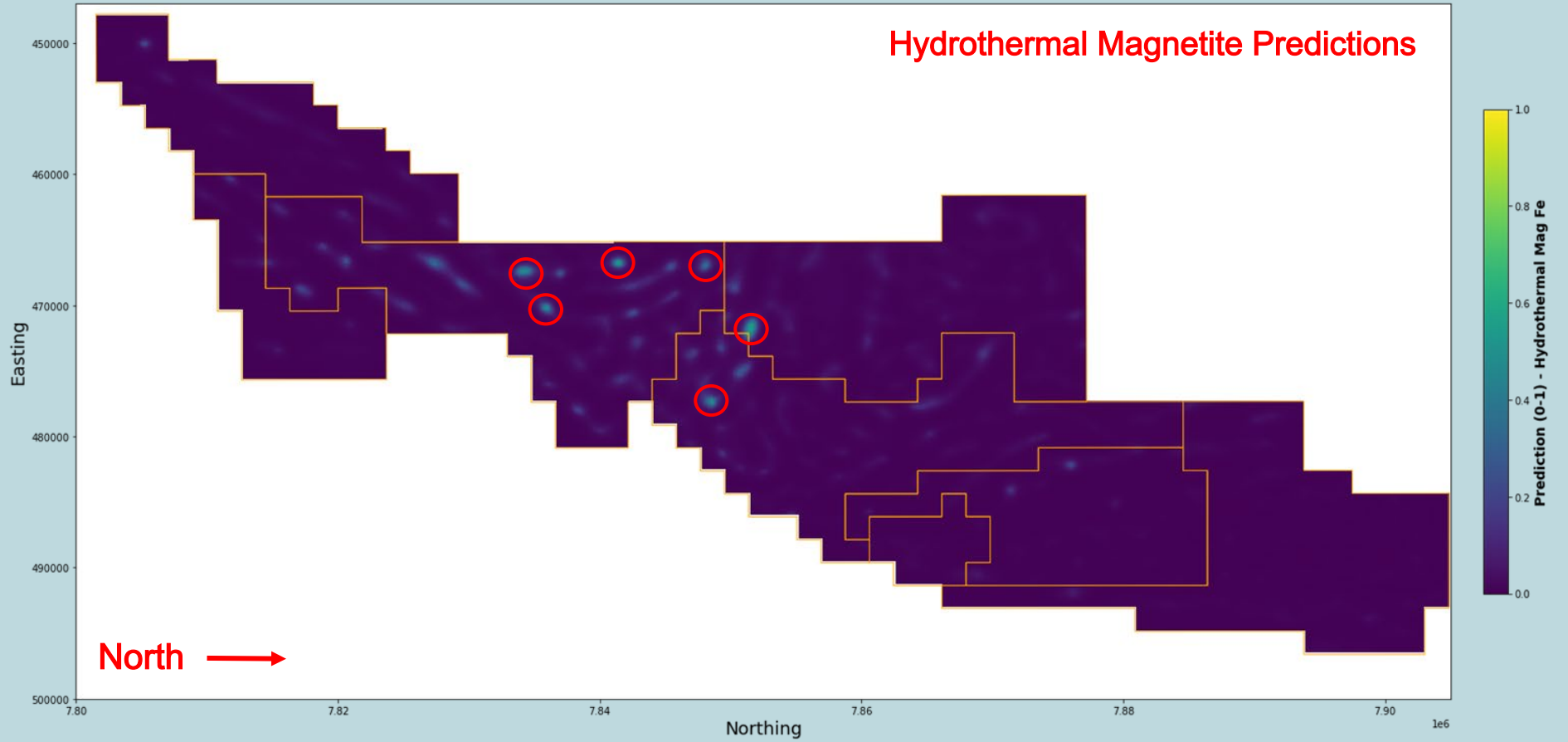
Predictions Isa North Hydrothermal Magnetite

Caldera Analytics



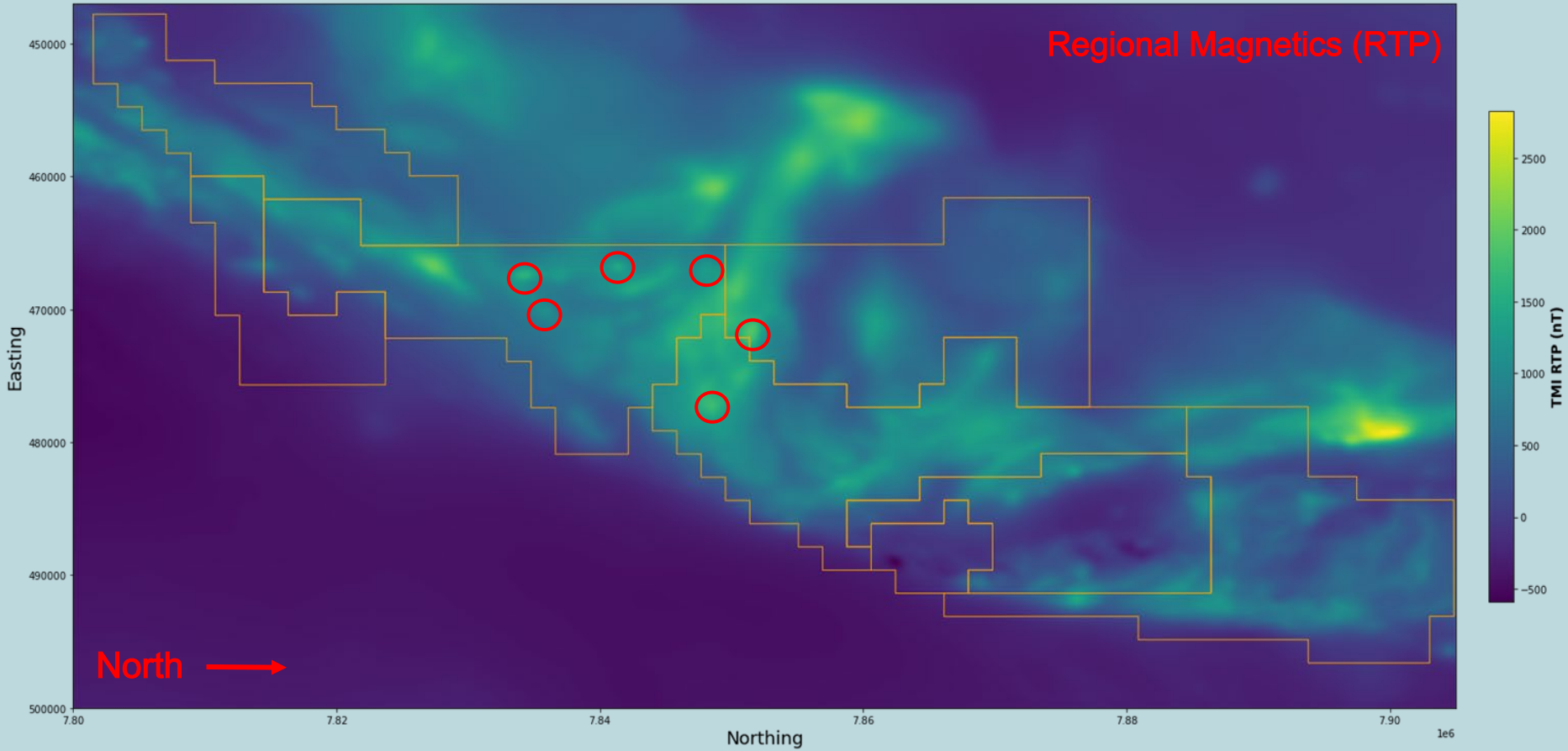
Predictions Canobie Hydrothermal Magnetite

Caldera Analytics



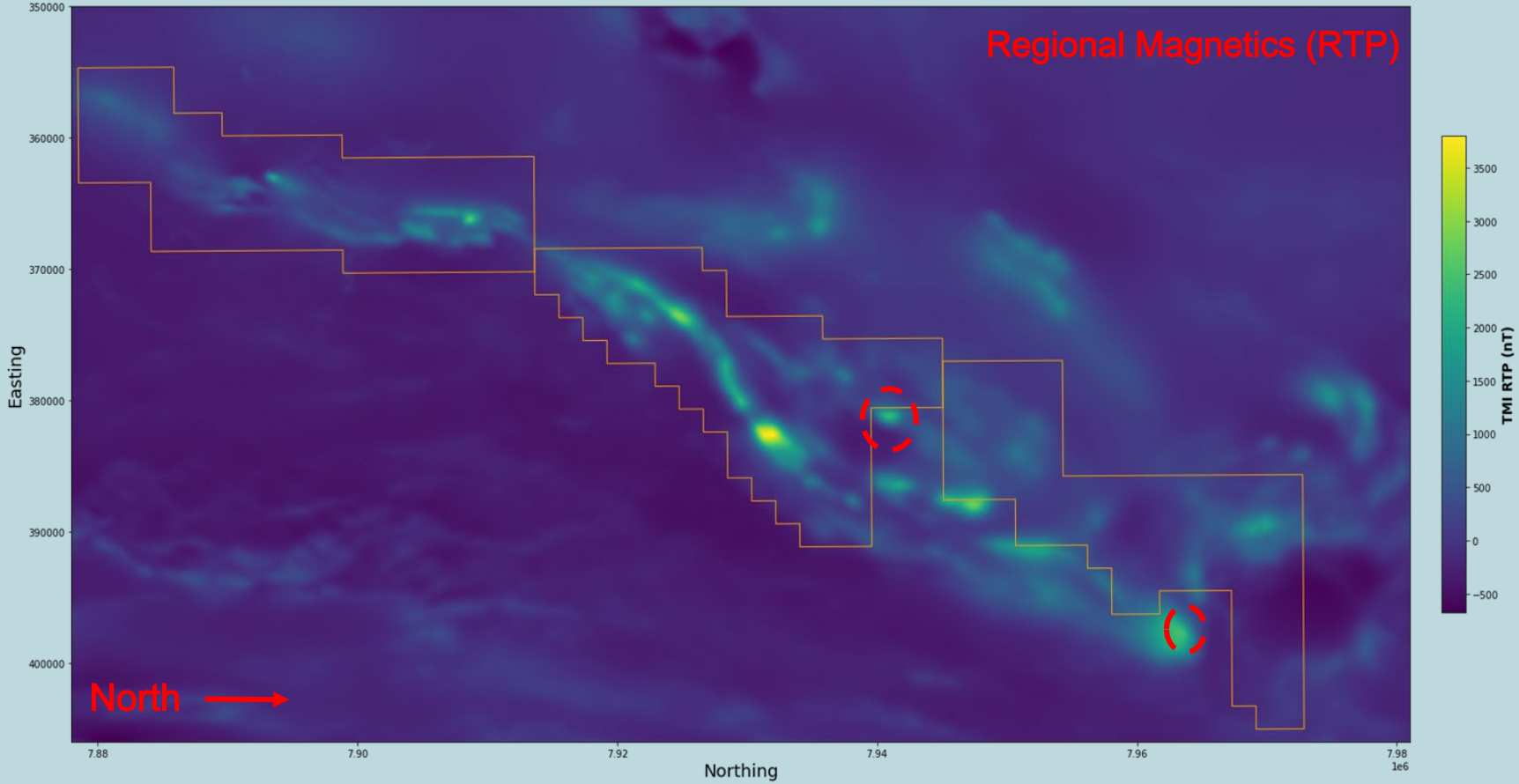
Predictions Canobie Hydrothermal Magnetite

Caldera Analytics



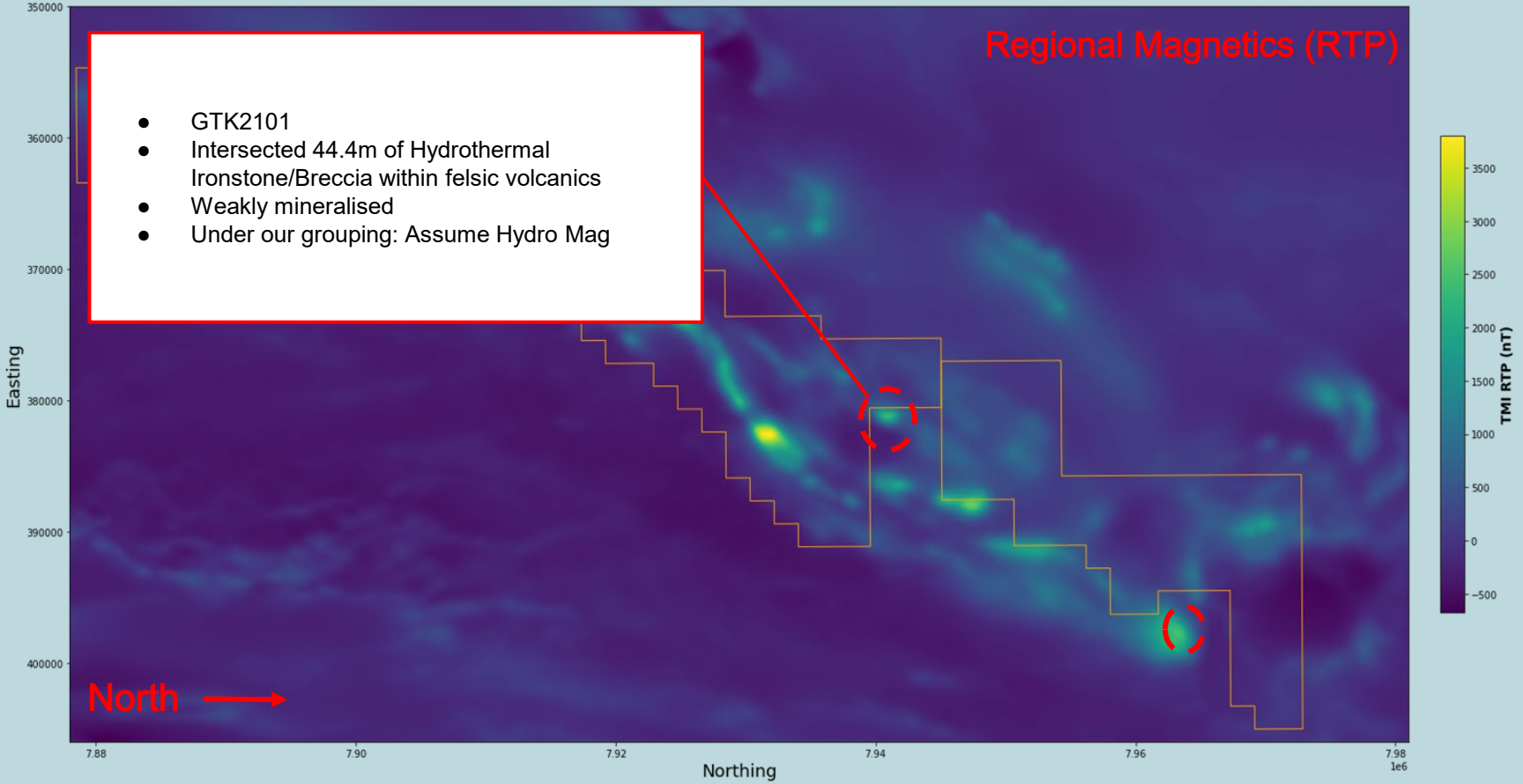
Predictions Future Drilling @Isa North

Caldera Analytics



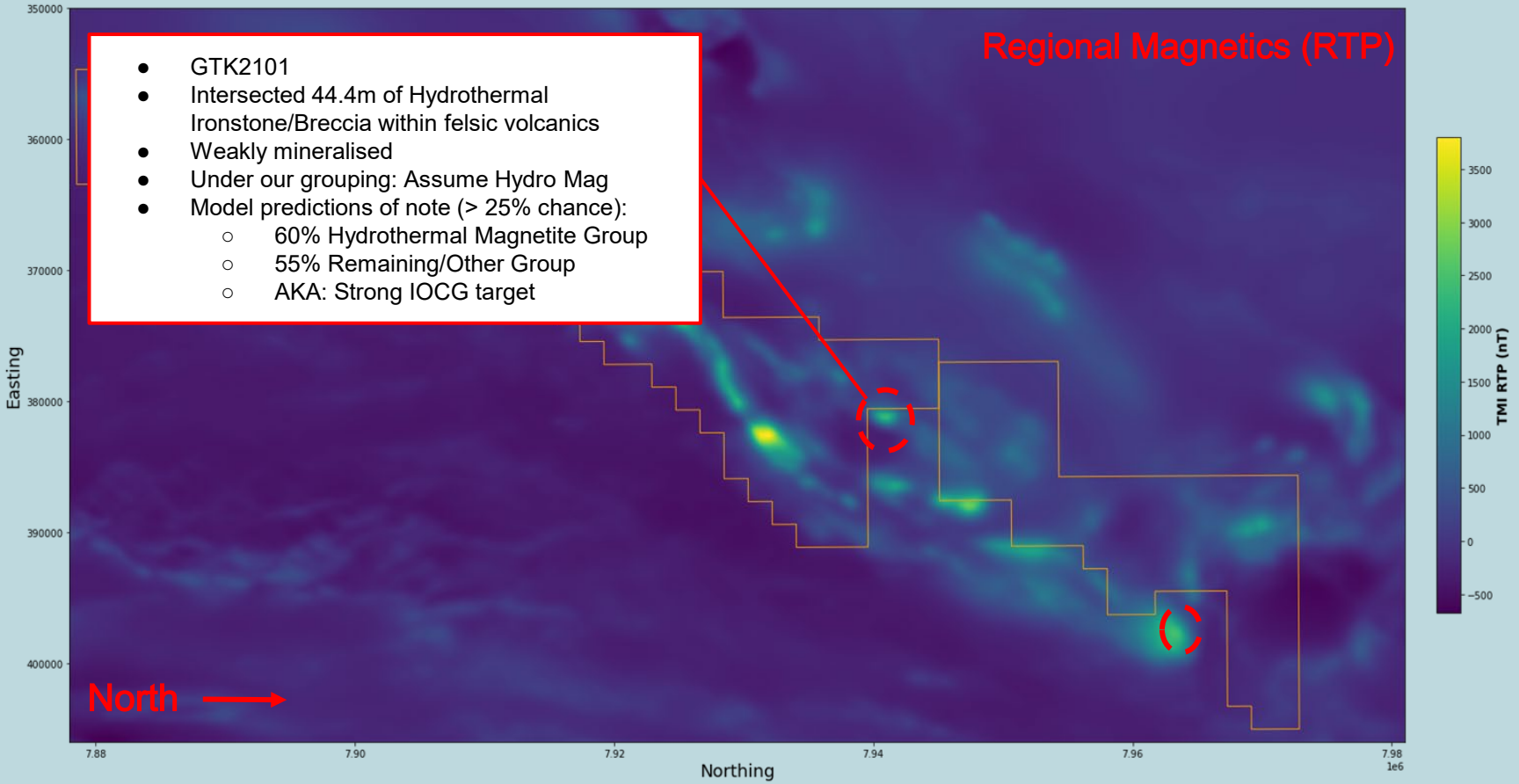
Isa North Nearby Drilling Predictions

Caldera Analytics



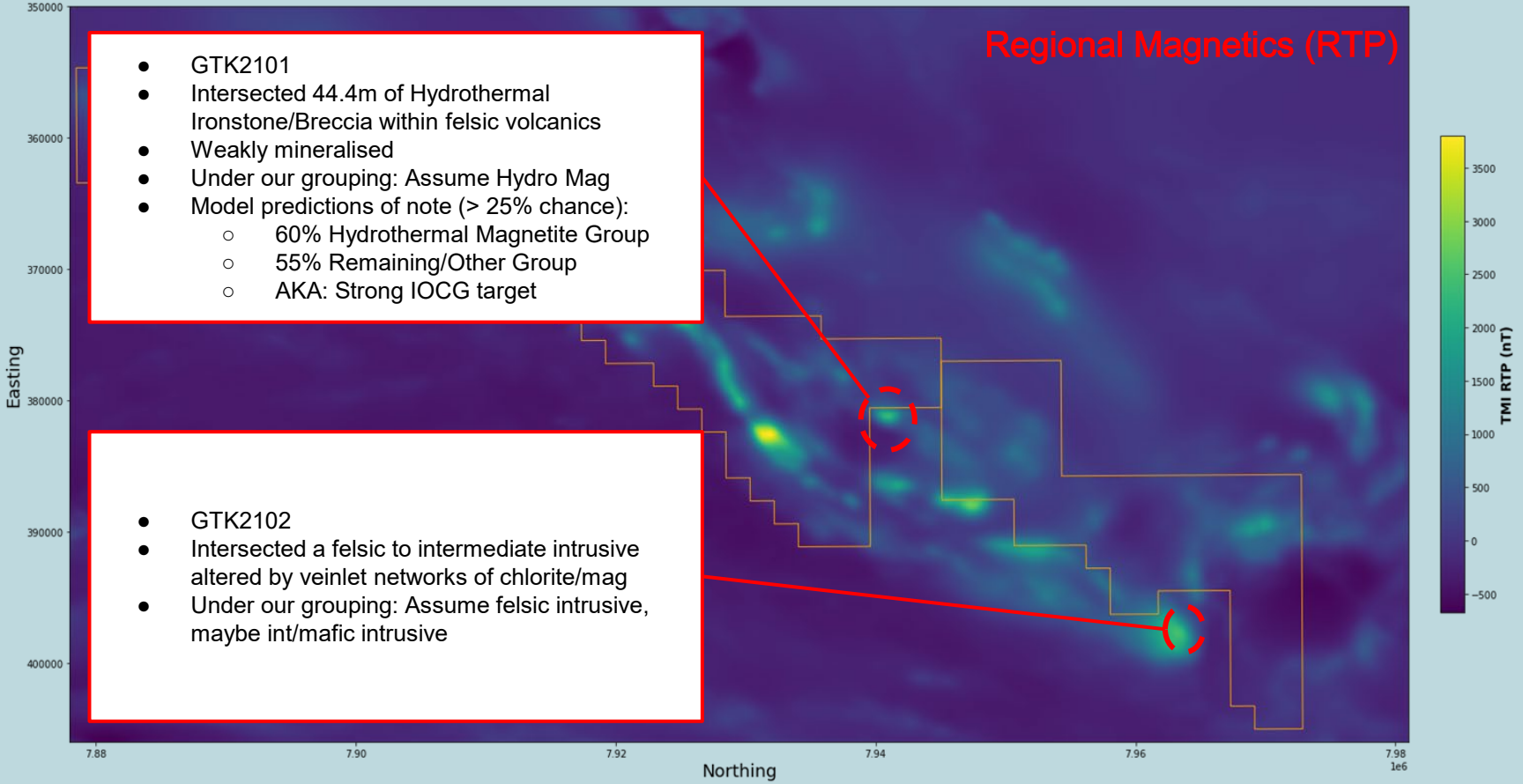
Isa North Nearby Drilling Predictions

Caldera Analytics



Isa North Nearby Drilling Predictions

Caldera Analytics

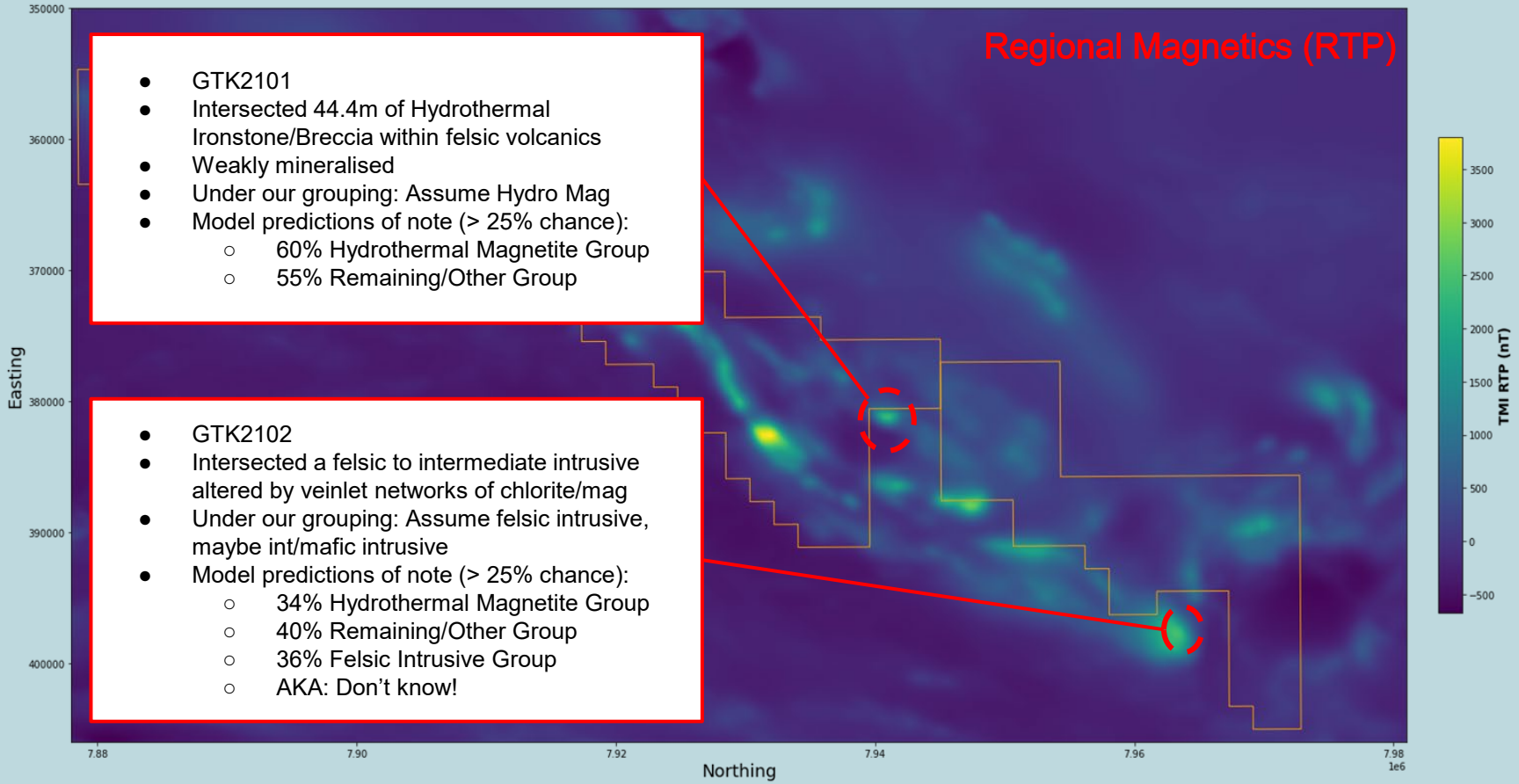


- GTK2101
- Intersected 44.4m of Hydrothermal Ironstone/Breccia within felsic volcanics
- Weakly mineralised
- Under our grouping: Assume Hydro Mag
- Model predictions of note (> 25% chance):
  - 60% Hydrothermal Magnetite Group
  - 55% Remaining/Other Group
  - AKA: Strong IOCG target

- GTK2102
- Intersected a felsic to intermediate intrusive altered by veinlet networks of chlorite/mag
- Under our grouping: Assume felsic intrusive, maybe int/mafic intrusive

Isa North Nearby Drilling Predictions

Caldera Analytics



- GTK2101
- Intersected 44.4m of Hydrothermal Ironstone/Breccia within felsic volcanics
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- Under our grouping: Assume Hydro Mag
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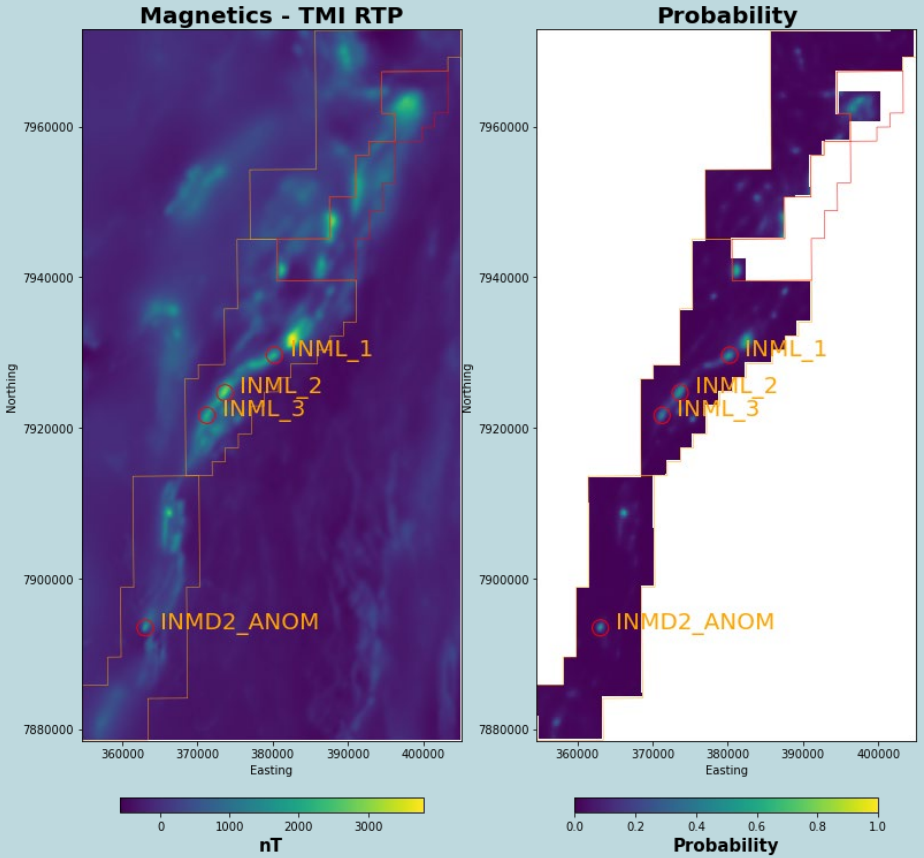
  - 60% Hydrothermal Magnetite Group
  - 55% Remaining/Other Group

- GTK2102
- Intersected a felsic to intermediate intrusive altered by veinlet networks of chlorite/mag
- Under our grouping: Assume felsic intrusive, maybe int/mafic intrusive
- Model predictions of note (> 25% chance):
  - 34% Hydrothermal Magnetite Group
  - 40% Remaining/Other Group
  - 36% Felsic Intrusive Group
  - AKA: Don't know!

Isa North Ranking IOCG Targets

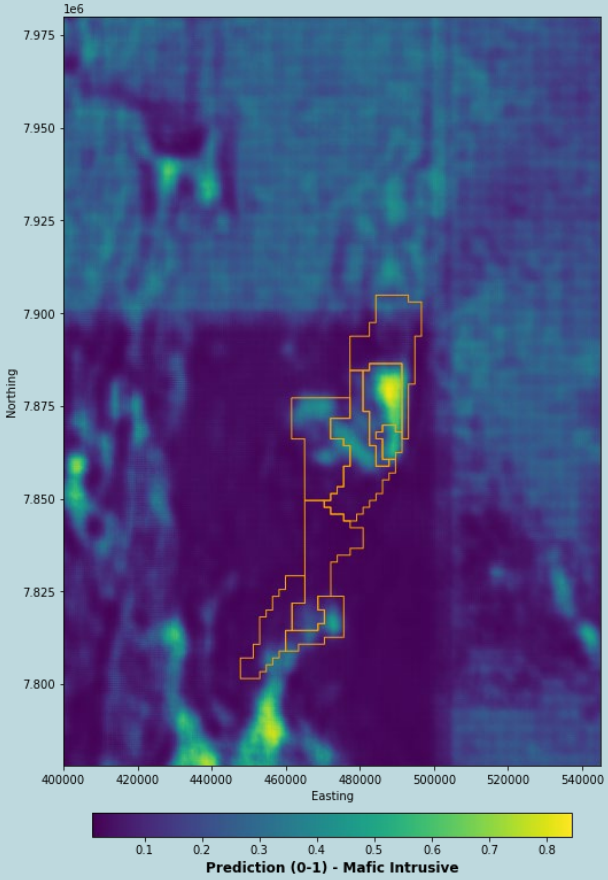
Caldera Analytics

Name	Easting	Northing	Hydro Mag Prob	Hydro Mag Uncertainty	MetaM. Mag Risk	Mafic Intrusive Risk	Project Priority
INMD0002	363050	7893450	0.56	LOW	LOW	LOW	2
INML_1	380250	7929650	0.56	MODERATE	HIGH	LOW	1
INML_2	373650	7924650	0.52	MODERATE	HIGH	LOW	3
INML_3	371250	7921650	0.44	MODERATE	MODERATE	LOW	4



Going Forward The Power of ML

Caldera Analytics



Going Forward The Power of ML

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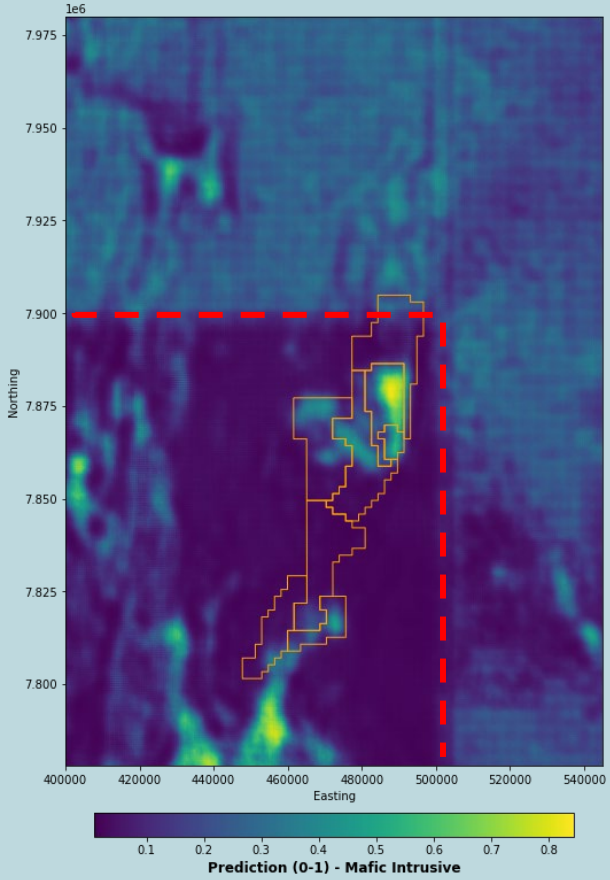

Going Forward The Power of ML

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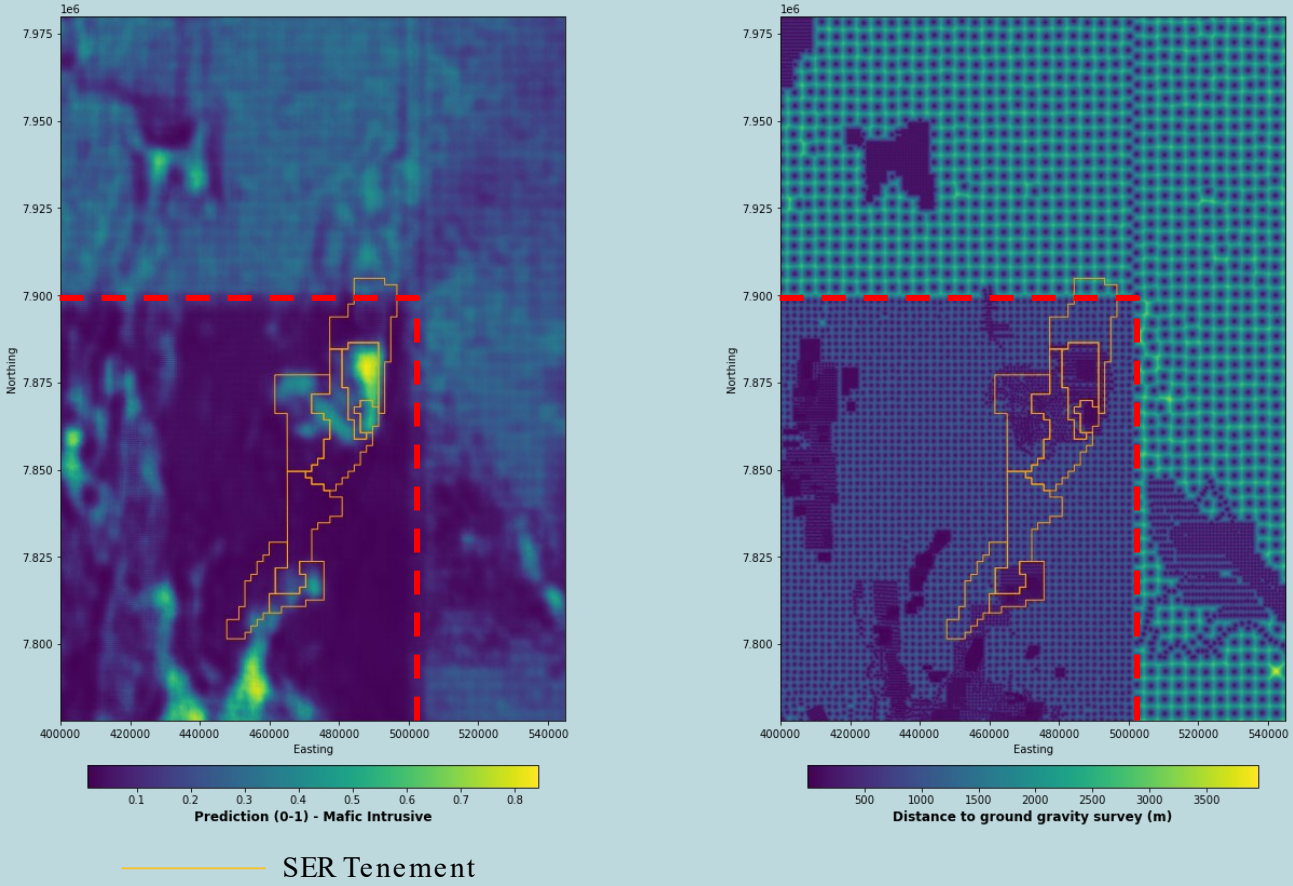


Summary

Caldera Analytics

- A powerful *complementary* decision making tool for exploration in difficult areas
- Model has highlighted some compelling and untested magnetite IOCG targets for SER's Isa projects
- Thanks to SER for trying new methods & Queensland government/GSQ for providing the pathways for new innovation to be tried

Summary

Caldera Analytics

Interested in applying these models to your own IOCG targets?
Doing geophysical heavy exploration for other deposit types?

Reach out at

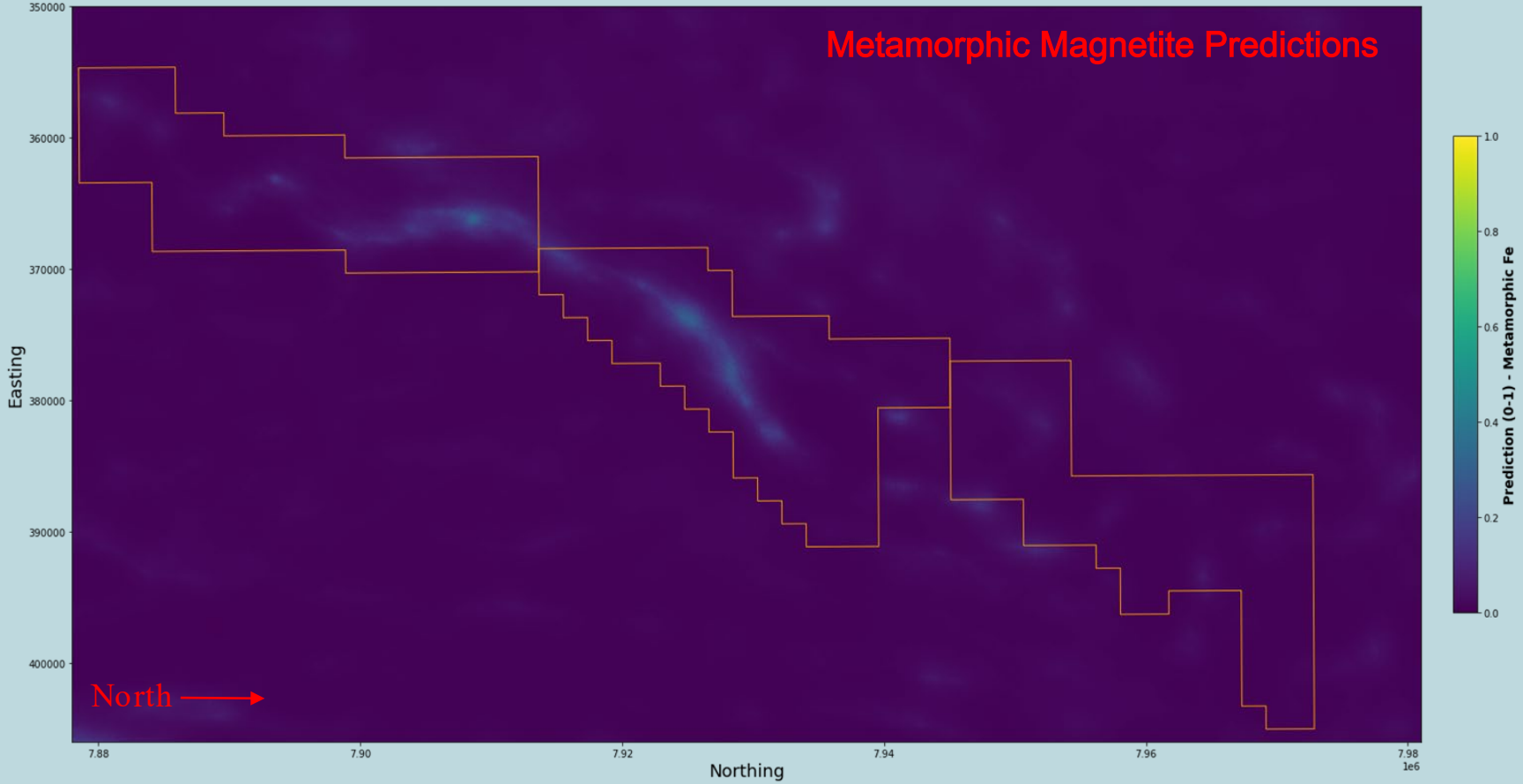
hello@caldera.technology

Thanks!

Questions?

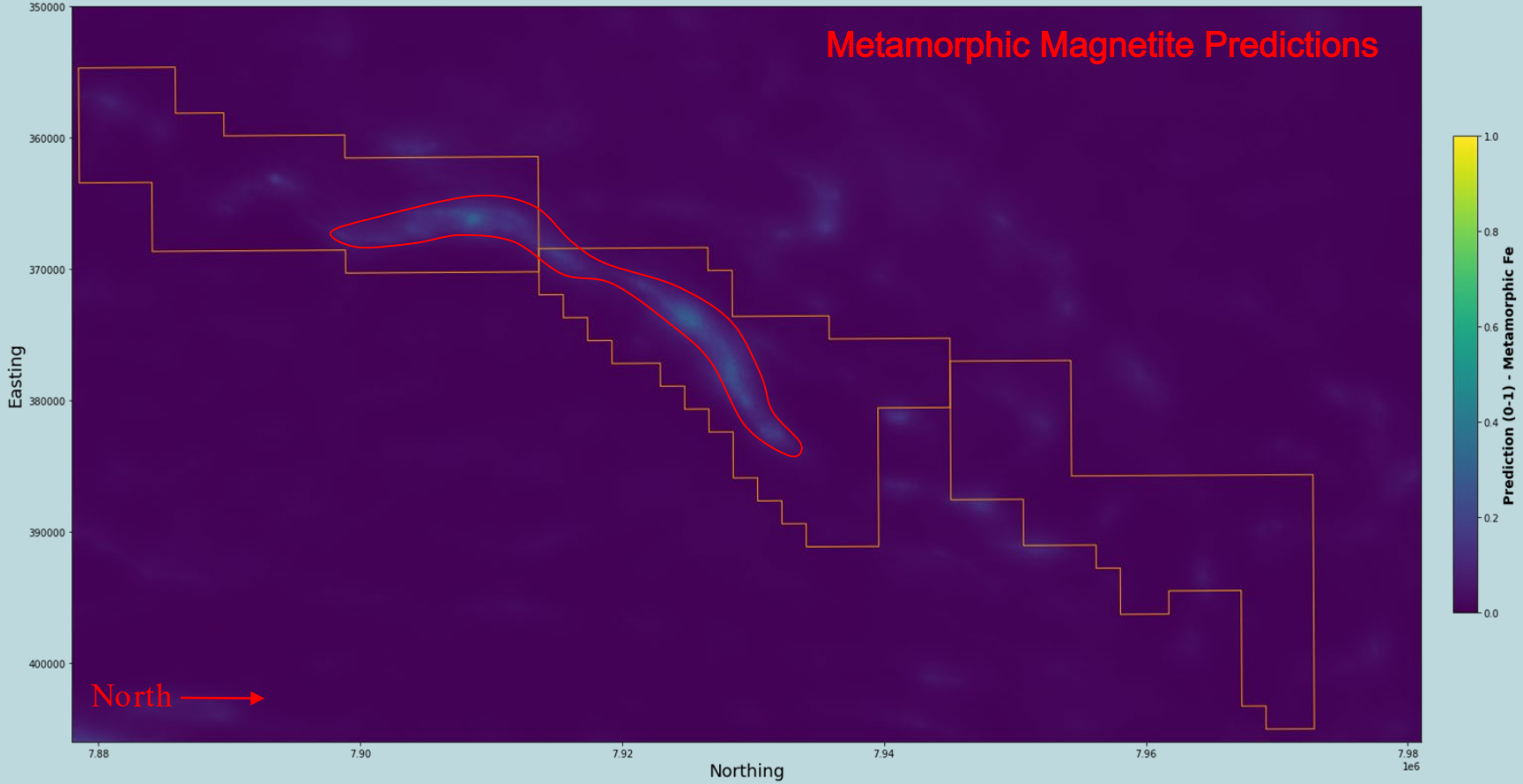
Predictions Isa North Metamorphic Magnetite

Caldera Analytics



Predictions Isa North Metamorphic Magnetite

Caldera Analytics



Predictions Isa North Metamorphic Magnetite

Caldera Analytics