

CONE

MINE EXPLORATION

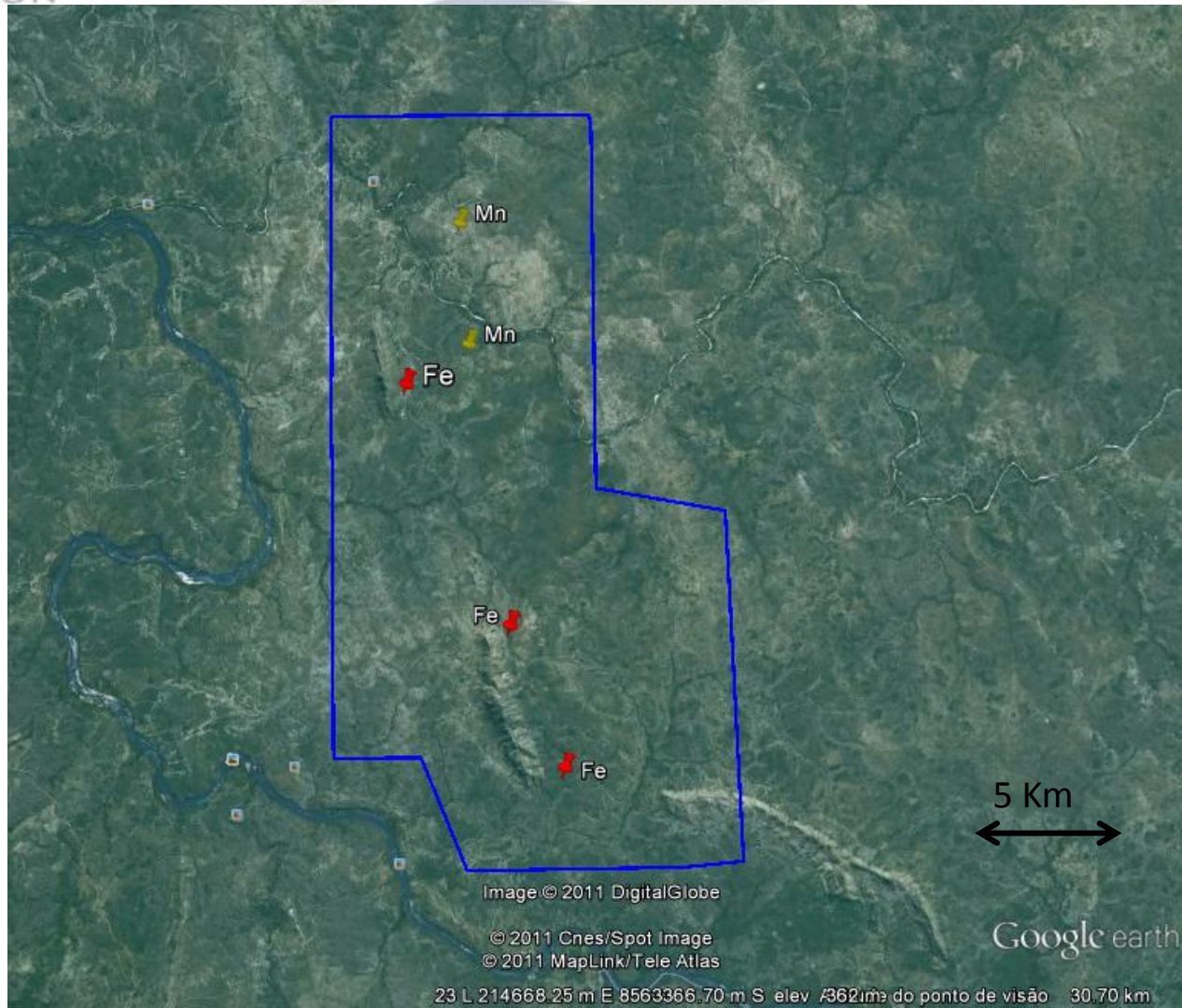
Fe-Mn Project

Belo Horizonte – Brazil

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Local of the Project

The Project is situated on the southeast of the Tocantins State, Brazil.



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Executed services

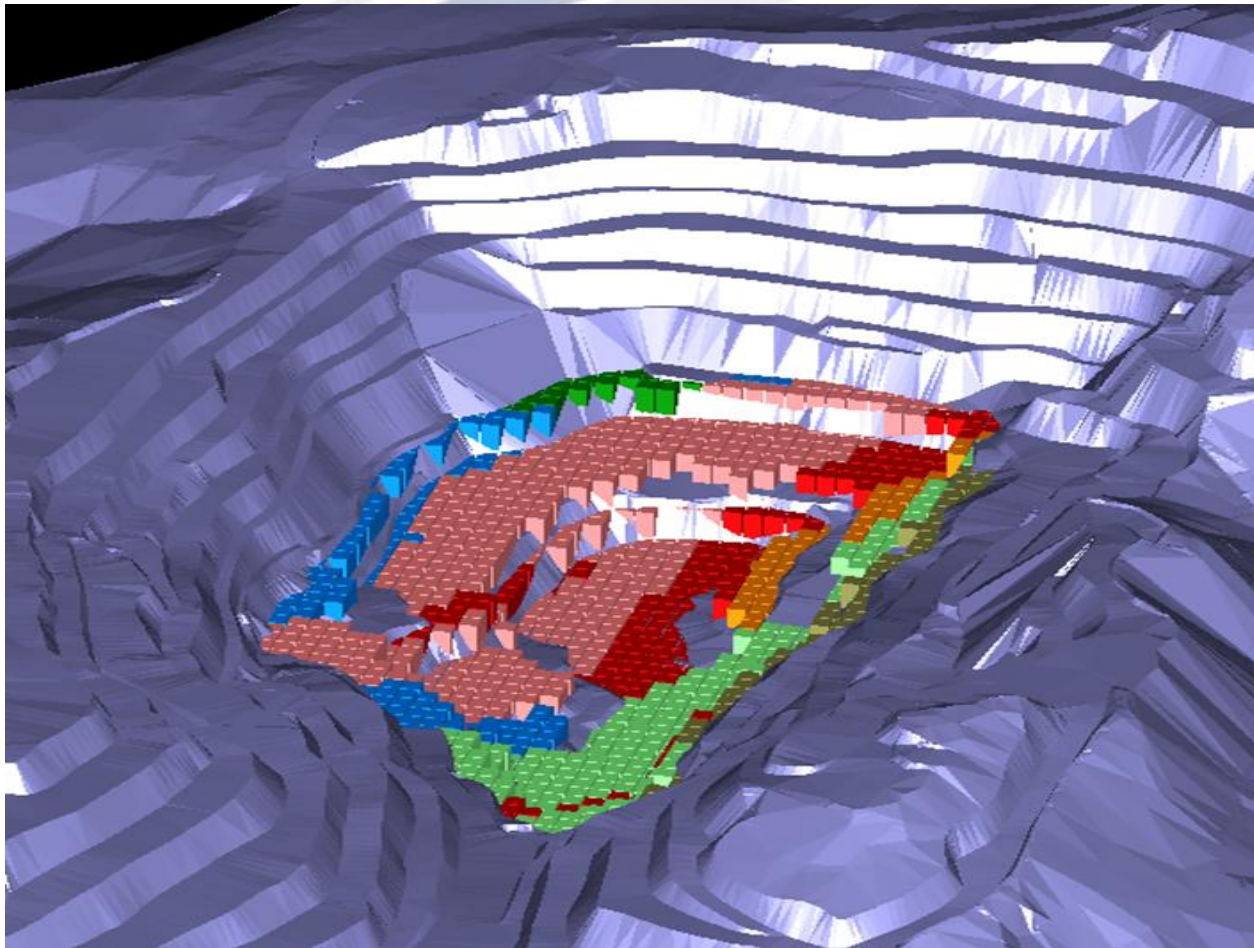
- 54 samples of the iron and manganese ore rocks were collected and examined.
- The occurrence of Mn was mapped.
- It was made two punctures of probe for the Mn without the recovery of the testimony.
- More than 4000 samples of soil were collected and examined with 13 chemistry analyses in more than 42 elements.

Results of the done services

- From the samples, it was done the delimitation of the trend of the iron ore with kilometric extensions on the centre, east and south portion of the area. Estimating a reserve of more than 800Mt.
- With the mapping they did the definition and cubage of two Mn occurrences, highlighting Canjica and Ideal. The reserve is about 300 thousand tons.
- Magnetics anomalies were detected in a extension of 8km for 5km of width, indicating a presence of iron ore and basic metals.
- With the soil samples it was identified more than 6 anomalies of Ni, Cu, Au, Co and Pd with kilometric extensions. It is similar to others brazilian and world deposits.

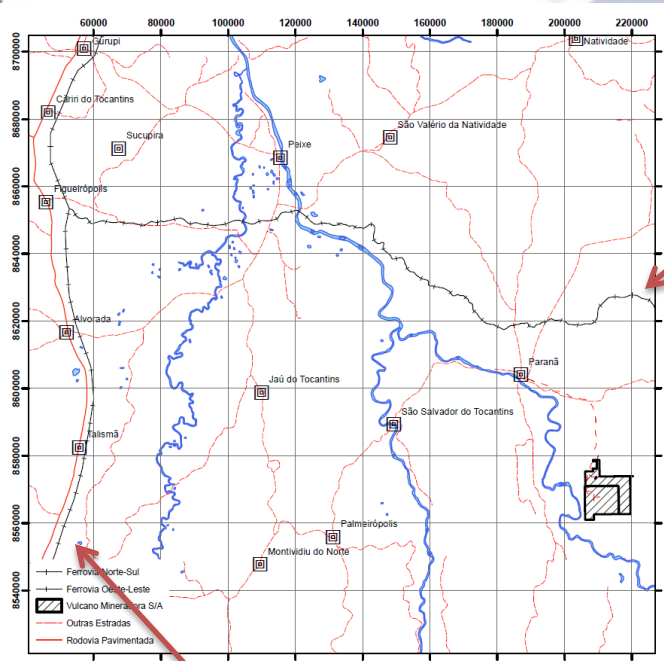
The project

There are four permissions of search on a totality of 36 thousand hectares. The potential resource of iron is almost 800Mt to 1,2Bt, that means that the project is a “World Class” (when the resource proved is more than 400Mt) and the grade of iron is between 38% and 47%. The reserve measured, indicated and inferred of Mn is something of 300 thousand tons and with 42% of a medium grade of Mn.



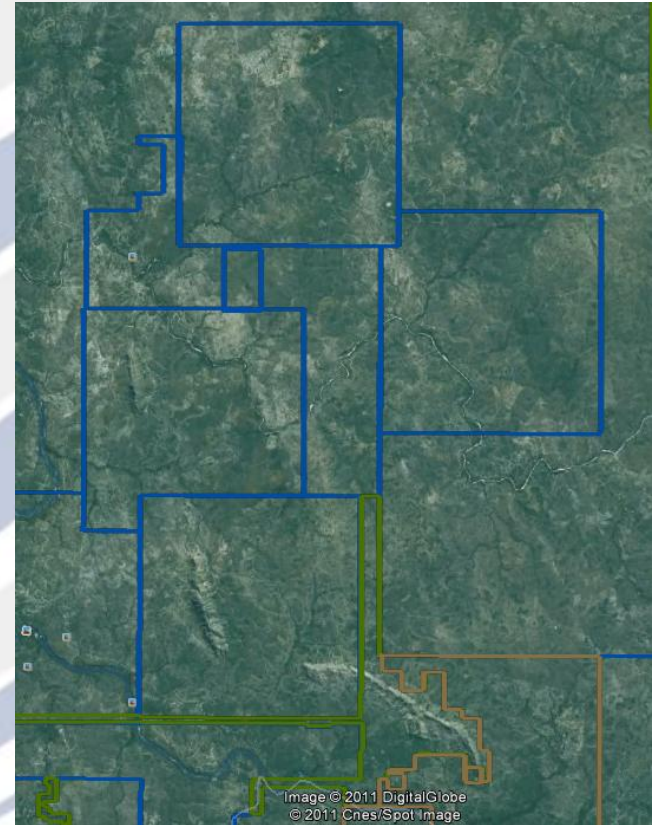
Logistic

- There are 150km of North-South railway and a project that has already been implemented of 60km of East-West railway.
- The states and federal roads are on excellent conditions.
- The rivers Paranã, Arraias and Maranhão are water resources and, on 30km of distance from the project area there is the San Salvador Hydroelectric.
- On the distance of 35 km there is Paranã City (TO) which could be the base city for the development of the project.

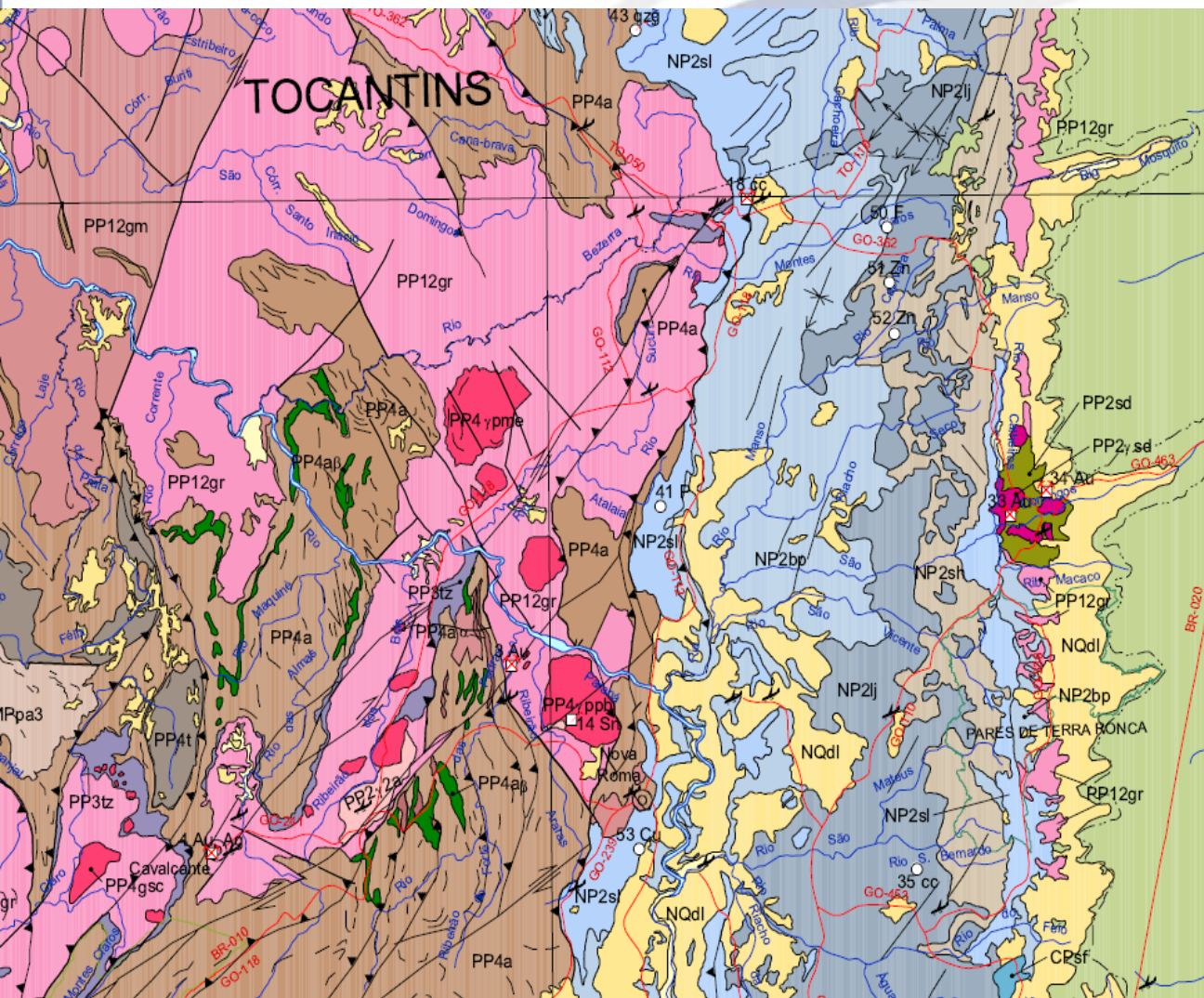


East-West Railway – 60km

North-South Railway – 150km



Local Geology



	UNIDADE GEOLÓGICA	UNIDADE LITOLÓGICA	UNIDADE LITOLÓGICA
1	Complexo Metamórfico do Tocantins (CMT)	1.1 - Gneiss e Migmatito	1.2 - Quartzito
2	Sílex	2.1 - Sílex	2.2 - Sílex
3	Schisto	3.1 - Schisto	3.2 - Schisto
4	Quartzito	4.1 - Quartzito	4.2 - Quartzito
5	Granito	5.1 - Granito	5.2 - Granito
6	Sedimentar	6.1 - Arenito	6.2 - Argilito
7	Basalto	7.1 - Basalto	7.2 - Basalto
8	Diáspiro	8.1 - Diáspiro	8.2 - Diáspiro
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Manganese Ore

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Economic Model

Projeto Manganeés Tocantins

<u>Assumptions</u>	<u>Unit</u>	<u>Worst Case</u>	<u>Base Case</u>	<u>Best Case</u>
Resource *	t	200.000,00	200.000,00	200.000,00
ROM /year	t	100.000,00	100.000,00	100.000,00
Recuperation Production	%	100,00	100,00	100,00
Production output (Lump ore)	t / year	70.000,00	70.000,00	70.000,00
Production output (sinter feed)	t / year	30.000,00	30.000,00	30.000,00
Mine life	years	2	2	2
Exploration + Capex (100% Equity)	US\$m	359.700,00	359.700,00	359.700,00
<u>Opex Total</u>	<u>US\$/t</u>	<u>161,79</u>	<u>161,79</u>	<u>161,79</u>
Opex (Mining+Prod.+Admin)	US\$/t	91,79	91,79	91,79
Opex Logistics	US\$/t	70,00	70,00	70,00
Sale Price (lump @ 42%) CIF Siderugas	US\$/t	168,00	210,00	252,00
Sale Price (Fines @ 35%) CIF Siderugas	US\$/t	84,00	105,00	126,00
Total Revenue Year	US\$m/y	11.760.000,00	17.850.000,00	17.640.000,00
Total Operational Expenses Year	US\$m/y	11.504.850,00	11.504.850,00	11.504.850,00
Net Income (variable) - range from 0,10	US\$m/y	255.150,00	6.345.150,00	6.135.150,00
IRR (Unlev. after Tax) - Operation (no research costs)	%		1768,3%	
NPV @ 10% Discount Rate	US\$m		9.684.131	

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The reserves Calculations

Body	Resource	Thickness (m)	Extension (m)	Depth (m)	Depth (m)	Volume (m3)	Density (t/m3)	Ton. (t)	Reserve			
									Measured	Indicated	Infered	Potential
Canjica	Measured	5,0	150	0 a 20m	20	15.000	4,00	60.000	60.000	-	-	-
	Indicated	5,0	150	0 a 20m	20	15.000	4,00	60.000		60.000	-	-
	Infered	5,0	150	0 a 20m	20	15.000	4,00	60.000	-	-	60.000	-
	Potential	5,0	300		20	30.000	4,00	120.000	-	-	-	120.000
	Total								60.000	60.000	60.000	120.000
									180.000			
Measured												
Indicated												
Infered												
				75m	75m	50m	50m	50m	75m	75m		
		Depth	5m									
			5m									
			5m									
			5m									
Body	Resource	Thickness (m)	Extension (m)	Depth (m)	Depth (m)	Volume (m3)	Density (t/m3)	Ton. (t)	Reserve			
									Measured	Indicated	Infered	Potential
Ideal	Measured	5,0	100	0 a 20m	20	10.000	4,00	40.000	40.000	-	-	-
	Indicated	5,0	100	0 a 20m	20	10.000	4,00	40.000		40.000	-	-
	Infered	5,0	100	0 a 20m	20	10.000	4,00	40.000	-	-	40.000	-
	Potential	5,0	100	0 a 20m	20	10.000	4,00	40.000	-	-	-	40.000
	Total								40.000	40.000	40.000	40.000
									120.000			
Measured												
Indicated												
Infered												
				50m	50m	50m	50m	50m	50m			
		Depth	5m									
			5m									
			5m									
			5m									

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Strategies

The reserve can reach 500 thousand tons, and the extension of 5km haven't been researched yet. The ore is already on a condition to be mined, with an initial investment of nearly U\$ 360 thousand using outsourcing services for the operation (as it has been predicted on the economic model). Although, it is necessary to obtain the Guide of Use to mine (Can be started on 2012).



Iron Ore

Belo Horizonte – Brazil

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Economic Model

Projeto Ferro Tocantins

<u>Assumptions</u>	<u>Unit</u>	<u>Worst Case</u>	<u>Base Case</u>	<u>Best Case</u>
Resource	t	800.000.000,00	800.000.000,00	800.000.000,00
ROM/year	t	36.000.000,00	36.000.000,00	36.000.000,00
Recuperation Production	%	45,00	45,00	45,00
Production output (Pellet feed)	t / year	16.200.000,00	16.200.000,00	16.200.000,00
Mine life	years	22	22	22
Exploration + Capex (100% Equity)	US\$m	981.190.000,00	1.989.960.000,00	981.190.000,00
<u>Opex Total</u>	<u>US\$/t</u>	<u>64,66</u>	<u>74,47</u>	<u>64,66</u>
<i>Opex Operation</i>	<i>US\$/t</i>	<i>14,21</i>	<i>24,01</i>	<i>14,21</i>
<i>Opex Administration</i>	<i>US\$/t</i>	<i>21,60</i>	<i>21,60</i>	<i>21,60</i>
<i>Opex Logistics</i>	<i>US\$/t</i>	<i>28,85</i>	<i>28,85</i>	<i>28,85</i>
Sale Price (pellet feed @ 67%) FOB Porto (dmtu)	US\$/t	112,00	140,00	168,00
Total Revenue	US\$m/y	1.814.400.000,00	2.268.000.000,00	2.721.600.000,00
Total Operational Expenses Year	US\$m/y	963.400.000,00	963.400.000,00	963.400.000,00
Net Income (variable) - range from	US\$m/y	851.000.000,00	1.304.600.000,00	1.758.200.000,00
0,10				
IRR (Unlev. after Tax) - Operation (no research costs)	%		40,5%	
NPV @ 10% Discount Rate	US\$m		5.313.614.106,14	

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Strategies

The production of Mn can afford the research of Fe, and the investment on the first phase, 6 months length, is R\$ 580 thousand reais and, on the second phase, 18 months length, is R\$ 6.0 millions reais. If the research is developed following the schedule, it can reach resources indicated and inferred of 1Bt.

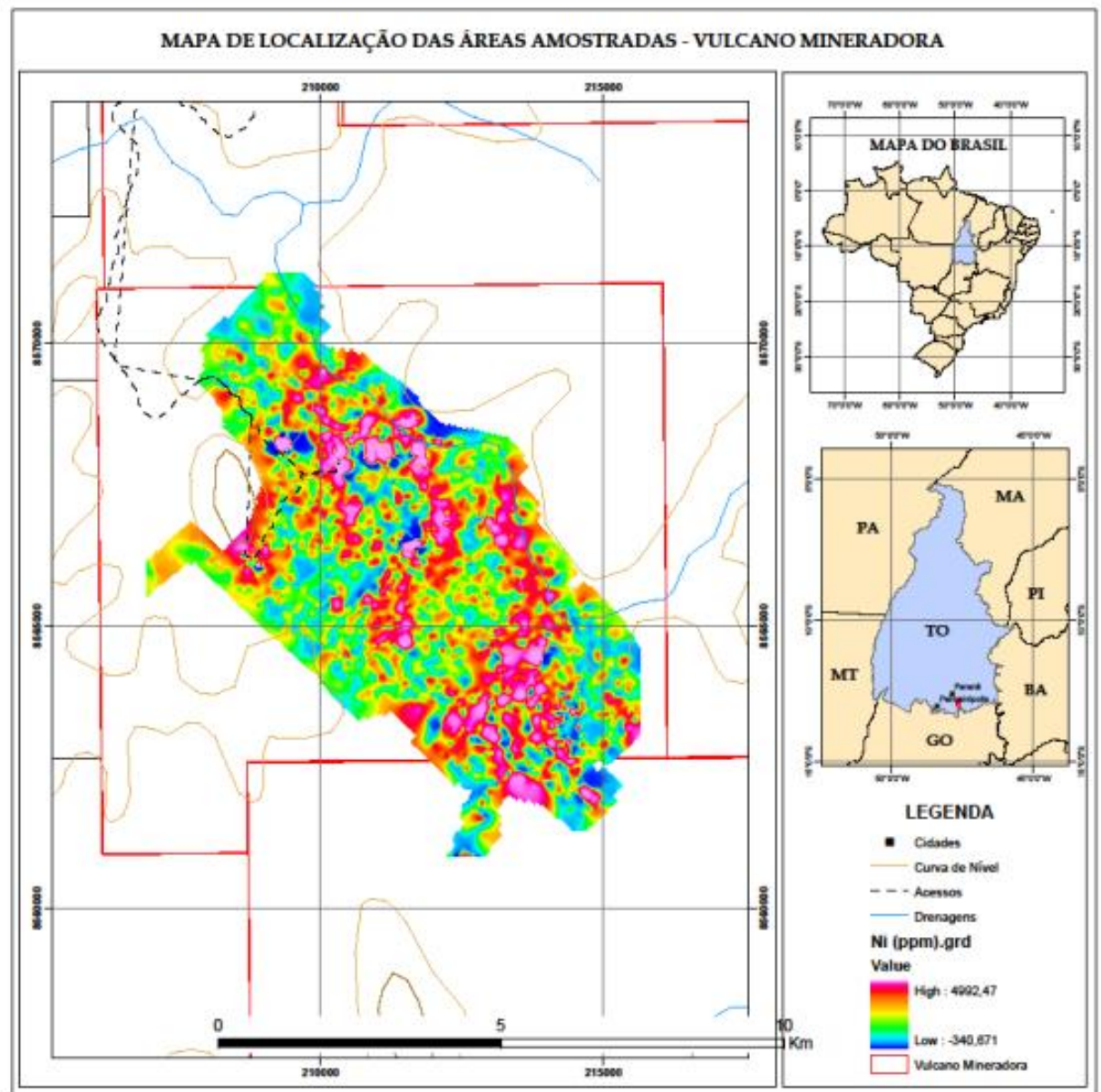


Geochemical Anomalies

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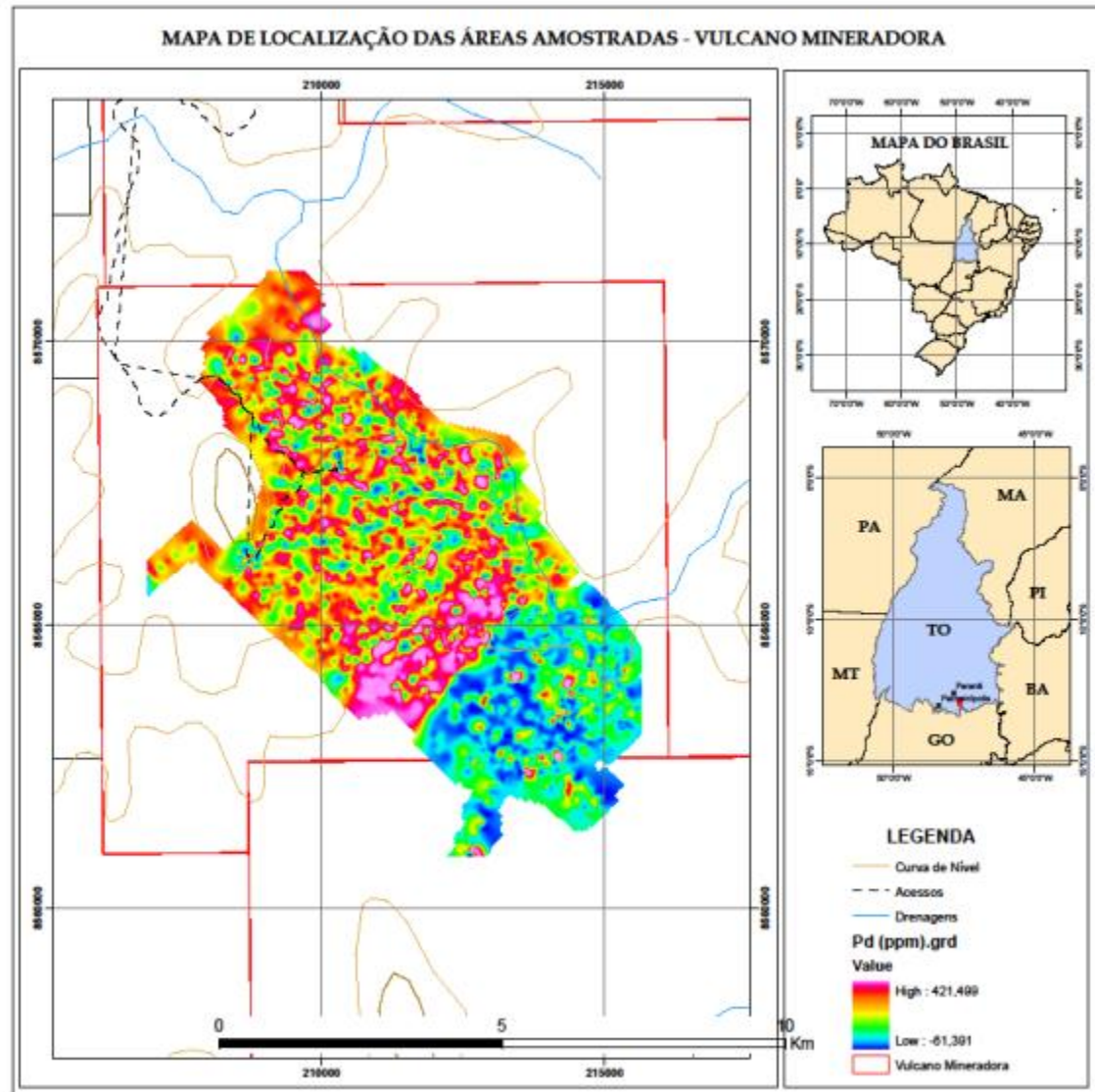
Nickel



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Palladium



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