

II EU-Latin America dialogue on Raw Materials
II Diálogo UE-América Latina sobre Matérias-primas
II Diálogo UE-América Latina sobre materias primas

22-23|09 2015 Cartagena de Indias Colombia



Colombia's geological survey: Contributing to the mining value chain



MINMINAS



**TODOS POR UN
NUEVO PAÍS**

PAZ EQUIDAD EDUCACIÓN



AGENDA

- 1. GEOLOGICAL SURVEY OF COLOMBIA (SGC)**
- 2. WHY GEOSCIENTIFIC INFORMATION FOR MINING?**
- 3. PRODUCING GEOSCIENTIFIC INFORMATION**
- 4. AVAILABLE INFORMATION TO THE MINING VALUE CHAIN**





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GEOLOGICAL SURVEY OF COLOMBIA (SGC)

2016, hundred years generating geoscientific knowledge

During 99 years, the Geological Survey of Colombia, as a science and technology institution, have been generating information and knowledge on the natural environment for the Colombian society.

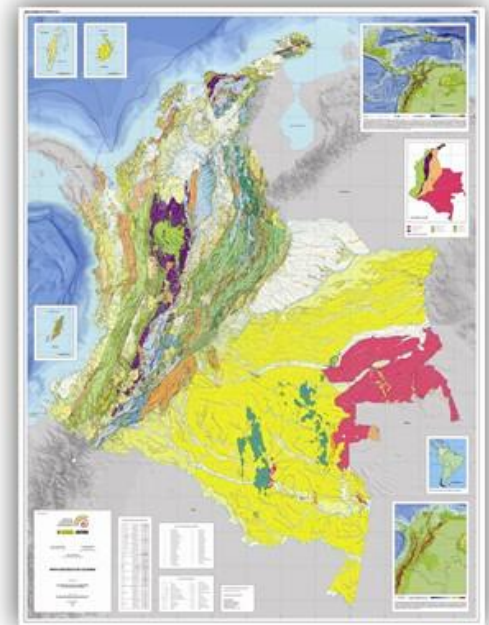




GEOLOGICAL SURVEY OF COLOMBIA (SGC)

The Geological Survey of Colombia is committed to the social and economic development of the country, through:

- ✓ Basic research in geosciences
- ✓ **Research of the potential of subsoil resources: Minerals, hydrocarbons, groundwater, geothermic**
- ✓ Research, evaluation and monitoring of geo-hazards
- ✓ Research and application of nuclear technology





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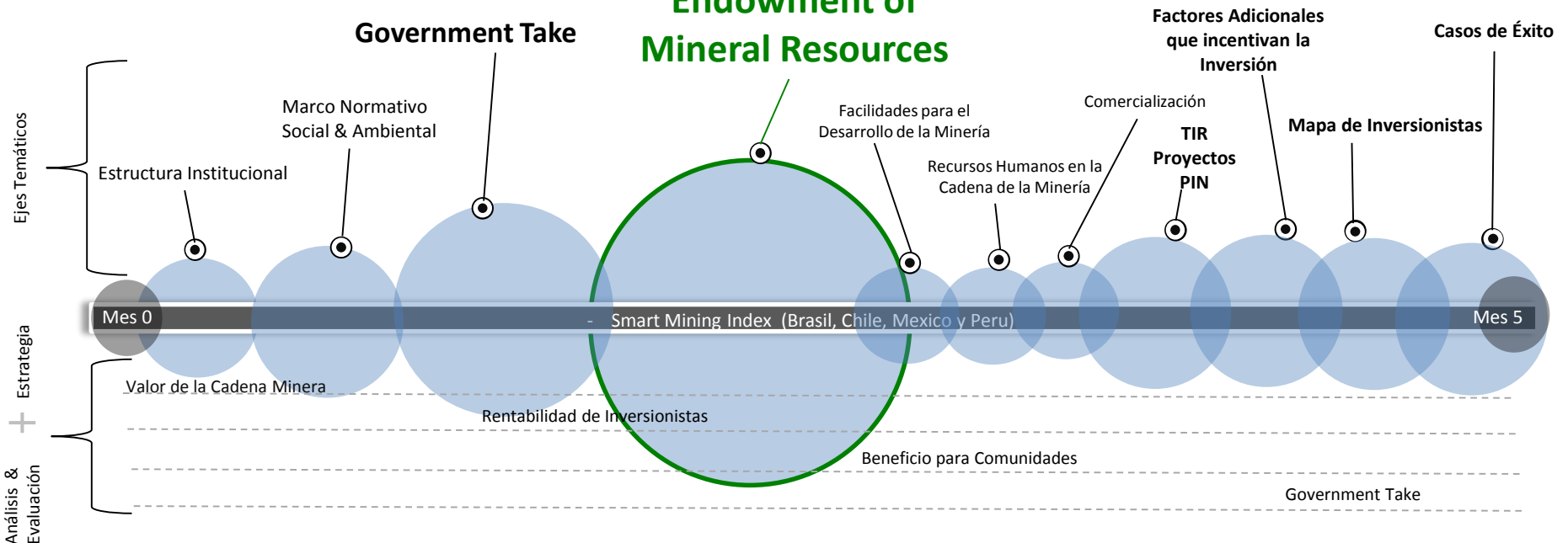


Consolidate Investment in Mining

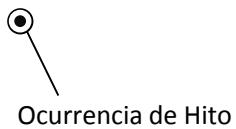
Thematic Axes, Dedication, Importance & Schedule

SGC

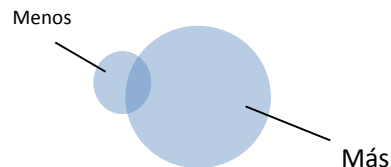
Endowment of Mineral Resources



Milestones



Importance



Dedication

Promedio
Mayor

Pillars

Drivers



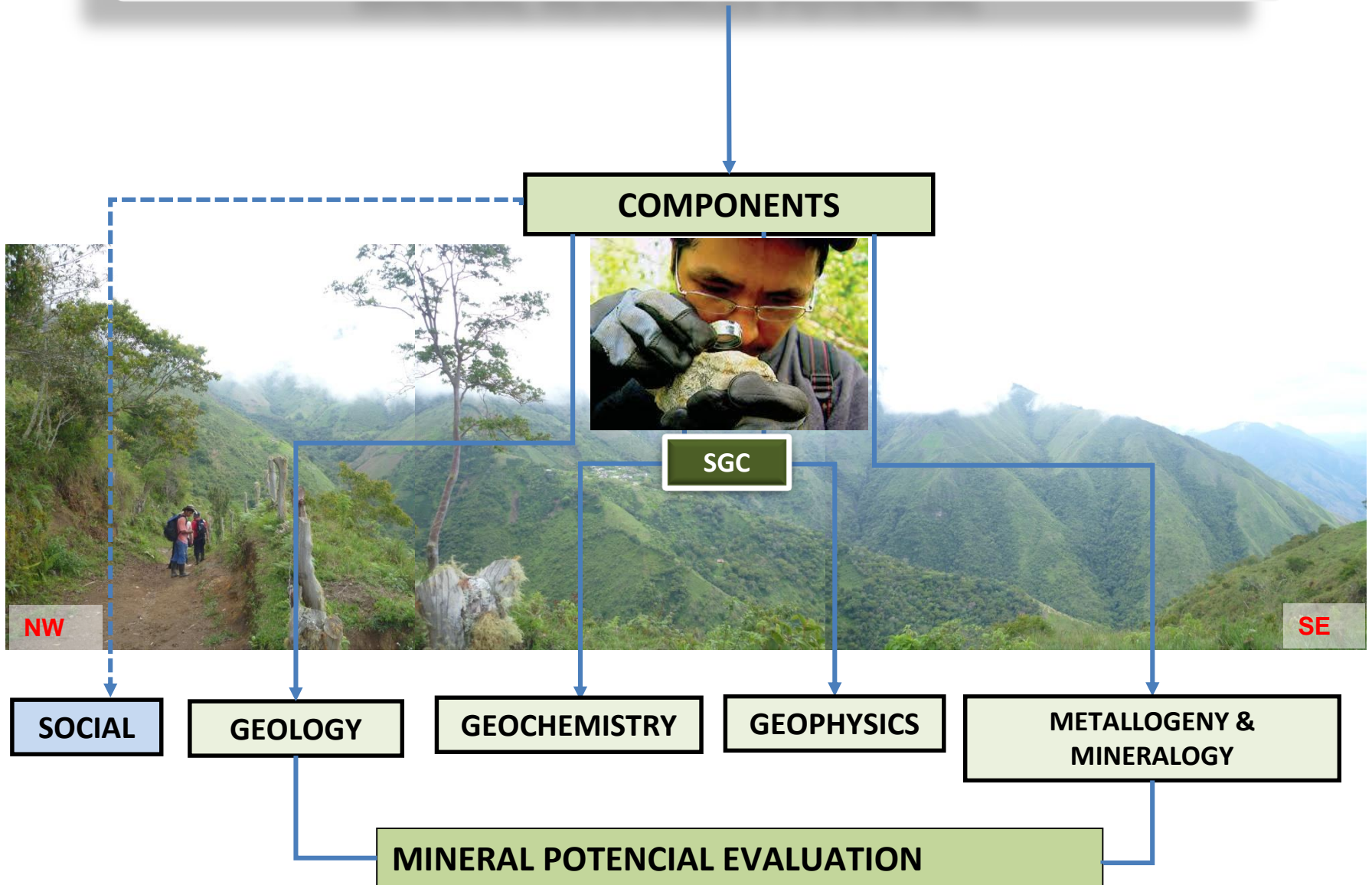
AGENDA

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MINERAL RESOURCES POTENTIAL

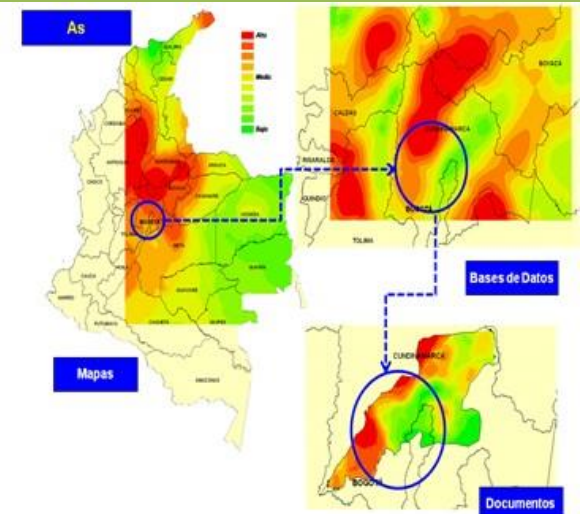
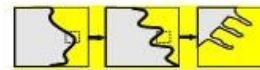
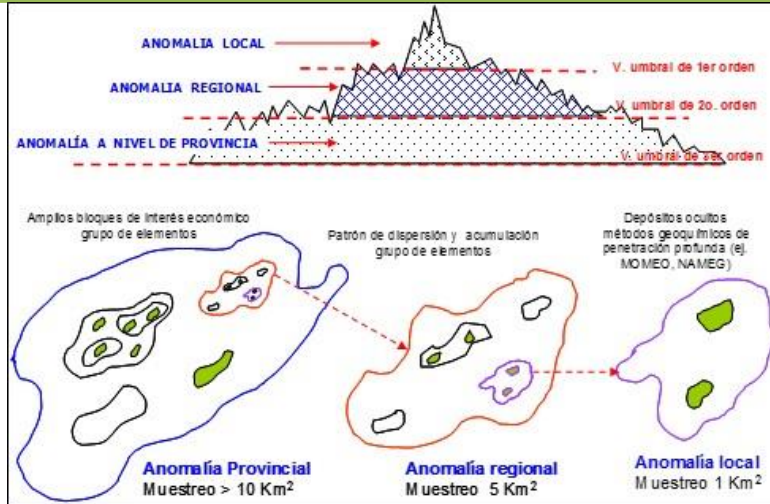




UPDATED EXPLORATION STRATEGIES

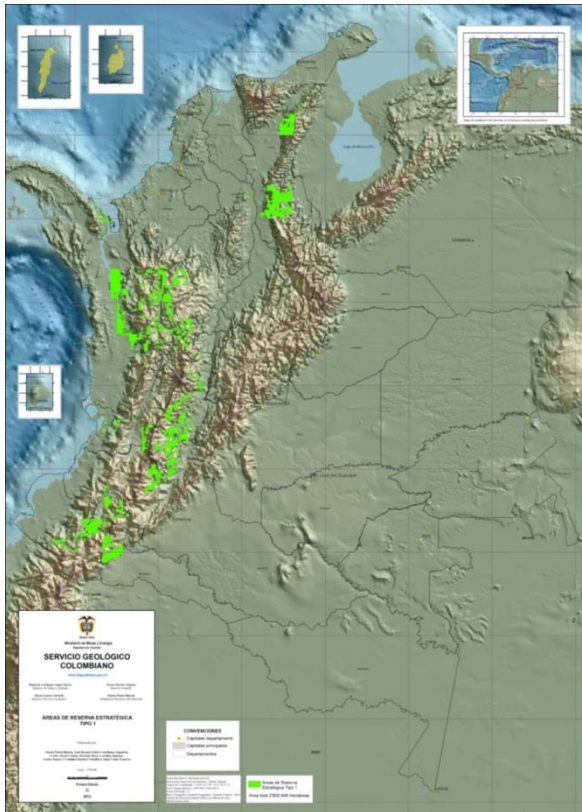
SYSTEMATIC COVERING, VARIOUS SCALES, DIVERSE SAMPLE TYPES, UPDATED ANALYTICAL METHODOLOGIES, MULTIVARIATE DATA PROCESSING, GIS ANALYSIS AND MODELING, HOLISTIC INTERPRETATION

1. *Obtain a global visión of a territory*
2. *Progressively reduce the target area*
3. *Get the most of information*
4. *Select areas of interest*

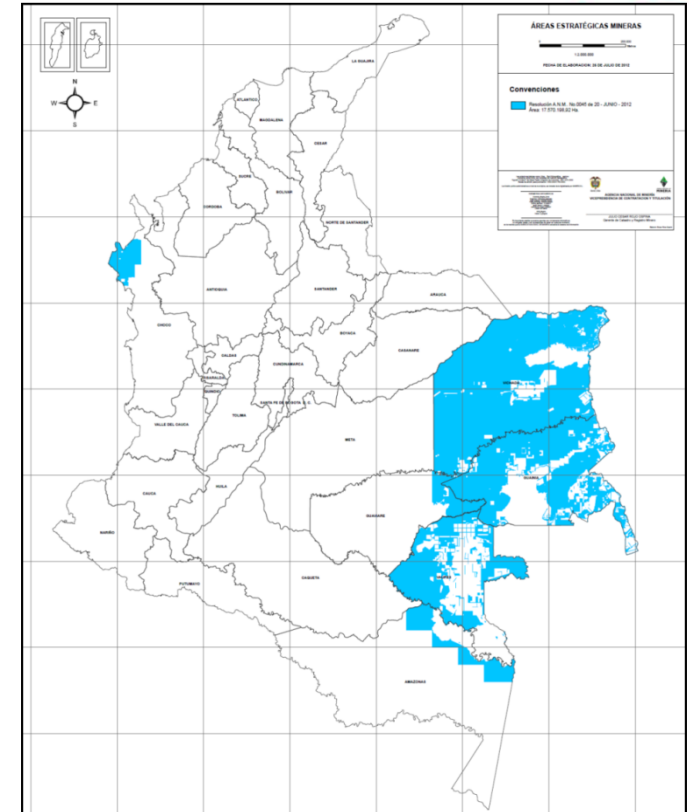


OPTIMIZE RESOURCES AND TIME

GOVERNMENT PLANS AND GOALS



SGC



Resolution 18-0241 MME February 24 - 2012
2.900.000 ha

5 years

Resolution 0045 ANM June 21- 2012
17.050.198 ha

10 years

STRATEGIC MINING AREAS (SMA)

(Au, Pt, Cu, Fe, Coltan, K, Fosfatos (P_2O_4), Mg, C-metalúrgico y U)

Resolución 180102 MME – enero 30/2012



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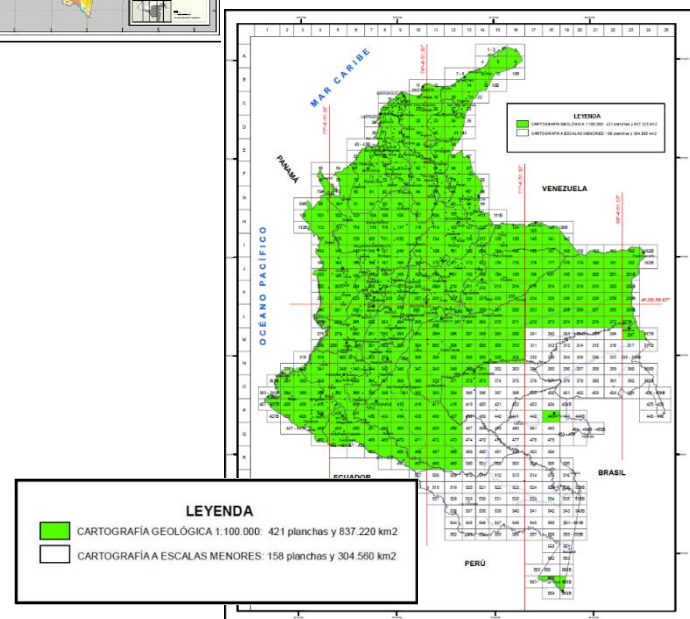
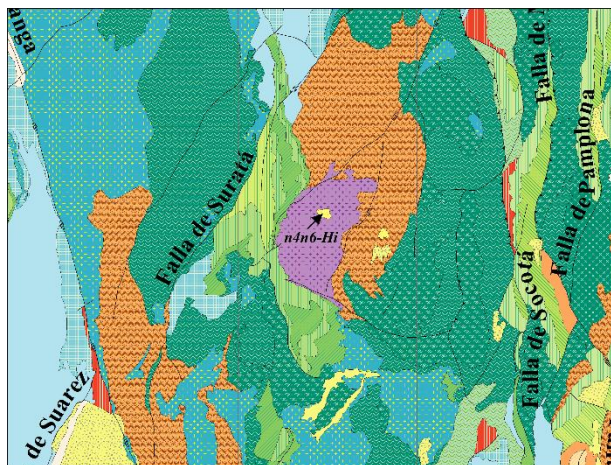
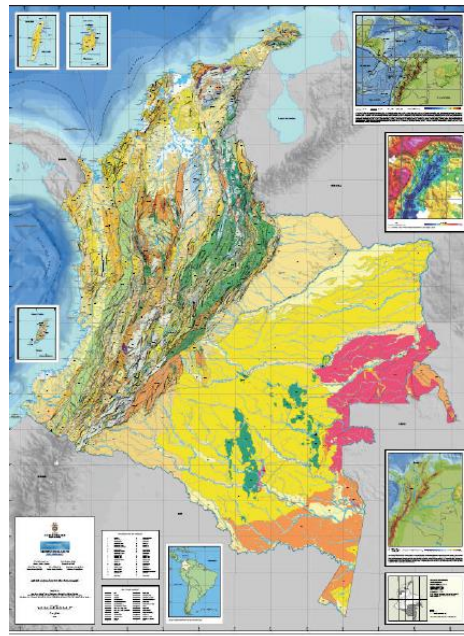


GEOLOGICAL INFORMATION

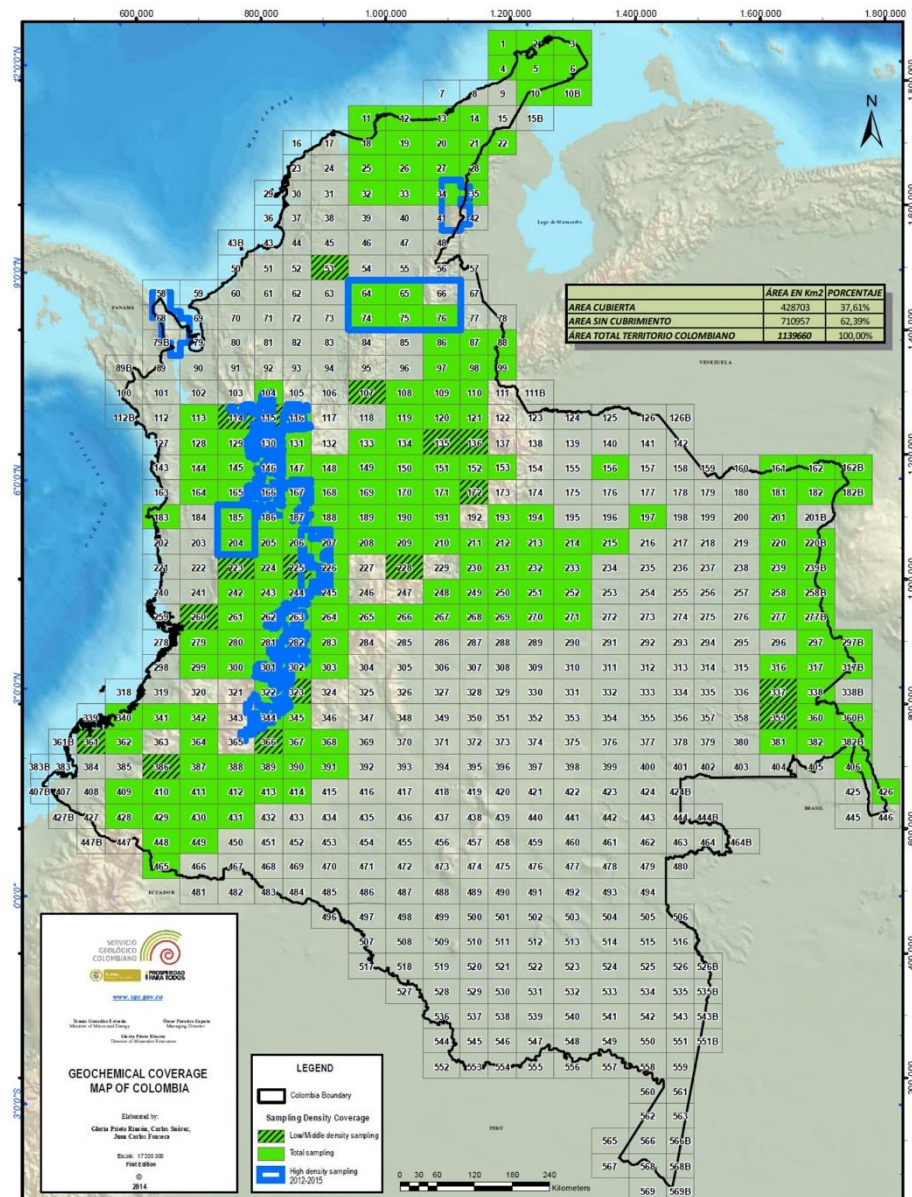


REGIONAL GEOLOGY

- Goal to 2016: 73 % of the colombian territory (1:100.000)
- Advances in 1:50.000 scale



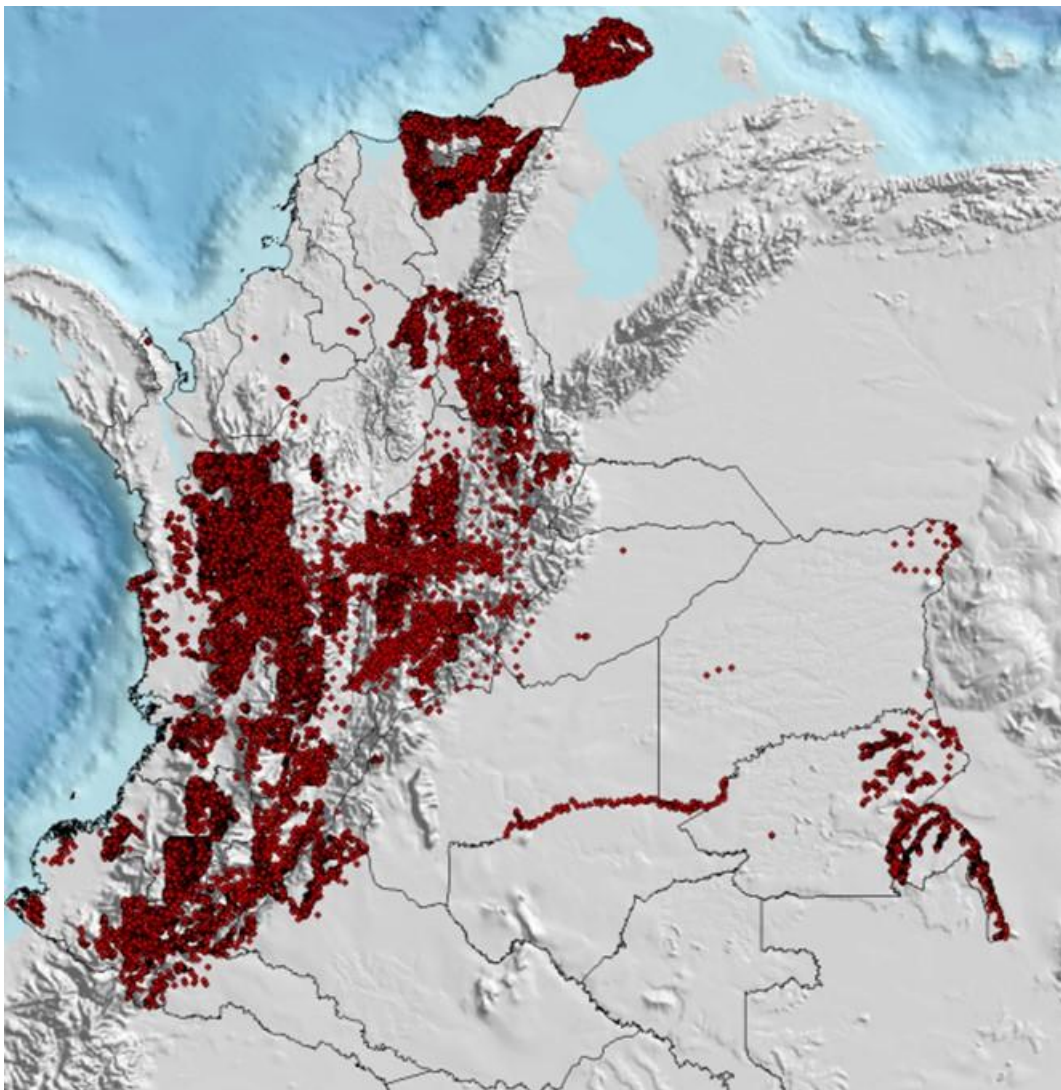
GEOCHEMICAL INFORMATION



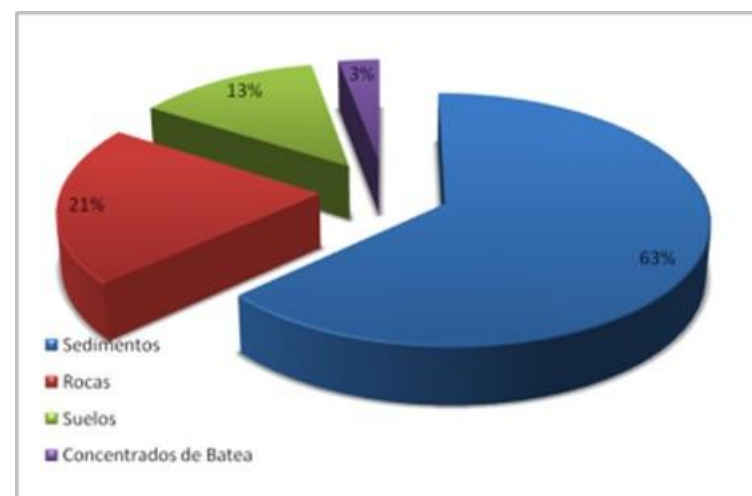
REGIONAL GEOCHEMISTRY



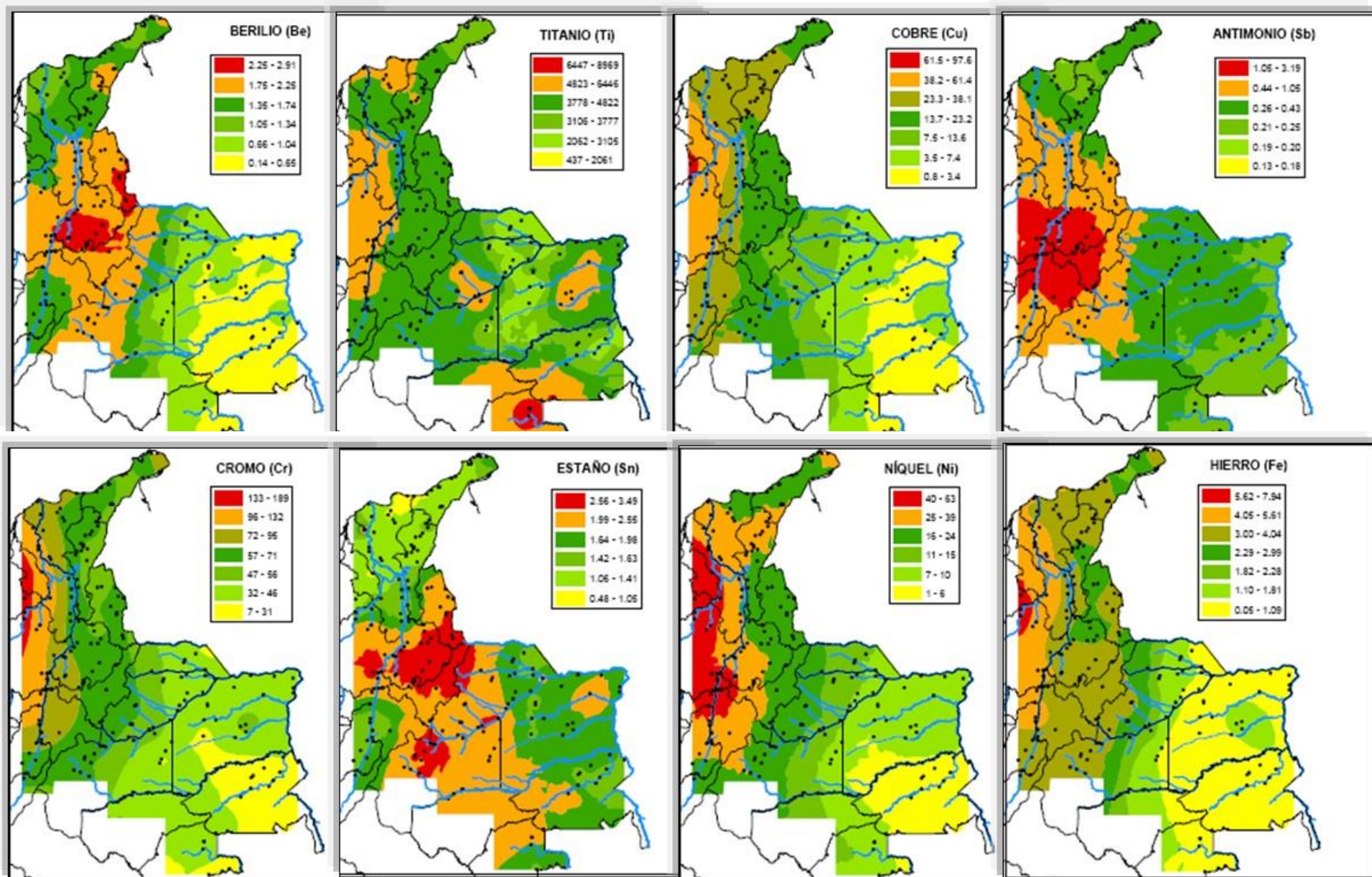
GEOCHEMICAL DBASE



Sample	Data
Stream Sediments	98435
Rocks	64995
Soils	23227
Panned concentrates	4212

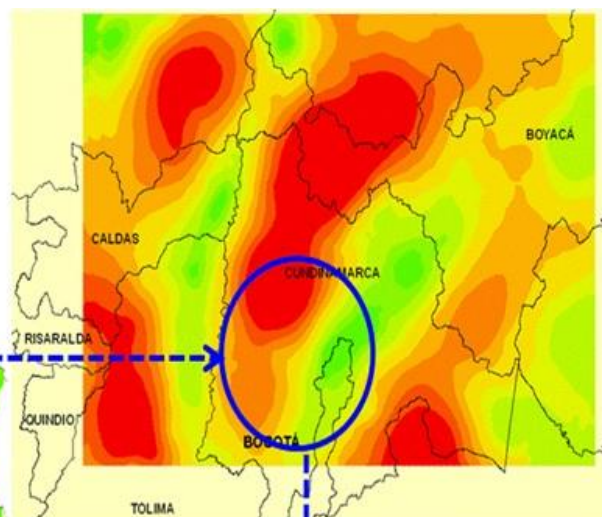
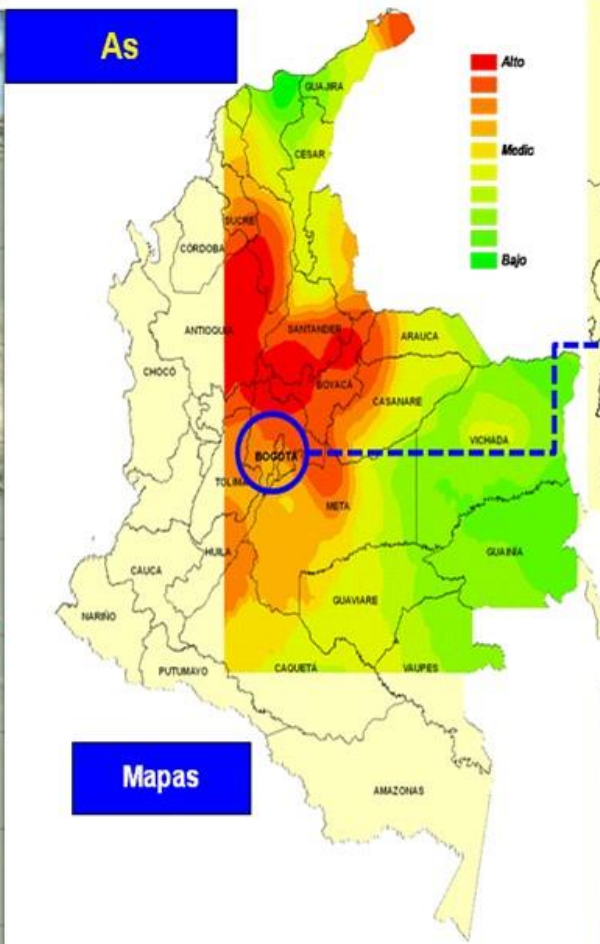
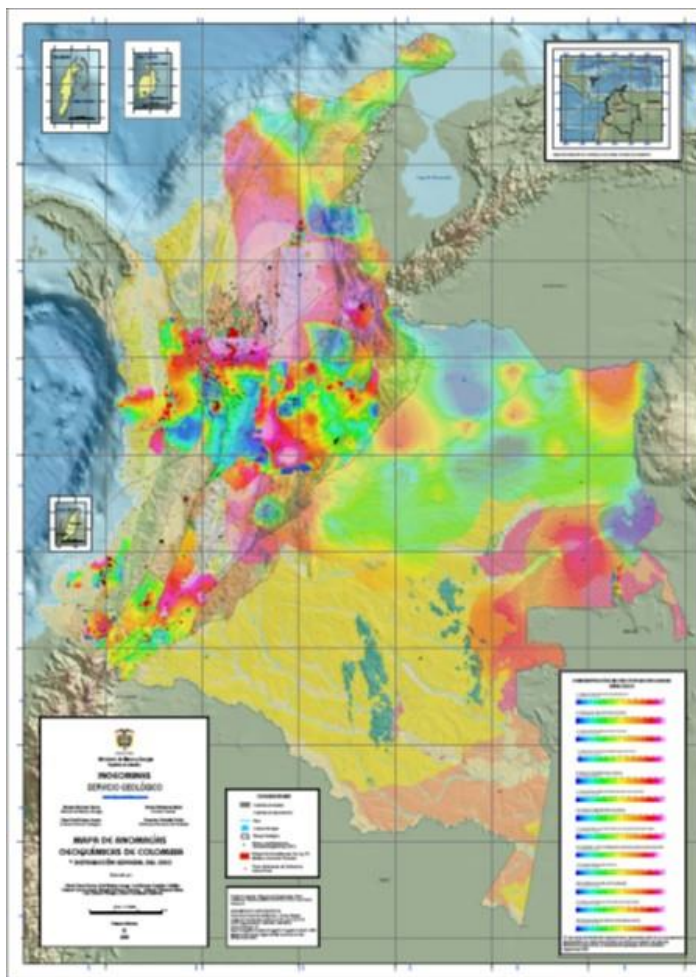


GEOCHEMICAL DOMINES (ULD)

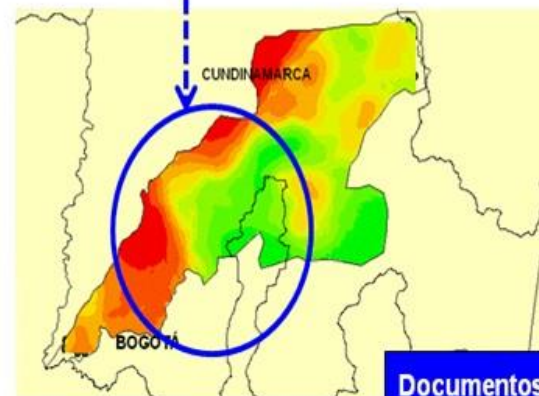




GEOCHEMICAL DISTRIBUTION MAPS

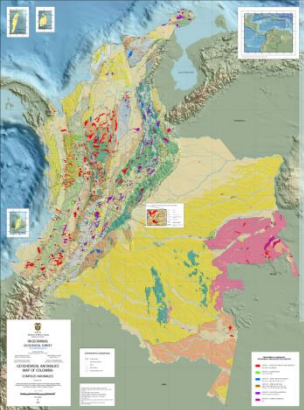


Bases de Datos



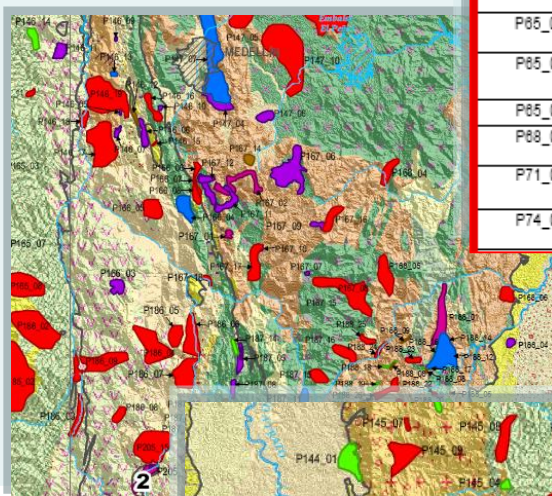
Documentos

Proyecto Línea Base Geoquímica Global
Proyecto UNESCO IGCP 269-360
Task Group on Geochemical Baselines 2010 - 2015



GEOCHEMICAL ANOMALIES FOR MINERAL RESOURCES EXPLORATION

- GROUP 1 - PRECIOUS METALS AND MINERALS (Au, Ag, Pt, Emeralds)
- GROUP 2 - BASE METALS (Cu, Zn, Pb, Sn)
- GROUP 3 - STEEL INDUSTRY METALS (Fe, Cr, Co, Mn, Mo, Ni, Nb, W, V)
- GROUP 4 - SPECIAL METALS (Mg, Ti, Be, REE, Ga, Zr, Hf, Se, Te, Ta, Cd, Y, In, Si, Bi, Hg, Sb, Li, Ge, Re)
- GROUP 5 - INDUSTRIAL MINERALS (Al, B, P, Na, K, Ca, Ba, S)
- GROUP 6 - ENERGY MINERALS (U)

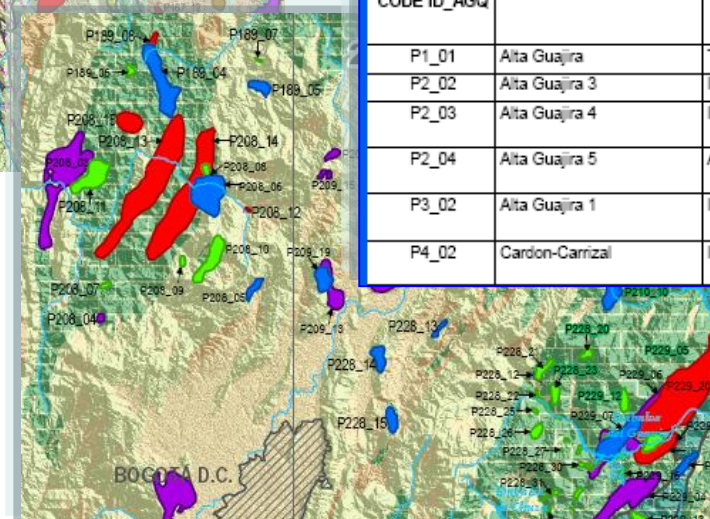
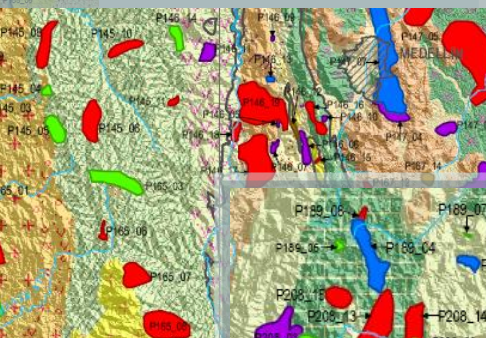
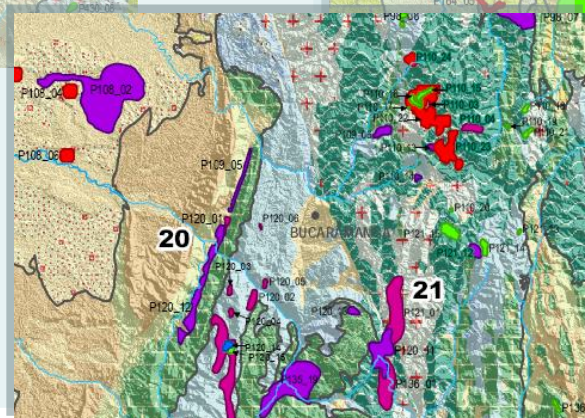
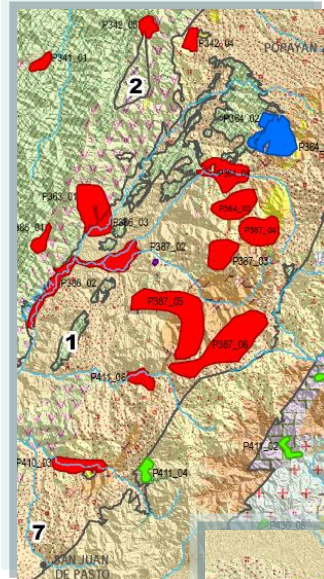


HIGH GEOCHEMICAL POTENTIAL		
ANOMALY CODE ID_AGQ	ANOMALY NAME	ELEMENT, GEOCHEMICAL ASSOCIATION OR MINERAL
P84_02	Santa Cruz	Au, Ag
P84_04	Paratebueno sur	Au, Ag
P85_04	La Puya-La Chiva-Vida	Au, Ag
P85_05	Sur de Bolívar 1	Au, Ag
P85_06	El Piñal	Au, Ag, Cu
P88_02	Acandí	Cu-Mo
P71_01	Planeta Rica	Ni, Fe
P74_01	Sur de Bolívar 3	Au, Ag, Cu

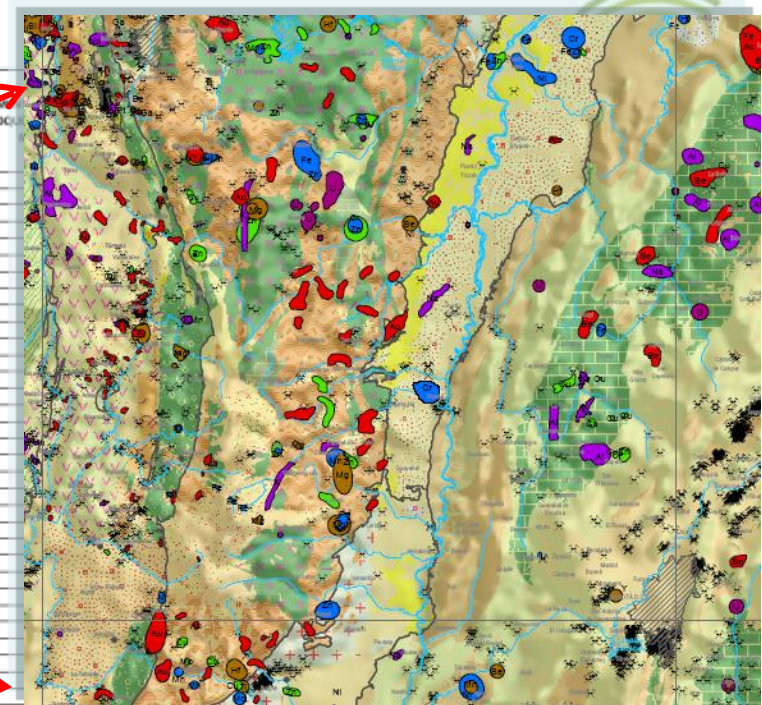
GEOCHEMICAL ANOMALIES

Anomalies	Classification
160	HIGH
421	MIDDLE
832	LOW

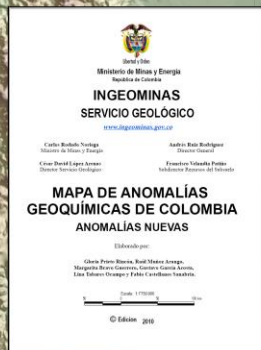
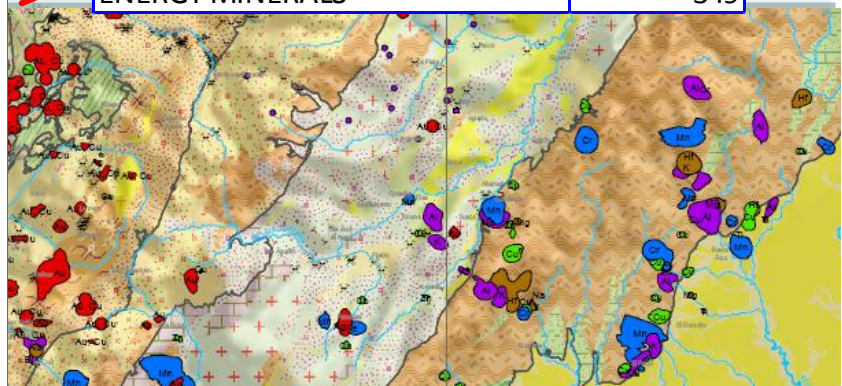
MIDDLE GEOCHEMICAL POTENTIAL		
ANOMALY CODE ID_AGQ	ANOMALY NAME	ELEMENT, GEOCHEMICAL ASSOCIATION OR MINERAL
P12_06	Rio Don Diego	Sb
P19_01	Sevilla 2	Fe
P34_04	San Diego	Cu
P48_08	Moco de Fierro	Fe
P64_03	Paratebueno norte	Au, Ag



LOW GEOCHEMICAL POTENTIAL		
ANOMALY CODE ID_AGQ	ANOMALY NAME	ELEMENT, GEOCHEMICAL ASSOCIATION OR MINERAL
P1_01	Alta Guajira	Ti
P2_02	Alta Guajira 3	Industrial Clays, Gypsum
P2_03	Alta Guajira 4	Industrial Clays, Gypsum
P2_04	Alta Guajira 5	Asbesto
P3_02	Alta Guajira 1	Industrial Clays, Gypsum
P4_02	Cardón-Carrizal	Industrial Clays, Gypsum



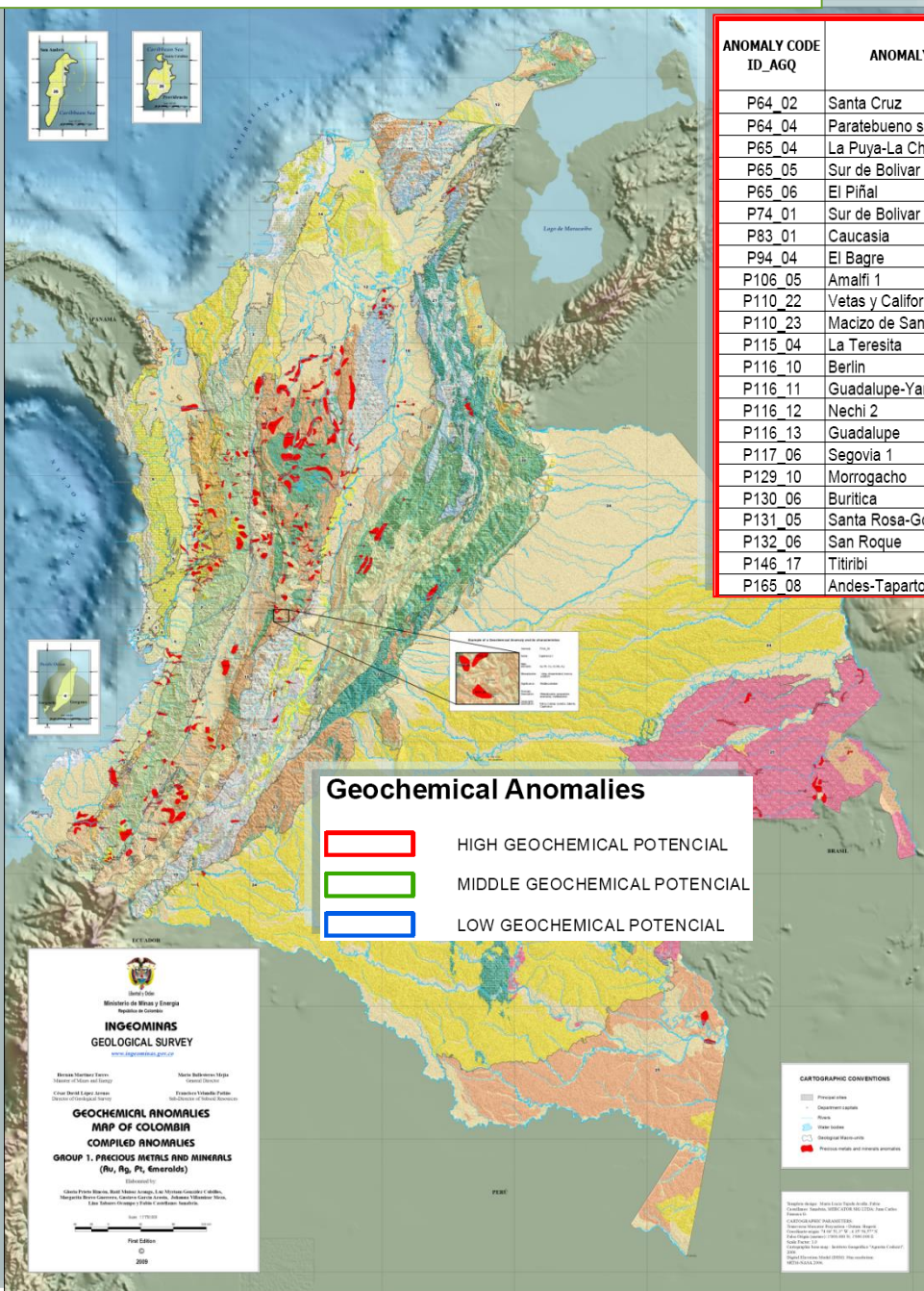
MINERAL GROUP	ANOMALIES
PRECIOUS METALS AND MINERALS	492
BASE METALS	244
STEEL INDUTRY METALS	221
SPECIAL METALS	197
INDUSTRIAL MINERALS	183
ENERGY MINERALS	349

ANOMALIAS GEOQUÍMICAS PARA
POTENCIAL DE RECURSOS MINERALES

- | | |
|---|--|
|  | GRUPO 1 - METALES Y MINERALES PRECIOSOS
(Au, Ag) |
|  | GRUPO 2 - METALES BASICOS
(Cu, Zn) |
|  | GRUPO 3 - METALES DE LA INDUSTRIA DEL ACERO
(Fe, Ni) |
|  | GRUPO 4 - METALES ESPECIALES
(Ti, Tierras Raras, Sb.) |
|  | GRUPO 5 - MINERALES INDUSTRIALES
(Al, Na, K) |
|  | GRUPO 6 - MINERALES ENERGETICOS
(U) |

Anomalías generadas partir de procesamiento geoestadístico
e interpretación geológica de datos geoquímicos. Ingeominas 2009

Gr 1- Precious metals and minerals



ANOMALY CODE ID_AGQ	ANOMALY NAME	ELEMENT, GEOCHEMICAL ASSOCIATION OR MINERAL
P64_02	Santa Cruz	Au, Ag
P64_04	Paratebueno sur	Au, Ag
P65_04	La Puya-La Chiva-Vida	Au, Ag
P65_05	Sur de Bolivar 1	Au, Ag
P65_06	El Piñal	Au, Ag, Cu
P74_01	Sur de Bolivar 3	Au, Ag, Cu
P83_01	Caucasia	Au
P94_04	El Bagre	Au
P106_05	Amalfi 1	Au
P110_22	Vetas y California	Au, Ag
P110_23	Macizo de Santander 1	Au, Ag
P115_04	La Teresita	Au
P116_10	Berlin	Au
P116_11	Guadalupe-Yarumal	Au
P116_12	Nechi 2	Au, Ag
P116_13	Guadalupe	Au, Ag
P117_06	Segovia 1	Au
P129_10	Morrogacho	Au-Ag
P130_06	Buritica	Au-Ag
P131_05	Santa Rosa-Gomez Plata	Au
P132_06	San Roque	Au
P146_17	Titiribi	Au-Ag, Cu
P165_08	Andes-Taparto	Au-Ag

ANOMALY CODE ID_AGQ	ANOMALY NAME	ELEMENT, GEOCHEMICAL ASSOCIATION OR MINERAL
P64_03	Paratebueno norte	Au, Ag
P65_03	Sur de Bolivar 2	Au, Ag
P83_03	Montecristo	Au
P93_02	La Aventurera	Au
P93_03	Bajo Cauca	Au
P95_01	Nordeste Antioqueño 2	Au
P105_01	Puerto Valdivia 1	Au
P106_01	Zaragoza	Au, Ag
P110_24	Macizo de Santander 2	Au, Ag
P115_05	San Jose de la Montaña	Au
P117_03	Amalfi 2	Au
P117_05	Segovia 2	Au
P117_07	El Diamante	Au
P118_01	Remedios	Au
P129_07	El Cerro	Au-Ag
P129_08	Carauta Alto	Au-Ag, Cr
P129_11	Piedras-Carauta	Au
P129_12	Piedras	Au-Ag, Pb-Zn
P129_13	San Jose 2	Au-Ag, Pb-Zn
P131_06	Don matias	Au
P132_05	Yali	Au
P133_03	Estacion La Cristalina	Au
P145_06	Pabon	Au-Ag
P145_09	Ocaido-Isleta	Au-Cu
P145_10	Urrao-San Jose	Au
P146_18	La Comia	Au
P146_19	Armenia	Au-Ag
P147_09	Concepcion	Au
P148_03	El Jordan	Au
P164_01	Bebarama	Au-MPG
P164_04	Tutunendo	Au-MPG
P164_06	Nemota	Au-MPG

ANOMALY CODE ID_AGQ	ANOMALY NAME	ELEMENT, GEOCHEMICAL ASSOCIATION OR MINERAL
P55_04	San Martin de Loba	Au
P68_03	Acandi-El Tolo	MPG
P79_01	Cuque	MPG
P83_02	Nechi 1	Au
P84_01	Nordeste Antioqueño 1	Au
P85_02	Santa Rosa	Au
P89_01	Riosucio 1	Au-MPG
P92_01	Corozalito-El Almendro	Au
P94_01	Puerto Triana	Au
P94_02	Caceres	Au
P94_03	Nordeste Antioqueño 3	Au
P13_06	Dibulla 4	Au
P13_07	Dibulla 1	Au
P13_08	Dibulla 2	Au
P102_01	Riosucio 2	Au-MPG
P103_01	Rio Mutata-Riosucio	Au-MPG

ZONES WITH GEOCHEMICAL POTENTIAL



Zones with geochemical potential

METALES Y MINERALES PRECIOSOS

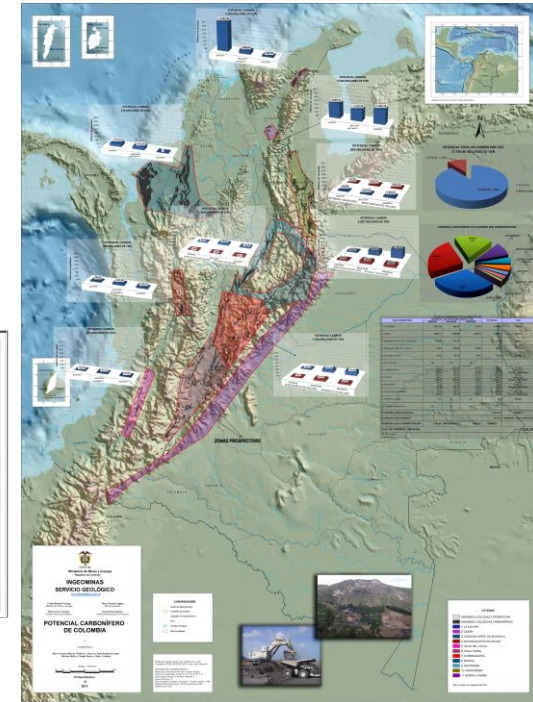
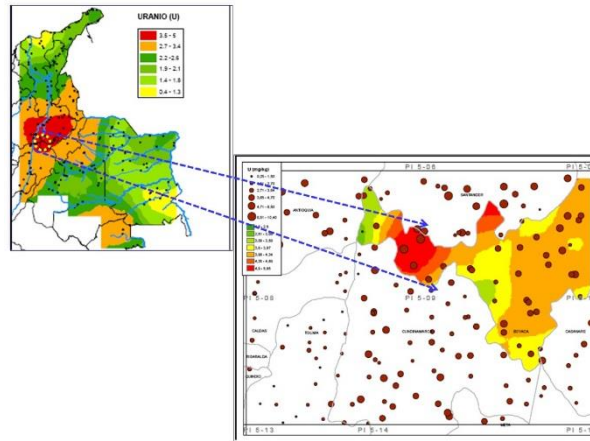
Identificador	Nombre de la Zona	P203_02	Condoto-Andagoya sur
P105_01	Puerto Triana	P278_01	Mayorquin occidental
P129_01	Moneta	P188_01	Quebrada Santa Rosa
P187_01	Rio Claro	P323_01	Rio Chiquila
P85_01	Nordeste Antioqueño	P206_01	Tolda Fria
P428_03	Diamante-Guachavez	P146_04	Amaga
P146_03	Titiribi	P79_01	Cuque
P146_01	Santa Fe de Antioquia-Guazabara Oeste	P381_01	Naquen 2
P130_02	Buriticá	P189_01	Muzo
P299_01	Pance occidental	P133_01	Puerto Berrio
P321_01	Calono-Pioya	P34_01	San Diego
P131_01	Santa Rosa-Gomez Plata	P320_01	Buenos Aires-Teta
P343_01	El Piso	P130_01	Liborina-Sucia occidental
P186_03	Mistrato	P186_02	Caramanta
P164_02	Quibdo-Guayabal	P359_01	Naquen 1
P166_02	Fredonia-Marsella	P129_03	Murri-Chaquenoda
P83_01	Bajo Cauca	P144_01	Bebara
P85_01	Santa Rosa	P279_02	Andicaya occidental
P83_01	Montecristo	P64_01	Sur de Bolivar
P244_01	Salento	P409_01	Magui
P13_01	Dibulla	P222_01	Cajon-Carbonero occidental
P387_02	Almaguer	P412_01	Palestina
P184_01	Raspadura	P410_02	Cumbitara
P68_01	Acandí-El Tolo	P116_01	Amalfi
P340_02	Napi-Belen	P340_01	Chate-Coteje
P205_01	Quinchia	P387_01	Bolivar
P132_01	Yali	P279_01	Raposo-Cocoli occidental
P362_01	Guapi norte	P175_01	Berlin
P62_01	La Aventurera	P166_01	Versalles norte
P186_01	Jardin-Dojurgo	P132_02	San Roque
P429_01	Ancuya	P129_02	Musinga
P167_01	Argelia	P208_01	Villeta
P431_01	Santa Lucia	P102_01	Rosucio
P167_02	Mesopotamia		
P130_03	Puente Occidente		
P210_01	Upiá		
P207_02	Libano		
P110_01	Vetas y California		
P280_01	Ginebra		
P302_01	Rio Ata		
P168_01	San Jose		
P279_03	Dagua occidental		
P145_02	Arquia-Arenales		
P342_01	Munchique-Fondas		
P113_01	Murindo-Jedega Norte		
P185_01	Farallones		
P150_01	Chipata		
P410_01	Tamboy		
P229_01	Gachala		
P203_01	Tamania occidental		
P380_01	Caramacoe		
P164_01	Bebarama		
P207_01	Fresno		
P363_01	Patia-Balboa norte		





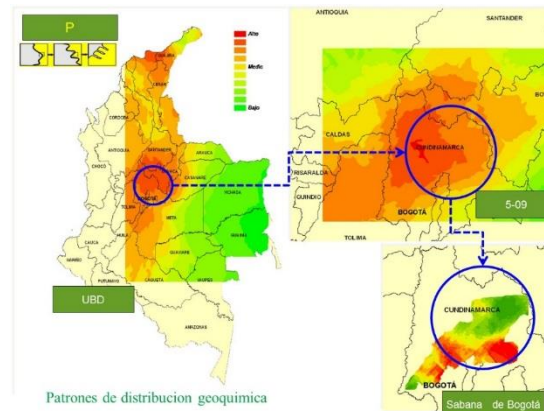
ENERGY MINERALS PROGRAM

- Coal (metallurgic)
- Coal Bed Methane (CBM)
- Uranium



INDUSTRIAL MINERALS PROGRAM

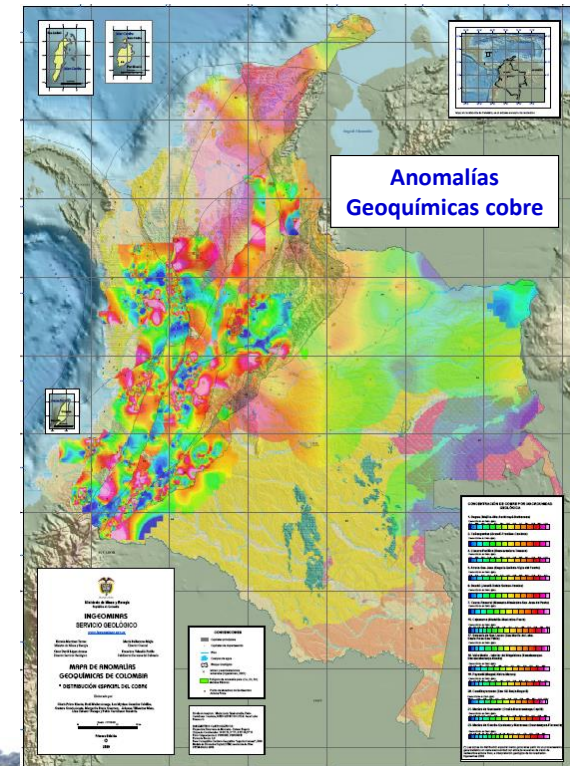
- Phosphates
- S, Mg, K, Ca
- Building materials



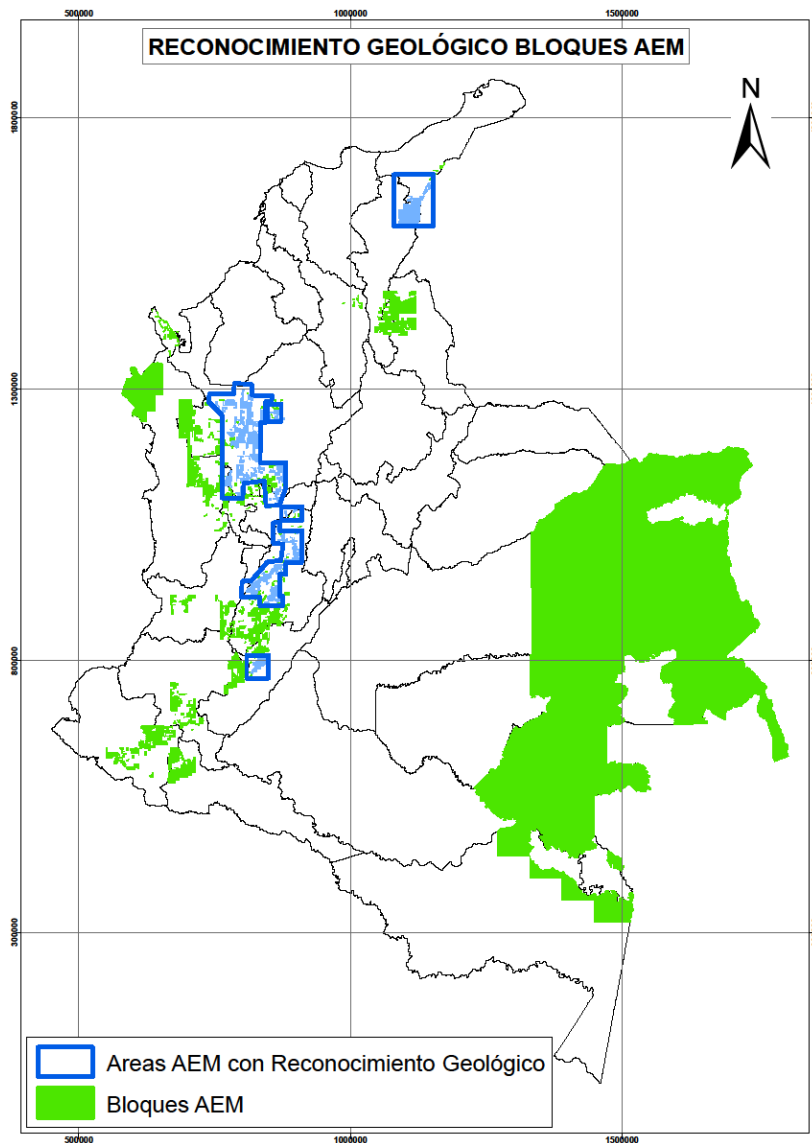


SPECIAL TOPICS OF RESEARCH PROGRAM

- Geochemical Atlas of Colombia
- Metallogenic Map of Colombia
- Geophysical Map of Colombia
- Research in mineral deposits and the environment - ARD



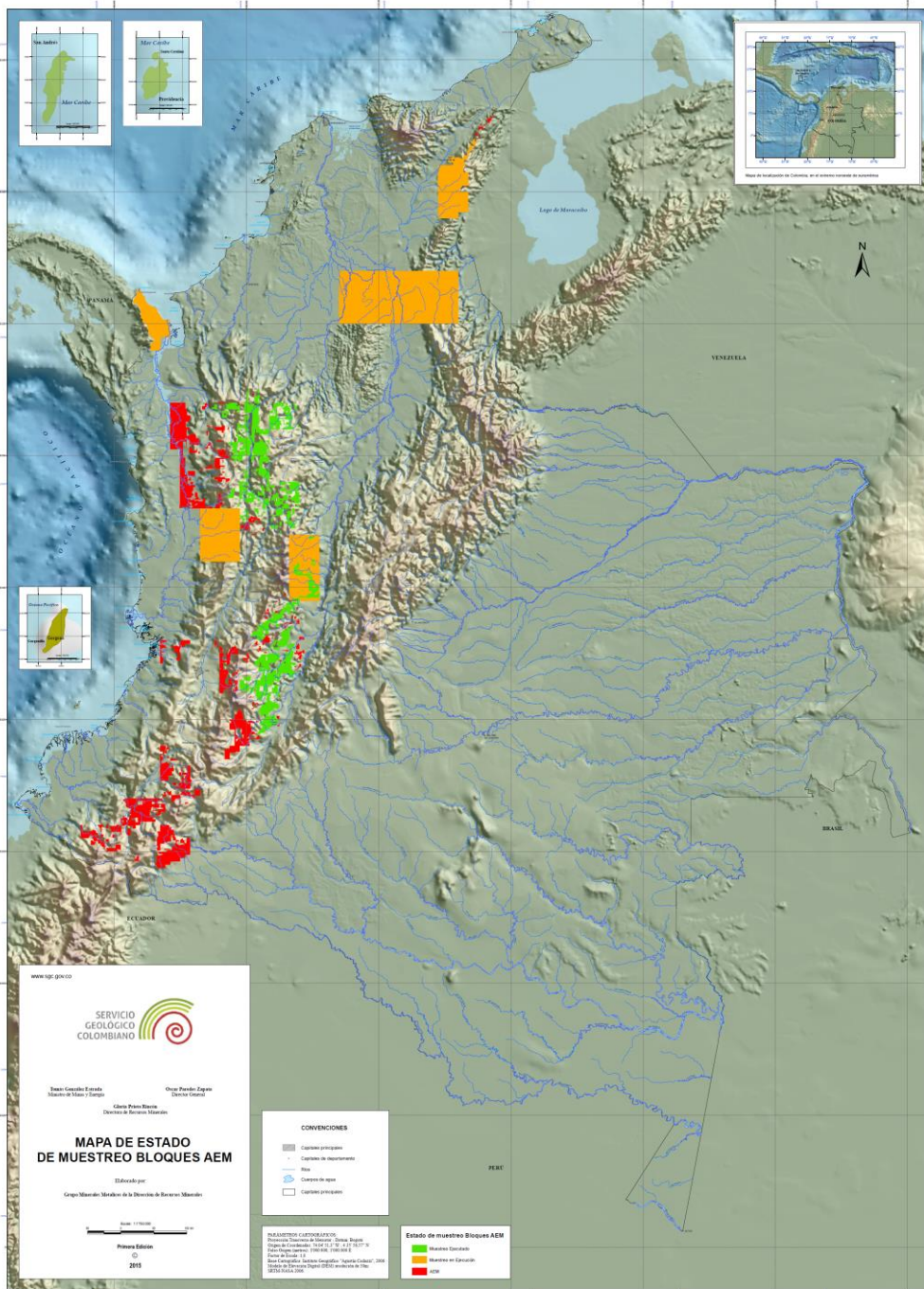
GEOLOGY FOR MINERAL RESOURCES PROGRAM



- **Geology**
- **Mineralizations**
- **Occurrences**
- **Mining**



Rocks, Minerals



Sampling

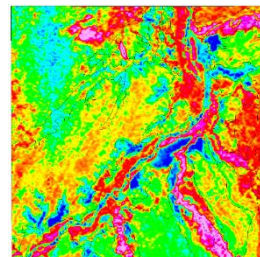
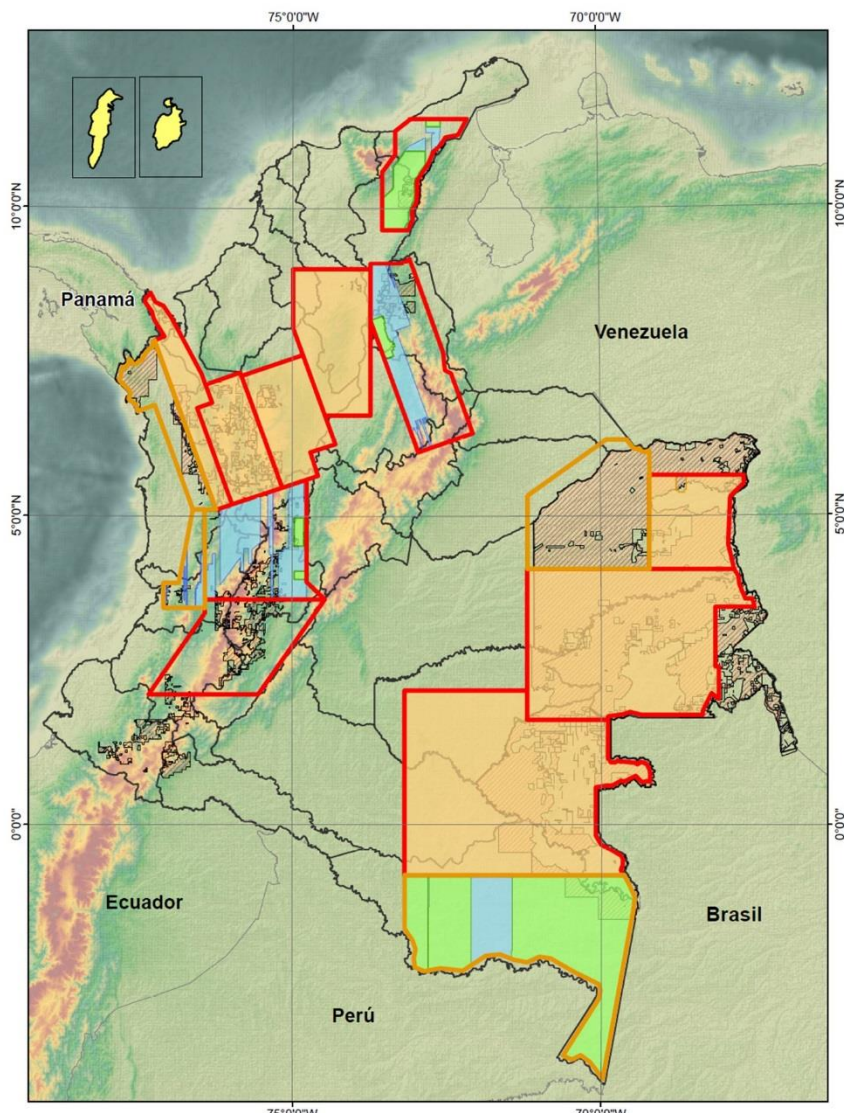
- ✓ **Stream sediments**
(1 samples/1-5 km²)
- ✓ **Rocks**
- ✓ **Panned concentrates**



Executed sampling
Sampling in execution
SMA



AIRBORNE GEOPHYSICS PROGRAM



Convenciones

- Area Util (Lineas de Vuelo y Lineas de Control)
- Avance en la Adquisición
- Bloque Finalizado
- Areas Estratégicas
- Bloques Aerogeofísica 2013
- Bloques Aerogeofísica 2014
- Departamentos de Colombia



LEVANTAMIENTO AEROGEOFÍSICO PARA COLOMBIA.

BLOQUES 2013 - 2014
Avance en la Adquisición
14 - Septiembre - 2015

©
2015 - Servicio Geológico Colombiano

Escala 1:4 500 000

DATUM MAGNA SIRGAS
ORIGEN EN LA ZONA BOGOTÁ
Coordenadas Geográficas: 4°35'46.3215" N, 74°04'39.0285" W
Coordenadas Planas: N = 1'000.000, E = 1'000.000



Magnetic and Radiometric System - PR-PEC

Magnetometry

Gamma - spectrometry

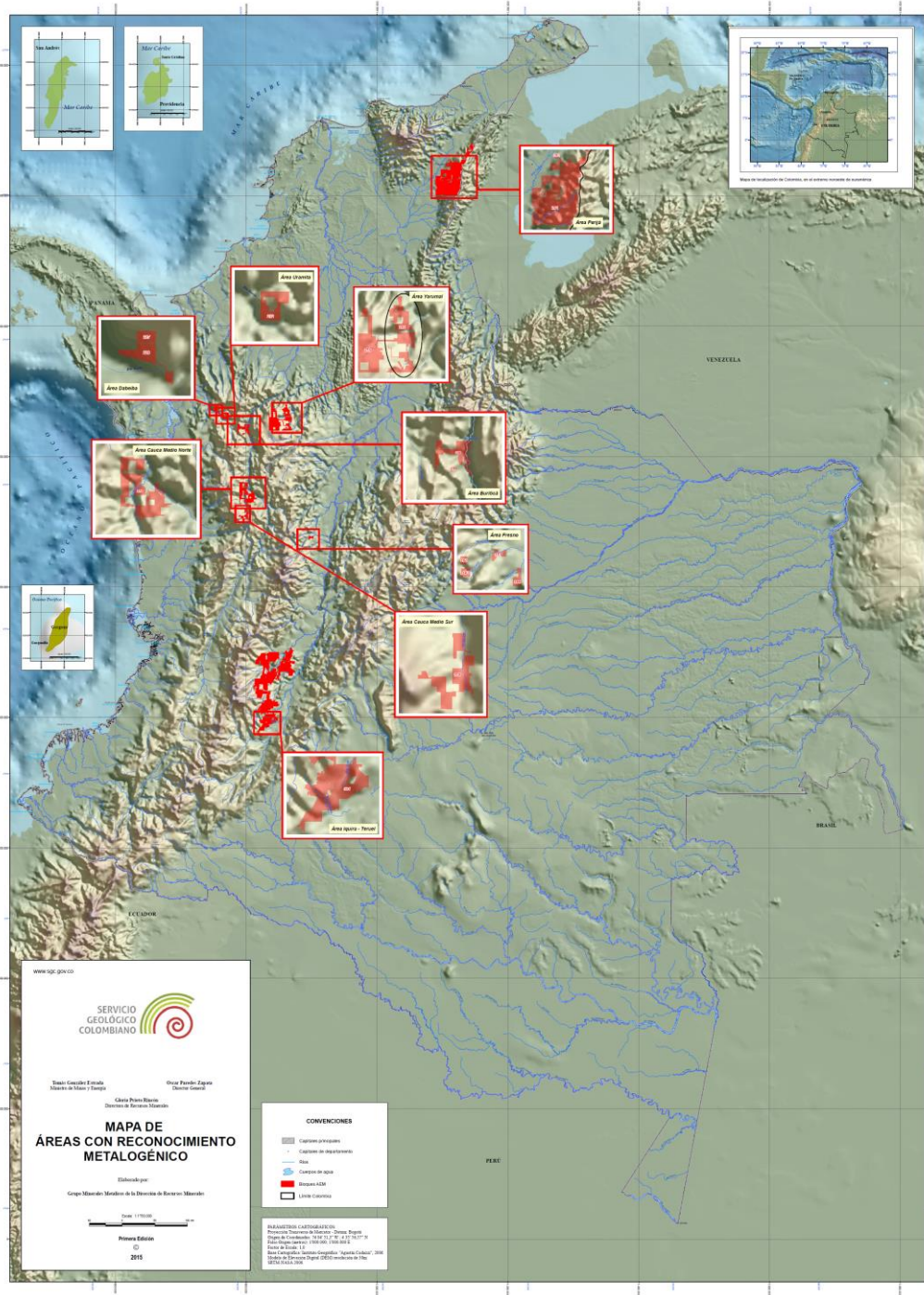
**Lines 500m / 5km (N20W)
Lines 1000m / 10km (N-S)
Altitude /100 a 300m**

Total km

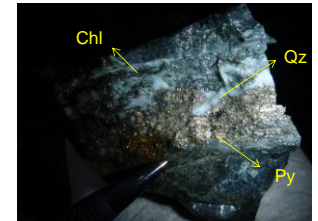
633.108 km

Total km²

438.630 km²

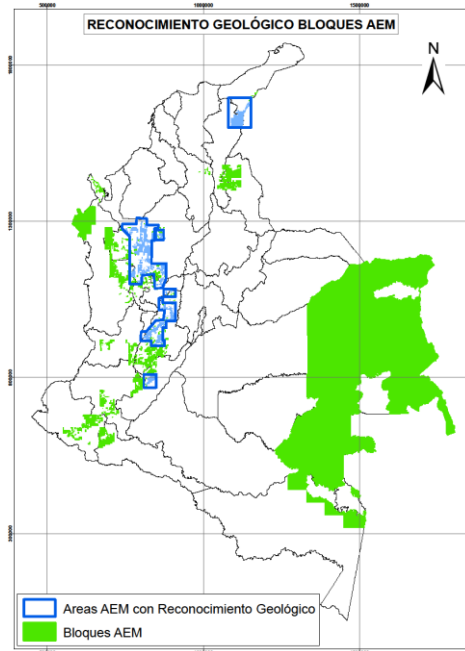


Py? Cpy?

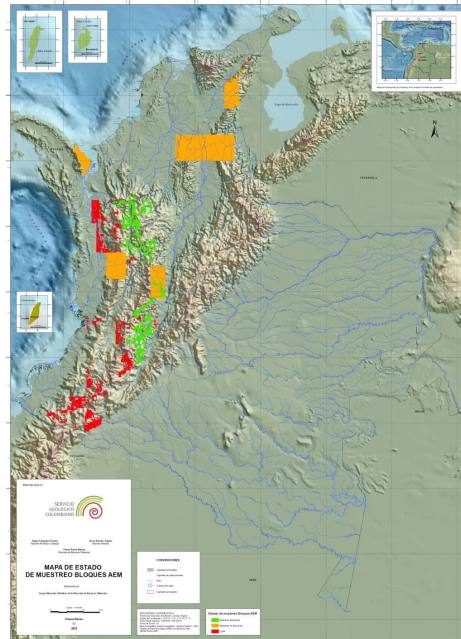


ROCKS, MINERALS, SEDIMENTS, PANED CONCENTRATES

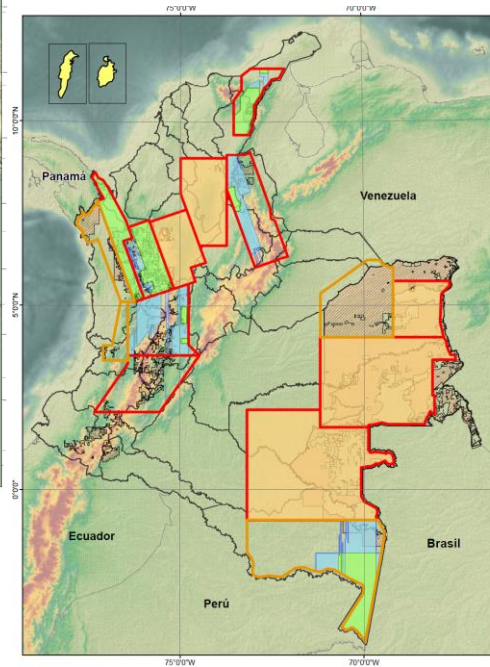
MINERAL RESOURCES POTENTIAL



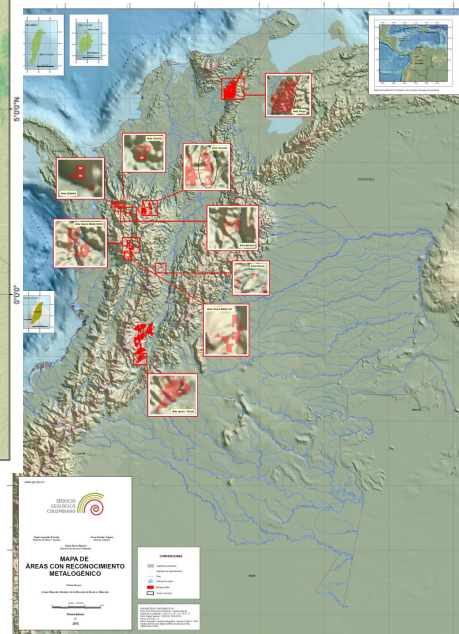
Geology



Geochemistry



Geophysics

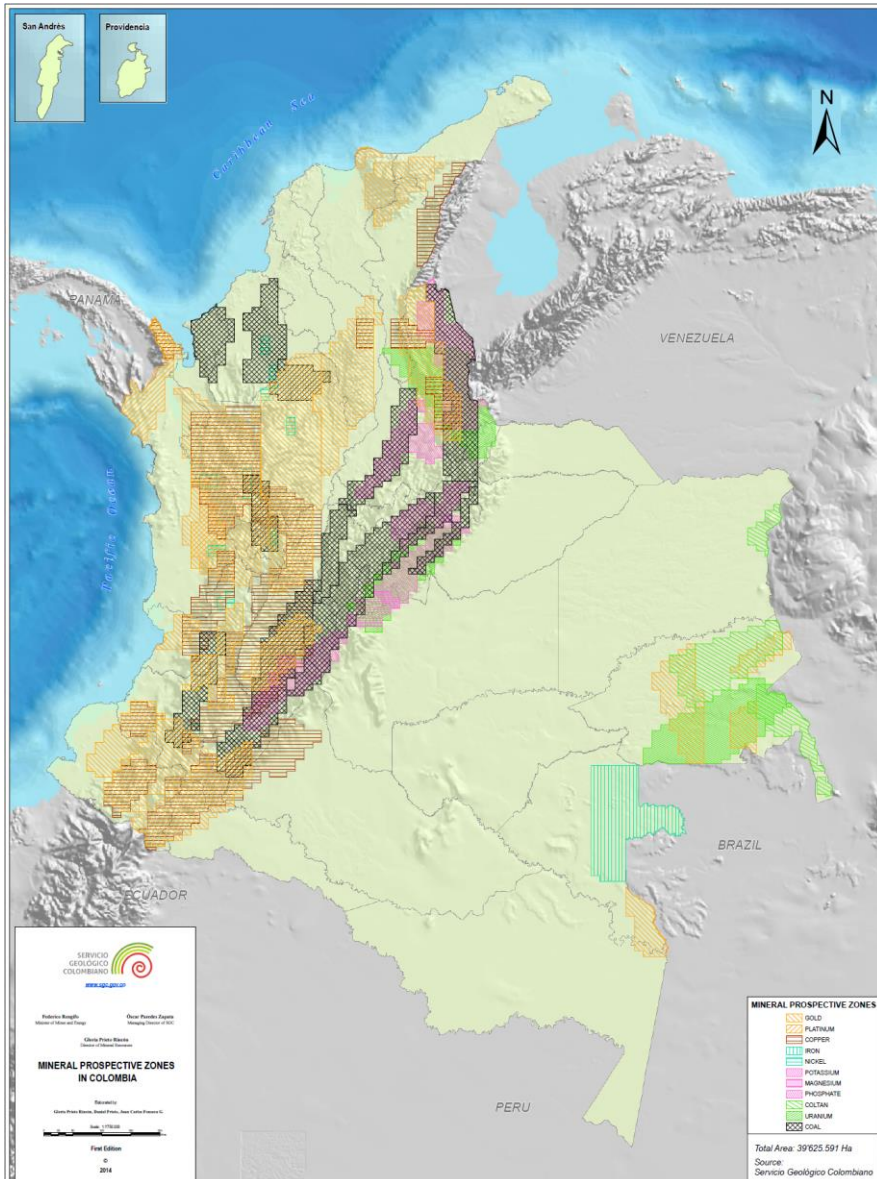


Metallogeny & Mineralogy

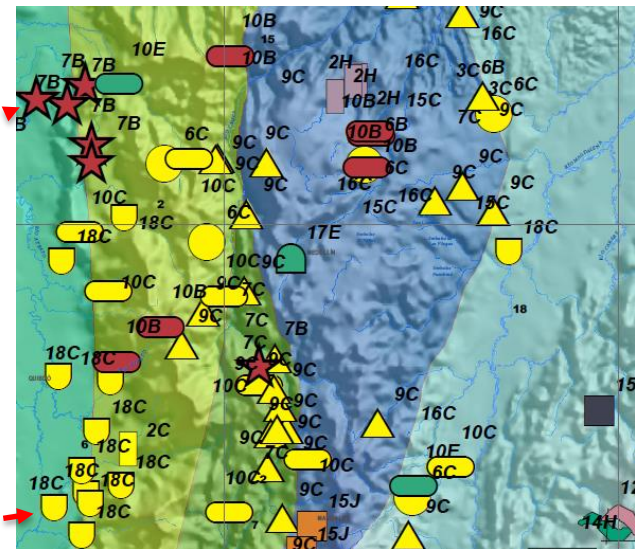
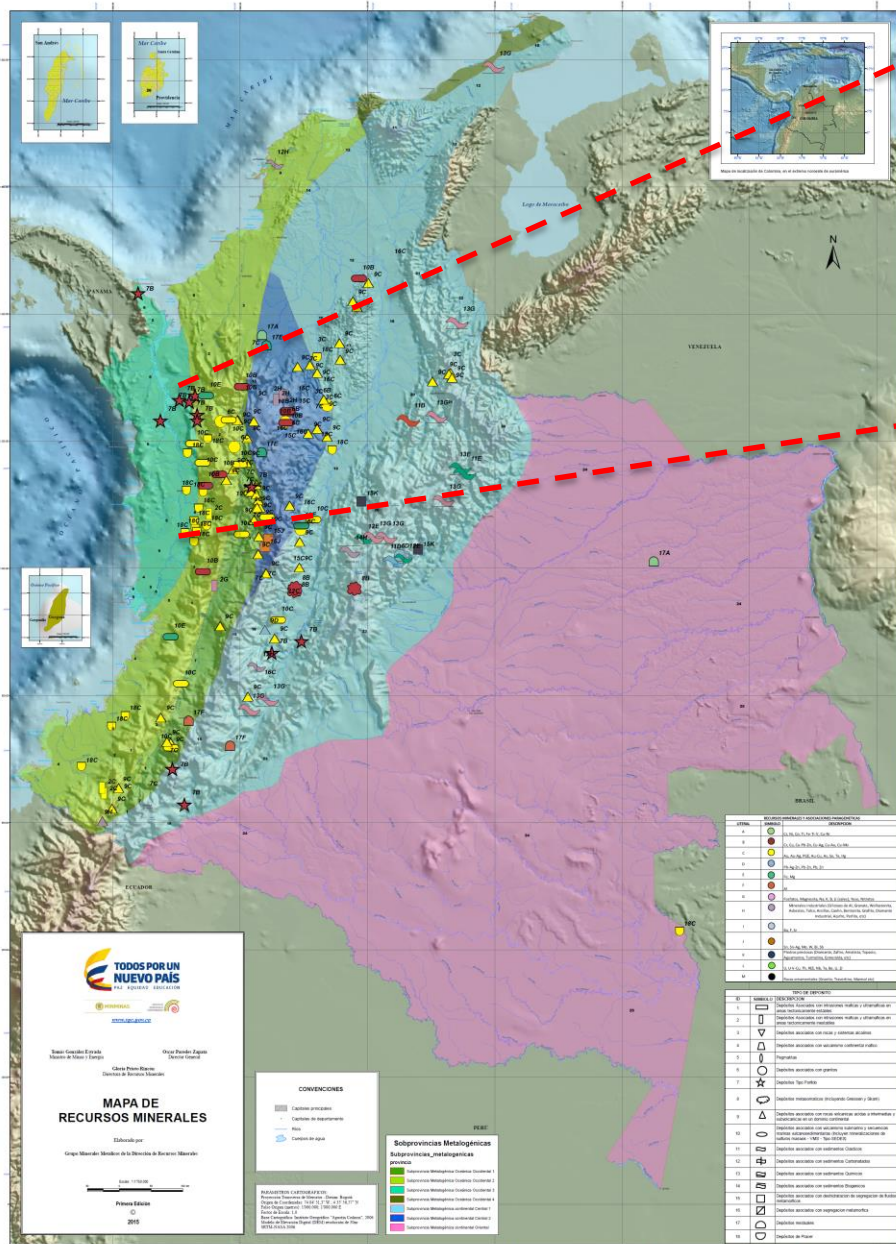
PROSPECTIVE AREAS



MINERAL PROSPECTIVES ZONES



METALLOGENETIC INFORMATION

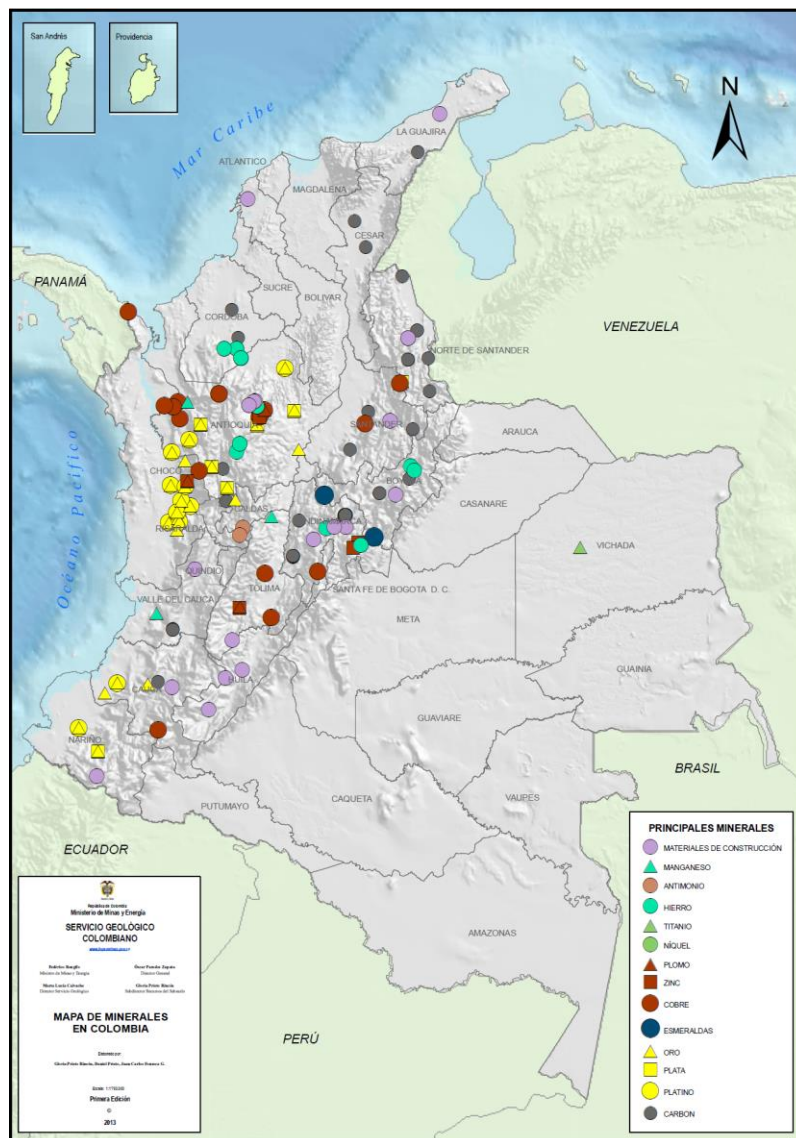


LITERAL	SÍMBOLO	DESCRIPCIÓN
A		Cr, Ni, Co, Ti, Fe-Ti-V, Cu-Ni
B		Cr, Cu, Cu-Pb-Zn, Cu-Ag, Cu-Au, Cu-Mo
C		Au, Au-Ag, PGE, Au-Cu, As, Se, Te, Hg
D		Pb-Ag-Zn, Pb-Zn, Pb, Zn
E		Fe, Mg
F		Al
G		Fosfatos, Magnesita, Na, K, B, Li (sales), Yeso, Nitratos
H		Minerales industriales (Silíceos de Al, Granate, Wollastonita, Asbestos, Talco, Arcillas, Caolín, Bentonita, Grafito, Diamante Industrial, Azufre, Perilita, etc)
I		Ba, F, Sr
J		Sn, Sn-Ag, Mo, W, Bi, Sb
K		Piedras preciosas (Diamante, Zafiro, Amatista, Topacio, Aguamarina, Turmalina, Esmeralda, etc)
L		U, U-V, Cu, Th, REE, Nb, Ta, Be, U, Zr
M		Rocas ornamentales (Granito, Travertino, Marmol etc)

ID	SÍMBOLO	DESCRIPCIÓN
1		Depósitos Asociados con intrusiones maficas y ultramaficas en areas tectonicamente estables
2		Depósitos Asociados con intrusiones maficas y ultramaficas en areas tectonicamente inestables
3		Depósitos asociados con rocas y sistemas alcalinos
4		Depósitos asociados con vulcanismo continental mafico
5		Pegmatitas
6		Depósitos asociados con granitos
7		Depósitos Tipo Porfido
8		Depósitos metamorficos (Incluyendo Greissen y Skarn)
9		Depósitos asociados con rocas volcanicas acidas a intermedias y subvolcanicas en un dominio continental
10		Depósitos asociados con intrusiones submarinas y secuencias marinas vulcanosedimentarias (Incluyen mineralizaciones de sulfuros masivos - VMS - Tipo SEDEX)
11		Depósitos asociados con sedimentos Clásticos
12		Depósitos asociados con sedimentos Carbonatados
13		Depósitos asociados con sedimentos Quimicos
14		Depósitos asociados con sedimentos Biogénicos
15		Depósitos asociados con deshidratación de segregación de fluidos metamorficos
16		Depósitos asociados con segregación metamorfica
17		Depósitos residuales
18		Depósitos de Placer



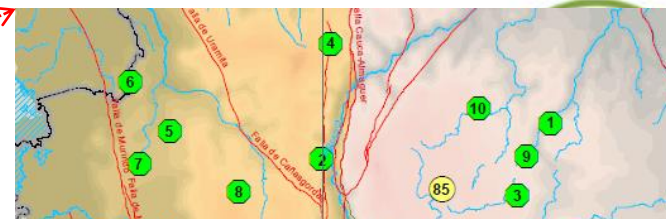
MINERAL DEPOSITS INFORMATION



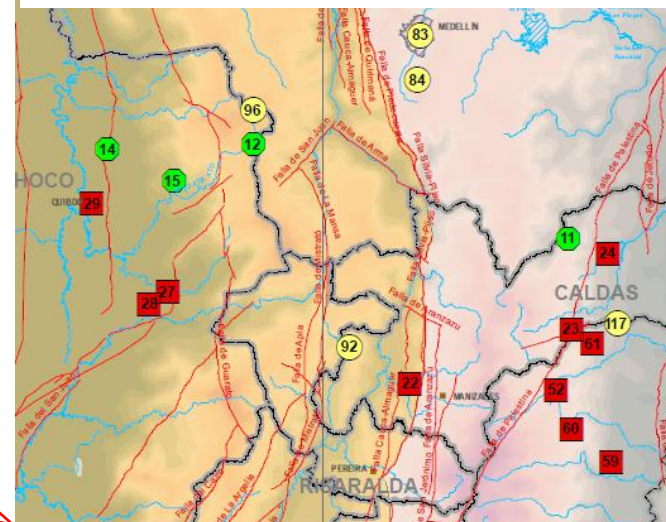
MINERAL DEPOSITS

-  MATERIALES DE CONSTRUCCIÓN
-  MANGANESO
-  ANTIMONIO
-  HIERRO
-  TITANIO
-  NÍQUEL
-  PLOMO
-  ZINC
-  COBRE
-  ESMERALDAS
-  ORO
-  PLATA
-  PLATINO
-  CARBON

MINERAL DEPOSITS INFORMATION



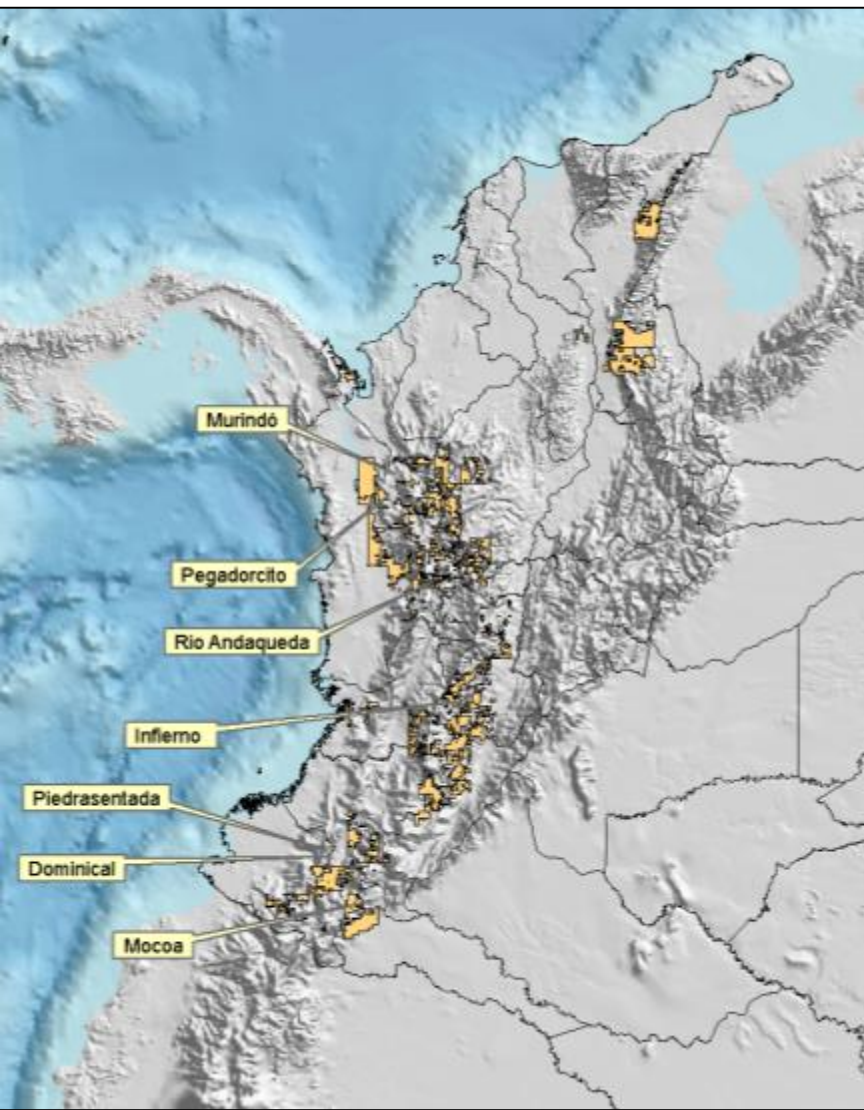
Base Metals



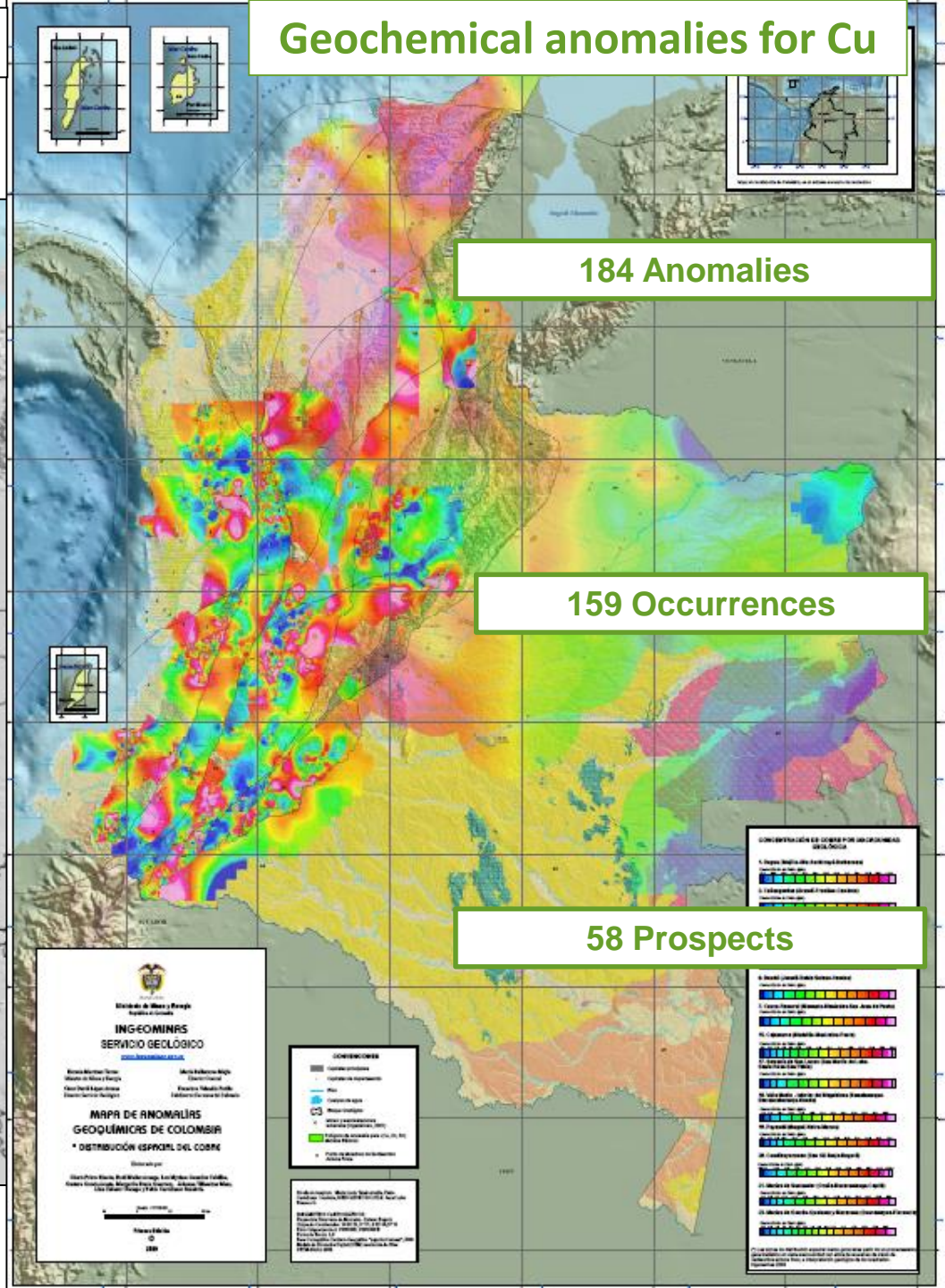
	ID	DEPÓSITO	LONGITUD	LATITUD	DEPARTAMENTO	MUNICIPIO	COMMODITY	PL25
YACIMIENTOS	1	La Bramadora	-75.14	6.92	ANTIOQUIA	AMALFI	Au, Cu, Pb	117-II-A
	2	Buriticá	-75.9	6.8	ANTIOQUIA	BURITICA	Cu	115-II-C
	3	El Silencio	-75.25	6.68	ANTIOQUIA	GOMEZ PLATA	Au, Ag, Cu, Pb, Zn	131-II-B
	4	El Alacrán	-75.87	7.18	ANTIOQUIA	ITUANGO	Cu, Au	104-II-C
	5	Minas de Mico Grande	-76.4	6.89	ANTIOQUIA	DABEIBA	Cu	114-I-A
	6	Murindó-La Rica	-76.53	7.05	ANTIOQUIA	DABEIBA	Cu, Au	113-I-B
	7	Pantanos	-76.5	6.78	ANTIOQUIA	DABEIBA	Cu, Mo	114-I-C
	8	El Cerro	-76.17	6.69	ANTIOQUIA	FRONTINO	Au, Cu, Ag, Pb, Zn	129-I-A
	9	Guadalupe	-75.22	6.81	ANTIOQUIA	GUADALUPE	Cu, Zn, Au, Ag	116-IV-D
	10	Pegadorcito	-75.38	6.97	ANTIOQUIA	YARUMAL	Cu	116-I-C
	11	Guayaquil Mine	-75.08	5.58	CALDAS	SAMANA	Pb, Au	188-I-C
	12	El Roble	-76.12	5.89	CHOCO	EL CARMEN DE ATRATO	Cu	165-I-C
	13	Acandí	-77.33	8.5	CHOCO	ACANDI	Cu	68-II-A
	14	Mina Unnamed	-76.6	5.87	CHOCO	QUIBDO	Cu	164-I-D
	15	La Esquis	-76.38	5.77	CHOCO	QUIBDO	Zn	165-II-A
	16	Rio Pantanos	-77	7	CHOCO	CARMEN DEL DARIN	Cu, Mo, Ag, Hg	113-I-C
	17	Mina Vieja De Payande	-75.12	4.28	TOLIMA	SAN LUIS	Cu	245-II-C
	18	Santa Barbara	-75.12	4.53	TOLIMA	IBAGUE	Mo	245-I-A
	19	El Sapo	-75.17	4.23	TOLIMA	VALLE DE SAN JUAN	Cu	263-I-B
PROSPECTOS	20	Guadalupe	-74.46	7.74	BOLIVAR	MONTECRISTO	Cu, Ag	95-I-D
	21	Santa Anita	-74.27	5.67	BOYACA	OTANCHE	Cu, Au, Ag	189-I-A
	22	Columbia	-75.6	5.1	CALDAS	MINIZALES	Cu	205-IV-A
	23	La Diamantina	-75.07	5.28	CALDAS	MARQUETALIA	Cu, Pb, Zn	207-I-A
	24	Samana	-74.95	5.53	CALDAS	SAMANA	Zn, Pb	188-I-D
	25	Piedrasentada	-76.83	2.16	CAUCA	LA SIERRA	Cu	364-II-B
	26	El Rincon/San Diego	-73.17	10.29	CESAR	SAN DIEGO	Cu	34-I-A
	27	Bagado	-76.4	5.4	CHOCO	BAGADO	Cu	185-II-C
	28	Andagueda	-76.46	5.36	CHOCO	CERTEGUI	Cu	185-II-C
	29	El Choco	-76.65	5.69	CHOCO	QUIBDO	Cu	164-IV-C
	30	Cajetas	-73.9	5.36	CUNDINAMARCA	CARMEN DE CARUPA	Pb	190-II-D

MINERAL DEPOSITS INFORMATION

Cu

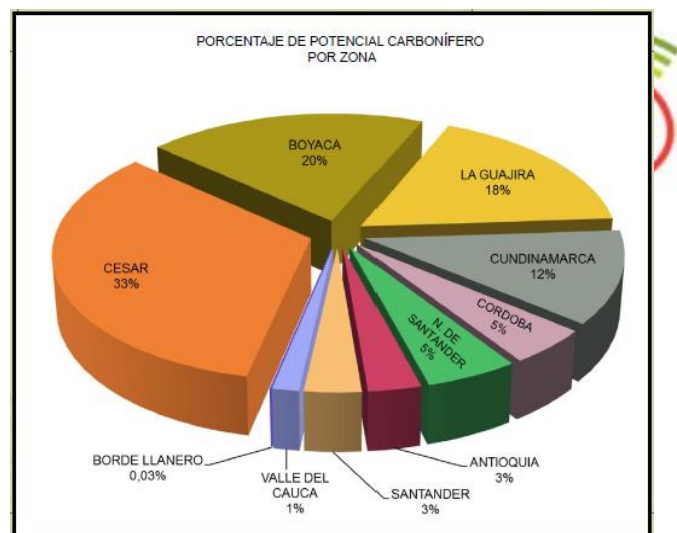
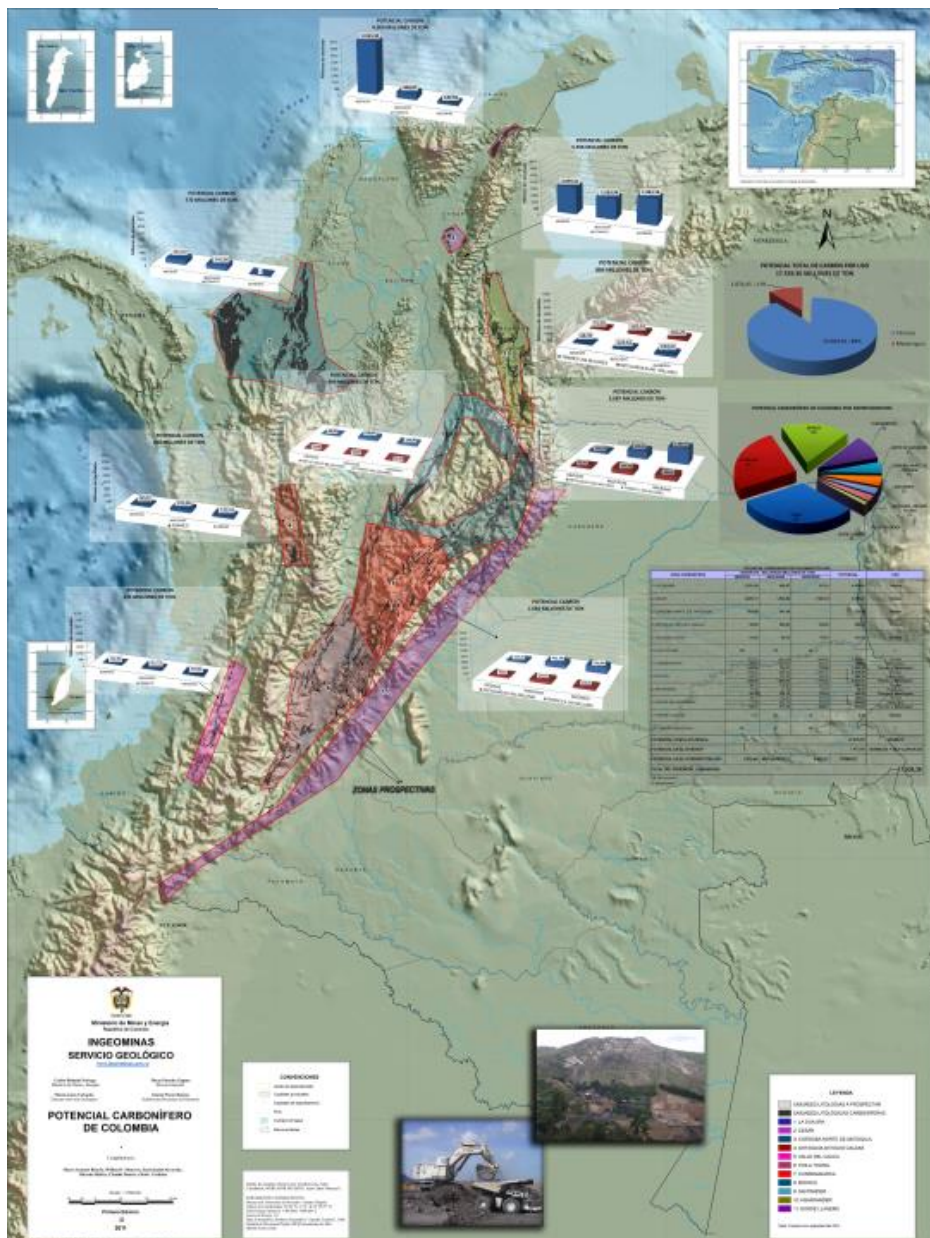


Geochemical anomalies for Cu



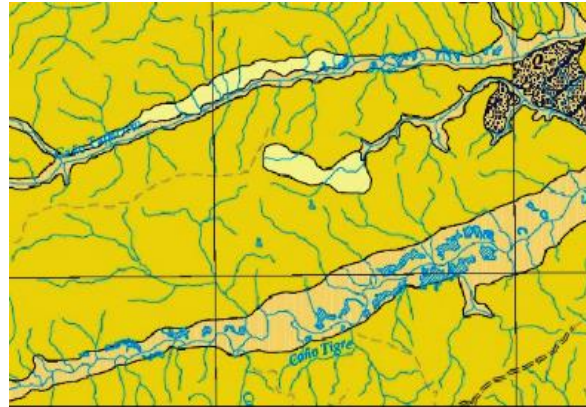
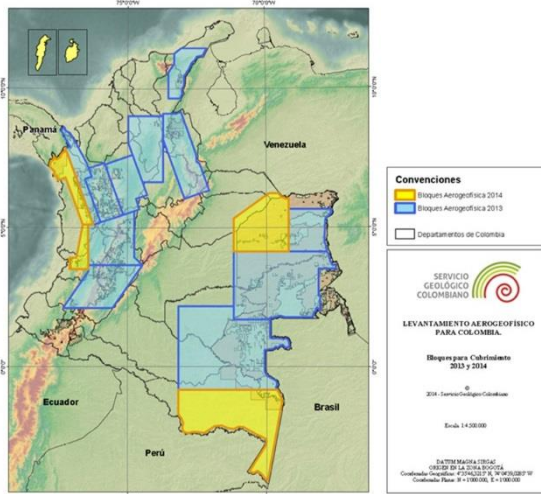
MINERAL DEPOSITS INFORMATION

Coal

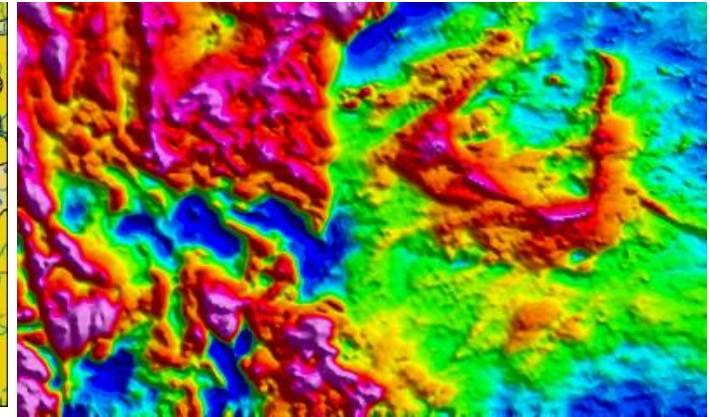


ZONA CARBONIFERA	RESERVAS - RECURSOS (MILLONES DE Tn)			POTENCIAL	USO
	MEDIDAS	INDICADAS	INFERIDAS		
1. LA GUAJIRA	1.541,32	673,52	520,57	2.735,41	Térmico
2. CESAR	2.282,74	2.751,81	136,43	5.170,99	Térmico
3. CORDOBA NORTE DE ANTIOQUIA	381	341	0	722	Térmico
4. ANTIOQUIA ANTIGUO CALDAS	90,09	225,86	132,43	448,37	Térmico
5. VALLE DEL CAUCA	41,52	92,15	97,91	231,58	Térmico
6. HUILA TOLIMA	NE	NE	NE	-	D
7. CUNDINAMARCA	181,91	489,21	661,09	1.312,20	Térmico
	97,48	267,60	190,83	555,91	Metalúrgico
	259,39	756,81	851,91	1.868,11	Térmico + Metalúrgico
8. BOYACA	153,23	690,2	1.387,37	2.230,80	Térmico
	93,57	379,38	383,26	856,22	Metalúrgico
	246,80	1.069,58	1770,63	3.087,01	Térmico + Metalúrgico
9. SANTANDER	46,70	231,97	124,78	402,45	Térmico
	11,59	25,19	51,75	88,53	Metalúrgico
	58,29	257,16	176,53	490,98	Térmico + Metalúrgico
10. NORTE DE SANTANDER	48,70	123,81	184,52	356,83	Térmico
	71,02	193,74	182,29	447,06	Metalúrgico
	119,72	317,35	366,81	803,88	Térmico+ Metalúrgico
11. BORDE LLANERO	0,76	0	4,53	5,29	Térmico
12. LLANURA AMAZONICA		NE	NE		D
TOTAL POTENCIAL COSTA ATLANTICA		7.906,39			TÉRMICO
TOTAL POTENCIAL EN EL INTERIOR		7.657,22			TERMICO+ METALURGICO
POTENCIAL EN EL INTERIOR POR USO		5.709,52			TERMICO
		1.947,72			METALÚRGICO
TOTAL POTENCIAL EN EL PAIS		15.563,61			TERMICO+ METALURGICO

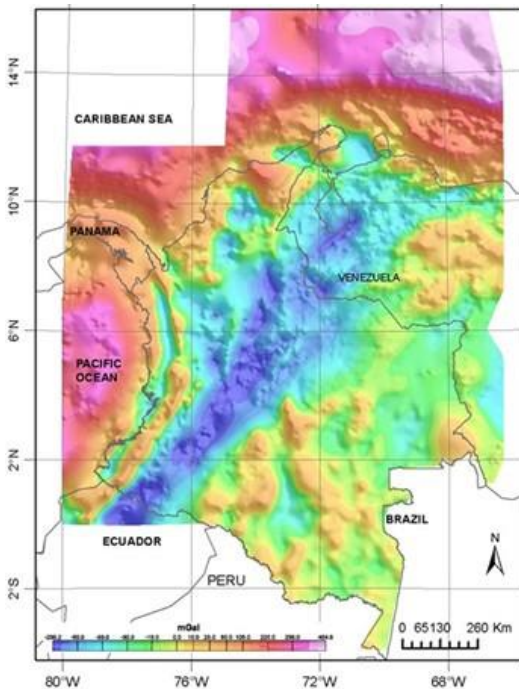
GEOPHYSICAL INFORMATION



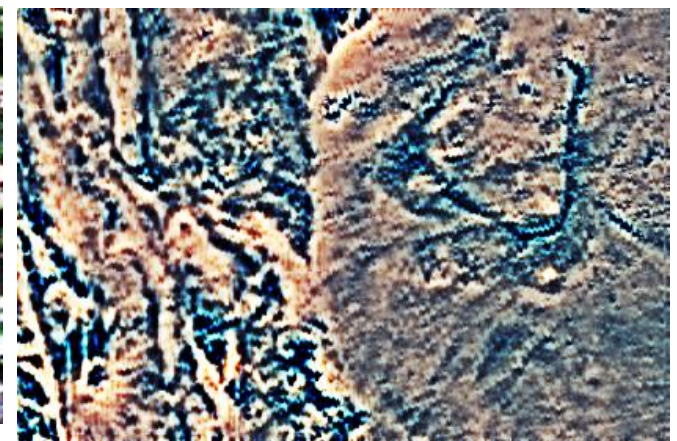
GEOLOGÍA 1:500.000



MAGNETOMETRÍA. (RTP)



GAMMAESPECTROMETRÍA. (U-K-Th)

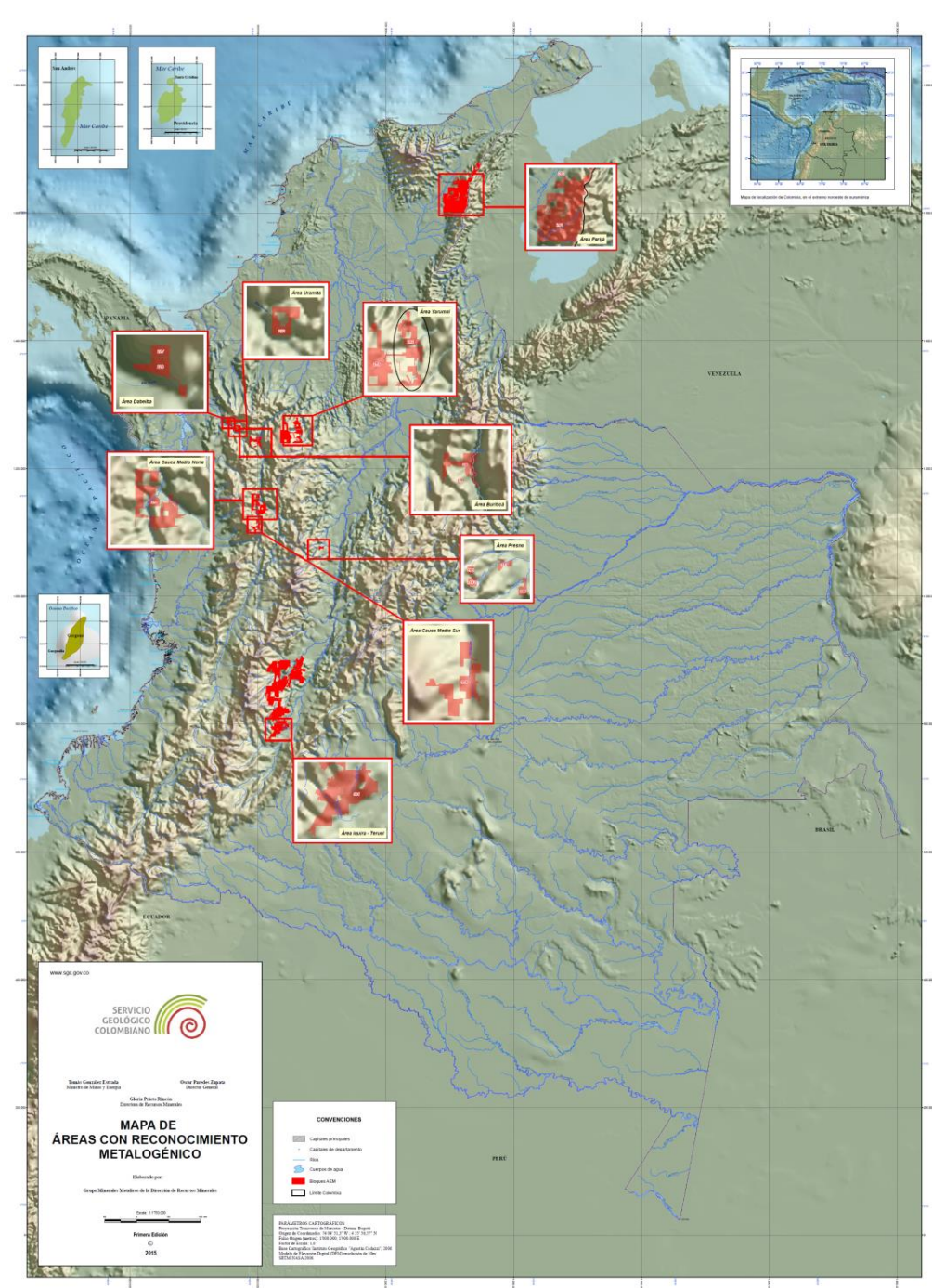
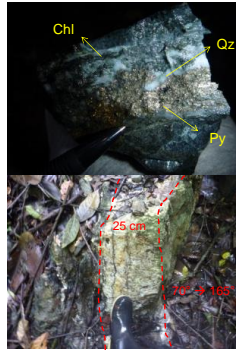


MAGNETOMETRÍA. (1DZ-1.5DZ-2DZ)

78° → 26° → G2

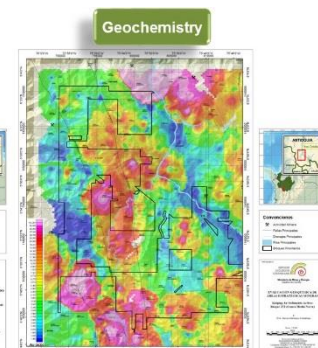
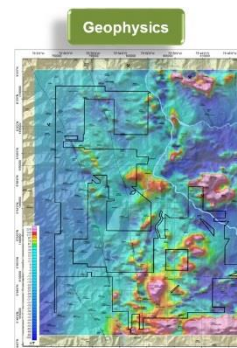
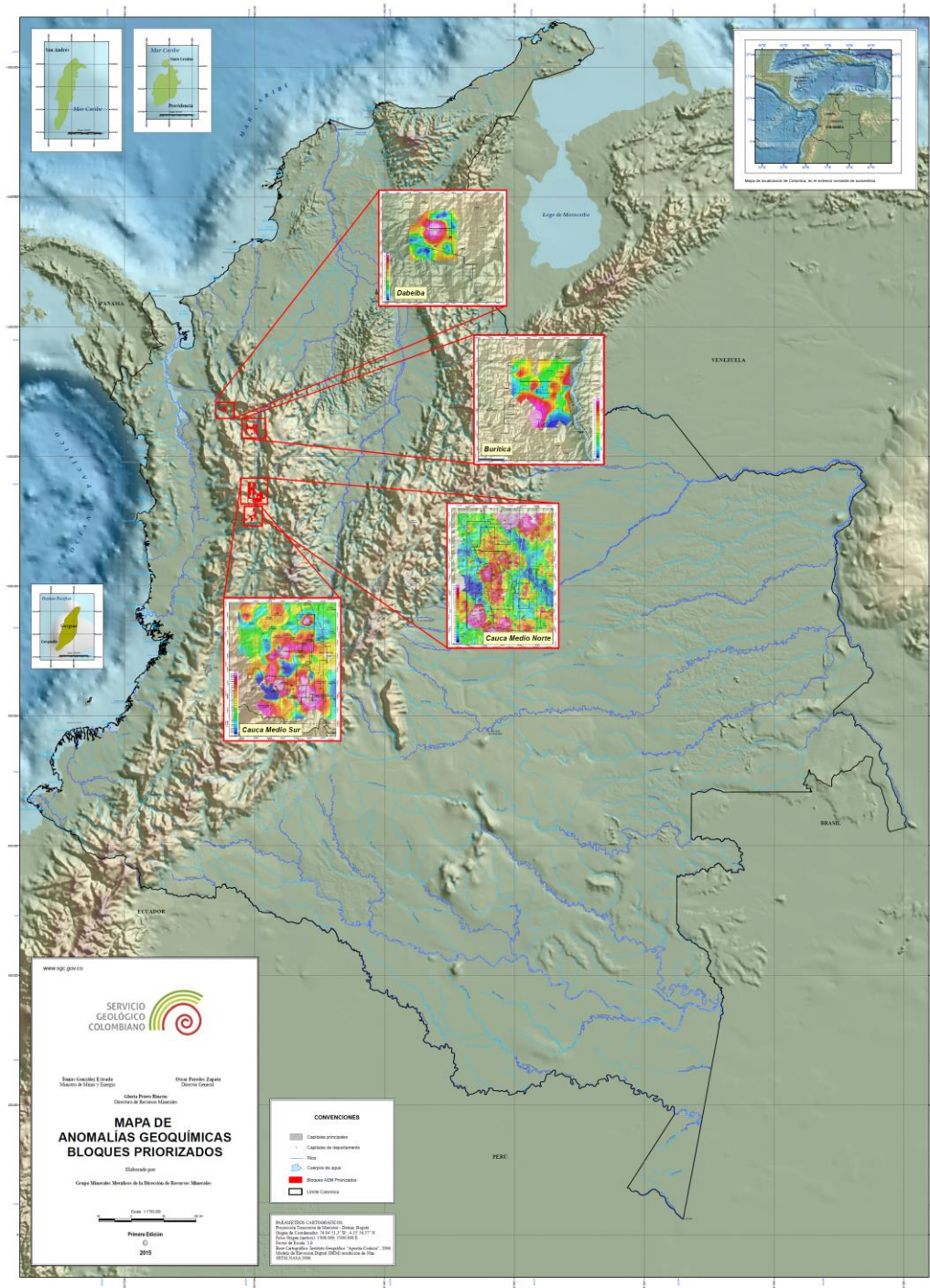
Variscas con sulfuros. Chertolva, Sierra de Guadalupe

Pyz, Cpy ?

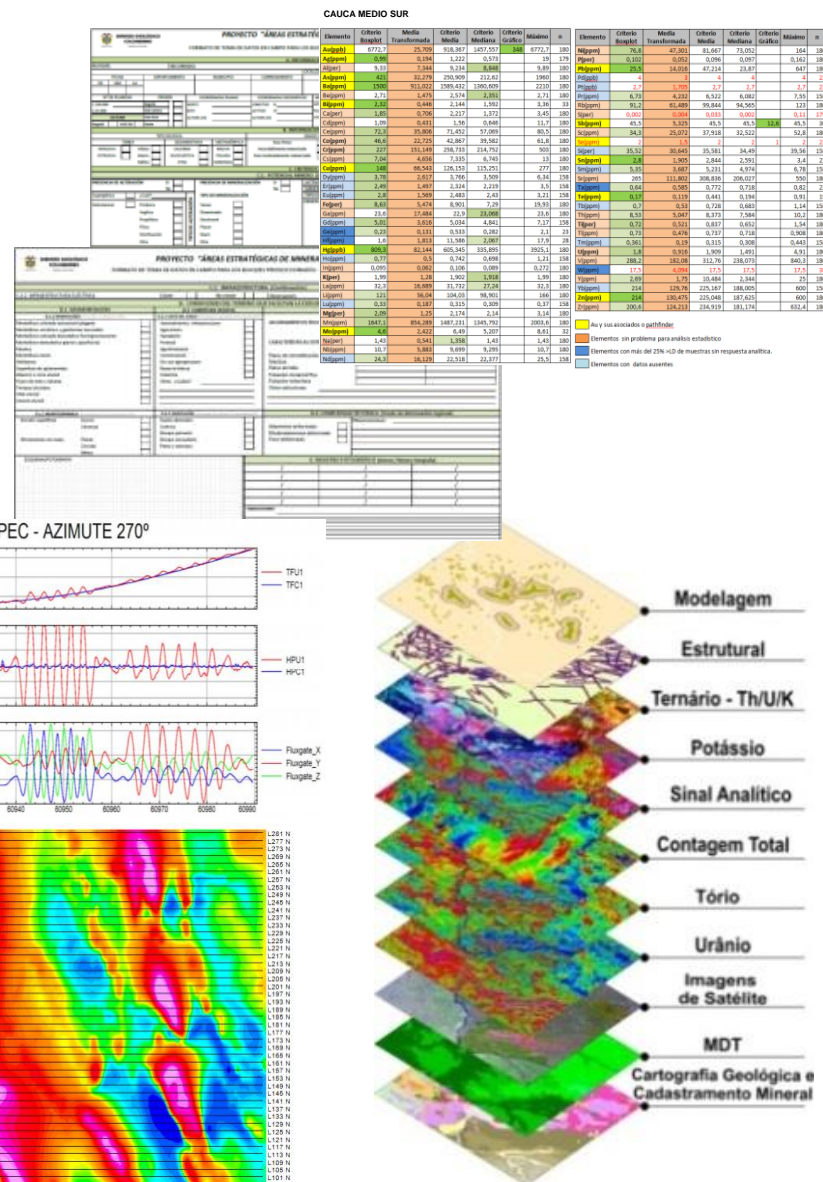




Priority Zones



- # GEODATABASE



The background of the slide is a vibrant, multi-colored topographic map. The colors represent different elevations and geological features, with blues and purples indicating lower elevations or water bodies, and greens, yellows, and reds indicating higher elevations and rugged terrain. The map shows various mountain ranges and valleys.

Gracias

<http://www.sgc.gov.co>