



# **The State of the Art of South America Geological Integration Projects in Progress, scales 1:5M and 1:1M**

Carlos Schobbenhaus

Geological Survey of Brazil (CPRM)

Commission for the Geological Map of the World (CGMW)

## ***ONGOING PROJECTS***

**Geologic Map of South America, 1:5 M**

**Geological and Mineral Resources Map of South  
America, 1:1M**

## ***IN CONCLUSION PROJECT***

**Tectonic Map of South America, 1:5 M**

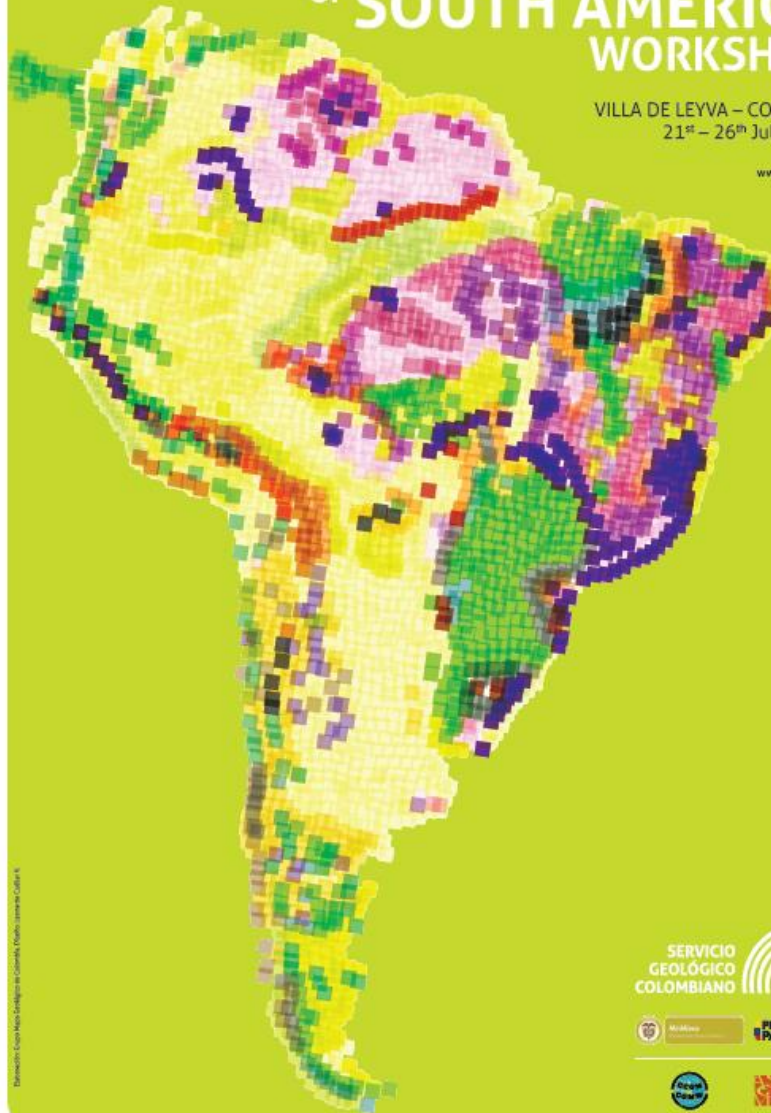
## ***NEW PROJECT***

**Geological Map of the Amazonian Craton, 1:2,5 M**

# GEOLOGICAL MAP OF SOUTH AMERICA WORKSHOP

VILLA DE LEYVA – COLOMBIA  
21<sup>st</sup> – 26<sup>th</sup> July, 2014

[www.sgc.gov.co](http://www.sgc.gov.co)



Elaboración: Grupo Mapa Geológico de Colombia, División Ingeniería, Bogotá, N.

SERVICIO  
GEOLOGICO  
COLOMBIANO



Mi Minería

PROSPERIDAD  
PARA TODOS





# Projects performed under the aegys of

COMMISSION FOR THE GEOLOGICAL MAP OF THE WORLD



Association of Ibero American Geological and Mining Surveys



**ASGMI**  
Associação de Serviços  
de Geologia e Mineração  
Ibero-americanos



**1913 - 2013**

**100 YEARS MAPPING THE WORLD**



**100 años de existencia**

Celebración del centenario de la CCGM en  
Villa de Leyva, Colombia 21 de Julio 2014



# 50 YEARS OF ACTIVITIES IN SOUTH AMERICA



The CGMW is an international non-profit association and is responsible for designing, coordinating, preparing and publishing small-scale thematic Earth Science maps of the globe, continent, major regions and oceans.

Geological Surveys (or similar organizations responsible for national geological mapping) are Statutory Members of the CGMW.



# **CGMW Bureau**

## **CONTINENTAL SUBCOMMISSIONS**

**North and Central America**

**South America**

**Antarctica**

**South and East Asia**

**Australia and Oceania**

**Europe**

**Moyen Orient**

**Eurasie du Nord**

## **THEMATIC SUBCOMMISSIONS**

**Tectonic Maps**

**Metallogenic Maps**

**Magmatic and Metamorphic Maps**

**Natural Hazards Maps**

**Hydrogeological Maps**

**Seafloor Maps**



# BUREAU MEETING, PARIS 2014



**CONTINENTAL SUBCOMMISSION**  
***South America***

**Carlos Schobbenhaus** (Vice President)  
**Jorge Gomez Tápias** (Secretary General)  
**Leda Maria Fraga** (Adjoining Secretary General)

**THEMATIC SUBCOMMISSION**  
***Tectonic Maps***

**Eduardo Zappettini** (President)



**ASGMI**

Asociación de Servicios  
de Geología y Minería  
Iberoamericanos



# ASGMI

Association created in 1993

Represented by Geological Surveys of  
19 latin american countries +  
Spain and Portugal

# The primary mission of ASGMI

## *La ASGMI tiene como misión fundamental*

1. The contribution to socio-economic development of the people through horizontal cooperation between partners, both bilateral and multilateral.
2. The institutional strengthening of Geology and Mining Services partners.

*1. La contribución al desarrollo socio-económico de los pueblos mediante la cooperación horizontal entre sus asociados, tanto bilateral como multilateral.*

*2. El fortalecimiento institucional de los Servicios de Geología y Minería asociados.*

# **Geological and thematic maps of South America (CGMW-ASGMI)**

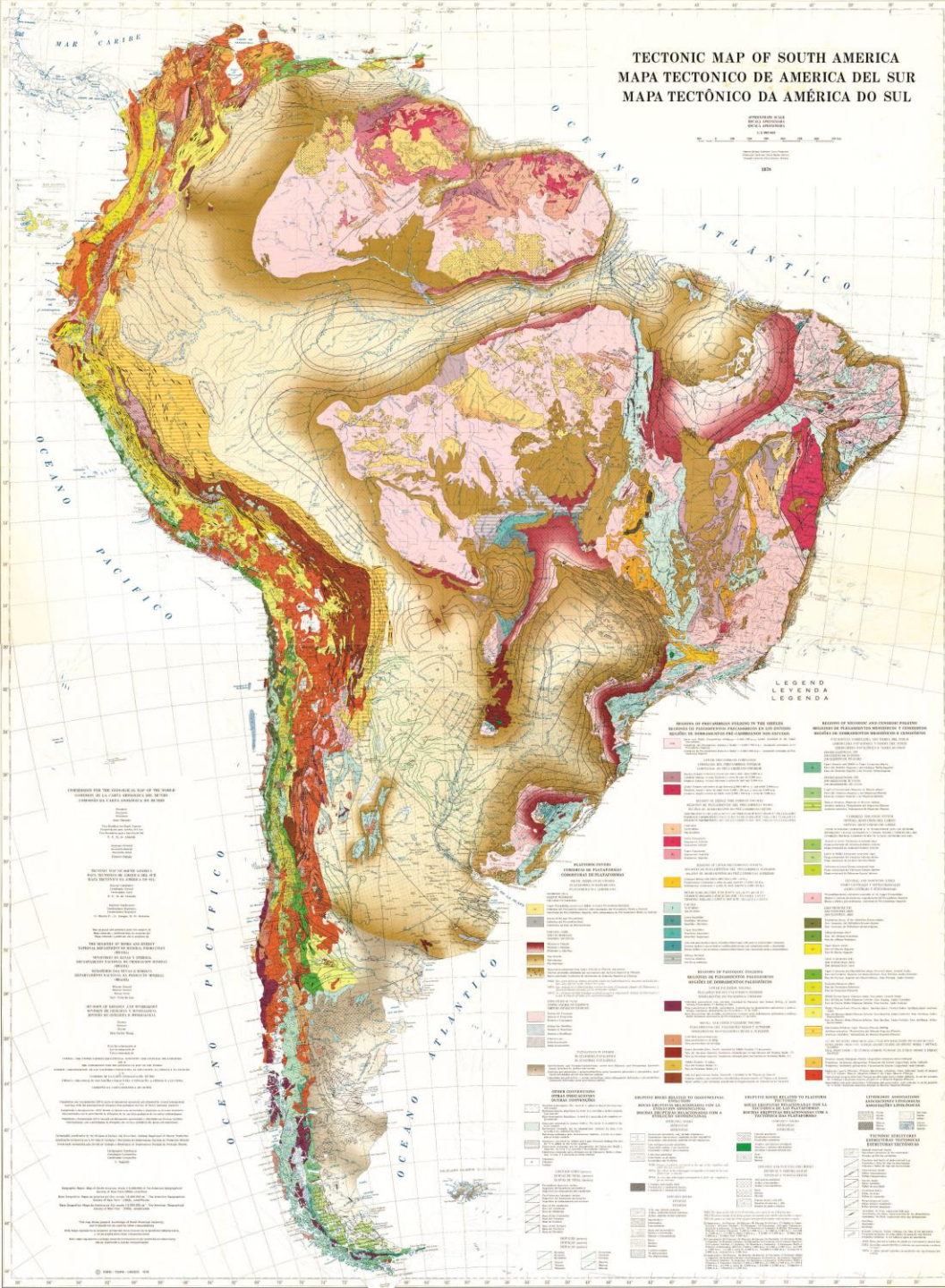
- 2014** TECTONIC (CGMW-CPRM-SEGEMAR-ASGMI-UNESCO)
- 2005** METALLOGENIC (CGMW-SEGEMAR-ASGMI-UNESCO)
- 2004** METAMORPHIC (CGMW-CPRM-DNPM-UNESCO)
- 2001** GEOLOGIC (CGMW-DNPM-CPRM-UNESCO)
- 2000** GEOLOGIC (CGMW-DNPM-CPRM-UNESCO)
- 1983** METALLOGENIC (CGMW-MEM/Venezuela)
- 1978** TECTONIC (CGMW-DNPM-UNESCO)
- 1964** GEOLOGIC (CGMW-DNPM/CNP-USAID-UNESCO)

CARTE GÉOLOGIQUE DE L'AMÉRIQUE DU SUD  
MAPA GEOLÓGICO DE AMÉRICA DEL SUR  
MAPA GEOLÓGICO DA AMÉRICA DO SUL



# GEOLOGIC (1964)





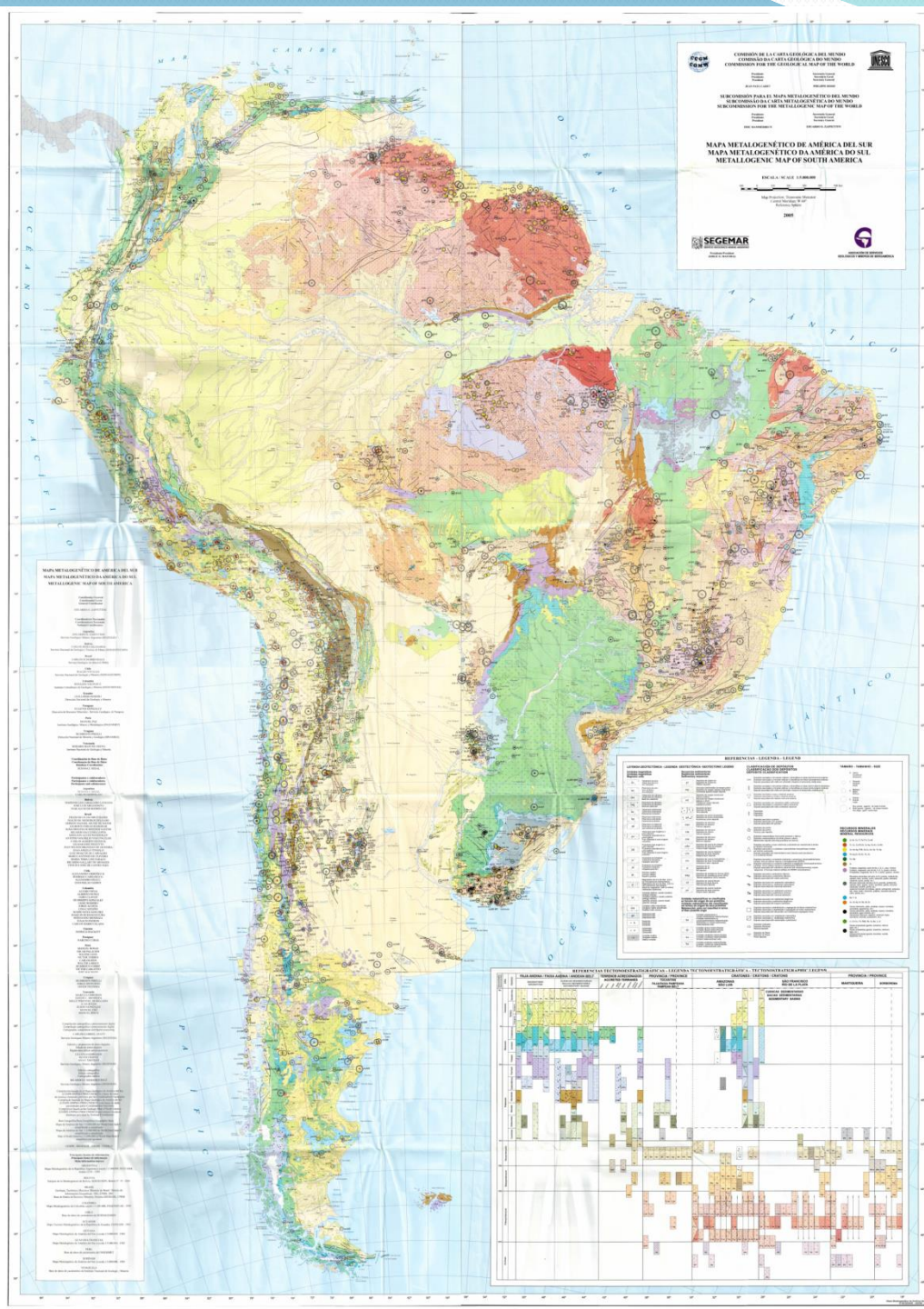
# TECTONIC (1978)



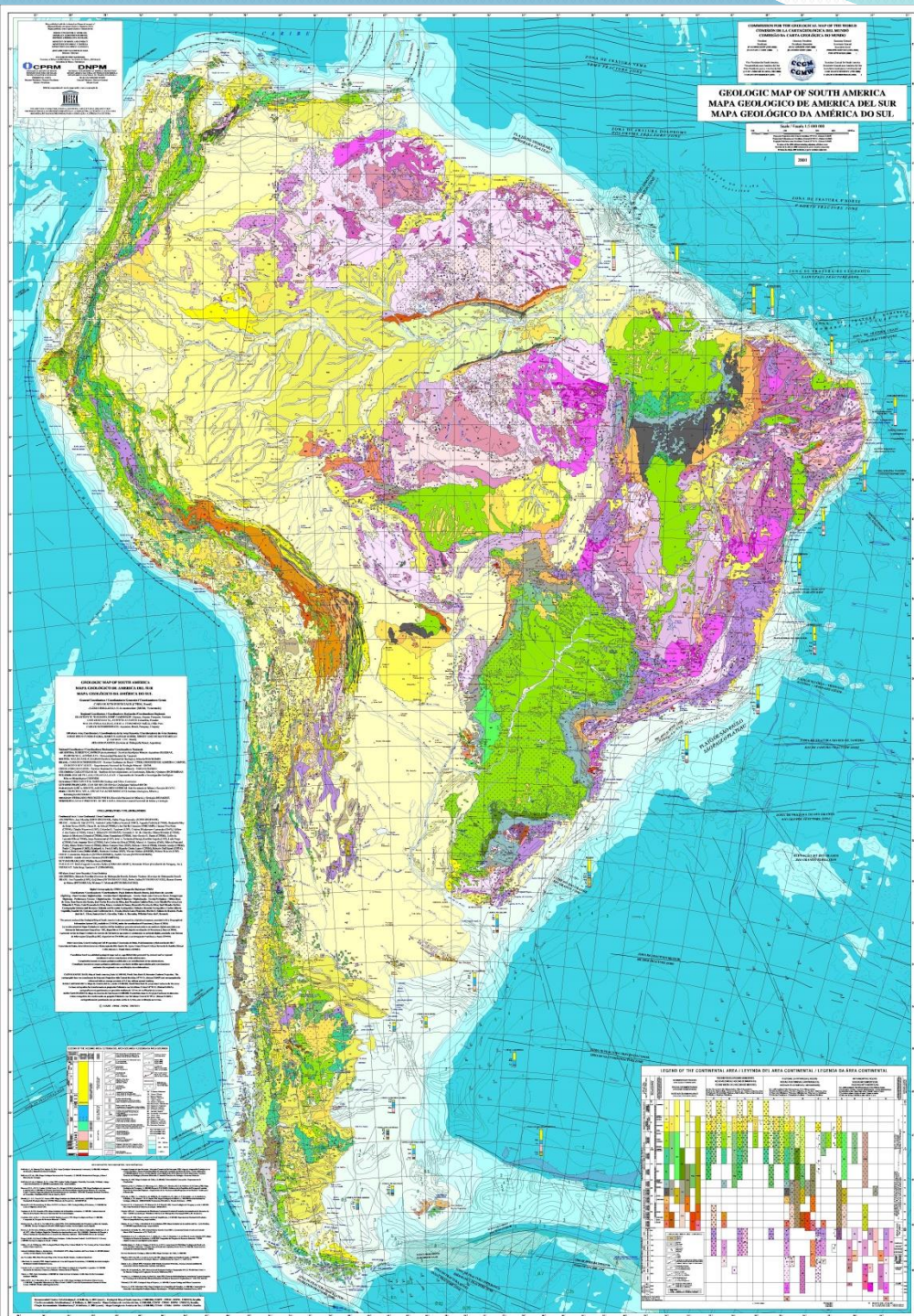
# METALLOGENIC (1983)



# METAMORPHIC (2004)

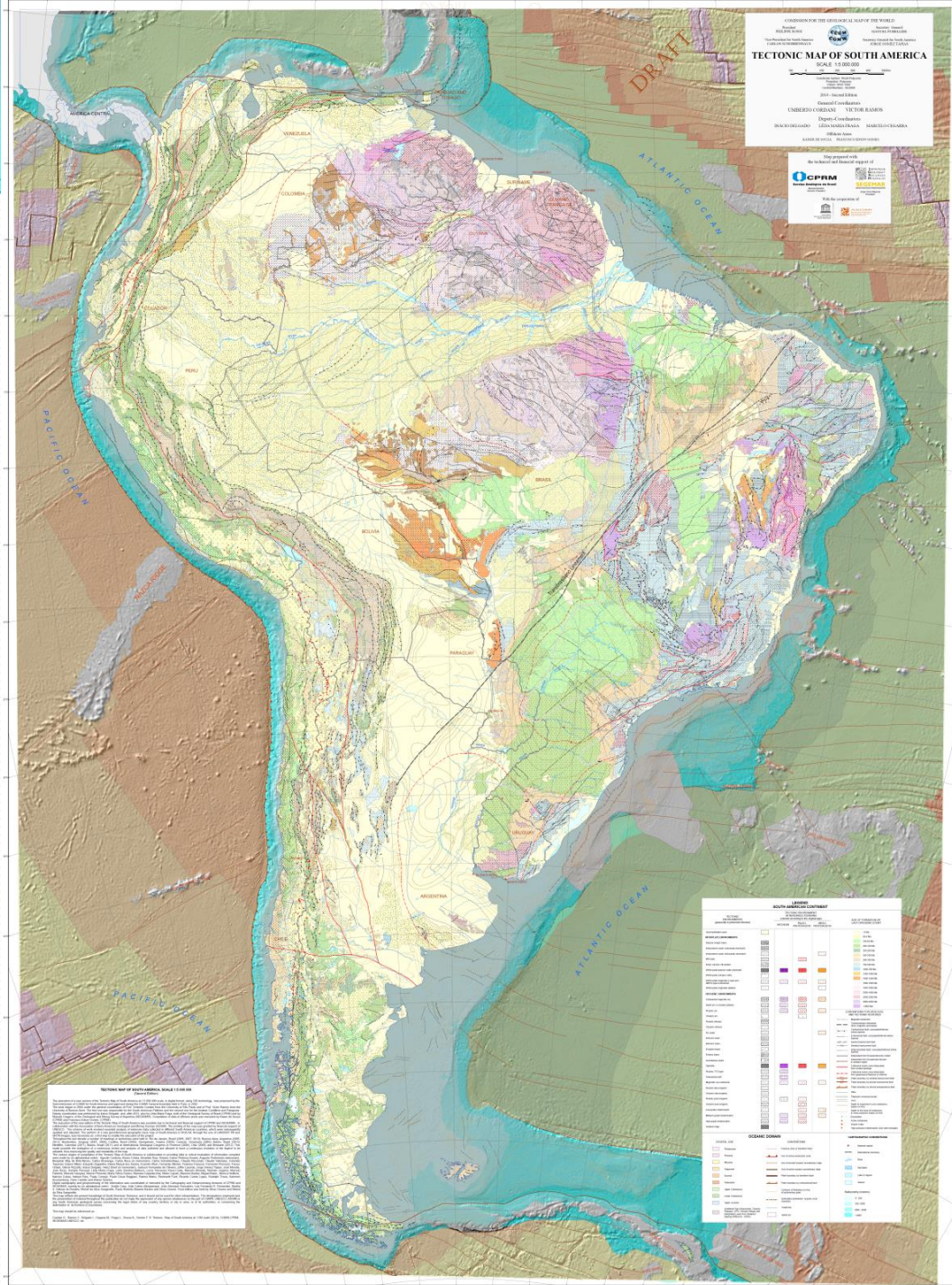


# METALLOGENIC (2005)



# GEOLOGIC (2001)

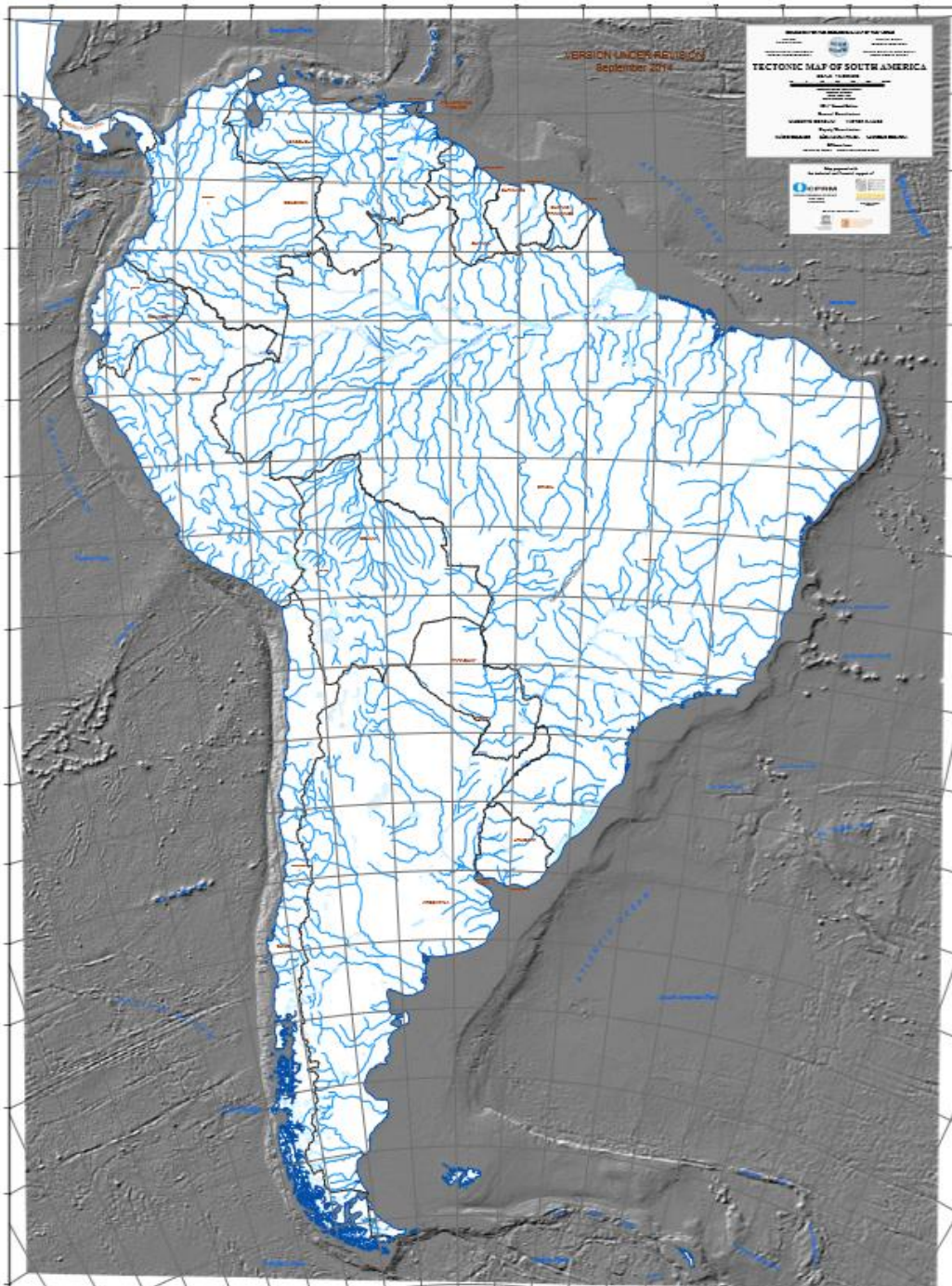
The first map in  
GIS



# TECTONIC (2014)



14/03/2012



# New Geographic Base of South America

World Polyconic  
Projection  
WGS 84





# **Geologic Map of South America**

**1:5 M  
(FIRST DRAFT)**

General Coordinators

**Carlos Schobbenhaus & Jorge Gomez Tapias**

Mapa Geológico de América del Sur  
 Geoparc  
 Comisión para el Mapa Geológico del Mundo  
 Comisión de la Carta Geológica del Mundo  
 Comisión de la Carta Geológica del Mundo

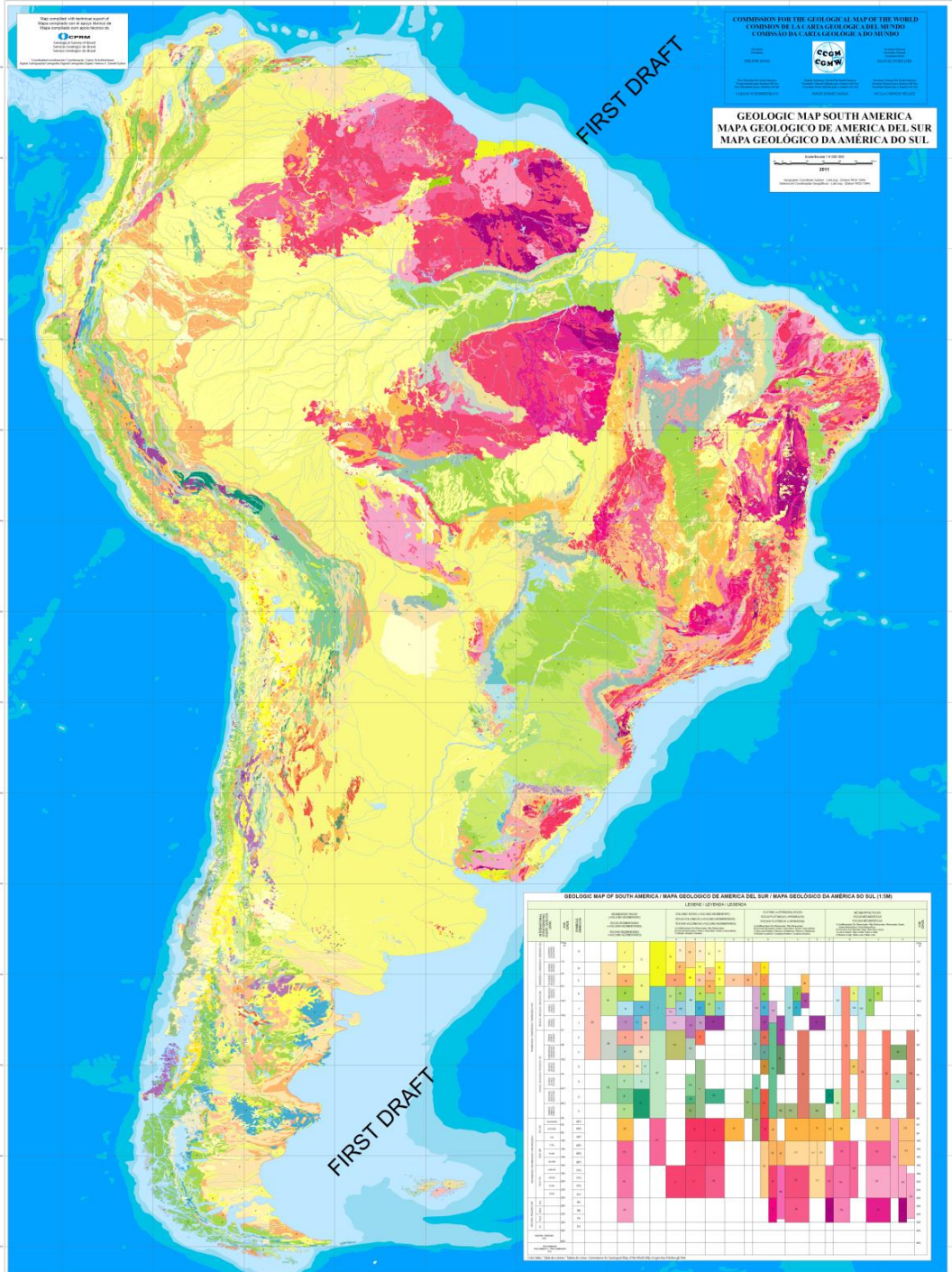
COMMISSION FOR THE GEOLOGICAL MAP OF THE WORLD  
 COMISION DE LA CARTA GEOLOGICA DEL MUNDO  
 COMISSÃO DA CARTA GEOLOGICA DO MUNDO

**Geoparc**

Geoparc  
 Comisión para el Mapa Geológico del Mundo  
 Comisión de la Carta Geológica del Mundo  
 Comissão de la Carta Geológica do Mundo

**GEOLOGIC MAP SOUTH AMERICA**  
**MAPA GEOLÓGICO DE AMÉRICA DEL SUR**  
**MAPA GEOLÓGICO DA AMÉRICA DO SUL**

Scale: 1:100,000,000  
 1:100,000,000  
 2011

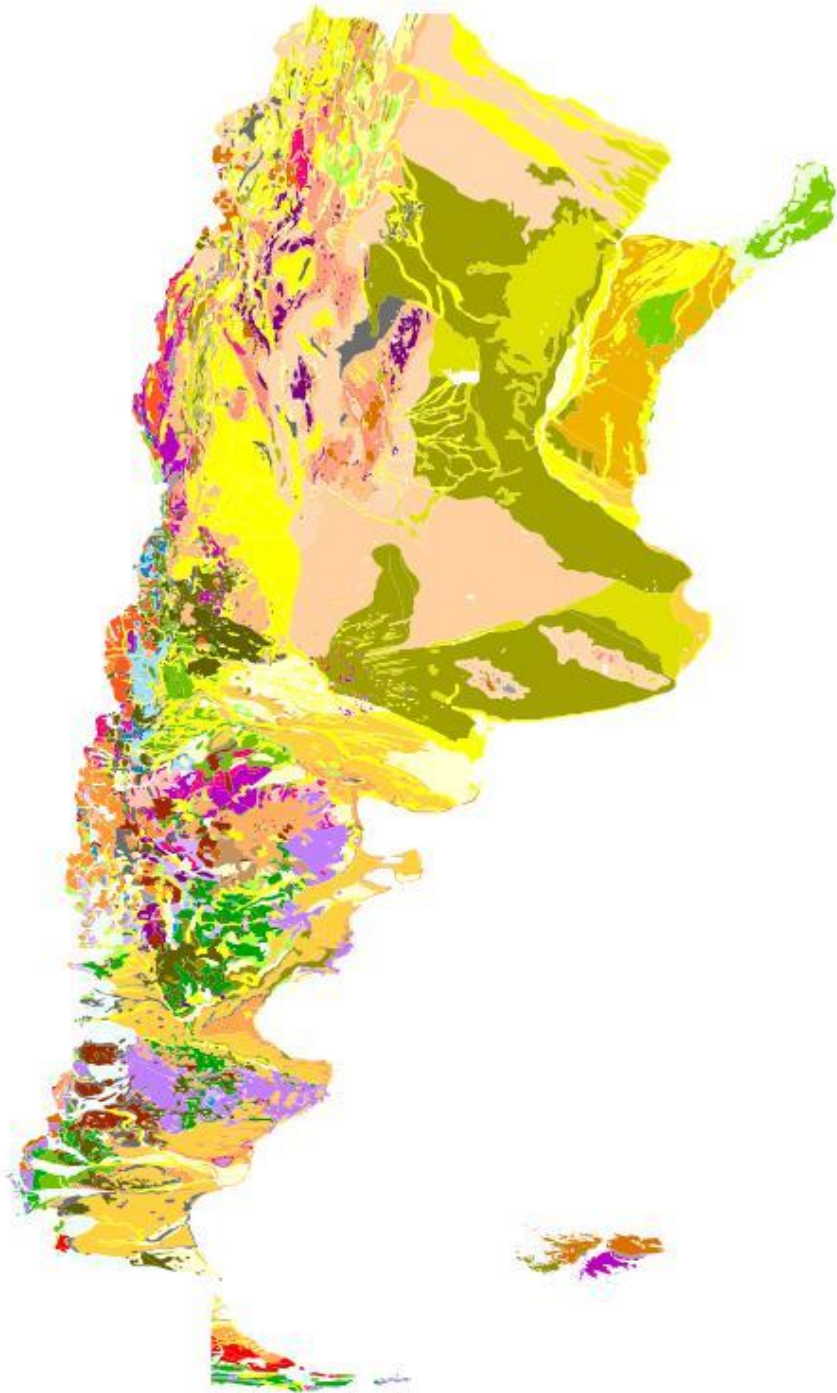


**GEOLOGIC MAP OF SOUTH AMERICA / MAPA GEOLÓGICO DE AMÉRICA DEL SUR / MAPA GEOLÓGICO DA AMÉRICA DO SUL (1:100,000,000)**

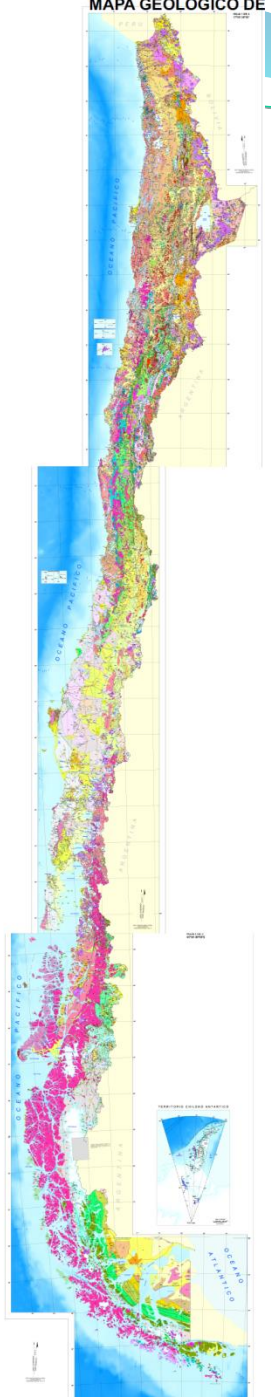
**LEGENDE - LÉGENDE - LEGENDA**

AGE	UNIT	SYMBOL	DESCRIPTION
CENOZOIC	Quaternary	Q	Quaternary
	Tertiary	T3	Tertiary
		T2	Tertiary
		T1	Tertiary
	Cretaceous	C7	Cretaceous
		C6	Cretaceous
		C5	Cretaceous
		C4	Cretaceous
		C3	Cretaceous
		C2	Cretaceous
C1		Cretaceous	
MESOZOIC	M10	Mesozoic	
	M9	Mesozoic	
	M8	Mesozoic	
	M7	Mesozoic	
	M6	Mesozoic	
	M5	Mesozoic	
	M4	Mesozoic	
	M3	Mesozoic	
	M2	Mesozoic	
	M1	Mesozoic	
PALEOZOIC	P10	Paleozoic	
	P9	Paleozoic	
	P8	Paleozoic	
	P7	Paleozoic	
	P6	Paleozoic	
	P5	Paleozoic	
	P4	Paleozoic	
	P3	Paleozoic	
	P2	Paleozoic	
	P1	Paleozoic	
PROTEROZOIC	Pr10	Proterozoic	
	Pr9	Proterozoic	
	Pr8	Proterozoic	
	Pr7	Proterozoic	
	Pr6	Proterozoic	
	Pr5	Proterozoic	
	Pr4	Proterozoic	
	Pr3	Proterozoic	
	Pr2	Proterozoic	
	Pr1	Proterozoic	

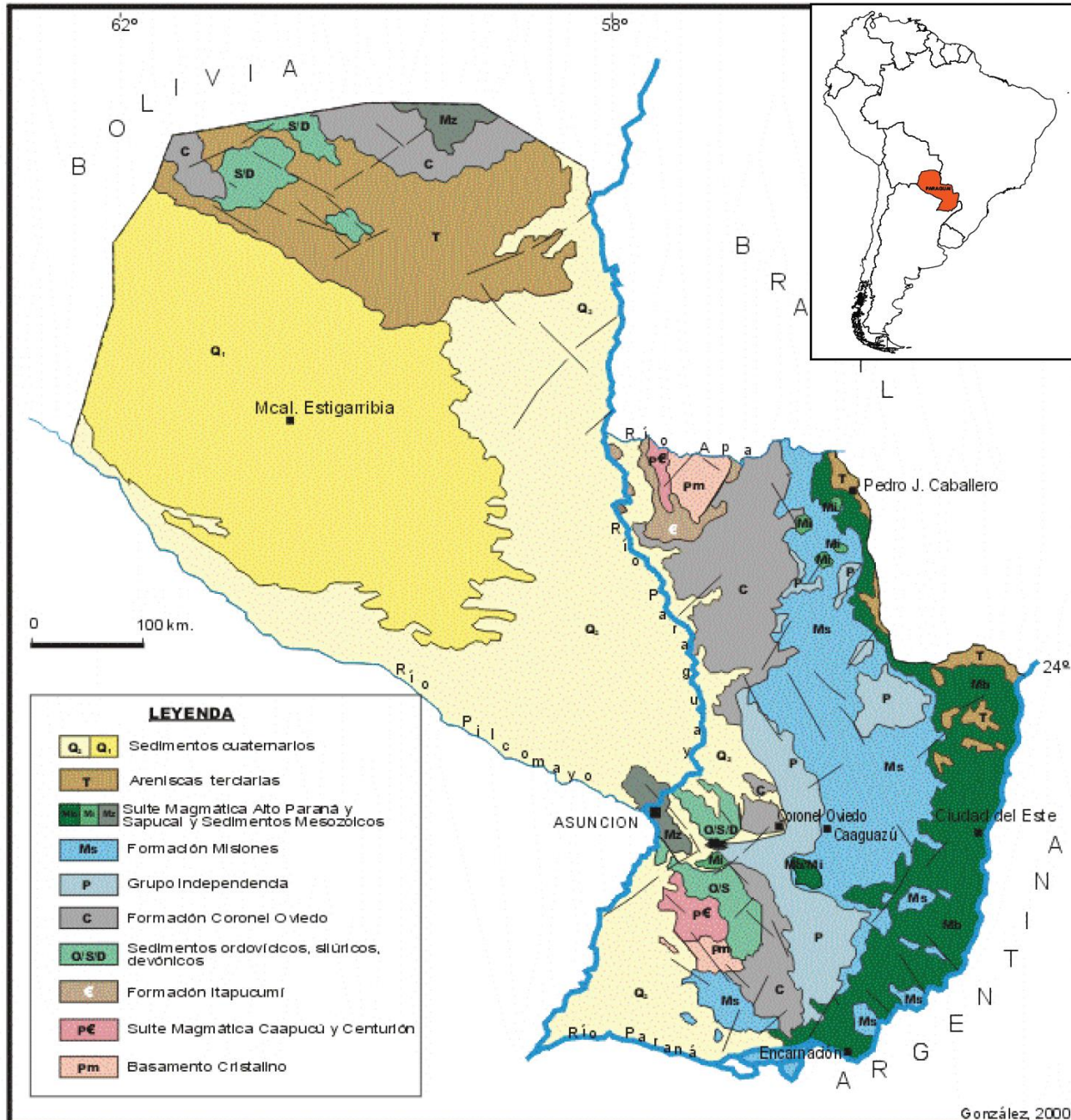


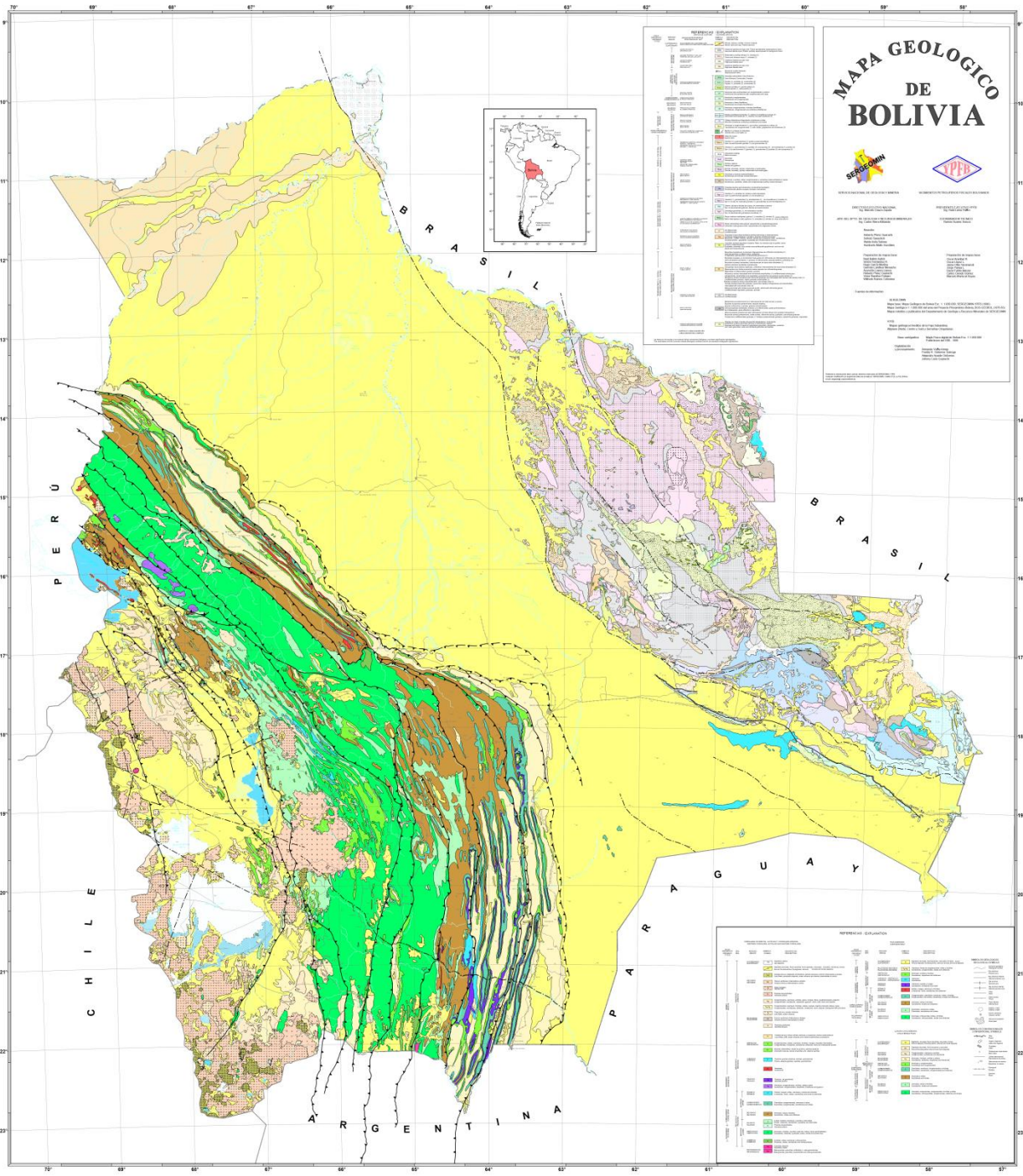


MAPA GEOLOGICO DE

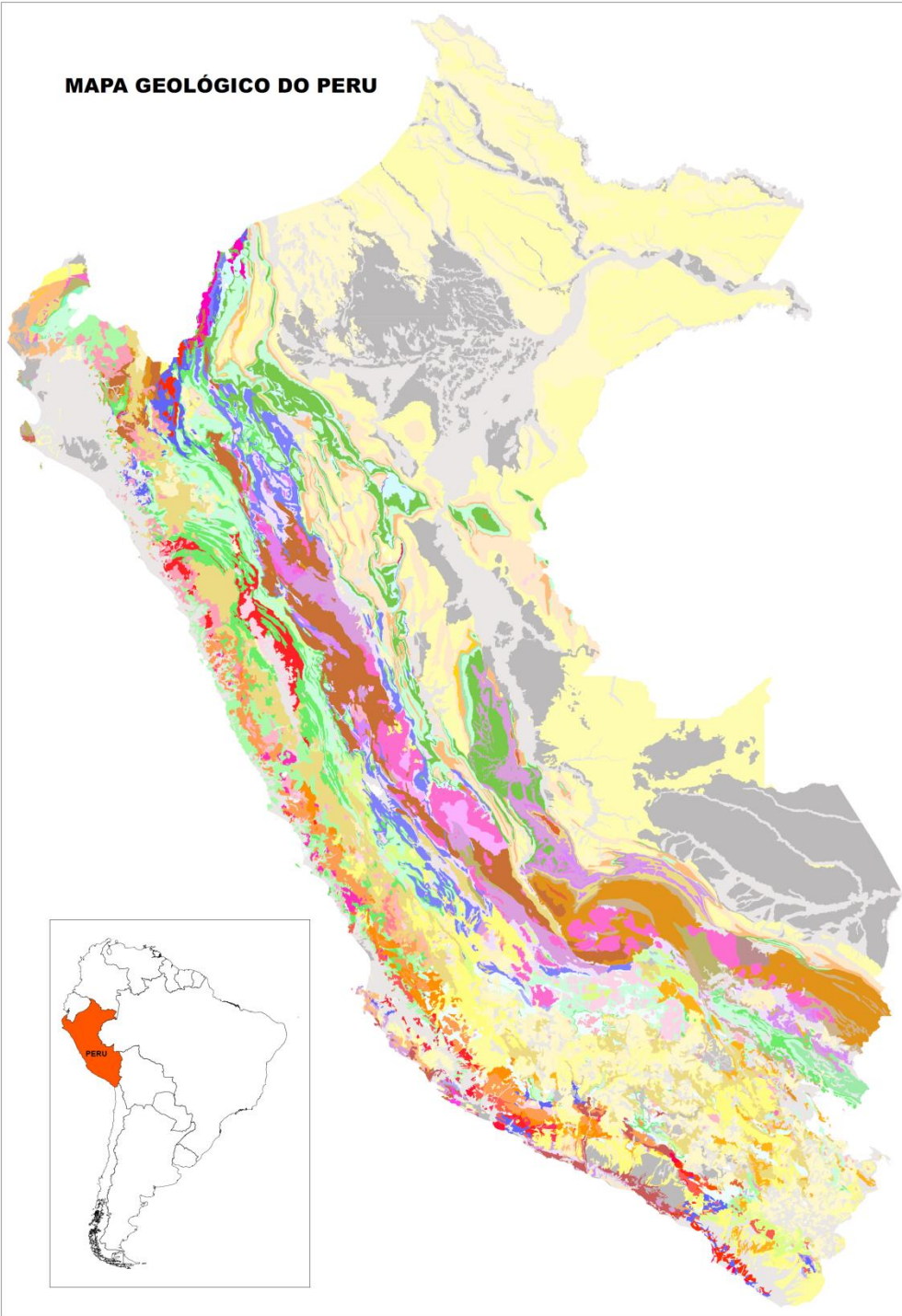


# Mapa Geológico de Paraguay.

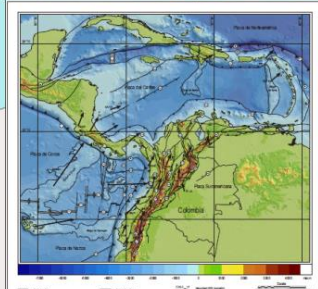




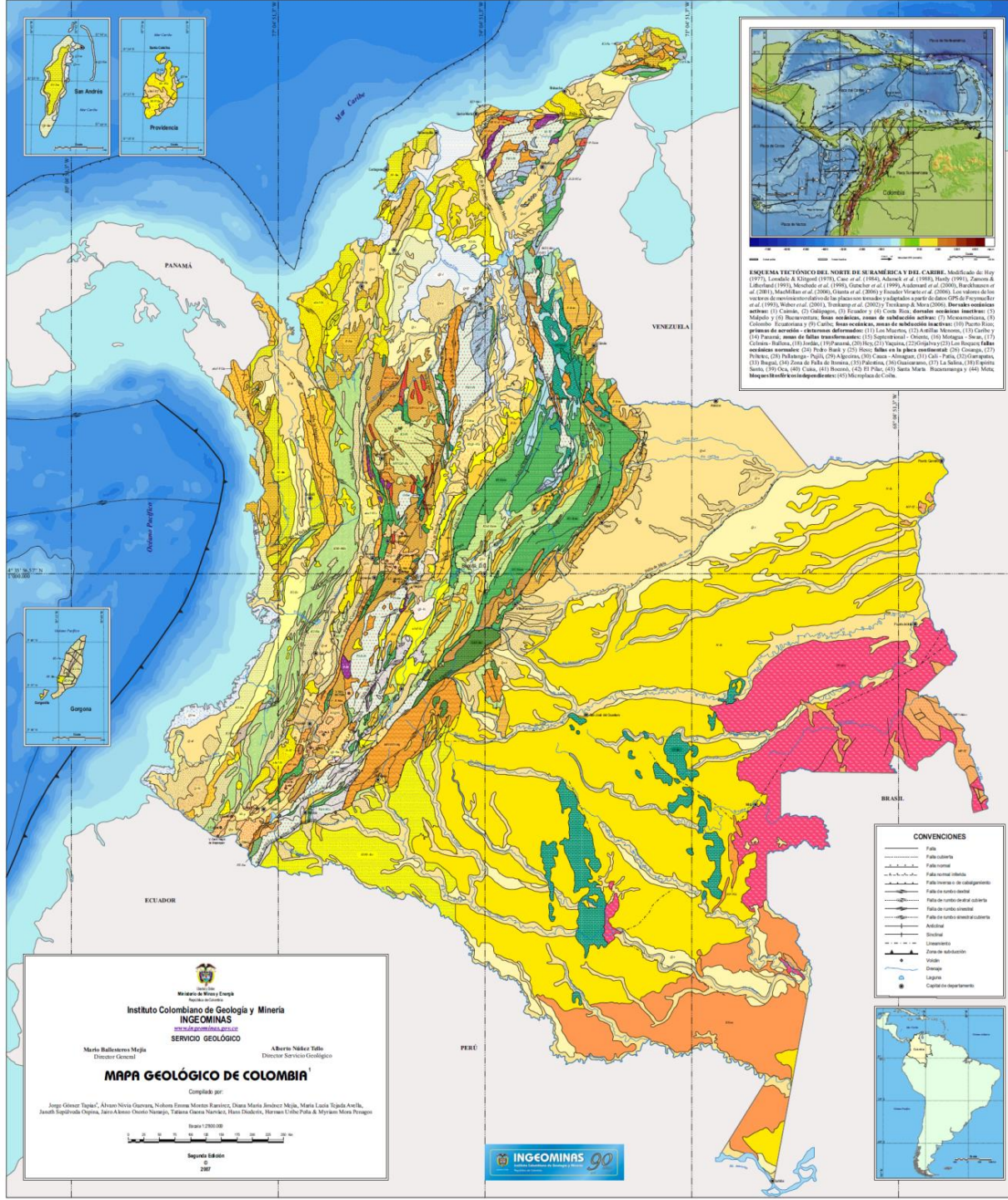
# MAPA GEOLÓGICO DO PERU








**ESQUEMA TECTÓNICO DEL NOROCCIDENTE DE SUDAMÉRICA Y DEL CARIBE.** Modificado de Hay (1973), Lambert & Vilgout (1978), Carr et al. (1984), Adachi et al. (1988), Harty (1991), Zinner & Lillie (1991), Molodtsov et al. (1998), Graciar et al. (1999), Aulic et al. (2000), Barckhausen et al. (2001), Molodtsov et al. (2006), Graciar et al. (2009), Aulic et al. (2010), Barckhausen et al. (2010), Molodtsov et al. (2010), Trindler et al. (2010), Trindler & Mora (2010). Dirección orientada según: (1) Caribe, (2) Chiriquí, (3) Ecuador y (4) Costa Rica, densidad secciones isostáticas (5) Maluco y (6) Guayana Francesa, zona de subducción andina (7) Microsección, (8) Colombia-Ecuador y (9) Caribe, zona oculta, zona de subducción tectónica (10) Puerto Rico, zona de subducción - subducción delimitada (11) Los Andes, (12) Antillas Menores, (13) Caribe y (14) Panamá, zona de fallas transformantes (15) Suroriental - Occidental, (16) Motagua - San Juan, (17) Colombia - Ecuador, (18) Indio, (19) Perené, (20) Huancabamba, (21) Yacoma, (22) Utiacajá y (23) Los Rioses. Falla seccion normal (24) Fucha-Huila y (25) Huila en la placa continental. (26) Cuzco, (27) Pichis, (28) Tulumayo, Pájaro, (29) Algeciras, (30) Casapalca - Algeciras, (31) Utiacajá - Pájaro, (32) Chiriquí, (33) Bogotá, (34) Zona de Falla de Honda, (35) Pastaza, (36) Guaporé, (37) La Salina, (38) Espino Santo, (39) Pájaro, (40) Cuzco, (41) Huancabamba, (42) Pájaro, (43) San Mateo, (44) Guaporé y (45) Mito. Dirección de flujo de la placa oceánica: (46) Magdalena de Caño.



**CONVENCIONES**

- Falla
- Falla cubierta
- Falla normal
- Falla normal oblicua
- Falla inversa o de subducción
- Falla de centro de arco cubierto
- Falla de centro de arco descubierta
- Falla de centro de arco cubierto
- Falla de centro de arco descubierta
- Anticlinal
- Artesiano
- Limnético
- Zona de subducción
- Volcan
- Chorro
- Laguna
- Capital departamental

  
 Ministerio de Minas y Energía  
**Instituto Colombiano de Geología y Minería**  
**INGEOMINAS**  
 SERVIDIO GEOLÓGICO

Mario Ballesteros Mejía  
 Director General

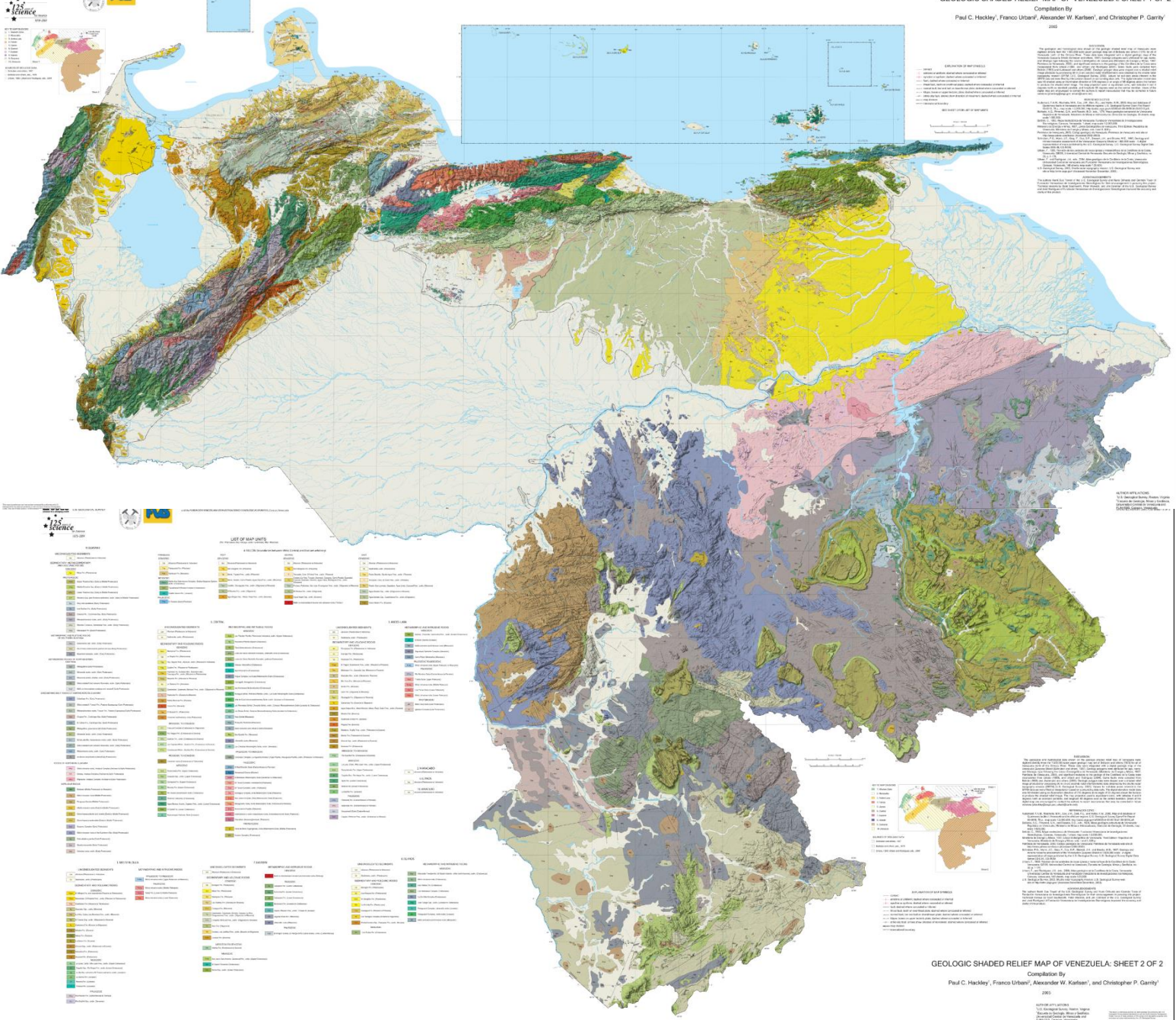
Alberto Núñez Tello  
 Director Servicio Geológico

**MAPA GEOLÓGICO DE COLOMBIA<sup>1</sup>**  
 Compilado por:  
 Jorge Gómez Tapia\*, Álvaro Nivia Guerrero, Nelson Ennio Muñoz Ramírez, Diana María Sánchez Mejía, María Lucía Ujeda Arellano,  
 Judith Sigüenza Ospina, Jairo Abasco Ospina Naranjo, Tatiana Guzmán Naranjo, Hans Dieckert, Herman Uribe Palfo & Myriam Mora Pineda

Escala 1:2500.000  
 Segunda Edición  
 © 2007







**EXPLANATION OF MAP SYMBOLS**

**RELIEF**  
Shaded relief map showing topographic relief. Contour interval is 100 meters. Shading is in 100-meter increments, with the lowest elevation shaded in white and the highest elevation shaded in black.

**GEOLGIC UNITS**  
Geologic units are color-coded according to the legend. The colors represent different geological formations and their relative ages.

**BOUNDARIES**  
Geologic boundaries are shown as lines with different styles and colors. Solid lines represent faults, dashed lines represent unconformities, and dotted lines represent other boundaries.

**PLACES**  
Major cities and towns are marked with dots and labeled. Other locations are marked with smaller dots.

**WATER BODIES**  
Lakes and reservoirs are shown as blue areas. Rivers and streams are shown as blue lines.

**ROADS**  
Major roads are shown as solid lines. Other roads are shown as dashed lines.

**GRID**  
The map is overlaid with a grid of latitude and longitude lines.

**LIST OF MAP UNITS**

UNIT	SYMBOL	DESCRIPTION
1	[Symbol]	Quaternary Alluvium
2	[Symbol]	Quaternary Sandstone
3	[Symbol]	Quaternary Claystone
4	[Symbol]	Quaternary Shale
5	[Symbol]	Quaternary Limestone
6	[Symbol]	Quaternary Dolomite
7	[Symbol]	Quaternary Gypsum
8	[Symbol]	Quaternary Salt
9	[Symbol]	Quaternary Sandstone
10	[Symbol]	Quaternary Claystone
11	[Symbol]	Quaternary Shale
12	[Symbol]	Quaternary Limestone
13	[Symbol]	Quaternary Dolomite
14	[Symbol]	Quaternary Gypsum
15	[Symbol]	Quaternary Salt
16	[Symbol]	Quaternary Sandstone
17	[Symbol]	Quaternary Claystone
18	[Symbol]	Quaternary Shale
19	[Symbol]	Quaternary Limestone
20	[Symbol]	Quaternary Dolomite
21	[Symbol]	Quaternary Gypsum
22	[Symbol]	Quaternary Salt
23	[Symbol]	Quaternary Sandstone
24	[Symbol]	Quaternary Claystone
25	[Symbol]	Quaternary Shale
26	[Symbol]	Quaternary Limestone
27	[Symbol]	Quaternary Dolomite
28	[Symbol]	Quaternary Gypsum
29	[Symbol]	Quaternary Salt
30	[Symbol]	Quaternary Sandstone
31	[Symbol]	Quaternary Claystone
32	[Symbol]	Quaternary Shale
33	[Symbol]	Quaternary Limestone
34	[Symbol]	Quaternary Dolomite
35	[Symbol]	Quaternary Gypsum
36	[Symbol]	Quaternary Salt
37	[Symbol]	Quaternary Sandstone
38	[Symbol]	Quaternary Claystone
39	[Symbol]	Quaternary Shale
40	[Symbol]	Quaternary Limestone
41	[Symbol]	Quaternary Dolomite
42	[Symbol]	Quaternary Gypsum
43	[Symbol]	Quaternary Salt
44	[Symbol]	Quaternary Sandstone
45	[Symbol]	Quaternary Claystone
46	[Symbol]	Quaternary Shale
47	[Symbol]	Quaternary Limestone
48	[Symbol]	Quaternary Dolomite
49	[Symbol]	Quaternary Gypsum
50	[Symbol]	Quaternary Salt

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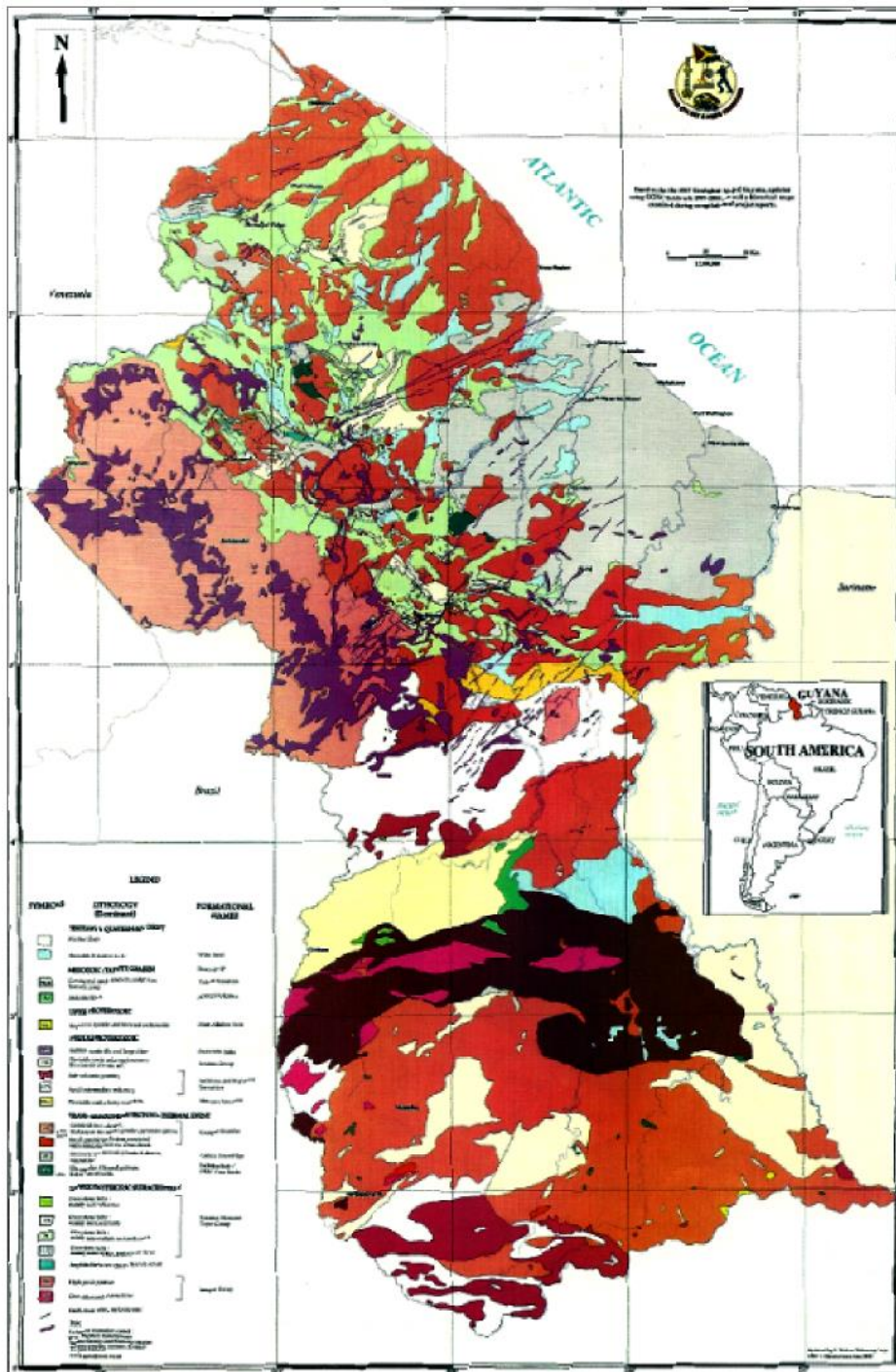
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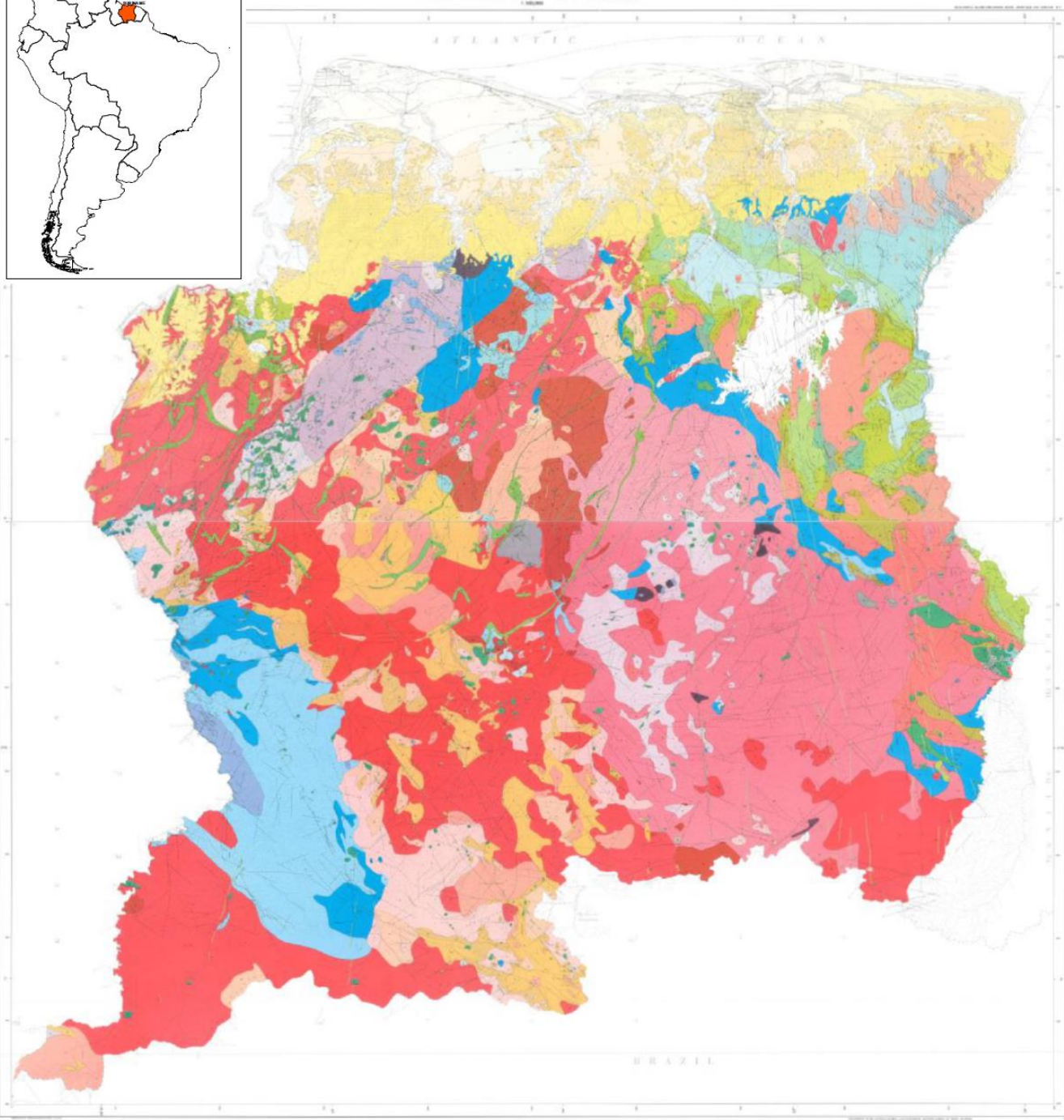
**ROADS**  
Major roads are shown as solid lines. Other roads are shown as dashed lines.

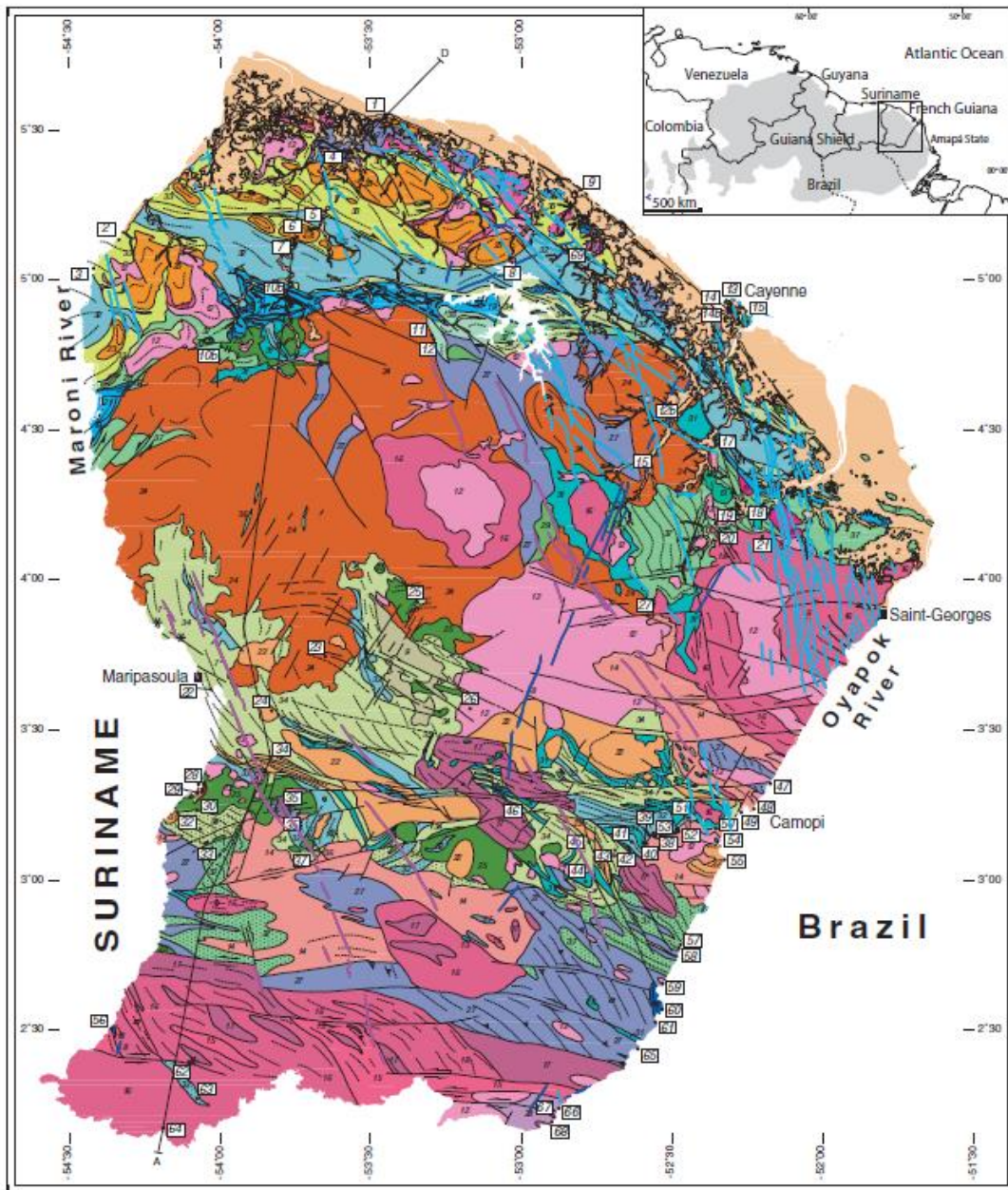
**GRID**  
The map is overlaid with a grid of latitude and longitude lines.

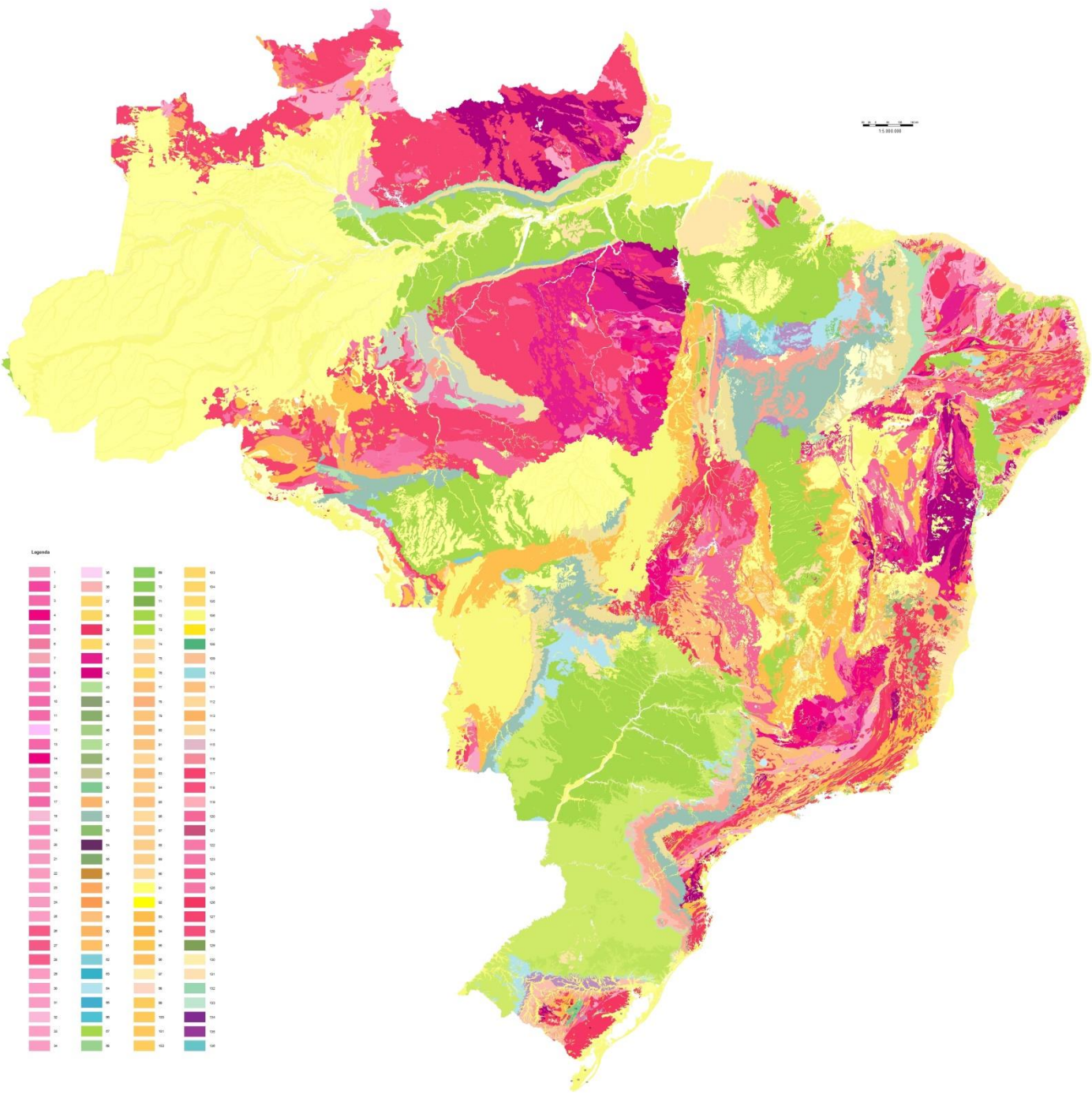
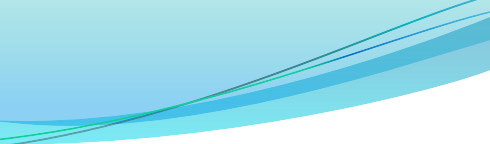




# GEOLOGICAL MAP OF SURINAME







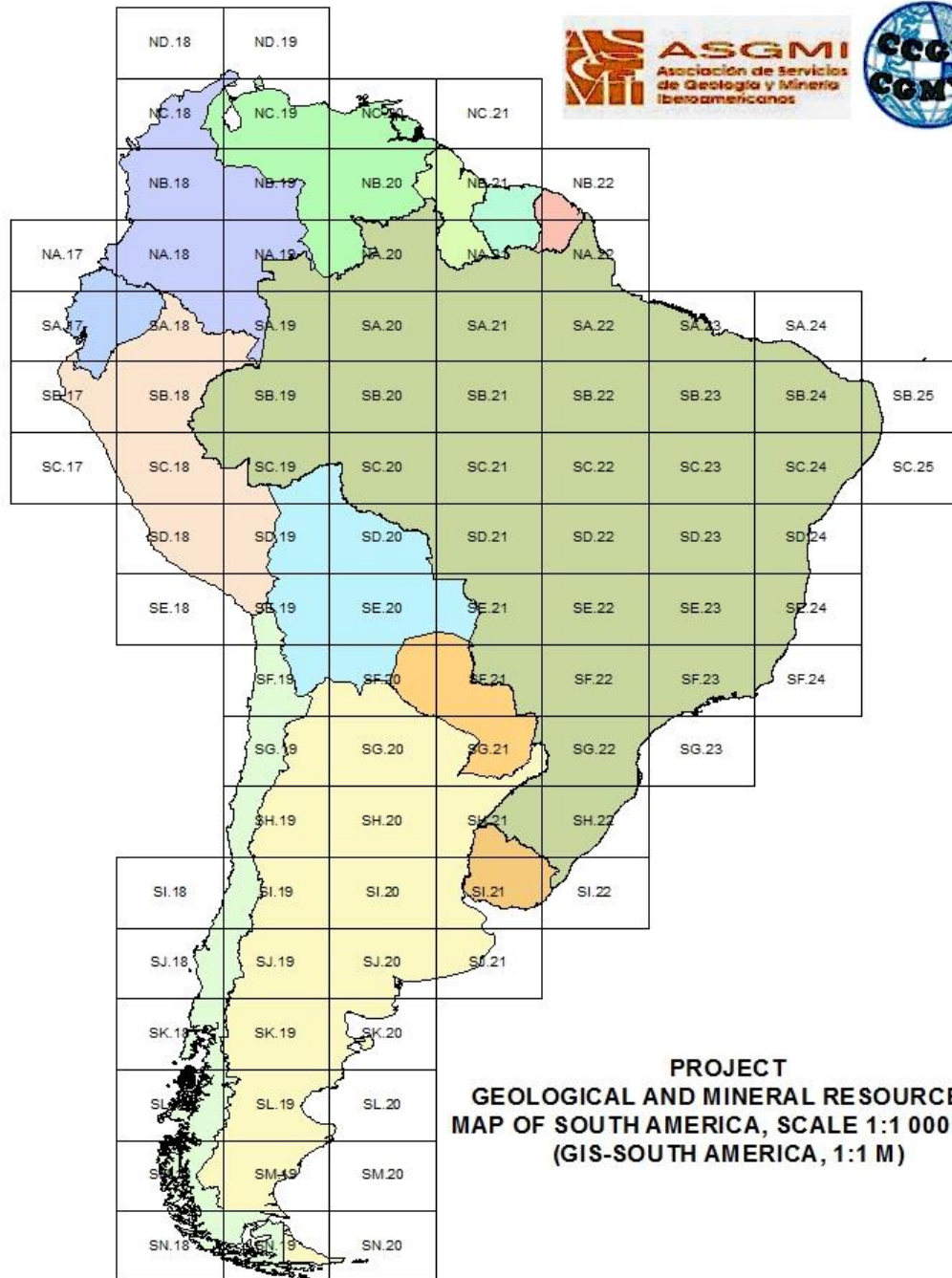
# **PROJECT**

**Geological and Mineral  
Resources Map of South America  
at 1:1M and related data basis**

**(GIS-South America 1:1M)**

**ASGMI-CGMW**





**PROJECT  
GEOLOGICAL AND MINERAL RESOURCES  
MAP OF SOUTH AMERICA, SCALE 1:1 000 000  
(GIS-SOUTH AMERICA, 1:1 M)**



**RESOLUTIONS OF THE CGMW  
GENERAL ASSEMBLY  
Paris  
UNESCO  
1st February 2002**

**SUBCOMMISSION FOR SOUTH AMERICA**

**Supports** the initiative of the ASGMI to launch the ***Geological and Mineral Resources Map of South America project at 1:1 M, and related data basis (GIS-South America 1:1 M)*** in conjunction with the CGMW S/C for South America and S/C for Metallogenic Maps.

# Relevance of the project

Integration, reassessment, systematization and broad dissemination of the geology and mineral resources of South America using GIS technology, homogeneously on the same geographical basis and at an appropriate scale;

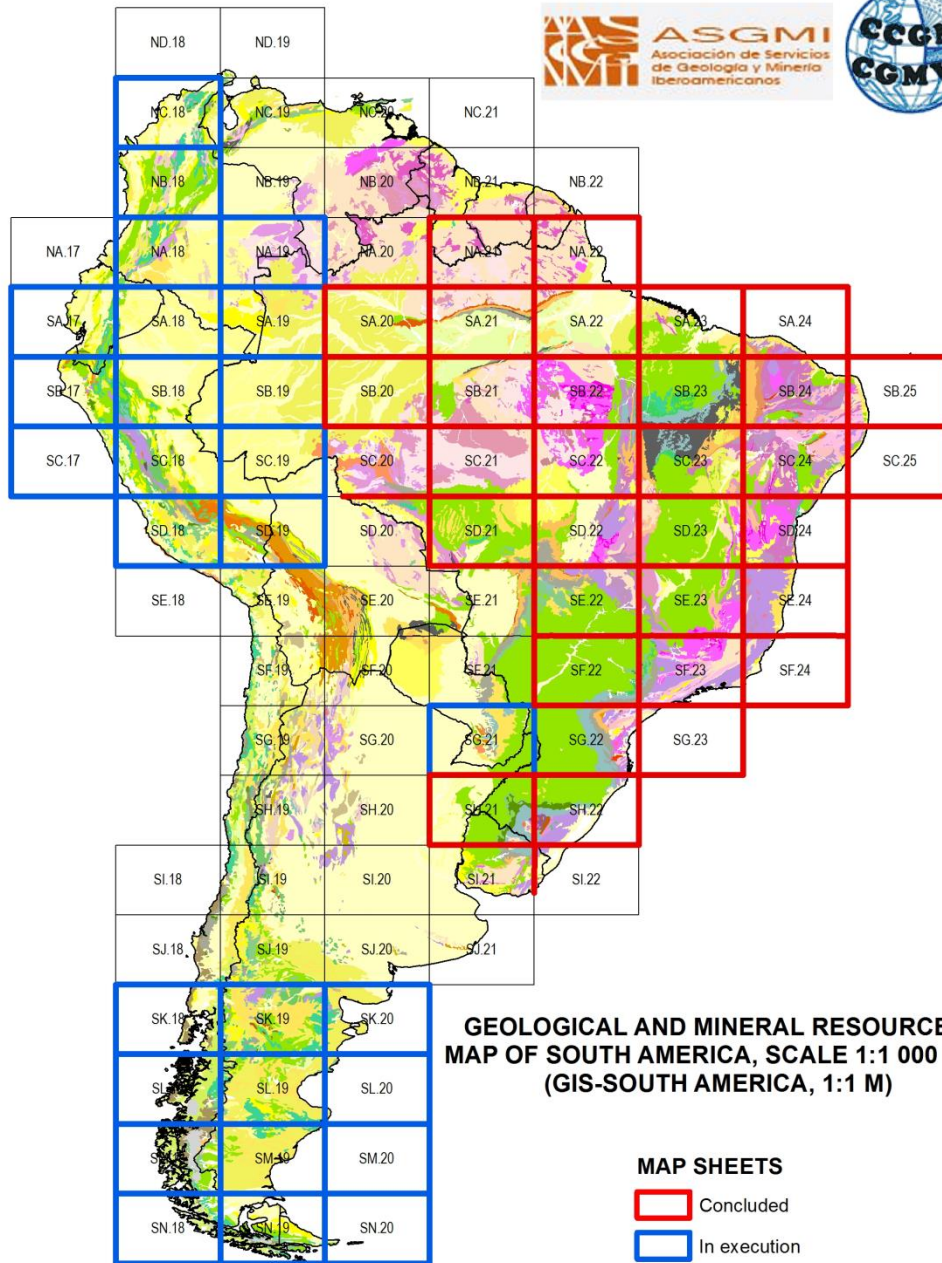
Harmonization not only of the geology along borders, but also of geoprocessing technologies, enabling exchange of technical and scientific knowledge;

Development and unification of various databases of the South American countries;

Preparation of a digital Stratigraphic Lexicon of South America;

Possibility of organizing on the job training programs;

New forms of relations between teams will emerge, that should result in new projects of common interest.

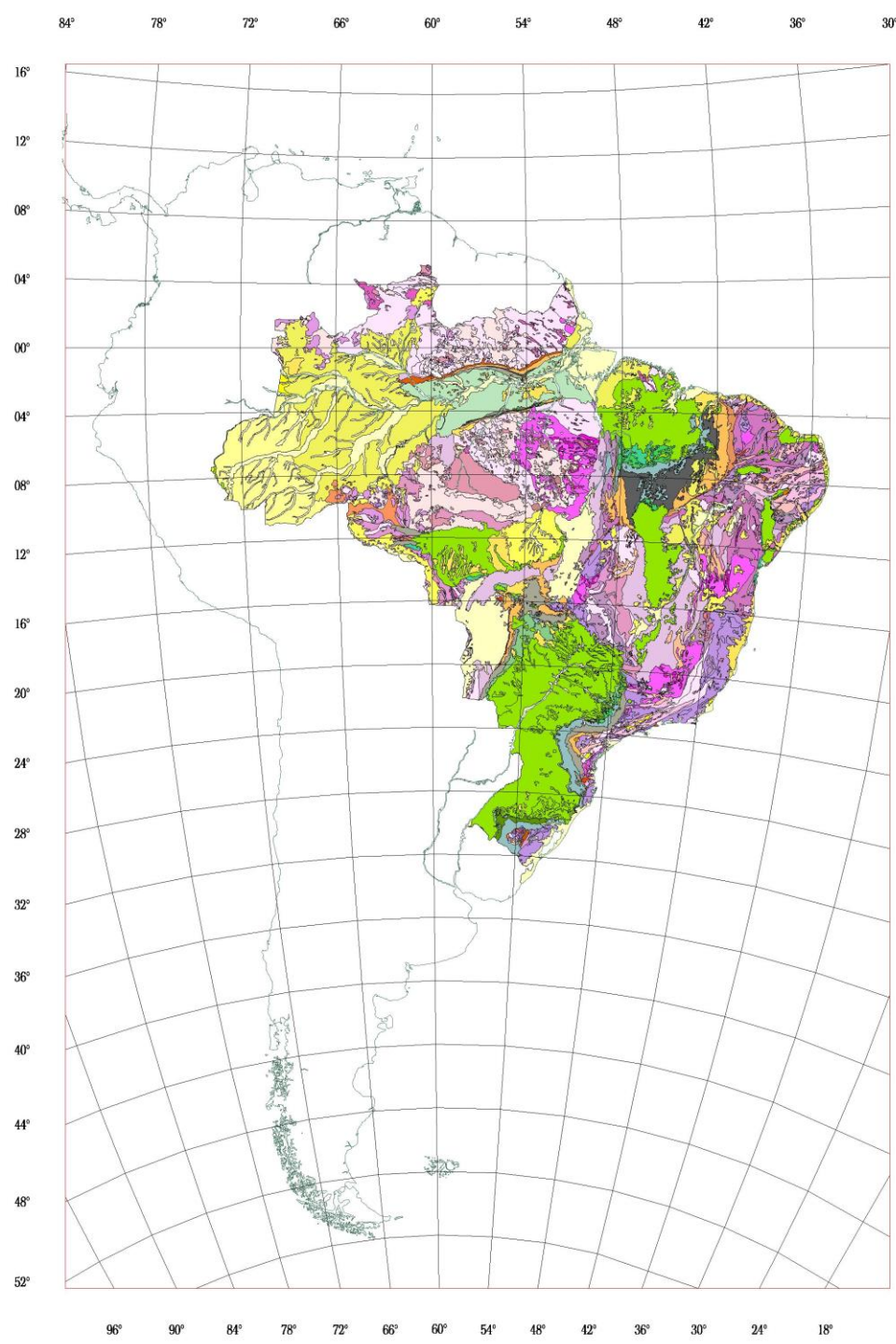


**GEOLOGICAL AND MINERAL RESOURCES  
MAP OF SOUTH AMERICA, SCALE 1:1 000 000  
(GIS-SOUTH AMERICA, 1:1 M)**

**MAP SHEETS**

- Concluded
- In execution

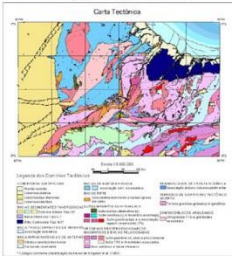
NOTE: SH.21 - Support of Mercosul / SGM-MME  
SG.21/SG.22 - Support of ABC/FOAR



**Geological Map of  
Brazil 1:1M in GIS**

**(46 Map Sheets 6° x 4°)**

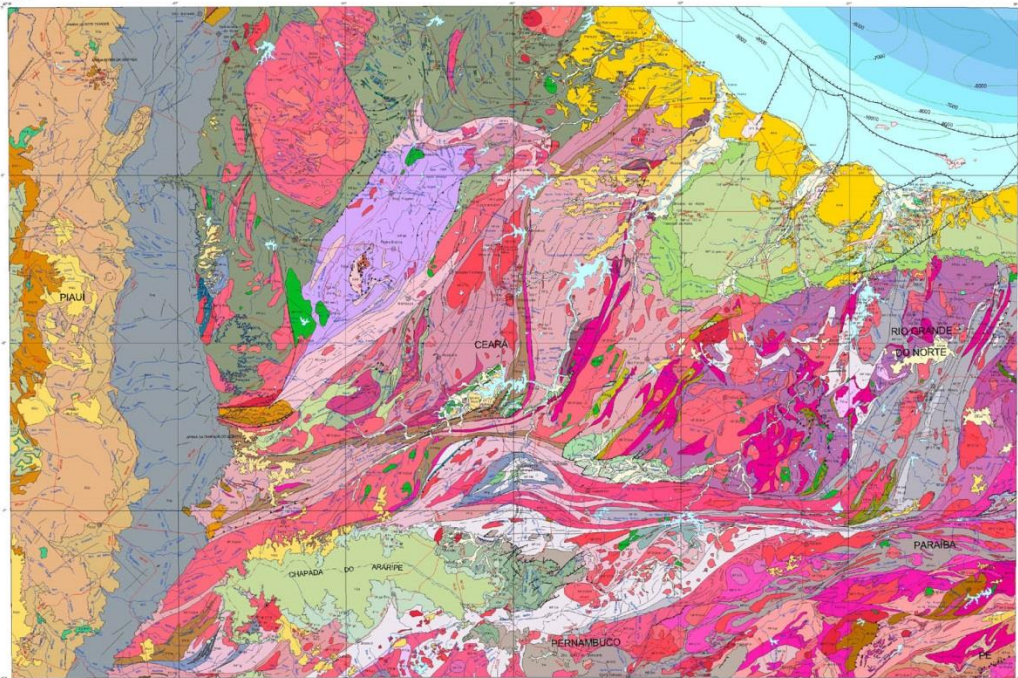
**Launched in 2004 by the  
Geological Survey of  
Brazil (CPRM)**



Relação de Recursos Minerais Selecionados Representados na Folha JGUAIBRE BR-24

Simbol	Descrição
...	...

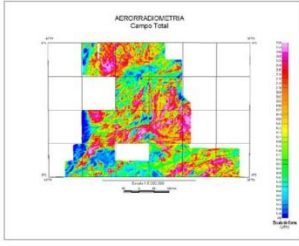
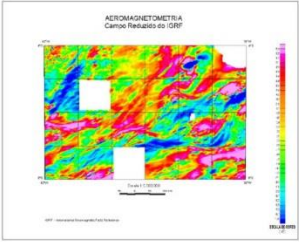
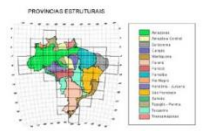
Simbol	Descrição
...	...



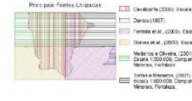
CARTA GEOLOGICA DO BRASIL AO MILIONÉSIMO

ESCALA 1:1 000 000

2003



NOTAS DE EMPrego, FERRAMENTAS, LANTAS, BOMBS, EQUIPAMENTOS, MATERIAIS, METODOS, PROCEDIMENTOS, OBSERVACOES, RESULTADOS, CONCLUSOES, RECOMENDACOES, BIBLIOGRAFIA, ANEXOS, etc.



PROVINCIAS BORBORENHA E PARAIBANA
...

LEGENDA
...

**SHEET – HOJA – FOLHA SH.21**

CONCORDIA (Ar) – URUGUAIANA (Br) – ARAPEY (Uy)



Ministerio de Planificación Federal,  
Inversión Pública y Servicios  
Secretaría de Minería

**SEGEMAR**  
SERVICIO GEOLOGICO  
MINERO ARGENTINO



Ministério de Minas e Energia  
Secretaria de Geologia, Mineração e  
Transformação Mineral

**CPRM**  
Serviço Geológico do Brasil



Ministerio de Industria,  
Energía y Minería

**MIEMDINAMIGE**  
INSTITUTO NACIONAL DE MINERÍA Y ENERGÍA

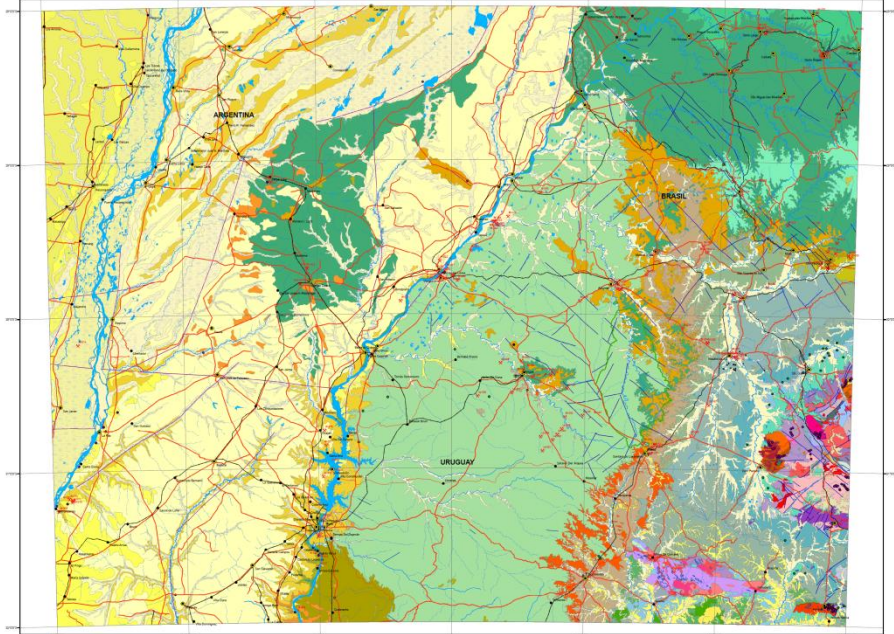
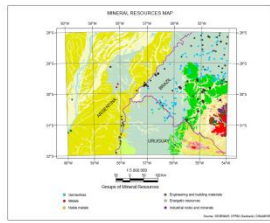
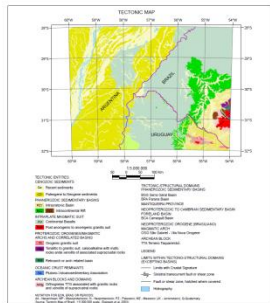


Convênio Secretaria de geologia, mineração e transformação mineral  
Universidade do Vale do Rio Dods Sinos



### GEOLOGICAL AND MINERAL RESOURCES MAP OF SOUTH AMERICA (GIS - SOUTH AMERICA, 1:1 M)

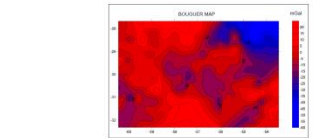
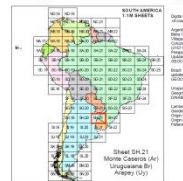
Contribution: MERCOSUR/MERCOSU L: SGT - 15: Geological and Mineral Resources Thematic Commission



**SELECTED MINERAL DEPOSITS OF SHEET SH 21**

MONTE CASEROS (Ar); URUGUAIANA (Br); ARAPEY (Ur)

Country	Province/State	Mineral Deposit Name	Coordinates (Approx.)				
Argentina	Misiones	Monte Caseros	30° 45' S, 54° 30' W				
		...	...				
		Brazil	Rio Grande do Sul	Uruguaiana	30° 45' S, 54° 30' W		
				...	...		
				Uruguay	Canelones	Arapey	30° 45' S, 54° 30' W
						...	...



**INDEX OF ADJOINING SHEETS**

802	801	803
803	801	802
800	801	802

**CARTOGRAPHIC CONVENTIONS**

- Point
- Line
- Area
- Text
- Scale
- North arrow
- Projection
- Units

**GEOLOGICAL CONVENTIONS**

- Geological map
- Geological structure
- Geological boundary
- Geological feature
- Geological symbol

**MINERAL RESOURCES CONVENTIONS**

- Gold
- Copper
- Iron
- Other minerals

**COMMISSION FOR THE GEOLOGICAL MAP OF THE WORLD**

Joint Panel (Latin America) - Project: "Geological Map of South America"

MEMBER STATES: ARGENTINA, BRAZIL, URUGUAY

CONTRIBUTORS: SEGEMAR (Argentina), CPRM (Brazil), DINAMIGE (Uruguay)

COORDINATOR: [Name]

SECRETARY: [Name]

MEMBERS: [List of names]

ADVISORY BOARD: [List of names]

OFFICE: [Address]

CONTACT: [Phone, Email]

**LEGEND**

**LITHOLOGICAL AND STRATIGRAPHIC**

Symbol	Description
[Symbol]	Quaternary alluvial deposits
[Symbol]	Quaternary fluvial deposits
[Symbol]	Quaternary lacustrine deposits
[Symbol]	Quaternary glacial deposits
[Symbol]	Quaternary periglacial deposits
[Symbol]	Quaternary colluvial deposits
[Symbol]	Quaternary aeolian deposits
[Symbol]	Quaternary marine deposits
[Symbol]	Quaternary other deposits
[Symbol]	Tertiary deposits
[Symbol]	Cretaceous deposits
[Symbol]	Jurassic deposits
[Symbol]	Triassic deposits
[Symbol]	Permian deposits
[Symbol]	Carboniferous deposits
[Symbol]	Devonian deposits
[Symbol]	Silurian deposits
[Symbol]	Ordovician deposits
[Symbol]	Other geological units

**STRUCTURAL**

Symbol	Description
[Symbol]	Active plate boundaries
[Symbol]	Transform faults
[Symbol]	Subduction zones
[Symbol]	Collision zones
[Symbol]	Extensional zones
[Symbol]	Other plate boundaries

**TOPOGRAPHICAL**

Symbol	Description
[Symbol]	Contour lines
[Symbol]	Spot heights
[Symbol]	Water bodies
[Symbol]	Coastal features
[Symbol]	Other topographic features

**ADMINISTRATIVE**

Symbol	Description
[Symbol]	International boundaries
[Symbol]	National boundaries
[Symbol]	Provincial boundaries
[Symbol]	Municipal boundaries
[Symbol]	Other administrative boundaries

**INFRASTRUCTURE**

Symbol	Description
[Symbol]	International airports
[Symbol]	National airports
[Symbol]	Other airports
[Symbol]	Seaports
[Symbol]	Roads
[Symbol]	Railways
[Symbol]	Other infrastructure





## GEOLOGICAL AND MINERAL RESOURCES MAP OF SOUTH AMERICA (GIS - SOUTH AMERICA, 1:1 M)

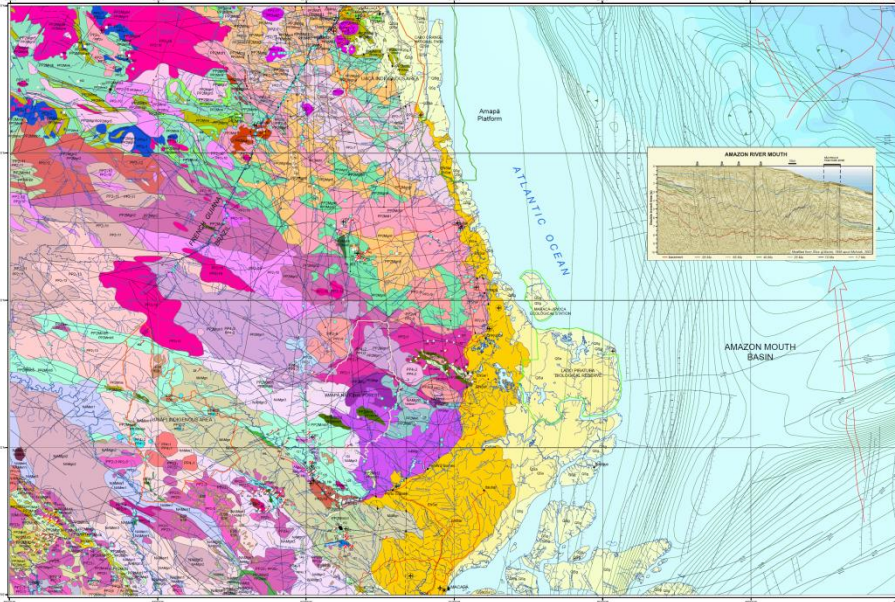


COMMISSION FOR THE GEOLOGICAL MAP OF THE WORLD



SHEET NA.22

MACAPÁ (Br. Fg)



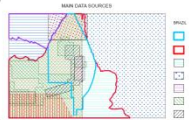
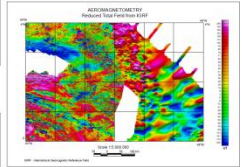
### SELECTED MINERAL RESOURCES OF SHEET NA.22 - MACAPÁ

Mineral	Location	Reserve	Estimated Resources
Aluminum	Alto da Moura	1,350,000,000 t	1,350,000,000 t
Iron	Alto da Moura	1,350,000,000 t	1,350,000,000 t
Iron	Alto da Moura	1,350,000,000 t	1,350,000,000 t
Iron	Alto da Moura	1,350,000,000 t	1,350,000,000 t



COMMISSION FOR THE GEOLOGICAL MAP OF THE WORLD  
GCMW  
INTERNATIONAL ASSOCIATION OF GEOLOGICAL AND MINERAL RESOURCES MAPS  
IAGMR

**SHEET NA.22 - MACAPÁ**  
Geological and Mineral Resources Map of South America  
Scale 1:1,000,000, South America 1:1,000,000



LITHOTYPES AND SEDIMENTATION ENVIRONMENTS	BRAZIL	FRENCH GUIANA
Granite intrusions	Alto da Moura	
Granite intrusions (Pleistocene)	Alto da Moura	
Tertiary and quaternary	Alto da Moura	
Quaternary	Alto da Moura	
Quaternary	Alto da Moura	
Quaternary	Alto da Moura	

NOTES



# GEOLOGICAL AND MINERAL RESOURCES MAP OF SOUTH AMERICA (GIS - SOUTH AMERICA, 1:1 M)



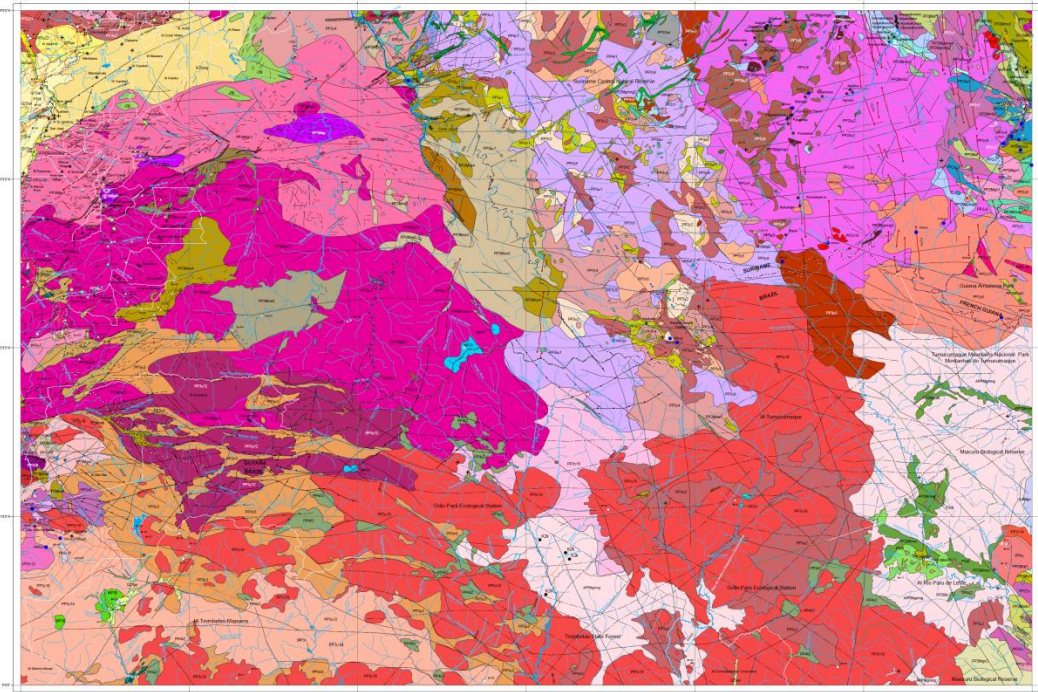
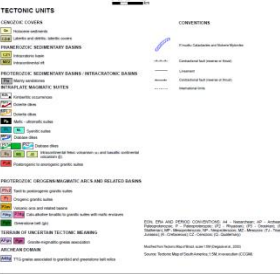
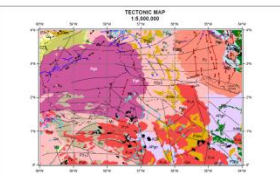
SHEET NA.21

COMMISSION FOR THE GEOLOGICAL MAP OF THE WORLD

## STRATIGRAPHIC COLUMN

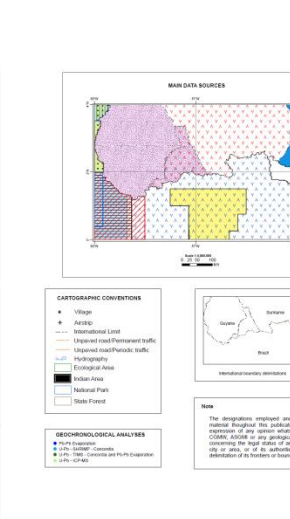
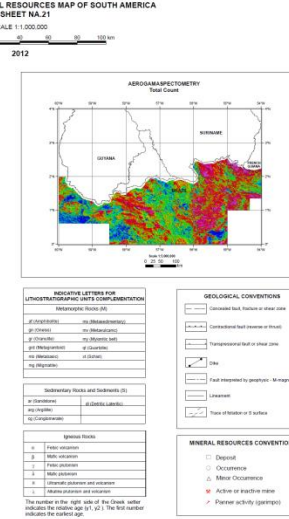
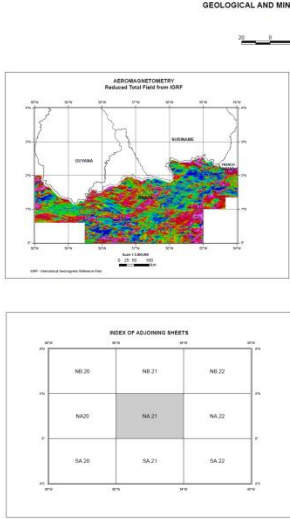


The acronyms Br (Brazil), Gy (Guyana), Su (Suriname) and Fp (French Guiana) after the names or ages of the lithostratigraphic units, indicate the country where they occur.



**SELECTED MINERAL RESOURCES OF SHEET NA.21 TUCUMÁN/AGUA**

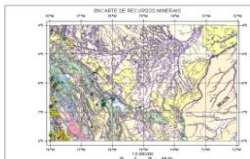
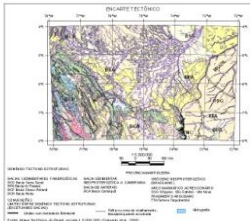
Symbol	Name	Symbol	Name
1	Aluminum	11	Iron
2	Aluminum	12	Iron
3	Aluminum	13	Iron
4	Aluminum	14	Iron
5	Aluminum	15	Iron
6	Aluminum	16	Iron
7	Aluminum	17	Iron
8	Aluminum	18	Iron
9	Aluminum	19	Iron
10	Aluminum	20	Iron
11	Aluminum	21	Iron
12	Aluminum	22	Iron
13	Aluminum	23	Iron
14	Aluminum	24	Iron
15	Aluminum	25	Iron
16	Aluminum	26	Iron
17	Aluminum	27	Iron
18	Aluminum	28	Iron
19	Aluminum	29	Iron
20	Aluminum	30	Iron
21	Aluminum	31	Iron
22	Aluminum	32	Iron
23	Aluminum	33	Iron
24	Aluminum	34	Iron
25	Aluminum	35	Iron
26	Aluminum	36	Iron
27	Aluminum	37	Iron
28	Aluminum	38	Iron
29	Aluminum	39	Iron
30	Aluminum	40	Iron
31	Aluminum	41	Iron
32	Aluminum	42	Iron
33	Aluminum	43	Iron
34	Aluminum	44	Iron
35	Aluminum	45	Iron
36	Aluminum	46	Iron
37	Aluminum	47	Iron
38	Aluminum	48	Iron
39	Aluminum	49	Iron
40	Aluminum	50	Iron



**MAPA GEOLÓGICO E DE RECURSOS MINERAIS DA AMÉRICA DO SUL (SIG - AMÉRICA DO SUL, 1:1 M)**

FOLHA SB.18

JAVARI (Br)



**Legenda**

**Tipos de Recursos Minerais:**

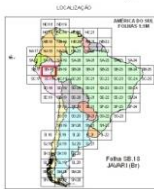
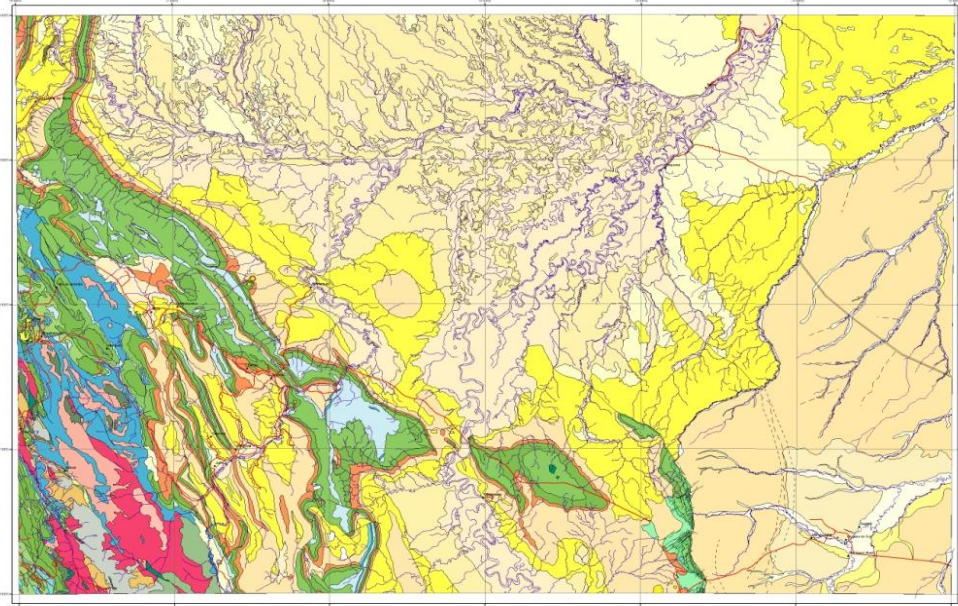
- Diamante
- Ferro
- Manganês
- Potássio
- Urânio
- Outros

**Tipos de Recursos Minerais:**

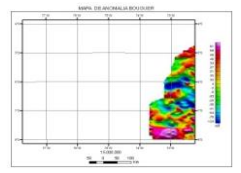
- Ferro
- Manganês
- Potássio
- Urânio
- Outros

**Tipos de Recursos Minerais:**

- Ferro
- Manganês
- Potássio
- Urânio
- Outros



**MAPA GEOLÓGICO E DE RECURSOS MINERAIS DA AMÉRICA DO SUL FOLHA SB.18 (JAVARI) (Br)**



**CONVENÇÕES DELEGADAS**

Lista de convenções delegadas para o mapa geológico e de recursos minerais.

**CONVENÇÕES PARA RECURSOS MINERAIS**

Lista de convenções para recursos minerais, incluindo símbolos para diamante, ferro, manganês, potássio, urânio e outros.

**COMISSÃO DE CARTOGEOLOGIA DO BRASIL**

**COMISSÃO DE RECURSOS MINERAIS DO BRASIL**

**COMISSÃO DE RECURSOS MINERAIS DO BRASIL**

**COMISSÃO DE RECURSOS MINERAIS DO BRASIL**

**COLUNA ESTRATIGRÁFICA**

**LITOLÓGICA E MINERALÓGICA**

UNIDADE LITOLÓGICA	UNIDADE MINERALÓGICA	PERFIL
1000	1000	1000
1001	1001	1001
1002	1002	1002
1003	1003	1003
1004	1004	1004
1005	1005	1005
1006	1006	1006
1007	1007	1007
1008	1008	1008
1009	1009	1009
1010	1010	1010
1011	1011	1011
1012	1012	1012
1013	1013	1013
1014	1014	1014
1015	1015	1015
1016	1016	1016
1017	1017	1017
1018	1018	1018
1019	1019	1019
1020	1020	1020
1021	1021	1021
1022	1022	1022
1023	1023	1023
1024	1024	1024
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1038	1038	1038
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1080	1080	1080
1081	1081	1081
1082	1082	1082
1083	1083	1083
1084	1084	1084
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1086	1086	1086
1087	1087	1087
1088	1088	1088
1089	1089	1089
1090	1090	1090
1091	1091	1091
1092	1092	1092
1093	1093	1093
1094	1094	1094
1095	1095	1095
1096	1096	1096
1097	1097	1097
1098	1098	1098
1099	1099	1099
1100	1100	1100



# MAPA GEOLÓGICO E DE RECURSOS MINERAIS DA AMÉRICA DO SUL (SIG - AMÉRICA DO SUL, 1:1 M)

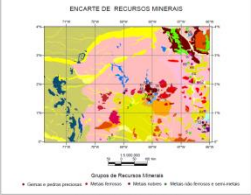
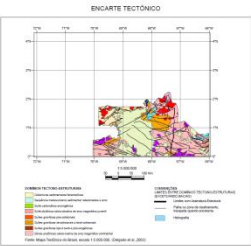
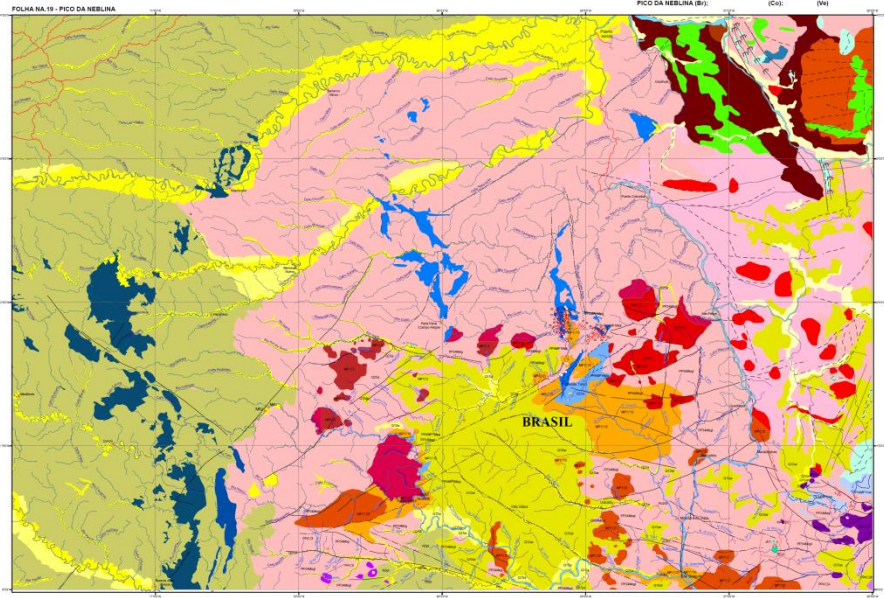
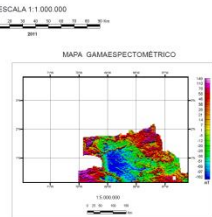
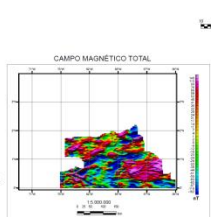
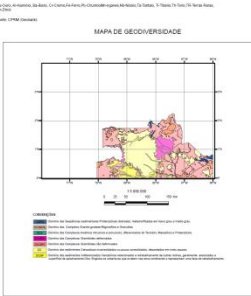


Table titled 'PRINCIPAIS DEPOSITOS MINERAIS' listing various mineral deposits and their locations.



COMISSÃO DA CARTA GEOLÓGICA DO MUNDO (CGMW) - Secretário Geral: Hans-Peter ... Presidente: Jorge Simões Tapiau ... SERVIÇO GEOLÓGICO DO BRASIL (SGB) - Diretor: Eduardo ...

Table titled 'COLUNA CRONOTOESTRATIGRÁFICA' showing stratigraphic columns for Brazil, Colombia, and Venezuela, detailing geological periods and units.

- CONVENÇÕES CARTOGRÁFICAS: Symbols for various geological features like faults, folds, and boundaries.

- CONVENÇÕES DOS RECURSOS MINERAIS: Symbols for different types of mineral resources.

- CONVENÇÕES GEOLÓGICAS ON-SHORE: Symbols for geological features and units.

NOTA: Este mapa foi elaborado com o apoio financeiro do Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) e do Conselho Nacional de Recursos Minerais (CNRM).

# Pico da Neblina (*Fog Peak*)

*Brazil-Venezuela Border*











# Harmonization along borders







**New Project**

**Geological Map of the  
Amazonian Craton**



# RESOLUTIONS OF THE CGMW

## GENERAL ASSEMBLY 2014

### UNESCO Headquarters Paris, France

Endorses the proposal to start the Geological Map of the Amazonian Craton project at 1:2.5 M, under the coordination of Lêda Maria Barreto Fraga, encompassing parts of seven countries in the northern part of South America.



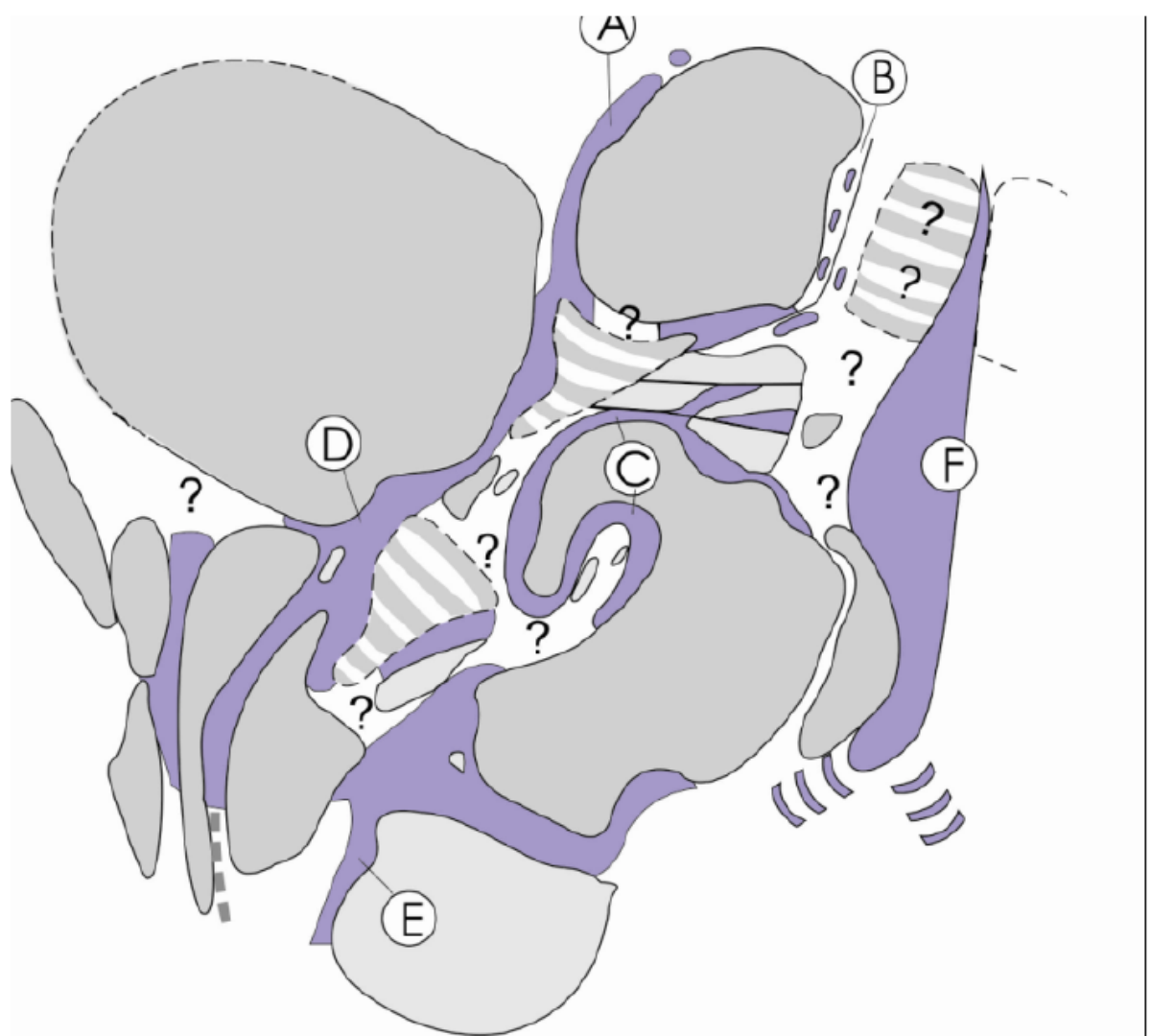
Sources: Geologic Map of South America, 1:5 000 000 (CGMW-DNPM-CPRM-UNESCO, 2001)  
 SRTM Mosaic (Shuttle Radar Topography Mission)

# Relevance of the project

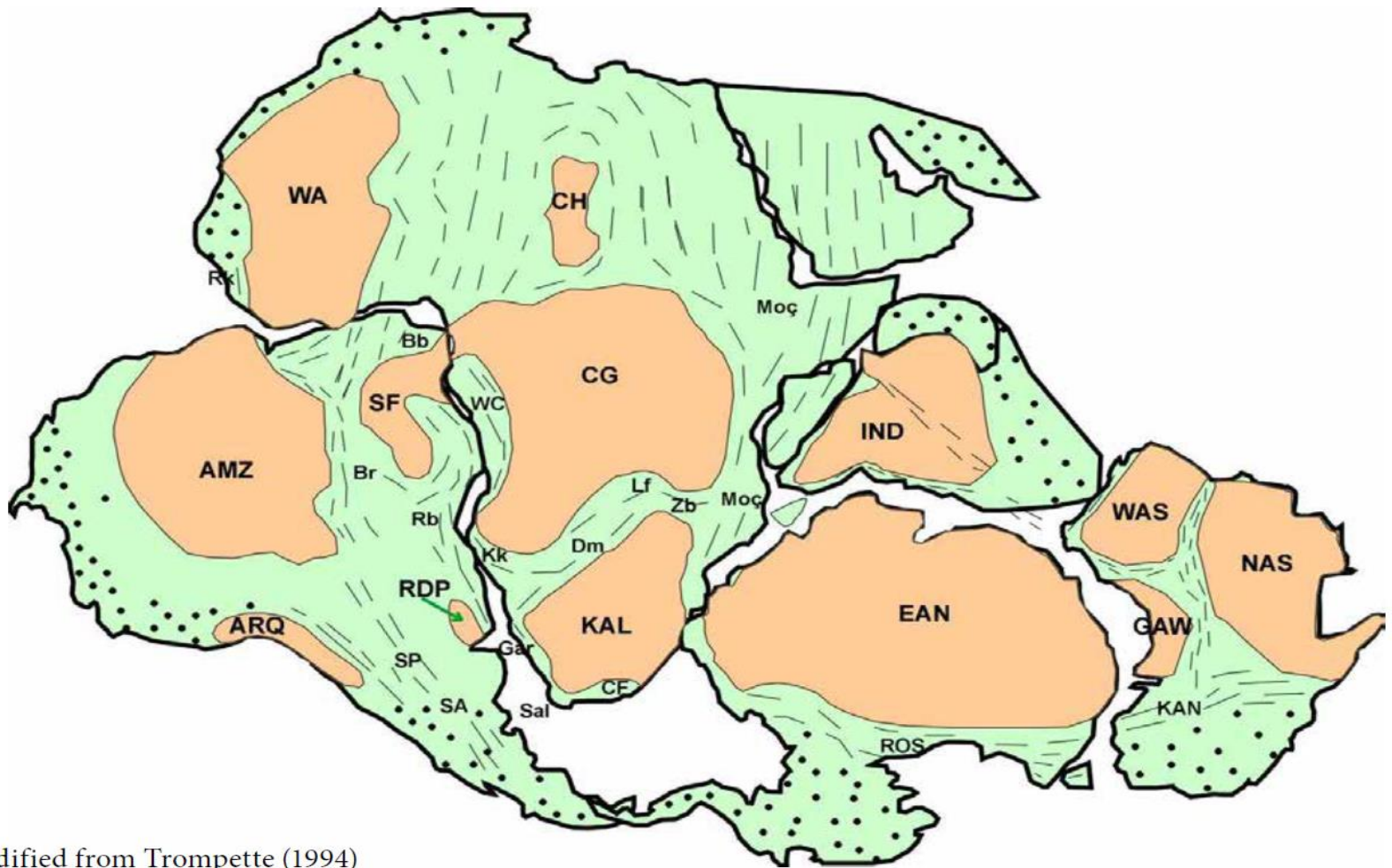
During the last decades important new information were made available by numerous mapping and geophysical airborne projects;

Assessment and reinterpretation of geological and structural data will contribute to a better understanding of its geotectonic evolution;

The Amazon Craton plays an important role in the reconstruction of almost all recognized Supercontinents and this project will certainly contribute to improve possible correlations.

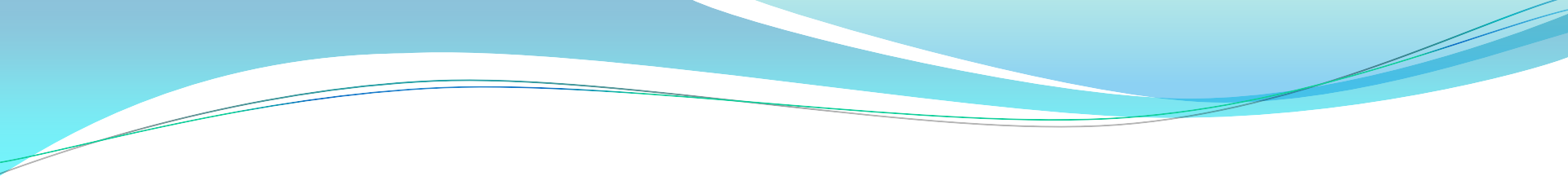


- Pre-Neoproterozoic continental lithospheric segments (cratonic domains)  
 Rodinia's descendants + High Grade neoproterozoic assemblages
  
- Segments as above, with important crustal reworking + thick sedimentary covers
  
- Neoproterozoic oceanic and related environments  
 A/D= Rokelide/Goianides/ Cordoba; B=Pharusian/ Cear; C = Peri-Franciscan; E= Adamastor; F= ANEKT/Mozambique



Modified from Trompette (1994)





**Thank you!**  
**Muchas gracias!**  
**Muito obrigado!**