

5º FÓRUM TÉCNICO PRÉ-SAL PETRÓLEO

Rio de Janeiro | 29 de novembro de 2022

O SERVIÇO GEOLÓGICO DO BRASIL NO SETOR DE ÓLEO E GÁS

Noevaldo A. Teixeira

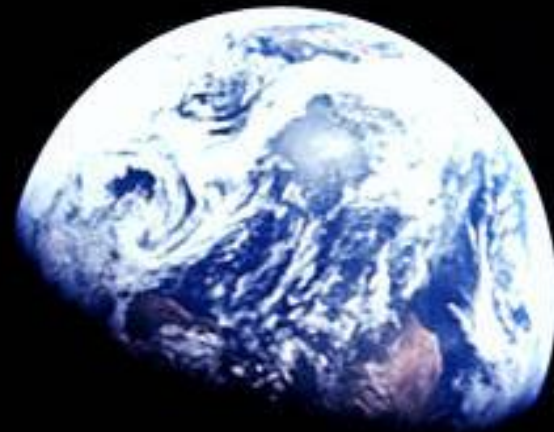
CHEFE DE CENTRO DE GEOCIÊNCIAS APLICADA (CGA-SGB)

Apoio:



Realização:





5º FÓRUM TÉCNICO

PRÉ-SAL PETRÓLEO

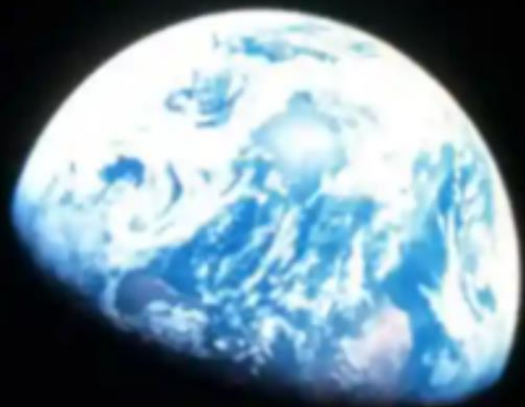
Apoio:



Realização:



Meio Século de Transformação



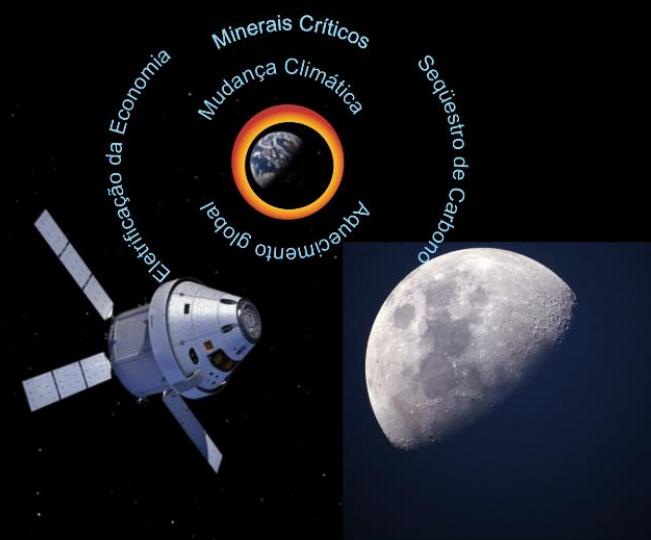
1968

Uma nova visão sobre o planeta - Apollo 8: Um ponto azul na imensidão do universo.



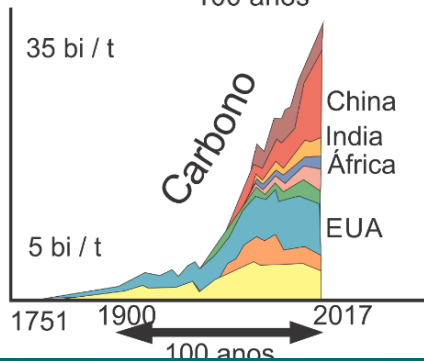
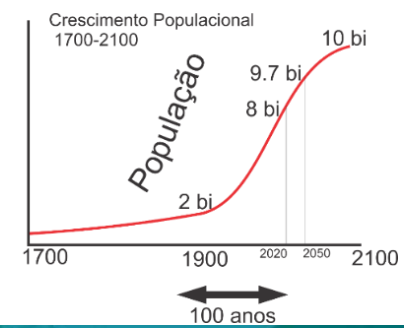
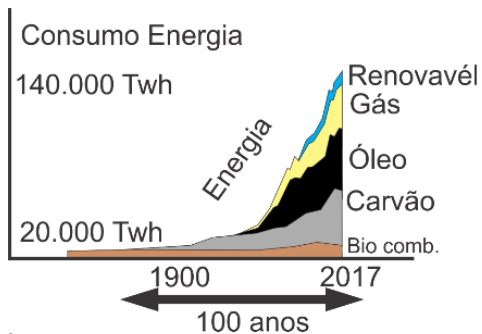
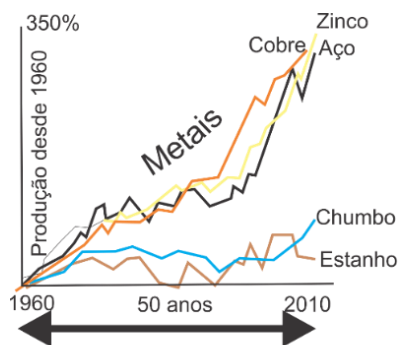
2002

Nature (Paul Crutzen, 2002), o período Antropoceno e as consequências para o planeta.



2022

Esta é a agenda dos Serviços Geológicos Mundiais - Um planeta em transformação.



5º FÓRUM TÉCNICO PRÉ-SAL PETRÓLEO

Apoio:



Realização:



MINISTÉRIO DE
MINAS E ENERGIA



1987



2013



1	H																	2	He																
3	Li	4	Be																	10	Ne														
11	Na	12	Mg																	18	Ar														
19	K	20	Ca	21	Sc	22	Ti	23	V	24	Cr	25	Mn	26	Fe	27	Co	28	Ni	29	Cu	30	Zn	31	Ga	32	Ge	33	As	34	Se	35	Br	36	Kr
37	Rb	38	Sr	39	Y	40	Zr	41	Nb	42	Mo	43	Tc	44	Ru	45	Rh	46	Pd	47	Ag	48	Cd	49	In	50	Sn	51	Sb	52	Te	53	I	54	Xe
55	Cs	56	Ba	57-71	72	Hf	73	Ta	74	W	75	Re	76	Os	77	Ir	78	Pt	79	Au	80	Hg	81	Tl	82	Pb	83	Bi	84	Po	85	At	86	Rn	
87	Fr	88	Ra	89-103	104	Rf	105	Db	106	Sg	107	Bh	108	Hs	109	Mt	110	Ds	111	Rg	112	Cn	113	Nh	114	Fl	115	Mc	116	Lv	117	Ts	118	Og	
						57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu
						89	Ac	90	Th	91	Pa	92	U	93	Np	94	Pu	95	Am	96	Cm	97	Bk	98	Cf	99	Es	100	Fm	101	Md	102	No	103	Lr



30 elementos



75 elementos

Murray Hitzman (2022, YouTube)



Raw materials



Al, B, Cr, Cu, Dy, Iron ore, Pb, Mn, Mo, Nd, Ni, Nb, Pr

Critical Raw Material

Processed materials



NdFeB magnets, copper wire, aluminium, steel, carbon fibres, glass fibres

Components

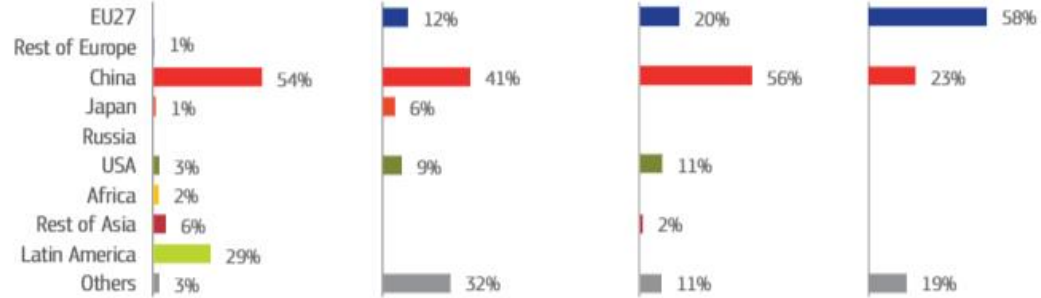


Nacelles
Blades

Assemblies



Wind turbines



Raw materials



Al, Au, B, Be, C (graphite), Cu, Co, Cr, Fe, Ga, Hf, Li, Mg, Nb, Ni, PGMs, Si, Ta, Ti, V, W, REE

Critical Raw Material

Processed materials



Semiconductors, Al alloys, Al-Mg alloys, Ni alloys, Ni-Ti alloys, Mg alloys, Ti alloys, High performance alloys, specialty steels, refractory metal powders, processed materials for magnets, Composites (CFC), Kevlar, aramid fibre, ferroniobium, Processed materials for batteries and fuel cells

Components

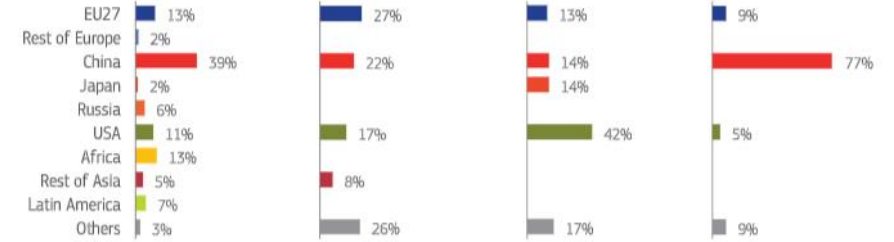


Navigation and control systems, Inertial Measurement Units, Graphical Processing Units, Communications Systems, Microprocessors, Sensors, Actuators, Magnets, Gears, Li polymer batteries, fuel cells

Assemblies



Unmanned Aerial Vehicles (Drones)



Raw materials



Al, B, Cd, Cu, Ga, Ge, In, Fe, Pb, Mo, Ni, Se, Si, Ag, Te, Sn, Zn

Critical Raw Material

Processed materials



Si-metal, polysilicon, Cu refined, Al, CdTe

Components

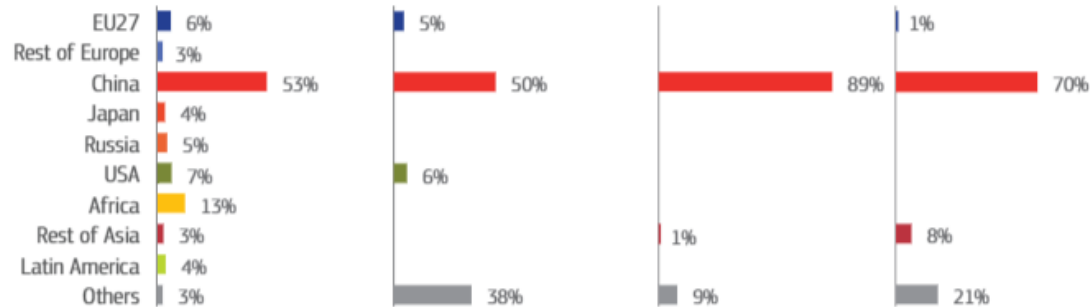


Crystalline / amorphous Si cells, Wafer

Assemblies



Si modules, Thin film Si/non Si modules



Raw materials



Al, B, C (graphite), Co, Cr, Cu, Fe, Ga, In, Li, Mg, Mn, Mo, Nb, Ni, PGMs, REEs, Sb, Si, Sr, Ta, Te, Ti, V, W, Zn, Zr

Critical Raw Material

Processed materials



Al alloys, Ni/Ni (Ti) alloys, Mg alloys, steel 1018/4310/Aer-Met100, semiconductors, processed materials for magnets, polymers, carbon fibre composites, kevlar, Li-ion batteries processed materials, advanced ceramics & glasses, fuel cells processed materials, nanomaterials & carbon nanotubes

Components

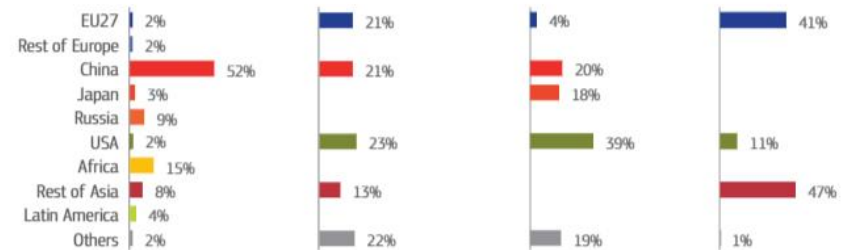


Gears, actuators, sensors, magnets, microprocessors, graphical processing units, Li-ion batteries, fuel cells

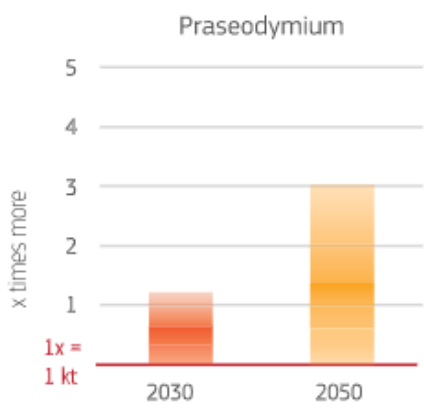
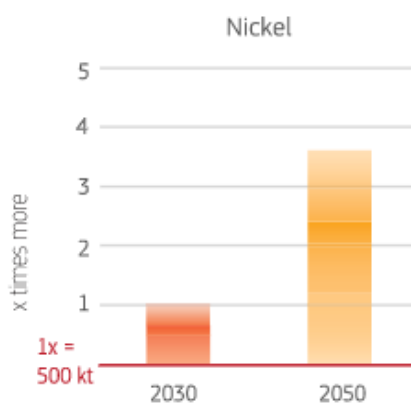
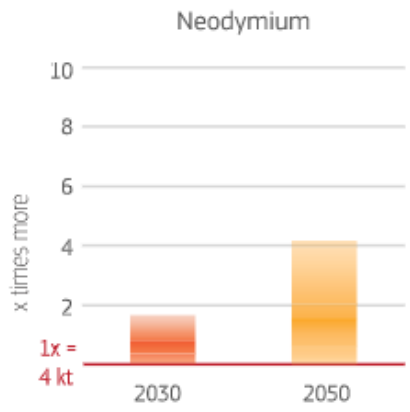
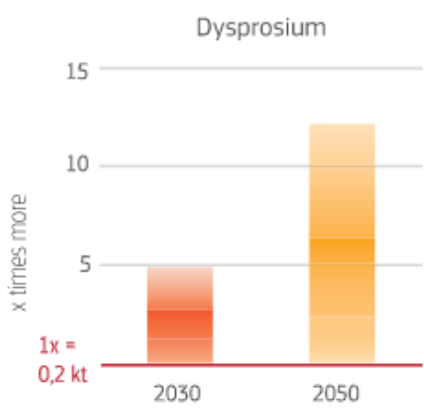
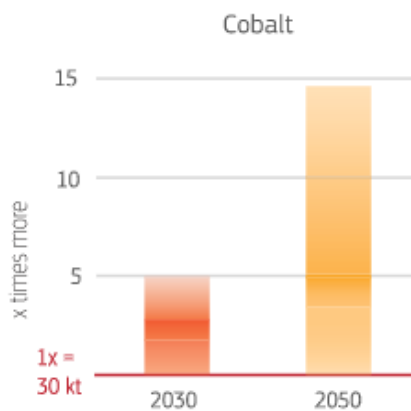
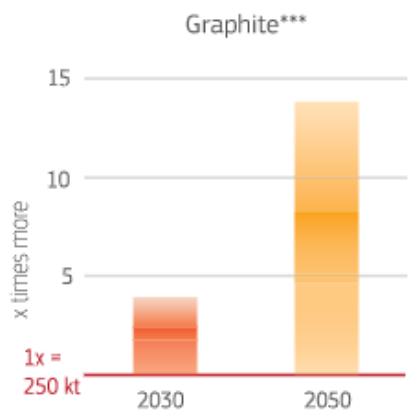
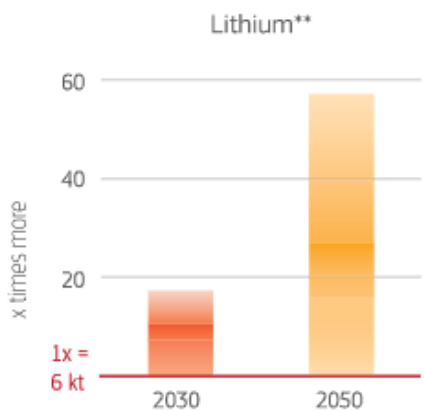
Assemblies



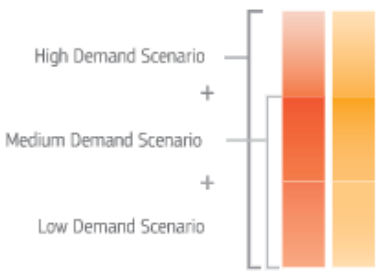
Industrial & service robots



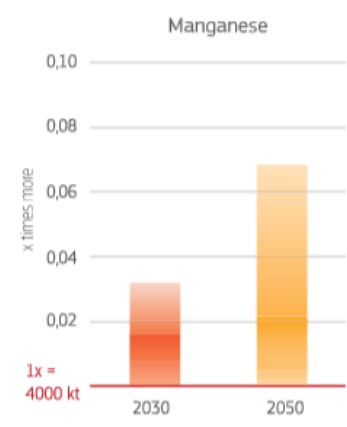
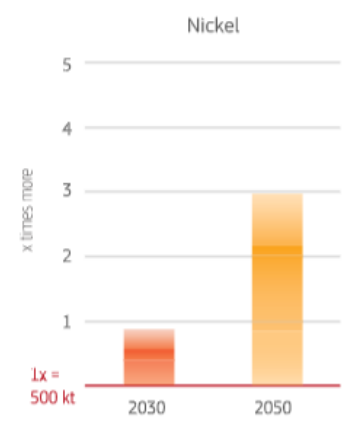
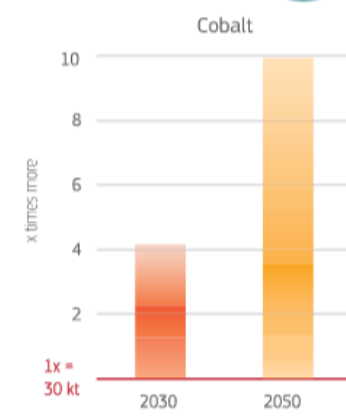
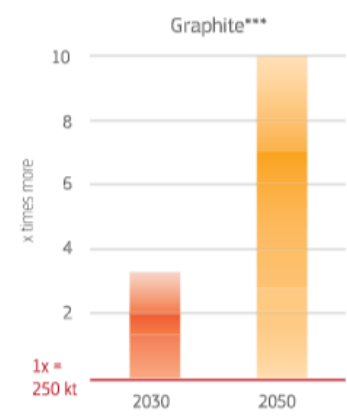
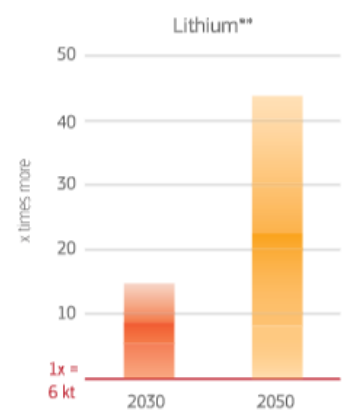
Additional material consumption batteries, fuel cells, wind turbines and photovoltaics in **renewables and e-mobility only** in 2030/2050 compared to current EU consumption* of the material in **all applications**



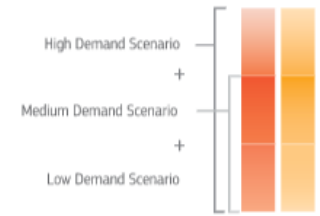
* See the methodological notes in Annex 1 and all data in Annex 2
 ** of refined supply (Stage II) instead of ore supply (Stage I)
 *** increase in demand of all graphite in relation to natural graphite
 Aluminium, borates, cadmium, chromium, copper, gallium, germanium, indium, manganese, molybdenum, platinum, selenium, silicon metal, terbium, tellurium, silver, steel and zinc have a negligible additional demand (< 10%) compared to the current EU share of global supply



Additional material consumption for batteries in **e-mobility only** in 2030/2050 compared to current EU consumption* of the material in **all applications**



* See the methodological notes in Annex 1 and all data in Annex 2
 ** of refined supply (Stage II) instead of ore supply (Stage I)
 *** increase in demand of all graphite in relation to natural graphite



Critical Raw Materials for Strategic Technologies and Sectors in the EU
 A Foresight Study

Serviços Geológicos têm energia como foco principal



Estados Unidos da América



Afeganistão



Inglaterra

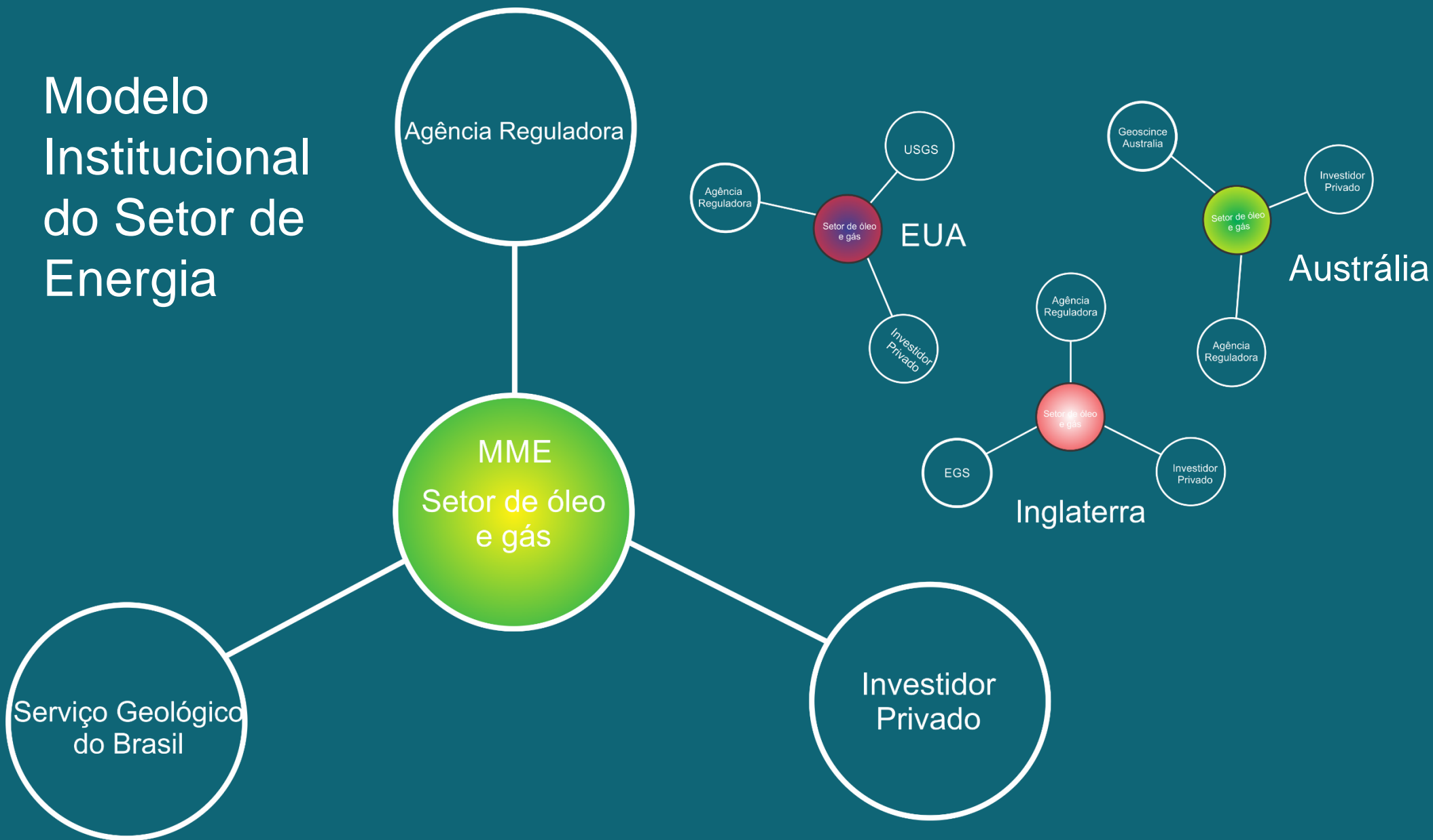


Austrália

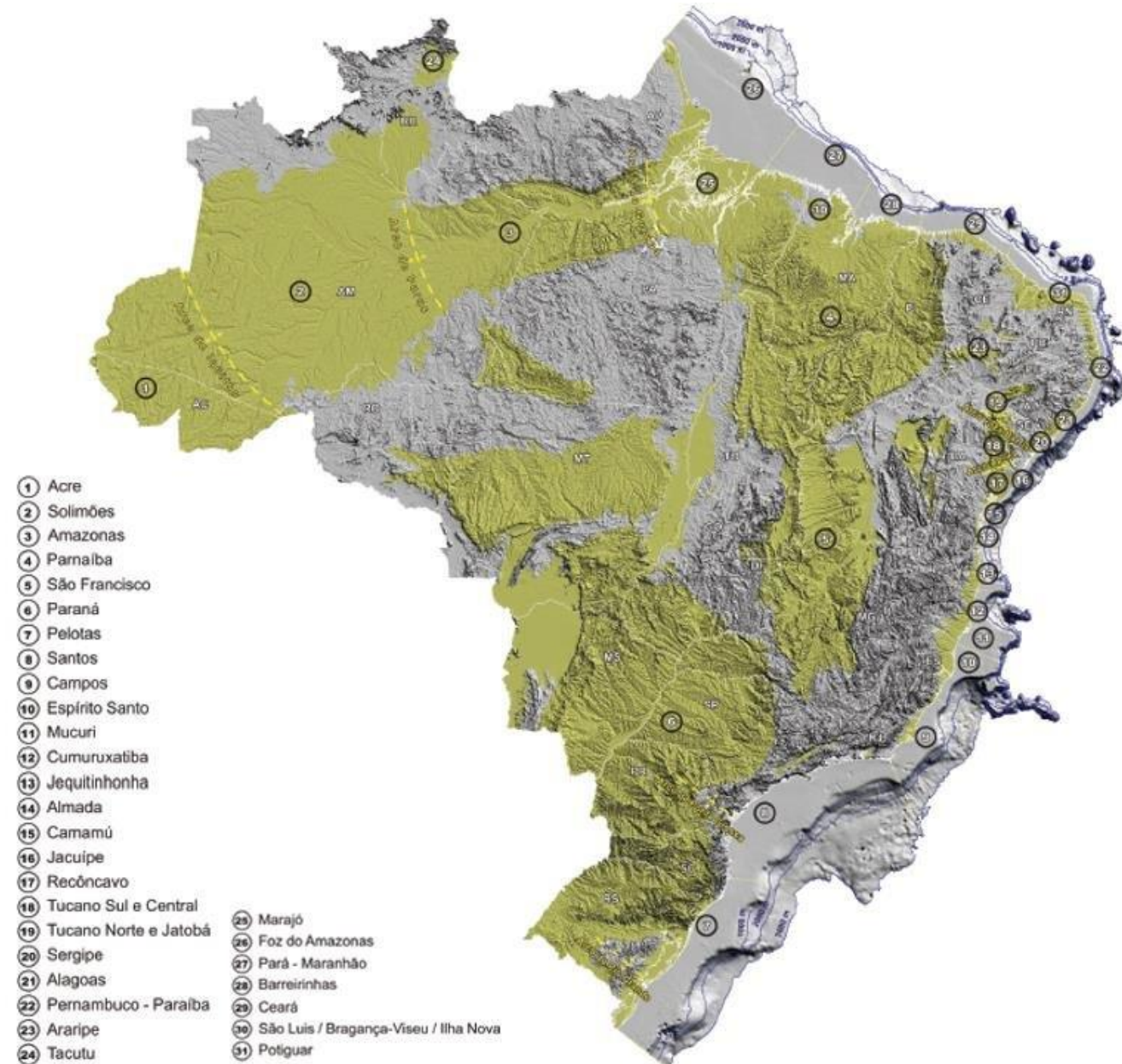
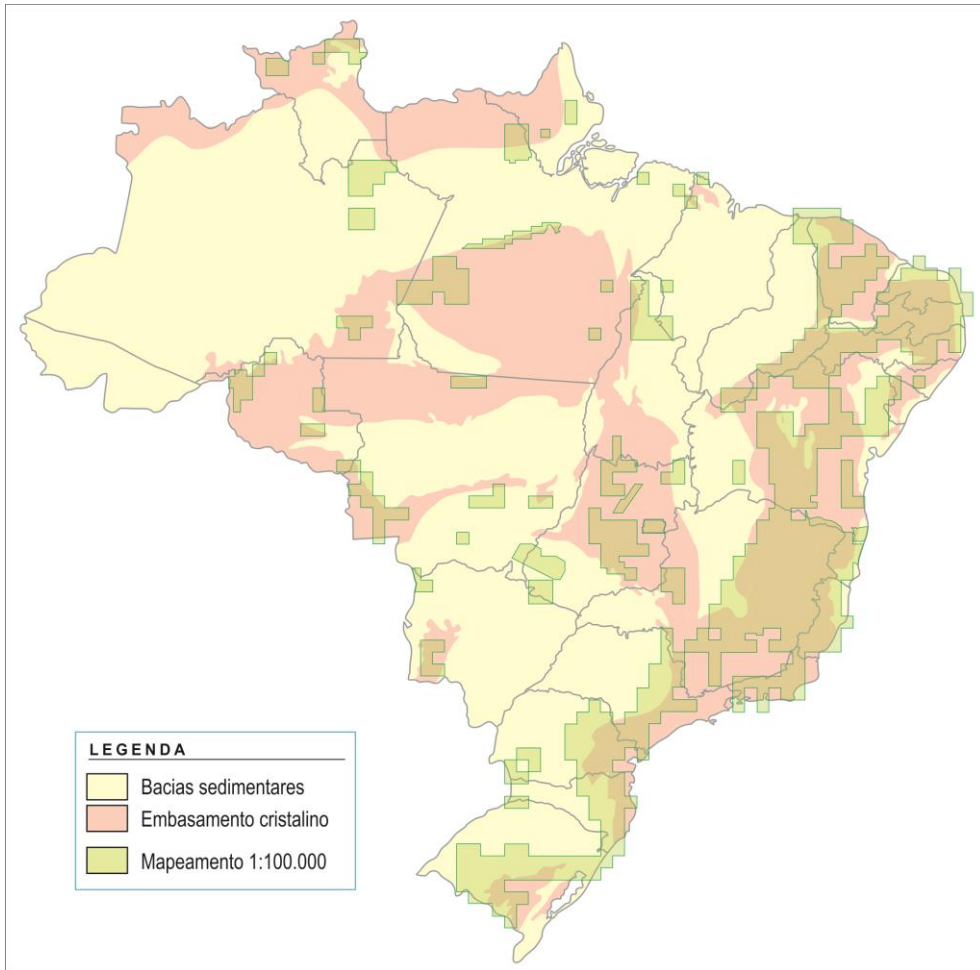


Canadá

Modelo Institucional do Setor de Energia



Mapeamento das bacias sedimentares brasileiras





2018 – Março



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Apoio:



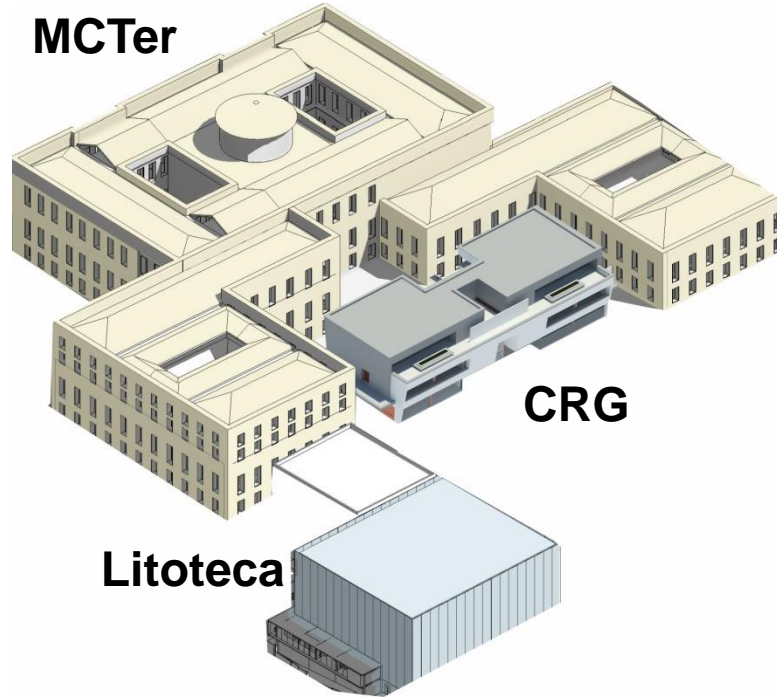
Realização:



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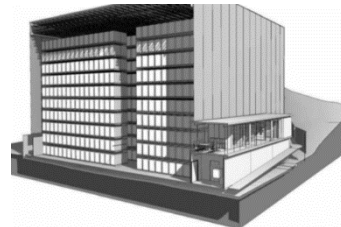
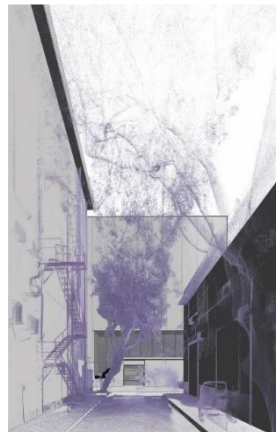


Serviço Geológico do Brasil – Petrobras - ANP Complexo Científico e Cultural da Urca



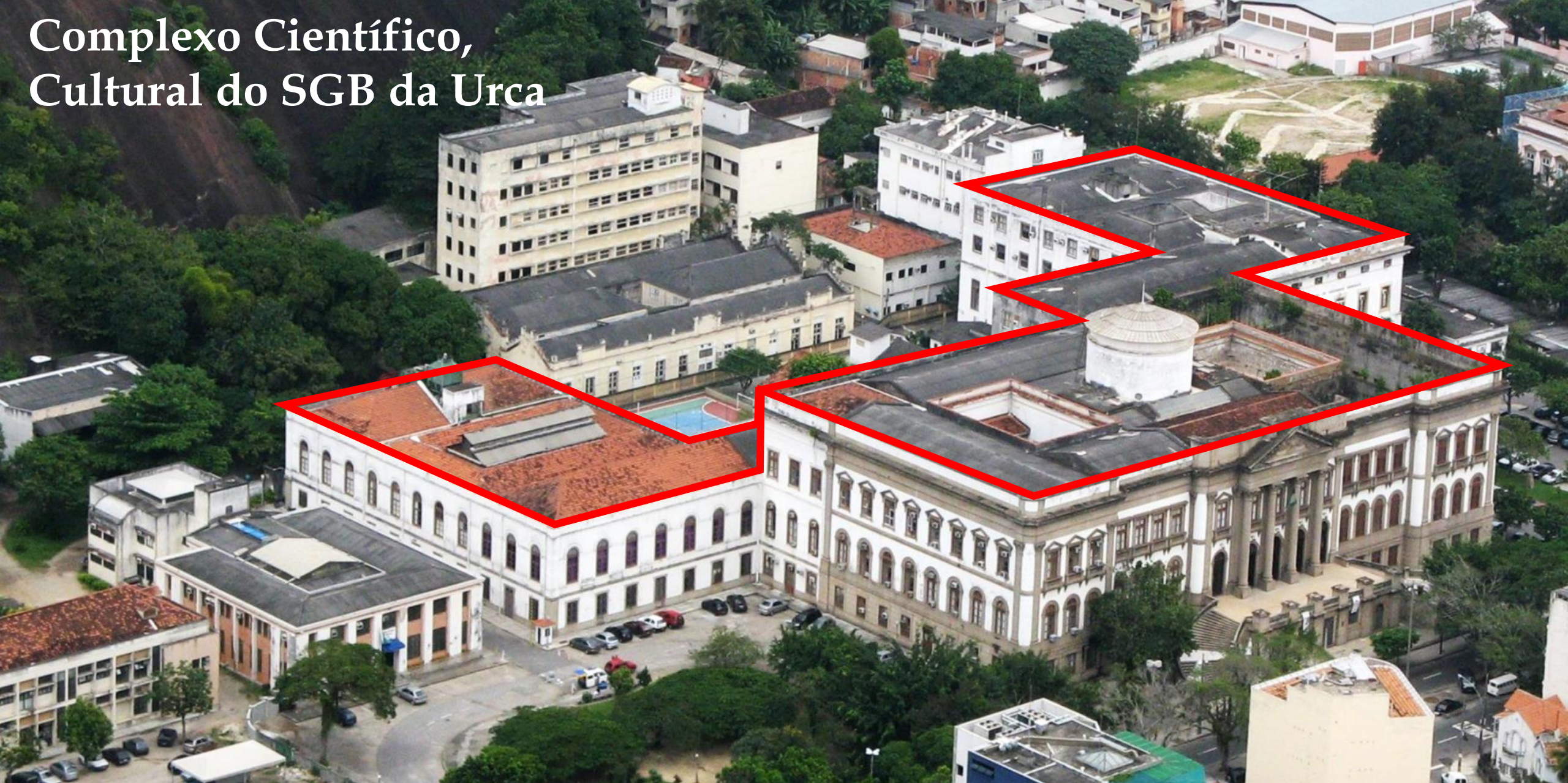
SECRETARIA DE
GEOLOGIA, MINERAÇÃO
E TRANSFORMAÇÃO MINERAL

MINISTÉRIO DE
MINAS E ENERGIA



Fluorination Line using BrF_5 UNM – Zach Sharp package

Complexo Científico, Cultural do SGB da Urca



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PRÉ-SAL PETRÓLEO

Apoio:



Realização:

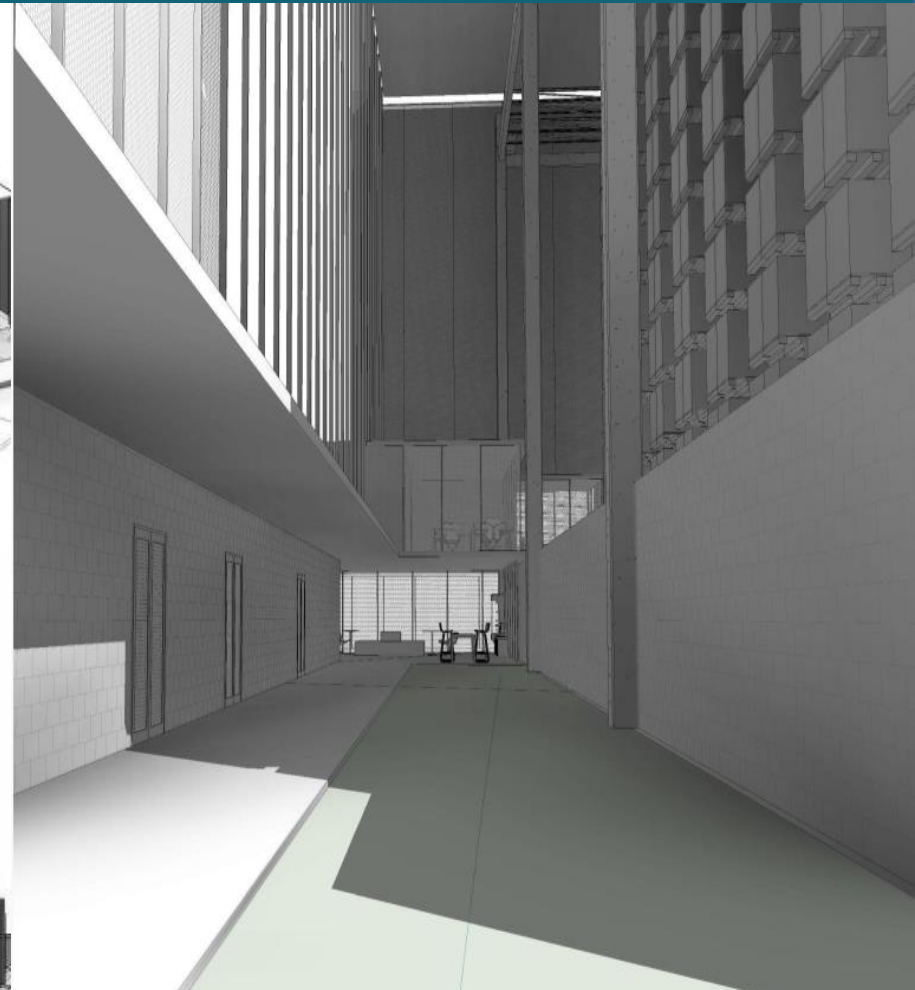
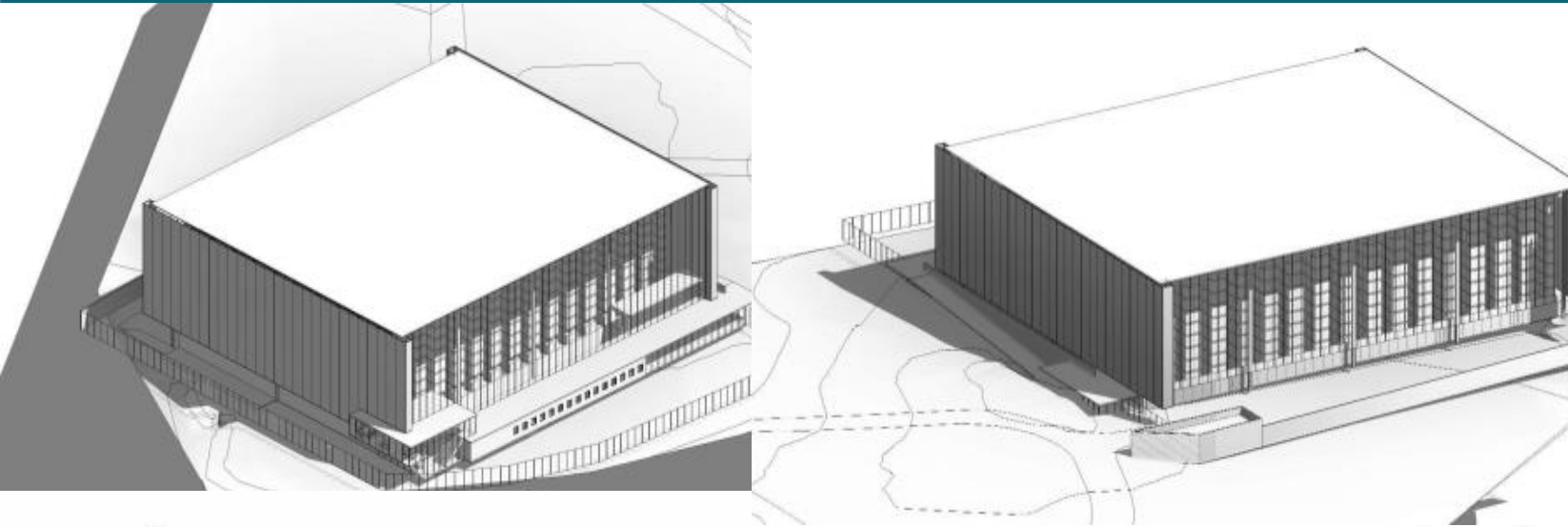


MINISTÉRIO DE
MINAS E ENERGIA

PÁTRIA AMADA
BRASIL
GOVERNO FEDERAL

Litotecas do Pré-Sal (Urca) e Caeté (MG)

Exigência legal e reivindicação da indústria



5º FÓRUM TÉCNICO
PRÉ-SAL PETRÓLEO

Apoio:



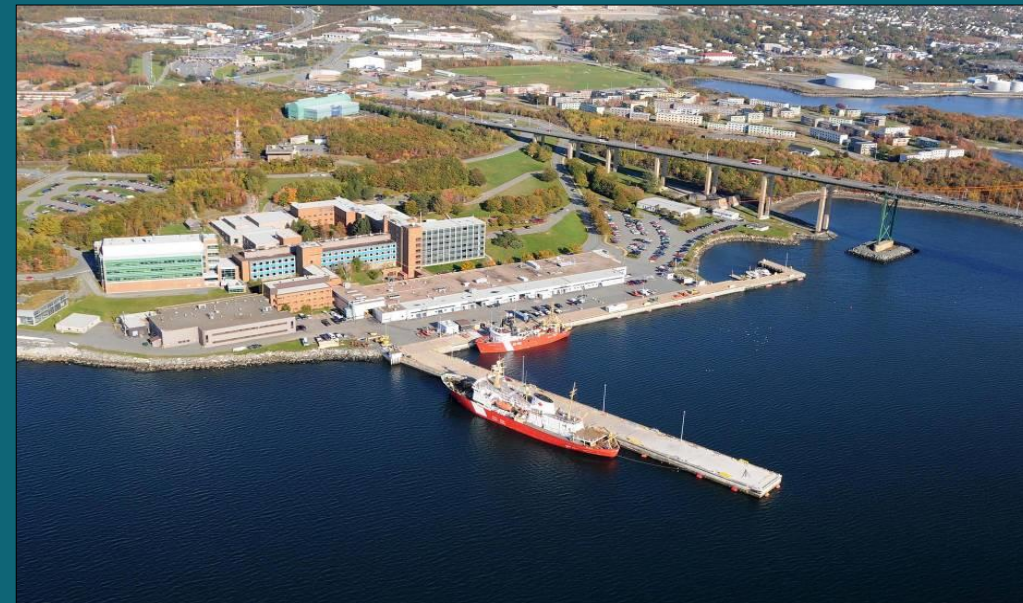
Realização:



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MINAS E ENERGIA

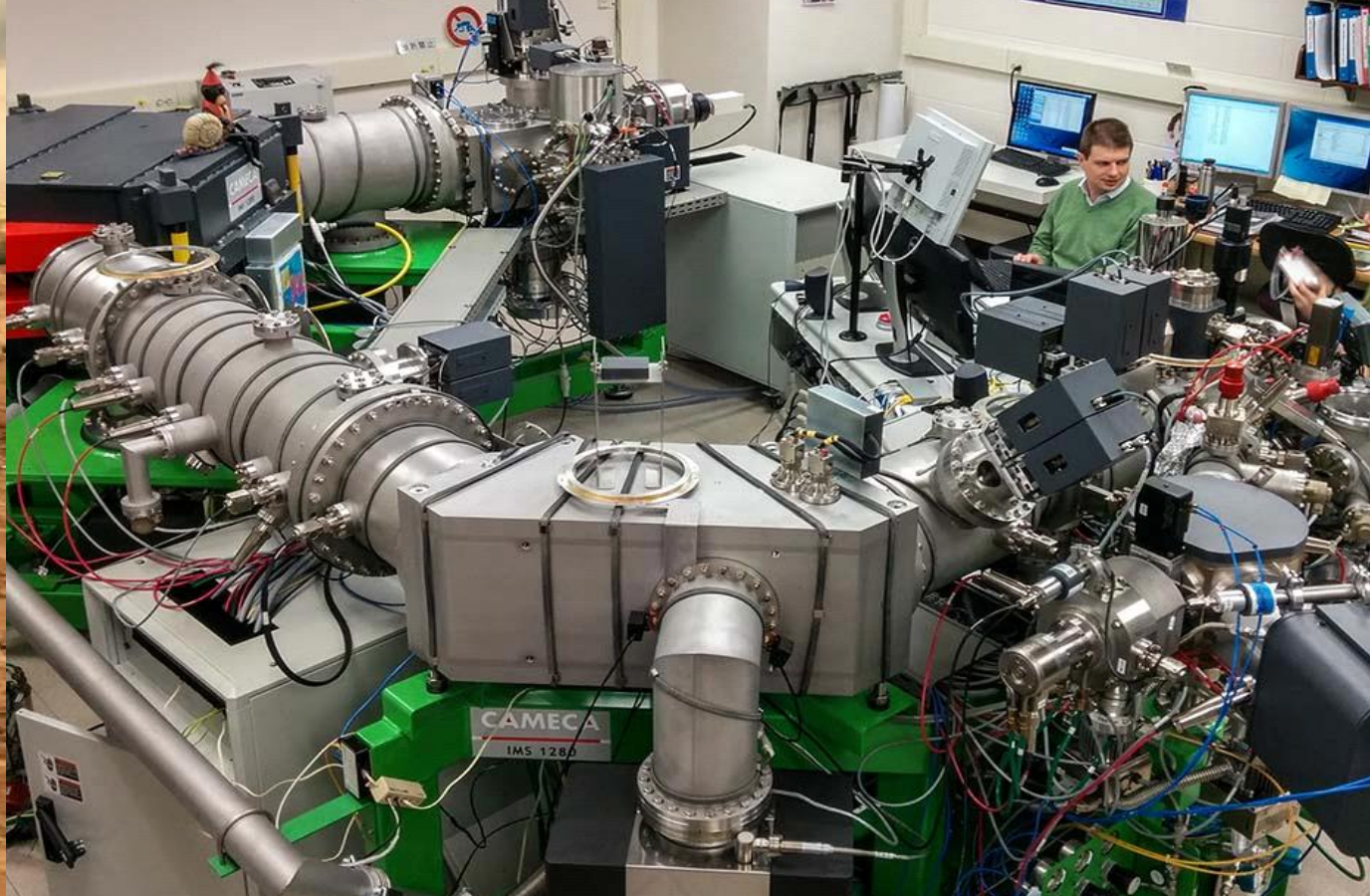


No Canadá, Austrália e EUA as amostras são guardados em parques tecnológicos e *campi* universitários



Ocupa um campus com o Institute of Ocean Sciences (Department of Fisheries and Oceans)

Instalado junto com o Department of Fisheries and Oceans, Canadian Hydrographic Service, Environment Canada e Department of National Defence



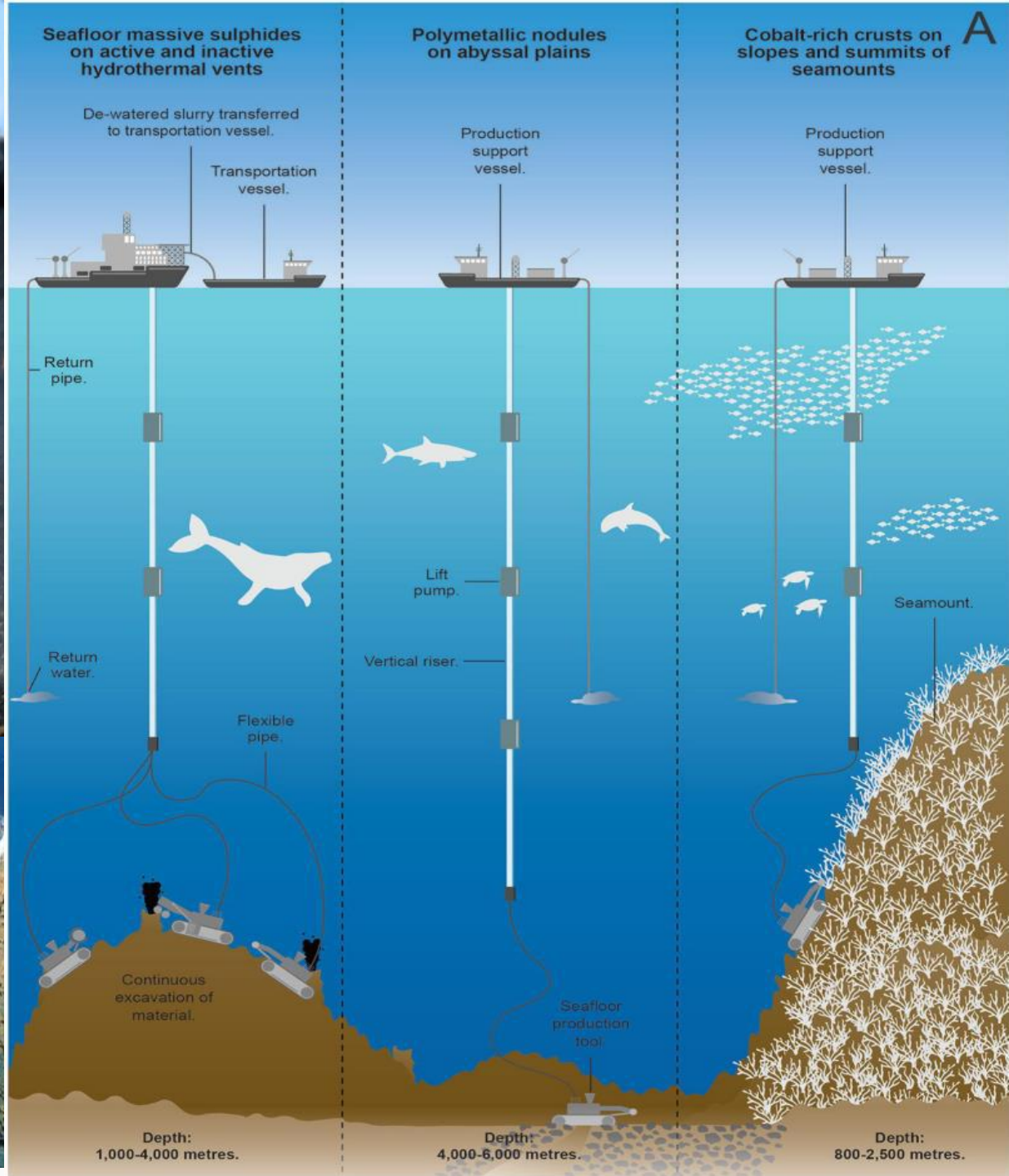
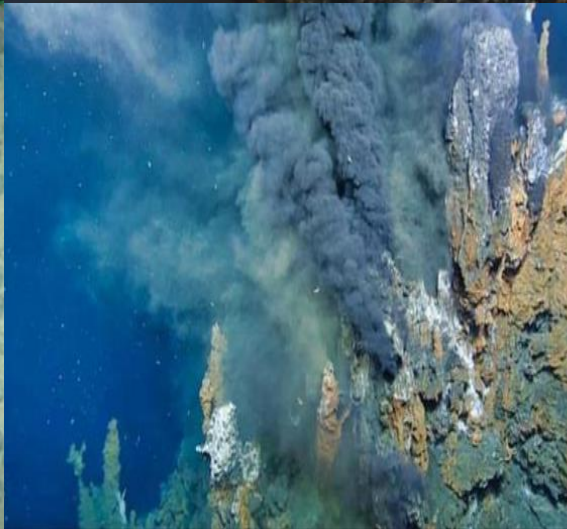
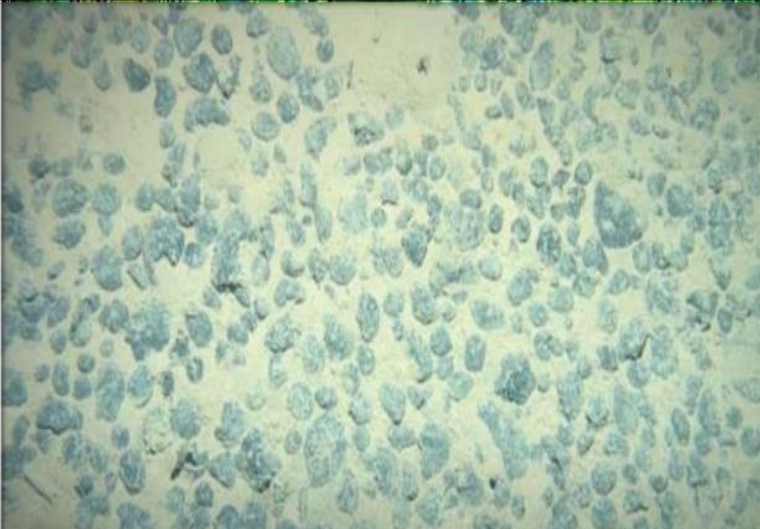
Fluorination Line using BrF_5 UNM
– Zach Sharp package

FUSION 10.6-55W
 CO_2

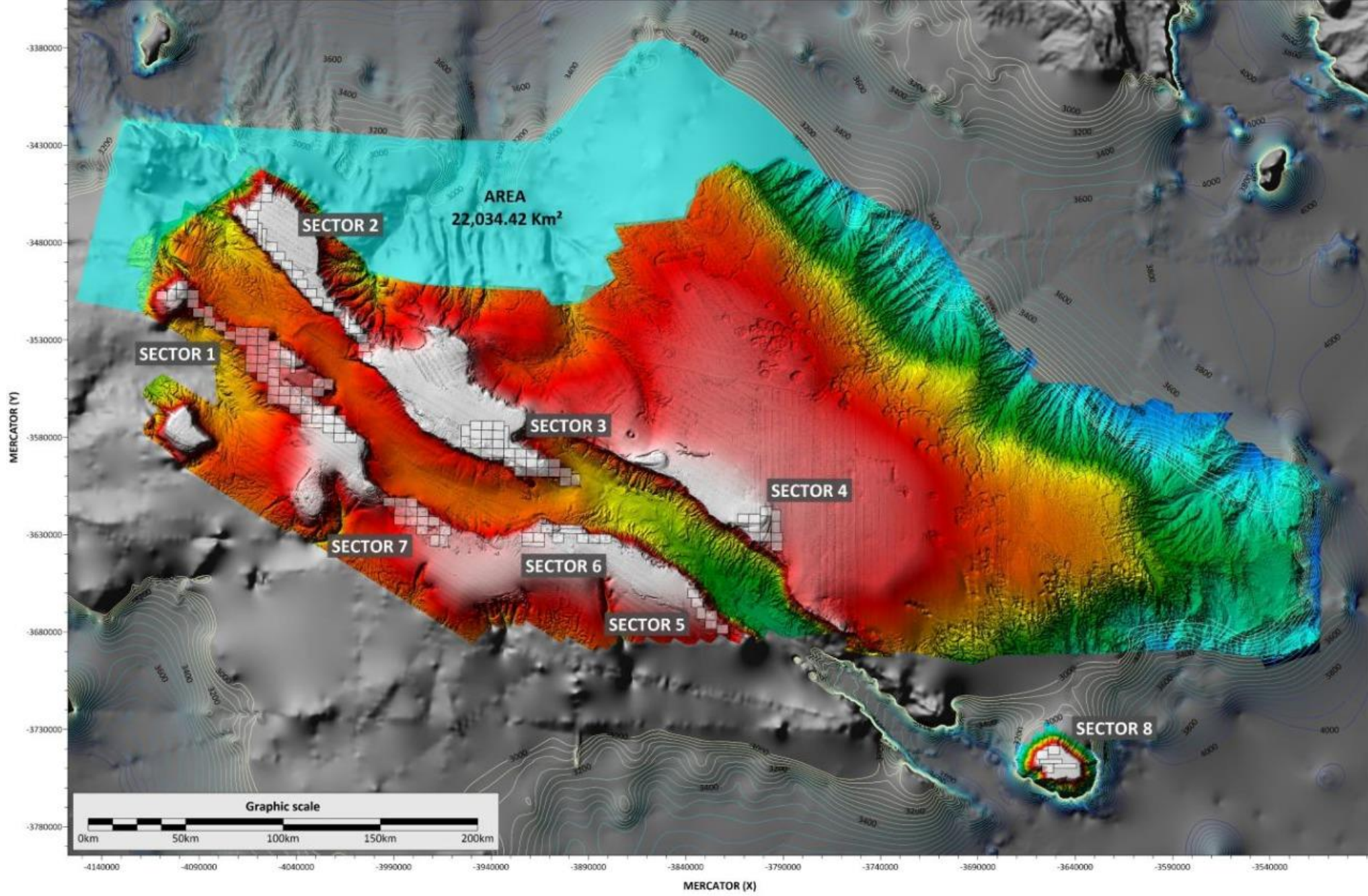
GasBench II +
LN2 Traps



DELTA V Plus IRMS



A

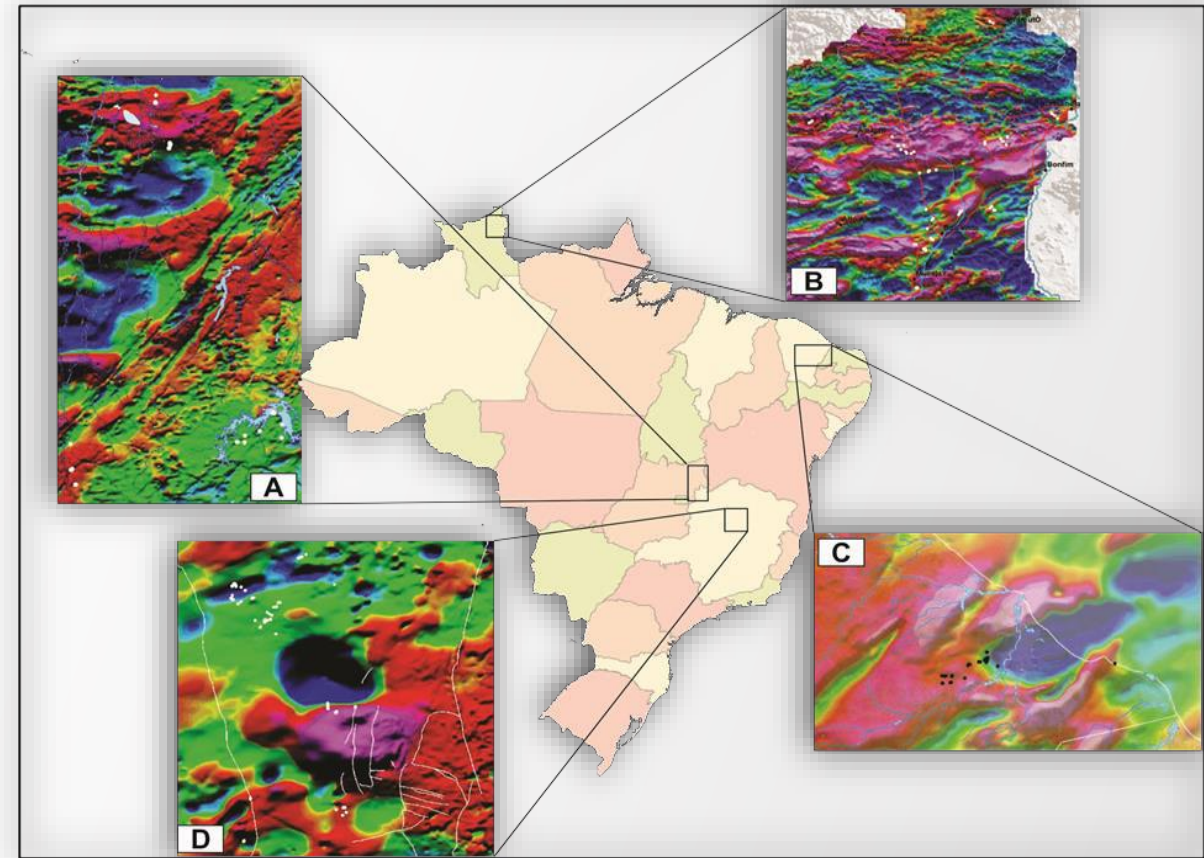
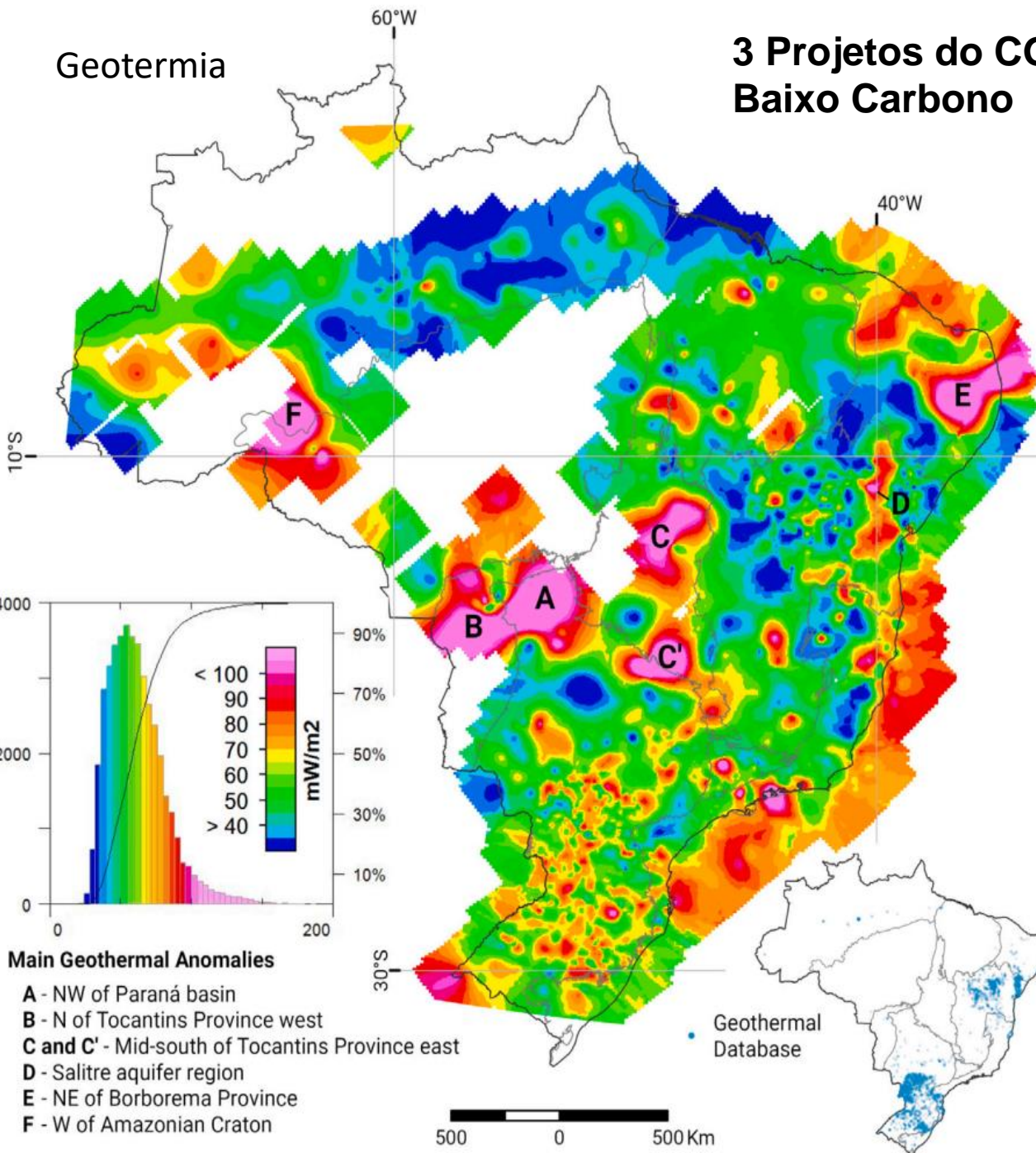
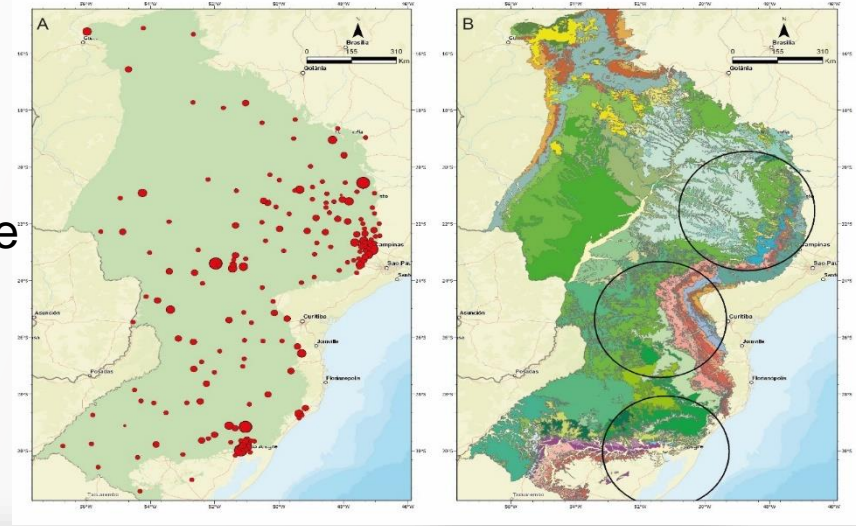


Geotermia

3 Projetos do CGA de Energia Baixo Carbono

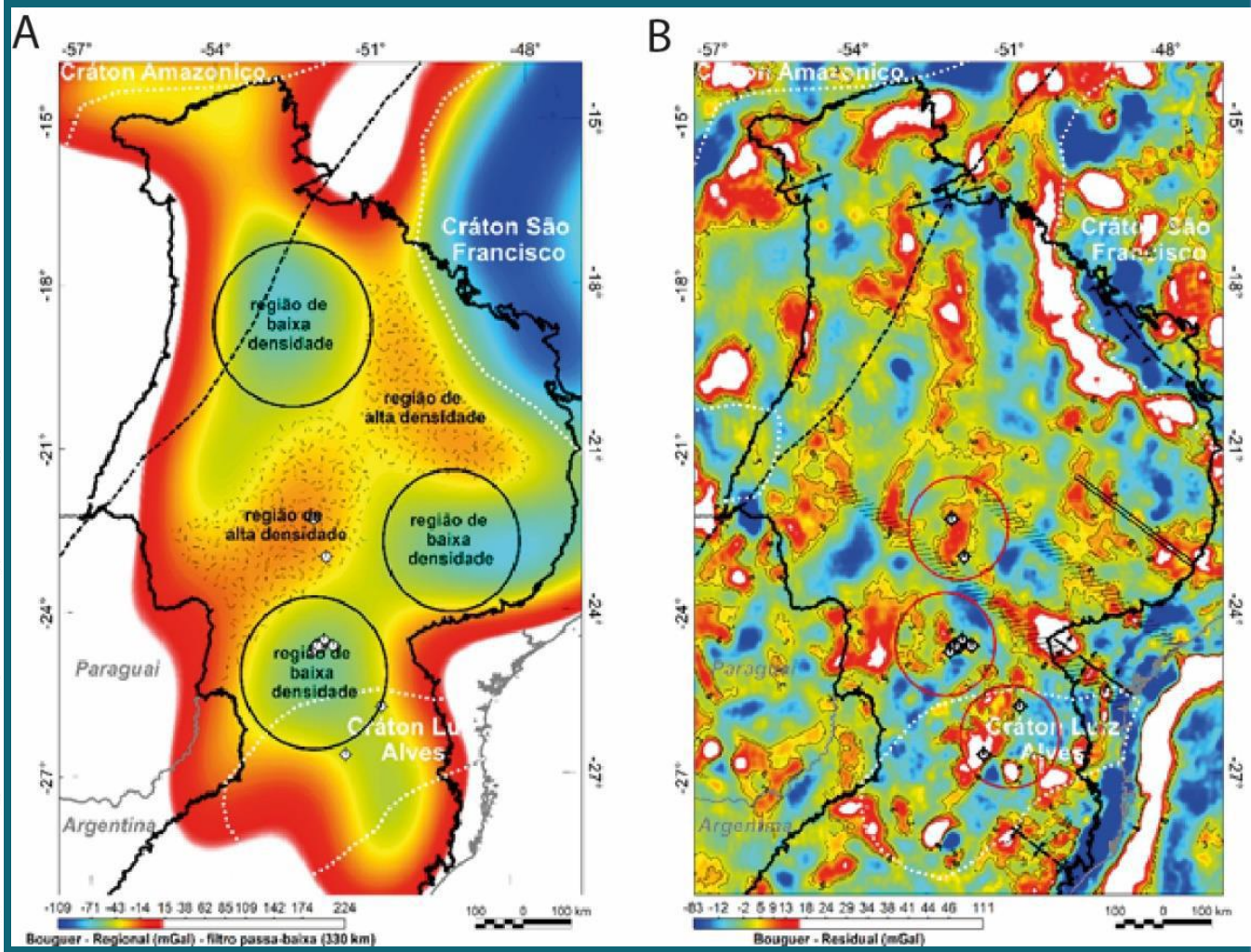
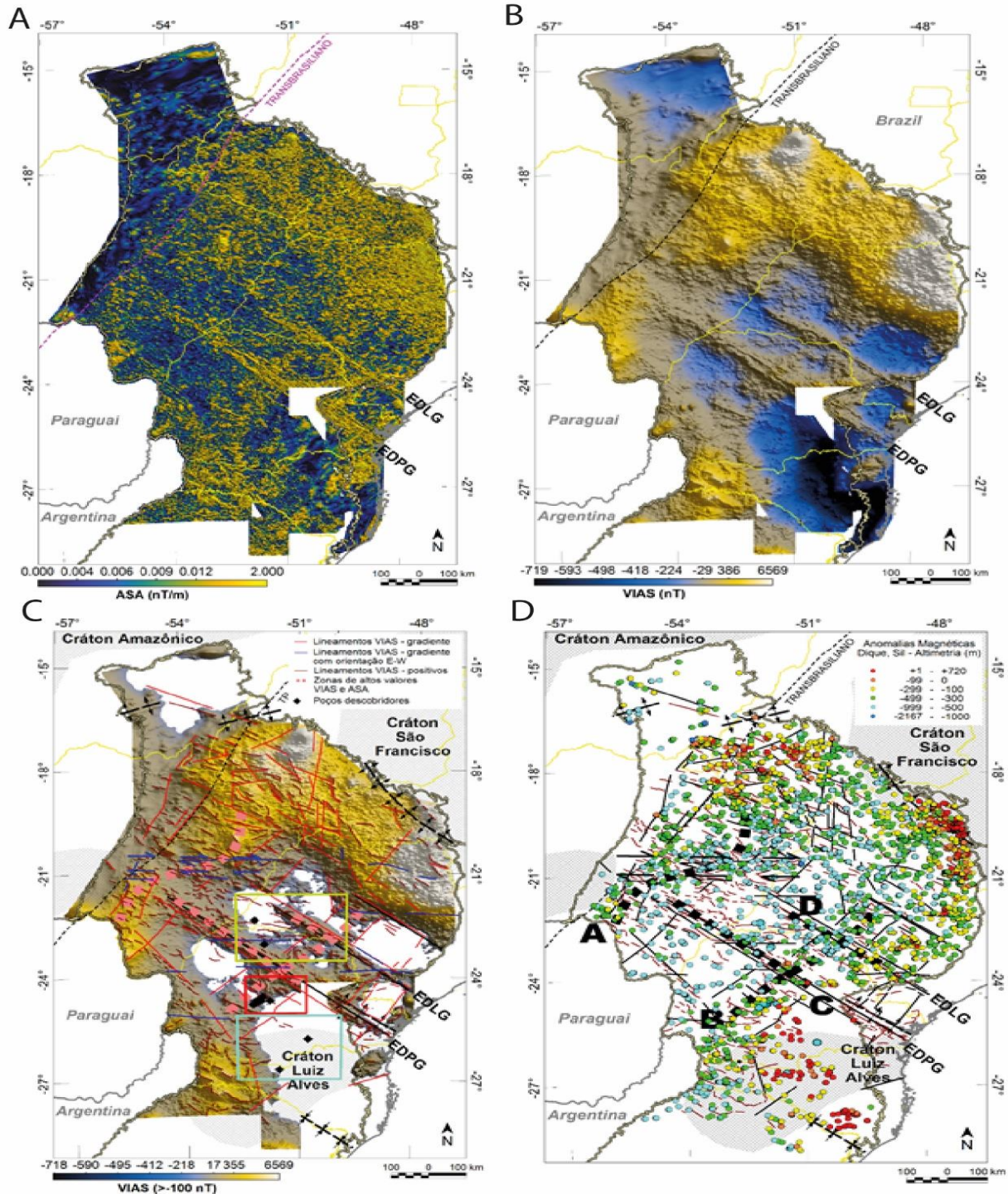
Sequestro de Carbono

H2 Natural



Participação do CGA no REATE

Arcabouço Tectônico da Bacia do Paraná



Projetos para o setor de óleo e gás

- Gravimetria terrestre na bacia do Recôncavo

Individualização e geometria dos blocos tectônicos

- Estudo ambiental das bacias Equatoriais

“Corais” da costa Equatorial

- Minerais Críticos para a nova matriz energética

Crosta Cobaltíferas da Elevação do ARG

- Cooperação com a ANP P/ Disponibilizar todos os dados das bacias *Offshore*

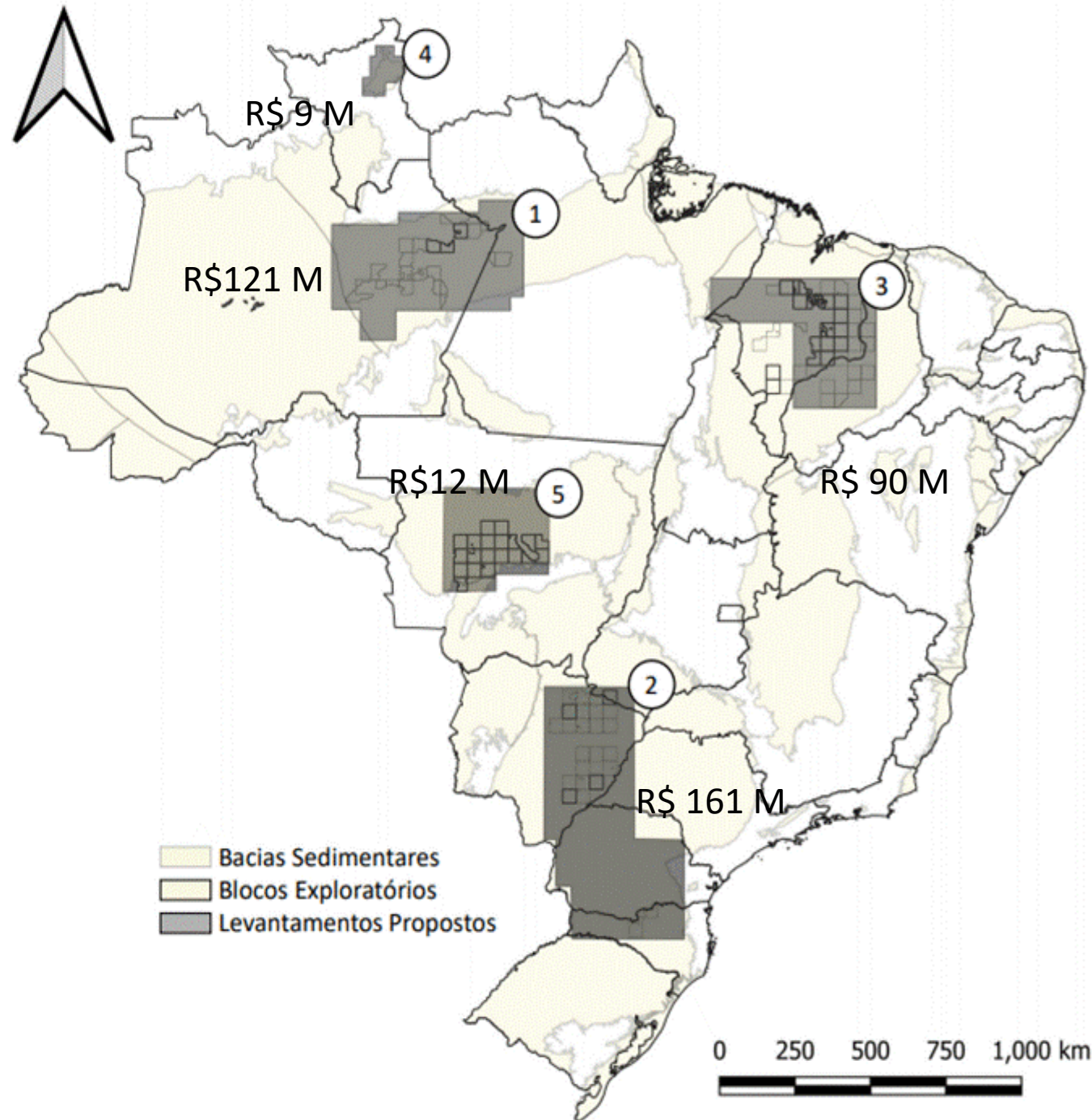
- Aeromagnetometria nas áreas com potencial para gás nas bacias do Parnaíba, Paraná, Amazonas

Benefícios e observações

- Poucos levantamentos de alta resolução nas bacias sedimentares onshore
- Aumento da atividade onshore nos últimos 5 anos com expectativa de uma maior diversidade de players
- Dados magnéticos apresentam um bom custo benefício
- Capacidade de recobrimento das extensas áreas das bacias interiores do Brasil

Priorização

	Localização	Quilômetros Lineares
1.	Bacia do Amazonas	652.208
2.	Bacia do Paraná	863.803
3.	Bacia do Parnaíba	482.250
4.	Bacia do Tacutu	48.433
5.	Bacia do Parecis	65.000



5º FÓRUM TÉCNICO

PRÉ-SAL PETRÓLEO

Rio de Janeiro | 29 de novembro de 2022

Obrigado

Apoio:



Realização:



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