SUPPLEMENTARY INFORMATION

Title - Archean crust and metallogenic zones in the Amazonian Craton sensed by satellite gravity data

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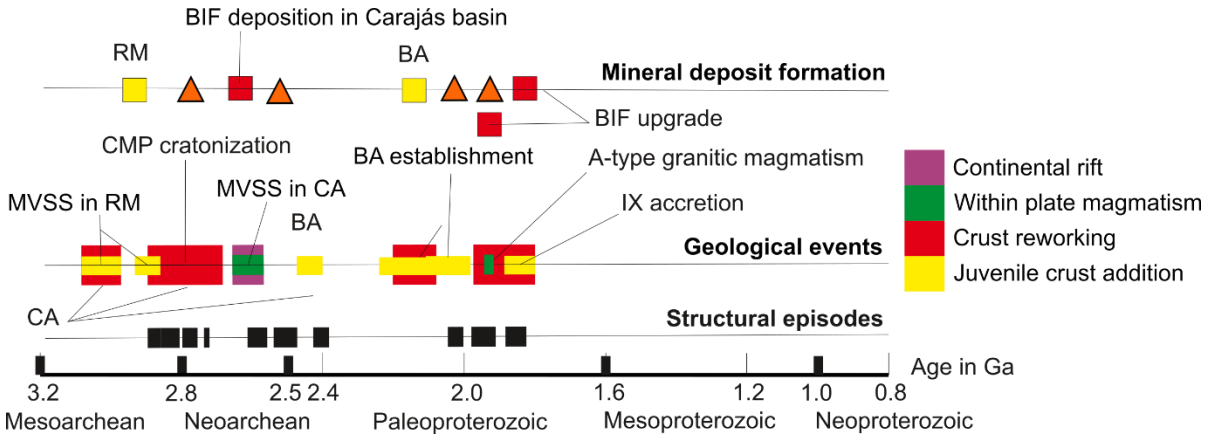
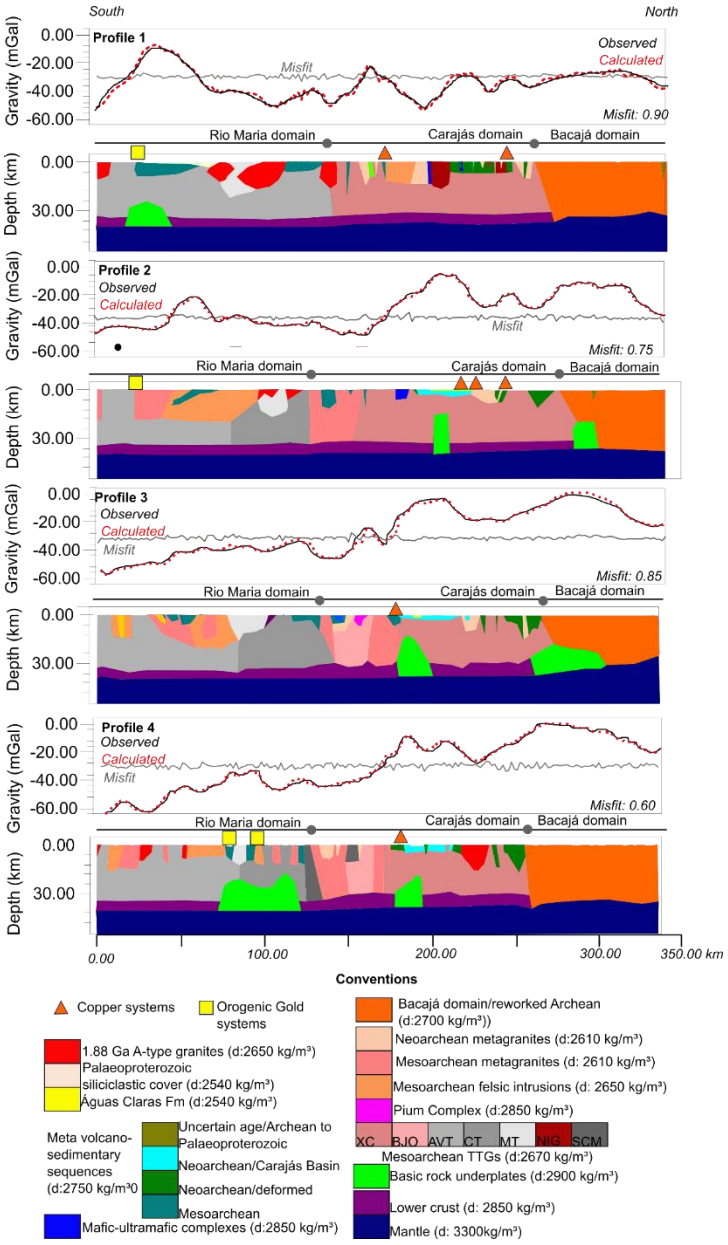
The supplemental information appendix contains accessory information for the understanding of the regional context of the study area (Supplementary Information figures S1, S3) and extended results (Supplementary Information Figure S2, Supplementary Information Table 1).

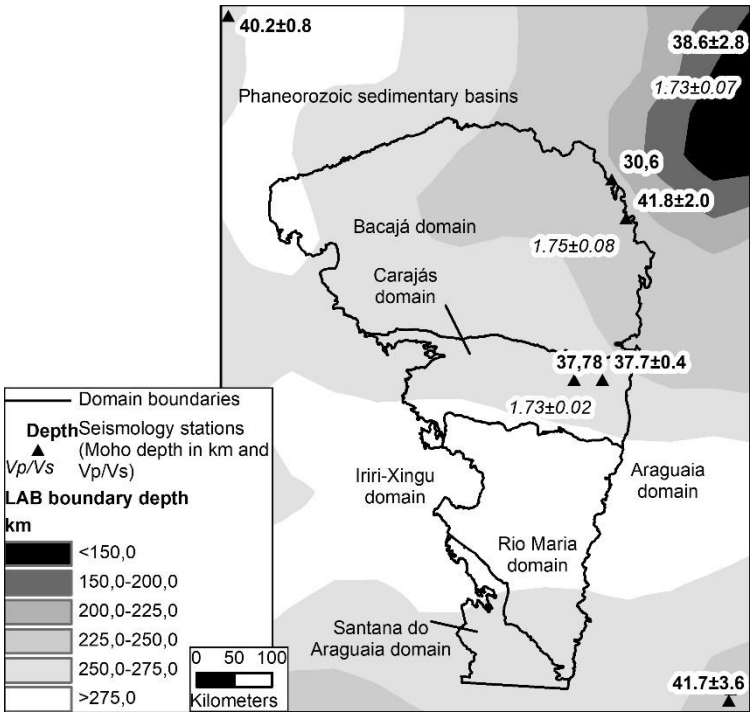
Supplementary Information Figure S1 – Timeline chart for the evolution of the south-eastern Amazonian Craton. Upper panel - mineral deposit formation stages of mineral deposits[1–5]; middle panel - geological events[6–11]. Periods of mineral deposits formation are marked with yellow squares for orogenic gold systems, orange triangles for copper systems, red squares for banded iron formations (BIF) deposition and upgrading. Lower panel - shear deformation episodes before or during the cratonization of CMP[4,12], and reactivations in the Mesoproterozoic history [4,12,13]. BA - Bacajá domain, BIF – banded iron formations, CA- Carajás domain, RM – Rio Maria domain, IX - Iriri-Xingu domain, MVSS - meta volcano-sedimentary sequences.


BIF deposition in Carajás basin
RM
BA
Mineral deposit formation
BIF upgrade
CMP cratonization
BA establishment
A-type granitic magmatism
MVSS in RM
MVSS in CA
IX accretion
BA
Geological events
CA
Structural episodes
Age in Ga
3.2
2.8
2.5
2.4
2.0
1.6
1.2
1.0
0.8
Mesoarchean
Neoarchean
Paleoproterozoic
Mesoproterozoic
Neoproterozoic
Continental rift
Within plate magmatism
Crust reworking
Juvenile crust addition

Supplementary Information Figure S2 – **Forward modeling sections from the airborne gravity survey**. Profile positions are according to traces in Figure 2b. a) profile 1; b) profile 2; c) profile 3 and d) profile 4. The modeled outlines of Rio Maria, Carajás, Bacajá, the lower crust, and mantle were used on the integrated 3D model in Figure 4. Acronyms: XC: Xingú complex, BJO: Bom Jesus orthogneiss, AVT: Arco Verde tonalite, CT: Caracol tonalite, MT: Mogno trondhjemite, NIG: Nova Índia gneiss, SCM: São Carlos meta tonalite; TTG: trondhjemite-tonalite-granodiorite associations.



Supplementary Information Figure S3 – **Seismology information over the Carajás Mineral Province and surroundings.** Contour map for the Lithosphere-Asthenosphere Boundary (LAB) depth from the LITHO1 global model[14], and passive seismic stations with information on Moho depth and the V_p/V_s ratio[15,16].



Supplementary Information Table 1 - Summary table for the geology, geochronology and geochemistry/geochronology inventory of the Carajás Mineral province and its surrounding Palaeoproterozoic belts. Key: ASA – Analytical signal amplitude of the magnetic anomaly; LAB – Lithosphere-Asthenosphere boundary depth; T_{DM} – depleted mantle model ages from Sm-Nd isotope geochemistry; TTG – tonalite-trondhjemite-granodiorite association; S – satellite-borne gravity information; A) airborne-gravity information.

	Rio Maria domain	**Carajás domain**	**Bacajá domain**	**Iriri-Xingu domain**
Magnetic texture in ASA maps	subtle low-gradient texture, mainly NW-SE high-gradient trends. Secondary NE-SW and E-W gradients. Overall low-gradient magnetic framework	Sinuous, discontinuous E-W, WNW-SSE and NE-SW(minor) high gradient zones	Sinuous, continuous NW-SE to E-W high-gradient zones, prominent to the North and NE. Discontinuous, sinuous, high-gradient fabrics from the center to the South which is transitional to the Carajás fabric.	NNW-SSE to NNE-SSW low-gradient fabric along a subtle magnetic framework.
Density texture in Bouguer anomaly maps	S) <10 mGal, rounded high-anomaly region to the South. A) discontinuous linear to rounded high-anomaly trends with NW-SE to NE-SW direction	S) regional high-anomaly region >-10mGal. A) subtle, discontinuous E-W to NW-SE high-anomaly sinuous shapes. Prominent high-anomaly region in the deep-sources anomaly maps up to 2 mGal.	S) regional high-anomaly region >-10mGal. A) subtle, discontinuous E-W high-anomaly sinuous shapes. The prominent high-anomaly region in the deep-sources anomaly maps up to 2 mGal.	S and A) overall low anomaly region (<-20 mGal).
LAB thickness	>275 km	275-250 km	275-225 km (rapidly thinning to the N-NE)	>250 km
Wave-speed information	Vs >4.6 km/s @ 100km	Vs <4.6 km/s @ 100km; Vp/Vs = 1.73±0.02	Vs <4.6 km/s @ 100km; Vp/Vs = 1.75±0.08	-
Overall composition	TTG + sanukitoid basement (orthoderived), volcano-sedimentary sequences (greenstone belts, komatiites are present)	TTG basement (orthoderived), volcano-sedimentary sequences (little- to no komatiites, chemical sediment-rich, ~2.7 Ga greenstone succession)	granite-gneissic basement (orthoderived from center to south; para-derived to the center to north), volcano sedimentary rocks are frequent (Archean to the South, Proterozoic from the center to North)	overall acid/intermediate volcanic, volcaniclastic and plutonic counterparts
Structural framework	discrete, linear, regional NW-SE shear zones, dome and keel granite-greenstone basement.	the patent, sinuous, E-W to WNW-SSE shear zones (poly-phase, Archean)	the patent, sinuous WNW-SSE to NW-SE shear zones, E-W reverse thrusts (footwall to the South) to the South, localized NE-SW shear faults.	NNW-SSE no E-W brittle faults
T_{DM} age ranges	2.7 to 3.4 Ga	2.7 to 3.2 Ga	3.0 to 2.2 Ga	3.0 to 2.2 Ga
Crystallization age ranges	2.8 to 3.4 Ga	2.5 to 3.0 Ga	2.6 to 2.0 Ga	<2.0 Ga
Metamorphism ages	amphibolite facies (>2.8 Ga, basement and greenstone belt sequences)	granulite facies (>3.0 Ga) and amphibolite facies (<2.7 to 2.8 Ga)	amphibolite retrograde over granulite (Early Palaeoproterozoic)	not metamorphic

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