
VINICIUS LOURO, Ph.D.

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PROFESSIONAL PROFILE

Geophysical methods (potential field methods, gamma-ray spectrometry, and remote sensing) in the most diverse environments. I have been an active member in projects covering mineral exploration, continental evolution, environmental pollution, tectonics, geohazards, and, lately, volcanism. Accompanying the continuous technological change, I have researched the Internet of Things, LPWA Networks, and Machine Learning applications to enhance the data-collection, interpretation and geophysical models.

EDUCATION

- 04/2013 – 04/2017 **PhD, Sciences – Geophysics (Double-Degree).** Institute of Astronomy, Geophysics and Atmospheric Sciences, University of São Paulo (IAG-USP), Brazil.
PhD, Earth and Environmental Sciences (Double-Degree). University of St. Andrews, UK.
Thesis: “*Geophysical, Geochemical and Isotopic Analysis of the Figueira Branca Intrusive Suite, Mato Grosso, Brazil*”
- 03/2012 – 03/2013 **MSc, Geophysics.** IAG-USP, Brazil. Dissertation: “Indirect Detection of Remanent Magnetization: A Procedure for Composing Initial Models for Inversion.”
- 02/2007 – 02/2012 **BSc, Geophysics.** IAG-USP, Brazil. Dissertation: “Gravity and Magnetic Study of the Geophysical Anomaly of Pratinha I (MG)”.

PROFESSIONAL EXPERIENCE

- 11/2022 – Present **Consulting Geophysicist.** Fundamento Geophysics
- 04/2018 – Present **PhD. Professor (Assistant Professor).** Geosciences Institute, University of São Paulo (IGc-USP), Brazil
- 04/2011 – 04/2012 **Undergrad Researcher, Exploration Geophysics.** IAG-USP, Brazil.
- 04/2009 – 04/2011 **Intern, Geophysics.** Institute of Technological Research of São Paulo State, Brazil
- 04/2007 – 04/2009 **Undergrad Researcher, Nuclear Geophysics.** IAG-USP, Brazil.
- 04/2006 – 12/2006 **Assistant Librarian,** Associação Pela Família, Brazil

LANGUAGES

Portuguese	Native	English	Fluent
Spanish	Basic	Italian	Basic

TECHNICAL SKILLS

Programming	C/C++, MATLAB, Javascript, Python, Arduino		
Data Processing	<i>Geophysics:</i>	Oasis, Maxwell, Modelvision, ENVI, SNAP, Geosc. Analyst	
	<i>GIS:</i>	ArcGIS, Pix4DMapper, Leica GeoOffice	
	<i>Editing:</i>	Corel Draw, Photoshop, Premiere, After Effects	
Equipments	<i>Magnetometer:</i>	GEMSystems GSM19, SENSYS R3	
	<i>Gravimeter:</i>	Scintrex CG-5, LaCoste&Romberg Gravimeter	
	<i>GPS:</i>	Trimble L1/L2 GPS	
	<i>UAV:</i>	DJI Matrice (300 RTK, 600 Pro)	
	<i>Spectral Sensor:</i>	Sentera Double4K Multispectral Camera, Fieldspec	

WORK EXPERIENCE / PROJECT PARTICIPATIONS

- 2023 - Ongoing** Geodynamics, magmatism and epithermal and porphyry type base and precious metal mineralizations of the Paleoproterozoic (2.1 to 1.87 Ga) in the southern portion of the Amazonian Craton (IGc-USP and Federal University of Pará).
About the project: Exploration of polymetallic occurrences hosted by porphyry intrusions in the southern Amazon Craton.
Key Responsibilities: Defining targets for the exploration phase and evaluating them during the follow up phase with airborne geophysical data and petrophysics.
- 2023 - Ongoing** Prospective modeling of LCT-type pegmatites: integrated multidisciplinary approach in Brazilian examples (Universities-Mining Companies Initiative).
About the project: This project is performing a systematic study on granitic pegmatites and proposing metallogenesis models to support a more realistic evaluation of exploration potential of Brazilian Pegmatites.
Key Responsibilities: Managing the geophysical exploration, integrating its results and interpretations with the geology, geochemistry and isotope teams.
- 2022 - Ongoing** Multidisciplinary study of the Rio Grande Rise: Sustainable exploitation of e-tech mineral resources (Universities, Brazilian Navy, Brazilian Geological Service).
About the project: This is an oceanographic, geological and geophysical effort to investigate the Rio Grande Rise exploratory potential for 'critical' raw materials (E-tech element), as Co, Te, Se, Nd, In, Ga and the HREE in FeMn crusts.
Key Responsibilities: Coordination of the potential field methods logistics, acquisitions, interpretation, management and integration with other methodologies.
- 2021 - Ongoing** Granitic magmatism and hydrothermal gold mineralization formation environments in the Alta Floresta Mineral Province (MT): tectonic setting, petrogenesis, fluid regime, and magnetic anisotropies (IGc-USP).
About the project: Continuation of the successful “Geological-geophysical investigation of the Alta Floresta Gold Province” project ended in 2021.
Key Responsibilities: Geophysical exploration as one of the principal investigators.
- 2020 - Ongoing** The Paraná Magmatic Province: petrogenesis, chronology and environmental impact of Cretaceous tholeiitic, alkaline and silicic magmatism in the Brazilian Platform (Multiple universities).
About the project: This project focuses on the characterization of both the volcanic and plutonic features of the event that formed the province.
Key Responsibilities: My participation has been on coordinating all geophysical acquisitions of magnetic (drone-borne), gamma-ray and gravity field data, integration with open-source data, processing and interpretation.
- 2019 - Ongoing** Sea level changes and the Global Monsoon System: evaluation through marine records in Brazil (Multiple Universities, Brazilian Navy, Brazilian Geological Service).
About the project: A comprehensive assessment of the shallow structure of western Atlantic Ocean's floor near volcanic islands chains, their role in controlling ocean currents and their part the climate change during the last 200 Ma.
Key Responsibilities: Coordinating the potential field methods logistics, acquisitions and interpretation; Managing and integrating this data with other methodologies.
- 2018 - 2021** Geological-geophysical investigation of the Alta Floresta Gold Province (IGc-USP).
About the project: A large-scale integration of geological and geophysical data of the Alta Floresta Gold Province (now Juruena Mineral Province). More than 20 deposits in the province were submitted to geological, geochemical, isotope and petrophysical analyses, so as the magnetic and gravity fields, remote sensing imagery and gamma-ray spectroscopy. The results trained Machine Learning models, resulting in the, so far, most accurate large-scale Mineral Prospectivity Mapping (MPM) of the province.
Key Responsibilities: Lead Investigator, from acquiring resources and logistics to final interpretation and publishing.
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2014 - 2014	<p><u>Buraco da Velha Copper Deposit (IAG-USP).</u> <i>About the project:</i> A geophysical investigation of a known copper deposit in Rondônia state, north Brazil. We suggested that a mafic intrusion generated the necessary thermal energy to mix an already oxidized brine and sulphide bearing fluids at the border of the Parecis Basin, leading to Cu deposition and providing a reference for similar environments in other spots of the border of the basin. <i>Key Responsibilities:</i> Lead Investigator, from acquiring resources and logistics to final interpretation and publishing.</p>
2014-2017	<p><u>Geophysical and Geochemical Characterization of the Jauru Terrain, Rondonian-San Ignacio Province, Brazil (IAG-USP, University of St. Andrews).</u> <i>About the project:</i> This project assessed geophysically delimit the Jauru Terrain, locating, analyzing, and correlating mineral targets (with economic potential) and geochemical characteristics, for the reconstruction of its geotectonic history. <i>Key Responsibilities:</i> Lead Investigator soon after the resources application, from acquiring resources and logistics to final interpretation and publishing.</p>
2012-2013	<p><u>Indirect Detection of Remanent Magnetization (IAG-USP).</u> <i>About the project:</i> This was my Master's project, aiming to comprehend the effects of remanent magnetization in magnetic field data and how to deal with it, especially in areas of low-amplitude geomagnetic fields (as in the South Atlantic Magnetic Anomaly, where the field intensity is roughly 1/3 of the field in Australia, for example). <i>Key Responsibilities:</i> Lead Investigator, from acquiring resources and logistics to final interpretation and publishing.</p>
2012-2012	<p><u>Morro do Leme Nickel Deposit (IAG-USP).</u> <i>About the project:</i> The Morro do Leme laterite nickel deposit (about 1.8% Ni) lies inside the western border of the Parecis Basin (Brazil). The results indicated that to explore for laterite Ni, the best locations are the southern part of the main anomaly and in the cover above the two smaller anomalies, whereas to explore for Pd, Au, Cu, Na, Co, Zn, and/or Pt, in the central portion of the main anomaly. <i>Key Responsibilities:</i> Lead Investigator, from acquiring resources and logistics to final interpretation and publishing.</p>

SUPERVISION

PhD Supervision

1. Isabella Nantes Nishimura, 2023 – Present. “Magnetic and gravity modelling of the Rio Grande Rise”, USP, Brazil.
2. Gabriela Serêjo de Oliveira, 2021 – Present. “Geophysical-geological model of the Cu-Au AQW2 deposit, in the Aquiri region, NW portion of the Carajás Province”, USP, Brazil.
3. Tiago Antonelli, 2020 – Present. “Use of geotechnologies applied to the study and analysis of gullies”, USP, Brazil.

PhD Co-Supervision

1. Gabriel Nogueira, 2022 – Present. “Geophysical characterization of Brazilian pegmatites”, Supervisor: Prof. Sérgio Fontes, Observatório Nacional, Brazil.

MSc Supervision

1. Luiz Eduardo Faria Coura Filho, 2023 – Present. , USP, Brazil, Scholarship: CAPES.
2. Felipe Cardoso Rodrigues, 2019 – 2023. “Tectonics, Seismostratigraphy and Paleogeography of the Santos Continental Shelf”, USP, Brazil.

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3. Renata Martins Rocha da Nobrega, 2020 – 2021. “Geoscientific Dissemination, Communication and Risk Management in Areas Affected by Disasters such as the Mariana Dam - MG”, USP, Brazil.
 4. Marina Fernandes Sanches Barros, 2018 – 2021. “Use of geophysical methods in the analysis of groundwater contamination in Urânia - SP”, USP, Brazil, Scholarship: CAPES.

MSc Co-Supervision

1. Victor A. F. Villagrán, 2022 – Present. " Geophysical survey using the electroresistivity method to determine the layer of mining tailings mud for the assessment of environmental impacts", Supervisor: Prof. Giulliana Mondelli, Universidade Federal do ABC, São Paulo, Brazil.
2. Divanir Conego Júnior, 2016 – 2018. " Geophysical characterization of polymetallic occurrences in the region of the Jaguaretama Complex, CE, Brazil: possible new exploratory targets", Supervisor: Prof. Vanessa B. Ribeiro, Universidade Federal de Pernambuco, Brazil.

Undergrad Supervision

1. Maithe F. Alvim, 2023 – Present. “Risk mapping for mass flows of the Nevado de Ruiz volcano, Colombia”, USP, Brazil.
2. Tiago S. Obara, 2022 – Present. “Geohazard assessment of slopes at Fernando de Noronha, Brazil”, USP, Brazil.
3. Milena G. Correa, 2022 – 2022. “Investigation of flood areas of Rio Negro (AM) by time series of SAR images”, USP, Brazil.
4. Carlos H. Sobral, 2021 – 2022. “Geophysical investigation of the AQW2 Cu-Au deposit, Carajás Province”, USP, Brazil.
5. Eduardo A. Ferrari, 2021 – 2022. “Historic Morphologic Change from Mt. Erebus (Antarctica) via InSAR”, USP, Brazil.
6. Nayara A. C. Silva, 2021 – 2022. “Characterization of Hydrocarbon Seepages in the Tucano Norte Sub-basin through Spectral Images”, USP, Brazil.
7. Larissa Garbelini, 2020 – 2021. "Application of geotechnologies in the characterization of erosion processes: a study of gullies in Anhembi-SP”, USP, Brazil.
8. Victor S. Santos, 2019 – 2021. “Machine Learning techniques applied to the exploration of the Alta Floresta Gold Province”, USP, Brazil / Institut National de la Recherche Scientifique, Canada. Scholarship: Bolsa de Intercâmbio Internacional – Modalidade Empreendedorismo.
9. Phillipe Lima, 2019 – 2021. “Development of a Deep Learning algorithm with airborne geophysical data for the investigation of gold exploratory targets”, USP, Brazil. Scholarship: CNPq-PIBIC.
10. André V. S. Eigenmann, 2020 – 2020. " Geophysical Signature of the Luizão deposit – East Alta Floresta Gold Province, Brazil”, USP, Brazil.
11. Thais R. Bottas, 2019 – 2020. “Geophysical investigation of the region of Nova Guarita, Gold Province of Alta Floresta (MT)”, USP, Brazil. Scholarship: CNPq.
12. Leonardo M. Sani, 2018 – 2019. “Investigation of gold zones in the region of Colíder (MT) by airborne geophysics”, USP, Brazil. Scholarship: CNPq.

Undergrad Co-Supervision

1. Pedro G. Bauli, 2019 – 2021. "Neotectonics and fault reactivation in the central sector of Serra do Mar (states of São Paulo and Rio de Janeiro)". Supervisor: André Pires Negrão, USP, Brazil.
2. Bruna L. Cenatti, 2019 – 2019. "Geological Context of the Agnaldo Gold Mine: A Structurally Controlled System in the Alta Floresta Province (MT)". Supervisor: Prof. Rafael Assis, USP, Brazil.
3. Felipe C. Rodrigues, 2018 – 2019. "Structural analysis and seismostratigraphy of the southern sector of the Santos Inner Continental Shelf: integration of seismic, magnetic and well data". Supervisor: André Pires Negrão, USP, Brazil.

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4. Danilo de Paula, 2017 – 2018. "Application development and graphical interface for gravimetric data reduction". Supervisor: Prof. Marta Silvia Maria Mantovani, USP, Brazil.
 5. Matheus R. Lino, 2015 – 2017. "Computation and implementation of the self-demagnetization effect using the Slicing the Earth library". Supervisor: Prof. Marta Silvia Maria Mantovani, USP, Brazil.
 6. Hyana M. Labanca, 2015 – 2016. "Geophysical study of the Gold Deposits of the Aguapeí Group in the Lavrinha Region, Southwest of the Amazonian Craton – MT". Supervisor: Prof. Marta Silvia Maria Mantovani, USP, Brazil.
 7. Vinícius K. F. Machado, 2014 – 2016. "Geophysical characterization of the Jauru anomaly (MT)". Supervisor: Prof. Marta Silvia Maria Mantovani, USP, Brazil.
 8. Cauã S. Drigo, 2013 – 2014. "Analysis of Euler Deconvolution in Magnetic Data Models". Supervisor: Prof. Marta Silvia Maria Mantovani, USP, Brazil.
 9. Tairo R. P. Santos, 2012 – 2013. " Geopotential Study of the Magnetic Anomaly of Comodoro (MT)". Supervisor: Prof. Marta Silvia Maria Mantovani, USP, Brazil.

PUBLICATIONS

1. Vasconcelos, T.Q.F., Janasi, V.A, Mello, J.T., **Louro, V.**, 2023. The Campinas-Jaguariúna sill, NE Paraná magmatic province, Brazil: Insights on the mechanisms of emplacement and differentiation from geochemical and magnetic data. *Journal of South American Earth Sciences*, 127, 104370, doi:10.1016/j.jsames.2023.104370.
2. Dutra, L.F., **Louro, V.H.A.**, Monteiro, L.V.S., 2023. The southern IOCG and hydrothermal nickel mineralization trend of Carajás Mineral Province: Airborne geophysical and remote sensing evidences for structural controls and hydrothermal signature. *Journal of Applied Geophysics*, 105016, doi: 10.1016/j.jappgeo.2023.105016.
3. Sergipe, P.P., **Louro, V.**, Marangoni, Y.R., Moura, D.S., Jovane, L., 2023. A study of volcanic rocks and ferromanganese crusts through marine geophysical methods integration in the north portion of Cruzeiro do Sul Rift in the Rio Grande Rise. *Frontiers in Marine Science*, 10, doi: 10.3389/fmars.2023.1093108.
4. Barros, M.F.S., **Louro, V.H.A.**, Terada, R., Marques, C.H.G., Saraiva, F.A., Almeida, E.R., Hirata, R., 2022. Geoelectrical anomalies associated to groundwater contamination in Urânia (SP, Brazil). *Journal of Applied Geophysics*, 2026, 104807, doi: 10.1016/j.jappgeo.2022.104807.
5. Santos, V.S., Gloaguen, E., **Louro, V.H.A.**, Blouin, M., 2022. Machine Learning Methods for Quantifying Uncertainty in Prospectivity Mapping of Magmatic-Hydrothermal Gold Deposits: A Case Study from Juruena Mineral Province, Northern Mato Grosso, Brazil. *Minerals* 2022, 12, 941, doi: 10.3390/min12080941.
6. Souza Junior, G.F., Trindade, R.I.F., Temporim F.A., Bellon, U.D., Gouvêa, L.P., Soares, C.C., Amaral, C.A.D., **Louro, V.**, 2021. Imaging the roots of a post-collisional pluton: Implications for the voluminous Cambrian magmatism in the Araçuaí orogen (Brazil). *Tectonophysics*, 821, 229146, doi: 10.1016/j.tecto.2021.229146.
7. Lino, L.M., Quiroz-Valle, F.R., **Louro, V.**, Basei, M.A.S., Vlach, S.R.F., Munõz, P.M., 2021. Synorogenic and post-collisional volcano-sedimentary sequences from Campo Alegre - SC, Southern Brazil. *Journal of South American Earth Sciences*, 107, 103147, 1 – 22, doi: 10.1016/j.jsames.2020.103147.
8. Barros, M.F.S., **Louro, V.H.A.**, Terada, R.K., Marques, C.H.G., Saraiva, F.A., Hirata, R., 2021. Vertical Electrical Soundings in the mapping of vulnerability to contamination of the Adamantina aquifer in Urânia (SP). *Geologia USP – Série Científica*.
9. Negrão, A.P., Mello, C.L., Ramos, R.R.C., Souza, M.R.S., **Louro, V.H.A.**, Bauli, P.G., 2020. Tectonosedimentary evolution of the Resende and Volta Redonda basins (Cenozoic, Central Segment of the Continental Rift of Southeastern Brazil). *Journal of South American Earth Sciences*, 102789, 1-20, doi: 10.1016/j.jsames.2020.102789.

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10. **Louro, V.H.A.**, Negrão, A.P., Castro, L.G., Ferreira, F.J.F., 2019. Canoas geophysical anomaly: A possible alkaline body or unusual anomaly caused by mafic dykes in the Ponta Grossa Arch, Brazil? *Journal of Applied Geophysics*, 170, 103857, doi: 10.1016/j.jappgeo.2019.103857
 11. **Louro, V.H.A.**, Cawood, P.A., Mantovani, M.S.M., Ribeiro, V.B., 2017. Tectonic insights of the southwest Amazon Craton from geophysical, geochemical and mineralogical data of Figueira Branca mafic-ultramafic suite, Brazil. *Tectonophysics*, 708, 96-107, doi: 10.1016/j.tecto.2017.04.025.
 12. **Louro, V.H.A.**, Mantovani, M.S.M., Ribeiro V.B., 2017. Integrated geological and geophysical interpretation of the Buraco da Velha Copper Deposit (Rondônia - Brazil): A basis for exploring in related environments. *Geophysics*, 82(3), B121-B133, doi: 10.1190/geo2016-0345.1.
 13. Mantovani, M.S.M., **Louro, V.H.A.**, 2015. Ribeiro V.B., Requejo, H.S., Santos, R.P.Z. Geophysical Analysis of Catalão I Alkaline-Carbonatite Complex in Goiás, Brasil. *Geophysical Prospecting*, 64(1), 216-227, doi: 10.1111/1365-2478.12283.
 14. **Louro, V.H.A.**, Mantovani, M.S.M., Ribeiro V.B., 2014. Magnetic Field Analysis of Morro do Leme Nickel Deposit. *Geophysics*, 79(6), K1-K9, doi: 10.1190/geo2014-0131.1.
 15. Ribeiro, V.B., Mantovani, M.S.M., **Louro, V.H.A.**, 2014. Notas de aerogamaespectrometria e suas aplicações no mapeamento geológico – estudos de caso. *Terræ Didática*, 10(1), 29-51.
 16. Ribeiro, V.B., **Louro, V.H.A.**, Mantovani, M.S.M., 2013. 3D Inversion of magnetic data of grouped anomalies - study applied to São José intrusions. *Journal of Applied Geophysics*, 93, 67-76, doi: 10.1016/j.jappgeo.2013.03.013.
 17. **Louro, V.H.A.**, Mantovani, M. S. M., 2012. 3D inversion and modeling of magnetic and gravimetric data characterizing the geophysical Anomaly source in Pratinha I in the southeast of Brazil. *Journal of Applied Geophysics*, 80, 110-120, doi: 10.1016/j.jappgeo.2012.01.013.

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