Vanderlei C. Oliveira Jr.

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Current Position

Sep 2013 – present Associate Professor in Geophysics, *Observatório Nacional - ON*, Rio de Janeiro, Brazil.

Research Interests

Geophysics; Potential fields (gravity and magnetic methods); data processing; modelling and inversion.

Education

2010 – 2013 **Ph.D. in Geophysics**, *Observatório Nacional - ON*, Rio de Janeiro, Brazil, Thesis title (portuguese): "Processamento e inversÃčo de dados de campos potenciais: Novas abordagens", (english): "Processing and inversion of potential field data: New approaches".
Advisor: Dr. Valeria C. F. Barbosa (Observatório Nacional, ON)

2009 – 2010 **Master in Geophysics**, *Observatório Nacional - ON*, Rio de Janeiro, Brazil, Thesis title (portuguese): "InversÃčo gravimÃĽtrica radial por camadas para a reconstruÃğÃčo de corpos geolÃşgicos 3D", (english): "Radial gravity inversion for retrieving 3D geological bodies".
Advisor: Dr. Valeria C. F. Barbosa (Observatório Nacional, ON)

2004 – 2008 **Bachelor in Geophysics**, *Universidade Federal Fluminense - UFF*, Rio de Janeiro, Brazil., Thesis Title: "Electromagnetic characterization of geological formations of São Francisco basin".
Advisor: Dr. Sergio L. Fontes (Observatório Nacional, ON).

Publications in refereed journals

1. **Solon, F.F.**, Fontes, S.L., Meju, M. A. 2015. "Magnetotelluric imaging integrated with seismic, gravity, magnetic and well-log data for basement and carbonate reservoir mapping in the São Francisco Basin, Brazil", Petroleum Geoscience Vol 21, No 4, November 2015, pp. 285 - 299, doi:10.1144/petgeo2013-013.

Submitted Publications

1. **Solon, F.F.**, Fontes, S.L., La Terra, E.F., 2017. "Magnetotelluric evidence of crustal conductors in Parnaíba basin, NE Brazil". In revision for Geological Society of London (GSL) Special volume: Cratonic Basin Formation:

A Case Study of the Parnaíba Basin of Brazil.

Publications in Conference Proceedings

1. **Solon, F. F.**; Fontes, S. L.; La Terra, E. F., 2016. "Electromagnetic studies in the Parnaíba Basin: structural characterization by MT imaging". In: 2016 AGU Fall Meeting, 2016, San Francisco, EUA - Oral presentation.

2. **Solon, F. F.**; Fontes, S. L. ; La Terra, E. F., 2015. "Electromagnetic studies in the Parnaíba Basin: structural characterization by MT imaging". In: 26th IUGG General Assembly, 2015, Praga, Czech Republic - Oral presentation.

3. **Solon, F. F.**; Gallardo, L. A.; Fontes, S. L., 2015. "Characterization of SàoFrancisco Basin, Brazil - Joint Inversion of MT, Gravity and Magnetic Data". In: 26th IUGG General Assembly, 2015, Praga, Czech Republic - Oral presentation.

4. **Solon, F. F.**; Fontes, S. L., 2014. "Electromagnetic studies in the Parnaíba Basin: structural characterization by MT imaging." In: 22nd EM Induction Workshop, 2014, Weimar, Germany - Poster presentation

5. **Solon, F. F.**; Fontes, S. L., 2013. "Caracterização da bacia de São Francisco: inversão conjunta de dados MT, sísmicos, gravimétricos e magnetométricos". In: 13th International Congress of the Brazilian Geophysical Society EXPOGEf, 2013, Rio de Janeiro, Brazil - Oral presentation

6. **Solon, F. F.**; Tupinamba, M.; Miquelutti, L. G.; La Terra, E. F.; Fontes, S. L., 2013. "Ancient geological structures in the middle crust of southeast brazilian portion identified by geoelectrical results with Magnetellurics geoohysical methods". In: 13th International Congress of the Brazilian Geophysical Society, Rio de Janeiro, Brazil - Oral presentation.

7. La Terra, E. F.; Miquelutti, L. G.; Fontes, S. L.; **Solon, F. F.**; Pinto, V. R.; Braga, F.; Maciel, M. M.; Poenca, T.; Figueiredo, I., 2012. "Depth distribution of geological structures in western edge of Santos basin from integrated broad band magnetotellurics and geological mapping". In: 21th Electromagnetic Induction Workshop, 2012, Darwin, Australia.

8. **Solon, F. F.**; Fontes, S. L.; Flexor, J.M.; Meju, M.A., 2011. "Electromagnetic and seismic images from SàoFrancisco Basin Brazil: oil and gas perspectives?. In: SEG Technical Program Expanded Abstracts p. 650-654. San Antonio, EUA - Oral presentation.

9. **Solon, F. F.**; Fontes, S. L.; Flexor, J.M.; Meju, M.A., 2011. "Electromagnetic and Seismic characterization of onshore basement and carbonate structures from SàoFrancisco Basin, Brazil". In: 12th International Congress of the Brazilian Geophysical Society, Rio de Janeiro, Brazil - Oral presentation.

10. **Solon, F. F.**; Bijani, R.; Pinto, V. R.; Fontes, S. L.; Carrasquila, A. A. G., 2011. "Magnetotelluric investigation on the onshore Campos Basin". In: 12th International Congress of the Brazilian Geophysical Society, 2001, Rio de Janeiro, Brazil - Poster presentation.

11. **Solon, F. F.**; Fontes, S. L.; Flexor, J.M.; Meju, M.A., 2010. ": Electromagnetic Characterization of fractured basement and carbonate structures beneath thick overburden in Sao Francisco-Parnaiba Basins, Brazil". In: 20th Electromagnetic Induction Workshop, Giza Egypt - Poster presentation.

12. **Solon, F. F.**; Melgaco, P. P. P. S.; Fontes, S. L.; Meju, M. A., 2009. "Assinatura geoelétrica do Arco de São Francisco: encontro das bacias do São Francisco e Parnaíba". In: 11th International Congress of the Brazilian Geophysical Society, Salvador, Brazil - Poster presentation

Participation in Research Projects

2013–2017 Parnaíba Basin structure from Magnetotelluric (MT) imaging In Integrated geophysical studies in Parnaíba basin, Brazil: Parnaíba Basin Integrated Project – PABIP, Observatorio Nacional/University of Oxford/BP Energy, *Sergio L. Fontes (coordinator); Emanuele F. La Terra (co-participant);* ***Flora F. Solon*** *(co-participant)*.

2011–2013 Characterization of SãoFrancisco basin, Brazil: joint inversion of multiple geophysical data, *advisors: Sergio L. Fontes and Luis A. Gallardo*.

2009–2010 Electromagnetic Characterization of fractured basement and carbonate structures beneath thick overburden in São Francisco-Parnaíba Basins, Brazil – Observatorio Nacional, *advisor: Sergio L. Fontes*.

2008–2009 "Geoelectrical signature of the São Francisco high: boundary of São Francisco and Parnaíba basins" – Observatorio Nacional, *advisor: Sergio L. Fontes.*.

Professional Experience

2011–2013 Consultant in Geophysics at a multi-institutional project Subsalt Imaging at Observatório Nacional, *Main Responsibilities: responsible for magnetotelluric survey and data processing*.

apr 2010–dec 2010 Intership Program as geophysicist at Strataimage Consultoria Ltda, *Worked with magnetotelluric survey, data processing, digitalization of seismic data*.

2008–2010 Academic Trainee at Repsol YPF at the project: Morpho-tectonic analysis and stratigraphic significance of Structural Highs in Southeast Brazilian margin basins, *Main Responsibilities: gravity and 2D seismic data interpretation of Campos and Espírito Santo basins, map and sedimentary analysis of Vitoria High*.

2009–2010 Graduate Research Assistant at Observatorio Nacional, *Main Responsibilities: Magnetotelluric Survey and processing: worked with Magnetotelluric survey and data processing at Recôncavo Basin using the ADU07 equipment of Metronix; magnetotelluric data processing and mapping fractured carbonates in São Francisco basin–Advisor: Sergio L. Fontes, Emanuele F. La Terra*.

Visiting Institutions

Oct 2012 – Jan 2013 **Centro de Investigación Científica y de Educación Superior de Ensenada – CICESE**, *Ensenada, BC*, Mexico., collaboration with Dr. Luis Allonso Gallardo.

Languages

Portuguese Native language

English Fluent

French Basic - Basic words and phrases only

Computing skills

Operating systems Linux, Windows

Programming Python, Matlab

References

Dr. Sergio L. Fontes Senior professor at Observatório Nacional (ON), *Rua Gen José Cristino, São Cristóvão, RJ, Brazil 20921-400*.
sergio@on.br

Dr. Valeria Barbosa Senior professor at Observatório Nacional (ON), *Rua Gen José Cristino, São Cristóvão, RJ, Brazil 20921-400*.
barbosa@on.br

Dr. Emanuele F. La Terra — Technologist at Observatório Nacional (ON), *Rua Gen José Cristino, São Cristóvão, RJ, Brazil 20921-400*.
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Dr. Maxwell A. Meju — Principal Geophysicist at PETRONAS, *Kuala Lumpur, Malaysia*.
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Summary of Research Interests – Flora F Solon

I'm a geophysicist working mostly in applied geophysics, with emphasis on the magnetotelluric method. During my Ph.D. I worked mainly with data processing, modelling and inversion of MT data. I analysed several MT surveys in the São Francisco basin and in the Parnaíba basin, both intracratonic basins localized in north-east of Brazil. In São Francisco Basin, MT was used to locate crystalline basement and overlying carbonate rocks. For model appraisal, we analysed well log (gamma ray, deep resistivity and neutron porosity) data as well as seismic, gravity and magnetic profiles coincident with one MT line passing through the well. I participated in a multidisciplinary project carried out in the Parnaíba basin between Observatorio Nacional, University of Oxford and BP Energy of Brazil, under BP sponsored Parnaíba Basin Analysis Project (PBAP). MT data were acquired in an E-W profile in the Parnaíba basin in a profile of approximately 1430 km long, the first MT profile to cross the entire basin. I applied 3D modelling and inversion to image geoelectrical structures within the crustal basement. Conductive anomalies have been associated with the presence of interconnected graphites suggesting that the central Parnaíba region is located over former suture zones.

Recently I have tried to improve my computational skills working with modelling and inversion of MT data. This was possible with the use of open-source software like MTpy [1], SimPEG [2] and Fatiando a Terra [3]. In addition, I developed small routines and programs using the Python language, which helped me during the development of the Ph.D. Among them, a routine to analyse the ambiguity of the MT method, a forward modelling and a 1D MT inversion code.

Links

[1] Krieger, L., Peacock, J. R. 2014, MTpy: A Python toolbox for magnetotellurics. Computers and Geosciences 72, 167–175.

[2] Cockett, Rowan, Seogi Kang, Lindsey J. Heagy, Adam Pidlisecky, and Douglas W. Oldenburg, 2015 SimPEG: An Open Source Framework for Simulation and Gradient Based Parameter Estimation in Geophysical Applications. Computers and Geosciences, doi:10.1016/j.cageo.2015.09.015.

[3] Uieda, L., V. C. Oliveira Jr, and V. C. F. Barbosa (2013), Modeling the Earth with Fatiando a Terra, Proceedings of the 12th Python in Science Conference, pp. 91–98.