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Professional address: Earth Sciences Department, Vrije Universiteit Amsterdam, De Boelelaan 1085 - 1081HV Amsterdam - The Netherlands

EDUCATION

- 2020:** **PhD in Geoscience (Geochemistry)** – Universidade Federal Fluminense (UFF), Brazil
2016: **Master in Geoscience (Geology)** – Universidade Federal do Rio de Janeiro (UFRJ), Brazil
2014: **Special studies in Quaternary Geology** – National Museum of Natural History (UFRJ)
2013: **B.S in Biology** – Universidade Federal Fluminense (UFF), Brazil

RESEARCH EXPERIENCE

- 11/2020:** **Postdoctoral Associate**, Geobiology Group Amsterdam, Faculty of Sciences, Vrije Universiteit Amsterdam

Project: Geobiological and Environmental Mechanisms Controlling the Formation of Micritized sediment in modern shallow marine carbonates (Red Sea, Arabian Sea, Arabian Gulf)

Advisor: Prof. Mónica Sánchez-Román

My study aimed to characterize the role played by microorganisms in carbonate diagenesis. I investigated the biogeochemical signatures associated with micritization through laboratory **incubation experiments and geochemical analysis (ICP-OES, XRD, stable isotopes)** of experimental products and carbonate sediments. The findings of this study distill our knowledge of early diagenesis and its implication for the formation and alteration of carbonate rocks.

- Sep/2020:** **PhD in Geoscience (Geochemistry)** – Universidade Federal Fluminense (UFF), Brazil

Thesis: Hydrological and environmental controls on biogeochemical cycles and Mg-carbonate precipitation in Lagoa Vermelha and Brejo do Espinho – Rio de Janeiro – Brazil.

Supervisors: Prof. Cátia Fernandes Barbosa and Prof. Daniel Ariztegui (Geneva University).

My study provided a comprehensive understanding of the biogeochemical cycles associated with microbial-induced carbonate formation in sedimentary cores from Lagoa Vermelha and Brejo do Espinho. I used **leaf wax biomarkers** to provide a detailed insight into **environmental changes, hydrological cycle**, source and composition of organic matter, mineralogical transformations, and isotopic variations in these lacustrine environments. My research has significantly advanced our knowledge regarding the **past environment** and **climatic history** of the region.

- April/Oct. 2019:** **Academic guest**, Biogeoscience group, Geological Institute, Department of Earth Sciences, ETH-Zurich.

Supervisors: Prof. Timothy Eglinton and Dr. Crisógono Vasconcelos.

I performed **lipid biomarker extraction (n-alkanes and n-alkanoic acids)** from sediments, **identification** and **quantification** analysis, and **stable isotopic composition of specific compounds ($\delta^2\text{H}$)**. Stable isotope in carbonates ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$) and organic matter ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$). Radiocarbon dating.

- Sep. 2018/2019:** **Ph.D. Fellow (Swiss Excellence Scholarship program)**, Earth Science Department, University of Geneva, Limnogeology and Geomicrobiology group.

Supervisor: Prof. Daniel Ariztegui

I conducted **sedimentological analysis (XRF, Carbonate%)** and discussion with collaborators.

- 2016:** **Master in Geoscience (Geology)** – Universidade Federal do Rio de Janeiro (UFRJ), Brazil

Thesis: Fossil vermetidae as indicators of paleo sea level during the Holocene in the Anjos Cove, Arraial do Cabo, Rio de Janeiro.

Supervisor: Prof. João Wagner de Alencar Castro and Dr. Paula Spotorno-Oliveira

I studied vermetid assemblages from the upper Holocene. I applied stable isotopes and mineralogical composition analysis to reconstruct sea-level changes, paleotemperature, and upwelling events, uncovering past environmental conditions and their significance for understanding regional climate dynamics.

SCIENTIFIC PRODUCTION PUBLISHED IN PEER-REVIEWED JOURNALS

1. Silva, D.F.N.; **Areias, C.**; Dornelas, N.; Sá-Valle, L.G.R.; Cruz, A.P.S.; Seoane, J.C.S.; Vasconcelos, C.; Strikis, N.M.; Santos, D.S.; Paytan, A. & Barbosa, C.F., (2024) Holocene paleo-redox conditions in a microbial dolomitic lake using foraminifera as bioindicators. *Marine Micropaleontology*
2. Garuglieri, E.; Marasco, R.; Odobel, C.; Chandra, V.; Teillet, T.; **Areias, C.**; Sánchez-Román, M.; Vahrenkamp, V. & Daffonchio, D., (2024) Searching for microbial contribution to micritization of shallow marine sediments. *Environmental Microbiology*.
3. Fichtner, V.; Schurr, S.L.; Strauss, H.; Vasconcelos, C.; Goetschl, K.E.; **Areias, C.**; Barbosa, C.F. & Immenhauser, A. (2023). The Relationship between Bacterial Sulfur Cycling and Ca/Mg Carbonate Precipitation—Old Tales and New Insights from Lagoa Vermelha and Brejo do Espinho, Brazil. *Geosciences*.
4. Robles-Fernández, A.; **Areias, C.**; Daffonchio, D.; Vahrenkamp, V.C. & Sánchez-Román, M. (2022). The Role of Microorganisms in the Nucleation of Carbonates, Environmental Implications and Applications. *Minerals*.
5. **Areias, C.**; Barbosa, C.F.; Cruz, A.P.S.; McKenzie, J.A.; Ariztegui, D.; Eglinton, T.; Haghipour, Vasconcelos, C. & Sánchez-Román, M., (2022). Organic matter diagenesis and precipitation of Mg-rich carbonate and dolomite in modern hypersaline lagoons linked to climate changes. *Geochimica et Cosmochimica Acta*.
6. Castro, J.W.A.; Seoane, J.C.S.; Fernandes, D.; Cabral, C.L.; Cunha, A.M.; Malta, J.V.; Lavo, L.; De Oliveira, **C.A.**; **Oliveira, P.S.** & Tamega, F.T.S., (2021). Relative sea-level curve during the Holocene in Rio de Janeiro, Southeastern Brazil: A review of the indicators - RSL, altimetric and geochronological data. *Journal of South American Earth Sciences*.
7. **Areias, C.**; Spotorno-Oliveira, P.; Bassi, D.; Iryu, Y.; Nash, M., Castro, J.W.A & Tamega, F.T.S., (2020). Holocene sea-surface temperatures and related coastal upwelling regime recorded by vermetids assemblages, southeastern Brazil (Arraial do Cabo, RJ). *Marine Geology*.
8. Cruz, A.P.S.; Barbosa, C.F.; Blanco, A.M.; **De Oliveira, C.A.**; Guizan, C.S. & Sicoli, J.C.S. (2019). Mid-late Holocene event registered in organo-siliciclastic sediments of Lagoa Salgada carbonate system, southeast Brazil. *Climate of the Past*.
9. Castro, J.W.A.; Seoane, J.C.S.; Cunha, A.M.; Malta, J.V.; **De Oliveira, C.A.**; Stella, R.V. & Suguio, K. (2018). Comments to Angulo et al. 2016 on Sea-level fluctuations and coastal evolution in the state of Rio de Janeiro, Southeastern - Brazil by Castro et al. 2014. *Anais da Academia Brasileira de Ciências (Online)*.
10. Malta, J.V.; Castro, J.W.A.; **De Oliveira, C.A.** & Couto, C. (2017). Rochas de praia 'beachrocks' da ilha do Cabo Frio - litoral do estado do Rio de Janeiro - Sudeste brasileiro: gênese e geocronologia. *Revista Brasileira de Geomorfologia*.
11. Spotorno-Oliveira, P.; Tamega, F.T.S.; **De Oliveira, C.A.**; Castro, J.W.A.; Coutinho, R.; Iryu, Y. & Bassi, D. (2016). Effects of Holocene sea-level changes on subtidal palaeoecosystems, southeastern Brazil. *Marine Geology*.
12. Maia M.A.M., Castro, J.W.A. & **Areias, C.O.** (2015). Physiographic compartments of the Vitória-Trindade volcanic seamount chain: Subsidy to marine geodiversity in the South Atlantic (Compartimentos fisiográficos da cadeia de montes vulcânicos submarinos Vitória-Trindade: Subsídio a geodiversidade marinha no Atlântico Sul). *Revista Brasileira de Cartografia (Online)*.

MANUSCRIPTS SUBMITTED

1. **Areias, C.**; et al., Biogeochemical characterization of micritized carbonate grains in the shallow marine Al-Kharrar Lagoon in the Red Sea, Saudi Arabia, submitted to *Sedimentology* in 05/2024.

MANUSCRIPTS IN PREPARATION

1. **Areias, C. & Sánchez-Román, M.**, Experimental micritization of carbonate grains using microorganisms isolated from the Red Sea.
2. **Areias et al.**, Tracing hydrological changes using leaf wax hydrogen isotopes from sediments in a microbial dolomitic lagoon.

SCHOLARSHIPS, GRANTS AND AWARDS

Scholarships

2019: Agouron Institute PhD student fellowship in Geobiology, USC Wrigley Marine Science Center, Catalina Island, California, USA

2018: Swiss Excellence scholarship (University of Geneva)
Aluno nota 10 (Outstanding Ph.D student - FAPERJ)

Grants

2022: Europlanet 2024 Research Infrastructure (RI) – Co-Investigator

2019: IAS Travel grant for the IAS 2019 Conference – Rome

Awards and Nominations

2021: Best PhD Thesis in 2020 – Nominated by the Geochemistry Department (UFF – Brazil).

2011: 2nd place on the I Seminar on Initiation to Innovation (UFF) AGIR (Innovation agency)

CONFERENCES

1. Oral presentation – In: *NAC (Netherlands Earth sciences Conference)*, 2024, **Areias C. & Sánchez-Román M.**, Microbial micritization experiments: Comparing heterotrophic and phototrophic bacteria.
2. Poster presentation - In: *International Association of Sedimentology Conference*, Dubrovnik, 2023, **Areias, C. et al.**, In vitro microbial micritization of shallow marine carbonate grains.
3. Poster presentation - In: *International Association of Sedimentology Conference*, Dubrovnik, 2023, **Areias, C. et al.**, Microbial and geochemical signals related to micritization of carbonate grains in the shallow marine Al-Kharrar Lagoon in the Red Sea, Saudi Arabia.
4. Oral presentation - In: *NAC (Netherlands Earth sciences Conference)*, 2022, **Areias, C. et al.**, Dolomitization experiments with shallow marine carbonate sediments.
5. Oral presentation (Online) - In: *AbSciCon*, Atlanta, 2022, **Areias, C. et al.**, Formation of microbial mixed-cation carbonates under aerobic and anaerobic conditions.
6. Poster presentation - In: *Microbialites Conference*, Paris, 2021, **Areias, C. et al.**, Hydrological cycle and microbial dolomite formation in hypersaline lagoons in Brazil.
7. Oral presentation (Online) - In: *VELITROP Webinar*, 2020, **Areias, C. et al.**, Changes in the hydrological cycle of two hypersaline lagoons inferred from annually surface water isotopic composition and lipids biomarkers.
8. Poster presentation - In: *AGU Fall Meeting*, San Francisco, CA, 2019, **Areias-Oliveira, C. et al.**, Lipid biomarkers as fingerprints of modern dolomite formation on hypersaline lagoons.

9. Poster presentation - In: *Goldschmidt*, Barcelona, 2019, **De Oliveira, C.A. et al.**, Sedimentary features of a modern environment with dolomite formation.
10. Poster presentation - In: *IAS – International Association of Sedimentologists Conference*, Rome, 2019, **Areias-Oliveira, C. et al.**, Sedimentary pigments associated to the formation of modern dolomite in a hypersaline lagoon.
11. Poster presentation - In: *SwissSed Meeting*, Fribourg, 2019. **Areias, C. et al.**, Sedimentological variability and carbonate precipitation on two hypersaline lagoons of the Brazilian coast - Preliminary results.
12. Oral presentation - In: *Congresso da Associação Brasileira de Estudos do Quaternário – ABEQUA*, Bertioga, 2017. **Areias, C.O. et al.**, Evolução organo-sedimentar com base em $\delta^{13}\text{C}$, $\delta^{15}\text{N}$ nos últimos 7,0 ka da Lagoa Salgada, NE, RJ.
13. Poster presentation - In: *Brazilian Congress of Geology*, Salvador, 2014, **Areias, C.O. et al.**, Biological indicators of the sea level variation during the Holocene: specimens of vermetidae and altimetric positioning.
14. Poster presentation - In: *Brazilian Congress on Marine Biology*. Natal, 2011, **Areias, C.O. et al.**, Assessment of the effects of adding CO_2 on the growth and chemical composition of *Dunaliella tertiolecta*, a potentially useful species for the production of biofuels.
15. Poster presentation - In: *Scientific and Invasion week* (UFF – Universidade Federal Fluminense), Niterói, 2010, **Areias, C.O. et al.**, Optimization of the production of biomass of the microalga *Dunaliella tertiolecta* for production of biodiesel.

COMPLEMENTARY EDUCATION

- 2019:** International Geobiology Course - CALTECH – California Institute of Technology
2016: Geochemistry of carbonates – LAMIR/UFPR – Universidade Federal do Paraná, Brazil
2015: International course on Ecology and biogeochemistry of benthic foraminifera and applications for (paleo) environmental studies - Fluminense Federal University, UFF, Brazil

TEACHING EXPERIENCE

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| 2010 – 2011 | Teaching assistant – Universidade Federal Fluminense
Taught laboratory practical lessons to Biology students, Preparation of samples for microscopy observation, Tutored students for final exams. |
| 2015 | Volunteer teacher – Vetor School
Taught biology concepts to students at a non-profit preparatory school for university. |

PROFESSIONAL ENGAGEMENT AND ACTIVITIES

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| Fieldwork | <ol style="list-style-type: none"> 1. Laguna Negra, Argentina (2022) – Europlanet RI grant (Co-I) 2. Pilbara, Western Australia (2022) – Dr. Schürmannfonds 3. Lagoa Vermelha and Brejo do Espinho, Brazil (2016 - 2020) 4. Arraial do Cabo, Brazil (2015) |
| Peer-Reviewer | <ol style="list-style-type: none"> 1. Journal of Sedimentary Research (JSR) 2. Communications earth & environment. 3. Minerals 4. Applied Sciences 5. Geo-Bio Interfaces |