Curriculum Vitae Dr. Fabrice Lacroix

"I am a biogeochemical scientist passionate in understanding the role of biogeochemistry and ecosystems in a changing environment. My research has focused on coupling hydrological and biogeochemistry dynamics in terrestrial, riverine and oceanic systems, with the coastal ocean as a vital connector. I aim to contribute to constantly evolving observational-based datasets and apply them to constrain cutting-edge modeling frameworks."

Citizenships	Canada, Switzerland, France
ORCID	**https://orcid.org/0000-0003-4749-2826**
Google Scholar ID	**https://scholar.google.de/citations?user=8mIU_wQAAAAJ&hl=de**

Education and Degrees

07.2019 **Ph.D. in Science**

Université Libre de Bruxelles, Brussels, Belgium

Max-Planck-Institute for Meteorology, Hamburg, Germany

Dissertation title: "*Global and regional contributions of riverine fluxes to the global and regional oceanic cycling of carbon and nutrients*"

Advisors: Prof. Dr. Pierre Regnier, Prof Dr. Tatiana Ilyina

07.2015 **M.Sc. in Environmental Science**

ETH Zürich, Zürich, Switzerland

Thesis title: *Offshore transport of carbon in the California current system*

10.2013 **B.Sc. in Environmental Science**

ETH Zürich, Zürich, Switzerland

Current Positions

03.2024 - **Ambizione Fellow, Senior Scientist, Junior Group Lead**

Institute of Geography & Oeschger Centre for Climate Change Research, University of Bern, Switzerland

Past Academic Positions

04.2022-01.2024 **Postdoctoral Researcher**

Climate and Environmental Physics & Oeschger Centre for Climate Change Research, University of Bern, Switzerland

09.2023-11.2023 **Guest Researcher (2.5 months), UniBe Travel Grant Recipient**

Laboratory of Climate Extremes, Universidade Federal de Santa Catarina, Brazil

04.2020- 04.2022 **Research Associate, Postdoctoral Researcher**

Department Biogeochemical Signals, Max-Planck-Institute for Biogeochemistry, Jena, Germany

07.2019 - 03.2020 **Postdoctoral Researcher**

Department Ocean in the Earth System, Max-Planck-Institute for Meteorology, Hamburg, Germany

09.2015 - 07.2019 **EU H2020 Marie Skłodowska-Curie Early-Stage Researcher**

Université Libre de Bruxelles, Brussels, Belgium / Max-Planck-Institute for Meteorology, Hamburg, Germany

Other Employment

03.2015-06.2015 **Intern Climate Accounting**

Climate-KIC, Zürich, Switzerland

11.2014-02.2015 **Intern Casualty Risk Engineering**

XL Insurance (Acquired by Catlin Insurance), Zürich Switzerland

Teaching and Lectures

09.2024 – **Co-Lecturer** for ” Land in the Earth System II” - M.Sc. Climate Science Graduate course

University of Bern, Bern, Switzerland

09.2022 – 01.2024 **Tutorial and Lab Course Assistant** for the lectures “Physics for Medical Undergraduates” and “Physics for Biology and Pharmacy Undergraduates”

University of Bern, Bern, Switzerland

01.2021 **Lecturer** of Ph.D. introductory course “Atmosphere, Ocean & Land 2021” - Ph.D. Level Course

Max Planck Institute for Biogeochemistry, Jena, Germany

09.2019	**Tutorial Assistant** at Max Planck Institute Earth System Modelling Summer School 2019 - Ph.D. Level Course *Max-Planck-Institute for Meteorology, Hamburg, Germany*
09.2011 - 08.2014	**Tutorial Assistant** for Introductory Chemistry 1 & 2 – Undergraduate Course *ETH Zürich, Switzerland*
02.2012 - 01.2014	**Tutorial Assistant** for Systems Analysis *ETH Zürich, Switzerland*

Supervision

07.2024-	**Supervisor** to Lara Oxley, Ph.D. Candidate at *University of Bern, Bern Switzerland*
08.2023 -	**Advisor** to Yu Zhu, Ph.D. Candidate at *Max Planck Institute for Biogeochemistry, Jena, Germany*

Funding, Proposals and Awards

2023	Awarded **Ambizione Fellowship, 2022 Call** (covering 799'000 CHF / 889'076 USD), covering own salary and a that of a PhD candidate for 4 years, with the project *"Past and Future Perturbation of the Pan-Arctic Nitrogen Cycle"* to be pursued at *University of Bern, Switzerland*
2023	Awarded **Travel Grant** by University of Bern (covering 2'800 CHF / 3116 USD) for projects *"Cascading Impacts of Climate Change in the South Atlantic"* to be pursued *at Universidade Federal de Santa Catarina, Florianopolis, Brazil*
2022	Contributor to accepted Swiss National Computing Centre computing time proposals OVERSHOOT (large proposal) and AERA (small proposal)
2020-2021	Contributor to annual project report Deutsche Forschungsgemeinschaft project CASPER
2020	Contributor to successful computing time request proposal EU Horizon 2020 project CRESCENDO
2019	Contributor to Annual Report *Deutsche Forschungsgemeinschaft* project PALMOD
2017	Outstanding Student Poster, *10th International Carbon Dioxide Conference*, Interlaken, Switzerland
2015-2019	Contributor to annual and final project reports for EU Horizon 2020 Marie Sklodowska-Curie innovative training network C-CASCADES

Selected Conference and Workshop Presentations

Lacroix et al.:. Persistent High-Latitude Ocean Warming and Global Sea Level Rise Following Temporary Overshoots. *EGU General Assembly 2024,* Vienna (**Oral**)

Lacroix et al.: Enhanced Transports from Land-to-Ocean: Towards Boundless Assessments of Carbon and Nitrogen Cycles. *Oeschger Centre for Climate Change Seminar,* University of Bern, 6 Dec 2023. (**Invited, Oral**)

Lacroix et al.: Riverine Influence on the global ocean CO_2 flux. *R2O-MIP Workshop, **SOCAT pCO2 Workshop Series***, Nov 2023, Ooostende, Belgium. (**Invited Oral**)

Lacroix et al. Towards a boundless Earth system: Do riverine and coastal disruptions affect marine greenhouse gases and ecosystems at the global scale? Oct 2023, *Seminar Oceanografia*, University of Sao Paulo, Brazil. (**Invited Oral**)

Lacroix et al.: Temporal Disconnect of Seasonal Plant Nutrient Demand and Thaw Depth implies an Increasing Source of N_2O in High-Latitude Permafrost Ecosystems. *EGU General Assembly 2022,* Vienna, Austria (**Oral**)

Lacroix F., Ilyina, T., Mathis, M., Laruelle, G., Regnier, P.: Past century increases of terrestrial nutrient inputs impact both the coastal and open ocean carbon cycle. *EGU General Assembly 2021,* Vienna, Austria (**Oral**)

Regnier, P. & **Lacroix, F.**: Coastal Ocean CO_2 fluxes and C cycle. *Ocean Carbon Budget Workshop* Jun. 2021*,* Online Workshop (**Invited**, **Oral**)

Lacroix, F. & Regnier, P: F_{nat}, more than just river-induced carbon outgassing? *Global Carbon Budget Ocean Workshop*, "Carbon Gaps", Feb. 2021, Online Workshop (**Invited, Oral**)

Lacroix F. Ilyina, T., Mathis, M., Laruelle, G., Regnier, P: Short coastal water residence times support an efficient cross-shelf transfer of organic matter: Were pre-industrial continental shelves already a global CO_2 sink? *Ocean Sciences* Meeting 2020 (**Oral**)

Selected Workshops

2019	C-CASCADES ITN Training Workshop – Entrepreneurial skills: Deltares, Delft, Netherlands.
2017	C-CASCADES ITN Training Workshop – Diagenic models and Earth system models of intermediate complexity. *University of Exeter, Cornwall, United Kingdom.*
2014	Avenues in the Tropics, *Barranquilla, Colombia*. Sustainable urban planning lab and workshop co-organized by Universidad del Norte (Colombia), ETH Zürich (Switzerland) and the World Bank (USA).

Publication List

In Review

Schuster, L., et al. (incl. **Lacroix, F.**): Irreversible glacier change and trough water for centuries after overshooting 1.5° C. In review for *Nature Climate Change*.

Silvy, Y. et. al. (incl. **Lacroix, F.**): AERA-MIP: Emission pathways, remaining budgets and carbon cycle dynamics compatible with 1.5 ºC and 2 ºC global warming stabilization, EGUsphere [preprint], https://doi.org/10.5194/egusphere-2024-488, 2024.

Published / in Press

2024

Lacroix, F., Burger, F., Silvy, Y., Frölicher, T.L. (2024): Persistent Sea Level Rise and High Latitude Warming Following Overshoot Scenarios. In press for *Earth's Future*.

Schleussner et al. (**Lacroix, F.**), Overconfidence in climate overshoot. In press for *Nature*.

Liu, M. et al. (Incl. **Lacroix, F.**): Revised river C flux to the global ocean based on model and observations. *Nature Geoscience*. 2024

Yolandi, E. et al. (Incl. **Lacroix, F.**): "The African regional greenhouse gases budget (2010–2019)." *Global Biogeochemical Cycles* 38.4 (2024): e2023GB008016.

Mathis, M., **Lacroix, F.**, Hagemann S., Nielsen, D., Ilyina, T., Schrum, C. (2024): Enhanced CO_2 uptake of the coastal ocean is dominated by biological carbon fixation. *Nature Climate Change*. https://doi.org/10.21203/rs.3.rs-2928105/v1

Resplandy, L. et al. (incl. **Lacroix, F.** 2024). A synthesis of global coastal ocean greenhouse gas fluxes. *Global Biogeochemical Cycles*, 38, e2023GB007803. https://doi.org/10.1029/2023GB007803

2023

Lacroix F. Arctic Rivers tell Tales of Change. *Nature Geoscience*, 16, 760-761. https://doi.org/10.1038/s41561-023-01248-6

Schaller, J. et al. (incl. **Lacroix, F.**, 2023): Arctic soil CO2 release during freeze-thaw cycles modulated by silicon and calcium. *Science of the Total Environment*, 870, 161943. https://doi.org/10.1016/j.scitotenv.2023.161943

Stimmler, P. et al. (incl. **Lacroix, F.,** 2023): Pan-Arctic soil element availability estimations. *Earth System Science Data*, 15, 1059–1075. https://doi.org/10.5194/essd-15-1059-2023

2022

Mathis, M., Logemann, K., Maerz, J., **Lacroix, F**., Hagemann, S., Chegini, F., et al. (2022). Seamless integration of the coastal ocean in global marine carbon cycle modeling. *Journal of Advances in Modeling Earth Systems,* 14, e2021MS002789. https://doi.org/10.1029/2021MS002789

Lacroix, F., Zaehle, S., Caldararu, S., Schaller, J., Stimmler, P., Holl, D., Kutzbach, L., & Göckede, M. (2022). Mismatch of N release from the permafrost and vegetative uptake opens pathways of increasing nitrous oxide emissions in the high Arctic. Global Change Biology, 28, 5973– 5990. https://doi.org/10.1111/gcb.16345

Dai, M., Su, J., Zhao, Y., Hofmann, E.E., Cao, Z., Cai, W.-J., Gan, J., **Lacroix**, F., Laruelle, G.G., Meng, F., Müller, J. D., Regnier, P.A.G., Wang, G., Wang, Z (2022): Carbon Fluxes in the Coastal Ocean: Synthesis, Boundary Processes and Future Trend, *Annual Review of Earth and Planetary Sciences* 50(1). https://doi.org/10.1146/annurev-earth-032320-090746

2021

Lacroix, F., Ilyina, T., Mathis, M., Laruelle, G. G., & Regnier, P. (2021): Historical increases in land-derived nutrient inputs may alleviate effects of a changing physical climate on the oceanic carbon cycle. *Global Change Biology*, 00, 1–23. https://doi.org/10.1111/gcb.15822

Lacroix, F., Ilyina, T., Laruelle, G. G., & Regnier, P. (2021): Reconstructing the preindustrial coastal carbon cycle through a global ocean circulation model: Was the global continental shelf already both autotrophic and a CO_2 sink?. *Global Biogeochemical Cycles*, 35, e2020GB006603. https://doi.org/10.1029/2020GB006603

2020

Lacroix F., Ilyina T. & Hartmann, J. (2020): Oceanic CO_2 outgassing and biological production hotspots induced by pre-industrial river loads of nutrients and carbon in a global modeling approach, *Biogeosciences*, 17, 55–88. https://doi.org/10.5194/bg-17-55-2020

Datasets

Lacroix, F., Liu, M., Ma, M., Resplandy, L., Beusen, A., Hauck, J., Lennartz, S., Li, Y., Tian, H., & Regnier, P. (2024). Biogeochemical river inputs for global ocean models (RivR2O) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.13799103

Lacroix, F., Burger, F., Silvy, Y., Schleussner, C.-F., & Frölicher, T. L. (2024). GFDL-ESM2M overshoot data [Data set]. Zenodo. https://doi.org/10.5281/zenodo.11091132

Lacroix, F., Zaehle, S., Caldararu, S., Schaller, J., Stimmler, P., Holl, D., Kutzbach, L. & Göckede, M. (2022). Coupled C-N-P QUINCY terrestrial biosphere enhanced for high latitude simulations over 1960-2018 for the high-Arctic region. Global Change Biology. https://doi.org/10.5281/zenodo.6832235