Gerard Rocher-Ros

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Catchment ecologist interested in landscape patterns of ecosystem function, with a background in complex systems and statistical modelling.

EDUCATION

Umeå University, Sweden, Ph.D. in Physical geography 2014-2019
Climate Impacts Research Centre. Department of Ecology and Environmental Science.
Thesis: *Biophysical controls of CO_2 evasion in inland waters*. Advisor: Reiner Giesler.

Autonomous University of Barcelona, Spain, M.S. Statistical Modelling 2013-2014
Department of Mathematics. Specialty in Statistical Modelling and Complex Systems.
Thesis: *"Multifractal patterns in ecosystems: implications for the response of forest fires to environmental conditions"*. Advisor: Salvador Pueyo

University of Barcelona, Spain, B.S. Environmental Sciences 2008-2013

PROFESSIONAL APPOINTMENTS

- Postdoctoral mobility grant from the Swedish Research Council. Host institution: **Blanes Centre for Advanced Studies (Spanish National Research Council)**. Local institution: **Swedish University of Agricultural Sciences** 2022 - 2025
  Project: *Closing the Carbon Cycle in River Networks across Climate and Terrestrial Productivity Gradients*. Collaborators: Susana Bernal, Hjalmar Laudon.
- Postdoctoral researcher at **Umeå University, Sweden**. Climate Impacts Research Centre. Department of Ecology and Environmental Science. 2020 - 2022
  Project: *Effect of reindeer herbivory on the reorganization of nutrient stocks and export to stream networks in the Arctic*. Advisors: Johan Olofsson, Ryan Sponseller.
- Parental leave (9 months):
  - October – November 2019 (100%)
  - September 2020 – April 2021 (80%)

SUPERVISORY ACTIVITIES

- Co-advisor of *Fredrik Sundberg*, PhD student in Arctic aquatic biogeochemistry at **Umeå University (Sweden)**. Main Advisor is Prof. Jan Karlsson. 2022 - present.
- Member of the PhD advisor committee (USA system) of *Keridwen Whitmore*, PhD student in tropical biogeochemistry at **University of North Carolina at Chapel Hill (USA)**. Main advisor is Prof. Diego Riveros-Iregui. 2022 - present.

SCIENTIFIC PUBLICATIONS

- 12. Olid C, Rodellas V, **Rocher-Ros G**, Garcia-Orellana J, Diego-Feliu M, Alorda-Kleinglass A, Bastviken D, Karlsson J. (2022) *Groundwater discharge as a driver of methane emissions from Arctic lakes* Nature Communications
- 11. Aho KS, Fair JH, Hosen JD, Kyzivat ED, Logozzo L, **Rocher-Ros G**, Weber LC, Yoon B, Raymond PA. (2021) *Distinct concentration-discharge dynamics in temperate streams and rivers: CO2 exhibits chemostasis while CH4 exhibits source limitation due to temperature control.* Limnology and Oceanography
- 10. Gomez-Gener L* & **Rocher-Ros G***, Battin TJ, Cohen MJ, Dalmagro HJ, Dinsmore KJ, Drake TW, Duvert C, Enrich-Prast A, Horgby Å, Johnson M, Kirk L, Machado-Silva F, Marzolf N, McDowell MJ,

McDowell WH, Miettinen H, Ojala AK, Peter HM, Pumpanen J, Ran L, Riveros-Iregui D, Santos IR, Six J, Stanley EH, Wallin M, White SA, Sponseller RA. (2021) *Global carbon dioxide efflux from rivers enhanced by high nocturnal emissions* (*Shared first authorship). *Nature Geoscience*

- 9. Karlsson J, Serikova S, Vorobyev S, **Rocher-Ros G**, Denfeld B, Pokrovsky OS. (2021) *Carbon emission from Western Siberian Inland Waters. Nature Communications*
- 8. Myrstener M, Gomez-Gener L, **Rocher-Ros G**, Giesler R, Sponseller RA (2021). *Nutrient availability shapes metabolic seasonal regimes in Arctic streams. Limnology and Oceanography*
- 7. **Rocher-Ros G**, Harms TK, Sponseller RA, Väisänen M, Mörth C-M, Giesler R (2021). *Metabolism overrides photo-oxidation in CO_2 dynamics of Arctic permafrost streams. Limnology and Oceanography*
- 6. Harms TK, **Rocher-Ros G**, Godsey SE. (2020) *Emission of greenhouse gases from water tracks draining arctic hillslopes. Journal of Geophysical Research-Biogeosciences*
- 5. **Rocher-Ros G**, Sponseller RA, Bergström A-K, Myrstener M, Giesler R. (2020). *Stream metabolism controls diel patterns and evasion of CO_2 in Arctic streams. Global Change Biology*
- 4. **Rocher-Ros G**, Sponseller RA, Lidberg W, Mörth C-M, Giesler R. (2019) *Landscape process domains drive patterns of CO_2 evasion from river networks. Limnology and Oceanography: Letters*
- 3. Lyon SW, Ploum SW, van der Velde Y, **Rocher-Ros G**, Mörth C-M, Giesler R. (2018) *Lessons learned from monitoring the stable water isotopic variability in precipitation and streamflow across a snow-dominated sub-arctic catchment. Arctic, Antarctic and Alpine Research*
- 2. Myrstener M, **Rocher-Ros G**, Burrows RM, Bergström AK, Giesler R, Sponseller RA. (2018) *Persistent nitrogen limitation of stream biofilm communities along climate gradients in the arctic. Global Change Biology*
- 1. **Rocher-Ros G**, Giesler R, Lundin E, Salimi S, Jonsson A, Karlsson J. (2017) *Large lakes dominate CO_2 evasion from lakes in an Arctic catchment. Geophysical Research Letters*

In preparation

- **Rocher-Ros G**, Sponseller R, Amatulli G, Casson N, Liu S, Loken L, Oliver S, Raymond PA, Stanley EH. *Global methane emissions from running waters.*
- **Rocher-Ros G**, Sponseller R, Olofsson J. *Arctic herbivores catalize nutrient and carbon terrestrial exports into inland waters.*
- **Rocher-Ros G**, Harms TK, Mörth CM, Väisänen M, Giesler R. *Shifts in stream carbon and 13CDIC across a tundra – boreal forest permafrost gradient in northern Alaska.*
- Stanley EH, **Rocher-Ros G**, Loken L, Casson NJ, Wallin M, Oliver S, Zhang L, Sponseller R. *GRiMeDB: the Global River Methane database.*
- Hintz C, **Rocher-Ros G**, Buffam I, Sponseller RA. *Large diel changes in nitrate concentrations in Arctic streams driven by in-stream photosynthesis: implications for catchment export estimates.*
- Harms T, Väisänen M, **Rocher-Ros G**, Hugelius G, Mörth CM, Giesler R. *Topographic organization of phosphorus availability in tundra landscapes.*
- Jakobsson E, Kaylor M, Lau D, **Rocher-Ros G**, Hauptmann D, Sponseller R. *Importance of seasonal shifts in resource supply for benthic consumers in an Arctic stream.*

ORAL COMMUNICATIONS

-Sponseller RA, **Rocher-Ros G**, Casson NJ, Loken LC, Oliver SK, Stanley EH. *Global patterns in the methane to carbon dioxide ratio of running waters* (Presented at SIL meeting in Berlin (Germany), 2022)

- **Rocher-Ros G**, Raymond PA, Liu S, Rosentretter J, Amatulli G, Loken L, Casson N, Sponseller R, Stanley EH. *Global methane emissions from running waters.* (Presented at JASM meeting in Grand Rapids (USA), 2022)

- Stanley EH, **Rocher-Ros G**, Loken L, Casson NJ, Wallin M, Zhang L, Sponseller R. *Introducing GRiMeDB: The Global Rivers Methane database.* (Presented at JASM meeting in Grand Rapids (USA), 2022)
- Hintz C, **Rocher-Ros G**, Buffam I, Sponseller RA. *How is diel nitrate variation coupled to N limitation in Arctic streams?* (Presented at ASLO meeting 2021 (online))
- **Rocher-Ros G**, Sponseller RA, Mörth C-M, Myrstener M, Giesler R. *Aquatic metabolism is an important driver of CO_2 dynamics in Arctic streams of Sweden.* (Presented at SFS meeting in Detroit (USA), 2018, and in ASLO meeting in Victoria (Canada), 2018)
- Myrstener M, **Rocher-Ros G**, Gomez-Gener L, Giesler R, Sponseller RA. *Nutrient availability shapes seasonal metabolic regimes in Arctic streams.* (Presented in ASLO meeting in Victoria (Canada), 2018)
- **Rocher-Ros G**, Sponseller RA, Mörth C-M, Giesler R. *High resolution measurements of CO_2 fluxes in an Arctic stream network reveal high spatial variability.* (Presented at SEFS meeting in Olomouc (Czech Republic), 2017)
- **Rocher-Ros G**, Burrows R, Bergström A-K, Giesler R, Sponseller RA. *Resource limitation in arctic stream ecosystems: a comparative study in three ecoregions in northern Sweden.* (Presented at ASLO Meeting in Granada (Spain), 2015)
- Karlsson J, Giesler R, **Rocher-Ros G**, Salimi S, Lundin E. *The role of inland waters in the carbon cycle at high latitudes: Assessment from integrated terrestrial-aquatic carbon balances of subarctic catchments* (Presented at ASLO+SFS meeting in Portland (USA), 2014)
- Karlsson J, Klaus M, Lundin E, **Rocher-Ros G.** *Spatiotemporal variability in GHG fluxes and implications for accurately estimating GHG emissions from inland waters.* (Presented at AGU Meeting in San Francisco (USA), 2013)
- Vogel H, Wagner B, Rosén P, Meyer-Jacob C, Ritter B, Boxberg F, Gudasz C, **Rocher-Ros G**, Snowball I. *Lake floor morphology, sediment architecture, and patterns of sedimentation in Lake Torneträsk.* (Presented at EGU Meeting in Vienna (Austria), 2012).

TEACHING EXPERIENCE

Umeå University

- Teaching assistant in *Arctic Geoecology*. 2015-2018
  Field course taught in Abisko, Sweden. Coordinating field projects and one lecture. Course coordinator: Reiner Giesler.
- Teaching assistant in *Water quality and management*. 2015-2017
  Supervising lab classes about aquatic macroinvertebrates and its use for water quality assessment. Course coordinator: Ryan Sponseller.
- Teaching assistant in *Aquatic Biogeochemistry*. 2015-2017
  Leading a field project on greenhouse gas dynamics in experimental ponds. Course coordinator: Ann-Kristin Bergström.
- Teaching assistant in *Miljöresan* 2015-2017
  Field course taught in Abisko, Sweden. Coordinating field projects and leading one excursion. Course coordinator: Micael Jonsson.
- Teaching assistant in *Environmental disturbances in soil and water* 2015
  Teaching practical sessions on spatial statistics, applied to soil and water disturbances Course coordinator: Håkan Eriksson.

Other teaching occasions

- Invited lecturer in the PhD course: *Time series analysis in ecological sciences*, organized by the Iberian Limnological Society. 2022. In this course I do a lecture on time-series analysis and visualization using R software, followed by a hands-on workshop for a whole day.
- Guest teacher in the *International Field School in Watershed Sciences*. 2014 A field course on field and laboratory techniques in watershed sciences for graduate students as part of the NSERC CREATE ABATE Program. I led a field excursion to show a catchment experimental setup in Abisko.

AWARDS AND GRANTS

- International postdoc grant from the Swedish Research council (2021): 3.6 mSEK (360 000 EUR) *Closing the Carbon Cycle in River Networks across Climate and Terrestrial Productivity Gradients*
- Early career project grant from the Climate Impacts Research Centre in Umeå (2020): 30000 SEK (3000 EUR) *Consequences of the altered tundra carbon cycle by reindeers: Accounting for aquatic carbon losses*
- Pilot research grant from the Climate Impacts Research Centre in Umeå (2018): 40.000 SEK. Title *Shaking radionuclides in agitated waters: using Radon222 to measure CO2 fluxes in Arctic streams.*
- Endowment award from the Society of Freshwater Science (2018): 1000 USD

PROFESSIONAL CONTRIBUTIONS AND AFFILIATIONS

- Manuscript reviewer (n=16) for: *Proceedings of the National Academy of Sciences (PNAS) (2)*, *Global Biogeochemical Cycles (2)*, *Biogeochemistry (1)*, *Water Resources Research (1)*, *Limnology and Oceanography (1)*, *Environmental Research Letters (1)*, *Ecosystems (1)*, *Hydrological Processes (1)*, *Journal of Geophysical Research-Biogeosciences (3)*, *Aquatic Sciences (2)*.
- Member of the *Association for the Sciences of Limnology and Oceanography*, the *Society for Freshwater Science* (SFS) and the *Asociación Ibérica de Limnología* (AIL).

RELEVANT SKILLS

Software skills

- Proficiency level programming with R.
  - Data processing and statistical analysis (*tidyverse*)
  - Graphical visualisation (*ggplot2*, *shiny*)
  - GIS analysis and hydrological modelling (*whitebox*, *sf*, *terra*)
  - Reproducible documentation (*Rmarkdown*)
- Intermediate level programming in C.
- Basic level programming in Python.
- Intermediate GIS user. Knowledge of ArcGIS, QGIS, Google Earth Engine.
- User of git/github.
- User of illustration software (Inkscape, Adobe Photoshop/Illustrator)
- User of Linux, Windows OS and Mac OS.
- Modelling aquatic stream metabolism using inverse Bayesian model fitting.
- Machine learning models using random forests in R.
- Development of cellular automata models.
- Development of basic websites using Hugo in markdown.

Environmental science skills

- Coordinate and perform fieldwork campaigns in remote places.
- Perform hydrological measures in streams and rivers.
- Field and laboratory handling of a wide array of water, soil and biological samples.

- Maintain, calibrate and program aquatic sensors (CO_2, O_2, temperature, pressure, conductivity ...)
- Use of Campbell Scientific data loggers and Raspberri Pi, including basic knowledge of electrical wiring.

Languages skills

- Native in: Catalan, Spanish, Occitan.
- Proficient in: English and Swedish.
- Intermediate in: French

Community engagement

- Manager of social networks for the Swedish Ecological society (Oikos-Sweden).
- Member of the European-wide collaborative project "Urban Algae", on the societal perception of the ecological status of urban ponds.
- Vice-chairman (2015-2017) and Chairman (2017-2018) of the PhD branch of NTK (Student association of the Science and Technology faculty, Umeå University).