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# Clément BERTIN

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## EDUCATION

<b>PhD, Earth and Fluid Envelopes</b> , <i>La Rochelle Université</i>	Mar 2023
<b>Dipl. Ing., Hydrography and Oceanography</b> , <i>École Nationale Supérieure des Techniques Avancées (ENSTA) Bretagne</i>	Sep 2019
<b>MSc., Ocean and Climate Physics</b> , <i>Université de Bretagne Occidentale (UBO)</i>	Sep 2019
<b>MSc., Physical and Biogeochemical Oceanography</b> , <i>Aix-Marseille Université</i>	Jun 2017
<b>BSc., Physics</b> , <i>Université de Bordeaux</i>	Jun 2016

## WORK EXPERIENCE

**Postdoctoral Fellow** **Oct 2023 – Now**  
*NASA, Jet Propulsion Laboratory* *Pasadena, USA*

- Evaluate the effect of the Mackenzie River plume on the mesoscale dynamics of the Beaufort Sea coastal periphery using high-resolution modeling (ECCO-Darwin 1km) and observations (SWOT).
- Assess the impact of land-to-ocean fluxes of organic matter (from rivers and coastal erosion) on the Arctic coastal carbon cycle.
- Evaluate the occurrence of Arctic sea-ice and ecosystem tipping points through modeling.

**Postdoctoral Fellow** **Apr 2023 – Jun 2023**  
*Littoral ENvironnement et Sociétés (LIENSs) Laboratory* *La Rochelle, France*

- Evaluated the contribution of Mackenzie River organic matter discharge on the biogeochemistry and the biophysical feedback of the Beaufort Sea coastal waters.

**PhD Candidate** **Nov 2019 – Mar 2023**  
*Littoral ENvironnement et Sociétés (LIENSs) Laboratory* *La Rochelle, France*

- Estimated the daily interannual flux of terrestrial dissolved organic carbon exported by the Mackenzie River into the Southeastern Beaufort Sea by non-linear fitting of the chemodynamic relationship using merged *in situ* and remote-sensing data.
- Adapted the ECCO-Darwin global ocean/sea ice/biogeochemical model to the Mackenzie shelf region in the aim of better describing the Arctic land-ocean continuum
- Evaluated and quantified the impact of Mackenzie biogeochemical river runoff on the coastal air-sea CO<sub>2</sub> flux of the coastal Beaufort Sea.

**Master Thesis** **Apr 2019 – Sep 2019**  
*Laboratoire d'Océanographie Physique et Spatiale (LOPS)* *Brest, France*

- Evaluated the drivers of interannual variability in phytoplankton biomass around Marquesas Island (French Polynesia) using ROMS-PISCES ocean-biogeochemical model.

## OTHER EXPERIENCES

**CAMAS Workshop** **Feb 2024**  
*US Department of Energy* *Santa Fe, USA*

- Advance the understanding and model representation of key marine Arctic processes that contribute to the rapid changes in the Arctic.
- Initiate coordinated activities that will advance our understanding on the biophysical impacts of Arctic marine biogeochemistry.

**Advancing Knowledge of Methane in Arctic (AKMA) Expedition** **May 2022**  
*RV Kronprins Haakon* *Arctic Ocean*

- Supported on-board research and measurement efforts through sediment cores, gravity cores or CTDs.
- Created educational content to enable children to explore the seafloor through the 5 senses.

## TEACHING EXPERIENCE

<b>Graduate level classes</b>	
• Signal Processing (Courses and Python programming)	10 Hours
• Programming for Environmental Sciences (Python programming)	14 Hours
• Least Square Method (Courses and Python programming)	18 Hours
• Initiation to Physical Oceanography	3 Hours

**Internship supervision**  
• Graduate level : Evaluation of the ECCO-Darwin Ocean/Biogeochemical/Sea Ice coupled model performance 6 Months

## OUTREACH

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### Ocean-Senses workshop

*RV Kronprins Haakon*

May 2022

Arctic Ocean

- Created educational content to enable children to explore the seafloor through the 5 senses.

### Podcast on permafrost thaw

*Radio Chrétienne Francophone (RCF)*

Dec 2020

La Rochelle

- Guest on a podcast on the consequences of permafrost thaw in Arctic for the program "*Littoral, ENvironnement & Sociétés*", presented by Gaëlle de Christen ([Podcast](#))

### Les Docs de l'environnement

2020–2023

- Content creation on an [Instagram](#) and a [Facebook](#) account aimed at sharing the daily life of PhD students to the broad audience

## PUBLICATIONS

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**Bertin, C.**, Le Fouest, V., Carroll, D., Dutkiewicz, S., Menemenlis, D., Miller, C.E., ... & Manizza, M. (*In Prep*). Terrestrial browning from colored dissolved organic matter (CDOM) changes the seasonal phenology of the coastal Arctic carbon cycle.

**Bertin, C.**, Carroll, D., Menemenlis, D., Dutkiewicz, S., Zang, H., Schwab, M., ... & Le Fouest, V. (*Submitted*). Paving the way for improved representation of coupled physical and biogeochemical processes in Arctic River plumes — A case study of the Mackenzie Shelf. *Permafrost and Periglac. Process.*

**Bertin, C.**, Carroll, D., Menemenlis, D., Dutkiewicz, S., Zang, H., Matsuoka, A., ... & Le Fouest, V. (2023). Biogeochemical river runoff drives intense Arctic Ocean outgassing. *Geophysical Research Letters*, 50, e2022GL102377. doi: [10.1029/2022GL102377](https://doi.org/10.1029/2022GL102377)

**Bertin, C.**, Matsuoka, A., Mangin, A., Babin, M. & Le Fouest, V. (2022) Merging satellite and in situ data to assess the flux of terrestrial dissolved organic carbon from the Mackenzie River to the coastal Beaufort Sea. *Frontiers in Earth Science*, 10. doi: [10.3389/feart.2022.694062](https://doi.org/10.3389/feart.2022.694062)

Cusset, F., Bustamante, P., Carravieri, A., **Bertin, C.**, Brasso, R., Corsi, I., ... & Cherel, Y. (2023). Circumpolar assessment of mercury contamination: the Adélie penguin as a bioindicator of Antarctic marine ecosystems. *Ecotoxicology*, 32(8), 1024-1049. doi:[10.1007/s10646-023-02709-9](https://doi.org/10.1007/s10646-023-02709-9)

Panieri, G., Bünz, S., Savini, A., Jensen, A., Løfquist, B., Runar, ..., **Bertin, C.**, ... & Dyrved, Holm V. (2022). CAGE22-2 Scientific Cruise Report: AKMA 2/Ocean Senses. *CAGE22-2 Scientific Cruise Report: AKMA 2/Ocean Senses*. doi:[10.7557/cage.6755](https://doi.org/10.7557/cage.6755)

## CONFERENCES AND WORKSHOPS

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**Bertin, C.**, Le Fouest, V., Carroll, D., Menemenlis, D. & Miller, C.E., (2024). The impact of Mackenzie River colored dissolved organic matter (CDOM) on coastal Arctic Ocean Carbon Cycling [Poster]. *AGU Fall Meeting*, December 9-12, 2024, Washington, D.C., USA.

**Bertin, C.**, Carroll, D., Menemenlis, D., Miller, C.E., Dutkiewicz, S., Manfredi, M., ... & Le Fouest, V. (2024). Modelling the carbon cycle across the Arctic land-ocean continuum: a case study of the Southeastern Beaufort Sea [Presentation]. *Ocean Sciences Meeting*, February 18-23, 2024, New Orleans, LA, USA.

**Bertin, C.**, Carroll, D., Menemenlis, D., Dutkiewicz, S., Zang, H., Miller, C.E., ... & Le Fouest, V. (2022). Quantifying the impact of terrestrial dissolved organic carbon runoff on Beaufort Sea coastal air-sea CO<sub>2</sub> fluxes over seasonal to interannual timescales [Oral presentation-Poster]. *Arctic Frontiers*, May 8- 11, 2022, Tromsø, Norway.

**Bertin, C.**, Carroll, D., Menemenlis, D., Dutkiewicz, S., Zhang, H., Matsuoka, A., ... & Le Fouest, V. (2021). Terrestrial DOC removal by marine heterotrophic bacteria in the oligotrophic Beaufort Sea, western Arctic Ocean: a model study [Oral presentation]. *Aquatic Science Meeting*, June 22-27, 2021, Online.

**Bertin, C.**, Menemenlis, D., Carroll, D., Zhang, H., Decharme, B., & Le Fouest, V. (2021). Impact of River Forcing on Simulated Ocean-Sea Ice Coupling in the Arctic Mackenzie Shelf (South-Eastern Beaufort Sea) [Oral presentation]. *Arctic Science Summit Week*, Online, March 19-26, 2021, Lisbon, Portugal.

## AWARDS

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Arctic Frontier 2022 outstanding poster award (APECS)