Scientific Committee on Oceanic Research

CANADIAN OCEAN SCIENCE NEWSLETTER LE BULLETIN CANADIEN DES SCIENCES DE L'OCÉAN

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OCEAN SCIENCE NEWS

Uncertainty in Canada's Marine Carbon Sink

Patrick Duke, UVic, has forwarded this item summarizing work with other early career colleagues from UVic, Dal, UBC, UCalgary, UofT, and Esri.

Scientific blurb:

Improving our understanding of how the ocean absorbs carbon dioxide is critical to climate

change mitigation efforts. Canada's surrounding waters act as a net sink for atmospheric carbon dioxide. However, given the large heterogeneity and uncertainty attributed to observational and model estimates, challenges exist in informing Canada's

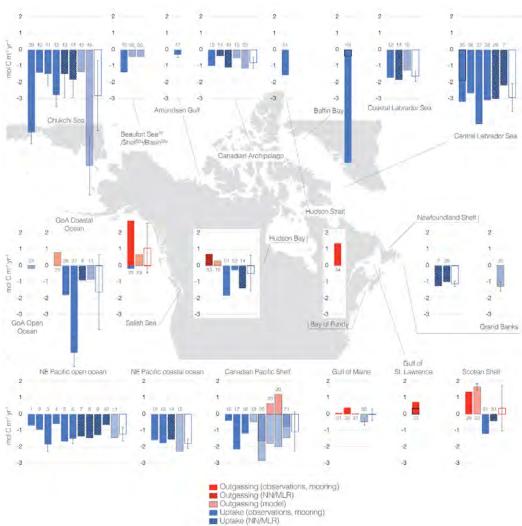


carbon stocktake, establish baselines for marine carbon dioxide removal projects, and supporting efforts to mitigate and adapt to ocean acidification. A new perspectives paper by a group of early career ocean professionals working in Canada, summarizes current research and identifies steps



forward to improve understanding of the marine carbon sink in DALHOUSIE Canadian national and offshore waters. The authors highlight major UNIVERSITY challenges hindering our ability to quantify a "policymaker relevant" value in terms of grams of carbon dioxide uptake per

year, discuss pathways to bridge different ways of knowing in collaborating with First Nations, and present recommendations to improve equity, diversity, and inclusion in ocean carbon science and technology.



Air-sea CO2 flux densities from different estimates in oceans around Canada (mol $C m^{-2} yr^{-1}$). Negative flux (blue) indicates oceanic sink, positive flux (red) indicates oceanic outgassing. The estimation method is indicated as: direct observations (solid dark bars), observationbased interpolation products such as Neural Network (NN) and Multiple Linear Regression (MLR) (hatched bars), and regional ocean biogeochemical models (solid light bars).

<u>Plain language blurb:</u>

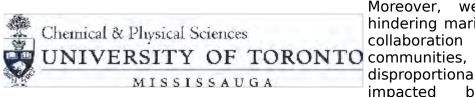
Most oceans surrounding Canada are currently taking up atmospheric carbon dioxide (CO₂), which is important for controlling climate change. The gaps and large uncertainties in ocean observations and model predictions present challenges to quantify CO₂ uptake by the ocean for informing climate change policies. Written by a group of early career

> ocean scientists (mostly PhD students!), this study shines a light on future climate actions as establishing policies for climate change mitigation relies on how well we understand the ocean's role in regulating



DEPARTMENT OF GEOGRAPHY

global CO₂. We assembled an extensive collection of published data and summarized processes that drive fluctuations on how much CO₂ gas moves across the air-sea interface within each of Canadian adjacent oceans (Pacific, Arctic, and Atlantic Ocean).



Moreover, we highlighted several hindering marine CO₂ research, such as lack of collaboration with First **Nations** coastal

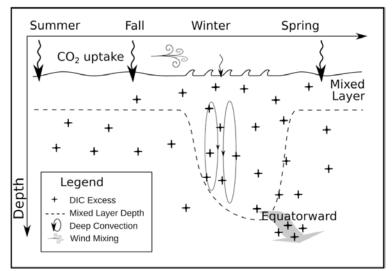
who are disproportionally impacted by ocean

acidification, due to institutional barriers. Therefore, we suggest future research efforts to bridge the gaps and reduce the uncertainty in Canada's carbon inventory reporting, and call for improvements on equity, diversity, ** and inclusion in ocean science and technology, such as aligning the priority of our future studies with the 94 Calls to Action for Canada by the Truth and Reconciliation Commission. These suggestions will help to create baselines for managing future marine CO₂ removal projects aimed at mitigating climate change and provide support on mitigating and adapting to ocean acidification in Canada.

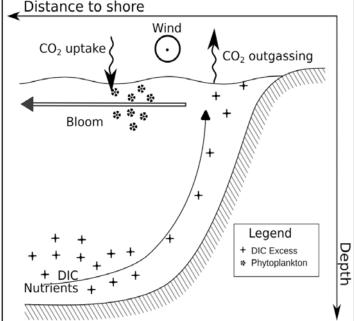


ESRI Canada

Reference: P. J. Duke, B. Richaud, R. Arruda, J. Länger, K. Schuler, P. Gooya, M. M. M. Ahmed, M. R. Miller, C. A. Braybrook, K. Kam, R. Piunno, Y. Sezginer, G. Nickoloff, A. C. Franco. (2023). Canada's marine carbon sink: An early career perspective on the state of research and existing knowledge gaps. FACETS. 8: 1-21. https://doi.org/10.1139/facets-2022-0214



Figures 3 and 4 from the paper linked above.



Funding Opportunities for Industry-Academic Collaboration in Canadian Ocean Science and Technology

David Fissel, ASL Environmental Sciences Inc., Victoria BC

The Canadian Ocean Science and Technology (OS&T) Enterprise spans key sectors including government, universities/colleges, industry, non-profits and indigenous organizations (ORCA, https://science.gc.ca/site/science/en/oceans-research-canada-alliance). collaboration among these sectors benefits the entire enterprise.

Industry-Academic collaboration provides access to funding and inkind contributions for Canadian universities and colleges through several funding mechanisms described below.

The Canadian OS&T private sector consists primarily of: many Oceans Research in Canada Alliance companies providing OS&T products and services, often on a global basis; as well as major

marine industries (shipbuilding and repairs), marine transportation, and companies supporting national defense including the Royal Canadian Navy. There are many hundreds of Canadian OS&T companies, which are typically small and medium size enterprises (SME) ranging from well established companies spanning decades



Government of Canada

du Canada

Gouvernement of activities to start-ups (Fig. 1). These companies operate in many different niches of ocean technology, but they

share the common attributes of being export oriented, knowledge intensive, collaborative and highly clustered by regions (<u>ISED</u>, <u>2023</u>, <u>Ocean Technologies</u>).



Figure 1: A map of 1,900 Canadian ocean and marine organizations (from https://canadasoceanassets.ca/)

Canadian OS&T SME companies conduct extensive research and development (R&D) in support of their businesses funded through large internal contributions derived from their revenues and augmented by access to external funding programs including Scientific Research and Experimental Development (SR&ED) investment tax credits from governments (Canada Revenue Agency and provincial governments), and the Industrial Research Assistance Program (IRAP) operated by the National Research Council of Canada.

Direct Funding from Industry:

Industry funding for university personnel, in the form of salary support for post-docs, graduate students and undergraduates (coop students) is an eligible expenditure under the available industry support programs outlined above.

<u>Industry-University Collaboration Funding Programs:</u>

Enhanced funding for industry-university collaboration is available from two Canadian government programs:

(a) **Mitacs** (https://www.mitacs.ca/en/programs) provides three programs that provide funding for university students through the: Accelerate Program (\$15K funding for a student for each renewable 4 month internship, with a \$7.5K contribution by industry); the Elevate Program (two year post-doctoral fellowships of \$60K per year including professional development training, with a \$30K per year contribution by the industry partner); and the Globalink Program (for international students).

(b) **Natural Sciences and Engineering Research Council (NSERC)** (https://www.nserc-crsng.gc.ca/index_eng.asp) Grants provide partial funding for university/college R&D activities, including funding of student and R&D costs, through:

Canada Nac.cnac

Collaborative Research and Development (CRD) program supporting projects of 1-5 years duration); applied Research and Development grants; Alliance (formerly Engage) grants of 1-5 years; Idea-to-Innovation program supports R&D funding for pre-competitive development of promising technology originating from the university and college sector to support its transfer to a

new or established Canadian company; and the *College and Community Innovation program* grants supporting R&D projects led by college researchers in partnership with private, public or not-for-profit organizations.

Getting Started

The first step in obtaining industry funding support for academia is to get to know the Canadian OS&T companies, starting with those in your region, as well as those in other parts of Canada, that have R&D interests that align with your activities. Direct contacts with these companies can be made through:

- exhibitors at scientific conferences and trade shows
- via regional OS&T industry cluster organizations (Fig.1) as well as
- the two Canadian OS&T collaboration centres:
 - COVE (Centre for Ocean Ventures and Entrepreneurship) in Dartmouth NS
 - COAST (Centre for Ocean Applied Sustainable Technologies) in Victoria BC

This section of your newsletter provides an opportunity to highlight your research programs to the Ocean Science Community.

Your are invited to send contributions to David Greenberg,

davidgreenberg@alumni.uwaterloo.ca

Mettez en valeur vos programmes de recherche en publiant un article dans cette première section de votre bulletin.

Faites parvenir vos contributions à David Greenberg, davidgreenberg@alumni.uwaterloo.ca

MEETINGS

CMOS/SCMO congrès 2024 Congress

June 2-6, 2024 / 2 à 6 juin, 2024

Virtuel - Les centres de Winnipeg et BC Interior/Yukon

Virtual - Hosted by BC Interior/Yukon & Winnipeg Centres



2024 Ocean Decade Conference

Barcelona, Spain, 10-12 April 2024

natural hazards.

2024 will mark the fourth year of implementation of the UN Decade of Ocean Science for Sustainable Development (2021-2030). The 2024 Ocean Decade Conference, will bring together the global Ocean Decade community and partners to celebrate and take stock of progress, and set joint priorities for the future. A key outcome of the Conference will be the publication of a set of white papers related to the 10 Ocean Decade Challenges, that will identify future priorities for the Ocean Decade to generate the knowledge needed for science-based solutions related to global challenges, such as climate change, food security, biodiversity conservation, sustainable ocean economy, pollution and 2021 United Nations Decade



for Sustainable Development

In the lead up to the Conference, partners will also have the opportunity to complement the official Conference programme through Satellite Events. Applications for Satellite Events will close on 30 October 2023.

Registration for the 2024 Ocean Decade Conference will take place in two steps:

- Pre-registration which will be open from 8 June to 30 October 2023. To pre-register, please click here.
- Full registration which will take place from 1 November 2023.

Monitor the Conference website for the call for posters and for presentations.

Please send meeting announcements to David Greenberg, davidgreenberg@alumni.uwaterloo.ca

SVP faites parvenir vos annonces de réunion à David Greenberg, davidgreenberg@alumni.uwaterloo.ca

POSITIONS AVAILABLE

Post-doctoral Researcher in Detrital Zircon Geochronology

Earth, Ocean and Atmospheric Sciences (EOAS), UBC

The Department of Earth, Ocean and Atmospheric Sciences (EOAS) is seeking a post-doctoral researcher in detrital zircon geochronology. The successful candidate will undertake a project relating the isotopic and geochemical compositions of minerals in modern rivers to the geology exposed in their catchments. The ideal candidate will have a demonstrated ability to integrate geological concepts related to sediment transportation within a source-to-sink system and detrital geochronology. Background and experience with laboratory analytical methods and/or numerical methods of analyzing multi-variate detrital data sets is also required. The ability to



integrate additional data sets (such as microXRF or petrology) into a quantitative interpretive framework would be considered an asset, as would a background in coding.

The successful candidate will have completed their Ph.D. in a field closely related to the topics described above by the starting date and will be no more than 5 years from completion of their Ph.D. by the start date. This position has a 24-month duration and a salary of CAD\$67,000. The successful candidate will be encouraged to apply for external funding and may be eligible for further internal awards and positions.

For further information or questions regarding this position should be directed to jobs@eoas.ubc.ca include the submit line "PDF Detrital Zircon".

Details

Deadline: October 21, 2023

Assistant Professor (Tenure - Track) in Chemical Oceanography

Earth, Ocean and Atmospheric Sciences (EOAS), UBC

The Department of Earth, Ocean and Atmospheric Sciences (EOAS) in the Faculty of Science at the University of British Columbia (UBC) seeks candidates for an Assistant Professor (Tenure Track) full-time, Chemical Oceanography / Marine Biogeochemistry with an expected start date of July 2024.

We seek a scholar who will conduct innovative research and contribute strongly to teaching programs with a focus on open ocean and/or coastal water chemistry. The candidate will have a strong interest in developing and applying geochemical tools to investigate the processes that control the distribution, sources, sinks, and biogeochemical cycling of marine elements, molecules, and/or their isotopic compositions, and using this information to



resolve the interplay between chemical, biological, geological, and physical processes that control the chemical composition of seawater, its spatiotemporal variability, and its response to changing marine conditions.

Candidates can submit their applications through the following link:

https://www.eoas.ubc.ca/chemocean-eoas-1

Details

Deadline: October 1, 2023

Azrieli International Postdoctoral Fellowships

Any academic discipline at accredited institutions in Israel

The <u>Azrieli International Postdoctoral Fellowship</u> supports the best and brightest minds in their postdoctoral research, connecting them with world-class academics and leading researchers.

The fellowship offers funding of approximately 188,000 Israeli shekels [~66K\$C] to each of the 24 postdocs selected annually. Beyond financial support, Fellows benefit from enrichment activities and events, networking opportunities, and personalized support. Azrieli Fellows have the flexibility to conduct research in any academic discipline at eligible institutions in Israel. The fellowship welcomes applications from candidates across the globe.



תוכנית עמיתי עזריאלי Azrieli Fellows Program

The Azrieli International Postdoctoral Fellowship is open to candidates who have received their PhD degrees no earlier than November 1, 2020, in all countries except Israel. Allowances are made for parental or medical leave or other career interruptions.

A maximum of 24 Azrieli International Postdoctoral Fellowships are awarded each year: up to 18 Fellowships in STEM fields, up to three in humanities and up to three in social sciences.

- Candidates currently enrolled in a PhD program may apply as long as they complete their dissertation defence successfully no later than June 1, 2024. Official university documentation indicating a dissertation defence date will be required.
- All nationalities are eligible to apply for the Azrieli International Postdoctoral Fellowship, except those who have Israeli citizenship or a resident of Israel.
- At the time of application, all applicants are required to have an academic sponsor who is a faculty member at one of the following eligible Israeli institutions: Barllan University, Ben-Gurion University of the Negev, Reichman University, Technion Israel Institute of Technology, Tel Aviv University, The Hebrew University of Jerusalem, University of Haifa, and Weizmann Institute of Science.

<u>Details</u> Apply

Deadline Nov 15 2023 11:59 PM (IST)

Chercheur ou chercheuse - Modélisation numérique en océanographie physique

Pêches et Océans Canada à Mont-Joli (Québec)

La Direction des sciences pélagiques et écosystémiques de Pêches et Océans Canada, région du Québec, recherche un chercheur ou une chercheuse scientifique en océanographie physique

avec spécialisation en modélisation numérique de l'océan. Le travail consiste à modéliser le système du Saint-Laurent soit dans le but d'approfondir la compréhension des processus physiques qui



influencent ses ressources maritimes, ou pour modéliser ses conditions océanographiques passées (30 ans), actuelles (avis sur l'état de l'océan) et/ou futures (prédictions saisonnières et/ou changements climatiques). Ce ou cette scientifique aura à collaborer avec l'équipe du Programme de monitorage de la zone Atlantique (PMZA), avec les autres modélisateurs du ministère ainsi qu'avec les scientifiques et évaluateurs de stocks des ressources maritimes

présentes dans le système du Saint-Laurent. La personne collaborera aussi avec des experts (océanographes physiciens, chimistes et chercheurs en ressources marines) des différentes régions du MPO, d'autres ministères, régions du pays et d'ailleurs dans le monde au besoin. Le défi consistera à élaborer des analyses scientifiques, de nouvelles techniques ou des approches intégrées qui représenteront une avancée scientifique originale en océanographie physique. Le chercheur ou la chercheuse devra interagir avec les clients afin de formuler des guestions qui appuient la prise de décisions et l'élaboration de politiques, et communiquer les constatations des recherches. Une capacité de poursuivre, en parallèle, les programmes en océanographie opérationnelle sur les niveaux d'eau et les prévisions de dérives est considérée comme un atout. Plus d'information [English Version]

Date limite 26 octobre 2023 - 23 h 59, heure du pacifique

Assistant Professorship in Oceans

Stanford University, Stanford, California

Stanford University invites applications in the broad area of Oceans for a tenure-track Assistant Professor level appointment. We are searching for pioneering scholars with a demonstrated record of high-impact research and a commitment to contribute to a strong interdisciplinary university community in ocean research, education, and external impact. We invite candidates in any area of ocean science, sustainability, technology, and human dimensions to apply. Examples of areas of scholarship could include scalable ocean observing, ocean-based climate solutions, sustainable blue food systems, ocean genomics, conservation physiology, ocean data science, marine



biodiversity, blue justice, and coastal social-ecological systems dynamics and adaptation, among many others.

Details

Deadline October 30, 2023

Postdoctoral Fellowship coastal ocean dynamics

Hakai Institute, British Columbia

Applications are invited for a two-year postdoctoral fellowship (PDF) to lead observational studies of coastal ocean dynamics and their ecological consequences in a physically and ecologically significant shelf sea off the coast of British Columbia, Canada. We seek a physical oceanographer with interests in coastal ocean dynamics and the interaction between ocean dynamics and chemical and biological processes who is keen to employ a variety of observational tools in their research. The Science on the Coastal Margin fellow will join the Hakai Institute and C-PROOF teams and advance their research missions by designing and executing process studies in Queen Charlotte Sound focused on coastal ocean dynamics and their ecological consequences. The specific research topic(s) can be tailored to the fellow's expertise and interests...

Details

Deadline October 15, 2023

	Looking for work? Try the CMOS site (click).	Vous recherchez un emploi? Visitez le site SCMO (click).
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GEOTRACES Intermediate Data Product 2021 updated, corrected, released

An updated and corrected version of the <u>GEOTRACES Intermediate Data Product</u> 2021 is now available to download. It contains hydrographic and biogeochemical data from 86 cruises. The data covers the global ocean. Please see <u>IDP2021 version 2 changes</u> document for further details on the revisions made.



The digital data is available at:

*Bulk download: https://www.bodc.ac.uk/geotraces/data/dp/

*WebODV online for data subsetting, extraction and visualisation:

https://geotraces.webodv.awi.de/

*WebODV online for data analysis, exploration and visualisation:

https://explore.webodv.awi.de/

The **eGEOTRACES Electronic Atlas** (available at <u>www.egeotraces.org</u>) is based on the digital data package and provides section plots and animated 3D scenes for many of the parameters, allowing quick overviews of the occurrence of geochemically relevant tracers.

The next IDP will be released in November 2025, please do not wait to submit your data. Please check the <u>timeline</u> and the <u>flowchart</u> "How to ensure that your data are included in IDP".

Thorium, Radium

More from the **GEOTRACES** eNewsletter

Video 5: Thorium, a luminous element

This mysterious chemical element is used as a chronometer by scientists...



Watch the YouTube video or click **here** to watch it in Youku.

Video 6: Radium, a chronometer of ocean currents

Discovered by Marie and Pierre Curie, radium is now used to calculate the time taken for coastal waters to reach the open ocean

Watch the YouTube video or click here to watch it in Youku.



Sharing Ocean Science Capacity

INVITATION TO CONTRIBUTE ARTICLES

In December 2024, The Oceanography Society (TOS) plans to publish a special issue of the open access journal *Oceanography* on "A Vision for Capacity Sharing in the Ocean Sciences." Details can be found at https://tos.org/capacity-sharing-special-issue.

Letters of interest should be emailed to *Oceanography* Editor Ellen Kappel (ekappel@geo-prose.com) by **October 15, 2023**.



The special issue has several goals: (1) describe the benefits around the world of sustained capacity building and capacity sharing in ocean science, technology, and applications; (2) identify barriers and gaps; (3) share best practices on how to build and sustain efforts; (4) highlight the importance to jobs and the economy; and (5) identify synergies among existing and new capacity-building and capacity-sharing programs. We encourage manuscripts that contribute to the goals of UN Decade of Ocean Science for Sustainable Development (2021–2030) and efforts that look beyond 2030.

There will be no cost to authors for publishing articles in this special issue. Copy editing, design, and distribution is supported by grants from the US National Science Foundation (NSF), US Office of Naval Research (ONR), US National Oceanic and Atmospheric Administration (NOAA), and the Scientific Committee on Oceanic Research (SCOR).

More Information

A.G. Huntsman Award

The A.G. Huntsman Foundation is pleased to announce that the 2023 A.G. Huntsman Medal will be awarded to Dr. Michael Follows in recognition of his contributions to understanding controls on the structure and function of phytoplankton communities, as well as their connection to ocean carbon and nutrient cycles. Through the development of novel tools and approaches, Dr. Follows has linked ecological theory, computer simulations and ocean observations.



With a background in physics and atmospheric sciences, Dr. Follows brings

a unique perspective to the field of biological oceanography. Following his PhD work at the University of East Anglia, he worked at the Max-Planck Institute in Mainz, Germany before moving to the Department of Earth, Atmospheric and Planetary Sciences at the Massachusetts Institute of Technology. From his initial position as a post-doctoral researcher, Dr. Follows eventually became a full Professor in the department and was recently appointed as the MIT Director of the MIT/Woods Hole Institute of Oceanography Joint Program. Across his career, Dr. Follows has mentored a large number

of young scientists and led international programs leaving a lasting mark on the marine sciences.

Save the Date: The 2023 award ceremony will be held at Government House in Halifax, Nova Scotia on November 2nd at 2:00 pm, with a reception to follow. The A. G. Huntsman Distinguished Lecture will be presented at the Bedford Institute of Oceanography on November 3rd at 10:00 am, with the option to participate remotely (2023 AG Huntsman Distinguished Lecture).

RSVP and reserve your free tickets for the award ceremony at: 2023 AG Huntsman Award.

Canadian Ocean Science Newsletter Le Bulletin Canadien des Sciences de l'Océan

Previous newsletters may be found on the CNC-SCOR web Les bulletins antérieurs se retrouvent sur le site web du site. The CNC-SCOR website is hosted by CMOS.

Newsletter #133 will be distributed in November 2023.

Please send contributions to David Greenberg davidgreenberg@alumni.uwaterloo.ca

Subscribing and Unsubscribing

If you wish to subscribe to this newsletter or cancel your subscription, please visit the website:

http://www.mailman.srv.ualberta.ca/mailman/listinfo/cncscor

CNC-SCOR. Le site du CNC-SCOR est hébergé par le SCMO.

Le Bulletin #133 sera distribué en novembre 2023.

Veuillez faire parvenir vos contributions à David Greenberg, <u>davidgreenberg@alumni.uwaterloo.ca</u>

Abonnement et désabonnement

Si vous souhaitez vous abonner à cette newsletter ou annuler votre inscription, veuillez visiter le site web:

http://www.mailman.srv.ualberta.ca/mailman/listinfo/cncscor

CNC-SCOR

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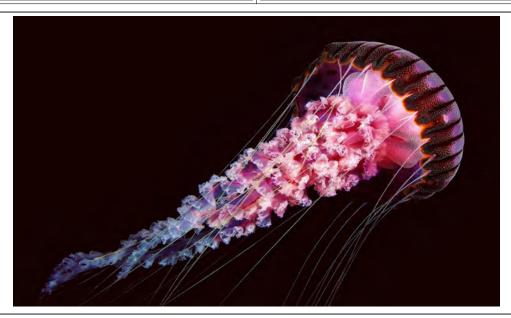
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Le Comité national canadien du Comité scientifique de la recherche océanographique (SCOR) favorise et facilite la coopération internationale. Il reflète la nature multidisciplinaire de la science océanique et de la technologie marine.

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The Canadian National Committee of the Scientific Committee for Oceanic Research (CNC-SCOR) fosters and facilitates international cooperation. It is a non-governmental body that reflects the multidisciplinary nature of ocean science and marine technology.



WWW.CNCSCOR.CA