

Iceland Ocean Climate Science Joint Learning Opportunity: Request for Proposals

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Introduction

The scientific community agrees that in addition to drastically cutting our greenhouse gas emissions, we need a portfolio of approaches that can clean up the carbon pollution already in our air. Meeting the ambitious climate targets of limiting warming to below 2°C necessitates the removal of hundreds of billions of tons of CO₂ from the atmosphere this century, alongside urgent reductions in greenhouse gas emissions.

While current carbon dioxide removal (CDR) efforts have predominantly focused on land-based solutions, like afforestation and reforestation, achieving climate-relevant targets demands continued innovation of CDR methods beyond existing practices. The ocean covers 70% of the Earth's surface and already absorbs approximately 25% of excess atmospheric carbon. For this reason, scientists are exploring ocean-based approaches, which are still in the early stages of development. Ocean Alkalinity Enhancement (OAE) is emerging as a promising method because it mimics a well-understood natural geological process called weathering, converting dissolved CO₂ into forms of carbon considered stable for more than 10,000 years and naturally present in the ocean in very large quantities. Ocean Alkalinity Enhancement may increase the ocean's ability to safely store carbon without increasing ocean acidification.

Following the success of [2024's Joint Learning Opportunity](#) in Halifax, Nova Scotia, the [Carbon to Sea Initiative](#) (Carbon to Sea) and [Röst Marine Research Center](#) (Röst) are excited to announce a new Joint Learning Opportunity (JLO) that will accompany the field research activity planned for May and September 2025 in Hvalfjörður, Iceland. This Joint Learning Opportunity will provide additional funding to support research scientists, innovative sensing and monitoring methods and social scientists interested in evaluating [Ocean Alkalinity Enhancement's](#) (OAE) viability as a climate solution.

This JLO provides logistical support, operational assistance, permits, and funding for applicants to leverage this planned alkalinity addition, maximizing the research value and cost-efficiency of the study.

Participating researchers will contribute to our understanding of scientific questions, develop and refine Measurement, Reporting, and Verification (MRV) instrumentation and techniques, and advance community engagement and understanding of the social benefits of research.

Successful applicant(s) will **demonstrate** scientific merit, strategic fit with the research priorities shared in this Request For Proposal (RFP), a clear and pragmatic vision for executing the work, appropriate qualifications needed to deliver on their vision, and be ready to conduct the work by May or September 2025.

The award package will reflect the unique needs of the work and may include: in-kind services and support for research logistics, meeting and working space from Röst, access to the alkalinity dosing data package, and research funding. The total budget allotted to this program is up to \$300,000 divided among winning awardees. To learn more, [please register for the Iceland Ocean Climate Science JLO Q&A Webinar here](#).

The JLO is delivered through a partnership between the Carbon to Sea Initiative and Röst Marine Research Center, and builds on research being conducted by researchers from [C]Worthy, GEOMAR, and Ghent University.

Carbon to Sea Initiative (Carbon to Sea) is a non-profit ocean science program to evaluate whether the ocean can help mitigate climate change through carbon dioxide removal. Carbon to Sea is building a global network of field research hubs to advance our understanding of OAE in real-world environments. Carbon to Sea provides grant funding for field research and Joint Learning Opportunities in an effort to investigate whether increasing ocean alkalinity is an effective, safe and sustainable way to remove CO₂ from the atmosphere.

Röst Marine Research Center (Röst) is a non-profit organization established as part of Carbon to Sea’s global network of research hubs and is the first newly established hub created within this network. Röst aims to build specialized facilities and knowledge in Iceland that will be useful to the global scientific community. Röst is supporting this JLO through technical, logistical, and infrastructural support and coordination of access to materials and resources for JLO awardees.

Important Dates

Table 1: List of important dates for the Joint Learning Opportunity

Event	Date
Q&A Webinar (Register here)	Feb 18, 2025
Original Proposal Submission Deadline	March 10, 2025
Extended Proposal Submission Deadline	March 24, 2025
Awardees notified	Approximately April 21, 2025
Research dates (approximate)	May / September 2025

Joint Learning Opportunity Strategic Objectives

The objective of this JLO is to advance the scientific, technical, and social understanding of OAE’s viability and desirability as a method for climate change mitigation. By collaborating with planned field research, we can extend the impacts of this work to collect additional data or test novel methods.

There are three primary categories of activities that are key to advancing the research and implementation of OAE and establishing a strong community of practice in the field. These include:

1. **Scientific:** Understanding the biological impacts of OAE on marine environments throughout the water column, within sediments, and along the air-sea interface. The aim is to gather comprehensive data and build skillful models to learn more about the effects of OAE and inform strong scientific practices for activities performed by others.

2. **Technical:** Developing and enhancing sensing methods, autonomous missions and data analysis to improve monitoring quality, cost efficiency and reduce uncertainty of measurements.
3. **Social:** Engaging with interested and affected parties about their perceptions of climate change, perceived risks and benefits, and details of the proposed ocean research. The aim is to seek feedback and explore and advance ongoing methods of engagement, public outreach, and collaboration.

Knowledge Gaps and Strategic Research Priorities

This JLO invites researchers to submit proposals on any topic that advances the existing body of knowledge on OAE field research. Priority will be given to projects that help close knowledge gaps beyond the scope of the existing, planned field research activities. (Please note: applicants are not expected to address all of the below and some data may not be available until later in the year due to analytical and sampling processing timelines.)

In addition to the robust analysis conducted by the parties to the field research (see [Field Research Overview](#)), the following are a range of research areas that the management team considers most *additional and/or complementary* to the planned OAE field research activities:

1. **Biological Impact Monitoring:** Study potential ecosystem responses to changes in water or benthic habitat quality. Research may examine species abundance, growth, behavior, physiology, biodiversity, or other properties. Innovative approaches to real-time monitoring are especially welcome. *Note: Extensive baseline data will be available; minimal to no biological impacts are expected based on earlier studies conducted in the lab and mesocosm.*
2. **Biological Impact Synthesis:** Robust approaches to synthesize relevant data on biological responses (if any) to the field research, for publication in a peer reviewed journal(s).
3. **Sensor Deployment for MRV:** Deploy sensing methods for OAE MRV (quantification, alkalinity enhancement efficiency, ecosystem health, water quality) that enhance the current monitoring plan (e.g. adding new parameters or improving spatial-temporal resolution). Introduce novel, cost-efficient MRV sensing approaches or sensor-platform combinations that would benefit from co-deployment with high-resolution scientific data for validation.

4. **Uncrewed Surface Vessel Data Tools & Synthesis for MRV:** Introduce innovative analytical, modeling, processing, or optimization tools and methods that build on the existing ROMS model and field research data (across traditional and emerging MRV technologies). Develop insightful intercomparison studies and autonomous data collection missions to inform cost-efficient MRV development in the future. See *Uncrewed Surface Vessel Sensor Overview* in [Field Research Overview](#).
5. **Public Sentiment Exploration:** Explore public perceptions, beliefs, attitudes and interest areas related to climate interventions through educational outreach, surveys, workshops or other social science methodologies with a focus on co-creating a framework for ongoing participation and decision-making.
6. **Community Engagement & Experience:** Prototype innovative and creative methods of scientific communication, awareness building, research site experience and / or community involvement to make science more accessible.

Summary of Planned Field Research Activity

A fluorescent dye study is scheduled for May and a small-scale Ocean Alkalinity Enhancement (OAE) pilot field research is tentatively scheduled for September 2025, in Hvalfjörður, Iceland. Dates and details are subject to change due to uncontrollable factors such as feedback and direction from regulators, weather and other unforeseen circumstances. Any changes will be communicated via email from the JLO Management Team to all applicants as soon as possible.

This research builds on several waves of site characterization studies, including Regional Ocean Model System development ([\[C\]Worthy](#)), Baseline Data Collection of the physics, biogeochemistry and pelagic and benthic biology ([Marine and Freshwater Institute of Iceland](#)), Dual Tracer Release Experiment ([\[C\]Worthy](#)), foundational feasibility, regulatory and site evaluation research ([Röst](#)), and ongoing community engagement ([Röst](#)). *Important note for JLO Applicants: Please direct all communications to the JLO Management Team, jlo@rostrannsoknir.is, who can coordinate with members of the above Research Team if necessary.*

The research aims to validate models of enhanced marine carbonate processes and to provide real-world insights into the efficacy of OAE as a mode of mCDR. This would lay important groundwork for the standardization of measuring and monitoring field research around the world, while monitoring the health of benthic and pelagic marine ecosystems. Additional details about the research are included in the [Field Research Overview](#).

Selection Methodology

Proposals for the JLO initiative will be independently reviewed by an experienced and technically proficient advisory committee, and final selection will be conducted by the JLO Management Team (members of the Carbon to Sea Initiative and Röst Marine Research Center). In addition to considering the thoroughness and completeness of the proposal, they will be evaluated against the criteria below:

- A. **Scientific merit:** Research demonstrates scientific rigor and advances OAE knowledge.
- B. **Strategic alignment:** Research addresses key gaps and generates significant new insights beyond existing work.
- C. **Technical feasibility:** Proposal presents a clear, achievable approach with high likelihood of success.
- D. **Expert qualifications:** Applicant has the necessary experience, qualifications, and capacity to deliver the proposed activities.
- E. **Cost-effectiveness:** Proposal demonstrates efficient use of funds, clear value for investment and leverages existing resources where possible.

Eligibility Criteria

Proposals must be submitted by individuals or teams affiliated with established organizations or research institutions that are legally recognized and capable of receiving charitable donations, as well as conducting research or conservation activities in the May, September, or shortly thereafter in 2025 in Iceland. Applicants should have a strong track record in marine science, environmental research, marine technology, social research, or related fields. While the JLO is based in Iceland, international proposals are welcome. Term definitions and additional participation requirements for proposals are provided in the [Terms and Conditions](#).

Instructions for Submission

Proposals must be submitted directly to the JLO Management Team at jlo@rostrannsoknir.is with the title of your project as the subject line by March 24, 2025, by 5:00 PM GMT using the [Proposal Application Guidelines](#). For additional questions related to the JLO, the proposal process, or questions surrounding the OAE community of practice in Hvalfjörður, Iceland please contact the JLO Management Team directly, or raise questions at the JLO Q&A Webinar hosted on February 18, 2025, 3:00 PM - 4:00 PM GMT. [Please register for the event here](#).

Organizations & Team Members

We are grateful to the experts and leaders from the organizations below, who have helped conceptualize and deliver these important scientific contributions and have generously opened the research to additional parties. The table below summarizes the team members and their involvement in this project. *Important note for JLO Applicants: Please direct all communications to the JLO Management Team jlo@rostrannsoknir.is who can coordinate with the Research Team if necessary.*

Table 1: JLO Management & Research Teams with organizations & members

	Organization	Team Members	Scope & Role
JLO Management Team			
Research Site Leadership	Röst Marine Research Center	Salome Hallfredsdottir Audria Dennen Dr. Birkir Bárðarson	Organizational lead for Joint Learning Opportunity; responsible for administration of awards and operational support in Iceland.
Funding & Strategic R&D Alignment	Carbon to Sea Initiative	Irene Polnyi Nick Kleinert Dr. David Keller Anna Madlener	Strategic alignment with global R&D priorities for OAE efficacy, safety and measurability. Scientific, technical and operational funding.
Research Team			
Scientific Measurements, CDR Quantification	[C]Worthy	Dr. David Ho Dr. Matt Long Dr. Alicia Karspeck Dr. Ulla Heede Dr. Toby Koffman Dr. Lennart Gerke	Provide overall scientific leadership for the field research, including research design and implementation, ocean biogeochemical modeling, field monitoring, in-water tracer measurements, and CDR quantification.
Biological Monitoring	Carbon to Sea Initiative & Röst	(Interim) Dr. David Keller Dr. Birkir Bárðarson Audria F. Dennen	Biological monitoring approach design, field operations and biological sampling.
Other Researchers			
Carbonate Chemistry	GEOMAR	Dr. Tobi Steinhoff	Discrete and underway sampling collection for carbonate chemistry parameters.
Physical Oceanography	University of Iceland	Dr. Angel Ruiz-Angulo Audria F. Dennen	ADCP-based ocean currents measurements.
Particle and PIC Measurement	Ghent University	Prof. Dr. Griet Neukermans Dr. Alexandre Castagna	Deploy particle and PIC sensors and conduct analysis for the purposes of measuring secondary precipitation.