



OCEAN
NETWORKS
CANADA



STANDING STRONG FOR SCIENCE

ANNUAL REPORT 1 APRIL 2024 - 31 MARCH 2025

A proudly made-in-Canada data technology hub and world leader in ocean observing

What's inside

- 1 Message from President and CEO
- 2 Proudly Canadian, Together
- 6 Northern Roots, Global Vision
- 8 Expeditions
- 12 Services & Solutions
- 14 Scientific Discoveries
- 18 Community-based Monitoring
- 20 Knowledge & Learning
- 22 Big Data
- 24 Marine Technology Innovation
- 26 ONC's Reach
- 29 Conferences
- 30 Collaborations
- 32 Financials FY24/25
- 33 #KnowTheOcean FY24/25

Introducing Canada's national ocean observatory

Ocean Networks Canada (ONC), an initiative of the University of Victoria (UVic), is one of Canada's Major Research Facilities, and a Decade Implementing Partner for the United Nations (UN) Decade of Ocean Science for Sustainable Development (2021–2030).

ONC operates world-leading observatories in the deep ocean and coastal waters of the Pacific, Atlantic, and Arctic coasts of Canada, and in the Southern (Antarctic) Ocean. ONC's cabled observatories supply continuous power and internet connectivity to scientific instruments, cameras, and 12,000-plus ocean sensors. ONC also operates mobile and land-based assets, including coastal radar.

ONC's observatories generate big data in the form of high resolution sensor measurements, video, and underwater sound recordings—used by more than 70,000 researchers, communities, and decision-makers around the world. The data collected by its cabled, mobile, and community-led observatories are accessible through ONC's Oceans 3.0 data portal.

ONC is transforming ocean science through data technology innovation and partnerships that support ocean health, scientific discovery, safer coastal communities, climate solutions, and a sustainable future for our planet.

With thanks, ONC acknowledges the funding and support from the Canada Foundation for Innovation and the Government of Canada.

Goals

1. Advance ocean observing
2. Develop and deliver world-leading data and ocean intelligence products and services
3. Enable ocean-based solutions for climate change mitigation and coastal resilience

Vision

Ocean Networks Canada enhances life on Earth by providing ocean intelligence that delivers solutions for science, society, and industry.

Cover image: 3D-rendered bathymetric model of NEPTUNE observatory's Main Endeavour Field site; an integration of high-resolution Norbit multibeam sonar data, collected via remotely operated vehicle (ROV), during the ONCabyss Summer 2024 Expedition with E/V *Nautilus* and ship-based seafloor imaging multibeam surveys from previous Monterey Bay Aquarium Research Institute (MBARI) expeditions. ROV-based surveying is opening new avenues for ONC to capture complex environments, such as these hydrothermal vent fields more than two kilometres beneath the ocean surface. Credit: Jeff Samson and Caroline Lee, ONC GIS specialists. Data credit: ONC (2024), Ocean Exploration Trust (2024); MBARI (2014). (*Instrumentation not to scale*).



ONC President and CEO Kate Moran, and Desi.

Land and Sea Acknowledgement

We acknowledge and respect the Lək wəŋən (Songhees and X̱w̱sepsəm/Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and W̱SÁNEĆ Peoples whose historical relationships with the land and sea continue to this day. We also acknowledge the Indigenous communities with whom we have the honour to partner on coastal monitoring and data management solutions.

Standing strong for ocean science and innovation

In FY24/25, Ocean Networks Canada received two prestigious honours that reflect its growing impact and global standing: recognition as a Major Research Facility by the Government of Canada; and designation as a Decade Implementing Partner for the United Nations Decade of Ocean Science for Sustainable Development by UNESCO's Intergovernmental Oceanographic Commission.

These honours at the midpoint of the UN Ocean Decade reflect the trust and collaboration of our partners across governments, science, academia, industry, and Indigenous and coastal communities. They are also a testament to our greatest asset, our people, as ONC's agile teams of scientists, engineers, data specialists, communicators, and community outreach experts continue to think big in advancing ocean observing for the benefit of science, society, and industry.

This year, ONC attracted a record number of ocean data users within Canada and around the world. More than 70,000 decision-makers, researchers, and organizations are now using ONC real-time and long time-series data, gathered from the three coasts of Canada and the Southern Ocean, to explore our blue planet, and to address our biggest challenges. From enabling research

into ocean-based climate solutions through to early warning systems for coastal hazards, ONC's multi-use infrastructure is expanding in size and efficiency to serve the needs of Canadians and the international scientific community.

I invite you to explore FY24/25 highlights, including the Government of Canada's \$24-million investment in the University of Victoria-led Solid Carbon project that leverages ONC's infrastructure: a bold, Canadian-led, and potentially global climate solution. Learn about our partnerships in ocean exploration, our scientific discoveries and technology innovations, and dive into new interactive products that let us know the ocean through multiple perspectives.

Through partnership and innovation, ONC is helping to supercharge Canada's opportunity to strengthen and grow our world-leading ocean science technology sector. The world is changing, but ONC remains steadfast in its mission: to deliver and expand the science-based ocean intelligence needed to understand and care for our blue planet, support Canadian industry, build coastal resilience and climate solutions, buttress our ocean sovereignty, and support diplomacy by growing ONC's international partnerships.

Kate Moran
President and CEO



Proudly Canadian, Together

Canada has the longest coastline of any nation in the world.

Our nation has the opportunity to grow a sustainable blue economy and ocean technology sector **the Canadian way:** through partnership and innovation, using ocean data, emerging AI tools, and ocean observatories to support research, industry, and a thriving ocean future.



Our valued partnerships

Ocean Networks Canada is a proudly made-in-Canada ocean science and data technology innovation hub, and a world leader in ocean observing.

ONC is transforming ocean science through data and technology innovation and in partnership with Canadian science, industry, and Indigenous communities, with whom we have the honour to partner on coastal monitoring.

ONC supports data delivery from all-Canadian expedition to the Southern Ocean

In early 2025, ONC partnered in the first all-Canadian-led scientific mission to the Southern Ocean: the Canadian Antarctic Research Expedition (CARE 2025) aboard the HMCS *Margaret Brooke*.

This groundbreaking mission involving government, science, and industry focused on mapping the seafloor surrounding the southern continent, sampling the glacier-fed bays, and collecting vital ocean data in this rapidly changing polar region.

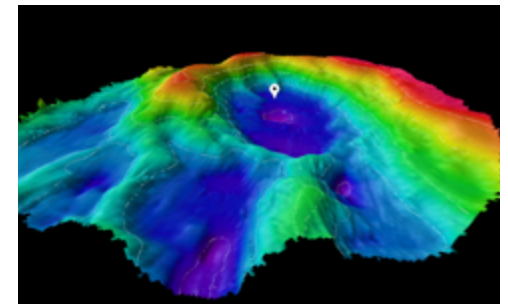
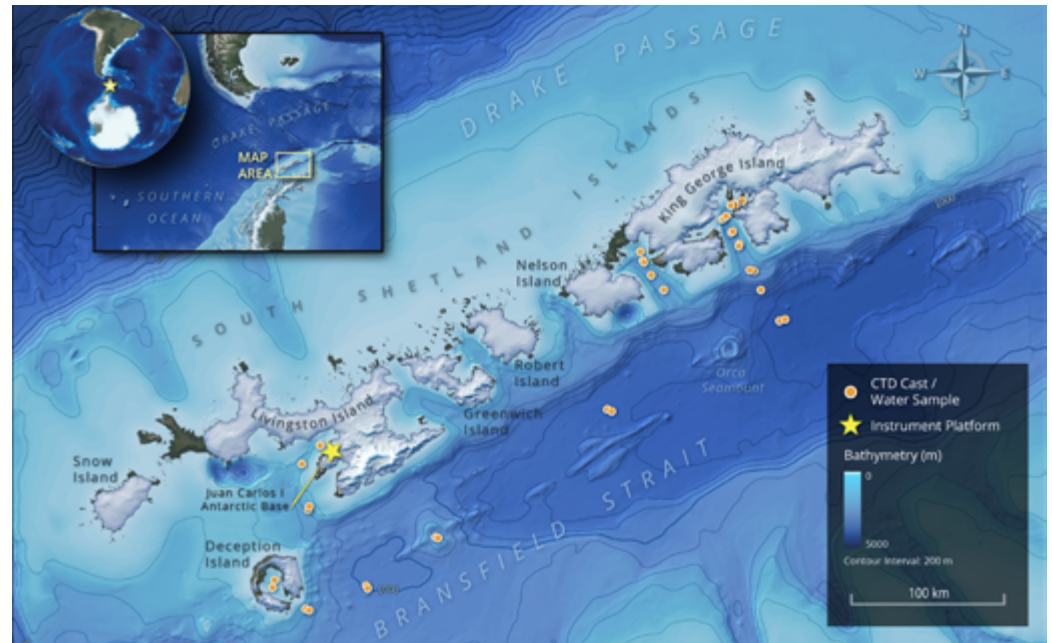
ONC contributed critical data stewardship expertise both during and post-expedition, and is processing over 200,000 data points collected during 35 CTD (conductivity, temperature, depth) deployments. These water profiles were sampled at 22 locations and are being curated in ONC's openly accessible data system, Oceans 3.0.

Seafloor mapping, led by the University of New Brunswick, used Canadian GNSS technology and an autonomous surface vessel to chart underexplored regions, including the bay surrounding **ONC's partner observatory** deployed at Spain's Juan Carlos I Antarctic Station.

ONC is also supporting research on the impact of glacial melt on ocean chemistry. Dr. Tia Anderlini from UVic is using the new data to study how metals from tidewater glaciers, both nutrients and toxins, move into the ocean and influence ecosystems.

Expedition data will be accessible through ONC and the Canadian Integrated Ocean Observing System (CIOOS), advancing global research on climate change and polar ocean processes. Learn more about CARE 2025 and its partners, including Natural Resources Canada, the Marine Environmental Observation, Prediction and Response Network (MEOPAR), and the Royal Canadian Navy. [Click to learn more](#)

Left facing: ONC regularly partners with Fisheries and Oceans Canada (DFO) and the Canadian Coast Guard (CCG) for deep sea operations, including this expedition aboard the CCGS *John P. Tully*. Credit: NEPDEP 2023, DFO.



Top of page: Location of the 22 water column profiles that were sampled around the South Shetland Islands in Drake Passage during CARE 2025. *Bottom left and middle:* The Royal Canadian Navy vessel HMCS *Margaret Brooke* in Antarctica, and UVic PhD Tia Anderlini with penguins in Antarctica. Credit: CARE 2025. *Bottom right:* Seafloor map of the bay where the ONC-CSIC partner observatory is deployed. Credit: Dr. Kevin Wilcox, University of New Brunswick.

Ocean monitoring with BC Ferries

Ocean Networks Canada and BC Ferries are expanding their long-standing partnership to collect oceanographic data on the west coast of Canada, with a new science sampling system built, installed, and commissioned on two hybrid vessels in FY24/25.

Since 2012, the organizations have together outfitted vessels to support long time-series data collection. As passenger ferries make repeat daily transits through the Strait of Georgia, the Canadian-designed scientific water sampling system is collecting high-quality measurements on ocean temperature, salinity, oxygen, turbidity, and chlorophyll concentration.

Long-term observations from ONC instruments help us understand the dynamic earth-ocean system, and have wide-ranging policy applications supporting climate change mitigation, port security, and shipping, as well as ocean soundscape management.



Advancing ocean observing

From the three coasts of Canada to the Southern Ocean, ONC and its partners are expanding the reach of ocean monitoring to inform decisions that will shape the future of our blue planet.

ONC ocean data, available to all through the Oceans 3.0 data management portal, provides foundational knowledge that informs decisions on key opportunities and challenges. These include the advancement of climate solutions and innovation and job creation within Canada's emerging sustainable blue economy.

AI for ocean research and climate solutions

ONC is a partner in Canada's Ocean Supercluster's \$2.5-million **Building Bridges project** to accelerate the adoption of artificial intelligence (AI) in the ocean sector.

Launched in June 2024, and led by Dalhousie University in collaboration with CIOOS, the St. Lawrence Global Observatory, the Hakai Institute, and ONC, the project is tackling barriers to AI uptake by developing new machine intelligence tools and educational resources for Canada's ocean sector.

"Through our AI Strategy, our government is excited to support Canada's Ocean Cluster as it accelerates the adoption of AI solutions in our oceans. This strategic investment propels our ocean sector forward, fostering economic growth and reinforcing Canada's reputation as a global leader in the blue economy."

The Honourable François-Philippe Champagne,
Federal Minister of Innovation, Science and Industry in 2024.



From the ice rink to the deep sea

Hockey pucks are a staple in ONC's toolkit for maintaining our subsea observatories. Pucks are durable and serve as ideal grabbing points for the claws of remotely operated vehicles (ROVs) working deep underwater.

Holes are drilled through the center of each puck and mounted on rods attached to scientific instruments, allowing ROVs a way to grip, maneuver, and service these instruments. It's a uniquely Canadian twist on innovative ocean science!

Low-impact marine renewable energy

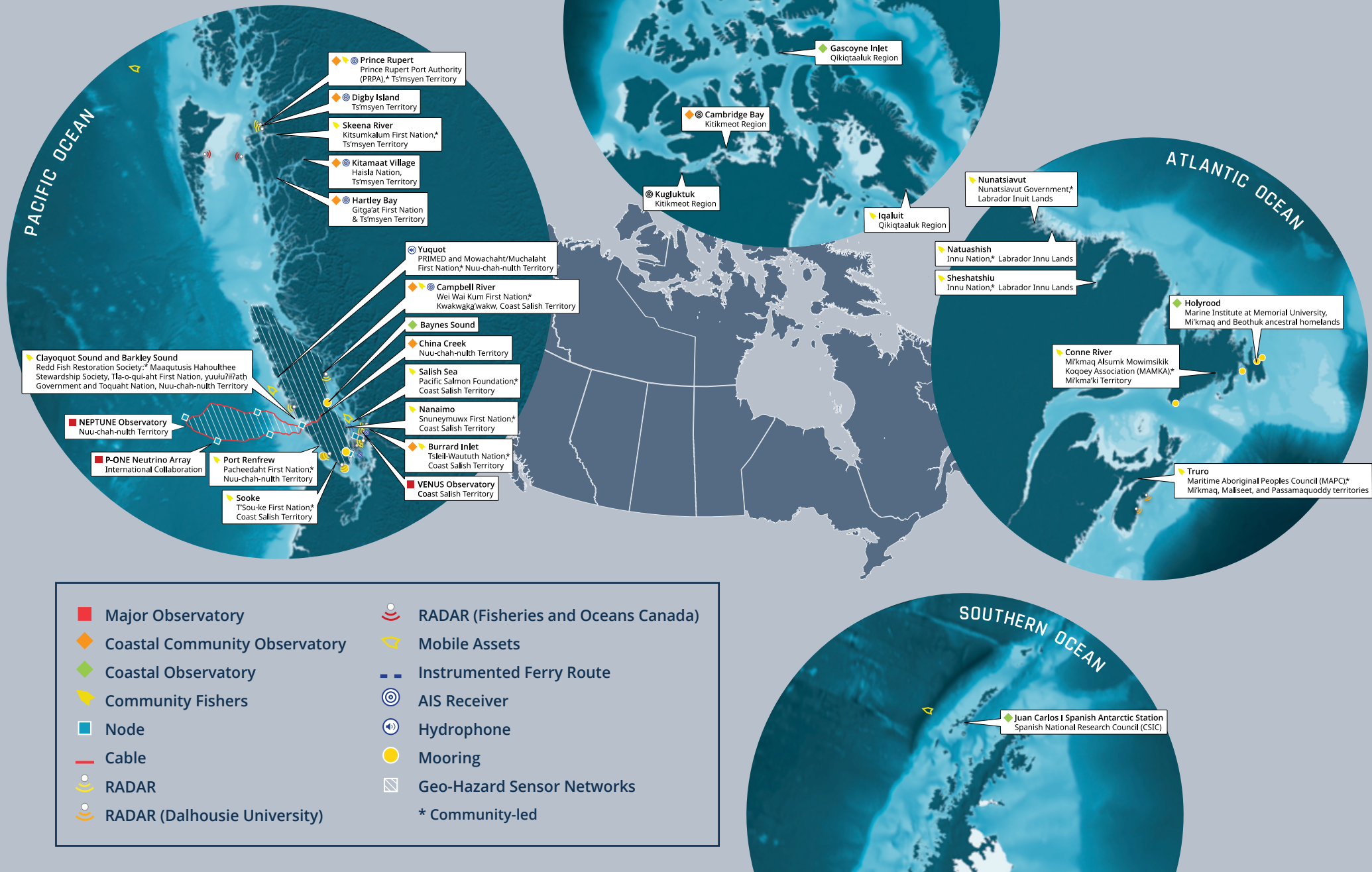
ONC is working with partners to advance marine renewable energy technologies on the British Columbia (BC) coast through acoustic monitoring projects that measure the impact of wave and tidal technologies on the surrounding environment.

From July to November 2024, the project partners—Mowachaht/Muchalaht First Nation, the UVic-led Pacific Regional Institute for Marine Energy Discovery (PRIMED), and ONC—deployed a hydrophone and acoustic doppler current profiler at a wave generator site near the Nation's centre, Yuquot, in Nootka Sound, to support research on the community's goal of using renewable energy sources.

The hydrophone was used to characterize the ambient soundscape and understand the marine mammal activities in the area. The dataset is now being processed and analyzed by ONC data specialists.

PRIMED and ONC will partner on a noise risk and soundscape assessment in fall 2025, to understand the impacts of a tidal energy test site in Blind Channel, BC.

ONC Infrastructure & Partnerships FY24/25





Northern Roots, Global Vision

There is one global ocean, and comprehensive ocean monitoring recognizes the interconnectedness of place, people, and perspectives.

Ocean Networks Canada's contribution to ocean science on a global stage was formally recognized by the United Nations in FY24/25.

Indigenous knowledge, coastal communities' observations, and scientific innovation all play a vital role in comprehensive ocean monitoring to advance a sustainable ocean future.

The science we need for the ocean we want: How ONC is supporting the United Nations Decade of Ocean Science for Sustainable Development (2021–2030)

ONC designated as UN Ocean Decade Implementing Partner

In March 2025, ONC was formally recognized as one of only two Canadian organizations to receive Decade Implementing Partner status for the United Nations (UN) Decade of Ocean Science for Sustainable Development (2021–2030) by the Intergovernmental Oceanographic Commission (IOC) of UNESCO (UN Educational, Scientific and Cultural Organization).

This designation highlights ONC's role over the next three years in contributing to global ocean observing efforts for a healthier, sustainable, and more equitable future for our planet.

The UN Ocean Decade provides a framework of 10 challenges under which scientists and partners commit to delivering solutions towards the 2030 Agenda for Sustainable Development.

ONC is leading and participating in **a range of endorsed UN Ocean Decade initiatives** that contribute to the overall framework.

ONC works closely with Fisheries and Oceans Canada to build a strong Canadian presence and leadership within the UN Ocean Decade.

"On behalf of the entire Ocean Decade Team, please accept my heartfelt congratulations on the formalisation of your role in the Decade. Together, let us work towards the ocean we want."

Vidar Helgesen, executive secretary of the Intergovernmental Oceanographic Commission (IOC/UNESCO) and assistant director-general of UNESCO, in a letter to ONC.



"ONC is a global leader in ocean observation, helping us better understand and protect our oceans. The recognition from UNESCO Ocean highlights the important role that Canadian research facilities play in addressing major scientific and societal challenges and in building a more sustainable future for our oceans. The Canada Foundation for Innovation/ Fondation canadienne pour l'innovation supports ONC, one of Canada's six national Major Research Facilities, through ongoing investments in National Research Facilities."

Claudia Fall, associate director for research facilities, Canada Foundation for Innovation.



Credit: Andy Casagrande / Ocean Image Bank.



UN Ocean Decade Conference—Barcelona

Presentations by ONC and its partners at the UN Ocean Decade in Barcelona in April 2024 marked a milestone in advancing leadership in ocean science and Indigenous partnerships.

ONC delegates participated in panel discussions, posters, and events, representing ONC's deep commitment to the goals of the decade.

At this international gathering of ocean stakeholders, ONC shared key outcomes from the UN Ocean Decade-endorsed project AIPOSS (Advancing Indigenous Partnerships in Ocean Science for Sustainability). AIPOSS is led by Ken Paul of the Wolastoqey Nation in partnership with ONC and the Ocean Frontier Institute, with support from Pisces Research Project Management and Fisheries and Oceans Canada (DFO). The goal of the project is to help establish a clear path towards tangible Indigenous-led solutions to ocean sustainability and change resilience, while advancing Indigenous leadership in ocean governance.

The conference in Spain also featured a screening of ONC's documentary **Tsunami 11th Relative**, offering a powerful platform to share Indigenous knowledge and perspectives on coastal resilience with a global audience. ONC's work fosters respectful partnerships with Indigenous communities and emphasizes the importance of two-way exchange between Indigenous knowledge systems and ocean science.

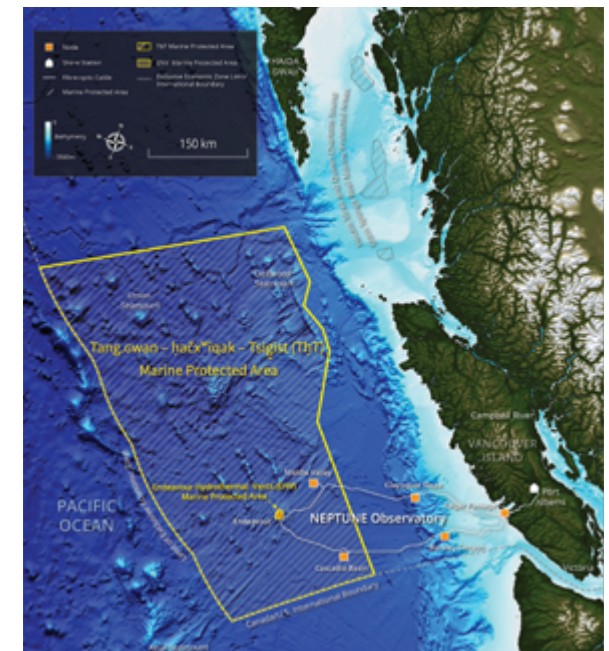
Above: ONC partner Ken Paul of the Wolastoqey Nation speaks at the 2024 Ocean Decade Conference in Barcelona, Spain.

Supporting Canada's marine protected areas

ONC welcomed the announcement in July 2024 of the Tang.gwan — ɥačxʷiqak — Tsigis (T̨t) Marine Protected Area (MPA), created by the Nuuchahnulth Tribal Council, the Council of the Haida Nation, Pacheedaht First Nation, the Quatsino First Nation, and the Federal government.

Covering 133,017 km² off BC's coast, the area includes ONC's deep-sea NEPTUNE observatory sites at Endeavour, Cascadia Basin, and Middle Valley. ONC's real-time monitoring supports conservation of seamounts and hydrothermal vents in this biodiverse region.

ONC continues to work closely with DFO and First Nations to follow regulatory processes when conducting these scientific activities within the T̨t that are improving our understanding of this rich biodiverse area. ONC supports Canada's commitment to protect 30% of its ocean area by 2030, and Canada's Ocean Protection Plan.



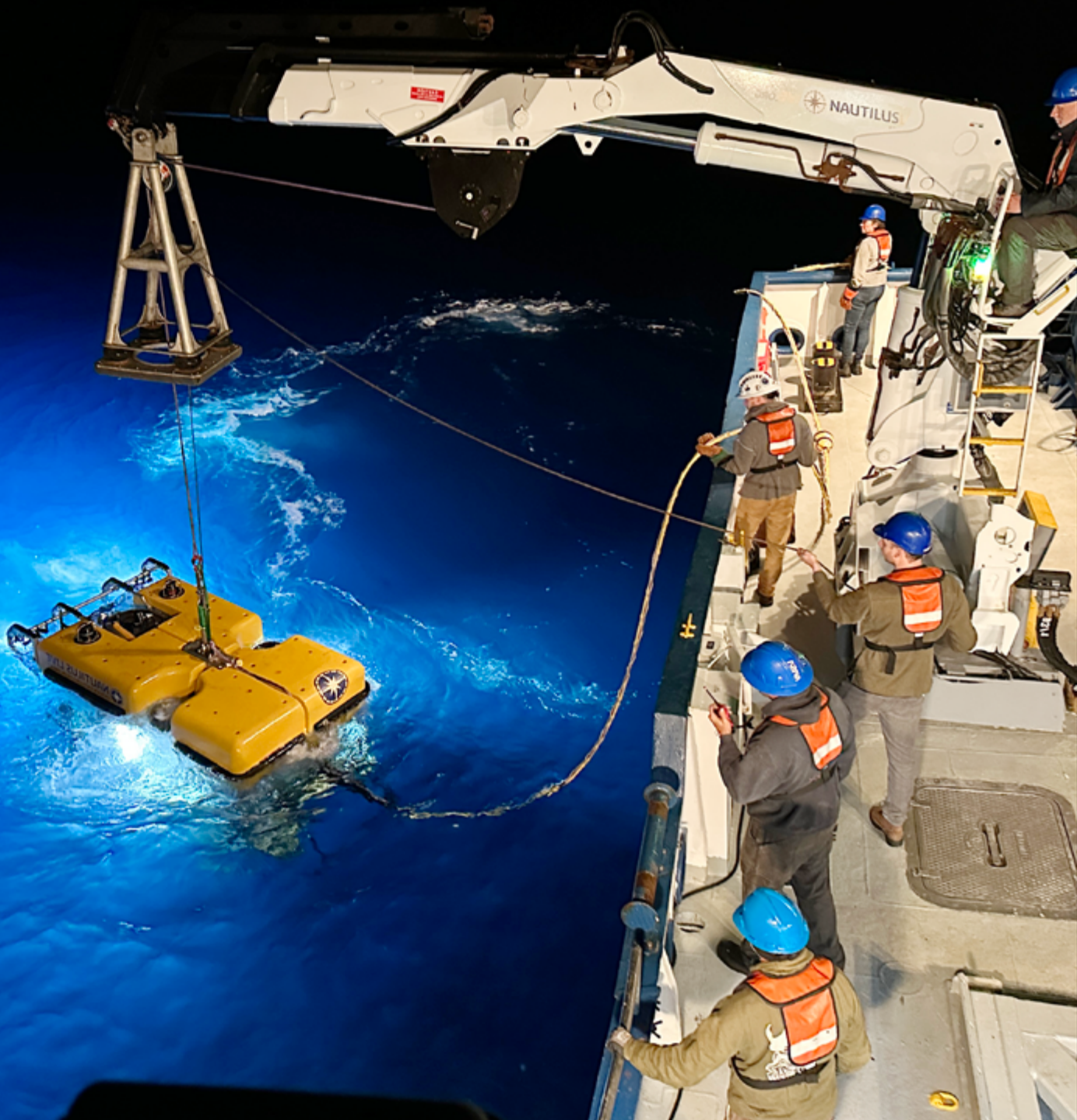
Three NEPTUNE observatory sites are now within Canada's new MPA, Tang.gwan — ɥačxʷiqak — Tsigis.

Expeditions

ONC expeditions maintain and upgrade its major cabled Pacific subsea observatories, VENUS and NEPTUNE, and conduct ocean-based scientific research.

In collaboration with industry and scientific partners, ONC engineering and technical teams deploy remotely operated vehicles to install, connect, and recover instrument platforms and sensors. Scientific samples are also collected.

Integrated with ONC's advanced digital infrastructure, this complex ocean observing network enables real-time monitoring, continuous data collection, and the testing of next-generation ocean technologies.



ONCabyss ocean expeditions

Explore highlights from three ONC-led expeditions in FY24/25 to maintain our Pacific Ocean major seafloor observatories—NEPTUNE and VENUS—located up to 300- kilometres off British Columbia's coast, and at depths ranging from 100 to 2,660 metres.

Maintenance operations were conducted from a ship using a remotely operated vehicle (ROV) equipped with robotic manipulators, sensors, lights, and cameras.

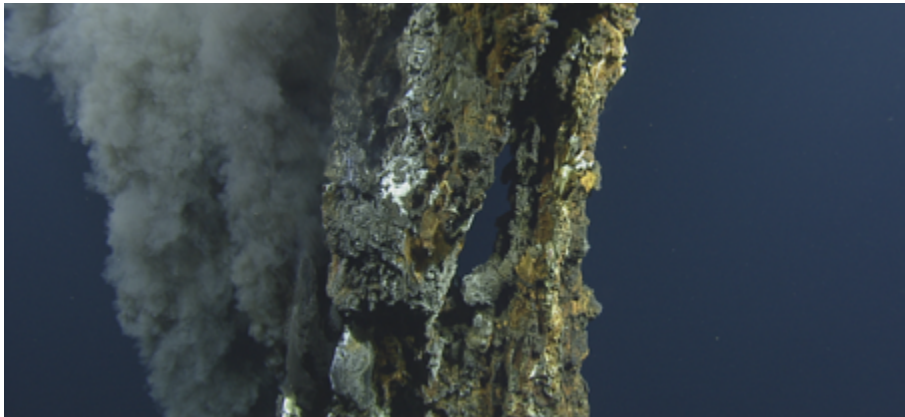
These dives were live-streamed, with highlights shared on social media, enabling ocean enthusiasts around the world to join ONC's undersea operations.

Discover the beauty of these sites—from the smoking hydrothermal vents of Endeavour and Middle Valley, to the vast plains of Cascadia Basin, and the rich biodiverse ecosystem of Barkley Canyon—in ONC Expedition StoryMaps.



DID YOU KNOW?

The fluid expelled by the Endeavour hydrothermal vents can reach temperatures exceeding 300°C. During expeditions, scientists sample this extreme environment to study the unique ecosystems these vents support.



Left facing: ROV Hercules deployed from exploration vessel (E/V) Nautilus in an evening dive during the ONCabyss Summer 2024 Expedition. Above: An Endeavour hydrothermal vent tower. Credit: ONC/Ocean Exploration Trust.



Top right: Map of sites within ONC's NEPTUNE and VENUS observatories. Above: ROV Mantis deployed from the M/V Canpac Valour during ONCabyss Fall 2024 Expedition.

ONCabyss Expeditions



Summer 2024 June 6-27

Fall 2024 October 4-12

Spring 2025 March 18-24



(L-R) ONC's Steve Mihaly, senior staff scientist and A.J. Baron, field services manager, in the E/V *Nautilus* control room.



This 21-day expedition to maintain the 800+ kilometre NEPTUNE observatory aboard the E/V *Nautilus* marked the eighth year of partnership between ONC and Ocean Exploration Trust (OET).

Highlights:

- mapped **692 square kilometres** of seafloor
- laid **3,169 metres** of new fibre-optic cable at Cascadia Basin in a dual ship operation with cable ship (C/S) *Cable Innovator*
- completion of **19 dives** and **265 hours** of operations by ROV *Hercules*
- connected with **2,190 ocean learners** with the expedition team at-sea via the Ship2Shore program

[Link to Storymap](#)



(L-R) Canpac Marine Services CEO Ryan Anderson and Josh Tetarenko, director of ROV operations, with ONC executive director of observatory operations, Meghan Paulson.



ONC partnered with the Canadian company Canpac Marine Services for an eight-day expedition aboard the motor vessel (M/V) *Canpac Valour* to maintain NEPTUNE and the inshore observatory, VENUS. This expedition was also the first deep-sea trial for Canpac's new, purpose-built for science ROV *Mantis*.

Highlights:

- completed **six operational dives** and **24 hours** of underwater work by ROV *Mantis*
- recovery in Saanich Inlet of a hefty instrument platform (**512 kilograms** in water, **823 kg** on land)
- recovery of ONC's wave glider, following its month-long mission measuring seafloor tectonic movements

[Link to Storymap](#)



ONC staff, Stef Mellon, scientific data specialist, and Morgan Charlton, project engineer (EIT), collecting a water sample.



ONC sailed on the M/V *Canpac Valour* with Canpac Marine Services to maintain NEPTUNE and VENUS in what originally was a 10-day expedition. Rough seas and three-metre swells offshore cut the expedition short, but the at-sea team completed many key operational tasks.

Highlights:

- recovery, servicing, and redeployment of Saanich Inlet instrument platform
- recovery of the Delta Dynamics Lab mini-node
- completed underwater survey of seafloor pockmarks near the Fraser Delta

[Link to story](#)

Top of page: A skate (*Bathyrhaja* genus) recorded by ROV *Hercules* during the ONCabyss Summer 2024 expedition livestream. Credit: ONC/OET.

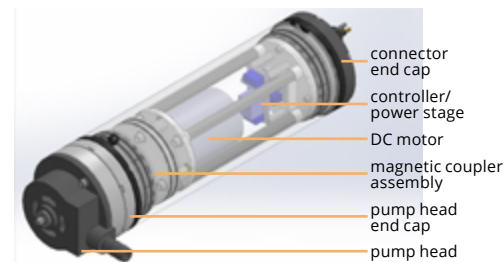
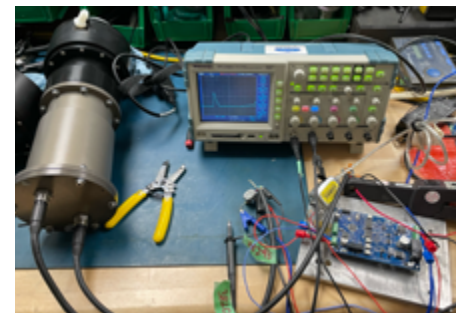
ONC's "super pump" innovation

A key challenge of oceanographic monitoring is biofouling—the buildup of marine life and debris on scientific instruments that can block scientific sensors and interfere with data collection and transmission.

Introducing the ONC-designed technological solution—the "super pump"—which was deployed during ONCabyss 2024 expeditions to ensure reliable instrument performance and data collection. The pump's cleaning prowess is especially important for CTD (conductivity, temperature, depth) instruments at murky nearshore sites such as Folger Deep, and on the VENUS observatory.

CTDs pump seawater through narrow tubes to measure salinity and other variables. Over time, snails, algae, and debris can clog these cells, disrupting data collection. The "super pump" tackles this problem by automatically flushing water in reverse through the CTD once a week (and on demand if needed), dislodging anything stuck inside.

ONC marine equipment specialist Ruchie Custan presented the pump at the OCEANS conference in Halifax, Nova Scotia in September 2024. Version 3 of the super pump is under development as part of ONC's ongoing commitment to develop world-leading ocean products.



Left: Ruchie Custan, ONC marine equipment specialist, with the ONC-designed "super pump". Above: Assembling the "super pump". Bottom: Inside view.

Supporting Canadian science at sea

NEPDEP 2024 expedition August 13–September 2

ONC was proud to again support Fisheries and Oceans Canada's (DFO) annual Northeast Pacific Deep-sea Expedition (NEPDEP) expedition—now a UN Ocean Decade-endorsed project—to monitor Canada's marine protected areas. This 2024 expedition marked seven years of ocean exploration with DFO and the Council of the Haida Nation, Nuu-chah-nulth Tribal Council, and Pacheedaht First Nation.

ONC provided data services, including streaming and archiving ROV live dive footage during the expedition via SeaTube. In addition, ONC facilitated eight Ship2Shore events, connecting youth in Port Alberni, Victoria, Old Massett, Skidegate, Seattle, and Vancouver to the at-sea scientists; altogether, 295 participants were involved.



Background image: Bubblegum coral (*Paragorgia arborea*) and squat lobsters (*Sternostylus iaspis*) identified during the 2024 NEPDEP Expedition. Credit: CSSF-ROPOS/DFO. Left: (L-R) DFO's Georgia Clyde and Cherisse Du Preez connect with an ONC-hosted onshore audience during a 2024 NEPDEP expedition Ship2Shore event. Credit: Toby Hall, DFO. Above: Haida Gwaii community members and ONC staff connect with scientists onboard the 2024 NEPDEP expedition during a Ship2Shore event.

Services & Solutions

From safer coastal communities to climate solutions, ONC is advancing ocean science to inform the decisions that will shape our future.

ONC delivers long-term and near real-time ocean intelligence and data products used by governments, industry, academia, and coastal communities.

ONC ocean data and services are empowering evidence-based action on climate change mitigation, ocean health and sustainability, coastal resilience to earthquakes and tsunamis, innovation in Canadian ocean technology, and growth in the blue economy.

ONC's observatories support research into ocean-based carbon removal by providing real-time monitoring, reporting, and verification services

Solid Carbon receives \$24M to advance ocean-based carbon dioxide removal

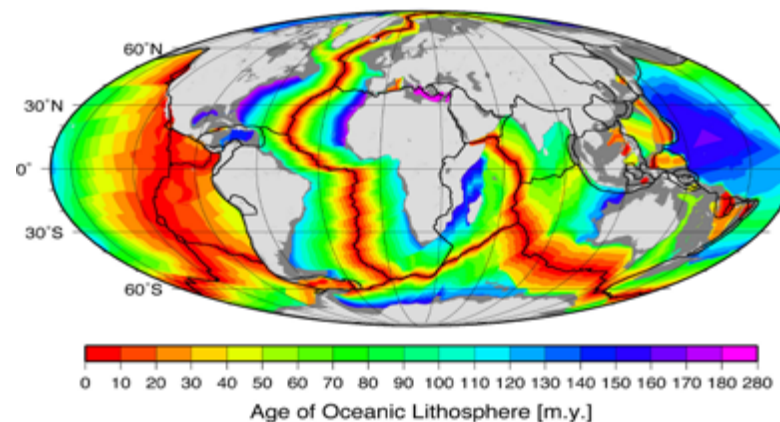
One of the world's most promising climate solutions took a major step forward in FY24/25, with the Government of Canada's \$24-million investment over six years in the UVic-led Solid Carbon ocean-based carbon dioxide (CO₂) removal project.

Solid Carbon was among six initiatives awarded funding under the **New Frontiers in Research Fund (NFRF) Transformation stream**. The project has been researching how deep ocean basalt can permanently and safely store CO₂ by converting it into solid rock through mineralization.

This negative emissions technology will utilize ONC's world-leading subsea cabled observatory, NEPTUNE, to provide 24/7 real-time monitoring, publicly accessible through the internet.

Next steps for the trans-disciplinary project team include ongoing research, public consultation with coastal and Indigenous communities, and a small-scale demonstration.

Solid Carbon will continue to work closely with Fisheries and Oceans Canada and local First Nations to follow regulatory processes when conducting scientific activities within the Tang.gwan – ȩačxwiqak – Tsig is Marine Protected Area.



Ocean basalt throughout the world ocean. Red colour is young ocean basalt which is ideal for reaction with CO₂ to form rock. Source: Müller, R.D., M. Sdrolias, C. Gaina, and W.R. Roest 2008. Age, spreading rates and spreading symmetry of the world's ocean crust, *Geochem.*

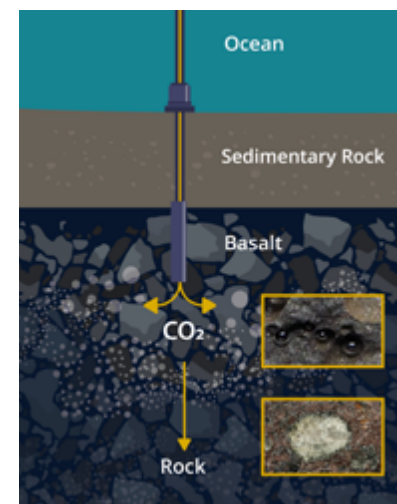


A core of basalt rock showing carbonate mineral deposits.

Credit: CarbFix.

"Solid Carbon has the potential to leverage the world's largest reservoir for carbon dioxide sequestration, ocean basalt, to combat the climate crisis and lay the foundation for a Canadian-led sustainable solution."

Kate Moran, ONC president and CEO, and principal investigator for Solid Carbon.



Solid Carbon: turning carbon dioxide into rock as a permanent, stable, and safe climate solution.



Preserving maritime heritage with NOAA

ONC expanded its services to include maritime archeology in FY24/25, with the hosting of rare underwater archaeological sites from World War II on its video data and annotation tool, SeaTube.

In partnership with the National Oceanic and Atmospheric Administration (NOAA) and Ocean Exploration Trust (OET), 73 hours of visual surveys of historic shipwrecks from the Battle of Midway in the Central Pacific Ocean are now publicly available on SeaTube. The surveys allowed the international scientific community to collaboratively annotate these important historical wrecks, along with those from the Great Lakes (Thunder Bay National Marine Sanctuary).

Since 2016, ONC has partnered with NOAA to integrate SeaTube into its ocean exploration cruises.

Left: Historic Battle of Midway shipwrecks, captured during ROV visual surveys, available on SeaTube. Credit: OET/NOAA.

"Making video data more accessible, usable, and valuable is a primary objective for NOAA Ocean Exploration archaeology. SeaTube has allowed many contributors to record observations on USS Yorktown, Akagi, and Kaga from wide perspectives, disciplines, and expertise."

Phil Hartmeyer, marine archaeologist at NOAA Ocean Exploration.



USS Yorktown (CV-5)
Credit: Naval History & Heritage Command

Watch a video of these surveys of deep ocean heritage sites on SeaTube that contribute to the evolving discipline of maritime archaeology.

Safer coastal communities

Earthquake early warning system

ONC is working with operators of major infrastructure in British Columbia on the integration of its real-time Earthquake Information Messaging System (EIMS) to help protect lives and infrastructure. Operators can sign up for ONC's automated messages that detail earthquake shake arrival times, location, and intensity. This information can be used to activate safety measures before ground shaking arrives and reduce earthquake risks to the public.

Live data from ONC's land-and-seafloor seismic sensor network is also available for integration into **the Canadian Earthquake Early Warning** system and the US Pacific Northwest Seismic Network.

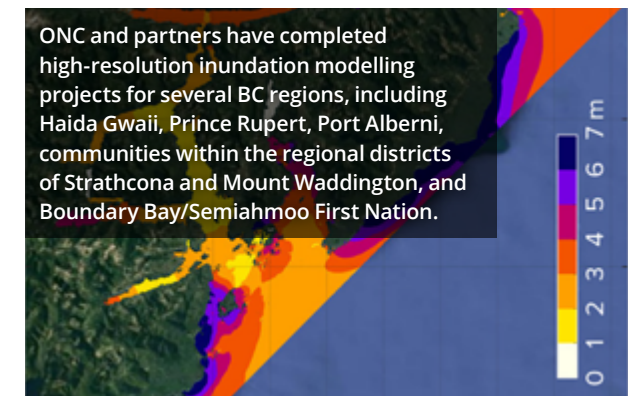
The EIMS has been tested and fully operational since 2023, with operator subscription available since 2024.

Mitigating tsunami risk for Kitimat and Kitimaat communities

ONC's inundation modelling services are helping coastal communities in British Columbia improve their resilience to natural hazard events, including tsunamis, storm surge, and sea-level rise due to climate change. In January 2025, the District of Kitimat, in partnership with the Haisla First Nation, contracted ONC and PSG Ocean Inc. to undertake a one-year tsunami risk assessment that will:

- **model and map tsunami hazards**, including an open ocean event and a landslide-generated event within Douglas Channel
- **identify risks** to populations, critical infrastructure, and areas of cultural/historical value
- **recommend strategies and investments** to enhance emergency preparedness and improve public outreach

By integrating seafloor and land geographic mapping into sophisticated propagation models, ONC will identify tsunami characteristics, including current speed (velocities) and direction, height (amplitudes), inundation extents, arrival times, and duration of tsunamis. Consultation with community members and Indigenous knowledge holders will also inform evacuation routes and risk reduction initiatives.



ONC and partners have completed high-resolution inundation modelling projects for several BC regions, including Haida Gwaii, Prince Rupert, Port Alberni, communities within the regional districts of Strathcona and Mount Waddington, and Boundary Bay/Semiahmoo First Nation.

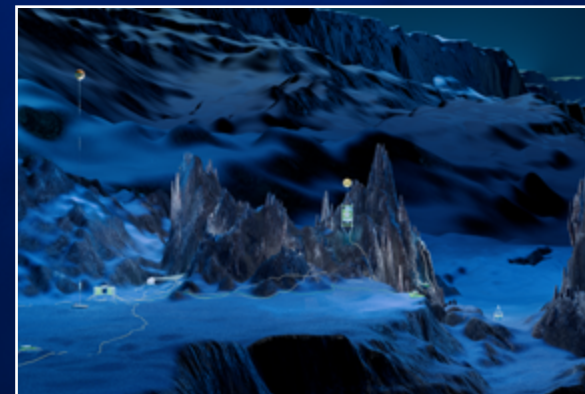
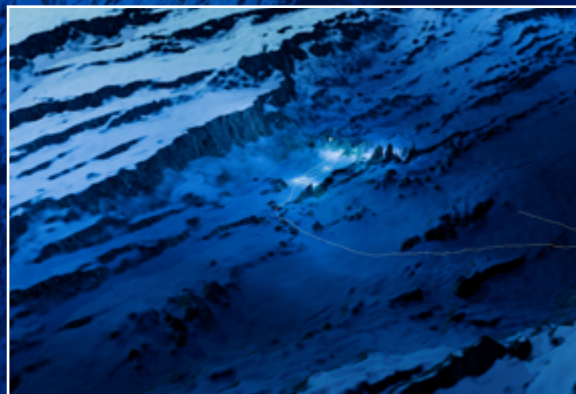
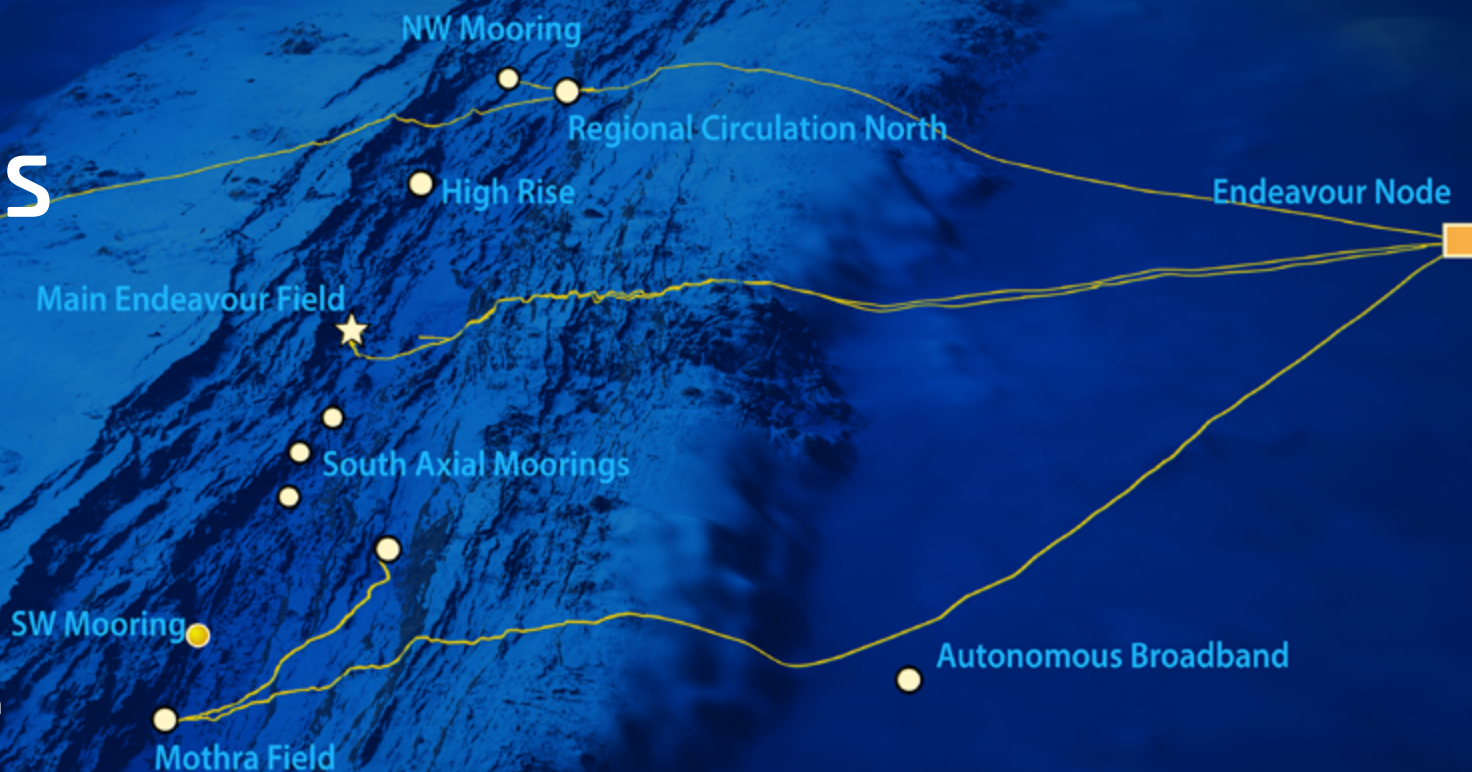
Scientific Discoveries

ONC's deep-sea and coastal observatories represent the widest range of environments of any ocean observing infrastructure on Earth.

Thousands of seafloor instruments advance scientific research, and provide a real-time window into how the ocean is changing over hours, days, seasons, and decades.

These observatories support research on complex Earth processes in ways not previously possible.

Researchers can access ONC data, instruments, and cameras from anywhere in the world via ONC's data management portal Oceans 3.0.



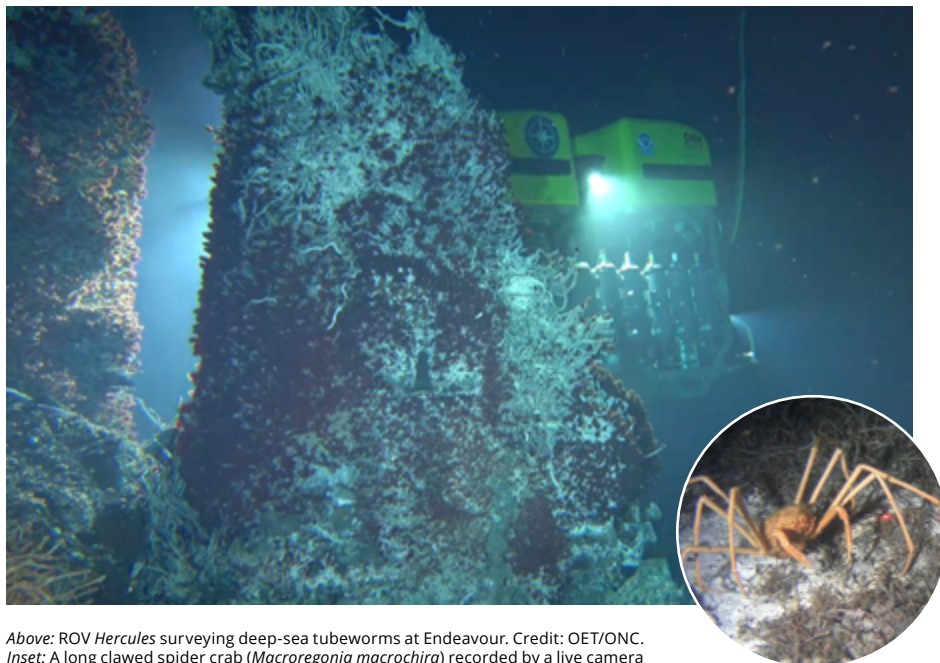
ONC scientific highlights

Eyes on Endeavour

Tens of thousands of people became new users of ONC's Oceans 3.0 data portal in FY24/25, in part due to interest in the increased seismic activity at the Endeavour segment of the Juan de Fuca Ridge that could foreshadow a rare tectonic event.

The detection (via seismometers/hydrophones) of more than 200 earthquakes an hour in March 2024 was ONC's biggest news story in FY23/24, reaching more than 668 million people around the world. ONC also hosted an Endeavour workshop for the scientific community in November, to plan technology and priorities for how to best observe this once-in-a-lifetime type tectonic event, as well as to strategize for the next decade of observations within this marine protected area.

ONC, DFO, and other key partners are developing a rapid response plan, including sampling equipment and protocols, to monitor the potential large-scale geological event. ONC is also planning densification of its existing sensor network to observe the dynamic changes in geology, chemistry, and biology anticipated at Endeavour where tectonic plates are diverging and new oceanic crust is forming: a rare phenomenon that is not considered a risk to coastal communities.



Above: ROV Hercules surveying deep-sea tubeworms at Endeavour. Credit: OET/ONC.

Inset: A long clawed spider crab (*Macroporegonia macrochira*) recorded by a live camera deployed at NEPTUNE's Endeavour site.

Left facing: This seafloor model, constructed from multibeam surveys, shows NEPTUNE's Endeavour site infrastructure distributed along a 10 km stretch of the rift axis of the Juan de Fuca Ridge. Insets: Bathymetric view of the Main Endeavour Field site using data from ship and ROV-based surveys. Image Credit: Jeff Samson and Caroline Lee, ONC GIS specialists. Data credit: ONC (2024), MBARI (2014), and (for the inset) Ocean Exploration Trust (2024). (Instrumentation not to scale).

Introducing ONC Director, Science, Kohen Bauer



"My mantra: be useful." Biogeochemist Kohen Bauer has brought a visionary leadership style grounded in pragmatism since taking the helm of the ONC science team in FY24/25, with a focus on delivering science that serves humanity and shapes a better future.

High among those priorities is advancing ocean-based climate solutions that can help turn the clock back and slow Earth's acceleration towards catastrophic climate change. His own research supports interdisciplinary projects related to marine biogeochemical cycling, ocean acidification, ocean deoxygenation, and climate dynamics in past, present, and future scenarios. This fiscal year saw the release of his [lead-authored Nature paper](#) that identified a historical Early Cretaceous climate warming threshold that, when crossed, led to widespread and persistent ocean deoxygenation, with lessons that can be applied to today's warming trends.

Bauer recognizes the importance of science communications in not only sharing the wonders of the ocean, but also in ensuring informed decision-making across the broad range of scientific disciplines that his team supports. Above all, Bauer strives to be an approachable and reliable collaborator, seeking to optimize ONC's contribution to the broader Canadian and global scientific communities in the collective pursuit of advancing knowledge that benefits science, society, and industry.

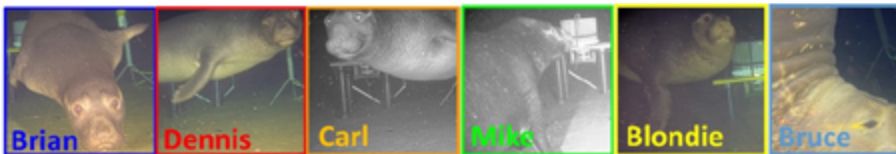
Subsea cameras—a window to another world

Meet "The Beach Boys"

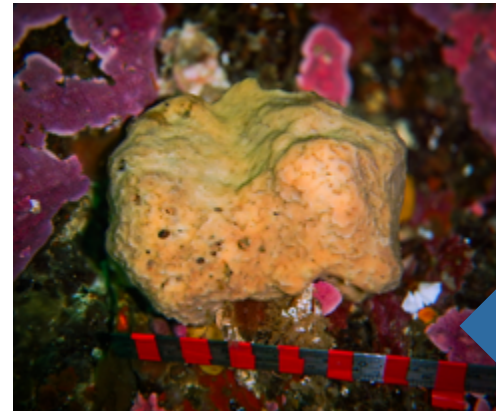
Northern elephant seals were repeatedly captured on camera (and detected by hydrophones) using sonar at ONC's Barkley Canyon site as a dinner bell to forage for fish in the deep Pacific Ocean.

The research study published in the *PLOS One* journal in 2024 provides a first-ever glimpse into the elusive mammals' deep subsea behaviours, sophisticated feeding strategies, prey preferences, and resting habits between 2022 and 2023.

Co-author and ONC senior scientist Fabio De Leo says NEPTUNE's **real-time monitoring capacity** allowed the researchers to better position the site's video camera and imaging sonar (being used for a separate fish acoustics study) to observe the surprise visitors—no mean feat considering it was 100 kilometres offshore and nearly a 1,000 metres beneath the surface. (*Research team: UVic, University of Miami, and Instituto de Ciencias del Mar*).



The frequent elephant seal visitors, named after the band, The Beach Boys.



"Observatories equipped with cameras enable us to document species' behaviour in situ and monitor environmental changes over both short and long terms. They are a key resource to support ecosystem health assessment and develop strategies for protecting marine environments."

Paulo Corrêa, ONC staff scientist, co-author of the "Belinda" study.

A sea-sponge stakeout

Rare footage from ONC's seafloor cameras off the British Columbia coast captured a resilient sea sponge's behavioral responses to its changing environment over four years—the longest continuous recording of these ancient but remarkably active animals in the wild.

The baseball-sized sponge, nicknamed "Belinda" by the researchers, was recorded by an eight-camera array and scientific instruments at the NEPTUNE Folger Pinnacle site. In a 2024 study in **Marine Ecology Progress Series**, they observed the sponge's changes in size, shape, and colour, and its daily "sneeze-like" contractions as it shrank prior to winter hibernation and during the marine heatwave, the Blob, between 2013 and 2016.

The study provided insight into the impact of conditions, such as water quality and temperature, both of which are affected by climate, according to the research team from the University of Alberta, UVic, and ONC.

Above: Belinda the "sneezing" sea sponge.

Baynes Sound monitoring partnership

ONC partners with the Hakai Institute's Ocean Acidification Program on the collection and analysis of discrete water samples at the Baynes Sound observatory—an important site for BC shellfish aquaculture. Using Hakai-provided kits, ONC gathers samples for laboratory analysis of key ocean acidification indicators. These samples help validate observatory data, ensuring more reliable monitoring of ocean conditions.



Advancing ocean observing with Argo

ONC's contribution to the international Argo program advanced significantly in FY24/25 with the deployment of six NKE Deep ARVOR floats in the Northeast Pacific, expanding its active fleet to 15, including two in the Southern Ocean.

Capable of profiling to depths of four kilometres, ONC's floats completed 570 ocean interior profiles by May 2025. Argo oxygen data is proving increasingly valuable for tracking the spread of low-oxygen zones in the Northeast Pacific—particularly in deep water masses affected by climate change.

ONC's collaborations with Argo Canada, the Canadian Biogeochemical Argo Initiative, and researchers across the world continue to unlock new avenues of scientific discovery and deepen our understanding of the changing ocean.

ONC deep floats trajectories since deployment in the NE Pacific and Southern Ocean.

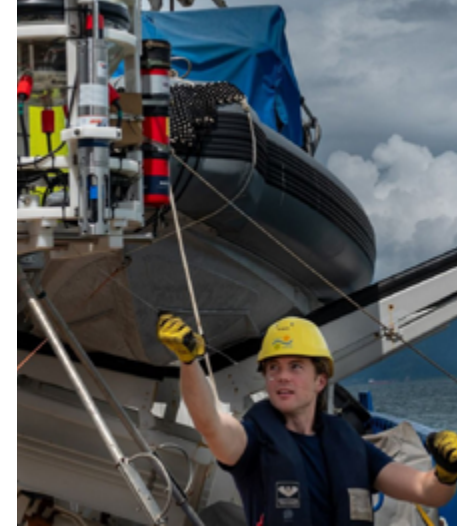
Roy Hyndman awardees dive into ocean soundscapes

Two recipients of the 2024 Roy Hyndman Ocean Observing Award utilized acoustic data from several locations on the 800-km loop NEPTUNE observatory to understand the soundscapes of vastly different deep ocean environments.

These annual awards, valued at \$20,000 each, support graduate students' research using ONC ocean data and/or technology, in collaboration with ONC experts.

Dalhousie University PhD student **Brendan Smith** (top-right) analyzed passive acoustic data from hydrophones at the Main Endeavour Field, along with other sensors, to characterise the soundscape of deep-sea hydrothermal vent fields. Combining video footage and seismic information, he created a ground-truth dataset for comparing acoustic signals with hydrothermal vent activity. This work contributed to Smith's successful application for a High Level Scientific Fellowship in France.

Closer to the coast, UVic MSc candidate **Brittanie Spriel** (right) combined visual surveys and acoustic monitoring to study kelp forests in Barkley Sound. Leveraging ONC data from the China Creek node and Folger Deep Station and from hydrophones in Barkley Sound, Spriel showed denser kelp areas were quieter, likely due to kelp dampening sound, and louder sites hosted more sound-producing species like rockfish. Spriel's study also detected species missed by visual surveys, highlighting how bioacoustics can enhance biodiversity monitoring and offer new insights into how underwater habitats shape acoustic environments.

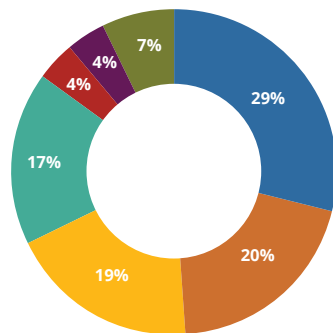


Scientific publications using ONC data, 2024

By the numbers

- **90** Peer-reviewed journal articles
- **10** Professional trade/industry publications
- **2** Monographs, books, or book chapters
- **71** Conference presentations and posters
- **21** Abstracts, references, theses and published data sets

Diversity of publications



- **Data science**
- **Advancing deep ocean observing**
- **Ocean soundscapes**
- **Natural hazards**
- **Hot and cold vent dynamics**
- **The coastal ocean**
- **Others**



Published research highlights

Sensors on BC Ferries capture 2020 spring bloom in Strait of Georgia

Advancing technologies for deep-sea cosystem restoration

Investigation into Western Canada earthquake magnitude discrepancies by reporting agencies

Underwater sound classification using learning-based methods

Detecting ocean seismicity and temperature using seafloor acoustic sensing



Community-based Monitoring

ONC is growing its network of installations and partnerships with Indigenous and coastal communities on the three coasts of Canada.

These community-led observatories and programs connect oceanographic instruments, training, and scientific support with traditional knowledge and stewardship built over generations.

Ocean monitoring partnerships between ONC and communities support local needs, marine protection, and Indigenous coastal leadership, and are transforming how ocean science and data sovereignty intersect on the coasts of Canada.

From coast, to coast, to coast—valued partnerships to advance ocean observing

Increasing geographic monitoring via ONC's Community Fishers Program

Community Fishers partners are monitoring—by boat, snowmobile, and helicopter—their local ocean conditions and marine habitat at over 494 sampling sites on the three coasts of Canada. The water column data they collect, including seawater temperature, oxygen, and salinity, provide insight into climate impacts and environmental changes, and support local ocean stewardship initiatives.

In FY24/25, eight new coastal communities and Indigenous partners joined the program in Newfoundland, on the Labrador coast, and in British Columbia. Supported by DFO's Ocean Management Contribution Program, ONC provided the CTD scientific instrument and data transmitter, hands-on training, project support, and data management services. Participants in this training can be certified through UVic Continuing Studies and the United Nations Institute for Training and Research (UNITAR).

Below: Instrument training with Guardians (L-R) Cool Cliffe, Jordan Labbe, and Joey Henderson from the Wei Wai Kum First Nation, which joined the Community Fishers Program in August 2024, to support its ocean stewardship goals.

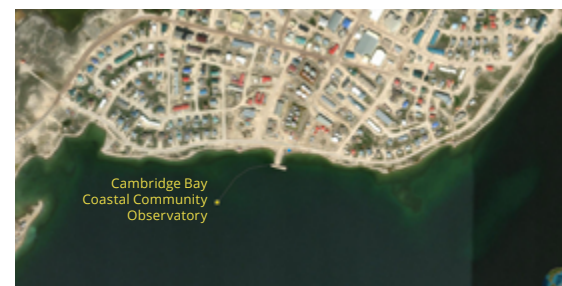


Prince Rupert coastal community observatory flipbook.

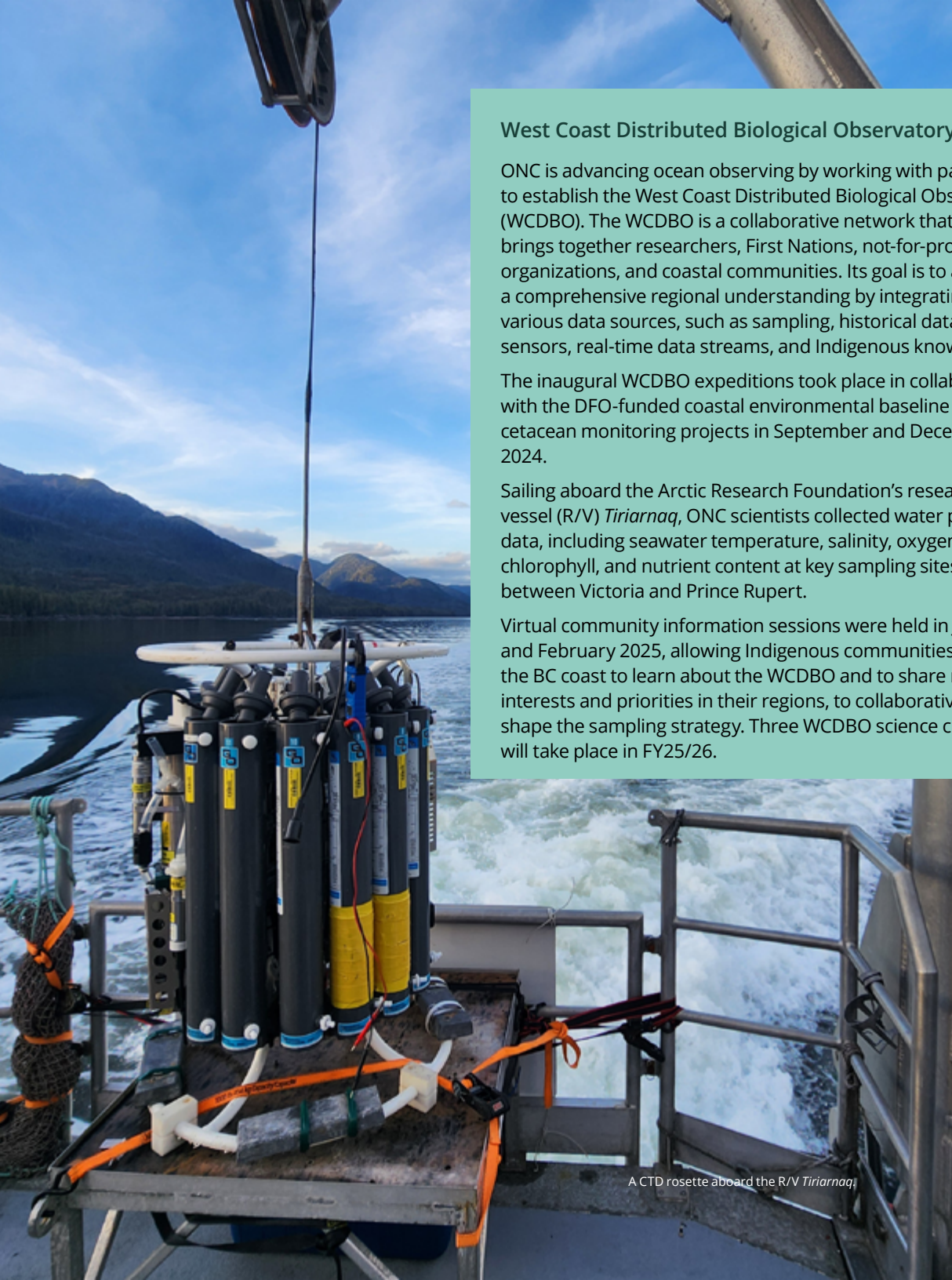
Engaging with coastal communities

New displays showcasing local coastal community observatories were installed in FY24/25 at the North Coast Ecology Centre in Prince Rupert, BC, and the Canadian High Arctic Research Station in Cambridge Bay, Nunavut. These installations are designed to engage communities, promote ocean literacy, and highlight the role of Indigenous-led monitoring in coastal stewardship.

Each display includes a 3D-printed model of the observatory; a flipbook explaining its sensors; ONC's "Know the Ocean" children's activity books; retired sensors for hands-on exploration; and an interactive touchscreen with a customized ArcGIS StoryMap featuring observatory data and community engagement highlights.



Explore the [Cambridge Bay StoryMap](#) that celebrates ONC's valued partnership with the community.



West Coast Distributed Biological Observatory

ONC is advancing ocean observing by working with partners to establish the West Coast Distributed Biological Observatory (WCDBO). The WCDBO is a collaborative network that brings together researchers, First Nations, not-for-profit organizations, and coastal communities. Its goal is to achieve a comprehensive regional understanding by integrating various data sources, such as sampling, historical data, optical sensors, real-time data streams, and Indigenous knowledge.

The inaugural WCDBO expeditions took place in collaboration with the DFO-funded coastal environmental baseline and cetacean monitoring projects in September and December 2024.

Sailing aboard the Arctic Research Foundation's research vessel (R/V) *Tiriarnaq*, ONC scientists collected water property data, including seawater temperature, salinity, oxygen, chlorophyll, and nutrient content at key sampling sites between Victoria and Prince Rupert.

Virtual community information sessions were held in January and February 2025, allowing Indigenous communities along the BC coast to learn about the WCDBO and to share marine interests and priorities in their regions, to collaboratively shape the sampling strategy. Three WCDBO science cruises will take place in FY25/26.

A CTD rosette aboard the R/V *Tiriarnaq*



A vessel of opportunity

In FY24/25, Geneviève Tanguay, vice-chief science advisor of Canada, joined the ranks of citizen scientists who are helping to monitor climate impacts and environmental changes in the ocean. **Dr. Tanguay's journey** to collect oceanographic data, which extended from the St. Lawrence River into the Gulf of the St. Lawrence and along the Atlantic Coast of Canada, helped expand the geographic reach of ONC's Community Fishers Program.

Above: Dr. Geneviève Tanguay preparing to cast a CTD. Credit: Paul Gaudreau.

Visualizing seasonal shifts with ONC's new data product

A new interactive data product, available on Oceans 3.0, enables users and community members to visualize seasonal shifts in key environmental variables, like sea surface warming and phytoplankton blooms.

This animated data profile plot uses data from community driven sampling and was developed with local input. This was supported by funding from Fisheries and Oceans Canada (DFO) Ocean Management Contribution Program.

The tool supports data sovereignty by clearly identifying data ownership in the metadata. Two additional data products are under development with a planned 2025 release date.



Knowledge & Learning

ONC partners with Indigenous communities and other organizations to develop and deliver educational programs that spark curiosity, build capacity, and advance ocean knowledge.

These education programs equip and empower learners using science, technology, engineering, arts, and mathematics (STEAM) and are delivered in settings from classrooms to communities.

ONC's programs engage learners from K-12 to graduate school, professionals, and community members—helping to build the next generation of ocean leaders.



Connecting people with the ocean

ONC and Actua, a leading Canadian STEM outreach organization, co-create ocean-based educational resources for youth and educators in northern, remote, and Indigenous communities. Here, youth in Arctic Bay, NU, enjoy the hydrothermal bubbler demonstration, part of the "Hybrid-ROVs and Hydrothermal Vents" activity during the 2024 Actua summer outreach camps. Credit: Actua.



DID YOU KNOW?

Earth's surface is 70% ocean. Only 5% of the ocean has been explored. ONC is helping us #KnowTheOcean.

"Activities like these ignite the spark for youth to see the vast and exciting opportunities in ocean sciences, from operating ocean robots to understanding marine ecosystems and more."

Lauren Hudson, ONC K-12 education coordinator.

ONC supports the Indigenous-led *Polar Prince* expeditions

ONC joined a 13-day ocean expedition led by the Miawpukek First Nation aboard Horizon Maritime's *Polar Prince* in June 2024; the first Indigenous-led ship-based science expedition on the south coast of Newfoundland.

ONC worked with youth from the Miawpukek First Nation, Qalipu First Nation, and Junior Canadian Rangers to explore marine technology and science careers during the voyage through culturally significant fjords and waterways from Stephenville and the South Coast Fjords, to the Bay d'Espoir, and the Funk Island Marine Protected Area.

ONC will be a partner in the Miawpukek First Nation-led ocean science expedition aboard *Polar Prince* in summer 2025.

Right: Wylee Fitz-Gerald, ONC post-secondary education coordinator, trains youth participant DJ Hollett to use a CTD during the 2024 *Polar Prince* expedition. Credit: Fred Cattroll, Royal Canadian Geographical Society Photo.



Inspiring curiosity, supporting community

ONC is a proud supporter of **Ocean Week Victoria**, **Ocean Week Campbell River** (June 1–9, 2024), and **Ocean Week Canada**, three community driven efforts to celebrate **World Ocean Day** (June 8) with events across Canada.

Collaborating with two dozen community groups on the planning and promotion of 20+ events, ONC engaged with more than 1,000 community members about the wonders of ocean exploration and science. ONC also connected with residents in Victoria from aboard the E/V *Nautilus* during the 2024 ONCabyss Summer Expedition via a live-streamed Ship2Shore event.

For the fourth year, ONC partnered with UVic and Camosun College to bring **Science Rendezvous** to Victoria, in May 2024. Science Rendezvous is one of the largest one-day festivals to promote STEAM in Canada. Over 1,200 people attended, interacting with leading scientists and K-12 educators. ONC hosted a variety of activities, introducing event-goers to ocean monitoring instruments and ocean data.



Modelling a clam garden at Science Rendezvous: exploring ONC's Ocean Sense Loxiwey (clam garden) Module on how traditional Indigenous land management creates habitat for clam growth and harvesting.



Youth Science Ambassador, Jessica Winters, practiced casting a CTD during the March 2025 YSA training onboard the R/V *John Strickland*.

Youth Science Ambassadors

ONC welcomed five recruits to the Youth Science Ambassadors (YSA) program, supporting existing positions across coastal BC and the Inuit Nunangat.

The YSA program provides training, employment, and experience for youth (aged 18–30) in ocean science and technology, with each position tailored to local priorities.

YSAs are trained in scientific sampling, engage in ONC-led research and outreach, develop independent research projects, and explore connections between Indigenous knowledge systems and regional ocean science.

The new FY 24/25 ambassadors live in the Nunatsiavut communities of Nain, Hopedale, Postville, Makkovik, and Rigolet, with funding provided by Polar Knowledge Canada. In March 2025, they visited ONC in Victoria—accompanied by an Inuit Youth Advisor—for two weeks of training and team building.



ONC's **WSÁNEĆ Ocean Knowledge Cards**, co-developed with the SENĆOŦEN Language elders group, feature WSÁNEĆ names and information about Pacific Northwest aquatic species.

Created for K-12 educational activities and language-learning programs, these cards are the second in the series co-developed with ONC, following the **Nuu-chah-nulth Ocean Knowledge Card** set.

Artist-in-Residence 2024

Composer, audio engineer, sound artist, and School of Music graduate student, Megan Harton, was the fifth artist-in-residence in this continuing partnership between ONC and UVic's Faculty of Fine Arts. During their residency, they used their background in music technology to explore the concept of "solastalgia": emotional distress caused by the disruption of familiar landscapes due to environmental change.



By the numbers FY24/25

ONC and partners supporting the next generation of ocean learners and scientists (K-12)



11,086
youth



124
schools



1,234
educators



33
Indigenous community partnerships

Interdisciplinary post-secondary (courses, workshops, guest lectures, training sessions, and summer schools)



3,400+
students



9



3

post-secondary institutions

Big Data

ONC's ocean observing networks generate vast volumes of high-resolution data—from sensor measurements to video and underwater acoustic recordings—collected from the Pacific, Atlantic, Arctic, and Southern oceans.

These FAIR (findable, accessible, interoperable, reusable) datasets—accessible to all through ONC's Oceans 3.0 data portal—are used by more than 70,000 researchers, communities, and decision-makers worldwide

A key principle of ONC's work with coastal and Indigenous partners is ensuring community ownership, control, and attribution of the data they collect. ONC is committed to making data as open as possible, while respecting the rights of data-generating communities.



"ONC's network might provide a very helpful additional window into the effects of solar activity on the Earth's terrestrial magnetism."

Justin Albert, professor of physics with UVic's Department of Physics and Astronomy.

ONC data detectives

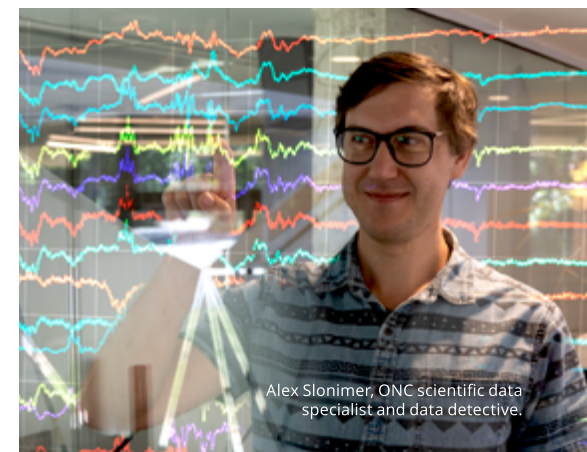
Data anomalies detected during quality checks by ONC staff revealed surprise findings in earth science and behavioural ecology, attracting worldwide media attention in FY24/25.

ONC is committed to providing open, tested and vetted, long-term data that have undergone rigorous quality assurance/quality control (QAQC). ONC data are ready to be integrated into research, classrooms and decision making.

Solar storm detected in deep sea observatories

A powerful solar storm that drove the aurora borealis over global skies in May 2024 also **triggered the movement** of ONC's deep sea compasses. ONC's subsea observatories on the west and east coasts of Canada recorded the temporary distortion of the Earth's magnetic field on instrument platforms deployed as deep as 2.7 kilometres below the ocean surface, potentially some of the most remote recordings ever captured.

The most significant magnetic shift moved the direction of the compass within a range of +30 to -30 degrees and was recorded at a depth of 25 metres



Alex Slonimer, ONC scientific data specialist and data detective.

at the NEPTUNE Folger Passage subsea site. ONC primarily uses compasses to orient its acoustic Doppler current profilers instruments that measure ocean currents.

Alex Slonimer, ONC scientific data specialist, was completing daily data checks when he noticed an anomaly in the numbers in the **Oceans 3.0 data portal**. Further investigation revealed that the peaks in the compass headings closely correlated to the peaks in the visible activity in the aurora. Geomagnetic disturbances can pose risks to power grids, satellite networks, and navigation systems, as well as impact animals' navigational abilities.



DID YOU KNOW?

There aren't enough data specialists in the world to process the vast amounts of ocean data being captured: **ONC** alone has 1.7 petabytes of data that are increasing daily from our observatories! AI development is filling those gaps.

Bomb cyclone octopus

Subsea camera footage at NEPTUNE observatory's Folger Pinnacle captured a giant Pacific octopus bracing during the stormy turbulence when a bomb cyclone descended on the BC coast on November 20, 2024.

Surface wave heights were roughly 10 metres, compared to an average one-metre swell, creating tremendous pressure. **ONC's** camera, which records for five minutes at the top of every hour, captured the sea creature in a tenacious tentacle battle against the forces of nature, as the currents rapidly changed direction and at great speed.

Once again **ONC** "data detective" Alex Slonimer made the discovery during data quality checks, when it appeared the velocity of the storm affected two of **ONC's** ADCP units.

*"The octopus in the **ONC** video is sending us an important message: that collecting ocean data is not just about human applications for our models and management needs, but also to understand the underwater world from a marine life point of view."*

Eddy Carmac, **ONC Ocean Observatory Council board member** and emeritus senior research scientist, oceanography at the Institute of Ocean Sciences.



[Watch the octopus video](#)

A giant Pacific octopus (*Enteroctopus doffeini*) battling strong waves during a bomb cyclone in November 2024.

Hartley Bay Coastal Community Observatory

What is a coastal community observatory?

Coastal community observatories enable community members to conduct year-round continuous monitoring of their local ocean environments, collecting valuable baseline and time-series data for tracking the changing ocean conditions.

Ocean Networks Canada (ONC) collaborates with community partners to custom-design each observatory to meet local needs. This partnership recognizes the value of place-based knowledge and pairs it with oceanographic instruments, high-tech design, training, and scientific support.

The observatory data can be used by researchers, community members, Indigenous leaders, governments and others to inform decision-making for a sustainable ocean future.

Why Hartley Bay?

Gitga'at First Nation monitors ocean conditions on the northern British Columbia coast to inform decision-making to protect ecosystems and ensure their sustainability for future generations. Gitga'at priorities include monitoring marine biodiversity, water quality, and human impacts, and proactively addressing emerging threats to the marine environment (Gitga'at State of the Ocean Report 2023).

The Hartley Bay Coastal Community Observatory was deployed in 2020 by Gitga'at and Ocean Networks Canada to support efforts for baseline data collection for our changing ocean and climate. The Hartley Bay observatory is one of three **ONC** coastal community observatories operating in the area, alongside those situated in Prince Rupert and Kitimaat Village. The observatory is owned, operated and maintained by **ONC** in partnership with the Gitga'at First Nation who are co-owners of the data collected by the observatory.

How the observatory works

On the north side of Hartley Bay is a shore station equipped with a meteorological station that records weather conditions, a time-lapse camera looking out over the water, and an automatic identification system (AIS) antenna to monitor vessel traffic. A subsea cable connects the shore station to a seafloor platform around 360 metres offshore at a depth of approximately 90 metres. The cable provides power and internet connectivity to the underwater instruments, allowing for remote, real-time data monitoring of ocean conditions.

Instruments on the underwater platform

1. High definition video camera, and lights (1a) visually monitor sea life and seafloor changes.
2. Hydrophone records the sounds of marine mammals, fish, vessels, earthquakes, and underwater landslides.
3. Recovery float allows the observatory to be recovered for maintenance.
4. CTD measures Conductivity (salinity), Temperature, and Depth (pressure) and may include sensors to measure dissolved oxygen, turbidity, and chlorophyll.
5. Mini junction-box distributes power and connectivity to individual instruments via a seafloor cable.

Connect with the data

Most data captured by the Hartley Bay Coastal Community Observatory are available through the Oceans 3.0 data portal on the **ONC** website. The shore camera and hydrophone data are restricted and access is decided by Gitga'at First Nation through a request and use case review process. Contact data-restrictions@oceannetworks.ca for more information.

Scan the QR code to view the live data from this observatory. Hartley Bay is part of **ONC's** larger network of observatories in the deep ocean, coastal waters, and on-shore of the Pacific, Atlantic, and Arctic coasts of Canada, as well as in the Southern Ocean.

Get to #KnowTheOcean in your community!

[f](#) [@](#) [in](#) [v](#) [X](#) [t](#)

oceannetworks.ca A UNIVERSITY OF VICTORIA INITIATIVE

Supporting Indigenous data sovereignty

ONC is committed to ethical data use and supporting Indigenous Peoples' sovereignty over their ocean data. This includes adoption of Traditional Knowledge and BioCultural labels (with provenance information and contextual metadata) to identify Indigenous collections and interests, as well as a broader drive towards decolonization of data acquisition and ownership.

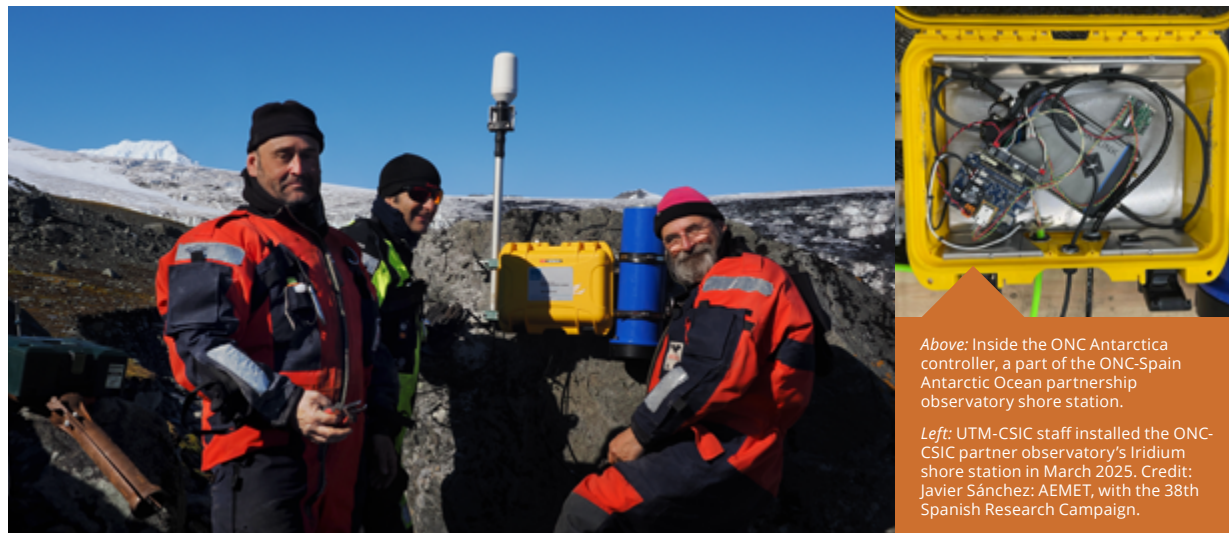
New public signage, such as the this Hartley Bay sign (above), reflects that commitment, with information about the accessible and requestable data types available from **ONC** coastal community observatories on display and approved by local First Nations.

Marine Technology Innovation

Utilizing the expertise across its engineering, data, science, and observatory systems divisions, ONC technological innovation, in collaboration with industry partners, is advancing ocean observing capabilities.

ONC's Marine Technology Centre serves as the central hub for mobilizing all ONC-led expeditions and field operations.

ONC is pushing the physical boundaries of ocean monitoring to support remote observations and provide insights into the rapidly changing polar regions



Above: Inside the ONC Antarctica controller, a part of the ONC-Spain Antarctic Ocean partnership observatory shore station.

Left: UTM-CSIC staff installed the ONC-CSIC partner observatory's Iridium shore station in March 2025. Credit: Javier Sánchez: AEMET, with the 38th Spanish Research Campaign.

Antarctica controller

A custom designed shore controller was a new feature of the updated ONC-Spanish National Research Council (CSIC) partner observatory, deployed by CSIC's Unit of Marine Technology (UTM), at the Juan Carlos I Antarctic Base on Livingston Island in March 2025.

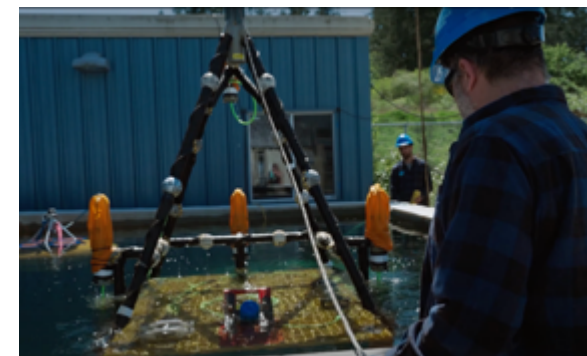
Effectively a shore station on a chip, this palm-sized controller—engineered and designed by ONC's physical operations and data stewardship teams—enables low-power, high-resolution data acquisition under extreme Antarctic conditions.

The partner observatory resides 25 metres below the surface and measures conductivity, temperature, depth, dissolved oxygen, turbidity, and chlorophyll-a.

The shore controller is designed to transmit data every 30 minutes via an Iridium satellite link to ONC's Oceans 3.0 data platform, enabling near real-time, year-round monitoring of this remote marine environment. The controller hosts the antenna and critical electronics, delivering precise, automated data handling between

annual summer maintenance visits. Once fully proven, additional instruments and remote command features may be integrated.

This observatory, along with two autonomous deep-sea Argo floats deployed by CSIC in late 2023, is helping to address urgent gaps in Southern Ocean monitoring.



Matt Tradewell, associate director of observatory physical operations, lowers a hydrophone array into MTC's test tank, which is used to assess instrument performance before at-sea deployment.

P-ONE neutrino observatory engineering innovations

ONC and its global partners achieved two major engineering contributions to advance the Pacific Ocean Neutrino Experiment (P-ONE) telescope observatory in FY24/25: the design of a custom deployment frame (Figure 1), and a project-specific junction box (Figure 2). These innovations support a planned observatory off the coast of Vancouver Island, which will comprise 70 one-kilometre-tall moorings equipped with scientific instruments extending up from the seafloor.

Research has shown that the deep ocean is the perfect environment to study neutrinos, which are elusive subatomic particles produced by nuclear reactions in the sun, radioactive decay, and exploding stars. The project brings together a multi-disciplinary team from Canada, Germany, Poland, the UK, and the United States. ONC is working with DFO and First Nation partners to ensure activity planning processes are being followed.

The deployment frame, designed and manufactured by ONC in collaboration with

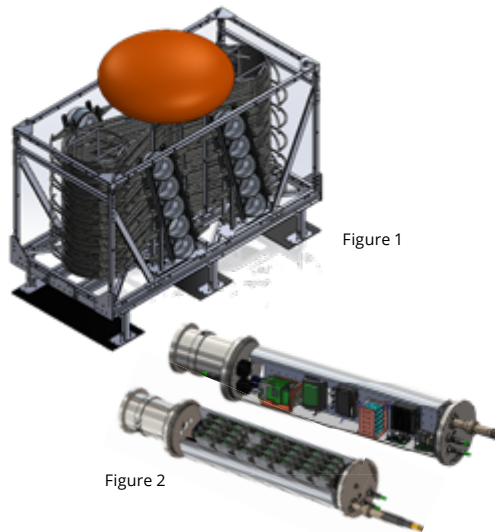
MacArtney Underwater Technology Group in Denmark, was developed to enable the controlled, efficient deployment of a kilometre-long armoured cable and scientific instruments. Unlike traditional surface-based deployment methods, which require extensive weather windows and carry high risks of tangling, ONC's bottom-up approach allows the entire structure to be deployed as a single compact unit directly from the seafloor with the help of an ROV.

At each mooring's base, the junction box serves as the nerve centre of the system, housing power, control, and data management electronics, all powered by ONC's NEPTUNE observatory. Built to handle 26 instrument connections at once, it integrates precise timing equipment critical to neutrino detection.

Together, the deployment frame and the junction box position the project to meet its future deployment goals while offering valuable innovation solutions for future deep-sea observatory projects.



(L-to-R) ONC project engineer (EIT), Don Lo, and junior project engineer (EIT), Caleb Magee, with the P-ONE mooring junction box housing at MTC. Figure 1: Custom deployment frame: a customized cable system designed to maximize space efficiency within the frame while ensuring smooth unspooling during deployment. Figure 2: Project-specific junction box.



CODAR kiosk expands remote monitoring capabilities

ONC advanced CODAR (Coastal Ocean Dynamics Applications Radar) services for remote locations where traditional coastal installations aren't feasible.

Field engineers made major strides in developing a custom low-power, off-grid CODAR kiosk designed for autonomous operation in harsh Arctic conditions.

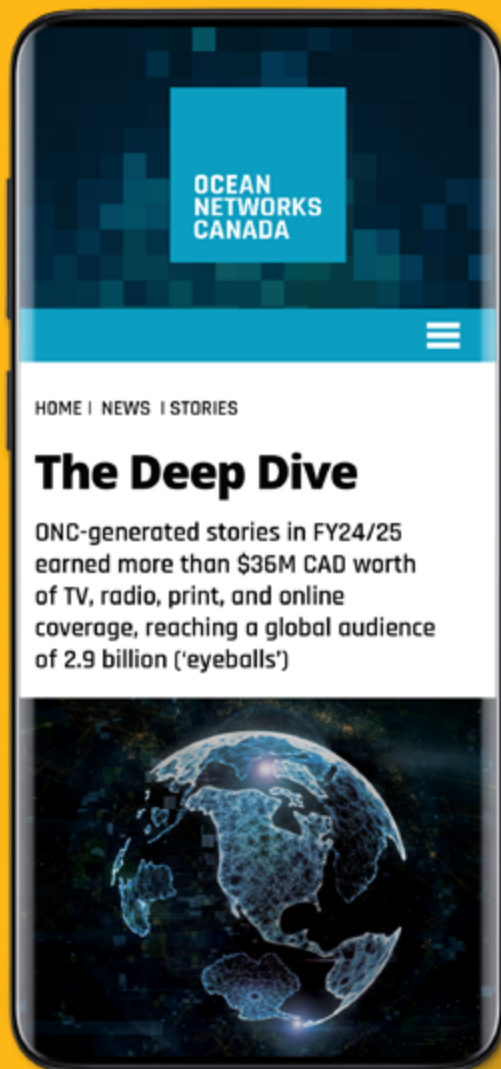
Housed in a mobile trailer, the system uses solar and wind power, weather sensors, and custom control electronics to maximize data upload capacity. This initiative aims to support year-round observations.

A test site near Jordan River in BC produced detailed performance data throughout the winter, validating the system's operation against a full-scale radar. Insights from this test phase are now being used to simulate system viability across potential Arctic locations.

This innovation in remote sensing has applications that span oceanographic research, climate monitoring, and marine situational awareness. The CODAR kiosk is a foundation for future deployments as Arctic interest and infrastructure needs grow.

Above: ONC CODAR kiosk near Jordan River, BC.

ONC's Reach



ONC is a leader in knowledge outreach, leveraging media communications and innovative storytelling platforms to broaden the impact of ocean data, research, and technology innovation

ONC, newsmaker

The ONC communications team released **15 original web stories** and **five news releases** (plus expedition **media advisories**) in FY24/25, drawing public attention to scientific discoveries, tech innovation, and users of ocean data in Canada and around the world.

More than 50 interviews were conducted with ONC staff members, resulting in **3,200 stories** (mentions) across TV, radio, print, and online mainstream media, reaching an audience of **2.9 billion**.

The top three stories were:

- **Northern elephant seals use deep-sea research sonar as dinner bell**
- **Solar storm detected in deep sea observatories**
- **Giant Pacific octopus battles rough seas during bomb cyclone**

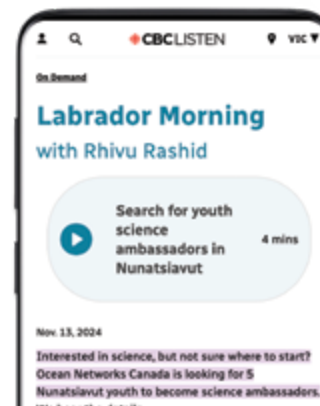
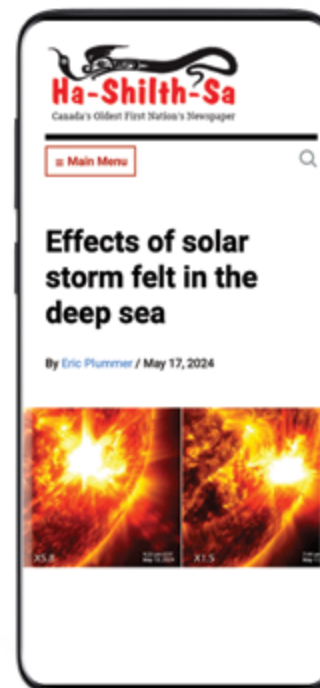
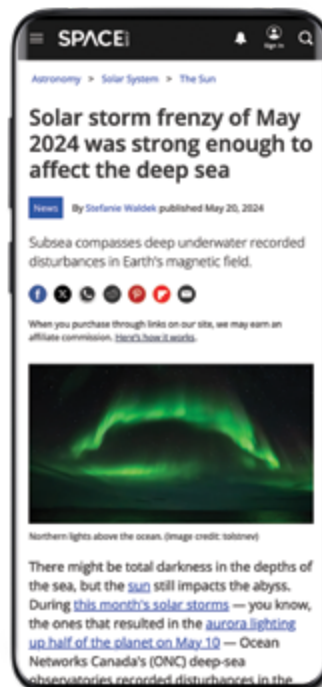
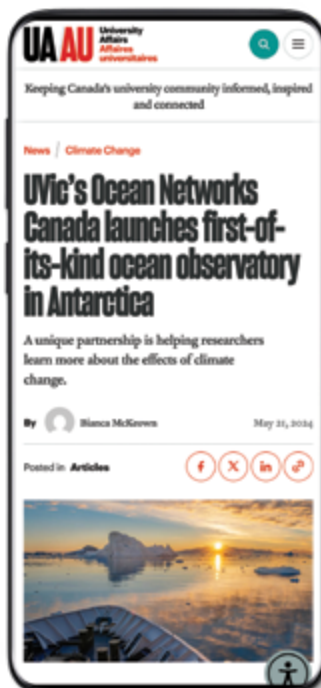
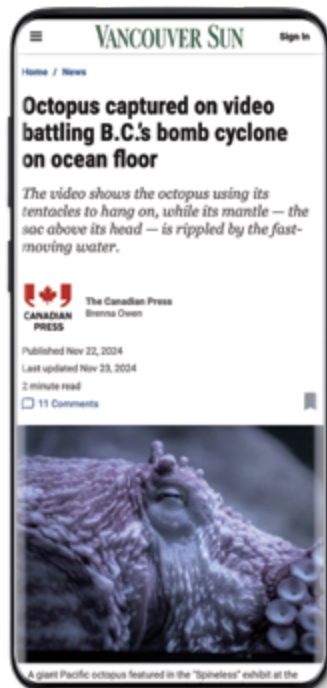
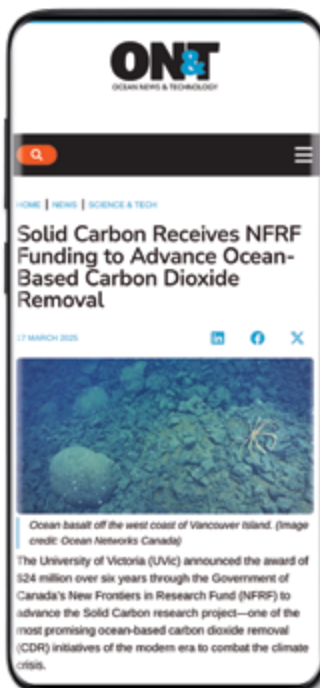
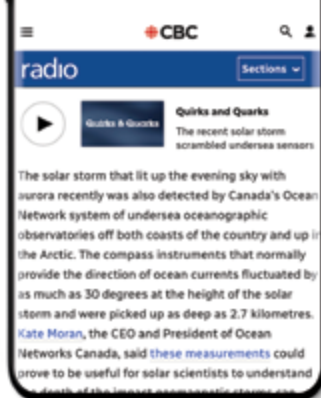
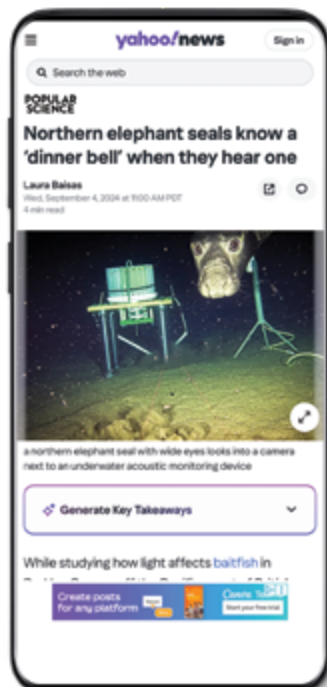
Our top webstory, *Changing STEM to STEAM: ONC farewells Kim Juniper*, attracted more than 1,100 online visitors to read this tribute to ONC's late Chief Scientist and his immense legacy.

A digital first strategy

In recognition of consumer trends, ONC has a digital-first approach to amplify the visibility of ONC's work and foster meaningful collaboration on critical ocean issues. ONC's range of digital platforms include videos, websites, and interactive social media, **StoryMaps** (see below), and touchscreens. Printed publications and handouts are also digital first, with QR codes that point to online content for easy sharing.



Meghan Paulson, executive director of observatory operations, speaking to journalists onboard the M/V Canpac Valour ahead of the ONCabyss Fall 2024 expedition.

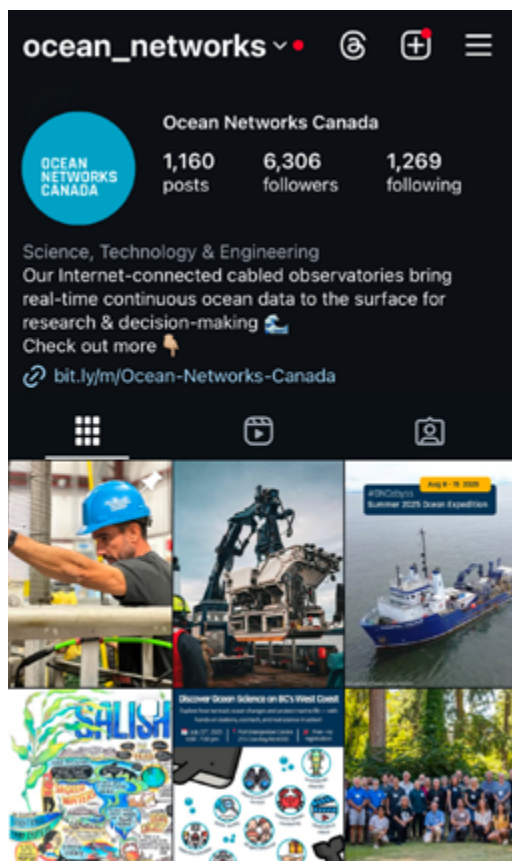


Engaging through social media

ONC social media content saw a 29% increase in impressions and reach across Instagram, X, Facebook, LinkedIn, and BlueSky during FY24/25. There was also a 17% increase in post reactions and 3% increase in overall engagement with ONC activities and messaging.

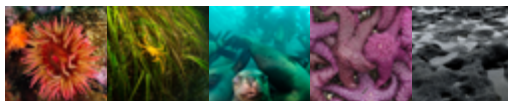
In February 2025, ONC joined a new platform, BlueSky, to engage with the scientific community that is increasingly migrating from X to BlueSky. ONC is moving away from X, and encouraging our 13,000 X followers to engage with us on our other channels instead.

Join ONC for livestream expedition dives via our website, BlueSky, and Instagram!



New outreach products, FY24/25

Underpinning all outreach products is the new **ONC Brand Identity & Guidelines Staff Toolkit**—produced in-house in 2024—that meets accessibility standards and offers tools to position ONC on a global stage.



The ocean is the inspiration for the extended colour palette of the ONC brand refresh.

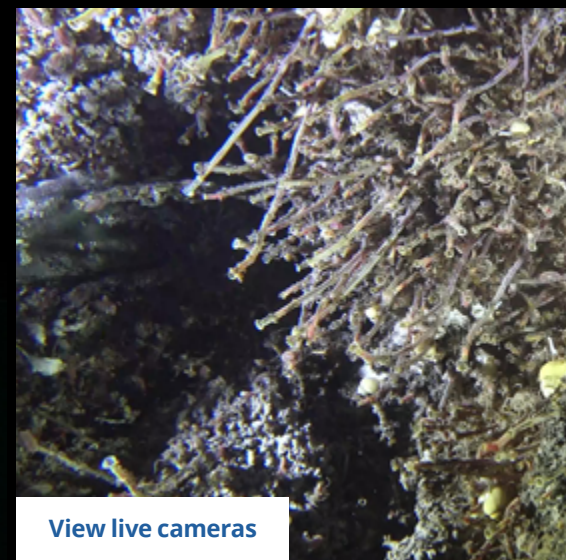
Using the rebrand, new products to connect with ONC's diverse audiences include: public signage about ONC CODAR installations and coastal community observatories; two-pager handouts; two new LED conference backdrops; banners; and ONC's popular glossy calendars (1000 were snapped up at the IEEE and AGU conferences alone).



One of ONC's new LED conference backdrops.

Digital products

ONC's primary website, oceannetworks.ca, saw a rise in active users in FY24/25—the most visited page was the **Earthquake Data Dashboard**, receiving a total of 37,654 views: a 4,000% increase from FY23/24. Other top visited sites include live cameras (14,028 views) and the **ONCabyss Summer 2024 Expedition** page (1,171 views).



[View live cameras](#)

Above left: ONC's touchscreen, which showcases the services and solutions that ONC data supports, is now hosted in BC and Arctic locations. Above right: A still from a live camera deployed at the Main Endeavour Field.

Conferences

In FY24/25, ONC hosted **27** stakeholder and public events (e.g., symposia, workshops, open houses), with staff also participating in **82** external events.

ONC strengthened connections within the regional, national and international ocean science community through presentations, hosted booths, and expert panels at events. These included the **UN Ocean Decade Conference**, Barcelona, Spain; **European Geoscience Union**, Vienna, Austria; **ArcticNet**, Ottawa, ON; **American Geophysical Union**, Washington, DC; **All Native Basketball Tournament**, Prince Rupert, BC; **Kitikmeot Trade Show**, Cambridge Bay, Nunavut; **Earth Science for Society**, Calgary, AB; and the **16th Canadian Science Policy Conference (CSPC)**, Ottawa, ON. Industry-focused events included the **OCEANS 2024 Conference** in Halifax, NS, and the **Ocean Visions Biennial Summit**, in Vancouver, BC.

Delegates from ONC attended the **16th Japan-Canada Joint Committee Meeting on Cooperation in Science and Technology** in Tokyo, Japan, at the invitation of Canada's Chief Trade Commissioner at Global Affairs Canada. ONC was also part of the Canada pavilion at the **2025 American Association for the Advancement of Science** in Boston, MS.

In addition to multiple engagement opportunities with federal departments, ONC hosted visits from Federal Minister Hon. Diane Lebovitch, Minister of Fisheries and Oceans Canada and the Canadian Coast Guard, and Hon. Joyce Murray. ONC also welcomed to Queenswood Dr. Sylvain Chabonneau, president and CEO of the Canada Foundation for Innovation, David Morin, director general, ocean and regulatory science for DFO, Rear-Admiral Christopher Robinson of the Royal Canadian Navy, and City of Victoria Mayor, Marianne Alto.



Top of page: ONC delegates at the OCEANS 2024 conference in Halifax in September, 2024. *Middle left:* Delegates from the Canada Foundation for Innovation touring ONC's Marine Technology Centre in November, 2024. *Middle right:* Kiyomi Holman (R), ONC community support specialist, at ONC's booth at ArcticNet, 2024. *Bottom left:* (L-R) Arthur B. McDonald, Canadian Nobel laureate, Kate Moran, ONC CEO and president, and Geneviève Tanguay, Canada's vice-chief science advisor visit ONC's booth at the 16th CSPC in Ottawa, ON. *Bottom right:* The ONC-hosted panel discussion on ocean climate solutions at the 16th CSPC in Ottawa with panelists (L-to-R) Kate Moran, ONC CEO and president, David Taillefer, national manager of marine programs for Environment and Climate Change Canada, Dr. Mona Nemer, chief science advisor of Canada, and Na'im Merchant, executive director, Carbon Removal Canada.

Collaborations

Canada is home to the world's most advanced ocean observatories thanks to the support for Ocean Networks Canada from government, science and academia collaborators, industry, and Indigenous and coastal community partners.

ONC works closely with valued partners to support Canada's marine conservation goals, blue economy strategy, and the goals of the High Level Panel for a Sustainable Ocean Economy and the United Nations Decade of Ocean Science for Sustainable Development.



As one of Canada's Major Research Facilities, ONC is advancing ocean observing in collaboration with valued partners to the benefit of science, society, and industry

Federal government partners

Ocean interests cross several federal departments and are woven into multiple department mandates. Each year provides increased opportunities for ONC to contribute to government mandates and objectives. This includes ongoing support for Canada's Oceans Protection Plan to expand ocean data collection with Indigenous partners, and support for Fisheries and Oceans Canada (DFO) ocean management objectives and expeditions.

Supporting marine protected areas

Three of ONC's deep-sea nodes are now within the newly designated Tang.gwan — ḥačx̱wíqak — Tsigis Marine Protected Area (MPA). ONC worked closely with DFO and the MPA First Nations co-managers to continue to operate and maintain our infrastructure within this new, larger MPA. The long time-series data from these observations support Canada's MPA management objectives and help conserve this unique ecosystem. Data from ONC Community Fishers sampling also contribute to MPA monitoring efforts.

Major Research Facility

As one of Canada's Major Research Facilities—large-scale facilities of national significance—ONC worked closely with the Canada Foundation for Innovation to develop a framework for this initiative. ONC is committed to supporting Canada's research and innovation ecosystem now and into the future.

Data partnerships

ONC serves as the administrative home and a major data contributor to the **Canadian Integrated Ocean Observing System (CIOOS) Pacific office (CIOOS-Pacific)**. Its mission is to support regional data providers by supporting software systems and services to ensure good data management, curation, and stewardship practices, so that data are interoperable and accessible to all. These data support the UN Ocean Decade goals, including efforts to create a predictable and accessible ocean.

The **World Data System-International Technology Office** is hosted at ONC. The office supports the establishment of research data management standards and advocates for best practices in data management, important for all research organizations and for Canada, and is funded in FY24/25 by the **Digital Research Alliance of Canada**.

Above: A shared vision for advancing science: an ONC-hosted Endeavour Workshop (Nov, 2024) with federal government agencies (US and Canada), BC regional bodies, industry partners, European partners, universities (US and Canada), and Coast Salish Nations. Top right page: One of ONC's Marine Robotic Vehicles microALTO floats that carries two sensors manufactured by Rockland Scientific to measure ocean microstructure turbulence.

Industry partners

In partnership with industry, ONC is developing and delivering world-leading ocean intelligence products and services.

Ocean Visions, a non-profit organization, is working with ONC to advance responsible marine carbon dioxide removal (mCDR) climate solutions, and establish monitoring, reporting, and verification protocols. ONC supports the **Centre for Ocean Applied Sustainable Technologies (COAST)**, Pacific Canada's hub for the sustainable blue economy that is accelerating marine technology startups and helping them scale. COAST has a touch screen showcasing ONC capabilities in their downtown Victoria office.

Equity, Diversity, and Inclusion

ONC embraces diversity and is building a culture of belonging that increases our capacity to effectively address and serve the interests of our diverse communities of partners and collaborators.

Achieving a comprehensive and profound understanding of the ocean requires diversity of perspectives, and an equitable and inclusive approach. In removing barriers to participation, we collectively advance our knowledge and understanding of the world. Recognizing this, ONC has committed to advancing equity, diversity, and inclusion within ocean science and technology.

Recognizing our valued advisors

ONC's governance structure—**Board of Directors**, **International Science Advisory Board**, and the **Ocean Observatory Council**—provides valued insights and contributions to strategic goals and priorities. In addition, a new **Standing Advisory Committee**, formed in FY24/25, provides sound guidance.

Letter from ONC Board Chair, Jim Ghabbane

Of the many highlights in the past year, one with considerable significance is that ONC was recognized as one of Canada's six Major Research Facilities by the Government of Canada. This is clear acknowledgement of the value and relevance to the residents of Canada since our inception in 2006. Additionally, ONC's relevance brought with it stable funding, which propelled ONC's evolution nationally and globally.



What drew me to serve on the ONC Board was the collective drive to leave the world in a better place than we found it. UVic's Solid Carbon grant, with our President and CEO Kate Moran as the principal investigator, will capitalize on ONC's core capabilities to support the development of lasting solutions to address the current climate crisis. Advancing the Solid Carbon project to a field demonstration requires a multidisciplinary approach that includes science, engineering, as well as social and economic focus, which will benefit and transform society. A successful outcome for the project will go a long way towards protecting the climate for future generations.

Looking forward, the Board will continue to work with management to guide ONC to further relevance on the national and global stages, including supporting the Pacific Ocean Neutrino Experiment (P-ONE). ONC has much to offer in making Canada a world leader in ocean observing and a convener of international partnerships. The Directors of ONC are proud to be part of this pioneering organization at a critical time for society.

Boosting ocean insights from autonomous floats

ONC and the Victoria-based company **Rockland Scientific** are co-developing new sensor technology that will extend the ocean observing capabilities of autonomous floats that travel up and down through the water column, to the potential benefit of the global scientific community. By integrating sensors that capture microstructure measurements into two ONC profiling floats, this experimental project aims to enhance the device's ability to finetune measurements of ocean turbulence and mixing processes.

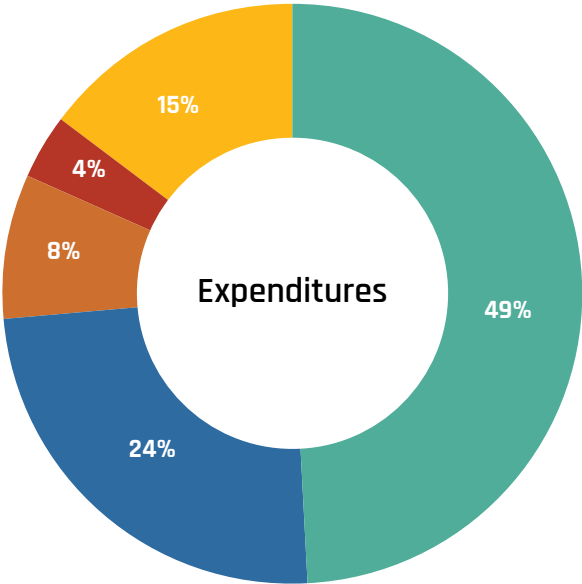
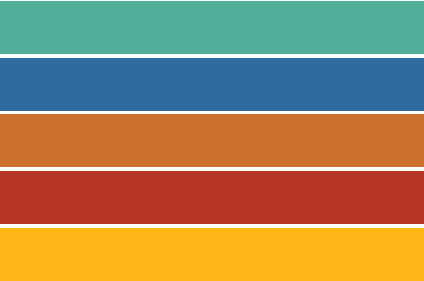
The data will support both scientific understanding of ocean dynamics and engineering insights into sensor performance and durability. This partnership underscores ONC's commitment to innovation and industry collaboration in ocean observing.



Financials

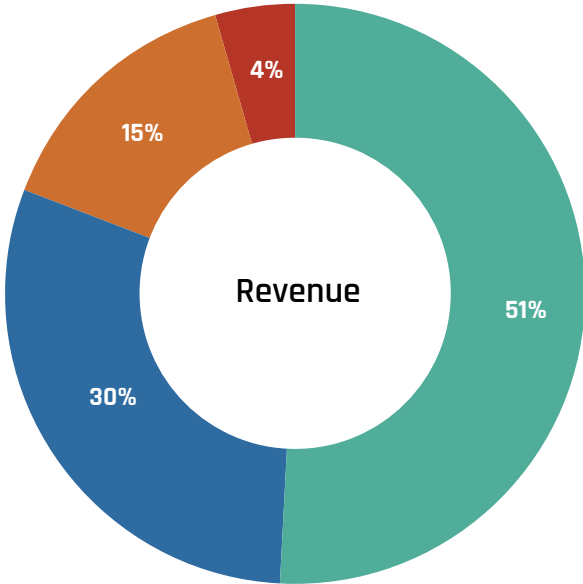
FY24/25

The Ocean Networks Canada Society's audited financial statements for FY24/25, posted to the website, reflect external contracts and services. The revenues and expenditures are included in the University of Victoria's audited financial statements. Totals presented are net of in-kind contributions.



\$15,874,193	Personnel
\$7,938,692	Maintenance & Repairs
\$2,564,858	Services
\$1,179,745	General Administration & Other
\$4,714,247	ONCS Operational Expense

\$32,271,735 TOTAL

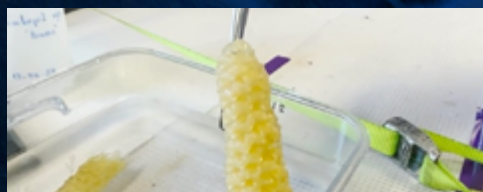


\$16,934,073	Canada Foundation for Innovation
\$9,900,000	Federal Government
\$4,849,858	Ocean Networks Canada Society
\$1,456,000	University of Victoria

\$33,139,931 TOTAL

#KnowTheOcean FY24/25

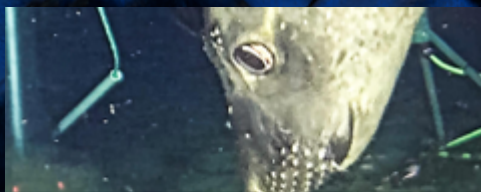
Social Media Highlights



ocean_networks
Jun 16, 19:30

During dive H2034 at the Barkley Canyon hydrates site, ROV Hercules sampled some #snail eggs growing on a #CTD! Tap the link the bio to watch the #ONCabyss operations with ONC + @NautilusLive! #KnowTheOcean #NautilusLive #UVic #CFIfunded

46,432 reel total plays
3.3 % engagement rate



ocean_networks
Sep 04, 21:30

This trend just reached the bottom of the ocean! Northern elephant seals were captured on video at an ONC NEPTUNE observatory site for nearly a year using sonar as a dinner bell to find their fishy feast, a new study published in PLOS ONE reveals. Tap the link in our bio to

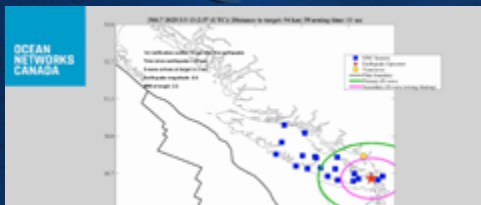
22,343 reach
6.04 % engagement rate



Ocean Networks Canada
Oct 05, 15:01

Canada's newest remotely operated vehicle (ROV) is designed, engineered, and manufactured by Canpac Marine Services Inc. in BC – and was featured in yesterday's #ONCabyss Fall Expedition media event. The purpose-built #ROV is designed for depths

26.11 % engagement rate



Ocean Networks Canada
Mar 03, 18:06

ONC's land+seafloor seismic network successfully detected the earthquake felt in #Vancouver and #Victoria early this morning and notified critical infrastructure subscribers. The earthquake was located 30km southwest of Bellingham and occurred

3,601 organic reach
6.94 % engagement rate

Social Media

f 11,760
Followers

o 6,308
Followers

y 6,272
Subscribers

in 8,248
Followers

b 1,178
Followers

X 13,000
Followers

Media Metrics

3,200+
News articles &
broadcast mentions

2.9 billion
Total audience reach



OCEAN
NETWORKS
CANADA

#knowtheocean

oceannetworks.ca

A UNIVERSITY OF VICTORIA INITIATIVE

ONC is primarily funded by: the Canada Foundation for Innovation, Government of Canada, University of Victoria, and Government of British Columbia.

We are thankful for our many partners in industry, government, research, community, and higher education.

Ocean Networks Canada is a Major Research Facility of Canada.