



The Antarctic Society

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PRESIDENT

Liesl Scherthanner
P.O. Box 3307
Ketchum, ID 83340
antarctican.org.president@protonmail.com

VICE PRESIDENT

Kathy Covert
4455 W. 36th Ave.
Denver, CO 80212
klcovert@comcast.net

TREASURER

Thomas Henderson
35 Cherry Street #701
Burlington, VT 05401
webmaster@antarctican.org

SECRETARY

Joan Boothe
2435 Divisadero Street
San Francisco, CA 94115
hoodooskr@aol.com

DIRECTORS

Dale Andersen
Guy Guthridge
Matthew Jordan
Valmar Kuroi
Michele Raney
Ron Thoreson
Stephen Wilson

WEBMASTER

Thomas Henderson
(address above)

ARCHIVIST

Charles Lagerbom
clagerbom@gmail.com

SOCIAL MEDIA DIR.

Lesley Urasky
yamcam@gmail.com

NEWSLETTER

CO-EDITORS

Jeff Rubin
rubinwiles@gmail.com
Dick Wolak
wolak66@gmail.com

MEMBERSHIP

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U.S. Coast Guard May Acquire Commercial Icebreaker *Aiviq*

In a new public notice, the U.S. Coast Guard disclosed it intends to solicit a firm-fixed-price contract from Offshore Service Vessels LLC to acquire an existing “domestically produced, commercially available icebreaker” from the company.

Offshore Service Vessels, part of Edison Chouest Offshore, is the registered owner of American-made icebreaking offshore supply vessel *M/V Aiviq*, the only commercially-available vessel to meet previously specified criteria.

In its 2023 Arctic Strategic Outlook Implementation Plan, the USCG discussed a plan to potentially procure a commercially-available icebreaker to expand its polar capabilities in the near-term. The service’s upcoming icebreaking Polar Security Cutter, produced by Bollinger Mississippi Shipbuilding, faces ongoing delays with a service entry now likely pushed back to 2028 at the earliest.

The Coast Guard’s options for a stop-gap measure are extremely limited, especially given the need for the vessel to be American-made. “Offshore Service Vessels is the only company that can meet USCG needs,” the notice reads. Most recently the *Aiviq* has been in the service of the Australian Antarctic program during the 2021-22 and 2022-23 seasons.

Discussions about the Coast Guard acquiring the vessel to supplement its own icebreakers *Polar Star* and *Healy* have been ongoing since at least 2015.

At the time Coast Guard leadership did not find the vessel “suitable for military service without a substantial refit.” It was also found to be less capable than the medium icebreaker *Healy*.

While the vessel meets the service’s specified requirements, e.g. Polar Class 3 or higher, at least 15 years of service life remaining, and capable of breaking 3 feet of ice continuously at 3 knots, it would require a host of modifications. The need for a “substantial refit” will add to the expected purchase price of around \$150 million.

Aiviq appears to be the service’s least-bad option despite the substantial costs to purchase the vessel and get it mission ready. Previous discussions to revive *Polar Star*’s sister ship, *Polar Sea*, which suffered a catastrophic engine failure in 2010, have not materialized.

Reviving the 50 year old *Polar Sea*’s power plant – consisting of three gas turbines, six propulsion diesel generators and electric propulsion motors – would be a tall order. And it would not get the Coast Guard any closer to operating in the Arctic with a modern fleet of capable icebreaking vessels.

The Coast Guard has not released a timeline for when it would expect *Aiviq* to enter service, but recent experience refitting Norwegian icebreakers for service with the Canadian Coast Guard, suggests the vessel would not be ready before 2026 or 2027.

Malte Humpert, gcaptain.com, March 5, 2024

Gathering Update



Colorado Chautauqua General Store

The number of registrants for the 2024 Gathering has now reached 119. **We must limit registration to 125 because of Fire Marshal requirements.** If you're planning to attend and have not registered, wait no longer! Use the form at the end of this newsletter or go to the 2024 Gathering page on the website.

The registration fee for the Gathering is \$275. It will increase to \$300 on June 1, 2024.

All 45 of the Colorado Chautauqua lodging units have been reserved. If you would like to get on the waitlist for a Chautauqua unit, please contact Liesl Scherthanner at:

antarctican.org.president@protonmail.com

Registrants lodging at Colorado Chautauqua will receive information prior to the Gathering about check-in, parking, registration, etc.

The 2024 Gathering Planning Guide is a wealth of information on the Gathering and Boulder, including the Colorado Chautauqua venue as well as lodging in the area and transportation. See: [2024+Gathering+Planning+Guide_2.0.pdf \(squarespace.com\)](#).

A preliminary list of the invited speakers, with biographies, is here: <https://www.antarctican.org/2024-gathering>

2024 AUCTION

Gathering Momentum!

What might you have?

What might you be seeking?

The Auction Committee is eager to add to its collection of Antarctica-related donations in the following categories:

- Books
- Services
- Antiques
- Artwork
- Clothing & Accessories
- Music
- Tickets & Travel
- Your special expertise!

In search of something?

What items might you find irresistible to bid on? Are you looking for something specific to complete a collection? Have you been searching for particular Antarctic memorabilia? Let us know!

There will be a silent auction, a live auction and a "skua table" (a place to feature smaller-ticket items for donations) as well as the usual mugs and hats for sale. Proceeds from the auction help support the Society and offset costs for the gathering, so your donations are very much appreciated. To see a partial list of current auction items, go to:

[2024+Gathering+Auction+Items_11Apr2024.pdf \(squarespace.com\)](#)

Thank you for your donations!

Contact Diana Logan,

Auction Committee Chair

antarctican.auction@gmail.com.

Letter to the Editors

We too mourn the demise of [Colin Monteath's Antarctica] calendar. We have about 10 of them and found that we can recycle them every so many years. That way we can continue to enjoy them.

Sara and Arthur Hayes

Belfast, Maine, Jan. 30, 2024

New Podcast: Everything Antarctica



Antarctican Society Board Member Matty Jordan and Jonny Harrison have recently started a new podcast called “Everything Antarctica.” With a new episode released every week, the show aims to educate and inspire. The pair cover a wide range of topics from logistics to engineering, science to safety, and wildlife to human factors. It’s available everywhere you get your podcasts - search for **Everything Antarctica**. They are always looking for guests with interesting stories about the Ice who are willing to share their experiences with listeners. If you’ve spent time down south, they’d love to hear from you at info@everythingantarctica.com

Hero Update

By Charles H. Lagerbom, Society Archivist

The Society continues its efforts to preserve (parts of) the NSF R/V *Hero* and its history. Last summer the vessel’s two Baldt anchors were donated to the Sail Power & Steam Museum in Rockland, Maine. They now adorn the entrance to a museum building. The ship’s barometer was recently donated to the Society, part of a growing accumulation of artifacts



Charles Lagerbom with *RV Hero* anchor



***RV Hero* Barometer**

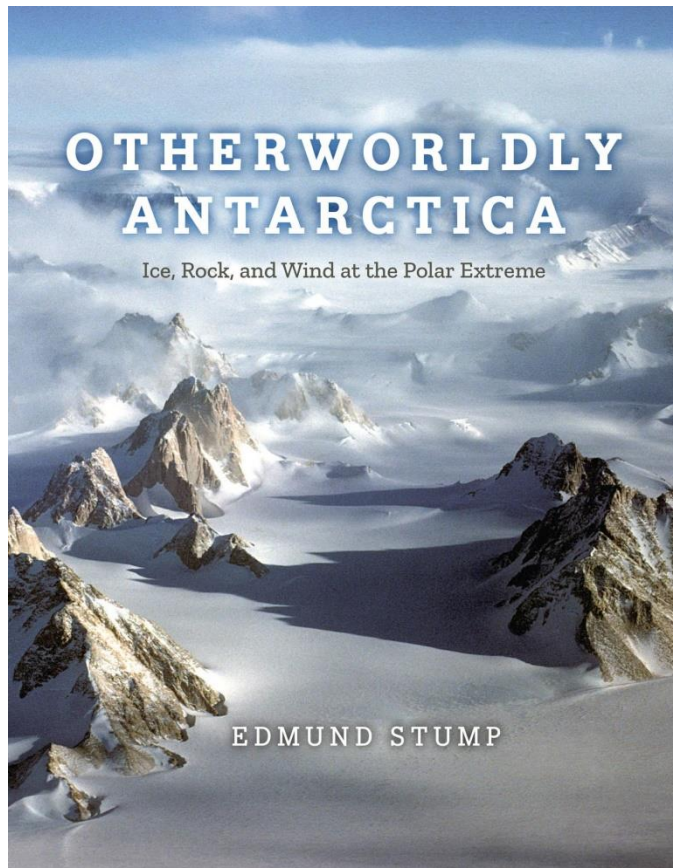
we are preserving and preparing to give to the Penobscot Marine Museum in Searsport on the Maine coast, near where *Hero* was built in South Bristol back in 1968. Equipment from the ship's bridge, including the compass and radios, has also been received, along with material from *Hero's* time as an Antarctic attraction in Reedsport, Oregon. Restoration work continues on the *Hero's* 3,000-lb

bronze propeller and eight-foot rudder. At the National Archives in College Park, Maryland, meanwhile, a professional researcher successfully located copies of *Hero's* ship plans. These have been made available to the Society's webpage and will also possibly be used to have a museum-quality ship model constructed.

Photos, film, journals and other memorabilia keep pouring in, hugely benefiting my work writing the ship's story, a manuscript which is now nearing completion. It is hovering around 200 pages. My goal is to finalize it this year and then submit to a publisher. So I am making one **last call for any *Hero* information, photos, stories, etc.** And also, if you know of or have a preferred publisher we might approach with the manuscript, I would appreciate hearing from you. I am also looking into self-publishing options. If you would like to help, contact me clagerbom@gmail.com.

***Otherworldly Antarctica* by Edmund Stump**

Reviewed by Thomas Henderson



Dr. Edmund Stump has written what he calls a “coffee table” book and, indeed, it could be seen that way by the casual reader. The spectacular photographs he has captured in Antarctica over a 40-year career provide the visual anchor for the book. Viewed by themselves, these images are stunning glimpses of a vast, pristine and beautiful continent. However, the descriptions that accompany the photographs are well worth the reader's time. They not only explain the features depicted, but also reveal how being there penetrates one's soul in a way no other place can. Those of us who have been fortunate enough to spend time in Antarctica, especially in those remote, quiet places unsullied by human bustle and noise, understand Stump's reverence for the continent.

His first chapter, *The Ice*, explores Antarctica's most prominent feature: its almost incomprehensible mantle of ice, in some places more than two miles deep. Stump begins in the prologue with a fascinating micro-level view of ice in meltwater ponds. He imbues the various forms and patterns of ice with a life of their own, recounting the forces and circumstances that produced them but letting his imagination run free in describing the incredible beauty that nature has created. The photographs of ice frozen in beautiful, intricate patterns in meltwater ponds invites the viewer to – as Stump says – “drown in its depths.” The designs mesmerize the mind, an insight that the micro view of Antarctic ice can be as compelling as the vast vistas of the macro view.

Those vast vistas are well-represented in the rest of the chapter. We are treated to exquisite images taken all along the Transantarctic Mountains, the series of geologic uplifts extending thousands of miles in bisecting the continent into East and West Antarctica. The immensity of the ice fields, glaciers and the ice tongues that extend the coastal glaciers into the surrounding sea ice are difficult to fully appreciate. Antarctica offers nothing by which to judge scale. Without the narration, one could easily be an order of magnitude off in underestimating the size of the features depicted. That is the frustration of photographing Antarctica.

The Ice is an essay on the many varieties and sizes of ice features common to the Antarctic.

Stump discusses and illustrates each in turn, describing how they are formed and shaped into such beautiful, and often dramatic, configurations.

His second chapter, *The Rock*, covers the second-most prominent physical entity in Antarctica: its geology. Many people unfamiliar with the Antarctic are surprised when they learn that the continent is not all ice but has mountain ranges that rival the greatest in North America. It even has an active volcano: Mount Erebus at the southern end of the Ross Sea. What could have been a dry lecture on geology is, rather, an accessible account of how these features came about. This is not a scientific book, nor does it presume to be. It provides enough explanation for a lay reader to understand and appreciate what they are seeing in the exquisite photographs.

Scale, or lack thereof, once more comes into play in *The Rock* images. In Photo 2.4.5 of Mount Fridtjof Nansen, Stump points out that the relief from peak to base shown in the photo is over 7,500 feet – 1.5 times the depth of the Grand Canyon! There is just no way to judge the immensity of that terrain relief from the photograph alone.

The Wind is devoted to the invisible but powerful force that shapes much of what one sees on the continent. "In the lifeless world of Antarctica," he writes, "the wind is an animate force active in human-time – miles per hour, a heartbeat. It may be fierce, it may be calm, it may be steady, it may be restless or fickle or faint. Sometimes it isn't even there at all. It is the bearer of cloud and the deliverer of snow. It can be a fearsome force, roiling through the mountains." (p191).

Stump's concise explanation of katabatic winds flowing from the polar plateau is especially helpful in understanding how cold, heavy winds barreling unimpeded down the immense glaciers hundreds of miles in length can approach hurricane speeds. In places such as the Dry Valleys near McMurdo Sound, his Gargoyle Ridge photograph illustrates how the persistent winds from the polar plateau shape the exposed rocks in the ice-free valleys into grotesque forms which remain so because the wind is the only form of erosion there.

His fascination with wind-formed ice shapes – particularly sastrugi, the rugged and rippling ice

surface formed by the ever-present winds - is illustrated by the series of photographs from 3.2.1 – 3.2.17. These are all deliberately not captioned or narrated. In this case, less is more; he simply wants the reader to enjoy the limitless expression of nature in the wind-formed ice.

The Spectre and the Glory is a reflection on solitude and the opportunity it gives to perceive things easily overlooked: the ragged shadows of a ridgeline, the ancient tropical mud flat frozen in icy rock, and the atmospheric oddity known as the Brocken Spectre. The latter must be seen in the photograph to be fully appreciated.

Stump saves some of his favorite – and best – photographs for the chapter entitled *The Gallery*. Like the crescendo of an orchestral composition, it hits the reader with a final flourish of photographic beauty. This chapter is a wistful look back at his time in Antarctica, as if he wants to recreate the unique experience that he was privileged to enjoy for 40 years. It is a feeling many of us carry with us from our time there. *If I could go back just one more time Just once more.*

My only criticism of *Otherworldly Antarctica*, perhaps deriving from my career as a cartographer, is that more larger scale maps of specific areas referenced in the book might have been useful. Two general maps are included toward the beginning.

This is more than a "coffee table" book for those willing to make the effort to explore it more deeply. What could have been just an extensive collection of slides stored away in a closet has become a richly illustrated story of one man's long experience and fascination with the most extreme and awe-inspiring continent on Earth. Now we all can share in his story, and in a little bit of his soul.

Ice Cores Provide First Documentation of Rapid Antarctic Ice Loss in the Past

University of Cambridge, Feb. 8, 2024

Researchers from the University of Cambridge and the British Antarctic Survey (BAS) have uncovered the first direct evidence that the West Antarctic Ice Sheet (WAIS) shrank suddenly at the end of the Last Ice Age, around 8,000 years ago.

The evidence contained within an ice core shows that in one location, the ice sheet thinned dramatically, by 450m—more than the height of the Empire State Building—in just under 200 years.

This is the first evidence anywhere in Antarctica for such a fast ice loss. Scientists are worried that today's rising temperatures might destabilize parts of WAIS in the future, potentially passing a tipping point and inducing a runaway collapse. The new study, published in *Nature Geoscience*, sheds light on how quickly Antarctic ice could melt if temperatures continue to soar.

"We now have direct evidence that this ice sheet suffered rapid ice loss in the past," said Professor Eric Wolff, senior author of the new study from Cambridge's Department of Earth Sciences. "This scenario isn't something that exists only in our model predictions and it could happen again if parts of this ice sheet become unstable."

The Antarctic ice sheets contain enough freshwater to raise global sea levels by around 57m. WAIS is considered particularly vulnerable because much of it sits on bedrock that lies below sea level.

Model predictions suggest that a large part of WAIS could disappear in the next few centuries, causing sea levels to rise. Exactly when and how quickly the ice could be lost is, however, uncertain.

One way to train ice sheet models to make better predictions is to feed them with data on ice loss from periods of warming in Earth's history. At the peak of the Last Ice Age 20,000 years ago, Antarctic ice covered a larger area than today. As our planet thawed and temperatures slowly climbed, the WAIS contracted to about its current extent.

"We wanted to know what happened to WAIS at the end of the Last Ice Age, when temperatures on Earth were rising, albeit at a slower rate than current anthropogenic warming," said Dr. Isobel Rowell, study co-author from BAS. "Using ice cores, we can go back to that time and estimate the ice sheet's thickness and extent."

The researchers drilled a 651-meter-long ice core from Skytrain Ice Rise in 2019. This mound of ice sits at the edge of the ice sheet, near the point where grounded ice flows into the Ronne Ice Shelf.

After transporting the ice cores back to Cambridge at -20°C, the researchers analyzed them

to reconstruct the ice thickness. First, they measured stable water isotopes, which indicate the temperature at the time the snow fell. Temperature decreases at higher altitudes (think of cold mountain air), so they were able to equate warmer temperatures with lower-lying, thinner ice.

They also measured the pressure of air bubbles trapped in the ice. Like temperature, air pressure also varies systematically with elevation. Lower-lying, thinner ice has higher-pressure air bubbles.

These measurements told them that ice thinned rapidly 8,000 years ago. "Once the ice thinned, it shrunk really fast," said Wolff, "this was clearly a tipping point—a runaway process."

They think this thinning was probably triggered by warm water getting underneath the edge of the WAIS, which normally sits on bedrock. This likely untethered a section of the ice from bedrock, allowing it to float suddenly and forming what is now the Ronne Ice Shelf. This then allowed neighboring Skytrain Ice Rise, no longer restrained by grounded ice, to thin rapidly.

The researchers also found that the sodium content of the ice (originating from salt in sea spray) increased about 300 years after the ice thinned. This told them that, after the ice thinned, the ice shelf shrunk back so that the sea was hundreds of kilometers nearer to their site.

"We already knew from models that the ice thinned at around this time, but the date of this was uncertain," said Rowell. Ice sheet models placed the retreat anywhere between 12,000 and 5,000 years ago and couldn't say how quickly it happened. "We now have a very precisely dated observation of that retreat, which can be built into improved models."

Although WAIS retreated quickly 8,000 years ago, it stabilized when it reached roughly its current extent. "It's now crucial to find out whether extra warmth could destabilize the ice and cause it to start retreating again," said Wolff.

NZ Reassesses Scott Base Overhaul

By Lucy Craymer, *Reuters*, Feb. 23, 2024

New Zealand is reassessing a proposed overhaul of its Antarctica base after negotiations with a

construction firm reached a deadlock due to budget issues, the government said.

Antarctica New Zealand said it was looking at other options, including revising the current design after it was unable to reach agreement with Leighs Construction.

In 2019, New Zealand unveiled its intentions to revamp the decades-old Antarctica base. Since then, projected costs have surged by more than 50%, prompting the new government that came into power in November to raise concerns.

The National Party-led coalition government, however, remains committed to the project, with Foreign Minister Winston Peters telling parliament it was in the nation's "strategic national interests."

Antarctica New Zealand said in its statement it hoped a revised project plan will be agreed upon by May 2024.

On Thursday, Peters appointed two new members to Antarctica New Zealand's board and said they'd been chosen to ensure the project was delivered in a cost-effective and efficient manner.

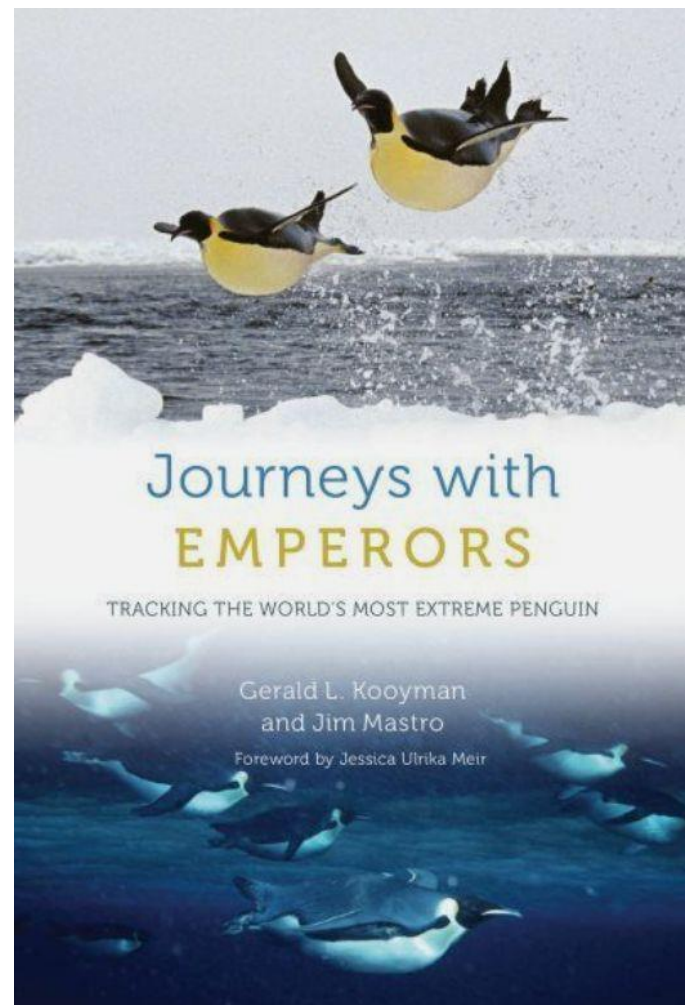
Journeys with Emperors by Gerald Kooyman and Jim Mastro

Reviewed by Kristin Larson

Run to your nearest bookstore for a copy of this much anticipated book from Gerald (Jerry) Kooyman and Jim Mastro. The opus is pure magic in the way it captures the awe and wonder of living amongst emperor penguins, the heartiest creatures on earth. And even more noteworthy is the way it informs the reader how these beautiful birds manage to exist and thrive as the only land-based, warm-blooded species to winter-over far below the Antarctic Circle. The book is so fun to read as Jerry recounts more than 50 years of scientific trial and error, innovation, and frequent brushes with death that the reader hardly notices that they are also learning about the species' natural history.

What I loved most about this book is the way it imparts the near childlike reverence Jerry experienced, not only for his chosen research subject, but also for the landscape he immersed himself in to conduct this work. Another favorite

aspect was learning how he was instrumental in developing key technology, which scientists worldwide now rely on for understanding diving creatures of all types: the time-depth recorder. Starting in the early 1960s, Jerry built the first crude devices and attached them to the backs of his study subjects to determine how deep they were foraging. It turns out they were going 1,500 feet down! Modern TDRs not only record depths, but a full range of physiological and environmental parameters too. This data provides insights on species health, as well as the ecosystems they depend upon.



Jerry partnered with long-term Antarctic and author Jim Mastro to help elucidate the science and add in lyrical context based on Jim's many decades of experience supporting science in Antarctica. The detailed bibliography, index, vivid color plates, and

access to digital video provided throughout the text combine to make it one of the most well-rounded and enjoyable natural history works I have read.

Drone Collects Climate Data

Reuters, Feb. 23, 2024

Scientists are testing new aerial vehicles as they look for more efficient ways to study the frozen continent. The Windracers drone has already flown hundreds of miles capturing information that could help us understand how Antarctica is being affected by climate change.

"Using airborne platforms is a really, really efficient way to collect data because you can cover large areas, you don't actually have to go on to the ground," says Tom Jordan, a BAS aerogeophysicist, explaining that the technology can be incorporated with research on the ground. "By bringing ground observations and the airborne survey together, you can get the full picture of what you need to understand the environment and the ecosystem down here."

"We've got camera systems on for environmental sensing, so we can take photographs and hyperspectral imagery to study the ecology of some of the islands and the bay behind me. Then we've got gravity and magnetic sensors and we use these to look at the geology of rocks underneath the water and underneath the ice, and that's really important for understanding how the ice might flow in the future. And then finally, we've got a radar system that we're going to be testing and this will let us see through the ice so we can study the shape of the landscape buried beneath the ice."

The Windracers drone was developed as part of a pilot program, aimed at demonstrating how advanced drone technology can be used to gather environmental data in Antarctica.

Iran's Navy Intends to Establish Base

Tehran Times, Jan. 28, 2024

The commander of the Iranian Navy has announced the intention to establish a base in the South Pole, aligning with the current global trend of

nations expanding their influence in this strategic region.

Rear Admiral Shahram Irani emphasized that the operational decisions of the Iranian Navy are guided by the precise vision of the Leader of the Islamic Revolution, Ayatollah Seyyed Ali Khamenei. He announced the establishment of strategic commands in the Pacific, Atlantic, and Indian Oceans, with plans for a permanent deployment in these crucial regions in the future.

Highlighting the success of the Navy's 86th flotilla during its mission to sail around the world, Irani noted that it involved 11 months of scientific planning. The goal of traversing the largest ocean for the first time showcased the armed forces' mastery of complex weather and ocean conditions.

Admiral Irani provided details about the integration of 50 years' worth of oceanic meteorological data into advanced software, a crucial element in plotting the course for the unprecedented global journey.

In a notable revelation, Irani shared that the destroyer *Dena* successfully completed its mission around the globe without any damage to its equipment, attracting significant interest and support post-mission. The flotilla featured the domestically manufactured *Dena* and *Makran* forward base ship, which returned on May 17, 2023 after completing the inaugural round-the-world mission, which covered 63,000km in 236 days.

AUV Missing Under Ice Shelf

The Maritime Executive, Feb. 4, 2024

In a blow to research in West Antarctica, Sweden's University of Gothenburg has lost an unmanned underwater vehicle (AUV) under a glacier in the region. The vehicle, owned by the university, was one of a small number of units in the world that have the unique capabilities needed to operate beneath the unstable Thwaites Glacier, commonly referred to as the "Doomsday Glacier."

The seven-meter long AUV - called *Ran* - disappeared last weekend during an expedition with the South Korean icebreaker *Araon*. The AUV was part of a project led by Professor Anna Wählén, one

of the six participants from University of Gothenburg on board the icebreaker.



Swedish *Ran* AUV
Photo by Anna Wahlin

“This was the second time we took *Ran* to Thwaites Glacier to document the area under the ice. Thanks to *Ran*, we became the first scientists in the world to enter Thwaites in 2019, and during the current expedition we have visited the area again. Even if you see melting and movements in the ice from satellite data, from *Ran* we got close-ups of the underside of the ice,” said Prof. Wåhlin.

With scientists increasingly mapping the impacts of climate change in the polar regions, melting glaciers and ice sheets have become a main concern. Most studies are focusing on the nexus between ice loss and sea level rise, which could be detrimental to ecosystems far from polar regions.

According to recent studies, the Antarctic ice sheet contains enough ice to raise global sea-levels by about 58m. Most of this ice is held in East Antarctica, which is thought to be relatively stable.

However, a sizeable portion is held in West Antarctica, which is considered less stable and has been losing mass in the past decade. This poses a threat of raising sea-levels by around 5m. Much of the ice-loss has been recorded within the Thwaites Glacier, which flows into Amundsen Sea in West Antarctica. The glacier is considered highly vulnerable to warming.

If the Thwaites collapses entirely, scientists

project that it would raise global sea levels by around 65 cm.

For this reason *Ran*'s measurements received a lot of attention, and not only among polar scientists. During its dives under the 200-500 thick ice, *Ran* did not have continuous contact with the research vessel. Its route was programmed in advance, and thanks to its advanced navigation system, *Ran* could find its way back to the open water.

Last month, *Ran* completed several successful dives under Thwaites. Unfortunately, during the last planned dive of the expedition, *Ran* did not appear at the programmed rendezvous, and after an extensive search, was declared lost. Wåhlin notes that the university team got five years of service and 10 research missions out of the AUV, and that the importance of the study made it worth the risk to the equipment. "Our aim is to replace *Ran*," she said. "We will be looking for a financier to cover the deductions made by the insurance company and the price increase that has occurred over the years."

Russia's New Vostok Station Opens

Russia Beyond, Arctic and Antarctic Research Institute, Feb. 1. 2024



New Vostok Station

Russian polar explorers have opened a new wintering complex at Vostok. Living conditions there are the most extreme. Five months of polar night, low oxygen content, remoteness from the sea (about 1,500 km) and almost all year round minus temperatures. The station itself was founded in 1957 and, in 1983, Earth's lowest temperature was recorded there: minus 89.2°C!

The new complex will use the most modern Russian-made equipment. It consists of five modules: two residential, two engineering, where the necessary equipment is kept, as well as one with a garage and a workshop. In winter, this station will accommodate up to 15 people and, in summer, 35.

Vostok is one of the five permanent Russian bases in the Antarctic. It is the most southern and also the highest, located at 3,500m above sea level.

Directly beneath the station is subglacial Lake Vostok, from which the first core of freshly frozen lake ice was obtained on Jan. 10, 2013.

El Niño May Have Kicked Off Thwaites

By Grace van Deelen, *Eos*, Feb. 26, 2024

Antarctica's Thwaites Glacier is currently losing significant mass, contributing to around 4% of all global sea level rise. New research suggests that the start of Thwaites's current retreat aligns with that of the nearby Pine Island Glacier, which is also losing mass rapidly.

The findings, published in PNAS, indicate that the mass loss was more likely spurred by regional conditions, such as an El Niño event, rather than dynamics unique to the glaciers themselves.

Thwaites and its neighbor, Pine Island Glacier, are part of the West Antarctic Ice Sheet, the area of the continental ice sheet that is retreating most quickly. Scientists have observed accelerating ice loss from Thwaites since the 1970s, mostly via satellite data. But satellite data are "really not enough of a record to understand what controls such a big system," said Julia Wellner, a glacial geologist at the University of Houston and an author on the paper. Understanding the glacier's presatellite past helps scientists know "what the ice is capable of," she said. "How fast can it really change? And what mechanisms drive that change?"

In the new study, researchers used marine sediment cores collected from near the Thwaites Glacier in 2019. The team dated the sediment in the cores using lead-210, a radioactive isotope present in the ocean and binds to sediment as it settles onto the seafloor. The ratio of lead-210 in sediment

compared to its radiogenic daughter products can tell scientists when the sediment was deposited.

The cores also showed a visible transition from sediment deposited beneath a glacier to marine sediment, marking when the glacier retreated from its foothold on the ocean floor. The analysis is "amazing, quality scientific work," said David Holland, a physical climate scientist at New York University not involved in the new research.

The analysis showed that Thwaites likely began to retreat around the 1940s, coinciding with the beginning of a retreat at neighboring Pine Island Glacier that had been determined previously.

The results are in line with evidence provided by a series of parallel ridges in the seafloor near Thwaites, which researchers say indicates a period of rapid retreat that likely occurred in the 1940s.

Evidence that both glaciers began retreating around the same time indicates that the glacial mass loss is driven not by factors unique to the glaciers themselves, such as their shapes or the structures of their internal plumbing, but by external factors such as region-wide shifts in climate.

In particular, a prolonged El Niño that occurred from 1939 to 1942 could have spurred the retreat of both glaciers, the authors say. El Niño events tend to bring warmer-than-average temperatures to the Southern Ocean and cause warm water to flow onto the continental shelf upon which the Thwaites Glacier sits, they explain.

The radiocarbon dating they did showed that the edge of the Thwaites Glacier was near its current position around 9,400 years ago and was relatively stable until modern retreat started around the 1940s.

The study implies that even a short-term change in regional climate, such as the 1940s El Niño, can cause long-term glacial retreat, said study coauthor James Smith, a marine geologist at BAS.

It makes "perfect sense" that an El Niño event would kick off the retreat, Holland said. Distant changes in the tropics, such as an event in the El Niño–Southern Oscillation weather phenomenon, can create wind patterns and ocean conditions near Thwaites that would lead to glacial retreat, he said.

Why the glaciers did not quickly recover from the 1940s perturbations is an open question, according to Wellner. She hypothesized that

multiple destabilizing factors in addition to an El Niño event could have combined to weaken the glacier. Additionally, both Thwaites and Pine Island Glaciers are grounded in very deep water, meaning that once their footholds are lost, it's very difficult for them to gain back any lost mass. "Once the system is kicked out of balance," she said, "the retreat is ongoing."

Attributing the start of the glacial retreat to the 1940s El Niño event or to other causes such as human-caused climate change is a task for a future analysis, she added: "Because we know these two glaciers are retreating in conjunction with each other, we are looking for external drivers. And the external drivers that happen around the right time are increased anthropogenic warming." But directly pinpointing the cause of the retreat is a "step farther" than what the new paper shows, she said.

80 mph Speed Record for Glacier Fracture

University of Washington, Feb. 28, 2024

What will happen to these Greenland and Antarctic glaciers over the coming decades is the biggest unknown in the future of rising seas, partly because glacier fracture physics is not yet fully understood.

A critical question is how warmer oceans might cause glaciers to break apart more quickly. UW researchers have demonstrated the fastest-known large-scale breakage along an Antarctic ice shelf. The study, recently published in *AGU Advances*, shows that a 10.5km crack formed in 2012 on Pine Island Glacier — a retreating ice shelf that holds back the larger West Antarctic ice sheet — in about 5 and a half minutes. That means the rift opened at about 35m/second, or about 80 miles per hour.

"This is to our knowledge the fastest rift-opening event that's ever been observed," said lead author Stephanie Olinger, who did the work for her doctoral research at UW and Harvard and is now a postdoc at Stanford University. "This shows that under certain circumstances, an ice shelf can shatter. It tells us we need to look out for this type of behavior in the future."

A rift is a crack that passes all the way through the roughly 300 meters of floating ice for a typical Antarctic ice shelf. These cracks are the precursor to ice shelf calving. Such events happen often at Pine Island Glacier — the iceberg observed in the study has long since separated from the continent.

"Ice shelves exert a really important stabilizing influence on the rest of the Antarctic ice sheet. If an ice shelf breaks up, the glacier ice behind really speeds up," Olinger said. "This rifting is essentially how Antarctic ice shelves calve large icebergs."

In other parts of Antarctica, rifts often develop over months or years. But it can happen more quickly in a fast-evolving landscape like Pine Island Glacier, where researchers believe the West Antarctic Ice Sheet has already passed a tipping point on its collapse into the ocean.

Satellite images provide ongoing observations. But orbiting satellites pass by each point on Earth only every three days. What happens during those three days is harder to pin down, especially in the dangerous landscape of a fragile Antarctic ice shelf.

For the new study, the researchers combined tools to understand the rift's formation. They used seismic data recorded by instruments placed on the ice shelf by other researchers in 2012 with radar observations from satellites.

Glacier ice acts like a solid on short timescales, but it's more like a viscous liquid on long timescales. "Is rift formation more like glass breaking or like Silly Putty being pulled apart? That was the question," Olinger said. "Our calculations for this event show that it's a lot more like glass breaking."

WMO Sounds Red Alert for Heat

Reuters, March 19, 2024

Every major global climate record was broken last year and 2024 could be worse, the World Meteorological Organization (WMO) said.

The United Nations weather agency said in its annual State of the Global Climate report that average temperatures hit the highest level in 174 years of record-keeping by a clear margin, reaching 1.45°C above pre-industrial levels. Ocean

temperatures also reached the warmest in 65 years of data with over 90% of the seas having experienced heatwave conditions during the year.

"The WMO community is sounding the Red Alert to the world," said WMO Secretary-General Celeste Saulo. "What we witnessed in 2023, especially with the unprecedented ocean warmth, glacier retreat and Antarctic sea ice loss, is cause for particular concern."

WMO's head of climate monitoring, Omar Baddour, told reporters there was a "high probability" that 2024 would set new heat records, saying that the year after an El Nino was typically warmer still.

Diana Wall, 1943-2024

News & Observer, April 7, 2024



Diana Wall in the Dry Valleys 2017

Diana H. Wall, whose interdisciplinary research in the Dry Valleys uncovered dramatic impacts to invertebrate communities in response to climate change, as well as the key role that nematode species play in soil carbon turnover, died March 25. She was a long-time member of our Society.

She earned a BA, in Biology, and PhD in Plant Pathology from the University of Kentucky. She was a staunch supporter of women's rights, having encountered blatant gender discrimination early on.

A soil ecologist, after 20 years at UC-Riverside, Dr. Wall was at Colorado State University from 1993 until her death. She was the Director of the

CSU School of Global Environmental Sustainability (SoGES). Read more about her career and impact at: <https://source.colostate.edu/diana-wall/>.

In 1989, Dr. Wall and an extraordinary group of scientist-friends began an NSF Long-Term Ecological Research project in the Dry Valleys of Antarctica. Their research proved that her beloved nematodes (microscopic roundworms) topped the food chain in the Dry Valleys. She and her team embraced the nickname "Wormherders," creating t-shirts to commemorate their teams.



Diana Wall Lecturing

Wall Valley in Antarctica was named in her honor. She was the 2013 Tyler Prize for Environmental Achievement Laureate; a member of the National Academy of Sciences & American Academy of Arts and Sciences, chaired the Council of Scientific Society Presidents, and served as President of ESA, AIBS, and the Society of Nematologists. She was proud to chair the Global Soil Biodiversity Initiative, which together with the European Union Joint Research Initiative, released the "Global Soil Biodiversity Atlas" in 2016. Wall was also a fellow of the American Association for the Advancement of Sciences and was awarded the Ulysses Medal and the Scientific Committee on Antarctic Research President's Medal for Outstanding Achievement in Antarctic Science.



The Antarctic Society

webmaster@antarctican.org

August 11-14, 2024 Boulder, CO Gathering Registration

Name (s) _____

Address _____

Email _____ Phone _____

Registration

_____ \$275.00 Full Registration per person. Increases to \$300.00 on June 1, 2024. 50% refund until June 1, 2024.

Full Registration includes the day programs, 2 lunches, Reception on Monday evening, Auction on Tuesday, and the Tour and Picnic on Wednesday.

_____ \$125.00 Guest Registration(s) per person

Guest Registration includes the Reception, 2 lunches, Auction, Tour and Picnic **only**. The day programs are **not** included.

Guest(s): _____

\$_____ Donation

Donations toward the Gathering are very much appreciated and are tax deductible.

Do you or another of your registrants have ADA accessibility needs? Yes No

Please indicate the need: _____

Do you or another of your registrants have a special dietary need? Yes No

Please indicate the need: _____

Proceed to page 2 if you wish to reserve a lodging unit on the Chautauqua campus.

August 11-14, 2024 Boulder, CO Gathering Lodging

Lodging Reservation and Deposit

The Antarctic Society has reserved and paid for 45 lodging units on the Chautauqua campus. Registrants may select and hold the lodging unit of their choice by indicating the type of unit and paying a deposit of one day's lodging cost for the selected unit. The balance of the lodging cost will be due by June 1, 2024. Deposits may be refunded only if another registrant agrees to assume the reservation for that unit.

THERE ARE NO AVAILABLE COLORADO CHAUTAUQUA LODGING UNITS AT THIS TIME.

To get on the waiting list in case of cancellations, contact Liesl Scherthanner at:

antarctican.org.president@protonmail.com

Total Registration and Lodging Deposit

\$ _____ Total Registration and Donation (from page 1)

\$ _____ Total Registration and Donation

Mail your check and registration form to:

The Antarctic Society
35 Cherry Street, Unit 701
Burlington, VT 05401

or go to the 2024 Gathering page on the Antarctic Society website to pay by credit card.