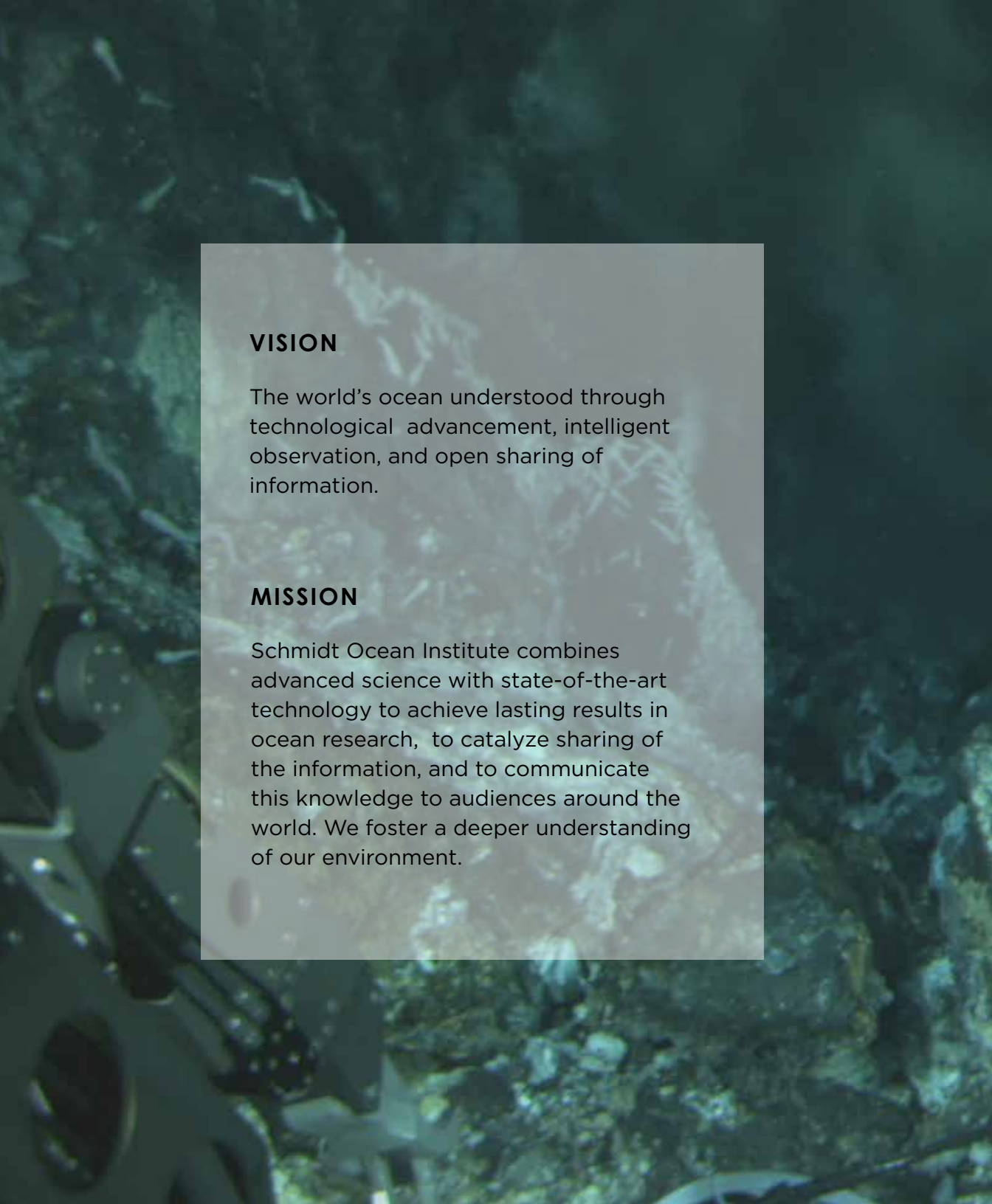
2013 ANNUAL REPORT



VISION

The world's ocean understood through technological advancement, intelligent observation, and open sharing of information.

MISSION

Schmidt Ocean Institute combines advanced science with state-of-the-art technology to achieve lasting results in ocean research, to catalyze sharing of the information, and to communicate this knowledge to audiences around the world. We foster a deeper understanding of our environment.

A frame grab of live HD video captured by HROV Nereus at the Mid-Cayman Rise in June of 2013. HROV Nereus was operated from R/V Falkor at the depths of 2.5 - 5 km to investigate deep ocean hydrothermal vent systems.

R/V Falkor transiting near Vancouver Island, British Columbia in September 2013

TECHNOLOGY FOR THE OCEANS

ERIC SCHMIDT, *President*
WENDY SCHMIDT, *Vice President*
Founders of Schmidt Ocean Institute

Schmidt Ocean Institute connects marine scientists with innovative technologies at sea.

We operate and continuously refine research vessel *R/V Falkor* to proudly maintain her as one of the world's most technologically advanced seagoing scientific facilities. Researchers from around the globe compete for the right to work aboard *R/V Falkor*, and Schmidt Ocean Institute supports the projects that reveal the best applications of modern technology to understand the oceans.

As a research facility operator, Schmidt Ocean Institute emphasizes operational, technological, and informational aspects of ocean sciences. We believe that the current technological boom can accelerate the pace of all fields of oceanography. As we outfit *R/V Falkor* to meet the demands of diverse projects, we focus on improving research workflows across all ocean sciences, from technologically advanced marine operations to intelligent observation, open information sharing, and effective communication of research outcomes.

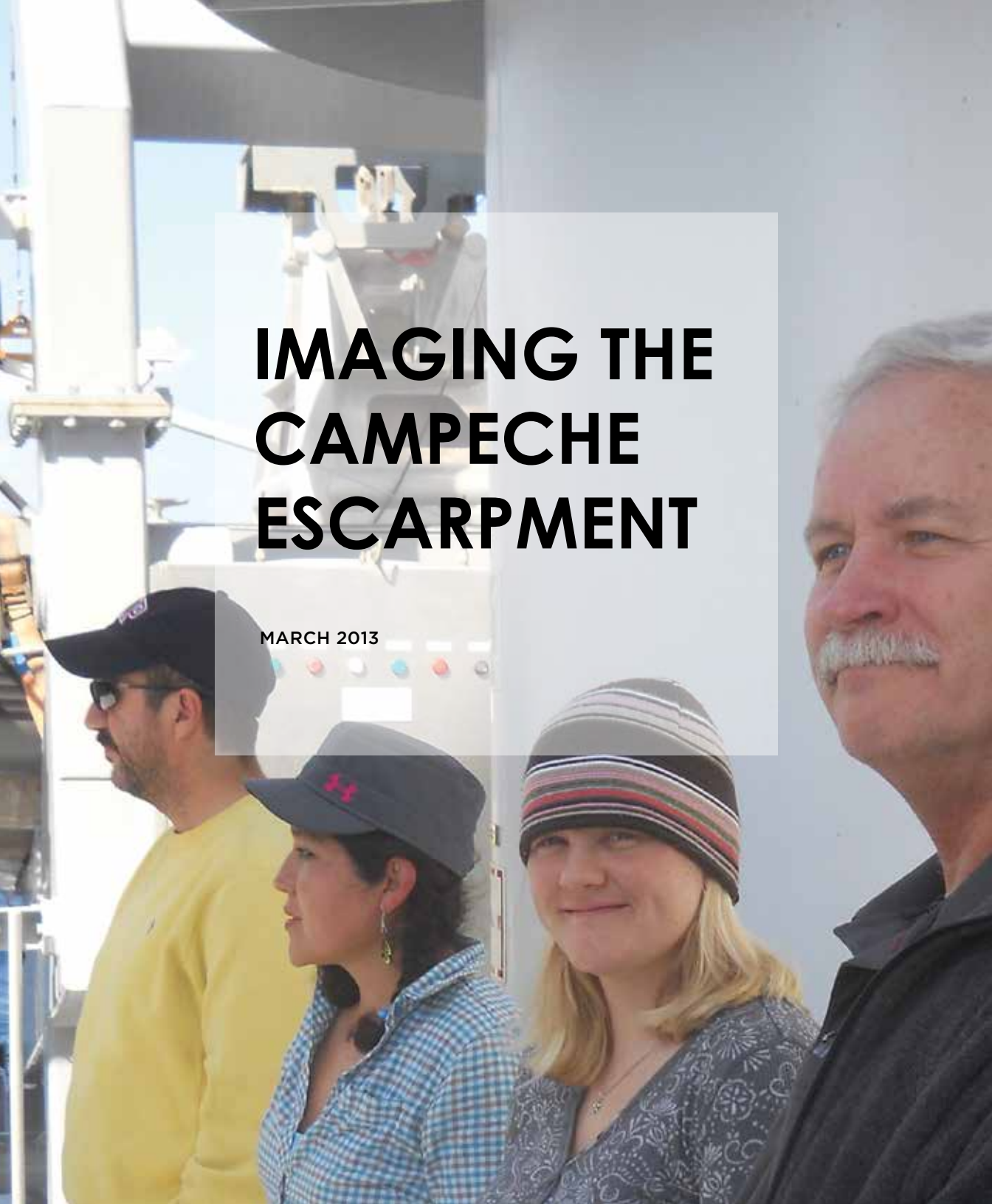
2013 was a remarkable year for Schmidt Ocean Institute and *R/V Falkor*, a year of learning and innovation. In its first full year of committed scientific operations, *R/V Falkor* transited over

11,000 nautical miles across the Atlantic Ocean, Gulf of Mexico, and Pacific Ocean; hosted hundreds of visitors in 7 different cities; conducted 6 successful oceanographic projects; accommodated 84 marine scientists representing 24 organizations from 9 different countries for a total of 100 days of scientific operations at sea; mapped over 20,000 square kilometers of seafloor; and supported 60 days of scientific operations with 2 deep sea remotely operated robotic vehicles onboard while streaming live video from thousands of meters under the sea to YouTube.

The following sections of this report describe the projects that *R/V Falkor* supported in 2013 and highlight our commitment to challenging the limits of technology to advance the pace of marine sciences. For the first time, over 20,000 square kilometers of the largest, yet previously poorly understood, geological feature of the Gulf of Mexico, Campeche Escarpment, has been imaged with *R/V Falkor* sonars and, within 6 months, visualized on Google Earth. For the first time, a full ocean depth rated hybrid remotely operated vehicle, *Nereus*, was deployed in support of an oceanographic research project – exploring hydrothermal vent fields at the Mid-Cayman Rise.

For the first time, live high-definition video was streamed from 5000 meters depth to YouTube and recorded for posterity. Also, for the first time, anyone around the world can explore all compartments of the globally capable research vessel (*R/V Falkor*) by taking her comprehensive inner-space Google Street View tour online. To foster a productive dialog with our global scientific user community, Schmidt Ocean Institute convened leading ocean researchers, technology developers, and operations experts from around the world to our inaugural research symposium entitled "Accelerating the pace of ocean science through technological advancement and open sharing of information." The numerous resulting interactions reaffirmed the central role technology and innovation play in enabling the three critical themes of modern marine sciences: communications, observations, and discovery.

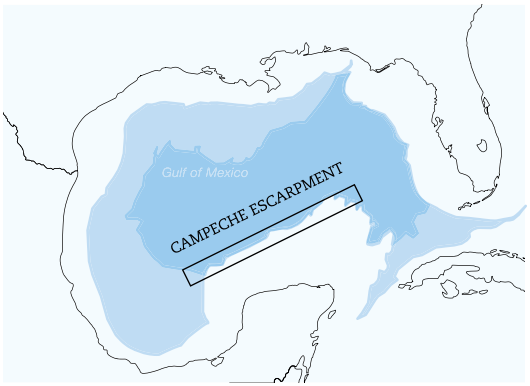
As an oceanographic facility operator, Schmidt Ocean Institute focuses on workflow improvement across the diverse range of ocean sciences, seeking to fill the niche of technologically advanced marine operations, engineering, and information sharing. In 2013, our young organization had several opportunities to pursue these goals, and we describe our achievements in the following sections of this report.



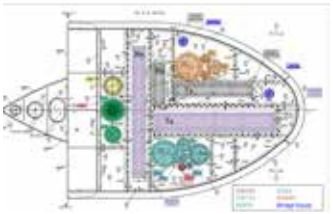
IMAGING THE CAMPECHE ESCARPMENT

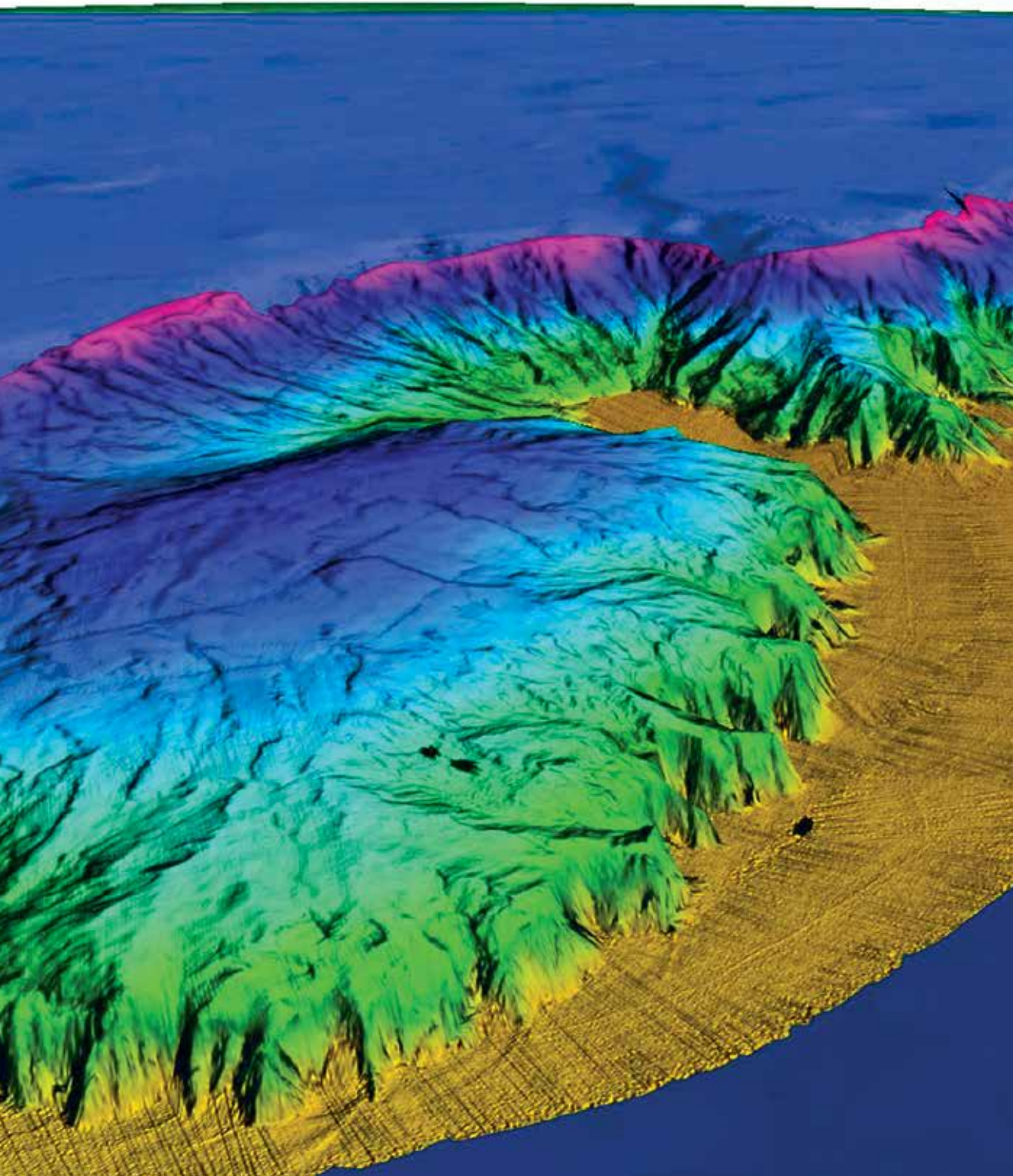
MARCH 2013

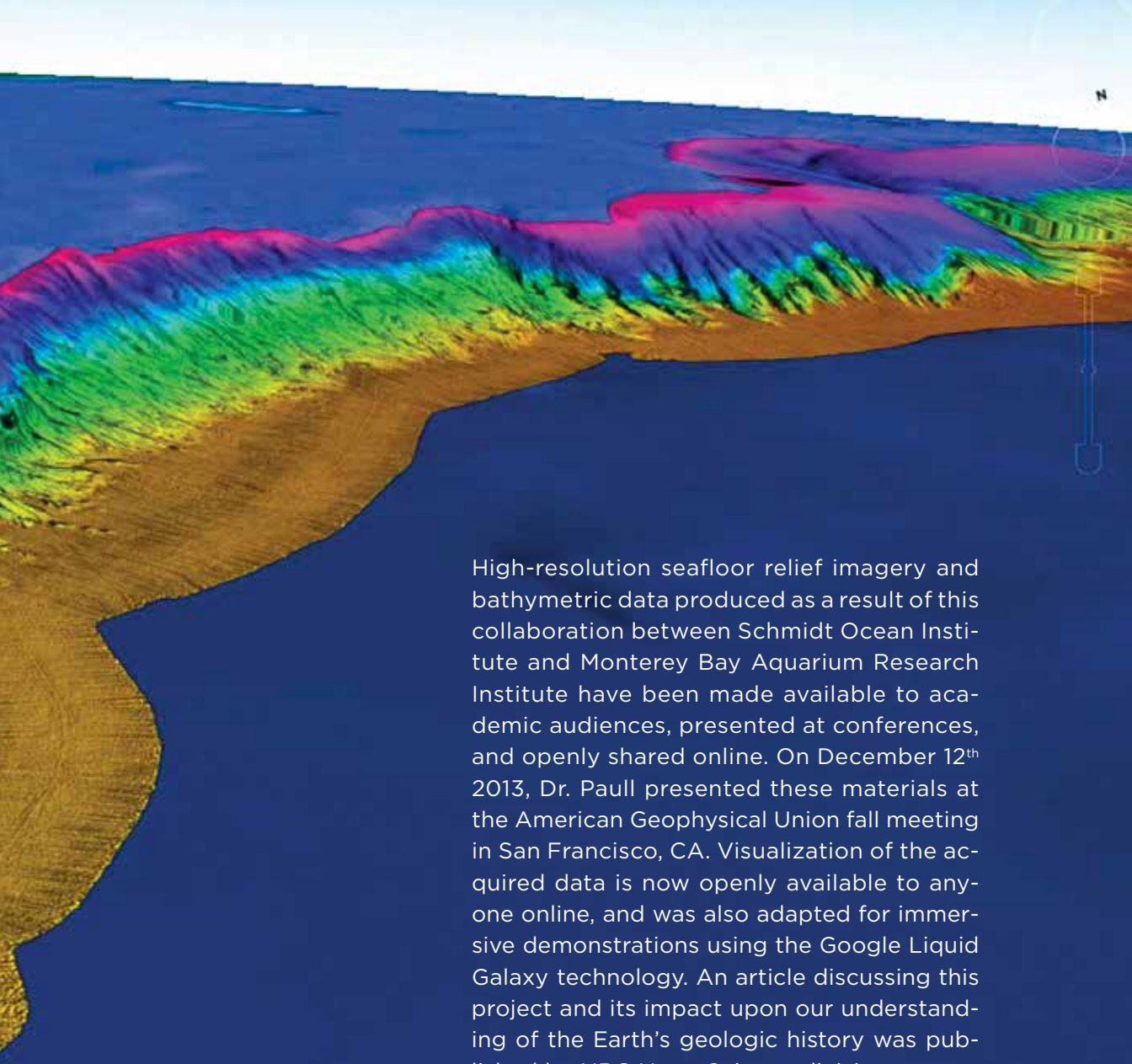
About 65 million years ago, an asteroid or comet crashed into a shallow sea near what is now the Yucatán Peninsula of Mexico. The resulting firestorm and global dust cloud caused the extinction of many land plants and large animals, including most of the dinosaurs. The event also produced a massive crater, devastated a wide region surrounding the Gulf of Mexico, stimulated a massive slope failure that covered the floor of the Gulf of Mexico, and indelibly marked the Cretaceous - Paleogene (K-Pg) Boundary with distinctive sediments world-wide. Dr. Charlie Paull of the Monterey Bay Aquarium Research Institute has long suspected that rocks associated with the impact might be exposed along the Campeche Escarpment, a 600-kilometer long underwater cliff just northwest of the impact crater on the Yucatán Peninsula. Nearly 4,000 meters tall, the Campeche Escarpment is one of the steepest and tallest underwater features on Earth. It is comparable to one wall of the Grand Canyon except that it lies thousands of meters beneath the sea.



Even before *R/V Falkor* had returned to port, the high-resolution relief images of the entire Campeche Escarpment had been posted online on Schmidt Ocean Institute's website. Since then, the data from this cruise have been incorporated into Google Oceans, making them available for reference to the scientific communities and general public. The raw multibeam data set will reside in the National Geophysical Data Center, where it will be readily available for reference or re-processing to any interested researchers around the world. Dr. Paull said, "I view this as an interesting experiment to evaluate whether rapid release of the multibeam data increases its utility and ultimately the scientific impact of the cruise."





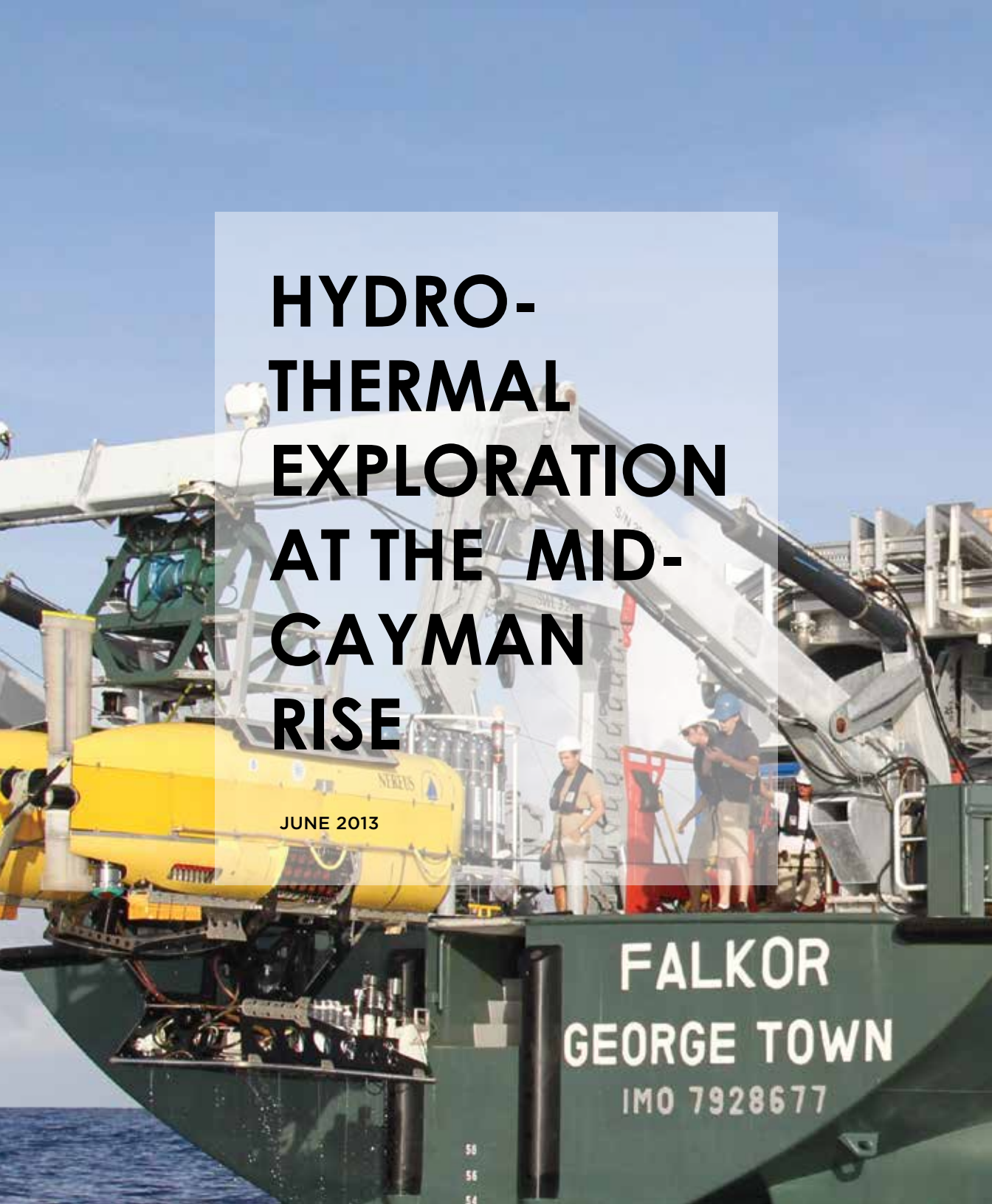


High-resolution seafloor relief imagery and bathymetric data produced as a result of this collaboration between Schmidt Ocean Institute and Monterey Bay Aquarium Research Institute have been made available to academic audiences, presented at conferences, and openly shared online. On December 12th 2013, Dr. Paull presented these materials at the American Geophysical Union fall meeting in San Francisco, CA. Visualization of the acquired data is now openly available to anyone online, and was also adapted for immersive demonstrations using the Google Liquid Galaxy technology. An article discussing this project and its impact upon our understanding of the Earth's geologic history was published by NBC News Science division.

Google earth

HYDRO-THERMAL EXPLORATION AT THE MID-CAYMAN RISE

JUNE 2013

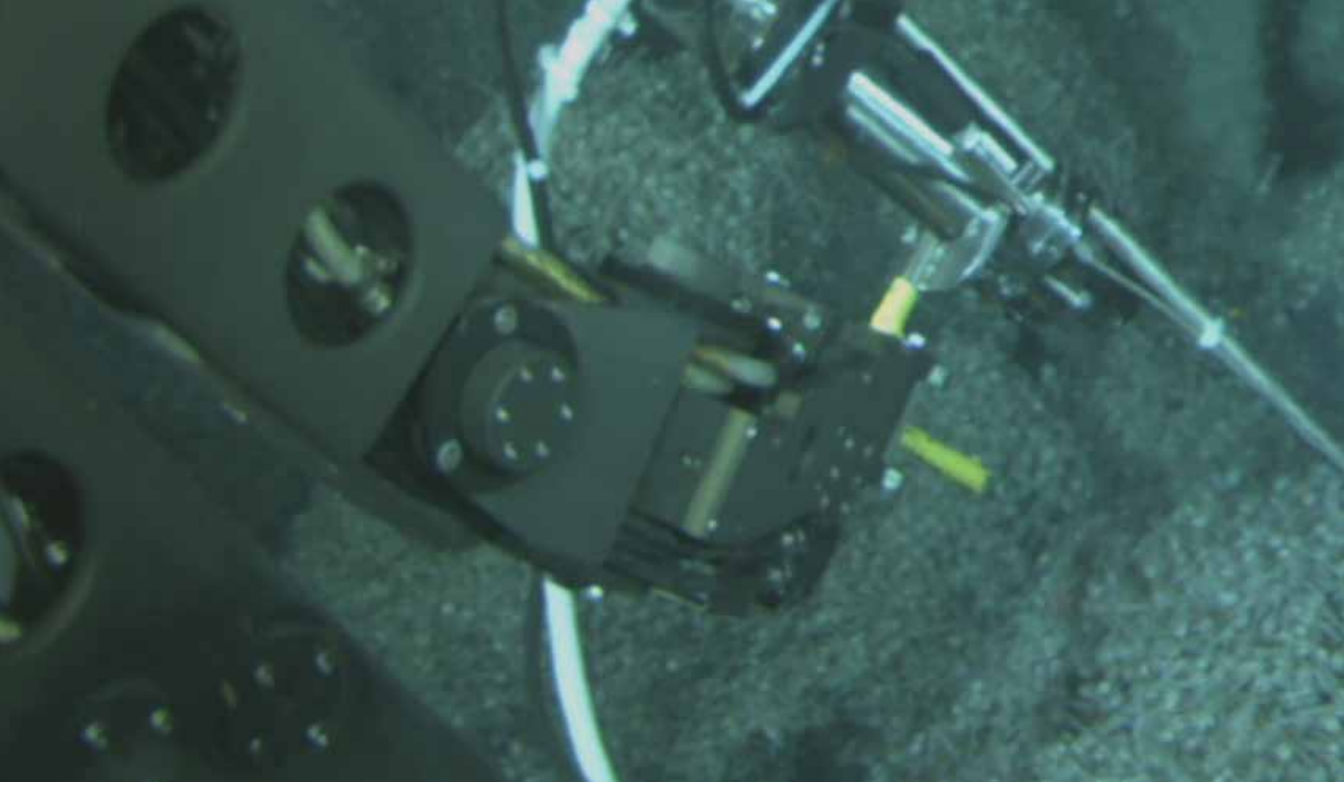


In June 2013, *R/V Falkor* supported an international research team led by Dr. Chris German from Woods Hole Oceanographic Institution (WHOI). This study targeted the Mid-Cayman Rise, Earth's deepest and slowest spreading mid-ocean ridge, home to diverse and remarkably abundant habitat surrounding deep submarine hydrothermal vents. Hybrid underwater robotic vehicle *Nereus* was used to trace chemical and thermal plume signals in the deep water to locate their origins at the Piccard and Von Damm vent fields, first discovered in 2009. The team also aimed to explore for two new hydrothermal vent fields, Europa and Walsh to better understand the limits to which life can exist in such extreme environments. This was the first time that Schmidt Ocean Institute had supported operations of the state-of-the-art deep submergence vehicle *Nereus* aboard *R/V Falkor*.

R/V Falkor hosted a variety of scientific operations during the two legs of the cruise, including CTD casts, multibeam mapping, and deployments of HROV *Nereus* as both Autonomous Underwater Vehicle (AUV) and Remotely Operated Vehicle (ROV) for mapping, sampling, and data collection. One of *Falkor*'s notable features is that she is very acoustically quiet, which is helpful when collecting high quality acoustic data such as seafloor maps.

HROV *Nereus* provided the research team with an additional source of high-resolution seafloor mapping data and enabled interactive research and sample collection at the vent sites. Live video captured by HROV *Nereus* was streamed to YouTube and around the world using *R/V Falkor*'s satellite Internet connection.

Swatch seafloor mapping and the data from conductivity, temperature, and depth (CTD) profiles collected during the first leg of the expedition indicated the potential presence of previously unknown current patterns near the seafloor, which the researchers are now able to start interpreting. While operating in an AUV mode, *Nereus* dove to the Von Damm vent site and collected new magnetic data sets which had not been available previously, and may provide insights into the sub-seafloor plumbing for the Von Damm vent field.



Notably, scientific data sets collected by HROV *Nereus* during the first leg of this cruise were among the very first scientific data sets ever collected by this vehicle in an AUV mode since the vehicle was launched in 2009.

Following the AUV operations, HROV *Nereus* was converted into ROV mode and outfitted with high definition cameras donated by James Cameron. These cameras were originally developed for the Deepsea Challenger vehicle. This was the first project where HROV *Nereus* was used in a sustained oceanographic research program, as opposed to a technology R&D program and performing routine scientific operations. Using HROV *Nereus* in ROV mode, the researchers collected high temperature vent fluids and geological and biological samples, and conducted in-situ measurements. The state-of-the-art high-definition cameras provided the global community with a rare live view of the hydrothermal habitats online via Schmidt Ocean Institute's web site and YouTube. Throughout the HROV dive program, Schmidt Ocean Institute staff and scientists onboard *R/V Falkor* tweeted links to the live dive feeds and commentary about the ongoing activities.

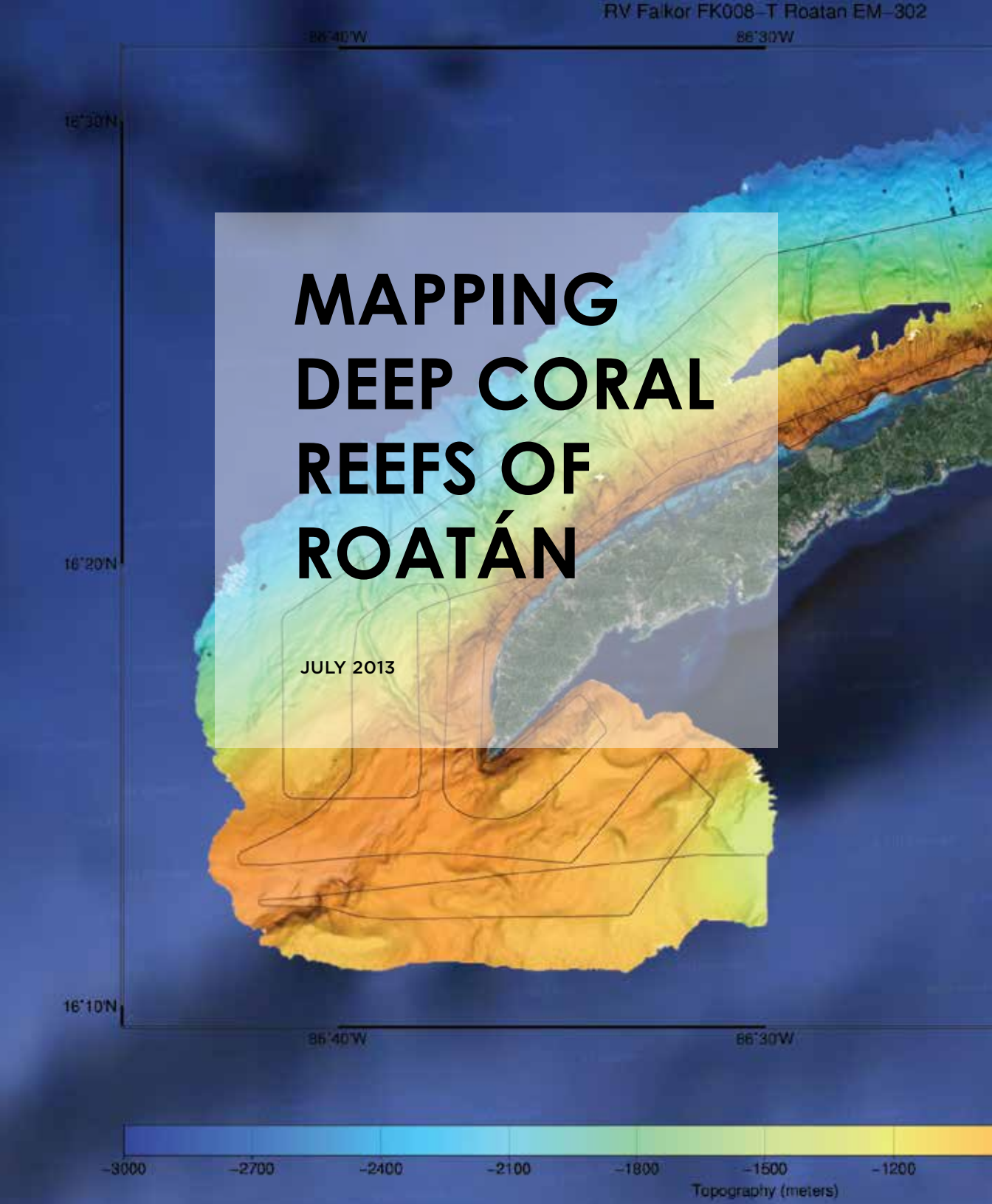
HROV Nereus preparing to take a temperature measurement of hydrothermal fluids while capturing video of shrimp, anemonies, and other inhabitants of hydrothermal vent ecosystems at the Mid-Cayman Rise in June of 2013.

"Watching Nereus live from my office is almost like being in Falkor's control room!"

DR. CODY SHEIK, UNIVERSITY OF MICHIGAN GEOMICROBIOLOGY LABORATORY

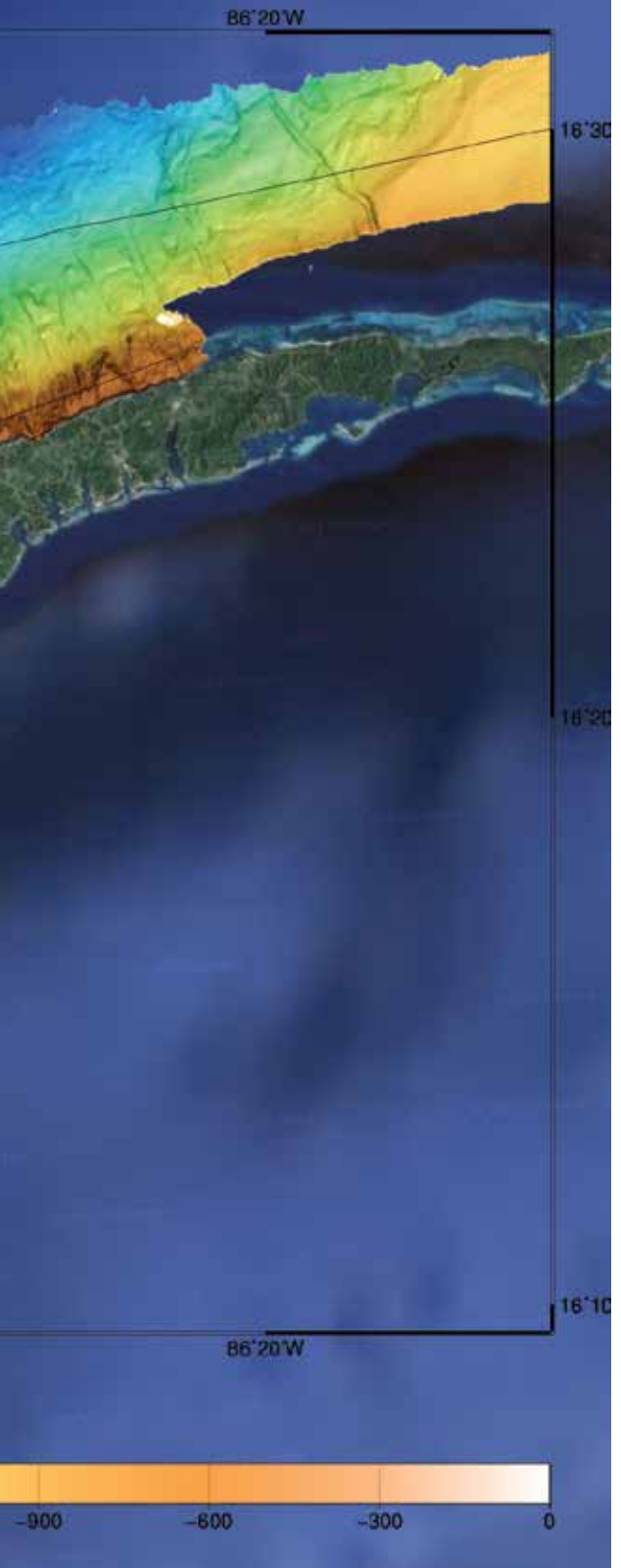
This was the first time an entire *Nereus* dive sequence was not only streamed live over the Internet, but also simultaneously archived online. With approximately 60 hours of high-definition HROV video recorded on YouTube for posterity, we hope to have established a precedent for the future research projects.

After this expedition, Dr. German remotely participated in another cruise back to the two visited vent sites, which he believed host a new style of venting, never seen before. He was able to direct the robotic vehicles to revisit the *R/V Falkor's* Leg 1 study area and found low temperature and relatively weak fluid flow seeping out from a hillside. Rock fractures in the hillside caused sinkholes in the sediment and created pathways for fluid to flow from under the seafloor, just as he had expected, but had not witnessed this previously.



MAPPING DEEP CORAL REEFS OF ROATÁN

JULY 2013



R/V Falkor completed the first-ever high-resolution map of deep reefs near the island of Roatán in Honduras. The Roatán escarpment is believed to be one of the steepest in the world, plunging to 2,500 meters depth within 5 kilometers off shore.

Dr. Peter Etnoyer, a marine ecologist at NOAA's National Centers for Coastal Ocean Science, and his colleagues, with support from Schmidt Ocean Institute, have been exploring the deeper slopes on the Meso-American Barrier Reef off Roatán's coast. Previously existing maps for the reefs were poor resolution, about 1km, which is insufficient to discern the rocky plateaus and outcroppings where corals are likely to be found. *R/V Falkor*'s echosounders created maps with resolution in the 5 to 10-meter range, which reveals those critical features. Systematic explorations of this biologically rich deep sea environment are now possible where they were not before.

Within only 12 hours on July 10, 2013, the ship's personnel mapped approximately 650 square kilometers of the reef in depths ranging between 50 and 2,500 meters depth. This new resource will catalyze research on the deep Meso-American Reef and facilitate conservation and management of Roatáns deep-sea reefs.

DYNAMICS OF HYPOXIA ON THE WEST COAST OF CANADA

AUGUST 2013

Leg 1: Collecting Basic Oxygen Measurements

Led by Dr. Richard Dewey from the University of Victoria and Ocean Networks Canada, a team of Canadian researchers aimed to collect basic oxygen and other oceanographic measurements around Vancouver Island, in order to better understand the paths that deep, low-oxygen waters take as they move inland. Two cabled observatories, NEPTUNE and VENUS provide vast amounts of information about sea water at fixed locations offshore and inshore, but miss some of the story on how the deep water moves from the ocean's abyss to the continental shelf inland and into coastal waters. This research cruise focused on measuring seawater characteristics along the most likely paths (similar to rivers and creeks, but submerged) for the flow of the low-oxygen waters, with hydrographic and tidal flows directed by submarine landscape. The data collected will provide a foundation for future studies and will also lead to a better understanding of Canadian coastal waters.

One of the key scientific systems used during this cruise was the Moving Vessel Profiler (MVP). MVP is designed to repetitively deploy various instruments such as oxygen sensors, through the full water depth while towed behind a

research vessel, yielding a constant stream of collected data and enabling efficient studies of large areas.

Altogether, the MVP was towed for nearly 2,500 kilometers during 10 surveys, with each survey ranging in duration from 12 to 40 hours, creating thousands of profiles. The MVP was used to characterize vertical sections of water across large topological features, such as a shelf break and axes of canyons. Between MVP sections, CTD rosette casts were conducted to cross-reference and calibrate the MVP measurements.

To augment the basic chemical data collection, *R/V Falkor*'s sonar system was utilized to map the bottom topography that controls water movement. The sonars were also used to quantify the

plankton and fish present in the study areas, and measure currents in the region.

Although data analysis continues, preliminary results suggest that during the late summer (August), the relative roles of the various canyons cutting into and across the continental shelf west of Vancouver Island may shift. Previous measurements from earlier in the summer (June) had indicated the Juan de Fuca Canyon, cutting through the continental shelf and connecting the continental slope with the Juan de Fuca Strait, played an important role in bridging a pathway from offshore to inshore. However, the data collected during the August 2013 *R/V Falkor* cruise did not fully support this. Deep water from the continental slope appeared to spill onto the shelf at the head of Barkley Canyon, feeding a region of relatively low-oxygen water on the midshelf.

These results will help the scientists to better understand the exchanges between offshore and inshore regions, and in particular, the avenues taken by low-oxygen deep water, which is known to have potentially disastrous consequences on nearshore ecosystems.

GO FURTHER

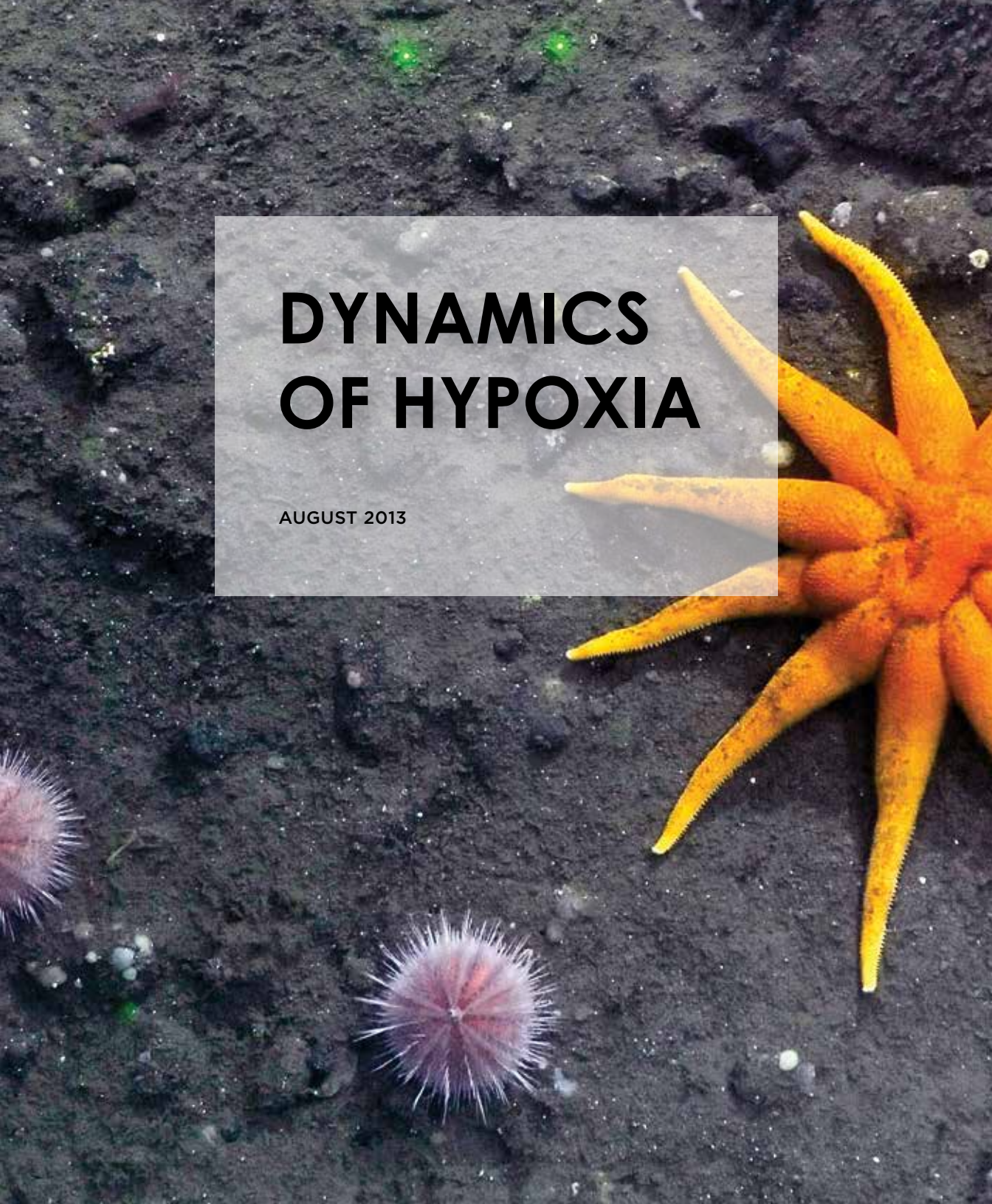
Scan to take a virtual tour of R/V Falkor.

http://goo.gl/1Dsnsz

YEAR OF FIRSTS

R/V FALKOR MAKES ITS FIRST PANAMA CANAL PASSAGE

In mid-July, *R/V Falkor* transited through the Panama Canal for the first time in the vessel's 32 year history. After departing Montego Bay, Jamaica, *R/V Falkor* motored towards Cristobal, the Caribbean Gate to the Panama Canal. The ship was prepared and cleared in and started the Panama Canal Passage on July 13th. *R/V Falkor* had a smooth evening passage through the Gatun locks, Lake Gatun, the Cut and eventually through the locks Pedro Miguel and Miraflores. *R/V Falkor* entered the Pacific Ocean in the morning of July 14th.



DYNAMICS OF HYPOXIA

AUGUST 2013

Leg 2: Video records of life in low-oxygen zones

During the second leg of the research cruise, led by Dr. Kim Juniper from the University of Victoria and Ocean Networks Canada, Canadian ROV ROPOS was used to document marine life in low-oxygen waters around Vancouver Island. High-definition video and digital still cameras on ROPOS allowed researchers to relate deep-water biodiversity to data collected during the first leg of the cruise. This correlation enabled researchers to understand how reduced oxygen levels influence seafloor ecosystems. Since low-oxygen ocean areas are expanding globally, these findings also provided a glimpse of future marine ecosystems. ROPOS and *R/V Falkor* conducted imaging and sampling surveys in three locations. Dives began in Saanich Inlet, where natural processes cause oxygen levels in deeper waters to become seasonally anoxic (approach zero). The expedition then moved offshore to Barkley Canyon. Low-oxygen conditions prevail in its middle reaches (400 – 1200 meters depth). A brief survey in Tully Canyon, near the entrance to Juan de Fuca Strait, provided a look at a shallower ecosystem impacted by low-oxygen waters.

In Saanich Inlet, several species living on the muddy bottom and rocky fjord walls are known to be very tolerant of low-oxygen conditions. The Saanich Inlet dives focused on the boundary between deep waters that were completely devoid of oxygen (anoxic) and waters just above that had very low levels of oxygen (hypoxic). A few, very resilient organisms survive and even thrive in this transition zone. Video surveys were used to define the lower limits for the distribution of these low-oxygen specialists. One animal of particular interest was a small seabottom dwelling flatfish called the slender sole (*Lyopsetta exilis*), which the video feed showed to be very abundant on sediments near the hypoxic-anoxic boundary. Researchers used the high-definition video camera to record the behavior of the slender sole and to understand how this fish adapts to low-oxygen conditions by changing the rate at which it pumps water over its gills. Scientists hypothesize that this behavior may provide the slender sole with a competitive advantage over other sole species, in areas where low-oxygen waters are expanding. Further up the fjord, where steep, rocky walls plunge down into anoxic waters, ROPOS collected a hypoxia tolerant anemone for the first time and it may be a new species!

At Barkley Canyon, ROPOS set up a year long experiment designed to test how seafloor ecosystems in low-oxygen zones respond to plankton debris, food for bottom organisms, sinking down from the surface ocean.

Squat Lobsters observed with ROV ROPOS on cliffs of Saanich Inlet in September of 2013.

During the second phase of the Barkley Canyon expedition ROPOS conducted transects at various depths to document the animals found above, below, and within the oxygen minimum zone. Comparing the species found at different depths and oxygen levels will provide a better understanding of which species are best suited to low-oxygen habitats. Additionally, researchers used the ROPOS robotic arms to collect species observed in the video for identification in the lab, some of which might prove to be new to science. The dive program concluded with two, video-only transects in low-oxygen sections of Tully Canyon, off Washington's Olympic Peninsula. These dives provided the first ever look at this area, which lies within the Pacific Coast National Marine Sanctuary. Scientists returned home from the expedition with hundreds of hours of video and thousands of digital still images of unknown and little-studied species in their natural seafloor habitats, and numerous samples of seafloor organisms and mud cores. The imagery archive and physical samples represent an immensely valuable legacy that will support research projects for the next several years. They will be analyzed to identify species, determine food chain connections and reveal chemical properties of bottom sediments; all with the ultimate goal of understanding how low-oxygen conditions are shaping marine biodiversity and ecosystem function.

R/V Falkor transiting under the Golden Gate Bridge upon her departure from San Francisco in early August of 2013

YEAR OF FIRSTS

R/V FALKOR MAKES ITS FIRST VISIT TO SAN FRANCISCO

On July 28th, *R/V Falkor* made her way beneath the Golden Gate Bridge and into San Francisco Bay for the first time. Falkor visited San Francisco at the invitation of the Exploratorium, and docked alongside their new facility at Pier 15. The Exploratorium graciously hosted Schmidt Ocean Institute for a reception with over 150 guests and over 300 people toured Falkor at public and invitation events during her visit.

SUBSEAFLOOR LIFE 2013

SEPTEMBER 2013

Exploring Viruses, Microbes, and Carbon in the Subseafloor at Axial Seamount

Scientists have recently recognized that seemingly isolated rocks beneath the seafloor are a haven for microbial life. Biological activity in this subseafloor realm likely impacts ocean chemistry and the ocean's critical capacity to store carbon and maintain the planet's habitability. On September 22, *R/V Falkor* departed Victoria, British Columbia with the remotely operated vehicle ROPOS to sail to the underwater volcano, Axial Seamount, about 575 kilometers to the southwest. There, Dr. Julie Huber and her team, representing four institutions, began an unprecedented study of the microbes and viruses that live within the rocky layers beneath the seafloor.

The subseafloor environment does not directly receive organic matter derived from photosynthesis. The understudied food webs in the subseafloor instead begin with microbes able to produce energy and food from chemicals and inorganic carbon via chemosynthesis. Viruses, likely plentiful there, are expected to play a critical role in microbial evolution and the release of carbon and other nutrients back into the subseafloor. To examine these subseafloor microbes and viruses, the team utilized ROPOS with two specialized samplers supported by the Marine Microbiology Initiative at the Gordon and Betty Moore Foundation. The Hydrothermal Fluid Particle Sampler filtered vent fluids for chemical analyses and enrichment experiments and collected and preserved microbial samples for genetic analyses. The Large Volume Water Sampler collected sufficient quantities of viruses to allow for their manipulation and study. The team also collected samples from gushing hydrothermal vents using an isobaric gas-tight sampler that can be used in water temperatures up to 400°C.

Sample analysis is ongoing in individual laboratories and preliminary results indicate the experiments at sea were extremely successful. Dr. Huber and her team are moving forward to create an ecosystem level model for subseafloor communities at Axial Seamount.


WHERE WE'VE BEEN IN 2013
SUBSEAFLOOR LIFE
September, 2013
DYNAMICS O
August-Septemb
R/V FALKOR VISITS SF EXPLORATORIUM
July, 2013
RESEARCH SYMPOSIUM
November, 2013


CANADA
Lake Winnipeg
OF HYPOXIA, LEG 1 AND 2
ber, 2013
UNITED STATES
IMAGING THE CAMPECHE ESCARPMENT
March, 2013
MEXICO
MAPPING DEEP CORAL REEFS OF ROATAN
July, 2013
THE BAHAMAS
HYDROTHERMAL EXPLORATION OF MID-CAYMAN RISE
June, 2013
CUBA
CAYMAN ISLANDS
DOMINICAN REPUBLIC
HAITI
JAMAICA
BELIZE
GUATEMALA
EL SALVADOR
NICARAGUA
PANAMA

Anemones observed with HROV Nereus at 2500 meters depth at the Von Damm hydrothermal vent field, Mid-Cayman Rise, in June of 2013.

ROV ROPOS mobilized on R/V Falkor and prepared for deployment to collect video records of life in and around low-oxygen zones near Vancouver Island, Canada.

In November, collaborators and advisers of Schmidt Ocean Institute, along with thought leaders in ocean sciences and related disciplines from around the world convened in Honolulu to discuss pathways to accelerating the pace of ocean sciences through technological innovation and open sharing of information.

OUR PARTNERS

PHOTO CREDITS & CAPTIONS

COVER: Carola Buchner, Schmidt Ocean Institute | **PAGE 2-3:** Schmidt Ocean Institute, Woods Hole Oceanographic Institution | **PAGE 4-5:** Peter Zerr, Schmidt Ocean Institute | **PAGE 6:** Greg Habiby | **PAGE 8:** Schmidt Ocean Institute: Left to right – Dr. Mario Rebolledo-Vieyra, Prof. Iza Canales-Garcia, Dr. Esther Sumner, and Dr. Charlie Paull during familiarization with *R/V Falkor* as they prepare to image Campeche Escarpment in March of 2013 | **PAGE 9 - LEFT:** Schmidt Ocean Institute: Side view of *R/V Falkor* highlighting the location of the sonar gondola, where most of the ship's scientific echo sounders are installed. | **PAGE 9 - RIGHT:** Schmidt Ocean Institute: Schematic view of the *R/V Falkor* gondola looking from underneath the ship highlighting the location of the multibeam echo sounders. | **PAGE 10-11:** Google Earth, MBARI, Schmidt Ocean Institute: Acoustic image of Campeche Escarpment produced based on the multibeam bathymetric survey conducted from *R/V Falkor* in March of 2013. Depths of seafloor shown in the image range between 400 and 3700 meters. | **PAGE 12:** Mark Schrope / Schmidt Ocean Institute: HROV Nereus is deployed from the *R/V Falkor* to investigate hydrothermal vent fields at the Mid-Cayman Rise in June of 2013. | **PAGE 13:** Schmidt Ocean Institute: Dr. Christopher German overseeing the recovery of HROV Nereus aboard the *R/V Falkor* after the deployment to the Mid-Cayman Rise in June of 2013 | **PAGE 14-15:** Schmidt Ocean Institute / Woods Hole Oceanographic Institution | **PAGE 16:** Schmidt Ocean Institute, NOAA, Google Earth: The underwater topography of Roatán, Honduras was revealed for the first time by *R/V Falkor* multibeam echosounders in July of 2013 | **PAGE 18:** Schmidt Ocean Institute: Conductivity, Temperature, and Depth (CTD) sensor and sampler rosette is deployed from *R/V Falkor* to measure seawater parameters, including oxygen content, in August of 2013 | **PAGE 19:** Ocean Networks Canada: Dr. Richard Dewey, Ocean Networks Canada, Chief Scientists of the first Hypoxia Dynamics cruise aboard *R/V Falkor* in August of 2013 | **PAGE 20-21:** Mark Schrope / Schmidt Ocean Institute: Moving Vessel Profiler mobilized on *R/V Falkor* and prepared for deployment to survey low oxygen zones near Vancouver Island, Canada. | **PAGE 22-23:** Mark Schrope / Schmidt Ocean Institute: An 11-legged starfish found by the ROV ROPOS during dive operations off the Vancouver Island in September of 2013. | **PAGE 23:** Ocean Networks Canada: Dr. Kim Juniper, Ocean Networks Canada, Principle Investigator of the Hypoxia Dynamics project | **PAGE 24-25:** Ocean Networks Canada, Schmidt Ocean Institute, CSSF ROPOS | **PAGE 26-27:** Chloe Jackman | **PAGE 28:** Carola Buchner: ROV ROPOS attached to deployment collar and secured to *R/V Falkor* aft deck in preparation to deployment at the Axial Seamount in Late september of 2013 | **PAGE 29:** Schmidt Ocean Institute: Dr. Julie Huber, Principle Investigator of the Subseafloor Life research project, observing sunset from *R/V Falkor* in early October of 2013 | **PAGE 30-31:** Tomboy Studio | **PAGE 32-33** Carola Buchner: Crew of the *R/V Falkor* | **PAGE 34** Left to Right, Top to Bottom: Schmidt Ocean Institute, Mark Schrope / Schmidt Ocean Institute, Schmidt Ocean Institute

FINANCIAL INFORMATION

For financial information and the Independent Auditors' Report, please refer to the following link:
http://www.schmidtocean.org/about/financial/financial.html

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Twitter: @SchmidtOcean
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YouTube: SchmidtOceanVideos

COVER PHOTO

R/V Falkor transiting to Axial Seamount research site off the coast of Oregon, U.S. during the Subseafloor Life 2013 research cruise in late September of 2013