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Arctic and Antarctic project leaders, together with Chief Scientist Dr. Ron O'Dor, are available August 1-3 for advance interviews. Please call contacts or email terrycollins@rogers.com to schedule a time. They will also take part in a media conference call at 1 p.m. EDT, Friday July 29. To join the call, dial +1-303-664-6045, conference ID 8309014. High-res images are available (from July 29) for media download at <http://www.coml.org/embargo/embargo6.htm>

"The Ice Oceans" Abound with Life

Census of Marine Life Explorers Surprised By Diversity, Density of Arctic Creatures; Matching Effort Announced for Antarctic

***Specimens Drawn from Depths of Ice-Lidded Canada Basin and Northern Seas;
Churn at South Pole May Be Cradle of Maritime Genetic Diversity***

A historic expedition of Census of Marine Life explorers to the planet's most northern reaches has revealed a surprising density and diversity of Arctic Ocean creatures, some believed new to science.

Sheltered for millennia under a lid of ice currently one to 20 meters thick, unexpectedly high numbers and varieties of large Arctic jellies, squid, cod, and other animals have been found thriving in the extreme cold, thanks to a landmark voyage during the brief polar summer aboard an American ice cutter.

News of the marine discoveries in the far north coincides with announcement of seed funds for a matching effort in the Antarctic.

The 30-day “Hidden Ocean” expedition (<http://www.oceanexplorer.noaa.gov>), funded and coordinated by the US National Oceanic and Atmospheric Administration (NOAA, an agency of the US Department of Commerce) sailed aboard the US Coast Guard Cutter Healy with 24 scientists from four countries (the US, Canada, Russia and China).

Eleven of the scientists are engaged in the Census of Marine Life (www.CoML.org), an independent and unprecedented 10-year global scientific collaboration to inventory biodiversity throughout the seas.

The Healy returned to port July 26 with thousands of specimens from the Chukchi and Beaufort Seas and the Canada Basin, a vast bowl walled by steep ridges and lidded with ice.

“The Canada Basin is one of the world’s most isolated ocean areas,” says Dr. Rolf Gradinger, head of the Arctic CoML, based at the University of Alaska, Fairbanks (UAF), and chief scientist on the voyage. “Several creatures brought aboard the Healy are unfamiliar to expedition experts and may well prove new to science.”

Early findings amid several thousands specimens and images include suspected new species of jellyfish and benthic bristle worms, and the first squid and octopus ever found in the area.

Scientists were also intrigued to discover among other things two species of sand flea-like crustaceans (amphipods) which, though familiar, had never before been found in an ice environment.

Animal density far higher than expected

“Overall, the densities of animals are much higher than expected,” says Census researcher Dr. Bodil Bluhm of the UAF. “It now appears possible to confirm that the rich biodiversity surprising deep-sea explorers worldwide exists as well in deep Arctic waters, the most under-studied area of the ocean world.”

Baseline data about such long-inaccessible marine species will have growing importance for measuring impacts of climate change and, should polar caps continue receding, hypothetical new disturbances on the northern ocean such as energy exploitation, fishing and shipping.

The research compares species distribution in the shelf, slope and deep-sea regions (the deep sea is generally agreed to begin at 1,000 meters). Investigations of the seawater's physical and chemical properties augment this biological data, revealing relationships between the biological communities, water temperature, salinity and nutrient loads.

The scientists operated around the clock to maximize expensive ship time, sampling at 14 locations in all; five involved depths 3,300 meters and more below ice. The explorers employed a suite of tools to conduct "gentle sampling," including a remotely operated underwater vehicle, a benthic camera platform, under-ice cameras and SCUBA divers, complemented by pelagic nets, benthic box cores and an ice corer.

They also return with the most comprehensive and best-resolution imagery under the ice, in the water column and at the seafloor of the Canada Basin.

"Modern technology has opened a window on this amazing world for the first time," says scientist Dr. Russ Hopcroft of UAF. "The imagery obtained of the mid-water and seafloor shows many life forms, such as soft bodied zooplankton, deep sea cucumbers and soft corals. The few explorers in this area before us had no adequate tools to collect or see these creatures.

"What continues to fascinate and motivate us all is the chance to record species never known before, to accurately map their range and understand their rapidly-changing habitat."

Census of Antarctic Marine Life

Whereas the Canada Basin is a deep, lidded bowl, relatively unstirred for thousands of years, the landmark Census of Antarctic Marine Life (www.caml.aq) will explore Earth's other ice ocean – literally a polar opposite in several respects.

Long considered an icy wasteland, scientists now theorize the swirling Southern Ocean current is an evolutionary cauldron, upwelling Antarctic nutrients and mixing life forms from the Pacific, Indian and Atlantic oceans, returning them in centrifuge-like fashion.

At the same time, because of the great depths and cold, particularly in the benthos, some things may just sit endemically in parts of the Southern Ocean.

Seeded with a \$525,000 grant, announced today by the New York-based Alfred P. Sloan Foundation, the Australian Antarctic Division in Hobart will lead the project, which will complement existing Census initiatives studying life at the world's deepest depths.

During the main field phase, December 2007 to March 2008, the involvement of up to 200 scientists from about 30 countries is expected, together with several million dollars in direct and in-kind support. Countries confirmed to date: Australia, UK, USA, Brazil, Argentina, Germany, France, Poland, Italy, Russia, New Zealand, Belgium, Chile.

Covering 35 million square kilometers (10 per cent of the world's ocean surface), the Southern Ocean is the planet's most mysterious and treacherous sea. For centuries, sailors have called it "The Roaring 40s," a reference to ceaseless winds that scream across Earth's barren southern latitudes, broken by no high lands.

Deadly to explorers, inhospitable to even the mightiest ships and scientific techniques, the vast Southern Ocean has been a closed book to oceanographers until recently. Now, through smaller research studies using modern technology, they have identified the Antarctic Circumpolar Current, a powerful force flowing from west to east moving 145 million cubic meters of water per second, more than the combined flow of all world rivers.

Piecing together the history of marine evolution

Because they now understand the physical churn that goes on in the Southern Ocean, biologists want to investigate its role as a cradle of genetic diversity.

The Antarctic Census will take extensive samples from the deep abyssal plain on the sea floor, 4,500 to 5,500 meters below surface, research that holds huge promise for biologists.

Says Dr. Ron O'Dor, Chief Scientist of the Census: "DNA research made possible through this project may allow us to reconstruct the history of marine evolution."

More than scientific curiosity drives this enterprise. The planet's polar regions are uniquely vulnerable to the effects of global climate change.

They are reacting to the planet's gradual warming in increasingly unexpected and dramatic ways. This phenomenon is driving the International Polar Year of 2007/08, an unprecedented

international collaboration of which the Censuses of Arctic and Antarctic Marine Life will form an important part.

Because the Southern Ocean appears to be so critical to the biology of the global ocean system, scientists are eager to understand how continued climate change, if realized, will affect it and the other oceans in turn.

For example, the Larsen B ice shelf on the Antarctic Peninsula collapsed in early 2002. Roughly 500 billion tonnes of ice sheet (3,250 square kilometers, about the size of Rhode Island) disintegrated in less than a month, what scientists have called “staggering” speed.

The work builds on that of marine scientists who have plumbed the depths of the Weddell Sea, off the coast of Antarctica, and the Scotia Sea (between South America’s furthest tip and Antarctica).

During the Census-affiliated ANDEEP III expedition, from January to April 2005, a crew of 56 scientists from 10 countries took samples by towing two kinds of net over the ocean floor and by stamping out small cores 50 centimeters deep.

In some cases it took up to three hours for sampling equipment to reach the seabed, 4,500 meters below the ocean surface. (Half of the Earth is under more than 3,000 meters of water. The seas’ deepest trenches drop to 12,000 meters.)

While results from these samples are still being examined, they have spawned some early, intriguing results. For example, the cores contained many small sea creatures; other sampling techniques turned up relatively large specimens, including sea cucumbers up to 20 centimeters long.

In addition to obtaining a large number of unfamiliar specimens, DNA extractions are enabling Census scientists to discern previously unknown differences between species and insights into the history of Southern Ocean fauna.

The scientists found on the ocean floor miniscule meiofauna, single-celled creatures less than half a millimeter long, the most successful and numerous animal in the southern sea. They form the base of the food web.

As well, the team uncovered a sponge with a calcium-based skeleton, a finding that amazed scientists given the depth (about 4,500 meters) at which it was found.

Research in the Southern Ocean is the most expensive in the world. The recent ANDEEP III expedition by icebreaker cost one Euro per second.

The Antarctic Census will also harmonize with efforts by BirdLife International to track and understand the migration of albatross, 19 of 21 species of which are threatened and the other two near-threatened.

Census of Marine Life

More than 1,000 scientists from 72 countries are at work on the Census, designed to assess the diversity, distribution and abundance of ocean life and explain how it changes over time. The scientists, their institutions and government agencies are pooling their findings to create a comprehensive and authoritative portrait of life in the oceans today, yesterday and tomorrow.

Support for the Census of Marine Life comes from government agencies concerned with science, environment, and fisheries in a growing list of nations as well as from private foundations and companies. The Census is associated or affiliated with several intergovernmental international organizations including the Intergovernmental Oceanographic Commission of the UN, the Food and Agriculture Organization of the UN, the UN Environment Programme and its World Conservation Monitoring Centre, the Global Biodiversity Information Facility, the International Council for the Exploration of the Seas, and the North Pacific Marine Science Organization. It is also affiliated with international nongovernmental organizations including the Scientific Committee on Oceanic Research and the International Association of Biological Oceanography of the International Council for Science. The Census is led by an independently constituted international Scientific Steering Committee, whose members serve in their individual capacities, and a growing set of national and regional implementation committees.