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EDITORIAL

Communicating Government Science

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NASA Administrator Michael Griffin issued an agency-wide policy on 30 March clarifying how scientists should communicate with news media. The guidelines allow NASA scientists to communicate their scientific results to the media, but requires them to distinguish between professional and personal views. Griffin said the guidelines resulted from an effort to revise NASA public affairs policies and "to make sure they are fair, reasonable, and easily understood."

Griffin deserves thanks for clarifying agency rules, and he sets a standard for other agencies to follow. His approach to clarifying the communication policy should be applied broadly to U.S. federal agencies that support science or produce scientific results. Clearly and accurately presenting scientific information to the media is an important responsibility for federal agencies and the scientists working there.

The NASA policy also sets rules for what the agency's public affairs officers are permitted, and not permitted, to do in terms of issuing, limiting, or editing the release of scientific information. In addition, the policy provides NASA scientists and public affairs officers with a method to resolve disputes over the release of scientific information.

Clarifying and coordinating the rules should enable scientists to communicate their results without fear of retribution, particularly important when those results bear on currently contentious policy issues such as climate change or the rebuilding of New Orleans, La.

Other federal agencies also need a clear policy for scientists and public affairs officers. For example, scientists with the U.S. National Oceanic and Atmospheric Administration (NOAA) have been pressured from within their agency when attempting to speak to the media about research findings, according to a 6 April report in the *Washington Post*. NOAA officials have defended their actions, stating that the public affairs office was following long-standing policies not enforced in the past. This kind of confusion about communication policies hurts science and limits its utility in informing policy makers and the public.

In a letter dated 7 April, U.S. Rep. Sherwood Boehlert (R-N.Y.), chair of the House of Representatives' Science Committee, urged NOAA Administrator Conrad Lautenbacher to support "open and unfettered scientific communication" at the agency. Boehlert noted, "NOAA's efforts to attract, retain and make full use of the nation's best scientists will be stymied if scientists and the scientific community at-large believe that NOAA seeks to limit the discussion of climate science and its implications."

There is surely a better way to achieve clear policies across U.S. federal agencies than a piecemeal, agency-by-agency approach. This is an opportunity for President George W. Bush and his science advisor, Jack Marburger, to lay out a single policy for communicating science to the media that all agencies could adopt. That policy could be similar to NASA's, which was drafted by a working group that included science, engineering, law, public affairs, and management representatives.

The media is often a primary conduit to communicate the best scientific understanding of key issues to the public and to policy makers. President Bush should take this opportunity to clarify the rules of communication for scientists and public affairs officers in federal agencies and put an end to the real or perceived risks for government researchers who provide scientific information to reporters and thus the public.

—SOROOSH SOROOSHIAN, CHAIR, AGU Committee on Public Affairs

Mapping Supports Potential Submission to U.N. Law of the Sea

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Multibeam bathymetric data from selected U.S. continental margins are being collected for use in the future development of potential submissions that the United States may make to the United Nations Commission on the Law of the Sea (UNCLOS) to extend the nation's sovereign rights over the resources of the seafloor and the subsurface.

However, the new data also represent a valuable resource for the next generation of marine geologists to study the complexity of surficial processes of several U.S. continental margins. For example, the details of the morphology of large sediment slides on the U.S. Atlantic continental slope and rise have been mapped, and enigmatic features such as a meandering channel on a channel levee on the U.S. Alaskan Pacific margin have been discovered.

The new data sets, first shown at the 2005 AGU Fall Meeting in San Francisco, Calif. [*Gardner et al.*, 2005; *Mayer et al.*, 2005], are now available on the Web at http://www.ccom.unh.edu/law_of_the_sea.html. UNCLOS requirements for an extended shelf submission [*United Nations,* 1983] are based on either of two formulae: a distance formula that allows an extension of the shelf to 60 nautical miles (nmi) beyond the foot of the continental slope (specifically defined by UNCLOS as the point of maximum change in gradient at its base), and a sediment-thickness formula that allows the extension of the shelf to where the thickness of sediment is one percent of the distance back to the foot of the slope. One objective of the new mapping is thus to provide the data needed to define the location of the foot of the continental slope.

However, the extended submissions cannot extend beyond 100 nmi from the 2500-meter isobath (the location of which also is accurately mapped in these new surveys) or 350 nmi from the officially defined shoreline, whichever is more advantageous to the coastal state. A submission for an

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extension of the U.S. juridical shelf under UNCLOS would likely be based on a combination of bathymetric data (the 2500-meter isobath and the foot of the slope) and geophysical data (the thickness of sediment) [*Hutchinson et al.,* 2005].

The U.S. Bathymetric Mapping Program

Though as of this writing, the U.S. Senate has not acceded to the UNCLOS treaty, the University of New Hampshire's Center for Coastal and Ocean Mapping/Joint Hydrographic Center has been directed by the U.S. Congress, through funding by the U.S. National Oceanic and Atmospheric Administration (NOAA), to conduct multibeam bathymetric mapping of selected U.S. continental margins. *Mayer et al.* [2002] conducted a study of the U.S. marine data archives to determine where additional bathymetric surveys might be beneficial in developing a potential U.S. submission under UNCLOS Article 76. This study identified seven regions: areas in the Arctic Ocean, the Bering Sea, and the Gulf of Mexico, the entire U.S. Atlantic margin, the Gulf of Alaska, and areas surrounding the Mariana Islands, Kingman Reef, and Palmyra Atoll (Figure 1 and Table 1), where the United States may have a potential for extended shelf submission.

To date, about 25 percent of the identified Arctic Ocean area, the entire area identified in the Bering Sea, the entire U.S. Atlantic margin, and all of the area in the Gulf of Alaska have been mapped under this program. The purpose of this article is to briefly describe the completed mapping surveys, announce the public availability of the data, and encourage the use of these data for studies of the U.S. continental margins.

The multibeam echo sounder systems used in these surveys include an L3 SeaBeam 2112 aboard the U.S. Coast Guard icebreaker *Healy*, a Reson 8150 on the Thales GeoSolutions (now Fugro)-leased research vessel (R/V) *Davidson,* Kongsberg Maritime EM121A systems aboard the U.S. Naval Oceanographic Office vessels *USNS Henson* and *USNS Pathfinder,* and a Kongsberg Maritime EM120 on the University of Hawaii R/V *Kilo Moana*.

The U.S. Arctic Margin

The largest potential for a U.S. submission beyond the current 200-nmi U.S.-exclusive economic zone is in the area of the Chukchi Plateau (Figure 1), a submerged extension of the Chukchi Shelf north of Alaska, and the margin adjacent to the Alaska mainland. Mapping in this area led to many surprises, including the discovery of a major seamount (Figure 2), christened Healy Seamount, located northeast of Chukchi Plateau. Healy Seamount stands ~2000 meters high with a summit depth of 940 meters, and is ~46 kilometers long and ~15 kilometers wide. The northwest facing flanks rise ~40° whereas the southeast facing flanks have slopes of ~30°, and the seafloor immediately to the northwest is as much as 1000 meters shallower than the seafloor immediately to the southeast.

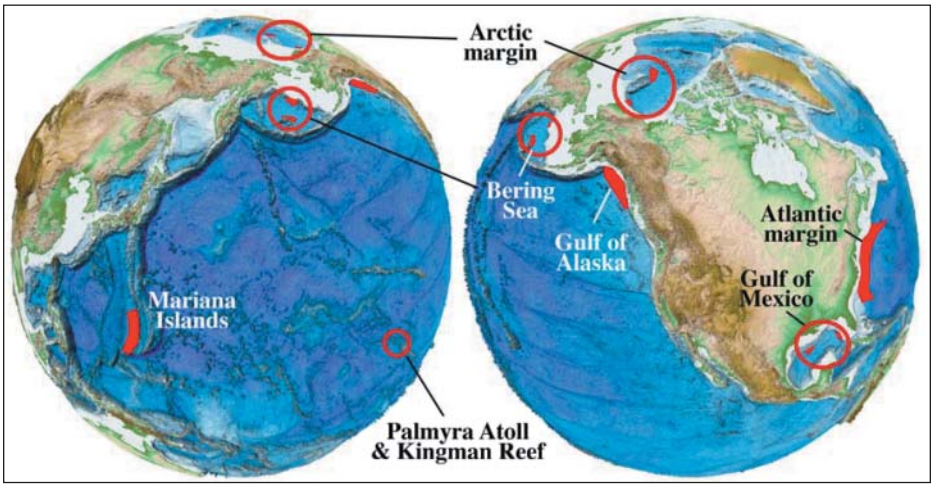

Fig. 1. Locations of areas mapped or to be mapped by the University of New Hampshire United Nations Commission of the Law of the Sea bathymetric mapping project.

Table 1. Approximate Ranges of Water Depths and Area Mapped

Area	Water Depth, m	Area Mapped, km^2
Bering Sea	1200–3800	21,000
Atlantic margin	800–5200	403,000
Gulf of Alaska	1000–3900	162,000
Arctic margin	1000–3800	124,000
Gulf of Mexico[a]	1000–3500	~30,000
Mariana Islands[a]	1000–4500	~155,000
Kingman/Palmyra[a]	1000–4500	~54,000

[a]Yet to be mapped.

Bowers Ridge and the Beringian Margin, Bering Sea

Two areas of the Bering Sea have been mapped: the northern flank of Bowers Ridge and a portion of the southern Beringian margin. Mapping the northern flank of Bowers Ridge revealed a steep flank with slopes of 10°–20°. The middle half of the ridge flank is bordered by two broad, low-standing, curving ridges that are concentric with Bowers Ridge proper.

A section of the Beringian margin east of the U.S.-Russia international boundary was mapped and revealed a steep margin that is deeply eroded and has numerous sediment-filled canyons, some of which have what appear to be plunge pools at their termini. Long, sharp-crested, linear ridges strike perpendicular to the margin and terminate in sediment drifts.

The U.S. Atlantic Margin

Although the U.S. Atlantic margin has been studied for more than half a century, there were many new and unexpected observations made when it was completely mapped in 2004 and 2005. For instance, although the northern third of the U.S. Atlantic margin is dominated by well-documented, large mass failures, there is a prevalence of large, sediment-filled canyon channels with superimposed narrow channels that appear to represent a rejuvenation of channel down-cutting.

The middle third of the U.S. Atlantic margin has several large canyon channels, the most prominent of which is Hudson Canyon. The Hudson channel is relatively straight until depths between 3000 and 3500 meters, where the channel contorts through six sharp bends, each >90°. Johns Valley, ~25 kilometers northeast of Hudson channel, has three sharp bends of >90° at the same water depths. In addition, ~50 kilometers southwest of Hudson channel, a series of at least four channels abruptly deepen their incision depth at water depths of ~3000 meters. The four channels have what appear to be plunge pools at the points of deepening.

One interesting feature mapped in the middle third of the margin is a seamount that was discovered and partially mapped in 1967; however, it had not been placed on any map and has effectively been ignored since its discovery. The seamount, named Knauss Knoll by *Lowrie and Heezen* [1967], stands 1200 meters above the continental rise, is nine by six kilometers at its base, and has a sharp summit peak.

The U.S. Gulf of Alaska Margin

The Gulf of Alaska has seen very little systematic mapping since the U.S. Geological Survey's EEZ-SCAN program in the mid-1980s.

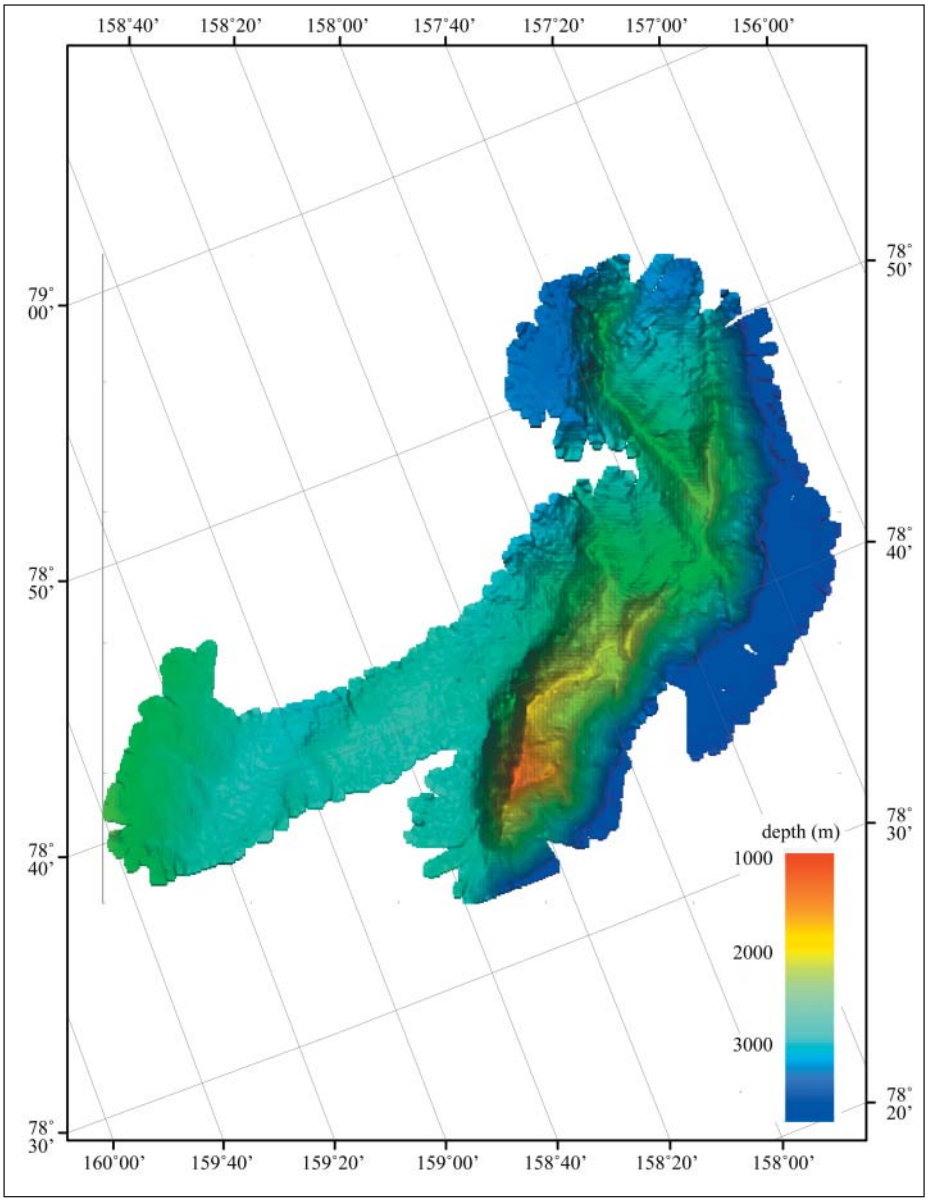

Fig. 2. Color-coded shaded bathymetry of Healy Seamount, a newly discovered seamount north of the Chukchi Plateau, U.S. Arctic margin.

The University of New Hampshire program mapped more than 162,000 square kilometers of the Gulf of Alaska margin. The southeastern third of the mapped area is composed of a channel levee system that has been incised by steep-walled channels. An ~500-meter-wide meandering channel is incised ~200 meters into the north levee (Figure 3). The meanders have wavelengths of ~25 kilometers, and one meander bend is almost 180°. The lower flanks of the levee are mantled by curvilinear bed forms that resemble retrogressive failures in high-resolution subbottom profiles.

Surveyor Channel [*Stevenson and Embley,* 1987] is the most prominent deep-sea channel in the northern half of the mapped area. This relatively straight and broad channel has captured a 200-kilometer-long, narrow unnamed channel before it continues across the basin, narrowing to ~1.5 kilometers and deepening from 100 meters at the capture point to as much as 200 meters at the edge of the mapped area.

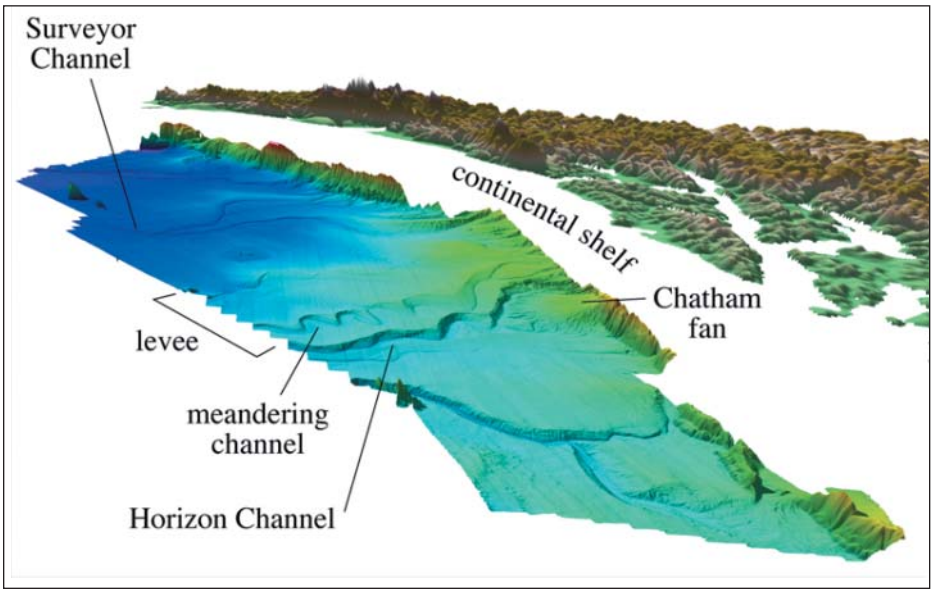

Fig. 3. Perspective view of the U.S. Gulf of Alaska margin. Vertical exaggeration ×15, looking north.

Future Plans

More bathymetric mapping will be carried out in the U.S. Arctic margin, in two areas in the Gulf of Mexico, and then in several areas in the western Pacific during the next four years. All of the bathymetric data collected to date, as well as many maps and images generated from the data, are available at http://www.ccom.unh.edu/law_of_the_sea.html in various formats, and the data are also archived at the NOAA National Geophysical Data Center. Although the data are being collected for specific requirements outlined by the UNCLOS, they also offer exciting opportunities to investigate surficial processes on margins at unprecedented detail.

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Assessing Global Water System Research

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Rapid growth of global change science has led to improved knowledge about interdependencies in the global water cycle and recognition that the global water system consists of physical, human, and biogeochemical components [*Vörösmarty et al.,* 2004]. Traditionally, water research is spread over a number of scientific disciplines. However, for water science to effectively inform policy for sustainable water management, research about the dynamics of water in the context of global change needs to be holistic, must integrate the existing knowledge base, and should synthesize knowledge about how the interactions between nature and society at various scales are affecting the global water system.

This article assesses the level of interdisciplinarity in water science programs by comparing the activities of international water-related projects with the Global Water System Project (GWSP) activity profile (http://www.gwsp.org). The GWSP is a project of the Earth System Science Partnership (ESSP) comprising the International Geosphere-Biosphere Programme (http://www.igbp.kva.se/cgi-bin/php/frameset.php), the International Human Dimension Programme on Global Environmental Change (www.ihdp.org), the World Climate Research Programme (http://www.wmo.ch/web/wcrp/wcrp-home.html), and the DIVERSITAS international program on biodiversity science (http://www.diversitas-international.org/). GWSP's attributes include its scientific and policy-informing orientation, global perspective, integrative and interdisciplinary approach, and multitemporal investigation of human impacts on water resources.

Methodology

Forty-two research projects were selected using systematic searches for international water-related research projects on the Internet. (Information on the research projects is available from the corresponding author.) It was ensured that the research projects cut across natural, social, technological, and health science domains. The criteria for selecting research projects were engagement in global change research, published evidence of studies in the 14 thematic activities of the GWSP (Table 1; see also http://www.gwsp.org/downloads/GWSP_Report_No_1_Internetversion.pdf), and an international perspective. For the analysis, each research activity was scored based on a hierarchy of objectives on a four-point scale (0 to 3 points), with zero points awarded to projects that do not focus on any of GWSP's themes and three points awarded to projects where the GWSP themes are central goals.

Multidimensional scaling (MDS) was used to detect similarities in the levels of involvement of the research projects in the thematic activities based on the accumulated