Alumni and Friends News

Spring 04

ISSUE 6

LDEO

LAMONT-DOHERTY EARTH OBSERVATORY
THE EARTH INSTITUTE AT COLUMBIA UNIVERSITY

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letter from ldeo director

Mike Purdy

It has been a great few months for the Observatory since our last newsletter was circulated. We have had significant success in securing a major gift to support innovation in earth observing technologies. One of our premier laboratories—the Tree Ring Laboratory—has received a landmark $5.5M grant from the National Science Foundation (NSF) that will allow it to focus its efforts over the next five years on the highly complex climate dynamics of all areas affected by the Asian monsoon. Also, we remain optimistic that our efforts to secure funds from NSF to significantly upgrade our research vessel capabilities will prove successful.

There is a lot of activity—perhaps most important of all is the success of our recent phase of recruiting, which has brought exciting new talent to the Observatory.

Jim Gaherty has joined us from Georgia Tech. His innovation in the use of seismic methods to study deep earth structure will strengthen our ever-growing efforts in solid earth dynamics. **Ajit Subramaniam** joins us from the University of Maryland. His specialty is using information obtained from earth-observing satellites to understand biological processes occurring in the upper layers of the ocean.

Chris Zappa joined the Ocean and Climate Physics Division a few months ago and already has achieved distinction as the recipient of a prestigious Office of Naval Research Young Investigator award. **Andreas Thurnherr,** an observational oceanographer from Florida State University devoted to understanding oceanic circulation on a range of scales, also joined the Ocean and Climate Physics Division and almost immediately departed for a major two-month-long expedition in the Southern Ocean.

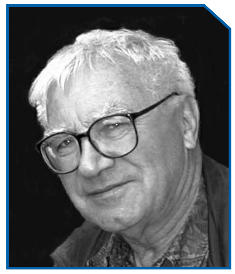
Wade McGillis departed Woods Hole Oceanographic Institution (WHOI) to join the senior staff in the Geochemistry Division, where he will lead growth in our observation and experimental-based efforts in ocean carbon research. Also from WHOI, **Peter Kelemen** will join the Department of Earth and Environmental Sciences faculty and the Geochemistry Division and will play a fundamental leadership role in our efforts to understand the dynamics of the deep earth. We are in the final stages of refining a new strategic plan for the Observatory for the next decade. This plan will highlight the priority that we place on the establishment of a new research division focused on biogeosciences and the importance of growing our education activities. Key priorities will include building our endowment to strengthen salary support for our staff and the construction of laboratory facilities. We will include more about this plan in the next newsletter.

I must never forget to express my thanks and appreciation to all who responded to our annual fund request. These discretionary dollars are of immeasurable value to us. The federal grant funding that is our lifeblood remains in very short supply(!), and it is a testament to the quality and tenacity of our staff that we raise as much of it as we do (more than $30M each year). The private donations that we receive are much less than these dollars, but their value is comparable because of the flexibility that they afford—allowing us to respond to new opportunities and follow new directions without the lag time associated with federal money.

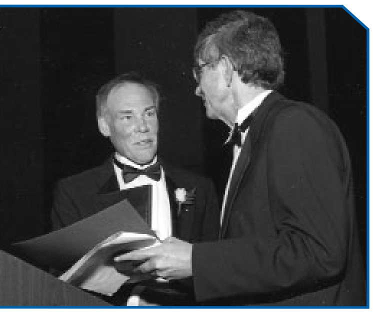
I look forward to seeing many of you at our events this year—be it one of our Spring Public Lectures, Open House in the fall, or the San Francisco AGU Reception. The primary reason I attend these is so that I can meet you, so please come say hello. I am always happy to hear from the Friends and Alumni of Lamont.

Recent Awards Received by Lamont-Doherty Staff

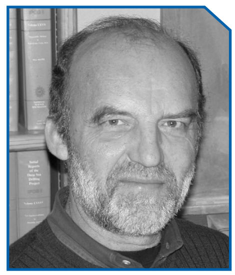
Taro Takahashi
2003 Fellow
American Geophysical Union



George Kulka
2003 Miluntin Milankovitch Medal
European Geosciences Union



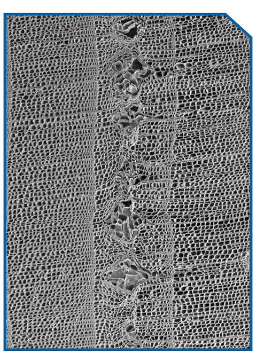
Gerard Bond
2003 Maurice Ewing Medal
American Geophysical Union



Dennis Kent
Rutgers University and LDEO

2003 Arthur L. Day Medal
Geological Society of America
and
2003 VMSG Medal
Vening Meinesz School of Geodynamics

Dee Breger won both first and second prize in the photography category of the first annual 2003 Science and Engineering Visualization Challenge, a joint project of the National Science Foundation and *Science Magazine,* designed to "encourage recognition of the visual and conceptual beauty of science and engineering." Breger has recently left Lamont to run a similar electron microscope lab at Drexel University. More images are online at www.sciencemag.org/feature/data/vis2003/ssintro.html.



First place:
Mongolian Frost Rings, Siberian Pine (sample, Gordon Jacoby).

Second place:
Black Sea Pyrite (sample, Bill Ryan and Walter Pitman).

The Earth Institute Offers New Academic Programs in Climate and Society and Sustainable Development in Fall 2004

Top to bottom: Mark Cane, Jeffrey Sachs, Joseph Stiglitz

One of the prime motivations for establishing The Earth Institute at Columbia is the proposition that solutions to many of the world's most pressing problems demand research and teaching at the interface between the natural and social sciences. Human well-being and prospects for improvement are closely coupled to environmental conditions. The social and natural sciences must be engaged together to describe this relationship and devise strategies for development that can be sustained. The Earth Institute, working with affiliated academic departments, has created two new graduate programs that examine these issues.

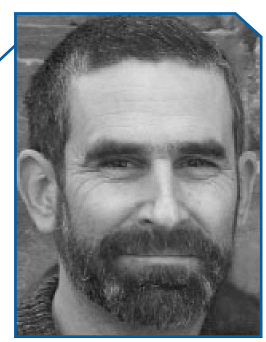
The **M.A. Program in Climate and Society** is an interdisciplinary twelve-month program offered by the Department of Earth and Environmental Sciences; it studies climate variability, climate change, and their impacts, particularly with respect to the developing world. The program combines elements of earth and environmental sciences, environmental management and policy, economic development, and decision making under uncertainty.

This program is designed to provide training in research and policymaking for students from the United States and abroad, particularly those who are interested in agricultural policy and planning, water resources, health, and risk and insurance topics. The program is led by Professor Mark Cane. www.columbia.edu/climatesociety

The **Ph.D. in Sustainable Development** is offered by the School of International and Public Affairs. Global economists Jeffrey Sachs and Joseph Stiglitz are lead professors. www.sipa.columbia.edu/phd

Sustainable development involves economic and social development that reflects the physical and environmental, as well as the political and cultural conditions in which human society operates. Obstacles facing developing countries go beyond economics; they also involve natural processes of ecology, natural resources, climate, and disease. To tackle these poorly understood linkages, the program uniquely integrates a rigorous core curriculum of micro- and macroeconomics with a set of elective courses in ecology, earth science, and engineering or public health, and a comprehensive series of fundamental social science and public policy courses.

New Faculty in Earth and Environmental Sciences



Dr. Peter Kelemen

We are pleased to welcome Dr. Peter Kelemen as the new Arthur D. Storke Memorial Professor of Earth and Environmental Sciences. He joins us from the Woods Hole Oceanographic Institution, where he is currently senior scientist. Dr. Kelemen's primary research interest is in the genesis and evolution of the earth's crust, in the ocean basins, in arcs, and in continents.

He brings to these topics the perspective that reactions between melt and rock during transport through the upper mantle are as important as melting, mixing, and crystal fractionation processes in producing different crustal bulk compositions in different tectonic settings.

Dr. Kelemen was an undergraduate at Dartmouth College and received his Ph.D. from the University of Washington in 1987. He is a founding partner of Dihedral Exploration, mineral exploration consultants. Dr. Kelemen arrives in summer 2004.

—William Menke

Reporting on Misconduct at a National Laboratory

In October 2002, Earth and Environmental Science Journalism graduate Adam Rankin broke the story of high-level financial malfeasance at the Los Alamos National Laboratory (LANL). Rankin's coverage of this story in the Albuquerque Journal North *is credited with leading to the resignations, firings or demotions of the lab director and fifteen other senior managers, three congressional hearings, and the decision by U.S. Department of Energy (DOE) Secretary Spencer Abraham to order the first-ever competition to run the prestigious nuclear weapons research facility.*

What was it like to investigate and report such a fast-breaking, high profile story?

Rankin reflects:
It was really a matter of luck and timing. I will take credit only for perseverance. I owe a lot to my sources who had the courage to provide me with information when it could have—and did have in some cases—a negative impact on their professional careers.

Once the first stories were reported, I felt like a cog in a wheel that was part of a process that was bound to run its course. All I had to do was keep pushing.

Each day a new story popped out, usually after many phone calls to sources; many were unwilling to go on the record, some only willing to provide a useful document or two, or maybe someone else's phone number.

By day's end I had enough new material to write another revealing story.

The situation started shortly after I arrived in Santa Fe. An outlandish e-mail was sent to my bureau chief from someone who claimed to represent a group with grave concerns over security at LANL, a facility operated by the University of California since 1943.

The e-mail made claims of rampant corruption and fraud—everything from lab employees carting off computers to using their credit cards at casinos, even an attempt to buy a souped-up Ford Mustang—and an attempted cover-up by senior managers.

The e-mailer promised I could see documentation—receipts, internal e-mails, reports, and memo—to verify each claim.

Sure enough I got reams of receipts, e-mails, reports, and memos that showed the lab couldn't locate about $3 million worth of equipment. The documents showed that an employee had used her lab credit card to get about $1,200 cash at a casino, and that another had apparently tried to buy a $30,000 Mustang with hers (she was later exonerated, but the case remains open).

Other receipts showed how two senior facility managers in charge of a top-secret section of the lab used their positions to buy more than $330,000 worth of outdoor equipment, hunting gear, barbecue grills, car parts, and other "unallowable" items.

Everything went into high gear and gained national media attention when the laboratory fired two top security investigators in retaliation, as the pair claimed, for leaking documents to me.

Some thought I was lab bashing, but when subsequent reviews by the DOE Inspector General, Price Waterhousecoopers, the University of California, Congress, and others substantiated what I was reporting and made their own claims of lax management and improper internal controls, I felt vindicated.

Now, for the first time in 60 years, the contract to operate Los Alamos National Laboratory is open to competition.

Eddie Moore, *Albuquerque Journal*

Rankin shown with scores of internal memos, e-mails, and vendor receipts that depict the weak business management and controls that Energy Department investigators, Congress, and others discovered in subsequent reviews. Many receipts were for legitimate purposes, but many were not, including $500 barbecue grills, performance truck parts, night vision binoculars, lock pick kits, TVs, a $30,000 souped-up Ford Mustang, and a $1,200 cash withdrawal at a casino. To avoid suspicion, some item descriptions were changed, e.g., a TV was listed as a monitor. The FBI is continuing its investigation.

Save the Date!
Open House and Alumni Reunion 2004

Please join us for Lamont's Annual Open House
Saturday, October 9, 2004
10:00 a.m.–4:00 p.m.

Alumni Reception Area
10:00 a.m.–3:00 p.m.
Lamont Hall

Alumni Association Annual Meeting
3:00 p.m.–4:00 p.m.
Lamont Hall

Open House Party for Staff, Volunteers, and Alumni
4:00 p.m.
Monell Lobby

Contact:
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Tel: 845-365-8634; Fax: 845-365-8182
61 Route 9W, Palisades, NY 10964
www.ldeo.columbia.edu

Top: Sally Dorman, Jim Dorman, Arnold Finck, and John Kuo at the Open House Alumni Reception 2003. Bottom: Visitors at the Tree Ring Lab exhibit, Open House 2003.

LDEO Women Scientists Meet

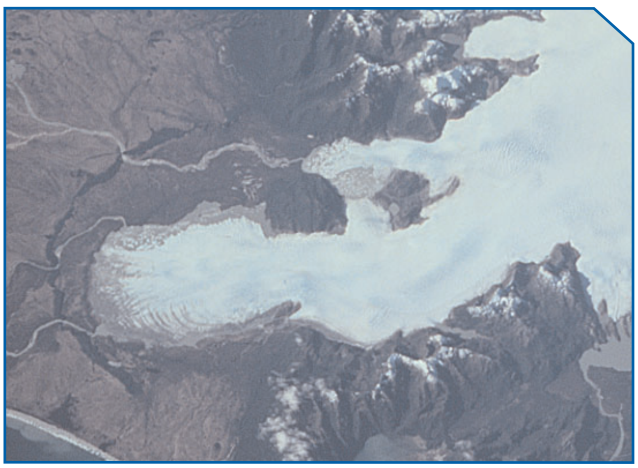
On October 21, 2003, the Observatory held its first annual "Women Scientists Lunch" at a restaurant in Piermont, New York. Twenty-two female Lamont scientists used the opportunity to discuss issues relevant to the status and career advancement of women scientists at Lamont and in the academic environment in general. As an outcome of this event, a monthly "Women's Forum Breakfast" has been established at the Observatory to promote communication among women researchers at Lamont, to continue discussions with the goal of identifying problems and initiating change.

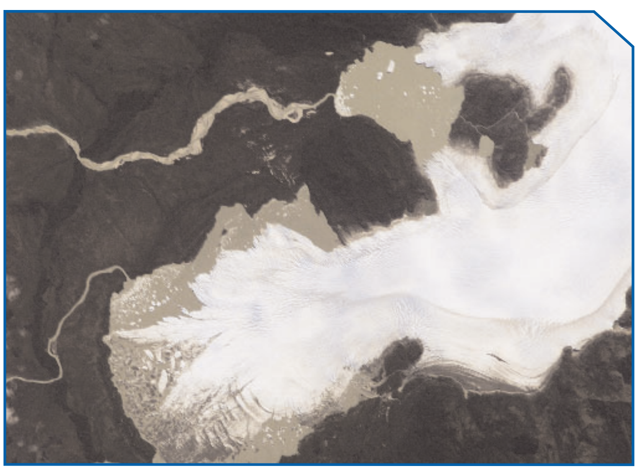
Kneeling left to right: Mingfang Ting, Robin Robertson, Xiaojun Yuan, Dallas Abbott
Standing left to right: Sidney Hemming, Katie Donnelly, Connie Class, Baerbel Hoenisch, Gisela Winckler, Deirdre Commins, Tina van de Flierdt, Cecilia McHugh, Kim Kastens, Robin Bell, Stephanie Pfirman, Maya Tolstoy, Dorothy Peteet, Roseanne D'Arrigo, Beate Liepert.

Oceans, Carbon Dioxide, and Climate Changes

Some New Findings Relevant to Changes in the Oceans' Role in the Global Climate and Carbon Cycle

by Taro Takahashi





Glacier images courtesy: Earth Observations lab, NASA Johnson Space Center

Glacial Retreat in Chilean Patagonia.
Top: October 10, 1994. Bottom: March 7, 2002.

As a result of the combustion of fossil fuels and other industrial activities, the concentration of carbon dioxide (CO_2) gas in the air has increased by about 30 percent from 280 ppm (parts per million) in the pre-industrial period to today's 375 ppm. It is anticipated that the preindustrial concentration will double toward the end of the twenty-first century. Because of the infrared absorbing characteristics of CO_2 molecules, the increase could cause global warming and other associated climate changes, which might seriously impact on the socioeconomic stability of the global community. For this reason, the atmospheric CO_2 concentration has been monitored at a number of internationally coordinated stations over the globe. The observations show that atmospheric CO_2 concentrations have been increasing at a rate about one half of that which is expected from the rate of fossil fuel consumptions and other industrial activities. This means that an amount of CO_2 equivalent to about one half the industrial CO_2 emitted each year has been absorbed somewhere in the natural carbon cycle system.

This is good news, since Earth's atmosphere is receiving only one half of the full industrial impact, thereby reducing the potential climatic changes. The most likely candidates for taking up CO_2 from the air are the oceans and land biosphere. But what is their respective importance? To address this question, Ralph Keeling of the Scripps Institution of Oceanography and Michael Bender (Columbia Ph.D., 1970) of Princeton, with their respective associates, developed methods for high-precision measurements of oxygen concentrations in the air. The observed rates of oxygen decrease, when compared with the corresponding CO_2 increase, turned out to be quite different from the one oxygen to one CO_2 molecular ratio that is expected from the combustion of fossil fuels. This difference is a measure of the amount of CO_2 taken up by the land biosphere by photosynthesis. After correcting for the release of oxygen from the oceans by recent warming of ocean waters, Keeling and Bender estimated that in 1990s, one half to two thirds of the missing CO_2 was taken up by the oceans and the remainder by the land biosphere. The global oceans appear to be a major absorber of industrial CO_2.

Some Questions to Consider

Questions that may follow include, for example, "Will the proportion of the missing CO_2 change in the future in response to climate changes?" "How would climate changes alter interactions between lands and oceans?" Our knowledge of the global carbon cycle is far too incomplete to provide answers for these important questions with a high degree of confidence. However, I present in this article some of our new findings that are relevant to changes in the role of oceans in the global climate and carbon cycle.

Ocean Carbon Dioxide Basics

The oceans influence weather and climate by transporting and redistributing heat and moisture. In addition, they play an important role in storing CO_2 and regulating the atmospheric concentration of CO_2, one of the most important "greenhouse" gases. Since the oceans contain about 50 times as much CO_2 as the atmosphere, the changes in the oceans' dynamics and ecosystems could influence the atmospheric CO_2 content and, hence, long-term climate. Deep ocean waters below about 500 meters to the ocean floor (about 4,000 meters on the global ocean average) contain about 15 percent greater concentrations (~2,300 micromoles CO_2 per kilogram of seawater) than surface waters (2,000 micromoles CO_2 per kilogram of seawater), which are in contact with the atmosphere.

The CO_2 concentration in surface waters is drawn down by two major processes. One is the "biological" pump. Marine plankton utilizes CO_2 molecules in the photic zone of the oceans, resulting in surface ocean waters to take up CO_2 from the atmosphere. Biogenic debris thus formed sink toward abyssal depths, but most (~98 percent) of them are decomposed and oxidized by microbial activities on their journey to the ocean floor, thereby releasing CO_2 in surrounding deep waters.

The other important process is the "solubility" pump. As warm tropical ocean waters flow poleward and cool, the waters can dissolve more CO_2 and take up more CO_2 from the atmosphere. In the cold high latitude oceans, these CO_2 enriched waters become more dense due to cold temperatures and increased salinity (by ice formation) and are convectively mixed into subsurface regimes joining the deep "thermohaline" circulation conveyor transport through the global oceans. Because of the complexity of interactions of ocean circulations with biology, the distribution of oceanic areas acting as a source or sink of atmospheric CO_2 is complicated.

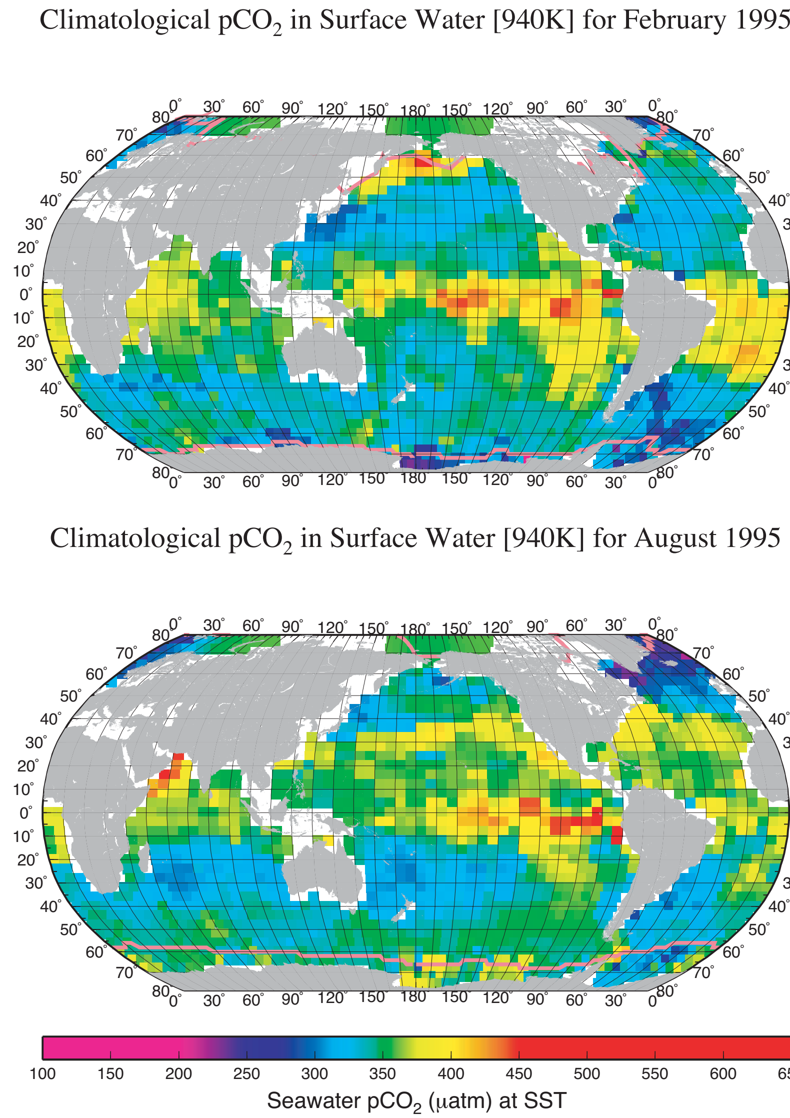


Figure 1

1.5 Million Measurements since 1957

Whether seawater is able to take up more CO_2 from the air or release it to the air can be measured by the partial pressure of CO_2, pCO_2, or the vapor pressure of CO_2 exerted by seawater. If a parcel of seawater has a pCO_2 smaller than that of the overlying atmosphere, the seawater should absorb more CO_2 until pCO_2 in seawater becomes equal to that in the atmosphere. Seawater loses CO_2 to the overlying air if its pCO_2 exceeds that in the air. This is the quantity that I have measured in oceans all over the world since the 1957 International Geophysical Year. My databank has been increased since then to include observations made by other U.S. and international investigators totaling about 1.5 million measurements of pCO_2 in surface ocean waters. Before we could measure the oceans' changes, we needed to establish a mean state of pCO_2 distribution, against which we could measure changes. This also allowed us to learn how the oceans and atmosphere exchange CO_2.

Climatological Mean pCO_2 Maps

My colleagues and I have constructed global ocean maps indicating the climatological mean state in 1995 of pCO_2 distribution in surface waters for each month. Since pCO_2 in surface ocean waters changed with time by exchange of CO_2 with the atmosphere, the measurements made in various years have been corrected to the reference year 1995.

Figure 1 shows the February and August maps representing the northern winter and summer conditions, respectively. The red-yellow areas are where the oceans are a CO2 source for the atmosphere, and the purple-blue areas are a CO_2 sink, where atmospheric CO_2 is being absorbed by the surface ocean waters. The tropical oceans of the Pacific and Atlantic are strong CO_2 sources, whereas the cold subpolar and polar oceans are strong CO_2 sinks, although their intensity vary seasonally. The tropical sources are attributed to the upwelling of CO_2 rich subsurface waters combined with warming to surface temperatures. Two intense sources areas located in the western subarctic Pacific (see February map) and the Arabian Sea in the Indian Ocean (see August map) are due to seasonal upwelling of subsurface waters rich in CO_2. The former is caused by convective mixing resulting from intense cooling of water by the cold dry Siberian air during winter, and the latter by strong southwest monsoon winds. During the months following the upwelling events, phytoplankton blooms reduced pCO_2 to the atmospheric level.

Has the Distribution of the Oceanic CO_2 Source and Sink Areas Been Changed?

My colleague Stew Sutherland and I focused our attention on the Pacific equatorial belt, which is the most intense oceanic CO_2 source area during non–El Niño conditions (El Niño periods are excluded in the figures) and also has highly variable CO_2 source intensity because of El Niño events. Our recent study (published in *Science,* vol. 302, Issue 5646, 852–856, October 31, 2003) shows that, during El Niño conditions, the source intensity in the central and eastern Pacific CO_2 sources is reduced on the average by 25 percent as a result of reductions in the upwelling of subsurface waters. Our analysis also demonstrates that, since about 1990, the intensity of the equatorial Pacific source has been increasing steadily at a rate of about 7 percent per decade. This increase coincides with the onset of the basin wide change in climate pattern called the "Pacific Decadal Variation" (or "Oscillation"), which caused major shifts in the temperature distribution and marine biological communities (including fisheries) over the entire North Pacific. Although the observed intensification of the equatorial Pacific CO_2 source appears to coincide with the basin scale climate change phenomena, it is not possible yet to predict the future course of events. We are looking forward to observing how the equatorial CO_2 source changes in response to the next major phase shift in the Pacific Decadal Variation.

Observations Give Us a Clue for the Cause

The high-latitude oceans are a strong CO_2 sink (indicated by purple-blue colors; see Figure 1) due to cooling of waters and intense photosynthesis occurring during summer months (August in the northern, and February in the southern, hemisphere). The subarctic and arctic Atlantic (including the Greenland, Iceland, and Norwegian Seas) is one of the most important CO_2 sink areas. Since I noticed that the low pCO_2 values in these waters cannot quite be accounted for by the effects of cooling and photosynthetic utilization of CO_2, I suspected that some other processes might be contributing to it. Figure 2 shows the relationship between the pCO_2 and the total amount of CO_2 dissolved in seawater. The observations were made in collaboration with Jon Olafsson of the University of Iceland in Reykjavik, in waters north of the 65.5°N latitude. Two distinct trends are seen: the North Atlantic trend (solid line) and the East Greenland Current trend (dashes). The North Atlantic trend represents a northward flowing branch of the North Atlantic Drift (or the northern extension of the Gulf Stream), which is characterized by high salinities greater than 33.5 o/oo. The East Greenland trend represents a southward flowing narrow current hugging the east coast of Greenland, which is characterized by low salinities (less than 33.5 o/oo). The low salinity values as well as other chemical signatures such as high contents of radioactive tritium (hydrogen-3) indicate that this water includes river waters from Siberia and arctic Canada.

The difference in the slope of the trend lines suggests major differences in their response to the increase in the atmospheric CO_2 concentration. If the atmospheric CO_2 concentration increased by 50 ppm (or microatm) in the future, the East Greenland current water would be able to absorb about 68 micromoles of CO_2 for each kilogram of water, as shown in the lower right inset in Figure 2. On the other hand, the North Atlantic waters would be able to take up only about 18 micromoles of CO2 for the same increase in the atmospheric CO_2 concentration, as shown in the upper left inset in Figure 2.

The Role of Arctic Rivers

The East Greenland Current water is capable of taking up an amount of CO_2 corresponding to about 3 percent of the present total CO_2 concentration in seawater and three times (=68/18) as much as the North Atlantic water can from the atmosphere. This is due to the more alkaline nature of arctic river waters flowing into the East Greenland Current, which eventually carry their effects into the subarctic North Atlantic. Using a mean flow rate of 2 million cubic meters per second for the East Greenland Current, I estimate that it contributes to about 7 percent of the subarctic North Atlantic CO_2 sink intensity.

The amount and nature of river waters may change in response to future changes in climate, rainfall, and ecosystems on the lands. Therefore, the contributions of arctic rivers to the major oceanic CO_2 sink region may also change, although we are unable to predict how. We do recognize for the first time, though, how the chemical characteristics of river waters, which originated over continents, are carried into the ocean current flowing along the continents and then mixed into open ocean waters to affect the sea-air transfer of CO_2 over the large areas of the North Atlantic Ocean. Since this area is the starting point of the global ocean "conveyor," CO_2 and other chemicals dissolved in the seawater will be transported into the abyssal regime. We are able to identify a carbon cycle pathway that carries climate change signals originated on lands to the abyssal oceans.

For the Future

I believe that for the assessment of the future effects of industrial CO_2 on climate changes, observations that are relevant to improving our quantitative understanding of a series of processes connecting the land-sea-climate domains should be one of the important research areas, and that it deserves greater attention.

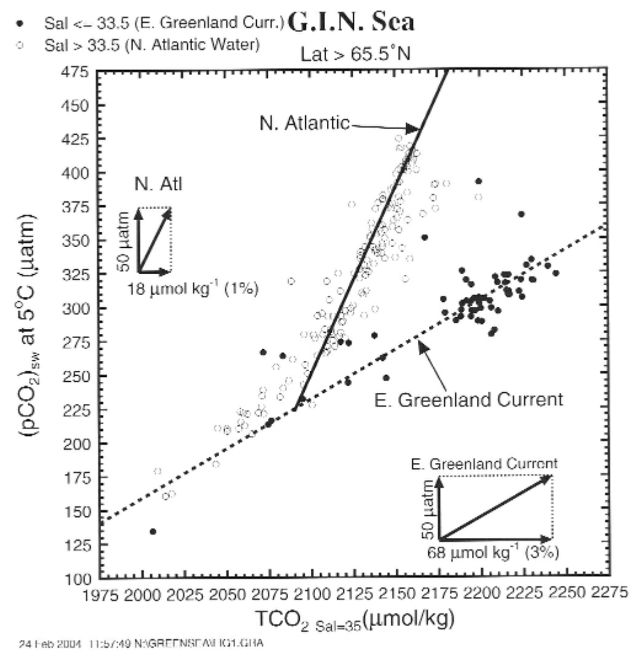


Figure 2

Michael Esmay

Takahashi cutting Peter Esmay's hair aboard *VEMA 14*.

My involvement in the carbon cycle study started quite accidentally in the spring of 1957. I was finishing up my graduate degree at Columbia University and looking for a mining industry job, positions that were rather scarce during the recession period. By chance, I bumped into Professor Maurice "Doc" Ewing on the sixth floor of Schermerhorn Hall.

When Doc heard that I had no job yet, he offered me one on the spot and told me to see him the next morning at Lamont Observatory. The salary that he offered me was $4,000 a year, which I eagerly accepted. The assigned task was to determine if the Atlantic Ocean was absorbing CO_2 gas from the atmosphere. I was told that I should work under Professor J. Lawrence Kulp, head of the Geochemistry Laboratory, and get ready for an extended oceanographic expedition aboard the Research Vessel *VEMA,* which was to start in November 1957, as a part of the International Geophysical Year (IGY) of 1956–1959.

It was a great ten-month period aboard the VEMA, during which time I had the chance to work closely with Doc Ewing, conducting a geophysical investigation across the South Sandwich Trench located between South America and Antarctica. My work that started in 1957 has evolved into determining the role of the oceans in regulating the atmospheric CO_2 concentration and, hence, the climate.

–Taro Takahashi

Thank you to Taro Takahashi for twenty-two years as Geochemistry associate director.

Taro Takahashi became the first associate director for Lamont's Geochemistry Division in 1981 and served in that position for twenty-two years, until late 2003.

His tenure as associate director spanned four directors and three interim directorships, during which time the structure of the Observatory was reorganized many times.

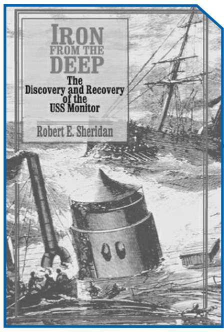
Throughout these changes, Taro provided a base of stability and institutional memory that helped keep the Observatory moving forward.

Changes in the Geochemistry Division occurred under Taro's leadership as well, with two major expansions of the Geochemistry Building, followed by the Geochemistry Annex and a corresponding increase in Geochemistry personnel. Despite the heavy demands on his time as associate director, Taro maintained an active research program that gained him a position of international leadership in the study of the ocean carbon cycle.

His recent award of an AGU Fellowship testifies to the recognition by the oceanographic community of Taro's contributions, as does the high citation rate of his recent paper (presenting the results shown in Figure 1 of his article) summarizing air-sea CO_2 fluxes (42 citations in about a year and a half, more than most papers ever receive!).

All of us at Lamont have benefited from Taro's leadership, for which we owe him a great debt of gratitude.

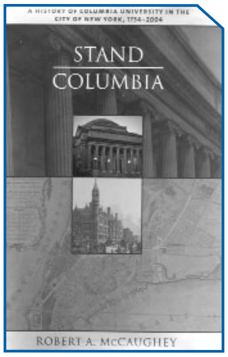
Robert Anderson, Associate Director,
LDEO Geochemistry Division



On Our Bookshelf

Iron from the Deep: The Discovery and Recovery of the USS Monitor
By Robert E. Sheridan
Naval Institute Press, 2003. 288 pages

Robert Sheridan, LDEO Ph.D. 1968, has been part of the *Monitor* story since the 1970s, when his research vessel first made sonar contact with the long-lost wreck of the famous Civil War ironclad, and he collected the first identifiable artifact. In this book he combines his first-hand perspective of the *Monitor*'s discovery and efforts to save her artifacts with an authoritative history of the ship that revolutionized naval ship design.



Stand, Columbia
By Robert A. McCaughey
Columbia University Press, 2003. 760 pages.

Marking the 250th anniversary of one of America's oldest and most formidable educational institutions, this comprehensive history of Columbia University extends from the earliest discussions in 1704 about New York City being "a fit Place for a colledge" to the recent inauguration of President Lee Bollinger. The book includes passages about Lamont.

The Earth Inside and Out: Some Major Contributions to Geology in the Twentieth Century
Edited by David Oldroyd
"Marie Tharp, Oceanographic Cartographer, and Her Contributions to the Revolution in the Earth Sciences"
By Cathy Barton
Geological Society of London, 2002.
Pages 215–228

This paper examines the empirical and car tographic work relating to the ocean floors, and the ideas of Lamonters Marie Tharp (b. 1920) and Bruce Heezen (1924–1977). It details their contributions to the Earth sciences revolution of the 1960s, through the provision of fresh empirical information and its presentation in a form that, in itself, led to new ways of thinking about Earth.

Lamont-Doherty Earth Observatory Public Lecture Series 2004

Gordon Jacoby of the Tree Ring Lab giving a presentation, along with colleagues Edward Cook and Brendan Buckley, May 18, 2003.

April 4, 2004
Earthquake Prediction in the Shadow of Chaos
Dr. Bruce E. Shaw, LDEO

April 18, 2004
Revealing the Deep: Science and Engineering in Deep Ocean Exploration
Sponsored by the Lamont-Doherty Alumni Association
Dr. Daniel J. Fornari, Senior Scientist, Woods Hole Oceanographic Institution

May 2, 2004
African Climate Changes and Human Evolution
Dr. Peter B. deMenocal, LDEO

May 23, 2004
The Air We Breathe: Air Pollution and New York City Subways
Dr. Steven N. Chillrud, LDEO

letter from alumni association president

Jeff Fox

Welcome to the latest edition of our Alumni and Friends newsletter. We are pleased to present the feature article by **Taro Takahashi** (Ph.D. '57) on his important work on carbon dioxide in the oceans, and the profile of one of our most accomplished alumni—**Frank Press** (Ph.D. '49).

Good things have been happening at our still-young alumni association. The association again sponsored a well-attended reunion at the annual meeting of the American Geophysical Union. It featured a "State of the Observatory" presentation by Lamont Director **Mike Purdy,** and much interaction among alumni. Development office staff have recently visited alumni in Florida, Washington, D.C., and Texas, and are currently planning other regional events.

We are happy to welcome three new members to our association board—**H. James Dorman** (Ph.D. '61), **Steve E. Eittreim** (Ph.D. '70), and **Art F. McGarr** (Ph.D. '68). Jim is retired from the University of Memphis, Art is a geophysicist with the USGS in Menlo Park, and Steve recently retired from the USGS, having worked with the Marine Geology group for nearly 30 years. Also, the board was pleased to invite **Dan Fornari** (Ph.D. '78), senior scientist and chief of Deep Submergence at Woods Hole Oceanographic Institution, to give the annual Alumni–Public Lecture this spring.

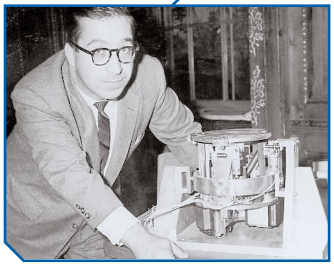
Some great folks have joined our alumni ranks recently. **Joe Stennett** retired (but is still helping out) after 35 years in science support aboard *Vema, Conrad,* and *Ewing.* **Millie Giarratano** retired after nearly 40 years, most recently working in the Ocean Drilling Program Site Survey Data Bank. Also, **Dee Breger,** manager of the electron microscope lab, has retired after nearly 40 years (see *News Bytes,* page 4). It gives me particular pleasure to welcome Joe, Millie, and Dee to the Alumni Association because I had the pleasure of sailing with Joe on the *Vema* and *Conrad* a few decades ago, and I worked with both Millie and Dee during my time at Lamont.

We are sad to report that **George Sutton** (Ph.D. '57), a seismologist who worked on the lunar program and who made fundamental contributions to our understanding of the seismic structure of the oceanic crust, passed away earlier this year. George was a great supporter of Lamont and a member of the legendary first generation of Lamont students; he will be remembered for his scientific contributions and his great sense of humor.

Many thanks go out to those who contributed to our annual appeal, which again exceeded the previous year's total! As many of you already know, the funds won by Lamont through competitive proposals are substantial but cannot be used for efforts such as this newsletter, the Web site, or Open House. Your financial support of these projects is critical. Thank you!

And don't forget to visit our Web site—www.ldeo.columbia.edu/ldeo/alum/assoc—and update your contact information, including e-mail address, so that we can stay in touch with you and help you stay in touch with fellow alums.

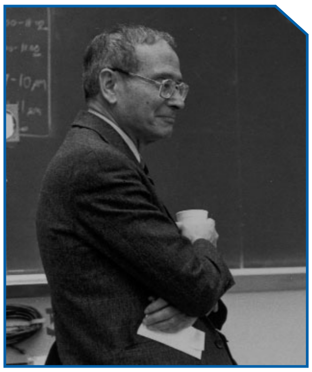
From left to right: George Sutton with lunar seismograph (ca. late 1960s); Joe Stennett and wife Margie Winslow; Daniel Quoidbach, Matilda (Milly) Giarratano, Michael Purdy, and Patty Catanzaro at Millie's March 9 retirement party.



alumnus

Profile

Max Hirshfeld Studio, courtesy AIP Emilio Segre Visual Archives



Courtesy: AIP Emilio Segre Visual Archives, Press Collection

Frank Press, Ph.D. 1949

Tireless, restlessly innovative, as brilliant in theory as in practice, entrepreneurial, open-minded, humanistic—Frank Press seems to be living the lives of several exceptional people all at once.

Press has made many pioneering contributions to our basic knowledge of the structure of Earth's crust and deep interior, the sea floor, the constitution of the moon, earthquake seismology, wave propagation, free oscillations, and planetary sciences. With Maurice "Doc" Ewing in the early days at Lamont, he designed groundbreaking seismographic instruments, more than 100 of which were later deployed to create the first global earthquake-monitoring system.

His contributions to the earth sciences include numerous publications (some 200 technical papers and textbooks to date), two classics—*Elastic Waves in Layered Media* in 1957, written with Ewing and Wenceslas Jardetzky; and later, *Understanding Earth,* with Raymond Siever, reissued in 2000—and the legacy of the many students he sent out into the world as accomplished earth scientists.

Press's extraordinary record of service is at the intersection of science and public affairs. He served as an adviser to the governor of California on atomic activities, a consultant to seven federal departments, and as a member of President Kennedy's, and later President Johnson's, Science Advisory Committee.

From 1959 to 1963, he represented the United States at four nuclear-test ban conferences in Geneva and Moscow, where seismological monitoring of atomic tests was a key issue—an assignment that demonstrated his skill at handling critical negotiations with formidable adversaries.

In 1977, Press was once again called to the national stage when President Jimmy Carter tapped him to be science adviser to the President and director of his Office of Science and Technology Policy. Press's four-year tenure at the White House was characterized by his judicious, low-key, yet extremely effective approach. Among his many accomplishments were the signing of United States–China scientific cooperation agreements.

Frank Press, international scientist and humanist, helped bring about the International Geophysical Year. Decades later, he conceived and organized the International Decade of Natural Disaster Reduction, a United Nations program that sought to inspire all nations to join forces to reduce the consequences of natural hazards. In 1963, he served as U.S. delegate to the U.N. Conference on Science and Technology in Underdeveloped Nations.

We are not the first to take notice of Frank Press. At the age of 33, he was elected to the National Academy of Sciences (NAS). In 1962, his picture appeared in *Life* magazine as one of the 100 most important people under the age of 40 in the United States. In 1981, Press became the first White House science adviser to serve as president of the NAS, a position he held for two six-year terms. Three times he was named most influential American scientist in *U.S. News and World Report.* He even has a mountain in Antarctica named after him.

Press's accomplishments are not all scientific. He is a skilled sailboat pilot, an authority on professional baseball and New Orleans-style jazz, and a family man. He and his wife Billie have been married since 1946 and have two children, William and Paula.

As a principal with the Washington Advisory Group LLC (www.theadvisorygroup.com), Frank Press currently advises leaders of companies, universities, governments, and nonprofit organizations on R&D strategic planning, management and research scenarios for new undertakings, and international research opportunities.

With Doc Ewing, May 1950

"Frank Press is Lamont's most outstanding alumnus."

—Lynn R. Sykes,
Higgins Professor of Earth and Environmental Sciences

Frank Press—A Few Highlights

At Lamont, circa 1950s

Education

1944 City College of New York, B.S.
1944 Columbia University, M.A
1949 Columbia University, Ph.D.

Teaching

1952 Joined Columbia's faculty
1955 Appointed professor of geophysics at the California Institute of Technology
1957 Became director of Cal Tech's Seismological Laboratory
1965 Joined MIT as chair of the Department of Earth and Planetary Sciences
1981 Named Institute Professor at MIT, a title reserved for scholars of special distinction

Past/Present Appointments

- President of the U.S. National Academy of Sciences and chair of the National Research Council, from 1981 to 1993
- Science adviser to the president of the United States and director of the Office of Science and Technology Policy, from 1977 to 1980
- President of the American Geophysical Union and the Seismological Society of America
- Life member of the Corporation of MIT
- Board member of the Woods Hole Oceanographic Institution, the Marine Biological Laboratory, and the Monterey Bay Aquarium Research Institute
- Fellow of the American Academy of Arts and Sciences, the Royal Astronomical Society, and the French and Russian Academies of Science
- Cecil and Ida Green Senior Fellow at the Carnegie Institution of Washington, from 1993 through 1997

Honors

- National Medal of Science, awarded by President Clinton
- Decorated Cross of Merit (Germany)
- Legion of Honor (France)
- Japan Prize
- Lomonosov Gold Medal (Russian Academy of Sciences)
- Thirty honorary degrees
- Arthur L. Day Medal (Geological Society of America)
- Bowie Medal (American Geophysical Union)
- Ewing Medal (Society of Exploration Geophysicists)
- Gold Medal (Royal Astronomical Society of England)
- First Gutenberg Medal (European Geophysical Society)
- Public service awards (NASA and the U.S. Department of the Interior)

From the Archive

December 1948: Mrs. Florence Corliss Lamont (M.A. in Philosophy 1898), widow of Thomas W. Lamont, gives Columbia University President (later U.S. President) Dwight Eisenhower the deed to “Torrey Cliff,” their estate in Palisades, New York. Thomas W. Lamont was an international banker and CEO of J.P. Morgan & Co. Torrey Cliff became the Lamont Geological Observatory in 1949 under founding director Professor Maurice “Doc” Ewing. In 1969, the Observatory was renamed Lamont-Doherty after a major contribution from the Henry L. and Grace Doherty Charitable Foundation. Henry L. Doherty was the founder of the Cities Service Company.

Read more Lamont history at www.ldeo.columbia.edu/ldeo/hist.

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