



UNIVERSITY OF HAWAII AT MANOA 2003-2004

Coastal Geology at the University of Hawaii

The “Coastal Geology Group” is part of the Marine and Environmental Geology (MEG) Division (7th floor of POST) of the Department of Geology and Geophysics. We are an informal and ever-shifting conglomeration of post-docs, technicians, graduate students, and undergraduate students researching the beaches and reefs of Hawaii. Many of you pass by our posters in the hallway—but do you know what coastal geology is? The goal of this article is to fill you in on the field of coastal geology and the activities of our group.

Coastal geology is the study of modern processes and late Quaternary history of environments where the land and sea meet. Most studies emphasize the sedimentology and relative sea-level history of coastal environments. However coastal geology can include any research that clarifies the interaction of geologic materials and marine processes in coastal settings such as estuaries, wetlands, beaches, reefs, barrier islands, and the inner shelf. It is a relatively new discipline that has grown rapidly in recent years. If you google the term “coastal geology” you find over 500,000 entries (we show up as number 7 at http://www.soest.hawaii.edu/coasts/cgg_main.html). Yet in the 1970s only a handful of universities offered any graduate training in coastal geology.

Why has the field grown so rapidly? Since WWII air travel and a new system of roadways fueled a national migration toward the coastal states. Now, more than half of all Americans live within a one-hour drive of the shoreline. But this growth came at a cost. Government agencies tasked with managing coastal wetlands, beaches, estuaries, and other fragile environments were not prepared for the massive development pressure and population growth. Land-use decisions were made without the benefit of sound scientific research.

Today, there is heightened interest in guiding coastal management on the basis of scientific principles. Coastal geology is carefully considered when decisions are made pertaining to sediment management, groundwater use,



Coastal erosion is a problem that plagues shorelines around the state, the nation, and the world. The Federal Emergency Management Agency has calculated that within the next 60 years approximately 25 percent of U.S. homes located within 500 feet of the shoreline will fall victim to the effects of coastal erosion. Erosion-induced losses to property owners during this time are expected to be half a billion dollars annually—an amount equal to the losses expected from coastal flooding due to storm surge and tsunamis.

coastal hazard mitigation, environmental conservation and restoration, coastal mineral resources, and the impacts of global change.

The field has experienced major growth since the mid-1980s when the U.S. Geological Survey created the “Coastal Geology Program” and established three regional research centers at Woods Hole, MA, St. Petersburg, FL, and Menlo Park, CA (now located at Santa Cruz). The USGS now employs about 400 people in their coastal geology program, with an annual budget of approximately \$38 million.

The UH Coastal Geology Group evolved during the early 1990s in response to state and national funding opportunities. As of this writing 14 graduate degrees have been awarded to 12 students. These include Scott

(continued on page 2)

Calhoun (MS '95, PhD '99), Rob Mullane (MS '96), Melanie Coyne (MS '98), Eric Grossman (MS '97, PhD '01), Clark Sherman (PhD '00), Jodi Harney (PhD '00), Zoe Norcross (MS '01), Ebi Isoun (MS '01), John Rooney (PhD '02), Tara Miller (MS '02), Dolan Eversole (MS '02), and Mary Engels (MS '03). Currently Chris Conger and Ayesha Genz are hard at work on their MS degrees. Group efforts have been greatly aided by several undergraduate students and technicians including Eden Feirstein, Matt Dyer, Melanie Smith, Matt Barbee, Chyn Lim, Ole Kaven, Bill Morrison, and Torsten Heinen.

We are especially proud that each student has published their research in peer-reviewed journals. Studies include the accretion history of Hawaiian reefs, carbonate sediment production, late Quaternary relative sea-level history, beach dynamics, remote sensing, shoreline change, and watershed sediment yield. The group's most notable achievements include:

1. Confirmation of the "Kapapa Stand of the Sea" ca. 3-5 kyrs BP. A 2 m highstand of sea level first conjectured by Harold Stearns in the 1930s.
2. Establishment of the damaging influence of seawalls on chronically eroding coasts. Our study doc-

umented the loss of 25% of the length of Oahu beaches due to seawall construction and led to the end of seawall permitting by state agencies.

3. Discovery and dating of the "Waianae Reef" a vast fossil reef complex that forms the core of the Oahu insular shelf. This reef dates from Marine Isotopic Stage 7, ca. 200 kyrs BP.
4. Measurement of shoreline change rates using historical aerial photographs and NOAA maps. Our data formed the basis for a new set-back law on the island of Maui.
5. The El Nino reef accretion hypothesis that proposes that large damaging wave episodes in Hawaii first developed during mid-Holocene time (ca. 5 kyrs BP) when the El Nino Southern Oscillation became enhanced due to climate warming and sea-level rise. This brought local reef accretion to an end on shorelines exposed to north swell.
6. Measurement of the carbonate sediment budget for an entire fringing reef (Kailua reef), establishing that most beach sands formed under the higher seas of the Kapapa Stand.

One of the hallmarks of the Coastal Geology Group is our interest in helping various government agencies and nonprofit groups work toward the conservation of Hawaii's beautiful coastal environment through the application of geologic principles to management decisions.

Chip Fletcher

Nuhou Kanaka Puka

Nohou Kanaka Puka (which means "alumni news" in Hawaiian) is published by the Department of Geology and Geophysics of the School of Ocean and Earth Science and Technology for its alumni and friends. Throughout the year we'd like to hear from you. Contributions of photos, news items, changes in addresses and monetary donations may be sent to Department of Geology and Geophysics, University of Hawaii, 1680 East-West Road, POST 701, Honolulu, HI 96822.

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Table of Contents

Coastal Geology in Hawaii	1
Message from the Chair	3
Confirmation of Degrees	4
Student Awards	5
Memorial: George Sutton	5
Retirees	6
Curriculum Enhancements	8
GG 614 Field Excursion	11
Alumni News	12
Faculty News	14
Geology Club Rocks!	18

Message from the Chair

As the Spring 2004 semester winds down and faculty and students prepare for finals, it is time to reflect on the happenings of the academic year and take stock of where we are. The student population continues to see modest growth; as of Spring 2004 we have 58 graduate students and 46 undergraduate students enrolled in our program. Of the graduate students, only five are supported directly by the Department's resources as teaching assistants; the rest of them are research assistants supported by external research grants obtained by their faculty mentors. We are justifiably proud of our continuing ability to provide financial support for our deserving graduate students. However, the inadequate funds for teaching assistants continues to be an issue in the Department. The five TAs are stretched very thin each semester as they assist with laboratory courses at the lower division level. Given our course offerings, we are perpetually under-staffed in terms of teaching assistants, but it is unlikely that the University will provide additional resources. Instead, we must seek alternative support from external sources such as donations.

During this academic year we started the Department of Geology and Geophysics Field Trip Fund, whose purpose is to channel donor support directly to field trip/camp activities by our students. The initial success of this fund has given us hope that a better advertised campaign in the fall may result in even more donations that will be used to underwrite the large expenses associated with our field trips. As you may know, GG majors are required to participate in a week-long field methods trip to the mainland, and with airfares, rental cars, and gas prices steadily going up we will soon be looking at participation expenses of \$1,000 per participant. Thanks to your support and the fund-raising activities led by the students themselves we have so far been able to underwrite the bulk of these expenses, but each semester we basically start back at zero and try to plan for the next field trip season. Even our shorter trips to neighboring islands have seen significant increases in cost, primarily due to a large hike in inter-island airfares. Despite these realities we seek to expand our field-trip opportunities, reflecting the collective wishes of faculty, students, alumni, and potential employers. Clearly, we will all have to pull together to make such an endeavor a reality. Thus, I once again call upon all friends of the Department to consider making tax-exempt donations to



Chip Fletcher replaces Paul Wessel as Chair on July 1, 2004.

one of our funds (see the UH Foundation web site www.uhf.hawaii.edu, give us a call at 1-808-956-7640 or e-mail us at gg-dept@hawaii.edu).

By the time this newsletter hits the streets my three-year service assignment will be up and we will have a new Department Chair. In a landslide election, Chip Fletcher was voted in as the next Boss.

As the lame-duck Chair, I would like to extend my thanks to all of you for your support during my lengthy reign of terror, and to wish Chip the best of luck as he begins to grapple with both old and new challenges on behalf of the Department's students, staff, and faculty. On behalf of all of us at the Department, have a wonderful and peaceful summer, and drop us a postcard!

Paul Wessel

Investment Gift Towards the Future

The Department is deeply grateful to all its alumni, faculty and friends who have made generous monetary gifts over the past few years. Your contributions allow us to continue offering opportunities for research assistance, purchase software for our computer labs and continue offering field trips throughout the Hawaiian Islands and abroad. Donations to our endowed scholarships, department's discretionary fund or field trip fund are welcome at any time. For more information, please contact us at (808) 956-7640 or gg-dept@hawaii.edu. Mahalo nui loa.

Confirmation of Degrees

Undergraduates

Vsevelod Ulitsky (BS, Fall 2002)
Kimberly Artita (BS, Spring 2003)
Sarah Askey (BS, Spring 2003)
Donielle Chittenden (BS, Spring 2003)
Michael Dahilig (BS, Spring 2003)
Rachel Gilhooly (BS, Spring 2003)
Shawn McMillan (BS, Spring 2003)
Eva Ng (BS, Summer 2003)
Max Blake (BS, Spring 2004)
Junaid Dawud (BS, Spring 2004)
Melody Eckmier (BS, Spring 2004)
Eden Feirstein (BS, Spring 2004)
Jeremy Kimura (BS, Spring 2004)
Peter La Placa (BS, Spring 2004)
Angela Miller (BS, Spring 2004)
Jennifer Olson (BS, Spring 2004)
Carrie Plath (BS, Spring 2004)
Tami West (BS, Summer 2004)
Sara Wilson (BS, Summer 2004)

Masters of Science

Dolan Eversole
Large-Scale Beach Change: Kaanapali, Hawaii
(Advisor: C. Fletcher, Fall 2002)

Tara Miller
Waikiki: Analysis of an Engineered Shoreline
(Advisor: C. Fletcher, Fall 2002)

Donovan Steutel
Efficient Materials Mapping Using Hyperspectral Imaging Data
(Advisor: P. Lucey, Fall 2002)

Aisha Morris
Emplacement of Deep Submarine Lava Flows on the North Hawaiian Arch: A Study of the Thermal and Rheological Evolution Using a Numerical Model
(Advisor: B. Appelgate, Spring 2003)

Buffy Cushman
Plume-Ridge Interaction Along the Galápagos Spreading Center, 90° 30' W to 98° W: A Hydrous Melting Model to Explain Variations in Observed Glass Compositions
(Advisor: J. Sinton, Summer 2003)

Mary Engels
Holocene Reef Accretion: Southwest Molokai, Hawaii
(Advisor: C. Fletcher, Summer 2003)

Dana Caccamise
Sea and Land Level Changes in Hawaii
(Advisor: M. Bevis, Fall 2003)

Nile Akel Kevis Sterling
Cenozoic Changes in Pacific Absolute Plate Motion
(Advisor: P. Wessel, Fall 2003)

Hao Zhou
A Mathematical Model for the Deformations Achievable by a Slightly Extensible Spherical Cap
(Advisor: M. Bevis, Fall 2003)

Joern Ole Kaven
Normal Fault Growth in Three Dimensions
(Advisor: S. Martel, Spring 2004)

Tomoko Kurokawa
A Dual-Pathway Eruption Model for the Rapid Thickening of Seismic Layer 2A on the East Pacific Rise 9° 25'–57' N
(Advisor: M. Edwards, Spring 2004)

Doctors of Philosophy

James Foster
GPS Meteorology and Phenomenology of Precipitable Water
(Advisor: M. Bevis, Fall 2002)

Geoffrey Garrison
Holocene Sedimentary and Aquatic Biogeochemical Responses Reflected in Ordy Pond, Oahu, Hawaii and Contemporary Modeling of Submarine Groundwater Discharge in Kahana Bay, Oahu, Hawaii
(Advisor: C. Glenn, Fall 2002)

David Phillips
Crustal Motion Studies in the Southwest Pacific: Geodetic Measurements of Plate Convergence in Tonga, Vanuatu and the Solomon Islands
(Advisor: M. Bevis, Fall 2003)

Eric Kendrick
Geodetic Studies of Geodynamic Processes in the Central and Southern Andes
(Advisor: M. Bevis, Spring 2004)

Student Awards

Agatin Abbott Memorial Award

Presented to an outstanding senior each year in memory of department faculty Agatin Abbott.

Kimberly Artita (2003)
Eden Feirstein (2004)

William T. Coulbourn Fellowship in Marine Geology

Endowed by friends and family in memory of department alumnus and faculty member William T. Coulbourn.

Kate Bridges (2003)
Jim Gharib (2004)

Harold T. Stearns Fellowship

Endowed by longtime department friend for the purpose of supporting student research on geological and geophysical problems in Hawaii and the Pacific Basin.

Kolja Rotzoll (2003)
Patrick Shamberger (2003)
Eric Bergmanis (2004)
Chris Gandy (2004)

J. Watumull Scholarship

Awarded annually to the department's outstanding graduate student from an endowment from the Watumull Foundation.

Nancy Adams (2003)
Nicole Lautze (2003)
Matt Patrick (2004)

2004 UHM Scholar-Athlete for Women's Volleyball

Melody Eckmier

George Sutton 1927-2004

With much sadness, we report that George Sutton passed away on January 25, 2004, in Virginia. George was a member of the Geology and Geophysics and Hawaii Institute of Geophysics faculty from 1966 until 1981, when he left the University to join Rondout Associates, a geophysical consulting firm. He later retired to western Virginia. At the UH, George was Associate Director of HIG for several years, an active researcher in lunar and Mars seismology. He was a member of the Apollo and Viking Seismology teams and developed seismic systems for use on the ocean floor. George is remembered by many of us as an excellent teacher, advisor and true friend.



Ralph Moberly Retires—Forty-three years at the UH

Born in a small town near St. Louis, Missouri, Ralph Moberly's love for history, science and nature developed early in childhood and this 1950 Princeton University graduate found in college that geology combined these interests.

After graduating, Ralph joined the Navy with tours on a cruiser and an oceanographic survey ship. Returning to Princeton, Ralph earned his PhD in 1956 and started a career with Standard Oil of California (now Chevron) as a field and subsurface geologist. The University of Hawaii lured him away in 1959 to teach "soft-rock" courses and conduct research in marine geology.

When he arrived at UHM, September 1959, the Geology department grew to three faculty members. Soon after, the Kilauea Iki and Kōpoho eruptions and the Chilean tsunami told him that events would be lively for a geologist in Hawaii. (Ralph compiled a history of the early days which is available on the department's website at www.soest.hawaii.edu/GG/about_gg.html.)

Ralph taught both undergraduate and graduate classes including historical, structural, regional, fuels, marine geology, stratigraphy, sedimentology, and tectonics. Research programs included beach and coastal studies and later, with DSDP, ODP, ONR and NSF studies in the tectonics and sediments of the Central Pacific and the Peru-Chile margin.

Since coming to the UHM, Ralph says the most notable changes, besides the obvious growth in student body and buildings on campus, are diminished teaching assignments, expanded research, and a reduction in the number of students willing to read much or critically. He also remembers there was greater support in the earlier days by the government, the business community, and the public.

Ralph says what has made him happiest at UHM is "watching each year the blooming of one or two undergraduates and two or three grad students (proudest if they were mine, but certainly happy for them and their mentors in GG)" and "faculty acquired during my 8 years at GG Chair." He is also pleased with the increased national ranking of GG.

Ralph was active in the initial planning of the



Patty and Ralph at his retirement party.

POST building and the Ocean Drilling Program. He now stays current with his favorite topics: historical, marine and economic geology and tectonics.

Ralph and his late wife Jean had two children, Beth and Ralph. He also has two granddaughters. Ralph currently lives on Pacific Heights with his wife Patty, whose daughter Cecily is in the graduate program in Ocean Sciences at UC Santa Cruz. To find Ralph on campus, you can contact him in his office at POST 719E or find him at GSA, AGU and IGC meetings.



Pow-foong Fan Retires—Thirty-eight years at the UH

In 1965, the UHM recruited Pow-foong Fan to join the Hawaii Institute of Geophysics and jointly appointed to the geosciences department. He arrived with a BS degree from Wheaton College (1955), and a MA (1963) and PhD from UCLA (1965).

Pow-foong became a professor of geology in 1987 and taught courses on the geology of the Hawaiian Islands, and geology and mineral resources of Asia. He led numerous field trips and has many fond and humorous memories of his experiences with the students.

Additionally, Pow-foong worked with East-West Center students on mineral resources and the tectonics and mineral resources of China. Pow-foong's research focused on the mineral resources of Asia, mineralogy of sediments in Hawaiian waters and elsewhere, and altered basalt related to Hawaii's geothermal resources. When asked about the changes he has witnessed at the UHM, he mentions the expansion of the Geology and Geophysics Department as the most notable.



Retirement party at Maple Gardens, April 30, 2004.

International Society" in Hilo, Hawaii. He will provide one of the highlights of the conference as he leads a caravan of busses and vans on a visit to the volcano. Dickinson's poetry referencing volcanoes inspired this fifth annual international conference to be held July 30–August 1 in Hilo and Madame Pele is cooperating with a spectacular lava flow, which is drawing a crowd as the participant list keeps growing. As he retires, Pow-foong says he will continue his research in geology and has plans to travel with his wife.



This summer Pow-foong will join the "Realms of Amplitude: The Conference of the Emily Dickinson

*On my volcano grows the grass,
A meditative spot,
An area for a bird to choose
Would be the general thought.*

*How red the fire reeks below,
How insecure the sod
Did I disclose, would populate
With awe my solitude.*

*Emily Dickinson
(1830–1886)*

Curriculum Enhancements—New and Improved

During the past two years the Chair, faculty, and Curriculum Committee in the Department of Geology & Geophysics have been very active in designing new courses to enhance the educational experience and meet the career goals of Geology & Geophysics majors. New and modified courses to be offered are as follows.



- **GG 170 Physical Geology**

This four-credit lecture, lab, and field trip course will begin in the Fall 2004. This undergraduate course is intended for the Geology & Geophysics major and other physical science majors seeking a more rigorous introductory course. GG 170 will emphasize applications of physics, chemistry, and math to geological problems and stress the learning skills required for a career in science. The course is limited to 16 students; Fred Duennebier will be instructor for Fall 2004.

- **GG 250 Scientific Programming**

A three-credit lecture and lab computer course will begin in the Fall 2004. This course was set up in response to recognition of the indispensable need for computer skills in the world of Geology & Geophysics, physical sciences, and many other areas of scientific study. The course introduces students to computer programming and Matlab. The class will emphasize aspects of programming and logic that apply across a broad range of algorithmic programming languages and scientific problem types. GG 250 is limited to 20 students; first priority is given to GG majors. In the Fall 2004, Paul Wessel and Steve Martel will team-teach the course.

- **GG 410 Undergraduate Seminar**

This class was modified to a two-credit course starting in Spring 2005. Students will learn techniques for effective oral communication, make at least 3 oral presentations in one semester, and receive critical evaluations on their efforts. It is intended that this

course will be used to qualify for an “Oral Communication” Focus Designation, which will allow students to obtain this requirement within our department while they concentrate on their major.

- **GG 609 Graduate Teaching Geology**

A variable credit (1-5) lecture and lab course will begin in Spring 2005. The limited number of paid teaching assistants is not adequate to meet the need for students who wish to gain experience in teaching classes in Earth Sciences. Under the scrutiny of the Department Chair, and with consent, students enrolled in GG 609 will gain practical experience and instruction in various aspects of classroom teaching including preparation of materials, leading classroom activities, and evaluation of student work.

- **GG 703 Fractures and Faults**

This three-credit lecture course was previously a “Special Topics in Geology and Geophysics.” The course is intended to give students a working knowledge of fracture mechanics theory, boundary element modeling and an appreciation of their broad application to geologic phenomena. Among other specific goals, GG 703 will combine lectures to understand the underlying principles of elastic theory and fracture mechanics, and computer (Matlab) skills to solve a variety of fracture problems. This course will be offered in Spring 2005.

*John Sinton
Curriculum Committee Chair*

*Teachers open the door.
You enter by yourself.*

Chinese Proverb



Research into the history of Hawaiian reef systems has been aided by development of our hydraulic rotary drill that can obtain 10-15 m cores. Former post-doctoral researcher John Rooney cores the fringing reef, south shore of Molokai.



Student award winners. Front: Eden Feirstein and Jim Gharib. Back: Patrick Shamberger, Matt Patrick, and Eric Bergmanis. Missing: Chris Gandy and Melody Eckmier.



SOEST Open House, October 2003, with Garrett Ito and Eric Mittelstaedt.



SOEST Open House, October 2003, with Greg Ravizza.



GG 305 Death Valley Field Adventure, 2004.

UNIVERSITY OF HAWAII AT MĀNOA

School of Ocean and Earth Science and Technology
Department of Geology and Geophysics

"I actually got to hike down inside a lava tube inside the earth and got to see just how large and destructive a force a volcano really is"...Hans '07
"I learned things about Hawaii and our world that cannot be grasped in the classroom, particularly the depth, shape and topography of ravines, lava lakes and recent flows"...Kamana '04

Aloha Friend:

The Department of Geology and Geophysics at the University of Hawaii at Manoa is nationally recognized in terms of its research and equally committed to preparing our students for careers in our community and in the global marketplace. An essential part of our students' education is broad, integrated training in field, theoretical, and laboratory aspects of geology.

We ask for your support to assist us in providing the students with exposure to field studies, which poses a particular challenge for our department. The geology of Oahu spans but a brief period of geologic time, is represented by only a few types of rocks, and provides but a small sample of important geologic processes. We know that it is vital to expose our students to the world outside of Oahu so that they can be broadly trained, can compete well with students from other universities, and can represent Hawaii well around the world. Course requirements include student field trips, including travel on Oahu, to a neighbor island to experience a volcanic eruption, and an annual field trip to the mainland. Rising travel costs, coupled with the decline in our educational budget, are jeopardizing the field trips. Please consider a tax-deductible donation to support our undergraduate field program. Donations to this fund will only be used for student expenses associated with required field trips and camps.

Your contribution can be made on-line through the UH Foundation website <http://www.uhf.hawaii.edu>, or by mail to the University of Hawaii Foundation, P.O. Box 11270, Honolulu, HI 96828-0270. Please indicate the ***Geology & Geophysics Field Trip Fund*** on your check payable to: *University of Hawaii Foundation*. Or, feel free to contact our office at 956-7640 (email: gg-dept@hawaii.edu) and we will be happy to mail you a donation card and envelope. The students and faculty of the Department of Geology and Geophysics greatly appreciate your support!

Sincerely,



Paul Wessel
Professor & Chair

GG614 Field Excursion Taupo Volcanic Zone, New Zealand

Twelve students and two faculty members spent between 2 and 4 weeks in New Zealand at mid-semester break studying the physical volcanology of calderas and composite cones. Taupo Volcanic Zone is perhaps the most active silicic magmatic system known with 33 caldera-forming events in the last 330 kyr. As such, it offers an ideal contrast to our own great field laboratory Kilauea, where we traditionally teach GG601. The excursion visited White Island, Rotorua, Tarawera, Taupo, Tongariro-Ngauruhoe, and Ruapehu. The trip had two modules—conventional field days to classical outcrops of ignimbrites, Plinian and phreatoplinian fall



Ruapehu crater lake showing tephra falls from the 1995-96 eruptions.

deposits, block lavas, lahars, and debris avalanches and two intensive training modules based about the incomparable 181 AD Taupo eruption. It was a fabulous class that worked, played (well, just one recreational day), and cooked incredibly well together. The trip was also blessed by amazing weather—a drought in Middle Earth is defined as seven dry days. If demand stays high (funds permitting), in the future this class will run biannually alternating with GG601 to give students the total pyroclastic experience.

Bruce Houghton, Faculty Leader

GG614 Field Excursion

Our field trip to the North Island was a whirlwind adventure tour of the volcanoes and deposits of past volcanic eruptions. The Taupo Volcanic Zone (TVZ) is a belt of volcanoes in the north island and is host to diverse types of volcanoes. Our trip included an ascent up the valleys of previous lahar paths to the near overflowing pale grey crater lake at Mt. Ruapehu and a hike through the amazing Tongariro National park, where many desolate scenes from the “Lord of the Rings” movies were filmed. The eager heads of the group staged a grueling Mt. Doom ascent (Mt. Ngauruhoe), followed by a speedy scree run through knee deep scoria to the bottom.



Students from GG614 hike Mount Doom.

Our boat trip to the active volcano of White Island, also featured some local fauna, where we were accompanied by dolphins for much of the journey! Our accommodation was located close to the scenic Lake Taupo, which is not always recognized as a volcano. However, our investigations of the deposits which surround the lake identify that this volcano has been extremely active and not too far back into the distant past (last eruption 181 AD)! The products from this volcano include both voluminous pyroclastic fall and flow deposits, indicating the extremely violent nature of this volcano. With this in mind, our mini van stops around the island to many towns (also bars and geothermal hot springs) included a volcanic hazard discussion of the implications of future eruptions to North Island communities. Finally, exhausted after a day of field work, we sat down each night with some New Zealand tucker and fine local beverages to watch photo slideshows of the events of the day!

Rebecca Carey, Student

Alumni News

1970s

- **Ken Hollett** ('77) retired in August 2003, from USGS as a senior hydrogeologist. He spent 30 years in government service, 4 years piloting Navy aircraft, and 26 years dabbling in domestic and international hydrology for USGS. He and **Claudia Stone** (HIG-GG, '77) live in Tucson, AZ but plan to be on the road experiencing new and revisiting favorite parts of the globe.
- **Bruce Schenck** ('78) is employed with Omaha Public Power District as a system administrator.

1980s

Send us your news!

1990s

- **Kelly Kolysko** ('99) is employed at TRC as a Senior Staff Geologist.
- **Chris Okubo** ('96) received a PhD in Geological Engineering from the Department of Geological Sciences, Mackay School of Mines, University of Nevada, Reno.
- **Kimberly Sides** ('96) works for the University of California College Prep Initiative as a part-time fiscal assistant. She is busy raising three boys with her husband and living in Santa Cruz, CA.
- **Alan Soicher** (MS '96) works near Bellingham, WA as a watershed restoration coordinator for the Nooksack Indian Tribe and is licensed by the state as a geologist and hydrogeologist. In 2002, he married Stephanie, from Oklahoma, and they have one child named Isaiah. He also makes time to be an appointee for a public member seat on the state Forest Practices Board, an independent state agency that establishes rules to protect public resources while maintaining a viable timber industry in Washington.

2000s

- **Nate Adams** (BS '02) is working for USGS as a hydrologist here in Honolulu.
- **Jodi Harney** (PhD '00) is working for USGS as a Mendenhall Postdoctoral Research Fellow. She says she's working with a great group doing research in central California, Glacier Bay in Alaska, and Puget Sound in Washington.
- **Andrea Nelson** ('00) is living in Iowa and working for ISU Extension as a Human Resources Manager.

Missing but not forgotten...

We have lost contact with the following alumni, who missed out on this great issue of our newsletter and more.

Sarah Askey (03)	Stefano Baffi (99)
Olivia Athens (81)	Larry Beers (97)
Nancy Baker (92)	Theodore Brattstrom (00)
Chris Busing (91)	Carol Bryan (92)
David Chaffee (84)	Susan Burke (77)
Lawrence Chun (71)	David Diller (82)
James Celetta (84)	Shung Sheng Fu (98)
Carla Crissinger (00)	Beverly Giza (79)
Thomas Fleming (82)	Jeremy Hodder (97)
Claudia Stewart (93)	Richard Halda (78)
Erica Klohn (00)	David Hargis (71)
Lawrence Lorhan (72)	Roberta Harma (82)
Kathryn Middlestead (97)	Denise Hills (03)
Nicholas Mitchell (98)	Rick Holasek (95)
Andrea Neslon (00)	Paul Johnson (96)
Richard Quigley (93)	Rockne Johnson (68)
Patricia Pennywell (85)	Keith Katahara (77)
Michelle Yoshioka (95)	Sherrie Sasaki (93)
Robert Mallonee (89)	Zifu Wang (96)
Hillary Epps (78)	Mark Mattice (81)
Xiyuan Wen (95)	Lafayette Maynard (73)
Larry Wipperman (72)	Lucy-Ann McFadden (83)
Gail Yamada (86)	Daniel Miller (87)
Susannah Mistr (99)	Kakkala Mohanan (93)
Marica Nelson (90)	Robert Oldnall (75)
Daniel Palmiter (75)	Steven Pottratz (68)
Chandra Rai (77)	Lisa Kinsey (99)
Anthony Schreiner (83)	Michael Smith (82)
Claudia Stone (77)	Wayne Suyenaga (73)

If you know the whereabouts of any of these people please send e-mail to gg-dept@hawaii.edu.

Your turn!

Help us stay in touch with you. Please update your address and other information using either the form here or online at <http://www.soest.hawaii.edu/GG/alumni-input.html>. We would also like to hear if you've changed jobs, received a promotion or experienced any notable developments in your professional career or personal life. Please let us know so we can share them with others.

Name _____ *Semester/Year Graduated* _____

Mailing address _____

Telephone/FAX/e-mail _____

Firm/Organization _____

How do you prefer to read our newsletter? *by mail* *e-mail* *our website*

Would you like to be able to contact other alumni through an alumni homepage at the G&G website?

If yes, is it okay for us to list your name and e-mail address? *Yes* *No*

Your news

Faculty News

Aly I. El-Kadi and the hydrogeology group's research projects include identifying current pollution levels and sources of contamination for the Nawiliwili Watershed, Kauai. The study is aimed at developing a restoration and protection plan for the watershed. Another project is delineating capture zones for public water sources in Hawaii, evaluating sources of contamination within these zones, and evaluating the risk of contamination for each source. A follow-up project has been initiated to maintain and update this study and address the issue of uncertainties in models and their data. New projects that have been initiated in 2004 will address the use of helium as an environmental tracer, best management practices for watershed protection, and management of surface water and groundwater resources.

Neil Frazer is working with Ben Brooks on the development of non-linear inverse methods. Their new method makes Gibbs sampling nearly independent of critical temperature. Results were submitted for publication and they are now applying them to INSAR data for the post-seismic geodetic inverse problem; the payoff will be especially high for earthquakes distant from seismic stations. Neil and Eva-Marie Nosal are developing acoustic algorithms to locate humpback whale singers using hydrophones, a very exciting project because of the mathematical and computational challenges. Neil is also working on the population dynamics of parasite exchange between wild fish and seacage fish. Convinced that seacage farming is fundamentally hazardous to wild fish, Neil believes it is likely to prevent the rebuilding of wild fish populations. "Look for ecological disaster in the ocean, after the federal government leases it to seacage farmers. The dynamical equations don't say exactly how fast wild fish will decline; they just say that's the way to bet, and experience with salmon farming in Europe and British Columbia is consistent with the predictions of the equations." says Neil.

Michael Garcia is pursuing research on Hawaii's active volcanoes, including monitoring the petrologic and geochemical evolution of the 21 year old Puu Oo eruption. After 15 years, and with the help of many students and his younger daughter, he completed a comprehensive study of the historical lavas from the summit of Kilauea (published Fall 2003). A new 4-year grant from NSF will continue his Kilauea work, and assisted him on sabbati-

cal leave (Spring 2004) in Canberra, Australia, where he used their ion microprobe and other analytical toys to probe the origins of Kilauea lavas. Garcia is finishing a study of submarine geology of Mauna Loa with grad student Dorsey Wanless; they made a detailed bathymetric survey of the flanks of the volcano and discovered 8 new submarine vents. Using the new JASON 2 submersible, they sampled these vents. With Greg Moore, Garcia convinced the Ocean Drilling Program to drill a hole in the debris fan from the Nuuanu slide to investigate, and found eight sand layers, more than 260 km from the island of Oahu, indicating that the volcano has repeatedly collapsed during its growth, each probably creating large tsunami waves. Collaborating with geochronologists from Kyoto University to date Honolulu eruptions, they discovered two distinct eruptive pulses and speculated that the second pulse may not be over. On Kauai, he will investigate the geology and ages of the young volcanism with grad student Chris Gandy. Garcia is still teaching igneous petrology, current events in volcanology, and various grad seminars. Garcia (with Bruce Houghton) was program chair for the *Cities on Volcanoes 3* conference in Hilo in July 2003; it attracted over 250 volcanologists and emergency managers. Garcia continues to organize the SOEST awards for the State Science fair participants and to lead Oahu geology field trips.

Craig Glenn's research interests remain in the areas of paleoceanography, stratigraphy and sedimentology, submarine groundwater discharge, sedimentary petrology, low temperature geochemistry, light-stable isotope geochemistry and inorganic-organic chemical interactions as applied to studies of the deposition and diagenesis sediments and sedimentary rocks. His more recent research includes U.S.-Israel Binational Science Foundation studies, where he has been working with Israeli co-investigators to use temporal and regional variations in P and organic carbon accumulation rates, C/N stable isotopes, Sr, Nd and Ca radiogenic isotopes, and Cd and REE analyses for correlating and investigating ancient marine water mass migrations, upwelling and marine paleoproductivity of the Upper Cretaceous through Eocene of the Tethyan Seaway (Egypt, Israel, Turkey, Morocco, Helvetic Alps). He and his recently graduated student Geoff Garrison are finishing up publications with Jane Schoonmaker on the Holocene sedimentation and climatic history revealed from an isolated anoxic pond on the Ewa Plain. Craig and his students have also expanded their Sea Grant studies of the flux and pollutant effects

associated with submarine fresh groundwater and pollutant discharge into several coastal embayments in Hawaii (e.g., http://aslo.org/lo/toc/vol_48/issue_2/0920.pdf). Craig is a Fellow of the Geological Society of America and was recently the lead editor of SEPM Special Publication 66 entitled *Marine Authigenesis: From Global to Microbial*, and remains Chair of the SEPM Research Group on Marine Authigenesis (see <http://www.fromage.ethz.ch/>).

Julia Hammer's research on the chemistry of mid-crustal and shallow volcanic processes has focused on a combination of sites near and far—Hualalai Volcano (Big Island) and Mars. Working with grad student Patrick Shamberger, she is looking at a record of the early growth and failure of the volcano's submarine flanks. Patrick is deciphering Hualalai's plumbing system using some very unusual rocks ejected from the volcano during recent eruptions. Julia is also examining the effects of cooling rate and oxygen pressure on the magnetic properties of iron-rich basalts using laboratory experiments, with application to understanding the intense magnetic anomalies on Mars detected from orbiting spacecraft. An experimental petrology facility is also beginning to come together in POST. When complete, it will be capable of subjecting samples to the temperatures and pressures of crustal magma chambers, and replicating complex decompression paths that simulate magma ascent during volcanic eruptions.

Bruce Houghton reports that the future has been looking dark for the physical volcanology group as more and more grants come in to walk on what Professor Steve Self dismisses as "black rocks." Currently, the group is working at Stromboli, Etna (Italy), Tarawera, Ruapehu (New Zealand), Masaya (Nicaragua), and Kilauea with Novarupta as the only light relief. Nicole Lautze and Bruce are working with Andy Harris on the spectacular 2002 and 2003 eruptions at Stromboli—including products of the largest explosive event since 1930—on April 5, 2003. Nicole's first paper (with Andy) was accepted for publication in a JVGR special issue. Nancy Adams and Nicole shared last year's J. Watumull Merit Scholarship. Costanza Bonadonna received an NSF grant to extend our bag of basaltic plinian eruptions to include the Fontana Lapilli from Masaya caldera in Nicaragua. Costanza our SOEST Young Investigator, was also the inaugural recipient of the IACVEI Young Scientist award. Chris Gregg's studies of natural hazards

perceptions and preparedness in the State of Hawaii (which won him an ARCS Foundation scholarship in 2003) resulted in two papers in international journals and culminated in his successful thesis defense. Julia Sable, Rebecca Carey, and Bruce spent an intensive week with Colin Wilson completing the detailed analysis of the architecture of the complex near-vent deposits of the 1886 Tarawera eruption in New Zealand. Nancy Adams and Bruce did a similar exercise looking at the spectacular Episode IV block bed from the 1912 Novarupta eruption in Alaska. Julia was awarded a Senior Thesis Research Award in May 2004.



Richard Hey and Donna Dale were married in January 2003.

Garrett Ito enjoyed the challenge of teaching Continuum Mechanics (GG 681), Gravity, Magnetism, and Heatflow (GG 652), and Physics of the Earth and Planets (GG 304). One of his recent research projects is a study of how and why the Galapagos hotspot generates excess and compositionally abnormal magmatism along the Galapagos Spreading Center. His collaborators are J. Sinton, J. Mahoney, K. Rubin, and post-doc W. Chazey. He is currently working with grad student Eric Mittelstaedt on a theoretical study of how oceanic hotspots appear to "capture" mid-ocean ridge spreading segments and generate radiating, spoke-like volcanic lineations on the adjacent seafloor. He is also working with Todd Bianco in developing a new model to explain the rejuvenated stage of Hawaiian volcanism as well as the expansive but enigmatic lava flows well off-shore of the Hawaiian islands. M. Garcia and J. Becker are collaborators on this and other related research.

Kevin Johnson (who joined the UHM in late 2003 as affiliate graduate faculty and associate researcher) is currently focusing his research on the geochemistry of mantle-derived melts from a variety of geologic environments. He is working on submarine lavas collected by submersible from the Hana Ridge, Haleakala's 140 km-long east rift zone, to understand how the Hawaiian plume has changed in isotopic and trace element composition during growth of the Haleakala shield. He is also trying to wrap up a study, in collaboration with researchers from Brown and Oregon State, on the effect of two mantle plumes on volcanism along the Southeast Indian Ridge. And he's got two projects in the works. One is a study of trace element concentrations in peridotites from the Mid-Atlantic Ridge. The other is a seagoing investigation of back-arc basin spreading center lavas in the northern Lau Basin.



John Mahoney completed an investigation of Tethyan ophiolites in Tibet with postdoc S. Q. Zhang, and is wrapping up studies of the Mesozoic Pacific oceanic plateaus (Ontong Java, Shatsky Rise, Manihiki) with H. Sheth. A project with Paul Wessel and postdoc J. Ray on the Nazca Ridge and Easter Seamount Chain is nearly finished, while work on the Galápagos Spreading Center with John Sinton, Garrett Ito, and Ken Rubin continues. Mahoney also recently began a study with PhD student Loyc Vanderkluyzen to identify the feeder dike system(s) of the Deccan Traps of India, in order to test competing models of flood basalt formation.

Steve Martel has continued to work with students on fault growth and landslide initiation (for details see his web site). He also is pursuing a new project on how exfoliation joints form (these are the fractures that give the domes in Yosemite National Park their "onion-skin" appearance). Steve's work indicates that they do not form due to erosion of overburden, as is widely considered, but rather due to the interaction of high horizontal stresses in the Earth with the topographic surface. He also has been increasingly involved in slope stability issues on Oahu. His two-year term as associate chair ends June 30, 2004.

Greg Moore and his group continued work on the Nankai Trough accretionary prism. Patrizia Costa Pisani

joined the group in 2003 and has been working on pre-stack depth migration of several seismic reflection lines over the Nankai prism south of Kii Peninsula, the focus of a new IODP deep riser drilling proposal. She is also helping with PSDM of our 3D data set off Shikoku. Graduate student Toshihiro Ike joined the group in 2002 and is working on a large data set of seismic reflection lines across the Nankai prism and northern Shikoku Basin that they received from their Japanese colleagues. Toshi also joined two JAMSTEC cruises to collect additional data in this region. His work is focused on defining the variation of inputs to the Nankai subduction zone. Greg also continued his work on giant Hawaiian landslides. He was able to participate in the Japanese diving program in 2002, having gotten a great thrill by diving to 4500 m off the Waianae coast in the Shinkai 6500 submersible. He collected samples of pillow basalts that were originally erupted above sea level before becoming involved in the Waianae slump.

Greg Ravizza is working with colleagues at the Woods Hole Oceanographic Institution to better constrain the environmental consequences of continental flood basalt volcanism. Their results, published last November in the journal *Science*, suggest that abrupt decreases in the osmium isotope composition of seawater can provide a stratigraphic marker of flood basalt volcanism. By studying pelagic marine sediments deposited some 66 million years ago, coincident with eruption of the Deccan Traps, we demonstrated that this change in ocean chemistry coincides with a brief global warming event. They speculate that the warming event may result from the release of volcanic CO₂. Recently they turned their attention to Ethiopian Traps in order to determine if there is a shift in the osmium isotope composition of seawater associated with the eruption of this somewhat smaller flood basalt province. Stay tuned.

Johanna Resig (emeritus) continues her micropaleontological research on various Pacific projects. Papers were published on the morphological adaptation of a foraminifer off Peru, the stratigraphy of Eocene-Oligocene rocks of southern Guam, and the age and preservation of foraminifera in Hawaiian beach sand. Current research involves dating the Tuscaloosa Seamount, the paleoecology of marine intervals in Kauai cores, and the paleobathymetry of Woodlark Basin.



Scott Rowland and Mele Look wed at Volcano, Hawaii in January 2003.

Ken Rubin's group continues to work on applications of short-lived radioisotopes and other geochemical tracers to problems in volcanology and sea-level history, in collaboration with others in the GG department and elsewhere. Along with his group's postdocs (Iris van Der Zander, Zinzuni Jurado, Georg Zellmer) and grad students (Eric Bergmanis and Chris Russo, of OSU) Rubin is studying historical bimodal eruptions in Iceland and Mexico, new dating methods and petrogenetic tracers for young mid-ocean ridge basalts, volcanology, petrology and eruption frequency on the southern East Pacific Rise, rates of vertical tectonics of coastlines in Hawaii and Mexico, and petrogenesis of Indian Ocean MORBs. He is also part of a collaborative study of the Galápagos spreading center with newly arrived postdoc Bill Chazey, plus Sinton, Ito, and Mahoney. Rubin shares the

Isotope Lab with John Mahoney and Doug Pyle and they all anxiously await the day when they move into a newly renovated space in POST.

John Sinton is involved in three main field-based projects that explore the relationships among mantle melting, crustal magma chambers, and eruptive processes on mid-ocean ridges. One project involves Alvin submersible mapping of individual eruptive sequences on the southern East Pacific Rise. PhD student Eric Bergmanis is working with Ken Rubin in determining the relative age and internal chemical heterogeneity of these flows using a variety of geochemical tracers. A study of the Galápagos Spreading Center with students Buffy Cushman and Deborah Eason, in collaboration with Garrett Ito, John Mahoney, and Ken Rubin, is examining the effects of the nearby Galápagos hotspot on the geochemistry and petrography of lavas erupted along the spreading center. A third project involves the mapping, dating, and petrological characterization of every eruption that has occurred along the 170 km-long Western Volcanic Zone of Iceland in the last ~12,000 years. The field work for each of these projects is now completed and analysis and interpretation are continuing. A new project on the geochemical evolution of the Waianae Volcano, with John Mahoney and postdoc Iris van der Zander, will begin later this year.

Paul Wessel hopes to jumpstart his research now that he is no longer Chair. With students Seung-Sep Kim and Michael Chandler, and collaborators Loren Kroenke and Yasushi Harada (now at Tokai University) he expects to unleash all that pent-up research energy on projects that revolve around determining the absolute plate motion of the Pacific and Nazca plates, investigating the thermo-mechanical evolution and isostasy of the Nazca Ridge, and developing and implementing quality control methods for the global data set of bathymetry, magnetics, and gravity collected by surface ships. Over Spring Break 2004, Paul ran a successful GMT workshop with participants from local, mainland, and foreign companies. He is now finalizing the 4.0-release of the Generic Mapping Tools (GMT) software.

Geology Club Rocks

The Geology Club is alive and well—fundraising and fellowship abound. We have just received a new shipment of t-shirts, sizes S–XL, in the latest fashion colors of pumpkin, denim, and natural. These are available for purchase, M-F, in POST 713 or 701 for only \$10. Check it out and support our students!

Additionally, GG Club efforts in bake sales, daily coffee and muffin cart, sales and re-sales of lab books, providing food for the SOEST Open House and the G&G picnic, and other endeavors have contributed much welcomed cash to the field trip fund for students.

(right) Spring 2004 TAs, Kate Bridges and Jonathan Weiss sport the latest t-shirt looks. OK, so it's not that new, but the colors are and it's still only \$10.



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