

Department of
GEOLOGY & GEOPHYSICS
University of Hawai'i, Manoa
Summer 2008

Inside this issue...

The Blue Line	1
Message from the Chair.....	2
Degrees & Awards	3
Honors & News	4
Division Reports	5
Memorial-Johanna Resig.....	6
Distinguished Alumnus	7
Geology Club & Field Trips.....	8
Softball & Autumn Assembly.....	11
Alumni News	12
Faculty News	14
GG Publications 2007-08	17
World Map	20

Nuhou Kanaka Puka

Nuhou Kanaka Puka ("Alumni News" in Hawai'ian) is published by the Department of Geology and Geophysics of the School of Ocean and Earth Science and Technology (SOEST) for its alumni and friends. Throughout the year, we'd like to hear from you. Contributions of photos, news items, changes in address and monetary donations may be sent to Department of Geology & Geophysics, University of Hawai'i, 1680 East West Rd., POST 701, Honolulu, HI 96822.

Chair: Charles Fletcher
Editors: GG Relations & Honors Committee; Ken Rubin, Chair

E-mail: gg-dept@hawaii.edu
Phone: (808) 956-7640
FAX: (808) 956-5512

Visit our web site at
<http://www.soest.hawaii.edu/asp/GG/index.asp>

The Blue Line

In Hawai'i, sea-level rise resulting from global warming is a particular concern. Riding on the rising water are high waves, hurricanes, and tsunami that will be able to penetrate further inland with every fraction of rising tide. In addition, the coastal groundwater table is likely to crop out above ground level and lead to widespread flooding. The physical effects of sea-level rise fall into five categories. These are 1) marine inundation of low-lying developed areas including coastal roads, 2) erosion of beaches and bluffs, 3) salt intrusion into surface ecosystems, 4) higher water tables, and 5) increased flooding and storm damage due to heavy rainfall.

Assessing the impact of these on Hawai'i requires identifying a likely global sea-level scenario. Global sea level is principally the product to two phenomena: 1) melting ice on Antarctica, Greenland, and among alpine glaciers, and 2) thermal expansion of seawater due to surface warming. The first detailed observations of Antarctic ice reveal net melting; the melting rate on Greenland has increased 250% in the past decade; there is widespread retreat and thinning of mountain glaciers, and together these major ice sources contribute about 2.0 mm/yr to global sea-level rise. Thermal expansion is calculated as a function of water temperature. Studies indicate that thermal expansion increased from an average rate of about 0.36 mm/yr in past decades, to 1.6 mm/yr in the most

(continued on page 2)



The blue line marks the contour of high tide when sea level is 1 m above present. Lands māakai of the line are highly vulnerable to coastal hazards. These are targets for redevelopment to increase resiliency to natural hazards.

recent decade. These calculations of global sea level rise (~3.6 mm/yr) agree remarkably well with the observed rate of rise (~3.4 mm/yr) as measured by satellites.

The Intergovernmental Panel on Climate Change has predicted future sea-level changes to the year 2100 in the range 18 to 58 cm. However, recently published findings (Rahmstorf, 2007), coupled with documented accelerations in melting of both the Greenland and Antarctic ice sheets, strongly suggest that a sea level of approximately 1 m above present could be reached by the end of the 21st century.

In Hawai'i, as the ocean continues to rise, natural flooding occurs in low-lying regions during rains because storm sewers back up with saltwater, coastal erosion accelerates, and critical highways shut down due to marine flooding. The Māpunapuna industrial district of Honolulu adjacent to the airport is a good example. If heavy rains fall during monthly highest tides, portions of the region flood waist deep because storm drains are backed up with ocean water. Even when it does not rain, some areas flood into the streets, and local workers report seeing baby hammerhead sharks in the 2 foot deep pools.

Using precise topographic data collected by NOAA and the Army Corps of Engineers, it is possible to map the contour line marking 1 m above present day high tide. This "blue line" identifies the portion of our communities that fall below sea level when seas reach the 1 m mark later in the century. This dramatic map has roughly 30 cm vertical accuracy and 10 m horizontal accuracy. Those lands that are closer to the ocean are highly vulnerable to inundation by seawater during high waves, storms, tsunami, and extreme water levels. Hotel basements will flood, ground floors will be splashed by wave run-up, and seawater will come out the storm drains on most of the streets in Waikīkī and along Ala Moana Boulevard.

Don't think that waves will be rolling down the streets and reaching the blue line. More likely, lands lying below sea level in the future will be dry at low tide during arid summers. But they will have high water tables, standing pools of rainwater, and backed up storm drains when it rains and tides are high. Beaches will be mostly gone and we'll have built large seawalls lining most of our shores. Despite the wet conditions, most of the buildings will probably still be inhabited and residents will have to time their movement between the tides, just as they do today in Māpunapuna. McCully and Makiki residents won't see any seawater, but they will see the wetlands of the 19th century reemerging as the water table rises above ground level in some areas. Heavy rains will exacerbate the problem. Runoff will raise the water table, storm drains will be full of seawater except at very low tide, and standing pools of water will accumulate throughout the region without a place to drain. Travel will be limited and many lands will turn to wetlands, there may be some areas of permanently standing water.

What can you do? Live a low carbon lifestyle as your part to help stabilize warming, encourage elected officials to support

research into this problem and to set up funds to purchase key vulnerable lands, and promote a state-wide retreat from our moving shoreline.

Rahmstorf, S., 2007, A semi-empirical approach to projecting sea level rise. Science, 315, 368-370.

Rahmstorf, S., et al., 2007, Recent climate observations compared to projections. Science, 316, 709.

Chip Fletcher

Message from the Chair

Greetings all! It's hard to believe another year has come and gone. The department is doing extremely well. GG faculty serve on local, national, and international commissions and boards and we have several faculty who have been honored with the highest national and international awards in their fields.



Every week we generate over 1800 hours of student learning in our classrooms, laboratories and field trips. Judging from the very strong classroom evaluations of our instructors, GG teachers are widely appreciated by students.

Annual research grants average over \$4 million dollars and with our teaching assistantships we are able to provide full scholarships for 94% of our graduate students. Nearly one-quarter of our undergraduate majors are employed on these research funds as well.

Among our 56 graduate students we have representative of 13 nations: Australia, Venezuela, Malaysia, Canada, Nepal, Korea, Argentina, Belgium, Germany, Indonesia, Iceland, Switzerland, and South Africa. We are joined most fall semesters by an average of 25 new graduates and under-graduates for a total of 95 students. Add to this 33 faculty, 15 staff, and a number of post-doctoral researchers and we constitute a community of 150 people joined in the passionate pursuit of knowledge about planet Earth and the Solar System.

I have to say it is a true privilege to be part of such a vibrant learning community. So turn the pages and enjoy our 2007-2008 report!

My very best wishes to each of you,

Chip Fletcher
Professor and Chair
Department of Geology and Geophysics.

GG Confirmation of Degrees & Student Awards

Undergraduates

Kieran Rovaldi	(BS, Fall 2007)
Brett Guerin	(BA, Spring 2008)
Michael May	(BS, Spring 2008)
Carolyn Parcheta	(BS, Spring 2008)
Mark Raymond	(BA, Spring 2008)
Craig Senter	(BS, Spring 2008)
Natalie Yakos	(BA, Spring 2008)

Masters of Science

Sean Vitousek—*Nearshore Hydrodynamics at Kaanapali, Maui & Hawai'i Extreme Wave Statistics* (Advisor: C. Fletcher, Fall 2007)

Melissa Rotella—*Magmatic Processes at the Galápagos 93.25°W Overlapping Spreading Center* (Advisor: J. Sinton, Spring 2008)

Adam Johnson—*Groundwater Discharge from the Leeward Half of the Big Island, Hawai'i* (Advisor: C. Glenn, Summer 2008)

Doctor of Philosophy

Toshihiro Ike—*Regional variations in basement structure and overlying sediments of the subducting Philippine sea plate and their effect on the Nankai accretionary prism* (Advisor: G. Moore, Summer 2007)

Samuel Lawrence—*Remote sensing and geochemical constraints on asteroid and lunar composition* (Advisor: G. Jeffrey Taylor, Summer 2007)

Julie Stopar—*Aqueous alteration of olivine in Nakhilite Miller Range (MIL) 03346* (Advisor: G. Jeffrey Taylor, Summer 2007)

Eva-Marie Nosal—*Tracking marine mammals using passive acoustics* (Advisor: L. Neil Frazer, Fall 2007)

Kolja Rotzoll—*Hydraulic parameter estimation using Aquifer tests, specific capacity, ocean tides and wave setup for Hawai'i aquifers* (Advisor: Aly El-Kadi, Fall 2007)

Steve Sahetapy-Engel—*Ground-based thermal remote sensing of eruption dynamics at Santiaguito Lava Dome Complex, Guatemala* (Advisor: Luke Flynn, Fall 2007)

William Koeppen—*Understanding the composition and evolution of the Martian surface using thermal infrared laboratory*

analyses and remote sensing (Advisor: V. Hamilton, Spring 2008)

Student Awards

Agatin Abbott Memorial Award

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

Carolyn Parcheta

William T. Coulbourn Fellowship

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

Carrie Plath & Jacque Kelly

Harold T. Stearns Fellowship

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

Jacque Kelly & Ashton Flinders

J. Watumull Scholarship

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

Meryl McDowell

ARCS

Awarded by the Achievement Rewards for College Scientist foundation.

Toby Lee Award in Geology

Samuel Hulme



2008 GG Graduates and Award winners (front row) Adam Johnson, Natalie Yakos, Ashton Flinders, Meryl McDowell, (back row) Chip Fletcher, Michael May, Carolyn Parcheta, Jacque Kelly, Will Koeppen. Missing: Brett Guerin, Mark Raymond, Craig Senter, Melissa Rotella.

Honors and Awards

Faculty

Twenhofel Medal, SEPM-Society for Sedimentary Geology

Steve Stanley, for outstanding contributions to sedimentary geology

Paleontological Society Medal

Steve Stanley, for outstanding contributions paleontology

Students

Geological Society of America National 2008 Harold T. Stearn's Fellowship

Jacque Kelly, "Nutrient and Isotopic Study of Groundwaters, Big Island, Hawai'i,"

Outstanding student paper awards:

Todd Bianco, "Geochemical variations at a ridge-centered plume caused by variable melting of a veined mantle" (2007 Fall AGU meeting)

Outstanding student paper awards: (con't)

Carolyn Parcheta "The Influence of Slope Variations on the Levees of Large Channelized Lava Flows in the Tharsis Region of Mars" (2007 Spring AGU meeting)

32nd UH Testers Symposium:

Todd Bianco, "Geodynamic models of hotspot geochemistry"

Chris Bochicchio, "Why is Lanikai Beach eroding? Determining and understanding sediment transport trends near a chronically eroding beach"

Albert and Alice Weeks Outstanding Student Research Paper, Univ. Wisconsin at Madison:

Jacque Kelly, "Optically continuous silcrete cements of the St. Peter Sandstone: Oxygen isotope analysis by ion microprobe and laser fluorination", *Geochimica et Cosmochimica Acta.*, 2008

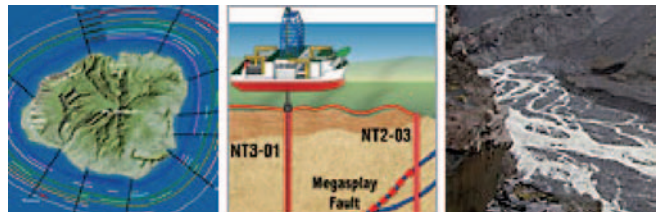
GG in the News

Making an Impact. Fifteen studies by members of GG department were highlighted in the local or national media in the past year, on topics ranging from starlight, asteroid impacts and mantle helium, to sea level and life in an undersea laboratory. Pictures, below, and accompanied stories (on the web) about Kaua'i's shoreline law, seismic imaging of a "tsunami factory off" Japan, and a New Zealand mudflow document our research. See more at: http://www.soest.hawaii.edu/soest_web/soest.news.htm

(top left) *Studies on Kauai, Japan, and New Zealand.*

GG is Nationally ranked by the Chronicle of Higher Education. UH-Manoa Geophysics ranked 7th nationally in their annual Faculty Scholarly Productivity Index (Nov. 16 issue). Faculty members are judged up to five factors, depending on the most important variables in the given discipline: books published; journal publications; citations of journal articles; federal-grant dollars awarded; and honors and awards.

(bottom left) **Garrett Ito** (Ito-lower left) and **Mike Garcia** (not present) ran a workshop for K-12 teachers last year during an outreach effort related to a research cruise around Kaua'i.



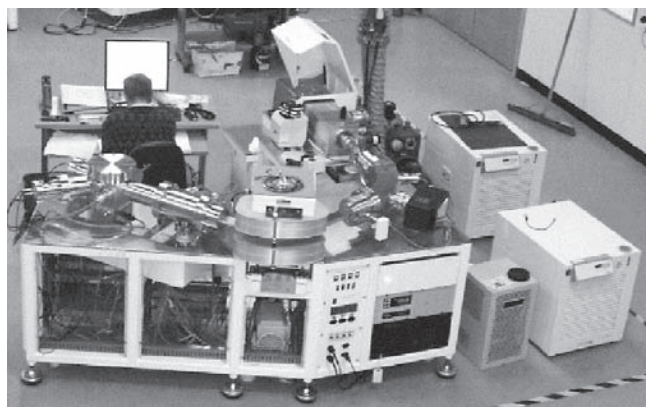
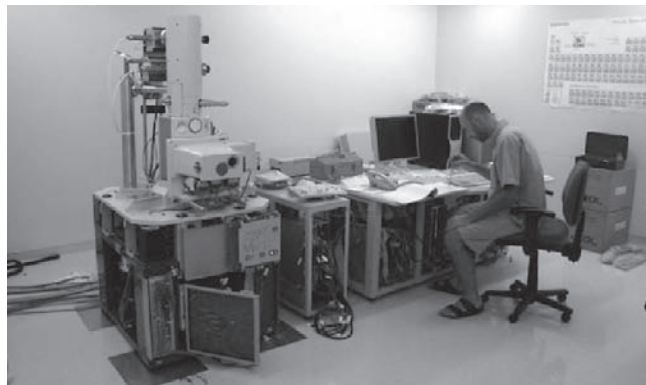
Highlights from GG Research Divisions

The VGP, MEG, and GT divisions are chaired by: Ken Rubin, Greg Ravizza and Steve Martel

VGP—Volcanology, Geochemistry & Petrology faculty members have been very active over the past year. Here we highlight the addition of \$2M of new analytical instrumentation to our state-of-the-art laboratories, which attract students, post-docs and researchers from around the world to our labs. This spring, a JEOL JXA-8500F field emission electron probe microanalyzer and a Nu Instruments HR multi-collector inductively coupled plasma mass spectrometer (MC-ICPMS) are being installed. It has been 15 years since our last major analytical instrumentation acquisitions. There is only one other JEOL “Hyperprobe” in the US. It can magnify to several tens of thousands times for submicron quantitative element analysis, which will allow finer scale compositional resolution for mineralogical, geochemical, metallurgical and biological studies. The high abundance sensitivity, ion counting MC-ICPMS will be used for both “traditional” heavy radiogenic isotope applications and exciting “new” transitional metal, metalloid and Mg isotopic applications to studies of mantle, magmatic and sedimentary geochemistry, geochronology, climate change, environmental contamination and geosphere-biosphere interactions. The MC-ICPMS will provide improved data quality, sample size and analysis time compared to our thermal ionization mass spectrometers. Isotopic microanalysis will be possible using a NewWave 213nm Nd:YAG laser.

MEG—Marine & Environmental Geology faculty have all been very busy with teaching and research projects (check out profiles in the Faculty News). Eric Gaidos is running a new course this term on filming science documentaries. His students are putting together a few short pieces—all related to local topics. In academia, we are becoming more and more aware of the need to take our science to the general public and to train others to do so—kudos to Eric. Brian Popp will be busy this summer teaching part of a short course at the University of Utah, training other researchers to use some of the innovative stable isotope methods he applies in his lab. This type of gig is reserved for those at the leading edge of their field—nice work Brian! Two of Steve Stanley’s recent contributions deserve special mention: He completed the 3rd edition of his popular “Earth System History” textbook (which we use in our courses) and he published an important memoir in the on patterns of Phanerozoic evolution. This type of synthesis is rare and destined to become a “benchmark” contribution to the way we think about evolution and the fossil record.

GT—Geophysics & Tectonics is a division in transition. Fred Duennebieer has announced his retirement, effective in 2009;



(top) Installation of the JEOL JXA-8500F in POST 620 in May 2008. (below) Testing of the UH MC-ICPMS at the Nu Instruments factory. Delivery is expected in June.

we will miss Fred greatly. Fred was hired as a geophysicist at the UH in 1975 after earning his Ph.D. here in 1972. He leaves behind over three decades of accomplishments. We welcome Clint Conrad, a geodynamicist from Johns Hopkins, who joins us July 1st. Geobiologist Hope Jahren, Clint’s wife, will join the MEG division. Greg Moore returns from Japan this summer, after two years as advisor to the Director General of the Center for Deep Earth Exploration (CDEX). In student news—Eva-Marie Nosal, one of our recent Ph.D. graduates, has accepted a tenure-track position in Ocean Engineering at UH. Eva-Marie’s specialty is marine acoustics. Eric Mittels-taedt, a Ph.D. candidate working with Garrett Ito, has accepted a 2-year post-doctoral NSF Research Fellowship; he will work at the Institut de Physique du Globe de Paris pending completion of his Ph.D. Finally, Steve Martel, GT head since 2005, will be passing the baton to someone new before leaving on sabbatical in 2009.

These newsletter contributions were provided by: Doug Pyle, Greg Ravizza and Steve Martel

In Memory of....

Dr. Johanna Martha Resig

May 27, 1932–September 19, 2007

Johanna M. Resig was born in Los Angeles, California, the only child of Martha and Max Resig. Her parents were immigrants from Germany, having come to the US at the start of World War I. This very bright girl attended the best public



schools in LA, before entering the University of Southern California, where she discovered geology and earned her Bachelor of Science in 1954 and her Master of Science in 1956.

After earning her M.S., she went to work for the Allen Hancock Foundation, where she studied the living foraminifera of the southern California coast. As part of her studies, she conducted research on

the impacts of ocean outfalls on foraminiferal ecology. Her papers on that research are regularly cited among the pioneering applications of the field now known as environmental micropaleontology.

In 1962, Johanna applied for and was awarded a Fulbright grant to pursue her research at the Christian Albrechts University in Kiel, Germany. She earned an extension to her Fulbright, which enabled her to earn her doctorate in natural science (Doctor der Naturwissenschaften) from Christian Albrechts University in 1965.

Dr. Resig was immediately recruited by the Hawai'i Institute of Geophysics at the University of Hawai'i as an Assistant Micropaleontologist, and promoted to Associate Micro-paleontologist in 1970. She was the first woman on the HIG faculty and only one for many years. During her more than 40 years at



the University of Hawai'i, Johanna's publication record surpassed 50 articles in scientific journals, books and proceedings. She earned the title of Micropaleontologist and Professor in the Department of Geology and Geophysics at the University of Hawai'i in 1990, and retired as an Emeritus Professor in 2001, maintaining a small office/laboratory in the POST building. To discover and describe a new species is one of the high-



lights of any paleontologist's or biologist's career. Johanna not only discovered and described five new species of Foraminifera, she actually discovered a new Suborder (later elevated to Order) of opaline foraminifera. Johanna was not only an active researcher, but also a dedicated teacher and mentor. She taught hundreds of undergraduates in historical geology, Earth history, and paleontology courses. On the graduate level, Dr. Resig also taught micropaleontology and paleoceanography courses and gave stratigraphy seminars. She mentored nearly a dozen students as thesis or dissertation advisor, and served on the advisory committees of two dozen more. She was the undergraduate advisor for Geology and Geophysics undergraduates for many years, and mentored high school and undergraduate researchers. Her dedication to science, her kind and humble nature, and her strong encouragement of others have led her to be revered and loved by colleagues and former students worldwide.

*Dr. Pamela Hallock Muller
Former Student & Colleague*

Distinguished Alumnus: Charles (Chip) McCreery

I was born and raised in Kansas City, Missouri. In 1966 my brother Steve Hammond left to study at UH's newly formed Hawai'i Institute of Geophysics. His letters about Hawai'i had a fascinating appeal to a 16-year-old high school junior trudging through a gray winter in the Midwest. My interest was enhanced by the release that year of the movie *Endless Summer* about surfers exploring Hawai'i and the world in search of the perfect wave. So I saved what I could from my job as a sack boy and bought a \$75 student-fare TWA round-trip ticket to Hawai'i for the following summer. That trip opened my eyes to another world. George Sutton, an HIG professor, had asked graduate students Loren Kroenke, Fred Duennebier, Dan Walker, and my brother to house sit. I tagged along. Geophysics was exploding due to the discovery of plate tectonics and I enjoyed the animated discussions between my housemates and other students who showed up at the house—Don Hussong, John Halunen, Mark Odegard, and Fris Campbell, to name a few. There was also plenty of time to enjoy Hawai'i—hiking, sunning and swimming, surfing lessons from Dan and Fred at Waikiki, and picnics at Kapiolani Park. My brother and his wife Dixie watched out for me; I had a great summer.

My senior year back in Kansas City, I couldn't stop thinking about Hawai'i. UH was my top choice for college, so when I got an acceptance letter for Fall 1968 from the Engineering School I was thrilled. Dan offered me a job as student helper to read records from seismic stations at Midway and Marcus Islands. I thus learned about seismic waves and the seismic zones around the Pacific. I drifted from engineering to architecture to art and graduated with a BFA in Printmaking in 1975 (yes, 7 years). I continued to work at HIG, learning geophysics from Dan, other students, and faculty and researchers including George Sutton, Ed Berg, and Rockne Johnson. I also made many lifelong friends including Gerard and Patti Fryer, Bob Cessaro, Jill Mahoney (Wessel), Sharon Yokogawa (Schneider), Bob Mitiguy, and Steve Dang -- Don Hussong's student helper whose regular antics often kept us entertained.

After a brief stint as a struggling artist, Dan offered me a position as Research Assistant. Over the next ten years we studied very high-frequency guided seismic phases in oceanic lithosphere that Dan named P_0 and S_0 , ocean T-phases as potential indicators of tsunamigenesis, spectral analysis of underground nuclear tests recorded on hydrophones, and patterns of global seismicity. I realized I had better get a degree in the field and began plugging away at the G&G coursework.

In 1985 I participated in a cruise deploying ocean bottom seismometers off Taiwan and found time to explore parts of Taiwan, Hong Kong and Thailand. On my flight from Hong Kong to Bangkok I met my future wife, Nitaya, who had been traveling with her family in China. She and her girlfriends were my tour guides in Bangkok. After 3 years of back and forth to Thailand, we got married in 1988. Nitaya provided



Nitaya, Chloe, Claire and Chip McCreery

the motivation and encouragement for me to accelerate my education. With ONR support I finished my Ph.D on ambient infrasonic noise in the deep ocean and its relationship to wind and waves in 1992.

After graduation I remained at HIG as an Associate Researcher. But research dollars for geophysics weren't flowing as they had in the 1970s, so when Laura Kong and Jill Wessel told me about an opening at NOAA's Pacific Tsunami Warning Center in Ewa Beach where they were working, I decided to pursue more permanent employment. The PTWC work was exciting and challenging—responding to earthquakes around the Pacific within minutes and evaluating them for their potential to generate destructive tsunamis. On October 4, 1994, I was on duty with Bruce Turner (another G&G graduate) when a magnitude 8.3

earthquake occurred in the Kuril Islands. PTWC issued a warning and evacuation for Hawai'i, and although the Kurils and Japan had significant waves, only a small tsunami arrived in Hawai'i. The experience clearly demonstrated to me the difficulties of early warning for tsunamis.

In 1995, I became Director of NOAA's International Tsunami Information Center. The job required me to interact with agencies responsible for tsunami warning in countries around the Pacific, all facing similar challenges: The hazard was rare and governments devoted their resources to more frequent events such as hurricanes. In addition, it was difficult to keep up education and awareness with the public and emergency manage-

As Director of NOAA's Pacific Tsunami Warning Center in Ewa Beach, G&G alumnus Chip McCreery has been instrumental in transforming the agency in the aftermath of the deadly Indian Ocean tsunami of 2004. Chip is the G&G Distinguished Alumnus for the 2008 academic year.

(continued on page 8)



In January of 2005, I viewed firsthand the destruction wrought by the December 2004 tsunami at a coastal resort in Khao Lak, Thailand that had opened only weeks before. Security personnel said lives were lost in almost every room of the resort.

ment community for something that might happen only once in a lifetime. To maximize efforts, Pacific countries shared their seismic and sea level data, translated and customized common educational materials, and cooperated in scientific improvements including compiling and analyzing historical data and post-tsunami assessments.

In 1997, I returned to PTWC as its Director. The science of tsunami warning was improving with faster numerical models capable of forecasting tsunami impacts. Improved IT facilitated rapid processing of many more seismic and sea level data streams. Eddie Bernard, Director of NOAA's Pacific Marine Environmental Laboratory and a UH Oceanography alumnus, was developing an instrument to record tsunamis in the deep ocean. Stuart Weinstein (formerly at HIG) and Jill Wessel, with help from UH's Bob Cunningham, Pat Townsend, and

Mike Simpson, redesigned and administered a new IT hardware and communications configuration. Bob Cessaro supplied critical scientific and programming creativity, especially for teleseismic data ingest and processing. Barry Hirshorn, formerly with the USGS, implemented an improved processing system for local earthquakes and a more rapid magnitude method for teleseisms. These efforts reduced the time it took PTWC to analyze any large Pacific earthquake and issue an initial message from ~1 hour to ~15 minutes; for a local earthquake it dropped from ~15 to under 5 minutes. Further, the possibility of producing more quantitative and area-specific tsunami wave height forecasts was beginning to be feasible using deep ocean sensors and forecast models.

On Christmas Day, 2004 I was on my way back home from breakfast when Stuart Weinstein told me about a large earthquake in the Indian Ocean. As news came from an ocean without gauges to detect a tsunami and no system for alerting those at risk, we witnessed the worst tsunami disaster in history. That event changed my life and the lives of all persons involved in tsunami work. We have since been involved in building a system to better prepare all ocean communities for future tsunamis and to improve warning capabilities so we never again have a tragedy at such a scale. The event also made our own government increase funding for the U.S. program. Thus, PTWC increased its staff from 8 to 15 and we were able to attract many top-notch geophysicists and oceanographers including former UH-ers Gerard Fryer, Vindell Hsu, and Dailin Wang and former HVO and NEIC seismologist Stuart Koyanagi.

I am very grateful to my wife and family for the sacrifices they have made so I could pursue this career. I am grateful to UH, G&G, HIG, and the many people associated with those institutions that provided me the opportunity of an education and work in this interesting and challenging field. And I am honored and humbled by this recognition.

Geology Club 2007-2008

The Geology Club had an especially active and fun academic year 2007-2008. Things started off right with a two night three day hiking and camping adventure through Maui's Haleakala Crater in September of 2007. Ten students and two faculty members hiked from the summit of the "House of the Sun" down the spectacular Sliding Sands trail with views over the crater's multi-colored cinder cones, lava flows, and erosional features to Kapalaoa cabin. After a hearty dinner of freeze-dried camping food everyone grabbed their sleeping bags and braved the frigid temperatures to lie out on the grass for an evening of unforgettable stargazing. On day two an early start took us past breathtaking views of Mauna Kea and Mauna Loa on the Big Island over to Paliku cabin, a shaded oasis under the crater walls. Day three started before dawn since our hike for the day totaled 13 miles uphill! First we

hiked across the crater to Holua cabin, where we shared our lunch stop with some curious nene geese, then the final beautiful schlog up the switchback trail took us up the crater rim and out via a service trail to the park entrance.

In 2008 we decided to try another famous and difficult hike. The Na Pali trail on Kaua'i traverses dramatic sea cliffs with stunning views of the deserted coastline and the deep offshore channels that in February host a multitude of extroverted whales. This trail is like none other in the world, there are few places more beautiful or more Hawai'ian! The downside is that those sea cliffs require a constant up-and-down traverse, mile after mile of bouldery trail, stream crossings, and steep drop-offs to the ocean below. Fortunately our tired crew discovered a gorgeous camping spot at mile 8 that overlooked the coastline and had its own private waterfall. The next day the

most energetic bunch finished the three mile hike into Kalalau Valley and spent the day exploring the fabulous sea caves, waterfalls, and perfect beach. On day three we patched up our blistered feet, shouldered our much lighter packs, and got an early start before the sun had made it over the cliffs. The return hike was just as thrilling as the hike in, made even better by the anticipation of our well-deserved swim at the protected beach that borders the trail-head.



Michael May (BS, Spring 2008) shows off the new black GG T-shirt available for sale—\$15 (plus S/H)... the yellow caution sign warns those behind you of the geologist “FALLING in love with ROCKS”.

In addition to these hiking adventures, a rock-climbing class, and hosting several fun parties and picnics throughout

the year, the Geology Club participated for the second time in a national recycling competition among colleges and universities called RecycleMania. The Geology Club has spearheaded recycling on campus for the last two years and is responsible for maintaining recycling bins throughout SOEST. During this year’s competition the Geology Club and UH diverted a total of 41,503 pounds of recyclables from the waste stream—now that’s something to be proud of! The funds collected from recycling and other fundraising activities supported the trips of eight Geology majors traveling to the Mojave Desert during Spring Break of 2008 for their required GG305 field methods course.

As the Spring 2008 semester draws to a close we are already planning for next Fall’s adventures! It is with bittersweet emotions that we bid Aloha to our graduating seniors, and we wish them the best in their future endeavors! They and other alumni will always be welcomed here in the Geology Club, every other Tuesday, for free pizza and good company. Hope to see you there!

Jenny Engels
Geology Club Faculty Advisor

In the field with GG courses...

GG 104—Volcanoes in the Sea. (Scott Rowland) Fall 2007, GG 104 was resurrected (in name only) as a Hawai’ian & Pacific focus course. Helped immensely by a long list of talented guest speakers, including GG alumnus Frank Trusdell and faculty member John Sinton, the students learned about Pacific Ocean Geology and Geophysics, and how regional (e.g., archipelago location and shape) and local (e.g., stone availability) features have affected Pacific people in the past and present. With a great deal of kokua from Walterbea Al-



A student using the “flaking” technique to produce the planar stone surface of a ko’i (adze).

deguer of Leeward Community College, the students collected pohaku from ‘Ohikilolo and produced implements in the traditional Hawai’ian style. These were displayed in the elevator lobby of POST.

GG 305—Geological Field Methods (Scott Rowland) Students completed an epic 11 days of mapping, strike-and-dip-pin’ it up, and geological learning in the Mojave Desert March 20-31, 2008. For those of you alumni who might be looking for future employees, this gang has been trained to deal with sun, heat, wind, blank maps, and rocks other than basalt. Mahalo to the G&G Field Trip Fund (U.H. Foundation), the Geology Club, and ASUH for support. A simple website of the GG305 travels can be found at: http://www.higp.hawaii.edu/~scott/GG305/GG305_photos.htm.



GG 305 on Spring Break in the Mojave Desert

Geology Club and GG 101



(above) Hanging out in a “No Parking” zone and (right) Jenny Engels and the Geology Club camping; both images taken on Kaua’i, Fall 2007



(above) GG 101 lab students at the Lanai Lookout, Spring 2008



2008 Field Trips to Maui & Big Island

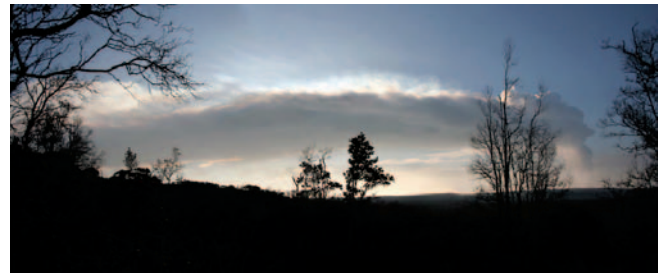
Maui no ka ‘oi



Sinton, Engels and group on Maui, Spring 2008

Easter weekend provided an opportunity for John Sinton and Jenny Engels to take a group of nineteen 101/103 students, graduate students, post-docs, alumni and others on a four-day field trip investigating the geological wonders of Maui. With four days of excellent weather, the group managed to scale magnificent peaks (Pu‘u Koa trachyte dome), fight off prehistoric beasts (Dragon’s Teeth at Makaluapuna), survive a marvelous day hike through Haleakalā Crater, descend into the depths of a lava flow (Hōlua lava tube), and see dramatic evidence for the relationships between erosion and volcanism in Hawai‘ian postshield and rejuvenation volcanics. Evenings were spent at Camp Maluhia Boy Scout camp where games were played, fires were built and extraordinary meals were prepared and devoured. Many logistics for the trip were facilitated by a local organizing committee, headed up by JoAnn Sinton and the Oka family on Maui.

Kilauea eruption: New excitement in 2008



Ash-free gas plume from Halema‘uma‘u vent being blown to the northwest over Hawai‘i Volcanoes National Park and adjacent townships. Gas concentrations on this day led to the evacuation of the park.

The 2008 eruption of Halema‘ma‘u (Kilauea) has proved a wonderful research opportunity for physical volcanology as well as a challenge in terms of accurate eruption forecasting. The current eruption began abruptly with a small explosion on March 19, 2008, ejecting about 10^4 m³ of rock derived from the crater floor and walls (see first photograph). This followed a weak of vigorous gas emission from a new fumarole on the floor of Halema‘uma‘u crater. The eruption has been accompanied by unusually high summit emission of sulfur dioxide leading to significant environmental issues for the national park and surrounding communities and prompting a new multi-agency alert-level and warning scheme for volcanic gas on the Big Island.

The unusual pattern of pulsating open-vent degassing and ash emission interspaced with brief weak impulsive explosions has permitted HVO scientists Don Swanson and Juanita Rausch and GG's Bruce Houghton to document pyroclastic products to their feather edges, at limits beyond that ever achieved for any explosive eruption to-date. Ben Brooks, Todd Ericksen and James Foster (HIGP) are working with Michael Poland to constrain fine-scale deformation of Halema'uma'u crater accompanying the eruptions. The events in 2008 took center stage in the HVO-UHM coordination meeting in early May. The researchers see the 2008 eruption as a sign of Pele's approval for the new collaborative agreement being brokered between volcanologists at HVO and UH-Manoa.

(right) Large block from the March 19, 2008 explosion which destroyed a portion of the fence adjacent to the Halema'uma'u lookout. Don Swanson for scale.



Faculty and Undergrads Join Forces, Defeat Grads By Todd Bianco

In what will surely be forgotten, or at best remembered as a fluke, the G&G Faculty Team, along with more than just a little help from the undergrads, defeated the Graduate Student Team at the annual department picnic. This year the game returned to Lanikai Park, which was avoided in 2007 due to unsafe conditions caused by the bomb the Graduates dropped on the Faculty in 2006, in what is now referred to as "The Miracle at Lanikai". The Graduates had aspirations for a three-peat, but the dream was quickly dashed as the faculty got out to a big, early lead. Some controversy exists over the final score, which many claim they don't remember, however a few Faculty players have been inflating it as high as 30-16.



Victory is sweet for the Faculty & Undergrads.

The Graduates point to the absence of perennial superstar **Adam Johnson**, who was later found chained to his desk, as a contributing factor to the loss. Also hurting the team was an

injury to 2006 MVP **Jared Marske**, who may or may not have been the victim of a covert attack. Meanwhile Faculty veterans like **Michael Garcia**, **Steve Martel**, and **Chip Fletcher** were bolstered by offensive support from **Ben Brooks** of HIGP and undergraduate **Craig Senter**. It was later revealed, however, that many of the so-called "homeruns" hit by Brooks and Senter, were in fact "too high," and at times "too far," and should have been called back.

After the game, the Faculty Team celebrated with the undergraduates by taking back the Johnny Geeangee Memorial Trophy of Supreme Power and Ultimate Righteousness. Later, the newly aligned "Facundergradulty Team" was spotted laughing maniacally, while lighting cigars with diplomas and paychecks that would never reach their destination.

G&G Autumn Assembly 2007 By Koja Rotzoll and Todd Bianco

On September 7th, students and faculty of the G&G department gathered to take part in the first G&G Autumn Assembly in the Kuykendall Auditorium. The primary goal was to create a departmental community event that welcomes new graduate students and features the work of continuing graduate students. The event also offered upper-level graduate students a more advanced scenario for practicing talks in a conference-style environment. Altogether, 15 students participated reflecting the entire diversity of the Geology and Geophysics department.

The department also awarded outstanding presentations. A \$500 first prize went to **Pat Hughes** for his presentation "Tracking the mobility of subsurface oil plumes using a fluorescent tracer". Runner-up **Eva-Marie Nosal** received \$250 for her talk "Bottom-mounted hydrophones used to investigate sperm whale swim orientation and click characteristics". **Chris Bochicchio** was awarded \$125 for his presentation "Where did Lanikai Beach go?: Determining long-term

(continued on page 12)



sediment transport across the seafloor through net sediment grain-size trend analysis”.

Following the assembly, the traditional Pizza Shindig was held in front of the POST building to welcome new students and faculty, and announce award winners. Future schedules will be available on the G&G website, where the complete speaker list from 2007 is also available.

(left) Autumn Assembly Awards—Sept. 7, 2007

Alumni News

1960's

Fris Campbell (MS '66) reports he is enjoying retirement and living in Kailua.

1970's

Claudia Stone (MS '77) is a Senior Geologist for SRK Consultants in Tucson Arizona.

1980's

Michael Jackson (MS '82) shared his “big game” experience attending the Sugar Bowl. “I drove in from Houston the Saturday before the Big Game in order to attend a UH pep rally in the ballroom at New Orleans Marriot. A very rousing performance of Hawai'i 5-0 by the UH band and the cheerleaders/dancers got the celebration moving. I met Donna Vuchinich, head of the UH Foundation who looks forward to Geology and Geophysics Field Trip fund donations, especially after I explained to her how much extra effort is required for Hawai'i students to have some of the same field experiences that mainlanders do. On Big Game day, I managed to get caught up in a parade of Bulldog supporters on the walk to the Superdome. Some of them were bad-mouthing the Hawai'i team and the state itself.

A couple of things went through my head in response, but I just kept these thoughts to myself. As a Hawai'i fan, the best

part of the game was the ha'a performed just after warm-ups and then the opening kickoff that made it official that Hawai'i played in a Major Bowl Game. It became obvious not too far into the first quarter that Georgia was much bigger and faster than the opponents Hawai'i had faced to date. Georgia may well be the best team going into the 2008 collegiate season.

All in all, the trip was very enjoyable—thanks to Chip for the t-shirt and cheesy foam hand! The only thing that would have made it better would have been some Longboard Lager at the Superdome.”

Brian Terauchi (BS '84) and wife Patricia again boarded a cruise ship, this time for a second honeymoon, to Cabo San Lucas and the Mexican Riviera in January 2008. Checking out the ancient sites and historical ruins and a chance to eat genuine “Mexican Foods” (without the two kids) made it a special treat. At his day job—teacher at Aiea HS—he continues to teach three levels of Physics.

John Hoffmann (MS '88) is the Director, USGS Arizona Water Science Center, in Tucson, AZ. John works with “a staff of almost 100 scientists, technicians and support staff all over the state doing some pretty interesting work. Fortunately, we have a financially and scientifically strong office.” He also tells us that USGS has many “success stories” of GG Alumni, especially from our late 1980's-90's graduates, who work at various locations: Gordon Tribble, Steve Anthony, Scot Izuka, Steve Gingrich, Delwyn Oki, and Todd Presley.

Robert Mallonee (MS '89) living in Rociada, NM, is working as a Senior Field Geophysicist for PGS Onshore Inc.

1990's

David O'Brien (PhD '90) is working for the Alaska Department of Health & Social Services as a Database Manager for the Cancer Program.

Delwyn Ching (BS '93) is living in Honolulu and working for the US Army as a Civil/Environmental Engineer.



Mike Jackson at the Sugar Bowl—Jan. 1, 2008

2000's

Geoff Garrison (PhD '02) Geoff brings us up to date on his activities since graduation. Since 2005 he has been a Senior Geologist at URS in Seattle managing a broad spectrum of geologic and environmental projects (such as surface and groundwater quality at mines, soil and groundwater cleanup feasibility studies, and surface water/groundwater interaction at wetland restoration areas). He spends his remaining time fixing his home in Seattle and chasing his three kids around the neighborhood. He also has 3 chickens, which help remind him of the years he lived in Kaimuki. Prior to 2005, Geoff was a postdoc at the National Astrobiology Institute branch at the Univ. of Washington, working with Peter Ward on stable isotope geochemistry of terrestrial and marine deposits across the Permian-Triassic and Triassic-Jurassic extinction events. He studied perturbations of the global carbon system during these events using rock samples from South Africa, Italy, Nevada, and Canada.

Mark McGowan (MS '04) In August 2007, Marc moved to Perth, Australia where he is employed as a Hydrogeologist with a small consulting company called Rockwater. He works on a variety of projects dealing with developing groundwater supplies for mining and municipal entities. He spends about

30% of his time in the bush supervising water bore drilling programs and carrying out geological mapping projects. In his free time Marc continues to surf and SCUBA dive and is enjoying the many nice beaches in Australia. He has recently taken up kite surfing to take advantage of the steady winds in the Perth area.

Ken Natividad (BS '05) Ken was hired as a Geophysicist, at the USGS National Earthquake Information Center at Golden, Colorado in summer 2007. He monitors earthquakes in the U.S. and around the world, looking at real-time seismic data to get P and S arrival times for accurate location, depth, and magnitude of events, and find/label other phases that go through the crust, mantle, outer core, and/or inner core. He finds it very interesting to see seismic waves from different parts of the world. "If there is a potential destructive quake, it gets pretty crazy here in the office. I've had phone calls from the media such as AP news, FOX news, or radio stations asking more information about the event, e.g. the 8.0 Peru quake on 8/15/07 and 8.4 Southern Sumatra quake on 9/13/07". Ken says it is a hectic, fun and exciting job, and it makes him feel like he is doing his civil duty watching over Hawai'i, a place that has made him who he is today.

SOEST Open House October 19-20, 2007 Ocean Depths to Outer Space



Sometimes it's just best to experiment outside the lab

For a "volcanic eruption"... You just need a soda bottle with liquid nitrogen, submerge the sealed bottle in 25 gallons of water and several seconds later, the soda bottle bursts, pro-

jecting water droplets out of the can in a powerful jet. The can is lifted from the ground, and an impressive boom is generated by the explosion.



Dr. Steve Stanley has a bone to pick with students

Geology and Geophysics professors and students look forward to participating in the SOEST Open House. A large crowd of students and teachers, K-12, visited on Friday, October 19, 2007 and some returned for more fun, when it was open to the public on Saturday, October 20, 2007.

Faculty News

Garrett Apuzen-Ito's Ph.D. student *Eric Mittestaedt* is using geodynamic models to learn why segments of mid-ocean ridges tend to jump toward oceanic hotspots. Ph.D. student *Todd Bianco* is studying how mantle convection influences the geochemistry of hotspots including Hawai'i and Iceland. Both students plan to complete their degrees within a year. M.S. student *Ashton Flinders* is working on gravity data around and on Kaua'i to delineate the ancient magmatic centers of the island. Garrett is also using dynamical models to study how magmatism and tectonics interact at mid-ocean ridges to shape the seafloor in the ocean basins. Garrett's daughter, Sekai, is growing quickly. She has just learned to pedal her tricycle and is a big help (usually) in the garden.

Janet Becker continues her work on the Pacific Island Land-Ocean Typhoon Experiment (US Army Corps.) and is happy to report that tropical storm Man-Yi generated waves of 7 m significant wave height offshore of Ipan Reef, Guam in July 2007 resulting in 1 m set-up. In addition, video and in-situ observations of wave transformation and run-up (Sea Grant) have been obtained during the winter of 2007-08 at Waimea and Mokuleia and are currently being analyzed by graduate student *Anne-Christine Pequignet*. In her spare time, Janet has enjoyed working on barotropic to baroclinic tidal conversion with *Nathalie Zilberman* and on applications of T-lidar to nearshore processes with *Ben Brooks*.

Fred Duennebier has been busy working on the NSF funded ALOHA Cabled Observatory, with phase-1 installed in February, 2007. The system utilizes a retired AT&T trans-oceanic optical cable system that went between O'ahu and California. Proof-of concept experiments include a hydrophone that records sounds from 0.01 Hz to 20 kHz, and a pressure sensor that records tides and tsunamis. Phase-2 will be installed in October, 2008, using the Woods Hole ROV JASON-II to install infrastructure to support up to 8 experiment systems. Station ALOHA, where the system is located, is an important observatory for oceanographic monitoring. From December to May, the hydrophone is rich in humpback whale vocalizations, and the real-time sounds can be heard over the Internet at www.soest.hawaii.edu/GG/Deep-oceanOBS/aco_home_page.htm. Fred is also getting ready to retire next summer, probably to the Big Island.

Robert Dunn happily reports a productive year; six papers published, including one in *Nature* on the EPR magmatic system. He impatiently awaits a major expedition in 2009 to the Lau Spreading Center, during which he and colleagues from three other institutions will perform over a month of seismic work. Robert will lead the active-source component of the seismic work and will also be heavily involved with the passive component. His graduate student *Michaela Conley* is performing waveform analyses of mantle structures and will later use that knowledge to analyze data



Please see our GG website to identify this cast of characters.

from Arctic ridges. Robert serves on the RIDGE steering committee, the national Ocean Bottom Seismic Instrumentation Pool oversight committee, and is the UH representative to the Incorporated Research Institutions for Seismology.

Aly El-Kadi and the hydro group celebrated the *Kolja Rotzoll's* (F'07) graduation. His dissertation research used four methods to estimate hydraulic properties for basalts: (1) unconventional step-drawdown tests that provided good match with those from classical aquifer tests; (2) an empirical relationship between specific capacity and hydraulic parameters resulting in island-wide hydraulic conductivity maps; (3) aquifer ocean tide responses used to estimate an average hydraulic diffusivity, which necessitated considering asynchronous and asymmetric tidal influence from two sides in an aquifer; and (4) ground-water responses to wave setup, used to estimate hydraulic parameters.

Jenny Engels is happily busy with her second year of teaching GG101. Highlights from this year included great Big Island and Maui field trips, yielding exciting new geological insights and friendships. She is also working with *Janet Becker* as an undergraduate advisor, and with the Geology Club students made hiking and camping trips through Maui's Haleakala Crater and along Kaua'i's Na Pali Coast. Jenny is particularly proud of the Geology Club leading UH in their second annual participation in RecycleMania, a nationwide recycling competition among colleges and universities that helps to raise environmental awareness across campus.

Chip Fletcher reports 2007/-08 was another good year for the Coastal Geology Group. *Ayesha Genz*, *Matt Barbee*, and *Matt Dyer* finished a study of Managaha Island in Saipan. *Sean Vitousek* finished his Masters degree and is moving to Stanford for his PhD. *Tiffany Anderson*, *Chris Bochicchio* and *Brad Romine* will defend their theses in summer '08. Undergrads *Angela Stevens*, *Amanda Vinson*, *Jillian Luis*, and *Craig Senter* continue their important help in mapping beach changes. *Chyn Lim* had a darling baby girl this year (Ashley).

Aysha had a baby boy in May (Anwar), and Brad is a new father of a baby boy (Julian), also born in May.

Neil Frazer. In 2007 Neil's student, *Eva-Marie Nosal*, completed her PhD work on the passive tracking of whales using hydrophone recordings, and published several more papers. Neil now works with *Chip Fletcher* and his Coastal Geology Group developing computer models for long-term changes to Hawai'i's shorelines. He also continues to work on the modeling of disease transfer between sea-cage farmed fish and wild fish, using observations of sea-cage salmon farming in Canada, Scotland, Norway, Western Ireland and Chile. In spring 2009 he will offer a special topics course in theoretical ecology. As one global problem leads to another, ecology (the connectedness of seemingly independent processes) is too important to be left to the biologists, he says. Every scientist should know its methods.

Eric Gaidos spent the fall semester on sabbatical at the Univ. of California Berkeley where he worked with collaborators in the Dept. of Earth and Planetary Science on the geology of extrasolar planets, and Molecular and Cell Biology on the genomics of the "primitive" marine invertebrate *Trichoplax adhaerens*. He also worked on an introductory Earth History textbook. He migrated back to Manoa for the spring semester where he is teaching that class and a graduate seminar on science documentary filmmaking. Eric, 8 graduate students, and a technical assistant just completed a video news release on UHM research on the pollinators of Hawai'ian plants; the class is now working on a 20-minute film on the natural history of the Hawai'ian archipelago. Eric and several collaborators at other institutions just launched a major initiative to search for Earth-sized planets around nearby "M-type" stars using telescopes on Mauna Kea and elsewhere.

Mike Garcia. This academic year Mike was involved in field work on Kilauea with student *Jared Marske* examining historical rift zone eruptions, a four-week marine expedition to the northern Hawai'ian Islands with students *Lisa Swinnard*, *Todd Bianco* and *Ashton Flinders* and colleagues *Garrett Ito* and *Bruce Appelgate* mapping and sampling products of secondary volcanism, and in Antarctica for four weeks with GG undergraduate student *Carolyn Parcheta* studying beautifully exposed dikes.

Craig Glenn has been continuing his fascination with submarine groundwater discharge. Employing high-resolution aerial infrared thermal techniques and groundtruthing those missions in collaboration with colleagues with Florida State University, Craig and his students have been carefully mapping their discovery of now more than 40 massive submarine groundwater nutrient plumes pouring into the coastal waters throughout the western half of the Big Island. They are modeling the discharge fluxes and dissolved loads of those plumes and are now expanding that work back towards O'ahu. But, Craig also continues to proudly wear his hard hat as special editor for "Authigenic Mineral Formation in the Marine Environment: Pathways, Products and Products," published in Deep-Sea Research-II in 2007, and is currently shepherding a new IAS Special Publication "Authigenic Minerals: Sedimentology, Geochemistry and Origins," slated for 2009.

Lucia Gurioli and student *Thomas Shea*, continue to work on textural, chemical and experimental data on the pumice of the 79AD Vesuvius. They finished the experimental side of the project and now will focus on the study of the devastating pyroclastic density currents pumice texture. Lucia and *Andrew Harris* are supervising *Natalie Yakos* on her undergraduate thesis focus on the mechanism of emplacement of three lava flow units cropping out in O'ahu, at Makapuu. In collaboration with *Andrew Harris* and *Bruce Houghton*, Lucia will also work on the microtexture of scoria from Strombolian events at Stromboli, Italy.

Julia Hammer continued her research into the kinetics of crystallization in a variety of settings. *Carrie Brugger* wrapped up the lab phase of her dissertation work, having completed a series of high-temperature decompression experiments emulating the process of magma ascending from a crustal reservoir. Postdoc *Julie Bowles* explored the consequences of slow cooling and mineral exsolution (unmixing in the solid state) for the magnetic properties of Martian basalts. *Owen Neill*, who joined the group in the fall, will be participating in field work in Russia's volcano-rich Kamchatka Peninsula during the summer of 2008. In the spring, *Lisa Tatsumi* began MS work with Julia and *Mike Fuller* as advisors on projects at the intersection of petrology and rock magnetism.

Eric Hellebrand's time has been mainly consumed by keeping the Electron Microprobe and XRF labs operational, as well as preparing for the arrival of the new electron microprobe. His research continues to focus on the petrology of the upper mantle and lower crust at mid-ocean ridges. Two out of three doctoral students from his former working group in Germany successfully completed their thesis in the past year. After that Liu Chuan-Zhou returned to China, setting up his own osmium lab, while *Anette von der Handt* recently joined G&G as a postdoc. She is working with Eric and *Kevin Johnson* on drilled gabbros from the Mid-Atlantic Ridge. Zoran Jovanovic, the third student who is still in Germany, will complete his dissertation in the summer of 2008.

Bruce Houghton. The physical volcanology group was frenetic in Spring 2008 semester, with three students at various stages of undergraduate theses (*Michael May*, *Maria Janebo* and *Samantha Weaver*), all on dynamics of explosive eruptions; two intensely productive PhD students (*Rebecca Carey* has generated 2 published papers this year and 3 manuscripts about Askja; *Wendy Stovall* has one paper accepted and a second in review). Data acquisition for the big USA tsunami study ended in February and *Penny Larin* is writing a series of reports analyzing awareness and preparedness in 6 communities around the US. The highpoint of 2008 has been daily involvement in the response to the 2008 Halemaumau eruption (see story pg. 10), an outgrowth of a long, productive collaboration with *Don Swanson* and the new research accord between HVO and UH-Manoa. The March 19, 2008 explosion yielded a unique data set only matched by the May 18, 1980 St Helens eruption.

Kevin Johnson spent 2006-January 2008 in Washington DC as the Program Director for the Ocean Drilling Program at the

(continued on page 16)

National Science Foundation. He managed the research grants portion of the program and logged too many frequent flyer miles. Besides the NSF duties, he continued his research projects on lower crust formation on the Mid-Atlantic Ridge, plume-ridge interaction processes on the Southeast Indian Ridge, and geochemical structure and evolution of the Hawai'ian mantle plume.

John Mahoney reports that in addition to continuing several of the projects summarized in last year's newsletter, he has completed a study of a major basalt-rhyolite complex in southern Madagascar, the Androy (thorn forest) massif. This complex, part of the middle Cretaceous large igneous province of Madagascar, covers 4000 sq. km, several times larger than the largest modern-day examples such as Torfajökull in Iceland. The study was done in collaboration with colleagues in England and Denmark. Mahoney also has begun experimental and modeling studies with S. Dye and J. Learned of the UH Physics Department in order to converge on the final design for a deployable and retrievable deep-ocean geoneutrino detector for measuring U and Th within the planet's interior.

Steve Martel is working on two projects with GG students. One is on sheeting joints in Yosemite National Park, with *Kelly Mitchell* and *Carolyn Parcheta*. This research combines laser surveying, stress measurements, and differential geometry (calculus applied to curved surfaces) to test whether the fractures form in response to high compressive stresses parallel to convex surfaces, rather than overburden erosion. The other project on Kilauea pit craters with *Nancy Nicklis* tests a model from *Chris Okubo's* undergraduate thesis that the pit craters form over large subterranean fractures. Both projects contributed to the undergraduate structural geology course.

Floyd McCoy. During 2007-8, Floyd has been on sabbatical in Athens, Greece, as the M.H. Wiener Professor in Geoarchaeology at the American School of Classical Studies, and as a Senior Fulbright Scholar to Greece. It was a year to get caught-up with field data, manuscripts, etc. However, obligations with field trips, a grad seminar, lectures and talks, not to mention Greek life, saw that goal perturbed. Research focuses on the consequences of the Late Bronze Age eruption of Santorini on Minoan Crete (tsunami, ash fall, climate change, etc). Additional fieldwork focuses on deep-water surveys in the Mediterranean and Aegean Seas for ancient shipwrecks.

Ralph Moberly, retired, is intrigued with new information from Japanese volcanoes that has renewed his interest in what was termed the Oxidation-Polarity paradox. He enjoys talking with colleagues and former Hawai'i students at GSA and AGU meetings.

Greg Moore's main research focus continues to be on the Nankai Trough. He will have spent all of the 2007-8 academic year in Japan working with colleagues at JAMSTEC, including participating in the first IODP drilling expedition on the Japanese drilling vessel Chikyu. Before the drilling cruise he gave lectures on the NanTroSEIZE drilling program at the University of the Philippines and University of Hong Kong. His group's work on the first ever commercial 3D seismic survey for scientific study produced a paper on the relationship between splay fault slip and tsunami generation that was published in *Science*. Graduate student *Toshi Ike* finished

his Ph.D. dissertation and returned to Japan in April, 2008 to work for the government agency that will be operating a new 3D seismic vessel around Japan.

Pete Mougini-Mark is happy to be the new Director of HIGP. When not signing forms, Pete studies the geology of Mars, most notably by mapping the impact crater Tooting and in studying Martian volcanic landforms. He retains a strong interest in satellite observations of Earth, and works to help develop new remote sensing projects associated with the Hawai'i Space Flight Lab and the new UH Center for Maritime Domain Awareness. Pete's future new "research mission" will focus on the mitigation of the effects of climate change in Hawai'i.

Brian N. Popp and his students continue stable isotope biogeochemical research. Several students finished their thesis last year and have left. New projects this year include study of the coupling of denitrification and N₂ fixation in the eastern tropical Pacific, alkenone geochemistry in the subarctic Pacific near New Zealand and investigating a mesophotic reef (~50-100 m deep) near Maui. Popp also continues work on the nitrogen biogeochemistry of sponges. The laboratory has seen some personnel changes with *Terri Rust* leaving and *Elizabeth Gier* taking over as laboratory manager. We all miss Terri very much and wish her well in California!

Doug Pyle reports—"Another year, another lab renovation". The old inductively coupled plasma mass spectrometer (ICP-MS) lab in POST 632 has been refurbished to house a Nu Instruments multiple-collector ICP-MS (see photo pg. 5), expected to arrive in June 2008. This new instrumentation will increase our analytical capabilities and open new research avenues and isotopic systems that are beyond our current reach. Doug continues to work on the timing and composition of mafic volcanism in several areas which include mid-ocean ridge systems (SEIR), large igneous provinces (Caribbean Plateau, Oregon-Washington Coast Range), and Cretaceous Pacific seafloor (Nova-Canton Trough).

Greg Ravizza's group had a busy year continuing work on chemostratigraphy, paleoclimate and catastrophic events in Earth history. PhD student *Francois Paquay's* work on a new approach to estimating the size of large impact events from chemical fingerprints preserved in the marine sediment received quite a lot of attention from the press. The group's ongoing work on the "green house-ice house" transition across the Eocene-Oligocene boundary has led to some innovative high resolution chemostratigraphy in petroleum source rocks. M.S. Student *Nicole Robinson's* work on changes in ocean chemistry caused by Decan volcanism is ready for submission and is timed to coincide with renewed interest in estimating the environmental effects of flood basalt volcanism. *Denys VonderHaar* is keeping the lab running smoothly and helping me to make progress on our NSF project examining the influence of major Cenozoic glacial events on chemical weathering.

Scott Rowland. Over the past year, Scott continued to teach courses and take students on as many field trips as possible. He is also helping GG alumnus *Thor Thordarsson* edit a book honoring George P.L. Walker, and working with *Andy Harris*, *Harold Garbeil*, and *Rob Wright* to make FLOWGO better at pre-

dicting lava flow paths. Scott also finally converted the Kilauea field trip guide to electrons, it and other SOEST field trip guides are at www.soest.hawaii.edu/asp/GG/esources/ftguides.asp

Ken Rubin continues his geochemical and volcanological research with multiple projects investigating the rates and styles of magmatic processes via radiochemical and geochemical methods, including two on submarine volcanic rocks with postdoc *Chris Russo* and SOEST YIP *Rhea Workman*, and a study of Torfajokull, Iceland with recent postdoc *Georg Zellmer*. Ken also began a project with the US Army investigating environmental depleted uranium (DU) contamination at some of their Hawai'i installations. He is advising *Nancy Nicklis* on an undergraduate thesis studying arsenic contamination in Hawai'ian soils and Univ. of Bremen diploma student *Antje Herbrich* on research into the petrogenesis of the mysterious Hawai'ian volcano known as Penguin Banks. He will soon be very busy with the new multi-collector icp mass spectrometer, anticipated to arrive in June, 2008. Ken continues to teach GG courses in geochemistry and environmental geochemistry and sits on the ridge2000 steering committee.

John Sinton continues to work on mid-ocean ridge, Icelandic and Hawai'ian volcanic eruptions, and the magmatic evolution of the Wai'anae and West Moloka'i volcanoes. Highlights of the last year include the completion of *Melissa Rotella's* thesis on the Galápagos 93°W overlapping spreading center, the long-awaited publication of the digital geologic map of the State of Hawai'i, and learning new things from PhD students *Eric Bergmanis* and *Deborah Eason*. Teaching has mainly been at the undergraduate level with GG301 Mineralogy and introductory GG103 Geology of the Hawai'ian Islands. The latter provided an excuse to run a Spring 2008 field trip to Maui.

Steve Stanley published a memoir accompanying the Fall, 2007, issue of *Paleobiology* that he hopes will establish a new

paradigm for our understanding of the dynamics of diversification of marine animals during the past half billion years. He is in the process of setting up laboratory experiments for his ongoing research program on effects of seawater chemistry on biomineralization through time. Last summer, he continued his work at the Smithsonian on a huge, beautifully preserved Pliocene molluscan fauna from Florida that suffered heavy extinction at the onset of the modern ice age. Once again, he enjoyed helping teach "The Big Gulp"—the course on all of geology for new graduate students coming from other fields.

Paul Wessel continues to work with his colleague *Loren Kroenke* on refining the absolute motion of the Pacific, now back to 145 Ma. They will soon start the analysis of other plates using the same techniques. Wessel and graduate student *Seung-Sep Kim* are mapping and characterizing the global seamount population and assessing the implications for intraplate volcanism in time and space. Also, with graduate student *Michael Chandler*, he is analyzing and enhancing the unique and valuable NGDC marine geophysical track line database. This year he expects to initiate a new global fracture zone and magnetic isochron database, which will be used to address many questions in plate tectonics. Finally, he continues to spearhead the development of the Generic Mapping Tools (GMT).

New Faculty

The GG department enthusiastically welcomes geophysicist **Clint Conrad**, geochemist **Hope Jahren** paleoceanographer **Katharina Pahnke**, and radiochemist **Henrietta Dulaiova** as new faculty members in the upcoming academic year (Clint and Hope arrive in summer 2008, Katharina in December 2008, and Henrietta arrives in Jan 2009).

Geology and Geophysics Publications, June 2007-May 2008

Faculty & Staff Publications

(members of GG dept. are in bold)

Ballmer, M, et al., (**Ito, G, Bianco, TA**) (2007) Non-hot-spot volcano chains originating from small-scale sublithospheric convection, *Geophys. Res. Lett.*, 34, doi:10.1029/2007GL031636.

Beman, JM, **Popp, BN**, Francis, CA (2008) Molecular and biogeochemical evidence for ammonia oxidation by marine Crenarchaeota in the Gulf of California. *The ISME Journal*, 1-13, doi:10.1038/ismej.2007.118.

Carter et. al. (**Becker, JM**) (2008) Energetics of M2 barotropic to baroclinic tidal conversion at the Hawai'ian Islands, *J. Phys. Ocean*, doi: 10.1175/2008JPO3860.1, in press.

Courtier, AM et al., (**Workman, R**) (2007) Correlation of seismic and petrologic thermometers suggests deep thermal anomalies beneath hotspots, *Earth Planet. Sci. Lett.*, 264, 308-316.

Duennebie, FK, Sutton, GH (2007) Why bury ocean bottom seismometers?, *Geochem. Geophys. Geosys.*,8, Q02010,

doi:10.1029/2006GC001428

Duennebie, FK, Harris, D, Jolly, J (2008) ALOHA Cabled Observatory will Monitor Ocean in Real Time, *Sea Technology*, 49, 51-54

Engels, JL, Edwards, MH, Polyak, L, Johnson, PD (2007) Seafloor evidence for ice shelf flow across the Alaska-Beaufort margin of the Arctic Ocean. Published Online in *Earth Surface Processes and Landforms*, DOI: 10.1002/esp.1601

Fekiacova, Z, et al., (**Garcia, MO**) (2008) Temporal evolution of Ko'olau Volcano: inferences from isotope results on the Ko'olau Scientific Drilling Project (KSDP) and Honolulu Volcanic Series. *Earth Planet. Sci. Lett.*, 261, 65-83.

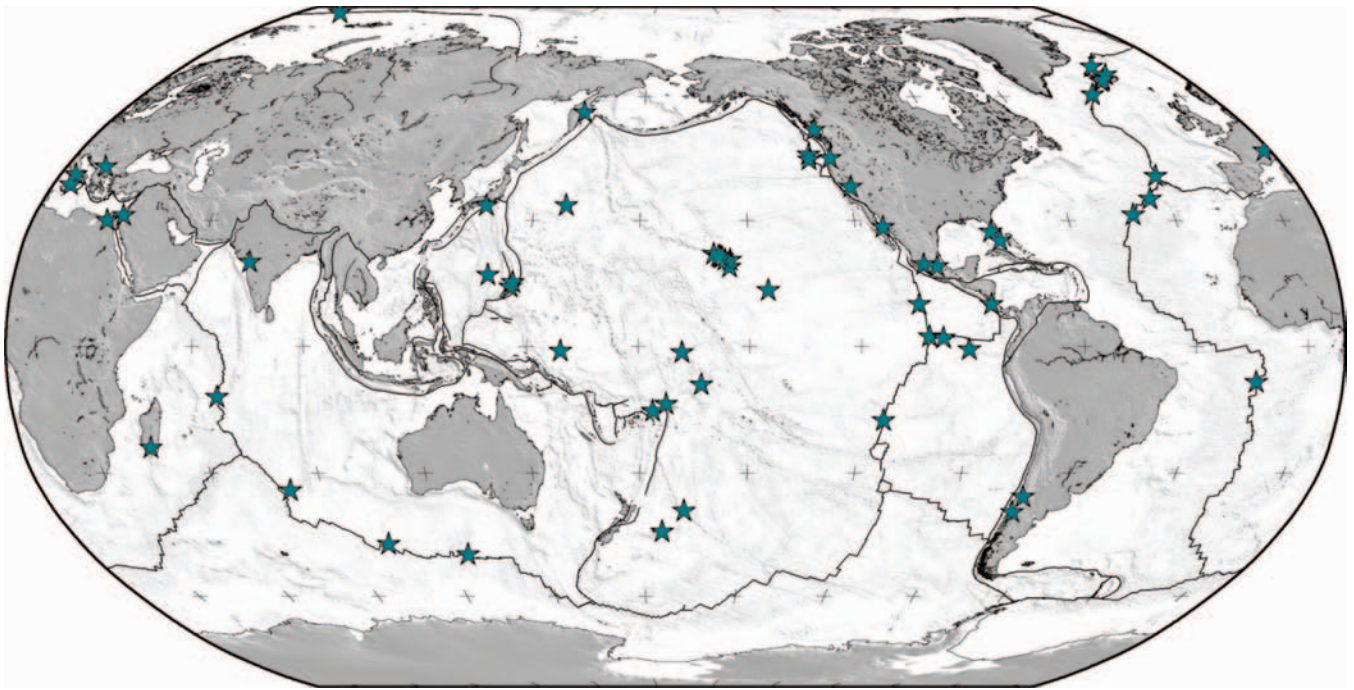
Garcia, MO, Ito, E, Eiler, J Oxygen Isotope Evidence for Chemical Interaction of Kilauea historical magmas with basement rocks. *J. Petrology*, doi:10.1093/petrology/egm034

Genz, AS, **Frazer, NL, Fletcher, CH**, Thieler, ER (2007) Improving statistical validity in calculating erosion hazards

(continued on page 18)

- from historical shorelines. *Proceedings, Coastal Sediments '07, New Orleans*, ASCE, May 13-17, p. 1799-1812.
- Glenn, CR**, Filippelli, GM (2007) Authigenic Mineral Formation in the Marine Environment; Pathways, Processes and Products. *Deep-Sea Res. II*: 54, 1142-1146.
- Gurioli L**, et al., (**Harris, A**, **Houghton, B**) Textural and geophysical characterization of explosive basaltic activity at Villarrica volcano. *J. Geophys. Res.*, doi:10.1029/2007JB005328
- Hanyu, T, **Johnson, KTM**, Hirano, N, Ren, ZY (2007) Noble gas and geochronology study of the Hana Ridge, Haleakala volcano, Hawai'i; implications to the temporal change of magma source and the structural evolution of the submarine ridge. *Chemical Geology*, 238, 1-18.
- Ito, G.**, van Keken, PE (2007) Hot spots and melting anomalies, in *Mantle Dynamics*, edited by D. Bercovici, Elsevier, Treatise in Geophysics, 7, 371-435.
- Jackson, MG, Kurz, MD, Hart, SR, **Workman, RK** (2007) New Samoan lavas from Ofu Island reveal a hemispherically heterogeneous high $3\text{He}/4\text{He}$ mantle. *Earth Planet. Sci. Lett.*, 264, 360-374.
- Kim, S**, **Wessel, P** (2008) Directional median filtering for regional-residual separation of bathymetry. *Geochem. Geophys. Geosyst.*, 9 (Q03005): doi:10.1029/2007GC001850.
- Knies, J, et al., (**Popp BN**) (2008) Surface water productivity and paleoceanographic implications in the Cenozoic Arctic Ocean. *Paleoceanography*, 23, PA1S16, doi:10.1029/2007PA001470.
- Lam, P, Cowen, JP, **Popp, BN**, Jones, RD (2008) Microbial ammonia oxidation and enhanced nitrogen cycling in the Endeavour hydrothermal plume. *Geochim. Cosmochim. Acta*, doi: 10.1016/j.gca.2008.01.033.
- Lebo, S, **Johnson, KTM** (2007) Geochemical Sourcing of Rock Specimens and Stone Artifacts from Nihoa and Necker Islands, Hawai'i. *Journal of Archaeological Science*, doi:10.1016/j.jas.2006.08.009.
- Mahoney, JJ**, Saunders, AD, Storey, M., Randriamanantenasoa, A (2008) Geochemistry of the Volcan de l'Androy basalt-rhyolite complex, Madagascar Cretaceous Igneous Province. *J. Petrology*, 49, doi:10.1093/petrology/egn018, 28 pp.
- Mjelde, RA, et al., (**Mittelstaedt, E**, **Ito, G**) (2008) Magmatic and tectonic evolution of the North Atlantic. *J. Geol. Soc.*, 165, 32-42.
- Nicolaysen, KE, et al., (**Mahoney, JJ**, **Johnson, KTM**) (2008) Influence of the Amsterdam/St. Paul hot spot along the Southeast Indian Ridge between 77 and 88 E: Correlations of Sr, Nd, Pb, and He isotopic variations with ridge segmentation. *Geochem. Geophys. Geosyst.*, 8, Q09007, doi:10.1029/2006GC001540.
- Patton, D, et al., (**Houghton, BF**) (2008) Managing tsunami risk in coastal communities: Identifying predictors of preparedness. *Australian Journal of Emergency Management* 23: 4-9.
- Peterson, RN, Burnett, WC, **Glenn, CR.**, Johnson, AJ (2007) A box model to quantify groundwater discharge along the Kona coast of Hawai'i using natural tracers. In: Sanford, W., Langevin, C, Poremio, M, Povinec, P (eds.) *A New Focus on Groundwater-Seawater Interactions*. IAHS Publication 312, Oxfordshire, UK., 142-149.
- Ravizza, GE** (2007) Reconstructing the marine $^{187}\text{Os}/^{188}\text{Os}$ record and the particulate flux of meteoritic osmium during the late Cretaceous. *Geochim. Cosmochim. Acta*, 71:1355-1369.
- Rooney, J, **Wessel, P**, Hoeke, R, **Weiss, J**, Baker, J, Parrish, F, **Fletcher, C**, Chojnacki, J, **Garcia, MO**, Vroom, P, (2008) Geology and Geomorphology of the Northwest Hawai'ian Islands, in Riegl, B, Dodge, RE (Eds.), *Coral Reefs of the USA*, Springer Verlag, p. 470.
- Rubin, KH** (2007) Volcanoes and Earthquakes, The Five Mile Press PTY, Ltd, Sydney, Australia, pp64.
- Rubin, KH**, **Sinton, JM** (2007) Inferences on mid-ocean ridge thermal and magmatic structure from MORB compositions. *Earth Planet. Sci. Lett.*, 260, 257-276, doi:10.1016/j.epsl.2007.05.035.
- Smith, IEM, Blake, S, Wilson, CJN, **Houghton, BF** (2008) Deep-seated fractionation during the rise of a small-volume basalt magma batch: Crater Hill, Auckland, New Zealand. *Contrib. Mineral. Petrol.* 155:511-527.
- Soule, SA, Fornari, DJ, Perfit, MR, **Rubin, KH** (2007) New insights into mid-ocean ridge volcanic processes from the 2005-06 eruption of the East Pacific Rise, $9^{\circ} 46' - 56' \text{N}$. *Geology*, 35 (12), 1079-1082; doi: 10.1130/G23924A.1
- Southwell, MW, **Popp, BN.**, Martens, CS (2008) Nitrification controls in fluxes and isotopic composition of nitrate from Florida Keys sponges. *Marine Chemistry*, 108, 96-108, doi:10.1016/j.marche.2007.10.005.
- Stanley, SM** (2007) An analysis of the history of marine animal diversity. *Paleobiology* 33(4 Supplement), Memoir 4, 1-55.
- Stanley, SM** (2008) Predation defeats competition on the seafloor. *Paleobiology* 34, 1-21.
- Wessel, P** and Becker, JM, 2008, "Interpolation using a generalized Green's function for a spherical surface spline in tension", *Geophys. J. Int.*, doi:10.1111/j.1365-246X.2008.03829.x
- Wessel, P**, Kroenke, LW (2008) Pacific absolute plate motions since 145 Ma. *J. Geophys. Res.*, doi:10.1029/2007JB005499
- Wessel, P**, Müller, D (2007) Plate Tectonics, in Schubert, G (ed.), *Treatise of Geophysics*, 6, 49-98, Elsevier, Oxford.
- Wessel, P** (2007) Seamount Characteristics, in Pitcher, TJ, Morato, T, Hart, PJB, Clark, M, Haggan, N and Santos, R (eds), *Seamounts: Ecology, Fisheries and Conservation, Fish and Aquatic Resources Series*, 12, 3-25, Blackwell Press, Oxford, UK.
- Wessel, P**, Kroenke, LW (2007) Reconciling Late Neogene Pacific Absolute and Relative Plate Motion Changes. *Geochem. Geophys. Geosyst.*, 8, Q08001, doi:10.1029/2007GC001636.
- Wilson, CJN, et al., (**Houghton, BF**) (2007) A multiple-approach radiometric age estimate for the Rotoiti and Earthquake Flat eruptions, New Zealand, with implications for the MIS4/3 boundary. *Earth. Plane. Sci. Lett.* 26: 1861-1870.
- Zanella E, et al., (**Gurioli L**) (2008) Estimate of Deposi-

- tion Temperature of the PDC Deposits of the AD 472 Pollena Eruption of Somma-Vesuvius, Italy. *Bull. Volc.*, doi:10.1007/s00445-008-0199-9.
- Zellmer, GF, **Rubin, KH**, Grönvold, K, Jurado-Chichay Z (2008) On the recent bimodal magmatic processes and their rates in the Torfajökull-Veidivötn area, Iceland, *Earth Planet. Sci. Lett.*, doi:10.1016/j.epsl.2008.02.026.
- Zhong, S, et al., (**Wessel, P**) (2007) Bathymetry of the Pacific Plate and its Implications for Thermal Evolution of Lithosphere and Mantle Dynamics, *J. Geophys. Res.*, 112, B06412, doi:10.1029/2006JB004628.
- ## Student Publications
- (GG students and faculty in bold)*
- Bergmanis, EC, Sinton, J, Rubin, KH** (2007) Recent Eruptive History and Magma Reservoir Dynamics on the Southern East Pacific Rise at 17.5°S, *Geochem. Geophys. Geosyst.*, 8, Q12006, doi:10.1029/2007GC001742
- Carey, RJ, Houghton, BF**, Thordarson, T (2008) Contrasting styles of welding observed in the proximal Askja 1875 eruption deposits: I Regional welding. *J. Volcanol. Geotherm. Res.* doi:10.1016/j.jvolgeores.2007.11.020.
- Carey, RJ, Houghton, BF**, Thordarson, T (2008) Contrasting styles of welding observed in the proximal Askja 1875 eruption deposits: II Local welding. *J. Volcanol. Geotherm. Res.* doi:10.1016/j.jvolgeores.2007.11.017
- Chandler, MT, Wessel, P** (2008) Improving the Quality of Marine Geophysical Trackline Data: Along-track Analysis, *J. Geophys. Res.*, 113 (B02102), doi:10.1029/2007JB005051
- Fee, D**, Garcés, M (2007), Infrasonic tremor in the diffraction zone, *Geophys. Res. Lett.*, 34, L16826, doi:10.1029/2007GL030616
- Gregg, CE**, et al., (**Houghton, BF**) (2008) Hawai'ian cultural influences on support for lava flow hazard mitigation measures during the January 1960 eruption of Kilauea volcano, Kapoho, Hawai'i. *J. Volcanol. Geotherm. Res.* doi: 10.1016/j.jvolgeores.2007.12.025
- Hulme, SM**, Wheat, CG, Coggon, RM, McManus, J, (2008) Data report: trace element, Sr isotope, and Ge/Si composition of fluids and sediments in ridge-flank low-temperature hydrothermal environments. In Fisher, AT, Urabe, T, Klaus, A, and the Expedition 301 Scientists, *Proc. IODP, 301*: College Station, TX (IOPP). doi:10.2204/iodp.proc.301.202.2008
- Izuka, SK, **Perreault, JA.**, Presley, TK (2007) Areas contributing recharge to wells in the Tafuna-Leone Plain, Tutuila, American Samoa: *U.S. Geological Survey Scientific Investigations Report 2007-5167*, 52 p. [http://pubs.usgs.gov/sir/2007/5167/].
- Kelly, JL**, Fu, B, Kita NT, Valley JW (2007) Optically continuous silcrete quartz cements of the St. Peter Sandstone: High precision oxygen isotope analysis by ion microprobe, *Geochim. Cosmochim. Acta*, 71, 3812-3832.
- Koeppen, WC**, Hamilton, VE (2008) The global distribution, composition, and abundance of olivine on the surface of Mars from thermal infrared data, *J. Geophys. Res.*, doi:10.1029/2007JE002984.
- Lautze, NC, Houghton, BF** (2008) Single explosions at Stromboli in 2002: use of clast microtextures to map physical diversity across a fragmentation zone. *J. Volcanol. Geotherm. Res.* doi:10.1016/j.jvolgeores.2007.10.011
- Maragos, J, et al., (**Weiss, J**) (2008) U.S. atolls and low reef islands in the Line and Phoenix Islands, Central Pacific Ocean. In: Riegl, B., Dodge, R.E., (eds.), *Coral Reefs of the USA*. Springer, Berlin, p.470.
- Marske, J P**, et al., (**Garcia, MO**) (2007) Rapid passage of a small-scale mantle heterogeneity through the melting regions of Kilauea and Mauna Loa Volcanoes, Hawai'i, *Earth Planet. Sci. Lett.*, 259, 34-50.
- McDowell, ML**, Hamilton, VE (2007) Geologic characteristics of relatively high thermal inertia intracrater deposits in southwestern Margaritifer Terra, Mars, *J. Geophys. Res.*, 112, E12001, doi:10.1029/2007JE002925.
- Mittelstaedt, E, Ito, G**, Behn, M (2008) Mid-ocean ridge jumps associated with hotspot magmatism, *Earth Planet. Sci. Lett.*, 266, 256-270.
- Mittelstaedt, E, Garcia, MO** Modeling the sharp compositional interface in the Pu'u ' ' magma reservoir, Kilauea volcano, Hawai'i. *Geochem. Geophys. Geosys.* (G3), 8, Q05011, doi:10.1029/2006GC001519.
- Oakley, AJ, Taylor, B, Moore, GF** (2008), Pacific Plate Subduction beneath the central Mariana and Izu-Bonin Forearcs: New insights on an old margin, *Geochem. Geophys. Geosys.*, doi:10.1029/2007GC001820, in press.
- Osterloo, MM**, et al. (2008) Chloride-Bearing Materials in the Southern Highlands of Mars, *Science*, 319,1651 DOI:10.1126/science.1150690
- Paquay, FS, Ravizza, GE**, Dalai, TK, Peucker-Ehrenbrink, B (2008) Determining Chondritic Impactor Size from the Marine Osmium Isotope Record. *Science* v. 320 p. 214-218.
- Perreault, JA** (2007) Reconnaissance study of the hydrology of American Memorial Park, Island of Saipan, Commonwealth of the Northern Mariana Islands: *USGS Scientific Investigations Report 2007-5042*, 31 p. [http://pubs.usgs.gov/sir/2007/5042/].
- Rotzoll, K, El-Kadi, AI** (2008) Estimating hydraulic conductivity from specific capacity for Hawai'i aquifers, *Hydrogeology J.*, DOI:10.1007/s10040-007-0271-0.
- Rotzoll, K, El-Kadi, AI**, Gingerich, SB (2008) Analysis of an unconfined aquifer subject to asynchronous dual-tide propagation, *Ground Water*, 46(2):239-250.
- Rotzoll, K, El-Kadi, AI** (2008) Estimating hydraulic properties of coastal aquifers using wave setup, *Journal of Hydrology*, 353, 201-213
- Shea, T**, van Wyk de Vries, B, Pilato, M (2007) Emplacement mechanisms of contrasting debris avalanches at Volcán Mombachó (Nicaragua), provided by structural and facies analysis. *Bull. Volc.* (online first DOI 10.1007/s00445-007-0177-7).
- Vitousek, S**, et al., (**Fletcher, CH**) (2007) Model scenarios of shoreline change at Kaanapali Beach, Maui, Hawai'i; Seasonal and extreme events. *Proceedings, Coastal Sediments '07, New Orleans*, ASCE, May 13-17, 1227-1240.



The map shows the location (stars) of geographic areas where GG faculty have been engaged in field work or participated in oceanographic cruises during the last few years. In addition to these specific locations, many students and faculty work on problems that are regional or global in nature or involve other planets. (Map created by Paul Wessel using GMT.)



Department of Geology and Geophysics
University of Hawai'i at Manoa
1680 East-West Road, POST 701
Honolulu, HI 96822 USA

Address Correction Requested