

NUHOU KANAKA PUKA

Department of
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Nuhou Kanaka Puka

Nuhou Kanaka Puka (“*Alumni News*” in Hawaiian) published by the Department of Geology and Geophysics of the School of Ocean and Earth Science and Technology (SOEST) for its alumni and friends.

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Climate Change and Water Resources in Hawaii

Global Warming

In 1995, the United Nations’ Intergovernmental Panel on Climate Change (IPCC) concluded that climate has changed over the past century. Their models predicted a rise of 1.8 to 6.3°F in the global mean surface temperature during the next century, with sea-levels expected to rise by 0.15 to one meter by 2100 (IPCC 1995). Their 2007 report concluded that warming of Earth’s climate system is unequivocally taking place.

Rising temperature since the mid-20th century is mostly attributed to increased concentrations of greenhouse gases from human activities. These gases, which include carbon dioxide (CO₂), are produced naturally and by human activities, including burning fossil fuels, industrial agriculture, and deforestation. Through data obtained from ancient ice cores from Antarctica, strong correlation was shown to exist between concentrations of the dominant greenhouse gas, carbon dioxide in the atmosphere with temperature variations over the past 400 thousand years. However, atmospheric CO₂ concentrations begin an unprecedented upward climb, starting in the 1800s as the Industrial Revolution gained momentum. Values rapidly rose from 280 ppm (parts per million by volume) in the early 1800s to a current level of 391 ppm, 91 ppm above the highest previously recorded concentrations in the course of the past 400 thousand years.

Records beginning in 1880 show that the temperature of Earth’s surface and shallow ocean have increased over the past century, and accelerated since the 1970’s. According to the National Aeronautics and Space Administration¹, global surface temperatures have increased about 1.44°F since the late-19th century, and the linear trend for the past 50 years of 0.36°F per decade is nearly twice that for the past 100 years. The year 2005 is the warmest year on record, recently matched by the year 2010, while the years 1998, 2002, 2003, 2006, 2007, and 2009 are tied as close second. Earth is warmer now than at any time in the past 1300 years and perhaps longer (D’Arrigo et al., 2006).

Modeling studies show that global and continental temperature change cannot be explained solely by natural phenomena. It is clear that including anthropogenic effects is necessary to obtain reasonable match between modeling results and field data. According to the U.S. National Academy of Science, it is “settled fact” that the Earth system is warming,

¹ See the NASA-GISS website for discussion and updates of global temperature patterns: <http://data.giss.nasa.gov/gistemp/>; last viewed 6/29/11.

and there is 90 to 99 percent probability that humans are the cause.²

Climate Change in Hawaii

Atmospheric circulation in the tropical Pacific has increased, winds have accelerated, and the tropics have widened ; global warming is identified as the cause. Studies report a rapid rise in air temperature in the past 30 years, with stronger warming occurring at high elevations (Giambelluca, 2008). Timm and Diaz (2009) concluded that the most likely scenario for Hawaii is a 5-10% reduction of wet-season precipitation and a 5% increase during the dry season. In addition, studies of rainfall records in Hawaii confirm that rainfall has steadily declined about 15% over the past 20 years. Effects of warming on evapotranspiration are not known, but an increase in evapotranspiration is expected. Beginning in the early 1940's, base flow has declined around the state and the cause is likely related to decreased rainfall (Oki, 2004). Finally, sea level has risen in Hawaii at approximately 0.6 inches per decade over the past century and probably longer.

Climate change impacts

Climate change can seriously affect a wide range of worldwide areas related to natural resources and infrastructure and, ultimately, society's health and welfare. Issues related to natural resources include watersheds and water resources, forests and terrestrial biodiversity, coastal resources and marine biodiversity, beaches and shorelines, and ecosystem structure and function. The potential for negative impacts is large given that climate change significantly influences elements of the water cycle, including rainfall, runoff and streamflow, and groundwater recharge. Combined with temperature increases, such changes may adversely affect the ecosystem balance of forests and terrestrial biodiversity. Saltwater intrusion due to sea level rise has the potential to impact the quality of water resources and produce widespread flooding on low-lying coastal plains. Threatened infrastructure includes transportation, food supply, water delivery systems, wastewater systems, and public utilities. There are likely to be significant economic, environmental, and social impacts due to changes in

disease patterns, damage to property and public networks, and decline in recreational resources.

The adverse affects described above have the potential to negatively influence the economy through declining agriculture, tourism, and water resource and energy availability. Additional strains on the economy are related to potential land use and flood zone changes.

Impacts of climate change in Hawaii

Climate change is on-track to seriously complicate Hawaii's water quantity and quality problems, considering the geographical nature of the islands and the extensive dependence on groundwater resources. Climate change will likely diminish the availability of water recharge and lead to water degradation, especially due to saltwater contamination. The highly variable nature of the hydrogeological and environmental processes on the islands will complicate efforts to assess the impacts of climate change and to develop remediation strategies. Specifically:

- Unique ecosystems that support diverse plants and animals are threatened by rising air temperatures and decreased rainfall and stream-discharge.
- Taro farming in low-lying coastal plains is tied to stream flow and can be negatively affected. When combined with sea level rise, farms will experience intruding salt water and declining stream flows
- Studies indicate that chances of heavier rainfall are likely to occur because of climate change. Global warming appears to be taking Hawaii into a time of declining fresh water resources while enduring more intense rainstorms. Intense rains trigger flash flooding, mudslides and debris flows, road and business closure, infrastructure damage, and loss of public services to isolated communities.
- Rising temperatures have the potential to produce a shallower cloud zone decreasing fog drip. This process provides a significant source of water to mountain ecosystems, especially at windward exposures. A decline in the amount is likely to cause some ecological damage.
- Increased evaporation and transpiration would reduce the runoff entering streams that recharge groundwater.
- Sea level rise can lead to chronic coastal erosion, coastal flooding, drainage problems, and rising probability of marine inundation related to storm

² The National Academies (2011) America's Climate Choices: Panel on Advancing the Science of Climate Change, National Research Council, (p. 21-22), 506 p., http://www.nap.edu/catalog.php?record_id=12782; last viewed 6/25/11.

surge, high wave events, and tsunami; all of which are already experienced in Hawaii.

- Continued sea-level rise will increase flooding of coastal roads and communities and strengthen saltwater intrusion in coastal

wetlands and groundwater systems, estuaries, and other lowland areas.

Charles Fletcher

GG Professor & Associate Dean for Academic Affairs

References

- Center for Island Climate Adaptation and Policy. 2010. The effects of climate change on Hawaii's ocean and coastal resources. A special report to the People of Hawaii.
- D'Arrigo, R., Wilson, R., Jacoby, G., 2006, On the long-term context for late twentieth century warming, *Journal of Geophysical Research – Atmospheres*, v. 111.D3, D03103, doi:10.1029/2005JD006352, 07 February. See: <http://www.ncdc.noaa.gov/paleo/pubs/darrigo2006/darrigo2006.html>; last viewed 6/29/11.
- Fletcher, C. 2010. Hawaii's changing climate. Briefing Sheet, 2010, Univ. of Hawaii Sea Grant College Program and ICAP
- Giambelluca, T.W., H. F. Diaz, and M. S. A. Luke. 2008. Secular temperature Changes in Hawaii. *Geophysical Research Letters*, 35:L12702.
- Intergovernmental Panel on Climate Change. 2007. *Climate change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Core Writing Team, Pachauri, R.K. and Reisinger, A., Eds. Intergovernmental Panel on Climate Change, Geneva, Switzerland, 104 pp.
- Timm, O., Diaz, H.F., 2009. Synoptic-Statistical Approach to Regional Downscaling of IPCC Twenty-First-Century Climate Projections: Seasonal Rainfall over the Hawaiian Island. *Journal of Climate* 22, 4261-4280.

Message from the Chair...

Aloha students, alumni, and friends of the G&G Department,

It is an interesting time here at the University. We have a new Democratic Governor, who used to be a UH faculty member, but it is unclear whether or not he will be a "friend of UH". And the Legislature continues to cut the UH budget. But, I'm happy to report that the Department continues to thrive. Our undergraduate majors are increasing, with enrollments approaching 20 in our 300-level courses. Mineralogy, Petrology and Sed/Strat all benefitted from the addition of several new microscopes with advanced camera equipment (courtesy of a large fund match from the Dean). We are fortunate to have such a strong and committed faculty who brought in more research funding and taught more student credit hours than the previous year. We congratulate Garrett Apuzen-Ito for promotion to Professor and to Eric Hellebrand for promotion to Associate Specialist. Hope Jahren returned from Norway after a year as a Fulbright Fellow, while Eric Gaidos will spend part of the Fall Semester at Lund University in Sweden. Henrieta Dulaiova (who just gave birth to her second daughter!), will participate in a study of the change in radioactivity in the Pacific Ocean due to the release of radioactive material from the Fukushima Daiichi nuclear power plant that was damaged by the March tsunami. I am sad, however, to report that one of our newer faculty members, Katharina Pahnke will be returning to Germany, having accepted a fantastic offer of a Professorship at the University of Oldenburg. We wish her well in her new job!

We once again thank Michael Jackson for his generous support of G&G field trips and welcome another large donation from alum Steve Leslie. Thanks to the others of you who have made contributions to the Department! Your gifts make a real difference for our students and our program. If you have not already done so, please consider a (tax deductible) contribution to one of the Department's funds (see the last page of this Newsletter for a copy of the form).

Greg Moore, Chair



Degrees, Awards & Honors

Undergraduates

Matthew DiPietropolo BS Summer 2010
Samantha Weaver BS Summer 2010
Kyle Taniguchi BA Fall 2010
Aaron de Loach BS Fall 2010

Mark Higley BA Spring 2011
Kimberly Rottas BS Spring 2011

Masters of Science

Kelly J. Mitchell – *Factors Contributing to the Formation of Sheeting Joints: A Study of Sheeting Joints on a Dome in Yosemite National Park* (Advisor: S. Martel, Summer 2010)

Jeff A. Perreault – *Development of a Water Budget in a Tropical Setting Accounting for Mountain Recharge: Tutuila, American Samoa.* (Advisor: A. El-Kadi, Summer 2010)

Brian C. Kastl – *Erosional and Depositional Processes of the 18 March 2007 Lahar at Mt. Ruapehu, New Zealand* (Advisor: S. Fagents, Fall 2010)

Jonathan D. Sleeper – *Intra-Segment Variations in Subduction Influence Along the Eastern Lau Spreading Center and Valu Fa Ridge, Lau Backarc Basin, SW Pacific* (Advisor: F. Martinez, Spring 2011)



GG “Sweet Success” party- Spring 2011 - (L-R) Kim Rottas, Myriam Telus, Alice Colman, Francois Paquay, Christine Waters, Greg Moore (Chair), Jacque Kelly, Joe Kennedy, Wendy Cockshell, Craig Glenn (Assoc. Chair)

Doctor of Philosophy

David E. Fee – *Infrasound from Hawaiian to Plinian Eruptions: Constraining Volcanic Source Parameters* (Advisor: M. Graces, Summer 2010)

Thomas Shea – *New perspectives on the style and dynamics of the 79AD plinian eruption at Vesuvius* (Advisor: L. Gurioli, Summer 2010)

Samuel Hulme – *The Birth and Death of the Oceanic Lithosphere: Geochemical and Tectonic Investigations of the Juan de Fuca Ridge and Mariana Trench* (Advisor: P. Fryer, Fall 2010)

Seung-Sep Kim – *Remote Sensing of Seamounts: A Geophysical Study of Lithospheric Flexure, Seamount Statistics and Intraplate Volcanism* (Advisor: P. Wessel, Fall 2010)

Mikki M. Osterloo – *Revealing Compositional Diversity of the Martian Surface from Remote Sensing Observations and Thermal Infrared Laboratory Analyses: Implications for Ancient Hydrological and Climatological Systems* (Advisor: F.S. Anderson, Fall 2010)

William Cutler – *Bioaccessible Arsenic in Soils of the Island of Hawaii* (Advisor: A. El-Kadi, Spring 2011)

François Paquay – *Extraterrestrial and climatic forcing of the marine osmium isotope record* (Advisor: G. Ravizza, Spring 2011)

Student Awards

Fred M. Bullard Fellowship

Endowed by Thais Freda Bullard in memory of her father, Fred M. Bullard, a pioneer in the studies of Volcanology and general Geology & Geophysics. **Tiffany Anderson, Emily First**

William T. Coulbourn Fellowship

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

J. Watumull Scholarship

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

ARCS Award

Awarded by the Achievement Rewards for College Scientist foundation. **Jacque Kelly**

G&G Achievement Scholarships

Awarded based on merit service, achievements and outstanding grades of Graduates. **Carrie Brugger, Tiffany Anderson**

Michael Chandler – 2011 Fernando Gabriel Leonida Memorial Scholarship. **Wendy Cockshell** – 2010 American Mineralogist Undergraduate Award. **Alice Colman** – 2011 URC Excellence in Research Award at Master's level. **Christine Waters** – 2011 Fellowship from the National Science Foundation Graduate Research Fellowship Program

Faculty – Promotions, Awards & Honors

Garrett Apuzen-Ito – Full Professor, August 1, 2011.

Eric Hellebrand – Associate Specialist, August 1, 2011.

Chip Fletcher - 2011 Chancellor's Citation for Meritorious Teaching for UHM

A.Hope Jahren – Exceptional Reviewer 2010, Geology, Leopold Fellow 2011

Ken Rubin – NSF-Ridge 2000 Distinguished Lecturer 2011

Distinguished Alumnus: Patricia Berge



Patricia Berge (PhD, 1991)

In March 1986, Gerard Fryer invited me to visit HIG/GG when I was applying to graduate school. I was interviewing at several other schools, but they really faded into the background when I watched Halley's comet glowing in the beautiful night sky and met all the creative, supportive professors and grad students at UH. I think that same magic still characterizes SOEST now.

The late 1980's was an exciting time; the fiber optic cable linking UH to the San Diego supercomputer center was being completed and we already had a satellite link allowing us to use the Cray in Minnesota as well as in San Diego. Sun workstations were just coming into use and it was amazing to have nearly the power of a Cray, sitting in a classroom on the 4th floor of the HIG building. GPS was about to replace Loran and the older technologies for navigation at sea, which really made a huge difference in placing and retrieving seismometers and other instrumentation, and improving geophysical interpretation. The drilling program had completed Hole 504B and we were hearing new ideas about the nature of oceanic crust. Several ships in the research fleet were being refurbished and the Office of Naval Research was funding multi-university collaborations that included some very creative developments in ocean-bottom seismic sources and receivers. Add to this the special draw of Hawaii, where everyone wants to come for a sabbatical, and we had access to some of the brightest geoscientists from the oil industry as well as all these exciting new technological advances. I hope that leading researchers still come from all over the world to spend their sabbaticals in Hawaii now, benefitting today's UH grad students.

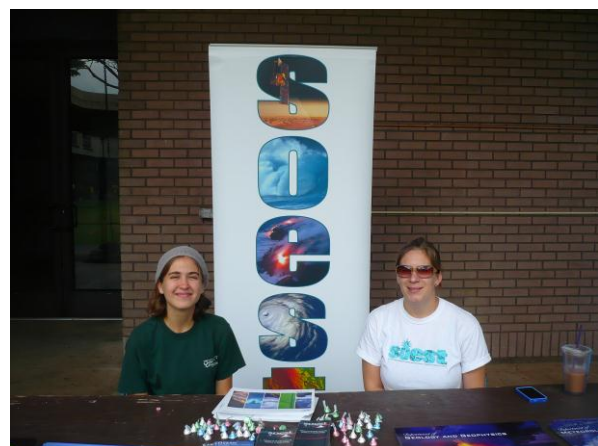
While working on my dissertation on seismic anisotropy and rock physics, I received generous mentoring from many professors and researchers from Woods Hole, Scripps, Schlumberger and Chevron as

well as UH. The postdocs and other grad students at UH also taught me a lot, technical and non-technical. We had some of the same elements so popular in the Silicon Valley workplaces today where teams of diverse individuals bounce ideas and nurf balls off each other. Everyone was interested in each other's research; there was a lot of cross-disciplinary collaboration and shared resources. I went out on research cruises with oceanography grad students as well as with geophysicists. The postdocs were always willing to provide solutions to computer problems, and they were available long after professors had left for the day! Diversity and mutual respect were a main part of the culture. I think that environment and those attitudes were as important as the technical training because that's when I started to learn how to work with other people in such a way that the whole can become more than the sum of the parts.

I began working at Lawrence Livermore National Laboratory as a postdoc in 1991 immediately after receiving my PhD from UH. I spent the next ten years as a principle investigator on a number of different projects and then became a division leader in 2002. The transition from research scientist to manager did not require any special technical talent; it's more about being a good coach than being a star player. It's all about creating and maintaining the right work environment so that innovation can thrive, and enabling the successes of others. I think I learned some of this in grad school back at UH.

Much aloha to my colleagues and lifelong friends who were the professors, postdocs, and grad students at HIG/GG during 1986 to 1991.

* * *



GG and SOEST were represented at Science Olympiad 2011. Adonara Mucek & Elise Rumpf talked with high school and middle school student and teachers about academic departments and opportunities in SOEST.

Recent GG Research Highlights

The following summaries were provided by Garrett Ito for Geophysics and Tectonics (GT) Division, Greg Ravizza for Marine and Environmental Geology (MEG) Division, and John Mahoney for Volcanology, Geochemistry, and Petrology (VGP) Division.

GT

Garrett Apuzen-Ito is working with **Cecily Wolfe** (HIGP) and post-doc **Maxim Ballmer** to explore the possibility that part of the Hawaiian plume is not rising straight up from the lower mantle but could be stalling and pooling in the upper mantle before reaching the lithosphere. Graduate student **Samuel Howell** is using geodynamic models to study the evolution of the Iceland hotspot and the opening of the North Atlantic basin. **Garrett** had a fabulous time teaching GG312, Geomathematics, a still popular and challenging class created by **Janet Becker**.

Janet Becker is a co-PI on an NSF project to study coastal inundation in the Marshall Islands. The upcoming instrument recovery in May will include pressure and current data from Majuro from the 11 March 2011 tsunami.

Clint Conrad spent part of 2010-2011 as a guest researcher at the Center for Advanced Studies in Oslo Norway. In addition, postdoctoral scholar **Todd Bianco** (formerly a PhD student working with **Garrett Ito**) departed Hawaii for an NSF postdoctoral fellowship at Brown University in Rhode Island. **Julia Fieldler**, who performed a GES undergraduate research project on sea level change with Conrad, graduated and is leaving for graduate study at Scripps in San Deigo. Finally, **Clint** is currently helping to organize a newly-created NSF-Earthscope Institute on the "Lithosphere-Asthenosphere Boundary", and published "Patterns of intraplate volcanism controlled by asthenospheric shear" in *Nature Geoscience* (doi:10.1038/NGEO1111, 2011).

Robert Dunn and new research assistant **Dana Brodie** traveled to Fiji in November 2010 to meet the Kilo Moana and then went on to recover 54 ocean bottom seismometers in the Lau basin that had been on the sea floor for the past year. **Dana** has discovered blue and fin whale calls in the seismic data and hopes to write a short paper about their seasonal migration through the basin. Research assistant **Michaela Conley** is finishing up her work on the mantle structure beneath the Mohns Ridge and post doc **Alejandro Gallego** is working with **Robert** and **Garrett Ito** on a joint geodynamic/seismic project. Participating in **Robert's** regular group meetings is **Silke**, who is working with **Cecily Wolfe** (HIGP) to examine Big Island seismic structure via seismic interferometry.

Neil Frazer continues to work on problems of shoreline change and prediction with **Chip Fletcher** and graduate students **Tiffany Anderson** and **Brad Romine**. He also works with **Bruce Houghton**, **Cecily Wolfe** and graduate student **Malin Klawonn** on studies of volcanic plumes. In his spare time, he works on the mathematical epidemiology of macro-parasites and some thorny problems in marine policy.

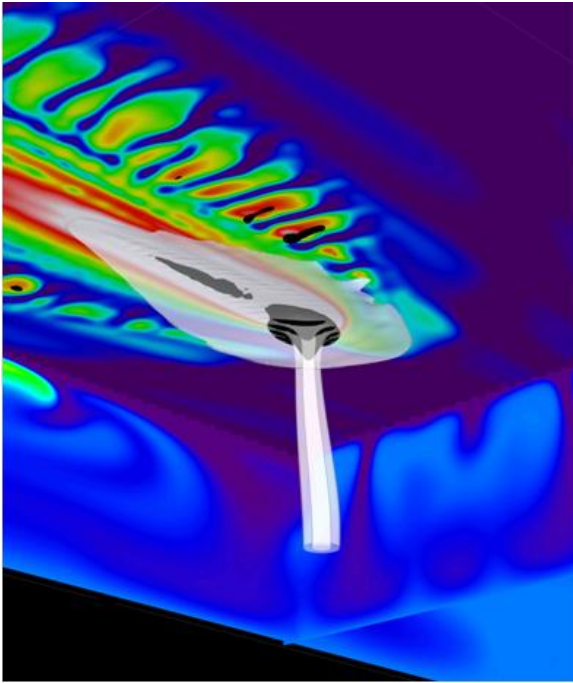
Steve Martel continues his studies of sheeting joints in Yosemite National Park, Pit Craters on Kilauea, and the Deep Underground Science and Engineering Laboratory, Black Hills, South Dakota. **Kelly Mitchell** wrapped up her M.S. under **Steve's** direction last August. Now that **Steve's** terms as (a) Steering Committee Chair of the National Center for Airborne Laser Mapping, and (b) editorial board member of Engineering Geology are completed, preparation of a pair of structural geology books is helping to occupy his spare time.

Greg Moore and his two new graduate students, **Jessica Barnes** and **Brian Boston**, continued work on the Nankai 3D seismic data set, focusing on young normal faulting in the forearc basin and development of a bottom-simulating-reflection (BSR) caused by the accumulation of gas below a methane-hydrate layer in the basin. They are also working on a synthesis of seismic reflection data across the entire Nankai subduction zone.

Paul Wessel continues work with graduate student **Michael Chandler** as **Seung-Sep Kim** graduated in Fall 2010. Current projects include plate tectonic reconstructions, analysis of oceanic fracture zones, and GMT software development (GMT will celebrate its 20th anniversary this October). This is more work that Paul can handle so he hopes to take on a new PhD student by Fall.



Graduate Research Assistant Dana Brodie hard at work aboard the Kilo Moana in November 2010.



A recent study by Garrett Ito, his post-doc Maxim Ballmer, and colleagues, used a model for mantle plume dynamics to simulate small-scale convection at the base of the Pacific plate, enabling them to explain a complex set of observations at the Hawaiian hotspot. This plot shows a three-dimensional image of predicted mantle temperatures (blue = warm, red=hot, white = hottest) and a plume of hot mantle rising beneath the Hawaiian hotspot.



Recovering broadband OBS aboard the Kilo Moana in November 2010.

MEG

The MEG group had another busy year both working here on our islands and around the globe.

Henireta Duliaova and **Craig Glenn** continue their collaborative research on submarine ground water discharge. This effort has extended from Oahu to the Big Island with Maui next in line. This research is important for tracing nutrient sources to the coastal ocean and for a better understanding of the hydrology and water resources of various islands. The Japan disaster, where Fukushima's nuclear plant was damaged by the March 11, earthquake and tsunami, has Henrieta now active in sea-going efforts to trace radioactivity releases and monitoring the coastal waters of Hawaii and the central Pacific (look for updates on these results on the PACIOOS website). Craig's graduate student, Kayla Holleman, defended her M.S. in June and is scheduled to graduate this Summer.

Congratulations Chip!

Chip Fletcher has been presented with a 2011 UH Manoa Chancellor's Citation for Meritorious Teaching by Chancellor Virginia S. Hinshaw. The annual award recognizes UH Manoa faculty members who have made significant contributions to teaching and student learning ([click for more...](#)). Chip has also recently published two books: [Living on the Shores of Hawai'i: Natural Hazards, the Environment, and our Communities](#), University of Hawai'i press, and [Physical Geology: The Science of Earth](#), J. Wiley & Sons.



Aly El-Kadi and his hydrology group has expanded to include 3 post-doctoral investigators Benny Hagedorn, Alan Mair, and Sue Tillery, and research associate, Bob Whittier. Their research activities include assessing the impacts of invasive species, anthropogenic activity, and climate change on Hawaiian focal species; examining sustainability of Hawaii groundwater resources under future climate conditions; and Hawaii source-water assessment program. Their work has gained attention in Korea where El-Kadi's group has recently completed a study on sustainable water-use practices on Jeju Island.

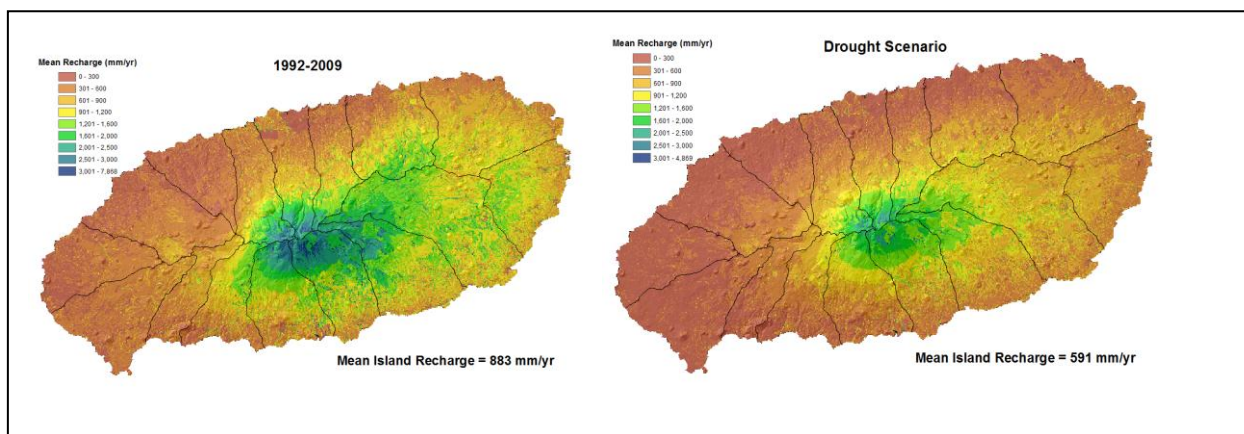
Brain Popp's stable isotope group has continued to grow and extend the scope of their research, concentrating primarily on nutrient cycling in food webs. Around the islands, this includes research on deep-sea corals, sea turtles and rays. Recently collaboration with UH soil scientists has extended this work to the study of nitrogen cycling in taro fields.

Chip Fletcher, in addition to his new role as Associate Dean for Academic Affairs in SOEST, continues to teach GG 101, now armed with a new textbook he authored, *Physical Geology: the Science of Earth*, published by John Wiley & Sons, Inc. 2011. His coastal geology group continues to actively document the changing coastlines of our islands and develop new tools for understanding the many phenomena that shape Hawaii beaches. Be

sure to read the cover story in this newsletter about Chip's recent research findings and his award from the US EPA.

Hope Jahren recently returned from nearly a year in Norway as a Fulbright scholar, working on living plants instead of dead ones, for a change! Norway is one of the few places on Earth that contains trees above the Arctic Circle, so it is not a bad analogy for the ancient polar environments of the Early Paleocene (65-45 Ma), when vast forests extended above 80 degrees North latitude. In her absence, Hope's lab was ably maintained by Bill Hogopian and several post-docs. Except for Hope, her group is now off to a summer field season in Alaska.

Steve Stanley is currently conducting summer research at the Smithsonian. Recently, Steve finished a new edition of his *Earth System History* textbook and he continues important research on evolution in the aftermath of the great Permo-Triassic extinction 250 million years ago. Working for Steve here in GG, Jenny Engels is also taking some time off this summer - her son, Samuel, was born on June 6.



A study by Aly El-Kadi's hydrology group investigated sustainability of water resources for the Jeju Island, Korea, under various climate conditions. The plots compare groundwater recharge under baseline and drought conditions. Decline of groundwater levels of as much as 70 m can result in some locations due to drought.

Upcoming Conference: **Water Resource Sustainability Issues on Tropical Islands**, Organized by the Water Resources Research Center, Aly El-Kadi, Conference Chair

November 14-16, 2011

[Conference web site](#)

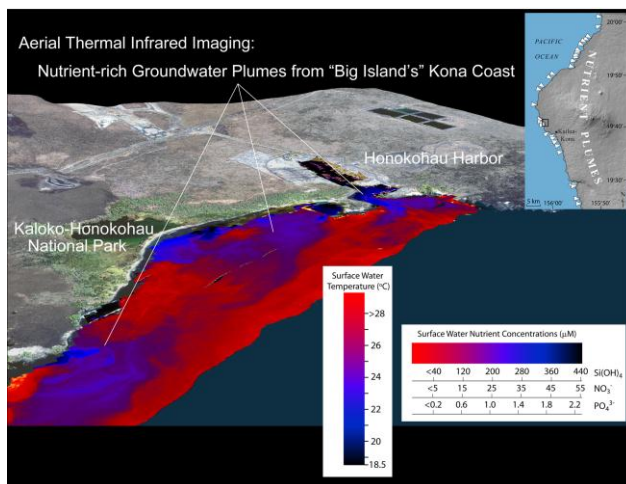
The MEG groups' reach extends far beyond our islands, the globe and into the heavens.

Eric Gaidos was awarded a four-month Visiting Professorship in Astrobiology at the Pufendorf Institute of Lund University in Sweden. Through the summer, Eric is managing his research program remotely, including his ongoing study of coral reef microbial diversity and bodies orbiting distant stars.

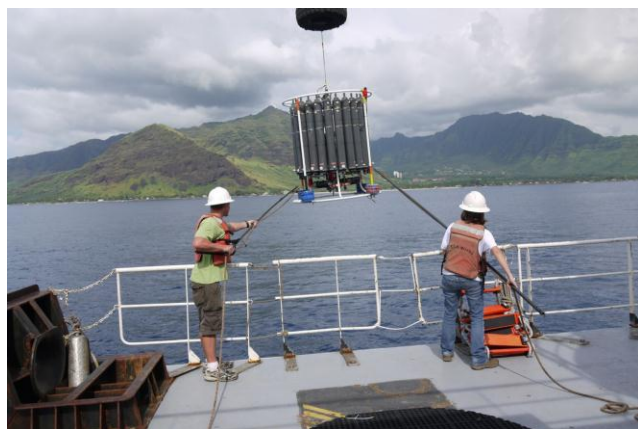
Greg Ravizza's research also continues to have an extraterrestrial flavor, concentrating on large impact events on Earth and the environmental consequences. Ravizza's newest NSF project is a collaboration with colleagues at Cal Tech and focuses on the background flux of extraterrestrial matter to the Earth. Congratulations to Greg's

graduate student, Francois Paquay, who earned his Ph.D. this Spring.

Sadly, we must end this update with a fond Aloha to **Katharina Pahnke** who returns to Germany in August, to take a position at the University of Oldenburg. Though Katharina will be missed, her association with UH will continue as she completes her National Science Foundation funded research on the chemistry of trace elements in the modern ocean and its application to paleoceanography. We wish her the best of luck in her new position and look forward to continued collaboration in the future, in spite of the dreadful time difference!



This plot is based on a study by Craig Glenn's group, which used aerial thermal infrared imaging to assess ocean nutrient contamination due to land sources.



GG faculty members Henrieta Dulaiova and Katharina Pahnke sailed on the R/V Kilo Moana for 2 days in February as part of the State-funded days initiative. They studied the offshore flux of island-derived solutes released by surface and groundwater discharge around Oahu and its impact on the neodymium and radium isotope and rare earth element distributions. They were joined by a great team of undergraduate students Adonara Mucek, Shellie Key, Mark Higley and Joseph Kennedy, graduate student Christine Waters, and postdoc Torben Stichel.

VGP

VGP was once again the destination for visiting scientists who came from Italy, France, Australia, Iceland, Japan, and other parts of the United States to work in our labs and collaborate with members of the division.

Kevin Johnson began a research project with Yale and University of Maryland scientists on carbon sequestration in basalts and ultramafic rocks. He continued serving on the U.S. National Committee of IUGG, and also on the Scientific Technology Panel, Operations Task Force, and Science Planning Committee of IODP.

Scott Rowland compiled the advance rates and history of all post-1800 Mauna Loa 'a'ā lava flows. He also continued working with Harold Garbeil (HIGP) to produce a computer model of an advancing 'a'ā flow front.

Mike Garcia collaborated with volcanologists at the University of the Philippines on tephra deposits in marine sedimentary cores.

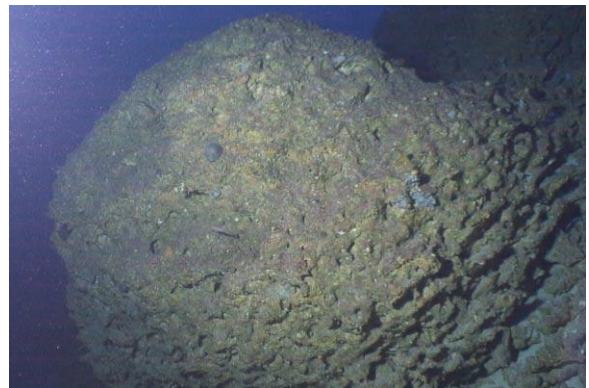
During **Ken Rubin's** 2010-2011 sabbatical, he led cruises to study boninite volcanism in the northeastern Lau Basin and Last Glacial Maximum coral reef deposits in Hawaii, organized a 150-person Ridge 2000 workshop, and spent 2.5 months at Cambridge University modeling coupled signatures of magma mixing and differentiation.

John Sinton, Ken Rubin, Chris Russo, Deborah Eason and Alice Colman participated in the "GRUVEE" cruise to the Galápagos Spreading Center. The cruise employed the submersible *Alvin*, AUV Sentry mapping, and a towed camera system to map recent lava flow fields. Sinton and Eason continued a study of late-glacial eruptions in Iceland's Western Volcanic Zone, to determine melting systematics and melt migration rates during deglaciation-induced mantle melting.

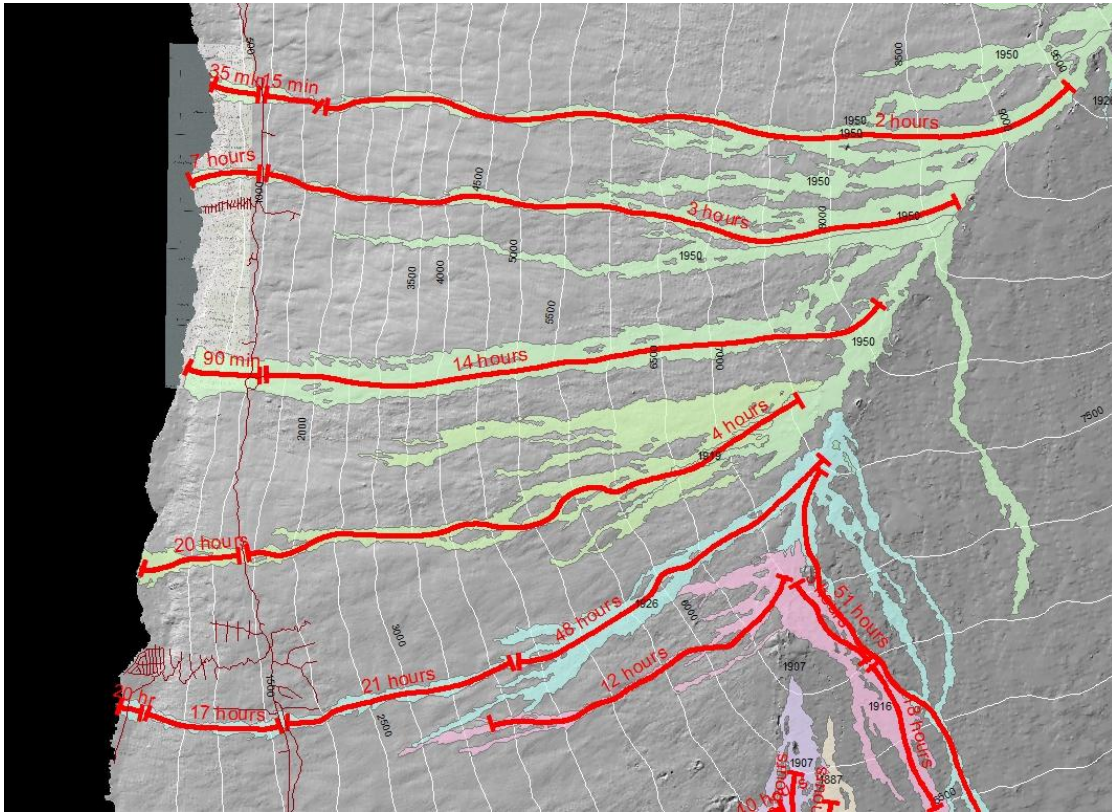
IODP Expedition 330 to the Louisville Seamount Chain kept **John Mahoney** busy, as did the completion of a related project with ex-student **Loyc Vanderkluyzen** on dredged Louisville samples recovered during their survey cruise a few years earlier. Mahoney also continued his work on basalts drilled last year on Shatsky Rise, the oldest oceanic plateau in the Pacific.

The physical volcanology group participated with the Hawaii Volcano Observatory (HVO) in responding to the Kamoamo eruption in March 2011. **Rebecca Carey** has been awarded a prestigious Australian Research Council fellowship and will be taking up her new position in Hobart. Four UH students will start HVO research fellowships this year: postgraduate fellows **Silke Baumer and Carolyn Parcheta**, and undergraduate fellows **Adrienne Poulain and Adonara Mucek**. **Bruce Houghton, Samantha Weaver, and Carey** are working with three USGS volcano observatories to develop a two-day training course on volcanic crises.

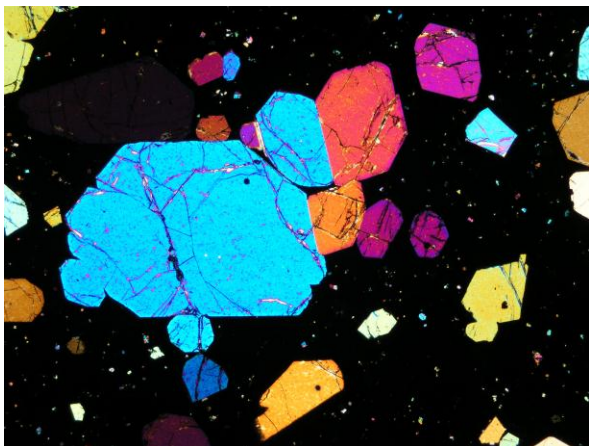
In 2010, **Julia Hammer** helped two M.Sc. students graduate into the wide world. She has been busy this year working with three postdocs in the lab and with a student finishing a Ph.D.



HURL Pisces V submersible photo of a huge (10m+ diameter) coral head now at 140 m water depth. Recent work by K. Rubin and C. Fletcher shows that this grew in a verdant shallow water reef complex during the last glacial maximum in Hawaii, some 22,000 years ago.



A recent study by Scott Rowland compiled, from a variety of sources, 'a'ā flow-front locations during Mauna Loa eruptions since 1800 AD. The flows achieved most of their lengths in only a few hours, and then slowed considerably. The base map is derived from an [on-line geologic GIS database](#), and the lava flow project was funded by a FEMA grant to Don Thomas (HIGP).



Visiting postdoctoral researcher in Julia Hammer's lab, Benoit Welsch, is studying growth of olivine crystals. Welsch maintains that the crystals clustered in the center of this polarized light image of a natural submarine-erupted basalt from Hualalai Volcano, Hawaii, share a growth history, with the smaller crystals having formed as "buds" on the larger crystal during diffusion-controlled growth at large undercooling in the volcanic plumbing system. Welch is attempting to create the budded crystals in the laboratory using various cooling regimes and thermal gradients.

GG Picnic & Softball Challenge 2011

On April 17, 2011, the annual GG picnic was hosted in Lanikai Park by the University of Hawaii Geophysical Society and the Geology Club. It was a nice sunny Sunday afternoon where students, post-docs and faculty came together to enjoy a tasty BBQ, play volleyball, and of course to play the annual grad students vs. faculty/undergraduates/post-docs softball game. The grad team successfully thrashed the other team, second year in a row, and therefore got to raise the trophy to the sky, AGAIN. Many people topped off the hot day by enjoying the beautiful Lanikai beach in the nice afternoon breeze. Be prepared for the next picnic in the Spring of 2012 where the grads will strike back even more vicious!



Faculty member, John Sinton, humbly passes the trophy to the victorious Graduate Students.



The All-Star Graduates: Patrick Gasda, Samuel Howell, Jonathan Sleeper, Samuel Murphy (visitor), Joe Fackrell, Jessica Barnes, Jonathan Weiss, Brian Boston, Ásdís Benediktsdóttir

Field Trips

Field trips are usually rated as the most enjoyable part of GG classes. The following sections contain brief descriptions and some photos for trips that covered Oahu and neighbor islands, as well as the mainland.

On March 11th, 40 excited students flew to Hilo to undertake the every-semester **GG 101** field trip to the Big Island (Chip Fletcher, Instructor). We arrived at Kilauea Military Camp by 9pm, moved into our rooms, had the traditional hallway meeting where we all introduced ourselves, and headed for Thurston lava tube for a midnight hike. This was a notably international affair with groups from Norway, Germany, England, Japan, and China; we were a veritable United Nations of volcano explorers. There was much uncertainty surrounding this trip as Puu Oo had fallen silent only a week earlier and a fissure eruption at Kamoamoa had flared up and died again. Because of the potential fire hazard from the fissure eruption, Park authorities closed Chain-of-Craters Road, jeopardizing my favorite hike – the summit of Mauna Ulu. Saturday dawned bright and clear after a night of heavy rain and we feasted on the classic military breakfast, eggs, sausage, pancakes, biscuits, and potatoes piled higher and deeper. A stop at the visitor center, the usual (awesome!) movie, and a quick discussion around the physical model of the Big Island...then we were off on our first hike – Kilauea Iki. Per usual, the group broke into three cohorts: dawdlers, racers, and everyone else. We had a box lunch at the end of devastation trail and encountered a Park ranger who (because we obviously cut the figure of seasoned veterans) gave us permission to hike the summit of

Mauna Ulu – rejoice! By the end of that windy but sunny hike we had 7 van loads of exhausted, dehydrated, sunburnt (and happy!) explorers. We made it back to camp after a visit to Jagger Museum, in time for a huge dinner. Sunday morning we managed a few short walks: sulfur banks, black sand beach (severely eroded by the way!), and Hilo cookie factory. It was a brilliant group, lots of fun, and several sincere requests to come again next semester. Thank you Patty Lee! We walked in your footsteps the entire trip!!

Photos of the trip can be visited on our [class website](#).



Three amigas



Lunch time!



Herding cats

Field Trips con't...

During Spring Break 16 GG faculty, undergrads, grad students and post-docs spent three days enjoying the geological wonders of the three older volcanoes on the western part of Hawai'i Island. Highlights included the two youngest lava flow fields of Hualālai and their resplendent xenoliths, the unique (for Hawai'i) Pu'u Wa'awa'a trachyte pumice cone and lava flow (the volumetrically largest eruption in all of Hawai'i), a day exploring lava-ice interaction on Mauna Kea, wide-ranging discussions of climate change and shoreline deposits on Kohala, and culinary exploits of the two senior members of the group.



Folks on rocks. Mauna Kea summit party enjoying an ice-contact lava flow on the banks of Lake Waiau



16 smiling faces on steps. The W. Hawai'i Field Trip group on the steps at Kalopa State Park

On Nov. 19-21, 2010, 44 students in **GG103**, **G101L**, **GG101**, **GG106**, 2 TAs, 3 alumni, and their various friends trooped over to Kīlauea for active lava and Halema'uma'u glow (Scott Rowland, Instructor). Getting there was an adventure thanks to Go! Airlines' unwillingness to fly through thunderstorms (Hawaiian's willingness to do so was not exactly comforting). But once everyone finally made it to Hilo, we were on our way. We found both active lava and a nice glow in Halema'uma'u, and much much more. [Click here to visit the trip website.](#)



Lava tube. Intrepid field trippers in lava tube of the Hu'ehu'e lava flow field



GG 103 et al., about to embark on an exhausting 500 meter (!) hike to active lava.



The start of day 1 of the ground-truth exercise. 1: Silje Storaker, 2: Vlad Anastasecu, 3: Kristof Lovas, 4: Lindsey Spencer, 5: Haunani Kane, 6: Gerhard Enersveldt, 7: Camilla Loeland, 8: James Bishop, 9: Hege Loevereide, 10: Brian Boston, 11: Alex Oliver, 12: Kristine Kosinski, 13: Miles Kreisberg, 14: Roger Amundsen, 15: Michel Laudier, 16: Julianne Gravdal, 17: Rob Wright (co-instructor), 18: Jess Barnes, 19: Jeff Skrotzki, 20: Kristina Taylor, 21: Mark Higley, 22: Laura Corley, 23: Samantha Jacob.

GG460 (Scott Rowland, Instructor) returned after a 1-year hiatus, and spent April 22-23 ground-truthing the geologic maps they'd created from satellite and airborne image data. As usual it was an eye-opening experience to learn first-hand both the capabilities and limitations of remotely-sensed mapping. On the second day the fog rolled in, so they also learned first-hand the benefits of hand-held GPS units. Mahalo to the Hawai'i Space Grant Consortium, especially Luke Flynn and Mars Sistoso, for supporting the trip.



Roger Amundsen and Kristof Lovas decide whether or not to hike to the Kamakai'a hills.



Lindsey Spencer, Kristina Taylor, and Samantha Jacob, mapping an ash-covered 'a'ā flow.



Julianne Gravdal, Jess Barnes, Laura Corley, Haunani Kane, and Brian Boston return from a day of mapping.



The gang perched on the highest outcrop of Skyline Tuff, in Rainbow Basin (the first day of mapping).



Lindsey, mapping solo in the lower Cambrian of the Resting Spring range.



Mauri and Ado trudging back to the car after a long day of mapping the Resting Spring range.

GG305 (Scott Rowland, Instructor) completed another semester of putting in-class knowledge to use out in the field. We mapped on O‘ahu and in the Mojave Desert. A key aspect of this year’s Mojave trip was cold windy weather just about every day. We are very grateful to the GG Department’s travel fund for helping with the Mojave Desert trip, and any support to that fund (hint, hint) would help future students gain experience with non-basalt rocks and structures. We concluded the semester with a service project to pull weeds from a lo‘i at Ka‘ala Farms, Wai‘anae (mud is geological, right?).



The traditional Badwater jump photo. L-R = Jeff Skrotzki, Travis Richardson, Mark Higley, Adonara Mucek, Heidi Reiter, Mauri Fabio, and Lindsey Spencer

Alumni News

GG455 (Hydrogeology -- Aly El-Kadi, Instructor) includes field trips that emphasize the local hydrogeological conditions of Hawaii. In the Spring of 2011, the class visited Haiku and Herring Springs, Wahie Tunnel, a watercress farm that feeds on spring water, Board of Water Supply (BWS) facilities, among others.



Class at the gate of the Wahie Tunnel: From left: Veronica Gibson, Haunani Kane, Kikuko Mochimaru, Palmira Vilanova, Kavina Dayal, Selena Pang, El-Kadi, and Joseph Fackrell.



Our tour guide (Glenn Oyama, BWS, also a graduate student with El-Kadi) points to an important feature at the Herring Spring.



Springs are the main source of water for some streams.

Jeremy Kimura (BS '03) and **David Gandy** (BS '10) were guest speakers for "Geology – Life after graduation" an undergraduate seminar in April. Both found jobs in Hawaii; Jeremy is working for the Commission on Water Resources and David is working for Yogi-Kwong Engineers. **Eden Feirstein Defendini** (BS '04) After completing a MS in Hydrology & Water Resources at the University of Arizona, I went to work for the Ground Water Protection Program at the District Department of the Environment in Washington DC. In late 2010, I moved with my husband to Las Vegas where our son Rigel was born, and I feel very lucky to be able to spend nearly all of my time with him in his first year. I fondly think back to my GG days and send my best!

GT Grads

Seung-Sep Kim (PhD '10) I am currently working as a Post-Doc at Seoul National University in South Korea. My recent activities include a trip to Christchurch NZ, a research cruise to the Australian-Antarctic Ridge departed from Christchurch right after the earthquake, completing reports for the Korean government on a daily-basis, and my first and last wedding! On June 4, I got married to my beautiful and supportive better half, Cheong Eun Shim, who also graduated from UHM (MA in Linguistics). It is



another adventure that brings me many smiles and joyous moments. I wish I can visit you with my wife in near future!" **Masako (Sugimoto) Robb** (BS '00, MS '04) I now have three children and am currently working as a Software Applications Support Specialist at Paradigm Geophysical in Tokyo. **Zhiyong Zhao** (PhD '98) I am currently working for Geokinetics (oil and gas company in Houston) in an integrated reservoir geoscience group, as an interpretation geoscientist. **Adrienne Oakley** (PhD '08) I am an Assistant Professor of Geology and Marine Science at Kutztown University in Kutztown, PA. I am currently working with undergraduates on two research projects: Collaborative Research: A Deep-AUV Magnetic and Seismic Study of the Hawaiian Jurassic Crust - The Global Significance of Jurassic Magnetic Anomalies (NSF funded) and, closer to home: Surface and Sub-Surface Mapping in the Coastal Zone of Wallops Island NASA Flight Facility: Monitoring Storm Response and Sea-Level Rise (NASA "collaboration"). **Stephen Leslie** (MS '01) I am

working as an exploration geologist for Hess Corporation, with a focus on Latin America. In my spare time, I enjoy hanging out with my 4-year-old son Ethan. **Toshi Ike** (PhD '08) I am working for the Japan Oil Gas and Metals National Corporation (JOGMEC) in Chiba (east of Tokyo) in charge of processing 3D seismic data from the Japanese government's 3D seismic vessel. My house was not damaged during the March 2011 earthquake, but, because all trains were stopped, I had to walk home --2 1/2 hours! I am now married with a 2-year-old daughter. **Gregory J Kurras** (MS '98) Leaving UH in 2001, I spent a few years living & working in the Middle East for Saudi Aramco before moving back to the west coast of the US mainland in 2004, to work as a Geophysicist & Lidar mapping specialist for Fugro Inc. And, I started my own company, [Seafloor Investigations LLC](#) specializing in the acquisition, processing and interpretation of Marine Survey Data in 2009. I recently have been involved with environmental mapping assessments around the BP Deepwater Horizon, AUV & ROV work around the Southern Hydrate Ridge and locating of Air France flight 447 off the coast of Brazil. **Emily Chapp** (MS '08) I am currently working as a geologist for Chevron, Gulf of Mexico out of New Orleans. I am mapping a deep-water sub-salt Miocene field using 3D wide azimuth seismic data, well logs and conventional core data. I am also working with the seismic acquisition group as we acquire our first Coil seismic dataset later this year.

MEG Grads

John Rooney (PhD '02) I am working in Honolulu for the NOAA Pacific Islands Fisheries Science Center's Coral Reef Ecosystem Division, running their benthic habitat-mapping group. I enjoyed spending time again with fellow alumnus from the UH Coastal Geology Group, **Clark Sherman** (PhD '00), at the American Society for Limnology and Oceanography meeting in Puerto Rico in February. Clark is an Associate Professor at the Department of Marine Sciences at University of Puerto Rico. **Chris Conger** (BS '02, MS '05) I am married to my college sweetheart. We have two little boys and live in Kailua. I serve as a Hawaii Sea Grant Extension Agent specializing in coastal processes and hazards. **Dolan Eversole** (BS '99, MS '03) Specializing in Coastal Geomorphology. Married with 2 kids (2 and 7 yrs). I have served as a University of Hawaii Sea Grant Extension Agent for the last 8 years. Currently also serving as the NOAA Coastal Storms Program Regional Coordinator through the UH Sea Grant Program. **Eric Grossman** (MS '96, PhD '01) I am married with 2 kiddens. I am a Research Geologist/ Ecologist with the United States Geological Survey Western Fisheries Research Center

in Seattle, Washington and serving as the National Tribal Liaison for the Hazards Mission Area of the USGS. **Rob Mullane** (MS '96) I am a Planning Manager with Rincon Consultants, a planning and environmental consulting firm in San Luis Obispo, CA. I am married to Jill La Fleur with one son, and am fortunate to be able to return to Hawaii frequently, often to help with my wife's wedding planning business. **Zoe Norcross-Nu'u** (BS '97, MS '01) I am married with two daughters. After eight years as the UH Sea Grant Coastal Processes Extension Agent for Maui County, we moved to Canada in 2009 to be closer to our extended family. I am grateful to have been able to spend the last 2 years at home with my daughters learning to be farmers, but I will soon enter the world of private consulting. **Kolja Rotzoll** (PhD '07) I am employed as a post-doctoral researcher with the Water Resources Research Center (UH) and the U.S. Geological Survey. I currently investigate the effects of borehole flow on salinity with a numerical model, and assess aquifer properties of the northern Guam aquifer by analyzing tidally influenced water levels. In my free time, I enjoy surfing and kitesurfing in the North Shore area. **William Cutler** (PhD '11) I am employed as a principal scientist with [Integral Consulting Inc.](#), where my work is related to site assessments and investigations, sampling plan development, geophysical surveys, remedial technology assessments, and application of risk-based approaches.

VGP Grads

Wendy Stovall (PhD '09) I am working at the USGS – Long Valley Observatory in Menlo Park, CA as the Public Information Officer. **Owen Neill** (MS '09) I am now in the PhD program at the University of Alaska-Fairbanks. **Lisa Tatsumi Petrochilos** (MS '10) I work for Schlumberger, a leading supplier of technology in the oil and gas industry. My husband Nicolas and I became new parents March 3, 2011, to baby Camille Momoka Sophie. **Dave Blewett** (MS '94, PhD '97) and **Gina Ling** (MEG PhD '96) We left Hawaii in the Fall of 2007 to take jobs at the Johns Hopkins University Applied Physics Laboratory in Maryland. Gina works on defense-related programs, Dave is in the Planetary Exploration Group. Dave continues to collaborate with HIGP-ers on lunar research, and is a Participating Scientist on NASA's MESSENGER mission to Mercury and the Dawn mission to asteroid Vesta. Our son, Derek, graduated from Mid-Pac 2006 and the Univ. of Pennsylvania in 2010, is now getting a master's degree in electrical engineering at Stanford University. We look forward to moving back to Hawaii.

Mark Your Calendars!

SOEST Open House is happening October 21-22, 2011. This is our 11th Open House. Besides Geology & Geophysics, SOEST is home to these academic departments: Meteorology, Oceanography, and Ocean & Resources Engineering, as well as several related research institutes. The SOEST Open House presents a diverse array of entertaining and educational “hands-on” activities for children of all ages, which highlight the research conducted by our faculty, students, and staff. Your family and students will learn about volcanoes, tsunamis, El Niño, planetary exploration, hurricanes, coastal erosion, and marine ecosystems to mention just a few topics, through a variety of hands on activities, videos, posters, and interactive demonstrations. All may visit state-of-the-art laboratories and hear about cutting-edge research from the scientists who are making the new discoveries! The SOEST Open House is only offered every two years. We hope that you and your friends, classmates, and family will be able to join us for this great event on the UH Manoa Campus.

E komo mai. Please look for program updates at our [SOEST Open House website](http://www.soest.hawaii.edu/openhouse).

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Please call **Marcie Grabowski**
at 808.956.3151 or email her at
mworkman@hawaii.edu for groups of 10 or more.

For other info, please visit www.soest.hawaii.edu/openhouse



Images from SOEST Open House 2009

