News

Rock Coring Koolau Volcano

News | Well Site | 3D Model | Objectives | Scientists | References | Public Data
Internal Data | Jobs | Project Links

General Project Information

Daily News from the Koolau Drill Site

Daily Data Packages

Pages of the Core Logging Crew

Summarizing Project Reports

Project Data
(authorized access only !)

Top News on the Top

[FrontPage-Komponente "Ergebnisse speichern "]

Presentations at AGU Fall 2000 Meeting (17-October-2000)

please select one item from the list and click the red ball

Please direct comments, questions, suggestions to ICDP webteam.

Implications for Deep Mantle Recycling of the Crust

by Michael O. Garcia, PI

Mantle plumes produce basalts which provide fundamental information on the composition and history of the mantle. The Hawaiian plume is the classic example of a mantle plume and its basalts are unquestionably the best studied suite from any plume.

The subaerially exposed lavas of Koolau Volcano belong to the Enriched Mantle1 endmember of ocean island basalts and they define a geochemical endmember among Hawaiian shield lavas in major and trace elements and in isotopes. Koolau lavas are important to an understanding of the origin and evolution of the Hawaiian plume and the mantle. In particular, Koolau lavas appear to provide the strongest evidence for deep mantle recycling of crust (sediments and basalt), although this interpretation remain controversial and is based on sampling only the uppermost veneer of the volcano. It is important to establish the longevity of the distinctive Koolau geochemical signature by sampling deeper and older lavas from the volcano. If there were basaltic and sedimentary components in the Hawaiian plume, were they restricted to the final stages of Koolau volcano´s growth? Scientific drilling will allow us to answer this question by obtaining lavas from subsurface of this enigmatic volcano.

Funding in support of this project has been obtained from the U.S. National Science Foundation and from several U.S., German and Japanese research groups that will support collecting about 300 m of rock cores from the base of the Kalihi, a 345 m deep, water observation hole, which has just been drilled by the City of Honolulu. This coring will extend below any surface exposures of the volcano's lavas and it is expected that the rocks obtained will have experienced less topical weathering than surface rocks. As part of this project, we will systematically log the chips obtained from the upper part of the well. The cores from the lower 300 m of the well will be logged following procedures we have developed for the Hawaii Scientific Drilling Program. We have assembled an international team of experts to make a thorough petrographic and geochemical characterization of the core and chips from the Kalihi hole as part of this one year project. This will include petrography, mineral and glass chemistry by microprobe, and whole-rock major and trace element (Rb, Sr, Y, Zr, Nb, V, Ni, Cr, Zn, by XRF , and all REE, Ta, Ba, Nb, Th, Hf, U, Pb, Rb, Cs by ICP-MS) compositions for approximately 50 lavas flows and O, Pb, Sr, Nd and Hf isotope ratios for select samples. Several of the flows will also be dated by Ar-Ar.

---

koolau Contacts

search

Person	Institute & Company	Keywords	Projects	Function	Edit
Dr. Blichert-Toft, Janne Phone: +33/472-728488 FAX: +33/472-728677 jblicher@ens-lyon.fr	Ecole Normale Supérieure de Lyon, Département des Sciences de la Terre (CNRS UMR 5570) 46, Allée d'Italie, F-69364 Lyon Cedex 07 France	"Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics, High-resolution and high-precision Hf isotope			
Prof. Dr. DePaolo, Donald J. Phone: +1/510-643-7686 or +1/510-643-5064 FAX: +1/510-642-9520 depaolo@socrates.berkeley.edu	University of California, Center for Isotope Geochemistry, Department of Earth & Planetary Science 473 McCone, Berkeley, CA 94720-4767 California, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Prof. Dr. Eiler, John M. Phone: +1/626-395-6942 eiler@gps.caltech.edu	California Institute of Technology, Division of Geology and Planetary Sciences Mail Code 170-25, 1200 East California Boulevard, Pasadena, CA 91125 California, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Prof. Dr. Frey, Frederick A. Phone: +1/617-253-2818 FAX: +1/617-253-7102 fafrey@mit.edu	Massachusetts Institute of Technology, Department of Earth, Atmospheric and Planetary Sciences 77 Massachusetts Av., bldg. 54-1226, Cambridge MA 02139 Massachusetts, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano,	ICDP-13/99		

		volcanics			
Prof. Dr. Garcia, Michael O. Phone: +1/808-956-6641 FAX: +1/808-956-5512 garcia@soest.hawaii.edu	University of Hawaii, Honolulu, Department of Geology and Geophysics 2525 Correa Road, Honolulu, HI 96822 Hawaii, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99	PI	
Haskins, Eric Phone: +1/808-956-6213 ehaskins@soest.hawaii.edu	University of Hawaii, Honolulu, Department of Geology and Geophysics 2525 Correa Road, Honolulu, HI 96822 Hawaii, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics, drilling, koolau, coring	ICDP-13/99	ST	
Dr. Hauri, Erik H. hauri@dtm.ciw.edu	Carnegie Institution of Washington, Department of Terrestrial Magnetism 5241 Broad Branch Road, N.W., Washington, DC 20015-1305 District of Columbia, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Prof. Dr. Hofmann, Albrecht W. Phone: +49/6131-305-280 FAX: +49/6131-371-051 hofmann@mpch-mainz.mpg.de	Max-Planck-Institute Mainz for Chemistry, Department of Geochemistry Joh.-J.-Becher-Weg 27, D-55128 Mainz Rhineland-Palatinate, Germany	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		

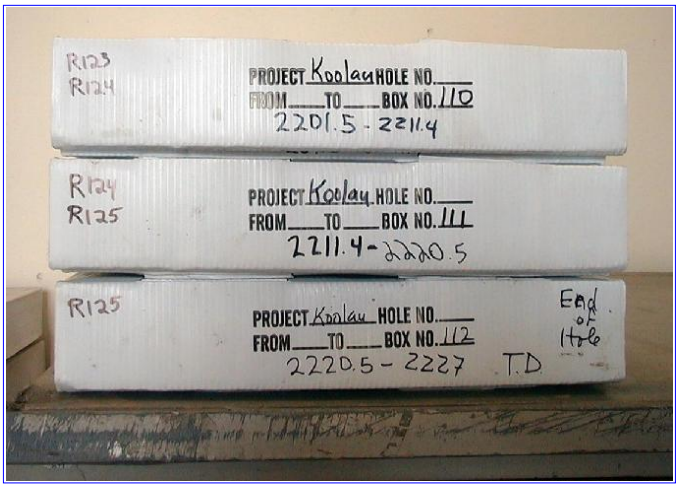
Huang, Shichun Phone: +1/617-253-2869 FAX: +1/617-253-7102 huangs@mit.edu	Massachusetts Institute of Technology, Department of Earth, Atmospheric and Planetary Sciences 77 Massachusetts Av., bldg. 54-1210, Cambridge MA 02139 Massachusetts, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics, drilling, koolau, coring, trace element, ICP-MS, source character	ICDP-13/99	ST	
Dr. Kurz, Mark D. Phone: +1/508-289-2888 mkurz@whoi.edu	Woods Hole Oceanographic Institution, Department of Marine Chemistry and Geochemistry mail stop #25, 360 Woods Hole Rd., Woods Hole, MA 02543-1050 Massachusetts, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Prof. Dr. Rhodes, J. Michael Phone: +1/413-545-2841 FAX: +1/413-545-1200 jmrhodes@geo.umass.edu	University of Massachusetts, Department of Geosciences 233 Morrill Science Center, Amherst, MA 01002 Massachusetts, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Prof. Dr. Solomon, Sean C. Phone: +1/202-364-4370 or +1/202-364-4444 FAX: +1/202-364-8726 solomon@dtm.ciw.edu	Carnegie Institution of Washington, Department of Terrestrial Magnetism 5241 Broad Branch Road, NW, Washington, DC 20015 District of Columbia, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		

Prof. Dr. Stolper, Edward M. Phone: +1/626-395-6108 FAX: +1/818-568-0935 ems@expet.gps.caltech.edu	California Institute of Technology, Division of Geology and Planetary Sciences Mail Code 170-25, 1200 East California Boulevard, Pasadena, CA 91125 California, USA	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Prof. Dr. Takahashi, Eiichi Phone: +81/3-5734-2338 FAX: +81/3-5734-3538 etakahas@geo.titech.ac.jp	Tokyo Institute of Technology, Earth & Planetary Sciences Ookayama 2-12-1, Meguroku, Tokyo 152 Japan	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		
Dr. Uto, Kozo Phone: +81/298-54-3557 FAX: +81/298-54-3533 uto@gsj.go.jp	Geological Survey of Japan, Isotope Geoscience Section 1-1-3 Higashi, Tsukuba, Ibaraki 305-8567 Japan	Rock Coring Koolau Volcano, Hawaii: Implications for Deep Mantle Recycling of the Crust. Hawaii, mantle plume, volcano, volcanics	ICDP-13/99		

Koolau Scientific Drilling Project

Since the last update, all the core has been logged and sampled. There is now a full lithologic column and other new data available at this site.

Image of the day.



The final three boxes of the Koolau Scientific drilling project have been logged and await sampling.

History

Date	Image of the Day	Message of the Day
06/16/2000		Since the last update, all the core has been logged and sampled. There is now a full lithologic column and other new data available at this site.
06/13/2000		Another interesting day of logging Koolau core. We logged our first sedimentary unit today, fluvial sediments between two lava flows.
06/12/2000		Logging continued smoothly today, and Eric logged 12 more boxes of core. Only 30 more boxes to go, hopefully this phase of the project will be finished by the end of the week.

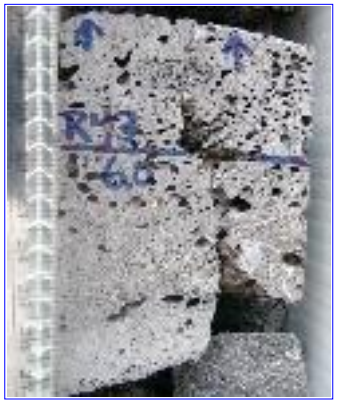
06/09/2000

About 60% of the core logging is complete so far, we hope to finish this phase of the project in another week or so.

06/02/2000

All drilling materials have been packed and removed from the site. The two 40-foot containers were filled with drilling mud packages, 3000 feet of drilling pipe, drill hole casing, the drill rig, and various tools. The total weight of material removed from the site today was 48 tons, or 96,000 pounds.

06/01/2000



Cleanup finished at the drill site today, and the drilling equipment will be shipped tomorrow morning. Also, core logging continued at the UH Marine Center - today's photos show some of the features present in the flows that were logged.

05/31/2000

The site is starting to look as it did before the start of this project. Today one of the two 40-foot shipping containers was filled completely with drilling equipment. On Friday morning, the containers will be removed from the site.

05/30/2000

Today the last of the casing was removed from the drill hole, and cleanup of the site reached full swing. The drill rig and all drilling equipment should be packed away and ready for transport to the Big Island on Thursday.

05/26/2000

Now that drilling is finished, we have started to clean up the drill site. Today all of the pipe was removed from the hole, along with the first 300 feet of casing. Next week the drill rig and all the drilling and core processing equipment will be shipped to the Big Island HSDP site.

05/25/2000

Today was the final day of drilling for the Koolau Scientific Drilling Project. This hole began at a depth of 1150 feet and ended at 2227 feet. Core recovery was excellent for most of the 1077 feet of rock drilled through. This web page will continue to be updated with pictures and the newest information regarding this project.

05/24/2000

Drilling progressed through some difficult rock today, and passed the 1000 foot mark (2150 ft. total depth) for the project. At the end of the day, the depth of the hole is 2180 feet.

05/23/2000

Drilling proceeded slowly today, as drillers are having trouble achieving good penetration at the bottom of the hole. We hope to see more core tomorrow.

05/22/2000

This is the last week of drilling, and we all hope it will be a good one. After tripping in pipe this morning, drillers cored about 43 feet today. The current depth of the hole is 2113 feet.

05/19/2000

Today was a day for repairs at the drill site and logging core boxes at the University of Hawaii Marine Center (Snug Harbor). We would like to thank David Whilldin (not pictured) for helping us begin the logging phase of this project. Mahalo Dave!

05/18/2000

Drillers had recovered about 10 feet of core today when the hydraulic pump that reels in core gave way. Drilling will not resume until next week. On a lighter note, David Whilldin is here helping us begin to log core and post reports on the web. Check back in the near future for newly activated portions of this web page.

05/17/2000

Today was a difficult day of drilling, because of the soft and unconsolidated nature of the rock we are attempting to drill (see photo). After little progress in the morning, it was decided to trip out the bit and replace it with another that will provide better circulation. In addition, a different density mud will be used for drilling tomorrow.

05/16/2000

Drilling proceeded slowly today, but volunteers helped the core processing team make considerable progress. Thanks for your help, Toby and Nate!

05/15/2000

The Koolau Scientific Drilling Project eased into another week by recovering 43.5 feet of core today. Special thanks to volunteers Mike Davis and Melissa Ito (pictured) for helping us catch up with processing the core today.

05/12/2000

Drillers brought up another 67 feet of core today before pulling out pipe for the weekend. It has been a great week here at the Koolau Scientific Drilling Project, the current depth of the hole is 1967 feet.

05/11/2000

Even heavy rains in Kalihi valley couldn't stop the drillers today - Kiki and Vance set yet another Koolau Scientific Drilling Project single-day drilling record, retrieving 101 feet of core.

05/10/2000

Today drillers brought up 90 more feet of beautiful core. With the help of graduate student volunteer Mike Davis, the core processing team accomplished much more than we are used to. Thanks for your help Mike!

05/09/2000

Today was another exciting day at the drill site. In addition to setting another drilling record of 99 feet of core, we had visitors from the University of Alaska at Anchorage. Mike Garcia explains the details of the Koolau project to the group.

05/08/2000

It was another smooth day of drilling today, as we recovered 90 feet of core and are currently at a depth of 1610 feet.

05/05/2000

Today was highly productive at the drill site. Drillers retrieved more core than any other day of the project. The sign in Vance and Kiki's hands reads, 'Koolau Scientific Drilling Project: One-Day Drilling Record - 91 ft.'

05/04/2000

Today was the most productive day of the Koolau project so far. Drilling was back on track, and we retrieved 66 feet of core! Great job everyone, let's go for another record tomorrow!

05/03/2000

The last couple of days have been difficult for the drillers, because of the unconsolidated nature of the rock they are currently attempting to core. This material often falls out of or gets caught in the bottom of the drill string, resulting in shorter core runs.

05/02/2000

Drillers changed the bit and tripped pipe back into the hole today, resuming drilling in the afternoon. We hope to see lots more core tomorrow.

05/01/2000

After coring for most of the day, drillers begain to trip out pipe this evening for a bit change. We also said goodbye to our engineer Bruce Howell, today was his last day at the site. Aloha Bruce, and many mahalos!

04/28/2000

Another productive day at the drill site. The drilling crew has been working hard all week, and will certainly enjoy the weekend off. See you on Monday guys!

04/27/2000

Drillers retrieved 56 feet of core today, keeping the core processing team busy.

04/26/2000

Drilling reached 1200 ft. depth today.

04/25/2000

There was excitement in the air today as drillers brought up the first core of the project.

04/19/2000

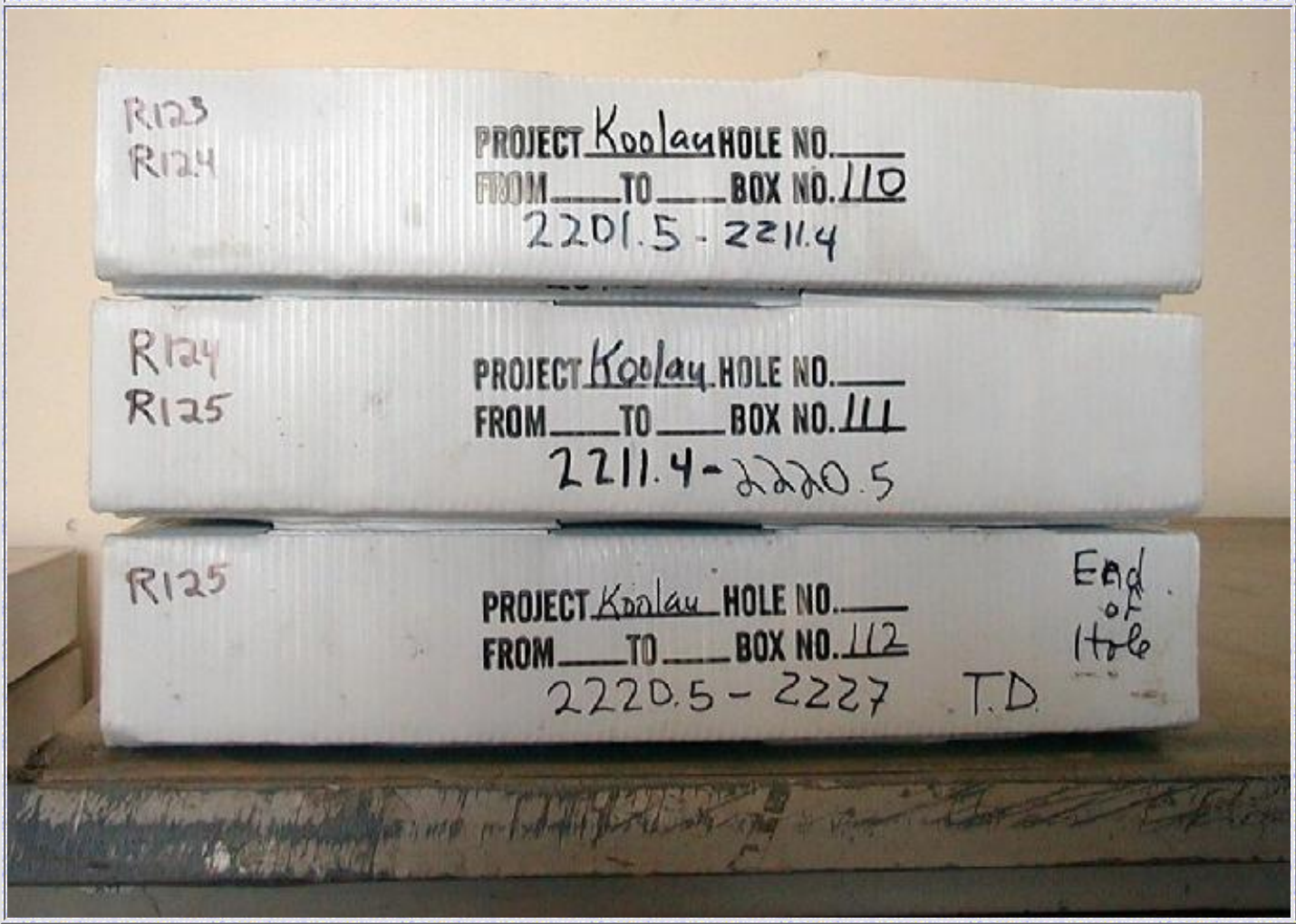
We are all excited to start drilling and processing core at the site.

04/12/2000

And so it begins. Day one of the Koolau Scientific Drilling Project. Project members from left to right: Vance Hiatt, Bruce Howell, Dr. Dennis Neilson, and Richard Horne. Photo taken by Dr. Michael O. Garcia, PI for the Koolau project.

Back to Koolau start page

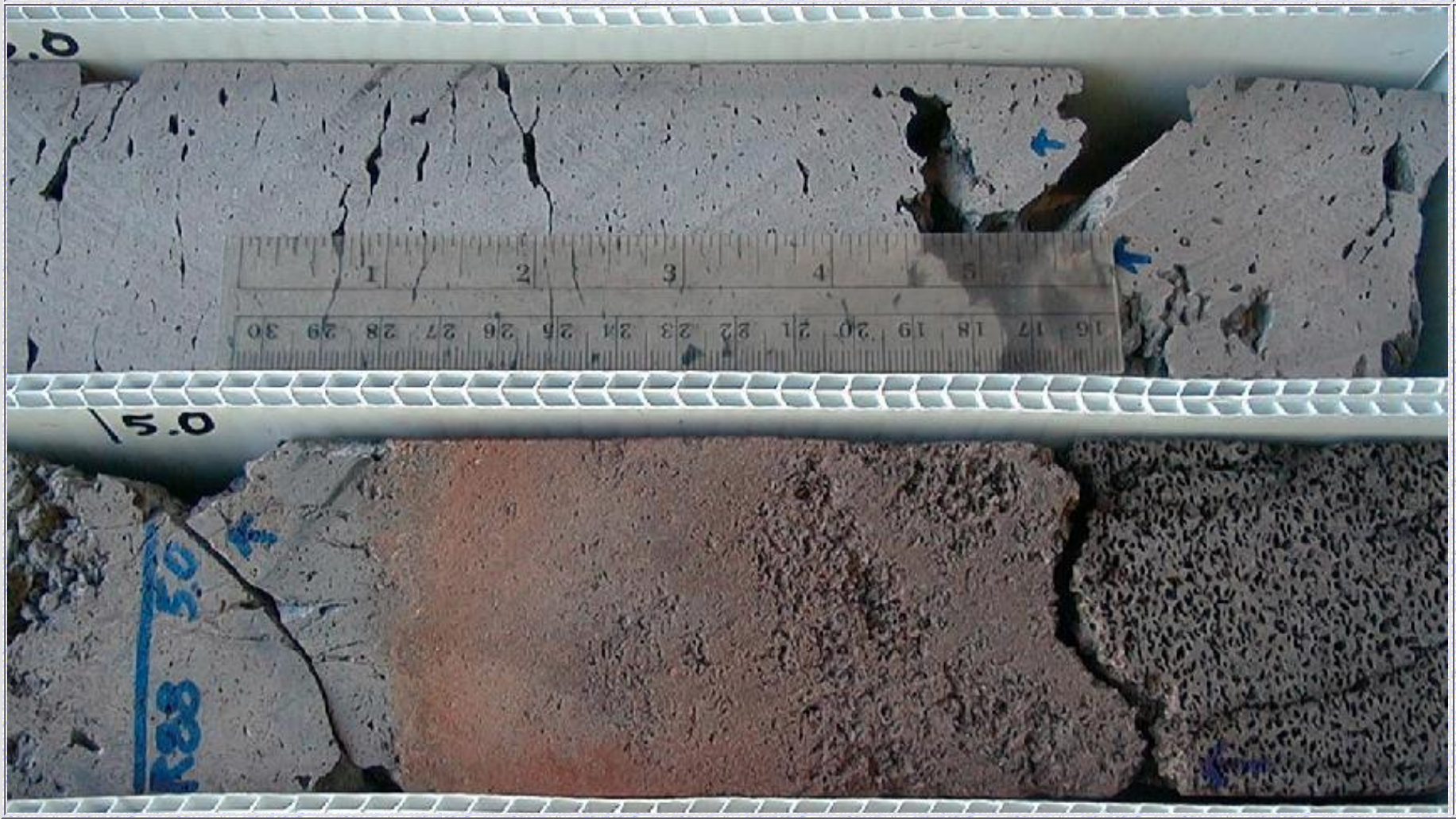
Koolau Scientific Drilling Project
Image of the day
Date: 6/16/00

Image of the day	Description
	The final three boxes of the Koolau Scientific drilling project have been logged and await sampling.

Koolau Scientific Drilling Project
Image of the day
Date: 6/13/00

Image of the day	Description
	A portion of the core box that shows a pahoehoe flow over sediment over an a'a flow (contacts not shown in photo).

Koolau Scientific Drilling Project
Image of the day
Date: 6/12/00

Image of the day	Description
	A view of what the logger sees - an obvious flow contact of a'a over pahoehoe.

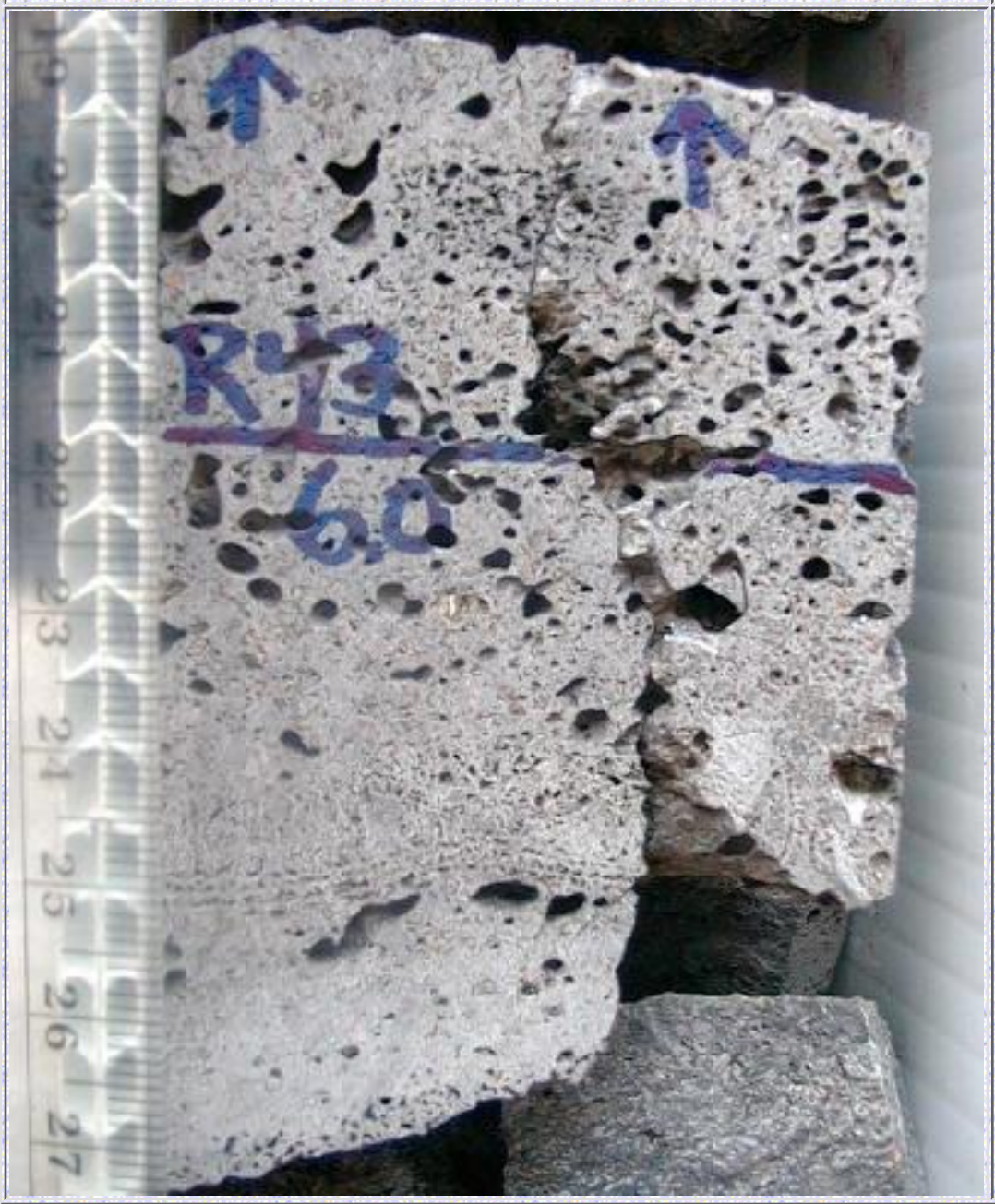
Koolau Scientific Drilling Project
Image of the day
Date: 6/9/00

Image of the day	Description
	The core boxes are stacked and stored at the UH Marine Center after they have been logged.

Koolau Scientific Drilling Project
Image of the day
Date: 6/2/00

Image of the day	Description
	Vance, Kiki, the crane operator, and Robin (inside the trailer) cooperate to load the main body of the drill rig for shipping.

Koolau Scientific Drilling Project
Image of the day
Date: 6/1/00

Image of the day	Description
	This core from a depth of 1464 feet shows flow banding of vesicles near the base of the photo.

Koolau Scientific Drilling Project
Image of the day
Date: 5/31/00

Image of the day	Description
	The GLAD 800 drill rig in its compact form, ready to be loaded into a shipping container.

Koolau Scientific Drilling Project
Image of the day
Date: 5/30/00

Image of the day	Description
	Vance and Robin lowered the GLAD 800 mast today, continuing their cleanup of the Kalihi drill site.

Koolau Scientific Drilling Project
Image of the day
Date: 5/26/00

Image of the day	Description
	The drilling crew poses for one last photo at the end of the day. Robin is standing on the first 300 feet of casing that was removed from the drill hole today.

Koolau Scientific Drilling Project
Image of the day
Date: 5/25/00

Image of the day	Description
	Kiki sits back and relaxes after drilling is over.

Koolau Scientific Drilling Project Image of the day Date: 5/24/00

Image of the day	Description
	Kiki shows DOSECC trainee Robin how to attach a new length of pipe.

Koolau Scientific Drilling Project
Image of the day
Date: 5/23/00

Image of the day	Description
	The drilling crew of Kiki, Vance and Robin keep the drill rig running well in order to optimize core recovery.

Koolau Scientific Drilling Project Image of the day Date: 5/22/00

Image of the day	Description
	Eric works to update the database and webpage each evening.

Koolau Scientific Drilling Project
Image of the day
Date: 5/19/00

Image of the day	Description
	Chaos in Kalihi valley.

Koolau Scientific Drilling Project
Image of the day
Date: 5/18/00

Image of the day	Description
	The motor of the hydraulic pump has sustained a considerable amount of damage. We will have to get a new pump before drilling can resume.

Koolau Scientific Drilling Project
Image of the day
Date: 5/17/00

Image of the day	Description
	Today's rock was loaded with secondary minerals and large olivine crystals.

Koolau Scientific Drilling Project
Image of the day
Date: 5/16/00

Image of the day	Description
	University of Hawaii undergraduate volunteers Nathan Adams and Toby Vana process core at the drill site.

Koolau Scientific Drilling Project
Image of the day
Date: 5/15/00

Image of the day	Description
	Melissa Ito smiles with some core at Snug Harbor.

Koolau Scientific Drilling Project
Image of the day
Date: 5/12/00

Image of the day	Description
	It doesn't get much more exciting than watching core dry. These boxes are drying in the sun so that they can be marked and photographed.

Koolau Scientific Drilling Project
Image of the day
Date: 5/11/00

Image of the day	Description
	Vance and Kiki smile for the record books after a hard day's work.

Koolau Scientific Drilling Project Image of the day Date: 5/10/00

Image of the day	Description
	Another day, another record. Vance and Kiki pose after yesterday's drilling heroics.

Koolau Scientific Drilling Project Image of the day Date: 5/9/00

Image of the day	Description
	Mike Garcia discusses the Koolau Scientific Drilling Project with a group of geology students from the University of Alaska at Anchorage.

Koolau Scientific Drilling Project
Image of the day
Date: 5/8/00

Image of the day	Description
	Vance and Kiki regularly check their equipment to make sure drilling continues at the current pace.

Koolau Scientific Drilling Project
Image of the day
Date: 5/5/00

Image of the day	Description
	Kiki and Vance celebrated Cinco de Mayo today with 91 feet of core.

Koolau Scientific Drilling Project
Image of the day
Date: 5/4/00

Image of the day	Description
	A familiar sight today - Kiki hands Vance the latest run of core.

Koolau Scientific Drilling Project
Image of the day
Date: 5/3/00

Image of the day	Description
	A representative 1.4 feet of the rubbly material recovered today.

Koolau Scientific Drilling Project
Image of the day
Date: 5/2/00

Image of the day	Description
	Mike Garcia and Vance Hiatt discuss drilling details while Kiki drills a run of core.

Koolau Scientific Drilling Project
Image of the day
Date: 5/1/00

Image of the day	Description
	It is always exciting to see what a fresh run of core will reveal.

Koolau Scientific Drilling Project Image of the day Date: 4/28/00

Image of the day	Description
	Visitors from the Big Island's Hawaii State Earthquake Advisory Board. HSEAB members in the photo from left to right: Don Swanson, Afaq Sarwar, Paul Okubo, Stan Goosby, Brian Yanagi, and Don Thomas.

Koolau Scientific Drilling Project
Image of the day
Date: 4/27/00

Image of the day	Description
	A beautiful contact.

Koolau Scientific Drilling Project
Image of the day
Date: 4/26/00

Image of the day	Description
	Vance and Kiki monitor the rig as they drill.

Koolau Scientific Drilling Project
Image of the day
Date: 4/25/00

Image of the day	Description
	The first run of the Koolau project recovered 2.3 feet of core.

Koolau Scientific Drilling Project
Image of the day
Date: 4/19/00

Image of the day	Description
	The GLAD 800 drill rig.

Koolau Scientific Drilling Project

Index of the Drilling History

06/16/2000

Since the last update, all the core has been logged and sampled. There is now a full lithologic column and other new data available at this site.

06/13/2000

Another interesting day of logging Koolau core. We logged our first sedimentary unit today, fluvial sediments between two lava flows.

06/12/2000

Logging continued smoothly today, and Eric logged 12 more boxes of core. Only 30 more boxes to go, hopefully this phase of the project will be finished by the end of the week.

06/09/2000

About 60% of the core logging is complete so far, we hope to finish this phase of the project in another week or so.

06/02/2000

All drilling materials have been packed and removed from the site. The two 40-foot containers were filled with drilling mud packages, 3000 feet of drilling pipe, drill hole casing, the drill rig, and various tools. The total weight of material removed from the site today was 48 tons, or 96,000 pounds.

06/01/2000

Cleanup finished at the drill site today, and the drilling equipment will be shipped tomorrow morning. Also, core logging continued at the UH Marine Center - today's photos show some of the features present in the flows that were logged.

05/31/2000

The site is starting to look as it did before the start of this project. Today one of the two 40-foot shipping containers was filled completely with drilling equipment. On Friday morning, the containers will be removed from the site.

05/30/2000

Today the last of the casing was removed from the drill hole, and cleanup of the site reached full swing. The drill rig and all drilling equipment should be packed away and ready for transport to the Big Island on Thursday.

05/26/2000

Now that drilling is finished, we have started to clean up the drill site. Today all of the pipe was removed from the hole, along with the first 300 feet of casing. Next week the drill rig and all the drilling and core processing equipment will be shipped to the Big Island HSDP site.

05/25/2000

Today was the final day of drilling for the Koolau Scientific Drilling Project. This hole began at a depth of 1150 feet and ended at 2227 feet. Core recovery was excellent for most of the 1077 feet of rock drilled through. This web page will continue to be updated with pictures and the newest information regarding this project.

05/24/2000

Drilling progressed through some difficult rock today, and passed the 1000 foot mark (2150 ft. total depth) for the project. At the end of the day, the depth of the hole is 2180 feet.

05/23/2000

Drilling proceeded slowly today, as drillers are having trouble achieving good penetration at the bottom of the hole. We hope to see more core tomorrow.

05/22/2000

This is the last week of drilling, and we all hope it will be a good one. After tripping in pipe this morning, drillers cored about 43 feet today. The current depth of the hole is 2113 feet.

05/19/2000

Today was a day for repairs at the drill site and logging core boxes at the University of Hawaii Marine Center (Snug Harbor). We would like to thank David Whilldin (not pictured) for helping us begin the logging phase of this project. Mahalo Dave!

05/18/2000

Drillers had recovered about 10 feet of core today when the hydraulic pump that reels in core gave way. Drilling will not resume until next week. On a lighter note, David Whilldin is here helping us begin to log core and post reports on the web. Check back in the near future for newly activated portions of this web page.

05/17/2000

Today was a difficult day of drilling, because of the soft and unconsolidated nature of the rock we are attempting to drill (see photo). After little progress in the morning, it was decided to trip out the bit and replace it with another that will provide better circulation. In addition, a different density mud will be used for drilling tomorrow.

05/16/2000

Drilling proceeded slowly today, but volunteers helped the core processing team make considerable progress. Thanks for your help, Toby and Nate!

05/15/2000

The Koolau Scientific Drilling Project eased into another week by recovering 43.5 feet of core today. Special thanks to volunteers Mike Davis and Melissa Ito (pictured) for helping us catch up with processing the core today.

05/12/2000

Drillers brought up another 67 feet of core today before pulling out pipe for the weekend. It has been a great week here at the Koolau Scientific Drilling Project, the current depth of the hole is 1967 feet.

05/11/2000

Even heavy rains in Kalihi valley couldn't stop the drillers today - Kiki and Vance set yet another Koolau Scientific Drilling Project single-day drilling record, retrieving 101 feet of core.

05/10/2000

Today drillers brought up 90 more feet of beautiful core. With the help of graduate student volunteer Mike Davis, the core processing team accomplished much more than we are used to. Thanks for your help Mike!

05/09/2000

Today was another exciting day at the drill site. In addition to setting another drilling record of 99 feet of core, we had visitors from the University of Alaska at Anchorage. Mike Garcia explains the details of the Koolau project to the group.

05/08/2000

It was another smooth day of drilling today, as we recovered 90 feet of core and are currently at a depth of 1610 feet.

05/05/2000

Today was highly productive at the drill site. Drillers retrieved more core than any other day of the project. The sign in Vance and Kiki's hands reads, 'Koolau Scientific Drilling Project: One-Day Drilling Record - 91 ft.'

05/04/2000

Today was the most productive day of the Koolau project so far. Drilling was back on track, and we retrieved 66 feet of core! Great job everyone, let's go for another record tomorrow!

05/03/2000

The last couple of days have been difficult for the drillers, because of the unconsolidated nature of the rock they are currently attempting to core. This material often falls out of or gets caught in the bottom of the drill string, resulting in shorter core runs.

05/02/2000

Drillers changed the bit and tripped pipe back into the hole today, resuming drilling in the afternoon. We hope to see lots more core tomorrow.

05/01/2000

After coring for most of the day, drillers begain to trip out pipe this evening for a bit change. We also said goodbye to our engineer Bruce Howell, today was his last day at the site. Aloha Bruce, and many mahalos!

04/28/2000

Another productive day at the drill site. The drilling crew has been working hard all week, and will certainly enjoy the weekend off. See you on Monday guys!

04/27/2000

Drillers retrieved 56 feet of core today, keeping the core processing team busy.

04/26/2000

Drilling reached 1200 ft. depth today.

04/25/2000

There was excitement in the air today as drillers brought up the first core of the project.

04/19/2000

We are all excited to start drilling and processing core at the site.

04/12/2000

And so it begins. Day one of the Koolau Scientific Drilling Project. Project members from left to right: Vance Hiatt, Bruce Howell, Dr. Dennis Neilson, and Richard Horne. Photo taken by Dr. Michael O. Garcia, PI for the Koolau project.

Back to Koolau start page

Koolau Scientific Drilling Project Daily Information Date: 6/16/00

Summarizing Project Information / Reports

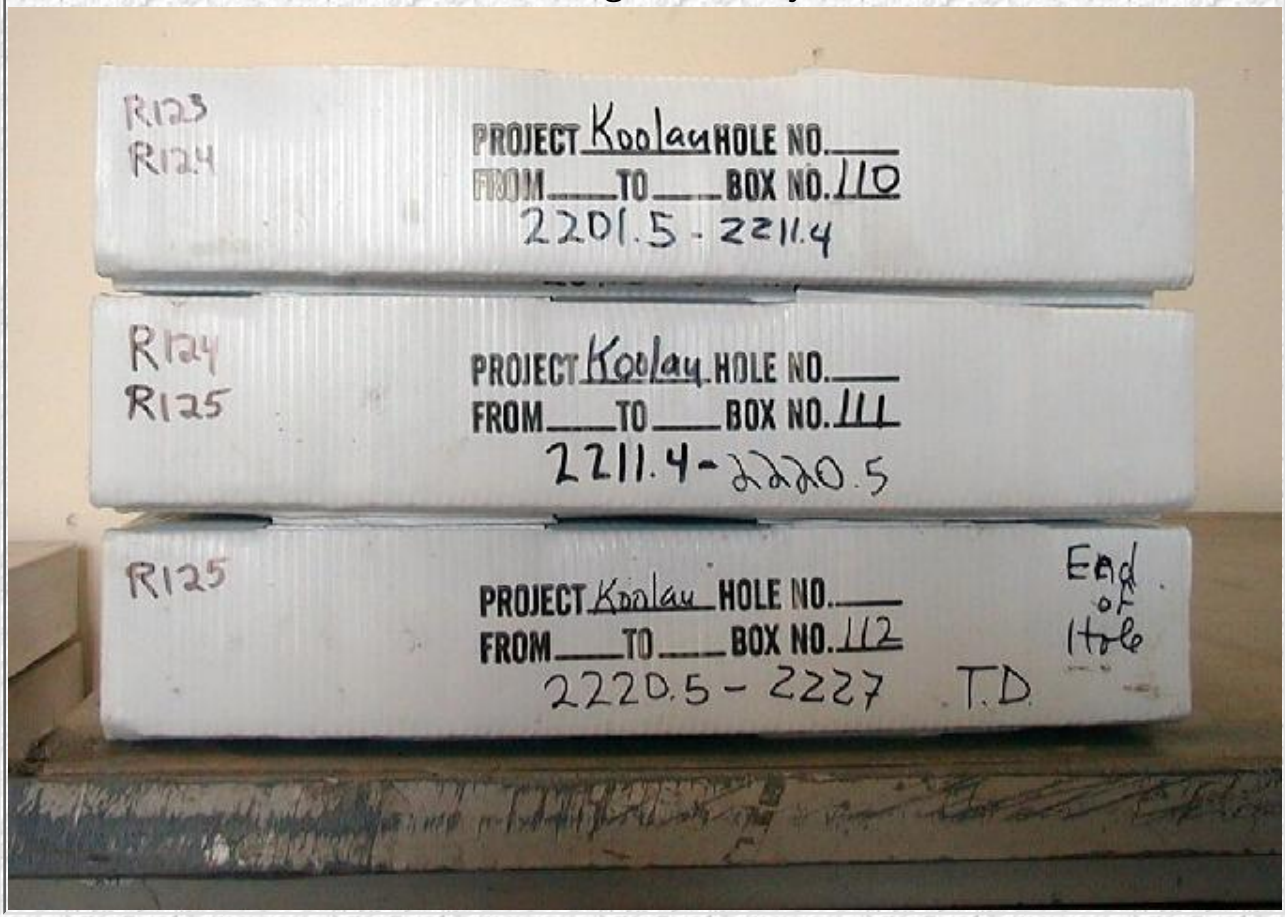
Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day



All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Rock Coring Koolau Volcano

Summarizing Project Reports

Core Box Report
report of core boxes archived until today

Core Run Report
report of core runs recovered until today

Lithological Report
report of lithological units described until today

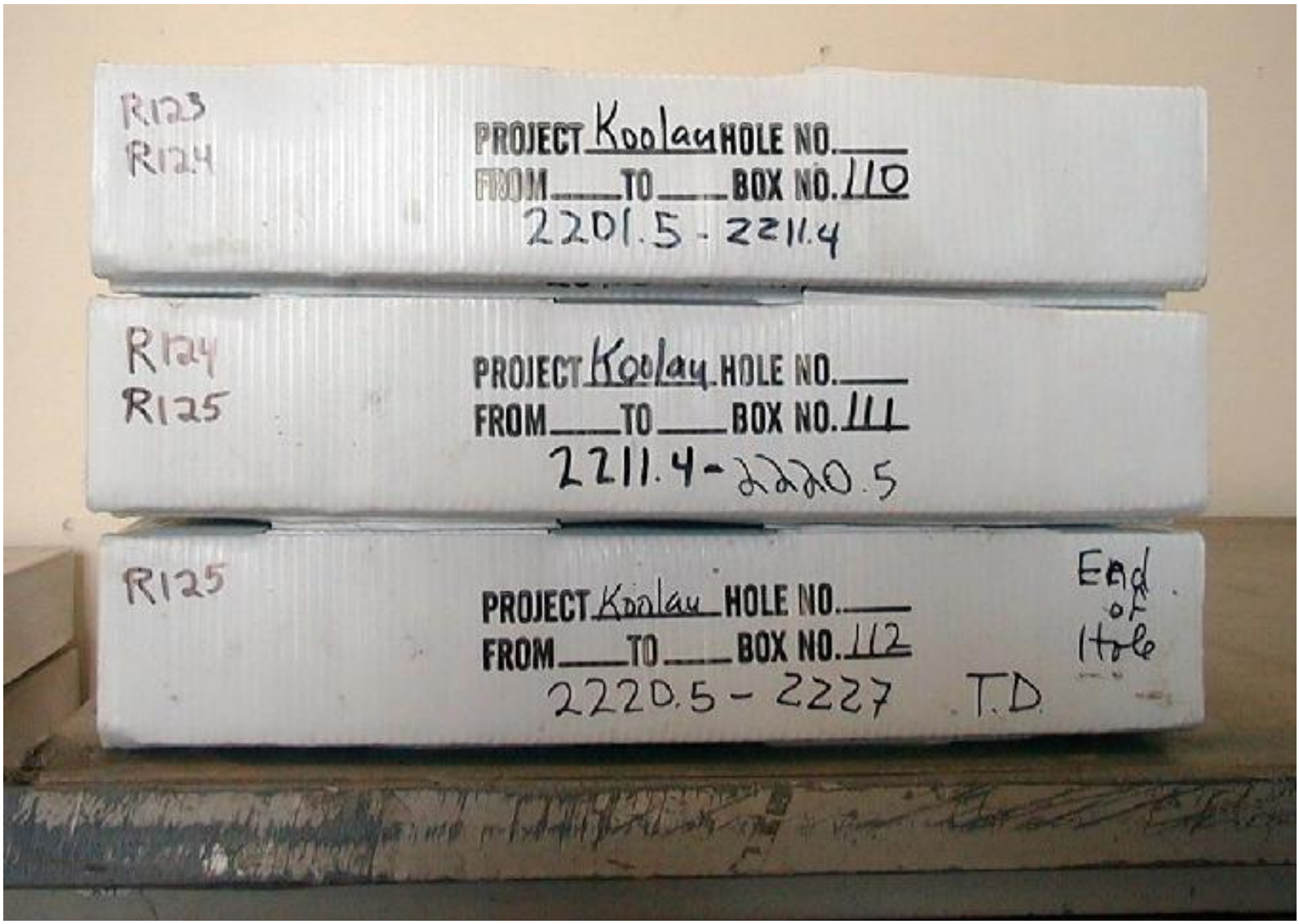
Lithological Profile
plot of the lithological profile

Core Logging Report

report of detailed units/box-units already described

Koolau Scientific Drilling Project Additional Pictures Date: 6/16/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_108.jpg	The final three boxes of the Koolau Scientific Drilling Project have been logged and await verification.	n.a. - n.a.


R123
R124
PROJECT Koolau HOLE NO.
FROM TO BOX NO. 110
2201.5 - 2211.4
R124
R125
PROJECT Koolau HOLE NO.
FROM TO BOX NO. 111
2211.4 - 2220.5
R125
PROJECT Koolau HOLE NO.
FROM TO BOX NO. 112
2220.5 - 2227 T.D.
End of Hole

Koolau Scientific Drilling Project Daily Information Date: 6/13/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

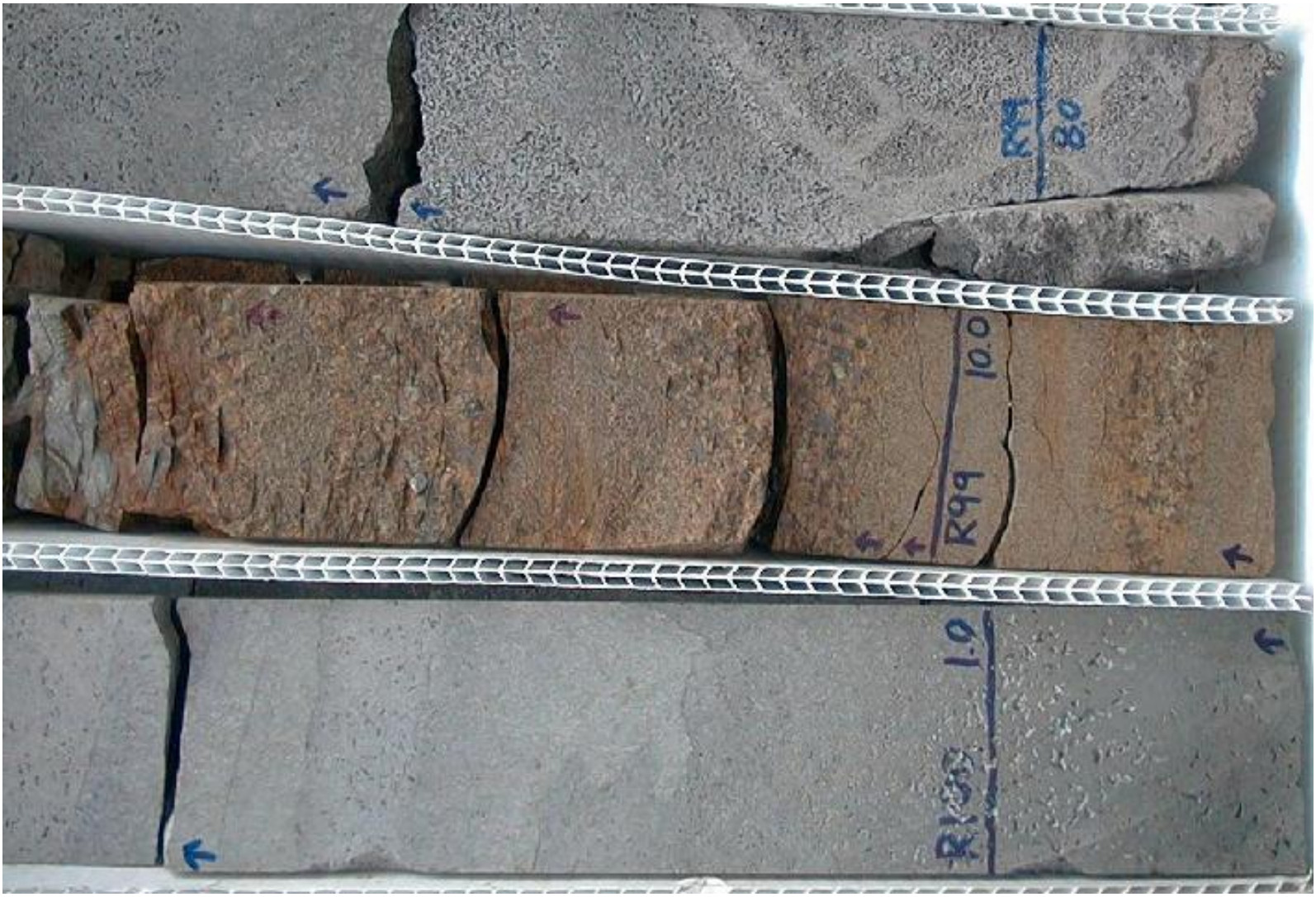
The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 6/13/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_107.jpg	Today we logged our first sedimentary unit. This box contains pahoehoe over fluvial sediments over a'a.	n.a. - n.a.


REF
80
10.0
R99
1.9

Koolau Scientific Drilling Project Daily Information Date: 6/12/00

Summarizing Project Information / Reports

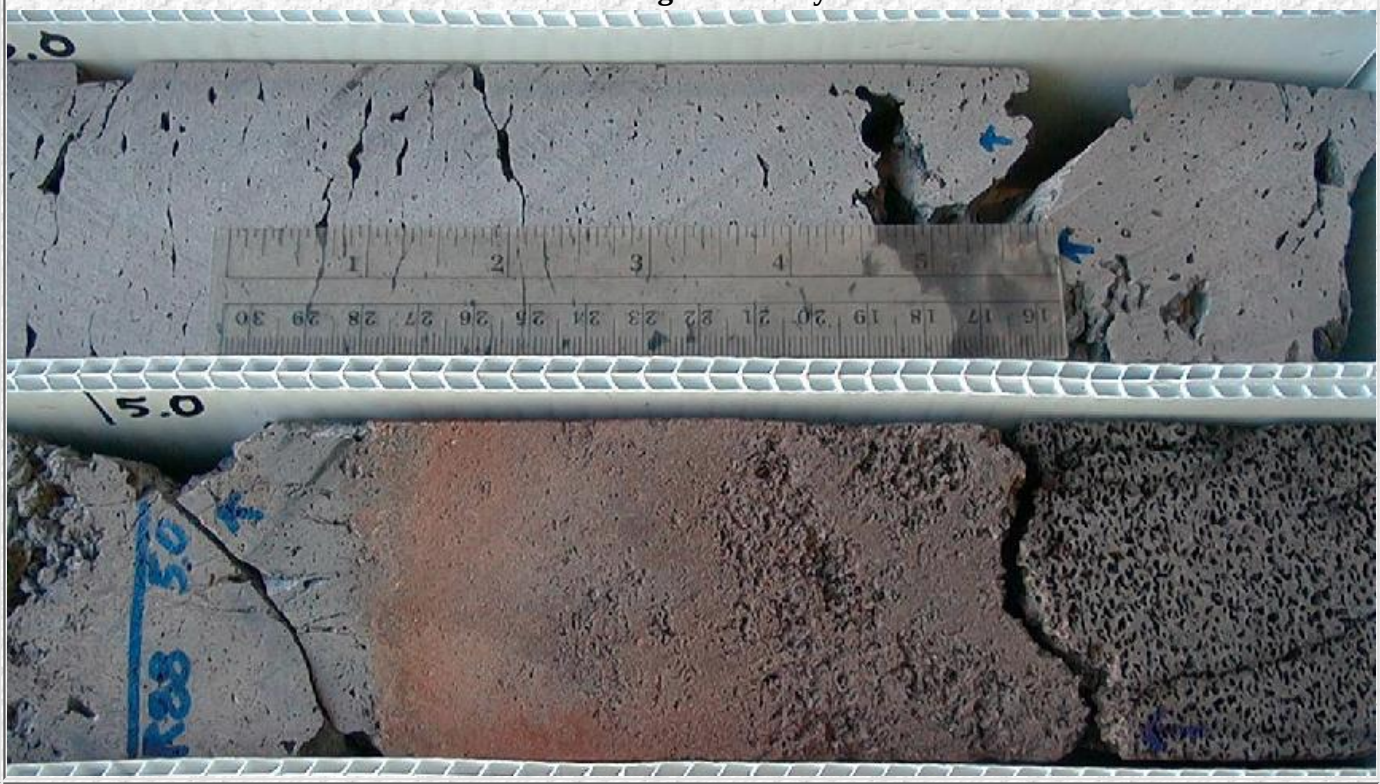
Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

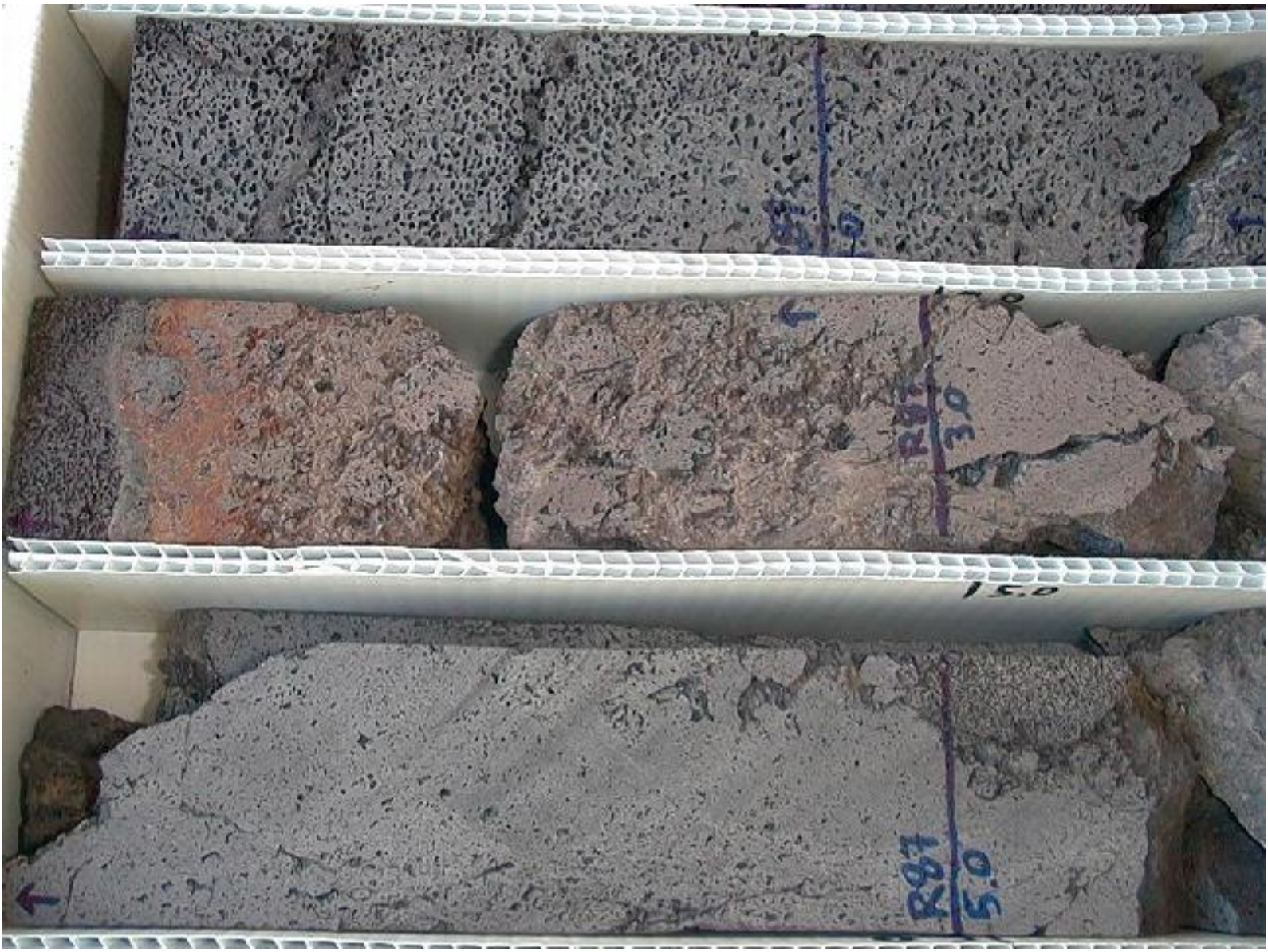


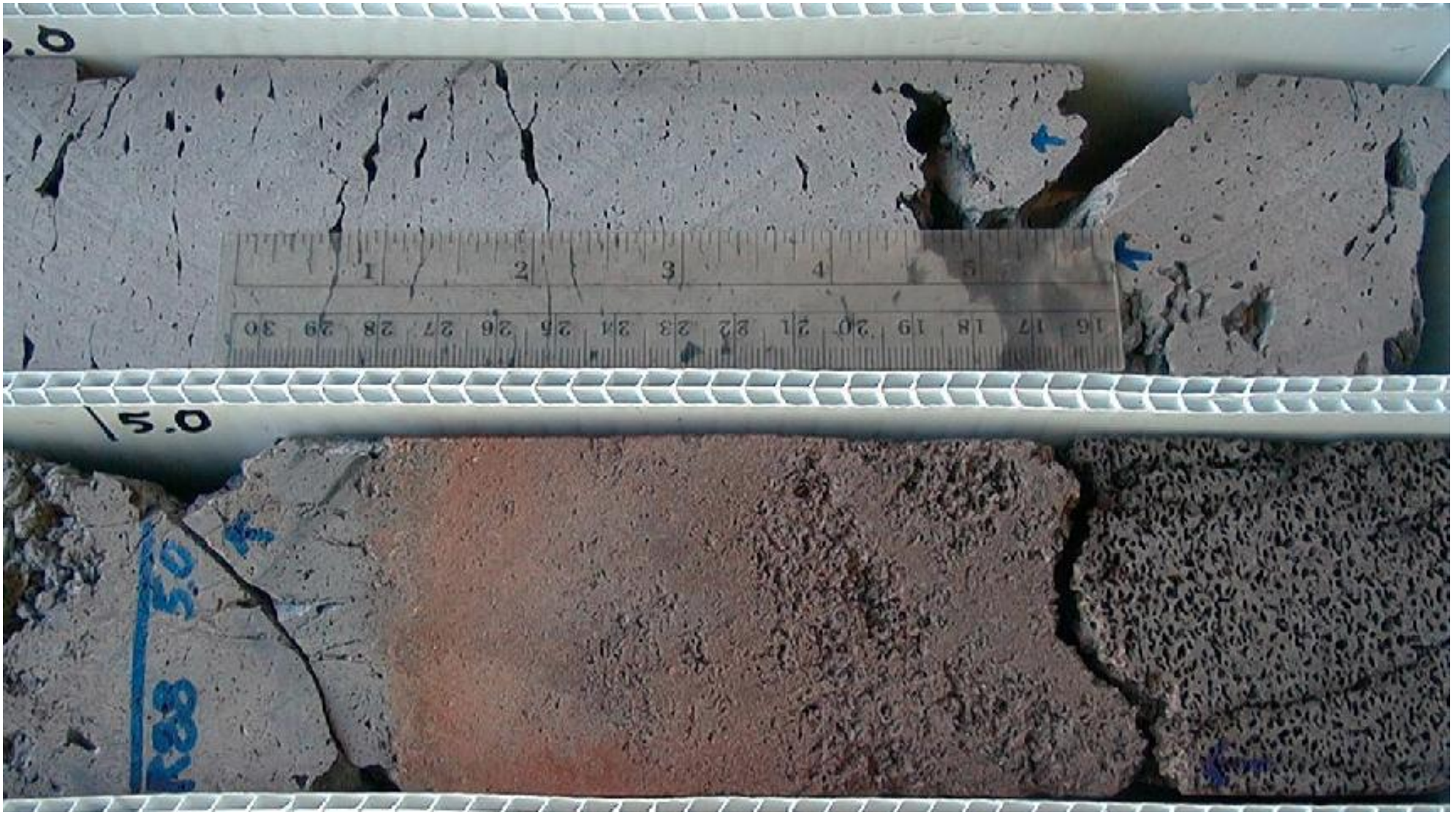
All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 6/12/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_106.jpg	This picture shows a flow contact with pahoehoe over a'a. Note the gray-pink color of the baked a'a beneath the contact. In addition, there is an autolith in the lower right corner of this image.	n.a. - n.a.
	UN_UN_105.jpg	This photo shows a flow contact with a'a over pahoehoe. Note the orange-red baked soil directly beneath the contact surface and the differences in vesicularity between the two flow types.	n.a. - n.a.


15.0
5.0


5.0

Koolau Scientific Drilling Project Daily Information Date: 6/9/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

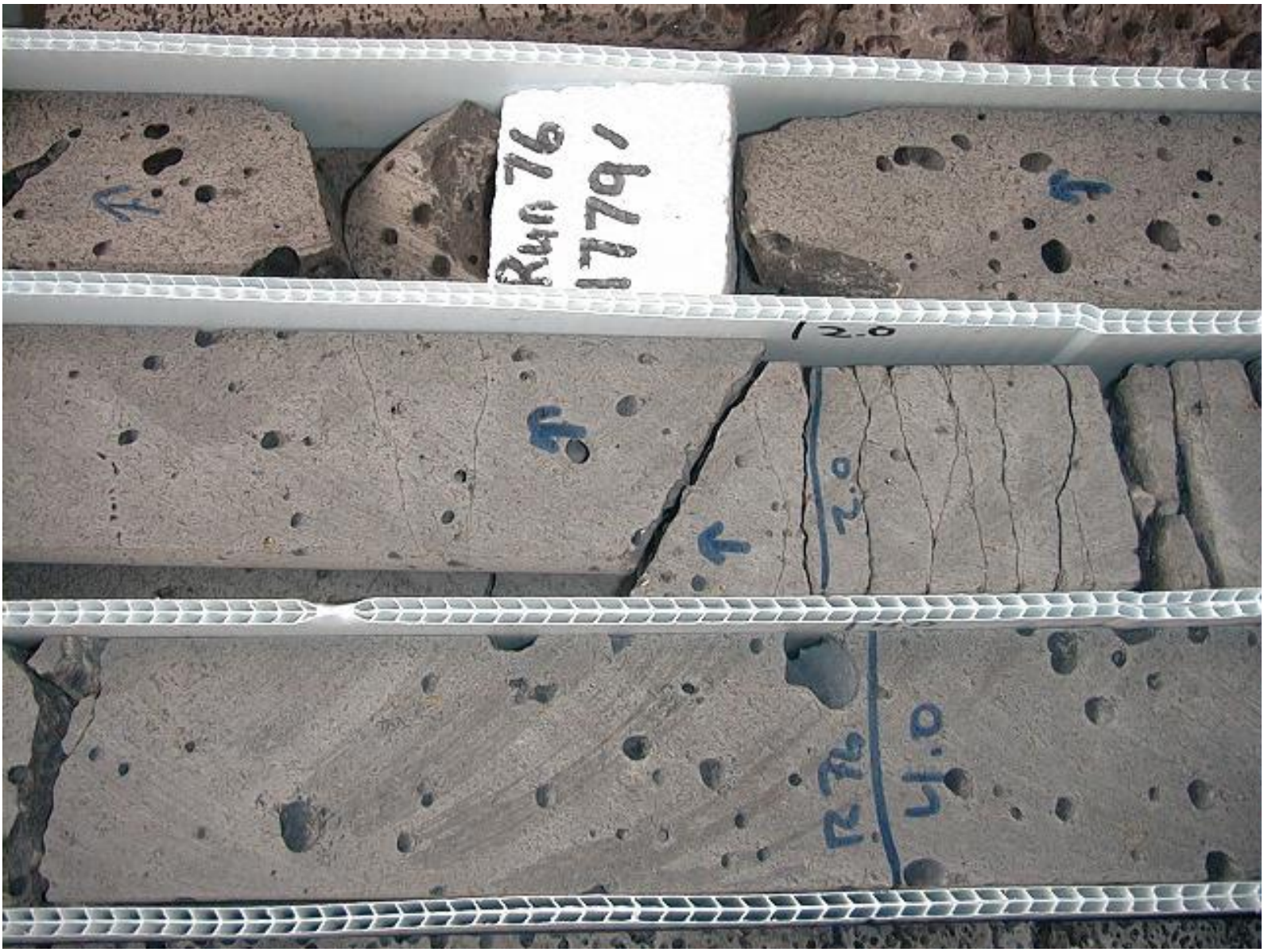
The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 6/9/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_104.jpg	Eric logs core each day at the UH Marine Center.	n.a. - n.a.
	UN_UN_103.jpg	We have logged about 3/5 of the 125 runs of core so far.	n.a. - n.a.
	UN_UN_102.jpg	The logged core boxes are stored at the UH Marine Center.	n.a. - n.a.


Run 76
1779'
12.0
2.0
4.0

Koolau Scientific Drilling Project Daily Information Date: 6/2/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 6/2/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_94.jpg	Loading sequence photo #3.	n.a. - n.a.
	UN_UN_87.jpg	Eric stands next to the drill rig before it is loaded into a container for shipping.	n.a. - n.a.
	UN_UN_88.jpg	The crane that will move the drill rig and shipping containers arrives at the drill site.	n.a. - n.a.
	UN_UN_89.jpg	The crane telescopes to its full height, estimated by observers to be well over 100 feet.	n.a. - n.a.

	UN_UN_90.jpg	Kiki removes the last leg from the drill rig as the crane holds it in midair.	n.a. - n.a.
	UN_UN_91.jpg	The crane holds the drill rig in midair, ready to move it in front of the container for loading.	n.a. - n.a.
	UN_UN_86.jpg	Kiki, Vance and Robin pose for one last photo with the drill rig.	n.a. - n.a.
	UN_UN_93.jpg	Loading sequence photo #2.	n.a. - n.a.
	UN_UN_101.jpg	A final view of the drill site after both containers and all drilling equipment has been removed. Only the observational well head and cement pad remain.	n.a. - n.a.
	UN_UN_95.jpg	Loading sequence photo #4. Vance is now pushing the drill rig into the container with the forklift with assistance from the crane operator.	n.a. - n.a.
	UN_UN_96.jpg	Loading sequence photo #5. The crane has detached its cables, and Vance uses the lift to push the drill rig the rest of the way into the container.	n.a. - n.a.

	UN_UN_97.jpg	A view of the drill rig after it has been loaded. There is still room to add the drilling mud.	n.a. - n.a.
	UN_UN_98.jpg	Vance clears off dirt and gravel from the front of the container after the drilling mud has been loaded.	n.a. - n.a.
	UN_UN_99.jpg	Robin climbs down the far side of the container after attaching the crane cables.	n.a. - n.a.
	UN_UN_100.jpg	The crane lowers the storage container onto a truck that will transport it to the harbor for shipping.	n.a. - n.a.
	UN_UN_92.jpg	The first of a series of photos wherein the drill rig is loaded into its shipping container.	n.a. - n.a.


YOUNG BROTHERS LTD


HAWAIIAN CRANE


XTRA
XTRU
405062
4310
MG
TARE
NET
CUCAP


KTRA
YOUNG BROTHERS LTD

Koolau Scientific Drilling Project Daily Information Date: 6/1/00

Summarizing Project Information / Reports

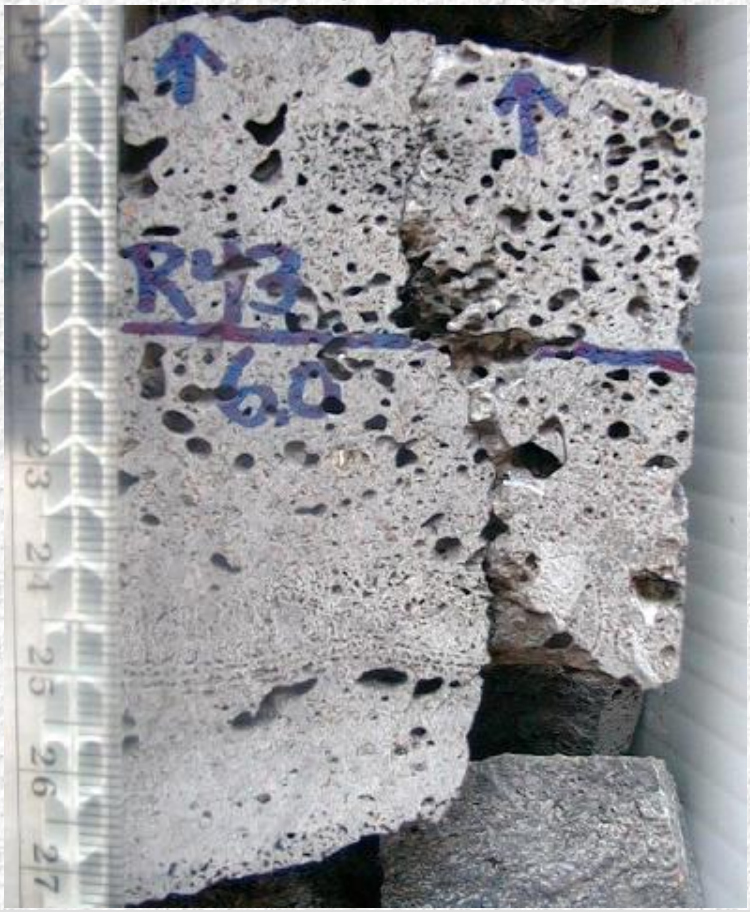
Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

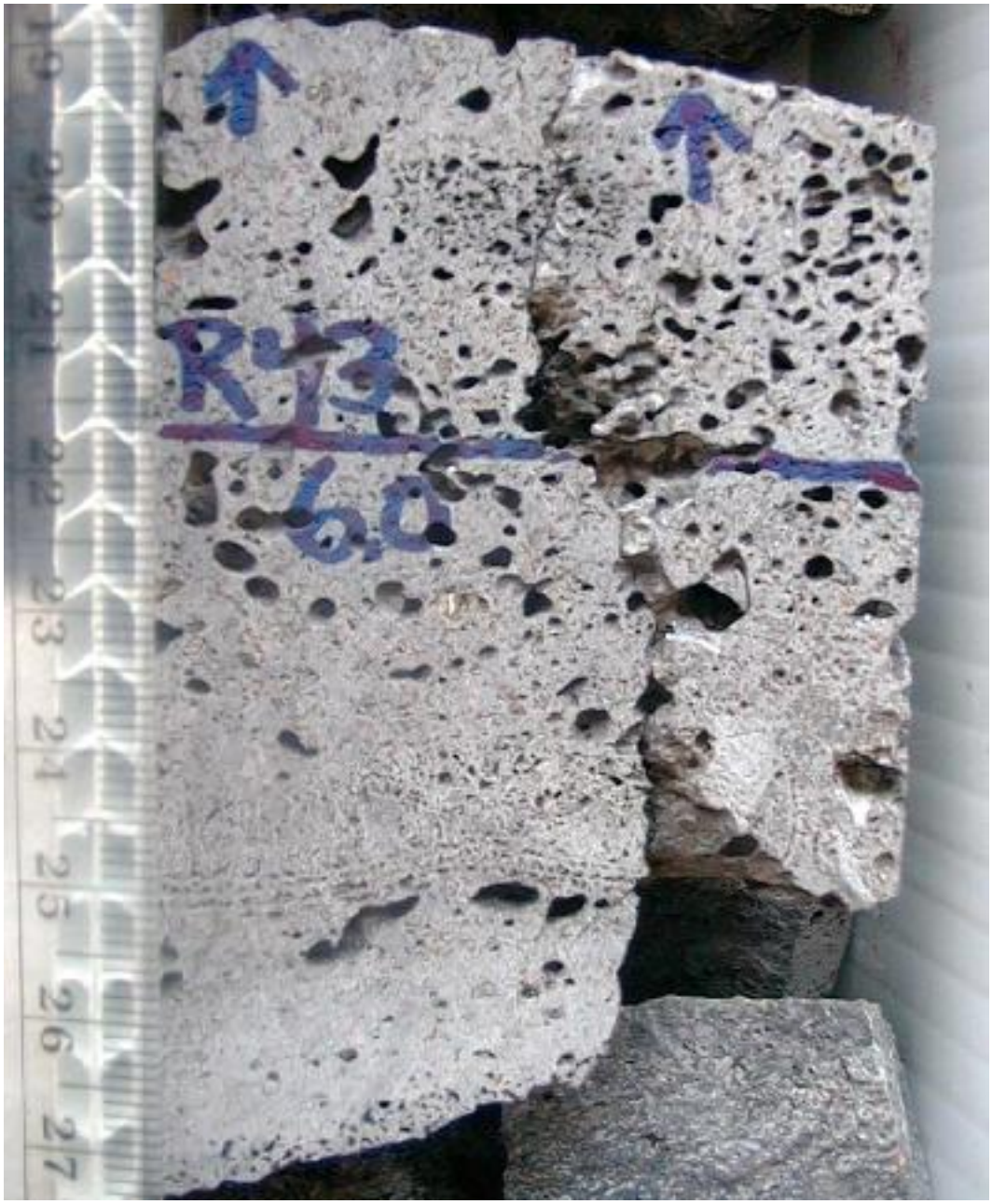


All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 6/1/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_85.jpg	This photo shows some of the autoliths that were seen today while logging the core. These features are formed by vesicle segregation within a cooling lava flow.	n.a. - n.a.
	UN_UN_84.jpg	The thin layers of aligned vesicles near the bottom of this picture form a feature called flow banding. Note that the band curves upward (see lower right of photo). This feature is formed by vesicle alignment due to shearing forces within flowing lava.	n.a. - n.a.


R13
60

Koolau Scientific Drilling Project Daily Information Date: 5/31/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/31/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_83.jpg	A side view of the drill rig in its compact form. The legs have been lowered and the bottom of the mast tilted downward so the rig will fit into a shipping container.	n.a. - n.a.
	UN_UN_82.jpg	Kiki and Robin work to load the top half of the GLAD 800 mast into a trailer for transport to the Big Island.	n.a. - n.a.
	UN_UN_81.jpg	A view of the drill rig from the core processing area.	n.a. - n.a.
	UN_UN_80.jpg	After welding the top back onto the well cap, Vance retires to his office to discuss transport of the drill rig with his DOSECC superiors.	n.a. - n.a.


CAT
392
STOW-IT
RENT-ME


XTRA

Koolau Scientific Drilling Project Daily Information Date: 5/30/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

The image of the day

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/30/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_79.jpg	Vance uses a forklift to remove the mud tank off the drill hole.	n.a. - n.a.
	UN_UN_78.jpg	Vance and Robin work to lower the mast of the drill rig.	n.a. - n.a.
	UN_UN_77.jpg	Vance scrubs all of the drill rig before disassembly.	n.a. - n.a.
	UN_UN_76.jpg	Vance climbs up the drill rig's ladder to clean the mast.	n.a. - n.a.


CAT
392
110 CATERPILLAR

Koolau Scientific Drilling Project Daily Information Date: 5/26/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/26/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_75.jpg	The drilling crew is ready to take off at the end of the day to enjoy the long weekend. Robin is standing on the 300 feet of casing that was removed from the hole today.	n.a. - n.a.

Koolau Scientific Drilling Project Core Run Report Date: 5/26/00

RUN	DEPTH (ft)	DRILLED LENGTH (ft)	CORE RECOVERY (ft)	CORE RECOVERY (%)	BOXES	REMARKS
R0123	2196.5 - 2207	10.5	9.9	94.2	B0109 - B0110	Pahoehoe flows with a glassy, baked contact in between. Both flows are moderately olivine-phyric, highly vesicular, and slightly to moderately altered.
R0124	2207 - 2217	10.0	10.2	102	B0110 - B0111	Aphyric, inflated pahoehoe flows with a glassy, baked contact in between. Vesicularity is high, and alteration is slight to moderate.
R0125	2217 - 2227	10.0	10.2	102	B0111 - B0112	Aphyric over moderately olivine-phyric pahoehoe. There are two contacts present in this run, and the lower contact is present at the base of the run. This is the last core run of the project!

Koolau Scientific Drilling Project Daily Information Date: 5/25/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/25/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_74.jpg	Kiki is working hard, as usual, to retrieve as much core as possible today.	n.a. - n.a.
	UN_UN_73.jpg	Kiki sits back and relaxes, happy that the last day of drilling was a relatively smooth one.	n.a. - n.a.
	UN_UN_72.jpg	Vance shows Robin how to remove the core catcher from the end of the drill pipe.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/24/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/24/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_71.jpg	Kiki shows Robin how to attach a new length of pipe.	n.a. - n.a.
	UN_UN_70.jpg	Robin hands Kiki a newly attached length of pipe.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/23/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/23/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_69.jpg	The drilling crew monitors the rig to make sure that drilling proceeds smoothly.	n.a. - n.a.
	UN_UN_68.jpg	Vance tests the viscosity of the drilling mud.	n.a. - n.a.
	UN_UN_67.jpg	Vance slides a run of core out of the pipe and into the tray.	n.a. - n.a.
	UN_UN_66.jpg	The drilling crew says hello.	n.a. - n.a.
	UN_UN_65.jpg	Robin adds more bentonite to the drilling mud.	n.a. - n.a.

	UN_UN_64.jpg	Vance makes sure the drilling mud is the right consisitency.	n.a. - n.a.
	UN_UN_63.jpg	Vance and Kiki tighten the new pipe addition.	n.a. - n.a.
	UN_UN_62.jpg	Kiki and Vance add another length of pipe to extend further down the hole.	n.a. - n.a.


XTRA

Koolau Scientific Drilling Project Daily Information Date: 5/22/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/22/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_61.jpg	The days's last rays of sun stream in through the window as Eric updates the Drilling Information System database and Koolau Scientific Drilling Project web page.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/19/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

The image of the day

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/19/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_59.jpg	The drill site was in disarray today as repairs were in progress. Robin stands amidst the chaos.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/18/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

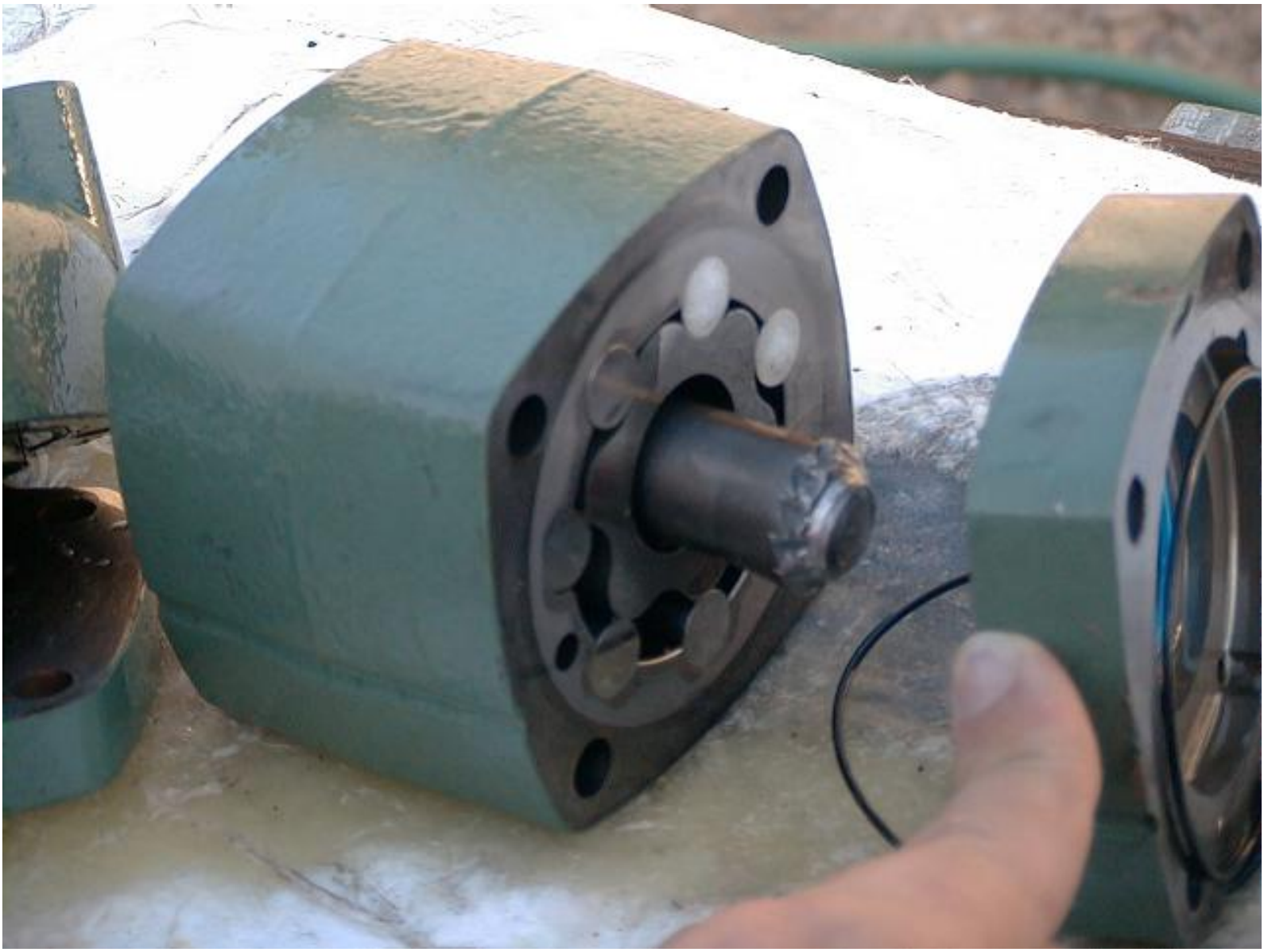
The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/18/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_57.jpg	One half of a broken hydraulic pump. Note the bent teeth and rounded center piece.	n.a. - n.a.
	UN_UN_58.jpg	The second half of the broken pump. Notches on the end of the protrusion have been partially stripped.	n.a. - n.a.
	UN_UN_56.jpg	After changing the bit, drillers tripped back into the hole this morning.	n.a. - n.a.



Koolau Scientific Drilling Project Daily Information Date: 5/17/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/17/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_55.jpg	Vance and Mike work together to extract this difficult run of core.	n.a. - n.a.
	UN_UN_54.jpg	Vance hammers the barrel in order to extract core. Mike Garcia gets ready to help.	n.a. - n.a.
	UN_UN_53.jpg	Vance begins to extract today's run of core from the barrel.	n.a. - n.a.
	UN_UN_52.jpg	Eric holds a sample of the rock that was drilled today. The white material is secondary minerals, and the olive green crystals are large olivines. This soft material easily crumbles in one's hand.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/16/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

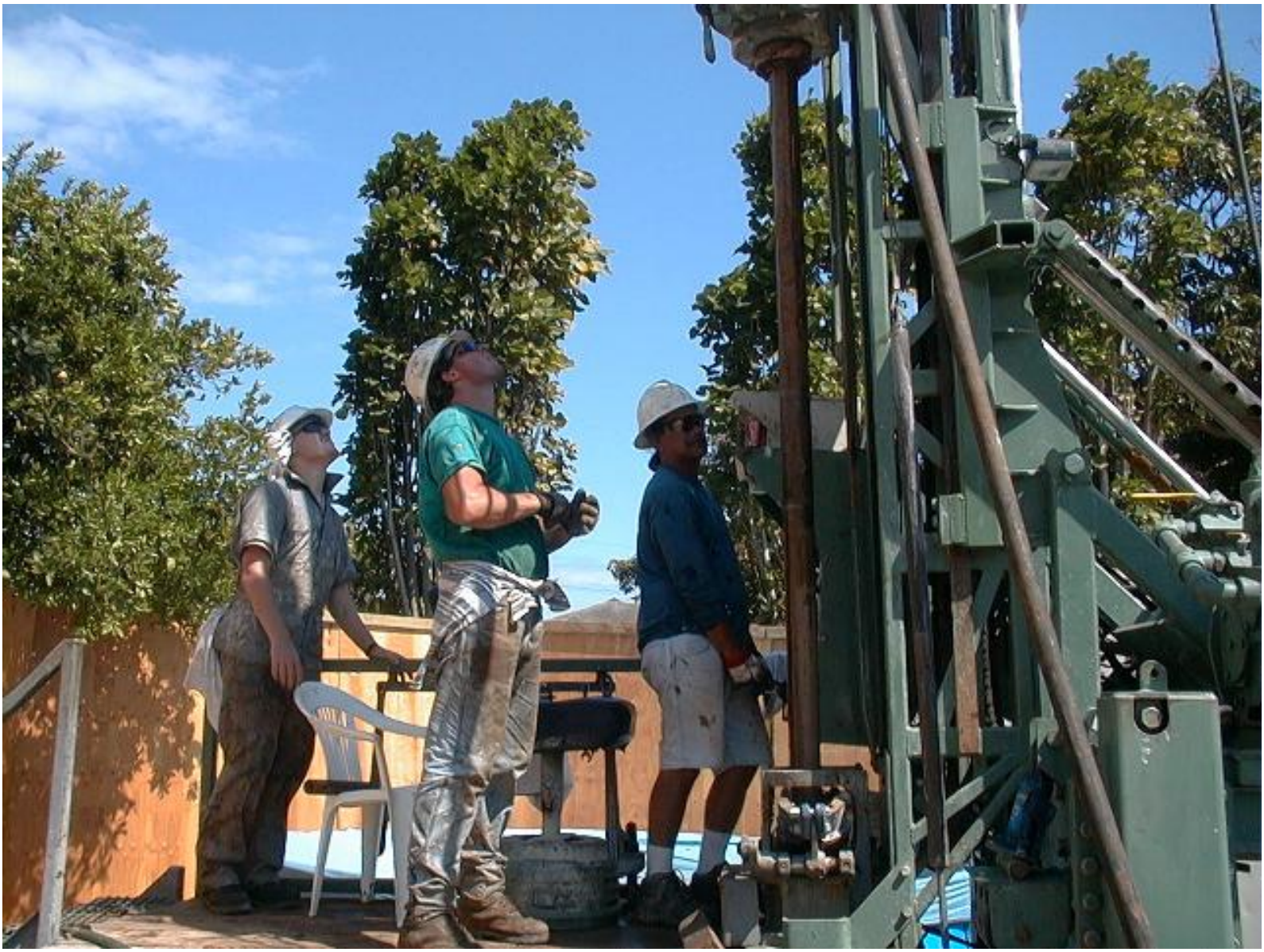
The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/16/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_50.jpg	Toby smiles while cutting inserts for the core boxes.	n.a. - n.a.
	UN_UN_51.jpg	Toby hoses off a run of core while Kiki rinses out the core barrel.	n.a. - n.a.
	UN_UN_49.jpg	University of Hawaii undergraduate volunteers Nathan Adams and Toby Vana work on processing a run of core at the drill site.	n.a. - n.a.
	UN_UN_48.jpg	Vance listens for vibrations with a wrench in order to try and determine what is happening over 2000 feet below.	n.a. - n.a.
	UN_UN_47.jpg	Vance and Robin are hoping that drilling will start looking up tomorrow.	n.a. - n.a.



Koolau Scientific Drilling Project Daily Information Date: 5/15/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/15/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_46.jpg	Volunteer Melissa Ito smiles with core in hand at Snug Harbor.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/12/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/12/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_45.jpg	Core that has been slabbed drys in the sun at Snug Harbor. After the core is dry, the slabbed surface will be marked, photographed, and posted on this site.	n.a. - n.a.
	UN_UN_44.jpg	Boxes at Snug Harbor are building up, we will have to slab more core soon. Check the website soon to see the latest core box pictures and descriptions.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/11/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/11/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_43.jpg	Eric hustles to box core and keep up with the drillers.	n.a. - n.a.
	UN_UN_42.jpg	Kiki and Vance put on a drilling clinic today, setting yet another record for this project by pulling up 101 feet of core.	n.a. - n.a.
	UN_UN_41.jpg	Eric holds a single coherent piece of core, over 4.5 feet long.	n.a. - n.a.


405062 4
US
STOW-IT
PORTABLE
STORAGE
CONTAINERS
MAY BE
THE ANSWER


NEW Drilling Record 101 ft


405062
STOW-IT
PORTABLE STORAGE CONTAINERS MAY BE THE ANSWER!
RENT-ME

Koolau Scientific Drilling Project Daily Information Date: 5/10/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/10/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_40.jpg	Vance and Kiki updated the record books yesterday, so an official photo was necessary.	n.a. - n.a.
	UN_UN_39.jpg	Kiki and Vance were hard at work again today, recovering 90 feet of core. Here they are drilling and preparing the latest run.	n.a. - n.a.
	UN_UN_38.jpg	Vance shows volunteer and fellow Mike Garcia graduate student Mike Davis how to extract core from the barrel. Thanks for the help, Mike!	n.a. - n.a.


Koolau Scientific Drilling Project
One Day Drilling Record - 91 feet

Koolau Scientific Drilling Project Daily Information Date: 5/9/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/9/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_37.jpg	A group of geology students from the University of Alaska at Anchorage visited the site today. Mike Garcia explains the Koolau project to them.	n.a. - n.a.
	UN_UN_36.jpg	A glassy rind surrounds baked pahoehoe lava. Eric's hand for scale.	n.a. - n.a.
	UN_UN_35.jpg	Vance and Kiki trip pipe into the hole to start drilling. Photo taken at 8:00 am.	n.a. - n.a.
	UN_UN_34.jpg	The drillers buried Eric in core today, pulling up 99 feet.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/8/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

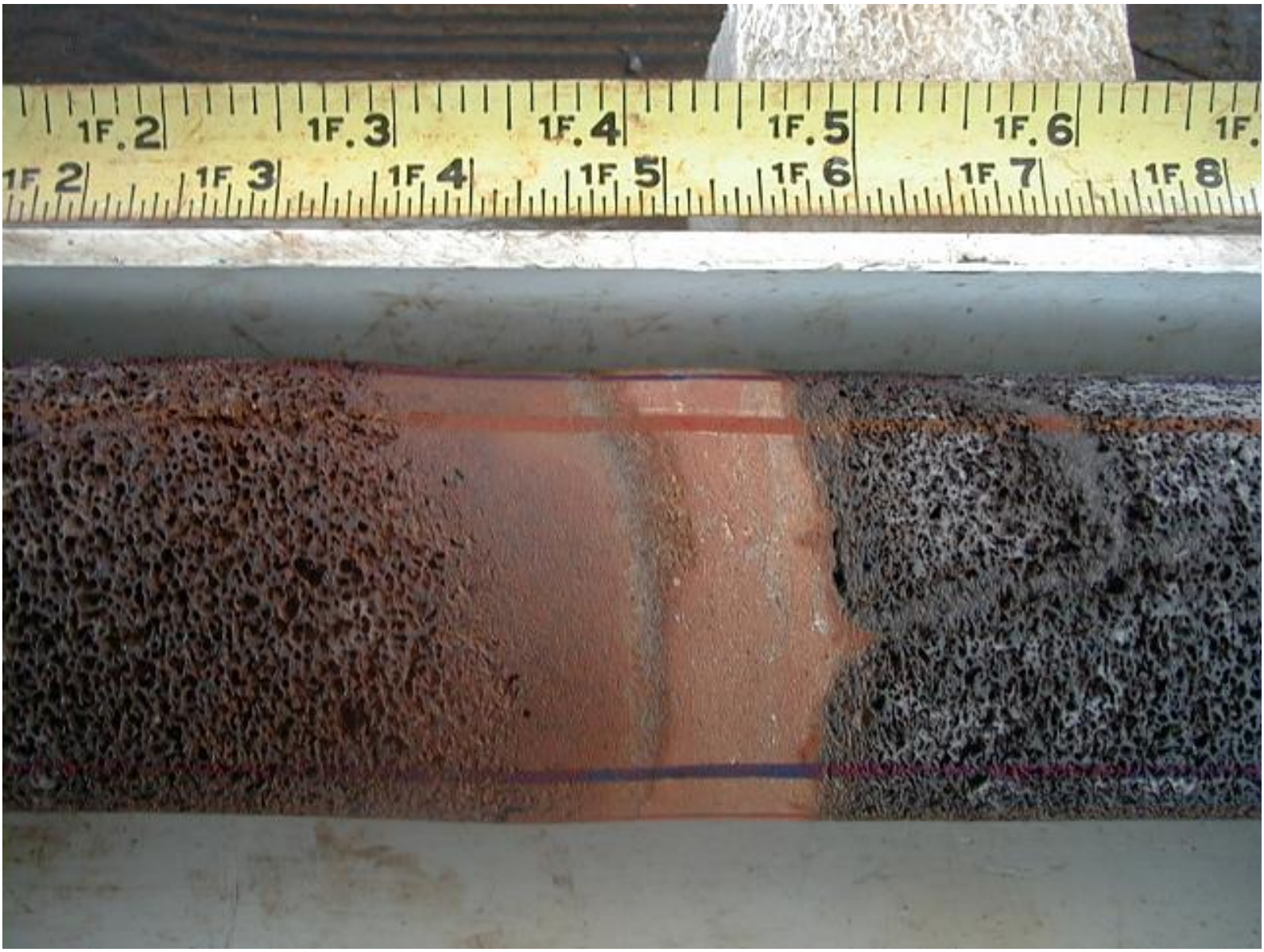
All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/8/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_30.jpg	Kiki and Vance check the tool used for latching onto and hauling up the latest core run.	n.a. - n.a.
	UN_UN_33.jpg	Another great baked contact, this time the left side is up.	n.a. - n.a.
	UN_UN_32.jpg	A beautiful baked contact - markings indicate that the top is on the right.	n.a. - n.a.
	UN_UN_31.jpg	Vance attaches and hands up another length of pipe to extend further down the hole.	n.a. - n.a.


MADE IN U.S.A.
FABRIQUÉ AUX
É.-U.
P.R. APP'D.
252 TC


1F. 2
1F. 3
1F. 4
1F. 5
1F. 6
1F 2
1F 3
1F 4
1F 5
1F 6
1F 7
1F 8

Koolau Scientific Drilling Project Daily Information Date: 5/5/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Box Report
report of core boxes archived today.

Core Run Report
report of core runs recovered today.

Core Box Pictures
list of pictures of core runs and core boxes sampled today

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/5/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_29.jpg	Vance hammers the end of the drill pipe to shake loose the last bits of core from a run.	n.a. - n.a.
	UN_UN_28.jpg	Eric checks box depths at Snug Harbor. The saw on the right is used for slabbing core (cutting it lengthwise) before marking and taking photos.	n.a. - n.a.
	UN_UN_27.jpg	Kiki and Vance smile after a highly productive day of drilling.	n.a. - n.a.
	UN_UN_26.jpg	Our photography setup at Snug Harbor. Digital images of each completed box are taken from above.	n.a. - n.a.
	UN_UN_25.jpg	Eric hammers out another run of core while Vance holds the drill pipe steady.	n.a. - n.a.

	UN_UN_24.jpg	The photography lamps provide ample luminescence.	n.a. - n.a.


SAFETY FIRST

Koolau Scientific Drilling Project Daily Information Date: 5/4/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/4/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_23.jpg	The core processing crew was busy today, but happy to see a good amount of core. Here Eric is working quickly to keep up with the drillers.	n.a. - n.a.
	UN_UN_22.jpg	Mike Garcia arrives in the morning to find Kiki and Vance pulling out a full run of core.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/3/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Core Run Report

report of core runs recovered today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/3/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_21.jpg	1.4 feet of the rubbly material recovered today.	n.a. - n.a.
	UN_UN_20.jpg	Kiki smiles, optimistic about retrieving core tomorrow.	n.a. - n.a.

	UN_UN_19.jpg	Kiki is doing everything he can to drill through this unconsolidated layer of rock.	n.a. - n.a.
	UN_UN_18.jpg	Vance has been working extra hard the past few days, handling over 200 feet of pipe per trip.	n.a. - n.a.


TOP
Run 30
1356-
1358

Koolau Scientific Drilling Project Daily Information Date: 5/2/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/2/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_17.jpg	Vance carries a 20 foot steel pipe with one hand! (Rig attachment not shown)	n.a. - n.a.
	UN_UN_16.jpg	After tripping out the pipe at the end of the day, Vance gets ready to check for core.	n.a. - n.a.
	UN_UN_14.jpg	Vance and Kiki are hard at work, drilling and filling up the mud tank.	n.a. - n.a.
	UN_UN_13.jpg	Kiki and Vance say hello as they pull out the last core run of the day.	n.a. - n.a.
	UN_UN_12.jpg	Mike Garcia and Vance discuss the day's progress while Kiki continues to drill.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 5/1/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 5/1/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_11.jpg	Mike trys his hand at banging out the latest run of core.	n.a. - n.a.
	UN_UN_10.jpg	Another run of core is extracted and inspected.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 4/28/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 4/28/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_9.jpg	Bruce extracts his final run of core before bidding us a fond farewell and moving on to Idaho to prepare for future drilling projects.	n.a. - n.a.
	UN_UN_6.jpg	Members of the Hawaii State Earthquake Advisory Board; Big Island Group, visit the drill site.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 4/27/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 4/27/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_5.jpg	Kiki transfers a run of core to Vance for removal from the pipe.	n.a. - n.a.
	UN_UN_4.jpg	Eric looks up for a moment while examining a run of core.	n.a. - n.a.
	UN_UN_3.jpg	Kiki looks over and smiles for the camera while drilling.	n.a. - n.a.
	UN_UN_2.jpg	A beautiful contact between an a'a and an underlying pahoehoe flow (left and right, respectively).	n.a. - n.a.


RIQUÉ AUX
É.-U.
P.R. APP'D.
252 Tc

Koolau Scientific Drilling Project Daily Information Date: 4/26/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Core Run Report
report of core runs recovered today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 4/26/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_7.jpg	Vance and Kiki monitor the rig as they drill.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 4/25/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Core Run Report

report of core runs recovered today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 4/25/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_60.jpg	The first run of the Koolau project recovered 2.3 feet of core.	n.a. - n.a.


Run 00
Cave
Run 01
1150'
2.0
R1
Run 2
1156'

Koolau Scientific Drilling Project Daily Information Date: 4/19/00

Summarizing Project Information / Reports

Overall Project Reports

reports of boxes, cores, runs and units archived/described until today.

Additional Pictures

list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 4/19/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_UN_15.jpg	The drill rig is up and running in Kalihi valley.	n.a. - n.a.

Koolau Scientific Drilling Project Daily Information Date: 4/12/00

Summarizing Project Information / Reports

Overall Project Reports
reports of boxes, cores, runs and units archived/described until today.

Additional Pictures
list of additional pictures from the Koolau drill site taken today

The image of the day

All core box images are standardized to Kodak® Color Separation Guide No. Q-14

short description

Koolau Scientific Drilling Project Additional Pictures Date: 4/12/00

THUMBNAIL	NAME	REMARKS	DEPTH
	UN_Pic_1_1.jpg	Vance Hiatt, Bruce Howell, Dennis Neilson, Richard Horne.	n.a. - n.a.

Rock Coring Koolau Volcano Summary Core Box Report Date: 02/13/2002

data in ASCII-Format

BOX	DEPTH (ft)	INTERVAL (ft)	RUNS IN BOX
B0001	1150.0 - 1161.9	11.9	R0001 - R0003
B0002	1161.9 - 1170.9	9.0	R0003 - R0004
B0003	1170.9 - 1180.5	9.6	R0004 - R0005
B0004	1180.5 - 1189.5	9.0	R0005 - R0006
B0005	1189.5 - 1198.0	8.5	R0006 - R0008
B0006	1198.0 - 1210.2	12.2	R0008 - R0009
B0007	1210.2 - 1219.6	9.4	R0009 - R0010
B0008	1219.6 - 1228.2	8.6	R0010 - R0011
B0009	1228.2 - 1238.1	9.9	R0011 - R0012
B0010	1238.1 - 1247.2	9.1	R0012 - R0013
B0011	1247.2 - 1256.0	8.8	R0013 - R0013
B0012	1256.0 - 1264.5	8.5	R0014 - R0015
B0013	1264.5 - 1275.5	11.0	R0015 - R0017
B0014	1275.5 - 1284.6	9.1	R0017 - R0018
B0015	1284.6 - 1295.3	10.7	R0018 - R0020
B0016	1295.3 - 1304.5	9.2	R0020 - R0020
B0017	1304.5 - 1312.8	8.3	R0020 - R0022
B0018	1312.8 - 1320.3	7.5	R0022 - R0023
B0019	1320.3 - 1333.4	13.1	R0023 - R0025
B0020	1336.0 - 1346.3	10.3	R0026 - R0028
B0021	1346.3 - 1362.0	15.7	R0028 - R0031
B0022	1363.0 - 1375.5	12.5	R0032 - R0034
B0023	1375.5 - 1384.0	8.5	R0034 - R0035

B0024	1384.0 - 1393.4	9.4	R0035 - R0036
B0025	1393.4 - 1401.6	8.2	R0036 - R0037
B0026	1401.6 - 1412.2	10.6	R0037 - R0038
B0027	1412.2 - 1420.9	8.7	R0038 - R0039
B0028	1420.9 - 1430.4	9.5	R0039 - R0040
B0029	1430.4 - 1439.4	9.0	R0040 - R0041
B0030	1439.4 - 1448.9	9.5	R0041 - R0041
B0031	1448.9 - 1461.0	12.1	R0041 - R0043
B0032	1461.0 - 1473.0	12.0	R0043 - R0044
B0033	1473.0 - 1483.3	10.3	R0045 - R0046
B0034	1483.3 - 1493.5	10.2	R0046 - R0047
B0035	1493.5 - 1502.5	9.0	R0047 - R0048
B0036	1502.5 - 1513.4	10.9	R0048 - R0049
B0037	1513.4 - 1521.8	8.4	R0049 - R0050
B0038	1521.8 - 1531.1	9.3	R0050 - R0051
B0039	1531.1 - 1540.0	8.9	R0051 - R0051
B0040	1540.0 - 1549.1	9.1	R0051 - R0052
B0041	1549.1 - 1558.5	9.4	R0052 - R0053
B0042	1558.5 - 1567.7	9.2	R0053 - R0054
B0043	1567.7 - 1576.5	8.8	R0054 - R0055
B0044	1576.5 - 1586.1	9.6	R0055 - R0056
B0045	1586.1 - 1594.5	8.4	R0056 - R0057
B0046	1594.5 - 1603.4	8.9	R0057 - R0058
B0047	1603.4 - 1612.9	9.5	R0058 - R0059
B0048	1612.9 - 1622.7	9.8	R0059 - R0060
B0049	1622.7 - 1632.5	9.8	R0060 - R0061
B0050	1632.5 - 1641.2	8.7	R0061 - R0062
B0051	1641.2 - 1650.4	9.2	R0062 - R0063
B0052	1650.4 - 1659.9	9.5	R0063 - R0063
B0053	1659.9 - 1668.8	8.9	R0063 - R0065
B0054	1668.8 - 1678.7	9.9	R0065 - R0065
B0055	1678.7 - 1688.3	9.6	R0065 - R0066
B0056	1688.3 - 1697.6	9.3	R0066 - R0067
B0057	1697.6 - 1706.8	9.2	R0067 - R0068
B0058	1706.8 - 1716.5	9.7	R0068 - R0069

B0059	1716.5 - 1726.2	9.7	R0069 - R0070
B0060	1726.2 - 1736.0	9.8	R0070 - R0071
B0061	1736.0 - 1746.1	10.1	R0071 - R0072
B0062	1746.1 - 1755.9	9.8	R0072 - R0073
B0063	1755.9 - 1766.4	10.5	R0073 - R0074
B0064	1766.4 - 1776.0	9.6	R0074 - R0075
B0065	1776.0 - 1786.3	10.3	R0075 - R0076
B0066	1786.3 - 1796.2	9.9	R0076 - R0077
B0067	1796.2 - 1804.8	8.6	R0077 - R0078
B0068	1804.8 - 1814.5	9.7	R0078 - R0079
B0069	1814.5 - 1824.4	9.9	R0079 - R0080
B0070	1824.4 - 1833.8	9.4	R0080 - R0081
B0071	1833.8 - 1842.9	9.1	R0081 - R0082
B0072	1842.9 - 1852.5	9.6	R0082 - R0083
B0073	1852.5 - 1861.4	8.9	R0083 - R0084
B0074	1861.4 - 1870.7	9.3	R0084 - R0085
B0075	1870.7 - 1880.0	9.3	R0085 - R0085
B0076	1880.0 - 1889.0	9.0	R0085 - R0086
B0077	1889.0 - 1898.1	9.1	R0086 - R0087
B0078	1898.1 - 1907.8	9.7	R0087 - R0088
B0079	1907.8 - 1916.6	8.8	R0088 - R0089
B0080	1916.6 - 1927.0	10.4	R0089 - R0090
B0081	1927.0 - 1936.6	9.6	R0091 - R0091
B0082	1936.6 - 1945.5	8.9	R0091 - R0092
B0083	1945.5 - 1955.1	9.6	R0092 - R0093
B0084	1955.1 - 1964.0	8.9	R0093 - R0094
B0085	1964.0 - 1973.0	9.0	R0094 - R0096
B0086	1973.0 - 1982.5	9.5	R0096 - R0097
B0087	1982.5 - 1991.8	9.3	R0097 - R0098
B0088	1991.8 - 2002.3	10.5	R0098 - R0099
B0089	2002.3 - 2011.8	9.5	R0099 - R0100
B0090	2011.8 - 2022.2	10.4	R0100 - R0101
B0091	2022.2 - 2031.0	8.8	R0101 - R0102
B0092	2031.0 - 2041.0	10.0	R0102 - R0102
B0093	2040.5 - 2049.7	9.2	R0103 - R0104

B0094	2049.7 - 2059.4	9.7	R0104 - R0106
B0095	2059.4 - 2068.7	9.3	R0106 - R0106
B0096	2069.0 - 2078.8	9.8	R0107 - R0107
B0097	2078.8 - 2088.8	10.0	R0107 - R0109
B0098	2088.8 - 2097.9	9.1	R0109 - R0110
B0099	2097.9 - 2107.4	9.5	R0110 - R0111
B0100	2107.4 - 2116.3	8.9	R0111 - R0113
B0101	2116.3 - 2125.6	9.3	R0113 - R0114
B0102	2125.6 - 2135.0	9.4	R0114 - R0115
B0103	2135.0 - 2144.3	9.3	R0115 - R0117
B0104	2144.3 - 2152.5	8.2	R0117 - R0118
B0105	2152.5 - 2162.1	9.6	R0118 - R0119
B0106	2162.1 - 2171.5	9.4	R0119 - R0120
B0107	2171.5 - 2181.2	9.7	R0120 - R0121
B0108	2181.2 - 2191.6	10.4	R0121 - R0122
B0109	2191.6 - 2201.5	9.9	R0122 - R0123
B0110	2201.5 - 2211.4	9.9	R0123 - R0124
B0111	2211.4 - 2220.5	9.1	R0124 - R0125
B0112	2220.5 - 2227.0	6.5	R0125 - R0125

Rock Coring Koolau Volcano Summary Core Run Report Date: 02/13/2002

data in ASCII-Format

RUN	DEPTH (ft)	DRILLED LENGTH (ft)	CORE RECOVERY (ft)	CORE RECOVERY (%)	BOXES	REMARKS
R0001	1150.0 - 1156.0	6.0	2.7	45.0	B0001 - B0001	The first run of the project is highly olivine-phyric aa with irregularly shaped vesicles.
R0002	1156.0 - 1159.0	3.0	3.0	100.0	B0001 - B0001	Rubble at the top of the run obscures the contact between overlying aa and underlying pahoehoe.
R0003	1159.0 - 1166.0	7.0	7.5	107.1	B0001 - B0002	Highly vesicular pahoehoe with 5-10% olivine.
R0004	1166.0 - 1173.0	7.0	7.6	108.6	B0002 - B0003	NULL
R0005	1173.0 - 1183.0	10.0	10.0	100.0	B0003 - B0004	Pahoehoe with internal baked contacts.
R0006	1183.0 - 1190.0	7.0	8.0	114.3	B0004 - B0005	Olivine-rich pahoehoe overlying olivine-rich aa.
R0007	1190.0 - 1196.0	6.0	5.3	88.3	B0005 - B0005	Highly vesicular, olivine-rich aa.
R0008	1196.0 - 1206.0	10.0	6.2	62.0	B0005 - B0006	Highly olivine-phyric aa.

R0009	1206.0 - 1216.0	10.0	10.0	100.0	B0006 - B0007	Olivine-rich aa with large, irregular vesicles.
R0010	1216.0 - 1226.0	10.0	10.8	108.0	B0007 - B0008	Olivine-rich aa overlying pahoehoe with olivine and plagioclase feldspar.
R0011	1226.0 - 1236.0	10.0	9.7	97.0	B0008 - B0009	Aa with abundant olivine and plagioclase feldspar.
R0012	1236.0 - 1246.0	10.0	10.3	103.0	B0009 - B0010	Aa at the top of the run is underlain by inflated pahoehoe. The baked contact is clearly visible.
R0013	1246.0 - 1256.0	10.0	10.6	106.0	B0010 - B0011	Inflated pahoehoe lies over more pahoehoe.
R0014	1256.0 - 1260.5	4.5	5.5	122.2	B0012 - B0012	Higly fractured, moderately vesicular aa begins at the start of this run.
R0015	1260.5 - 1266.0	5.5	4.9	89.1	B0012 - B0013	Transitional aa with sparse olivine and common plagioclase feldspar. Vesicularity is variable, ranging from high to moderate.
R0016	1266.0 - 1273.0	7.0	6.1	87.1	B0013 - B0013	Highly fractured aa with small olivine and plagioclase feldspar crystals.
R0017	1273.0 - 1283.0	10.0	10.3	103.0	B0013 - B0014	Massive aa overlies pahoehoe.
R0018	1283.0 - 1285.0	2.0	2.1	105.0	B0014 - B0015	Highly vesicular, sparsely olivine-phyric pahoehoe.
R0019	1285.0 - 1295.0	10.0	8.7	87.0	B0015 - B0015	Inflated pahoehoe with about 3% olivine.
R0020	1295.0 - 1305.0	10.0	10.0	100.0	B0015 - B0016	Highly vesicular, inflated pahoehoe with several intraflow contacts.

R0021	1305.0 - 1309.0	4.0	4.8	120.0	B0017 - B0017	Inflated pahoehoe with 1-3% small olivine.
R0022	1309.0 - 1315.0	6.0	8.7	144.2	B0017 - B0018	Pahoehoe with glassy intraflow contacts and sparse amounts of olivine.
R0023	1315.0 - 1325.0	10.0	6.9	69.0	B0018 - B0019	Inflated pahoehoe overlies another pahoehoe flow which is on top of aa rubble at the base of the run. There is only a slight change in mineralogy between flows.
R0024	1325.0 - 1329.0	4.0	3.0	75.0	B0019 - B0019	Aa with sparse olivine and plagioclase feldspar. Massive portions of the flow are fresher than the rubble.
R0025	1329.0 - 1336.0	7.0	4.4	62.9	B0019 - B0019	Sparsely olivine and plagiclase-phyric aa overlies aa that contains common large olivines. Baking is visible at the contact.
R0026	1336.0 - 1341.0	5.0	3.9	78.0	B0020 - B0020	Transitional aa overlies pahoehoe, which extends to the end of the run. Olivine is abundant in the upper flow.
R0027	1341.0 - 1346.0	5.0	5.0	100.0	B0020 - B0020	Highly vesicular pahoehoe with common olivine.
R0028	1346.0 - 1354.0	8.0	2.1	26.9	B0020 - B0021	Inflated pahoehoe; poor recovery in this run.
R0029	1354.0 - 1356.0	2.0	1.9	95.0	B0021 - B0021	Pahoehoe to aa; vesicularity is high in both flows.

R0030	1356.0 - 1358.0	2.0	1.4	70.0	B0021 - B0021	A short run of highly vesicular aa rubble.
R0031	1358.0 - 1363.0	5.0	4.0	80.0	B0021 - B0021	Transitional pahoehoe to aa. Olivine abundance is sparse.
R0032	1363.0 - 1366.5	3.5	2.0	57.1	B0022 - B0022	Moderately vesicular aa rubble, some of which is baked.
R0033	1366.5 - 1373.5	7.0	5.7	81.4	B0022 - B0022	Massive aa with elongated vesicles and many horizontal fractures.
R0034	1373.5 - 1379.0	5.5	6.7	121.8	B0022 - B0023	Massive aa that is almost completely aphyric. Olivine abundance is <1%.
R0035	1379.0 - 1389.0	10.0	10.3	103.0	B0023 - B0024	A clearly baked contact near the top of this run marks the division between overlying aa and underlying pahoehoe.
R0036	1389.0 - 1399.0	10.0	10.6	106.0	B0024 - B0025	Two highly vesicular, aphyric pahoehoe flows.
R0037	1399.0 - 1409.0	10.0	8.8	88.0	B0025 - B0026	Aphyric pahoehoe overlies olivine-rich pahoehoe. The glassy, baked contact is present near the top of the run.
R0038	1409.0 - 1419.0	10.0	10.8	108.0	B0026 - B0027	Highly olivine-phyric and vesicular pahoehoe with several intraflow boundaries.
R0039	1419.0 - 1429.0	10.0	10.2	102.0	B0027 - B0028	Highly olivine-phyric pahoehoe with ropy textures.

R0040	1429.0 - 1439.0	10.0	10.4	104.0	B0028 - B0029	Pahoehoe that changes from highly olivine-phyric to virtually aphyric six feet into the run. Vesicularity is high and vesicle size is highly variable throughout the run.
R0041	1439.0 - 1449.0	10.0	10.9	109.0	B0029 - B0031	Aphyric to sparsely olivine-phyric pahoehoe.
R0042	1449.0 - 1458.0	9.0	6.4	71.1	B0031 - B0031	Highly vesicular pahoehoe with a moderately vesicular, massive flow interior.
R0043	1458.0 - 1468.0	10.0	7.9	79.0	B0031 - B0032	Highly vesicular pahoehoe with baked regions at the top and bottom ends of the run.
R0044	1468.0 - 1473.0	5.0	4.8	96.0	B0032 - B0032	Inflated pahoehoe that is baked at the top of the run. Olivine abundance is sparse.
R0045	1473.0 - 1480.0	7.0	6.7	95.7	B0033 - B0033	Highly vesicular pahoehoe overlies transitional pahoehoe. There is a baked zone with abundant glass between flows.
R0046	1480.0 - 1490.0	10.0	9.6	96.0	B0033 - B0034	Highly vesicular pahoehoe with several glassy, baked intraflow contacts.
R0047	1490.0 - 1500.0	10.0	10.8	107.5	B0034 - B0035	Highly vesicular, sparsely olivine-phyric pahoehoe.

R0048	1500.0 - 1510.0	10.0	8.6	86.0	B0035 - B0036	Highly vesicular pahoehoe over moderately vesicular, transitional aa. There is a clear baked contact between flows.
R0049	1510.0 - 1520.0	10.0	11.4	114.0	B0036 - B0037	Inflated pahoehoe with several glassy intraflow contacts.
R0050	1520.0 - 1530.0	10.0	10.1	101.0	B0037 - B0038	Highly vesicular, sparsely olivine-phyric inflated pahoehoe with glassy baked intraflow contacts.
R0051	1530.0 - 1540.0	10.0	10.3	103.0	B0038 - B0039	Sparsely olivine-phyric, inflated pahoehoe. There is a glassy, baked intraflow contact about five feet below the top of the run.
R0052	1540.0 - 1550.0	10.0	10.7	107.0	B0040 - B0041	Pahoehoe with numerous baked contacts. Vesicularity is variable and there are healed fractures throughout the run.
R0053	1550.0 - 1560.0	10.0	10.2	102.0	B0041 - B0042	Pahoehoe with intraflow contacts. Olivine increases in abundance below the two foot mark of the run. Extreme vesicularity variations in the upper two to three feet of the run.
R0054	1560.0 - 1570.0	10.0	10.7	107.0	B0042 - B0043	Sparsely olivine-phyric, inflated pahoehoe. This run contains a few glassy, baked intraflow contacts.

R0055	1570.0 - 1580.0	10.0	10.3	103.0	B0043 - B0044	Highly vesicular, almost completely aphyric pahoehoe with a spectacular baked soil contact.
R0056	1580.0 - 1590.0	10.0	10.6	106.0	B0044 - B0045	Highly vesicular, virtually aphyric pahoehoe with an altered zone in the middle of the run.
R0057	1590.0 - 1600.0	10.0	10.7	107.0	B0045 - B0046	A new inflated pahoehoe flow begins this run. Below the contact, the rock is moderately olivine-phyric.
R0058	1600.0 - 1610.0	10.0	10.3	103.0	B0046 - B0047	Olivine is common to abundant in this highly to moderately vesicular pahoehoe flow.
R0059	1610.0 - 1620.0	10.0	10.0	100.0	B0047 - B0048	This run contains highly vesicular pahoehoe. There is a glassy, layered contact five to six feet from the top of the run, and subvertical glass another foot below.
R0060	1620.0 - 1630.0	10.0	10.0	100.0	B0048 - B0049	Sparsely olivine-phyric pahoehoe with glassy intraflow contacts.
R0061	1630.0 - 1640.0	10.0	11.0	110.0	B0049 - B0050	A moderately olivine-phyric pahoehoe flow with variable vesicularity. Plagioclase feldspar is also present.
R0062	1640.0 - 1650.0	10.0	10.4	104.0	B0050 - B0051	Highly vesicular pahoehoe with common olivine and plagioclase feldspar.

R0063	1650.0 - 1660.0	10.0	10.8	108.0	B0050 - B0053	Highly vesicular pahoehoe with healed fractures and abundant plagioclase feldspar below eight feet from the top of the run.
R0064	1660.0 - 1668.5	8.5	8.4	98.8	B0053 - B0053	Highly to moderately vesicular pahoehoe with abundand plagioclase feldspar. Olivine is common, and yellow secondary minerals are present in fractures.
R0065	1668.5 - 1679.0	10.5	10.4	99.0	B0053 - B0055	Pahoehoe with abundant plagioclase feldspar. Several baked regions are present in this run.
R0066	1679.0 - 1689.0	10.0	10.4	104.0	B0055 - B0056	Pahoehoe with abundant olivine and plagioclase feldspar overlies another pahoehoe flow that contains less plagioclase. The lower flow contains fewer, but larger, vesicles.
R0067	1689.0 - 1699.0	10.0	10.2	102.0	B0056 - B0057	Highly vesicular pahoehoe that contains olivine and plagioclase feldspar. There are many large vesicles in the top four feet of the run.
R0068	1699.0 - 1709.0	10.0	9.9	99.0	B0057 - B0058	Pahoehoe with both massive and inflated regions. Vesicularity ranges from <5% to >25% in this run.

R0069	1709.0 - 1719.0	10.0	9.8	98.0	B0058 - B0059	Inflated pahoehoe with a baked contact at the top of the run. Olivine is sparse while plagioclase feldspar is abundant. Vesicularity is highly variable, ranging from <5% to >25%.
R0070	1719.0 - 1729.0	10.0	9.4	94.0	B0059 - B0060	Highly vesicular pahoehoe with sparse olivine and abundant plagioclase feldspar.
R0071	1729.0 - 1739.5	10.5	10.1	96.2	B0060 - B0061	Highly vesicular pahoehoe with common olivine and abundant plagioclase feldspar. An intraflow contact is visible about 4 feet below the top of the run.
R0072	1739.5 - 1750.0	10.5	10.5	100.0	B0061 - B0062	Pahoehoe with highly variable vesicularity (<5% to >25%). Olivine is highly altered in massive zones.
R0073	1750.0 - 1760.0	10.0	9.2	92.0	B0062 - B0063	This run is mainly sparsely olivine-phyric pahoehoe with abundant plagioclase microphenocrysts. The contact is about two feet below the top of the run, and there are slickensides just above it.
R0074	1760.0 - 1770.0	10.0	9.8	98.0	B0063 - B0064	Inflated pahoehoe with moderate olivine and abundant plagioclase. There are two glassy, baked intraflow contacts.

R0075	1770.0 - 1779.0	9.0	8.5	94.4	B0064 - B0065	Highly vesicular pahoehoe with a glassy, baked contact. There is no change in mineralogy across the contact, each flow contains common plagioclase feldspar and is moderately olivine-phyric.
R0076	1779.0 - 1789.0	10.0	9.9	99.0	B0065 - B0066	Pahoehoe with extreme vesicularity variations. Mineralogy is identical to the previous run.
R0077	1789.0 - 1799.0	10.0	10.9	109.0	B0066 - B0067	Moderately olivine-phyric inflated pahoehoe. Olivines have been altered slightly, they have iddingsite rims.
R0078	1799.0 - 1809.5	10.5	10.4	99.0	B0067 - B0068	Inflated pahoehoe with an amazing glassy, baked contact. This rock is moderately olivine-phyric.
R0079	1809.5 - 1820.0	10.5	10.3	98.1	B0068 - B0069	Inflated pahoehoe that is highly to moderately vesicular. This flow is sparsely to moderately olivine-phyric with plagioclase feldspar microphenocrysts.
R0080	1820.0 - 1830.0	10.0	10.5	105.0	B0069 - B0070	Inflated pahoehoe that is moderately to sparsely olivine-phyric. There are baked zones at the top and middle of the run, but no obvious changes in mineralogy.

R0081	1830.0 - 1840.0	10.0	10.2	102.0	B0070 - B0071	Two pahoehoe flows, with the contact about four feet below the top of the run. Olivine is present in the upper flow while plagioclase and secondary minerals appear in the lower flow.
R0082	1840.0 - 1850.0	10.0	10.2	102.0	B0071 - B0072	Pahoehoe with a baked intraflow contact at about eight feet below the top of the run. Vesicularity increases significantly below this point.
R0083	1850.0 - 1860.0	10.0	10.4	104.0	B0072 - B0073	Inflated pahoehoe with a glassy, baked contact at the bottom of the run. The flow is aphyric to sparsely olivine-phyric.
R0084	1860.0 - 1870.0	10.0	10.2	102.0	B0073 - B0074	Pahoehoe with a flow contact about eight feet below the top of the run. Some vesicles are coated or infilled with secondary minerals.
R0085	1870.0 - 1880.0	10.0	10.5	105.0	B0074 - B0076	Aphyric to sparsely olivine-phyric pahoehoe.
R0086	1880.0 - 1890.0	10.0	10.3	103.0	B0076 - B0077	Sparsely olivine-phyric pahoehoe with a glassy, baked zone at the top of the run.

R0087	1890.0 - 1900.0	10.0	9.7	97.0	B0077 - B0078	Highly vesicular, sparsely olivine-phyric pahoehoe overlies moderately vesicular, aphyric aa. There is an obvious glassy, baked contact between flows.
R0088	1900.0 - 1910.0	10.0	10.7	107.0	B0078 - B0079	Aa overlies highly vesicular pahoehoe. Both flows are aphyric.
R0089	1910.0 - 1920.0	10.0	10.5	105.0	B0079 - B0080	Highly vesicular, sparsely olivine-phyric pahoehoe. There is a glassy, baked region near the top of the run.
R0090	1920.0 - 1927.0	7.0	5.5	78.6	B0080 - B0080	Pahoehoe overlies aa. Both flows are highly vesicular and sparsely olivine-phyric. The baked contact between flows is extremely glassy.
R0091	1927.0 - 1937.0	10.0	10.5	105.0	B0081 - B0082	Moderately vesicular, aphyric aa.
R0092	1937.0 - 1947.0	10.0	10.1	101.0	B0082 - B0083	More moderately vesicular, aphyric aa. This rock is only slightly altered, so it should be excellent for geochemical analysis.
R0093	1947.0 - 1957.0	10.0	10.0	100.0	B0083 - B0084	Aa overlies pahoehoe. Both flows are fresh and lowly to moderately vesicular. The contact is located near the base of the run.

R0094	1957.0 - 1967.0	10.0	10.3	103.0	B0084 - B0085	Highly vesicular pahoehoe with a flow contact about three feet below the top of the run. The lower flow is moderately olivine-phyric with plagioclase microphenocrysts.
R0095	1967.0 - 1970.5	3.5	3.5	100.0	B0085 - B0085	Moderately olivine-phyric pahoehoe with a partially exposed baked zone near the top of the run. Rubble or cave material at the top of the run.
R0096	1970.5 - 1980.0	9.5	9.5	100.0	B0085 - B0086	Highly vesicular, moderately olivine-phyric pahoehoe overlies highly vesicular, sparsely olivine-phyric aa with plagioclase microphenocrysts. White and clear secondary minerals are present in vesicles. .
R0097	1980.0 - 1990.0	10.0	10.5	105.0	B0086 - B0087	Aa overlies pahoehoe. Both flows are sparsely olivine-phyric and highly vesicular. There is a change in flow type, but not much baking has occurred.

R0098	1990.0 - 2000.0	10.0	8.8	88.0	B0087 - B0088	Pahoehoe overlies aa. Both flows are moderately olivine-phyric. There are green and white secondary minerals present, as well as iddingsite that has partially replaced olivine.
R0099	2000.0 - 2010.5	10.5	10.8	102.9	B0088 - B0089	Pahoehoe overlies sandstone. Sandstone is present at the end of the run. Blue clay lines many vugs.
R0100	2010.5 - 2020.5	10.0	9.4	94.0	B0089 - B0090	Two massive pahoehoe flows below sandstone. There is fine sandstone past the first foot of the run, massive pahoehoe to three feet, and a foot of coarser sediments. The second massive pahoehoe flow extends to the end of the run.
R0101	2020.5 - 2030.5	10.0	10.0	100.0	B0090 - B0091	Massive pahoehoe with at least two flow contacts. This rock is moderately olivine-phyric with some phenocrysts up to 1cm across. In addition, it is moderately to highly altered, containing green, blue, white, clear, and metallic red secondary minerals.

R0102	2030.5 - 2040.5	10.0	10.2	102.0	B0091 - B0092	Massive pahoehoe or transitional aa with slight to moderate alteration. There is a aqua-colored secondary mineral present in this aphyric to sparsely olivine-phyric rock.
R0103	2040.5 - 2048.0	7.5	7.6	101.3	B0093 - B0093	Massive pahoehoe with a glassy, baked contact about seven feet into the run. Vesicularity is low to moderate and increases with depth after the first few feet of the run.
R0104	2048.0 - 2058.0	10.0	10.0	100.0	B0093 - B0094	Two highly vesicular pahoehoe flows are contained in this run. The lower flow is highly olivine-phyric and more altered. At the base of the run, olivine is totally replaced with a white secondary mineral.
R0105	2058.0 - 2059.0	1.0	0.3	30.0	B0094 - B0094	This rock is highly olivine-phyric, moderately vesicular, and moderately to highly altered. Due to poor drilling recovery, it is not possible to characterize it further at this time.

R0106	2059.0 - 2069.0	10.0	9.7	97.0	B0094 - B0095	Highly olivine-phyric, massive pahoehoe. Olivine is fresh in this rock, but there are vugs filled with a white secondary mineral. This material took a long time to drill through.
R0107	2069.0 - 2079.0	10.0	10.2	102.0	B0096 - B0097	This run contains a flow contact at the top and aphyric aa below. Vesicularity is moderate and alteration is slight.
R0108	2079.0 - 2083.5	4.5	4.0	88.9	B0097 - B0097	Moderately vesicular, aphyric aa. Secondary minerals present are a light blue clay and zeolites. There is a flow contact present at the bottom of the run.
R0109	2083.5 - 2090.5	7.0	7.4	105.7	B0097 - B0098	Highly vesicular, aphyric pahoehoe. Alteration is slight to moderate, with extensive blue clay present.
R0110	2090.5 - 2100.5	10.0	10.2	102.0	B0098 - B0099	Highly vesicular, aphyric to sparsely olivine-phyric pahoehoe. There is a baked zone that may represent a contact about two feet below the top of the run. Alteration is slight overall and moderate in the baked zone.

R0111	2100.5 - 2110.5	10.0	9.9	99.0	B0099 - B0100	Highly vesicular pahoehoe to a transitional flow. There are slickensides located one foot below the top of the run, and glassy material about three feet into the run.
R0112	2110.5 - 2113.0	2.5	2.5	100.0	B0100 - B0100	Highly to moderately vesicular pahoehoe over a transitional flow. There is volcanic at the contact between these flows. The flows are sparsely to moderately olivine-phyric.
R0113	2113.0 - 2120.0	7.0	7.0	100.0	B0100 - B0101	Aa picrite with plagioclase feldspar phenocrysts. Vesicularity ranges from moderate to high at the bottom of the run. White secondary minerals fill many vesicles.
R0114	2120.0 - 2130.5	10.5	10.5	100.0	B0101 - B0102	Aphyric pahoehoe over olivine-rich pahoehoe. Alteration is moderate with greenish clays and a white secondary mineral present in fractures and vesicles.
R0115	2130.5 - 2140.5	10.0	9.7	97.0	B0102 - B0103	A massive, highly olivine-phyric unit overlies another massive, aphyric flow. Vesicularity ranges from moderate to high. The upper unit may only be an inclusion, not an actual flow.

R0116	2140.5 - 2142.5	2.0	2.2	110.0	B0103 - B0103	Moderately to highly altered massive picrite. The drilled length of this run is very short because drilling is difficult in this extremely olivine-rich rock.
R0117	2142.5 - 2150.5	8.0	9.2	115.0	B0103 - B0104	Picritic pahoehoe over aphyric pahoehoe. Vesicularity is high to moderate in this rock. Green clay and gypsum are common secondary minerals, products of alteration.
R0118	2150.5 - 2160.5	10.0	9.8	98.0	B0104 - B0105	Inflated, aphyric pahoehoe with an holocrystalline matrix. Vesicularity is >25%, and alteration is slight to moderate.
R0119	2160.5 - 2170.5	10.0	10.1	101.0	B0105 - B0106	Inflated, aphyric pahoehoe flows with only slight alteration. Light blue clay is present in some vesicles.
R0120	2170.5 - 2180.5	10.0	9.8	98.0	B0106 - B0107	More aphyric, inflated pahoehoe flows. Segregation vesicles are present in these flows, and alteration is slight to moderate.
R0121	2180.5 - 2186.0	5.5	4.7	85.5	B0107 - B0108	Highly vesicular, aphyric pahoehoe. There are no contacts present in this run, which begins with cave material from the start of the days drilling.

R0122	2186.0 - 2196.5	10.5	10.5	100.0	B0108 - B0109	Aphyric and moderately olivine-phyric pahoehoe. Vesicularity of these flows is high (>25%) and light blue clay is present as an alteration product.
R0123	2196.5 - 2207.0	10.5	9.9	94.3	B0109 - B0110	Pahoehoe flows with a glassy, baked contact in between. Both flows are moderately olivine-phyric, highly vesicular, and slightly to moderately altered.
R0124	2207.0 - 2217.0	10.0	10.2	102.0	B0110 - B0111	Aphyric, inflated pahoehoe flows with a glassy, baked contact in between. Vesicularity is high, and alteration is slight to moderate.
R0125	2217.0 - 2227.0	10.0	10.2	102.0	B0111 - B0112	Aphyric over moderately olivine-phyric pahoehoe. There are two contacts present in this run, and the lower contact is present at the base of the run. This is the last core run of the project!

Rock Coring Koolau Volcano Summary Lithological Report Date: 02/13/2002

data in ASCII-Format or CSV-Format

UNIT	RUN	DEPTH INTERVAL(ft)	CLASS	TYPE	ROCK NAME
U0001	R0001	1150.0 - 1156.0	VOL	aa	Highly vesicular, moderately plagioclase-olivine-phyric basalt.
U0002	R0002	1156.0 - 1166.0	VOL	pahoehoe	Highly vesicular, plagioclase-olivine-phyric basalt.
U0003	R0003	1166.0 - 1169.0	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0004	R0004	1169.0 - 1183.0	VOL	pahoehoe	Moderately vesicular, highly olivine-phyric basalt with plagioclase microlites.
U0005	R0004	1183.0 - 1190.0	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0006	R0004	1190.0 - 1217.1	VOL	pahoehoe	Highly vesicular, highly olivine-phyric basalt.
U0007	R0010	1217.1 - 1224.2	VOL	transitional	Highly vesicular, moderately olivine-phyric transitional pahoehoe to aa basalt.
U0008	R0010	1224.2 - 1236.9	VOL	aa	Moderately vesicular, moderately olivine-phyric basalt.

U0009	R0012	1236.9 - 1247.2	VOL	pahoehoe	Variably vesicular, sparsely olivine-phyric basalt.
U0010	R0013	1247.2 - 1253.7	VOL	pahoehoe	Variably vesicular, sparsely olivine-phyric basalt.
U0011	R0013	1253.7 - 1256.0	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0012	R0014	1256.0 - 1260.8	VOL	aa	Moderately vesicular, moderately olivine-phyric basalt.
U0013	R0015	1260.8 - 1266.0	VOL	transitional	Highly vesicular, aphyric basalt.
U0014	R0016	1266.0 - 1277.6	VOL	aa	Variably vesicular, aphyric basalt.
U0015	R0017	1277.6 - 1285.1	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0016	R0019	1285.1 - 1295.0	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0017	R0020	1295.0 - 1317.2	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0018	R0023	1317.2 - 1321.4	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0019	R0023	1321.4 - 1329.9	VOL	aa	Sparsely to moderately vesicular, sparsely olivine-phyric basalt.
U0020	R0025	1329.9 - 1338.0	VOL	aa	Moderately vesicular, moderately plagioclase-olivine-phyric basalt.
U0021	R0026	1338.0 - 1344.2	VOL	pahoehoe	Highly vesicular, aphyric basalt..
U0022	R0027	1344.2 - 1354.7	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0023	R0029	1354.7 - 1360.3	VOL	transitional	Variably vesicular, aphyric basalt.
U0024	R0031	1360.3 - 1373.5	VOL	aa	Moderately vesicular, aphyric basalt.

U0025	R0034	1373.5 - 1380.0	VOL	aa	Sparsely to moderately vesicular, aphyric basalt.
U0026	R0035	1380.0 - 1388.8	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0027	R0035	1388.8 - 1399.4	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0028	R0037	1399.4 - 1404.0	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0029	R0037	1404.0 - 1409.4	VOL	transitional	Highly to moderately vesicular, moderately olivine-phyric basalt.
U0030	R0038	1409.4 - 1421.8	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0031	R0039	1421.8 - 1425.7	VOL	pahoehoe	Highly vesicular, moderately to highly olivine-phyric basalt.
U0032	R0039	1425.7 - 1432.9	VOL	pahoehoe	Highly vesicular, highly olvine-phyric basalt.
U0033	R0040	1432.9 - 1435.1	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0034	R0040	1435.1 - 1439.0	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0035	R0041	1439.0 - 1441.5	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0036	R0041	1441.5 - 1449.4	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0037	R0041	1449.4 - 1453.6	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0038	R0042	1453.6 - 1474.7	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0039	R0045	1474.7 - 1480.7	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0040	R0046	1480.7 - 1491.4	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0041	R0047	1491.4 - 1495.1	VOL	pahoehoe	Highly vesicular, aphyric basalt.

U0042	R0047	1495.1 - 1497.3	VOL	transitional	Highly vesicular, aphyric basalt.
U0043	R0047	1497.3 - 1500.0	VOL	transitional	Highly vesicular, aphyric basalt.
U0044	R0048	1500.0 - 1503.7	VOL	transitional	Variably vesicular, aphyric basalt.
U0045	R0048	1503.7 - 1507.0	VOL	aa	Moderately vesicular, aphyric basalt.
U0046	R0048	1507.0 - 1524.0	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0047	R0050	1524.0 - 1534.6	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0048	R0051	1534.6 - 1548.2	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0049	R0052	1548.2 - 1555.7	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0050	R0053	1555.7 - 1573.6	VOL	pahoehoe	Highly vesicular, aphyric to sparsely olivine-phyric basalt.
U0051	R0055	1573.6 - 1590.3	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0052	R0057	1590.3 - 1596.5	VOL	pahoehoe	Highly vesicular, aphyric to sparsely olivine-phyric basalt.
U0053	R0057	1596.5 - 1604.4	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0054	R0058	1604.4 - 1615.1	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0055	R0059	1615.1 - 1617.5	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0056	R0059	1617.5 - 1629.4	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0057	R0060	1629.4 - 1640.4	VOL	pahoehoe	Variably vesicular, aphyric basalt.
U0058	R0062	1640.4 - 1645.8	VOL	pahoehoe	Highly vesicular, sparsely plagioclase-olivine-phyric basalt.
U0059	R0062	1645.8 - 1660.3	VOL	transitional	Highly vesicular, sparsely plagioclase-olivine-phyric basalt.

U0060	R0064	1660.3 - 1683.2	VOL	transitional	Highly vesicular, moderately plagioclase-olivine-phyric basalt.
U0061	R0066	1683.2 - 1709.0	VOL	pahoehoe	Variably vesicular, moderately olivine-plagioclase-phyric basalt.
U0062	R0068	1709.0 - 1726.2	VOL	transitional	Variably vesicular, moderately olivine-plagioclase-phyric basalt.
U0063	R0070	1726.2 - 1751.8	VOL	pahoehoe	Variably vesicular, moderately olivine-plagioclase-phyric basalt.
U0064	R0073	1751.8 - 1775.5	VOL	pahoehoe	Variably vesicular, moderately plagioclase-olivine-phyric basalt.
U0065	R0075	1775.5 - 1807.5	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0066	R0078	1807.5 - 1827.0	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0067	R0080	1827.0 - 1835.2	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0068	R0081	1835.2 - 1860.2	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0069	R0083	1860.2 - 1867.5	VOL	transitional	Highly vesicular, aphyric basalt.
U0070	R0084	1867.5 - 1880.0	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0071	R0086	1880.0 - 1892.4	VOL	transitional	Highly vesicular, aphyric basalt.
U0072	R0087	1892.4 - 1905.1	VOL	aa	Variably vesicular, aphyric basalt.
U0073	R0088	1905.1 - 1914.8	VOL	pahoehoe	Highly vesicular, aphyric basalt.

U0074	R0089	1914.8 - 1923.3	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0075	R0090	1923.3 - 1957.2	VOL	aa	Sparsely vesicular, aphyric basalt.
U0076	R0093	1957.2 - 1959.9	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0077	R0094	1959.9 - 1967.0	VOL	pahoehoe	Highly vesicular, highly olivine-phyric basalt.
U0078	R0095	1967.0 - 1967.9	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0079	R0095	1967.9 - 1974.9	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0080	R0096	1974.9 - 1977.3	VOL	transitional	Highly vesicular, aphyric basalt.
U0081	R0096	1977.3 - 1981.6	VOL	aa	Moderately vesicular, aphyric basalt.
U0082	R0097	1981.6 - 1991.2	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0083	R0098	1991.2 - 1997.8	VOL	aa	Variably vesicular, moderately olivine-phyric basalt.
U0084	R0098	1997.8 - 2003.8	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0085	R0099	2003.8 - 2009.3	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0086	R0099	2009.3 - 2010.5	SED	sandstone	Fine to coarse grained fluvial sandstone and pebbly breccia.
U0087	R0100	2010.5 - 2013.4	VOL	transitional	Variably vesicular, moderately olivine-phyric basalt.
U0088	R0100	2013.4 - 2024.1	VOL	transitional	Sparsely vesicular, moderately olivine-phyric basalt.
U0089	R0101	2024.1 - 2028.1	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.

U0090	R0101	2028.1 - 2033.3	VOL	transitional	Variably vesicular, moderately olivine-phyric basalt.
U0091	R0102	2033.3 - 2048.5	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0092	R0104	2048.5 - 2069.3	VOL	massive	Moderately vesicular, highly olivine-phyric basalt.
U0093	R0107	2069.3 - 2083.5	VOL	aa	Variably vesicular, aphyric basalt.
U0094	R0109	2083.5 - 2092.1	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0095	R0110	2092.1 - 2102.0	VOL	pahoehoe	Variably vesicular, moderately olivine-phyric basalt.
U0096	R0111	2102.0 - 2111.0	VOL	transitional	Variably vesicular, moderately olivine-phyric basalt.
U0097	R0112	2111.0 - 2117.3	VOL	aa	Moderately vesicular, highly olivine-phyric basalt.
U0098	R0113	2117.3 - 2129.7	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.
U0099	R0114	2129.7 - 2143.9	VOL	massive	Moderately vesicular, highly olivine-phyric basalt.
U0100	R0117	2143.9 - 2168.1	VOL	transitional	Variably vesicular, moderately olivine-phyric basalt.
U0101	R0119	2168.1 - 2199.5	VOL	transitional	Highly vesicular, aphyric basalt.
U0102	R0123	2199.5 - 2212.3	VOL	pahoehoe	Highly vesicular, sparsely olivine-phyric basalt.
U0103	R0124	2212.3 - 2226.0	VOL	pahoehoe	Highly vesicular, aphyric basalt.
U0104	R0125	2226.0 - 2226.0	VOL	pahoehoe	Highly vesicular, moderately olivine-phyric basalt.