DOSECC

DRILLING OBSERVATION & SAMPLING OF THE EARTH'S CONTINENTAL CRUST

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NEWS FOR THE CONTINENTAL SCIENTIFIC DRILLING COMMUNITY

CONTENTS

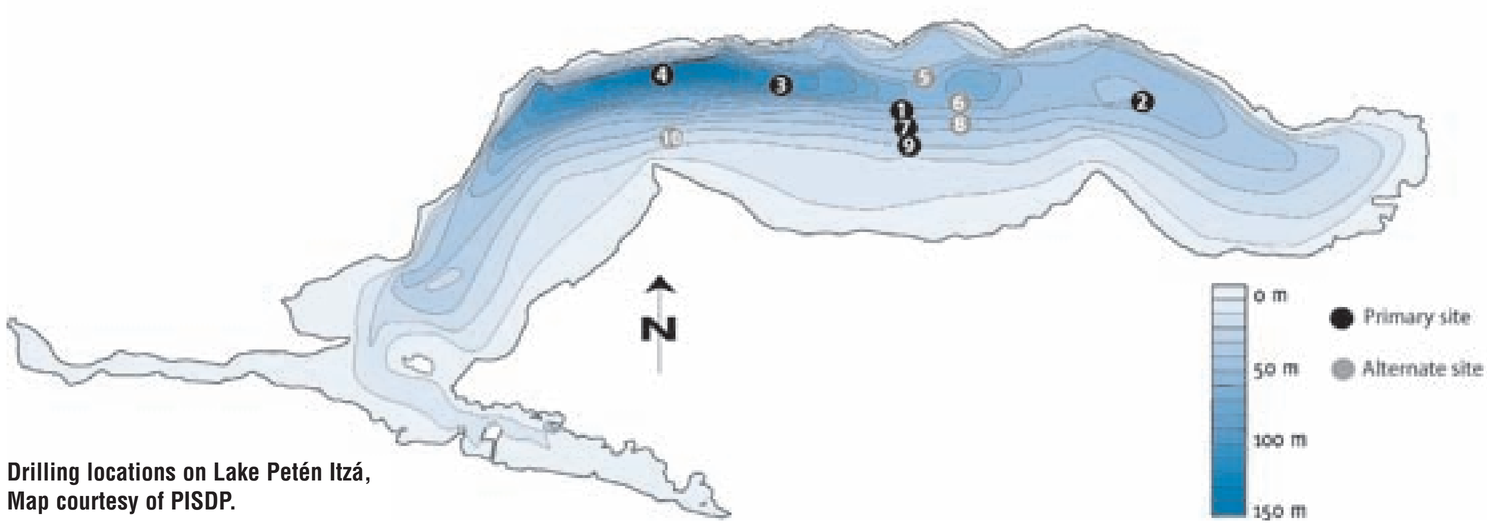
1.3 km of Sediment Recovered by the Lake Petén Itzá Scientific Drilling Project

Lake Petén Itzá, a 165 m deep lake in northern Guatemala, is the deepest lake in the lowlands of Central America. Because of its great depth, it held water during full glacial periods of the Pleistocene when arid climate persisted in the region. The objective of the PISDP was to recover complete lacustrine sequences to study climate variability in lowland Central America during the late Pleistocene and Holocene on time scales ranging from decades to millennia.

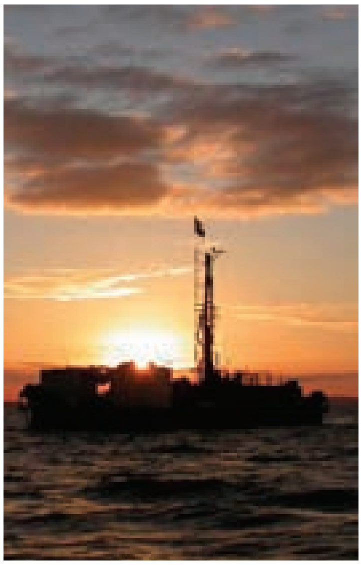
Tools used to collect core included DOSECC's Hydraulic Piston Coring (HPC) system and extended-nose bit coring tools. A total of 1327 m of sediment was recovered at seven sites ranging in water depth from 30 to 150 m. Core recovery averaged 93.4%. Multiple holes were drilled at most sites and cores were logged in the field for density, p-wave velocity, and magnetic susceptibility using the ICDP GEOTEK core logger. Complete stratigraphic recovery was verified in near-real time using Splicer, an IODP software program that aligns features among holes using core logging data.

Smear-slide analysis of core catcher samples indicates similar lithostratigraphies among deep-water sites in the central basin. All cores show an abrupt transition from Late Glacial dense gypsum sand interbedded with silty clays, to Holocene gray clay, representing a shift from arid glacial to moist early Holocene conditions. High-frequency variations in bulk density occur throughout the last glacial period and can be cor-

1000 meters and counting! March 1, 2006. L to R – Jason Curtis, Dave Hodell, James Cranmer, Ed Brown, Mark Brenner, Doug Schnurrenberger, and Kent Thomas. *(Photo: PISDP)*



Drilling locations on Lake Petén Itzá, Map courtesy of PISDP.



All cores show an abrupt transition from Late Glacial dense gypsum sand interbedded with silty clays, to Holocene gray clay, representing a shift from arid glacial to moist early Holocene conditions. *(Photos: PIDSP)*

related among sites in the deep basin. Below the gypsiferous interval is a thick sequence of diatom-rich gray clay. Radiocarbon and U/Th dating are under way to determine the age of the sediments recovered.

Downhole logging was conducted by the ICDP Operational Support Group (OSG) at five sites using slimhole tools, which will permit correlation of core and downhole logs and their integration with seismic profiles. Samples from at least one hole at each site were squeezed for pore water geochemical analysis, and ephemeral properties such as alkalinity and pH were measured on site. One unexpected finding was the occurrence of elemental sulfur in several cores.

The cores were shipped from Guatemala in a refrigerated container and arrived safely at the National Lacustrine Core Repository at the University of Minnesota where they will be stored. We, the members of the Petén Itzá Scientific Drilling Party, express our sincere thanks and appreciation to the DOSECC drilling team and ICDP-OSG whose hard work and good humor made the project such a success. We have recovered a wealth of high-quality core material that will permit us to study the sediment biogeochemistry of Lake Petén Itzá and reconstruct the climate and environmental history of the region.

David Hodell, Department of Geological Sciences, University of Florida, Gainesville, FL
Flavio Anselmetti, ETH Zurich, Geological Institute, Zurich
Daniel Ariztegui, Institute F.- A. Forel, Univesity of Geneva, Versoix
Mark Brenner, Department of Geological Sciences, University of Florida, Gainesville, FL
Jason Curtis, Department of Geological Sciences, University of Florida, Gainesville, FL
and members of the Petén Itzá Scientific Drilling Party
Additional input from David Zur, DOSECC

Between Feb 3 and March 11, 2006, drilling was conducted by DOSECC on Lake Petén Itzá using the Global Lake Drilling (GLAD800) drill rig, mounted on the "superbarge" *R/V Kerry Kelts. (Photo: PISDP.)*

Drilling of three 75-100 feet deep holes was done with DOSECC's CS-500 rig and was completed in four days. The highly professional and incredibly hard-working two-man drilling crew (Chris Delahunty and Vance Hiatt) did a fantastic job and succeeded with nearly 100% core recovery. —G.K.

Examining core recovery at Brazos drill site: Gerta Keller and Jerry Baum. *(Photo montage by Gerta Keller)*

Drilling K-T and Chicxulub Event Strata in Texas

In March 2005, DOSECC drilled the Cretaceous-Tertiary (K-T) boundary sequences in two localities along the Brazos River, Falls County, Texas. The project was organized by Professor Gerta Keller (PI), Geosciences Department, Princeton University, and funded by NSF-EAR. The Brazos River area was chosen to test the current controversy over the age of the Chicxulub impact: whether this impact was the K-T killer as commonly believed or predated the K-T boundary by 300 k.y., as suggested by the new Chicxulub crater core Yaxcopoil-1 and outcrops in NE Mexico (Keller et al., 2003, 2004).

The Brazos River area provides a simple and inexpensive test of these results by drilling a couple of 100 feet deep holes across the K-T boundary. This area was chosen because of the complete stratigraphic sequences, which are comparable to the K-T boundary stratotype section at El Kef, Tunisia, the location about 1000 km from the impact crater, and the presence of both the K-T Ir anomaly and "event deposit" with Chicxulub impact ejecta spherules in widely separated stratigraphic intervals. These attributes mark the Brazos River area as the most important K-T impact locality outside Mexico and critical to resolving the current controversy regarding the age of the Chicxulub impact and its potential kill-effect.

The cores recovered the K-T boundary in undisturbed dark laminated mudstones 90 cm above the 30 cm thick "event deposit", which consists of reworked Chicxulub impact spherules, glauconite, shell hash and mudclasts at the base followed by bioturbated laminated and hummocky sandstones. Between the event deposit and the K-T boundary are upward fining silty mudstones (first 10 cm) followed by 80 cm monotonous laminated shales and mudstone with shells and burrows infilled with pyrite. The stratigraphic separation of the K-T boundary and event deposit provides the most promising test for the K-T and Chicxulub impact events. Initial results presented at the May 23-25, AGU, in Baltimore.

Gerta Keller, Princeton University

Brazos KT Drilling participants include:

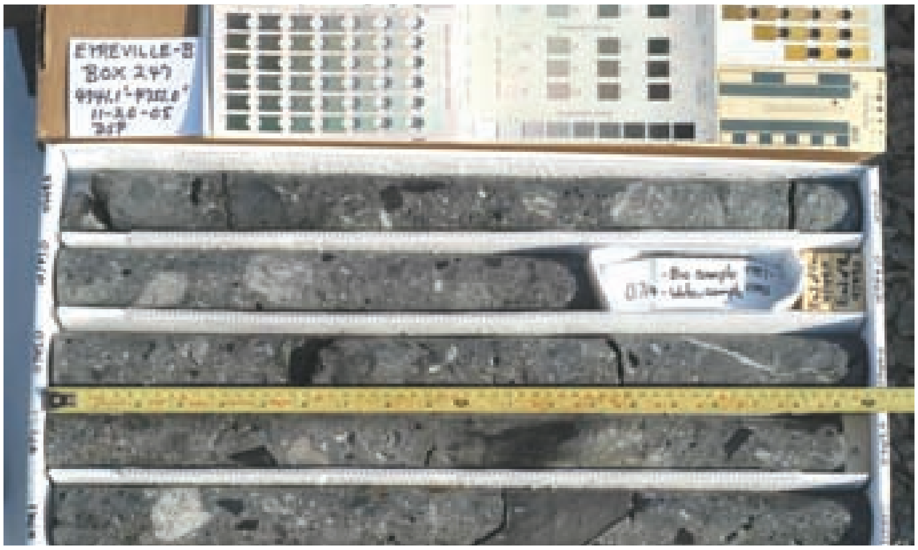
Gerta Keller (PI) Princeton University, Princeton, NJ
Gerald R. Baum, Maryland Geological Survey, Baltimore, MD
Thomas Yancey, Texas A & M University, College Station, TX
Thierry Adatte, Geology Department, University of Neuchatel, Switzerland.
Michael Prauss, Free University, Berlin, Germany

References:

Keller, G., Stinnesbeck, W., Adatte, T. and Stueben, D., 2003. Multiple Impacts across the Cretaceous-Tertiary boundary. Earth Science Reviews, 62, 327-363

Keller, G., Adatte, T., Stinnesbeck, W., M. Rebolledo-Vieyra, J. Urrutia Fuccugauchi, U. Kramar and D. Stueben, 2004. Chicxulub impact predates the K-T boundary mass extinction. PNAS 101(11): 3753-3758

Deep Corehole Completed in the Chesapeake Bay Impact Structure



Suevitic and lithic breccia in core box; Eyreville - B Corehole; 1445 - 1448m *(Photo: David Powars)*

The Chesapeake Bay Impact Structure

The late Eocene Chesapeake Bay impact structure is located in southeastern Virginia, USA, and is among the largest and best preserved of the known impact structures on Earth. This buried crater structure consists of a deep, 38-km-wide central zone surrounded by a shallower outer zone of sediment collapse known as the annular trough, which extends the structure to a total diameter of about 85 km and gives it a distinctive shape that is generally referred to as an "inverted sombrero." It is the seventh largest impact structure recognized on Earth.

The Chesapeake Bay structure is distinctive among impact structures on Earth for several, scientifically important reasons. At 35.5 Ma, it is a relatively young structure and, in comparison to other known impact structures of similar size, is very well preserved. Its location on a passive continental margin prevented the tectonic distortion that has affected many large terrestrial impact structures. Also, its location on a relatively deep continental shelf allowed marine deposition to resume immediately following the impact, which rapidly and completely buried the crater, thereby preventing subsequent erosion. Its target zone consisted of multiple layers (water, sediment, rock) that varied in strength; this rheological variation appears to have controlled the final size and shape of the structure to a large extent. The presence of an oceanic water column in the target resulted in a thick section of sedimentary breccias within the upper part of the crater produced by catastrophic resurge currents and perhaps impact-generated tsunamis; ocean-resurge sediments obviously are not a feature found in "dry" continental impacts. Finally, the Chesapeake Bay impact structure is the source of the North American tektite strewn field.

The post-impact late Eocene to Pleistocene sediments that cover the structure also are of significant interest. This section of fine-grained marine sediments documents the post-impact, middle to late Cenozoic sea-level history, stratigraphic sequences, and climate variability of the Mid-Atlantic segment of the U.S. Atlantic continental margin.`

A further prime research issue is the hydrogeology of the impact structure. The presence of salty groundwater throughout the structure is of significant interest to those studying the availability of fresh water in the densely populated and rapidly growing urban corridor located along the southwestern and southern margins of the impact structure. This project also presented an opportunity for deep biosphere research, which was carried out using appropriate drill-site anti-contamination protocols (including tracer gas and microbead additions to the drilling mud) during core retrieval.

The ICDP-USGS Chesapeake Bay Structure Drilling Project

In September 2003, a workshop funded by the International Continental Scientific Drilling Program (ICDP) and hosted by the U.S. Geological Survey (USGS) was held near Reston, Virginia, to create scientific, operational, and funding plans for the drilling of a deep corehole into the central area of the Chesapeake Bay impact structure. The workshop was attended by over 60 scientists from ten countries.

A funding proposal resulting from the workshop was submitted to ICDP in January 2004 and accepted by ICDP in late 2004. The USGS also authorized funding for the deep drilling in 2004. Hence, ICDP and USGS provided the initial funds for the drilling budget. Supplementary drilling funds were provided by ICDP, USGS, and the NASA Science Directorate in November-December 2005. DOSECC, Inc., served as the general contractor for the field operations, and Major Drilling America, Inc., drilled the deep corehole under contract to DOSECC. Seven science teams organized at the 2003 workshop constitute the Project's research group.

The drill site is located on private land owned by the Buyrn family and is known locally as Eyreville Farm. This site is in Northampton County, Virginia, between the villages of Eastville and Cheriton.

Preliminary Corehole Stratigraphy

Coring was completed to a total depth of 1,766 m during September-December 2005. Cores were recovered from two parallel coreholes, as described in the following section.

The geologic section consists of 1,322 m of crater-fill impactites overlain by 444 m of post-impact sediments (Table 1). The lowest crater unit encountered in the core consists of a ca. 216-m-thick section of mica schist and pegmatite with minor gneiss and impact-generated dike rocks. A ca. 157-m-thick section of suevitic and lithic breccias overlie the schists and pegmatites and underlie a 275-m-thick megablock of granitic rock. The granitic megablock is overlain by a thick section of impact-disrupted pre-impact sediments; the upper part of this section includes a sedimentary breccia known as the Exmore breccia, which contains sediment clasts and crystalline-rock clasts. The cored post-impact section consists of upper Eocene, Oligocene, and Miocene fine-grained marine sediments.

Drilling History

Site operations began in late July 2005 when a local well-drilling company, Somerset Drilling, Inc., installed a water-supply well at the site. They also began the deep corehole by rotary drilling to a depth of about 128 m (no coring) and installing large-diameter steel casing to a depth of 125 m. The Virginia Department of Environmental Quality acquired a set of geophysical logs in the corehole before casing was installed.

TABLE 1. Preliminary generalized lithologic column (composite for two coreholes)

0 to 444 m	Post-impact sediments
444 to 1,096 m	Sediment-clast breccia and sediment megablocks
1,096 to 1,371 m	Granitic megablock(s)
1,371 to 1,393 m	Lithic blocks in sediment
1,393 to ca. 1,550 m	Suevitic and lithic breccia
ca. 1,550 to 1,766 m	Schist and pegmatite; breccia veins

The drill crew and equipment from Major Drilling America arrived in early September, and coring began in the deep hole at a depth of about 125 m on September 15th using a CP-50 wireline coring rig. Drilling proceeded in good fashion using a PQ sampling system (Table 2) to a depth of 591.0 m when mud circulation was lost on September 23rd and the CHD-134 ("PQ") rods became trapped in the hole.

Coring resumed on September 24th using an HQ coring system (Table 2) and continued to a depth of 940.9 m on October 8th when mud circulation again was lost. At that time, the drillers pulled the HQ rods and bit up into the CHD-134 rods at 591.0 m depth. Repeated attempts to ream the hole back to 940.9 m depth continued for nearly two weeks because of repeated loss of mud circulation due to expanding and sliding red-clay sections ("clay boots") in the sediment-clast breccia (Table 1). The bit finally returned to a depth of 940.9 m on October 20th. However, during the reaming process, the bit had deviated from the original hole at a depth of 737.6 m. As a result, duplicate cores were collected between depths of 737.6 m and 940.9 m. Hence, two coreholes are designated at the Eyreville site, the Eyreville A corehole and the Eyreville B corehole (Table 2).

Coring in Eyreville B continued with the HQ system to a depth of 1,100.9 m where the HQ bit was deliberately stuck within a section of granite on October 26th. Thus, the HQ rods were intentionally left in the hole to serve as casing against the troublesome red clays in the sediment-clast breccia. Coring with an NQ coring system (Table 2) started on October 27th at 1,100.9 m and continued without major problems to the final depth of 1,766.3 m on December 4th.

The uppermost 125 m of the geologic section were not cored in 2005. The USGS will drill a

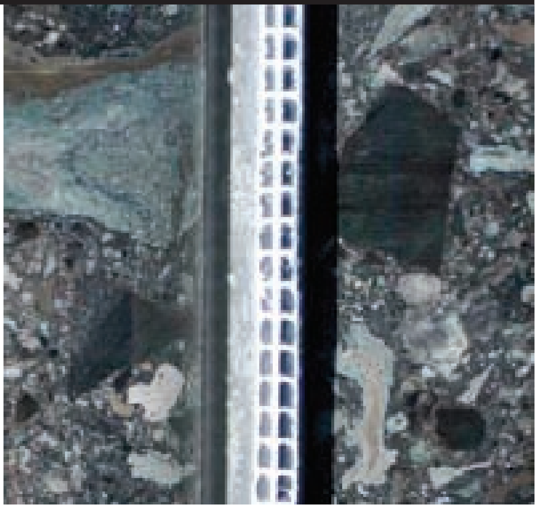
View of CBIS drilling operation. *(Photo: David Powars)*

ABOVE: Recovering the core barrel. *(Photo: Greg Gohn)*

DOSECC

TABLE 2. Corehole information

Total depth:	1,766.3 m
Cored interval:	125.6 m to 1,766.3 m
Core recovery:	Very good, but percentage not calculated
Latitude:	37 19 17 N (preliminary)
Longitude:	75 58 30 W (preliminary)
Location:	Eyreville Farm, Northampton County, Virginia, USA
First core:	September 15, 2005
Last core:	December 4, 2005
Core sizes:	PQ, 125.6 to 591.0 m in Eyreville A corehole, 85 mm diameter
	HQ, 591.0 to 940.9 m in Eyreville A corehole, 63.5 mm diameter
	HQ, 737.6 to 1,100.9 m in Eyreville B corehole, 63.5 mm diameter
	NQ, 1,100.9 to 1,766.3 m in Eyreville B corehole, 47.6 mm diameter
Geophysical Logging:	July 27, 2005
	Virginia Dept. of Environmental Quality logging truck
	December 4-5, 2005
	USGS logging truck, Denver, Colorado
	Karlsruhe University temperature logging trailer



Suevite - ~4825' (1524m) - 11/17/05

TABLE 3. Post-drilling corehole configuration

Steel casing, diameter 35.56 cm	0 to 16.8 m
Steel casing, diameter 16.83 cm	0 to 125.6 m
CHD-134 (“PQ”) rods, inside diameter 103.2 mm	0 to 591.0 m
HQ rods, inside diameter 77.8 mm	0 to 1,100.9 m

Extruding a new core from the sample barrel.

corehole to about 140 m depth at Eyreville in May 2006 to recover this section, which is anticipated to consist of upper Miocene, Pliocene, and Pleistocene sediments.

Unfortunately, the geophysical logging program was compromised significantly because of the trapped steel rods in the corehole, equipment malfunctions, and bridging of the open hole after the NQ rods were removed. A planned interim logging run to about 1 km was not attempted because of the reaming problems in the red clay and the subsequent permanent placement of the HQ rods in the hole. Only three logs were acquired after the coring was completed on December 4th, despite considerable effort. The USGS logger collected a natural gamma log and a temperature log inside the NQ rods for nearly the entire length of combined holes A and B. A temperature log collected using a probe from Karlsruhe University, Germany, also was run at that time.

The top of the hole is closed with a removable short section of modified HQ drill rod fitted with a pressure gauge and hose connection. The hole may be accessed only through the HQ rods. The uncased hole below 1,100.9 m probably cannot be accessed. Four sets of steel casing or rods remain in the hole (Table 3).

Core Storage and Sampling Party

The cores were taken to the USGS National Center in Reston, Virginia, during and after the drilling operations in 2005. The cores from the impactite section will reside there for the near future. Cores from the post-impact sedimentary section will be moved to Rutgers University, New Jersey, in May 2006.

The entire core was displayed at a sampling party that was held on March 19-22, 2006 at the USGS National Center. At that time, the Project’s Science Team members examined the cores and marked sample intervals. Presentation of preliminary results is tentatively planned for spring 2007 at an international meeting to be determined.

Drill-Site Staff

The success of the Chesapeake Bay impact structure drilling program is directly attributable to hard work by numerous dedicated individuals (Table 4) during the long days and nights at the drill site. Chief among this group are the field-operations staff from DOSECC, the drillers from Major Drilling America, and the dozens of scientists and technicians from universities and agencies in Austria, Canada, Finland, Germany, Norway, South Africa, Spain, the UK, and the USA, who served as the site geologists.

Gregory S. Gohn, U.S. Geological Survey, USA
Christian Koeberl, University of Vienna, Austria
Kenneth G. Miller, Rutgers University, USA
Wolf Uwe Reimold, Univ. of the Witwatersrand, South Africa, & Humboldt University, Germany

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Milford Hayes, Drill Helper
Richard Nehring, Drill Helper
Ryan Wilson, Drill Helper

Henning Dypvik (University of Oslo) and Jean Self-Trail (USGS) examine a new core. *(Photo: Greg Gohn)*

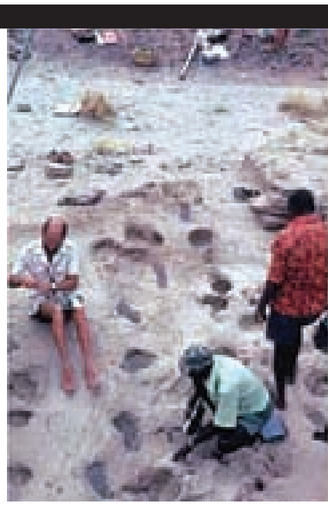
ABOVE: Night Shift! Geologists clean the new core from a depth of 3,090 ft (942 m). *(Photo: Greg Gohn)*

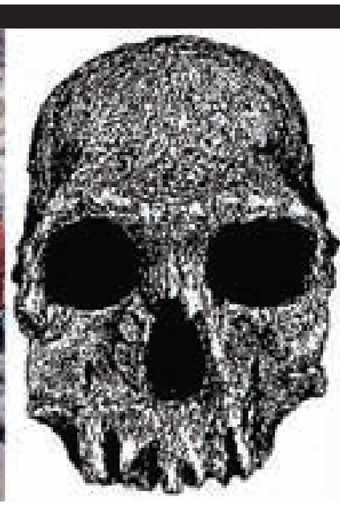
DOSECC

MEMBERSHIP NOW INCLUDES 54 INSTITUTIONS

DOSECC welcomes the University of Massachusetts at Amherst as its 54th member! Julie Brigham-Grette is the UMass representative. DOSECC continues to increase its membership as a way of gathering input and guidance from as broad a cross section of the scientific community as possible. Participation of the membership on DOSECC committees and at membership meetings is critical to chart the direction for the organization. To become a member, the institution is required to pay a one-time membership fee of $3,000. The membership fees become part of a corporate reserve account, the interest from which provides funding for the annual student internship awards.

UMASS AMHERST





Paleoclimate and Human Evolution Workshop

Over the past two and a half decades, new techniques for studying climate change, applied especially to deep-sea drill core records, have driven the development of environmental forcing hypotheses of human evolution. These hypotheses link specific climate transitions during the last 5 to 10 million years or changes in climate variability over that same time period to events in hominin physical and adaptive evolution and species diversification [e.g., Vrba, 1988; Potts, 1996; Bobe and Behrensmeyer, 2004].

Key developments in hominin evolution, and especially in the human genus Homo with its unique array of behavioral characteristics, may be tied to specific climate ‘events’ or to the increase or decrease in climate variability in particular time intervals. The key forcing factors might include the stepwise aridification of Africa during the late Pliocene and early Pleistocene (about 3 to 1.5 million years ago), or changes in the variability of climate (and the food and water resources affected by the new climate regime) driven by changes in the Earth's orbital precession, obliquity, and eccentricity, (Milankovich insolation forcing) or millennial-scale climate fluctuations.

Simultaneously, there has been a tremendous growth in interest in documenting climate change in those regions of the world where major events in human evolution occurred. This interest has been spurred by efforts to complement the paleoanthropological record [e.g., Cerling, 1992; Quade et al., 2004] and, more broadly, to understand climate dynamics in the tropics [e.g., deMenocal, 1995].

The convergent interests of geologists, paleoanthropologists, archaeologists, and paleoclimatologists, coupled with recent developments in the acquisition of long drill cores from Lakes Malawi and Bosumtwi in tropical Africa, formed the backdrop for a recent workshop on paleoclimates and human evolution. Workshop participants gathered to consider current knowledge of the relationship between human evolution and climate history over the last 25 million years and to chart promising directions for future research and interdisciplinary collaborations in this rapidly developing field.

Linking Deep Sea and Lake Cores to Evolutionary History

Workshop participants debated the challenges to understanding the role of climate in human evolution. Although correlation of events cannot demonstrate causation, comparative temporal analyses of paleoclimate versus hominin and other vertebrate fossil records are at least a first step in researching this linkage, and several researchers presented such data.

Workshop participants recognized that fundamental difficulties exist in integrating data derived from very different sources, as these data represent very different temporal and spatial scales of resolution and completeness. In particular, discussion focused on how to better use environmental history data that are appropriately scaled to the hypotheses being evaluated [e.g. Behrensmeyer, 2006].

Drill core records from the deep sea currently provide the most temporally complete record of environmental variability in East Africa over the last five million years; and this record shows some striking correlations with major episodes of hominin and other mammalian evolution [deMenocal, 2004]. Marine records indicate that African climate has been influenced by a combination of high-latitude teleconnections (~100-kiloyear glacial/interglacial cyles), variability in tropical insolation (driven by the precession cycle), sea surface temperatures [e.g., Schefuss et al., 2003], and monsoon intensity. Drying cycles apparently became larger and longer after 2.8, 1.7, and 1.0 million years ago (Ma), following the predominant orbital beats of global climate variability.

New drill core records from African lakes and the promise of identifying future drill sites provide an exciting opportunity to address this scaling problem by opening up new combinations of spatial/temporal resolution and stratigraphic continuity during key intervals in human evolution, conference participants noted. Potential targets might be situated in existing lakes, in the depocenters of ancient lake basins, or even in the outcrop belts where hominin fossils and artifacts have been recovered. Tropical lakes, with their long-recognized sensitivity to subtle changes in precipitation/evaporation ratios, and their frequent accumulation of annually varved deposits, are ideal for producing such records [e.g., Johnson et al., 2002; Scholz et al., 2005].

Another challenge discussed during the workshop is to link reconstructed changes in paleoclimate to the patterns observed in fossil bones and stone tools. Part of this involves assessing which behaviors and anatomical traits make sense as evolutionary responses to changing climate and habitat.

Conference participants discussed how changes in diet, evidenced from hominin jaw or dental evolution within a species of hominin, might suggest a particular directional shift in vegetation cover and/or climate over the time or in the geographic range of the species in question. Participants also showed that microscopic patterns of wear on fossil teeth related to different types of food consumed could provide evidence that among early hominins, selective pressures favored generalists capable of falling back on less preferred foods during arid intervals, when preferred food types were scarce. In addition, conference attendees showed that skeletal differences between humans living under different climatic regimes are evident even between modern populations of Homo sapiens. Similar climate response arguments may help in the understanding of major transitions between Austalopithecus and Homo, between species of Homo, or even within those hominin species such as A. afarensis that have a rich and long fossil record [Wood and Richmond, 2000]. Given the limited species diversity of hominins today (n = 1), models linking skeletal or size differences both within and between species and sexes to climate or vegetation differences in other types of modern mammals, especially primates can also be developed.

Defining time intervals for study and subjects for interdisciplinary research

There was a consensus among workshop participants that improved climate reconstructions for Africa and the hominin expansion corridors in Eurasia are an immediate, pressing goal. With continuous African continental drill core records, researchers now can test ideas linking cultural innovation and human dispersal with the timing of specific climate events (e.g., wetter periods or periods of greater or lesser climate variability). In Eurasia, where regional climate reconstructions for the middle to late Pleistocene transition are more broadly available, this approach has already paid off in a better understanding of the differences in habitat and climate range between modern Homo sapiens and Neanderthals.

There was also a consensus concerning the need for interdisciplinary research on key time intervals. These are intervals when there are both data supporting extremely important evolutionary events and the potential to obtain much more highly resolved climate records than we have at present. Three intervals stood out as noteworthy for future intensive, integrative study:

- 3.0–2.4 Ma: Onset of 41-kiloyear glacial cycles in Arabian Sea dust records, origin of stone tools and the genus Homo, evidence of faunal change in East Africa
- 2.0–1.5 Ma: Evolution of Homo erectus, expansion of Homo out of Africa, evidence for expansion of grassland habitats
- 0.4–0.05 Ma: Diversification of Homo, origin of anatomically modern humans, beginning of Middle Stone Age and major transition in stone tool and other technological innovations, dispersal of modern humans out of Africa

In taking a time-slice approach, the challenge for the paleoclimate/human evolution community will be to better integrate outcrop, marine, and lake core data and modeling results, in order to reconcile their very different temporal and spatial scales and resolutions. Conference participants agreed that a research consortium of like-minded scientists could provide an umbrella of symposia,

DOSECC RIG AND TOOLS DISPLAYED AT GSA

With the annual Geological Society of America meeting in Salt Lake City in 2005, DOSECC decided to display our CS500 drilling rig at the convention. We also displayed some of our drilling tools and bits.

(Photo: DMZ)

UPCOMING CONFERENCES

Society of Economic Geologists
May 13-16, 2006
Keystone, CO, USA

Geological Society of America
October 22-25, 2006
Philadelphia, PA, USA

American Geophysical Union
December 11-15, 2006
San Francisco, CA, USA

UPCOMING WORKSHOPS

ICDP Workshop: Snake River Scientific Drilling Project
Twin Falls, Idaho, USA
May 18-21, 2006

IODP- ICDP Workshop on Fault Zone Drilling: Developing a Global Perspective
Miyazaki, Japan
May 23-26, 2006

ICDP Workshop: Lake Van Drilling Project
Van, Turkey
June 6 – 9, 2006

ICDP Workshop: The Magma-Hydrothermal Connection Mutnovsky Volcano and the Mutnovsky Geothermal Reservoir
Petropavlovsk-Kamchatsky, Russia
September 2006

LINKS TO ALL WORKSHOPS AT WWW.DOSECC.ORG

databases, and Web sites or publications to promote such an effort. It would also sharpen the focus on where improved climate records might be obtained on the continents, specifically through scientific drilling technology. Such records might come from a range of possible targets, from drilling existing fossil/artifact outcrop sites in order to sample unweathered strata, to drilling depocenters near such sites for more complete records, to drilling extremely long continental records in areas such as Lake Tanganyika in central Africa, where a continuous record of the span of human evolution might be obtained.

Regardless of the approach, the workshop made clear that this is only the beginning of what promises to be an exciting time for collaborative efforts to understand the climatic context in which our species and our close relatives evolved.

Paleoclimates and Human Evolution: A Workshop on Integrating Continental Drilling Research with Paleoanthropology and Other Geological Records, held 17–20 November 2005 at the Smithsonian's Conservation and Research Center in Front Royal, Va., was sponsored by the U.S National Science Foundation; the Smithsonian Institution's National Museum of Natural History's Human Origins Program; and Drilling, Observation and Sampling of the Earth's Continental Crust (DOSECC), Inc. Additional workshop information can be found at http://www.geo.arizona.edu/web/HumanEvolutionWorkshop/

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DOSECC – SCEC Workshop: Origin and Depth Extent of Pulverized Rock Along Active Continental Faults in Southern California: Insights to be Gained from Shallow Boreholes
Palm Springs, CA, USA
September 2006

10th International Paleolimnology Symposium
Duluth, Minnesota, USA
June 25-29,2006

12th International Symposium on Deep Seismic Profiling of the Continents and their Margins
Shonan Village Center
Hayama, Japan
September 24-29, 2006

Iceland Deep Drilling Project Update

In December 2003, Hitaveita Sudurnesja Ltd (HS) offered one in a series of several production wells they planned to drill at Reykjanes as a candidate for deepening to 5 km by the IDDP, once the production characteristics of these wells had been tested. Accordingly the drillhole RN-17 at Reykjanes became the prime candidate for deep drilling by the IDDP. HS intended to release this drillhole, or another well of opportunity, to IDDP for deepening, provided enough steam for a 100 MWe power plant had been secured before mid-year 2006. However a flow test of RN-17 in November 2005 was cut short when it became plugged by rock debris and attempts to clean and condition this drillhole failed in February 2006. A caliper log revealed that there has been extensive caving, therefore drillhole RN-17 is no longer a candidate for deep drilling by the IDDP.

In February 2005, RN-17 was completed to 3.1 km depth, the deepest drillhole in the Reykjanes field. As it was then the prime candidate for deepening by the IDDP, all daily reports and well reports on RN-17 were written in English and, following the ICDP protocol, made available at the ICDP website. ICDP agreed to finance a spot core in this well. However, by the time funding became available RN-17 had already been completed and so the core was collected from the bottom of well RN-19, another "well of opportunity" that was being drilled at that time. In 2005 the IDDP distributed samples of drill cuttings from RN-17 and core from RN-19, for study by the international science team. At the moment several groups in Italy, France, Germany, USA, Russia and Iceland are studying this material as well as drill cutting samples from other wells at the Reykjanes geothermal field. Other teams were waiting for fluid samples from the flow test of RN-17 of last November that ended abruptly due to collapse of the formation, as mentioned above. Losing RN-17 is most unfortunate for Hitaveita Sudurnesja, as that company has borne the financial loss of drilling a well that had to be abandoned.

This situation has created the opportunity for IDDP to re-evaluate future plans. At the moment we are discussing the advantages of drilling a deep well in search of supercritical fluid in a different location, at the Krafla geothermal field, instead of at Reykjanes, while maintaining the objectives and momentum of the project. Expect a new announcement on this matter shortly.

Wilfred Elders

DOSECC Provides Drilling Tools for Antarctica Project

Drilling tools are one of the most important parts of a drilling program. DOSECC has recently supplied downhole coring tools for the Shallow Drilling on the Antarctic Continental Margin (SHALDRIL) Project.

The SHALDRIL Project will use DOSECC's Lake Coring System (DLCS) suite of tools. The suite includes a push sampler for soft sediments, the extended nose case sampler for stiffer sediments, DOSECC's proprietary hydraulic piston corer, the DOSECC-designed Alien sampler, and a non-coring assembly for fast drilling where core is not collected.

In addition, DOSECC has proposed to provide drilling tools for the Antarctic Geological Drilling Program (ANDRILL).

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Newsletter edited by David Zur

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Congratulations to the 2006 DOSECC Internship Awardees!

Brandon Mijal
Western Washington University

Brandon is studying Holocene glaciation of central Idaho's Sawtooth Mountains. His study involves intensive glacial mapping and alpine lake sediment coring throughout the Redfish Lake drainage. By linking outwash sediments to moraine sequences, lake core sediments can provide a proxy record of glacial fluctuations of the range. Lake sediment stratigraphy, 14C AMS radiocarbon, and tephra analysis from each core will outline glacial fluctuations throughout the area, leading to the first detailed Holocene glacial chronology for the range. His faculty sponsor is Dr. Douglas Clark.

Kristen Marra
University of Oklahoma

Kristen's project will examine the origin, composition, and depositional history of sediment fill within Unaweep Canyon, CO in order to help constrain the canyon's unresolved genesis. The fill from the inner canyon includes a thick lacustrine section that will provide a high resolution climate record for an upland setting for the early and mid Pleistocene. Sedimentological and geochemical analyses will be conducted on core collected from the canyon's inner gorge in June, 2004. Her faculty sponsors are Dr. Michael J. Soreghan and Dr. G.S. Soreghan.

Andrew Kulpecz
Rutgers University

Andrew's study will evaluate the post-impact stratigraphic evolution of the late Eocene Chesapeake Bay Impact Structure using integrated sequence stratigraphy. Lithologic, Sr-isotopic, and biostratigraphic analyses will be used to establish temporal hiatuses and determine sequence distribution within the crater. One-dimensional backstripping will be used to quantify in-crater tectonics and allow for an evaluation of the processes that control sequence distribution (eustasy, tectonics, sediment supply) across the mid-Atlantic coastal plain. This study will use core from the DOSECC/USGS/ICDP Eyreville-1 corehole, the USGS Langley and Exmore coreholes, and regional geophysical logs. His faculty sponsor is Dr. Kenneth G. Miller.

DOSECC annually makes available funding from its membership reserves to promote student involvement in projects where drilling has provided data and material for study. Since 2000, DOSECC has supported 11 internships.

DOSECC thanks all the applicants for their interest in the internships, and congratulates the awardees on their success. We look forward to the presentation of the results of their studies at DOSECC's Eleventh Annual Continental Scientific Drilling Workshop in June 2007.

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