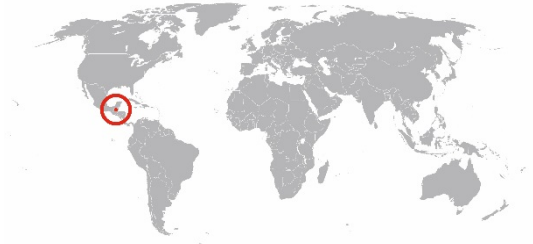




## PISDP

Lake Petén Itzá Drilling Project  
Guatemala



### Goal & Scientific Objective

The primary purpose of the Lake Petén Itzá Scientific Drilling Project (PISDP) was to recover complete lacustrine sediment sequences to study the following: (i) the paleoclimatic history of the northern lowland Neotropics on decadal to millennial timescales, emphasizing marine-terrestrial linkages (e.g., correlation to Cariaco Basin, Greenland ice cores), (ii) the paleoecology and biogeography of the tropical lowland forest, such as the response of vegetation to disturbance by fire, climate change, and humans and (iii) the subsurface biogeochemistry, including integrated studies of microbiology, porewater geochemistry, and mineral authigenesis and diagenesis.

### Operational Achievements

Seven sites (mostly multiple cored) were drilled and a total of 1327 m of sediment was recovered. The deepest site reached 133 m below the lake floor.

Downhole logging was conducted by the ICDP Operational Support Group (OSG) at five sites using their slimhole logging tools.

### Data & Sample Access

Cores are stored in the National Lacustrine Core Facility at the University of Minnesota. Data are available at ICDP website on request.

### Web & Media Resources

<http://peten-itza.icdp-online.org>

[www.youtube.com/watch?v=3HqOJrODP14](http://www.youtube.com/watch?v=3HqOJrODP14)

### Timeline

2004 ICDP proposal submission

2006 (February – March) drilling operations

### Principal Investigators

David A. Hodell, University of Cambridge

Flavio Anselmetti, University of Bern

Daniel Raul Ariztegui, Université de Genève

Mark Brenner, University of Florida

Jason H. Curtis, University of Florida

James M. Hall, Carnegie Institution for Science of Washington

Gerald H. Haug, Max-Planck-Institute Mainz

Judith Ann McKenzie, Swiss Federal Institute of Technology Zurich



*Drill rig at Lake Petén Itzá*

## Scientific Findings

Sediment deposited between ca 200 and 85 ka reflect deposition during an initial transgression, followed by clay and carbonate-rich sediments without major gypsum units, reflecting rather sustained humid conditions resulting in high run-off and high detrital constituents.

Before 85 ka, the sediment record is characterized by a gravel-bearing and sand-bearing unit that forms an unconformity indicative of a major lake level lowstand (i.e. dry climate). Dry climate around this time was also inferred by study of sediments from low-latitude African lakes.

During the last ca 50 ka, lithological units are characterized by alternating clay and gypsum units. Gypsum units are associated with low lake levels (i.e. dry climate) and clay units with high lake levels (i.e. humid climate). Stacked palaeo-shorelines at 68 m, 64 m and 56 m coincide with gypsum units that indicate a stepwise increase in water levels from the lowstands during the arid last deglaciation 18 to 11 ka ago.

The Holocene lacks gypsum deposits, and was thus characterized by relatively high lake levels and humid climate. Human impact during the Maya epoch (ca 3.0 to 1.0 ka) is reflected by rapid clay deposition.

Analysis of ostracodes shows that the distribution of *C. okeechobei* and *P. globula* are not correlated with changes in physicochemical variables, indicating their broad hydrochemical tolerance.



*A core catcher section from Pi-4*

## Key Publications

Hodell, D.; Anselmetti, F.; Brenner, M.; Ariztegui, D.; the PISDP Science Party (2006): The Lake Petén Itzá Scientific Drilling Project. *Scientific Drilling* 3 25-29. doi:10.2204/iodp.sd.3.02.2006

Mueller, A.D.; Anselmetti, F.S.; Ariztegui, D.; Brenner, M.; Hodell, D.A.; Curtis, J.H.; Escobar, J.; Gilli, A.; Grzesik, D.A.; Guilderson, T.P.; Kutterolf, S.; Plötze, M. (2010): Late Quaternary palaeoenvironment of northern Guatemala: evidence from deep drill cores and seismic stratigraphy of Lake Petén Itzá. *Sedimentology* 57 1220-1245. doi:10.1111/j.1365-3091.2009.01144.x

Pérez, L.; Lorenschat, J.; Bugja, R.; Brenner, M.; Scharf, B.; Schwalb, A. (2010): Distribution, diversity and ecology of modern freshwater ostracodes (Crustacea), and hydrochemical characteristics of Lago Petén Itzá, Guatemala. *Journal of Limnology* 69(1). doi:10.4081/jlimnol.2010.146

Pérez, L.; Frenzel, P.; Brenner, M.; Escobar, J.; Hoelzmann, P.; Scharf, B.; Schwalb, A. (2011): Late Quaternary (24–10 ka BP) environmental history of the Neotropical lowlands inferred from ostracodes in sediments of Lago Petén Itzá, Guatemala. *Journal of Paleolimnology* 46(1) 59-74. doi:10.1007/s10933-011-9514-0