



PROCEEDINGS OF THE INTEGRATED OCEAN DRILLING PROGRAM VOLUME 308 EXPEDITION REPORTS GULF OF MEXICO HYDROGEOLOGY

Expedition 308 of the riserless drilling platform
from Mobile, Alabama, to Balboa, Panama
Sites U1319–U1324
30 May–8 July 2005

Volume Authorship

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and the Expedition 308 Scientists

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Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the participating agencies, Integrated Ocean Drilling Program Management International, Inc. (IODP-MI), or the Integrated Ocean Drilling Program Implementing Organizations.

Abbreviations for names of organizations and publications in IODP reference lists follow the style given in *Chemical Abstracts Service Source Index* (published by American Chemical Society).

The bulk of the shipboard-collected core data from this expedition is accessible from Integrated Ocean Drilling Program U.S. Implementing Organization (IODP-USIO) Science Services, Texas A&M University (TAMU), at iodp.tamu.edu/database/index.html. If you cannot access this site or need additional data, please contact:

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A complete set of the logging data collected by ODP-USIO Science Services, Lamont-Doherty Earth Observatory (LDEO), is available at iodp.ldeo.columbia.edu/DATA/IODP/. If you have problems downloading the data, wish to receive additional logging data, or have questions regarding the data, please contact:

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Some close-up core photographs have been tonally enhanced to better illustrate particular features of interest.

Cover photograph, by IODP Photographer William Crawford, is of removal of bit during trip-out operations in the Gulf of Mexico.

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Foreword

By Integrated Ocean Drilling Program Management International, Inc.

The Integrated Ocean Drilling Program (IODP) is the most ambitious ocean exploration and drilling program ever undertaken. With multiple platforms and multiple partners, our research spans the globe and truly represents international collaboration and diplomacy among scientists and nations interested in attaining scientific goals.

The *Proceedings* present the scientific and engineering results of IODP drilling projects, each an important component of an international program designed to better understand Earth, its environmental changes and processes, the deep biosphere, and climate change.

The collective effort required to conduct each IODP expedition is colossal. Beginning with scientists who submit ocean drilling research proposals, there are others who evaluate, rank, and prioritize proposals. Scientists also schedule the science operations, select science party members from scores of international scientists qualified to participate, plan platform operations, ready the drillship, and choose borehole locations. There are onboard logistics to manage and critical communications to coordinate among various academic institutions, governments, and national science organizations. And the resulting data must be managed and made accessible to scientists, particularly those who will prepare future proposals. Every aspect of planning an IODP expedition takes a village—or several. There are many participants and many more stakeholders.

Ocean-drilling achievements, however complex, help us understand extraordinary linkages and interpret relationships as they exist in various parts of the Earth system. Achievements in two legacy drilling programs (the Ocean Drilling Program and Deep Sea Drilling Program) have validated the scientific concepts behind plate tectonics, contributed to the understanding of ocean circulation changes, and extended our knowledge of long- and short-term climate change—scientific information at the foundation of our current drilling program.

IODP drilling platform operations are conducted by three Implementing Organizations (IOs). Riserless platform operations are conducted by the JOI Alliance, comprising the Joint Oceanographic Institutions, Inc., Texas A&M University through the Texas A&M Research Foundation, and Lamont-Doherty Earth Observatory of Columbia University. Riser platform operations are conducted by the Japan Agency for Marine-Earth Science and Technology through Japan's Center for Deep Earth Exploration in cooperation with the Center for Advanced Marine Core Research at Kochi University. Mission-specific platform operations are conducted by the European Consortium for Ocean Research Drilling, Science Operator, comprising the British Geological Survey, Bremen University, and the European Petrophysics Consortium. The European IO currently represents the ocean-drilling efforts of 16 nations in Europe, plus Canada. At the start of this drilling project, IODP involved 20 nations.

The discoveries discovered in this volume build upon layers of knowledge and science developed over roughly the last fifty years. Expedition *Proceedings* are published by IODP Management International for IODP under the sponsorship of the U.S. National Science Foundation (NSF), Japan's Ministry of Culture, Education, Sports, Science and Technology, and other IODP members. The material is based upon research supported under Contract OCE-0432224 from NSF.

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Web site: www.ecord.org/eso/eso.html

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To achieve Expedition 308's scientific goals, we completed the design and testing of a new downhole tool, used a new technique of drilling with weighted mud, and monitored downhole pressure in real time. This was accomplished because of the skill and persistence of the engineering, operations, and technical staff of the U.S. Implementing Organization (USIO) of the Integrated Ocean Drilling Program. USIO Science Services, TAMU, Deputy Director Jack Baldauf doggedly pursued a safe and well-designed drilling program. USIO engineering staff members Derryl Schroeder, Kevin Grigar, and Dean Ferrell helped to build the temperature-pressure (T2P) data acquisition system. USIO Science Services, LDEO, Director Dave Goldberg planned our logging program.

All of the shipboard technical staff provided outstanding support and maintained a positive "can do" attitude throughout the expedition. We acknowledge more particularly Operations Superintendent Ron Grout's patient oversight, and Transocean's Wayne Lambert, Mark Robinson, Craig Prosser, Mick Curry, Jim Fyfe, and Ian McDonald for their ingenuity with deploying and repairing our downhole tools.

Expedition 308 was conceived in the spring of 1999 with a Joint Oceanographic Institution-U.S. Science Support Advisory Committee (JOI-USSAC)-sponsored industry academic workshop focused on the study of hydrodynamics in sedimentary basins. A 5 year effort was launched; three proposal versions, countless responses, planning documents, safety meetings, and evaluations followed. Hundreds of individuals helped to create Expedition 308: we thank you all.

Contents

Expedition reports

Chapters

Expedition 308 summary
Expedition 308 Scientists

Methods
Expedition 308 Scientists

Site U1319
Expedition 308 Scientists

Site U1320
Expedition 308 Scientists

Site U1321
Expedition 308 Scientists

Site U1322
Expedition 308 Scientists

Site U1323
Expedition 308 Scientists

Site U1324
Expedition 308 Scientists

Core descriptions

Visual core descriptions (VCDs), smear slide data tables, and digital images are included in this section. VCDs and smear slide data tables are combined into one PDF file for each site.

Site U1319

[Visual core descriptions · Smear slides](#)

Site U1320

[Visual core descriptions · Smear slides](#)

Site U1322

[Visual core descriptions · Smear slides](#)

Site U1324

[Visual core descriptions · Smear slides](#)



Expedition research results

Data reports

Titles are available in [HTML](#) pending completion of the volume.

Syntheses

Titles are available in [HTML](#) pending completion of the volume.

Supplementary material

Supplementary material for this volume includes physical properties (vane shear and water contents in Microsoft Excel and ASCII formats), downhole temperature and pressure measurements (APCT, DVTPP, and T2P data in Microsoft Excel and raw data formats), and Rhizone geochemistry data in Microsoft Excel. See [README.TXT](#) in the SUPP_MAT directory for a full listing of directories and files, or see the [Directory structure](#) for the names of the main subdirectories.

Drilling location maps

A site map showing the drilling locations for this expedition and maps showing the drilling locations of all Integrated Ocean Drilling Program (IODP), Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) drilling sites are available in PDF format. These maps were produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (gmt.soest.hawaii.edu).

[IODP Expedition 308 site map](#)

[IODP map](#) (Expedition 301–312)

[ODP map](#) (Legs 100–210)

[DSDP map](#) (Legs 1–96)



Expedition-related bibliography

IODP publications

Scientific Prospectus

Flemings, P.B., Behrmann, J., Davies, T., John, C., and the Expedition 308 Project Team, 2005. Gulf of Mexico hydrogeology—overpressure and fluid flow processes in the deepwater Gulf of Mexico: slope stability, seeps, and shallow-water flow. *IODP Sci. Prosp.*, 308. doi:10.2204/iodp.sp.308.2005

Preliminary Report

Expedition 308 Scientists, 2005. Gulf of Mexico hydrogeology—overpressure and fluid flow processes in the deepwater Gulf of Mexico: slope stability, seeps, and shallow-water flow. *IODP Prel. Rept.*, 308. doi:10.2204/iodp.pr.308.2005

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Index

Pending

Directory structure*

308.PDF (Preliminary pages and table of contents)		
README.TXT (Information about the Expedition Reports DVD-ROM)		
ACROREAD (Acrobat Reader installation software and instructions for different platforms)	MAC_OS	
	UNIX	
	WINDOWS	
	README.TXT	
EXP_REPT (Expedition Reports section of <i>Proc. IODP, 308</i>)	CHAPTERS (Expedition Reports chapters)	308_101.PDF (Expedition 308 summary)
		308_102.PDF (Methods)
		308_103.PDF (Site U1319)
		308_104.PDF (Site U1320)
		308_105.PDF (Site U1321)
		308_106.PDF (Site U1322)
		308_107.PDF (Site U1323)
		308_108.PDF (Site U1324)
	CORES (Visual core descriptions, smear slide data tables, and digital core images)	IMAGES (PDF files of core images)
		CORU1319.PDF (Site U1319 VCDs)
		CORU1320.PDF (Site U1320 VCDs)
		CORU1322.PDF (Site U1322 VCDs)
	OVERSIZE (Large-format files of data tables)	308_108 (Site U1324 files)
SUPP_MAT (Supplementary material)	DOWNHOLE (APCT, DVTPP, T2P, and TruView data in Excel, RAW, and DAT)	APCT (APCT data)
		OVERVIEW (Deployment summary and README)
		U1319 (Site U1319 DVTPP and T2P data)
		U1320 (Site U1320 DVTPP and T2P data)
		U1322 (Site U1322 DVTPP and T2P data)
		U1324 (Site U1324 DVTPP and T2P data)
	PHYSPROP (Vane shear and water content data in Excel and ASCII)	README
		VANE_SHR (Vane shear data)
		WATERCON (Water concentration data)
	RHYZON (Geochemistry data in Excel and figure in EPS)	DATA (Geochemistry data)
		README.TXT
	MAPS (Drilling location maps)	308_MAP.PDF (Expedition 308 site map)
		IODPMAP.PDF (IODP map, Expeditions 301–312)
ODPMAP.PDF (ODP map, Legs 100–210)		
DSDPMAP.PDF (DSDP map, Legs 1–96)		

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