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## Guaymas Basin Tectonics and Biosphere

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# Proceedings of the International Ocean Discovery Program

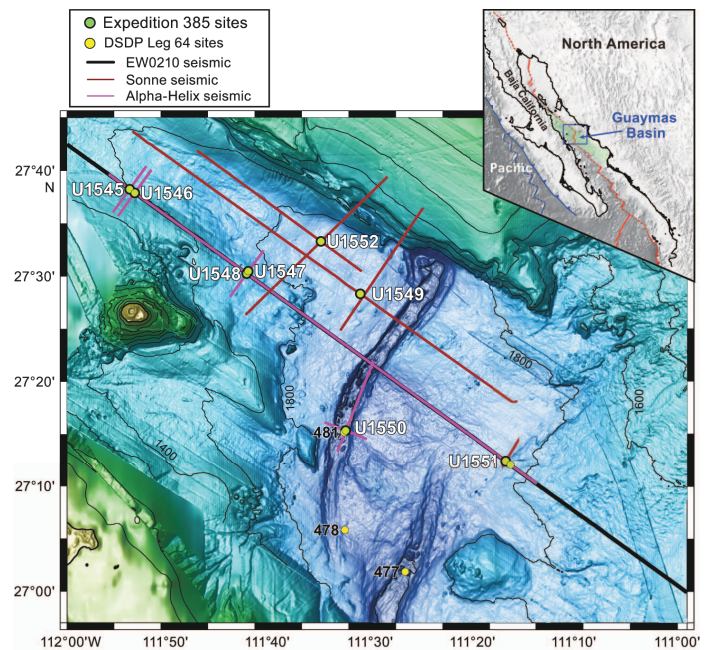
## Volume 385

### Guaymas Basin Tectonics and Biosphere

Expedition 385 of the R/V *JOIDES Resolution*  
from and to San Diego, California (USA)  
Sites U1545–U1552  
15 September–15 November 2019

#### Volume authorship

Teske, A., Lizarralde, D., Höfig, T.W., and the Expedition 385 Scientists



## Publisher's notes

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Korea Institute of Geoscience and Mineral Resources (KIGAM)  
Australia-New Zealand IODP Consortium (ANZIC)  
Ministry of Earth Sciences (MoES), India

The JRSO is supported by the NSF. Any opinions, findings, and conclusions or recommendations expressed in this material do not necessarily reflect the views of the NSF, the participating agencies, TAMU, or Texas A&M Research Foundation.

The bulk of the shipboard-collected core data from this expedition is accessible at <http://iodp.tamu.edu/database/index.html>. If you cannot access this site or need additional data, please contact Data Librarian, International Ocean Discovery Program *JOIDES Resolution* Science Operator, Texas A&M University, 1000 Discovery Drive, College Station TX 77845-9547, USA. Tel: (979) 845-8495; Fax: (979) 458-1617; Email: [database@iodp.tamu.edu](mailto:database@iodp.tamu.edu).

A complete set of the logging data collected during the expedition is available at [http://mlp.ldeo.columbia.edu/logdb/scientific\\_ocean\\_drilling](http://mlp.ldeo.columbia.edu/logdb/scientific_ocean_drilling). If you have problems downloading the data, wish to receive additional logging data, or have questions regarding the data, please contact Database Administrator, Borehole Research Group, Lamont-Doherty Earth Observatory of Columbia University, PO Box 1000, 61 Route 9W, Palisades NY 10964, USA. Tel: (845) 365-8343; Fax: (845) 365-3182; Email: [logdb@ldeo.columbia.edu](mailto:logdb@ldeo.columbia.edu).

Supplemental data were provided by the authors and may not conform to IODP publication formats.

JRSO expedition photos are the property of IODP and are public access.

Some core photographs have been tonally enhanced to better illustrate particular features of interest. High-resolution images are available upon request.

Cover photographs show (top) R/V *JOIDES Resolution* in Guaymas Basin at the Ringvent location at sunset with Isla Tortuga on the horizon and (bottom) a sill sample. Photo credit: Phil Christie (*JOIDES Resolution*), Andreas Teske (sill sample), and IODP JRSO.

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### Core descriptions

Visual core descriptions (VCDs) are presented in PDF files for each site. Smear slides and/or thin sections are presented in PDF and/or CSV files for each site and/or hole (CSV files are available in the CORES directory). The entire set of core images in PDF is available in the IMAGES directory.

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### Supplementary material

Supplementary material for the Volume 385 expedition reports includes DESClogik workbooks in Microsoft Excel format, diatom photomicrographs in PDF, and Formation MicroScanner images in PDF and GIF. A full list of directories can be found in SUPP\_MAT in the volume zip folder or on the [Supplementary material for Volume 385 expedition reports](#) web page.

## **Expedition research results**

### **Data reports**

Titles are available in [HTML](#).

### **Syntheses**

Titles are available in [HTML](#).

### **Drilling location maps**

A site map showing the drilling locations for this expedition and maps showing the drilling locations of all International Ocean Discovery Program (IODP) expeditions, produced using QGIS (<http://www.qgis.org>), and all Integrated Ocean Drilling Program, Ocean Drilling Program (ODP), and Deep Sea Drilling Project (DSDP) expeditions, produced using Generic Mapping Tools (GMT) of Paul Wessel and Walter H.F. Smith (<https://www.generic-mapping-tools.org>), are available in PDF.

#### **[IODP Expedition 385 site map](#)**

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The success of the expedition was also enabled by the support of the IODP Environmental Protection and Safety Panel (EPSP) and the Secretariat of Foreign Affairs (Secretaría de Relaciones Exteriores) of Mexico. The support from the National Autonomous University of Mexico (Universidad Nacional Autónoma de México [UNAM]) during the precruise clearance and visa approval processes is deeply appreciated. Support for development of the expedition objectives was provided by the Center for Dark Energy Biosphere Investigations (C-DEBI) (Catalina Island, California, USA) and the IODP U.S. Science Support Program (USSSP) (Puerto Vallarta, Mexico). The scientific groundwork that led to the conception of this expedition was supported by National Science Foundation (NSF) grants to Lizarralde (OCE011983, OCE0324983, and OCE0751901) and Teske (OCE1449604 and OCE1357239). The initial piston coring site survey was realized by Carlos Mortera (UNAM) and the crew of the R/V *El Puma*. The Ringvent survey critically depended on the HOV *Alvin* and AUV *Sentry* dives performed by the respective teams aboard the R/V *Atlantis*. Additional site survey data were acquired during R/V *Sonne* Cruise SO241 by Christian Berndt and other scientists from the Helmholtz Centre for Ocean Research Kiel as well as by Antonio Gonzalez (Centro de Investigación Científica y de Educación Superior de Ensenada [CICESE]) with funding from CICESE and IODP USSSP, and we are very grateful to those scientists and funding agencies.

The editorial staff at the IODP *JOIDES Resolution* Science Operator at Texas A&M University is thanked for their help with the publication of this document.

## Foreword

The International Ocean Discovery Program (IODP) represents the latest incarnation of almost five decades of scientific ocean drilling excellence and is generally accepted as the most successful international collaboration in the history of the Earth sciences. IODP builds seamlessly on the accomplishments of previous phases: the Deep Sea Drilling Project, Ocean Drilling Program, and Integrated Ocean Drilling Program. The 2013–2023 IODP Science Plan (*Illuminating Earth's Past, Present, and Future*) defines four themes and thirteen challenges for this decade of scientific ocean drilling that are both of fundamental importance in understanding how the Earth works and of significant relevance to society as the Earth changes, at least in part in response to anthropogenic forcing. This phase of IODP represents an intense level of international collaboration in bringing diverse drilling platforms and strategies to increasing our understanding of climate and ocean change, the deep biosphere and evolution of ecosystems, connections between Earth's deep processes and surface manifestations, and geologically induced hazards on human timeframes.

The *Proceedings of the International Ocean Discovery Program* presents the scientific and engineering results of IODP drilling projects, expedition by expedition. As in the preceding Integrated Ocean Drilling Program, expeditions in the current IODP phase are conducted by three implementing organizations, each providing a different drilling capability. These are the US Implementing Organization (USIO; through September 2014) and the *JOIDES Resolution* Science Operator (JRSO; as of October 2014), providing the leased commercial vessel *JOIDES Resolution* for riserless drilling operations; JAMSTEC's Institute for Marine-Earth Exploration and Engineering (MarE3), providing the drillship *Chikyu* for riser and occasional riserless operations; and the European Consortium for Ocean Research Drilling (ECORD) Science Operator (ESO), providing "mission-specific" platforms (MSPs) for expeditions that extend the IODP operational range where neither drillship is suitable, for example, in polar environments and in shallow waters. Scheduling decisions for each capability are made by three independent Facility Boards, each of which includes scientists, operators, and platform funding partners: the *JOIDES Resolution* Facility Board (JRFB), *Chikyu* IODP Board (CIB), and ECORD Facility Board (EFB). At the beginning of the current IODP, the three Facility Boards agreed to utilize Publication Services at the USIO and now the JRSO for production of all expedition *Proceedings* volumes and reports.

The current IODP differs from prior scientific ocean drilling programs in that it has neither a central management organization nor commingled funding for program-wide activities. Yet this phase of IODP retains a fundamental integrative structural element: a "bottom-up" evaluation of all proposals for drilling expeditions by a single advisory structure composed of scientists representing all international program partners. International scientists may submit drilling proposals to the Science Support Office; all submitted proposals are then evaluated by a Science Evaluation Panel in the context of the Science Plan.

The current IODP also has a second internationally integrative level for high-level discussion and consensus-building: the IODP Forum. The Forum is not only charged with assessing program-wide progress toward achieving the current Science Plan, but also with overseeing approaches toward a new bright future of scientific ocean drilling post 2023. At present, IODP involves 25 international financial partners, including the United States, Japan, an Australia/New Zealand consortium (ANZIC), China, India, South Korea, and the eighteen members of ECORD (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Italy, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, and the United Kingdom). This enhanced membership in the current IODP represents a remarkable level of international collaboration that remains one of the greatest ongoing strengths of scientific ocean drilling.

Dick Kroon  
Chair, IODP Forum



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Website: <http://iodp.tamu.edu>

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## IODP publications

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Teske, A., Lizarralde, D., and Höfig, T.W., 2018. *Expedition 385 Scientific Prospectus: Guaymas Basin Tectonics and Biosphere*. International Ocean Discovery Program. <https://doi.org/10.14379/iodp.sp.385.2018>

### Preliminary Report

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