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GREETING

In this fourth edition of the Caribbean Basins, Tectonics, and Hydrocarbons ("CBTH") Newsletter, we provide an update on our completed activities from May 2006 and offer an overview of our activities in the coming months. For those of you who are CBTH sponsors, we hope over the past four months your group has become comfortable using the CBTH web-based GIS database and website and that this resource is benefiting your exploration efforts. Please let us know if you have suggestions or questions for use of the database.

If your company is not a CBTH member but is interested in participating in the CBTH consortium, please take a few minutes to review our website (www.ig.utexas.edu/research/projects/cbth) where you can also download our three-year project proposal. Please feel free to contact us at cbth@ig.utexas.edu

Year One and Two payments received from all sponsors. We appreciate the extra efforts of the representatives of all 11 companies who insured that the payments for Years One and Two were received by the annual deadline of September 1, 2006. For the third year, we will initiate the invoicing process at an earlier date (May 1, 2007) to allow you more time to arrange payment by the deadline of September 1, 2007. When your payment is received you will receive your new password to access the data downloads on the website for Fall 2007 release date.

SPECIAL THANKS TO SPONSORS...

... who participated in our productive year-end meeting on September 1, 2006.

British Gas—Stephen Babb



BHP—

Neil Evans
Laura Jennings
Tim O'Connor
David Risch
Dave Widdoes



British Petroleum Trinidad and Tobago—

Teunis Heyn



Chevron—Richard Parrish



ExxonMobil—

Jaime Buitrago,
Bolaji Famakinwa,
Ron Johnson, Randy Perkey, Robyn Schapiro



Newfield—Hank Woods



PDVSA—Leonardo Duerto



Petrobras—

Ricardo Martinez



Repsol—Mo Etemadi, Dewi Jones



Shell—Amy Garbowicz, Sonya Punch,
Dave Stewart



Talisman—Kevin Meyer



ADDITIONS TO THE CBTH RESEARCH TEAM

Thanks to the funding support of our sponsors, the CBTH research team is growing.

We have added two new first year master's students, Eleine Vence and David Contreras. Eleine comes to us from Colombia where she worked with Occidental on exploration studies in the Llanos and Magdalena basins. The subject of her proposed Master's thesis is subsurface structure and stratigraphy of the Guajira area of northern Colombia. She is partially supported by the CBTH. David Contreras is from Venezuela where he is an employee with PDVSA (Venezuelan National Oil Company). David is entirely supported by PDVSA. The subject of his Master's thesis is the subsurface structure and stratigraphy of the northern Maracaibo basin. This is an area of particular interest because of its known gas potential.

We have also hired a new post-doctoral researcher, Dr. Hamed El-Mowafy. Hamed comes to us from Egypt where he was an assistant professor of Geosciences at the Department of Geology at Al-Azhar University in Cairo and worked as a part-time petroleum geoscientist with Apache Petroleum Corporation in Cairo. He received his PhD from the University of Tulsa in 2003 where his PhD dissertation topic was: "3-D seismic fluvial architecture of the basal middle Frio Formation, Stratton and Agua Dulce fields, south Texas."

To learn more about Eleine, David, Hamed or any other CBTH researcher, visit: http://www.ig.utexas.edu/research/projects/cbth/proj_res.htm

We are in the process of interviewing undergraduate students for research positions. We hope to add two undergraduate students to help us and to conduct senior research projects in geology in the CBTH study area.

Since we are part of the University of Texas, some of our most significant research "products" that you support with your annual payments are trained geoscientists at levels ranging from the undergraduate to graduate, and through the post-doctoral level. Please let us know if you would like to have any of our personnel as summer interns or permanent employees at your company.

MEET OUR COMPANY REPRESENTATIVES

The individuals listed below have volunteered to serve as our main contacts for CBTH. All analog and digital

data generated by CBTH is conveyed to the sponsoring companies through these individuals. Please let us know if your company representative changes over the three-year course of this study.

Our method of delivering analog data to the CBTH sponsors is to mail the data to the company representatives along with an invoice for what is contained in the shipment. The contact signs and returns the invoice to us by fax or mail. In that way, we can document the person and the date that the data was received at the company. The contact person also acts to disseminate our products to other people in their respective companies along with representing the company at our annual year-end meetings in September. We greatly appreciate all the extra efforts of the company representatives in keeping the project running smoothly!

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CBTH software support Landmark Graphics

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Landmark Graphics is kindly providing our interpretative software. We have just completed our second three-year software agreement.

IVS3D

Bill McKernan
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We are also using an exciting visualization software package called Fledermaus from IVS3D. We use this PC-based software to create interactive “flyovers” that combine topography, bathymetry, surface geology and seismic reflection profiles. Fledermaus is simple to use and user-friendly.

PAST MEETINGS AND EVENTS

Field work: “Seismic survey of Lakes Nicaragua and Managua in Nicaragua”

Who: Paul Mann
When: May, 2006
Where: Nicaragua

In May, 2006, Paul Mann, Kirk McIntosh (<http://www.ig.utexas.edu/people/staff/kirk/>), UT MS-level graduate student Justin Funk (<http://www.ig.utexas.edu/people/students/funk/>), and UTIG technician Steffen Sastrup (<http://www.ig.utexas.edu/people/staff/steffen/>) collected single channel seismic data from Lakes Nicaragua and Managua in Nicaragua.

We used a small, portable system mounted on rented ferry boats. The objective was to map active faults deforming the very young lake sediments. We also carried out coring to provide age constraints on the sediments. These data represent the first seismic data collected on both lakes. The study was funded by the US National Science Foundation and the University of Texas Jackson School of Geosciences. <http://www.ig.utexas.edu/research/projects/NicLakes/>

Geological Conference: “Geology of the area between North and South America, with focus on the origin of the Caribbean plate”

Who: Paul Mann
When: May 28-June 2
Where: Sigüenza, Spain

This International Research Conference was endorsed by the Geological Societies of London, Spain, Trinidad and Tobago and Venezuela and operated by the Spanish Association of Geologists and Geophysicists as part of their 25th anniversary celebratory program.

The meeting convenors included Dr. Keith James (Honorary Departmental Fellow, Institute of Geography and Earth Sciences, Aberystwyth, UK), Dr. Dave Roberts (BP Exploration Operating Company, Ltd., Sunbury-on-Thames, United Kingdom), Dr. Maria Antonieta Lorente Alonso (Professor of Advanced Stratigraphy, Central University of Venezuela, Caracas), and Dr. Bert Bally (Rice University, Houston, Texas). Forty people participated in the meeting and talks and posters were presented on all areas of the Caribbean. Much debate ensued on the Pacific origin versus the in situ tectonic models for Caribbean evolution. Paul Mann attended the meeting and presented three talks and one poster which are all available to our sponsors through the web site: http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm under “Other Publications.”

Talk: Mann *et al.*—First-order, regional-scale geophysical constraints on the structure, stratigraphy, and tectonics of the South America-Caribbean arc-continent collision.

Talk: Mann *et al.*—Report on the International Ocean Drilling Project (IODP) workshop on Caribbean drilling held in Austin, Texas, March 30-April 2, 2006.

Talk: Mann and Rogers—Geology of the Chortis block (Central America)

Poster: Mann *et al.*—Plumbing the depths of the Caribbean-South American arc-continent collisional zone using long seismic reflection and refraction transects.

You may also visit the general web site on the meeting at: http://www.geolsoc.org.uk/template.cfm?name=Caribbean_Plate

Field work: Margarita Island field trip

Who: Alejandro Escalona
When: May-June, 2006
Where: Margarita Island

In May-June 2006, Alejandro Escalona visited Margarita Island, offshore eastern Venezuela, to document and sample Eocene deep-water turbidites that outcrop along the southeastern coast of the island. A correlative offshore section has been identified offshore of Margarita using seismic data in the CBTH database. Six outcrop localities were visited in the area, where approximately 50 rock samples were collected for petrographic thin section study and age dating. Sections were measured and panoramic and detailed photos of the outcrops were taken.

The objective of this study is to improve our information on Eocene age delta system and their deepwater extensions along the northern margin of South America. Eocene sandstone in the Maracaibo basin provide high quality fluvial reservoirs but the reservoir potential of the deepwater Eocene is not well known off the northern coast of Venezuela.

Researchers involved in the project are: Kitty Milliken (sandstone petrography and diagenetic studies, Univ. of Texas at Austin), Kathy Marsaglia (sandstone provenance studies and correlation to previously studied sands in DSDP cores –UC), and Alejandro Escalona (reservoir geology). If funding can be obtained, this study may become a part of a Master's student project at the University of Texas ("UT").

If your company is interested in funding this study, please contact Paul Mann (paulm@ig.utexas.edu) or Alejandro Escalona (escalona@ig.utexas.edu).

Talks presented on the CBTH project:

Who: Alejandro Escalona
When: May-June, 2006
Where: Caracas, Puerto la Cruz, and Maracaibo, Venezuela

During May-June, Alejandro Escalona gave a series of talks at different companies and academic institutions in Venezuela to promote the CBTH project. Companies and institutions visited include: PDVSA Oriente, PDVSA Occidente, INVETEP, Chevron Venezuela, Petrobrás Venezuela, Universidad Central de Venezuela, Sociedad Venezolana de Geofisicos, and FUNVISIS.

Geological and biological conference: "The Evolution of West Indian Diversity, a catalysis meeting sponsored by the National Evolutionary Synthesis Center (NESCent)"

Who: Paul Mann
When: July 5-9, 2006
Where: Dominican Republic

Paul was an invited participant to a meeting in the Dominican Republic on July 5-9, 2006, called "The Evolution of West Indian Diversity" sponsored by the U.S. National Science Foundation and the National Evolutionary Synthesis Center, Duke University (http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm under "Other Publications"). The main theme of the meeting was to explore the connections between the paleogeography and tectonics of the Caribbean and the evolution of its biologic organisms. This invited keynote talk on "Overview of Caribbean tectonics and paleogeography" is also available on our website. More about the meeting, is available at: <http://www.lacertilia.com/WIndies/>

CBTH Year One Year-End Meeting

Who: All CBTH researchers and representatives from 11 sponsoring companies
When: September 1, 2006
Where: Austin, Texas

Three-day shortcourse for the oil industry: "Jurassic-Recent Subsurface Geology of the Gulf of Mexico and Caribbean Region"

Who: Paul Mann, Alejandro Escalona and Bill Galloway
When: September 11-13, 2006
Where: Houston, Texas

Geophysical conference: Society of Exploration Geophysicists Annual Meeting

Who: Hamed El-Mowafy
When: October 2-6, 2006
Where: New Orleans, Louisiana

Hamed El-Mowafy attended the SEG meeting in New Orleans (October 2-6, 2006) and gave a talk entitled "Integration of 3-D seismic attributes and sequence stratigraphy in interpreting the Middle Frio formation fluvial architecture. Case History: Stratton and Agua Dulce Fields, South Texas, USA." The talk was based on work as part of his Ph.D. study at the University of Tulsa. He is currently preparing a publication on the same topic with his coauthor, Dr. Kurt Marfurt of the University of Houston. You can download the SEG expanded abstract on our website at: http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm

Paper for AAPG Bulletin: David Gorney, Paul Mann and Alejandro Escalona have submitted a revised version of the paper, "Chronology of Cenozoic tectonic events in western Venezuela and the Leeward Antilles based on integration of offshore seismic reflection data and onland geology," to the *AAPG Bulletin*. We expect the revised version to be accepted and to be published in the coming months. The paper summarizes the main results of David Gorney's 2004 Master's thesis on the offshore area of western Venezuela which may be downloaded by sponsors at: http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm. David is currently an explorationist with the East Texas-North Louisiana Asset Team of Marathon Oil.

DATA DISTRIBUTION

New data that has been added to the sponsor webpages since September 1, 2006 are listed below.

Calendar—A Google™ calendar was added to our Sponsor pages to view CBTH and geologic organizations meetings and events. You may either subscribe to Google™ Calendar and import into your own calendar software or view it on our webpages. <http://www.ig.utexas.edu/research/projects/cbth/calendar.htm>

2006 GIS release covering eastern Venezuela and Trinidad. <http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/VenmarHtml/GIS/2006/>

Fledermaus scene—CBTH I—an overview of the 2005 release area of western Venezuela with topography,

bathymetry, oilfields, faults, interpreted seismic lines, gravity and isochrons. <http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/movies.htm>

GIS-HTML manual http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm

CBTH Year One atlas in pdf format

http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm

CBTH Year One atlas in GIS format <http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/VenmarHtml/GIS/2006/>

Year-End Meeting presentations in pdf format

http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/thes_diss.htm

All references compiled to date for the CBTH project.

We have completed the reference pages for all of the sources we have cited on the website to date. You can download the EndNote libraries from:

<http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/References>

We have also finished webpages for each reference so you can see where it is cited. In the near future, we plan to also add links where a reference is cited to the reference page to quickly and easily view the reference information. We are confident that we are on track for compiling all literature relevant to oil and gas exploration in the CBTH Phase I area.

Structure and isochron grids in Zmap and GIS formats.

These are the same grids in the Fledermaus CBTH I scene and the CBTH Atlas Volume 2006.

<http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/VenmarHtml/GIS/ Grids/>

UPCOMING MEETINGS

Keep an eye on our website for updates and more information for these upcoming events.

www.ig.utexas.edu/research/projects/cbth/links.htm

Two-day Northern South America Shortcourse

Please contact Paul Mann or Alejandro Escalona if you are interested in having this shortcourse presented at your company. If you have new hires or transfers with the group, these courses provide a quick way to get them 'up-to-speed.'

Geophysical conference: Venezuelan Geophysical Society Meeting (SOVG)

Who: Alejandro Escalona
When: October 22-25, 2006
Where: Caracas, Venezuela

Alejandro Escalona will be contributing to this meeting in several ways. He will:

- Teach the two-day northern South America short-course;
- Co-chair (with Victor Ramos of Argentina and Miguel Bosch of Venezuela) a symposium called "Tectonics of the Northern Andes and adjacent regions" [The primary objective of the session is to analyze and to discuss in a multidisciplinary forum the tectonic evolution of the northern Andes with special emphasis on the tectonic history of the Venezuelan Andes and its adjacent basins.];
- Co-chair two other sessions during the meeting related to the regional geology of northern South America; and
- Give a keynote talk on the regional subsurface geology of the northern South American margin.

Field trip for CBTH sponsors: "Tectonics and petroleum systems of the eastern Maracaibo and Falcon basins: Integrating outcrop geology with on- and offshore subsurface seismic reflection and well data"

Co-leaders: Peter Bartok (Bartok, Inc.), Paul Mann and Alejandro Escalona
When: October 29-November 4
Where: western Venezuelan region (Maracaibo basin, Falcon basin, Paraguana Peninsula)

We will co-lead a fieldtrip to western Venezuela on Oct 29-Nov 4, 2006 for about 25 participants. We thank PDVSA for helping to arrange the logistics of the trip and for subsidizing many of the costs. The trip will make an east-west transect connecting the oil-rich Maracaibo basin with the less explored Falcon basin and Paraguana Peninsula. Correlations will be discussed between the Falcon basin and the offshore La Vela and Bonaire basins and between the northern Maracaibo basin and the Gulf of Venezuela.

For those of you who cannot attend, we plan to make a complete photographic record of the trip in order to make a web-based 'virtual field trip' available through the CBTH website. Stay tuned!

Field work : Aruba, Bonaire and Curaçao

Who: Paul Mann and Jean-Claude Hippolyte (Univ. of Savoie, France)
When: November, 2006

We will collect striated fault data to better understand the timing of opening of the deep rift basins that separate these islands.

American Geophysical Union Annual Meeting

Who: Paul Mann and BOLIVAR working group
When: December 11-15, 2006
Where: San Francisco, California

Paul Mann and Greg Beroza (Stanford University) will be co-convening a special session of the meeting called: "Global strike-slip fault systems: Oblique divergence, oblique convergence, and true transform faults." The session will compare active strike-slip faults and their deformation mechanisms from different parts of the world. See more at: <http://www.agu.org/cgi-bin/sessions5?meeting=fm06&part=T34A&max-hits=400>

The BOLIVAR working group including researchers from both Rice University and UT will be presenting six posters at the meeting:

- Guedez *et al.*—BOLIVAR: Crustal Structure of the Caribbean-South America plate boundary at 70W
- Beardsley *et al.*—Oblique Collision of the Leeward Antilles, Offshore Venezuela: Linking Onshore and Offshore Data from BOLIVAR
- Levander *et al.*—BOLIVAR & GEODINOS: Investigations of the Southern Caribbean Plate Boundary
- Clark *et al.*—Tearing the lithosphere: Diachronous slab detachment along the Venezuelan margin from BOLIVAR seismic data
- Arogunmati *et al.*—BOLIVAR: 3-D Seismic Structure of the Leeward Antilles Arc From Seismic Refraction and Reflection Tomography
- Magnani *et al.*—Exhumation of High-pressure Metamorphic rocks along the coast of Venezuela: Insights from BOLIVAR Seismic Reflection and Refraction Data

Other Related Abstracts

- Funk *et al.*—Results from NICLAKES survey of active faulting beneath Lake Nicaragua, Central American volcanic arc
- Mondziel *et al.*—Multi-channel seismic images of structural deformation in the Mona Passage between Puerto Rico and Hispaniola

American Association of Petroleum Geologists Annual Meeting

Who: CBTH staff and students
When: April 1-4, 2007
Where: Long Beach, California

We have submitted a total of six CBTH-related abstracts to this meeting and will make all the talk and poster presentations available to the CBTH sponsors. To read the abstracts please visit: <http://www.ig.utexas.edu/research/projects/cbth/SponsorsOnly/POSTERS/AAPG/2007AAPGAbstracts.htm>

- **Abstracts directly related to the CBTH study:**
- **Poster:** Bingham *et al.*—Building an Integrated, Digital Database Using HTML and GIS Tools: A Case Study for the Northern South American Petroleum Province
- **Poster:** Contreras *et al.*—Structure, stratigraphy, and gas potential of the northwestern extension of the Maracaibo foreland basin, western Venezuela
- **Poster:** El-Mowafy *et al.*—Hydrocarbon potential of the Aruba and western Curaçao basins, offshore Venezuela
- **Talk:** Escalona *et al.*—Kinematic model linking basin subsidence and fault evolution along the obliquely convergent South America-Caribbean plate boundary zone
- **Talk:** Mann *et al.*—3D Anatomy of the Columbus Foreland Basin, Eastern Offshore Trinidad
- **Poster:** Vence *et al.*—Along-Strike Continuity of Caribbean Tectonic Terranes and Their Controls on Source and Reservoir Rocks Offshore Colombia and Venezuela
- **Poster:** Nordfjord *et al.*, Linking Tectonic and Sedimentary Events in the Northern Caribbean and Southern Gulf of Mexico

Other Related Abstracts

- **Talk:** Mann *et al.*—Emerging Trends from 69 Giant Oil and Gas Fields Discovered from 2000-2006
- **Talk:** Castellanos and Mann—Regional tectonic controls on reservoir and seal quality of Mio-Pliocene fluvial-channel sandstones, Bohai basin, eastern China
- **Poster:** Hanzlik *et al.*—Reconstructing paleogeography and sea-level history of western Puerto Rico using high-resolution 2D seismic profiles

Geological meeting: GSTT Meeting

Who: Paul Mann and Alejandro Escalona
When: June 17-22, 2007
Where: Port-of-Spain, Trinidad and Tobago

We will attend this meeting to present talks on CBTH-related work in the Trinidad-Barbados data release area for 2006-2007.

Geological meeting: XI Colombian Geological Conference

Who: Paul Mann and Alejandro Escalona
When: August 14-17, 2007
Where: Bucaramanga, Colombia

We are invited to present the two-day shortcourse on the geology of northern South America. We would also like to present some of the thesis work of Eleine Vence in the offshore Guajira region.

CBTH Trinidad-Tobago-Barbados field trip

When: October 22-26, 2007 (*Tentative date*)
Where: Trinidad, Tobago and Barbados

This five-day trip in late October/early November will conclude our efforts on this data release area at the end of Year Two. The theme of the trip will be to make a 400-km-long onland geologic transect from the Caribbean arc (island of Tobago) through the Trinidad fold-thrust belt, to the Barbados accretionary prism as exposed on Barbados. As on the 2006 Venezuela trip, the theme of the trip will be to relate the outcrop geology to the offshore seismic and well data. Please mark your calendars for this unique, integrated view of southeastern Caribbean geology! Our route will be: US-POS-start trip in Tobago, fly to Port-of-Spain, Trinidad, fly to Barbados, and return to Port-of-Spain,

return to U.S. <http://www.ig.utexas.edu/research/projects/cbth/2007cbthtrip.htm>

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