**AT42-05: Teske “Guaymas Basin” R/V Atlantis *w/ Alvin & Sentry***

Precruise Meeting: Thursday 12 July 2018, 1400 EDT

3rd Floor Smith Conference Room

Synopsis: <http://www.whoi.edu/cruiseplanning/synopsis.do?id=4882>

Join by phone: +1 508 289 3192 ext 203777

**General Information**

**Mission Objectives**

This integrated biogeochemical and microbiological research program will explore the pathways of and environmental controls on the consumption and production of methane, other alkanes, DIC, LMW organic acids and sedimentary organic matter that fuel the Guaymas sedimentary microbial ecosystem. The hydrothermal sediments of Guaymas Basin provide a spatially compact, high-activity location for investigating novel modes of methane cycling and carbon assimilation into microbial biomass. In the case of anaerobic methane oxidation, the high temperature and pressure tolerance of Guaymas Basin methane-oxidizing microbial communities, and their potential to uncouple from the dominant electron acceptor sulfate, vastly increase the predicted subsurface habitat space and biogeochemical role for anaerobic microbial methanotrophy in global deep subsurface diagenesis. Further, microbial methane production and oxidation interlocks with S and N transformations, which we will explore on the organism and process level in hydrothermal sediment microbial communities and mats of Guaymas Basin. In general, our first-order research tasks (rate measurements, radiotracer incorporation studies, genomes, in situ microgradients) will define the key microbial capabilities, pathways and processes that mediate chemical exchange between the subsurface hydrothermal/seep environment and the deep ocean waters.

**Science Activities**

In the proposed project, we will investigate genomic potential, physiological capabilities and biogeochemical roles of key uncultured organisms from Guaymas sediments, especially the high-temperature anaerobic methane oxidizers that occur specifically in hydrothermally active sediments; for this purpose, sediment cores from hydrothermal hot spots [to be determined with the Alvin heatflow probe] will be collected with HOV Alvin. We will focus on the role of methane-oxidizing archaea and other Guaymas microbiota in C transformations, but also explore their potential involvement in S and N transformations. First-order research topics include quantifying anaerobic methane oxidation under high T, P and in situ methane concentration, and with alternate electron acceptors; sulfate and sulfur-dependent microbial pathways and isotopic signatures under these conditions; and nitrogen transformations in methane-oxidizing microbial communities, hydrothermal mats and sediments. To complement these microbial and biogeochemical studies, we are planning to employ the AUV Sentry, build and operated by the Woods Hole Oceanographic Institution, for a mapping and photomosaic survey of the Southern Guaymas Trench and its adjacent regions. This survey should enlarge the commonly visited microbial sampling area, which is needlessly limited to a small area in the southern Guaymas Basin *[see Sentry Proposal PDF for the 2018 cruise attached]*

**Chief Scientist and PIs**

Andreas Teske: Chief Scientist, Principal Investigator

University of North Carolina at Chapel Hill Marine Sciences, CB 3300 Chapel Hill, NC USA 27599

+1 919 843 2463

[teske@email.unc.edu](mailto:teske@email.unc.edu)

Samantha Joye: Principal Investigator

University of Georgia

[mjoye@uga.edu](mailto:mjoye@uga.edu)

**Ship’s Personnel**

Captain: Al Lunt Chief Mate: Peter Leonard Chief Eng.: JT Walsh Bosun: Patrick Hennessey

SSSG: Allison Heater & Cris Seaton

*Note:* WHOI SSSG techs do not stand watches, but are available 24/7 to provide support for integrating science party equipment with ship systems, and aiding science party in the use of ship-based instrumentation to meet project objectives. If specialized/dedicated techs are required to run operations or equipment, they must be added to your science party. SSSG techs are not part of the science party.

**Science Party**

24 Max

Party includes a potentially 1 artists (who have joined previous cruises) pending bunk space

Bunk space for Sentry personnel can be accommodated [Total of 5 Sentry personnel, so 3 bunks from science are needed, if Alvin can spare 2 bunks for Sentry]. 1 person is a female

Participant list & [berthing diagram](http://www.whoi.edu/fileserver.do?id=17092&pt=2&p=19713) send to Sarah Fuller ([sfuller@whoi.edu](mailto:sfuller@whoi.edu))

Personnel Forms due to Kim Ray ([kray@whoi.edu](mailto:kray@whoi.edu)) 1 month before departure

Any crew member who has sailed within past 6 months should be up to date on forms

Highlight any food allergies/restrictions as soon as possible

**Voyage Info:**

Ship transit speed: Max 11 kts.

*Woods Hole ‘mini-Mob’*

This is exclusively for loading chemicals and gases

Date to load: September 4

ALL chems & gases must be redundantly labelled, manifests provided, MSDS sheets and spill kits provided

SSSG is not responsible for inadequately labelled and/or stored science materials

Please provide chem & gas volume estimates no later than August 1.

Edgecomb will be collecting them ahead of time -

*San Juan Mobilization*

Arrival in SJ: 1 October

Unloading JASON & Lang cruise: 2-3 Oct

Loading for Costa Rica & Mexico cruises: 4-5 Oct

Departure for Puntarenas: 6 Oct

\*No cabin space available while in San Juan

*Guaymas*

Arrival: 14 November

Move into cabins: 15 November

Loading & Alvin training: 15-16 November

Departure: 17 November, planned for morning departure around 8, the 4 -5 hr transit so arrive onsite around 1300; depends on all the contingencies; depth is 2km no time to mess around with fancy equipment (potentially)

630nm from Guaymas to Manzanillo (about 2.5 days distance between the 2) = Nov 26th would be the last dive day, depart station late on the 26th or early on the 27th

*Manzanillo*

Arrival: 29 November, morning arrival; taking almost everything (minimal spares left behind)

SWAB: 30 November

Move out of cabins: 30 November

Finish unloading: 30 November

Andreas stay in hotel night of November 30 and depart on the Dec 1

**Operating area**

Southern Guaymas Basin

Lat/Lon: 27° 0.0’ N / 111° 24.0’ W

Depth Range: 1900 / 2050

Will the vessel be operating within 200 NM of a foreign country? Mexico (status updates, Kerry?)

Are visas or special travel documents required? Yes. This is the responsibility of science personnel as needed

**Station Locations**

Please provide sampling & dive locations – tentative plan required 1 month prior to departure

Please use the waypoint excel template provided

**Scientific Support**

*\*Please highlight mission critical sensors*

**Shipboard Equipment**

Deionized Water System (80L/day maximum production)

Fume Hood (how many need to be accessible, all 3?)

Science Underway Seawater System (standard sensors: t, s, chla; anything to be added into the system?)

Water baths, overns, non standard equipment put into the bench; nothing to be added to flow through system, using it mostly for rinsingTransponder Navigation - Sonardyne USBL

* Hoping to recharge Erik’s puntarenas LN; dry shipper will be in Erik’s container, will charge it in Puntareans; will it be shipped or will is stay – fully charged until San Diego (how is Mandy getting it home).

*Is there a need for any of the following equipment? The following were NOT requested as of 7/10:*

ADCPs

12 kHz Pinger for Wire Use (2 pingers needed – 1 is a ready spare)

Bathymetry System 12 kHz

Bathymetry System 3.5 kHz

Gravimeter (ITAR documentation)

Multibeam – request for optimization of outer beams – Trish please elaborate

Sippican XBT System (Mark 21)

– 12-15 count of each shallow and deep

– SSSG provides 1 per day, additional will need to be provided by PIs  
Navigation – Heading & PositionRelay Transponder for Wire Use

**MET Senors? Nope!**

*Is there a need for any of the following equipment? The following were NOT requested as of 7/10:*

Barometric Pressure

Air temperature

Precipitation

Relative Humidity

Wind speed and direction

Short Wave Solar Radiation

Long Wave Solar Radiation

**CTD/Water Sampling**

911+ Rosette 24-position, 10-liter bottle Rosette with dual T/C sensors – Rick patterson

SBE oxygen sensor

Wet Labs C\*Star transmissometer (660nm wavelength)

Mandy will bring her CDOM

*What sensors are required? The following were NOT requested as of 7/9, but commonly provided sensors on the rosette are:*

- With enough warning, we can potentially provide:

* Wet Labs ECO-AFL fluorometer\*
* Seapoint STM turbidity sensor\*

Biospherical underwater PAR (1000m depth limit) with reference Surface PAR

*How frequently do you plan to conduct hydrocasts?* Last time, it was every night while Sentry in the water,

Lander deployed in an elevator – will need a beacon – process? Can dirk come on the transit from Puntarenas to Guaymas to build the elevator ( would need to be in puntarenas on Nov 7, ship departs on the 8th) or send a tech or sends dimensions/tech data – will continue to follow up on this with Bruce – deployed and can stay for 36 hrs, so can move it to new spots without recovering, possibly 3 deployments/recoveries

Osmo sampler – can go up and down on elevator (takes up a lot of Alvin space)

**Rock/Sediment Sampling**

Any special requirements needed in lab for processing sediment samples from Alvin?

Core liners and water is all that are needed

**Shipboard Communication**

Basic Internet access via HiSeasNet

Any need for tele- or video-conferencing? – hopefully not; customs issues last time

\*Please review “Internet-at-Sea” document provided with Precruise Agenda

**Navigation**

GPS

USBL – required for Alvin/Sentry

ROV Sentry will generate new and improved maps of the southern Guaymas Basin area and its surroundings; see the attached pdf "GuaymasSentryRationale".

**Sample Storage**

Freezer -70°C 25 cu. ft.

Freezer -70°C 3.2 cu. ft.

Refrigerator 8.6 cu. ft.

Walk-ins – what temperatures do you want them at? – 4’C for both walkins

Any intention on keeping samples aboard at end of cruise, or will everything be removed in Manzanillo? He will minimize as best as possible – I will keep you updated on exact time

*Special storage notes:* Sediments are either kept alive at +4C in the coldroom for shorebased work, or are frozen at -80C for DNA/RNA shorebased work. Similar for sediment porewater; DIC samples are usually frozen, methane can be stored at RT, and sulfide/sulfate can be stored refrigerated at 4C. Fixed microbial cells are usually stored at -20C.

**Winches, Wire, & Deck Equipment**

CTD winch with .322” Electro-mechanical wire

No slip rings requested

No additional winch requested

Standard overboarding equipment for SENTRY & Alvin

**Vans & Topside Equipment**

*Deck plan required w/ weights*

Any gear expected to be on deck in addition to what is listed below?

Sentry:

* 20,000 lb Server Van on Main Deck
* 13,000 lb Spares Van on inboard port 01
* 6,000 lb Sentry stbd main deck

Alvin:

* OV – Main Deck port side, aft of hangar
* Basket of Alvin line – 01 by Electrical shop
* tracks

Science:

* ‘Fornari/Teske’ Van – outboard 01, est 10k lbs
* Cordes/Joye Van – Fwd 02, est 10k lbs
* WHOI Rad Van – Fwd 02 🡪 we should have the rad request by end of this week (7/13)

Also Aboard:

* SSSG & Alvin stores – Fwd 02
* Carpenter Van – Fwd 02

**Ship Power Requirements:**

Sentry, OV power needs

European requirements – bring their own transformer – need 60 cycles

Can provide 220V single phase at 15amps at 60hz; everything else they need to br

Each lab has 2 sockets for 220, bring power strips with

Send me a list of equipment, 3-5 boxes (need amperage requirements and where they will be located)

110 to 220 transformers will limit you to 7amps

**Hazardous Material**

Hazmats include:

Sentry Li Battery

Please fill out hazmat inventory <http://www.whoi.edu/sbl/liteSite.do?litesiteid=7092>

Send copy of hazmat manifest to [sfuller@whoi.edu](mailto:sfuller@whoi.edu)

List of chems & gases attached “AT42-05 TeskeJoye Hazmats\_20180424”

Please update the attached list of chems & gases no later than August 1.

We recommend using AirGas for gas orders because they are country wide and will be able to retrieve your cylinders in San Diego. Users are responsible for delivery and pickup of gases (Sept 4 & Dec 20, respectively). Users are responsible for labelling and confirmation that their cylinders have been both received and returned.

All Hazmats must be redundantly labelled **(minimum of 2 places)** with Cruise #, PI’s responsible, concentration & contents prior to loading in Woods Hole

Make sure to bring own spill kits, MSDS

Bring 1 printed copied of all MSDS sheets for binders & submit electronic copies as attachments to synopsis

Be prepared to remove all Hazard Waste and unused chems during demob in California on Dec 20

**Other Special Requirements**

Small Boat Operations in Rescue Boat for Alvin ops

Sentry is operated during the night so that it does not interfere with Alvin dives during the day

CTDs at night

**ALVIN Scientific Instrumentation**

(This section was missed in the questionnaire/synopsis)

10 dives?

Radon detector – these are tracers for the physical process of venting; done on the ship; collects on CTDs

We can collect water with majors, wont retain gases… Mandy brine bottles (not full sampler) can be rigged as slurps but they are bigger than majors, they have a built in temp – they will be ready and on board, will just need someone to clean them after; want one of the slurp pumps to provide fluid to the brine bottle in basket (1 or 2)

Milk crates deployed and picked up the next day; 4 tubes (inlets) in sed column – please send images to Bruce, 12x12 milk crates; planning on doing 2 at each dive site, ideally up to 4 (4 available); need good water weights to Bruce

Any implodables

**Flammability & toxicity testing**

* Any laptops, ipads, etc fundamentally required to go in Alvin (no phones/cameras), must be tested (incl. spare batteries)
* Items must be delivered to Rick Chandler ([rchandler@whoi.edu](mailto:rchandler@whoi.edu)) no later than **Friday July 13.**

**Objectives**

General objectives: ?

**Site Survey**

Charts will be provided?

No generation of work area maps requested

No need for post-dive work area maps

**Navigation**

No LBL

No nets or transponders

USBL also will be needed for Sentry

**Vehicle Equipment**

Workshop is aware of making 15 short and 15 long pushcore liners for German collaborators – might want to drill holes in these; pending basket config, hope for 30 cores per dive, but will do 12 or 15 if need space for other spots

Heat flow probe

1 pump will be used to supply the brine bottles for mandy

(see Alvin 2 Mondays from now = July 23)

Avoid slurping because it disturbs the bacterial mats (destroys filaments)

Other potential options may include:

*Bio box: 12x12x24*

*Rock baskets: 12x12x12 milk crates*

*Rock baskets: 12x18x12 milk crates*

*Rock baskets: additional wire basket*

*12-pack rack of Push Cores*

*Scoop Nets*

*CTD*

*Large capacity slurps: single chamber*

*Small capacity slurps*

*Search sonar*

**Elevators**

deploy once for 36 hrs (once every 3 days)

**Science Supplied Equipment**

Will any special equipment be used on ALVIN?

Power: ?

Hydraulic Output needed?

Manipulation?

Deployed off the vehicle?

Glass spheres?

Computer/control panel for remote ops within personnel sphere?

Will equipment disconnect and be left in situ?

Will previously deployed equipment be recovered?

Will there be Hazmats?

*\*\*Need pressure housing schematics w/ dimensions, air & water weights*

Mandy and Teske will work with Bruce in advance in August

Let us know the hidden agenda as soon as possible

Brand new mirrorless camera – Alvin bragging rights ‘professional grade’ for use in Alvin

**SENTRY Scientific Instrumentation**

**Objectives**

General objectives: Sean Kelley, Carl Kaiser and I are currently exploring options to add methane sensors to Sentry, but this is not set in stone yet; we are looking for quotes. Previous Sentry users have also asked for Methane sensors; perhaps it is time to add them to Sentry's sensor repertoire. – Mandy sent Sentry her sensors (they are currently in Bermuda with Sentry) 2 low range, 1 high range; want 2 on at a time (plug into data logger)

Sensitive in the micromolar range

**Site Survey**

Charts will be provided – GUAYM-Overview copy.jpg attached to synopsis

See attached Sentry proposal

**Navigation**

No nets or transponders

USBL will be needed

Doppler/GPS navigation will be needed

**Science Supplied Equipment**

At present, I do not have information on special equipment; in 2016, all special equipment items were held back by Mexican customs and could not be deployed; the cruise parties hoping to use them (collaborators from Germany and Harvard) may be too scared to try again.

**Camera and Video**

Digital Still Camera: Color

Strobe lights – will be tested on the cruise

Mandy’s group used to share hydrolab w Mandy

Sentry meeting will be arranged by Masako

**Safety**

**Deck Safety**

Closed toe/heel shoes must be worn at all times on deck, and in labs/common areas.

Steel toe shoes required for movement of heavy equipment.

Open toe/heel only allowed in personal cabins.

Launch & Recovery: Safety Shoes, hard hats and vests must be worn; safety plan required

On the dock or at sea: hard hats for overhead lifts, fall protection for working on top of vans or for attaching gear on railings or towers.

We will have some hard hats, but bring one if you have one.

No clogs no crocs

**Lab Safety – PPE**

Science party is responsible for laboratory PPE including lab goggles, coat, gloves, storage containment and cleanup kits for working with all hazardous materials brought onboard the vessel.

**Shipping & Loading Logistics**

\*If you choose to work with the ship’s agents, [ebenway@whoi.edu](mailto:ebenway@whoi.edu) & [sfuller@whoi.edu](mailto:sfuller@whoi.edu) must be copied on all correspondence. Should you choose to ship anything to these agents, Sarah Fuller ([sfuller@whoi.edu)](mailto:sfuller@whoi.edu)) must receive all manifests, BOLs, shipping information prior to shipments departing your home institution.

Ship’s Agent Information in San Juan, Puerto Rico:

Shipping Address:

*R/V Atlantis*

*Attn: “Scientist's Name” / AT42-06*

*c/o Inchcape Shipping Services*

*1064 Ponce de Leon, Suite 301*

*San Juan, Puerto Rico 00907*

Our agent is from Inchcape Shipping Services, Eric Gonzalez (Operations Manager)

Office: +787 620 2030

Fax: +787 620-0001

Mobile: +787 505 3385

Email: eric.gonzalez@iss-shipping.com

Web: www.iss-shipping.com

Plan for ALL shipments to Puerto Rico to arrive NO LATER than 2 weeks prior to loading date (4 October).

Any science items being loaded on the vessel (valued over $1000) in the USA will need a **Customs Form 4455.** ORIGINALS need to be signed by the equipment owner. Faxes and photo copies are not accepted by US Customs. These forms will be stamped in San Juan as the final departure point from the United States prior to removal from the ship in San Diego. Please follow all of the instructions very carefully. Examples are also provided here:

<http://www.whoi.edu/page.do?pid=8515>

Dan, for items from Germany, let me know what Leo Barry recommends.

**Demobilization in San Diego**

All demobilization will occur December 20, day of arrival. Morning of Dec 21 can also be used.

Further details of the schedule will be discussed in a later teleconference with Kerry Strom.

ECS scientists and PIs are expected to be participating in the Dec 22 event. Please plan travel accordingly.

The Ship’s Agent Information in San Diego is:

Master R/V Atlantis

Attn: Scientist's Name – AT42-06

c/o Paxton, Shreve & Hays Inc.

453 54th Street Suite 101

San Diego, CA 92114

Contact: Tom Jenkins

Phone: (619) 232-8941

Fax: (619) 232-3006

Telex: 6731029 SHREVE SDG

Email: [marineops@pshinc.net](mailto:marineops@pshinc.net)

Note the above address is for the ship’s agent, not the pier where the ship will be located.

\*If you choose to work with the ship’s agents, [ebenway@whoi.edu](mailto:ebenway@whoi.edu) & [sfuller@whoi.edu](mailto:sfuller@whoi.edu) must be copied on all correspondence.\*

Shipping will be done by Leo Barry

**Financial responsibility:** Please supply a WHOI Project Number for any anticipated mobilization/demobilization costs.

**Project # -** In process of setting this up with Andreas & Jenn Carter

*\*New WHOI policy encourages PIs to make all shipping arrangements independent of the institution. Starting 2018, WHOI will cover certain fees when they occur at/on the ship, including immigration, cranes, forklifts, and stevedores for loading/offloading containers/heavy equipment. The science party will be responsible for all other costs associated with their science gear, including but not limited to: customs clearance of science equipment, visas, equipment storage, shipping and handling, purchase of science supplies (gases, chemicals, etc), personnel transportation costs to/from the ship, unexpected travel or medical needs, etc.*

*WHOI charges an MTDC rate of 40.96% for non-WHOI PIs. For WHOI PIs, research rates apply.*

*You may work with Sarah to estimate a budget for your anticipated science needs and supply a WHOI Project Number and/or create a Purchase Order. Otherwise, science personnel are expected to secure their own agent independent of the ship.*

*If you have any questions, please contact Sarah Fuller (*[*sfuller@whoi.edu*](mailto:sfuller@whoi.edu)*).*

**Post Cruise Responsibilities**

**Actions departing ship**

All scientists are responsible for cleaning their cabins & heads.

Remove all scientific samples, chemicals, waste, gases, and cylinders, unless specific permission has been given to leave them aboard. If items are left aboard, plan on sending a representative from your group to remove these items from the ship at the designated time & port. WHOI is not responsible for items left aboard outside of your designated cruise time.

Any materials staying aboard must be *redundantly* labelled with owner’s name, contact information, and cruise Id.

Double check all of this before departure – will ask for help from usc – friend in a local lab will make it disappear easily

**UNOLS cruise evaluation**

To be completed by both Chief Scientist & Master[**Post Cruise Report Link**](http://strs.unols.org/Public/diu_pre_pcar.aspx)

**Reports to foreign government/State Department:** required for work in EEZs; send to Kerry Strom, [kstrom@whoi.edu](mailto:kstrom@whoi.edu)

**Reports to R2R:** <https://www.unols.org/document/cruise-personnel-manifest>

Chief Scientist should fill this out and send to dropbox@rvdata.us at some point during the cruise

**Data delivery [shipboard]:** USB Hard drive

**Data archiving policy**

All data on a WHOI Cruise Data Distribution (which includes all underway data) will, by default be considered publicly available once a copy of it has been delivered to the chief scientist at the end of the cruise. Please review the [Cruise Assignment of Data Access Protection](http://www.sssg.whoi.edu/sssg/pdf/cruiseData_v3.pdf)

As of January 1, 2011, the default treatment for underway data from Woods Hole Oceanographic Institution (WHOI) research vessels is:

1. Cruise data files are copied by a WHOI SSSG Technician to the distribution media. One copy is delivered to the cruise Chief Scientist, the other is delivered to WHOI's Data Library and Archives. Please note that the distribution of cruise data to other scientist is the responsibility of the Chief Scientist.
2. The **default** access status for the cruise instrument datasets is that they will be immediately accessible by the public. If something other than this default protection is desired, the Chief Scientist must assign alternate protection as indicated below. For cruises funded by the National Science Foundation, the maximum protection is two years, for non-NFS cruises, other guidelines may apply.
3. WHOI maintains a local copy of the cruise shipboard data distribution at its Data Library and Archives, which also honors access moratorium periods. If the cruise Chief Scientist wishes to modify the data protection assignments made in this pre-cruise document upon cruise completion, they should contact the
4. WHOI Data Library and Archives at dla@whoi.edu, or the SSSG Data Manager at [sssgdatamgr@whoi.edu](mailto:sssgdatamgr@whoi.edu)