

Report LARISSA Biology Meeting  
10-11 January 2009  
Atlanta, GA

MEETING PARTICIPANTS: Cindy van Dover, David Honig, Bruce Huber, Scott Ishman, Amy Leventer, Mike McCormick, Craig Smith and Maria Vernet

CRUISE BIOLOGY PARTICIPANTS: David Honig, Mike McCormick, Craig Smith (+ post-doc) and Maria Vernet (+Mattias Cape, graduate student)

PI SAMPLING SUMMARY:

- 1) Cindy van Dover and Davig Honig
  - a. Active seep macrofauna (use of ROV to collect)
  - b. Bone-eating worms (2 moorings and bottom sampling in the PO moorings)
- 2) Mike McCormick
  - a. Active seep microbiology, differentiating 3 locations: bacteria mats, sites with clams and a reference (use of ROV for push cores and Karsten cores)
  - b. Sampling other locations as reference
  - c. Sampling microbiology at other locations with petroliferous shale (~1 m deep)
- 3) Craig Smith
  - a. Active seep in- and surface fauna (use of ROV for push cores)
  - b. Five other stations along a gradient for in- and surface fauna colonization
- 4) University of Ghent
  - a. Active seep sites
- 5) Maria Vernet
  - a. Water column sampling - CTD
  - b. Alongtrack ship's system sampling (with A. Leventer)
  - c. ROV with Niskin bottle

INSTRUMENTATION TO BE REQUESTED:

- MudScud and yo-yo (OIS) bottom camera to characterize benthos (large scale)
- (all)
  - ROV for high-resolution video to characterize benthos (all)
  - ROV for push cores (Smith and McCormick) and collection of macrofauna (van Dover) at seep site
  - ROV for collection of coral at hard bottom community in Cape Framnes (biology and geology)
  - Megacorer to sample infauna (Smith) and microbiology (McCormick)
  - CTD for water column sampling (Vernet)
  - Trawls (Otter and Blake) to collect macrofauna (Smith) and clams (van Dover)
  - Dredge to collect clams (van Dover)

Box Corer to collect clams (van Dover)

Smith-McIntyre grab to characterize macrofauna community (all)

BIOLOGY STATIONS (see Excel file by Mike McCormick and Map by Craig Smith):

- 1) Active Seep Station: as in 2005 Domack cruise. If the site is not active we will look (in order of probability) in Scar Inlet, Hektoría Inlet, Cape Framnes and Larsen C.

Mud Scud and yo-yo still camera in survey mode

CTD

ROV high-resolution video (All)

Megacorer (guided by camera): 40 cores (20 for Smith, 9 for McCormick, 12 for de Batiste)

Karsten Core (McCormick)

ROV push core (Smith, van Dover, McCormick)

ROV clam collection, or trawl or box corer (van Dover): 30 clams

Megacorer (away from the active seep) (Smith)

Wire time estimated at 66 hs

- 2) Other 5 stations along a transect (see Map) plus desirably at Crane Inlet, Scar Inlet and Hektoría Inlet

CTD

Smith-McIntyre grab - All

Megacorer (infauna, megafauna) - Smith

Karsten core (geology and microbiology) – geology, McCormick

PO, Sediment Trap and bone-eating worms mooring (geology, PO and van Dover)

Wire time estimated at 33 hs

- 3) Other CTD locations (Vernet)
- 4) Worm eating moorings (4 weeks and 2 years) – Location to be determined (van Dover)
- 5) Other Karsten core locations (McCormick, in collaboration with geology)

UPDATE ON ROV sampling (conference call with Willem Veerstep)

1) ROV to work 8-h dives (5-6 hs active sampling) per day (or more often shorter dives)

2) Video cameras, CTD, transponder all work well

3) Manipulator Arm works well but does not have a wide range of motion, has a low number of articulations, not very strong, limited grip ability

4) Push cores: the ROV has a set up to sample 3 (three) push cores per dive. The ability to increase the number of push cores using an elevator is *not recommended* as the

grip does not handle the cores well enough for a high quantity of cores. The proposed use of the manipulator arm to pick up cores from the elevator, sample the sediments and return the cores to elevator is not recommended. To date the University of Ghent has tested several designs but so far no success.

5) Push cores taken by ROV are 10 cm deep due to low ROV weight, manipulator arm not very strong (in comparison with 15-20 cm from megacorer).

6) Clam collection (the ROV has not done any biology sampling yet, only geophysics): the tray/drawer at the bottom of the ROV is open. Van Dover needs a close box. Van Dover to build one box with lid that fits the drawer. *Recommended.*

7) Elevator: the elevator can be used to collect clams and macrofauna. The ROV might need more/other than the manipulator arm to maximize sampling, i.e. a scoop instead of the grip at the end of the manipulator arm. *Recommended.*

8) Elevator design: a free vehicle package, with a line of floats, used with acoustic release, maybe with transponder: *the ROV can work around this design.*

#### ALTERNATIVE TO ROV FOR PUSH CORE SAMPLING

An alternative to collect high number of push cores (~20 cm of sediment), 40 per seep site, is to use the megacorer with a still camera with live feed. No need to control the camera from the ship but a cable (maybe coaxial) to receive images in real time (Domack says 15 second delay). The megacorer would hover over the bottom at about 2 m over the sediment and the ship would drift until the megacorer is over the previously located active seep (with the ROV). At such time the megacorer would be deployed.

WHY? The degree of detail needed to sample the active seep site (areas with microbial mats, areas with clams, control areas) need a degree of resolution (a few meters) not possible without visual information. This sampling is about 90% of the science by 2 PIs, McCormick and van Dover. In addition, U. Ghent would also like a high number of cores (12-16) from the active seeps

#### ALTERNATIVE TO COLLECT CLAMS

An alternative to collecting clams with the ROV (grabbing with the manipulator arm or a scoop in the manipulator arm) would be to use a trawl, a box corer or a dredge. In this case, collection of clams would also be contingent that these instruments have a camera mounted on the frame in order to collect from the location (within meters) where clams are present.

#### BONES AND WOOD MOORING (see design by van Dover)

- a. All physical oceanography and geology moorings (Huber and Leventer) to add a bag with wood and bones at the weight/anchor (Huber and van Dover).
- b. Two independent moorings to be added (van Dover and Huber)

#### PERSONNEL NEEDED WHEN SAMPLING AT A SEEP SITE

- 1) McCormick: +2 helpers + gopher
- 2) Smith +post-doc +2 helpers (possibly Ishman)
- 3) Honig +1 helper

- 4) ROV 3 participants + unknown number of helpers
- 5) Vernet & Cape

#### SEDIMENT SAMPLING (McCormick with Smith, geology group and U. Ghent)

- 1) methane, sulfide, sulfate, DNA (microbiology diversity), microscopy (Scanning electron microscope)
- 2) water content, grain size, diatoms (w/ Leventer), TOC (total organic carbon),
- 3) possibly: methane isotopic analysis, lipids, 14C-DOC and 14C-POC (w/Domack)

#### DECK OPERATIONS

- 1) from stern (up to 5 blocks on A frame)
  - a. Trawls (Blake and otter)
  - b. Megacorer w/camera
  - c. Jumbo corer
  - d. ROV
  - e. Mooring deployment
  - f. Smith-McIntyre w/camera
  - g. Dredge
  - h. Box Corer
  - i. MudScud
- 2) from starboard
  - a. Smith-McIntyre
  - b. Yo-yo camera (OIS)
  - c. Nets
- 3) Baltic room
  - a. CTD/LADC

#### ACTION ITEMS

All

- 1) Develop protocol for opportunistic sampling

Van Dover & Honig

- 1) Visit to U. Ghent
- 2) Elevator design (w/ Smith and U. Ghent)
- 3) Biobox design
- 4) Design bone and wood mooring – Location (w/ Domack)

Huber (none – on a cruise)

Ishman (none)

Leventer

- 1) Define sampling by geology group (w/ Domack)

- 2) Check with Stephanie Brachfeld about pore water analysis (iron, minerals, magnetic susceptibility)
- 3) Check construction of Jumbo Piston core storage in environmental room

#### McCormick

- 1) Microelectrodes (oxygen, Eh)
- 2) Nutrients (nitrate)
- 3) Specify collaboration with U. Ghent (carbonate system)
- 4) Develop collaboration with Germans (oxygen in sediments)

#### Smith

- 1) Guided megacorer design (add real-time visual)
- 2) Develop 14C-DOC analysis with Domack
- 3) Visit to U. Ghent
- 4) Elevator design (w/ van Dover and U.Ghent)

#### U. Ghent

- 1) Develop sampling plans to include in CON OPS document by end of January

#### Vernet

- 1) Prepare report
- 2) Talk with Domack and RPSC about guided megacorer - Done

#### Will

- 1) Send ROV schematics (manipulator arm, drawer, push core tray)