Pre-Cruise Meeting May 20, 2013

***Johnson – AT26-04, July 31- August 26***

**General Program Overview:**

1. Scientific Objectives:

A comprehensive study of the thermal environment of the Cascadia Subduction Zone (CSZ) within the NSF GeoPRISM Corridor off the Washington margin. The primary goal of this study is to determine the temperature structure of Juan de Fuca basement and overlying accretionary prism sediments that comprise the CSZ deformation zone with a transect of systematic heat flow and fluid flux profiles off the Washington Coast. Temperature is a primary controlling factor of many subduction zone processes, particularly at active margins that are subject to large magnitude, megathrust earthquakes as the CSZ offshore WA, and a comprehensive heat flow study of the Cascadia Corridor is a fundamental parameter required by the Scientific Plan of the GeoPRISM Program. Compilation of existing data demonstrate that the segment of the CSZ off-shore WA is dramatically under-measured, with only sparse heat flow stations made during programs focused on other scientific goals. We are proposing to acquire a systematic profile of heat flow and fluid flux measurements along a corridor of the accretionary prism on the Washington margin at 47°N, from west of the deformation front on the abyssal plain to just below the shelf edge at 500 m depth – in order to make the first quantitative estimates of the thermal structure of the ‘locked zone’ of the Cascadia megathrust. To obtain an accurate estimate of conductive heat flux from the challenging environment of the accretionary prism, we plan redundant methods to obtain both thermal and fluid flux measurements along a 2.5 D profile of the margin at a single latitude. In this profile we would use thermal blankets suitable for impenetrable sub-stratum, continuous fluid flow meters, multi-core deployments for sediment pore water chemistry and thermal gradient measurements, and Jason-II heat flow probes.

Activities:

Jason , CTD, Coring

OSU heat flow probe, multi-corer and gravity corer will be used OSU coring technician will be part of science party.

There will be one day for JASON engineering dive.

1. Identify other PIs associated with the cruise:
2. Identify the at-sea Chief Scientist: Paul Johnson
3. Identify operating area:

*box defined by latitudes 46N and 47n //125W and 126W  the Washington state continental margin.*

1. Voyage Dates and Leg # **July 31 – August 26. AT26-04** (Astoria - Astoria)
2. Science party (size) – 24 bunks available.

**Pre-cruise and Administrative:**

1. Diplomatic clearance requirements for operations in EEZs : None Req.
2. Financial responsibility: POs? How many to set up? Forklift?
3. Personnel forms (Passports, Visas, Entry Fees)
4. Any Special Food Requirements (Gluten Free, Vegetarian, Kosher, etc)
5. Berthing Plan - 1 week prior to mobilization

# Jason: (It is most important to communicate with Matt Heintz directly and to

refer to the *Jason Fact Sheet*  published on the WHOI website: <http://www.whoi.edu/fileserver.do?id=55543&pt=10&p=38332>)

And the Jason Specs / User Manual;

<http://www.whoi.edu/page.do?pid=10755> )

1. **General work description / Brief operation description or comments**:

It is only about a 6 hour transit to our first site once we cross the

Columbia bar, so we will have to be ready to go before leaving

the dock. We are still working on a Full Cruise Plan, but prior instrument

deployments have dictated our first order-of-operations.

A. go to our first site (probably at the western/seaward end of Line 4 on

the attached figure, depth 3000 m) and drop an elevator

full of thermal blankets. We are doing this early so they can reach

'thermal equilibrium' as soon as possible. No Jason dive yet.

B. do a short Jason II dive on the 3 instruments (2 thermal blankets and a

tiny mooring) that were deployed by Maya Tolstoy in

2012. Recover these instruments. This will not be far from the site in

item A above. We will probably want to do a 'test

deployment-and-recovery' of Evan's mosquito flow meters during this short

dive since they weigh 40 lbs in air each and Jason

has not dealt with them previously.

C. return to the elevator site in item A above and begin our profiles of

blanket/flow meter stations.

D. For planning purposes, we are assuming a cycle of 48-hour long dives

followed by 24 hours of surface ship operations, in repeated cycles

starting at the deep end of the profile (3000 m) and ending in shallow

water (500 m).

E. During the non-Jason-dive periods, we will be doing (a) multi-corer

deployments, (b) CTD casts, (c) OSU long-probe heat flow deployments, and

(d) EM122 and 3.5 kHz surveys. We will need the EM122 'water column'

software dongle to image the methane plumes in the water column. We will

have the OSU coring technician along (Peter Kalk), who has decades of

experience with over-the-side deployments.

We have the software for the Jason manipulator heat flow probe from Mike

Hutnak, but it would be good if the HF probe hardware was working and

tested prior to our cruise. We will do the probe calibration in Astoria,

as we did in 2011. In this context, I will mention the concept of 'spare

parts'.

We will be relying on the Jason hull-mounted CTD and brow camera video for

this cruise (both are student projects). You can do Real Science

with these routine data sets (see attached paper from our 2011 cruise).

1. **Number of instruments / samples to recover and their most accurate positions:**

Collection of sediments & infrequent biology.

Dive area is in the Quinault Indian Nation Treaty zone, and I am presently discussing the cruise with them. Dive area is in high density marine mammal zone, and has abundant fishing/crabbing activities which can conflict with science objectives. Jason has worked in this area previously (OBSIP program, 2012).

1. **Other sampling from Jason**
   1. BIO Collection boxes 12”x12”x16”
   2. Jason CTD Bottle
   3. High Temp Probe
   4. Search Sonar
   5. Elevators - how many? YES - 2

e. Push corers

f. High Temp Probe YES

g. Slurp Samplers – Large Multi chamber & Single chamber

h. Scoop Nets

1. **Please give a brief description of the equipment, its intended purpose, the cruise # it was last used on if any and its deployment method.**

Thermal blankets, deployed. Fluid flux meters, deployed.

August, 2011 Atlantis/Jason II cruise to Endeavour Ridge.

Fluid flux meters are ambient pressure. Data loggers are rated >4000 meters and use previously on Jason.

Does this equipment require manipulation?    
Yes - as on previous cruises.

If yes, please describe how the equipment is to be manipulated.

The instrument will be picked up from the science basket and placed gently onto a benchmark and released. After a measurement period of 15-20 minutes, the instrument will be picked up and stowed on the science basket until the next site.

**Instrumentation & Technician Support**  ***[Installed Scientific Equipment] :***

1. General Duties of Marine Technician ***[SSSG Tech]***

Allison Heater, Catie Graver and one SSSG Mate Intern (UNOLS)

1. WHOI general use equipment required for cruise ***[Installed Scientific Equipment]*:**
   1. Mulitbeam {Incl. Water Column MB survey}

Generate Maps on board ?

* 1. CTD 24/10 liter rosette with dual T/C sensors

Turbidity, SBE 43 O2 sensor, Fluorometer, transmissometer

* 1. Gravity Corer
  2. Freezers (all), -70o
  3. Reefers (all )
  4. Walk In Freezer & Refer
  5. Bathymetry Sys. 3.5 & 12 kHz
  6. ADCP 75 kHz
  7. Science Sea Water supply to labs
  8. Fume hood
  9. High Sea’s Net
  10. Met data.

**Science Party Supplied Equipment:**

Oregon State University will bring Multi-corer and tech.

Storage van?

**Ship** ***[Other Requirements][Shipboard Equipment/Nav] :***

* 1. Science/Ship Operations ***[Program-Provided Science Tools***
  2. Instrument Deployment / Recovery Procedures
  3. Overboarding Equipment (ISM)
  4. Vans – (Jason, Isotope, Chemical)
  5. Hazards [weight, bulk, chemical, pres.]
  6. Night Operations YES

1. Deck Safety – Safety Shoes ( ), Experience ( )
   1. Science personnel have Training/Experience to operate/deploy gear
2. Lab Safety – PPE ( ), Lab Training ( )
3. Hazardous Material***[Notes] Fill out HAZMAT INVENTORY FORM***

***http://www.whoi.edu/sbl/liteSite.do?litesiteid=7092&articleId=10875***

* 1. Chemicals & Compressed Gases
     1. Inventory Form
     2. Spill Kit
     3. Loading and waste removal logistics
  2. Isotope Use ***[Isotope Use Approval]***

http://ehs.whoi.edu/ehs/DesktopDefault.aspx?tabindex=2&tabid=5&itemID=543

1. Policies: (speed, departure/arrival times, moving aboard, etc
2. Ship Navigation
3. Communication (voice, fax, e-mail)
4. Equipment
   1. Cranes ( )
   2. Oceanographic winches: Hydro ( X ), Trawl (X ), CTD ( X )
   3. Air Tuggers ( X )
   4. Electrical power ( X )

## Logistics *[Notes]*

1. Shipping gear to and from vessel? Mob July 29 – 30.

2. Demob – Aug 27 - 28

**Post-Cruise**:

1. Actions departing ship
2. UNOLS cruise evaluation [Chief Scientist & Master]
3. Reports to foreign government/State Department [required for work in EEZs]
4. Data delivery [shipboard]
5. 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)