

CMOP cruise plan***R/V Point Sur***

September 1-14, 2009

Submitted by Murray Levine and Chris Wingard, Oregon State University

Area of Operations: Pacific Northwest coastal ocean from central Oregon to southern Washington, and the Columbia River and its estuary.**Scientific personnel**

Name	Inst	Position	Berth	Leg 1	Leg 2
Wingard, Chris	OSU	Senior Faculty Research Asst. Chief Scientist		X	X
Guadayol, Oscar	OSU	Research Assoc., Post Doc		X	X
McNeil, Craig	APL/UW	Senior Oceanographer		X	X
Litchendorf, Trina	APL/UW	Oceanographer		Y	Y
Swanson, Troy	APL/UW	Field Engineer		X	X
Shcherbina, Andrey (Leg 1)	APL/UW	Research Assoc., Post Doc		X	
Kelsey, Denise (Leg 1)	CRITFC	Fisheries Scientist		Y	
Moeller, Florian	OHSU	Graduate Student		X	X
Wolhowe, Matt (Leg 1)*	OSU	Graduate Student		X	
Seaton, Charles	OHSU	Research Assoc.		X	X
Prahl, Fred (Leg 2)**	OSU	Professor			X
Fortunato, Caroline (Leg 2)**	U Maryland	Graduate Student			Y
Jokinen, Ben	MLML	MarTech			
BERTHS FILLED				10	9
BERTHS OPEN				0	1 (X)

X = male; Y = female

* = Transferring from Point Sur to New Horizon in Astoria on Sept 8

** = Transferring to Point Sur from New Horizon in Astoria on Sept 8

Cruise Plan Overview

Overview of the various types of scientific activities (the technical details of equipment are given on the last pages of this plan):

- * AUV operations – REMUS 100. Daylight operation with deployment and recovery of AUV using the ship’s RHIB. Four acoustic beacons will be deployed to help the AUV navigate (25# weight, line, transponder, two surface floats).
- * Slow Drop vertical profiler– frame with CTD and other instruments. It has its own winch, block, etc., and is deployed over the aft A-frame. Operation is much like standard CTD.
- * Boom mounted ADCP/Biosonics – the boom used in the May CMOP cruise will again be mounted on the port side with an additional transducer added. This will be left deployed much of the time, except for transit and ship maneuverability.
- * Underway system – we need pumped water that bypasses the two de-bubblers currently installed in order to measure dissolved gases. Fred Prahl (OSU) is discussing this issue with Mar Tech and Chief Engineer.
- * Ship CTD (mode 1) – standard with rosette for use in ocean and plume
- * Ship small CTD (mode 2) – small system with no rosette for use in the estuary where currents can be strong; same as used in May CMOP cruise.
- * Pumped near surface water – We will bring a small impeller pump (used on the deck) (110 V) with a hose that is loosely attached to the CTD. The tubing is paid out as the package descends. There are clips on the tubing to attach it to the hydrowire every few meters.

Cruise schedule summary:

- 1 Sept: Leave Newport and transit to Columbia River plume.
- 2-3 Sept: Plume studies using AUV and Slow Drop.
- 4 Sept: Join the R/V New Horizon in transiting up the river and back; anchor at RM-17 (River Mile 17 near Tongue Pt)
- 5 Sept: Anchor at NC-7 (North Channel) for AUV and Slow Drop operations.
- 6 Sept: Transit offshore to pump bilges. Back to NC-7 for AUV and Slow Drop ops.
- 7 Sept: Anchor at NC-7 for AUV and Slow Drop operations.
- 8 Sept: Dock or small boat transfer of personnel and small equipment (coordinate with New Horizon)
(2 people to shore, 1 person to New Horizon, 2 people from New Horizon)
- 9 Sept: Plume study with Slow Drop / CTDs
- 10-13 Sept: Plume studies using AUV and Slow Drop.
- 14 Sept: Dock Newport

Detailed schedule follows.

Cruise Plan Details

Times in Pacific Daylight Time (PDT); Sunrise ~0640 PDT; Sunset ~1945 PDT

31 Aug: Load

Load ship in Newport, OR, including: install boom mount for ADCP, install block in A-frame for Slow Drop.

1 Sep: Plume Survey

Morning Leave dock. Transit to Columbia River (CR) plume (within a 50 km radius of CR); exact location determined by latest model forecast and satellite observations.

Evening Deploy boom ADCP. Survey plume with underway systems and ADCPs; pattern guided by real-time data, model forecasts, satellite observations and weather.

2 Sep: Plume Studies with AUV (Mission #A)

Early morn Determine site for AUV deployment based on survey, model forecast; transit

Daylight Deploy acoustic beacons by hand over the side. Using RHIB deploy AUV. Follow AUV. Periodically stop and hand deploy an over-the-side transducer to range on the AUV. After the mission, use RHIB to recover AUV. Recover beacons. If convenient, do test profiles using Slow Drop system.

Night Ops Survey plume with underway systems and ADCPs; pattern guided by real-time data, model forecasts, satellite observations and weather.

3 Sep: Plume Studies with Slow Drop and AUV (Mission #B) (Coordinate with R/V New Horizon)

Morning Slow Drop stations. Locations based on weather, model forecast and discussion with New Horizon.

Afternoon AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons. Slow Drop profiles may be made when AUV is in the water, if circumstances permit.

Night Ops Survey plume with underway systems and ADCPs; pattern guided by real-time data, model forecasts, satellite observations and weather.

4 Sep: Estuary and River transect (coordinate with R/V New Horizon)

First light Cross bar at low tide ~0730. Follow New Horizon up river to Beaver Army Dock sampling with underway systems.

Follow New Horizon down river beyond Astoria to Young's Bay (New Horizon may stop for a few CTDs conditions permitting).

Transit back up river to RM-17 (River Mile 17) to anchor near New Horizon.

Night Ops Monitor underway systems. If possible, time series of CTDs using ship's no-rosette system (mode 2).

5 Sep: Estuary Studies with AUV (Mission #C) and Slow Drop or CTD (R/V New Horizon will be at NC-11)

First light Transit to North Channel (NC-7) and anchor.

Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.

Time series of Slow Drops or CTDs using ship's no-rosette system (mode 2), if circumstances permit.
 Night Ops If possible, continue time series of Slow Drops or CTDs using ship's no-rosette system (mode 2).
 Monitor underway system.

**6 Sep: Pump bilges?
 Estuary Studies with AUV (Mission #D) and Slow Drop or CTD
 (R/V New Horizon will be at NC-11)**

Daylight Cross bar at low tide ~ 9:00 PDT. Transit and pump bilges.
 Transit back to NC-7 and anchor.
 AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons. Time series of Slow Drops or CTDs using ship's no-rosette system (mode 2), if circumstances permit.
 Night Ops If possible, continue time series of Slow Drops or CTDs using ship's no-rosette system (mode 2).
 Monitor underway system.

**7 Sep: Estuary Studies with AUV (Mission #E) and Slow Drop or CTD
 (R/V New Horizon will be at NC-11)**

Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.
 Time series of Slow Drops or CTDs using ship's no-rosette system (mode 2), if circumstances permit.
 Night Ops If possible, continue time series of Slow Drops or CTDs using ship's no-rosette system (mode 2).
 Monitor underway system.

8 Sep: Port call and Estuary Studies with AUV (Mission #F) and Slow Drop or CTD

First light Dock or do small boat transfer in Astoria for personnel and small equipment.
 Transit back to NC-7 and anchor.
 Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.
 Time series of Slow Drops or CTDs using ship's no-rosette system (mode 2), if circumstances permit.
 Night Ops If possible, continue time series of Slow Drops or CTDs using ship's no-rosette system (mode 2).
 Monitor underway system.

9 Sep: Plume Studies with CTD (with pump hose)

Daylight Cross bar at low tide ~10:30 PDT.
 CTD Survey with ship's CTD with rosette (mode1). Pump water from a few depths at some stations. Station locations based on model forecasts, satellite observations and weather.
 Slow Drop may be used at some of the stations instead of CTD.
 Night Ops Survey plume with underway systems and ADCPs; pattern guided by methane mapping group.

10 Sep: Plume Studies with AUV (Mission #G) and Slow Drop

Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.

If practical, profile with Slow Drop when AUV is in the water.

Night Ops Survey plume with underway systems and ADCPs; pattern guided by methane mapping group.

11 Sep: Plume Studies with AUV (Mission #H) and Slow Drop

Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.

If practical, profile with Slow Drop when AUV is in the water.

Night Ops Survey plume with underway systems and ADCPs; pattern guided by methane mapping group.

12 Sep: Plume Studies with AUV (Mission #I) and Slow Drop

Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.

If practical, profile with Slow Drop when AUV is in the water.

Night Ops Survey plume with underway systems and ADCPs; pattern guided by methane mapping group.

13 Sep: Plume Studies with AUV (Mission #J) and Slow Drop

Daylight AUV operation: deploy beacons, deploy and recover AUV using RHIB, recover beacons.

If practical, profile with Slow Drop when AUV is in the water.

Evening Transit to Newport.

14 Sep: Dock in Newport

0800 Dock.

Table of Stations

Station Name	Latitude	Longitude	
NC-7	46° 14.52' N (46.242)	123° 57.30' W (123.955)	North channel 4 miles west of bridge
NC-11	46° 14.04' N (46.234)	123° 52.44' W (123.874)	North channel near bridge & SATURN-01
RM-17	46° 12.60' N (46.210)	123° 46.62' W (123.777)	River Mile 17, near Tongue Point

Winches

Need ship CTD winch

Capstan

Might be useful in recovery of acoustic beacons

User Supplied Winch and Block for Slow Drop

The Slow Drop winch (weighing 1200 lbs) bolts to deck with 4' by 4' footprint. Winch power required is 440 - 3 phase 10A; we supply cable that can be wired to ship supply.

A user-supplied aluminum block (20" dia) needs to be mounted in the A-frame.

Ship CTD – 2 modes of operation

Mode 1: Standard 911+ CTD/Rosette; standard sensor suite: redundant temperature and conductivity, oxygen, transmissometer, Chl fluorometer, PAR and an altimeter.

Mode 2: High current 9+ CTD (no Rosette); with temperature, conductivity, transmissometer, Chl fluorometer. This configuration will be used in the river and estuary where there may be high currents. The switch from Mode 1 to Mode 2 will happen only once during the cruise.

Deepest planned sampling: less than 500 m in Mode 1 and river/estuary depth in Mode 2.

Ship ADCP

Standard RDI 75 kHz and 300 kHz

User supplied ADCP on boom mount

Need to mount an RDI 600kHz ADCP and Biosonics acoustic transducer on a vertical boom that we will supply. This is the same boom used successfully on the Pt Sur during the May CMOP cruise. Ship speed is limited to about 5 knots when the boom is deployed.

UDAS

Standard sensors: SST, salinity, conductivity, fluorescence, transmissometer, and meteorological instruments.

User supply underway systems to measure: CO₂, methane and other gasses

Needs 20-40 L/min seawater without passing through either of the two de-bubblers. Fred Prah will discuss further with Point Sur Engineer.

User supplied deck pump

Small deck impeller pump (110 V) is used with hose to pump water from no deeper than 20 m. The hose is attached to the CTD and loosely clipped to the hydrowire as it is deployed.

Hazardous materials

2 cylinders of compressed air for operating the underway CO₂ system.

Methanol

Liquid nitrogen

Mercuric chloride (McNeil)

Manganous chloride (McNeil)

Sodium hydroxide (McNeil)

Sulfuric acid, 10N (McNeil)

Sodium iodide (McNeil)

Potassium iodate (McNeil)

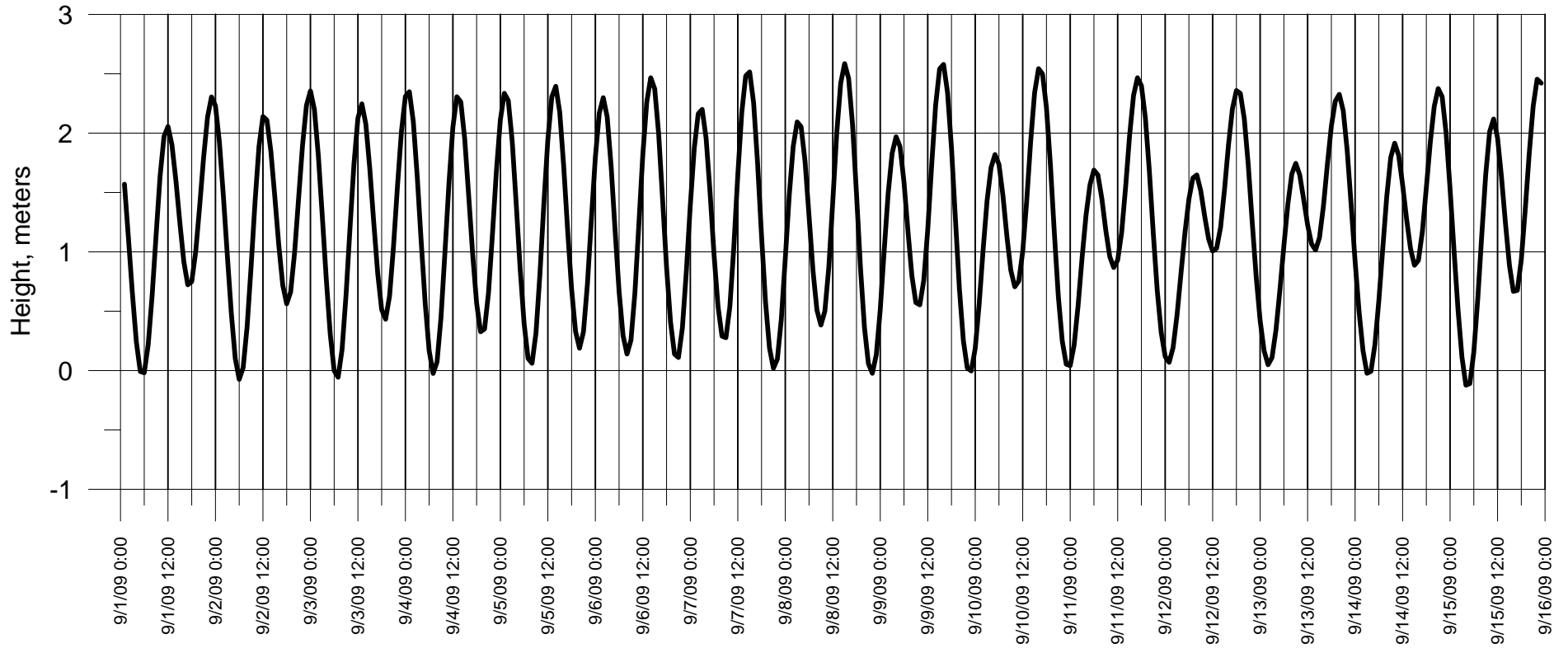
Sodium thiosulfate (McNeil)

Sodium sulfite (McNeil)

Soda lime, indicating (McNeil)

No Radioactive Material will be used.

Tide at Astoria, Oregon



Times in Pacific Standard Time
(add 1 hour to get Pacific Daylight Time)
(add 8 hours to get UTC)