



Regional Operations Centre, Canadian Coast Guard Western



Science Cruise Report: PAC 2023-026

Report last updated: 2023-11-28 13:40:29

<https://www.waterproperties.ca/requests/cruiseplanview.php?cruiseid=2023-026>

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Department/Group:	Fisheries and Oceans Canada, OSD
Other Participating Groups:	University of British Columbia: Tortell Lab; University of Victoria: Dower Lab
Science Cruise Number:	PAC 2023-026
Alternative Cruise Number:	
Ship's Patrol Number:	23-06
Name of Vessel/Platform:	J.P. Tully
Dates:	From: Thursday 24-Aug-2023 To: Tuesday 05-Sep-2023
Chief Scientist:	Akash Sastri , 778-677-1226, akash.sastri@dfo-mpo.gc.ca
Master:	F. Hamilton
Fishing Master:	
Appropriateness of Vessel:	Excellent

Time Allocations

Originally Allocated Days **12.00**

Accounting below is given in days and should match the originally allocated days above.

Weather	+ 0.00	
SAR	+ 0.00	
CCG Refueling	+ 0.00	
CCG Ship Repair & Maintenance	+ 0.00	
CCG Crew Changes	+ 0.50	last day of survey
CCG Other	+ 0.00	
Science Operations	+ 10.00	
Science Equipment Loading/Unloading	+ 1.50	
Science Other	+ 0.00	
Days Gained	+ 0.00	

Days Grand Total **= 12.00**

Time Allocation Comments: Days allocated appropriate for completing core survey activities in addition to mooring and float deployment for other OSD science groups

Cruise Events

Areas of Operations

Juan de Fuca, Strait of Georgia, Johnstone Strait, West Coast Vancouver Island, Northwest Coast Vancouver Island, Hecate Strait

Scientific Personnel

Name	Notes (Affiliation, Watches, Duties, etc)
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Akash Sastri	chief scientist, data
Moira Galbraith	
Francesca Loro	
Julian Smith	
Sile Kafrissen	
Scott Rose	
Jennifer Jackson	
Paul Covert	
Oliver Pankratz	
Brandon McNabb	
John Dower	
Nicole Fung	
Hana Hourston	

Event Log

Tuesday 08-24-2023: All scientific gear loaded by 2130; lab set up until departure

08-25-2023: Depart 0100 UTC. Sanich Inlet test cast, Stn SI,;

08-25-2023: Stations Haro 59 and JF2, start LB line [1641 UTC] LB 01 - LB06;

08-26-2023: Continue LB line: C1,C2, C3, LB07-LB15. NB LB16 dropped transit to and work at acoustic mooring site (48 23.098,-125 48.246)

08-27-2023: Resume survey stations: B7 and B8; started LC line 0417 UTC: LC01 - LC11

08-28-2023: Continue and complete LC line: LC12; transit and commence LD line starting offshore (LD11)

08-29-2023: Completed LD line (LD01), transit to LG line, starting inshore LG01-LG09; transit to LJ; sampled at LJ04

08-30-2023: Station LJ09 and ARGO float deployment (49 26.99, 127 56.94); transit to start LBP at offshore end (LBP8 - LBP3)

08-31-2023: Completed LBP line (LBP2 , LBP1); transit to and start Cape Scott (CS line; CS00-CS02) and proximate stns (CPE2, LQ03, JI22);

09-01-2023: Continue CS line (CS03-CS06, New ODAS, ;and SS3)

09-02-2023: Complete CS line (CS07-CS10, CPE1); transit Johnstone Strait and start northern SoG station: Stn. 14

09-03-2023: Strait of Georgia: Stations: 12, CPF2, CPF1, 24, 22, 28, GEO1, 42, 46, transit to IOS;

09-04-2023: IOS: demobilization

Scientific Equipment Report

We had a successful survey with respect to scientific equipment. We had no occasion to terminate the Rosette/CTD LARS cable. The Rosette/CTD was ok. Plankton nets and MPS also worked well. We had planned to deploy the Underwater Vision Profiler (UVP: plankton imaging device) during this survey; however the instrument suffered an electrical failure following it's first deployment at the Saanich Inlet test site. It was not used for the remainder of the survey.

Radioisotope Report

NA: no radioisotopes used on this survey

Scientific Successes and Concerns

This was a successful survey. With the exception of; time lost in transit due to fog inshore SVI, nearly all planned station work was completed. No delays due to ships equipment failure or problems with the ship. Both secondary and primary production rates were measured at multiple shelf and slope stations along the entire WCVI in addition to the standard physical, chemical, and biological measurements. These measurements are new additions to the standard DFO operations for this survey and were successful.

The ships crew helped stay on schedule with quick transit and efficient station keeping - many thanks!!

Brandon McNabb ; Oliver Pankratz (Tortell Group, UBC)

Cruise summary:

Dimethyl sulfide (DMS) is a trace gas produced by phytoplankton and microbes. DMS is of interest due to its hypothesized role in seeding cloud formation (and potentially regulating regional climates), but the physiological mechanisms driving its production are still poorly understood. We carried out a series of seven incubation experiments, using a suite of stable isotopes to trace the biological cycling of DMS between its related compounds dimethyl sulfoxide (DMSO) and dimethyl sulfoniopropionate (DMSP). ;These experiments were designed to test two hypotheses: that light-induced stress drives DMS cycling, particularly in communities that are acclimated to low light conditions; and that redox turnover between DMS and DMSO is used to regulate photosynthetic electron transport, consistent with the proposed antioxidant roles for these compounds in the literature. ;Water samples from the chlorophyll-a maximum were taken and incubated at either 1% or 50% light transmittance to stimulate light shock, and the photosynthetic inhibitor DCMU was used to treat surface water samples and investigate the potential links between DMS cycling and photosynthetic electron transport. Despite significant instrument repair and troubleshooting impacting half of these experiments, our preliminary results show support for both hypotheses, providing new insights into the biological roles that these compounds serve.

We would like sincerely to thank the captain, coast guard crew, IOS scientists, watch leaders and the chief scientist Akash Sastri for helping facilitate the completion of this work.

Platform Successes and Concerns

Ship operations were smooth and the science team and crew worked well together. The ship's speed throughout the cruise was generally ideal for accomplishing to overall goals and working through the core stations. Ships speed between stations was excellent, however, some additional time was required to 'setup' at some stations.

We did experience foggy conditions nearshore along the southern WCVI shelf - resulting in some delay to transit between stations in this area. We were not able to communicate with the acoustic mooring; however, even if successful, we would not have retrieved the mooring given poor visibility/fog.

Safety Concerns

No safety concerns. However, note the seawater leak from flowthrough as detailed in Hazardous Occurrences.

Hazardous Occurrences

The flow through system in the lab was fitted with some additional instruments belonging to UBC. There was buildup in pre-filters associated with these instruments which led to a increasing back pressure which finally resulting in a leak and spray of seawater in the vicinity of the wet lab entrance. This event occurred at 600 local and fortunately no injury or damage to equipment. However, seawater came into contact with the fire alarm, resulting in ship wide alarm and muster. Thank you to the crew and science watch for quickly assessing and resolving the issue. Below is a detailed incident report from Brendan McNabb (UBC) articulating the issue and future mitigation efforts:

Incident Report Notes (B. McNabb):

We had a failed hose cl on our underway optics system lead to a hose spraying seawater outside the sink area. Fortunately, damage was minimal and contained to a small monitor and a shorted fire alarm. The root cause of the incident was determined to be a filter clogging quicker than anticipated, due to the ship passing

through high density phytoplankton blooms across the continental shelf. The automated pumps on the system continued to run despite water flow becoming restricted past the clogged filters, and the resulting backpressure broke the hose cl seal. Measures to prevent this happening again were put in place for the remainder of the trip, including plastic wrapping exposed electronics, running a tarp around the sink to protect other groups lab equipment, and checking filters for signs of clogging more frequently. Our group is discussing system improvements that could be made to mitigate this happening in future deployments. A couple of ideas include;

bull; ; Modifying the system to be inside a contained, open-bottomed box or cabinet, so that in the event of another leak / burst seal, risk of exposure to other equipment would be minimal, and seawater would simply drain into the sink.

bull; ; Pressure or flow meters could also be installed on either side of the system's filters with coupled diversion valves. If the difference between these sensors exceeded a threshold (indicating clogging / building backpressure), the valve could be automatically activated to divert flow away from the problematic filter and into the sink.

Other Comments

NA


Images

[No Alternative Image Provided]

Image notes:

Other Supporting Documents:

Note that some of these files may not load correctly in your browser when clicked, but you can right-click on them and save them to your local machine to view.

Filename	Type	Size	Modified
 2023-026plan1.jpg	file	210K	Monday 26 Jun 2023 16:09

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