Cruise Plan

Field Oceanography - Physics 6314 and ENGI 9098

Memorial University

Prepared by Daniel Bourgault and the students

1. Introduction

This document outlines a cruise plan for a graduate course offered at Memorial University called Field Oceanography. One objective of this course is to provide students hands-on learning experiences at sea. Field work will be carried out on the Marine Institute's *Anne Pierce*.

2. Sampling

Sampling will be carried out in Conception Bay (Fig.1) concentrating on the oceanographic properties of the Bell Island Tickle, i.e. the channel between Bell Island and, Little Bell Island and Kellys Island (Fig. 2). The sampling will be divided into the following 6 components:

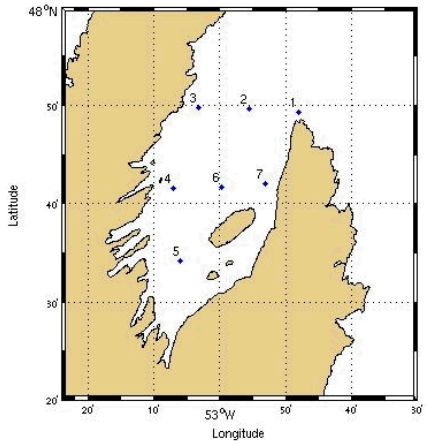

Figure 1: Conception Bay and stations for the large-scale CTD surveys.

2.1 Large-scale CTD surveys

During the first and last day of the cruise, while transiting from and to St. John's, a large-scale CTD survey of Conception Bay will be conducted. Figure 1 shows the stations for these surveys.

2.2 Large-scale glider surveys

Large-scale CTD and oxygen surveys will also continuously and autonomously be carried out by deploying one glider for the duration of the field trip. The glider will be deployed from a fishing boat during the first few days of the sampling period and will be recovered around 10 days later. It has been left to the students and to Ralf Bachmayer to determine the exact paths of this survey.

2.3 Moorings

A 600 kHz ADCP and a thermistor chain will be moored in 40 m of water on top of the sill just between Bell Island and Kellys Island (Fig. 2). This mooring is intended to provide information on the tidal currents and temperature structure over the sill. An ADV will be moored in about 5 m of water near the coastline (Fig. 2). This ADV is intended to provide information on the surface wave field and shallow water/beach dynamics. These moorings will be deployed early during the week of sampling and recovered roughly 10 days later fro a fishing boat.

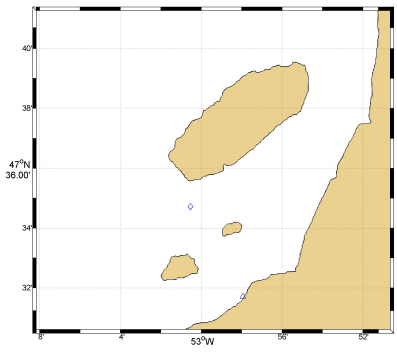

Figure 2: The Bell Island Tickle. The ♦ is where a bottom-mounted 600 kHz ADCP and thermistor chain will be moored and the Δ is where the ADV will be moored in roughly 5 m of water.

2.4 Stations

Daily sampling will be carried out at the 4 stations identified on Figure 3. The sampling protocol will involve doing a CTD cast, Secchi disk (should get one from Paul on Tuesday), deploying ring nets and a grab for benthic work. Each station should take around 1 to 1.5 hour to complete.

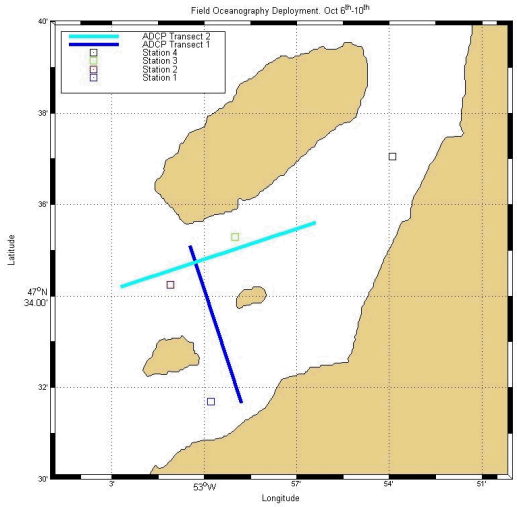

Figure 3: Stations and echo-sounder/ADCP transects in the Bell Island Tickle.

2.5 ADCP and echo-sounder surveys

Daily echo-sounder and ADCP surveys will be carried out across the Bell Island Tickle. The goal of these surveys is to get an understanding of the spatial variability of the flow structure in the Tickle. Two transect lines have been proposed (Fig. 3). One transect runs along-channel and the other one is across-channel. The along-channel transect should give us information of the flow over the sill and the across-channel transect may give us information on how the presence of the island affect the flow in the Tickle.

2.6 Sonar surveys

Daily multibeam/sidescan sonar surveys will be carried out across the Bell Island Tickle. The goal of these surveys is to map the bottom and sub-bottom morphology and to localize, identify and map ship wrecks. Figure 4 shows the proposed survey grid. This grid should be covered once during the duration of the 5-day cruise.

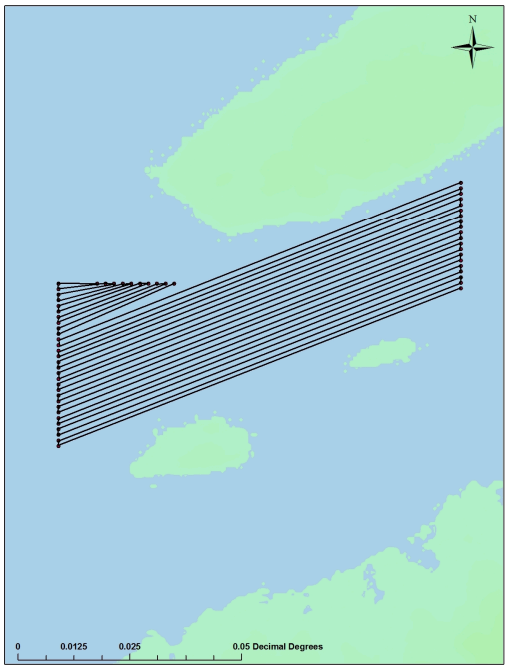

Figure 4: Sonar survey grid.

2.7 Coordinates

	Latitude	Longitude
CTD survey (Fig. 1)		
1	47° 49.319’ N	52° 48.101’ W
2	47° 39.627’ N	52° 55.597’ W
3	47° 49.769’ N	53° 03.251’ W
4	47° 41.541’ N	53° 07.086’ W
5	47° 34.214’ N	53° 05.901’ W
6	47° 41.665’ N	52° 59.765’ W
7	47° 41.997’ N	52° 53.019’ W
Fixed stations (Fig. 3)		
1	47° 31.698’ N	52° 59.784’ W
2	47° 34.248’ N	53° 01.098’ W
3	47° 35.298’ N	52° 58.998’ W
4	47° 37.050’ N	52° 53.898’ W
ADCP transects (Fig. 3)		
Transect 1 - Start	47° 31.668’ N	52° 58.800’ W
Transect 1 – End	47° 35.100’ N	53° 00.450’ W
Transect 2 - Start	47° 34.200’ N	53° 02.700’ W
Transect 2 - Start	47° 35.598’ N	52° 56.400’ W
Multibeam grid (Fig. 4)		
Pass 1 - Start	47° 34.860’ N	52° 57.300’ W
Pass 1 - End	47° 32.750’ N	53° 02.700’ W
Pass 2 - Start	47° 32.825’ N	53° 02.700’ W
Pass 2 - End	47° 34.935’ N	52° 57.300’ W
Pass 3 - Start	47° 35.010’ N	52° 57.300’ W
Pass 3 - End	47° 32.900’ N	53° 02.700’ W
Pass 4 - Start	47° 32.975’ N	53° 02.700’ W
Pass 4 - End	47° 35.085’ N	52° 57.300’ W
Pass 5 - Start	47° 35.160’ N	52° 57.300’ W
Pass 5 - End	47° 33.050’ N	53° 02.700’ W
Pass 6 - Start	47° 33.125’ N	53° 02.700’ W
Pass 6 - End	47° 35.235’ N	52° 57.300’ W
Pass 7 - Start	47° 35.310’ N	52° 57.300’ W
Pass 7 - End	47° 33.200’ N	53° 02.700’ W
Pass 8 - Start	47° 33.275’ N	53° 02.700’ W
Pass 8 - End	47° 35.385’ N	52° 57.300’ W
Pass 9 - Start	47° 35.460’ N	52° 57.300’ W
Pass 9 - End	47° 33.350’ N	53° 02.700’ W
Pass 10 - Start	47° 33.425’ N	53° 02.700’ W
Pass 10 - End	47° 35.535’ N	52° 57.300’ W
Pass 11 - Start	47° 35.610’ N	52° 57.300’ W
Pass 11 - End	47° 33.500’ N	53° 02.700’ W
Pass 12 - Start	47° 33.575’ N	53° 02.700’ W
Pass 12 - End	47° 35.685’ N	52° 57.300’ W

Pass 13 - Start	47° 35.760’ N	52° 57.300’ W
Pass 13 - End	47° 33.650’ N	53° 02.700’ W
Pass 14 - Start	47° 33.725’ N	53° 02.700’ W
Pass 14 - End	47° 35.835’ N	52° 57.300’ W
Pass 15 - Start	47° 35.910’ N	52° 57.300’ W
Pass 15 - End	47° 33.800’ N	53° 02.700’ W
Pass 16 - Start	47° 33.875’ N	53° 02.700’ W
Pass 16 - End	47° 35.985’ N	52° 57.300’ W
Pass 17 - Start	47° 36.060’ N	52° 57.300’ W
Pass 17 - End	47° 33.950’ N	53° 02.700’ W
Pass 18 - Start	47° 34.025’ N	53° 02.700’ W
Pass 18 - End	47° 36.135’ N	52° 57.300’ W
Pass 19 - Start	47° 36.210’ N	52° 57.300’ W
Pass 19 - End	47° 34.100’ N	53° 02.700’ W
Pass 20 - Start	47° 34.175’ N	53° 02.700’ W
Pass 20 - End	47° 36.285’ N	52° 57.300’ W
Pass 21 - Start	47° 34.175’ N	53° 02.700’ W
Pass 21 - End	47° 34.720’ N	53° 01.150’ W
Pass 22 - Start	47° 34.720’ N	53° 01.265’ W
Pass 22 - End	47° 34.795’ N	53° 02.700’ W
Pass 23 - Start	47° 34.870’ N	53° 02.700’ W
Pass 23 - End	47° 34.720’ N	53° 01.380’ W
Pass 24 - Start	47° 34.720’ N	53° 01.495’ W
Pass 24 - End	47° 34.945’ N	53° 02.700’ W
Pass 25 - Start	47° 35.020’ N	53° 02.700’ W
Pass 25 - End	47° 34.720’ N	53° 01.610’ W
Pass 26 - Start	47° 34.720’ N	53° 01.725’ W
Pass 26 - End	47° 35.095’ N	53° 02.700’ W
Pass 27 - Start	47° 35.170’ N	53° 02.700’ W
Pass 27 - End	47° 34.720’ N	53° 01.840’ W
Pass 28 - Start	47° 34.720’ N	53° 01.955’ W
Pass 28 - End	47° 35.245’ N	53° 02.700’ W
Pass 29 - Start	47° 35.320’ N	53° 02.700’ W
Pass 29 - End	47° 34.720’ N	53° 02.070’ W
Pass 30 - Start	47° 34.720’ N	53° 02.185’ W
Pass 30 - End	47° 35.395’ N	53° 02.700’ W

3. Schedule

Leg 1 – Monday 0730 to Tuesday 1300

Instructors: Sam Bentley, Brad deYoung, Ralf Bachmayer and Jack Foley
Students: Team 1 - Andre Roy, Renita Aranha, William Fowler and Sara Best
Team 2 - David Shea, Ray Roche (instead of Lina Stolze), Tristan Hauser and Zhimin Ma

Mon 0730	Everyone meets at the MUN bus station. A bus will bring everyone to the *Anne Pierce* at Southside.
Mon 0800	Departure from Southside. Large-scale CTD survey and stations.
Mon 1800	End of the day in Long pond, Conception Bay. Teams 1 and 2 stay on-board overnight.
Tue 0800	Departure. Stations and sonar/ADCP surveys.
Tue 1300	End of sampling for Teams 1 and 2. Bus takes everyone back to MUN.

Leg 2 – Tuesday 1300 to Wednesday 1700

Instructors: Sam Bentley, Paul Snelgrove and Jack Foley
Students: Team 3 - Graig Sutherland, Kathryn Denommee and Sheilagh O'Leary
Team 4 - Charlie Bishop, Susanne Brandstatter and Ashley Robar

Tue 1200	Everyone meets at the MUN bus station. A bus will bring everyone to Long Pond.
Tue 1300	Crew change. Security briefing.
Tue 1400	Departure. Stations and sonar/ADCP surveys.
Tue 1900	End of the day in Long Pond. Teams 3 and 4 stay on-board overnight.
Wed 0800	Departure. Stations and sonar/ADCP surveys.
Wed 1800	End of the day in Long Pond. Bus takes everyone back to MUN. Noone stays overnight on-board.

Leg 3 – Thursday 0730 to Friday 1700

Instructors: Daniel Bourgault, Brenda Boake and Jack Foley
Students: Team 5 - Peter Hulse, Lina Stolze (instead of Ray Roche), Madlena Hukobyan and Alison Kennedy
Team 6 - Julio Salcedo, Brian Claus and Sarah Graham

Thu 0730	Everyone meets at the MUN bus station. A bus will bring everyone to Long Pond.
Thu 0900	Departure. Stations and sonar/ADCP surveys.
Thu 1800	End of the day in Long Pond. Teams 5 and 6 stay on-board overnight except for Brenda.
Fri 0800	Departure. Stations and sonar/ADCP surveys. Large-scale CTD surveys. Return to St. John's.
Fri 1700	End of the day in St. John's. A bus will take everyone back to MUN.

Week of 13-18 October - Moorings and glider recovery

Instructors: Ralf Bachmayer and Jack Foley
Students: Tristan, Zhi Min Ma
Activities: Recover glider and moorings. Logistics details to be confirmed with Ralf and Jack.

4. Lodging and other details

- 3 meals a day are provided.
- Bring your own sleeping bag, pillowcase, towel and soap.
- Bring safety shoes or boots.
- Bring work clothes. You will get dirty (mud, seawater, grease etc).
- Bring warm clothes, raingear, gloves.
- Gravol may help if you think you can get seasick.