

# DAILY SCIENCE LOG BOOK

MISSION  
NUMBER

2013-57

DATE:

From: 19 Aug 2013

To: 31 Aug 2013

VESSEL:

R/V Folger

PROJECT(S):

Hypoxia WCVI

Water Properties Group  
Fisheries and Oceans Canada  
Institute of Ocean Sciences  
Ocean Sciences Division  
North Saanich, BC, Canada

[WaterProperties.ca](http://WaterProperties.ca)



*police drive*  
\*\* The following 3 pages are VERY IMPORTANT as they document equipment and settings used on board \*\*

These pages are to be completed by the CTD Technician setting up the equipment, the Watch Leader on board, and the Chief Scientist MUST verify that all relevant sections are completed prior to leaving the vessel. Any mid-cruise changes to be noted by watch leader in the notes.

Data logging computer: Falkor

Data acquisition program: SBK Seagull

CTD deck unit make: SBK model: 11 serial number: 0920

### Primary CTD

Make: SBK model: 9plus serial number: 1087

✓ Primary temperature serial number: 5403

✓ Primary conductivity serial number: 3916

✓ Secondary temperature serial number: 5545

✓ Secondary conductivity serial number: 4003

✓ Transmissometer: WetLabs Model: CS40 s/n: CS1-14760A

Transmissometer: \_\_\_\_\_ Model: \_\_\_\_\_ s/n: \_\_\_\_\_

✓ Fluorometer: Model ecoFlu Cable gain: \_\_\_\_\_ s/n: 2578 P, S or ☒ NO pump?

Fluorometer: Model \_\_\_\_\_ Cable gain: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

✓ Oxygen sensor: SBK Model: 43 s/n: 1231 ☒ S or ☒ NO pump?

PAR sensor: \_\_\_\_\_ Model: \_\_\_\_\_ s/n: \_\_\_\_\_ Surface PAR? Y / N

Other sensors: pressure s/n: 1082 P, S or NO pump?

Other sensors: alt s/n: 59543 P, S or ☒ NO pump?

Other sensors: Pinko III\* s/n: 0124 P, S or ☒ NO pump?

Other sensors: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

### Secondary CTD

Make: \_\_\_\_\_ model: \_\_\_\_\_ serial number: \_\_\_\_\_

Primary temperature serial number: \_\_\_\_\_

Primary conductivity serial number: \_\_\_\_\_

Secondary temperature serial number: \_\_\_\_\_

Secondary conductivity serial number: \_\_\_\_\_

Transmissometer: \_\_\_\_\_ Model: \_\_\_\_\_ s/n: \_\_\_\_\_

Transmissometer: \_\_\_\_\_ Model: \_\_\_\_\_ s/n: \_\_\_\_\_

Fluorometer: Model \_\_\_\_\_ Cable gain: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

Fluorometer: Model \_\_\_\_\_ Cable gain: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

Oxygen sensor: \_\_\_\_\_ Model: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

PAR sensor: \_\_\_\_\_ Model: \_\_\_\_\_ s/n: \_\_\_\_\_ Surface PAR? Y / N

Other sensors: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

Other sensors: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

Other sensors: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

Other sensors: \_\_\_\_\_ s/n: \_\_\_\_\_ P, S or NO pump?

CTD calibration bottle location (height above CTD in metres): 1m

This also includes the bottle location above the CTD on non-rossette casts (e.g., W.E. Ricker)

*24 the bottle, rossette, ocean test equipment bottles*

*12L each*

*Fluorometer 7-5-0*

*\*Contact Robert Fox, WIC, new Japanese boat, optode sensors*



**Rosette Setup:**

Number of bottles: 24  
Manufacturer: Ocean Test Equipment  
Volume of bottles (litres): 121

**Winches:**

1. Make: MacArtney Model: MASH CTD Serial #: CTD Used for: CTD  
2. Make: \_\_\_\_\_ Model: \_\_\_\_\_ Serial #: \_\_\_\_\_ Used for: \_\_\_\_\_  
3. Make: \_\_\_\_\_ Model: \_\_\_\_\_ Serial #: \_\_\_\_\_ Used for: \_\_\_\_\_

**Comments on performance during cruise** (comments should also be reflected in the post-cruise report):

no heave compensation

**Salinometer:** None

Make: \_\_\_\_\_ Model: \_\_\_\_\_ Serial Number: \_\_\_\_\_  
**Comments on performance during cruise** (comments should also be reflected in the post-cruise report):

**Oxygen Kit(s):** Provided by Rich Pawlowicz 2835

Make: aanderaa Model: O2optode Kit Number: \_\_\_\_\_  
Make: \_\_\_\_\_ Model: \_\_\_\_\_ Kit Number: \_\_\_\_\_

**Comments on performance during cruise** (comments should also be reflected in the post-cruise report):

SN 224

**Thermosalinograph System (SBE21):**

Program: 665 Version: 4.6.0.1485

Sampling interval (seconds): 1

Fluorometer sensor serial number: FLS 2702

**Comments on performance during cruise** (comments should also be reflected in the post-cruise report):

SEES8 as well for remote temp in TSG data string, SN: 6080

**ADCP Setup:**

Computer time zone: \_\_\_\_\_ User Exits: Name: \_\_\_\_\_ Exit points: \_\_\_\_\_  
Sampling interval (sec): \_\_\_\_\_ Name: \_\_\_\_\_ Exit points: \_\_\_\_\_  
Bin Length: (2^x): \_\_\_\_\_ Name: \_\_\_\_\_ Exit points: \_\_\_\_\_  
Pulse Length: \_\_\_\_\_ Work File: \_\_\_\_\_  
Buffer (bytes): \_\_\_\_\_  
Gyro Offset: \_\_\_\_\_

**Comments on performance during cruise** (comments should also be reflected in the post-cruise report):

**CTD Test Cast Information**

Test Cast along side? Yes ☐ No ☒

**Comments** deck test only

Test Cast in Saanich Inlet or other location? Yes ☒ No ☐

**Comments** Strait of Georgia, CTD001

CTD pressure reading on deck (db), before cast: \_\_\_\_\_ after cast: \_\_\_\_\_

Pumps working? Yes ☒ (0011) No ☐ (0010)

Secondary Temp – Primary Temp: \_\_\_\_\_  
(Average from the mixed region)

Secondary Salinity – Primary Salinity: \_\_\_\_\_  
(Average from the mixed region)

**Additional Comments:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## DAILY SCIENCE LOG

## Ocean Sciences Division, Institute of Ocean Sciences

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| Month <u>Aug</u> |              |     | Year <u>2013</u> |           |            | Vessel <u>Falkor</u> |                     |                       | Cruise ID <u>2013-57</u> |              |                       |              |               |                                     |                         |
|------------------|--------------|-----|------------------|-----------|------------|----------------------|---------------------|-----------------------|--------------------------|--------------|-----------------------|--------------|---------------|-------------------------------------|-------------------------|
| Event Number     | Station Name | Day | Time (UTC)       | Time Code | Event Type | Firing Method        | Positional Latitude | Information Longitude | Bottom Depth             | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/FI Cleaned                     | Comments                |
| 1                | JFG46        | 19  | 17:17            | BE        | ROS        | US                   | 48°29.178           | 124°41.111            | 254                      | 249          | 1 - 13                | 13           | SM/SA         | <input checked="" type="checkbox"/> |                         |
|                  |              |     | 17:28            | BO        |            |                      | 48°29.159           | 124°41.117            |                          |              | -                     |              |               | <input type="checkbox"/>            | file "2"                |
|                  |              |     | 17:55            | EN        |            |                      | 48°29.183           | 124°40.886            |                          |              | -                     |              |               | <input type="checkbox"/>            | opt down casts          |
|                  |              |     | :                |           |            |                      | .                   | .                     |                          |              | -                     |              |               | <input type="checkbox"/>            | very different          |
| 2                | LB03         | 19  | 21:05            | BE        | ROS        |                      | 48°25.294           | 125°28.623            | 143                      | 135          | 14 - 22               | 9            |               | <input checked="" type="checkbox"/> |                         |
|                  |              |     | 21:12            | BO        |            |                      | 48°25.297           | 125°28.619            |                          |              | -                     |              |               | <input type="checkbox"/>            | file "3"                |
|                  |              |     | 21:28            | EN        |            |                      | 48°25.297           | 125°28.582            |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
| (1)              | NS06         | 17  | 17:27            | BE        | ROS        |                      | .                   | .                     |                          |              | 0 -                   | 1            |               | <input checked="" type="checkbox"/> | all pred. test.         |
| 125              | 0            |     | 17:34            | BO        |            |                      | 49°17.              | 123°47.900            |                          |              | -                     |              |               | <input checked="" type="checkbox"/> | 125                     |
|                  |              |     | 17:44            | EN        |            |                      | 49°17.014           | 123°47.900            |                          |              | -                     |              |               | <input type="checkbox"/>            | Bottle #23 did not fire |
|                  |              |     | :                |           |            |                      | .                   | .                     |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
| 3                | BCC0         | 19  | 22:59            | BE        | ROS        |                      | 48°27.19            | 125°47.77             |                          |              | 23 - 29               | 7            |               | <input checked="" type="checkbox"/> |                         |
|                  |              |     | 23:07            | BO        |            |                      | 48°27.20            | 125°47.78             |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
|                  |              |     | 23:23            | EN        |            |                      | 48°27.20            | 125°47.77             |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
|                  |              |     | :                |           |            |                      | .                   | .                     |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
| 4                | BO01         | 20  | 00:04            | BE        |            |                      | 48°25.79            | 125°50.67             |                          |              | <del>23 - 29</del>    | <del>7</del> |               | <input checked="" type="checkbox"/> | 142m                    |
|                  |              |     | 00:09            | BO        |            |                      | 48°25.79            | 125°50.66             |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
|                  |              |     | 00:14            | EN        |            |                      | 48°25.81            | 125°50.65             |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |
|                  |              |     | :                |           |            |                      | .                   | .                     |                          |              | -                     |              |               | <input type="checkbox"/>            |                         |

## Event Type:

BOT = Bottle cast (no CTD)  
 CTD = Standalone CTD  
 ROS = CTD in Rosette  
 SET = Fish Set

LOOP = Sea Water Loop

MOR = Mooring  
 NET = Plankton Net Haul  
 DRF = Drifter

\_\_\_\_ = \_\_\_\_\_

## Bottle Firing Method:

US = Up / Stop (default)  
 UN = Up / No stop  
 DN = Down / No stop

Notes: \_\_\_\_\_

## Time Code:

BE = Beginning Time of Cast  
 BO = Bottom Time of Cast  
 EN = End Time of Cast

CTD Transmissometer and Fluorometer to be cleaned before each cast -- do not use Ammonia products

DE = Deployment Time  
 MR = Messenger Release Time  
 RE = Recover Mooring Time

Produced by the Water Properties Group, IOS

WaterProperties.ca  
 Version: 14 February 2013

## Falhar procedure for CTD's

- deploy to surface
- down 10, back up
- sec save start, pumps on, immediate acq logging
- 1m/s  $\uparrow \downarrow$  30 sec wait for bottles

### LB/B

- local max in transmission,  $O_2$ , S at  $\sim 10$  m depth
- large subsurface min in transmission at  $\sim 20$  depth
- at 90 m - change in the gradient of  $O_2$ , transmission; T, S  $\sim$  constant w/ depth below this depth
- drastic reduction in transmission at  $\sim 35$  m depth - turbid layer
- <sup>notable</sup> change in  $O_2$  trace upcast vs downcast below  $\sim 30$  m

### BCC0

low  $O_2$  layer between 98 and 75 m with distinct TS

Mixed layer about 10 m

Low light ~~at~~ to surface not like LB/B

### BCC1

surface layer 20 m not mixed, low trans at surface not sub-surface

oxyd  $\sim$  @ 50 m, uniform T inc S below 50 m  
no bottom mixed layer (went to 25 m OB)  $O_2$  dec, T dec, S inc



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Ocean Sciences Division, Institute of Ocean Sciences

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| DAILY SCIENCE LOG |                 |     |            |           |                |               |                        |               |              |              |                       |                   |               |                                                                         |              | OCEAN SCIENCES DIVISION, INSTITUTE OF OCEANOGRAPHY |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------|-----------------|-----|------------|-----------|----------------|---------------|------------------------|---------------|--------------|--------------|-----------------------|-------------------|---------------|-------------------------------------------------------------------------|--------------|----------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Month Aug         |                 |     |            | Year 2013 |                |               |                        | Vessel Falkor |              |              |                       | Cruise ID 2013-57 |               |                                                                         |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Event Number      | Station Name    | Day | Time (UTC) | Time Code | Event Type     | Firing Method | Positional Information |               | Bottom Depth | Max Pressure | Sample Serial Numbers | # of Bottles      | Watch Keepers | Trns/FI Cleaned                                                         | Comments     |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     |            |           |                |               | Latitude               | Longitude     |              |              |                       |                   |               |                                                                         |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 5                 | BCC2            | 20  | 00:47      | BE        | ROS            |               | 48°24.36               | 125°53.59     | 173          |              | 30 - 30               | 9                 |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   | on CTD computer |     | 00:52      | BO        |                |               | 48°24.36               | 125°53.58     |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | 01:10      | EN        |                |               | 48°24.36               | 125°53.56     |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 6                 | BCC3            | 20  | 01:53      | BE        | ROS            |               | 48°22.502              | 125°56.25     | 624          |              | 39 - 51               | 13                |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   | on CTD computer |     | 01:08      | BO        |                |               | 48°22.4934             | 125°56.2510   | 626          |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | 02:45      | EN        |                |               | 48°22.50               | 125°56.24     |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 7                 | BCC4            | 20  | 03:37      | BE        | <del>CTD</del> |               | 48°20.51               | 125°59.21     | 781          |              | -                     |                   |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   | on CTD computer |     | 03:59      | BO        | ROS            |               | 48°20.52               | 125°59.22     |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | 04:18      | EN        |                |               | 48°20.52               | 125°59.23     |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8                 | BCC5            | 20  | 05:05      | BE        | ROS            |               | .                      | .             | 1620         |              | 52 - 67               | 16                |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | time approx. |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   | on CTD computer |     | 05:25      | BO        |                |               | 48°18.33               | 126°03.32     | 1012         |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | 06:25      | EN        |                |               | 48°18.37               | 126°03.35     | 1017         |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 9                 | BCC6            | 20  | 07:25      | BE        | <del>CTD</del> |               | 48°16.16               | 126°07.41     | 1353         |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   | on CTD computer |     | 07:55      | BO        | ROS            |               | 48°16.21               | 126°07.37     | 1343         |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       | to bottom    |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | 08:24      | EN        |                |               | 48°16.17               | 126°07.40     | 1352         |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | :          |           |                |               | .                      | .             |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | :          |           |                |               | .                      | .             |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | :          |           |                |               | .                      | .             |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|                   |                 |     | :          |           |                |               | .                      | .             |              |              | -                     |                   |               | <input type="checkbox"/> <input type="checkbox"/>                       |              |                                                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

CTD Temperature and Fluorometer to be cleaned before each cast -- do not use Ammonia products

## Event Type:

BOT = Bottle cast (no CTD)  
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## LOOP = Sea Water Loop

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## Bottle Firing Method:

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WaterProperties.ca  
Version: 14 February 2013

Notes:

### BCC2

O<sub>2</sub> cline at 50m, water clearer @ surface than previous  
15m surface layer, T stratified.  
low O<sub>2</sub> layer just below 50m.  
low gradients of T & S with <sup>near-</sup>uniform layers.  
bottom mixed layer in T & S not in O<sub>2</sub>.

BCC3 Summer break, less attention to cast. Low resolution because of 700m range  
- still strong oxycline, turbid near bottom

### BCC4

Low/High O<sub>2</sub> pattern 50m down to 100m.  
High O<sub>2</sub> at 220m.  
little kink (cline) in O<sub>2</sub>, T, S at 690m

### BCC5

low oxygen 180-220m or high 200-220m, ~~to~~ T & S perturbation with this cast  
O<sub>2</sub> pretty steady & low from 780m at about 0.2 ml/l.  
→ not as visible on upcast

### BCC6

Surface layer 25m, with T stratification.  
low transmission at surface, bubbles?  
O<sub>2</sub>-cline @ 40m  
notch @ 425m in T, S & transmission

temperature & Salinity inc grad @ 900m for 25m  
touched bottom Salinity #2 reading about 0.2 PSU  
too low to 550m



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| Month <u>Aug</u> |              |     | Year <u>2013</u> |           |            | Vessel <u>Falkor</u> |                     |                       | Cruise ID <u>2013-57</u> |              |                       |              |               |                                     |          |
|------------------|--------------|-----|------------------|-----------|------------|----------------------|---------------------|-----------------------|--------------------------|--------------|-----------------------|--------------|---------------|-------------------------------------|----------|
| Event Number     | Station Name | Day | Time (UTC)       | Time Code | Event Type | Firing Method        | Positional Latitude | Information Longitude | Bottom Depth             | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/Fl Cleaned                     | Comments |
| 10               | BCC7         | 20  | 09:04            | BE        | ROS        |                      | 48° 13.96           | 126° 11.50            | 1601                     |              | 69 - 90               | 27           | SA            | <input checked="" type="checkbox"/> |          |
|                  |              |     | 09:46            | BO        |            |                      | 48° 13.99           | 126° 11.56            | 1590                     | 1537         | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | 11:00            | EN        |            |                      | 43° 14.04           | 126° 11.73            |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
| 11               | LC12         | 20  | 14:10            | BE        | ROS        |                      | 43° 14.923          | 126° 39.901           | 2522                     |              | 91 - 109              | 19           | SR            | <input checked="" type="checkbox"/> |          |
|                  |              |     | 15:11            | BO        |            |                      | 48° 15.025          | 126° 40.063           | 2578                     | 2515         | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | 16:44            | EN        |            |                      | 43° 15.006          | 126° 40.062           |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
| 12               | LC11         | 20  | 18:28            | BE        | ROS        |                      | 48° 18.932          | 126° 26.632           | 1465                     | 1460         | 110 - 126             | 17           | SR            | <input checked="" type="checkbox"/> |          |
|                  |              |     | 19:03            | BO        |            |                      | 48° 18.966          | 126° 26.679           |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | 20:10            | EN        |            |                      | 43° 18.960          | 126° 26.604           |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
| 13               | LC10         |     | :                | BE        | ROS        |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                | BO        |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                | EN        |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
| 14               | LC09         |     | :                | BE        | ROS        |                      | ° .                 | ° .                   |                          |              | 127 - 139             | 13           |               | <input type="checkbox"/>            |          |
|                  |              |     | :                | BO        |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                | EN        |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/>            |          |

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=

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Produced by the Water Properties Group, IOS

WaterProperties.ca  
Version: 14 February 2013

## BCC7

10m mixed layer, sharp thermocline

weak "chl" level at 20m,  $O_2$  die at 55m

low  $O_2$  intrusion at 90m with uniform TSS - seen in upcast as well

stopped for many minutes @ 1430m. Operator Colleen called away to look at a safety issue

- large scale  $O_2$  minimum at ~850m depth
- no indication of bottom boundary layer: gradients in  $O_2$ , T, S continue to the bottom of the cast; no change in transmission
- large spikes in transmission at ~1500m, 68m, 180m depth
- change in  $O_2$  profile upcast vs downcast above ~750m depth
- low  $O_2$  intrusion on upcast at 300m <sup>and 200m</sup> depth

## LC12

- shallow mixed layer (10m)
- subsurface  $O_2$  maximum at 0(20m) and 0(50m)
- low  $O_2$  intrusions? at ~190m depth + 210m
- local temp maximum at 160m
- $O_2$  and transmission decrease in bottom-most 100m  
T and S constant here

## DAILY SCIENCE LOG

Ocean Sciences Division, Institute of Ocean Sciences

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| Month <u>Aug</u> |              |           | Year <u>2013</u> |           | Vessel <u>Folker</u> |               | Cruise ID <u>2013-57</u> |                       |              |              |                       |              |               |                                     |          |
|------------------|--------------|-----------|------------------|-----------|----------------------|---------------|--------------------------|-----------------------|--------------|--------------|-----------------------|--------------|---------------|-------------------------------------|----------|
| Event Number     | Station Name | Day       | Time (UTC)       | Time Code | Event Type           | Firing Method | Positional Latitude      | Information Longitude | Bottom Depth | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/FI Cleaned                     | Comments |
| <u>13</u>        | <u>LC10</u>  | <u>20</u> | <u>20:50</u>     | <u>BE</u> | <u>CTD</u>           |               | <u>48° 22.344</u>        | <u>126° 20.114</u>    | <u>1235</u>  | <u>1230</u>  | -                     |              | <u>SR</u>     | <input checked="" type="checkbox"/> |          |
|                  |              |           | <u>21:31</u>     | <u>BO</u> | <u>ROS</u>           |               | <u>48° 22.312</u>        | <u>126° 20.193</u>    |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | <u>21:58</u>     | <u>EN</u> |                      |               | <u>48° 22.23</u>         | <u>126° 20.13</u>     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                |           |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
| <u>14</u>        | <u>LC09</u>  | <u>20</u> | <u>22:48</u>     | <u>BE</u> | <u>ROS</u>           |               | <u>48° 25.</u>           | <u>126° 13.</u>       | <u>611</u>   |              | <u>127 - 139</u>      | <u>13</u>    |               | <input checked="" type="checkbox"/> |          |
| <u>CTD F10</u>   |              |           | :                | <u>BO</u> |                      |               | <u>48° 25.88</u>         | <u>126° 13.67</u>     | <u>613</u>   |              | -                     |              |               | <input type="checkbox"/>            |          |
| <u>#15</u>       |              |           | <u>23:44</u>     | <u>EN</u> |                      |               | <u>48° 25.26</u>         | <u>126° 13.78</u>     | <u>617</u>   |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                |           |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
| <u>15</u>        | <u>LC08</u>  | <u>21</u> | <u>00:45</u>     | <u>BE</u> | <u>ROS</u>           |               | <u>48° 29.36</u>         | <u>126° 07.19</u>     | <u>202</u>   |              | <u>140 - 149</u>      | <u>10</u>    |               | <input checked="" type="checkbox"/> |          |
| <u>CTD F14</u>   |              |           | <u>00:51</u>     | <u>BO</u> |                      |               | <u>48° 29.38</u>         | <u>126° 07.21</u>     | <u>200</u>   |              | -                     |              |               | <input type="checkbox"/>            |          |
| <u>#16</u>       |              |           | <u>01:17</u>     | <u>EN</u> |                      |               | <u>48° 29.20</u>         | <u>126° 07.44</u>     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                |           |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  | <u>LC07</u>  |           | :                | <u>BE</u> | <u>ROS</u>           |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                | <u>BO</u> |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                | <u>EN</u> |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                |           |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  | <u>LC06</u>  |           | :                | <u>BE</u> | <u>ROS</u>           |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                | <u>BO</u> |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |           | :                | <u>EN</u> |                      |               | .                        | .                     |              |              | -                     |              |               | <input type="checkbox"/>            |          |

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BOT = Bottle cast (no CTD)  
CTD = Standalone CTD  
ROS = CTD in Rosette  
SET = Fish Set

LOOP = Sea Water Loop  
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DRF = Drifter

## Bottle Firing Method:

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LC10

Similar to LC11.

LC0920m "Chl" near surface, strong T gradient SS 32 ST 16.6m  $\approx 2.5 \text{ mg m}^{-3} \text{ max}$ O<sub>2</sub>-cline starts at 70m steps 110m. + continues. 2ml/l @ 100mHigh O<sub>2</sub> intrusion @ 200m low SAT

1ml/l @ 300m

went to 3.5m, no sign of bottom mixed layer  
deep O<sub>2</sub> at 0.15ml/lLC083.7  $\text{mg m}^{-3}$  Chl @ 10m.

surface layer 20m, higher Chl. SAT stratified.

oxy-cline up at 40m

low O<sub>2</sub> at 60m, then increase below

135m separated bottom boundary layer?

low O<sub>2</sub> feature retraced on upcast.

## DAILY SCIENCE LOG

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| Month <u>AUG</u> |              |     | Year <u>2013</u> |           |                | Vessel <u>Falkor</u> |                     |                       | Cruise ID <u>2013-57</u> |              |                       |              |               |                                                                         |                        |
|------------------|--------------|-----|------------------|-----------|----------------|----------------------|---------------------|-----------------------|--------------------------|--------------|-----------------------|--------------|---------------|-------------------------------------------------------------------------|------------------------|
| Event Number     | Station Name | Day | Time (UTC)       | Time Code | Event Type     | Firing Method        | Positional Latitude | Information Longitude | Bottom Depth             | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/FI Cleaned                                                         | Comments               |
| 16               | LC07         | 21  | 02:15            | BE        | <del>CTD</del> |                      | 48°32.96            | 126°00.46             | 128                      |              | -                     | —            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |                        |
| CTD file #17     |              |     | 02:24            | BO        | ROS            |                      | 48°32.98            | 126°00.48             | 126                      |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | 03:29            | EN        |                |                      | 48°32.97            | 126°00.50             |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
| 17               | LC06         | 21  | 03:21            | BE        | ROS            |                      | 48°36.44            | 125°53.99             | 92                       |              | 150 - 156             | 7            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | Charged some           |
| CTD file #18     |              |     | 03:26            | BO        |                |                      | 48°36.45            | 125°54.00             | 92                       |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       | bottle depths          |
|                  |              |     | 03:40            | EN        |                |                      | 48°36.46            | 125°54.00             | 93                       |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
| 18               | RDO1         | 22  | 00:31            | BE        | ROS            |                      | 48°00.28            | 125°21.82             | 633                      |              | 157 - 160             | 4            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | Top of bottles not     |
| CTD file #19     |              |     | 00:47            | BO        |                |                      | 48°00.29            | 125°21.84             | 627                      |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       | Closed. O <sub>2</sub> |
|                  |              |     | 00:13            | EN        |                |                      | 48°00.28            | 125°21.85             |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       | bottles??              |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |
|                  |              |     | :                |           |                |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                        |

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— = —

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Notes: \_\_\_\_\_

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LC07Fl<sub>0</sub> @ 10m 14.0 mgm<sup>-3</sup>

we are shoreward of shelf-break front

high O<sub>2</sub> at 75m, warm, clear  
-85m.

} about 20m deep

mixed layer 95m → 106m //

feature still there on the upcast, but shifted up.

LC06Shallower than expected, moved bottles. 210m. into high O<sub>2</sub> clear

water zone → almost uniform T, stratified in S

good mixed layer here too.

consistency with LC04.

RD01

surface mixed layer 10m

sal 33 @ 50m

33.5 at 90m

high O<sub>2</sub> @ 50m, constant salinity & T, cold34 at 276m O<sub>2</sub> @ 1

270m bp

1/2

oxy-cline at 140m

# DAILY SCIENCE LOG

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| Month <u>August</u> |              |     |            | Year <u>2013</u> |            | Vessel <u>Falkor</u> |                        |             |              | Cruise ID <u>2013-57</u> |                       |              |               |                                                                         |          |
|---------------------|--------------|-----|------------|------------------|------------|----------------------|------------------------|-------------|--------------|--------------------------|-----------------------|--------------|---------------|-------------------------------------------------------------------------|----------|
| Event Number        | Station Name | Day | Time (UTC) | Time Code        | Event Type | Firing Method        | Positional Information |             | Bottom Depth | Max Pressure             | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/FI Cleaned                                                         | Comments |
| 19                  | R002         | 22  | 02:27      | BE               | ROS        |                      | 48° 06.54              | 125° 15.12  | 337          |                          | 161-164               | 4            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
|                     |              |     | 02:39      | BO               |            |                      | 48° 06.54              | 125° 15.13  | 345          |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | 02:53      | EN               |            |                      | 48° 06.55              | 125° 15.13  | 336          |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | :          |                  |            |                      | °                      | °           |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 20                  | M007         | 22  | 07:09      | BE               | ROS        |                      | 48° 28.22              | 125° 19.49  | 162          |                          | 165-168               | 4            |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| CTD for 20          |              |     | :          | BO               |            |                      | 48° 28.22              | 125° 19.46  | 162          |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 21                  |              |     | 07:26      | EN               |            |                      | 48° 28.30              | 125° 19.47  | 162          |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | :          |                  |            |                      | °                      | °           |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 21                  | M008         | 22  | 15:15      | BE               | ROS        |                      | 48° 32.209             | 125° 21.357 | 153          |                          | 169-172               | 4            | SR            | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
|                     |              |     | 15:22      | BO               |            |                      | 48° 32.193             | 125° 21.351 |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | 15:36      | EN               |            |                      | 48° 32.198             | 125° 21.355 |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | :          |                  |            |                      | °                      | °           |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 22                  | M014         | 22  | 17:58      | BE               | ROS        |                      | 48° 39.922             | 125° 34.443 | 132          |                          | 173-176               | 4            | SR            | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
|                     |              |     | 17:06      | BO               |            |                      | 48° 39.896             | 125° 34.436 |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | 17:21      | EN               |            |                      | 48° 39.915             | 125° 34.439 |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | :          |                  |            |                      | °                      | °           |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 23                  | M016         | 22  | 20:05      | BE               | ROS        |                      | 48° 47.947             | 125° 15.927 | 108          |                          | 177-180               | 4            | SR/SW         | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
|                     |              |     | 20:09      | BO               |            |                      | 48° 47.942             | 125° 15.891 |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                     |              |     | 20:20      | EN               |            |                      | 48° 47.911             | 125° 15.863 |              |                          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |

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\_\_\_ =

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RDO2 Chl about  $8 \text{ mgm}^{-3}$   
60m Sal - dme

low  $O_2$ , low T, clear 40-80m  $\rightarrow$  huge step @ 80m to high  $O$ , high T, clear, high S

235m  $O_2$  dme, cold, dirty, salty  
low  $O_2$

not exactly retracing

MBOT

low Chl  $2.4 \text{ mgm}^{-3}$  20m surface layer

deep  $O_2$  down to 0.5ml/l

strong  $O_2$  dme at 10-40m, below that pretty smooth.

30m deep low  $O_2$  bottom mixed layer  
 $\rightarrow$  cold, salty, dirty.

MB08 mixed layer ~15m depth

- lots of spikes in transmission, spike in salinity at 20m depth

- big gradients in properties ~70m

- no evidence of bottom boundary layer

- interference in  $O_2$  small scale structure 90-110m

- differences  $\leftrightarrow$  up and down casts above ~60m; transmission entire dept

- bottle at 70m should capture dense water open ocean side of sill sampled with MVP survey 2

MB14

- no significant mixed layer (very calm)

- sharp gradients in properties to 40m in downcast (?) 30m in upcast

- max depth of cast ~180m  
- chart shows deeper gully to SW  
- CTD to be repeated at station RAD08 to get bottom water

RAD08

- on approach hole from EK60  
lots of biology deep in gully  
- multibeam/EK60 indicate soft bottom

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| Month <u>August</u> |                  |     |            | Year <u>2013</u> |            | Vessel <u>Falkor</u> |                        |             |              | Cruise ID <u>2013-57</u> |                             |              |               |                                                                         |                                     |
|---------------------|------------------|-----|------------|------------------|------------|----------------------|------------------------|-------------|--------------|--------------------------|-----------------------------|--------------|---------------|-------------------------------------------------------------------------|-------------------------------------|
| Event Number        | Station Name     | Day | Time (UTC) | Time Code        | Event Type | Firing Method        | Positional Information |             | Bottom Depth | Max Pressure             | Sample Serial Numbers       | # of Bottles | Watch Keepers | Trns/FI Cleaned                                                         | Comments                            |
|                     |                  |     |            |                  |            |                      | Latitude               | Longitude   |              |                          |                             |              |               |                                                                         |                                     |
| 24                  | RAD 08           | 22  | 17:42      | BE               | ROS        |                      | 48° 39.600             | 125° 35.900 | 234          | 230                      | 181 -                       | 1            | 82            | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | *Note BEFORE event MB16 - deep hole |
|                     |                  |     | 17:50      | BO               |            |                      | 48° 39.609             | 125° 35.916 |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | 17:57      | EN               |            |                      | 48° 39.609             | 125° 35.902 |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | Note samples 182-184 missed |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
| 25                  | LC050            | 23  | 01:39      | BE               | ROS        |                      | 48° 43.59              | 125° 42.75  | 213          |                          | 185-188                     | 4            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |                                     |
|                     | CTD computer #26 |     | 01:45      |                  |            |                      | 48° 43.59              | 125° 42.77  | 213          |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | 02:01      |                  |            |                      | 48° 43.58              | 125° 42.74  | 212          |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
| 26                  | LC08             | 23  | 05:06      | BE               | ROS        |                      | 48° 29.41              | 126° 07.09  | 199          |                          | 189-192                     | 4            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |                                     |
|                     | CTD computer #27 |     | 05:18      | BO               |            |                      | 48° 29.42              | 126° 07.06  | 199          |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | 05:26      | EN               |            |                      | 48° 29.42              | 126° 07.08  | 199          |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
| 27                  | R004             | 23  | 16:59      | BE               | ROS        |                      | 48° 14.664             | 125° 01.219 | 355          |                          | 193-206                     | 14           |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |                                     |
|                     | Fluoro           |     | 20:11      | BO               |            |                      | 48° 14.685             | 125° 01.264 |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | 20:46      | EN               |            |                      | 48° 14.676             | 125° 01.303 |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |
|                     |                  |     | :          |                  |            |                      | ° .                    | ° .         |              |                          | -                           |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |                                     |

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## RAD08

- multi beam indicates location of east is in middle of deep gully
- gradients in properties to 40m depth
- decrease in transmission centred at  $\sim 110\text{m}$ ,  $170\text{m}$
- big decrease at  $220\text{m}$ .  $\sim$  uniform in T, S, O<sub>2</sub>
- don't find the high  $\sigma_t$ , high O<sub>2</sub> water we are looking for!

## MB16

- <sup>near</sup> surface profiles messy as CTD not relevelled /  $\sim 10\text{m}$  depth mixed layer
- shallow gradient in properties to  $20\text{m}$  depth
- steep gradients between  $\sim 20$  and  $65\text{m}$  depth
- big reduction in transmission at  $\sim 75\text{m}$  depth
- <sup>bottom</sup> mixed layer in bottom-most  $\sim 10\text{m}$

## LC05a

$9\text{mgm}^{-3}$  surface Chl, subsurface Chl max & O<sub>2</sub> spike  
 O<sub>2</sub> cline  $40\text{m}$   
 $120\text{m}$  - dirty, dirty O<sub>2</sub>  $1.4$  at depth -  
 water T, S & O<sub>2</sub> well mixed but plenty of nepheloid - these different up & down  
 deep S  $33.3$  deep T  $6.8^\circ\text{C}$

## LC08

$3\text{mgm}^{-3}$  surface Chl  
 O<sub>2</sub> not nearly as low as last time - more incursion of shelf water?  
 up and down do not track

## RDO4

- $\sim 10\text{m}$  mixed layer
- steep gradients in properties to  $\sim 40\text{m}$
- subsurface maxima in oxygen  $60\text{m}$  to  $\sim 90\text{m}$  and at  $120\text{m}$
- noise in O<sub>2</sub> trace  $280\text{m}$  -  $300\text{m}$
- decrease in transmission at  $280\text{m}$

- profiles of oxygen, transmission, salinity many spikes
- false zeros at the bottom of profiles

40min

# DAILY SCIENCE LOG

Ocean Sciences Division, Institute of Ocean Sciences

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| Month <u>Aug</u> |              |           |              | Year <u>2013</u>                  |            | Vessel <u>Falkor</u> |                     | Cruise ID <u>2013-57</u> |              |              |                       |              |                         |                                                                         |                 |
|------------------|--------------|-----------|--------------|-----------------------------------|------------|----------------------|---------------------|--------------------------|--------------|--------------|-----------------------|--------------|-------------------------|-------------------------------------------------------------------------|-----------------|
| Event Number     | Station Name | Day       | Time (UTC)   | Time Code                         | Event Type | Firing Method        | Positional Latitude | Information Longitude    | Bottom Depth | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers           | Trns/FI Cleaned                                                         | Comments        |
| <u>28</u>        | <u>R002</u>  | <u>24</u> | <u>06:21</u> | <u>BE</u>                         | <u>ROS</u> |                      | <u>48°06.58</u>     | <u>125°15.04</u>         | <u>333</u>   |              | <u>207-218</u>        | <u>12</u>    | <u>W2</u><br><u>SUS</u> | <input type="checkbox"/> <input type="checkbox"/>                       | <u>??</u>       |
| <u>CTD #29</u>   |              |           | <u>06:36</u> | <u>BO</u>                         |            |                      | <u>48°07.00</u>     | <u>125°15.08</u>         | <u>335</u>   |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | <u>07:01</u> | <u>EN</u>                         |            |                      | <u>48°06.57</u>     | <u>125°15.00</u>         | <u>333</u>   |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
| <u>29</u>        | <u>R004</u>  | <u>25</u> | <u>23:45</u> | <u>BE</u>                         | <u>CTD</u> |                      | <u>48°20.50</u>     | <u>125°59.23</u>         | <u>777</u>   |              | -                     | <u>0</u>     | <u>W2</u><br><u>SUS</u> | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> | <u>not 781m</u> |
| <u>CTD #30</u>   |              | <u>26</u> | <u>00:12</u> | <u>350 on way up</u><br><u>BO</u> | <u>ROS</u> |                      | <u>48°20.55</u>     | <u>125°59.29</u>         | <u>776</u>   |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | <u>00:20</u> | <u>EN</u>                         |            |                      | <u>48°20.50</u>     | <u>125°59.47</u>         | <u>776</u>   |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |
|                  |              |           | :            |                                   |            |                      | °                   | °                        |              |              | -                     |              |                         | <input type="checkbox"/> <input type="checkbox"/>                       |                 |

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**Notes:** \_\_\_\_\_

*Produced by the Water Properties Group, IOS*

**WaterProperties.ca**  
Version: 14 February 2013



RDO22.8 mg m<sup>-3</sup> at surface

surface layer 10m

- strong cline at 20m

subsurface chl max @ 15m

oxy-cline at 80m - to low O<sub>2</sub>at 100m, smaller cline - back to high O<sub>2</sub>

nepheloid layer @ bottom

|               |           |
|---------------|-----------|
| 40min ECC4    | 4:30      |
| 1m to ECC3    | 5:10 5:20 |
| 40min ECC3    | 6:10 6:20 |
| 40min to ECC2 | 6:50 7:25 |
| 30min ECC2    | 7:30 7:15 |

BCC4Looking for salinity 33.8, T = 7.37 mg m<sup>-3</sup> surface chl.

33.8, T = 7.2

33.9, 6.8

} did not see super species, high O<sub>2</sub> water

|           |       |     |
|-----------|-------|-----|
| on way up | 34.0  | 6.2 |
|           | 33.95 | 6.7 |
|           | 33.90 | 7.0 |
|           | 33.85 | 7.1 |
|           | 33.73 | 7.2 |
|           | 33.45 | 7.3 |
|           | 33.33 | 7.4 |

It is there, interlocking.

## DAILY SCIENCE LOG

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| Month <u>Aug</u> |              |     | Year <u>2013</u> |           |            | Vessel <u>Falher</u> |                     |                       | Cruise ID <u>2013-57</u> |              |                       |              |               |                                                                         |          |
|------------------|--------------|-----|------------------|-----------|------------|----------------------|---------------------|-----------------------|--------------------------|--------------|-----------------------|--------------|---------------|-------------------------------------------------------------------------|----------|
| Event Number     | Station Name | Day | Time (UTC)       | Time Code | Event Type | Firing Method        | Positional Latitude | Information Longitude | Bottom Depth             | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/FI Cleaned                                                         | Comments |
| 30               | BCC3         | 26  | 00:57            | BE        | MOS        |                      | 48°22.49            | 125°56.29             | 631m                     |              | -                     | 0            |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
| CTD #31          |              |     | 01:11            | BO        |            |                      | 48°22.52            | 125°56.28             | 632m                     |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 01:25            | EN        |            |                      | 48°22.57            | 125°56.23             | 635m                     |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 31               | BCC2         | 26  | 01:55            | BE        | MOS        |                      | 48°24.40            | 125°53.56             | 173m                     |              | -                     |              |               | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
| CTD #32          |              |     | 02:03            | BO        |            |                      | 48°24.42            | 125°53.56             | 169m                     |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 02:08            | EN        |            |                      | 48°24.44            | 125°53.53             | 169m                     |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 32               | MB16         | 26  | 16:29            | BE        | MOS        |                      | 48°47.585           | 125°15.928            | 107                      | 105          | 219-226               | 8            | SL            | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
| (#31)            |              |     | 16:37            | BO        |            |                      | 48°47.587           | 125°15.954            |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 16:55            | EN        |            |                      | 48°47.605           | 125°15.862            |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 33               | SUSANO       | 26  | 21:47            | BE        | ROS        |                      | 48°39.361           | 125°34.564            | 195                      | 191          | 227-238               | 12           | SL/SL         | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
| (#34)            |              |     | 21:58            | BO        |            |                      | 48°39.360           | 125°34.6907           |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 20:20            | EN        |            |                      | 48°39.477           | 125°34.507            |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 34               | MB07         | 27  | 00:15            | BE        | ROS        |                      | 48°28.31            | 125°19.44             | 162                      |              | 239-248               | 10           |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| CTD #35          |              |     | 00:27            | BO        |            |                      | 48°28.31            | 125°19.50             |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                | EN        |            |                      | °                   | °                     |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |

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 =

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 Version: 14 February 2013

BCC3

depth estimate 620m

2.2 mg m<sup>-3</sup> at surface - little prod. here

Spice! at 60-100m

100m 33.8 & 7.3°C

BCC2

Spice! at 60m → 100m

MB16

- fresh layer in upper 1-2m
- mixed layer 0(15m)
- large property gradients 15m - 23m
- change in gradients at ~23m, ~27m, 32m, 62m, 80m
- rapid decrease in transmission at 40m
- bottom boundary layer (zero gradient in T, S and O) starting at ~92 m depth
- salty!

MB07

- mixed layer 0(15m); windy!
- large ~ constant gradient in salinity 15m - 85m; S, T over this range
- bottom mixed layer from ~160m; ↓ in transmission
- salty!

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| Month <u>Aug</u> |              |     | Year <u>2013</u> |           |            | Vessel <u>Falhar</u> |                     |                       | Cruise ID <u>2013-57</u> |              |                       |              |               |                                                                         |          |
|------------------|--------------|-----|------------------|-----------|------------|----------------------|---------------------|-----------------------|--------------------------|--------------|-----------------------|--------------|---------------|-------------------------------------------------------------------------|----------|
| Event Number     | Station Name | Day | Time (UTC)       | Time Code | Event Type | Firing Method        | Positional Latitude | Information Longitude | Bottom Depth             | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/Fl Cleaned                                                         | Comments |
| 35               | NNØ1         | 27  | 17:20            | BE        | ROS        |                      | 48° 20.224          | 125° 32.203           | 140                      |              | 249-257               | 9            | SR            | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
|                  |              |     | 17:27            | BO        |            |                      | 48° 20.235          | 125° 32.198           |                          | 133          | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 17:46            | EN        |            |                      | 48° 20.209          | 125° 32.202           |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 36               | NNØ2         | 27  | 18:57            | BE        | ROS        |                      | 48° 21.33           | 125° 27.79            | 134                      |              | 258-266               | 9            | SR            | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
| CTD R/R #37      |              |     | 19:06            | BO        |            |                      | 48° 21.291          | 125° 27.823           |                          |              | -                     |              | 0504          | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 19:24            | EN        |            |                      | 48° 21.297          | 125° 27.767           |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 37               | NNØ3         | 27  | 20:16            | BE        | ROS        |                      | 48° 21.127          | 125° 18.881           | 120                      |              | 267-274               | 8            | SM/SA         | <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> |          |
|                  |              |     | 20:23            | BO        |            |                      | 48° 21.134          | 125° 18.828           |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | 20:39            | EN        |            |                      | 48° 21.130          | 125° 18.855           |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
| 38               | NNØ4         | 27  | :                | BE        | ROS        |                      | ° .                 | ° .                   |                          |              | 275-                  |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                | BO        |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                | EN        |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |
|                  |              |     | :                |           |            |                      | ° .                 | ° .                   |                          |              | -                     |              |               | <input type="checkbox"/> <input type="checkbox"/>                       |          |

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\_\_\_ = \_\_\_\_\_

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Produced by the Water Properties Group, IOS

WaterProperties.ca  
Version: 14 February 2013



NN01

- well mixed at surface to 0(10m) due to yesterday's storm? CTD mixing in big swell.
- large property gradients  $\leftrightarrow$  10 + 20m.
- large subsurface max in Oxygen centred at ~45m depth assoc. with local min in temperature but no corresponding signature in salinity
- decrease in transmission at ~110m depth
- no bottom mixed layer structure in  $O_2$ , T, S
- change in salinity gradient at ~70m and temperature at 0(100m) depth; changes in T and S profiles do not line up in depth
- noisy traces especially near bottom - likely due to swell
- salty,  $\leftarrow$  (=spicy) water as expected on this side of the spice front

|             |            |
|-------------|------------|
| Oxy sat 96% | at surface |
| flu 1.70    | for Ben    |

NN02

@ 10m  $2.6 \text{ mgm}^{-3}$  96.6% sat@ 0m  $2.4$  97% sat

thermocline @ 15m - mixed 10 to surface.

oxy-cline @ 22m

NN03

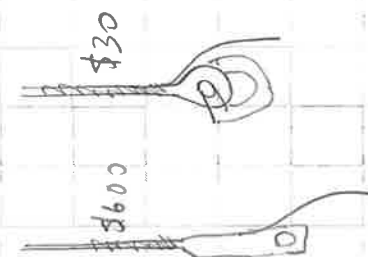
@ 0m  $1.5 \text{ mgm}^{-3}$   $97.7 \text{ mgm}^{-3}$ 

10m cline - thermo + chl.

$O_2$  down rapidly from 20m. - no <sup>broader</sup> high  $O_2$  layer - we are on the inside of the front.

- seeing at  $O_2$  pulse just below 80m.

- bottom water 90m down - very uniform



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| Month <u>AUG</u> |              |     | Year <u>2013</u> |           | Vessel <u>Falkor</u> |               | Cruise ID <u>2013-57</u> |                       |              |              |                       |              |               |                                     |          |
|------------------|--------------|-----|------------------|-----------|----------------------|---------------|--------------------------|-----------------------|--------------|--------------|-----------------------|--------------|---------------|-------------------------------------|----------|
| Event Number     | Station Name | Day | Time (UTC)       | Time Code | Event Type           | Firing Method | Positional Latitude      | Information Longitude | Bottom Depth | Max Pressure | Sample Serial Numbers | # of Bottles | Watch Keepers | Trns/FI Cleaned                     | Comments |
| 38               | TC01         | 27  | 23:07            | BE        | MOR                  |               | 48° 16.04                | 125° 12.63            | 209          |              | 275-286               | 11           |               | <input type="checkbox"/>            |          |
|                  |              |     | 23:35            | BO        |                      |               | 48° 16.60                | 125° 12.60            | 211          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | 23:56            | EN        |                      |               | 48° 15.91                | 125° 12.52            | 219          |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
| 39               | MOPS         | 30  | 19:44            | BE        | MOR                  |               | 48° 25.224               | 124° 50.077           | 312          |              | 287-300               | 14           | ST            | <input checked="" type="checkbox"/> |          |
| 40               |              |     | 19:55            | BO        |                      |               | 48° 25.242               | 124° 50.078           |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | 20:26            | EN        |                      |               | 48° 25.249               | 124° 50.012           |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |
|                  |              |     | :                |           |                      |               | ° .                      | ° .                   |              |              | -                     |              |               | <input type="checkbox"/>            |          |

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 BO = Bottom Time of Cast  
 EN = End Time of Cast

## CTD Transmissometer and Fluorometer to be cleaned before each cast -- do not use Ammonia products

DE = Deployment Time  
 MR = Messenger Release Time  
 RE = Recover Mooring Time

Produced by the Water Properties Group, IOS

WaterProperties.ca  
 Version: 14 February 2013

TC01

10 m  $3.1 \text{ mgm}^{-3}$

therocline end. chl max at 10 m

lots of layers & interleaving

warm & high  $\text{O}_2$   
cold & low  $\text{O}_2$

Casts fairly similar up and down

RD05

Strong thermocline Oxygen line at 75 m.

water dirty between 30-65 m

more uniform below 130 m

- steep property gradients 30-130 m

more oxygen below 230 m

salinity uniform from 250 m - deep bottom mixed layer! 0(60 m)!

all