σ = 26.26
down: 82.2m
up: 94.

## CTD Log Sheet

| | | |
|---|---|---|
| cruise: OC415 - 4 | type: CTD | station: oc415402 |
| leg: Tracer 2 | cast #: 02 | depth: 1200 |

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude | Longitude | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 1Sept05 | 15:30 | 29° 45.906 | 69° 14.354 | | |
| On Deck | | | | | | |

### Niskin Information

| Niskin #on CTD | Niskin Serial #CTD | Unique Bottle ID | Desired Depth (m) | Actual Depth (m) | Time Fired (z) | Temp At Bottle Fire | σ Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 24 | ✓ | 1200 | 1200.3 | | 6.217 | 27.628 |
| 2 | 23 | ✓ | 1100 | 1100.5 | | 7.080 | |
| 3 | 22 | ✓ | 1000 | 999.3 | | 8.778 | 27.340 |
| 4 | 21 | ✓ | 900 | 900.6 | | 10.734 | 27.085 |
| 5 | 20 | ✓ | 850 | 850.5 | | 11.179 | 27.052 |
| 6 | 19 | ✓ | 800 | 800.4 | | 11.689 | 27.018 |
| 7 | 18 | ✓ | 700 | 700.6 | | 14.382 | 26.825 |
| 8 | 17 | ✓ | 600 | 600.3 | | 17.399 | 26.533 |
| 9 | 16 | ✓ | 500 | 500.0 | | 17.981 | 26.473 |
| 10 | 15 | ✓ | 400 | 400.5 | | 18.148 | 26.443 |
| 11 | 14 | ✓ | 300 | 300.5 | | 18.573 | 26.392 |
| 12 | 13 | ✓ | 200 | 201.4 | | 18.786 | 26.346 |
| 13 | 12 | ✓ | 140 | 139.6 | | 18.992 | 26.310 |
| 14 | 11 | ✓ | 130 | 130.7 | | 19.012 | 26.305 |
| 15 | 10 | ✓ | 120 | 119.8 | | 19.030 | 26.302 |
| 16 | 9 | ✓ | 110 | 109.7 | | 19.077 | 26.292 |
| 17 | 8 | ✓ | 100 | 99.5 | | 19.143 | 26.279 |
| 18 | 7 | ✓ | 90 | 89.8 | | 19.236 | 26.256 |
| 19 | 6 | ✓ | 80 | 80.0 | | 19.394 | 26.22 |
| 20 | 5 | ✓ | 70 | 70.0 | | 19.582 | 26.174 |
| 21 | 4 | ✓ | 60 | 59.1 | | 20.205 | 26.008 |
| 22 | 3 | ✓ | 40 | 40.0 | | 22.544 | 25.359 |
| 23 | 2 | ✓ | 20 | 20 | | 25.361 | 24.431 |
| 24 | 1 | ✓ | 3 | 3.1 | | 28.431 | 23.415 |

## CTD Log Sheet

| cruise: | DC418-4 | type: | NUTRIENT | station: | CTD 020 |
|---|---|---|---|---|---|
| leg: | Tracer2 | cast #: 1 | | depth: | 1200 |

CTD 020

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 11 Sep 02 | 1755 | 29-37.56 | 69-47.48 | Ship | |
| on deck | | | | | | |

### Niskin information

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | Sal Oxy remarks |
|---|---|---|---|---|---|---|
| 1 | 24 ✓ | 1200 | 1201.5 | 5.976 | 27.659 | 35.110 201.0 |
| 2 | 23 ✓ | 1100 | 1099.8 | 6.888 | 27.538 | 35.111 196.9 |
| 3 | 22 ✓ | 1000 | 999.5 | 9.060 | 27.304 | 35.226 147.0 |
| 4 | 21 ✓ | 900 | 900.6 | 10.519 | 27.106 | 35.288 119.5 |
| 5 | 20 ✓ | 850 | 849.9 | 10.904 | 27.074 | 35.335 118.3 Oxygwin |
| 6 | 19 ✓ | 800 | 800.0 | 11.532 | 27.031 | 35.429 124.7 |
| 7 | 18 ✓ | 700 | 698.8 | 13.818 | 26.877 | 35.813 160.6 |
| 8 | 17 ✓ | 600 | 598.8 | 16.774 | 26.608 | 36.292 177.0 |
| 9 | 16 ✓ | 500 | 500.3 | 17.976 | 26.475 | 36.531 201.7 |
| 10 | 15 ✓ | 400 | 400.2 | 18.131 | 26.452 | 36.560 197.9 |
| 11 | 14 ✓ | 300 | 300.4 | 18.542 | 26.390 | 36.619 198.8 |
| 12 | 13 ✓ | 200 | 199.2 | 18.886 | 26.329 | 36.660 201.1 18.866 |
| 13 | 12 ✓ | 140 | 139.9 | 19.054 | 26.296 | 36.676 199.2 |
| 14 | 11 ✓ | 130 | 130.5 | 19.091 | 26.291 | 36.683 199.7 |
| 15 | 10 ✓ | 120 | 120.9 | 19.125 | 26.284 | 36.686 199.7 |
| 16 | 9 ✓ | 110 | 110.6 | 19.176 | 26.275 | 36.692 199.6 |
| 17 | 8 ✓ | 100 | 100.9 | 19.205 | 26.267 | 36692 200.0 |
| 18 | 7 ✓ | 90 | 90.1 | 19.320 | 26.238 | 36.694 206.6 |
| 19 | 6 ✓ | 80 | 79.5 | 19.466 | 26.202 | 36.699 211.2 |
| 20 | 5 ✓ | 70 | 70.3 | 19.659 | 26.151 | 36.705 240 |
| 21 | 4 ✓ | 60 | 59.9 | 20.286 | 26.004 | 36.727 217.3 |
| 22 | 3 ✓ | 40 | 40.8 | 22.487 | 25.411 | 36.696 218.3 oxy max |
| 23 | 2 ✓ | 20 | 20.5 | 25.263 | 24.467 | 36.647 208.9 |
| 24 | 1 ✓ | SFC | 3.5 | ~~23.454~~ 28.450 | 23.457 | 36.616 187.0 |

## CTD Log Sheet

| cruise: | oc415-4 | type: | nuts + metal | station: | oc415419 |
|---|---|---|---|---|---|
| leg: | transect 2 | cast #: | ~~18~~ 19 | depth: | 1510 |

down to 1510. to wait 1hr

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 11 Sept 05 | *14:~~34~~24 | 29 37.51 | 69 37.56 | | |
| on deck | 11 Sept 05 | 16:47 | 29.36.930 | 69 36.976 | | |

Fe Samples ↓

### Niskin information

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks |
|---|---|---|---|---|---|---|
| 1 | 24 | ✓ 1200 * | 1198.2 | 5.907 | 27.666 | ← *1210 wire ~1213 dbar |
| 2 | 23 | ✓ 1100 | 1100.6 | 7.411 | 27.492 | |
| 3 | 22 | ✓ 1000 | 999.5 | 9.442 | 27.249 | |
| 4 | 21 | ✓ 900 | 900.2 | 10.223 | 27.120 | |
| 5 | 20 | ✓ 850 * | 850.3 | 10.649 | 27.091 | 830 dbar ← ~~834~~ m |
| 6 | 19 | ✓ 800 | 800.5 | 11.413 | 27.036 | |
| 7 | 18 | ✓ 700 | 700.0 | 13.061 | 26.927 | (*830 wire |
| 8 | 17 | ✓ 600 | 598.6 | 17.177 | 26.553 | |
| 9 | 16 | ✓ 500 | 500.5 | 17.981 | 26.472 | |
| 10 | 15 | ✓ 400 | 398.4 | 18.156 | 26.441 | |
| 11 | 14 | ✓ 300 | 298.9 | 18.523 | 26.397 | |
| 12 | 13 | ✓ 200 | 202.7 | 18.754 | 26.352 | |
| 13 | 12 | ✓ 140 | 140.3 | 18.976 | 26.311 | |
| 14 | 11 | ✓ 130 | 130.2 | 19.029 | 26.303 | |
| 15 | 10 | ✓ 120 | 118.7 | 19.098 | 26.289 | |
| 16 | 9 | ✓ 110 | 109.6 | 19.113 | 26.280 | |
| 17 | 8 | ✓ 100 | 99.9 | 19.162 | 26.274 | |
| 18 | 7 | ✓ 90 | 89.6 | 19.185 | 26.269 | |
| 19 | 6 | ✓ 80 | 79.1 | 19.229 | 26.256 | |
| 20 | 5 | ✓ 70 | 71.0 | 19.369 | 26.225 | |
| 21 | 4 | ✓ 60 | 59.6 | 19.508 | 26.191 | |
| 22 | 3 | ✓ 40 | 39.6 | 21.479 | 25.591 | |
| 23 | 2 | ✓ 20 | 20.0 | 24.755 | 24.645 | ← 10 m * |
| 24 | 1 | ✓ surface * | 4.5 | 28.266 | 23.541 | |

## CTD Log Sheet

CTD 018

| cruise: | OC415-4 | type: | Trace Metal | station: | CTD018 |
|---|---|---|---|---|---|
| leg: | Tracer2 | cast #: | – | depth: | 127 |

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 09Sep05 | 1904 | 29-40.06 | 69-29.91 | Ship | Fe |
| on deck | 09Sep05 | 2010 | 29-40.10 | 69-29.88 | – | – |

### Niskin information

WIRE out

down cast  Upcast

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks |
|---|---|---|---|---|---|---|
| 1 | 24 | 10 | 117 | | 26.297 | 26.291 |
| 2 | 23 | 44 | 83 | | 26.264 | 26.264 |
| 3 | 22 | 87 | 40 | | 25.178 | 25.185 |
| 4 | 21 | 117 | 10 | 27.194 | 23.871 | 23.837 |
| 5 | 20 | 127 | 0 | | | |
| 6 | 19 | | | | | |
| 7 | 18 | | | | | |
| 8 | 17 | | | | | |
| 9 | 16 | | | | | |
| 10 | 15 | | | | | |
| 11 | 14 | | | | | |
| 12 | 13 | | | | | |
| 13 | 12 | | | | | |
| 14 | 11 | | | | | |
| 15 | 10 | | | | | |
| 16 | 9 | | | | | |
| 17 | 8 | | | | | |
| 18 | 7 | | | | | |
| 19 | 6 | | | | | |
| 20 | 5 | | | | | |
| 21 | 4 | | | | | |
| 22 | 3 | | | | | |
| 23 | 2 | | | | | |
| 24 | 1 | | | | | |

## CTD Log Sheet

| cruise: | IC415-4 | type: | NUTR. | station: | CTD 017 |
|---|---|---|---|---|---|
| leg: | Tracer 2 | cast #: | 1 | depth: | 1200 |

CTD 017

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 09Sep05 | 1730 | 29-39.94 | 69-30.51 | SIT/P | |
| on deck | | | | | | |

## Niskin information

sal oxy

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 24 ✓ | 1200 | 1200.5 | 6.142 | 27.634 | 35.105 | 195.6 | |
| 2 | 23 ✓ | 1100 | 1100.5 | 7.044 | 27.536 | 35.137 | 176.1 | |
| 3 | 22 ✓ | 1000 | 1000.0 | 8.857 | 27.339 | 35.230 | 153.6 | |
| 4 | 21 ✓ | 900 | 899.5 | 10.530 | 27.116 | 35.302 | 124.3 | |
| 5 | 20 ✓ | (850) | 850.1 | 11.104 | 27.063 | 35.368 | 120.5 | oxy min |
| 6 | 19 ✓ | 800 | 800.6 | 11.776 | 27.017 | 35.469 | 126.9 | |
| 7 | 18 ✓ | 700 | 699.8 | 14.219 | 26.843 | 35.873 | 165.2 | |
| 8 | 17 ✓ | 600 | 600.5 | 16.875 | 26.582 | 36.339 | 179.1 | |
| 9 | 16 ✓ | 500 | 500.0 | 17.981 | ~~36.535~~ | 36.531 | 203.1 | 26.472 |
| 10 | 15 ✓ | 400 | 399.0 | 18.124 | 26.446 | 36.549 | 200.1 | |
| 11 | 14 ✓ | 300 | 300.2 | 18.472 | 26.400 | 36.610 | 197.8 | |
| 12 | 13 ✓ | 200 | 200.1 | 18.720 | 26.357 | 36.641 | 200.4 | |
| 13 | 12 ✓ | (140) | 139.1 | 18.974 | 26.312 | 36.671 | 200.2 | |
| 14 | 11 ✓ | 130 | 129.2 | 19.013 | 26.305 | 36.675 | 200.2 | |
| 15 | 10 ✓ | 120 | 119.9 | 19.051 | 26.297 | 36.679 | 200.1 | |
| 16 | 9 ✓ | 110 | 109.9 | 19.092 | 26.288 | 36.681 | 199.2 | |
| 17 | 8 ✓ | 100 | 99.1 | 19.149 | 26.277 | 36.687 | 199.9 | |
| 18 | 7 ✓ | 90 | 90.5 | 19.164 | 26.275 | 36.688 | 200.5 | |
| 19 | 6 ✓ | 80 | 79.9 | 19.227 | 26.258 | 36.690 | 204.5 | |
| 20 | 5 ✓ | 70 | 69.1 | 19.384 | 26.220 | 36.694 | 211.1 | |
| 21 | 4 ✓ | 60 | 60.8 | 19.586 | 26.174 | 36.694 | 213.7 | |
| 22 | 3 ✓ | 40 | 40.1 | 23.195 | ~~26~~ | 36.684 | 216.6 | 25.158 |
| 23 | 2 ✓ | 20 | 19.8 | 24.199 | 24.186 | 36.626 | 200.7 | |
| 24 | 1 ✓ | SRF | 4.3 | 28.058 | 23.607 | 36653 | 188.5 | |

26.264 83 dbar

26.293 48 117 dbar.

## CTD Log Sheet

oc415416

| cruise: | oc415-4 | type: | nuts | station: | ~~oc415416~~ |
|---|---|---|---|---|---|
| leg: | tracer 2 | cast #: | 16 | depth: | 1200 |

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 9Sept05 | 1534 | ~~29~~ 29 42.041 | 69 ~~28~~ 23.858 | | |
| on deck | 9Sept05 | 1636 | 29 41.965 | 69 23.294 | | |

## Niskin information

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks |
|---|---|---|---|---|---|---|
| 1 | 24 ✓ | 1200 | 1199.8 | 6.131 | 27.645 | |
| 2 | 23 ✓ | 1100 | 1100.3 | 6.937 | 27.546 | |
| 3 | 22 ✓ | 1000 | 999.9 | 8.513 | 27.373 | |
| 4 | 21 ✓ | 900 | 899.3 | 10.232 | 27.198 | |
| 5 | 20 ✓ | 850 | 850.5 | 11.513 | 27.085 | |
| 6 | 19 ✓ | 800 | 800.0 | 12.505 | 26.991 | |
| 7 | 18 ✓ | 700 | 700.5 | 14.919 | 26.781 | |
| 8 | 17 ✓ | 600 | 600.4 | 16.766 | 26.597 | |
| 9 | 16 ✓ | 500 | 498.9 | 17.973 | 26.474 | |
| 10 | 15 ✓ | 400 | 400.3 | 18.123 | 26.449 | |
| 11 | 14 ✓ | 300 | 299.7 | 18.551 | 26.389 | |
| 12 | 13 ✓ | 200 | 199.8 | 18.858 | 26.331 | |
| 13 | 12 ✓ | 140 | 140.5 | 19.003 | 26.305 | |
| 14 | 11 ✓ | 130 | 129. | 19.018 | 26.303 | |
| 15 | 10 ✓ | 120 | 118.8 | 19.070 | 26.292 | |
| 16 | 9 ✓ | 110 | 110.2 | 19.097 | 26.288 | |
| 17 | 8 ✓ | 100 | 99.8 | 19.127 | 26.278 | |
| 18 | 7 ✓ | 90 | 91.3 | 19.185 | 26.266 | |
| 19 | 6 ✓ | 80 | 80.4 | 19.318 | 26.236 | |
| 20 | 5 ✓ | 70 | 69.2 | 19.469 | 26.197 | |
| 21 | 4 ✓ | 60 | 60.2 | 19.747 | 26.122 | |
| 22 | 3 ✓ | 40 | 39.9 | 22.487 | ~~25~~25.243 | |
| 23 | 2 ✓ | 20 | 20.1 | 26.787 | ~~25~~24.033 | |
| 24 | 1 ✓ | surface | 3.6 | 27.785 | 23.692 | |

## CTD Log Sheet

| cruise: | oc415-4 | type: | nuts | station: | ck415415 |
|---|---|---|---|---|---|
| leg: | tracer 2 | cast #: | 15 | depth: | 1200m |

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 9Sept05 | 13 43 | 29 44.329 | 69 17.318 | | |
| on deck | 9Sept05 | | 29°44.428' | 69 17.065 | | |

## Niskin information

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks |
|---|---|---|---|---|---|---|
| 1 | 24 ✓ | 1200 | 1200.2 | 5.863 | 27.661 | |
| 2 | 23 ✓ | 1100 | 1100.2 | 6.745 | 27.558 | |
| 3 | 22 ✓ | 1000 | 1000.1 | 8.099 | 27.414 | |
| 4 | 21 ✓ | 900 | 900.6 | 9.669 | 27.247 | |
| 5 | 20 ✓ | 850 | 851.1 | 11.024 | 27.130 | |
| 6 | 19 ✓ | 800 | 800.7 | 12.268 | 27.013 | |
| 7 | 18 ✓ | 700 | 700.8 | 14.666 | 26.803 | |
| 8 | 17 ✓ | 600 | 600.2 | 16.588 | 26.615 | |
| 9 | 16 ✓ | 500 | 500.5 | 17.802 | 26.487 | |
| 10 | 15 ✓ | 400 | 400.9 | 18.242 | 26.434 | |
| 11 | 14 ✓ | 300 | 300.5 | 18.573 | 26.385 | |
| 12 | 13 ✓ | 200 | 201.7 | 18.858 | 26.333 | |
| 13 | 12 ✓ | 140 | 141.2 | 19.025 | 26.302 | |
| 14 | 11 ✓ | 130 | 129.9 | 19.063 | 26.292 | |
| 15 | 10 ✓ | 120 | 121.2 | 19.117 | 26.281 | |
| 16 | 9 ✓ | 110 | 110.2 | 19.187 | 26.270 | |
| 17 | 8 ✓ | 100 | 100.7 | 19.222 | 26.262 | |
| 18 | 7 ✓ | 90 | 90.1 | 19.272 | 26.246 | |
| 19 | 6 ✓ | 80 | 81. | 19.447 | 26.216 | |
| 20 | 5 ✓ | 70 | 70.5 | 19.704 | 26.142 | |
| 21 | 4 ✓ | 60 | 60.7 | 20.323 | 26.009 | |
| 22 | 3 ✓ | 40 | 40.3 | 24.610 | 24.782 | |
| 23 | 2 ✓ | 20 | 19.6 | 27.817 | 23.651 | |
| 24 | 1 ✓ | surface | 1.9 | 28.070 | 23.601 | |

Start Time 2008 29-42.08N 69-38.07W

EDDIES CAST CTD 14 ~~CAROUSEL~~ DATE 08 Sept 05

| | | Press | Sal | | Temp | sigma ~~00~~ | SBE $O_2$ |
|---|---|---|---|---|---|---|---|
| | Vi | Vw | V_total | ~~Loop~~ | Area | Comments | |
| 1 | SFC | 7.1 | 36.644 | | 27.997 | 23.627 | 188.8 |
| ✓2 | 20 | 20.0 | 36.624 | | 27.604 | 23.739 | 191.4 |
| ✓3 | 40 | 40.0 | 36.675 | | 22.708 | 25.307 | 218.3 |
| ✓4 | 60 | 60.0 | 36.701 | | 20.458 | 25.944 | 217.2 |
| ✓5 | 70 | 70.0 | 36.700 | | 19.618 | 26.168 | 214.5 |
| ✓6 | 80 | 80.8 | 36.698 | | 19.446 | 26.208 | 210.5 |
| ✓7 | 90 | 90.2 | 36.697 | | 19.324 | 26.239 | 206.6 |
| ✓8 | 100 | 99.2 | 36.696 | | 19.259 | 26.254 | 201.5 |
| ✓9 | 110 | 109.5 | 36.694 | | 19.226 | 26.264 | 199.5 |
| ✓10 | 120 | 120.5 | 36.690 | | 19.161 | 26.277 | 199.5 |
| ✓11 | 130 | 130.9 | 36.685 | | 19.112 | 26.285 | 199.7 |
| ✓12 | (140) | 139.5 | 36.682 | | 19.090 | 26.291 | 199.5 |
| ✓13 | 200 | 200.4 | 36.653 | | 18.804 | 26.344 | 199.4 |
| ✓14 | 300 | 300.4 | 36.604 | | 18.419 | 26.409 | 197.4 |
| ✓15 | 400 | 399.5 | 36.549 | | 18.087 | 26.455 | 199.8 |
| ✓16 | 500 | 500.5 | 36.531 | | 17.970 | 26.475 | 202.5 |
| ✓17 | 600 | 600. | 36.310 | | 16.758 | 26.597 | 177.8 |
| ✓18 | 700 | 699.5 | 35.892 | | 14.303 | 26.837 | 166.5 |
| ✓19 | 800 | 800 | 35.534 | | 12.060 | 27.011 | 139.3 |
| ✓20 | (850) | 850 | 35.415 | | 11.301 | 27.066 | 130.4 |
| ✓21 | 900 | 899.7 | 35.358 | | 10.634 | 27.140 | 137.1 |
| 22 | 1000 | 1000 | 35.195 | | 8.515 | 27.379 | 154.99 |
| 23 | 1100 | 1101 | 35.117 | | 6.931 | 27.536 | 176.34 |
| 24 | 1200 | 1200 | 35.107 | | 6.109 | 27.639 | 196.19 |
| 25 | | | | | | | |

oxy mini SBE dog.

## CTD Log Sheet

CTD013

| cruise: | OC415-4 | type: | Trace Metal | station: | 13 |
|---|---|---|---|---|---|
| leg: | TRACER2 | cast #: | 13 | depth: | 410m |

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 08 Sep 05 | 1810 | 29-41.83N | 69-31.75W | SHIP | |
| on deck | | | | | | |

WIRE OUT

## Niskin information

| seq. # | Bottle # | ~~desired~~ depth | actual depth | temp. | sig theta | remarks |
|---|---|---|---|---|---|---|
| 1 | 24 | 10 | 400 | | | 2 Samples |
| 2 | 23 | 110 | 300 | | | 1 sample |
| 3 | 22 | 310 | 100 | | | 1 sample |
| 4 | 21 | 350 | ~~40~~ 60 | | | 1 sample |
| 5 | 20 | 410 | 0 | | | – |
| 6 | 19 | | | | | |
| 7 | 18 | | | | | |
| 8 | 17 | | | | | |
| 9 | 16 | | | | | |
| 10 | 15 | | | | | |
| 11 | 14 | | | | | |
| 12 | 13 | | | | | |
| 13 | 12 | | | | | |
| 14 | 11 | | | | | |
| 15 | 10 | | | | | |
| 16 | 9 | | | | | |
| 17 | 8 | | | | | |
| 18 | 7 | | | | | |
| 19 | 6 | | | | | |
| 20 | 5 | | | | | |
| 21 | 4 | | | | | |
| 22 | 3 | | | | | |
| 23 | 2 | | | | | |
| 24 | 1 | | | | | |

σ 26.26 @ 82m on down

## CTD Log Sheet

| cruise: | oc415-4 | type: | nutrients | station: | oc415412 |
|---|---|---|---|---|---|
| leg: | trans 2 | cast #: | 012 | depth: | 1200 |

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 8Sept05 | 16:04 | 29° 41.343' | 69° 31.776 | | |
| on deck | 08Sep05 | | | | | |

## Niskin information

pal

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks | |
|---|---|---|---|---|---|---|---|
| 1 ✓ | 24 | 1200 | 1200 | 6.089 | 27.641 | | |
| 2 ✓ | 23 | 1100 | 1102 (1107) | 7.01 | 27.593 | | |
| 3 ✓ | 22 | 1000 | 1001 | 8.736 | 27.352 | | |
| 4 ✓ | 21 | 900 | 900.1 | 10.461 | 27.128 | | |
| 5 ✓ | 20 | 850 | 849.2 | 11.256 | 27.055 | 35.389 | 0kg min |
| 6 ✓ | 19 | 800 | 800.8 | 12.015 | 27.004 | 35.513 | |
| 7 ✓ | 18 | 700 | 700.2 | 14.984 | 26.777 | 36.004 | |
| 8 ✓ | 17 | 600 | 599.9 | 17.468 | 26.525 | 36.436 | |
| 9 ✓ | 16 | 500 | 500.3 | 17.982 | 26.472 | 36.533 | |
| 10 ✓ | 15 | 400 | 398.5 | 18.130 | 26.446 | 36.551 | |
| 11 ✓ | 14 | 300 | 300.6 | 18.454 | 26.407 | 36.613 | |
| 12 ✓ | 13 | 200 | 200.0 | 18.726 | 26.356 | 36.643 | |
| 13 ✓ | 12 | 140 | 139.5 | 18.988 | 26.310 | 36.672 | |
| 14 ✓ | 11 | 130 | 129.2 | 18.987 | 26.309 | 36.672 | |
| 15 ✓ | 10 | 120 | 109.2 | 19.072 | 26.298 | 36.677 | |
| 16 ✓ | 9 | 110 | 100.8 | 19.064 | 26.293 | 36.679 | |
| 17 ✓ | 8 | 100 100 | 89.5 | 19.187 | 26.264 | 36.688 | |
| 18 ✓ | 7 | 90 90 | 79.5 | 19.300 | 26.246 | 36.694 | |
| 19 ✓ | 6 | 80 80 | 69.5 | 19.363 | 26.226 | 36.696 | |
| 20 ✓ | 5 | 70 70 | 70.2 | 19.371 | 26.226 | 36.696 | |
| 21 ✓ | 4 | 60 60 | 60.2 | 19.571 | 26.176 | 36.698 | |
| 22 ✓ | 3 | 40 40 | 38.9 | 22.987 | 25.208 | 36.683 | Oxy max |
| 23 ✓ | 2 | 20 | 20.2 | 25.260 | 24.520 | 36.636 | |
| 24 | 1 | surface | 4.5 | 27.796 | 23.680 | 36.638 | |

start 2049 29.3644 70-22.94W

EDDIES CAST CAROUSEL DATE 06 Sep 05

NO NISKINS CTD 011 Trace Metals only.

| | Vi | Vw | V_total | Loop | Area | Comments |
|---|---|---|---|---|---|---|
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |
| 11 | | | | | | |
| 12 | | | | | | |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |

Samples at ~~160~~ 150 50 m-

CTD 010

EDDIES CAST CTD010 ~~CAROUSEL~~ DATE 06 Sep 05

Start 1746 29-33.43 70-22.46 W

Target press Sal ~~Fluor~~ Temp Signma-t End 1955

| | Vi Depth | Vw | V_total | Loop Temp | Area | Comments |
|---|---|---|---|---|---|---|
| 1 | Sfc | 6.3 | 36.611 | | 28.891 | 23.446 |
| ✓2 | 20 | 19.5 | 36.643 | | 28.093 | 23.597 |
| ✓3 | 40 | 40.5 | 36.757 | | 23.683 | 25.07 ← |
| ✓4 | 60 | 60.8 | 36.809 | | 21.424 | 25.757 ~~oxymax~~ |
| ✓5 | 70 | 68.9 | 36.793 | | 20.949 | 25.918 ~~220~~/~~235~~ 221 236 |
| ✓6 | 80 | 80.4 | 36.750 | | 20.042 | 26.064 |
| ✓7 | 90 | 90.2 | 36.722 | | 19.831 | 26.130 |
| ✓8 | 100 | 100.2 | 36.717 | | 19.570 | 26.188 chl max |
| ✓9 | 110 | 110.5 | 36.693 | | 19.396 | 26.215 |
| ✓10 | 120 | 120.4 | 36.686 | | 19.256 | 26.250 |
| ✓11 | 130 | 130.0 | 36.678 | | 19.155 | 26.270 |
| ✓12 | 140 | 139.8 | 36.673 | | 19.098 | 26.282 |
| ✓13 | 200 | 200.2 | 36.633 | | 18.752 | 26.343 |
| ✓14 | 300 | 300.7 | 36.600 | | 18.407 | 26.409 |
| ~~15~~ | 400 | 400.8 | 36.565 | | 18.105 | 26.462 |
| ✓16 | 500 | 500.1 | 36.380 | | 17.169 | ~~26.554~~ 26.554 |
| ✓17 | 600 | 599.6 | 36.106 | | 15.550 | 26.723 |
| ✓18 | 700 | 700.2 | 35.738 | | 13.302 | 26.925 |
| ✓19 | ~~800~~ | 800.8 | 35.398 | | 10.770 | 27.144 oxy min. |
| ✓20 | 850 | 849.9 | 35.286 | | 9.642 | 27.254 142/150 |
| ✓21 | 900 | 900.8 | 35.225 | | 8.780 | 27.346 |
| ~~22~~ | 1000 | 999.0 | 35.140 | | 7.233 | 27.511 |
| ✓23 | 1100 | 1100.2 | 35.113 | | 6.226 | 27.626 |
| ✓24 | ~~1200~~ | 1200.0 | 35.102 | 5.685 | ~~26 27.69~~ | 27.691 |
| 25 | | | | | 5.685 | |

Trace metal lead wire

| wire out TO | depth ~~50~~ | 150 |
|---|---|---|
| 60 | ~~100~~ | ~~50~~/100 |
| 110 | ~~160~~ | ~~150~~ 50 |

1231 ml/2500#

## CTD Log Sheet

| | | |
|---|---|---|
| cruise: oc415-4 | type: Trace Metal / NAS | station: CTD009 |
| leg: tracer 2 | cast #: 1 | depth: 4500 |

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude | Longitude | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 5 Sep 05 | 15:29 | 29 42.950 | 69 26.997 | | |
| On Deck | | 2009 | 29-45.42 | 69-26.66 | | |

at 4510 dbar

### Niskin Information

| Niskin #on CTD | Niskin Serial #CTD | Unique Bottle ID | Desired Depth (m) | press Actual Depth (m) | pal Time Fired (z) | Temp At Bottle Fire | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 24 ✓ | | 1200 | 1199.9 | 35.116 | 6.202 | 27.633 |
| 2 | 23 ✓ | | 1100 | 1099.2 | 35.131 | 6.945 | 27.541 |
| 3 | 22 ✓ | | 1000 | 1000.3 | 35.209 | 8.583 | 27.365 |
| 4 | 21 ✓ | | 900 | 900.1 | 35.339 | 10.413 | 27.163 |
| 5 | 20 ✓ | Oxy min | 850 | 850.5 | 35.412 | 11.282 | 27.065 |
| 6 | 19 ✓ | | 800 | 800.3 | 35.530 | 12.062 | 27.011 |
| 7 | 18 ✓ | | 700 | 699.5 | 35.976 | 14.790 | 26.799 |
| 8 | 17 ✓ | | 600 | 599.7 | 36.393 | 17.245 | 26.551 |
| 9 | 16 ✓ | | 500 | 500.0 | 36.533 | 17.985 | 26.472 |
| 10 | 15 ✓ | | 400 | 400.6 | 36.553 | 18.145 | 26.443 |
| 11 | 14 ✓ | | 300 | 299.9 | 36.619 | 18.516 | 26.396 |
| 12 | 13 ✓ | | 200 | 199.8 | 36.648 | 18.769 | 26.352 |
| 13 | 12 ✓ | | 140 | 138.9 | 36.676 | 19.017 | 26.305 |
| 14 | 11 ✓ | | 130 | 129.5 | 36.682 | 19.078 | 26.292 |
| 15 | 10 ✓ | | 120 | 119.8 | 36.684 | 19.103 | 26.287 |
| 16 | 9 ✓ | | 110 | 109.7 | 36.689 | 19.144 | 26.280 |
| 17 | 8 ✓ | | 100 | 99.8 | 36.693 | 19.213 | 26.266 |
| 18 | 7 ✓ | | 90 | 89.2 | 36.696 | 19.292 | 26.249 |
| 19 | 6 ✓ | | 80 | 79.9 | 36.696 | 19.351 | 26.230 |
| 20 | 5 ✓ | | 70 | 69.7 | 36.701 | 19.646 | 26.189/169 |
| 21 | 4 ✓ | | 60 | 58.4 | 36.704 | 20.387 | 25.985 |
| 22 | 3 ✓ | oxy Max | 40 | 40.5 | 36.664 | 24.117 | 24.865 |
| 23 | 2 ✓ | | 20 | 20.3 | 36.628 | 26.155 | 26.24.126 |
| 24 | 1 | | surface | 2.5 | 36.606 | 27.912 | 23.628 |

for trace metal. Bottom @ 4510 dbar. 4560 meters

p = 4510.1 s = 34.891 t = 2.286

## CTD Log Sheet

| | | |
|---|---|---|
| cruise: OC 415-4 | type: trace metal/Nutr | station: CTD 008 |
| leg: tracer 2 | cast #: | depth: 160m thru 1200m |

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude | Longitude | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 4Sept05 | 1548 | 30 27.593 | 70 12.893 | SHIP | |
| On Deck | | | | | | |

### Niskin Information

| Niskin #on CTD | Niskin Serial #CTD | Unique Bottle ID | Desired Depth (m) | press Actual Depth (m) | sal Time Fired (z) | Temp At Bottle Fire | O2 Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 24 | 1200 | | 1201.4 | 35.089 | 5.605 | 27.686 |
| 2 | 23 | 1100 | | ~~1499.8~~ 1099 | 35.102 | 6.268 | 27.613 |
| 3 | 22 | 1000 | | 999.8 | 35.117 | 7.104 | 27.512 |
| 4 | 21 | 900 | | 899.5 | 35.189 | 8.598 | 27.347 |
| 5 | 20 | 850 | | 849.6 | 35.279 | 9.593 | 27.252 |
| 6 | 19 | 800 | | 799.8 | 35.372 | 10.504 | 27.179 |
| 7 | 18 | 700 | | 699.1 | 35.688 | 12.963 | ~~27~~ 26.955 |
| 8 | 17 | 600 | | 600.1 | 36.073 | 15.174 | 26.759 |
| 9 | 16 | 500 | | 500.0 | 36.281 | 16.575 | 26.618 |
| 10 | 15 | 400 | | 399.7 | 36.498 | 17.833 | 26.479 |
| 11 | 14 | 300 | | 300.2 | 36.572 | 18.318 | 26.411 |
| 12 | 13 | 200 | | 200.0 | 36.625 | 18.796 | 26.326 |
| 13 | 12 | 140 | | 139.8 | 36.669 | 19.268 | 26.237 |
| 14 | 11 | 130 | | 127.0 | 36.689 | 19.503 | 26.184 |
| 15 | 10 | 120 | | 120.0 | 36.708 | 19.603 | 26.178 |
| 16 | 9 | 110 | | 108.8 | 36.715 | 19.751 | 26.140 |
| 17 | 8 | 100 | | 99.3 | 36.721 | 19.896 | 26.107 |
| 18 | 7 | 90 | | 89.8 | 36.742 | 20.179 | 26.048 |
| 19 | 6 | 80 | | 80.2 | 36.764 | 20.505 | 25.976 |
| 20 | 5 | 70 | | 70.2 | 36.776 | 21.097 | 25.839 |
| 21 | 4 | 60 | | 59.8 | 36.808 | 22.022 | 25.595 |
| 22 | 3 | 40 | | ~~40~~ 40.6 | 36.732 | 24.310 | 24.853 |
| 23 | 2 | 20 | | 20.3 | 36.585 | 28.494 | 23.410 |
| 24 | 1 | surface | | 3.3 | 36.568 | 28.503 | 23.408 |

~~sample~~ = HB m.

+ bottles NUTRIENTS

## CTD Log Sheet

| | | |
|---|---|---|
| cruise: oc415-4 | type: trace metal | station: ~~CTD006~~ CTD007 |
| leg: Tracer2 | cast #: 1 | depth: 4000 m |

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude | Longitude | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 03Sept05 | 14:39 | 29°43.930 | 69°20.828 | | |
| On Deck | 03 Sep 05 | | | | | |

### Niskin Information

sequence #

| Niskin #on CTD | Niskin Serial #CTD | Unique Bottle ID | Desired Depth (m) | press Actual Depth (m) | pal Time Fired (z) | Temp At Bottle Fire | $\delta_o$ 10m Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 24 | ~~1200~~ 1200 | | 1200.2 | 35.123 | 6.334 | first instrument ~~27.621~~ |
| 2 | 23 | 1100 | | 1100.1 | 35.141 | 7.089 | 27.533 |
| 3 | 22 | 1000 | | 999.7 | 35.205 | 8.509 | 27.386 |
| 4 | 21 | 900 | Oxygen | 899.5 | 35.280 | 10.285 | 27.140 |
| 5 | 20 | ~~850~~ 800 | | 799.0 | 35.462 | 11.714 | 27.025 |
| 6 | 19 | 800 | | 800.6 | 35.462 | 11.694 | 27.024 |
| 7 | 18 | 700 | | 699.5 | 35.910 | 14.409 | ~~27.26.826~~ |
| 8 | 17 | 600 | | 600.0 | 36.405 | 17.328 | 26.540 |
| 9 | 16 | 500 | | 498.5 | 36.533 | 17.989 | 26.471 |
| 10 | 15 | 400 | | 400.0 | 36.586 | 18.256 | 26.442 |
| 11 | 14 | ~~3~~00 | | 300.0 | 36.625 | 18.586 | 26.384 |
| 12 | 13 | 200 | | 199.6 | 36.669 | 18.954 | 26.319 |
| 13 | 12 | 140 | | 139.8 | 36.674 | 19.013 | 26.305 |
| 14 | 11 | 130 | | 129.8 | 36.675 | 19.026 | 26.302 |
| 15 | 10 | 120 | | 118.5 | 36.681 | 19.093 | 26.289 |
| 16 | 9 | 110 | | 109.5 | 36.688 | 19.148 | 26.280 |
| 17 | 8 | 100 | | 99.0 | 36.691 | 19.219 | 26.264 |
| 18 | 7 | 90 | | 89.9 | 36.694 | 19.347 | 26231 |
| 19 | 6 | 80 | | 80.7 | 36.700 | 19.800 | 26.116 |
| 20 | 5 | 70 | | 70.3 | 36.704 | 20.282 | ~~25~~ 25.991 |
| 21 | 4 | 60 | | 60.5 | 36.699 | 21.082 | 25.787 |
| 22 | 3 | 40 | | 38.9 | 36.666 | 23.410 | 25.068 |
| 23 | 2 | 20 | | 20.2 | 36.590 | 25.777 | 24.350 |
| 24 | 1 | surface | | 2.8 | 36.563 | 29.341 | 23.095 |

Bottom of cast press 4010 - end of soak 1704Zp = 4043.0, S = 34.898, t = 2.313

## CTD Log Sheet

| | | |
|---|---|---|
| cruise: OC415-4 | type: TRACE METAL | station: CTD 006 |
| leg: Tracer 2 | cast #: 1 | depth: 200 m. |

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude N | Longitude W | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 02 Sep 05 | 1922 | 29-43.22 | 69-14.47 | SHIP | Markey winch |
| On Deck | | | | | | |

### Niskin Information

| Niskin #on CTD | Niskin Serial #CTD | Wire out winch. Unique Bottle ID | Desired Depth (m) | Press Actual Depth (m) | Time Fired (z) | Temp At Bottle Fire | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 24 | 10 | ~~30~~ 200 ~~10~~ | 12.7 | | | |
| 2 | 23 | 150 | 60 ~~140~~ ~~70~~ 60 | 153.5 | | | |
| 3 | 22 | 190 | 20 ~~210~~ | 192.0 | | | |
| 4 | 21 | 210 | | 211.2 | 2018 = 21 | 1.0 | |
| 5 | 20 | | | | | | |
| 6 | 19 | | | | | | |
| 7 | 18 | | | | | | |
| 8 | 17 | | | | | | |
| 9 | 16 | | | | | | |
| 10 | 15 | | | | | | |
| 11 | 14 | | | | | | |
| 12 | 13 | | | | | | |
| 13 | 12 | | | | | | |
| 14 | 11 | | | | | | |
| 15 | 10 | | | | | | |
| 16 | 9 | | | | | | |
| 17 | 8 | | | | | | |
| 18 | 7 | | | | | | |
| 19 | 6 | | | | | | |
| 20 | 5 | | | | | | |
| 21 | 4 | | | | | | |
| 22 | 3 | | | | | | |
| 23 | 2 | | | | | | |
| 24 | 1 | | | | | | |

~~8~~ 7
20 19
60
210

## CTD Log Sheet

| | | |
|---|---|---|
| cruise: OC 415-4 | type: Nutrient/CTD | station: CTD 005 |
| leg: Tracer 2 | cast #: 1 | depth: 1200 m. |

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude | Longitude | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 02 Sep 05 | 1658 | 29-44.45 | 69-14.18 | SHIP | Markey winch. |
| On Deck | | | | | | |

### Niskin Information

Sequence #

| Niskin #on CTD | Niskin Serial #CTD | Unique Bottle ID | Desired Depth (m) | Press Actual Depth (m) | Sal Time Fired (z) | Temp At Bottle Fire | $\delta_\theta$ Remarks |
|---|---|---|---|---|---|---|---|
| 1 | ~~24~~ | | 1200 | 1200.1 | 35.114 | 6.309 | 27.618 |
| 2 | ~~23~~ | | 1100 | 1100.1 | 35.135 | 6.986 | 27.544 |
| 3 | ~~22~~ | | 1000 | 1000.2 | 35.216 | 8.969 | 27.307 |
| 4 | ~~21~~ | Oxy min | 900 | 900.2 | 35.281 | 10.495 | 27.105 |
| 5 | ~~20~~ | | 850 | 850.2 | 35.335 | 10.920 | 27.072 |
| 6 | ~~19~~ | | 800 | 800.1 | ~~35~~ 35.446 | 11.661 | 27.024 |
| 7 | 18 | | 700 | 699.5 | 35.710 | 13.243 | 26.917 |
| 8 | 17 | | 600 | 600.0 | 36.387 | 17.234 | 26.550 |
| 9 | 16 | | 500 | 500.1 | 36.533 | 17.982 | 26.473 |
| 10 | 15 | | 400 | 399.6 | 36.552 | 18.139 | 26.444 |
| 11 | 14 | | 300 | 299.7 | 36.627 | 18.554 | 26.394 |
| 12 | 13 | | 200 | 199.9 | 36.656 | 18.844 | 26.337 |
| 13 | 12 | | 140 | 139.1 | 36.670 | 18.972 | 26.313 |
| 14 | 11 | | 130 | 129.7 | 36.674 | 19.003 | 26.307 |
| 15 | 10 | | 120 | 120.0 | 36.684 | 19.110 | 26.287 |
| 16 | 9 | | 110 | 109.8 | 36.684 | 19.122 | 26.283 |
| 17 | 8 | | 100 | 98.7 | 36.690 | 19.216 | 26.283 |
| 18 | 7 | | 90 | 89.5 | 36.700 | 19.452 | 26.208 |
| 19 | 6 | | 80 | 79.4 | 36.704 | 19.573 | 26.179 |
| 20 | 5 | | 70 | 70.0 | 34.708 | 19.969 | 26.078 |
| 21 | 4 | ~~Oxy min~~ Sal max | 60 | 60.2 | 36.696 | 21.138 | ~~26~~ 25.746 |
| 22 | 3 | ~~Oxy max~~ | 40 | 39.0 | 36.665 | 24.319 | 24.809 |
| 23 | 2 | | 20 | 20.0 | 36.565 | 25.685 | 24.230 |
| 24 | 1 | | 3 | 2.6 | 36.577 | 28.565 | ~~24~~ 23.392 |

σ = 26.26
downcast = 73.4

## CTD Log Sheet

| cruise: | oc415-4 | type: | CTD | station: | 4 |
|---|---|---|---|---|---|
| leg: | | cast #: | 04 | depth: | 1200 |

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 2Sep. 05 | 1536 | 29°44.916N | 69 14.810W | CTD | aborted cast |
| on deck | 2Sep. 05 | 15:55 | 29°44.723N | 69°14.643W | | |

error lights on deckunit

### Niskin information

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | remarks |
|---|---|---|---|---|---|---|
| 1 | 24 | 1200 | | | | abort cast |
| 2 | 23 | 1100 | | | | to switch cable |
| 3 | 22 | 1000 | | | | errors began around 170m |
| 4 | 21 | 900 | | | | |
| 5 | 20 | 850 | | | | |
| 6 | 19 | 800 | | | | Stop acquisition 1548 |
| 7 | 18 | 700 | | | | @ 99.6m |
| 8 | 17 | 600 | | | | |
| 9 | 16 | 500 | | | | |
| 10 | 15 | 400 | | | | |
| 11 | 14 | 300 | | | | |
| 12 | 13 | 200 | | | | |
| 13 | 12 | 140 | | | | |
| 14 | 11 | 130 | | | | |
| 15 | 10 | 120 | | | | |
| 16 | 9 | 110 | | | | |
| 17 | 8 | 100 | | | | |
| 18 | 7 | 90 | | | | |
| 19 | 6 | 80 | | | | |
| 20 | 5 | 70 | | | | |
| 21 | 4 | 60 | | | | |
| 22 | 3 | 40 | | | | |
| 23 | 2 | 20 | | | | |
| 24 | 1 | 3 | | | | |

## CTD Log Sheet

| | | | | | |
|---|---|---|---|---|---|
| cruise: | Ox 415-4 | type: | Trace metal | station: | CTD 3 |
| leg: | 4 | cast #: | 1 | depth: | 1010 |

Tracer2

### Position Information

| CTD Status | Date (z) | Time (z) | Latitude | Longitude | System | Remarks |
|---|---|---|---|---|---|---|
| In Water | 01Sep05 | 1731 | 29-46.02 | 69-15.60 | ship | Stbd |
| ~~On Deck~~ | | 1804 | 29-45.94 | 69-16.08 | | |
| start soak | | 1856 | 29-46.02 | 69-16.77 | | |
| end soak | | | | | | |

### Niskin Information

| Niskin #on CTD | Niskin Serial #CTD | Unique Bottle ID | Wire Desired Depth (m) | Press Actual Depth (m) | Time Fired (z) | Temp At Bottle Fire | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 24 | 1st Sample | 10.7 | 12.9 | | | |
| 2 | 23 | 2nd Sample | 160.1 | 159.3 | | | |
| 3 | 22 | 3rd Samp | 510.0 | 500.2 | | | |
| 4 | 21 | | 1010.0 | 965.2 | 1839- | 9525 | 1855-965.0 |
| 5 | 20 | | | | | | |
| 6 | 19 | end cast | | 1927 | 29-46.08N | 69-17.12W | |
| 7 | 18 | | | | | | |
| 8 | 17 | | | | | | |
| 9 | 16 | | | | | | |
| 10 | 15 | | | | | | |
| 11 | 14 | | | | | | |
| 12 | 13 | | | | | | |
| 13 | 12 | | | | | | |
| 14 | 11 | | | | | | |
| 15 | 10 | | | | | | |
| 16 | 9 | | | | | | |
| 17 | 8 | | | | | | |
| 18 | 7 | | | | | | |
| 19 | 6 | | | | | | |
| 20 | 5 | | | | | | |
| 21 | 4 | | | | | | |
| 22 | 3 | | | | | | |
| 23 | 2 | | | | | | |
| 24 | 1 | | | | | | |

## CTD Log Sheet

| cruise: | 4116-4 | type: | NUTRIENT | station: | CTD021 |
|---|---|---|---|---|---|
| leg: | Tracer 2 | cast #: | 21 | depth: | 1200 |

CTD 021

| | Date(z) | Time(z) | Lat. | Long. | System | remarks |
|---|---|---|---|---|---|---|
| in water | 11 Sep 05 | 2030 | 29 37.531 | 69 57.438 | SHIP | |
| on deck | | | | | | |

### Niskin information

| seq. # | Bottle # | desired depth | actual depth | temp. | sig theta | sal / oxy remarks |
|---|---|---|---|---|---|---|
| 1 | 24 ✓ | 1200 | 1201.2 | 5.954 | 27.657 | 35.106 201.2 |
| 2 | 23 ✓ | 1100 | 1099.7 | 6.810 | 27.563 | 35.131 181.4 |
| 3 | 22 ✓ | 1000 | 999.6 | 8.057 | 27.418 | 35.172 158.3 |
| 4 | 21 ✓ | 900 | 900.0 | 9.715 | 27.248 | 35.292 146.5 |
| 5 | 20 ✓ | 850 | 850.2 | 10.977 | 27.135 | 35.431 147.2 |
| 6 | 19 ✓ | 800 | 801.0 | 11.861 | 27.049 | 35.538 148.9 |
| 7 | 18 ✓ | 700 | 700.5 | 14.205 | 26.844 | 35.878 164.9 |
| 8 | 17 ✓ | 600 | 600.4 | 16.228 | 26.654 | 36.220 175.1 |
| 9 | 16 ✓ | 500 | 500.4 | 17.714 | 26.500 | 36.481 187.3 |
| 10 | 15 ✓ | 400 | 399.8 | 18.226 | 26.437 | 36.517 195.3 |
| 11 | 14 ✓ | 300 | 299.6 | 18.586 | 26.382 | 36.624 199.6 |
| 12 | 13 ✓ | 200 | 199.5 | 18.924 | 26.320 | 36.661 199.8 |
| 13 | 12 ✓ | 140 | 140.0 | 19.154 | 26.277 | 36.686 199.2 |
| 14 | 11 ✓ | 130 | 130.0 | 19.185 | 26.272 | 36.688 198.5 |
| 15 | 10 ✓ | 120 | 120.0 | 19.243 | 26.264 | 36.690 198.5 |
| 16 | 9 ✓ | 110 | 110.1 | 19.281 | 26.244 | 36.693 199.3 |
| 17 | 8 ✓ | 100 | 100.6 | 19.416 | 26.249 | 36.701 204.8 |
| 18 | 7 ✓ | 90 | 90.8 | 19.547 | 26.186 | 36.708 207.4 |
| 19 | 6 ✓ | 80 | 79.7 | 19.854 | 26.122 | 36.722 211.9 |
| 20 | 5 ✓ | 70 | 70.1 | 20.198 | 26.038 | 36.733 216.3 |
| 21 | 4 ✓ | 60 | 60.2 | 20.867 | 25.865 | 36.743 220.7 |
| 22 | 3 ✓ | 40 | 39.7 | 23.793 | 24.944 | 36.678 215.6 |
| 23 | 2 ✓ | 20 | 20.0 | 28.117 | 23.548 | 36.611 187.8 |
| 24 | 1 | SFC | 5.0 | 28.559 | 23.478 | 36.633 186.2 |