

Oceanography Branch CTD Data Report
CTD_REPORT_2009009DE

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DATE: Revised: October 28, 2009

Oceanography Branch CTD Data Report

CTD_REPORT_2009009DE

NOAA Fisheries Service
Northeast Fisheries Science Center
Woods Hole, MA 02543

DE 09-09
ECOMON/NASA Ground Truth Measurements Survey
Data Coverage: August 17 – 29, 2009
Mid Atlantic Bight, Georges Bank, Gulf of Maine

This report presents a summary of surface and bottom temperature and salinity data collected during the Northeast Fisheries Science Center's 2009 ECOMON/NASA Ground Truth Measurements Survey aboard the NOAA FSV *Delaware II*. Data was obtained with a Seabird Electronics SBE Model 19+ profiling CTD (s/n 4501) and a Seabird Electronics SBE Model 9/11+ CTD. Sea water samples were taken for the purpose of correcting salinity values for both instruments. No salinity correction was necessary for either instrument.

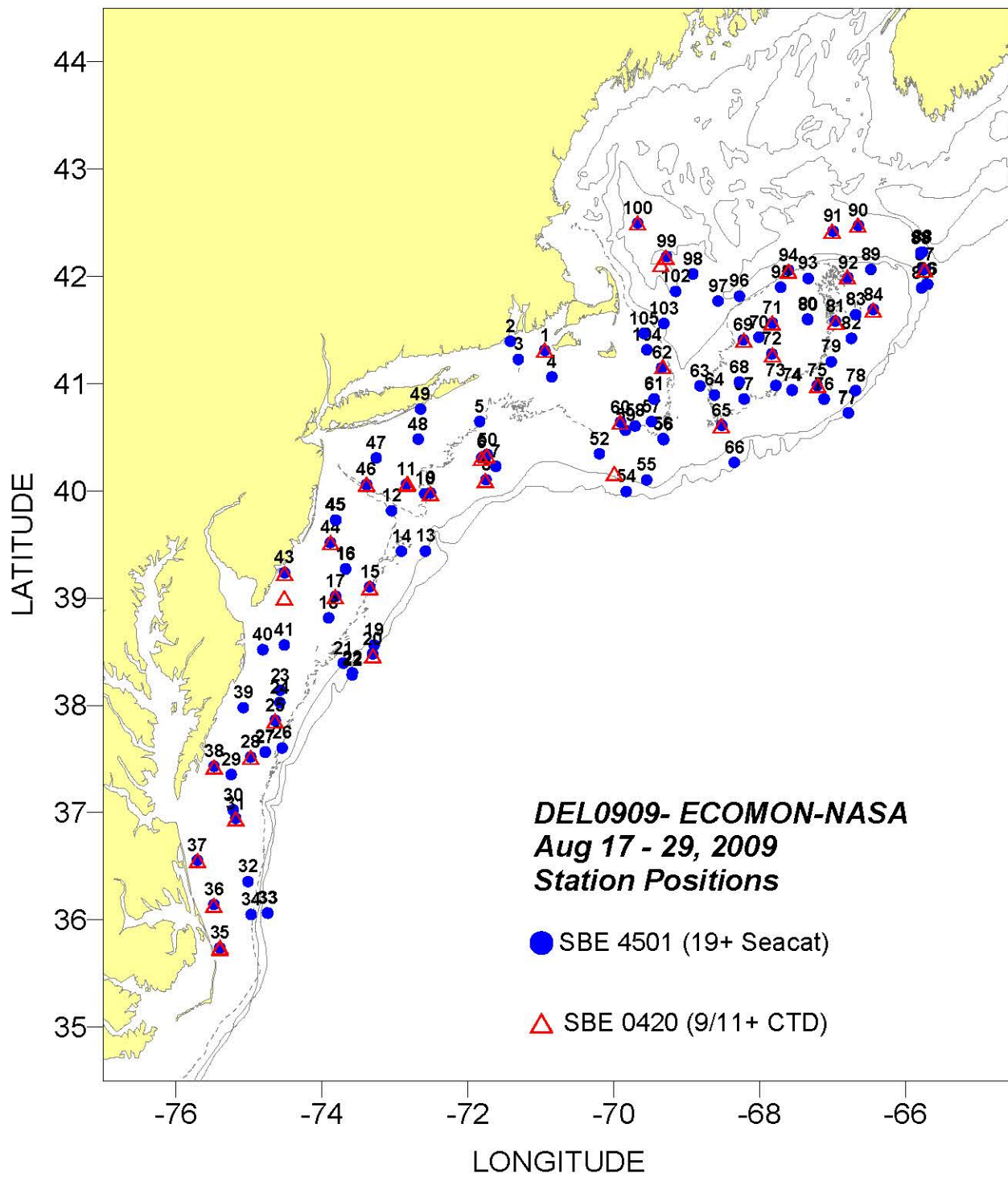
Data presented here have been audited, however, corrections and/or updates may be applied at a later time. The most recent and complete station data can be found in an NODC formatted ASCII file at:
<ftp://ftp.nefsc.noaa.gov/pub/hydro/del0909.dat>

This report may be viewed on the Oceanography Branch website at:

<http://www.nefsc.noaa.gov/HydroAtlas/>

choose: **2009 Cruises**
AUG_ECOMON_DEL0909
CTD_REPORT_2009009DE.pdf

Revised: October 28, 2009



**Areal average surface and bottom temperature/salinity and temperature/salinity anomalies for the 2009 DEL0909 ECOMON/NASA
Ground Truth Measurements Survey**

| CRUISE | CD | SURFACE | | | | | | BOTTOM | | | | | | Purpose |
|---------------------|-----|---------|-------|---------|------|------|------|--------|-------|---------|------|------|------|---------|
| | | #obs | T/S | Anomaly | SDV1 | SDV2 | Flag | #obs | T/S | Anomaly | SDV1 | SDV2 | Flag | |
| Georges Bank | | | | | | | | | | | | | | |
| DEL0909 | 237 | 45 | 17.32 | 1.13 | 0.16 | 1.80 | 0 | 38 | 12.10 | -0.20 | 0.18 | 1.32 | 0 | 22 |
| DEL0909 | 237 | 45 | 32.35 | -0.33 | 0.10 | 0.38 | 0 | 38 | 32.70 | -0.23 | 0.11 | 0.37 | 0 | 22 |
| MAB North | | | | | | | | | | | | | | |
| DEL0909 | 233 | 25 | 22.64 | 2.48 | 0.27 | 4.32 | 0 | 22 | 11.17 | 1.13 | 0.31 | 1.51 | 0 | 22 |
| DEL0909 | 233 | 24 | 32.18 | -0.24 | 0.17 | 0.76 | 0 | 22 | 33.24 | 0.01 | 0.18 | 0.52 | 0 | 22 |
| MAB South | | | | | | | | | | | | | | |
| DEL0909 | 232 | 43 | 25.84 | 2.03 | 0.19 | 1.26 | 0 | 40 | 11.15 | -1.54 | 0.21 | 3.06 | 1 | 22 |
| DEL0909 | 232 | 43 | 30.88 | -1.04 | 0.15 | 0.70 | 0 | 39 | 32.79 | -0.24 | 0.13 | 0.45 | 1 | 22 |

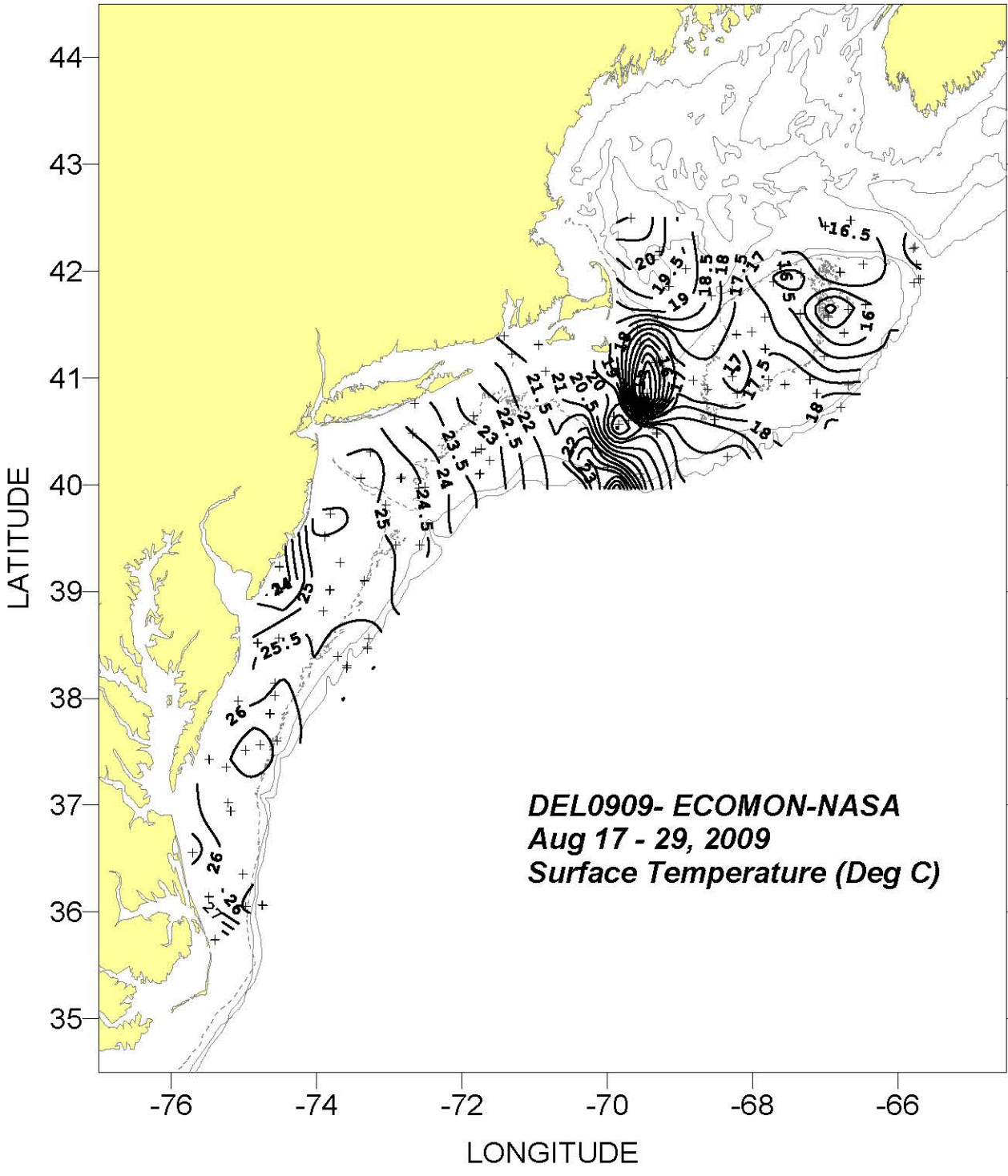
"CRUISE", the code name for a cruise: "CD", the calendar mid-date of all the stations within a region for a cruise:

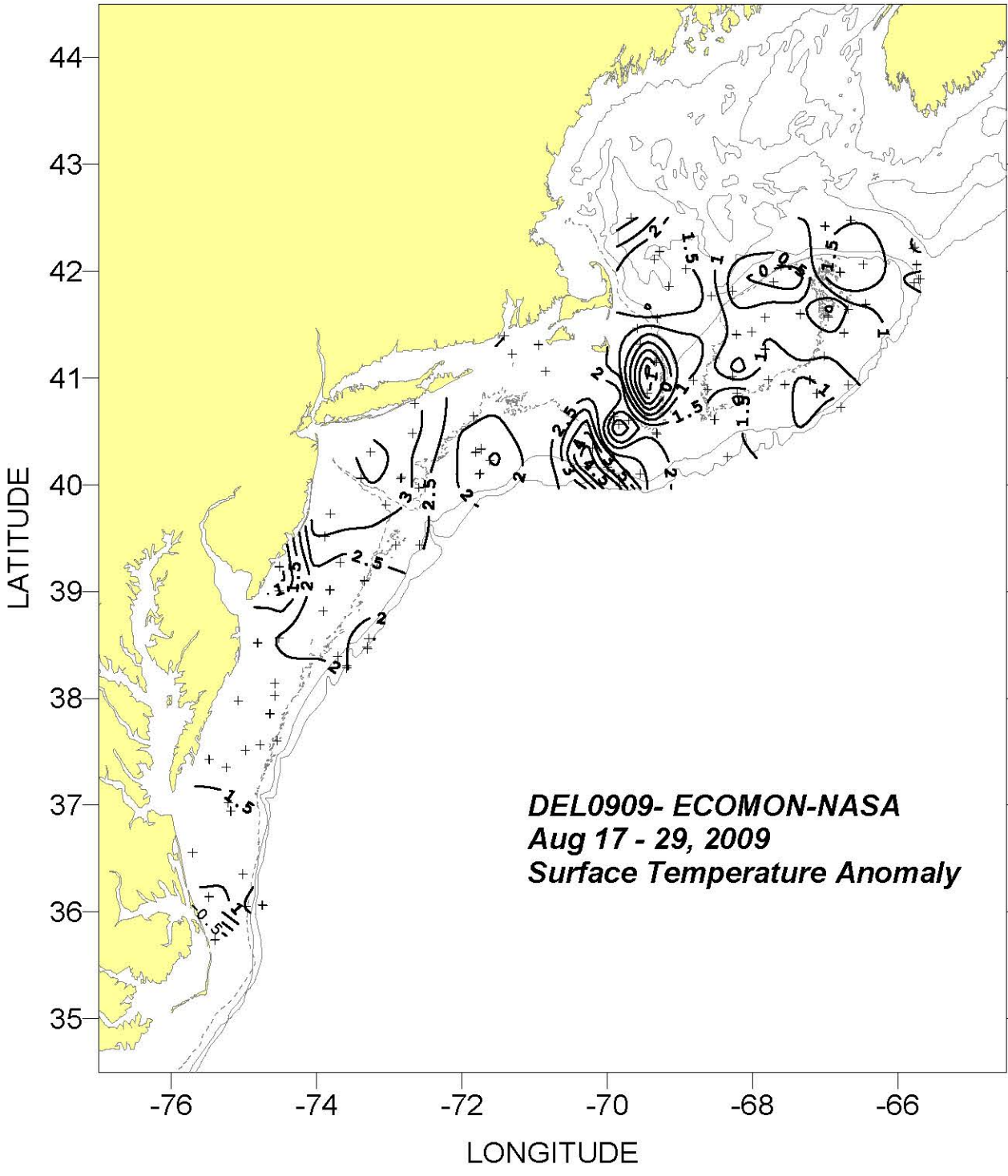
"#obs", the number of observations include in each average: "T/S", the areal average temp/salt: "Anomaly", the areal average temp/salt anomaly:

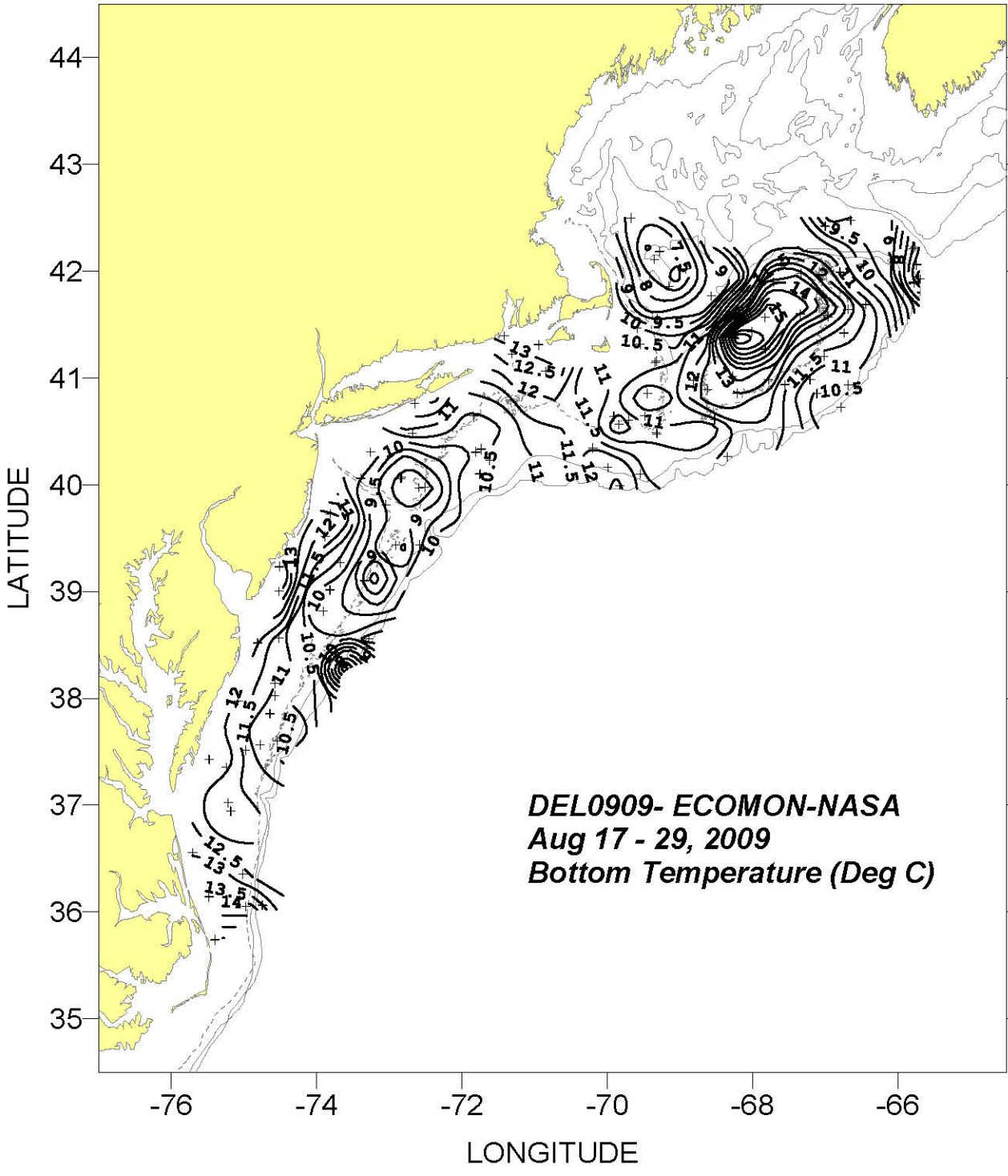
"SDV1", the standard deviation associated with the average temp/salt anomaly: "SDV2", the standard deviation of the individual anomalies from which the average anomaly was derived

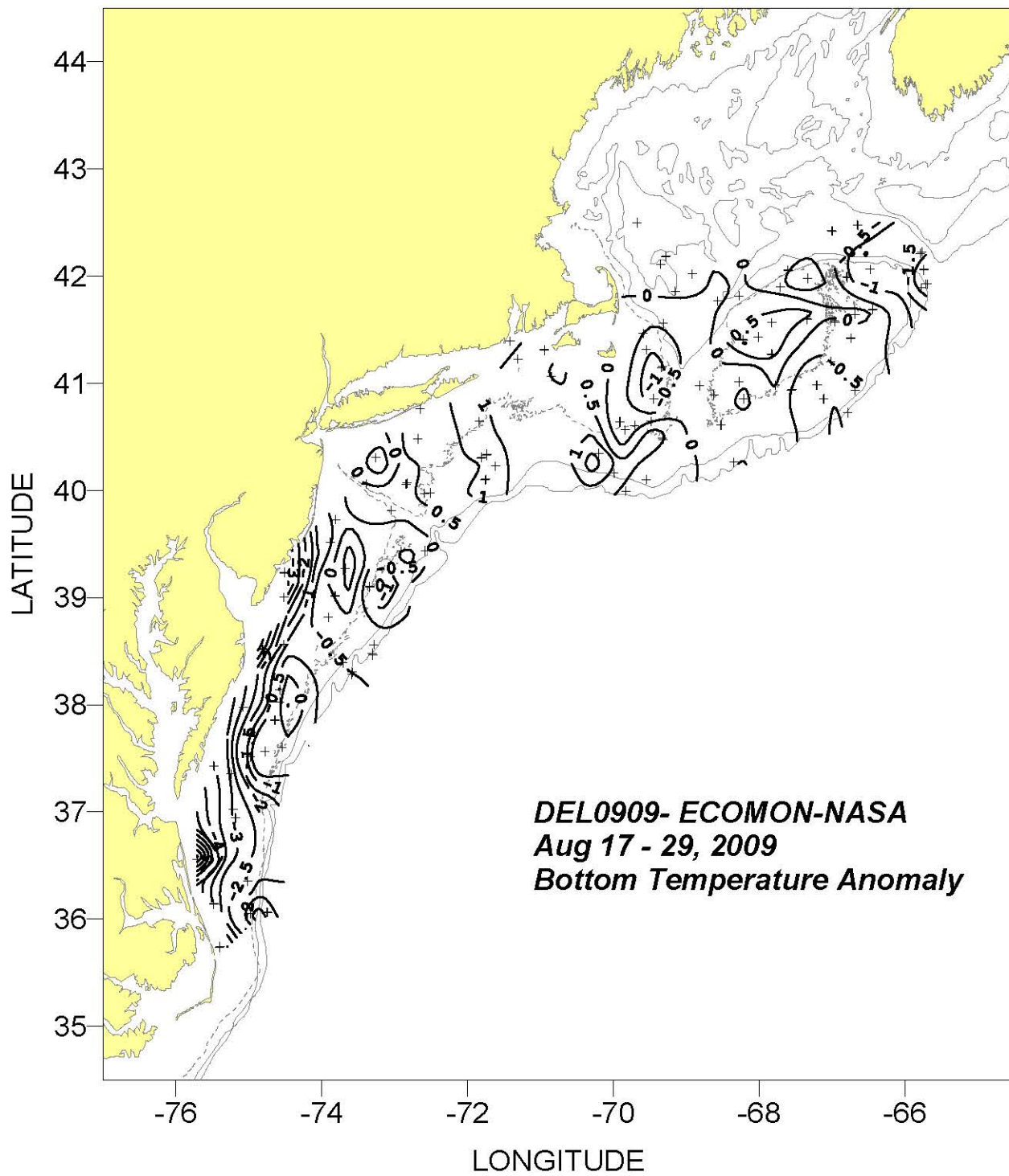
"Flag", a value of "1" indicates that a true areal average could not be calculated due to poor station coverage. The areal averages listed were derived from a simple average of the observations within the region.

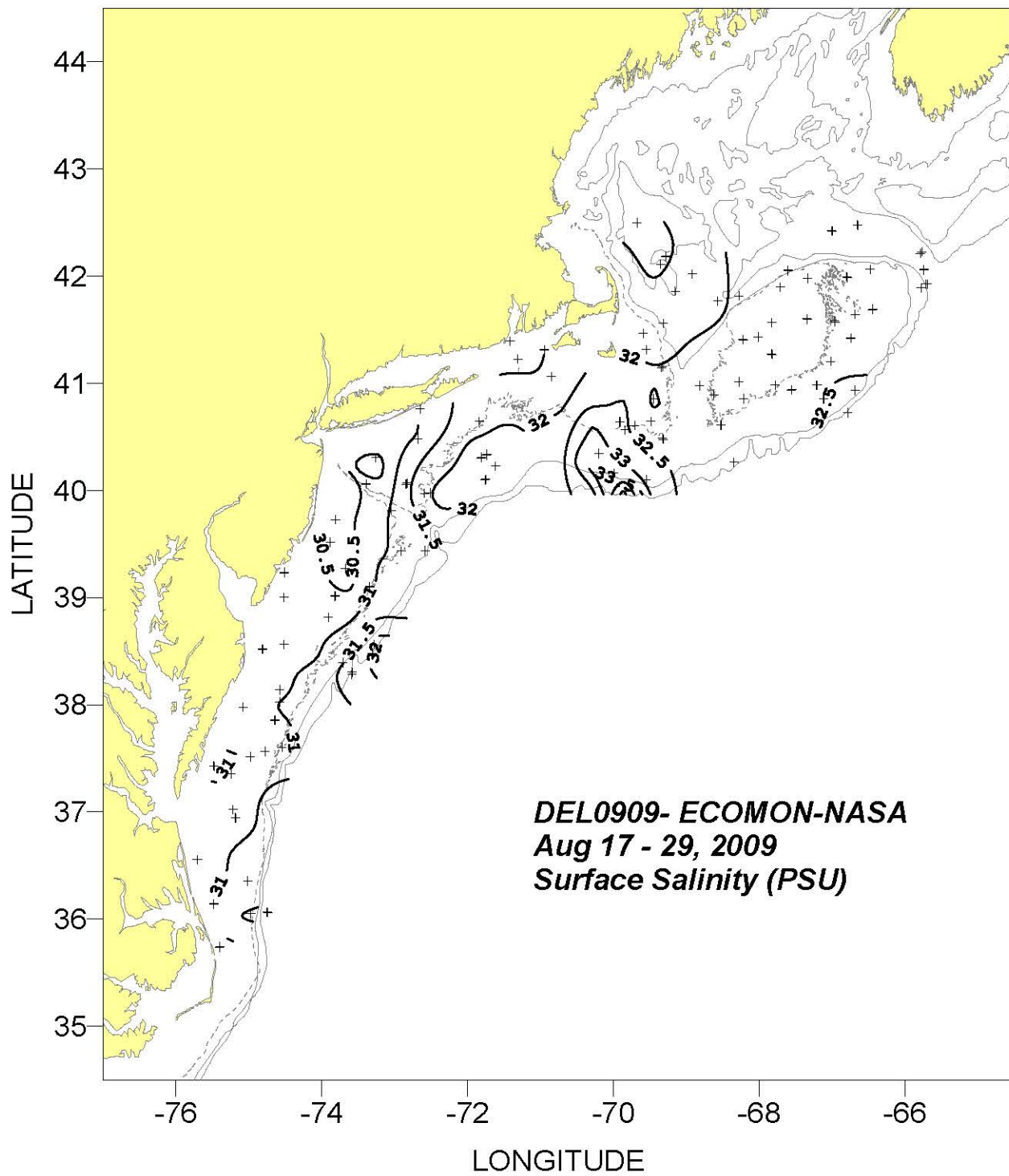
"Purpose", 2 digit code assigned by DMS to identify a unique NEFSC program survey.

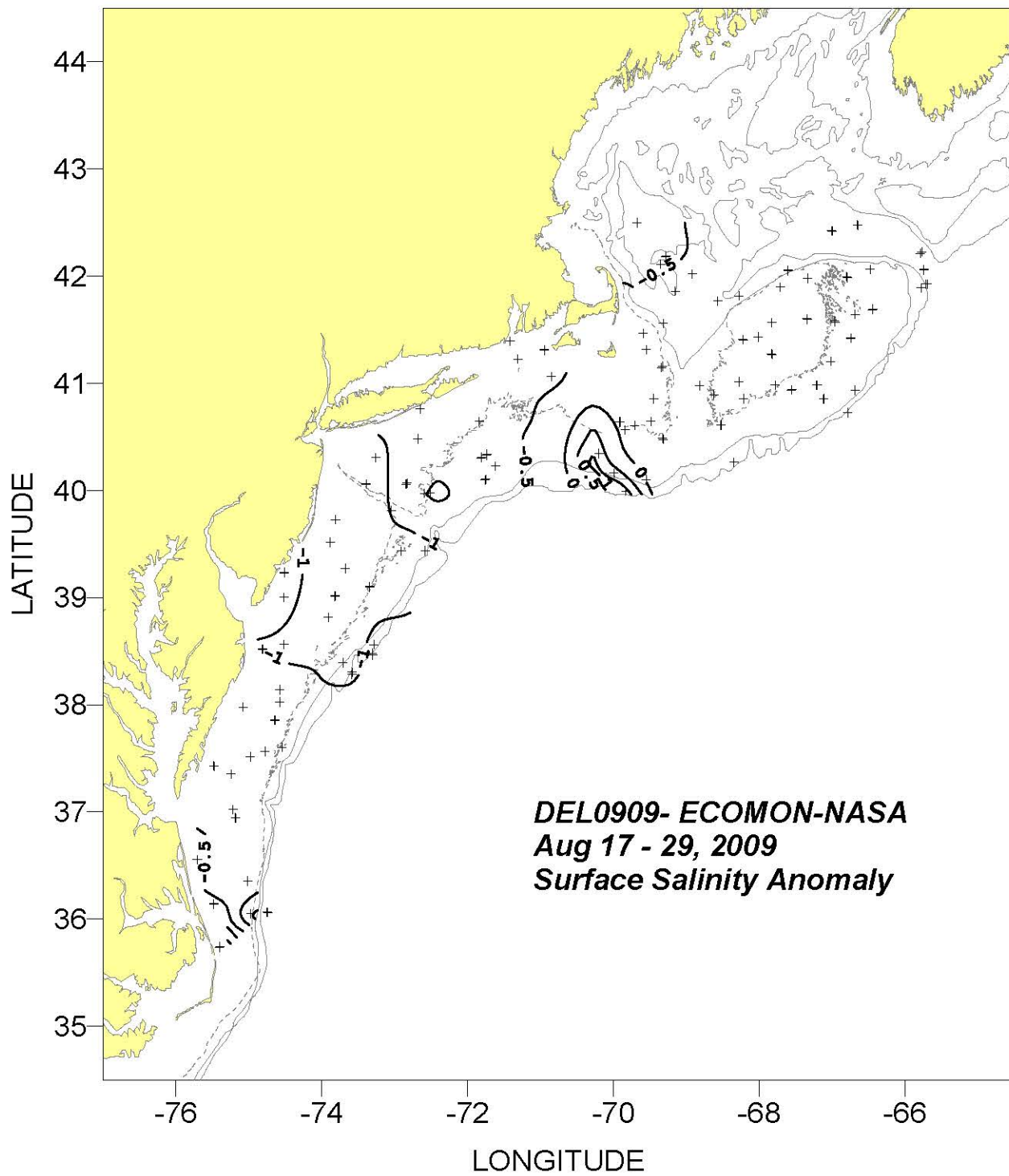


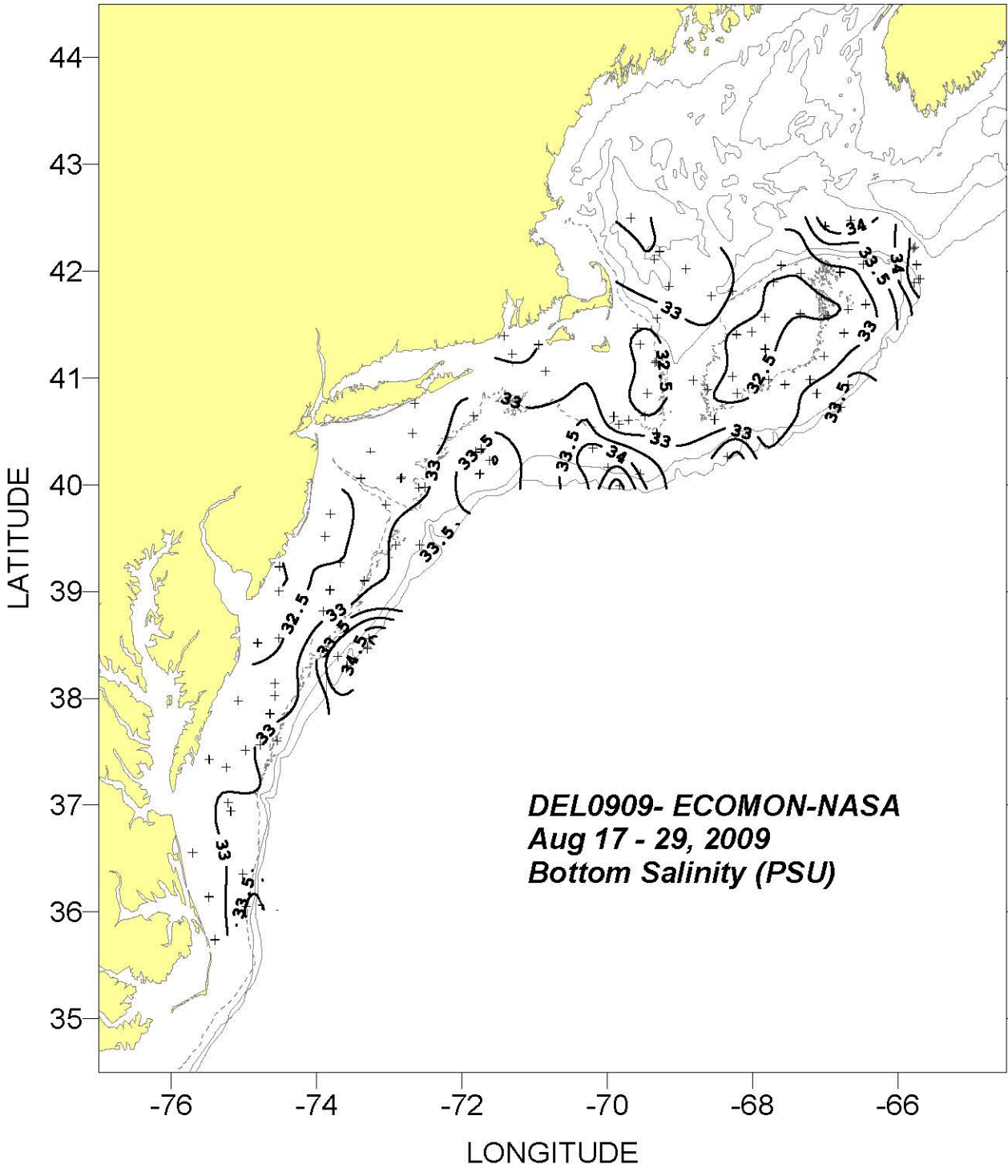


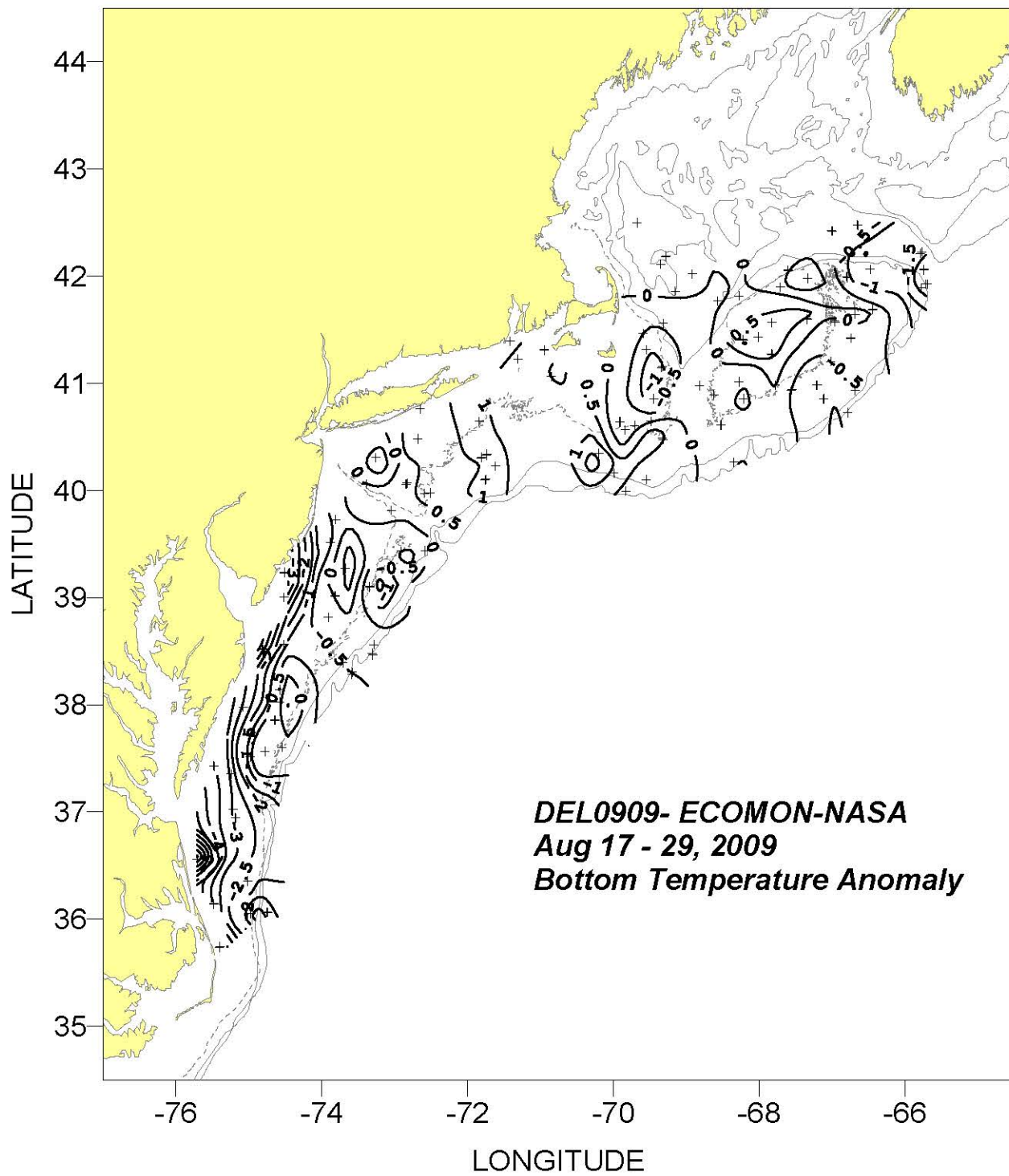












DEL0909 ECOMON/NASA GROUND TRUTH MEASUREMENTS
17 - 29 August, 2009

| Cast # | Sta # | Lat | Long | Day | Mo | Year | Time (GMT) | Btm Depth | Sfc Temp | Sfc Salt | Btm Temp | Btm Salt | Meters from Bottom |
|---------------|--------------|---------------|---------------|------------|-----------|-------------|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| 1 | 1 | 4118.8 | 7056.6 | 17 | 8 | 2009 | 22:22 | 34 | 20.95 | 31.39 | 13.97 | 32.10 | 4 |
| 1 | 1 | 4118.6 | 7056.7 | 17 | 8 | 2009 | 22:58 | 34 | 21.11 | 31.39 | 13.96 | 32.11 | 4 |
| 2 | 2 | 4123.6 | 7124.9 | 18 | 8 | 2009 | 1:22 | 32 | 21.17 | 30.76 | 13.69 | 31.89 | 4 |
| 3 | 3 | 4113.5 | 7118.4 | 18 | 8 | 2009 | 2:39 | 36 | 22.75 | 31.15 | 13.36 | 32.21 | 4 |
| 4 | 4 | 4103.7 | 7050.9 | 18 | 8 | 2009 | 5:05 | 35 | 21.11 | 31.39 | 13.86 | 32.88 | 4 |
| 5 | 5 | 4038.8 | 7150.2 | 18 | 8 | 2009 | 10:07 | 52 | 22.63 | 31.60 | 10.86 | 32.79 | 5 |
| 6 | 6 | 4018.6 | 7148.5 | 18 | 8 | 2009 | 12:15 | 73 | 23.22 | 32.73 | 8.34 | 33.28 | 5 |
| 2 | 6 | 4018.2 | 7148.7 | 18 | 8 | 2009 | 12:34 | 74 | 99.99 | 99.99 | 99.99 | 99.99 | 4 |
| 7 | 7 | 4013.7 | 7136.9 | 18 | 8 | 2009 | 13:52 | 79 | 23.11 | 32.59 | 11.06 | 34.35 | 5 |
| 8 | 8 | 4006.2 | 7145.0 | 18 | 8 | 2009 | 14:58 | 82 | 23.86 | 32.23 | 11.41 | 34.52 | 5 |
| 3 | 8 | 4005.9 | 7145.5 | 18 | 8 | 2009 | 15:22 | 82 | 23.73 | 32.27 | 11.46 | 34.53 | 3 |
| 9 | 9 | 3958.8 | 7230.7 | 18 | 8 | 2009 | 19:34 | 67 | 24.38 | 32.58 | 7.88 | 33.00 | 4 |
| 4 | 9 | 3958.5 | 7230.7 | 18 | 8 | 2009 | 20:00 | 67 | 24.34 | 32.57 | 8.03 | 33.03 | 4 |
| 10 | 10 | 3958.3 | 7235.4 | 18 | 8 | 2009 | 20:43 | 57 | 25.15 | 32.40 | 7.82 | 32.95 | 4 |
| 11 | 11 | 4003.5 | 7250.5 | 18 | 8 | 2009 | 22:15 | 57 | 24.79 | 31.39 | 7.70 | 32.68 | 4 |
| 5 | 11 | 4003.5 | 7250.3 | 18 | 8 | 2009 | 22:34 | 52 | 24.79 | 31.38 | 7.67 | 32.69 | 1 |
| 6 | 11 | 4004.2 | 7249.6 | 18 | 8 | 2009 | 23:21 | 55 | 24.68 | 31.40 | 7.70 | 32.69 | 4 |
| 12 | 12 | 3948.9 | 7302.7 | 19 | 8 | 2009 | 2:35 | 69 | 25.28 | 30.68 | 7.46 | 32.85 | 4 |
| 13 | 13 | 3926.3 | 7234.8 | 19 | 8 | 2009 | 5:46 | 109 | 24.80 | 31.35 | 12.24 | 35.21 | 3 |
| 14 | 14 | 3926.2 | 7254.6 | 19 | 8 | 2009 | 7:41 | 63 | 25.30 | 30.95 | 6.50 | 32.67 | 4 |
| 15 | 15 | 3906.3 | 7320.6 | 19 | 8 | 2009 | 10:43 | 61 | 25.59 | 31.11 | 6.65 | 32.77 | 4 |
| 7 | 15 | 3905.9 | 7320.6 | 19 | 8 | 2009 | 11:06 | 65 | 25.55 | 31.14 | 6.61 | 32.77 | 4 |
| 16 | 16 | 3916.4 | 7340.5 | 19 | 8 | 2009 | 13:25 | 32 | 25.14 | 29.88 | 11.03 | 32.29 | 5 |
| 17 | 16 | 3916.2 | 7340.4 | 19 | 8 | 2009 | 13:36 | 37 | 25.21 | 29.87 | 9.76 | 32.39 | 1 |
| 18 | 17 | 3901.0 | 7348.8 | 19 | 8 | 2009 | 15:23 | 38 | 25.51 | 30.11 | 9.13 | 32.44 | 2 |
| 8 | 17 | 3900.8 | 7349.0 | 19 | 8 | 2009 | 15:41 | 37 | 25.40 | 30.23 | 9.16 | 32.44 | 3 |
| 19 | 18 | 3848.9 | 7354.5 | 19 | 8 | 2009 | 17:13 | 37 | 25.89 | 30.30 | 7.90 | 32.69 | 6 |
| 20 | 19 | 3833.7 | 7317.0 | 19 | 8 | 2009 | 20:43 | 124 | 25.84 | 32.30 | 12.64 | 35.58 | 6 |
| 21 | 20 | 3828.8 | 7318.3 | 19 | 8 | 2009 | 21:43 | 465 | 25.86 | 31.77 | 10.34 | 35.31 | 264 |
| 9 | 20 | 3827.8 | 7318.0 | 19 | 8 | 2009 | 22:21 | 640 | 25.64 | 33.66 | 5.10 | 34.99 | 37 |

DEL0909 ECOMON/NASA GROUND TRUTH MEASUREMENTS
17 - 29 August, 2009

| Cast # | Sta # | Lat | Long | Day | Mo | Year | Time (GMT) | Btm Depth | Sfc Temp | Sfc Salt | Btm Temp | Btm Salt | Meters from Bottom |
|---------------|--------------|---------------|---------------|------------|-----------|-------------|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| 22 | 21 | 3823.6 | 7342.4 | 20 | 8 | 2009 | 1:16 | 98 | 26.31 | 31.06 | 13.22 | 35.56 | 5 |
| 23 | 22 | 3818.2 | 7334.9 | 20 | 8 | 2009 | 2:32 | 430 | 25.61 | 32.07 | 10.98 | 35.39 | 229 |
| 24 | 22 | 3817.1 | 7335.1 | 20 | 8 | 2009 | 3:10 | 550 | 25.77 | 31.63 | 5.43 | 34.99 | 47 |
| 25 | 23 | 3808.5 | 7434.4 | 20 | 8 | 2009 | 8:40 | 34 | 26.45 | 31.08 | 11.32 | 32.51 | 8 |
| 26 | 24 | 3801.6 | 7434.6 | 20 | 8 | 2009 | 9:33 | 40 | 26.45 | 30.99 | 10.37 | 32.80 | 3 |
| 27 | 25 | 3751.6 | 7438.4 | 20 | 8 | 2009 | 10:46 | 48 | 26.41 | 31.13 | 9.63 | 32.86 | 5 |
| 10 | 25 | 3751.3 | 7438.5 | 20 | 8 | 2009 | 11:07 | 48 | 26.40 | 31.13 | 9.56 | 32.88 | 4 |
| 28 | 26 | 3736.2 | 7432.7 | 20 | 8 | 2009 | 13:04 | 65 | 26.88 | 30.79 | 9.29 | 33.53 | 4 |
| 29 | 27 | 3734.0 | 7446.6 | 20 | 8 | 2009 | 14:28 | 42 | 27.02 | 30.91 | 10.02 | 32.98 | 4 |
| 30 | 27 | 3733.7 | 7446.6 | 20 | 8 | 2009 | 14:38 | 42 | 26.99 | 30.91 | 10.12 | 32.98 | 6 |
| 31 | 28 | 3731.1 | 7458.6 | 20 | 8 | 2009 | 15:52 | 26 | 26.97 | 31.00 | 11.59 | 33.03 | 4 |
| 11 | 28 | 3730.9 | 7458.5 | 20 | 8 | 2009 | 16:07 | 26 | 26.99 | 31.00 | 11.64 | 33.05 | 3 |
| 32 | 29 | 3721.3 | 7514.6 | 20 | 8 | 2009 | 18:07 | 25 | 26.71 | 31.11 | 12.35 | 32.66 | 4 |
| 33 | 30 | 3701.5 | 7512.9 | 20 | 8 | 2009 | 20:34 | 36 | 26.61 | 30.99 | 11.15 | 33.27 | 3 |
| 34 | 31 | 3656.8 | 7510.9 | 20 | 8 | 2009 | 21:16 | 37 | 26.67 | 30.83 | 11.19 | 33.08 | 5 |
| 12 | 32 | 3656.7 | 7510.8 | 20 | 8 | 2009 | 21:34 | 36 | 26.62 | 30.84 | 11.16 | 33.10 | 3 |
| 35 | 32 | 3621.4 | 7500.8 | 21 | 8 | 2009 | 1:52 | 41 | 26.53 | 31.46 | 11.88 | 33.77 | 3 |
| 36 | 33 | 3603.9 | 7444.9 | 21 | 8 | 2009 | 4:13 | 500 | 27.08 | 31.95 | 10.98 | 35.39 | 297 |
| 37 | 33 | 3603.8 | 7444.5 | 21 | 8 | 2009 | 4:35 | 650 | 27.03 | 31.88 | 5.87 | 35.00 | 144 |
| 38 | 34 | 3603.0 | 7458.2 | 21 | 8 | 2009 | 6:22 | 45 | 27.02 | 29.63 | 14.63 | 34.90 | 3 |
| 39 | 35 | 3544.3 | 7523.9 | 21 | 8 | 2009 | 9:34 | 26 | 23.79 | 30.63 | 15.80 | 31.51 | 4 |
| 13 | 35 | 3544.1 | 7524.0 | 21 | 8 | 2009 | 9:52 | 25 | 23.58 | 32.36 | 16.12 | 33.32 | 4 |
| 14 | 35 | 3544.7 | 7523.7 | 21 | 8 | 2009 | 10:28 | 28 | 23.81 | 32.22 | 15.62 | 33.21 | 4 |
| 40 | 36 | 3608.6 | 7528.8 | 21 | 8 | 2009 | 13:10 | 28 | 26.84 | 30.13 | 14.26 | 31.47 | 5 |
| 15 | 36 | 3608.3 | 7528.9 | 21 | 8 | 2009 | 13:30 | 30 | 26.84 | 31.55 | 14.09 | 33.25 | 4 |
| 41 | 37 | 3633.4 | 7542.5 | 21 | 8 | 2009 | 16:32 | 23 | 25.89 | 30.44 | 12.90 | 32.55 | 4 |
| 16 | 37 | 3633.3 | 7542.3 | 21 | 8 | 2009 | 16:46 | 24 | 24.61 | 30.70 | 12.95 | 32.55 | 4 |
| 42 | 38 | 3725.9 | 7528.7 | 21 | 8 | 2009 | 22:34 | 23 | 25.87 | 30.90 | 13.68 | 32.43 | 3 |
| 17 | 38 | 3725.7 | 7528.6 | 21 | 8 | 2009 | 22:52 | 23 | 26.02 | 30.91 | 13.67 | 32.44 | 1 |
| 43 | 39 | 3758.7 | 7504.7 | 22 | 8 | 2009 | 2:42 | 21 | 24.81 | 30.62 | 14.52 | 32.33 | 5 |

DEL0909 ECOMON/NASA GROUND TRUTH MEASUREMENTS
17 - 29 August, 2009

| Cast # | Sta # | Lat | Long | Day | Mo | Year | Time (GMT) | Btm Depth | Sfc Temp | Sfc Salt | Btm Temp | Btm Salt | Meters from Bottom |
|-----------|-----------|---------------|---------------|-----------|----------|-------------|--------------|------------|--------------|--------------|--------------|--------------|--------------------|
| 44 | 40 | 3831.2 | 7448.7 | 22 | 8 | 2009 | 6:25 | 26 | 24.97 | 30.59 | 12.53 | 32.12 | 3 |
| 45 | 40 | 3831.1 | 7448.5 | 22 | 8 | 2009 | 6:34 | 27 | 24.96 | 30.57 | 12.52 | 32.12 | 1 |
| 46 | 41 | 3833.8 | 7430.9 | 22 | 8 | 2009 | 8:08 | 30 | 26.25 | 30.40 | 10.96 | 32.46 | 5 |
| 18 | 42 | 3900.3 | 7430.9 | 22 | 8 | 2009 | 10:53 | 15 | 23.11 | 30.84 | 15.21 | 31.64 | 3 |
| 19 | 43 | 3913.9 | 7430.7 | 22 | 8 | 2009 | 12:33 | 18 | 22.26 | 30.98 | 14.29 | 31.80 | 3 |
| 47 | 43 | 3914.2 | 7430.7 | 22 | 8 | 2009 | 12:49 | 17 | 22.14 | 30.96 | 14.37 | 31.77 | 4 |
| 48 | 44 | 3931.1 | 7353.0 | 22 | 8 | 2009 | 16:16 | 28 | 26.22 | 30.42 | 13.04 | 31.98 | 2 |
| 20 | 44 | 3931.0 | 7352.8 | 22 | 8 | 2009 | 16:31 | 28 | 26.18 | 30.42 | 13.06 | 99.99 | 3 |
| 49 | 45 | 3943.7 | 7348.8 | 22 | 8 | 2009 | 18:10 | 22 | 26.18 | 30.06 | 16.07 | 31.73 | 5 |
| 50 | 45 | 3943.6 | 7348.5 | 22 | 8 | 2009 | 18:21 | 22 | 26.12 | 30.05 | 24.26 | 30.20 | 17 |
| 51 | 46 | 4003.5 | 7323.3 | 22 | 8 | 2009 | 21:27 | 47 | 25.77 | 29.72 | 9.16 | 32.46 | 4 |
| 21 | 46 | 4003.8 | 7323.3 | 22 | 8 | 2009 | 21:43 | 46 | 25.48 | 29.89 | 9.24 | 32.49 | 4 |
| 52 | 47 | 4018.4 | 7315.3 | 22 | 8 | 2009 | 23:43 | 37 | 25.29 | 30.14 | 10.50 | 32.36 | 4 |
| 53 | 48 | 4028.9 | 7240.8 | 23 | 8 | 2009 | 3:00 | 44 | 24.00 | 30.52 | 10.97 | 32.48 | 4 |
| 54 | 49 | 4045.7 | 7238.9 | 23 | 8 | 2009 | 4:55 | 22 | 23.37 | 30.60 | 18.42 | 31.42 | 2 |
| 55 | 50 | 4020.3 | 7144.0 | 23 | 8 | 2009 | 10:30 | 77 | 23.46 | 32.23 | 9.39 | 33.53 | 2 |
| 22 | 50 | 4019.8 | 7144.4 | 23 | 8 | 2009 | 10:53 | 75 | 23.45 | 32.24 | 9.33 | 33.49 | 3 |
| 57 | 52 | 4020.7 | 7011.7 | 23 | 8 | 2009 | 20:01 | 85 | 25.90 | 34.98 | 12.66 | 34.95 | 3 |
| 23 | 53 | 4009.8 | 6959.4 | 23 | 8 | 2009 | 21:52 | 105 | 23.07 | 32.95 | 13.37 | 35.34 | 4 |
| 58 | 54 | 3959.6 | 6949.7 | 23 | 8 | 2009 | 23:37 | 143 | 25.95 | 34.91 | 12.84 | 35.58 | 5 |
| 59 | 55 | 4006.1 | 6932.9 | 24 | 8 | 2009 | 1:28 | 101 | 22.50 | 33.04 | 12.15 | 34.70 | 4 |
| 60 | 56 | 4028.6 | 6918.8 | 24 | 8 | 2009 | 4:26 | 72 | 21.83 | 32.34 | 9.39 | 32.95 | 5 |
| 61 | 56 | 4029.2 | 6919.5 | 24 | 8 | 2009 | 4:52 | 68 | 21.69 | 32.34 | 9.73 | 32.86 | 2 |
| 62 | 57 | 4038.7 | 6928.8 | 24 | 8 | 2009 | 6:26 | 55 | 19.04 | 32.52 | 12.05 | 32.44 | 4 |
| 63 | 58 | 4036.3 | 6942.3 | 24 | 8 | 2009 | 7:49 | 61 | 17.33 | 32.36 | 10.79 | 32.64 | 4 |
| 64 | 59 | 4033.9 | 6950.3 | 24 | 8 | 2009 | 9:16 | 65 | 16.91 | 32.41 | 9.64 | 32.80 | 3 |
| 65 | 60 | 4038.4 | 6954.3 | 24 | 8 | 2009 | 10:07 | 54 | 22.52 | 32.89 | 10.87 | 32.72 | 7 |
| 24 | 60 | 4038.4 | 6954.7 | 24 | 8 | 2009 | 10:58 | 53 | 22.55 | 32.90 | 10.87 | 32.73 | 3 |
| 66 | 61 | 4051.4 | 6926.8 | 24 | 8 | 2009 | 14:15 | 35 | 12.47 | 31.87 | 12.27 | 31.87 | 23 |
| 67 | 61 | 4051.5 | 6926.7 | 24 | 8 | 2009 | 14:25 | 42 | 12.66 | 31.87 | 12.26 | 31.87 | 1 |

DEL0909 ECOMON/NASA GROUND TRUTH MEASUREMENTS
17 - 29 August, 2009

| Cast # | Sta # | Lat | Long | Day | Mo | Year | Time (GMT) | Btm Depth | Sfc Temp | Sfc Salt | Btm Temp | Btm Salt | Meters from Bottom |
|---------------|--------------|---------------|---------------|------------|-----------|-------------|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| 68 | 62 | 4108.8 | 6920.5 | 24 | 8 | 2009 | 16:23 | 50 | 11.62 | 32.06 | 10.72 | 32.15 | 4 |
| 25 | 62 | 4109.5 | 6919.5 | 24 | 8 | 2009 | 16:43 | 59 | 11.42 | 32.09 | 10.61 | 32.16 | 4 |
| 69 | 63 | 4058.7 | 6849.0 | 24 | 8 | 2009 | 19:43 | 84 | 17.39 | 32.32 | 13.44 | 32.39 | 6 |
| 70 | 64 | 4053.6 | 6837.1 | 24 | 8 | 2009 | 21:01 | 54 | 16.58 | 32.30 | 13.74 | 32.34 | 3 |
| 71 | 65 | 4036.7 | 6831.1 | 24 | 8 | 2009 | 22:42 | 68 | 19.11 | 32.25 | 9.74 | 32.82 | 3 |
| 26 | 65 | 4036.5 | 6831.6 | 24 | 8 | 2009 | 23:06 | 68 | 18.82 | 32.27 | 9.91 | 32.76 | 7 |
| 72 | 66 | 4015.9 | 6820.8 | 25 | 8 | 2009 | 2:30 | 163 | 21.00 | 32.72 | 11.99 | 35.51 | 5 |
| 73 | 67 | 4051.4 | 6812.7 | 25 | 8 | 2009 | 6:13 | 55 | 17.05 | 32.16 | 12.83 | 32.34 | 4 |
| 74 | 68 | 4100.9 | 6816.6 | 25 | 8 | 2009 | 7:20 | 49 | 14.67 | 32.26 | 14.66 | 32.26 | 5 |
| 75 | 69 | 4124.4 | 6813.4 | 25 | 8 | 2009 | 10:00 | 39 | 17.28 | 32.32 | 17.30 | 32.32 | 5 |
| 27 | 69 | 4124.3 | 6812.9 | 25 | 8 | 2009 | 10:15 | 28 | 17.29 | 32.32 | 17.31 | 32.32 | 5 |
| 76 | 70 | 4125.9 | 6800.5 | 25 | 8 | 2009 | 11:33 | 38 | 17.42 | 32.33 | 17.42 | 32.32 | 5 |
| 77 | 71 | 4133.9 | 6749.4 | 25 | 8 | 2009 | 13:04 | 20 | 17.00 | 32.35 | 16.99 | 32.35 | 4 |
| 28 | 71 | 4134.0 | 6749.6 | 25 | 8 | 2009 | 13:19 | 41 | 16.99 | 32.35 | 16.98 | 32.35 | 4 |
| 29 | 72 | 4116.1 | 6749.3 | 25 | 8 | 2009 | 15:34 | 43 | 17.00 | 32.25 | 16.94 | 32.25 | 2 |
| 78 | 72 | 4116.6 | 6749.8 | 25 | 8 | 2009 | 15:49 | 41 | 17.09 | 32.25 | 16.99 | 32.25 | 4 |
| 79 | 73 | 4058.9 | 6746.7 | 25 | 8 | 2009 | 18:16 | 57 | 18.52 | 32.07 | 12.01 | 32.38 | 4 |
| 80 | 74 | 4056.4 | 6733.1 | 25 | 8 | 2009 | 19:30 | 72 | 18.93 | 32.07 | 10.10 | 32.56 | 4 |
| 81 | 74 | 4056.2 | 6733.2 | 25 | 8 | 2009 | 19:42 | 71 | 18.53 | 32.07 | 10.20 | 32.55 | 24 |
| 82 | 75 | 4058.9 | 6712.6 | 25 | 8 | 2009 | 21:40 | 77 | 18.05 | 32.12 | 10.27 | 32.73 | 4 |
| 30 | 75 | 4059.0 | 6712.2 | 25 | 8 | 2009 | 21:58 | 76 | 18.02 | 32.11 | 10.33 | 32.68 | 3 |
| 83 | 76 | 4051.3 | 6707.0 | 25 | 8 | 2009 | 23:04 | 91 | 15.71 | 32.35 | 9.79 | 33.72 | 3 |
| 84 | 76 | 4051.4 | 6706.8 | 25 | 8 | 2009 | 23:17 | 91 | 16.01 | 32.36 | 9.74 | 33.69 | 1 |
| 85 | 77 | 4043.7 | 6646.9 | 26 | 8 | 2009 | 1:10 | 275 | 22.17 | 34.34 | 6.67 | 35.01 | 5 |
| 86 | 77 | 4043.5 | 6647.0 | 26 | 8 | 2009 | 1:27 | 280 | 21.70 | 34.26 | 12.62 | 35.60 | 102 |
| 87 | 78 | 4056.1 | 6640.9 | 26 | 8 | 2009 | 3:50 | 98 | 16.68 | 32.31 | 11.21 | 34.57 | 1 |
| 88 | 79 | 4112.2 | 6701.0 | 26 | 8 | 2009 | 6:04 | 67 | 16.70 | 32.27 | 10.79 | 32.56 | 5 |
| 89 | 79 | 4112.2 | 6701.0 | 26 | 8 | 2009 | 6:15 | 69 | 16.72 | 32.27 | 10.75 | 32.57 | 3 |
| 90 | 80 | 4136.1 | 6720.5 | 26 | 8 | 2009 | 9:10 | 48 | 16.20 | 32.31 | 16.13 | 32.31 | 5 |
| 91 | 80 | 4135.8 | 6720.3 | 26 | 8 | 2009 | 9:19 | 40 | 16.17 | 32.31 | 16.15 | 32.31 | 22 |

DEL0909 ECOMON/NASA GROUND TRUTH MEASUREMENTS
17 - 29 August, 2009

| Cast # | Sta # | Lat | Long | Day | Mo | Year | Time (GMT) | Btm Depth | Sfc Temp | Sfc Salt | Btm Temp | Btm Salt | Meters from Bottom |
|---------------|--------------|---------------|---------------|------------|-----------|-------------|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| 92 | 81 | 4134.9 | 6657.6 | 26 | 8 | 2009 | 10:52 | 63 | 14.17 | 32.28 | 14.03 | 32.28 | 4 |
| 31 | 81 | 4134.3 | 6657.3 | 26 | 8 | 2009 | 11:10 | 64 | 14.15 | 32.29 | 14.04 | 32.28 | 2 |
| 93 | 82 | 4125.3 | 6644.4 | 26 | 8 | 2009 | 12:37 | 79 | 14.46 | 32.36 | 10.94 | 32.64 | 6 |
| 94 | 82 | 4125.2 | 6644.5 | 26 | 8 | 2009 | 12:45 | 79 | 14.49 | 32.36 | 12.34 | 32.48 | 51 |
| 95 | 83 | 4138.5 | 6640.9 | 26 | 8 | 2009 | 14:28 | 68 | 14.51 | 32.30 | 13.81 | 32.31 | 5 |
| 96 | 84 | 4141.5 | 6626.4 | 26 | 8 | 2009 | 15:58 | 80 | 15.74 | 32.29 | 11.44 | 32.56 | 4 |
| 32 | 84 | 4141.2 | 6626.5 | 26 | 8 | 2009 | 16:15 | 79 | 15.37 | 32.31 | 11.31 | 32.57 | 3 |
| 97 | 85 | 4153.5 | 6546.7 | 26 | 8 | 2009 | 20:01 | 168 | 15.64 | 32.41 | 7.17 | 34.98 | 5 |
| 98 | 86 | 4155.5 | 6542.8 | 26 | 8 | 2009 | 21:10 | 231 | 16.13 | 32.37 | 5.85 | 34.97 | 2 |
| 99 | 86 | 4155.5 | 6541.6 | 26 | 8 | 2009 | 21:55 | 226 | 16.18 | 32.36 | 6.77 | 35.00 | 25 |
| 33 | 87 | 4203.5 | 6544.3 | 27 | 8 | 2009 | 0:07 | 261 | 16.98 | 32.32 | 5.58 | 34.96 | 4 |
| 100 | 87 | 4203.9 | 6544.5 | 27 | 8 | 2009 | 0:48 | 270 | 16.72 | 32.34 | 5.90 | 34.95 | 55 |
| 101 | 88 | 4213.6 | 6546.0 | 27 | 8 | 2009 | 2:34 | 227 | 14.96 | 32.48 | 6.83 | 35.00 | 25 |
| 102 | 88 | 4212.7 | 6547.3 | 27 | 8 | 2009 | 3:09 | 228 | 15.07 | 32.47 | 6.18 | 34.98 | 3 |
| 103 | 89 | 4203.8 | 6628.4 | 27 | 8 | 2009 | 6:49 | 81 | 17.97 | 32.17 | 7.54 | 33.22 | 4 |
| 104 | 90 | 4228.4 | 6638.7 | 27 | 8 | 2009 | 9:41 | 303 | 16.17 | 32.38 | 8.57 | 35.05 | 101 |
| 34 | 90 | 4228.7 | 6639.1 | 27 | 8 | 2009 | 10:28 | 303 | 16.09 | 32.38 | 8.38 | 35.05 | 2 |
| 35 | 91 | 4225.3 | 6700.3 | 27 | 8 | 2009 | 12:31 | 364 | 16.12 | 32.43 | 8.05 | 35.03 | 2 |
| 105 | 91 | 4225.2 | 6659.5 | 27 | 8 | 2009 | 13:33 | 364 | 16.32 | 32.43 | 9.09 | 35.07 | 163 |
| 106 | 92 | 4159.2 | 6647.3 | 27 | 8 | 2009 | 16:58 | 68 | 17.58 | 32.21 | 12.10 | 32.51 | 4 |
| 36 | 92 | 4159.7 | 6647.8 | 27 | 8 | 2009 | 17:15 | 69 | 17.20 | 32.22 | 11.93 | 32.53 | 3 |
| 107 | 93 | 4158.8 | 6720.0 | 27 | 8 | 2009 | 21:08 | 57 | 15.56 | 32.34 | 14.75 | 32.36 | 5 |
| 108 | 94 | 4203.4 | 6736.1 | 27 | 8 | 2009 | 22:43 | 100 | 17.32 | 32.21 | 5.89 | 32.80 | 3 |
| 38 | 94 | 4203.0 | 6736.2 | 27 | 8 | 2009 | 23:04 | 88 | 16.24 | 32.24 | 7.71 | 32.60 | 3 |
| 109 | 95 | 4153.9 | 6742.6 | 28 | 8 | 2009 | 0:25 | 39 | 15.26 | 32.32 | 15.26 | 32.32 | 6 |
| 110 | 96 | 4148.9 | 6816.5 | 28 | 8 | 2009 | 3:09 | 154 | 17.20 | 32.05 | 7.84 | 32.56 | 93 |
| 111 | 96 | 4148.9 | 6816.5 | 28 | 8 | 2009 | 3:22 | 141 | 17.14 | 32.08 | 5.44 | 33.16 | 4 |
| 112 | 97 | 4146.2 | 6834.1 | 28 | 8 | 2009 | 5:10 | 182 | 18.99 | 31.71 | 6.42 | 33.83 | 2 |
| 113 | 98 | 4201.3 | 6854.8 | 28 | 8 | 2009 | 7:26 | 134 | 19.49 | 31.72 | 4.94 | 33.12 | 3 |
| 114 | 99 | 4211.1 | 6916.5 | 28 | 8 | 2009 | 9:31 | 196 | 20.49 | 31.18 | 6.09 | 33.70 | 4 |

DEL0909 ECOMON/NASA GROUND TRUTH MEASUREMENTS
17 - 29 August, 2009

| Cast # | Sta # | Lat | Long | Day | Mo | Year | Time (GMT) | Btm Depth | Sfc Temp | Sfc Salt | Btm Temp | Btm Salt | Meters from Bottom |
|---------------|--------------|---------------|---------------|------------|-----------|-------------|-------------------|------------------|-----------------|-----------------|-----------------|-----------------|---------------------------|
| 39 | 99 | 4210.8 | 6917.0 | 28 | 8 | 2009 | 10:01 | 196 | 20.36 | 31.19 | 6.14 | 33.72 | 5 |
| 115 | 100 | 4229.8 | 6940.3 | 28 | 8 | 2009 | 13:04 | 255 | 22.00 | 31.13 | 6.54 | 33.94 | 53 |
| 41 | 100 | 4229.9 | 6940.3 | 28 | 8 | 2009 | 16:28 | 258 | 22.08 | 31.12 | 6.59 | 34.04 | 7 |
| 42 | 101 | 4206.6 | 6921.1 | 28 | 8 | 2009 | 19:42 | 212 | 20.86 | 31.19 | 6.02 | 33.67 | 9 |
| 116 | 102 | 4151.6 | 6909.0 | 28 | 8 | 2009 | 21:53 | 204 | 21.86 | 31.43 | 5.74 | 33.54 | 1 |
| 117 | 103 | 4133.6 | 6918.8 | 29 | 8 | 2009 | 0:10 | 130 | 21.45 | 31.34 | 4.96 | 33.09 | 4 |
| 118 | 104 | 4118.9 | 6932.7 | 29 | 8 | 2009 | 2:19 | 30 | 12.75 | 31.91 | 12.26 | 31.96 | 4 |
| 119 | 105 | 4128.0 | 6935.3 | 29 | 8 | 2009 | 3:31 | 31 | 19.90 | 31.46 | 9.02 | 32.19 | 3 |

data in bold taken from CTD 0420

all other data from Seacat 4501