

CTD data collected from MOCNESS hauls on R/V Atlantis II, R/V Knorr, R/V Chain, and R/V Endeavor in the Sargasso Sea, Slope Water and Northern Sargasso Sea from 1974-1981 (NAtIDarkData project)

Website: <https://www.bco-dmo.org/dataset/3604>

Data Type: Cruise Results

Version: new version in progress

Version Date: 2015-10-22

Project

» [North Atlantic Dark Data: Rings](#) (NAtIDarkData)

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Dataset Description

NOTE: Access to these data has been removed until the new versions of the data are ready. - DMO -10-22-2015

The MOCNESS is based on the Tucker Trawl principle (Tucker, 1951). The particular MOCNESS system from which these CTD data came is one of three net systems. The MOCNESS-1 has nine rectangular nets (1m x 1.4 m) which are opened and closed sequentially by commands through conducting cable from the surface (Wiebe *et al.*, 1976). In all three systems, the underwater unit sends a data frame, comprised of temperature, depth, conductivity, net-frame angle, flow count, time, number of open net, and net opening/closing, to the deck unit in a compressed hexadecimal format every 2 seconds and from the deck unit to a microcomputer every 4 seconds. Temperature (to approximately 0.01 deg C) and conductivity are measured with SEABIRD sensors. Normally, a modified T.S.K.-flowmeter is used. Both the temperature and conductivity sensors and the flowmeter are mounted on top of the frame so that they face horizontally when the frame is at a towing angle of 45deg. Calculations of salinity (to approximately 0.01 o/oo S), potential temperature (theta), potential density (sigma), the oblique and vertical velocities of the net, and the approximate volume filtered by each net are made after each string of data has been received by the computer. (Wiebe *et al.*, 1985) In addition, data were collected from four other sensors attached to the frame: the Transmissometer, the Fluorometer, the Downwelling light sensor, and the Oxygen sensor. A SeaBird underwater pump was also included in the sensor suite.

It should be noted that whenever the data are of questionable value, 50.000 is written in the particular data field.

Unless otherwise indicated, these data have not been post-processed.

For additional information, contact the [chief scientist](#) for the cruise or the [BCO-DMO](#).

Note: Some variables have been eliminated from the display or renamed something else, but are nevertheless available. These variables include: id_tag, raw_PR, raw_TE, raw_CO, raw_OT, raw_OC, raw_AN, raw_AN_FL, NR, LI, raw_FL, start_date, end_date, local_end_time, end_year, end_month, end_day, GMT_end_time, end_lat, end_lon, abort_flag, quality_flag, seconds, maybe_PR, maybe_TE, maybe_CO, maybe_AN, and time_zone_info. Contact the contributors for this information.

These Cold Core Rings data are organized by Cruise and therefore the CruiseID is at the directory level, identified by a lower-case ID, e.g. at85, for Atlantis-II cruise 85.

See individual cruises(below) for acquisition information specific to that cruise.

Methods & Sampling

The underwater unit sends a data frame, comprised of temperature, depth, conductivity, net-frame angle, flow count, time, number of open net, and net opening/closing, to the deck unit in a compressed hexadecimal format every 2 seconds and from the deck unit to a microcomputer every 4 seconds... Temperature (to approximately 0.01 deg C) and conductivity are measured with SEABIRD sensors. Normally, a modified T.S.K.-flowmeter is used... Both the temperature and conductivity sensors and the flowmeter are mounted on top of the frame so that they face horizontally when the frame is at a towing angle of 45deg... Calculations of salinity (to approximately 0.01 o/oo S), potential temperature (theta), potential density (sigma), the oblique and vertical velocities of the net, and the approximate volume filtered by each net are made after each string of data has been received by the computer.

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Related Publications

Fofonoff, N. P., & Millard Jr, R. C. (1983). Algorithms for Computation of Fundamental Properties of Seawater. Endorsed by Unesco/SCOR/ICES/IAPSO Joint Panel on Oceanographic Tables and Standards and SCOR Working Group 51. Unesco Technical Papers in Marine Science, No. 44.

Methods

Tucker, G.H.(1951) Relation of fishes and other organisms to the scattering of underwater sound Journal of Marine Research, 10, pp. 215-238

Methods

Wiebe, P. H., K.H. Burt, S. H. Boyd, A. W. Morton (1976). A multiple opening/closing net and environment sensing system for sampling zooplankton. J. Mar. Res., 34, 313-326.

Methods

Wiebe, P. H., Morton, A. W., Bradley, A. M., Backus, R. H., Craddock, J. E., Barber, V., ... Flierl, G. R. (1985). New development in the MOCNESS, an apparatus for sampling zooplankton and micronekton. Marine Biology, 87(3), 313-323. doi:10.1007/bf00397811 <https://doi.org/10.1007/BF00397811>

Methods

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Parameters

Parameter	Description	Units
tow	Tow number	numeric
station	station number	numeric
month	month of year at start of tow in local time	1-12
day	day of month at start of tow in local time	1-31
time_gmt	start time of tow in GMT	24-hour clock
time_local	start time of tow in local time	24 hour clock
lat	latitude at start of tow	decimal degrees; North is positive
lon	longitude at start of tow	decimal degrees; West is negative
n_sync_errors	synchronization errors	none
record_number	record number	numeric
time	time of day in local time	hhmm.dddd (24 hour clock)
scans_lost	number of scans lost	none
press	water pressure	decibars
temp	water temperature	degrees
cond_mM	conductivity	milliMhos/cm
angle	angle of net frame relative to vertical	0-89 degrees
oxycurrent	oxygen current	milliamps
oxytemp	oxygen temperature	degrees C
flow	consecutive flow counts; one count equals 4.7 meters traveled	counts
net	sequential MOCNESS net number	number

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Instruments

Dataset-specific Instrument Name	MOCNESS
Generic Instrument Name	MOCNESS
Generic Instrument Description	The Multiple Opening/Closing Net and Environmental Sensing System or MOCNESS is a family of net systems based on the Tucker Trawl principle. There are currently 8 different sizes of MOCNESS in existence which are designed for capture of different size ranges of zooplankton and micro-nekton Each system is designated according to the size of the net mouth opening and in two cases, the number of nets it carries. The original MOCNESS (Wiebe et al, 1976) was a redesigned and improved version of a system described by Frost and McCrone (1974).(from MOCNESS manual) This designation is used when the specific type of MOCNESS (number and size of nets) was not specified by the contributing investigator.

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Deployments

All-85

Website	https://www.bco-dmo.org/deployment/58766
Platform	R/V Atlantis II
Start Date	1974-10-12
End Date	1974-10-23
Description	<p>1. in-situ filtration sampling at selected deptphs and locations between Bermuda and Woods Hole; 2. in-situ tests of the Longhurst-Hardy Plankton Recorder (LHPR) system using SCUBA; 3. studies of the phytoplankton, zooplankton, and fish of Gulf Stream rings with emphasis on spatial patterns of phytoplankton and hydrographic factors; 4. tests of the newly constructed Multiple Opening/Closing Net and Environmental System (MOCNESS); 5. studies of bird migration patterns; 6. studies to examine differences in gene frequencies in fish across physical-chemical stress gradients; 7. analyses of mesopelagic fish blood for differences in ionic concentrations. The positions are not the cruise track. The positions here are station locations for zooplankton tows.</p> <p>Methods & Sampling</p> <p>===== Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. Transcribed 8/8/03 NJC Ship speed ~2 knots for all tows Both ¼" and 9-track tape-recorded most tows. Mesh opening of nets = 333 microns AT85 Oct. 1974 M1 NW of Bermuda, ring center to 800m, day. Oct 15, 1974. 465 meter wire out=192 m depth: 59degree net angle. 1056 mwo=450 m: 45 deg. 1300 mwo=565 m: 46 deg. 1504 mwo=673 m: 45 deg. 1798 mwo=795.1m: 46 deg. Nets 1,2,3,4 di not trigger net bar indicator. Down at 30 m/min; up at 30 m/min. Calibration factor 1 flowmeter count = 4.5m. Stopped and started at 425m to change ¼" tape. Not all net bars release as they should have. Rather, it appears that for every 3 NR commands only 1 bar dropped except perhaps the last command caused the toggle to step 20 deg. instead of 10 deg.or it only took 2 steps to release the net. It appears that the 1st net (net 0) fished down to 800m and then back up to 600m (commands 800, 700, 600). The 2nd net (net 1) fished from 600m to 300m and the 3rd net (net 2) from 300m to 100m and 4th (net 3) from 100-0m. M2 Outside ring (east) to 700m, night. Oct 17, 1974. Increased mwo rate from 30 to 50m/min at 100 mwo. No net bar indicator working so pressed net command 3 times for each depth. Bad tow - net command did not work - motor drive not plugged in. Simple oblique tow of net 0 from 0-700m and back to surface. We reset net system and fixed a broken net bar indicator for a second attempt. Subsurface current problem below 400m. Wire angle dropped to ~11 deg. We think we were running 1.5 knots against a surface current of ~1kt and that current only extended down to ~400m. Therefore were not moving forward below that depth. M3 Outside ring (east) to 400m, night. Oct 18, 1974. Down at 30m/min. Net 1 opened at surface (net 0 closed for test). Net 1 sent down to 400m and closed. ?Net 2 (400-300m), ?N3 (300-250m), N4 (250-200m), N5 (200-150m), N6 (150-100m), N7 (100-50m), N8 (50-0m). There is some question as to whether or not net 2 actually stayed open for any length of time as I pushed the net command button 5 times to release. I think net 2 fished only for a minute at most and net 3 was actually open from 400-250. The rest of the series should have gone normally. Net indicator did not work properly, probably because magnetic reed switch not fully activated by net bars dropping down. We plan to move magnet tomorrow to correct the problem. M4 Outside ring to 600m, day. Oct 18, 1974. Temp. and conductivity good. We seem to have same differential current problem with depth as we had yesterday. Up at 30m/min, down at ~50 m/min. 600m depth=1185 mwo. Wire tension 700-800 lbs. at 459 depth. 435m = 1000mwo ~1.5 kts. 384m = 900 mwo, tension ~800. lbs. 329m = 800 mwo, tension = 900 lbs. 281m = 700 mwo, tension = 900 lbs. 260m = 500 mwo, tension = 700 lbs. 230m = 400 mwo, tension = ~700 lbs. 113m = 200 mwo, tension = 800 lbs. M5 In ring to 800m, day. Oct 19, 1974. Good temp. and salinity plot. Rough seas but we think it will be ok. Down at 30m/min, up at same. 65m = 150 mwo, tension = 600 lbs. Speed for net 0 1.6 kts. 132m = 280 mwo, tension = 500 lbs. 195m = 430 mwo, tension = 400-500 lbs. Speed 1.3 kts at 250m 300m = 600 mwo, tension = ~500 lbs. 348m = 700 mwo, tension = 500-700 lbs. 4273m = 900 mwo, tension = 600 lbs. 578m = 1235 mwo, tension = 500-700 lbs. Speed of net at 650m = .9 kts 700m = 1456 mwo, tension = 600-700 lbs. 800m = 1596 mwo, tension = 600 lbs. Coming up. 744m = 1500 mwo, tension = 1100-1300 lbs. Slow to 15m/min at 1404 hrs. Net coming up too fast. 649m = 1400 mwo, tension = 1000 lbs. 606m = 1300</p>

	<p>mwo, tension = 1050 lbs. 592m = 1200 mwo, tension = 1000 lbs. 475m = 1000 mwo, tension = 800-1200 lbs. 438m = 900 mwo, tension = 1300 lbs. 295m = 700 mwo, tension = 1000 lbs. Changed tape reels at 1445 hrs. 200m = 500 mwo, tension = 1200 lbs. Ship's speed = 1.5-2 kts 154m = 400 mwo, tension = 900 lbs. 123m = 300 mwo, tension = 1000 lbs. 68m = 200 mwo, tension = 1100 lbs. M6 Slope Water to 800m, day. Oct. 21, 1974. Had trouble with wire ni chive - two stops: one at 63m for (1057-1115) 18 mins. And one at 125 m for (1118-1127) 9 mins. Down and up at 30m/min until ~360m and then changed to 15m/min., back to 30m/min on net 6. [details as in M5 located in blue cloth binder in Wiebe lab: 9 Mar. 2004] M7 Slope Water to 800m, night. Oct. 22, 1974. Rough night but fairly good launch. Wire tension gauge broke. Net bar indicator pretriggered once during launch. [details as in M5 located in blue cloth binder in Wiebe lab: 9 Mar. 2004] M8 Slope Water to 350m, day. Oct. 22, 1974. This tow was an oblique tow (0-1000m) for net 1 and a horizontal tow at 1000m for nets 2-8. Down: 54m depth = 115 meters wire out (mwo) 91m = 200 mwo 132m = 300 mwo 170m = 400 mwo, 500 lbs. increasing wire out speed form 30m/min to 50m/min [net] speed at 204m = 1.37 kts 220m = 500 mwo, 500 lbs. 260m = 600 mwo, 400 lbs., speed at 295m = 1.36 kts 315m = 750 mwo, 500 lbs. 335m = 800 mwo, 500 lbs., speed at 346m = 1.34 kts 349m = 875 mwo, 800-900 lbs., speed 1.8 kts 350m = 890 mwo, 500 lbs. = 1.9 kts 349m = 903 mwo, 700 lbs. 350m = 931 mwo, 800 lbs. 352m = 947 mwo, 800 lbs. = 2.4 kts 353m = 956 mwo, 800 lbs. = 2.1 kts 350m = 976 mwo, 800 lbs. = 2.1 kts 353.5m = 983 mwo, 800 lbs. = 2.0 kts 359m at 1029hrs 385m = 1000 mwo, 800 lbs. Up 30m/min: 350m = 980 mwo, 900 lbs. = 2.4 kts at 1036 hrs., 2.25 kts at 1039 hrs. 348m = 1000 mwo, 600 lbs. = 2.25 kts, 2.3 kts at 1053, 2.25 kts at 1055 350m = 1061 mwo, 1000 lbs. At 1062 hrs, drop in tensin 650-700 lbs. All nets closed speed 3.3 kts coming up from 1000mwo.</p>
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CH125

Website	https://www.bco-dmo.org/deployment/541971
Platform	R/V Chain
Start Date	1975-08-04
End Date	1975-08-17
	<p>These positions are not exactly the cruise track. They are station positions for zooplankton tows. This is part of a resurrected dark data set. At the beginning there are only two locations - the first and the last zooplankton tow locations -- but more locations will be filled in when there is time.</p> <p>Methods & Sampling</p> <p>Peter Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. transcribed Mar. 1, 2004 NJC Ship speed ~2 knots for all tows Both " and 9-track tape-recorded most tows. Mesh opening of nets = 333 microns CH125 Aug. 1975 M1 Sargasso Sea to 200m, night. Station 2. Aug. 4, 1975. Tow ok. All angles are high by 8 degrees and volumes could be low by 15%. Net 1 sampled between 100 and 195m a bit extra due to level wind problem on GEOSECS winch: 2035 wire paid out to get level wind fixed: 191m down to 194m coming in slowly: only paid out for 1 minute or so. 2037: stopped again at 194- 195m. 2037: coming in again. Net 2 fired ok. Net 3 fired ok. 2055: wire coming in at 10m/min. For most of tow, wire in at 10m/min. Note: net 8 fill of radiolarian colonies. M2 Sargasso Sea to 800m, night. Station 2. Aug. 4, 1975. Tow ok. All angles are high by 8 degrees and volumes could be low by 15%. Net 0 sent down to 955 (1600 meters wire out) then held there until angle and depth stabilized. Tape recorder #9984 turned on at 2323 with net 2 open. We forgot to turn it on at bottom of tow. Note: every time we push net command, angle changes dramatically by increasing also net response is not working and hasn't since beginning of tow (as net 4 opens). Tow was successful all 9 nets were successfully opened and closed at the right depths. The net response indicator was tripped 8 times while shooting the net at ~50m/min while steaming between 1.2-1.6 knots. During shooting, MOCNESS angle was ~18 deg. We paid out 1600 m wire and then speeded ship up to 1.9-2.0 kts and then let net which sank to 950+ m fly up to 800m. At 800m, net 1 was opened. Net response failed to work for entire hauling sequence. However, we could see when a net was tripped by a radical momentary increase in the frame angle. Flow far each net will have to be calculated by difference but estimates should be as good as if the net response had worked properly. On this tow, we had</p>

Description

planned to start the tape recorder at the time when net 1 was opened but we forgot and Polloni discovered our mistake during the time net 2 was opened. This set of samples was beautiful. M3 Sargasso Sea to 200m, day. Station 2. Aug. 5, 1975. All angles are high by 8 degrees and volumes could be low by 15%. We got net responses while shooting the net wire angle dropped off to 30 before I had ship speed up to 2.0 kts. Start haul coming n at 10m/min. Net 1 response: net 2 response: net 3 response got good net response until net 8 (top net no response). Also got spurious responses (13, 14, 15) between nets 7 & 8 (angle dropped to 38 deg about this time). Note: snap hook holding bottom of net 6 and top of net 5 broke off. Nets had reasonable collections but catches shouldn't be considered quantitative. No apparent reason for snap hook failure. [see M4 note] M4 Sargasso Sea to 800m, day. Station 2. Aug. 5, 1975. All angles are high by 8 degrees and volumes could be low by 15%. Net 5 response in shooting net right at surface. Ship's speed too slow! 2 more responses at 175m. We had a hard time getting the net at depth of 800m. Note: the angle of the CTD sensor was corrected after this tow. It was 53 deg. rather than 45 deg. 1700: This is probably the best MOCNESS haul to date. Wire was brought in at 35m/min and nets fished each depth interval very uniformly. There were no major screw ups except that the net response indicator still is being tripped by the nets' sides in shooting and right at the surface at the end of the haul. In shooting, the problem appears to be that the net is moving through the water too slowly. I.e. at 1.5 to 2.0 kts and 50m/min pay-out. The net is moving forward about 46.5-41=5.5m/min or 62-41=21 m/min which is \approx to 1 kt far too slow. The solution is to shoot the net with the ship moving ahead at 3 kts at 50m/min to give a net speed of 1.5 kts. 2100: Must now way that this was not best tow. Net 4 was ripped almost all the way across the top and the snap hook holding bottom of net 4 and top of net 3 on net release indicator side broke off. Snap hook was caught between nets. Did it happen at the surface?? Catch for both nets 3 and 4 looked ok. We modified the net response indicator. M5 Ring station to 800m, night. Station 3. Aug. 7, 1975. First start at 1956 but flow meter hung up. Brought net up and fixed flowmeter. Second start down at 2010. On this tow we started net going down ~15m/min and ship speed ~2.5 kts. When net was at 70m depth, sped ship up to 3.0 kts and paid out at 50m/min. Once wire was at (angle probably off by 8 deg). Tape change at 2149. No net response on nets 6 or 7. [Did not get data transferred from 9-track tapes: njc 3/1/04] M6 Ring station to 200m, night. Station 3. Aug. 7, 1975. Good set. No net responses. Down at 35m/min, in at 15m/min. M7 Ring station to 200m, day. Station 3. Aug. 8, 1975. We got two net responses when we first started net down, so we brought net back up to the surface to check it. Net responses were spurious, no bars released, so we sent the nets back down (500 mwo). M8 Ring station to 800m, night. Station 3. Aug. 8, 1975. From 540-640 meters, angle dropped off to ~18 deg. for no apparent reason. Flow also dropped. (Bad tow.) All nets closed before got to surface. Net response also did not work. Not sure can get much out of samples. Morning after examination showed that the top of net 0 had broken loose (another snap ring failed). This probably explains why sudden angle change to 18 deg. occurred while shooting the net. Check of net response indicator showed nothing wrong with reed switch and apparently nothing wrong with the wire and connectors. One of the male EO plugs was corroded and this may possibly have caused a bad connection in the pressure case bulk head connector. Spent day of 9 Aug. refitting net bars and upgrading electrical cables. Main wires from CTD to conductivity cable were not up to par, too much resistance. This was probably responsible for varying strength of signal received at computer. *Note Sept. 4, 1975: We found that net 1 closed and net 2 opened at about 755m depth without a command from the surface. This explains problem with nets all being closed at the surface. Samples probably all ok except 100m to surface was not sampled on this tow. M9 Ring station, night. Station 3. Aug. 9, 1975. Tow no good. I turned computer on for this one (first time). Motor drive did not work. Aborted tow after trying 2 nets. Reset on deck, tested, and sent down attain for MOC#10. Single oblique sample prescued (sic?). M10 Ring station to 200m, night. Station 3. Aug. 9, 1975. Note time on print out is 1100 instead of 2300. Beautiful tow. No failures apparent at end. [Very little data recovered from 9-track tape: njc, 3/1/04] M11 Ring station to 800m, day. Station 3. Aug. 10, 1975. Started \mathcal{C} tape at 8362-8, then turn off. 0932: start tape again. Had some trouble with computer print out. Lost net volume for net 4. Tow excellent in all other respects. Pressure offset = 4.0m on surface coming up. Usually 6.0 going down. Sample from net #1 lost bucket fell off. [poor retrieval from 9-track, very little data: njc, 3/1/2004] M12 Sargasso Sea to 200m, day. Station 4. Aug. 11, 1975. 11 August. Tape on at 905,48, reading 0000), Down to 240 m with net 0 let it stabilize, then hauled in at 8m/min and opened net 1 at 200m. Beautiful. [poor retrieval from 9-track, very little data: njc, 3/1/2004] M13 Sargasso Sea to 800m, day. Station 4. Aug. 11, 1975. Net put in water but Ortner forgot to pull flow meter string so had to bring it back to surface.

Ortner then pulled string in air so got 16 flow counts or 84 m³ in air. Stop recorder at 1216 (260m) will restart on upswing. Angle of net dropped to 20's once net was below 300m so I had ship speed up to 2.5 kts. During tow, sky clouded up and by end of tow rain pouring. Sea still calm. [poor retrieval from 9-track, data seems to be from 50m above sea level to 400m below: njc, 3/1/2004] M14 Sargasso Sea to 800m, night. Station 4. Aug. 12, 1975. Had a hard time getting nets down. Paid out 2300m wire rather than usual 1900. Came in at 25 m/min. Calculations indicate that net was moving about 3 kts at 200-600m depth, ship's speed ~1.9kts. Net 6 cod end bucket broke under water, sample lost. M15 Sargasso Sea to 800m, night. Station 4. Aug. 13, 1975. Tow to replace net 6 from MOC-14, 300-200m. One net response going into the water before it hit the water. Only 1 net to be fished. No net responses. Tow no good net opened and closed together. No sample. M16 Slope Water to 200m, night. Station 5. Aug. 14, 1975. Turned on " tape t 2005-43 at 75m depth going down. This tow went well. Had small problem with NR not clearing NC and flow but it was decided that it had to do with signal fading in and out rather than malfunction down in underwater unit. Pressure offset formula in CTD acquisition program appears to be incorrect and we have 2.75m error in the corrected depths on the computer tapes and printouts. All data collected to date have error is MOC 1 to 16. M17 Slope Water to 200m, day. Station 5. Aug. 15, 1975. " tape started at 1012-15, 154m depth. Had problems with data acquisition 9-track tape. Didn't get header on or 1st 12 to 15 records. This will mean some data processing problems with CTD3 program. We came up twice as fast on this haul as on previous 0-200m hauls to reduce amount of catch somewhat. Looks like a very nice haul. Pressure offset wrong as noted in M16. Two files on mag. Tape 1st file is data, 2nd file is header. M18 Slope Water to 800m, day. Station 5. Aug. 15, 1975. " tape on at 1231 for up trace. Had hard time flying this net to depth and getting it to stabilize. Ship was slowed down too much and when we started hauling the net in, it rose very slowly. Except for deep fishing, this tow went well. Pressure offset wrong as noted in M16. M19 Slope Water (edge of Gulf Stream) to 800m, night. Station 5. Aug. 15, 1975. " tape on 2037 when net 0 started to be hauled in. Plot of temp and salinity versus depth: black=down trace and blue = up trace. Very nice tow. M20 Slope Water to 800m, night. Station 5. Aug. 16, 1975. Two deep nets fished in 150m intervals so that we could sample upper 100m in 2 steps: 100-50 and 50-0 where there is a pronounced thermal break and start of thermocline. 10.55C @ 50m. Looks like a good tow. Net moving through water at ~3 kts for most of tow. M21 Slope Water to 800m, day. Station 6. Aug. 17, 1975. " tape started at bottom of tow. Black=down trace; green=up trace. Very nice tow; no problems. M22 Slope Water horizontal tow at 350m, day. Station 6. Aug. 17, 1975. " tape started on 1227. Had a problem with frame synch which coincided with net command on net 1. As a result, lost 2 min. of recording and in process of getting synch back we dropped net 1 and opened net 2. Beautiful tow after initial problem. Net frame stayed within 350 +/- 1 meter.

KN62

Website	https://www.bco-dmo.org/deployment/541982
Platform	R/V Knorr
Start Date	1976-12-04
End Date	1976-12-20
	<p>These positions are station locations and not cruise tracks per se. This is all we have for this cruise. We are charting the location of the zooplankton tows from the Rings Projects.</p> <p>Methods & Sampling</p> <p>Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. 8/8/03 NJC Ship speed ~2 knots for all tows Both " and 9-track tape-recorded all tows. KN62 Dec. 1976 M44 Sargasso, deep day. Bad tow. M45 Ring core, deep, night. Very good tow. 2041 premature net response (NR). 2042 tape unit one. 2042 one flow count and another NR. Angles may be off a bit because angle jug was not used to set pressure case on frame. We seem to be getting rather large changes in angle which are associated with live tension changes. Winch stopped momentarily at 1000mwo (2310) 2317 - increase speed 5% to 30%; 2320 - stop winch at 1303 mwo = depth 1062m; 2326 - start in 1303 mwo = depth 1028m. No NR for net 7. M46 Ring core, shallow, night. Header on this magnetic (9-track) tape written over twice - should get</p>

Description

write error. Stop winch at 0129 = 316mwo = 218m depth. This tow was fished by steps of 5 meters - haul net up 5m and hold for 1 min. for a total of 5 holds per net (depth interval). This was done to allow more water to be filtered. This tow very good. Tow correlated with Marshall Orr's scattering layer records. M47 Cold core ring center (Gulf), deep, dusk (darkness at ~1630). Start tape at 1347 on channel #1, input #2. New O2 membrane. 3 NR 1401 - noticed 5 NR - must replay tape to figure out flow. 1402 - 6 NR's (net being towed off stern - possibly NR coming from ship surge). 7-9 to 1407 - below 400m the net speed dropped from ~.5 kts to ~.15 kts and - from 50's to mid 30's. Increased ship's speed at 650m depth ~10%. ~1640mwo at bottom of tow. In at ~15m/min. Started releasing nets with NR reading 9 i.e. net 1=NR10, net 2=NR11, net 3=NR12, net 4=NR13, net 5=NR14, net 6=NR15, net7=NR00, net8=NR1, close=NR2 1514- depth 727, 1144mwo. Increase speed in by 5m/min to 25 m/min. 1530- depth 447, 738mwo. Reduce speed of ship by 10% (wire angle starting to get too high) 1532- depth 426, 685mwo. Reduce speed in by 5m/min to 20 m/min 1554- depth 147, 160mwo. Increase ship's speed ~5%. M48 High velocity core of Gulf Stream Re---?, 1000m, day. Start down with 8 net responses. Net 0=net 8; net 1=NR9, net 2= NR10, net 3=NR11, net 4= NR12, net 5=NR12 (no net response), net 6= NR13, net 7= NR14, net 8=NR15. Very nice tow. Lots of megalops. Surface O2 samples taken when MOC-1 went into the water by K. Little. [reprocessed tape 13/12/76: SC, @ 4411 , @177773; DC, @ 4411] M49 Sargasso west of ring, 1000m, day. Initial flow=19. Add 11 m to mwo for real reading. NR=9 i.e. n0=NR5; n1=NR6, n2=NR6 (no net response), n3=NR6 (no net response), n4=NR7, n5=NR7 (no net response), n6=NR7(no net response), n7=NR7(no net response), n8=NR7(no net response). [tape reads 710 at net 0 down] No nets open when frame came to surface. Means we fired last net at 100m below surface; when were others fired? This tow somewhat screw up but savable. M50 Sargasso west of ring, 1000m, day (1426-1540). Start with 2 net responses, i.e. n0=NR2, n1=NR3, n2=NR4, n3=NR5, n4=5 (no net response until 1505, depth 520m, when net bar triggered NR.) Bar for open net 4 must have hung up on the NR for a couple of minutes before slipping past so n4=NR6; n5=NR6 and net bar is probably hung up on NR mechanism. Some contamination into net 4; n6=NR7; n7=NR7 (no response) -possible contamination into n6. In at 22m/min. n8=NR_. Bottom net ripped on bottom near front (observed at net was put into the water) However, tear very small. Probably no loss of catch. Tear is Y in triangle. [reprocessed tape 14/12/76: SC, @ 4411 , @177773; DC, @ 4411] M51 Sargasso west of ring, 1000m, night. 5 net responses at start of tow. 4 more to /0 in setting net from surface to ~75m. Between 600 and 730m - 2 more NR; 2 more NR at ~940m. No NR for nets 1,2,3,4. Net 5 had a response. Nets 6 & 7: no NR. After tow, Morton and I replayed the tape to work out what happened to flow and net responses. We could analyze all false NR's and flow count resets and explain on basis of a sticky net response mechanism. All indications are that samples are good. Top net closed at surface on command. All that was lost was the bucket from net3. M52 East side of ring center, 1000m, night. 1st MOCNESS with new net release mechanism and new salinity cell [51.360 conductivity at 22m; at 1000m, conductivity shorted out - erratic readings (50's and 60's) started about 850m] 1 NR in going from deck into the water i.e. net0=NR1; n1=NR2, n2=NR3; n3=NR3 (no response), n4=NR4, n5=NR4 (no response), n6=NR5, n7=NR5 (no response), n8=NR5(no response). Computer program started at net 4 - time off on print out. Note: cod-end of net 1 had burn hole just above PVC bucket and collar was also torn. Therefore, some of catch very likely lost out of jar #74. Note: conductivity probably not too good but some readings may be obtainable. M53 Sargasso east of ring, in wake, 1000m, night. Magnetic 9-track recorded in real-time. First run with computer on in real time. New conductivity cell 1st run. What a hell of a launch. Almost everything went wrong. Nets ripped and had to be sewn, magnet in net response broke, haul winch was off and had to be turned on - wait 30 minutes, started to launch and motor drive spontaneously started dropping nets. Could find no reason for it. Started another launch and net twisted, breaking wire leads. Finally got nets in water but conductivity cell doesn't seem to be working. Plotting SA, OX (OX as corrected by GeoSecs algorithms for temp and pressure), TE - salinity plot no good. Removed SA from plotting routine after start plot. N1=NR1 (didn't set counter back to 0 right away) 2133: Start winch in at 20m/min. 2135: Flow not working and hasn't been for about 15 min. Stopped working about 800m for 6 min. then started again and then stopped - for good?? N2=NR2 but again NC set to 0 was slow, ~45 sec. Flow started at 2149 during net 2 open. N3=NR3 but NS set to 0 slow. 2201-43 NR 2202-53 NC=0. During n3 open, NR was triggered twice by ship's roll. N3=NR3,4,5. N4=NR5. Saw large angle change on 3rd NC but no change in status of NR. Switch still being held ON. Net 4 fished to 350 by mistake. N5=NR5 No NR but was angle change. N6, 7, 8 =NR5 No NR but was angle change on 3rd NC. M54 Sargasso northeast of ring, in wake, 700m, dusk. Magnetic 9-track recorded in real-time. CE" tape on at 1438 hrs. 2 NR at

surface: n0=NR2, 315 mwo=158m depth. This is a day tow but executed very close to dusk. Could not fish all the way to 1000m, for lack of enough time until dark. Sunset about 1615 [tow ended at 1640 hrs]. N2=NR4 but didn't reset flow or NC -reset at ?153?. N3=NR5 but didn't reset flow or NC right away - delayed 30-60 secs this time. Reset flow twice. N4=NR6 but didn't reset flow or NC right away - delayed 30-60 secs this time. Reset flow twice. N5=NR7, N6=NR8, N7=NR9, N8=NR10, N8 close=NR11. Nice tow, good catches. M55 Transition region of ring 'AL' towing away from center, 1000m, night. Magnetic 9-track recorded in real-time. Good launch, 1NC, 70 flow counts, ONR at start down with net at ~375 had ship slow down 10% because wire angle tending to high. Perfect tow, everything worked. M56 Transition region of ring 'AL' towing toward ring center, 850m, night. Magnetic 9-track recorded in real-time. Eleven NR at surface - very rough launch, surge very bad. N0=NR11 N1=NR11 (no response) I saw cod end bucket wrap around net response mechanism as net plunged in and out of water, possibly damaging NR mechanism. N2=NR12 (very possibly net 1 was not released until net 2 was thought to have been dropped because it took only 1 command. Spurious NR at (time) 23 24, 12set flow count back to 0. Spurious NR at 23 25, 18 set flow count back to 0. Spurious NR's too numerous to list during 1st five nets. Very hard tow to interpret. Must go through computer output to check volumes filtered. 2350-53 change course to more ?-? swell to reduce roll. Two nets released at surface. Analysis: Net fishedfrom- to 0 0-1030 850 1 850 700 2 700 550 3 550 400 4 400 300 5 300 200 6 200 100 7 100 0 8 surface M57 Slope water ~ 20 miles N of Gulf Stream, 1000m, night. Magnetic 9-track recorded in real-time. 3rd lowering with new membrane on O@ sensor. Got quite a few flow counts before net into water but no spurious net responses. Ship bearing set east some steering 220 making 180 at 0030, due to Gulf Stream? Slowed ship down 5% while net 6 open. A perfect haul! No problems and beautiful samples. M58 Slope, 1016m, day. Very nice launch. [1st sighted seagulls with oil on breasts about 3am this day. Several birds observed with oil] NR & NC set at 0. A few extra flow counts by wind before entering the water. Started getting spurious net response while net 5 open and another while net 6 open, 2 more with n7 (NR9 and 10) and net 8 (NR12, 13, 14, 15). Good tow and good samples. Spurious NR near surface due to increase in seas and swells. We still need to improve net response mechanism. Cloudy day.

KN65

Website	https://www.bco-dmo.org/deployment/541986
Platform	R/V Knorr
Start Date	1977-04-11
End Date	1977-04-30

Description	<p>These positions are not the complete cruise track. These positions are a subset and represent the locations of the zooplankton tows which are a part of the Rings Projects.</p> <p>Methods & Sampling</p> <p>Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. 8/8/03 NJC Ship speed ~2 knots for all tows Both CE" and 9-track tape-recorded all tows. KN65 April 1977 M59 Sargasso off Florida, 1000m, day. Plotting T, S‰, O2, and AN(removed AN at 280 m because overlapped O2). This is first tow with new Boyd-style net response mechanism. O2 membrane put on within about 2 weeks of start of cruise (looks like flowmeter stuck between 1124 and 1132 min) Red up from 700m. Flowmeter shut down while net 2 was open. 1204 - (1300+ mwo) depth=655: increase wire-in to 20m/min. M60 Sargasso, 1000m, day. New O2 membrane installed. Red for uptrace. Up starts at tape #680. Net response not working. Good tow. Observed that O2 probe probably not giving correct O2 reading and must be corrected. However, in a relative sense, can see that there is a subsurface maximum about 80-90m which very likely coincides with the DCM. M61 Sargasso west, 1000m, night. Good launch, red=up trace, perfect tow. M62 Ring 'Bob' center, 1000m, day. New membrane used on O2 probe and new KOH. Using my net response mechanism for 2nd time this cruise. Good launch. black=down trace; red=up trace. Net command button giving static but because net response working well the miscounts of the NC is not causing problems. Power surge caused computer to lose power and interrupt acquisition right before net entered surface. Net 7 had small rip in Dacron sleeve (~1" slit) so replace net 7 with another on next tow. M63 Ring 'Bob' center, 1000m, night. Red=uptrace. Tow uneventful. Very nice; all nets seemed to open and close without a hitch. M64 Sargasso west, 1000m, day. Conductivity cell not working from surface to depth. Wire angle dropped dramatically once net passed below 650-700m. Red=uptrace. Very nice tow. M65 Sargasso west, 1000m, night. Brief screw-up: replaced conductivity cell. Cod end bucket fell overboard and replaced with trawl bucket #2 which had a hole in it. Net launched and then brought back to replace it with a good cod-end. Net back in to water at 1904. Beautiful tow. M66 Ring 'Bob' fringe west, 1000m, day. Conductivity cell cleaned and checked and seems to be working properly error relative to GeoSec CTD. Beautiful tow. M67 Ring 'Bob' fringe west, 1000m, night. Had a lot of trouble with this tow. Started out on ship's course of ~300 but wire started tending under the hull and the water shifted course to 170 over short period of time. Since there was a strong current in upper 600m this had effect of putting us steaming with current. Salinometer surface value: 36.15-36.19. With net at 1000m doing 2.7 kts we could not slow ship down sufficiently to haul net in at reasonable rate. Eventually had to change course back to 285 after swinging crane back to stern but with great difficulty keeping nets flying properly. A couple of nets filtered very little water and we got a large number of spurious NR. However, we did get a complete set of samples. M68 Ring 'Bob' center, 1000m, day. After two false starts with bad wires net system got into water. New O2 membrane on sensor. At 195 put computer into IDLE and reset O2 to 3 to 13 ml/liter to get plots of SA and O2 separated. Net 6 took only 2 NC to open. Very nice tow. However nets wrapped around each other and samples got mushed up, animals in poor condition. M69 Ring 'Bob' center, 1000m, night. Net 0 fished down to 1015m and back to 850. We didn't push the NC button enough times (system wasn't set on 3 commands but rather 5). M70 Ring 'Bob' fringe southeast, 1000m, night. ~15 deg. at 250m. Towing in high current regime - while paying wire out had to get ship's speed up to 4.5 kts after net passed 800m. M71 Dec(?) ring 'Al' center, 1000m, night. Had a few difficulties with flowmeter during launch - had to bring it out of water twice. Finally changed fluorometer cable to get it working. Lovely night with ø moon. M72 Ring 'Al' center 1000m, day. Did not start CE" tape until 0928-19, 310 m. depth. M73 Slope water near Gulf Stream, 1000m, day. O2 not set properly in INET; net membrane on probe. NR started out equal to 3. M74 Slope water near Gulf Stream, 1000m, night. In water before AQ started. Flow counts 28 at time of synch. Had to shut down printer at 2038 and had to restart O2 at 278m from OX, 0.3, 0.13, .01 to OX .02, .12 .01 - back on at 2041. On 1st NC at 1000m signal went completely scrambled for a while. Not sure 1st net dropped. After net 4 we got no more net responses. Bad tow - all nets closed at surface. M75 Slope water near Shelf, 1000m, night. Good tow. Fairly uneventful tow. All systems seem to have worked save for 1 NR with net 2. I think net speed may have been too high and net bar slipped past NR mechanism without triggering it. M76 Slope water near Shelf, 1000m, day. Tape reads 0705 although ship's clocks were advanced 1 hr. at midnight on 29 April (ships log will be off 1 hour)</p>
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EN11

Website	https://www.bco-dmo.org/deployment/541990
Platform	R/V Endeavor
Start Date	1977-07-31
End Date	1977-08-17
Description	<p>These positions are not the whole cruise track. They represent some of the zooplankton collection stations. We will be adding more positions as time permits.</p> <p>Methods & Sampling</p> <p>Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. 8/8/03 NJC Ship speed ~2 knots for all tows Both " and 9-track tape-recorded all tows. EN11 July 1977 M77 Ring 'Bob' center, 1010m, night. Good launch. Tape recorder [1/4"] with mic [?]. New O2 membrane for test on 27 July; using hydrowinch with ~ 3/8" diameter wire. Net response (NR) did not work for net3 close/n4 open or for n4 close/n5 open but it did for n5 close/n6 open. Bucket 2 cracked on bottom - possible loss of some animals. Looks like a reasonably good tow. Several stops and starts as winch pulled wire in to adjust level wind and to straighten out wire on drum. Flow calibration = 46m/count. (lots of Sargassum weed seen passing by ship during tow) M78 Ring 'Bob' center, 1000m, day (5-7:30pm). Cloudy & rainy. Steaming into the wind and current. 1723 - sharp drop off in angle at 400m down to 10 degrees. Asked for speed increase to 3.0 kts. Wire rate in 30m/min. No NR on n2 open. Migration: at start of tow scattering layers at 475m 375m, 225m but at 1850 layer moving up situated at 425m, 310m, 150m. All nets tripped, samples look good. Spurious NR's during n7 open. Note: conductivity did some odd jumps on hauling net in - went bad at ~400m. (lots of Sargassum weed seen passing by ship during tow) M79 Sargasso west of ring 'Bob', 1000m, day. Bright sunny day with low broken stratus around. Sargassum weed in low abundance around ship during tow. Sea choppy with white caps. Played around with winch for very long time at bottom of tow. Coming in all nets opened/closed but on uptrace for n3, NR did not work. Near surface, we did get some spurious NR's. Had some trouble with ship's speed and winch speed toward end of haul. N2 has small holes near cod-end (on Dacron sleeve)-this was repaired before next tow. M80 Sargasso west of ring 'Bob', 1010m, night. Launch went smoothly. Bright full moonlight on sea surface broken up by clouds. Full moon up for entire tow. Sargassum weed not very abundant at this station. No NR on n1close/n2 open. No NR for n3 close/n4 open. Good set of samples but still the problem of net responses. Generally hauled wire in at 30m/min. Bucket 3 had top part of gauze come unglued - possible loss of some animals. M81 Sargasso east of ring 'Bob'. (15 degree isotherm at 622m) Night calm sky clear except for scattered clouds. Not much Sargassum. No NR for n1 close/n2 open. Good tow - good scattering layer record on PGR (Dick Backus). Net response mechanism spring replaced with stronger spring and greased up, but it appears that this did not improve performance of mechanism. M82 Sargasso east, (15 degree isotherm at 500 m), 1010m, day. Not much Sargassum. On this tow, Chip Ferguson got the aqui program going to hook us into the Tectronics GeoSecs computer. This program allows us to put incoming data on cassette tape for later replay and calculates volume filtered. NR adjusted so that trip finger is closer to net bars. Steaming with current (what there is of it) 290m - coupling between winch drive and drum jumped out and winch stopped for a moment. 245m - stopped again momentarily. 142m - winch stopped for 30 sec. PGR scattering layer record made during tow - see Backus. M83 Ring center, 1020m, night. No moon but sky clear. Tape recorder not turned on for 1st 76m. Fluorometer counts = 11 when net entered water on at 2058. Cod end buckets without funnels. Really excellent hauls - millions of megalops and E. krohnii M84 Ring 'Bob' center, (15 degree isotherm at 105 m - up), 1010m, day. Lots of Sargassum in Langemir cells. Bright sunny day with low scattered stratus clouds at beginning of tow and disappearing by end of tow. No NR n3 close/n4 open, or n5 open, net7 open. Buckets 3 and 5 possibly mixed up - corrected on deck (Boyd) - bucket numbers clearly marked after haul. Very nice haul. No problems with winch or net system. PGR record of scattering layers made during tow. Hole 1" across in n0 about half way up along seam and " hole in n2 about 3' up from cod- end - both sewed up. M85 Ring 'Bob' high velocity core (north), (15 degree isotherm at 250 m), 1010m, night. Very black night. O2 reaching surface on way up read 147. Very nice tow - no problems, all NR</p>

worked. M86 Ring 'Bob' high velocity core (north), (15 degree isotherm at 350 m), 1000m, night. Half moon just coming up at start of tow. Had to pay out a lot of wire to get to depth. Ship headed into current. NR didn't work on 2 nets. M87 Ring 'Bob' center, (15 degree isotherm at 127 m), 1033m, day. Bright sunny day, very few clouds. O2 at surface 147. Very good set of samples. No problems with tow. M88 Ring 'Bob' center, (15 degree isotherm at 150 m), 805m, night/dawn. First light at 0500. Really bad tow from a number of standpoints. Couldn't get net system down to 1000m so stopped at 800m. Made 8 NR but saw no angle change on NR. Got angle change at 700, 600, 400, 300m. Lost signal cable at ~200m. Very likely tape has no data on it. Very bad tow, but we did get some samples that look all right. Nets 7 & 8 did not open but n8 had a small catch with live animals in it. Where did they come from? Tectronics computer ran most of dive and good flow- meter data obtained. Upon replay of tape found recording all the way to the surface. M89 Ring 'Bob' high velocity core, eastern edge into current, (15 degree isotherm at 430 m), 1010m, night. Dark night, no moon. Good lowering. Very nice tow. Speed of net got up quite high during middle portion of uptrace but catch in all buckets looks good. NR did not work on 3 occasions. Perseid meteor showers very abundant. Note: on replay had trouble with line printer. Ribbon jammed twice and had to put computer into idle and rewind " tape back - for double replay. This means 9-track tape has redundant data on it in two places. M90 Ring 'Bob' high velocity core, (15 degree isotherm at 307 m), 1010m, day. Very good tow, bright sunny day only a few clouds around. Towing into current of HVC. M91 Gulf Stream, (15 degree isotherm at 545 m) 1008m, day. A lot of wire paid out to get to 1000m. Sky dark and completely overcast with intermittent rain and showers. Large swells and quite a bit of pitching. Very nice tow. Good catch. No problems. CTD#36 done here. M92 Slope water, (15 degree isotherm at 43 m), 1020m, night. Question of whether net 3 opened at 2205 hrs. No problem - net 4 opened in right number of commands. Dark night with clouds above. Scattering layer recorder (ALPINE) on during tow. Very nice tow. Only problem was it look like cod end buckets for nets 7&8 were reversed based on samples in the jars. M93 Slope water, (15 degree isotherm at 65 m) 1010m, day. Bright sunny, cloudless day. Scattering layer at - . Steaming south towards end point of last night's MOC-1-92. Net 8 closed at surface on command. Very nice tow. Good catch in all buckets. M94 Warm core ring 'M' Eddy 'M' (15 degree isotherm at 195 m), 1012m, night. First MOCNESS set in warm core ring. Broken hydraulic line on A-frame almost caused abortion of tow, but we got it in before the engineers started fixing it which generated a few arguments. Had a hard time keeping net speed and angle down because of a poor choice in course - actually tow went very well, very nice set of collections. Started raining right near end of tow. M95 Warm core ring, (15 degree isotherm at 230 m), 1013m, day. Secchi disc = 25m. Very rough seas, launch all right but had hard time getting net angle to stay up. Had ship going between 4 and 5 knots during most of shooting the net. No net responses when angle is over 54 degrees. Net response 4close/5open suspect (?). All nets appeared to open and close where they should have. Basically a good tow. Had slight spill of animals in net 2 - a few Calanus stage 5 lost but

KN71

Website	https://www.bco-dmo.org/deployment/541994
Platform	R/V Knorr
Start Date	1977-10-23
End Date	1977-11-16
	<p>These positions represent only a portion of the cruise track. They are the location of some of the scientific stations, but they are all we have at the moment. More positions will be added to the cruise track as time allows.</p> <p>Methods & Sampling</p> <p>Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. 8/8/03 NJC Ship speed ~2 knots for all tows Both " and 9-track tape-recorded all tows. KN71 Nov. 1977 M96 Slope water (15 deg. isotherm @ 43m), 1020m, day. 1st lowering this cruise. Clear sky, bright & sunny. NR started at 10=n0, 1375 counter. Had problem with net 5-6 - computer failed to read data lots ---? Synch errors. Not sure why. No NR for n7. Looks like a good tow. No header on</p>

Description

tape (1/4"?) M97 Slope (15 deg. isotherm @ 116m), 1020m, night. Good launch. CTD#1 taken just before tow. No NR on net3 open/net2 close (net speed above 2.3 kts) No NR n5 close/n6 open (net speed ~2.2 kts) M98 Ring 'Emerson' center (15 deg. isotherm @ 250m), 1025m, night. Approx. start position 34 45N, 70 20W. Tape recorder on at 52m below surface, flow counter started at 0 when net went into water - tape on flow read 25 counts. Very nice tow, good samples. M99 Ring 'Emerson' center (15 deg. isotherm @ 255m), 1000m, day. Secchi depth 37.5-38 (observer=Cox). Broke wire connecting conductivity cable to pressure case - had to resplice. Did chlorophyll profile just before this cast. Very nice tow all the way. M100 Sargasso west of ring 'Frank', east of 'Emerson' (15 deg. isotherm @ 710m), 1000m, night. Rough & stormy, moon peeking through mostly cloudy sky. New O2 membrane on this dive. Started AQ, then at 240m went back in to ID (idle) to correct parameters for plotting. Sky seemed to be clearing during tow - very nice tow. Secchi disc reading 10-31 at 1240 was 26 m (observer=Cox). This was rough estimate due to rough sea state. Lowering made during shallow CTD lowering. M101 Sargasso west of ring 'Frank', east of 'Emerson' (15 deg. isotherm @ 705m), 1040m, day/dusk. Nasty windy, cloudy day. This tow some 25-35 miles from night tow due to break down of trawl winch on the previous night MOC-10 trawl. Coupling between AC and DC generators for the winch broke. M102 Ring 'Franklin' center (15 deg. isotherm @ 180m), 1020m, day. (1/4") Tape not recording until 118m - forgot to plug in. N5 with 3 or so 2" to 4" hole 2/3 back towards cod-end - replaced after this tow (mate says may have torn while going over side). Good tow except computer lost synch at 60m. Secchi disk: 24.5m taken at 1130 (observer: Cox) * Had been using out-of-date INIT and AQUi programs (developed prior to Dec. 1976 cruise - KN62). These programs were used to process all the ENDEAVOR (#11) tapes and MOC-1 tows 96-102. Therefore, plots have no bias or offset corrections for depth, temp or salinity. Data on the 9-track tape should be ok and later processing should not be affected. M103 Ring 'Franklin' center (15 deg. isotherm @ 175m), 1050m, night. Dark cloudy sky. Numerous spurious net responses due to surge of ship but tow went quite well - no problems. Used new computer program (March 30 1977). *Text output on 9-track tapes shows change in pressure units from decibars to millibars (M104- 118) (njc) M104 Sargasso east of ring 'Franklin' (15 deg. isotherm @ 700m), 1000m, night. Secchi depth at 1205 4Oct77= 24m. Launch at dusk but sky quite dark and cloudy (broken clouds). Good tow. Shallow meter net tow made during this tow had tremendous #'s of Euphausia brevis in it. During the MOC-10 tow this night, neuston net missed them. Meter net which followed the neuston tow caught them. One possible conclusion is that E. brevis does not quite come up into the surface waters. M105 Sargasso east of ring 'Franklin' - fringe (15 deg. isotherm @ 570m), 1020m, day. This daytime tow was to take up time spent fixing CTD. Up at 15m/min. Bright sunny day; no clouds. Note: wire meter reads -2 when MOC at 12 m depth. M106 Sargasso east of ring 'Franklin' - fringe, 200m, day. Bright & sunny, with some high thin clouds. End good shallow tow. Winch in at 5-6m/min. Secchi=34m (observer: Cox) M107 6 Nov. 1977. Ring 'Franklin' fringe east (15 deg. isotherm @ 425m), 1000m, night. Course for this tow unlike any of preceding; was into current of Gulf Stream remnant rather than into wind. Had very hard time getting nets 1 and 2 to go fast enough and filter enough water in designated depth. Volumes of water by nets seem questionable. I can't believe flow meter speeds are right and the net is going as slow as it says it is. On surface, flow meter was not operating properly. Repaired prior to next dive. Volume filtered values adjusted by hand (probably not on tape). Speed of net through water was estimated from angle and then formula applied: $V = \cos(AN) * 1.4 * \text{speed} * \text{time}$. Down at 40m/min. M108 Ring 'Franklin' east fringe, (15 deg. isotherm @ 550m), 1013m, night. Flowmeter repaired from breakdown on previous dive. Had very hard time getting net down to below 800m. Last 200m down cast 600+ mwo. 865-595m depth up at 30m/min; then low to 20m/min. M109 Ring 'Franklin' center (15 deg. isotherm @ 152m), 1000m, day. Sky cloudy with squalls. Had trouble getting uniform sampling of depth intervals during haul up especially around n4. But good tow anyway. Down at 30m/min to 784m then increase to 40m/min. [no note on up haul speed] M110 Ring 'Franklin' center (15 deg. isotherm @ 171m), 1000m, night. Dark night w/stars & clouds. End perfect tow. M111 Ring 'Franklin' fringe (15 deg. isotherm @ 198m), 1020m, night. Night w/stars, few clouds and no moon. Had small amount of trouble with batteries but did not affect nets opening/closing. M112 Ring 'Franklin' high velocity core, (15 deg. isotherm @ 374m), 1000m, night. Dark cloudy night. Made 3 launches: 1st launch had problems: flowmeter stopped working - broken off mount and hanging by electrical cable; 2nd launch: EO plug bent sideways and signal not being sent; 3rd launch ok. Had 16 spurious NC at bottom of tow. At surface found that these commands actually triggered the nets 1,2,3,4,5. Only nets 6,7,8 fished and they fished from 1000-850, 850-700, 700- 550m. [tow no good] M113 Ring 'Franklin' fringe, (15 deg.

isotherm @ 240m), 1000m, night. Dark, cloudy. Start down at 1900 aborted because of NC spontaneously firing. After 2 hours of repair we put MOC-1 back over the side. Got a couple of spurious NC firings and repairs made (bad ground wire where cable and slip rings attached to winch) Signal vastly improved. Also, Knorr having serious problem with aft cycloid. This tow made using only the forward cycloid. Problems near surface with NC's and spurious NR's but looks like good tow and samples. Caught Sargassum in n3 - how did it get there?

M114 Ring 'Franklin' fringe, (15 deg. isotherm @ 277m), 1000m, night. Dark, cloudy. Computer would not synch during down portion of tow; spurious NC's but good tow

M115 Gulf Stream, (15 deg. isotherm @ 392m), 1000m, day. Scattered clouds with bright sunshine. Dark cloud overhead on up-trace at 1322. Good tow, no major problems. Net 3 has small holes near cod-end.

M116 Slope Water, east of warm core ring 'Q', coastal water at surface (no 15 deg. isotherm), 1000m, night. Cloud free night, stars but moon setting in west as net going down. As net doing down, saw bright orange flare in sky. After tow, went over to see if people in distress. This tow taken east of warm core ring in the apparent torque of coastal water entrained by wcr circulation. Very nice tow.

M117 Slope Water, east of warm core ring 'Q', 1000m (no 15 deg. isotherm), day. Secchi disc depth=14m at 1030 hrs at this station. Bright sunny day, very high thin clouds, hazy horizon. Lots of trouble with computer, had to replay uptrace. Problem with TTY board interfacing deck unit to computer.

M118 Warm core ring (15 deg. isotherm @ 355m), 1000m, night. Partly cloudy night but dark, no moon. Lots of spurious NC's but ok tow. However, once nets on deck, found that we had lost buckets 1,7,8 - too bad.

AII-110

Website	https://www.bco-dmo.org/deployment/542025
Platform	R/V Atlantis II
Start Date	1981-09-21
End Date	1981-10-05

Description	<p>These positions are only a portion of the cruise track. They represent the station locations where zooplankton tows were done and are the only positions we have at the present time for the cruise. More station positions will be added to the track as time permits. All the locations are found in the data.</p> <p>Methods & Sampling Wiebe's hand-written notes from MOCNESS ship log book regarding tapes, etc. 3/5/04 njc AT110 Sept/Oct. 1981 MOC 139-147 (warm core ring cruise) M139 Double MOCNESS in Ring 81-D center to 1000m, night. Station 2. Sept. 21, 1981. Net 3 came up to ~758m and then sank back down to 823m before coming up again. Problem with net speed and wire rate in. Net 3 open: had spurious net response so net 4 appears on tape for part of net 3 open. Net 5 open: sometime during net 4 or net 5 open we got another spurious response. So NR now reads 7 at 2345. May have jumped at net command for close net 4/open n5. Tape changed at 330 to 315 meters. Last couple of 100 meters, net angle too high to get accurate flow counts. M140 Double MOCNESS in Ring 81-D center to 1000m, day. Station 2. Sept. 24, 1981. After giving 3 commands to release net 0 and open net 1 we saw no net response. We gave it a fourth cmd and saw no NR. Then sometime later we got a NR. No NR after 3 cmd's to close net 1/open net2. Al Morton thinks he saw net go on 2nd command. ⌘" tape changed at 440-430m. Lost bucket for net#8 during tow. Although NR did not work and we saw no angle change during tow, all nets save one were dropped when net came to surface and last net was dropped on 3 cmd's so must conclude good tow. M141 Double MOCNESS in Ring 81-D center to 106m, day. Station 2. Sept. 26, 1981. Net response not working except at surface when we closed net 3/opened net 4 we got 6 NR's. Plotting: No plot going down leg 1, black ink coming up leg 2, red down leg 3, green up leg 4. Plot 2: Blue down & up legs 5 & 6, black down leg 7, red up leg 8. Net 7 close/net 8 open: we got 6 more NR's. Net 17 opened at 31.5m, came up a bit and then sank back down to 41 or 42m because ship speed slowed slightly. So we closed net 17 at 31.5 and fished net 18 to the surface. M142 Double MOCNESS in high velocity region to 116m, day. Station 3. Sept. 27, 1981. Northern edge of Ring 81-D. M143 Double MOCNESS in high velocity region 1000m, day. Station 3. Sept. 28, 1981. Northern edge of Ring 81-D. At 1135 hrs, lost signal because clip lead broke off signal cable next to computer. Stripped wire and hooked lead back up. M144A Double MOCNESS in Ring 81-D center to 1000m, late day. Station 4. Oct. 1, 1981. M145 Double MOCNESS in Slope Water to 1000m, night. Station 5. Oct. 3, 1981. Light sensor apparently not plugged in. Net 5 was hauled up to 530m but angle was too high so ship speed reduced, but too much. Net dropped back to 570m before net speed increased to compensate. Net 15 fished between 133m and 75m- royal screw up on part of bridge and engine/ship came essentially to stop, net angle fell to zero. M146 Double MOCNESS in Slope Water to 1000m, day. Station 5. Oct. 5, 1981. ⌘" tape failed. Light sensor kaput. M147 Double MOCNESS in Slope Water to 1000m, night. Station 6. Oct. 3, 1981. 9-track only. Net 8 fished twice. net sank from 196m to 290m.</p>
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KN53

Website	https://www.bco-dmo.org/deployment/541975
Platform	R/V Knorr
Start Date	1975-11-14
End Date	1975-12-02
Description	<p>These locations are not exactly the cruise track. They are station locations for Zooplankton tows. This is part of a resurrected dark data set. Only the first and last station locations are here to symbolize the cruise track. More locations will be added later as time permits. From http://dla.whoi.edu/catalog/dla_search/results/taxonomy%3A74113 [not currently available, 2018-08-20] GEOSECS Program, Project FAMOUS; subjects: transient traces in the ocean, bathymetry. Scientists: Luyendyk, B.P.; Teal, John M.; Metcalf, William G.; Haedrich, R. L. ; Worthington, L. Valentine ; Barvenik, F.W. ; Bradley, K.F. ; Hess, F.R.; Brewer, P.G. ; Bowen, Vaughn T. ; Burke, J.C. ; Jenkins, W.J. related subjects: Panulirus II (Ship) related subjects: R/V Oceanus related subjects: USS Mentor related subjects: R/V Knorr</p>

Project Information

North Atlantic Dark Data: Rings (NAtIDarkData)

Coverage: North Atlantic, Sargasso Sea, NW Atlantic Slope Water

Recent changes in NSF and other agency data policies (NSF11060, 2011; OSTP memo 2013) mandating timely and open access to data and information generated in the course of US funded research have resulted in a relatively rapid change in the culture of data sharing. Technological advances, policy changes, and increased awareness of the need for and benefits of well-curated data make it much more likely that recently generated research results will be made publicly available and in a timely manner. However, many scientific data were generated at a time when the technology for curation, storage, and dissemination were primitive or non-existent, and data sharing was not viewed as essential. In addition, many of the datasets were created by projects that make up the "long tail", smaller projects that form the bulk of the projects funded by agencies such as NSF (Heidorn, 2008). Data from these projects have in the past been poorly curated and thus less visible to other scientists, largely not available, and hence named "Dark Data" (Heidorn, 2008). But as Sinha et al. (2013) emphasize, without access to the types of historical observations or legacy data that make up the "dark data" in the "long tail" of science, emerging scientific challenges will not be addressable. "...making these data available on demand must be one of the highest priorities for any enterprise seeking to develop a cyberinfrastructure capable of promoting new ways to examine the earth system through time" (Sinha et al., 2013). The paucity of marine ecosystem data available to conduct cutting edge research and the critical need for the rescue of past data were also highlighted in a recent EarthCube End-User Domain Workshop Report "Articulating Cyberinfrastructure Needs of the Ocean Ecosystem Dynamics Community" (Kinkade et al., 2013). (from proposal to NSF, 2014)

There are significant dark datasets currently unavailable from multidisciplinary programs funded in the 1970's and 1980's such as those from the Northwest Atlantic cold-core and warm-core rings (The Ring Group, 1981; Joyce and Wiebe, 1983). The bulk of the data served here will be from the Rings projects.

The Cold-Core Rings (CCR) studies, [1972-1976] and Warm-Core Rings (WCR) Program, [1981-1982], were major research projects in the 1970s and 1980s. Large oceanic eddies or rings form when Gulf Stream waters first meander, then separate, forming a ring of Gulf Stream water around a core of cold Slope Water or a core of warm Sargasso Sea water. The CCRs move south or southwest from their point of origin into the Sargasso Sea and are initially 150-300 kilometers in diameter and 2500-3500 meters deep. They can persist as identifiable features for up to 2 years. WCRs move to the west/southwest in the Slope Water north of the Gulf Stream. They are 100 to 200 km in diameter, extend to at least 1500 m deep, and exist for a shorter period of time (usually less than a year) before gradually breaking up and rejoining the Gulf Stream. Both of these kinds of rings form about 5 to 8 times a year.

Rings are particularly interesting to the biologist because species living north and south of the Gulf Stream are distinctly different. Thus temperate species from the Slope Water or tropical-subtropical species from the Sargasso Sea are isolated during ring formation within their particular ring structure. Thus, a community of animals from one area is expatriated in the territory of another community of animals. As a ring decays, the water gradually takes on the physical and chemical characteristics of the surrounding non-ring water. Species outside the ring invade the ring habitat while those expatriated go to local extinction. This phenomenon provides for a large-scale natural ecological experiment that was the focus of the ring's studies.

This project is digitizing data from 33 cruises to the Northwest Atlantic Ocean that are locked in notebooks and old digital file formats and preparing them for serving online in a publically available data repository (BCO-DMO).

Each dataset has been the subject of extensive data recovery efforts and the work is continuing.

References:

Heidorn, P.B. (2008). Shedding light on the dark data in the long tail of science. *Library Trends*, 57(2), 280-299. doi: <http://dx.doi.org/10.1353/lib.0.0036>

Joyce, T.M., & Wiebe, P.H. (1983). Warm core rings of the Gulf Stream. *Oceanus*, 26(2), 34-44.

Kinkade, D., Chandler, C., Glover, D., Groman, R., Kline, D., Nahorniak, J., O'Brien, T., Perry, M.J., Pierson, J., & Wiebe, P. (2013). *Articulating cyberinfrastructure needs of the ocean ecosystem dynamics community*. Earthcube End-User Domain Workshop Report. Final report submitted to earthcube.org. Summary at <http://workspace.earthcube.org/sites/default/files/files/document-repository/OceanEcosystemDynamicsEndUserWorkshop.pdf>

Wiebe et al, 1976. Gulf stream cold core rings: large-scale interaction sites for open ocean plankton communities. *Deep-Sea Res.* 23:695-710

NSF11060. U.S. National Science Foundation. (2011). *Division of Ocean Sciences sample and data policy* (document number nsf11060). Retrieved from <http://www.nsf.gov/pubs/2011/nsf11060/nsf11060.pdf>

OSTP Memo 2013. U.S. Office of Science and Technology. *Increasing access to the results of federally funded scientific research*. Washington, DC. Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

Ring Group (Backus, R.H., G.R. Flierl, D. Kester, D.B. Olson, D. Richardson, A. Vastano, P.H. Wiebe and J. Wormuth). (1981). Gulf Stream cold core rings: Their physics, chemistry, and biology. *Science*, 212, 1091-1100.

Sinha, A.K., Thessen, A.E., & Barnes, C.G. (2013). Geoinformatics: towards an integrative view of Earth as a system. In Bickford, M.E. (ed.), *The Web of Geological Sciences: Advances, Impacts, and Interactions* (GSA Special Paper 500, pp. 591-604). Geological Society of America. doi: <http://dx.doi.org/10.1130/2013.2500>(19)

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