1804SH CTD Processing Notes

Parent Category: CTD Processing Notes (/ccdata/ctd/ctd-processing/180-ctd-processing-notes.html)
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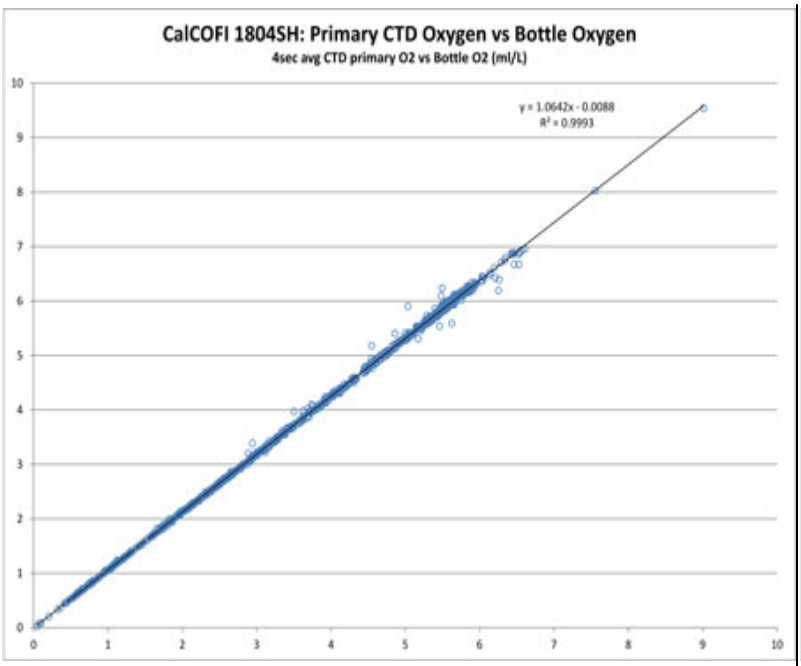
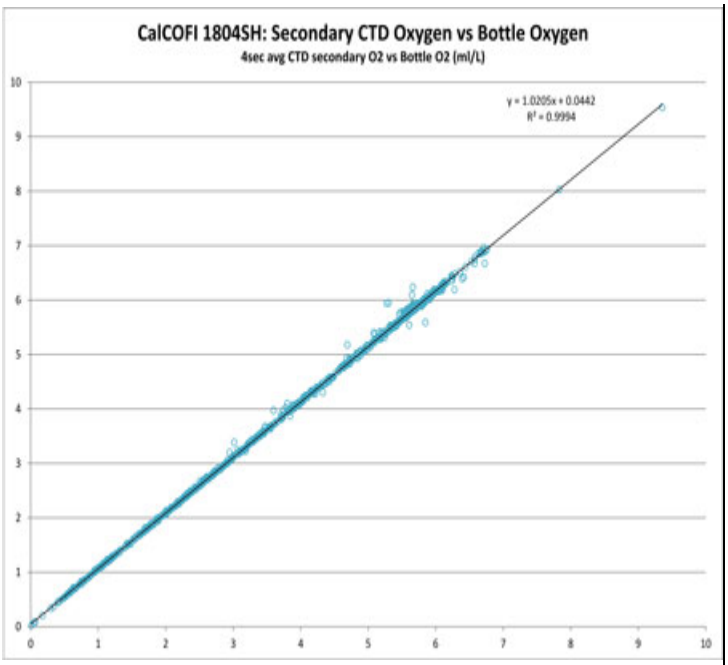
Last Updated: 26 March 2019

CTD Processing Summary CalCOFI 1804SH CTD Preliminary Data	
Download 1804SH CTD raw cast files zipped (http://cappuccino.ucsd.edu/downloads/2018/20-1804SH_CTDCast.zip)	Download 1804SH Preliminary CTD + bottle data (http://cappuccino.ucsd.edu/downloads/2018/20-1804SH_CTDPrelim.zip)
General CTD Notes - data acquisition notes, logistics, processing - see below. **Please note that these regressions are generated from preliminary CTD vs bottle data** and will be reprocessed once final bottle data are available. CTD temperatures and salinities do not usually change but oxygen, estimated chlorophyll-a, estimated nitrate may change significantly after point-checking. Questionable or mistrip bottle data are removed from these comparisons but may be visible on the CTD.csv plots. For this cruise and future cruises, both primary & secondary sensor profiles vs bottle data will be generated and archived in the downloadable CTD+Bottle data files. These plots are under the "csv-plots\Primary" & "csv-plots\Secondary" subdirectories.	
CTD sensor corrections derived by comparing CTD sensor data, 4sec averages prior-to-bottle closure, to bottle samples	

Dual T, S, & O2	Primary Sensor	Secondary Sensor
Salinity offset (bottle - CTD salinity; > 350m only; Seabird SBE4)	0.0017	-0.0005
Oxygen ml/L (dual Seabird SBE43)	y = 1.0642x - 0.0088 R^2 = 0.9993	y = 1.0205x + 0.0442 R^2 = 0.9994
Oxygen umol/Kg (dual Seabird SBE43)	y =1.0667x - 0.2641 R^2 = 0.9993	y = 1.023x + 2.0431 R^2 = 0.9994
Single sensors	Linear	Polynomial
Nitrate - ISUS 4sec ave voltage vs Bottle NO3 (Satlantic ISUS v3 SN111)	y = 27.787x - 10.348 R^2 = 0.9944	
Fluorometer - linear & polynomial regressions	y= 14.881x - 0.6747 R^2 = 0.8323	y = 1.7252x^2 + 13.122x - 0.5494 R^2 = 0.8374

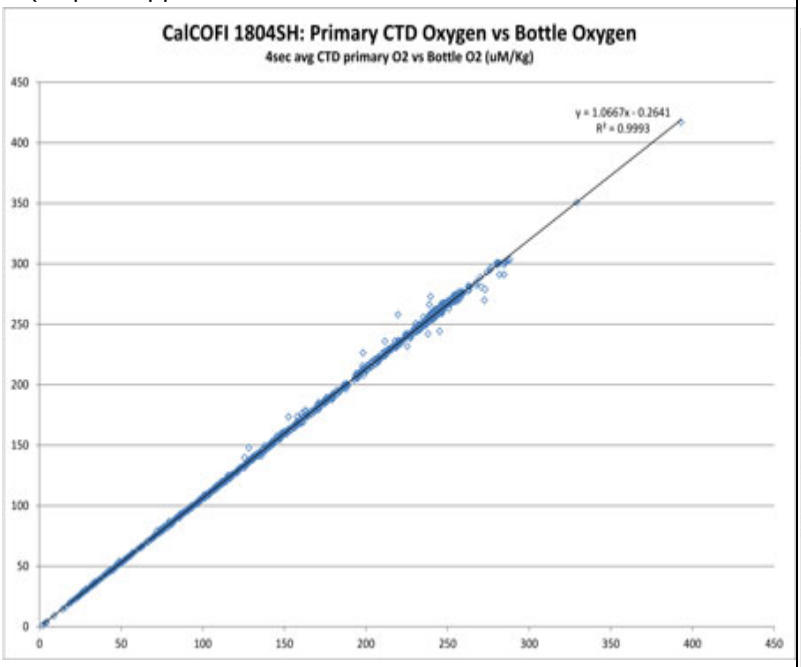


(http://cappuccino.ucsd.edu/downloads/2018/1804SH/1804SH_Ox1MLvsOxBML.jpg)



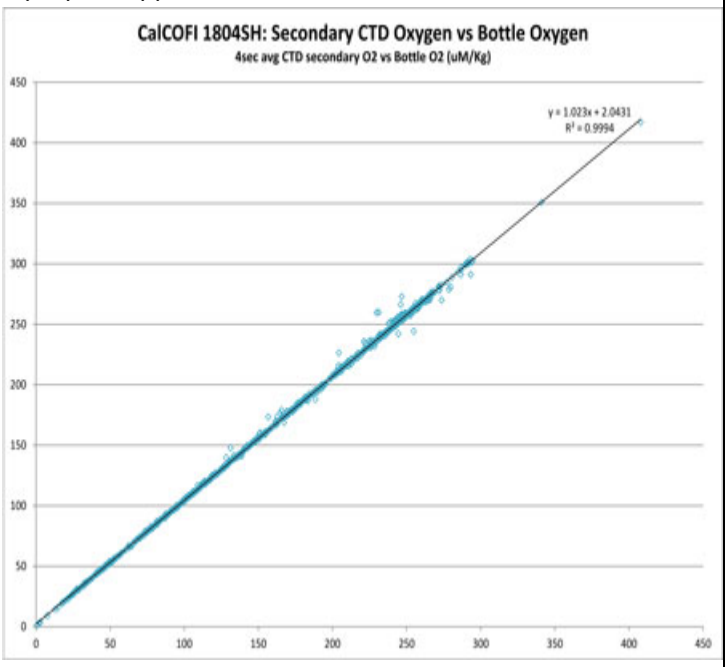
(http://cappuccino.ucsd.edu/downloads/2018/1804SH/1804SH_Ox2MLvsOxBML.jpg)

(http://cappuccino.ucsd.edu/downloads/2018/1804SH



/1804SH_Ox1UMvsOxBUM.jpg)

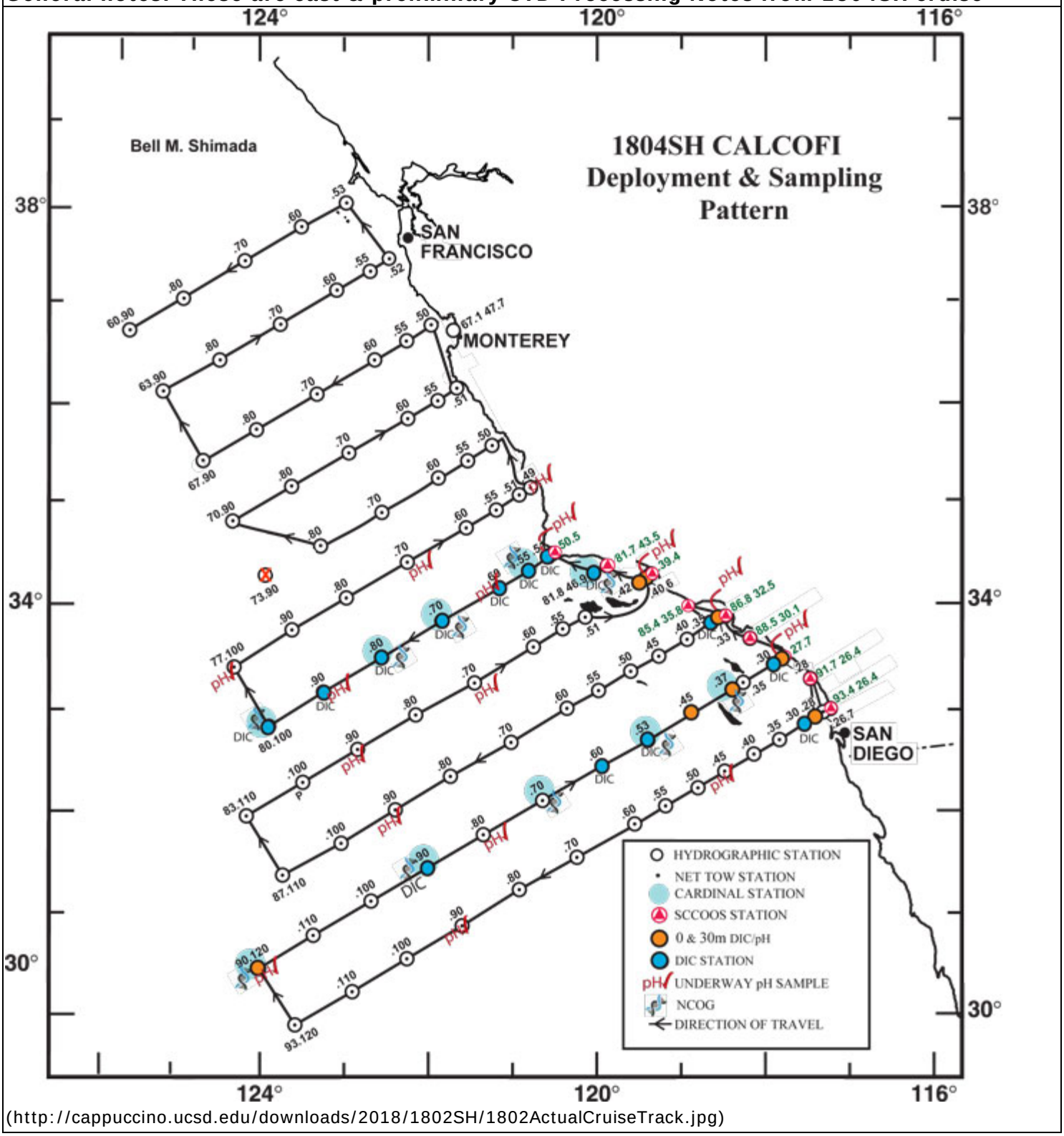
(http://cappuccino.ucsd.edu/downloads/2018/1804SH



/1804SH_Ox2UMvsOxBUM.jpg)

(http://cappuccino.ucsd.edu/downloads/2018/1804SH/1804SH_ISUSVvsNO3.jpg)	(http://cappuccino.ucsd.edu/downloads/2018/1804SH/1804SH_FlVvsChla.jpg)

General notes: These are cast & preliminary CTD Processing Notes from 1804SH cruise



(http://cappuccino.ucsd.edu/downloads/2018/1802SH/1802ActualCruiseTrack.jpg)

CalCOFI 1804SH General Cruise & Cast Notes:

CalCOFI Spring Cruise 1804SH was scheduled to occupy 104 stations from San Diego to San Francisco. All stations were occupied except one - sta 73.3 90.0 - which was dropped due to typical April bad weather.

CTD General Notes and Problems:

All CTD gear used were SIO-CalCOFI's this cruise on Shimada's two-pin termination, cable grip, & shackle. SIO-CalCOFI's Seabird 911+, 24-bottle epoxy-coated LARS rosette, and deck unit were used on our Windows 7 blade PC. RV Shimada provided a GPS feed for the deck unit and the remote depth readout box was run to the CTD winch shack. Cabling installed on CalCOFI 1802SH was left and reused so reconnecting CTD cables (termination, surface PAR, remote depth readout box, ethernet) was much quicker.
Standard sensor configuration: dual T, C, & O2 on separately plumbed & pumped horizontal arrays; Wetlabs ECO-Fl fluorometer; C-Star transmissometer; Biospherical PAR & Surface PAR (mounted near the Shimada's CTD A-Frame on the 01 deck since IOD Chl/Rad van was not onboard on CalCOFi 1802SH); MBARI-ISUS v3 w/ battery; SBE18 pH; altimeter. Refer to .hdr files for serial & model numbers or the table below. Primary T, C, & O2 sensors were freshly calibrated; secondary T, C, & O2 sensors were used on 1802SH. ISUS was DI lab calibrated prior to the cruise. Both sensor sets worked fine throughout the cruise and no changes were necessary. Retermination of the CTD winch wire was required due to a kink in the cable caused by catching on a cleat during a net deployment on cast 019. The retermination was quickly performed by Shimada's ET.

Setup: Using SIO-CalCOFI's 24-10L bottle CTD-rosette epoxy-coated LARS frame. CTD - SBE 9+ (SN#3161-0936) Sensor Configuration	
1° Sensors:	2° Sensors:
SBE 3plus temperature sensor (SN#5102); Conductivity SBE 4 Sensor (SN#3569) Oxygen SBE 43 Sensor (SN#1590) Pump	SBE 3plus temperature sensor (SN#5109); Conductivity SBE 4 Sensor (SN#2206) Oxygen SBE 43 Sensor (SN#1075) Pump
Other sensors (**unpumped**)	
Wetlabs ECO/FL Fluorometer SN#3122 Wetlabs C-Star Transmissometer SN#CST-811DR pH SBE 18 SN#0709 Remote PAR SN#70209	MBARI-ISUS v3 (Frank's) SN#109 Altimeter SN#46604 Carousel SBE 32 3217964-0225 Reference PAR SN#20514

Logistics & General System/Sampling Notes: CalCOFI 1804SH loaded the FSV Bell M Shimada at 10th Ave Marine Terminal 03-04 Apr 2018. Departure was 1000 05 Apr with 15 scientists, technicians and volunteers. No acoustic calibration of the EK60 was performed.
RV Shimada's two-conductor termination was used with the SIO-CalCOFI's v2 non-uplink deck unit and CTD PC for all casts. RV Shimada's monitor was used with SIO-CalCOFI's keyboard & mouse. SIO-CalCOFI's Seabird Remote Depth Readout Box was used to hit target depths. RV Shimada's NMEA GPS feed was attached to the deck unit, integratiing lat-lon-UTC date & time with CTD data . All computer & written data acquisition times were in PST - no adjustments or conversions were necessary this cruise although FSV Shimada ship time was PDT. All CalCOFI's data acquistion PCs are set PST.
The termination work fine till it was kinked badly enough to warrant retermination on station 019. After re-connecting the termination, all the sensor connections were reseated. pH signal problem was resolved by reseating the cable.
SIO-CalCOFI ran their own data network independent of the ship's network and there were no issues. Internet was available on the NOAA network throughout the cruise on individual devices using a NOAA user account on either wireless or hard-wired connections.
The CESL sample log tablet, hard-wired to the data network, worked well throughout the cruise. the IP number for

seaserv2, our data server, had to be set manually since it spontaneously changed when set DHCP. The NOAA technicians logged most station activities on an eventlog tablet setup in the fish lab. A new net tow program - "NETS" - was beta tested this cruise along with a new Weather program.NETS add net tow events to the event log when a tow is started and ends. This program generates a PDF XFDF form for each tow sheet. Wea2018 allows manual digital tabulation of weather conditions read off the MET/SCS system. It saves the data into CalCOFI's weather file so key-entry of the written form is not required. In beta testing, both written form and digital entries were done to insure no data loss. Both programs are ready for deployment without duplicating effort.
SIO personnel running the CTD console recorded the CTDatDepth events. The CalCOFI Electronic Sample Log (CESL) was modified for 12 oxygen samples per cast to reduce the analytical load and chemical waste. This reduced the oxygen sample load by 50%. Prior to the cruise, the effect of only having 12 vs 20 oxygen samples to bottle-correct CTD sensor oxygens was shown to be not significant. The number of DIC samples collected this cruise has been reduced due to a backlog of unprocessed samples on shore. DIC samples on cardinal station, such as Santa Barbara Basin and Line 80, were collected from several depths but samples on other stations have been reduced - see the map above for DIC stations. Refer to the sample logs for specfic depths DIC sampled.
SIO-CalCOFI's Portasal "Harry" was used throughout the cruise and worked fine.
D. Schuller performed nutrient analysis on QuAAtro nutrient analysis this cruise; alternate nutrient analyst D. Faber was watchleader & CTD operator from midnight to noon and stayed onboard after Monterey with JLW. The ammonia heater failed after cast 007 and a replacement was brought aboard in Santa Monica. Ammonia was back online cast 029.
RV Shimada has Knudsen 3.5 & 12kHz echosounders to find the bottom depth.

Cast Notes (transcribed from console ops, clipboard notes, & data processing):

CalCOFI 1804SH CTD Setup & Cast Notes:
Cast 001 sta 93.3 26.7: 64m bttom, 11 bottle late prodo station (left the dock at 1000)
Cast 002 sta 93.3 23.4 26.4 SCCOOS: 25m bottom, 4 bottle SCCOOS station
Cast 003 sta 91.7 26.4 SCCOOS: 23m bottom, 5 bottles
Cast 004 sta 93.3 28.0: 20 bottle cast to 515m; 0 & 30m DIC/pH taken
Cast 005 sta 93.3 30: 20 bottle cast to 515m; 5 DIC samples taken
Cast 006 sta 93.3 35.0:
Cast 007 sta 93.3 40.0: lost connection to network data server (seaserv2); reestablished at-depth
Cast 008 sta 93.3 45.0: 24-bottle prodo station; moderate seas; initially mislabeled 93.3 50.0, fixed post cast before backup; pH looks funky, transmissometer & ISUS look good although ISUS is not 0 @ surface
Cast 009 sta 93.3 50.0 - cast 011 sta 93.3 60.0: nothing noted
Cast 012 sta 93.3 70.0: chl max about 50m but most of the signal below 50 (50-90m); pH sensor wonky - changed storage solution post-cast
Cast 013 sta 93.3 80.0: early prodo station, 24 bottles
Cast 014 sta 93.3 90.0: DIC/pH sample #15094 taken from underway seawater
Cast 015 sta 93.3 100.0: nothing noted
Cast 016 sta 93.3 110.0: pH still wonky (no backup to switch to)
Cast 017 sta 93.3 120.0: nothing noted on console ops but bottle #20 mistripped, no seawater
Cast 018 sta 90.0 120.0: 24 bottle prodo station. CTD wire kinked during net ops, re-terminated by Shimada ET; bottle #23 duplicate 10m bottle mistripped; 2 & 30m DIC/pH + underway pH #15095
Cast 019 sta 90.0 110.0: 22 bottle cast, CTD sent from surface back for 10m bottle (#22); pH finally good, reseated pH cable after reconnecting re-terminated CTD wire; bottle #19 10m mistripped so CTD back down & #22 was tripped at 10m
Cast 020 sta 90.0 100.0: nothing noted
Cast 021 sta 90.0 90.0: 23 bottle cast, #17 did not close so went back down to 25m & tripped bottle #23; two DIC samples from surface; nutrient sample from bottle #22 2m missed, not drawn
Cast 022 sta 90.0 80.0: 24 bottle prodo cast; noted: nutrients from bottles #1 & #2 identical, probably from bottle #2; pH check sample #15110

Cast 023 sta 90.0 70.0: two NCOG bottle tripped at chl max & 10m

Cast 024 sta 90.0 60.0: 3 DIC samples drawn, 2 from 2m, 1 from 30m

Cast 025 sta 90.0 53.0: 2 DIC samples drawn from 2m

Cast 026 sta 90.0 45.0: no problem with Navy until after station then we had to head N before transiting to next sta; DIC from 2m & 30m; bottle #11 nutrient sample missed

Cast 027 sta 90.0 37.0: took awhile to get here (~4.5hrs); bottle #21 10m mistripped, send back #23 = 10m; DICs: 2 from 2m, 1 from 30m

Cast 028 sta 90.0 35.0: bottle #10 85m nutrient seems to be from the surface bottle, mistrip?

Cast 029 sta 90.0 30.0: CTD went from 20m to 4m to 10m - winch operator went past 10m so had to go back down; DICs from 2m & 30m

Cast 030 sta 90.0 27.7 SCCOOS: not sure pump kicked on before starting data archiving, only primary salt & 2nd O2 looked ok on recovery. Checked pump status data post-cruise and pump was on. If data are off, could be biofouling or strong gradients.

Cast 031 sta 90.0 28.0: 69m bottom, 8 bottle cast; underway pH #15113, surface DIC/pH #15114

Cast 032 sta 88.5 30.1 SCCOOS: 25m bottom, 5 bottle cast

Cast 033 sta 86.7 33.0: 54m bottom, 10 bottle prodo cast; DICs 2m & 30m plus underway pH #15117

Cast 034 sta 86.8 32.5 SCCOOS: 29m bottom, 5 bottle cast

Cast 035 sta 86.7 35.0: lanyard stuck in bottle #12 top cap; DIC from surface bottle

Cast 036 sta 85.4 35.8 SCCOOS: 51m bottom, 7 bottle cast

Cast 037 sta 86.7 40.0: Santa Monica Basin, 665m was terminal depth, EK80 gave 675m & decreasing, altimeter reading not noted. Post-cruise review of altimeter shows CTD was ~20m from bottom.

Cast 038 sta 86.7 45.0: wind blowing ~35kts - hard to keep depths, drifing ~0.5kts; bottle #10 nutrient mis-sampled or mistripped

Cast 039 sta 86.7 50.0: early prodo, 11 bottles, went to hide in lee of San Nicolas Island since conditions are deteriorating; 74m bottom, cast to 65m. Sunny but gale force winds

Cast 040 sta 86.7 55.0: after hove-to for 24hrs, 24-bottle prodo station; bottle #23 9m nutrient sample missed

Cast 041 sta 86.7 60.0: nothing noted

zCast 042 sta 86.7 70.0: bottle #1 mistripped

Cast 043 sta 86.7 80.0: 24-bottle prodo station; missed tripping 515m bottle until after 440m bottle, went back down so bottle #1 is 440m, bottle #2 is 515m, bottle #3 is 380m

Cast 044 sta 86.7 90.0: 21 bottle cast, bottle #17 no closure but not seen until on deck so no 40m seawater samples; underway pH #15119

Cast 045 sta 86.7 100.0: 21 bottle cast, #17 closed but bottle #12 100m did not - mistrip

Cast 046 sta 86.7 110.0: CTD cast performed by volunteer MC under DNF supervision. 21 bottles, no issues

Cast 047 sta 83.3 110.0: early prodo station, 24 bottles

Cast 048 sta 83.3 100.0: 21 bottle cast, nothing noted

Cast 049 sta 83.3 90.0: 21 bottle cast, 10m low salinity noted; use secondary sensor data since primary may be biofouled; bottle #1 mistripped again; underway pH #15120

Cast 050 sta 83.3 80.0: 21 bottle cast, primary salinity looks fine; bottle #1 mistripped again

Cast 051 sta 83.3 70.0: 24 bottles closed; 4 @525m - #1 to test temp/salt since its been mistripping, #2 - 515m insurance bottle to be sure we get 515m seawater, #3 & #4 LTER special request; underway pH #15121 taken

Cast 052 sta 83.3 60.0: 24 bottle prodo cast; bottle #20 20m mistrip; carousel removed, serviced, trigger #1 changed

Cast 053 sta 83.3 55.0: 21 bottle cast, nothing noted

Cast 054 sta 83.3 51.0: 11 bottle cast, 107m bottom

Cast 055 sta 83.3 42.0: after long transit, 13 bottle cast to 130m, 144m bottom and dropping; DIC/pH #15122 taken from surface bottle

Cast 056 sta 83.3 40.6: 7 bottle cast, 33m bottom; underway pH #15123 & 2m & 30m DIC samples drawn

Cast 057 sta 83.3 39.4 SCCOOS: 5 bottle 15m cast, 22m bottom

Cast 058 sta 81.7 43.5 SCCOOS: 4 bottle 15m cast, 21m bottom

Cast 059 sta 81.8 46.9: Santa Barbara Basin prodo station; "pea-soup" extremely green, 4m secchi, 0-25m strong gradient showing recent upwelling from all the strong winds; high chl high NO3 at surface; full array of DICs drawn from 515m to surface
Cast 060 sta 80.0 50.5 SCCOOS: 5 bottle 15m cast, 27m bottom
Cast 061 sta 80.0 51.0: 9 bottle cast to 60m, 72m bottom; underway pH #15126 logged plus surface DIC #15138
Cast 062 sta 80.0 55.0: 23 bottle cardinal station cast; 6 DICs drawn
Cast 063 sta 80.0 60.0: pCO2 computer crashed - no data collected; underway pH #151142 & surface DIC #15143 taken
Cast 064 sta 80.0 70.0: 24 bottle prodo station; surface DIC #15144 drawn
Cast 065 sta 80.0 80.0: 22 bottle cardinal station cast; 7 DICs drawn
cast 066 sta 80.0 90.0: 20 bottle cast, surface & 30m (25m) DICs drawn plus underway pH #15152
Cast 067 sta 80.0 100.0: unusual feature ~70-105m most sensors; weird ISUS profile noted, looks legit though since it matches other sensor "features"; 2 surface DICs drawn
Cast 068 sta 76.7 100.0: slow transit N, 24 bottle prodo cast; underway pH #15158 taken; bottle #12 lanyard stuck in #13 top cap
Cast 069 sta 76.7 90.0: 20 bottle cast to 515m, nothing noted
Cast 070 sta 76.7 80.0: 20 bottle cast to 515m, nothing noted; bottle #12 lanyard stuck in #13 top cap
Cast 071 sta 76.7 70.0: 23 bottle cast to 515m, 3 extra 515m bottles tripped for LTER; underway pH #15159
Cast 072 sta 76.7 60.0: 23 bottle cast to 515m, 3 extra 515m bottles tripped for LTER
Cast 073 sta 76.7 55.0: 24 bottle prodo cast to 515m, last prodo cast (#16) this cruise; ; bottle #17 lanyard stuck in #18 top cap
Cast 074 sta 76.7 51.0: 16 bottle cast to 220m, 236m bottom
Cast 075 sta 76.7 49.0: 9 bottle cast to 60m, 70m bottom; underway pH #15160 taken
Removed 12 bottles - 24 bottles to 12 bottle rosette casts
Using bottle positions 2 4 6 8 10 12 14 16 18 20 22 24 23 table-driven, bottle #23 is for mistrip insurance = send CTD back down for mistripped shallow bottles
Removed 12 bottles - 24 bottles to 12 bottle rosette casts
Using bottle positions 2 4 6 8 10 12 14 16 18 20 22 24 23 table-driven, bottle #23 is for mistrip insurance = send CTD back down for mistripped shallow bottles
Analytical sampling: 12 O2 samples/515m; 9 chlorophyll samples/515m; 3 check salts - 515m, 100m, 2m

Cast 076 sta 73.3 50.0: 34m bottom, 4 bottle cast to 20m; 4 nutrient samples collected
Cast 077 sta 73.3 55.0: 12 bottle cast to 515m; 12 nutrient samples collected
Cast 078 sta 73.3 60.0: 12 bottle cast to 515m; 12 nutrient samples collected
Cast 079 sta 73.3 70.0: 12 bottle cast to 515m; 12 nutrient samples collected
Cast 080 sta 73.3 80.0: 12 bottle cast to 515m; 12 last nutrient sample station
Sta 73.3 90.0 skipped to stay on schedule plus weather rough so transits are slow
Cast 081 sta 70.0 90.0: 12 bottle cast to 515m by MC
Cast 082 sta 70.0 80.0: 12 bottle cast to 515m; nav file created from mrk post-cast since not pressed at depth
Cast 083 sta 70.0 70.0: 12 bottle cast to 515m
Cast 084 sta 70.0 60.0: 12 bottle cast to 515m by JLW & volunteer PR
Cast 085 sta 70.0 55.0: 12 bottle cast to 515m by MC
Cast 086 sta 70.0 51.0: 11 bottle cast to 270m by MC; extra surface bottle for O2 training
Monterey Personnel Transfer - 4 SIO scientists & 1 NOAA officer disembarked courtesy of Marine Sanctuary boat
Cast 087 sta 66.7 50.0: 9 bottle cast to 185m
Cast 088 sta 66.7 55.0: 12 bottle cast to 515m by PR
Cast 089 sta 66.7 60.0: 12 bottle cast to 515m by PR
Cast 090 sta 66.7 70.0: 12 bottle cast to 515m by PR
Cast 091 sta 66.7 80.0: 12 bottle cast to 515m, nothing noted but weather was extremely calm for the rest of the cruise

Cast 092 sta 66.7 90.0: 12 bottle cast to 515m, nothing noted

Cast 093 sta 63.3 90.0: 12 bottle cast to 515m by PR

Cast 094 sta 63.3 80.0: 12 bottle cast to 515m by PR/JLW

Cast 095 sta 63.3 70.0: 12 bottle cast to 515m by MC

Cast 096 sta 63.3 60.0: 12 bottle cast to 515m

Cast 097 sta 63.3 55.0: mislabled 63.3 50.0 - fixed in hdr, hex; 10 bottle cast to 270m

Cast 098 sta 63.3 52.0: 6 bottle cast to 80m by PR, bottom 92m

Cast 099 sta 60.0 53.0: 6 bottle cast to 80m by PR, bottom 92m

Cast 100 sta 60.0 60.0: 12 bottle cast to 515m by PR

Cast 101 sta 60.0 70.0: 12 bottle cast to 515m

Cast 102 sta 60.0 80.0: 12 bottle cast to 515m by MC

Cast 103 sta 60.0 90.0: 12 bottle cast to 515m by PR; last station - heading to Pier 50 San Francisco

JRW 10 May 2018