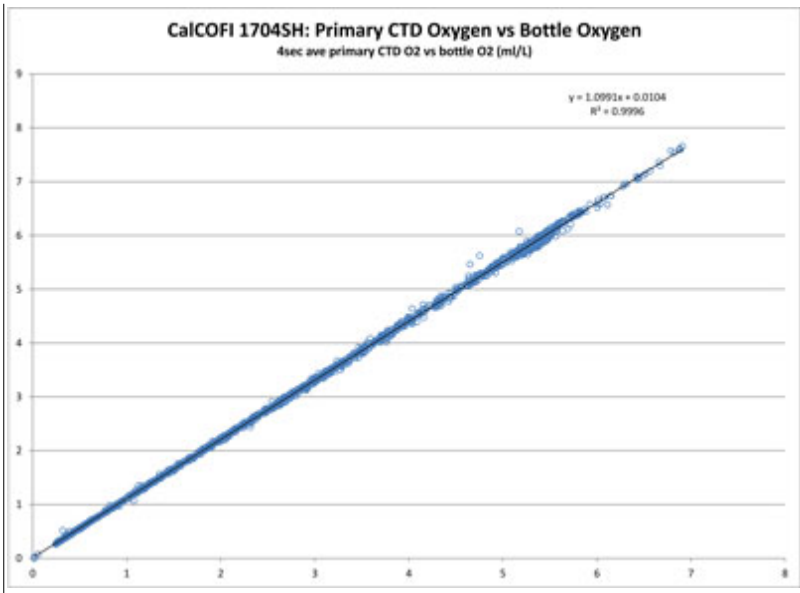
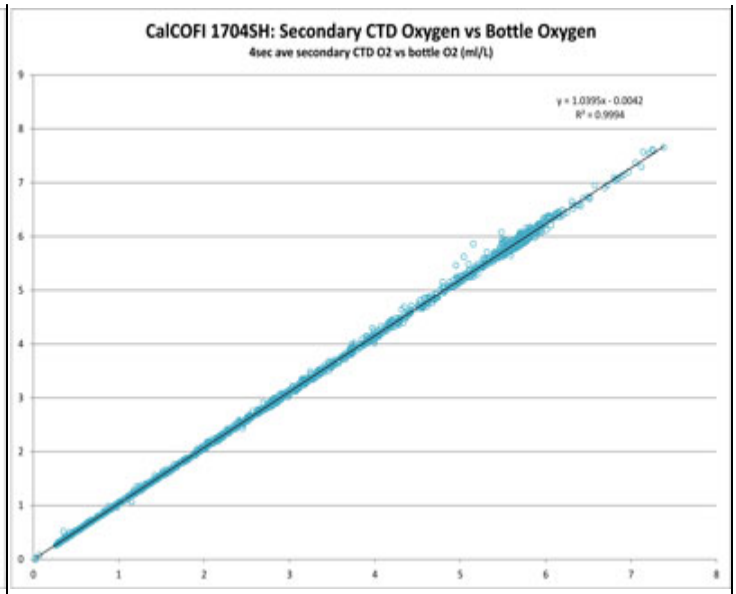
# 1704SH CTD Notes & Final Processing

Parent Category: 2017 Cruises (/cruises/2017-cruises.html)
Category: CalCOFI 1704SH (/cruises/2017-cruises/calcofi-1704sh.html)
Last Updated: 15 May 2018

| CTD Processing Summary CalCOFI 1704SH CTD Final Data | | |
|---|---|---|
| Download 1704SH CTD raw cast files zipped (http://cappuccino.ucsd.edu/downloads/2017/20-1704SH_CTDCast.zip) | | Download 1704SH Final CTD + bottle data (http://cappuccino.ucsd.edu/downloads/2017/20-1704SH_CTDFinalQC.zip) |
| **General CTD Notes** - data acquisition notes, logistics, processing - see below.<br>**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 average prior to bottle closure, to bottle samples | | |
| Dual T, S, & O2 | Primary Sensor | Secondary Sensor |
| Salinity offset (bottle - CTD salinity; > 350m only; Seabird SBE4) | 0.0030 | 0.0025 |
| Oxygen ml/L (dual Seabird SBE43; 2° O2 Calib Off) | y = 1.0991x+0.0104<br>$R^2$ = 0.9996 | y = 1.0395x - 0.0042<br>$R^2$ = 0.9994 |
| Oxygen umol/Kg (dual Seabird SBE43; 2° O2 Calib Off) | y =1.1019x+0.5443<br>$R^2$ = 0.9996 | y = 1.0422x - 0.0953<br>$R^2$ = 0.9995 |
| Single sensors | Linear | Polynomial |
| Nitrate - ISUS 4sec ave voltage vs Bottle NO3 (Frank's Satlantic ISUS v3) **Cast 001 - 040** | y = 28.453x - 2.2134<br>$R^2$ = 0.9797 | |
| Nitrate - ISUS 4sec ave voltage vs bottle NO3; **Cast 041 - 104** | y = 29.962x+0.2836<br>$R^2$ = 0.9881 | |
| Fluorometer - linear & polynomial regressions | y=15.478x-0.7205<br>$R^2$ = 0.8789 | $y = 5.8815x^2 + 11.488x - 0.4781$<br>$R^2$ = 0.8976 |

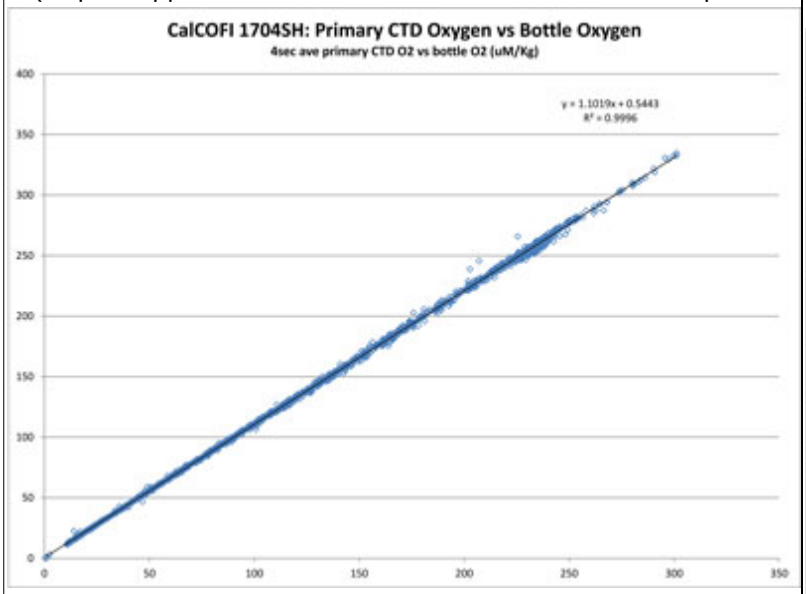



(http://cappuccino.ucsd.edu/downloads/2017/1704SH/plots/1704SH_Ox1MLvsOxBML.jpg)



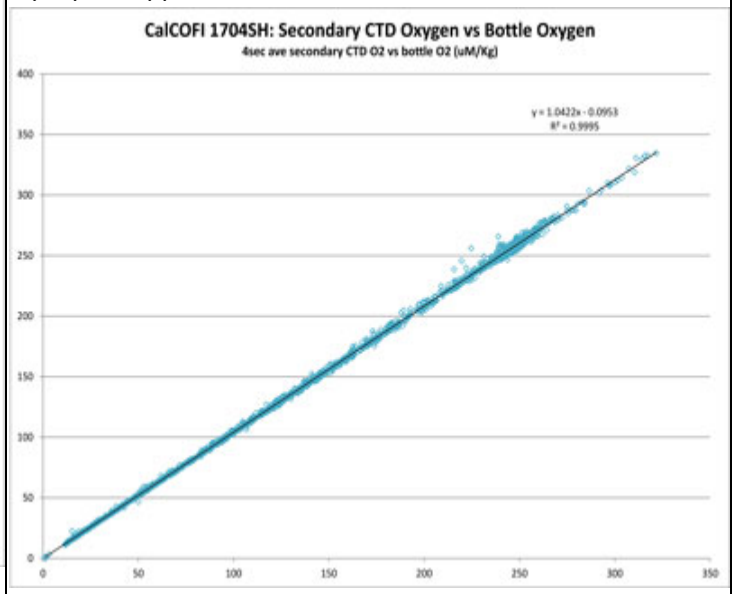

(http://cappuccino.ucsd.edu/downloads/2017/1704SH/plots/1704SH_Ox2MLvsOxBML.jpg)

(http://cappuccino.ucsd.edu/downloads/2017/1704SH/plots

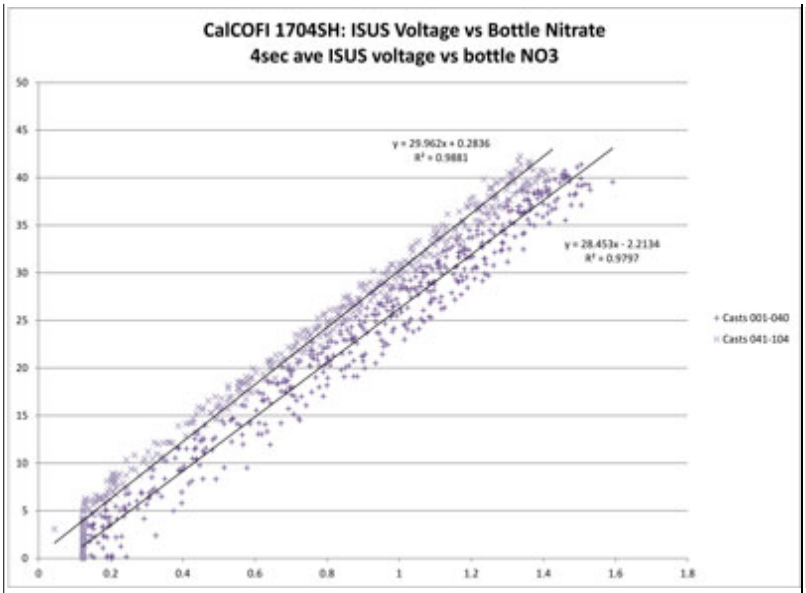



/1704SH_Ox1UMvsOxBUM.jpg)

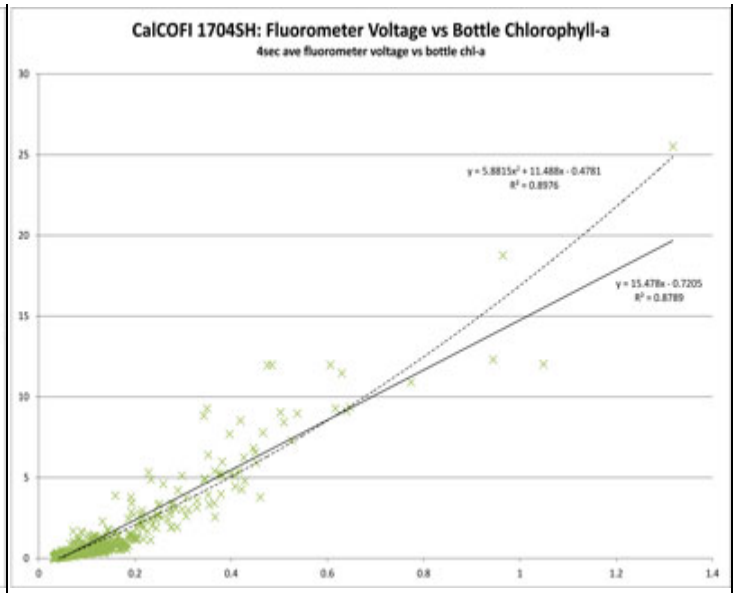
(http://cappuccino.ucsd.edu/downloads/2017/1704SH




/plots/1704SH_Ox2UMvsOxBUM.jpg)

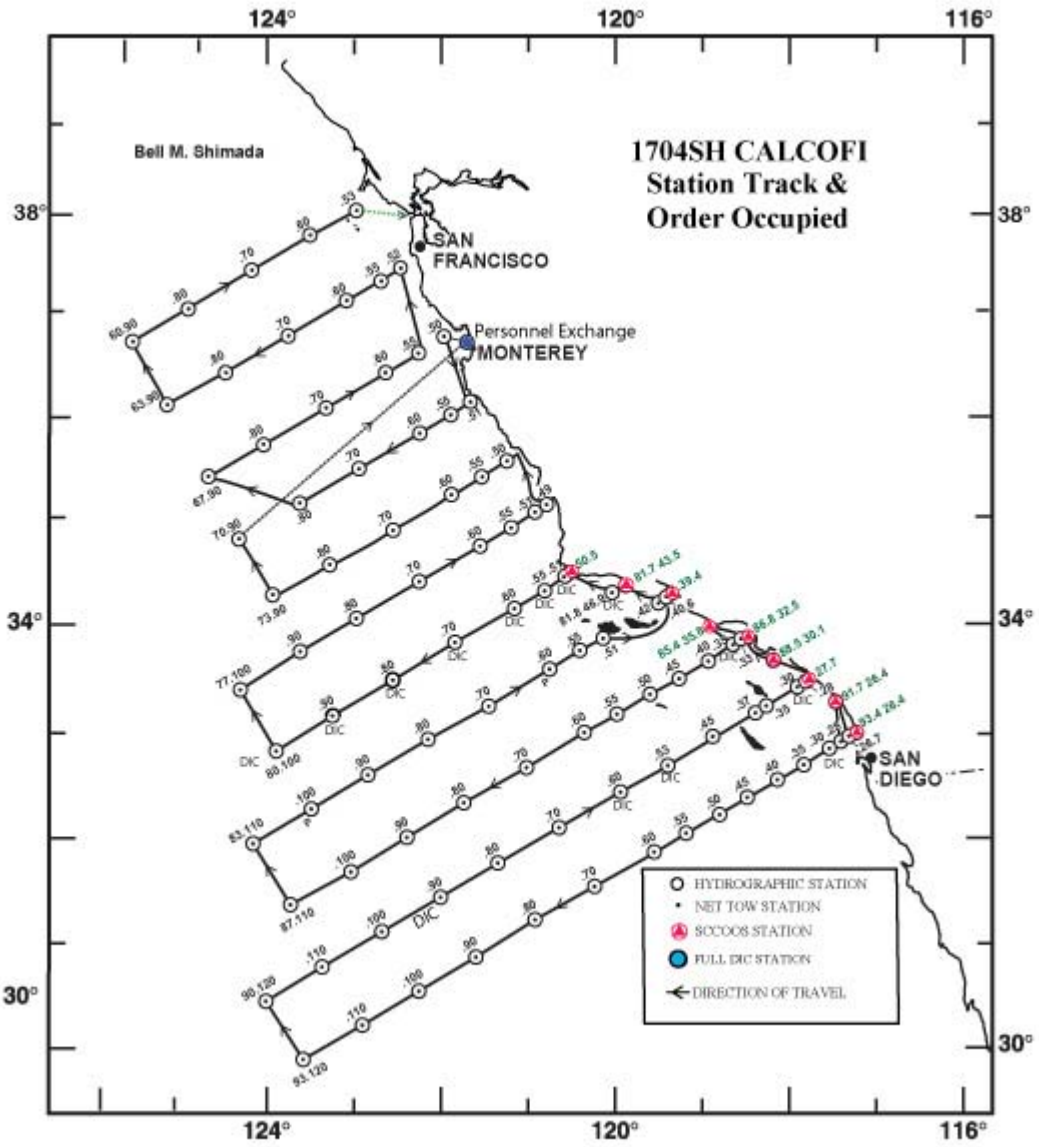



(http://cappuccino.ucsd.edu/downloads/2017/1704SH/plots/1704SH_ISUSVvsNO3-0.jpg)




(http://cappuccino.ucsd.edu/downloads/2017/1704SH/plots/1704SH_FlVvsChla.jpg)

**General notes: These are cast & final CTD Processing Notes from 1704SH cruise**




(http://calcofi.org/images/maps/1704_cruiseTrackOrdOcc1024.jpg)

**CalCOFI 1704SH General Cruise & Cast Notes:**

**Stations and Station Order**: CalCOFI 1704SH on RV Bell M Shimada occupied 104 scheduled stations: 75 standard (occupied 4 times a year) and 29 northern (winter, spring only). The station order was typical south-north, west-east-west starting off San Diego and ending off San Francisco. After station #82, 70.90, RV Bell M Shimada came into Monterey CA to exchange personnel. With fewer analytical personnel available, reduced seawater sample collection started after the southern 75 standard stations. The rosette was stripped of 12-10L bottles and three check salts, 12 oxygen samples, 9 chlorophyll samples were collected after sta #75, 77.49. Nutrients were collected from all 12 bottles on Line 73.3 but there were problems with the nitrate channel during the last few runs.
CUFES egg survey transects were performed throughout the cruise on all transects and transits. Refer to map for station order and track.

**CTD General Notes and Problems**:

The CTD configuration throughout the cruise was standard: Seabird 911+ with dual T, C, O2, & pumps; Wetlabs C-Star 25cm transmissometer; Biospherical QSP200L PAR; Datasonics/Benthos Altimeter; WET Labs ECO-AFL/FL; Seabird SBE 18 pH; **Satlantic ISUS v3 (**rebuilt & upgraded to firmware v3 prior to CalCOFI 1611SR; recalibrated by JRW/DGS on CalCOFI 1701RL) & Wetlabs (custom) batteries. Please refer to the xmlcon files or cruise prospectus for additional info & metadata. There were no primary sensor failures this cruise but the pH sensor behavior began to deteriorate after 30 casts. The pH sensor, which just returned from Seabird, will be sent back for service. Please remember the 50% reduction in bottle samples after station 75 may affect bottle corrections applied to CTD sensor data.

The first leg of the cruise was relatively calm the first two days of the cruise but rough weather appeared on day 3. After two days of rough weather the remainder of the offshore stations were in moderate seas. The 3500m deep casts on sta 90.90 (or 80.90) was not performed - RV Shimada has only 3800m wire. The transmissometer did not have any visible dropout problems. The ISUS was mounted vertically, with optics pointing down worked well when powered but one profile was lost due no power (not being plugged-in). pH sensor was fresh from service at Seabird and new coefficients imported.

**Logistics:** CalCOFI 1704SH loaded RV Shimada at TAMT Friday and setup Saturday with final setup & walk-thru Monday. RV Shimada sailed with 12 scientists and 2 volunteers at 1600PDT Mar 28th 2017. No acoustic calibration of the EK60 was performed.
RV Shimada's two-conductor termination was used with the SIO-CalCOFI's v2 deck unit and SIO-CalCOFI's primary PC (Windows 7 ASUS blade) for all casts. Shimada's monitor was interfaced with the SIO's CTD Blade PC, keyboard & trackball. SIO-CalCOFI's Seabird Remote Depth Readout Box was used, interfaced via deck unit, with cable run from the survey lab to winch shack. Shimada's NMEA GPS feed was interfaced with SIO-CalCOFI's deck unit using the Seabird serial-to-deck unit cable. The GPS NMEA string was occasionally problematic; the date year was 1920 and sometimes listed in the .hdr file as 2080. These casts will be identified in the cast by cast breakdown below. A few casts were not restarted so have bad GPS lat/lon/date/time. The solution discovered was to power cycle the deck unit and restart data acquisition (sometimes 3-4 times before success). SIO-CalCOFI's new (since 1611SR) LARS-designed 24-bottle rosette was used throughout the cruise.
The termination work fine throughout the cruise and there were no sensors replaced. The primary and secondary oxygen sensors differed from each other ~0.4ml/L but both responded as they should so were not replaced. Both had been recently serviced and calibrated.
SIO-CalCOFI ran their own data network independent of the ship's network although some SIO computers did connect to the internet occasionally via SHWLAN wifi. Other interent devices, mainly smartphones and tablets, were connected all the time - one internet device connection per scientist at a time. This restriction helps with the limited bandwidth but eastward transects still have poor internet connectivity (prevalent on ALL ships we sail on except the recent Sally Ride CalCOFI). Internet was lost completely April 11th and was not working the remainder of the cruise.
The CESL sample log tablet and CELog event tablet performed reliably when hard-wired to the data network, as well as the Chl Van Flog fluorometer computer. During the rough weather on day 4, the tablet base was flooded and electrical power connection shorted & eroded away. The backup tablet was installed onto an upper shelf, out of the splash zone

but covered with plastic.
SIO-CalCOFI's Portasal "Harry" was used after day 1 when the Shimada's Portasal stopped working properly during JLW sample run. "Harry" worked fine for the remainder of the cruise and Shimada's Portasal was not retried during the cruise.

RV Shimada does not have a Knudsen 3 or 12kHz echosounder to find the bottom depth. The EK60 system worked well although a +5m offset for center board depth should be applied..

**Cast Notes:**

Cast 001 - sta 93.3 26.7 verified but 0.3mi off desired lat/lon; bottom depth 216m - expecting 70m so CTD descent was stopped at 55m, 85m, then 100m until altimeter detected bottom. Continued to 200m terminal depth.
Cast 002 - SCCOOS 93.4 26.4, 37m deep initially so ship manuvered 20mins but did not get shallower so we tripped 5 bottles between 0-30m
Cast 003 - Camp Pendleton SCCOOS 91.7 26.4, bottom depth 26m, bottles tripped from 20-0m
Cast 004 - no issues recorded, back on Line 93.3, sta 93.3 28.0; 0 & 30m DIC/pH
Cast 005 - sta 93.3 30.0, no issues recorded; DIC station
Cast 006 - sta 93.3 35.0, prodo sta, temperature issues seen on CESL, possible mistrips noted
Cast 007 - sta 93.3 40.0, Deck unit GPS time was wrong, powered down the deck unit and restarted; ET Josh rewired pins 2 & 3 and added a null modem; Navy delay ~1hr; downcast CTD GPS data dropped out between 170-200m - fixed/corrected
Cast 008 - sta 93.3 45.0, pH check sample taken (#13423); took recycling the deck unit 3 times to get GPS synced
Cast 009 - sta 93.3 50.0, no issues recorded
Cast 010 - sta 93.3 55.0, no issues detected
Cast 011 - sta 93.3 60.0, cast files initially mislabeled "1701011..."; relabeled before backup
Cast 012 - sta 93.3 70.0, no issues detected
Cast 013 - sta 93.3 80.0, prodo sta, 4m rolls at surface
Cast 014 - sta 93.3 90.0, pH check sample taken (#13424), SBE Remote Depth wire issue - wire crushed by door, disconnected till repair possible since deck unit was reading "000000000000" with it connected.
Cast 015 - sta 93.3 100.0, prodo sta; unfortunately NMEA/GPS problem not noticed - bad GPS date/time/lat/lon recorded in CTD data; CTD.csv lat-lon were edited/corrected
Cast 016 - sta 93.3 110.0, no issues (no fooling! April Fool's Day uneventful)
Cast 017 - sta 93.3 120.0, weather rough so winch would not bring it closer to surface when asked, then ended up bringing it out, stopping the pumps, so it was sent back to 10m and restarted data acquisition once it returned to surface (~2.5m). pH sensor at 400m looks odd noted
Cast 018 - sta 90.0 120.0, 0 & 30m DIC/pH + NCOG; check pH taken (#13425)
Cast 019 - sta 90.0 110.0, prodo sta, deck unit GPS "1920" date issue reported, restarted; went back down to 90m to get duplicate NCOG bottle; bottle #20 lanyard hungup - mistrip noted
Cast 020 - sta 90.0 100.0, pH sensor is acting odd around 100m & 150-200m on downcast - biofouling or ?
Cast 021 - sta 90.0 90.0, DIC+NCOG station, check pH sample (#13428); pH sensor still problematic, noise @ 150-175m on downcast - no spare
Cast 022 - sta 90.0 80.0, no issues noted
Cast 023 - sta 90.0 70.0, prodo station + NCOG station
Cast 024 - sta 90.0 60.0, DIC station, no issues noted
Cast 025 - sta 90.0 53.0, DIC + NCOG station; nav hit a second time at 230m upcast by mistake - ignore; O2 draw temperature on bottle #4 was high indicating possible mistrip - trigger cleaned post-cast. #4 is next to support stancion which could interfere with closure, will monitor.
Cast 026 - sta 90.0 45.0, no issues noted; 0 & 30m DIC/pH station
Cast 027 - sta 90.0 37.0, 0 & 30m DIC/pH station + NCOG
Cast 028 - sta 90.0 35.0, prodo station, ~307m

Cast 029 - sta 90.0 30.0, DIC station

Cast 030 - sta 90.0 28.0, 0 & 30m DIC/pH = pH check sample #13473, sharp chl peak at 24m; sunny & calm off Dana Point

Cast 031 - SCCOOS sta 90.0 27.7, Deck unit restarted 3x for NMEA/GPS correct date; calm evening off Dana Pt

Cast 032 - SCCOOS sta 88.5 30.1, calm night off Long Beach

Cast 033 - SCCOOS sta 85.4 35.8 Pt Dume, sta reordered

Cast 034 - sta 86.7 35.0 DIC station, no issues recorded

Cast 035 - SCCOOS sta 86.8 32.5

Cast 036 - sta 86.7 33.0 prodo sta, extra surface bottle, 0 & 30m DIC/pH

Cast 037 - sta 86.7 40.0, Santa Monica Basin 515m cast

Cast 038 - sta 86.7 45.0, no notes recorded

Cast 039 - sta 86.7 50.0, San Nicolas Island station ~79m, lots of Velellas floating by - very calm, small broad chl profile

Cast 040 - sta 86.7 55.0, bottle #4 O2 draw temp high - probable mistrip

Cast 041 - sta 86.7 60.0, no issues recorded

Cast 042 - sta 86.7 70.0, prodo station, 24 bottles used

Cast 043 - sta 86.7 80.0, upcast different than downcast (internal wave?); extra 40m mrk removed post-cast/pre-backup

Cast 044 - sta 86.7 90.0, type I, pH check sample #13482 taken; odd pH profile - sensor issue?; O2 profile feature between 100-190m; NMEA/GPS restart 1x

Cast 045 - sta 86.7 100.0, no issues noted

Cast 046 - sta 86.7 110.0, prodo sta, "crisis management on this cast" noted - "3-4x restarts required on deck unit to get NMEA/GPS to have proper info; SBE Box non-operational in shack; restarted computer - not logging data initially so back to surface"; ISUS battery not plugged in - no ISUS data

Cast 047 - sta 83.3 110.0, slow big rolling waves, new connector on ISUS battery; bottle #10 mistrip - no closure at all - trigger still set, triggers #4 & #10 cleaned and serviced post-cast

Cast 048 - sta 83.3 100.0, troughy - big swells (data loops), moderate seas (relatively calm but big swell broadside); bottle #10 mistripped again so trigger was replaced post-cast

Cast 049 - sta 83.3 90.0, not noted but an extra 125m bottle was tripped; check pH sample taken #13483

Cast 050 - sta 83.3 80.0, prodo sta, moderate-rough weather - Bongo Net lost upon retrieval - no sample, no LOPC data saved (from all casts)

Cast 051 - sta 83.3 70.0, moderate-rough seas, pH profile looks odd - no backup

Cast 052 - sta 83.3 60.0, nothing noted

Cast 053 - sta 83.3 55.0, prodo station, 24 bottles closed

Cast 054 - sta 83.3 51.0, nothing noted, shallow 96m

Cast 055 - sta 83.3 42.0, full moon rising, transmissometer feature ~120-130m; 0 & 30m DIC/pH; deck unit restarted 3x to get NMEA/GPS

Cast 056 - sta 83.3 40.6, full moon station, calm night; 0 & 30m DIC/pH; NMEA/GPS started fine this time

Cast 057 - SCCOOS sta 83.3 39.4; broad flat bottom - ship did not want to get any closer to shore since they already had 28m depth

Cast 058 - SCCOOS sta 81.7 43.5, nothing noted

Cast 059 - sta 81.8 46.9, Santa Barbara Basin - DIC+NCOG 24-bottle 570m station

Cast 060 - SCCOOS sta 80.0 50.5, pH check sample taken one station early (#13497) since "pCO2=640!" noted

Cast 061 - sta 80.0 51.0, DIC & prodo station

Cast 062 - sta 80.55.0, DIC+NCOG station, 23 bottles closed

Cast 063 - sta 80.0 60.0, DIC station, moderate-rough seas; full moon rising during nets; noted - CTD pH sensor looks bad

Cast 064 - sta 80.0 70.0, DIC+NCOG, rough, cold night; unusual O2 feature ~155-400m on both sensors; NMEA/GPS/deck unit restarted 3x

Cast 065 - sta 80.0 80.0, DIC+NCOG station

Cast 066 - sta 80.0 90.0, DIC+Prodo(+NCOG) station, pH check sample #13543 taken
Cast 067 - sta 80.0 100.0, last DIC+NCOG; blue water; relatively calm, overcast afternoon; pH still wonky; CTD GPS oaky
Cast 068 - sta 76.7 100.0, relatively calm but big rolls; unusual T,S,O2 profiles; pH check sample #13554; CTD pH bad
Cast 069 - sta 76.7 90.0, no issues noted
Cast 070 - sta 76.7 80.0 prodo station, 24 bottles closed
Cast 071 - sta 76.7 70.0, check pH taken #13556 (# out of order)
Cast 072 - sta 76.7 60.0, relatively calm but some rolls; pH cable replaced - looks better
Cast 073 - sta 76.7 55.0, no issues reported
Cast 074 - sta 76.7 51, shallow 216m bottom, 16 bottles closed
Cast 075 - sta 76.7 49.0, check pH taken #13555
Cast 076 - sta 73.3 50.0, switched 12-bottle sampling but 24 bottles are still mounted; prodo station (to make 15 total prodo sta)
Cast 077 - sta 73.3 55.0, 13 bottles closed
Cast 078 - sta 73.3 60.0, 11 bottles removed prior to cast; switched to 12-13 table-driven casts (13 is an extra bottle for NCOG group or mistrip insurance)
Cast 079 - sta 73.3 70.0, some big rolls but mostly calm, CTD pH sensor looks bad again
Cast 080 - sta 73.3 80.0, nothing noted
Cast 081 - sta 73.3 90.0, nothing noted, end of Line 73.3
Cast 082 - sta 70.0 90.0, relatively calm with occasional big rolls; CTD pH wonky

Run to Monterey - SIO-CalCOFI personnel disembarked, SIO-NCOG got onboard plus replacement for Chief Bosun Bruce (Mary); End of Leg I

Cast 083 - sta 66.7 50.0, AUV comparison cast, stopped @ 10m & 50m on downcast to close bottles then to 270m (had to redo the cast, waited for AUV w/ CTD @10m for ~30mins); sta Line mislabeled "67.7" in the header - fixed
Cast 084 - back south to Line 70.0 - sta 70.0 51.0 270m; terminal depth 250m, 10 bottles closed
Cast 085 - sta 70.0 55.0, nothing noted
Cast 086 - sta 70.0 60.0, nothing noted
Cast 087 - sta 70.0 70.0, no issues noted
Cast 088 - sta 70.0 80.0, light rain noted; pH check sample #13557 taken
Cast 089 - sta 66.7 90.0, 75m chl max
Cast 090 - sta 66.7 80.0, no issue reported
Cast 091 - sta 66.7 70.0, nothing reported
Cast 092 - sta 66.7 60.0, bottle #11 mistripped, data acquisition stopped so it was restarted as 992 & sent to 10m to close bottle #13
Cast 093 - sta 66.7 55.0, chl max @10m
Cast 094 - sta 63.3 52.0, shallow 89m, 6 bottles; hdr mislabeled Line 66.7 - edited/corrected post-cruise
Cast 095 - sta 63.3 55.0, shallow 307m - terminal depth 10m off bottom 297m; hdr mislabeled Line 66.7 - edited/corrected post-cruise
Cast 096 - sta 63.3 60.0; hdr mislabeled Line 66.7 - edited/corrected post-cruise
Cast 097 - sta 63.3 70.0, chl max @35m - 20m bottle changed to 35m; hdr mislabeled Line 66.7 - edited/corrected post-cruise
Cast 098 - sta 63.3 80.0, pH check sample #13558 taken; hdr correct
Cast 099 - sta 63.3 90.0, chl max @70m - #9 62m bottle changed to 70m
Cast 100 - sta 60.0 90.0; hdr mislabeled Line 63.3 - edited/corrected post-cruise
Cast 101 - sta 60.0 80.0; hdr okay; #8 87m bottle depth adjusted to 85m chl max
Cast 102 - sta 60.0 70.0; bottle #11 mistripped so went back down to 10m and tripped #13
Cast 103 - sta 60.0 60.0, tripped #11 & 12 at 10m just to be safe of mistrips, only sampled from #12 and skipped duplicate 10m #11; #9 50m bottle depth adjusted to 40m chl max

Cast 104 - sta 60.0 53.0, last station, shallow 91m, 6 bottles closed

**File notes:**

Seasoft-generated asc-hdr files were not renamed to YY-YYLLLLSSSS_###d or u.asc & .hdr. Voltages were not relabled. This practice makes it difficult to reprocess & merge with bottle data if necessary.

**Mislabels found and corrected:**

Cast 011, 083, 094-097, 100 Line &/or Sta was mislabled in the .hdr, .hex. Hexedit-corrected post-cast

15May2018