

1708SR CTD Notes & Final Data Processing

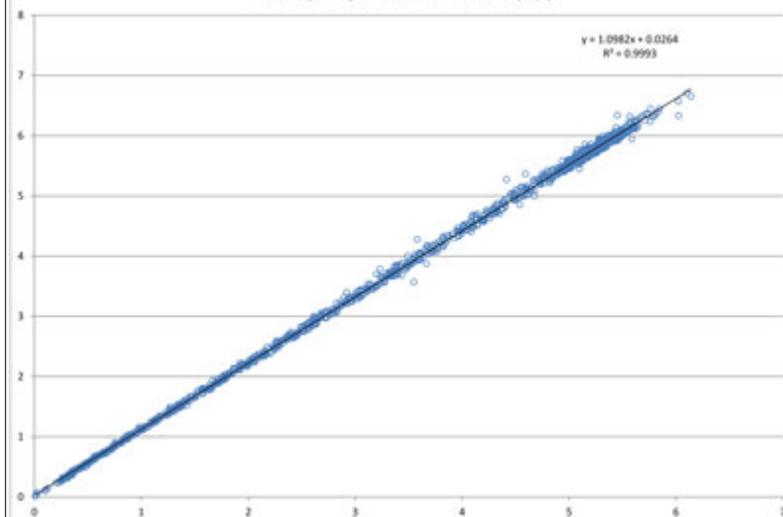
Parent Category: 2017 Cruises (/cruises/2017-cruises.html)

Category: CalCOFI 1708SR (/cruises/2017-cruises/calcofi-1708sr.html)

📅 Last Updated: 22 May 2018

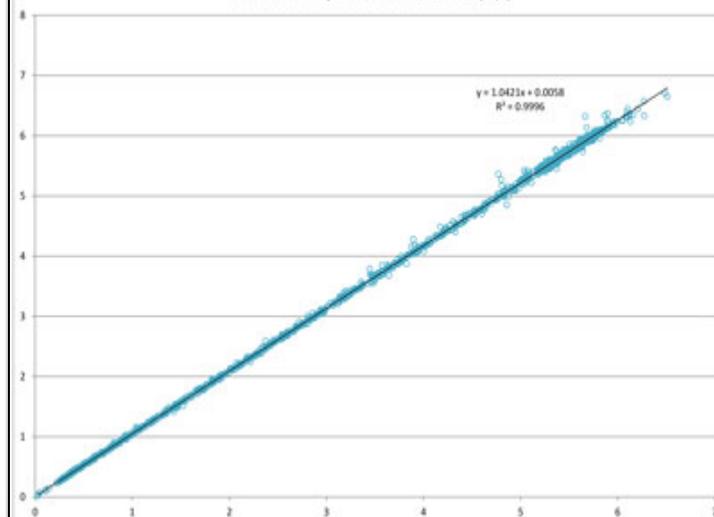
CTD Processing Summary CalCOFI 1708SR CTD FINAL Data		
Download 1708SR CTD raw cast files zipped (http://cappuccino.ucsd.edu/downloads/2017/20-1708SR_CTDCast.zip)	Download 1708SR Final CTD + bottle data (http://cappuccino.ucsd.edu/downloads/2017/20-1708SR_CTDFinalQC.zip)	
<p>General CTD Notes - data acquisition notes, logistics, processing - see below.</p> <p>Please note that these regressions are generated from FINAL CTD vs bottle data and have be reprocessed with final bottle. CTD temperatures and salinities may not have changed but oxygen, estimated chlorophyll-a, estimated nitrate may have changed 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.</p>		
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)	-0.00189	-0.00327
Oxygen ml/L (dual Seabird SBE43)	$y = 1.0982x + 0.0264$ $R^2 = 0.9993$	$y = 1.0421x + 0.0058$ $R^2 = 0.9996$
Oxygen umol/Kg (dual Seabird SBE43; 2° O2 Calib Off)	$y = 1.099x + 1.2798$ $R^2 = 0.9993$	$y = 1.0429x + 0.3795$ $R^2 = 0.9996$
Single sensors	Linear	Polynomial
Nitrate - ISUS 4sec ave voltage vs Bottle NO3 (Satlantic ISUS v3 SN111) Cast 001 - 036	$y = 32.427x - 2.435$ $R^2 = 0.9142$	Please note that the MBARI-ISUS light tube lost its reflective sensor surface (mirror). Although the ISUS light emitter was working, the reflected signal was not detected properly. A replacement optical tube was installed post-cruise once the problem was discovered.
Fluorometer - linear & polynomial regressions	$y = 10.817x - 0.4933$ $R^2 = 0.8052$	$y = 12.364x^2 + 4.9555x - 0.1677$ $R^2 = 0.867$

CalCOFI 1708SR: Primary CTD Oxygen vs Bottle Oxygen
4sec ave primary CTD O2 sensor vs bottle O2 (ml/L)



(http://cappuccino.ucsd.edu/downloads/2017/1708SR/final/1708SR_Ox1MLvsOxBML.jpg)

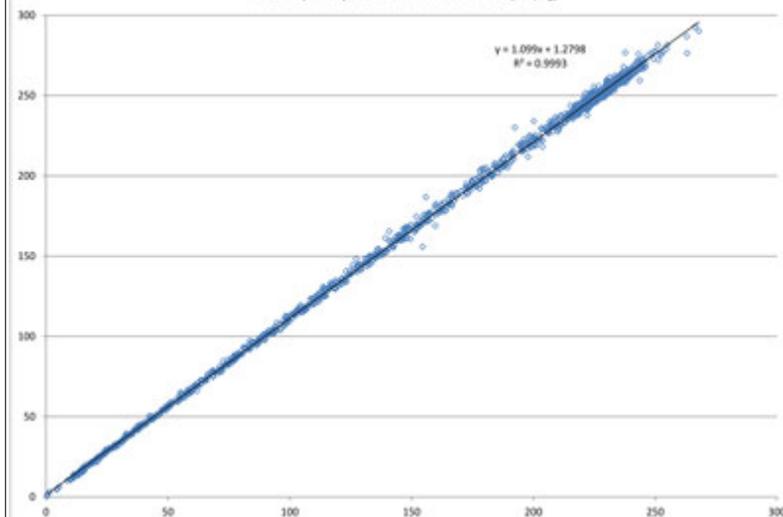
CalCOFI 1708SR: Secondary CTD Oxygen vs Bottle Oxygen
4sec ave secondary CTD O2 sensor vs bottle O2 (ml/L)



(http://cappuccino.ucsd.edu/downloads/2017/1708SR/final/1708SR_Ox2MLvsOxBML.jpg)

(<http://cappuccino.ucsd.edu/downloads/2017/1708SR/final>

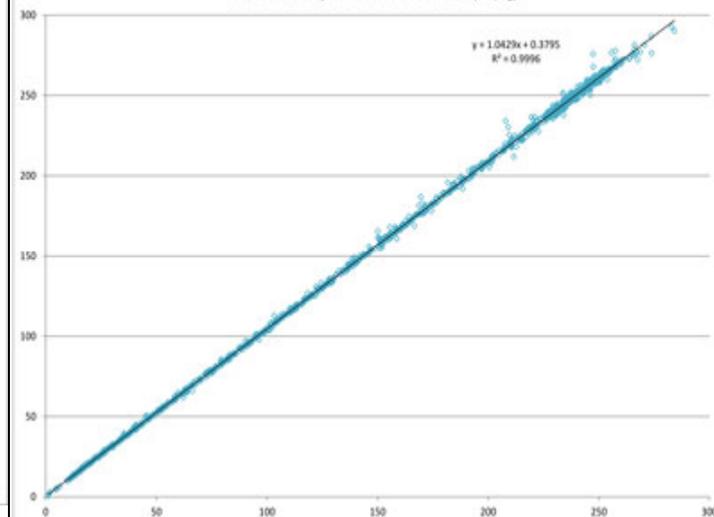
CalCOFI 1708SR: Primary CTD Oxygen vs Bottle Oxygen
4sec ave primary CTD O2 sensor vs bottle O2 (uM/Kg)



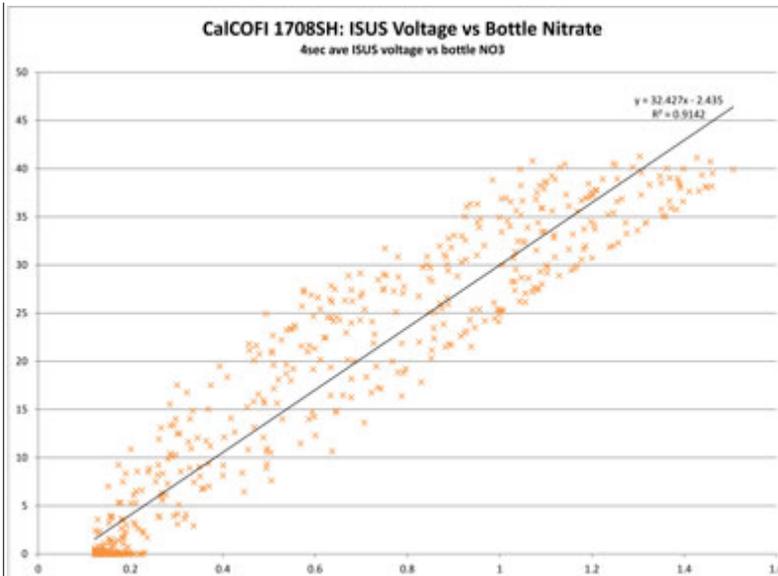
[/1708SR_Ox1UMvsOxBUM.jpg](#))

(<http://cappuccino.ucsd.edu/downloads/2017/1708SR>

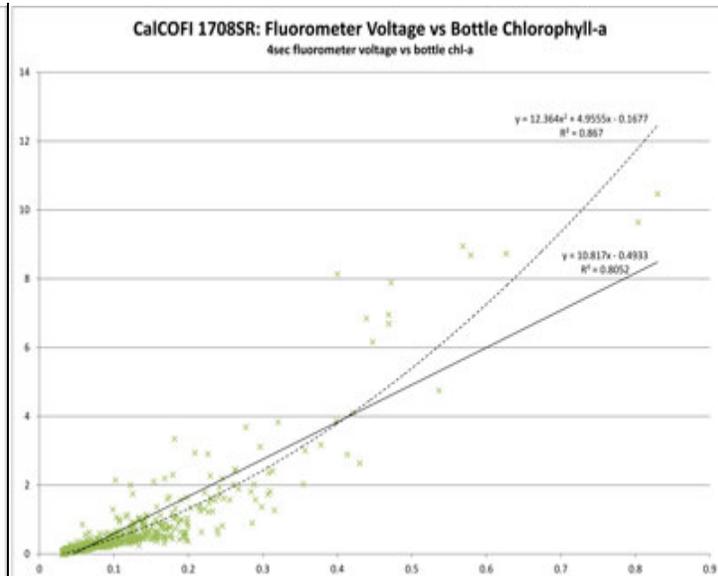
CalCOFI 1708SR: Secondary CTD Oxygen vs Bottle Oxygen
4sec ave secondary CTD O2 sensor vs bottle O2 (uM/Kg)



[/final/1708SR_Ox2UMvsOxBUM.jpg](#))

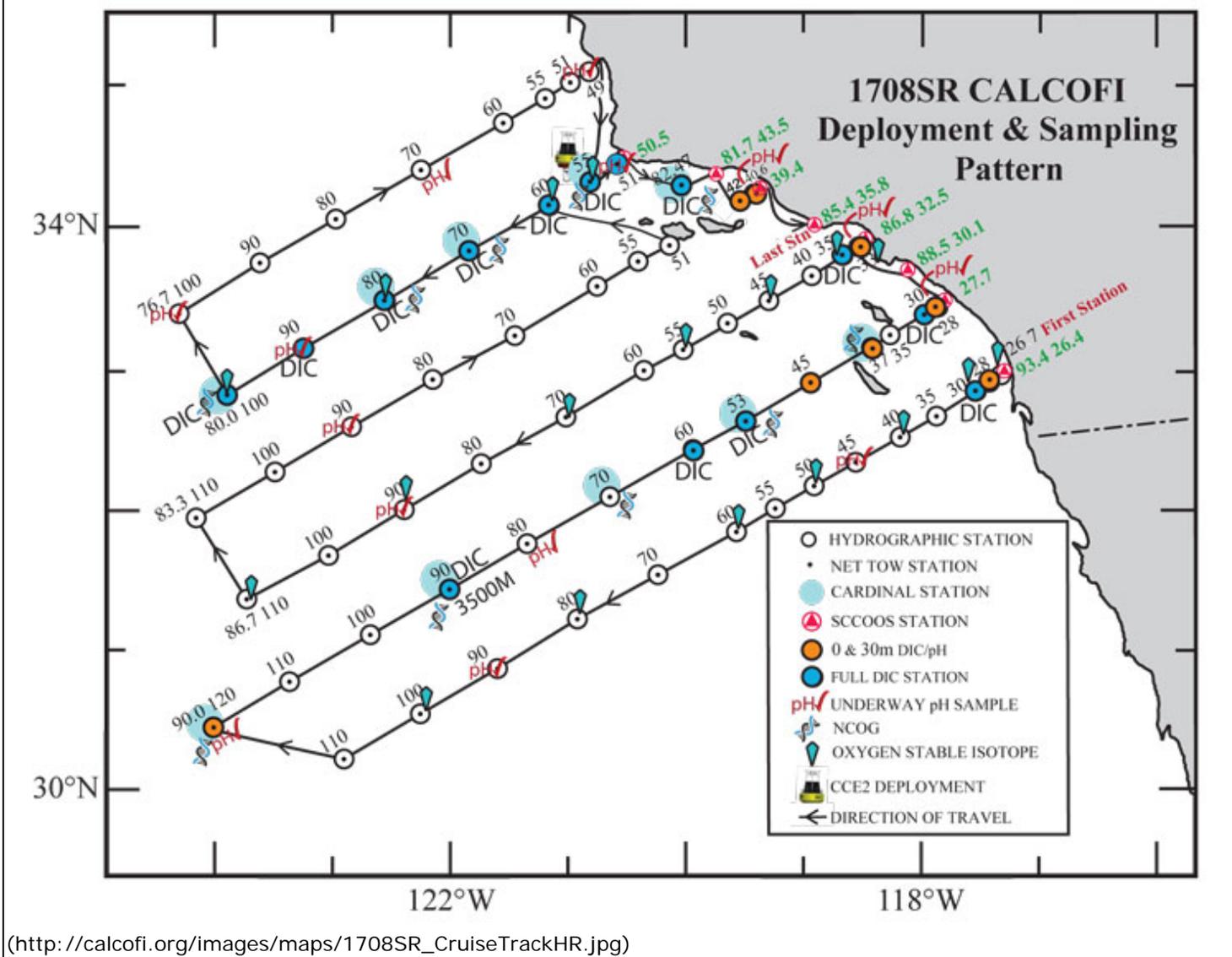


(http://cappuccino.ucsd.edu/downloads/2017/1708SR/final/1708SR_ISUSVsNO3.jpg)



(http://cappuccino.ucsd.edu/downloads/2017/1708SR/final/1708SR_FIVvsChla.jpg)

General notes: These are cast & FINAL CTD Processing Notes from 1708SR cruise



(http://calcofi.org/images/maps/1708SR_CruiseTrackHR.jpg)

CalCOFI 1708SR General Cruise & Cast Notes:

Stations and Station Order: CalCOFI 1708SR on RV Sally Ride occupied 73 scheduled stations: 65 standard (occupied 4 times a year) and 8 SCCOOS 20m nearshore stations. The station order was south > north > south, west > east > west starting off San Diego with the last station off Pt Dume near Ventura. After station #51, 83.3 51.0, RV Sally Ride transited north to Line 80, sta 80.0 60.0. Sta 80.0 55.0 was postponed till Uwe Send's mooring team was brought onboard at Avila Beach, after sta 76.7 49.0 14Aug2017. The CCE2 mooring was deployed 14Aug2017 before CalCOFI station work (CTD & nets) on sta 80.55 was completed. Deployment took ~5hrs from 1600 - 2100PDT.

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 SIO-CalCOFI 24-bottle CTD-LARS rosette was installed on RV Sally Ride's termination, LARS deployment system, and CTD PC & non-uplink deck unit. The CTD configuration throughout the cruise was our 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; CCE-LTER Satlantic ISUS v3 (SN 111 serviced & upgraded to firmware v3 just prior to CalCOFI 1708SR) & Wetlabs (custom) 12V batteries. Please refer to the xmlcon files or cruise prospectus for additional info & metadata.

There were problems with both the SIO-CalCOFI transmissometer (SN 810-DR) and CCE-LTER ISUS (SN 111). The transmissometer was deck tested prior to the first cast, using min & max voltages to calculate M & B coefficients, and looked normal. But transmissometer data from first casts 001-010 are bad. On cast 011, STS' backup transmissometer (ODF 1115DR) replaced the faulty transmissometer and worked fine the rest of the cruise. Deck-tested (file 1708911), the transmissometer voltages were used to calculate M & B for the replacement transmissometer used on casts 011-073. After the last cast, the transmissometer was remounted onto the STS backup CTD-rosette.

The newly serviced & upgraded ISUS nitrate sensor responded normally for several casts but began to deteriorate, getting noisier and noisier around cast 008. Initially, although noisy, it appeared to profile the nitrate vs depth, so it was deployed with troubleshooting done between casts - cleaning the optical surfaces & adding a new signal & battery cable. Seabird was sent example plots displaying the problem and the ISUS was removed after cast 036 for benchtop testing per their recommendation. Spectra analysis at 220nm during benchtop testing showed ~3000 counts, well below the ~15,000 counts expected. It was determined that an internal optical component may have failed and the ISUS was not re-installed. There are no ISUS sensor data on voltage 6 or ISUS est. NO₃ for casts 037-073. ISUS sensor data will be processed and assessed for potentially viable data on casts 001-036.

Logistics: CalCOFI 1708SR pre-loaded a stakebed & van with gear Friday 28Jul, then loaded RV Sally Ride at MarFac Sunday 30 Jul. More loading and setup continued Monday 31 Jul. Departure 01 Aug was delayed till ~1015PDT as final installation of the CUFES rail-mounted pump pipe was completed. RV Sally Ride sailed with 15 scientists and 2 volunteers at 1015PDT 01 Aug 2017. No acoustic calibration of the EK60 was performed. Five additional personnel came onboard after station 77.49, water-taxed from Avila Beach ~1120PDT 14Aug2017.

RV Sally Ride's two-conductor termination was used with the Sally Ride's v2 non-uplink deck unit and CTD PC for all casts. Sally Ride's monitor, keyboard & mouse were also used. SIO-CalCOFI's Seabird Remote Depth Readout Box was not used. NMEA GPS feed is attached to the CTD PC via serial port. The Sally Ride CTD PC is set to UTC so event times (CELog) had be adjusted (CELog reprogrammed to optionally convert UTC) to PST.

The termination work fine throughout the cruise and two sensors were 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 data network on the ship's network and there were no issues. Internet was available throughout the cruise on individual devices using a quota-based user account on either wireless or hard-wired connections.

The CESL sample log tablet, hard-wired to the data network, worked reliably although slow at times. The Sally Ride bridge watch logged most station activities on an eventlog tablet via wifi. The CTD console PC and supplemental sample-area tablet were also available for logging events. The Chl Van Flog fluorometer computer had no network issues of note.

Late in the cruise, around sta 77.60, the sample-area tablet which served GPS to the eventlogging network had problems with position. The GPS (GlobalSat BU-353-S4) receiver and usb extension cable were replaced with new units and that solved the problem. The eventlog lat-lon-date-time entries were corrected on these two stations: 77.60 & 77.55. SIO-CalCOFI's Portasal "Harry" was used throughout the cruise and worked fine.

E. Hunt was trained on QuAAtro nutrient analysis this cruise by D. Faber. D. Schuller was watchleader from 1600-0000.

RV Sally Ride has Knudsen 3.5 & 12kHz echosounders to find the bottom depth. RV Sally Ride also has an EK80 system which worked throughout the cruise. For deeper depths, the Knudsen depth values were typically recorded for bottom depth. When shallow, the Knudsen agree well with the CTD altimeter. The EK80 display often was significantly off.

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

Cast 001 - sta 93.3 26.7, 1433PST, no prodo; 61m bottom depth; salinity, oxygen sensor data spikes around 12-15m on cast plots - steep temperature gradient; processed profiles look fine; transmissometer looks bad; console ops cast time reported in PDT; 10-11m CTD data on upcast is bad and nulled.

Cast 002 - SCCOOS 93.4 26.4, 19m deep; transmissometer looks bad; console ops cast time reported in PDT

Cast 003 - 93.3 28.0 0&30m DIC/pH; (skipped Camp Pendleton SCCOOS 91.7 26.4), bottom depth 640m; all sensors working fine except transmissometer; console ops cast time reported in PDT

Cast 004 - sta 93.3 30.0 DIC sta; calm, transmissometer still bad, cable connection serviced; console ops cast time reported in PDT

Cast 005 - sta 93.3 35.0; lots of pyrosomes; transmissometer still low; upcast much different than downcast; console ops cast time reported in PST

Cast 006 - sta 93.3 40.0, calm sunrise sta, transmissometer bad - will install new cable asap; console ops cast time reported in PST

Cast 007 - sta 93.3 45.0 prodo sta; 24 bottles tripped; transmissometer not good; console ops cast time reported in PDT; pH check sample #13737

Cast 008 - sta 93.3 50.0, CTD yo-yo'd back down to 270m from 220m, bottle 5 = 220m bottle 6 = 270m; transmissometer still bad

Cast 009 - sta 93.3 55.0, no issues recorded; console ops times in PDT

Cast 010 - sta 93.3 60.0, some times recorded as PDT but watch changed at 0000PDT & last 6 bottles recorded in PST; transmissometer not good; ISUS signal deteriorating

Cast 011 - sta 93.3 70.0; transmissometer not good; ISUS signal deteriorating but still profiling; Downcast primary CTD data looks bad from 2-3m, secondary CTD sensor data look questionable 2-3m downcast. CTD may have popped out of the water on return to surface from 10m soak.

Cast 012 - sta 93.3 80.0 prodo sta; console ops times in PDT; transmissometer finally replace with backup (ODF 1115DR) - operational, calibrated (M & B); ISUS signal deteriorating but still profiling, sensor cleaned with alcohol swab

Cast 013 - sta 93.3 90.0; new transmissometer working fine; ISUS signal deteriorating but still profiling; pH check sample #13738

Cast 014 - sta 93.3 100.0; ISUS signal deteriorating but still profiling

Cast 015 - sta 93.3 110.0; end of Line 93 this cruise; ISUS signal getting noisier but still profiling; unusual T & S layer ~48-130m; bottle #7 replaced; 3.5khz echosounder bottom = 3888, EK80 bottom = 3742

Sta 93.3 120.0 skipped to save shiptime

- Cast 016 - sta 90.120.0 prodo sta, 0&30m DIC/pH+NCOG; ISUS battery not plugged in - replacement necessary after anode eroded; ISUS signal worsening; pH check sample #13739
- Cast 017 - sta 90.0 110.0, no issues recorded; ISUS signal extremely noisy
- Cast 018 - sta 90.0 100.0, ISUS serviced, new data cable installed, and sensor moved up, off plate in case of grounding or flow issues.
- Cast 019 - sta 90.0 90.0, DIC+NCOG station; 1000's of pyrosomes; double chl max (40m & 67m); calm night; 3849m bottom 3.5khz, 3921m EK80 bottom
- Cast 020 - sta 90.0 80.0 prodo sta; ISUS continues to be bad; pH check sample #13757
- Cast 021 - sta 90.0 70.0 +NCOG, ISUS still recording but not good - no replacement unfortunately
- Cast 022 - sta 90.0 60.0 +DIC, missed 70m bottle - went back down to get 70m after 30m bottle - yo-yo'd
- Cast 023 - sta 90.0 53.0, DIC+NCOG station; ISUS connected to laptop and reprogrammed but still noisy, no improvement - hardware issue most likely; calm night
- Cast 024 - sta 90.0 45.0, 0&30m DIC/pH, 24-btl prodo station, no issues noted;
- Cast 025 - sta 90.0 37.0, 0&30m DIC/pH station + NCOG; extremely noisy ISUS plot
- Cast 026 - sta 90.0 35.0, ~316m
- Cast 027 - sta 90.0 30.0, DIC station
- Cast 028 - sta 90.0 28.0, 0&30m DIC/pH = pH check sample #13793
- Cast 029 - SCCOOS sta 90.0 27.7, calm night off Dana Pt
- Cast 030 - SCCOOS sta 88.5 30.1, calm night off Long Beach
- Cast 031 - SCCOOS sta 86.8 32.5
- Cast 032 - sta 86.7 33.0 prodo sta, 0&30m DIC/pH; pH check sample #13794
- Cast 033 - sta 86.7 35.0, DIC sta
- Cast 034 - sta 86.7 40.0, Santa Monica Basin 740m cast - 24btls tripped
- Cast 035 - sta 86.7 45.0, forgot to trip bottle 4 320m - went back down from 270m - bottle order okay but CTD yo-yo'd; no surface bottle tripped
- Cast 036 - sta 86.7 50.0, San Nicolas Island station ~79m, moderate seas, winds 20+kts; ISUS removed post-cast after Seabird recommended trouble-shooting did not solve the problem.
- Cast 037 - sta 86.7 55.0, ISUS offline -removed from rosette, battery left on (ballast) & dummied; moderate seas
- Cast 038 - sta 86.7 60.0 prodo sta, 24 btls closed; moderate-rough seas
- Cast 039 - sta 86.7 70.0, no issues recorded
- Cast 040 - sta 86.7 80.0, no notes recorded
- Cast 041 - sta 86.7 90.0, type I, pH check sample #13805 taken; night, moderate seas, winds ~15+kts; bottle #19 came up opened, seen when CTD was lifted out of the water so CTD was sent back down to 10m to get the seawater sample, bottle 22 = 10m; CTD yo-yo'd from surface to 10m to surface/recovered between swells
- Cast 042 - sta 86.7 100.0 24-btl prodo station, no issues noted
- Cast 043 - sta 86.7 110.0, nothing noted

Cast 044 - sta 83.3 110.0, nothing of note

Cast 045 - sta 83.3 100.0, choppy seas but relatively calm night

Cast 046 - sta 83.3 90.0 24 btl early prodo station; 340m bottle tripped - no 380m bottle depth, no reason noted; check pH sample taken #13806

Cast 047 - sta 83.3 80.0, chl max ~90m

Cast 048 - sta 83.3 70.0, no notes

Cast 049 - sta 83.3 60.0, temperature inversion at ~200m

Cast 050 - sta 83.3 55.0, moderate-rough seas, night

Cast 051 - sta 83.3 51.0, shallow (96m) prodo station, 14 bottles closed

Turned north to Line 80 to save 10+hrs transit time

Cast 052 - sta 80.0 60.0, DIC station, nothing noted

Cast 053 - sta 80.0 70.0, DIC+NCOG, Mola Mola during vertical net tows,

Cast 054 - sta 80.0 80.0, DIC+NCOG+JOSI station; extra nav generated at ~170m upcast - ignore; sea state mellowing out a bit; night-early morning cast; arrived on sta ready to deploy but no winch operator for several minutes

Cast 055 - sta 80.0 90.0, DIC+Prodo(+NCOG) station, 24 btls closed; pH check sample #13840 taken

Cast 056 - sta 80.0 100.0, DIC+NCOG; NCOG bottles 15, 21

Cast 057 - sta 76.7 100.0, pH check sample #13851; unusual T & S feature ~80-130m - temperature inversion noted at 87m

Cast 058 - sta 76.7 90.0, no Knudsen echosounder reading visible - bottom depth from EK80 - deep here

Cast 059 - sta 76.7 80.0 prodo station, 24 bottles closed

Cast 060 - sta 76.7 70.0, check pH taken #13852

Cast 061 - sta 76.7 60.0, chl max from 0-20m

Cast 062 - sta 76.7 55.0, light mist, lots of larger pyrosomes; pretty calm seas. Tunnel thruster making a lot of noise this station; 300m blip in T, S, O2

Cast 063 - sta 76.7 51.0, 16 bottles closed, shallow sta (233m); misty, chl max at surface with no mixed layer

Cast 064 - sta 76.7 49.0 65m early prodo station; pH check sample #13853

Run to Avila Beach to pickup Uwe Send's mooring team, transiting south to sta 80.0 55.0 to deploy the mooring then do the CTD for groundtruthing

Cast 065 - sta 80.55.0, DIC+NCOG station, 23 bottles closed - 15m bottle added, post-mooring deployment

Cast 066 - sta 80.0 51.0, shallow DIC station, 77m; winch bypassed the 5m request initially, sent back down to 5m then returned for surface bottle; calm warm night; pH check sample #13867

Cast 067 - SCCOOS sta 80.0 50.5, 25m bottom; calm night; Ian on watch for this one

Cast 068 - sta 81.8 46.9, Santa Barbara Basin prodo DIC+NCOG 24-bottle 583m station - terminal bottle only 5m off bottom (calm seas); only one bottle tripped at depth, 2nd bottle was 515m since prodo depth needed; CTD deck pressure high so -0.1 offset applied

Cast 069 - SCCOOS sta 81.7 43.5, nothing noted but after dropping off the mooring team at Santa Barbara; not labeled

SCCOOS in hdr

Cast 070 - sta 83.3 42.0, 141m deep, 14 bottles, 0&30m DIC/pH;

Cast 071 - sta 83.3 40.6, 0&30m DIC/pH; 33m bottom depth, 6 bottles

Cast 072 - SCCOOS sta 83.3 39.4, 16m bottom depth, 3 bottles

Cast 073 - SCCOOS sta 85.4 35.8, 16-19m bottom depth, 3 bottles

File notes:

Mislabeled found and corrected:

Cast 067 was line.sta was labeled 80.0 5 instead of 80.0 50.5 - corrected in all files. Cast 069 sta 81.7 43.5 not labeled SCCOOS.

JRW 05/22/2018