

Parent Category: 2015 Cruises (/cruises/2015-cruises.html)
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 Last Updated: 10 March 2017

CTD Processing Summary CalCOFI 15070C CTD Final Data

Download 15070C CTD raw cast files zipped
 (http://cappuccino.ucsd.edu/downloads/2015/20-15070C_CTDCast.zip)

Download 15070C FinalQC CTD + bottle data
 (http://cappuccino.ucsd.edu/downloads/2015/20-15070C_CTDFinalQC.zip) Note:
 primary oxygen sensor data on casts 4 & 5 are bad. The sensor was replaced on cast 6.

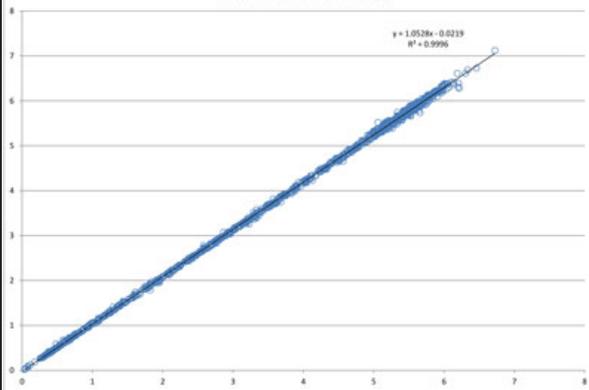
General CTD Notes - data acquisition notes, logistics, processing - see below.

Please note that these regressions are generated from FINAL CTD vs bottle data. CTD temperatures and salinities have not change much but oxygen, estimated chlorophyll-a, estimated nitrate may have change slightly after point-checking.

CTD sensor corrections derived by comparing CTD sensor data, 4sec average prior to bottle closure, to bottle samples

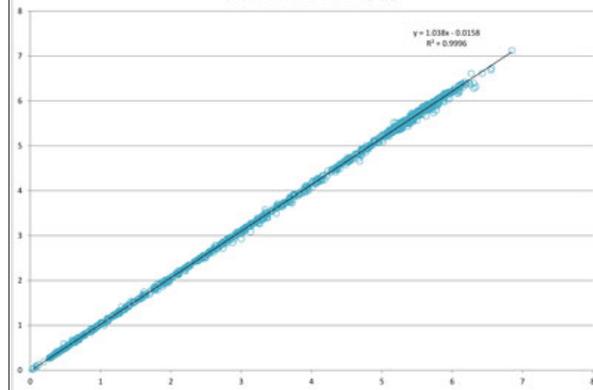
Dual T, S, & O2	Primary Sensor	Secondary Sensor
Salinity offset (bottle - CTD salinity; > 350m only; Seabird SBE4)	0.0010	0.0039
Oxygen ml/L (dual Seabird SBE43; 2° O2 Calib Good)	$y = 1.0528x - 0.0219$ $R^2 = 0.9996$	$y = 1.0381x - 0.0158$ $R^2 = 0.9996$
Oxygen umol/Kg (dual Seabird SBE43; 2° O2 Calib Good)	$y = 1.0547x - 0.8194$ $R^2 = 0.9996$	$y = 1.0399x - 0.5543$ $R^2 = 0.9996$
Single sensors	Linear	Polynomial
Nitrate - ISUS 4sec ave voltage vs Bottle Nitrate (Satlantic MBARI-ISUS v2)	$y = 28.031x - 8.7794$ $R^2 = 0.9906$	
Fluorometer - linear & polynomial regressions	$y = 7.4981x - 0.2437$ $R^2 = 0.7392$	$y = -0.182x^2 + 7.5075x - 0.2442$ $R^2 = 0.7392$

CalCOFI 15070C: Primary CTD Oxygen vs Bottle Oxygen
 4 sec ave CTD sensor vs bottle O2 (ml/L)



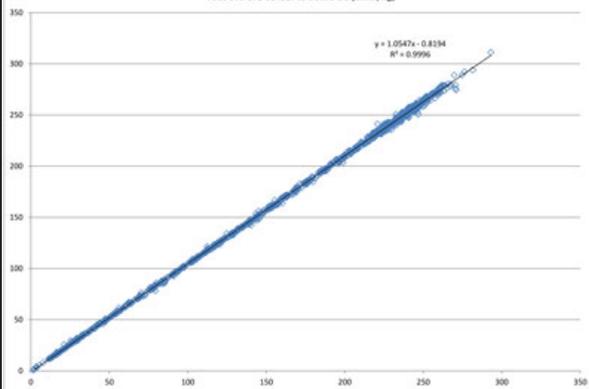
(http://cappuccino.ucsd.edu/downloads/2015/15070C/15070C_Ox1MLvsOxBML.jpg)

CalCOFI 15070C: Secondary CTD Oxygen vs Bottle Oxygen
 4 sec ave CTD sensor vs bottle O2 (ml/L)



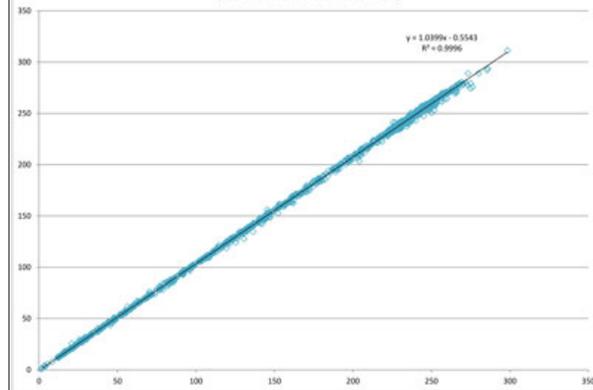
(http://cappuccino.ucsd.edu/downloads/2015/15070C/15070C_Ox2MLvsOxBML.jpg)

CalCOFI 15070C: Primary CTD Oxygen vs Bottle Oxygen
 4 sec ave CTD sensor vs bottle O2 (umol/Kg)



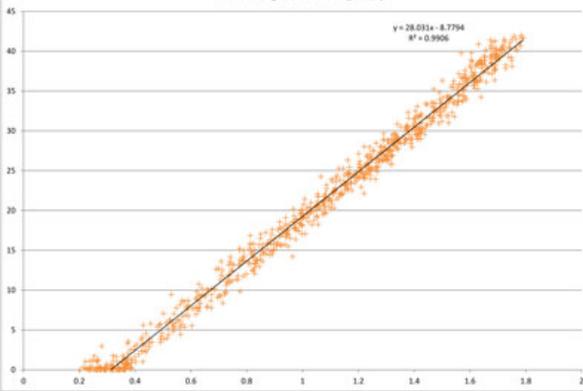
(http://cappuccino.ucsd.edu/downloads/2015/15070C/15070C_Ox1UMvsOxBUM.jpg)

CalCOFI 15070C: Secondary CTD Oxygen vs Bottle Oxygen
 4 sec ave CTD sensor vs bottle O2 (umol/Kg)



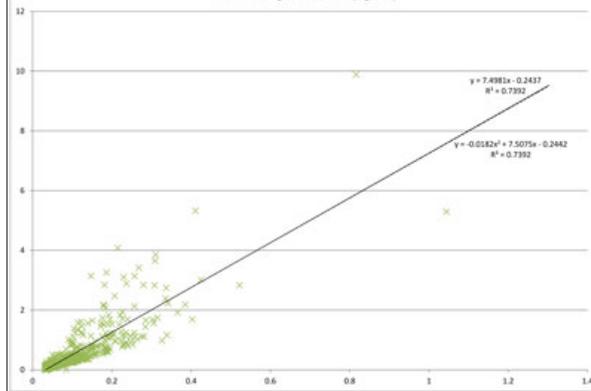
(http://cappuccino.ucsd.edu/downloads/2015/15070C/15070C_Ox2UMvsOxBUM.jpg)

CalCOFI 15070C: ISUS Voltage vs Bottle NO3



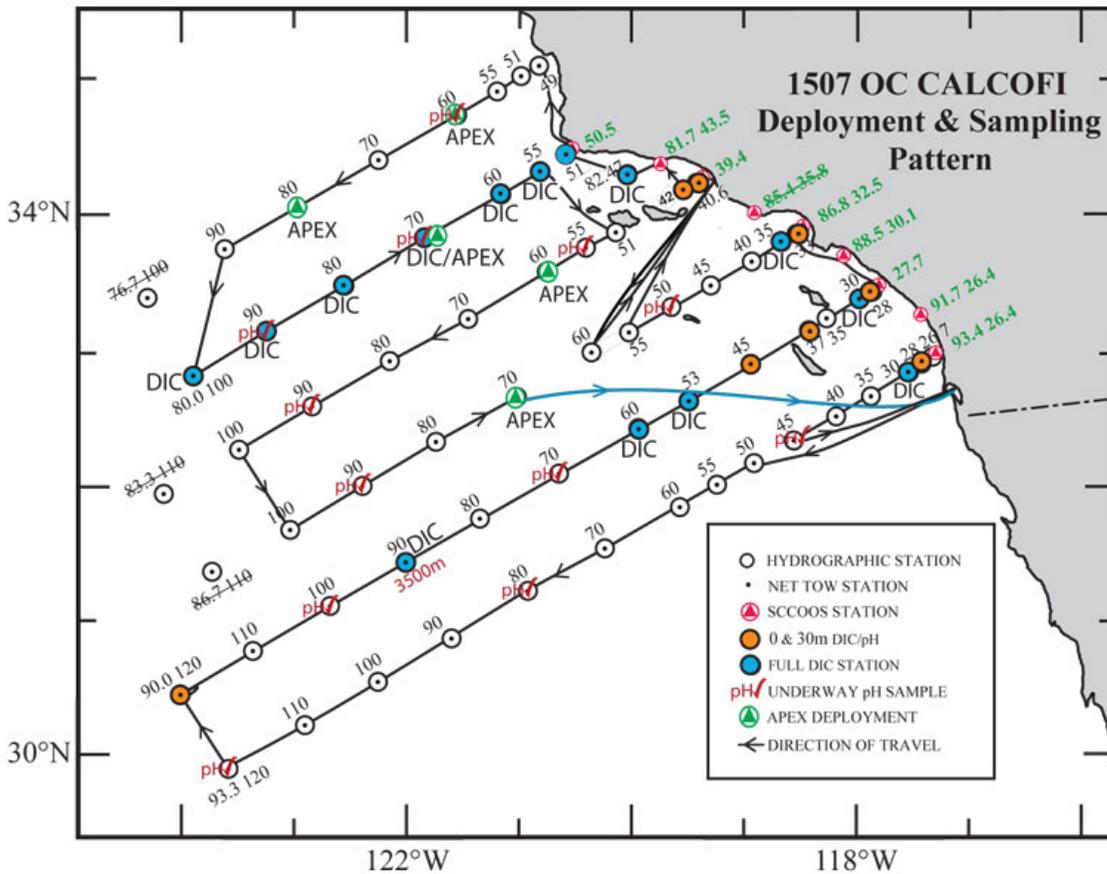
(http://cappuccino.ucsd.edu/downloads/2015/15070C/15070C_ISUSVsNO3.jpg)

CalCOFI 15070C: CTD Fluorometer Voltage vs Chlorophyll-a



(http://cappuccino.ucsd.edu/downloads/2015/15070C/15070C_FIVvsChla.jpg)

General notes: These are final cast & CTD Processing Notes from 15070C cruise



CalCOFI 15070C General Cruise & Cast Notes: This cruise occupied 71 stations: 63 standard, & 8 SCCOOS. The stations were occupied in a non-traditional sequence because of ship equipment failure and personnel delays. Offshore stations 86.7 110, 83.3 110, 76.7 100 were not occupied in order to maximize the number of stations completed. The Pt Dume SCCOOS station at 85.4 35.8 was not occupied since we transited directly from 86.7 70.0 south to San Diego. No stations or net tows were missed because of bad weather. But ancillary PRPOOS net tows on lines 86.7 & 83.3 were skipped and the 3500m deep CTD casts were cancelled to conserve shiptime. Standard 515m casts were performed on stas 90.0 90.0 & 80.90. PRPOOS net tows were done on all cardinal stations on lines 80.0 and 90.0.

CalCOFI 15070C was CalCOFI's first cruise on OSU R/V Oceanus. Two-day loading and setup were performed at 10th Ave Marine Terminal San Diego. R/V Oceanus' two-conductor termination, deck unit, CTD computer, and depth-readout box were used with SIO-CalCOFI's 24-bottle CTD-Rosette. There were no issues with the conductive wire but when the hydro winch (CTD winch 2) was used, the deck unit no longer talked to the CTD. This was only an issue during the daily primary productivity cast when trying to warm up the CTD during the secchi cast - this was not possible. The CTD deck unit was kept off during the secchi cast then started after hydro wire was pulled. R/V Oceanus winches are electric so the switching from one winch to another might affect the ground or junction box - no answer was found. The electric winches have very fine control and were extremely quiet. Oceanus' remote depth readout responds fast so it wasn't necessary to add 1m to the target depth on the upcast.

The primary oxygen sensor failed on cast 4, was bad on cast 5, and replaced on cast 6. Secondary oxygen sensor worked fine on all casts so use secondary oxygen sensor data on casts 4 & 5.

The CTD configuration throughout the cruise was standard: Seabird 911+ (new pressure case since 1501) 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 v2 & Wetlabs (custom) batteries. Please refer to the xmlcon files or cruise prospectus for additional info & metadata. Other than the failure of the primary oxygen sensor on casts 4 & 5, all the sensors worked well. A new univeral Y-cable on the C-Star transmissometer seemed to eliminate the low voltage spikes at depths below 400m on the downcast seen on previous cruises. The Satlantic ISUS nitrate sensor lamp hours have reached over 800 hours so it will be sent back to Satlantic for lamp replacement post-cruise. The ISUS was mounted vertically, with optics pointing down.

Note: SIO-CalCOFI CTD-Rosette was running on R/V Oceanus CTD system - deck unit, dual-screen computer, remote-depth readout via serial com port, GPS via serial com port. Seasave data acquisition had to be restarted often to handshake properly with GPS NMEA or else it would timeout. This was the only issue, other than going offline when the 2nd winch was operating, noticed with the Oceanus deck unit hosting our 911+. Our seasave screen display configuration was used and coefficients were imported.

RV Oceanus prefers to keep the Knudsen 12kHz echosounder on at all times while at sea, continually mapping the bottom depth.

Cast Notes:

Cast 01 - no issues reported on Console Ops.

Cast 02 - no issues reported on Console Ops; secondary oxygen sensor may have some bad data points; when matched to bottle O2, some values were slightly higher at surface (biofouling?).

Cast 03 - no issues reported on Console Ops; secondary oxygen sensor may have some bad data points; when matched to bottle O2, some values were slightly higher at surface (biofouling?).

Cast 04 - 93.3 28.0: all sensors look good except primary oxygen - displaying negative values.

Cast 05 - 93.3 30.0 primary oxygen sensor still reading negative, replaced post-cast

Cast 06 - ISUS was left plugged in so it was unplugged and restarted during bottle prep; oxygen sensor #1590 was installed, #680 was removed precast. It was discovered that the secondary oxygen coefficients were from a previous calibration so coefficient from the most recent calibration were imported. Casts 1 - 5 xmlcon files were updated - 2nd O2 sensor #1075 coefficients should be May 2015 not Mar

Cast 08 - ISUS not charged between stations, no data

Cast 08-09 - Family emergency delay, Oceanus' Chief Engineer taken to San Diego after sta 93.45 & replacement flew in next day. Returned to station 93.50 36 hours later.

Cast 09 - bottle #5 trigger was stuck during prep, cleaned, seemed to fire okay - O2 draw temperature looked good.

Cast 10 - bottle #1 broke(!), samples questionable. No obvious reason - CTD did not hit the ship - but the bottle was cracked and the grey PVC end tube broke free from white PVC body. New bottle installed post-cast.

Cast 11 - bottle #16 did not close so the CTD was sent back down and #21 tripped at 39m. CTD continuous data "yo-yo".

Cast 12 - CTD AT DEPTH event was late, ~440m on upcast because event log tablet needed to be restarted.

Cast 13 - Event log program on CTD computer was restarted but "Start" was not pressed so GPS was not updating.

Cast 14 - calm night, lots of pyrosomes; unusual stratified salinity layers in upper 100m. Bottle #7 (200m) O2 draw temperature was high so most likely mistripped. Pylon was Q-Tip cleaned post-cast.

Cast 15 - ISUS not charged between stations but worked. Hard to get a good Knudsen bottom reading, over 4000m deep here.

Cast 17 - cast delayed due to winch readout issues; cast done but no wire out or wire speed. Fixed post-cast.

Cast 19 - O2 sensors not agreeing initially, ~0.1ml/l off at start

Cast 21 - bottle #23 did not close at surface so #24 was tripped

Cast 22 - waited ~20mins to deploy while 1st mate was being trained to setup into the wind & swell

Cast 25 - flurometer spikes on downcast - noise or bugs? pH cap left on - no pH sensor data.

Cast 26 - ~3min delay with CTD acquiring data at surface while the GPS-Event Tablet was rebooted. Some ship rolls in moderate seas. Doug on winch adjusting CTD depth as wire settles - nice! Bottle #16 possible mistrip, O2 draw temperature high.

Cast 27 - ship rolls even though relatively calm, data loops as we sit in the trough. Winch speed spike to 80m/min for a brief period after 100m, winch operator told to keep it below 60.

Cast 28 - bottles #16 & #22 did not close so CTD was sent back down and #23 & #24 were tripped at 28m & 1m respectively.

Cast 29 - pylon "crown" replaced with backup to alleviate mistrips

Cast 31 - ISUS battery deployed unplugged, anode fried; battery switched post-cast. No ISUS data this cast.

Cast 35 - unusual inversion at ~290m. Bottle #17 tripped but didn't close.

Cast 36 - Knudsen read 756 so target depth was 745 but altimeter kicked on at ~720m, reading only 25m off the bottom so CTD was stopped at 735m. Soft bottom or large wire angle - wire out 776, CTD depth reading 735.

Cast 37 - bottles #1, 16, & 17 didn't close; bottle #17 27m prodo depth collected in bottle #24 after sending CTD back down. Pylon crown switched back to previous one and problem triggers replaced from backup inventory.

Cast 38 - shallow 9 bottle cast on sta 86.7 50.0 but all bottles tripped to test rebuilt crown - all bottles closed.

Cast 39-40 - A failure of the ship refrigeration unit require a port call repair to Port Hueneme, 16 hour delay between Cast 39 87.55 & Cast 40 87.60.

Cast 41 - after station 87.60 there was a 2nd ship equipment failure of the main generator cooling pump seal, another port call to Port Hueneme for repairs was required(!), 22 hour delay to get the part couriered from Fresno and installed during a stormy Saturday. Station schedule redone to avoid rough weather offshore - coastal run first, heading north then out on line 77 (76.7) - doing the remaining line north to south.

Cast 44 - up and downcast different, internal wave.

Cast 45 - Santa Barbara Basin, extremely calm sunrise station with thunder showers and lightning on the coast nearby. Relative humidity in mid 90%.

Cast 50 - wire out & Seabird depth readouts not working

Cast 51 - Nice chl peak at 38m, with spikes/noise at 122, 167, & 375m - will check the connector post-cast. Relatively calm but some big rollers. Upcast different than downcast - 350m feature noted.

Cast 52 - rolling so downcast speed being adjusted to reduce tension spikes; working quick so we can make prodo station, +-1m okay on bottle depths.

Cast 53-54 - mid-size rollers noted

Cast 55 - pH profiles have been looking odd - sensor needs to be sent back for maintenance post-cruise. GPS failure on CELog - no readout even after reboot. Turned out the rain had seeped into the wetlab and shorted out the GPS feed wire. Daryl was woken up and he reterminated the GPS wire. Light rain and moderate seas.

Cast 57 - Prodo+DIC+Cardinal! station

Cast 59 - higher frequency rolls. breather #18 closed but top valve opened

Cast 60 - barometer is finally reading to 10th on the MET screen thanks to Daryl (and my belated request). Some high freq rolls but relatively calm. Bottle #7 didn't close (200m). Triggers cleaned post-cast.

Cast 63 - pH is reading way too high

Cast 64 - short period rolls

Cast 65 - calm but some big rolls; good bottom trace

Cast 66 - soft bottom, poor bottom trace; last prodo station

Cast 69 - calm night with some small rolls, deep chl max at ~100m

Cast 70 - bottle #18 didn't close so CTD sent back to 25m to get that depth bottl #22, extra 10m tripped as well bottle #23

Cast 71 - Last station this cruise; bottle #21 didn't close so CTD was set back at surface for bottle closure at 2m bottle #21.

File notes:

08Mar2017 update to 20-150COC_CTDFinalQC.zip file:

Seasoft-generated asc-hdr files **are available** renamed to 20-15070C_LLLLLSSSS_###d or u.asc & .hdr. Voltage headers in .asc files were also relabeled, identifying the sensor channel.

Since file renaming makes it difficult to reprocess & merge with bottle data if necessary, the original final .asc, .hdr, & .btl files have also been archived. Their voltage header labels have not been changed, so refer to the corresponding .hdr file for sensor configuration. This cruise did not have any sensors rearranged.

Mislabeled found and corrected:

Sta 30 & 31 both labeled 90.0 28.0; 31 should be 90.0 27.7

07Aug2015

19Aug2015 update

On stations 53, 58, & 64 Seasave added some extra lines in the hdr. This caused the first preliminary run to have mislabeled line.sta in the ctd.csvs for these stations. These files were reprocessed and stations labeling corrected. Please download the latest preliminary zip.

25Oct2016 - Final bottle data used to correct the CTD sensor data. Cast 008 ISUS data not collected, Cast 002-003 had some slightly higher oxygen values so they were excluded from the correction regression. Salinity offsets did not change. ISUS profiles seemed to have more noise ie not smooth but response looks good, high r^2 .

08Mar2017 - Final bottle-corrected CTD archive - 20-15070C_CTDFinalQC.zip updated with additional CTD.asc & .hdr files relabeled and reheaders. See the 'FilenamingAndAscHeaderNotes.txt' file for additional info. Data themselves are unchanged.