


# CalCOFI 1611SR

## 1611SR CTD Final Data Processing (</cruises/2016-cruises/calcofi-1611sr/668-1611sr-ctd-final-data-processing.html>)

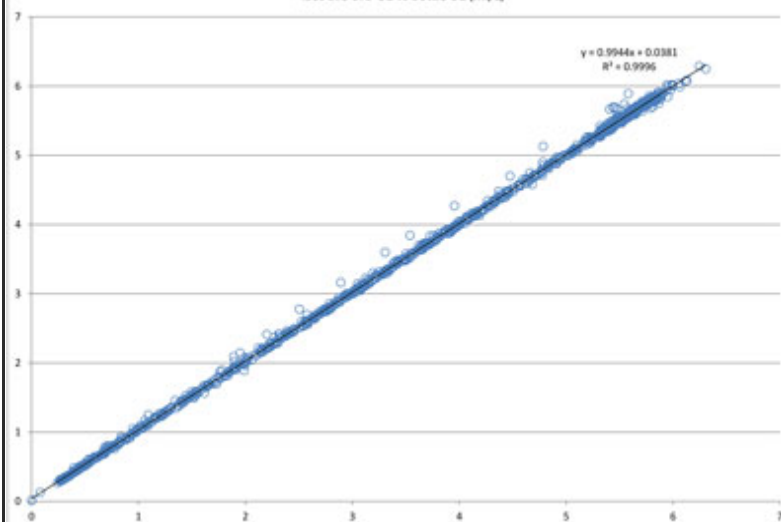
Parent Category: 2016 Cruises (</cruises/249-2016-cruises.html>)

Category: CalCOFI 1611SR (</cruises/2016-cruises/calcofi-1611sr.html>)

 Last Updated: 24 September 2017

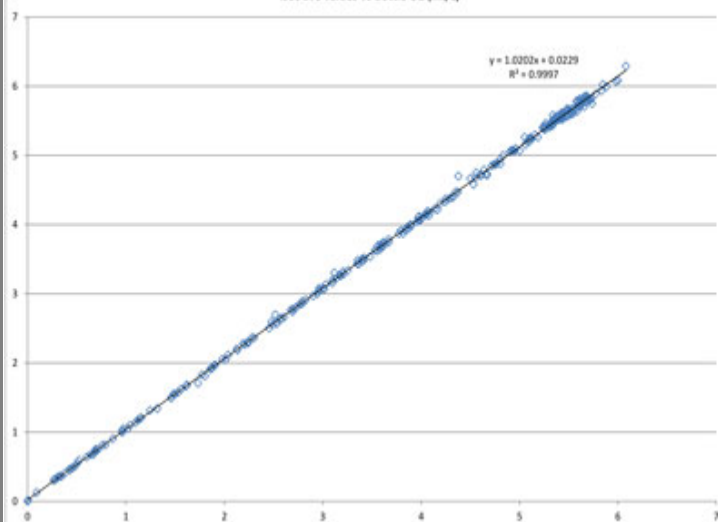
CTD Processing Summary CalCOFI 1611SR CTD Final Data			
Download 1611SR CTD raw cast files zipped (http://cappuccino.ucsd.edu/downloads/2016/20-1611SR_CTDCast.zip)		Download 1611 FinalQC CTD + bottle data (http://cappuccino.ucsd.edu/downloads/2016/20-1611SR_CTDFinalQC.zip)	
<b>General CTD Notes</b> - data acquisition notes, logistics, processing - see below.			
<b>Please note that these regressions are generated from final CTD vs bottle data</b> that were merged once final bottle data became available. CTD temperatures and salinities may not have significantly change but oxygens, particularly the RINKO III secondary oxygen data, estimated chlorophyll-a, estimated nitrate may change significantly. Questionable or mistrip bottle data were flagged and not used for these comparisons. For this cruise and future cruises, both primary & secondary sensor profiles vs bottle data have been generated and archived in the downloadable CTD+Bottle data files. These plots are under the "csv-plots\primary_plots" & "csv-plots\secondary_plots" subdirectories.			
CTD sensor corrections are derived by comparing CTD sensor data, 4sec average prior to bottle closure, to bottle samples			
Dual T, S, & O2	Primary Sensor	Secondary Sensor	RINKO III
Salinity offset (bottle - CTD salinity; > 350m only; Seabird SBE4)	-0.0017	-0.0051	
Oxygen ml/L (dual Seabird SBE43 on 27 stations; 1-SBE43 & 1-RINKO III on 48 stas, RINKO O2 data available now)	y = 0.9944x + 0.0381 R <sup>2</sup> = 0.9996	y = 1.0202x + 0.0229 R <sup>2</sup> = 0.9997	y = 1.0048x - 0.0123 R <sup>2</sup> = 0.9991
Oxygen umol/Kg (dual Seabird SBE43)	y = 0.9955x+1.799 R <sup>2</sup> = 0.9995	y = 1.0215x + 1.1389 R <sup>2</sup> = 0.9996	y = 1.006x - 0.4022 R <sup>2</sup> = 0.9991
Single sensors	Linear	Polynomial	
Nitrate - ISUS 4sec ave voltage vs Bottle Nitrate (Satlantic MBARI-ISUS v2)	y = 32.82x - 1.3189 R <sup>2</sup> = 0.9627		
Fluorometer - linear & polynomial regressions	y = 9.8936x - 0.3938 R <sup>2</sup> = 0.7413	y = 28.418x <sup>2</sup> + 1.7009x - 0.0322 R <sup>2</sup> = 0.8035	

**CalCOFI 1611SR: Primary CTD Oxygen vs Bottle Oxygen**  
4sec ave CTD O2 vs Bottle O2 (ml/L)



([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_Ox1MLvsOxBML.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_Ox1MLvsOxBML.jpg))

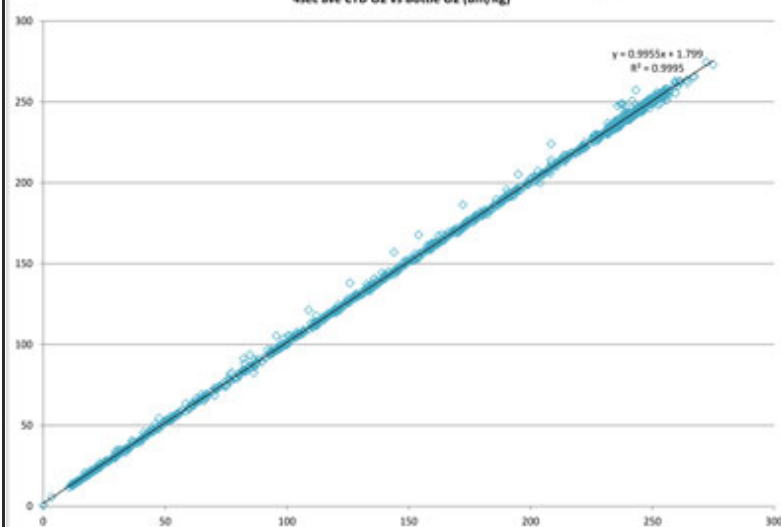
**CalCOFI 1611SR: Secondary CTD O2 + RINKO O2 vs Bottle O2**  
4sec ave values vs bottle O2 (ml/L)



([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_Ox2MLvsOxBML.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_Ox2MLvsOxBML.jpg))

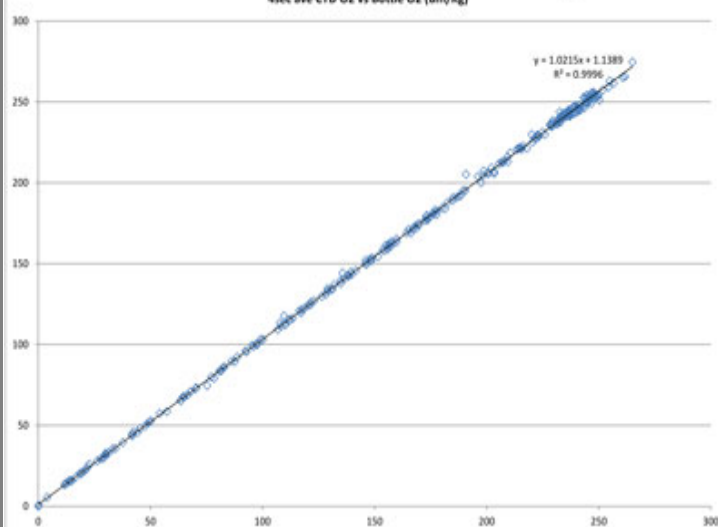
([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_Ox1UMvsOxBUM.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_Ox1UMvsOxBUM.jpg))

**CalCOFI 1611SR: Primary CTD Oxygen vs Bottle Oxygen**  
4sec ave CTD O2 vs Bottle O2 (um/Kg)



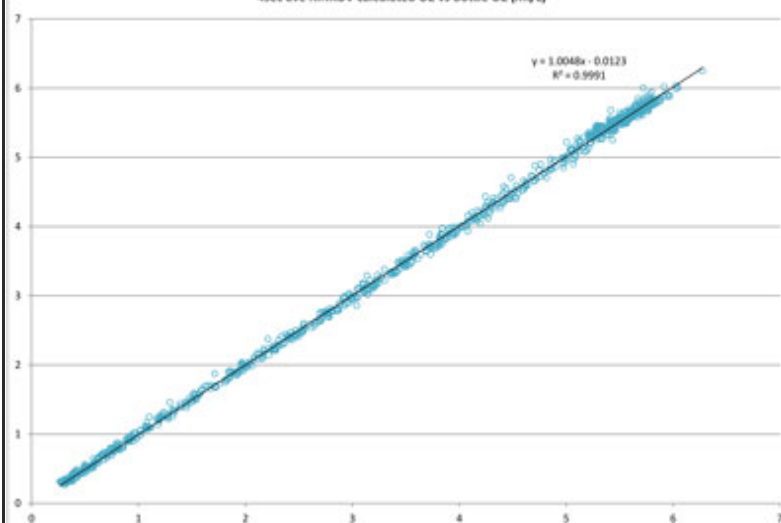
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**CalCOFI 1611SR: Secondary CTD Oxygen vs Bottle Oxygen**  
4sec ave CTD O2 vs Bottle O2 (um/Kg)



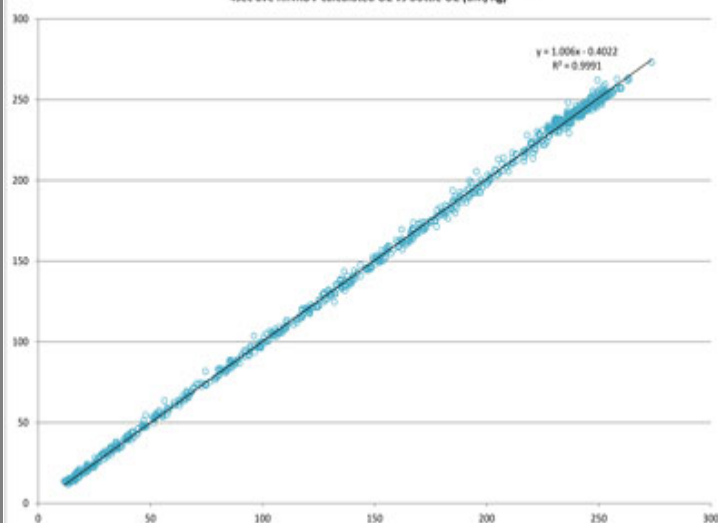
([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_Ox2UMvsOxBUM1.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_Ox2UMvsOxBUM1.jpg))

**CalCOFI 1611SR: RINKO Oxygen vs Bottle Oxygen**  
4sec ave RINKOV calculated O2 vs Bottle O2 (ml/L)



([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_Ox2MLvsOxBML4sec.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_Ox2MLvsOxBML4sec.jpg))

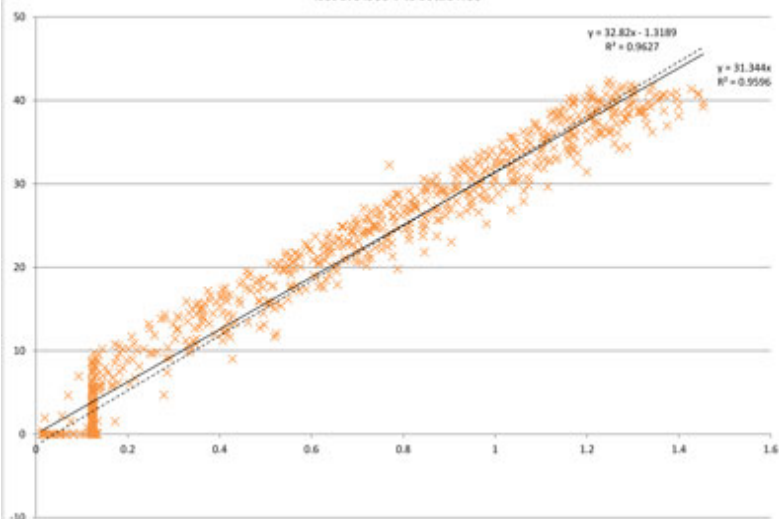
**CalCOFI 1611SR: RINKO Oxygen vs Bottle Oxygen**  
4sec ave RINKOV calculated O2 vs Bottle O2 (um/Kg)



([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_Ox2UMvsOxBUM4sec.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_Ox2UMvsOxBUM4sec.jpg))

CalCOFI 1611SR: ISUS Voltage vs Bottle Nitrate

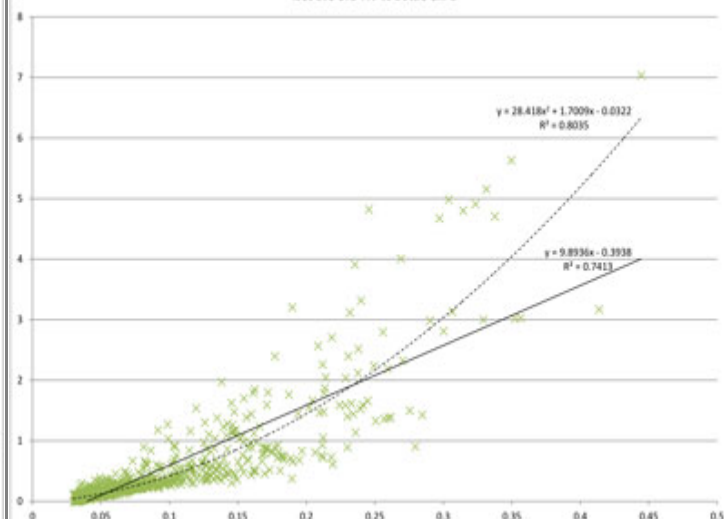
4sec ave ISUS V vs bottle NO<sub>3</sub>



([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_ISUSVvsNO3.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_ISUSVvsNO3.jpg))

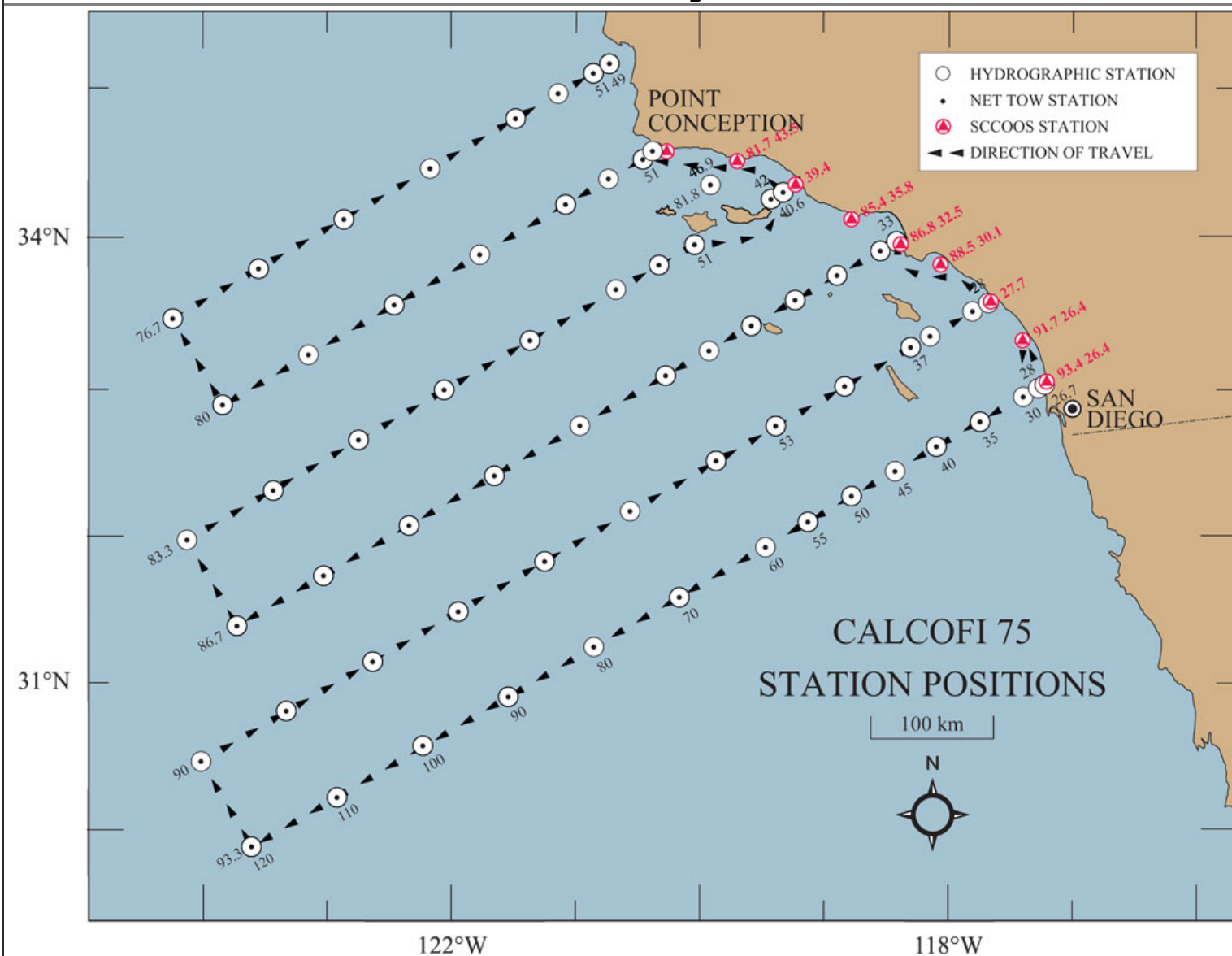
CalCOFI 1611SR: Fluorometer Voltage vs Bottle Chlorophyll-a

4sec ave CTD FIV vs Bottle Chl-a



([http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR\\_FIVvsChla.jpg](http://cappuccino.ucsd.edu/downloads/2016/1611SR/20-1611SR_FIVvsChla.jpg))

**General notes: These are cast & FINAL CTD Processing Notes from 1611SR cruise**



CTD Notes or CalCOFI 1611SR:

Standard configuration for Seabird 911+ was used on 27 stations: dual T,S,O2 pumped sensor arrays; one Wet-Labs ECO-FL fluorometer; one 25cm Wetlabs 440nm transmissometer; Benthos altimeter; SBE18 pH sensor; Biospherical surface and remote PAR; Seabird remote depth readout box; Satlantic FRANKS-ISUS v3 & battery (recently upgraded to firmware v3; repaired, just back from Satlantic); SBE32 carousel.

On 48 casts, the secondary SBE43 oxygen sensor and altimeter were removed and a RINKO III (ARO-CAV model) was installed.

All casts were performed on RV Sally Ride's SBE11 deck unit & Windows 7 64-bit PC using com settings set by RV Sally Ride IT tech. SIO-CalCOFI's new, white, epoxy-coated, metals-free rosette with 24-10L PVC no-metal, productivity clean bottles with silicone o-rings.

RV Sally Ride has 0.350 single-core conductive wire; STS performed the termination and it worked for all casts. The new SIO rosette has a LARS bracket to interface with the RV Sally Ride forward CTD winch system. It worked flawlessly and allowed us to deploy without taglines on deployment or recovery. It worked especially well during rough weather on stations which most likely would have been cancelled on any other ship.

CalCOFI 1611SR CTD O2 Sensor Configuration Notes:

A RINKO III oxygen optode sensor was deployed on stations that did not require an altimeter. The RINKO requires two voltage channels and we do not have two free when needing the altimeter. So after cast 003, the secondary oxygen and altimeter were moved to a Universal Y cable on V4 & V5. The RINKO was connected to its own cable and the cable on V4 & V5 were swapped when the altimeter was not needed.

There are 48 casts with the primary O2, RINKO, and no altimeter. The calculation of RINKO oxygen is pending and will be included in the processed CTD data.

There are 27 casts with two SBE43 oxygen sensors and one altimeter.

These files have been separated into two subdirectories: 2SBE43 & 1SBE43\_RINKO.

Cast 001-003: typical CTD configuration from CalCOFI 1609SR with 2 SBE43 O2 sensors.

- V0 - Transmissometer; V1 - Fluorometer
- V2 - Altimeter; V3 - Remote PAR
- V4 - Primary SBE43 O2; V5 - Secondary SBE43 O2
- V6 - ISUS; V7 - pH
- V15 - Surface PAR

Casts with RINKO as secondary O2 sensor (Stations that did not require altimeter bottom detection)

Casts 004-029, 039-051, & 064-072

- V0 - Transmissometer; V1 - Fluorometer
- V2 - Primary SBE43 O2; V3 - Remote PAR
- V4 - RINKO DO; V5 - RINKO Temperature
- V6 - ISUS; V7 - pH
- V15 - Surface PAR

Casts with 2-SBE43 O2 oxygen sensors & altimeter:

Casts 030-038, 052-063, & 073-075

- V0 - Transmissometer; V1 - Fluorometer
- V2 - Primary SBE43 O2; V3 - Remote PAR
- V4 - Secondary SBE43 O2; V5 - Altimeter
- V6 - ISUS; V7 - pH
- V15 - Surface PAR

Cast 001: 93.3 26.7 - slightly late prodo; using dual SBE43 .xmlcon from 1609SVC

Cast 002: 93.4 26.4 - 20m SCCOOS

Cast 003: 91.7 26.4 - 20m Camp Pendleton SCCOOS

Cast 004: 93.28 - RINKO III O2 sensor installed; second SBE43 O2 sensor cable disconnected but left plumbed to T-C sensors. Altimeter disconnected but left mounted.

Secondary O2 and Altimeter moved/paired with a universal Y-cable but dummied; RINKO III on V4 & V5. Primary O2 moved to V2 with PAR on V3. ISUS upcast data bad from 98-0m, datacoded "9".

Cast 005: 93.30 - bottles 12 & 17 Th-234 and salt samples only; 0 & 30m DIC-pH samples taken

Cast 006: 93.35 - DIC station; no console ops comments. ISUS upcast data datacoded "9", missing.

Cast 007: 93.40 - "No signal seem from RINKO O2 sensor" comment but okay since RINKO O2 data were not displayed and secondary O2 sensor was offline. Long slow rollers; transmissometer dropped out at ~440m on downcast. ISUS upcast data bad this station, datacoded "9" - missing.

Cast 008: 93.45 - Prodo, really late; pH 12473 taken; Bottle #8 replaced pre-cast, bottom seal poor, leaky; bottom valve #14 replaced pre-cast, drippy. Transmissometer drop out at ~494m on downcast.

ISUS upcast data bad from 319-0m this station, datacoded "9".

Cast 009: 93.50 - no con ops comments; ISUS data bad this station, datacoded "9" - missing.

Cast 010: 93.55 - no con ops comments; ISUS data bad this station, datacoded "9" - missing.

Cast 011: 93.60 - no con ops comments; ISUS upcast data bad this station, datacoded "9".

Cast 012: 93.70 - early prodo cast; grey morning, some wind chop; bottle #23 (extra 10m NCOG) top lid was open upon retrieval. In the mixed layer so probably fine, bottom closed. Transmissometer looked good the whole cast.

Cast 013: 93.80 - EK80 was not logging data, told Dan. Cast 13 = Nov 8th Election Day (Trump vs Hillary). ISUS downcast data bad 370-515m, datacoded "9"; all ISUS upcast data bad, datacoded "9"

Cast 014: 93.90 - no comments; pH sample 12474 taken; upcast ISUS data bad 75-0m, datacoded "9".

Cast 015: 93.100 - bottle #22 tripped on deck; upcast ISUS data bad 320-0m, datacoded "9".

Cast 016: 93.110 - cast restarted since data acquisition was not started (0638 vs 0616 start time). Yo-yo dur to "not archiving",. "Haste makes waste" comment. Drifter bottle (box 1/3) tossing every 15mins started after leaving station.

Cast 017: 93.120 - prodo cancelled - too late; changed bottom valve on #11 pre-cast, too hard to open & close even when "backed off". Drifter bottle box 2/3 deployed, one every 20mins on transit to 90.120.

Upcast ISUS data bad 80-0m, datacoded "9".

Cast 018: 90.120 - chl max = btl 14/NCOG station; 0 & 30m DIC-pH samples taken plus underway pH sample 12475; Drifter bottle box 3/3 deployed, one every 20mins during transit to 90.110. Upcast ISUS data bad 200-0m, datacoded "9".

Cast 019: 90.110 - console trip times logged in UTC, "switching all to UTC" DMW comment on console ops. PST was 0048-0140. Upcast ISUS data bad 175-0m, datacoded "9". ISUS upcast data does not display real-time so if the downcast looks good, it is assumed the sensor is working okay.

Cast 020: 90.100 - prodo, nets done first, cast started 1.1km from sta start; some long rolls; bottle #18 mistripped, fired but no closure = no samples, prodo samples taken from #19 (mixed layer so acceptable).

All ISUS data bad, datacoded "9"

Cast 021: 90.90 - 3500m deep station, DIC+NCOG sta, underway pH 12478 taken; pH, PAR, ISUS & battery taken off, connectors dummied. Transmissometer dropped at ~610m on downcast. V3 = PAR, V6 = pH, V7 = ISUS

Cast 022: 90.80 - no con ops comments; pH, PAR, ISUS back online. pH sample 12491 taken. Upcast ISUS data bad 240-0m, datacoded "9".

Cast 023: 90.70 - NCOG station; no con ops comments. Upcast ISUS data bad 400-0m, datacoded "9".

Cast 024: 90.60 - prodo & DIC sta; broad chl max. Transmissometer out @~280m downcast

Cast 025: 90.53 - DIC+NCOG sta; no con ops comments; on track to make Naval Clearance window for sta 90.45. Upcast ISUS data bad 280-0m, datacoded "9".

Cast 026: 90.45 - 0 & 30m DIC-pH sta; originally misnamed 1611024 - all files renamed to 1611026 after <ctrl><alt>B backup didn't work. CTD cast time 2121, inside the naval clearance window

Cast 027: 90.37 - 0 & 30m DIC-pH sta; no con ops comments

Cast 028: 90.35 - no altimeter on 360m station so CTD sent to 350 (next sta is deep so altimeter will be installed before sta 30)

Cast 029: 90.30 - prodo & DIC sta;

Cast 030: 90.28 - 0 & 30m DIC-pH sta, underway pH 12528 taken; shallow station, altimeter & secondary SBE43 O2 sensor reconnected, RINKO disconnected and dummied for coastal run. O22 on V4, altimeter on V5. Universal Y on V0/V1 changed in hopes of eliminating Transmissometer dropouts

Cast 031: 90 27.7 SCCOOS - Dana Point afternoon station (1514PST)

Cast 032: 88.5 30.1 SCCOOS; no con ops comments

Cast 033: 86.8 32.5 SCCOOS; no con ops comments

Cast 034: 87.33 - 0 & 30m DIC-pH, plus underway pH 12531 taken;

Cast 035: 87.35 - DIC sta; DMW used rinko.xmlcon file but dual SBE43 O2 sensors still online. CTD data processed using correct xmlcon, not rinko.xmlcon. Downcast ISUS data bad 0-30m, datacoded "9".

Cast 036: 87.40 - SM Basin but normal cast to 515m done; rinko.xmlcon used but dual SBE43 sensors still online. CTD data processed using correct xmlcon, not rinko.xmlcon

Cast 037: 87.45 - nets first prodo sta; CTD cast started ~1.1nm from sta coordinates (acceptable with dynamic position stopping drift); Remote PAR shaded by ship then clear ~30m; transmissometer working well now after Y-cable change

Cast 038: 87.50 - San Nicolas Island station, shallow; altimeter & dual SBE43 O2s still installed

Cast 039: 87.55 - RINKO III O2 sensor installed pre-cast; no con ops comments

Cast 040: 87.60 - no con ops comments

Cast 041: 87.70 - xtra bottle @45m for LTER chl max; 3 xtra @ 10m for LTER Size Fractionation and NCOG experiment

Cast 042: 87.80 - prodo sta; moderate seas, ~15min "no serial data" winch delay (winch readout failure)

Cast 043: 87.90 - interesting T, S, O2 "feature" ~90m on downcast; underway system pH 12542 drawn

Cast 044: 87.100 - no con ops comments

Cast 045: 87.100 - no con ops comments

Cast 046: 87.110 - prodo sta, grey morning. (Nov 15th birthday)

Cast 047: 83.110 - no con ops comments

Cast 048: 83.100 - underway pH sample 12543 taken; no con ops comments

Cast 049: 83.90 - pH 12543 taken; no con ops comments

Cast 050: 83.80 - prodo sta; rough seas, no nets (winds 40+kts), no secchi for prodo 18m used (from database); big rolls, dampening system not used. Noticable different between upcast and downcast between 0-50m. Hove-to while sampling post-cast. Langmuir circulation visible in 18khz acoustics. Downcast secondary O2 data noisy 0-75m, not flagged.

Cast 051: 83.60 - still rough, no nets; CTD "yo-yo'd" between 338 & 438 on upcast, wrong depth given to winch, went back to 438

Cast 052: 83.55 - still rough, no nets; CTD-only; RINKO sensor disconnected (a station early), dual SBE43 O2 sensors back online, with altimeter (alt.xmlcon)

Cast 053: 83.51 - still rough but only Manta net tow cancelled, all other nets done; original station schedule had us head north after this station but with the lousy weather, we headed shoreward. Weather will improve in ~24-36hrs.

Cast 054: 85.4 35.8 SCCOOS - calmer inshore; southward SCCOOS done now so prodo will be at 83.42

Cast 055: 83.42 - 95m prodo + 0 & 30m DIC-pH sta; calm, warm morning; top hose clamp on bottle #8 broke - replaced

Cast 056: 83.3 39.4 SCCOOS - leapfrogged over 83.3 40.6 because a fishing boat with net in the water was on our station position. So we headed shoreward and will come back. "No serial data" winch scoreboard problem.

Cast 057: 83 40.6 - 0 & 30m DIC-pH sta; fishing boat clear of station, but no winch operator for ~10mins - Henry launched while CJ was called (on the phone, personal call)

Cast 058: 81.7 43.5 SCCOOS - no con ops comments

Cast 059: 81.8 46.9 (82.47) Santa Barbara Basin DIC+NCOG station. CTD terminal depth 10m off bottom.

Cast 060: 80.0 50.5 SCCOOS - looks like pump may have sucked something up @ surface, end of cast

Cast 061: 80.51 - DIC sta; no con ops comments

Cast 062: 80.55 - DIC+NCOG sta; no con ops comments

Cast 063: 80.60 - DIC sta; early prodo station, calm sunny morning, nets first; small blue shark swimming by at CTD launch

Cast 064: 80.70 - DIC+NCOG sta; calm afternoon; some swell

Cast 065: 80.80 - DIC+NCOG sta; no con ops comments

Cast 066: 80.90 - DIC+NCOG sta; underway pH taken #12606

Cast 067: 80.100 - prodo & DIC+NCOG sta; weather picking up a bit, some rolls

Cast 068: 77.100 - unusual salinity & temperature profile @65m; pH 12615 taken; Th-234 McLane pumping done for ~45mins @100m (Tom Kelly, FSU)

Cast 069: 77.90 - no con ops comments. Upcast primary O2 data noisy but okay, not flagged.

Cast 070: 77.80 - no con ops comments. Downcast secondary salt noisy from 60-200m; upcast secondary salt noisy -

biofouling? Use primary data first.

Cast 071: 77.70 - prodo sta; primary conductivity is wonky - secondary conductivity looks fine = biofouling? At depth, primary & secondary agree okay. Use upcast data for oxygen and all other measurements but still a bit wonky. Primary salt noisy on both up & downcast, datacoded "8"; primary O2 looks bad on up & downcast, datacoded "9" - biofouling? Secondary data look fine.

Big swell, long period not helping. Post-cast note: plumbing back flush w/ fresh water hose = pressure; nothing visibly blown out.

Cast 072: 77.60 - salinities agree and look better this cast; still long period, big swell. Upcast does look different than upcast even though dynamic positioning has us on the same coordinates = internal wave?

Cast 073: 77.55 - DA from bottles 19, 21; altimeter and second SBE43 O2 sensor installed, RINKO disconnected (alt.xmlcon)

Cast 074: 77.51 - no con ops comments

Cast 075: 77.49 - no con ops comments

Two nets-only stations occupied after 77.49 - sta 83.60 & 83.55, Bongo, Manta, Pairovets net tows missed during rough weather were done. CTD profiles not requested by NOAA Fisheries. Th-234 45min filtering done at 83.55, 100m - last operation before heading home. Weather at 83.60 & 83.55 was moderate, not calm, with winds ~20-25kts

**22Sep2017 update** - initial Final RINKO vs Bottle O2 regressions were done by calculating RINKO O2 values from 1m binavg data and plotting vs bottle oxygen. I revised the routine to do the 4-second RINKO voltage average-prior-to-bottle-closure then calculate the RINKO oxygen values. The results were only very slightly different but now the RINKO protocol matches the routine for primary oxygen & other bottle-corrected sensors.

JRW 09/19/2017