

**CTD Processing Notes**  
**FR 9205**  
**D.J. Vaudrey**

**General.**

RV Franklin cruise Fr5/92 involved a study into the Inorganic and Organic Carbon Cycles in Equatorial Waters as part of the Joint Global Ocean Flux Study (JGOFS). The cruise consisted of two legs, both operating in equatorial region north of New Britain and New Ireland, with a partial exchange of scientific compliment between the two legs at Rabaul. A total of 75 CTD stations were carried out using the 24 bottle rosette with 10 litre Niskin bottles. During the first leg (Stations 1 to 38) the casts where made primarily to 2000 decibars with additional shallow casts for large volume samples. During Leg 2 casts (39 to 75) were generally carried out to 300 decibars.

The sampling strategy reduced the number of available bottles for calibration. Many of the samples where taken in the upper 300 metres where the steepest gradients occurred and where rejected on the grounds of the range of values within the sample burst data taken over the 10 seconds immediately prior to firing the bottle.

On various casts 3 A/D digitizer channels were used for a pH sensor, a PAR sensor and a Fluorometer. This data has not been calibrated but is reported as units as defined under initial setup during the cruise. These units relate to the zero and full scale signals of the digitizer channels. The Photosynthetically Active Radiation sensor output is scaled to read from 0 to 2000 mE/m<sup>2</sup>, which relates to full bright sunlight. The pH sensor out put is scaled to read 0 to 14 full scale and the Fluorometer signal is scaled to a percentage of full scale.

**Station List.**

1. Bottle test station. All bottles fired at 700 decibars.
2. Firing sequence out. Possibly due to incorrect setup.
3. No samples. Light meter cast. All bottles fired at 50 decibar. Misfire on position 10.
4. 2 misfires indicated at position 12. . Both misfires appear to have successfully fired.
5. No samples. Light cast only.
6. Misfires indicated at positions 2 and 15. Both appear to have fired normally.
7. Trace metal station. No hydrology.
8. No response at initial firing of position 17. Correct Odd/Even sequence reported on subsequent successful firing.
9. Light meter cast. No Hydrology samples.
10. "No Response" on position 3 on initial fire. Firing sequence reported "Odd" on successful fire.
11. Misfire indicated on position 10. pH sensor changed to #15.
12. Misfire indicated on position 21, apparently fired.
13. Misfire indicated on position 14. Successful on repeat fire.
14. No apparent problems.

15. Light meter cast. No hydrology samples.
16. No hydrology samples.
17. pH sensor reverted to #13. No apparent problems.
18. Misfires indicated on all positions 13 to 24 but bottles fired.
19. Firing sequence reported off by one position. Misfires indicated at positions 11 and 15. Initial sequence still held after refiring.
20. One bottle fired before ending downcast.
21. No apparent problems.
22. No hydrology samples. Trace metal samples.
23. Misfires indicated on positions 17 and 18. but appeared to have fired.
24. Light cast. No hydrology samples.
25. Misfire at position 5, assume fired. Lanyard caught in top of bottles at position 4 and 5.
26. Real Time Display hangup prior to this station. Reboot Micro 6 and restarted CTD program.
27. Misfires indicated at positions 2 to 6. Appear to have fired correctly.
28. Light meter cast. No hydrology samples.
29. Light meter cast. No hydrology samples.
30. No samples taken.
31. Position 7 - Air bleed left open - No sample drawn.
32. 2 Misfires at position 12 (at 145 dbar). Not repeated but appear not to have fired. From salinity information it appears that the two positions at 145 dbar fired but not at 123 dbar.
33. Misfire at position 9.
34. No apparent problems.
35. No apparent problems.
36. Misfire at position 1 and 9 indicated. Altimeter not sensing bottom as expected.
37. Altimeter did not pickup bottom until 55 m off and then only intermittently. Appeared OK 36 metres above bottom.
38. Light meter cast. No hydrology samples.
39. Altimeter not working consistently until 35m off bottom. Partial cell blockage below 862.0 ( raw record number 16068). Data deleted below 16068.
40. Misfire on position 2 and 9. Bottles appear to have fired.
41. Misfire at position 9. Bottle has appeared to have fired.
42. No apparent problems at data collection.
43. No apparent problems.
44. Misfire on position 2 and 9. Bottles appear to have fired.
45. No hydrology sampling.
46. No apparent problems.
47. Problem associated with Fluorometer data before cast. It appears problems associated with water leakage.
48. Fluorometer setting altered as repair to fluorometer prior to this cast.
49. No hydrology samples. Further revision to Fluorometer settings.
50. pH sensor removed prior to this station. Fluorometer may have flooded.

51. No apparent problems.
52. Misfire at position 9. Appears to have fired.
53. No apparent problems.
54. Misfire at position 9. Appears to have fired.
55. No samples taken. "YoYo" cast #1.
56. No samples taken. "YoYo" cast #2.
57. No samples taken. "YoYo" cast #3.
58. No samples taken. "YoYo" cast #4.
59. No samples taken. "YoYo" cast #5.
60. No samples taken. "YoYo" cast #6.
61. No samples taken.
62. New PC board in fluorometer. Different gain settings.
63. Again new board in fluorometer. Change in gain settings.
64. Disk problems with Micro 6 prior to logging of station.
65. No apparent problems.
66. Misfire indicated at position 6. Bottle appeared to have fired correctly.
67. Lanyards crossed on positions 13 and 14. No samples drawn from these bottles.
68. No response to initial fire command at position 2 and 13.
69. No apparent problem.
70. No samples taken.
71. No Apparent problem.
72. Misfire indicated at position 2.
73. No apparent problems.
74. Misfire indicated at position 10. Bottle appeared to have fired OK.
75. No apparent problems.

### Calibration Information.

Temperature Coefficients (CSIRO Calibration Facility Sept 1991)

Temperature Bias = 1.0000

Temperature Offset = -1.0000e-03oC

Conductivity (Cell Factors)

S.D Salinity following calibration = 0.0032 psu  
using 465 bottles out of 700.

Offset Term	Conductivity Term	Stn. Dep. Term	
Stations 1, 10	pres. bounds	0.0 6500.0 edit = 2.8	
0.30202576E-02	0.10012402E-02	-.14003753E-07, n = 81	
	std. dev. = 0.35793E-02		
Stations 11, 17	pres. bounds	0.0 6500.0 edit = 2.8	
-.26774993E-02	0.10017165E-02	-.42745604E-07, n = 41	
	std. dev. = 0.40623E-02		
Stations 18, 20	pres. bounds	0.0 6500.0 edit = 2.8	
-.18754622E-02	0.99928907E-03	0.10022520E-06, n = 31	
	std. dev. = 0.25123E-02		
Stations 21, 75	pres. bounds	0.0 6500.0 edit = 2.8	
-.83358267E-02	0.10015582E-02	0.28195663E-08, n = 299	
	std. dev. = 0.34063E-02		

Pressure Offset (Individual Stations)

station 001	offset = -5.20	station 002	offset = -5.40
station 003	offset = -5.50	station 004	offset = -5.50
station 005	offset = -6.20	station 006	offset = -5.20
station 007	offset = -5.10	station 008	offset = -5.50
station 009	offset = -5.20	station 010	offset = -5.10
station 011	offset = -5.40	station 012	offset = -5.40
station 013	offset = -5.40	station 014	offset = -4.40
station 015	offset = -4.90	station 016	offset = -5.20
station 017	offset = -5.50	station 018	offset = -5.30
station 019	offset = -5.00	station 020	offset = -5.60
station 021	offset = -5.40	station 022	offset = -4.80
station 023	offset = -5.40	station 024	offset = -5.40
station 025	offset = -5.30	station 026	offset = -5.20
station 027	offset = -5.40	station 028	offset = -3.40
station 029	offset = -3.50	station 030	offset = -5.30
station 031	offset = -5.20	station 032	offset = -5.10
station 033	offset = -5.40	station 034	offset = -5.10
station 035	offset = -5.10	station 036	offset = -5.10
station 037	offset = -5.10	station 038	offset = -3.50
station 039	offset = -5.10	station 040	offset = -5.10
station 041	offset = -4.90	station 042	offset = -4.80
station 043	offset = -4.80	station 044	offset = -5.10
station 045	offset = -5.00	station 046	offset = -4.90
station 047	offset = -4.70	station 048	offset = -4.80
station 049	offset = -4.80	station 050	offset = -4.60
station 051	offset = -4.70	station 052	offset = -5.20
station 053	offset = -4.60	station 054	offset = -5.00
station 055	offset = -4.90	station 056	offset = -5.00
station 057	offset = -5.00	station 058	offset = -5.00
station 059	offset = -5.00	station 060	offset = -5.00
station 061	offset = -5.00	station 062	offset = -4.90
station 063	offset = -4.90	station 064	offset = -4.70
station 065	offset = -4.70	station 066	offset = -4.80
station 067	offset = -4.80	station 068	offset = -4.80
station 069	offset = -4.60	station 070	offset = -4.60
station 071	offset = -4.80	station 072	offset = -4.70
station 073	offset = -4.60	station 074	offset = -4.70
station 075	offset = -4.70		

Down cast First Order : +8.4561e-03	Upcast First Order : -5.3668e -03
Second Order : -1.3702e-05	Second Order : -3.1088e-06
Third Order : -+6.7540e-09	Third Order : +3.7279e-09
Fourth Order : -1.3336e-12	Forth Order : -9.6233e-13
Fifth Order : -1.3702e-17	Fifth Order : +7.6358e-17