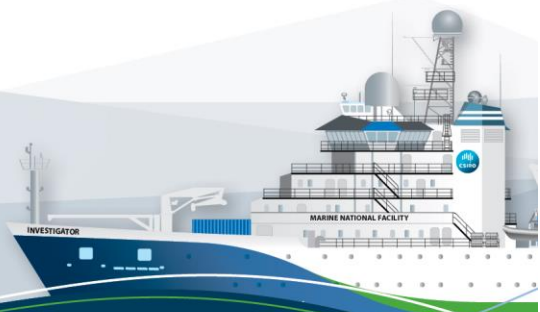
RV *INVESTIGATOR*

HYDROCHEMISTRY DATA PROCESS REPORT

Voyage:	IN2016_V02
Chief Scientist:	Tom Trull
Voyage title:	SOTS, CAPRICORN & EDDY
Report compiled by:	Cassie Schwanger & Kendall Sherrin



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Contents

1 Itinerary

Mobilise	**Date**
Hobart	11 March 2016
Depart	**Date**
Hobart	14 March 2016
Arrive	**Date**
Hobart	16 April 2016
Demobilise	**Date**
Hobart	16 April 2016

2 Key personnel list

Name	**Role**	**Organisation**
Cassie Schwanger	Hydrochemist	CSIRO
Kendall Sherrin	Hydrochemist	CSIRO

3 Summary

3.1 Hydrochemistry

Analysis	**Sampled**
Salinity (Guildline Salinometer)	450
Dissolved Oxygen (automated titration)	476
Nutrients (AA3)	780 (ctd) + 189 (experiment) + 84 (tmr) Total = 1053

3.2 Rosette and CTD

- 40 CTD stations were completed with a 24 bottle rosette (12 L).

3.3 Nutrients

Details					
HyPro Version	4.71 (17/01/16 bug fixes)				
Instrument	AA3				
Software	Seal AACE 6.10				
Methods	AA3 Analysis Methods internal manual				
Nutrients anaylsed	☒ Silicate	☒ Phosphate	☒ Nitrate + Nitrite	☒ Nitrite	☐ Ammonia

Concentration range	112 µmol/L	3 µmol/L	36.4 µmol/L	1.4 µmol/L	2 µmol/L
Method Detection Limit (MDL)	0.2 µmol/L	0.02 µmol/L	0.02 µmol/L	0.02 µmol/L	0.02 µmol/L
Matrix Corrections	N	N	N	N	N
Analyst(s)	Cassie Schwanger, Kendall Sherrin				
Lab Temperature (±1°C)	Reasonably constant, 20-22°C see lab temperature plot				
Reference Material	BQC and RMNS – CA and BV (Appendix 5.1)				
Sampling Container type	10mL plastic tubes				
Sample Storage	< 2 hrs at room temperature or < 24hrs @ 4°C				
Pre-processing of Samples	None				
Comments	Ascorbic acid was deteriorating quickly throughout the voyage.				

3.4 Salinities

Details	
HyPro Version	4.71 (17/01/2016)
Instrument	Guildline Autosal Laboratory Salinometer 8400(B) – SN 71613
Software	Osil
Methods	Hydrochemistry Operations Manual + Quick Reference Manual
Accuracy	± 0.001 salinity units
Analyst(s)	Kendall Sherrin, Ramkrushnbhai Patel
Lab Temperature (±0.5°C)	Reasonably constant, 20-22°C see lab temperature plot
Reference Material	Osil IAPSO - Batch P157
Sampling Container type	Tall rectangular glass bottle, with plastic insert and screw cap.
Sample Storage	Samples held in Salt Room for 24 hrs before analysis within ~48 hrs
Comments	

3.5 Dissolved oxygen

Details	
HyPro Version	4.71 (17/01/2016)
Instrument	Automated Photometric Oxygen system
Software	SCRIPPS
Methods	SCRIPPS
Accuracy	0.01 ml/L + 0.5%
Analyst(s)	Cassie Schwanger, Eldene O'Shea
Lab Temperature (±1°C)	Variable, 20 - 22°C
Sample Container type	Calibrated 120mL flasks
Sample Storage	Samples analysed within ~48 hrs
Comments	Standard B was used. Titrant 50g/L sodium thiosulphate

4 Detailed processing

4.1 Procedure

The procedure for data processing is outline in Figure 1.

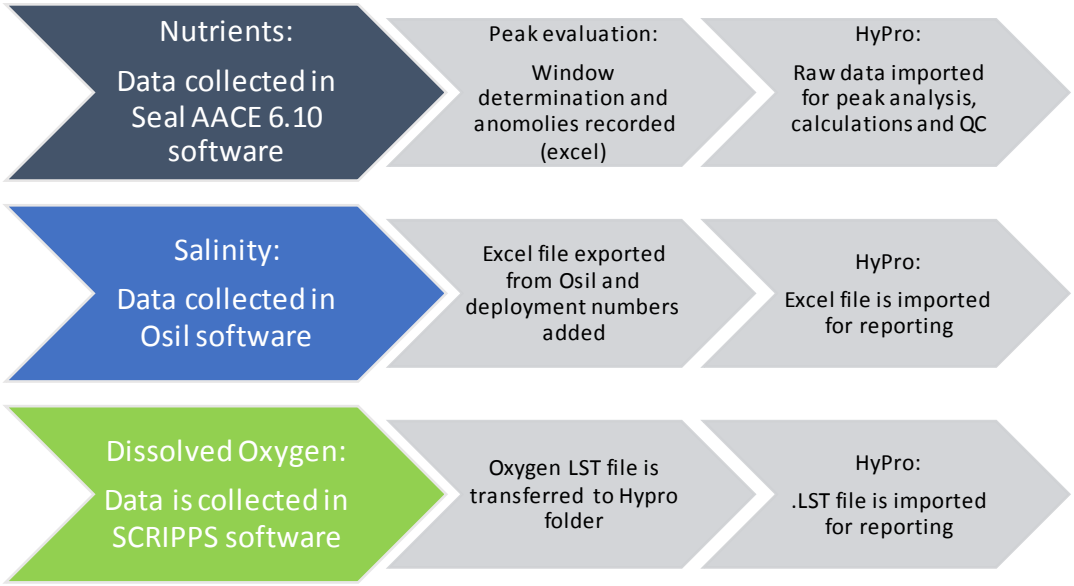


Figure 1: The process above shows the data trail procedure from the initial data generated to output via HyPro for reporting.

4.2 Nutrients

- Nutrient files for this voyage – in2016_v01nut001 – nut058.
- Nut006-12 where test files and not included in this report.
- Separate surveys were created for experiments (SCC, TMR, UWY and FER). All samples received are recorded with corresponding nutrient sample ID in the excel file *in2016_v01_Hydro_Nutrients_Underway_ and_Experiments_Log.xlsx* in order to coordinate sampling naming for HyPro data processing. Refer to this to match data id to sample id.

Details	Silicate	Phosphate	Nitrate+Nitrite	Nitrite	Ammonia
Data Reported as	µM l^{-1}	µM l^{-1}	µM l^{-1}	µM l^{-1}	µM l^{-1}
Calibration Curve degree	quadratic	quadratic	quadratic	quadratic	quadratic
Forced through zero?	N	N	N	N	N
# of points in Calibration	6	6	6	6	6
Matrix Correction	N	N	N	N	N
Blank Correction	N	N	N	N	N
Carryover Correction	Y	Y	Y	Y	Y
Baseline Correction	Y	Y	Y	Y	Y
Drift Correction	Y	Y	Y	Y	Y
Data Adj for RMNS	N	N	N	N	N

Medium of Standards	LNSW
Medium of Blank	18.2 Ω MQ
Proportion of samples in duplicate?	Deepest water sample was always run in duplicate.

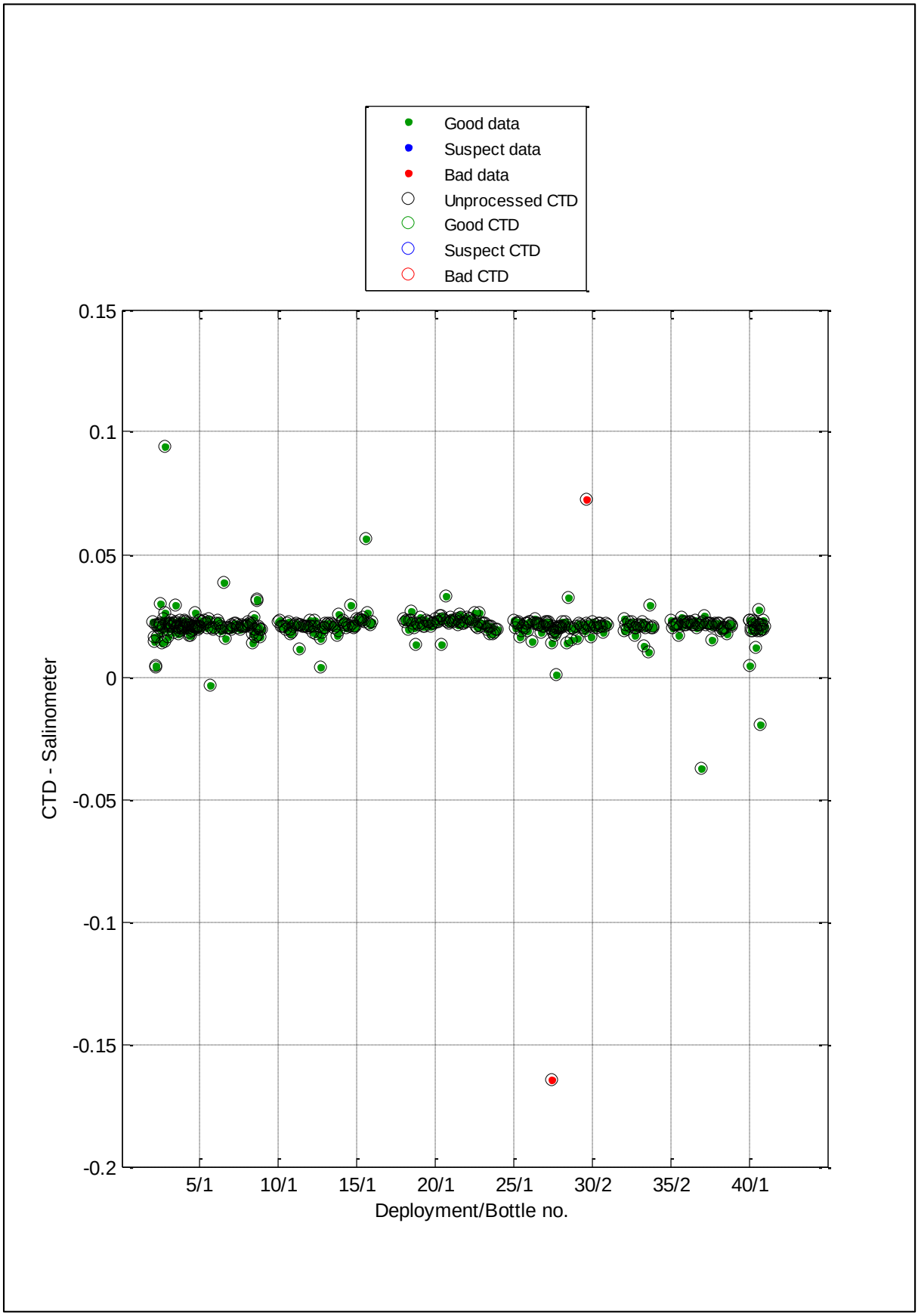
4.3 Salinities

- Files for this voyage are named in2016_v01sal001-20
- Bath temperature set to 24°C.
- Room temperature ranged from 20.0-22.5°C

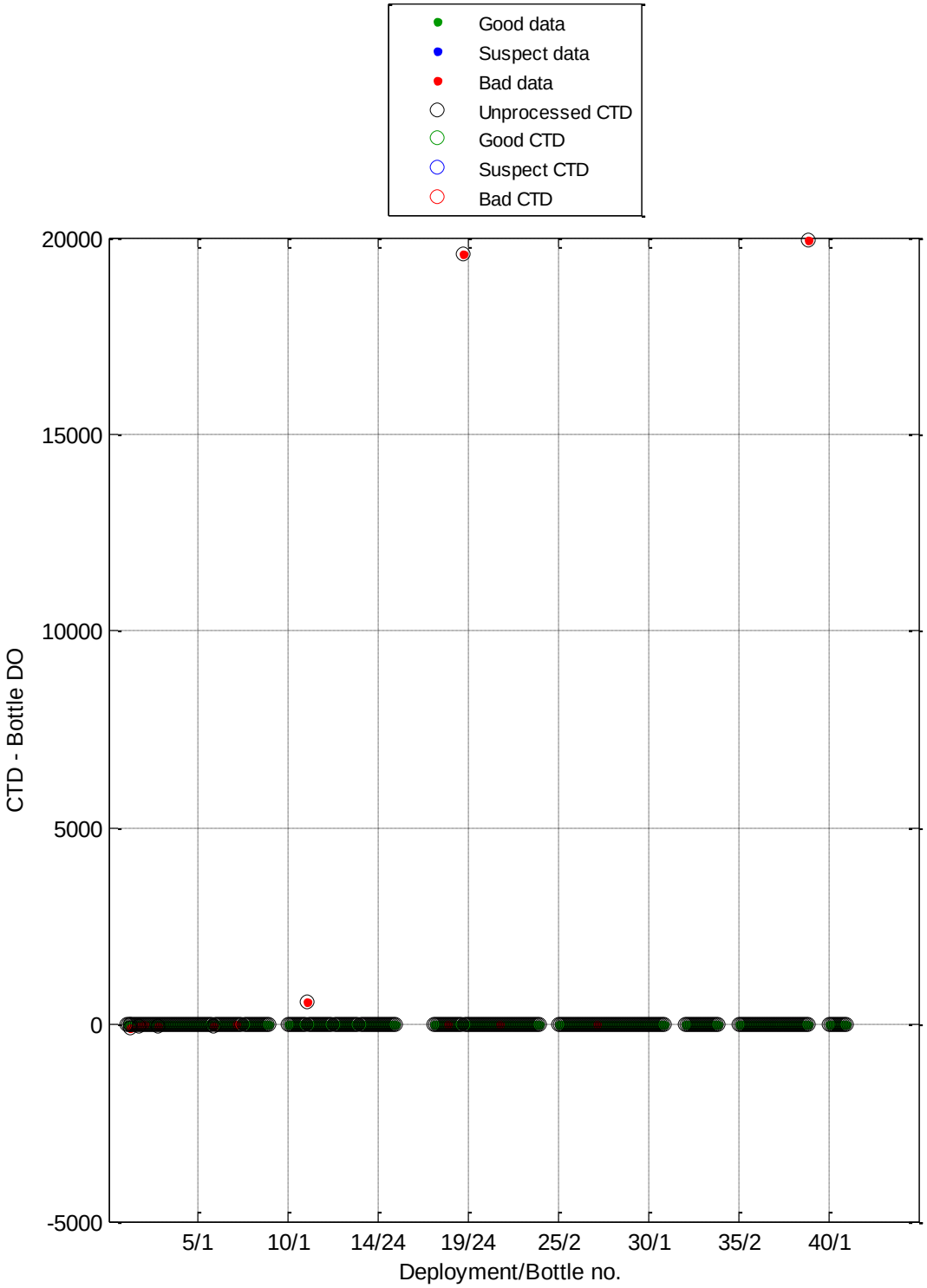
4.4 Dissolved oxygen

- Files for this voyage are named in2016_v02oxy001-oxy038

4.5 CTD vs Hydro salinities

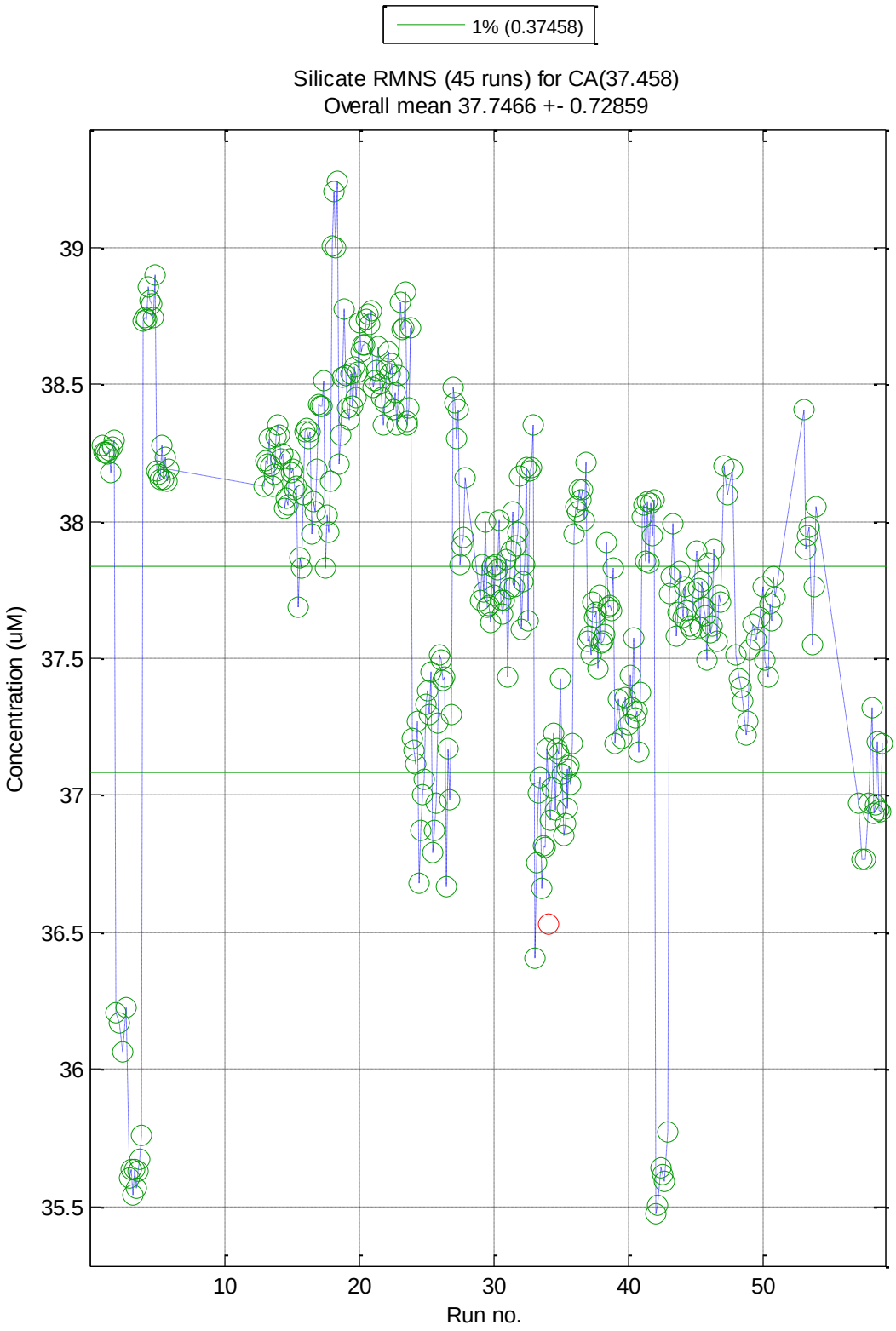


4.6 CTD vs Hydro Oxygen

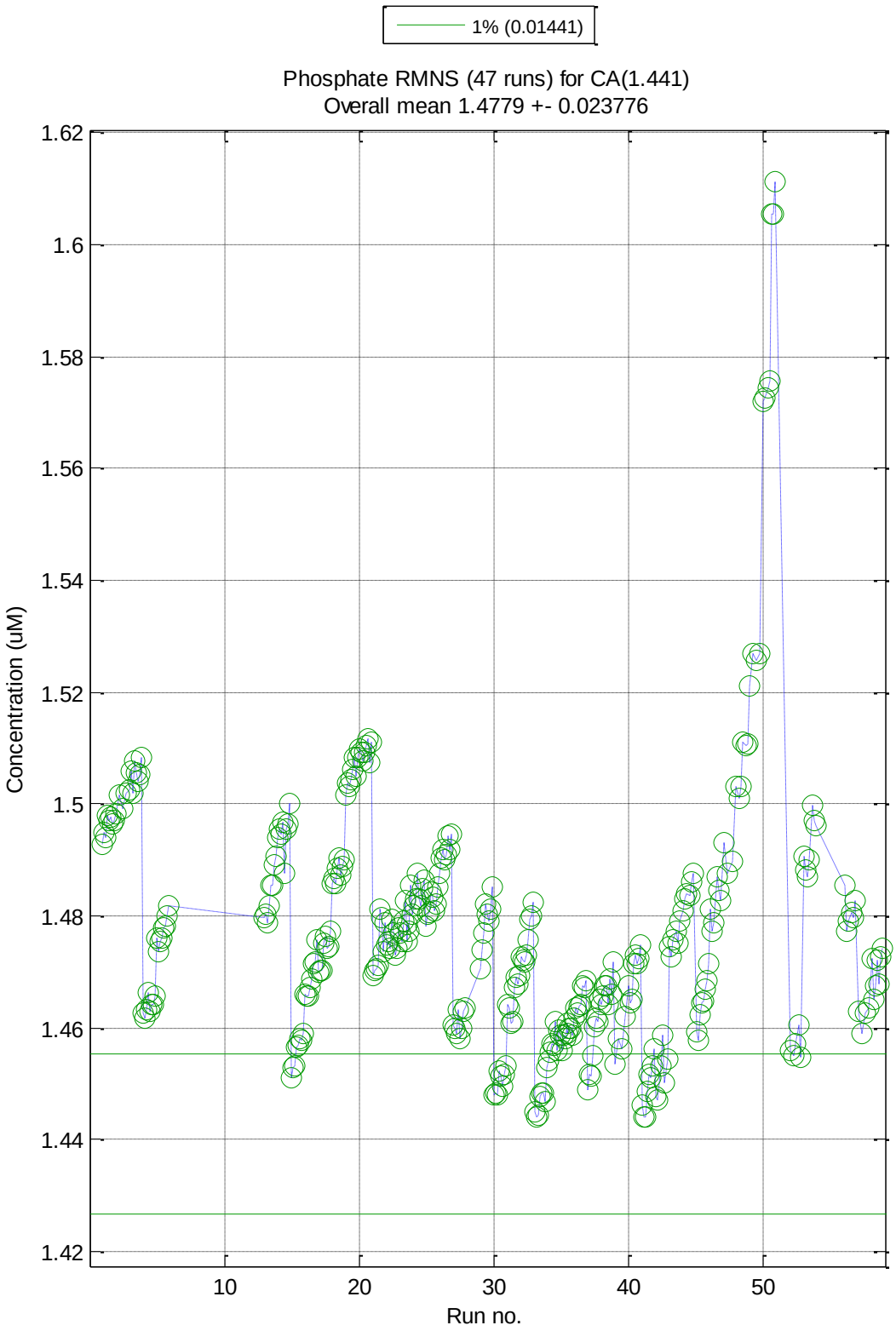


4.7 HyPro checks

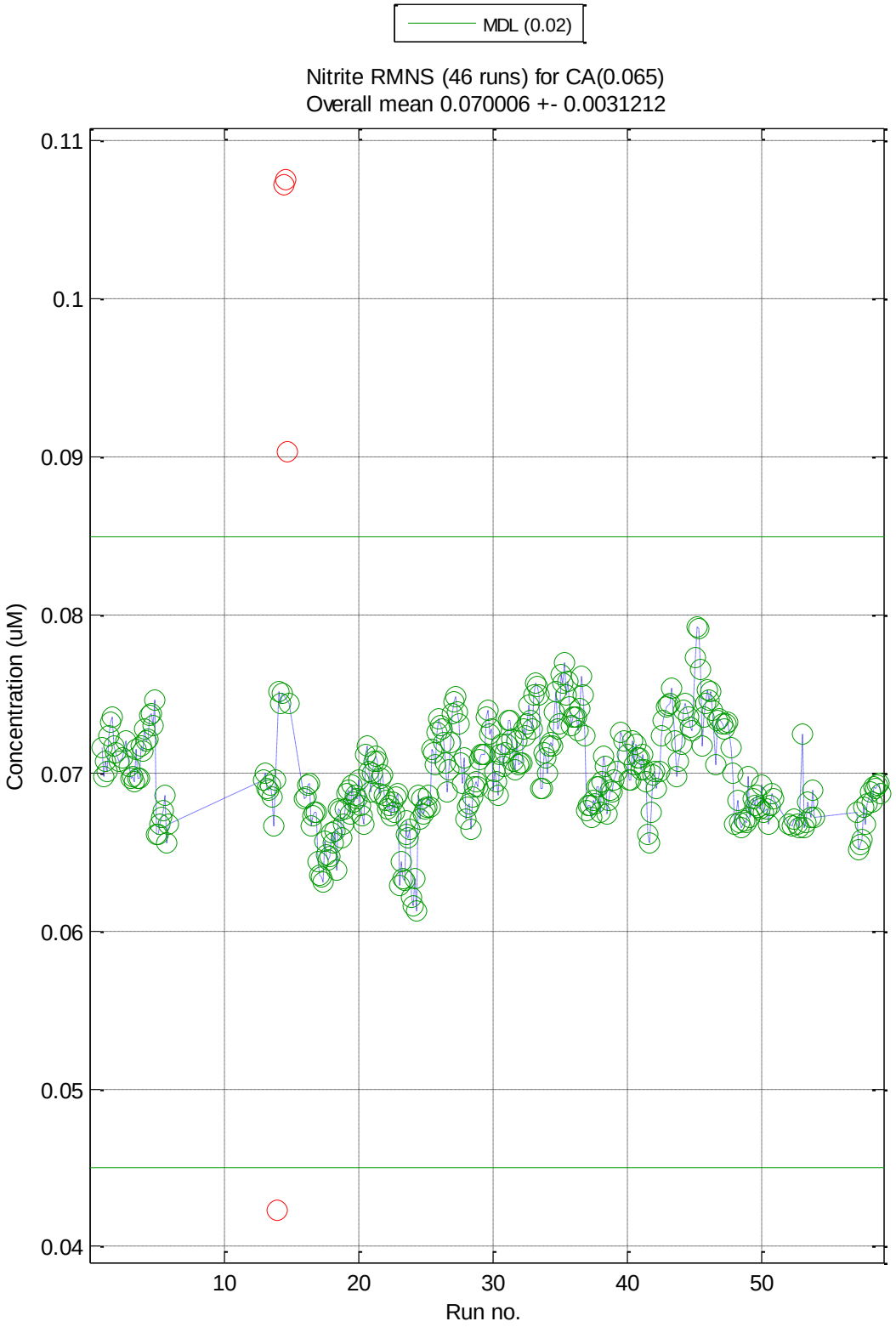
4.7.1 Silicate RMNS



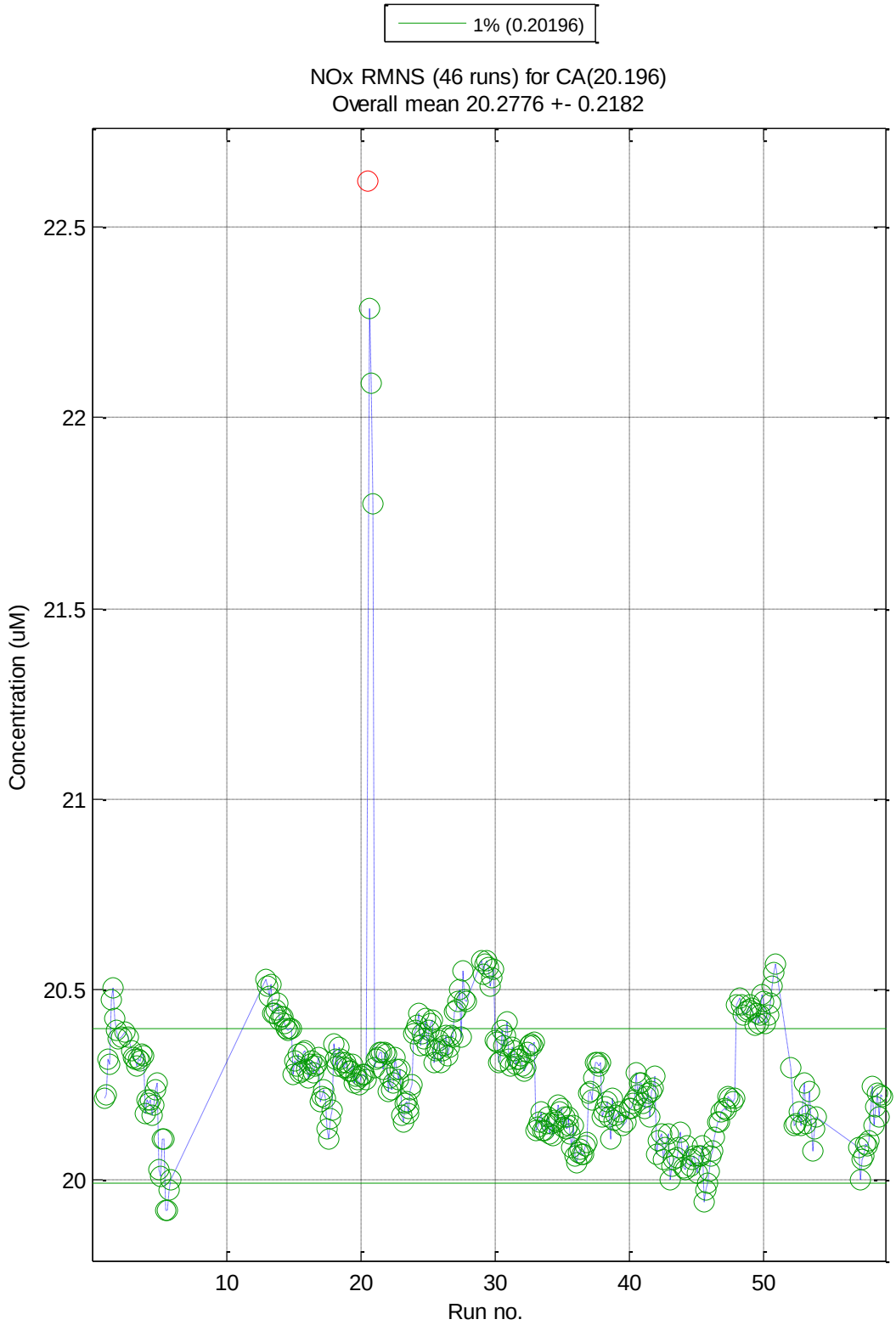
4.7.2 Phosphate RMNS



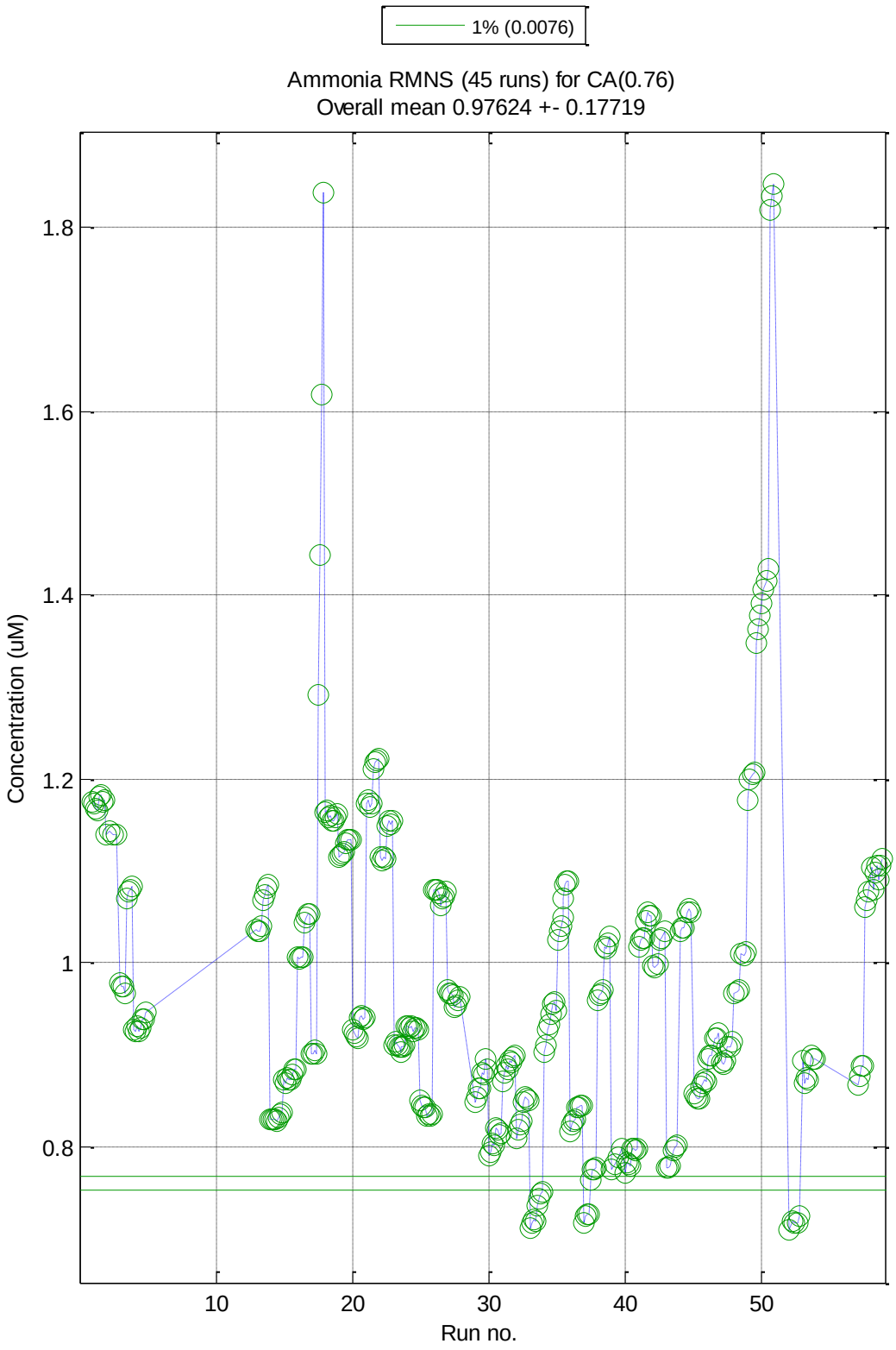
4.7.3 Nitrite RMNS



4.7.4 NOx RMNS


1% (0.20196)
NOx RMNS (46 runs) for CA(20.196)
Overall mean 20.2776 +- 0.2182
Concentration (uM)
22.5
22
21.5
21
20.5
20
10
20
30
40
50
Run no.

4.7.5 NH_4 RMNS


1% (0.0076)
Ammonia RMNS (45 runs) for CA(0.76)
Overall mean 0.97624 +- 0.17719
Concentration (uM)
1.8
1.6
1.4
1.2
1
0.8
10
20
30
40
50
Run no.

4.8 Precision

4.9 Removed or Bad Data

Deployment	RP	Analysis	Reason for removal	Action taken
1*	6	Oxygen	Poor samplingtechnique	Marked badin Hypro
1*	17	Oxygen	Poor samplingtechnique	Marked badin Hypro
1*	24	Oxygen	Poor samplingtechnique	Marked badin Hypro
2	18	Oxygen	Poor samplingtechnique	Marked badin Hypro
5	22	Oxygen	Poor samplingtechnique	Marked badin Hypro
7	3	Oxygen	Poor titration	Marked badin Hypro
11	1	Oxygen	Poor titration	Marked badin Hypro
19	18	Oxygen	Poor samplingtechnique	Marked badin Hypro
20	18	Oxygen	Poor samplingtechnique	Marked badin Hypro
21	18	Oxygen	Poor samplingtechnique	Marked badin Hypro
27	4	Oxygen	Poor titration	Marked badin Hypro
38	21	Oxygen	Poor samplingtechnique	Marked badin Hypro
2	18	Salinity	Sample bottle seal	Marked badin Hypro
27	10	Salinity	Salt crystals on neck	Marked badin Hypro
29	17	Salinity	Sample bottle seal	Marked badin Hypro

*CTD 1 was a test cast for sampling demonstration and practice

5 Appendix

5.1 Nutrient Reference Materials

RMNS	NO_X	NO_2	PO_4	SiO_4
BT	19.069	0.482	1.327	43.03
BF	41.388	0.02	3.114	157.932
CA	20.552	0.072	1.434	36.864
BU	4.052	0.07	0.381	21.517

BV	36.234	0.055	2.574	103.835
BW	25.089	0.052	1.593	60.518
BY	0.022	0.008	0.04	1.833

5.2 Salinity Reference Material

OSIL salinity standard batch P157, 34.994 PSU.