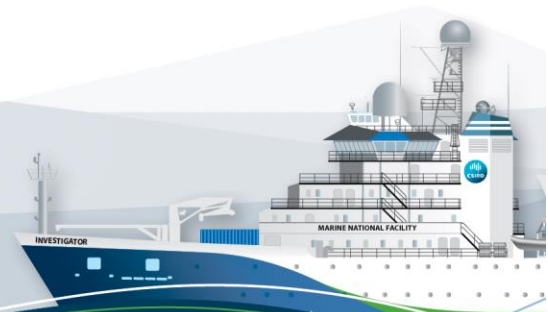


## ***RV INVESTIGATOR***

# **HYDROCHEMISTRY DATA PROCESS REPORT**

|                            |                               |
|----------------------------|-------------------------------|
| <b>Voyage:</b>             | IN2016_V01                    |
| <b>Chief Scientist:</b>    | Mike Coffin                   |
| <b>Voyage title:</b>       | HEOBI                         |
| <b>Report compiled by:</b> | Mark Rayner & Kendall Sherrin |



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## 1 Itinerary

|                   |                |
|-------------------|----------------|
| <b>Mobilise</b>   | <b>Date</b>    |
| Fremantle         | 6 January 2016 |
| <b>Depart</b>     | <b>Date</b>    |
| Fremantle         | 8 January 2016 |
| <b>Arrive</b>     | <b>Date</b>    |
| Hobart            | 5 March 2016   |
| <b>Demobilise</b> | <b>Date</b>    |
| Hobart            | 6 March 2016   |

## 2 Key personnel list

| Name            | Role         | Organisation |
|-----------------|--------------|--------------|
| Mark Rayner     | Hydrochemist | CSIRO        |
| Kendall Sherrin | Hydrochemist | CSIRO        |

## 3 Summary

### 3.1 Hydrochemistry

| Analysis                               | Sampled |
|--|---------|
| Salinity (Guildline Salinometer)       | 595     |
| Dissolved Oxygen (automated titration) | 594     |
| Nutrients (AA3)                        | 612     |

### 3.2 Rosette and CTD

- 55 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 analysed  | <input checked="" type="checkbox"/> Silicate | <input checked="" type="checkbox"/> Phosphate | <input checked="" type="checkbox"/> Nitrate + Nitrite | <input checked="" type="checkbox"/> Nitrite | <input type="checkbox"/> Ammonia |
| Concentration range | 140 µmol/L                                   | 3 µmol/L                                      | 36.4 µmol/L   | 1.4 µmol/L                                  | -                                |

|                              |   |             |             |             |   |
|------------------------------|---|-------------|-------------|-------------|---|
| Method Detection Limit (MDL) | 0.2 µmol/L  | 0.02 µmol/L | 0.02 µmol/L | 0.02 µmol/L | - |
| Matrix Corrections           | N   | N           | N           | N           | - |
| Analyst(s)                   | Mark Rayner, 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                     | 3-way chemical cleaning process for AA3 changed to daily. |             |             |             |   |

### 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   |
| 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)             | Mark Rayner  |
| Lab Temperature (±1°C) | Variable, 20 - 22°C  |
| Sample Container type  |  |
| Sample Storage         | Samples analysed within ~48 hrs                                      |
| Comments               | Suspect but not removed samples: CTD 29 RP5, CTD 35 RP8, CTD 38 RP4, |

## 4 Detailed processing

### 4.1 Procedure

The procedure for data processing is outline in Figure 1.

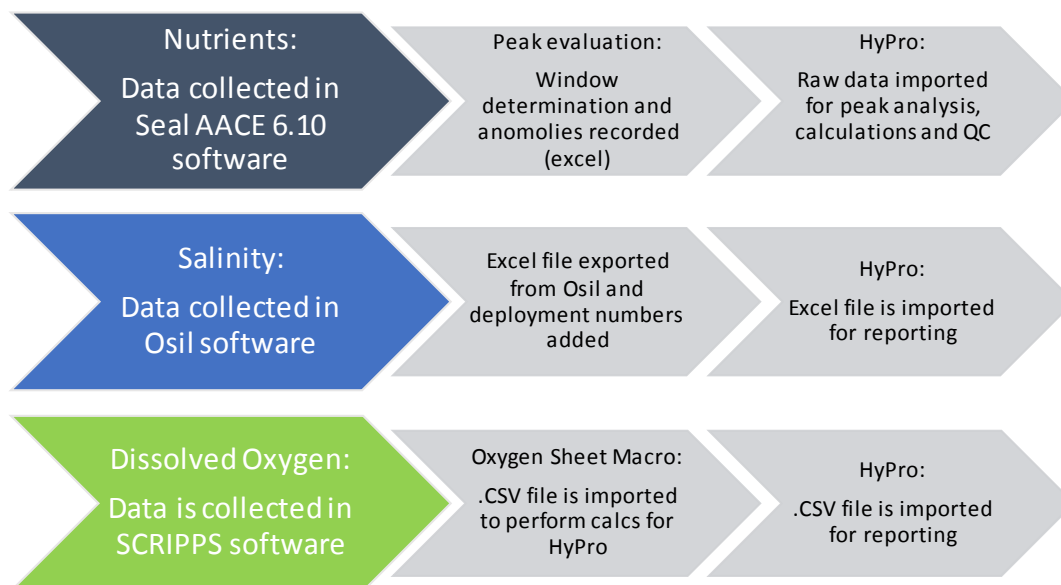


Figure 1: The process above shows the data trail procedure from the initial data generated to output via HyPro for reporting.

### 4.2 Nutrients

- The default peak window is a general estimate of peak timing and does not directly correlate to changes in data.
- Nutrient files for this voyage – in2016\_v01nut001 – nut029.

| Details                    | Silicate             | Phosphate            | Nitrate + Nitrite    | Nitrite              | Ammonia              |
|----------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Data Reported as           | $\mu\text{M l}^{-1}$ | $\mu\text{M l}^{-1}$ | $\mu\text{M l}^{-1}$ | $\mu\text{M l}^{-1}$ | $\mu\text{M l}^{-1}$ |
| 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                    |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| <b>Data Adj for RMNS</b>                   | N   | N | N | N | N |
| <b>Medium of Standards</b>                 | LNSW  |   |   |   |   |
| <b>Medium of Blank</b>                     | 18.2 $\Omega$ MQ                                  |   |   |   |   |
| <b>Proportion of samples in duplicate?</b> | Deepest water sample was always run in duplicate. |   |   |   |   |

Table 1: Nutrient data processing details

| File                    | Nitrite   | Nitrate                             | Phosphate  | Silicate                            | Ammonia                  | Run Type                               |
|-------------------------|---|-------------------------------------|--|-------------------------------------|--------------------------|--|
| <b>in2016_v01nut001</b> | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Test cast CTD 1                        |
| Peak window             | Manually adjusted   |                                     |  |                                     |                          |  |
| RMNS: CA                | Within 1%   | Within 1%                           | Within 2%  | Within 2%                           |                          |  |
| Comments                |   |                                     |  |                                     |                          |  |
| <b>in2016_v01nut002</b> | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Test cast CTD 2                        |
| Peak window             | Manually adjusted   |                                     |  |                                     |                          |  |
| RMNS: CA                | Within 1%   | Within 1%                           | Within 1%  | Within 2%                           |                          |  |
| Comments                |   |                                     |  |                                     |                          |  |
| <b>in2016_v01nut003</b> | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Underway samples and miniature sampler |
| Peak window             | Start:46 End: 79  | Start:33 End:88                     | Start: 34 End: 93                                      | Start: 31 End: 91                   |                          |  |
| RMNS: CA                | Within 1%   | Within 1%                           | Within 2%  | Within 1%                           |                          |  |
| Comments                | Calibrants were out, new ones were ran and data adjusted  |                                     |  |                                     |                          |  |
| <b>in2016_v01nut004</b> | <input checked="" type="checkbox"/>   | <input type="checkbox"/>            | <input checked="" type="checkbox"/>                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 4                                  |
| Peak window             | Start:46 End: 79  | Start:33 End:88                     | Start: 34 End: 93                                      | Start: 31 End: 91                   |                          |  |
| RMNS: CA, BV            | Within 1%   | Within 1%                           | Within 1%  | Within 1%                           |                          |  |
| Comments                | Autosampler failed near end of run, had to finish run early, missed BQCs and BV RMNS duplicates |                                     |  |                                     |                          |  |
| <b>in2016_v01nut005</b> | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>                    | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 6                                  |
| Peak window             | Start:46 End: 79  | Start:33 End:88                     | Start: 34 End: 93                                      | Start: 31 End: 91                   |                          |  |
| RMNS: CA                | Within 1%   | Within 1%                           | Within 1%  | Within 1%                           |                          |  |
| Comments                |   |                                     | Spikes on early peaks due to reagent containers closed | Random spikes still persistent      |                          |  |

| File                    | Nitrite                             | Nitrate                             | Phosphate                           | Silicate                            | Ammonia                  | Run Type  |
|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|---|
| <b>in2016_v01nut006</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 7   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 1%                           | Within 1%                           |                          |   |
| Comments                |                                     |                                     | BL forced                           |                                     |                          |   |
| <b>in2016_v01nut007</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 8   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 1%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut008</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 9   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 1%                           | Within 1%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut009</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 10 & 11   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 1%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut010</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 12 & 13   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 1%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut011</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 14,<br>software error<br>for nitrite<br>channel |
| Peak window             | -                                   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA, BV            | -                                   | Within 1%                           | Within 1%                           | Within 2%                           |                          |   |
| Comments                | Error on nitrite channel            |                                     |                                     |                                     |                          |   |



| File                    | Nitrite                             | Nitrate                             | Phosphate                           | Silicate                            | Ammonia                  | Run Type  |
|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|---|
| <b>in2016_v01nut012</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 15 & 16   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 3%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut013</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 17  |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 3%                           |                          |   |
| Comments                |                                     |                                     |                                     | Bit high on RMNS                    |                          |   |
| <b>in2016_v01nut014</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 18  |
| Peak window             | -                                   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | -                                   | Within 1%                           | Within 1%                           | Within 2%                           |                          |   |
| Comments                | Calibrants error                    |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut015</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Rerun of CTD 14 & 18 Nitrite channel                  |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 2%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut016</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 20,<br>phosphate<br>RMNS bit high,<br>BQC spot on |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 3%                           | Within 2%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut017</b> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 21 & 22   |
| Peak window             | Start:46 End: 79                    | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%                           | Within 1%                           | Within 2%                           | Within 1%                           |                          |   |
| Comments                |                                     |                                     |                                     |                                     |                          |   |

| File                    | Nitrite   | Nitrate   | Phosphate                           | Silicate                            | Ammonia                  | Run Type   |
|-------------------------|---|---|-------------------------------------|-------------------------------------|--------------------------|--|
| <b>in2016_v01nut018</b> | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 22 & 23,<br>phosphate<br>RMNS still high     |
| Peak window             | Start:46 End: 79  | Start:33 End:88   | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |  |
| RMNS: CA                | Within 1%   | Within 1%   | Within 2%                           | Within 1%                           |                          |  |
| Comments                |   |   |                                     |                                     |                          |  |
| <b>in2016_v01nut019</b> | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 25, LNSW<br>contaminated,<br>bad calibrants. |
| Peak window             | Start:46 End: 79  | Start:33 End:88   | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |  |
| RMNS: CA, BV            | Within 1%   | Within 3%   | Within 3%                           | Within 2%                           |                          |  |
| Comments                |   | These channels were all out due to bad Calibrants caused from contamination |                                     |                                     |                          |  |
| <b>in2016_v01nut020</b> | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Rerun of CTD<br>25                               |
| Peak window             | Start:46 End: 79  | Start:33 End:88   | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |  |
| RMNS: CA, BV            | Within 1%   | Within 1%   | Within 2%                           | Within 1%                           |                          |  |
| Comments                |   |   | CA high                             |                                     |                          |  |
| <b>in2016_v01nut021</b> | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 26, 27, 28                                   |
| Peak window             | Start:46 End: 79  | Start:33 End:88   | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |  |
| RMNS: CA                | Within 1%   | Within 1%   | Within 3%                           | Within 1%                           |                          |  |
| Comments                | Room temperature dropped 3 degrees over the length of the run |   |                                     |                                     |                          |  |
| <b>in2016_v01nut022</b> | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 29 & 30                                      |
| Peak window             | Start:46 End: 79  | Start:33 End:88   | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |  |
| RMNS: CA                | Within 1%   | Within 1%   | Within 3%                           | Within 2%                           |                          |  |
| Comments                |   |   |                                     |                                     |                          |  |
| <b>in2016_v01nut023</b> | <input checked="" type="checkbox"/>                           | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 31   |
| Peak window             | Start:46 End: 79  | Start:33 End:88   | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |  |
| RMNS: CA                | Within 1%   | Within 1%   | Within 3%                           | Within 1%                           |                          |  |
| Comments                |   |   |                                     |                                     |                          |  |

| File                    | Nitrite  | Nitrate                             | Phosphate                           | Silicate                            | Ammonia                  | Run Type  |
|-------------------------|--|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|---|
| <b>in2016_v01nut024</b> | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 32, 33 & 34. Cd column bad <95% efficiency.                   |
| Peak window             | Start:46 End: 79   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA, BV            | Within 1%  | Within 2%                           | Within 3%                           | Within 1%                           |                          |   |
| Comments                | BQC bad, accidentally reused old sample, biological activity and/or evaporation have occurred. |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut025</b> | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 35, 36, 38, 39, 40  |
| Peak window             | Start:46 End: 79   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%  | Within 2%                           | Within 3%                           | Within 1%                           |                          |   |
| Comments                |  | Column bad at 85% eff.              |                                     |                                     |                          |   |
| <b>in2016_v01nut026</b> | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 41, 43 & 44. Added CuSO <sub>4</sub> to column buffer to help |
| Peak window             | Start:46 End: 79   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%  | Within 1%                           | Within 2%                           | Within 2%                           |                          |   |
| Comments                |  |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut027</b> | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 45, 46 & 47   |
| Peak window             | Start:46 End: 79   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA, BV            | Within 1%  | Within 1%                           | Within 2%                           | Within 1%                           |                          |   |
| Comments                |  |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut028</b> | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 48, 49 & 51   |
| Peak window             | Start:46 End: 79   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA                | Within 1%  | Within 1%                           | Within 3%                           | Within 1%                           |                          |   |
| Comments                |  |                                     |                                     |                                     |                          |   |
| <b>in2016_v01nut029</b> | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | CTD 52, 53, 54, 55  |
| Peak window             | Start:46 End: 79   | Start:33 End:88                     | Start: 34 End: 93                   | Start: 31 End: 91                   |                          |   |
| RMNS: CA, BW            | Within 1%  | Within 1%                           | Within 3%                           | Within 1%                           |                          |   |
| Comments                |  |                                     |                                     |                                     |                          |   |

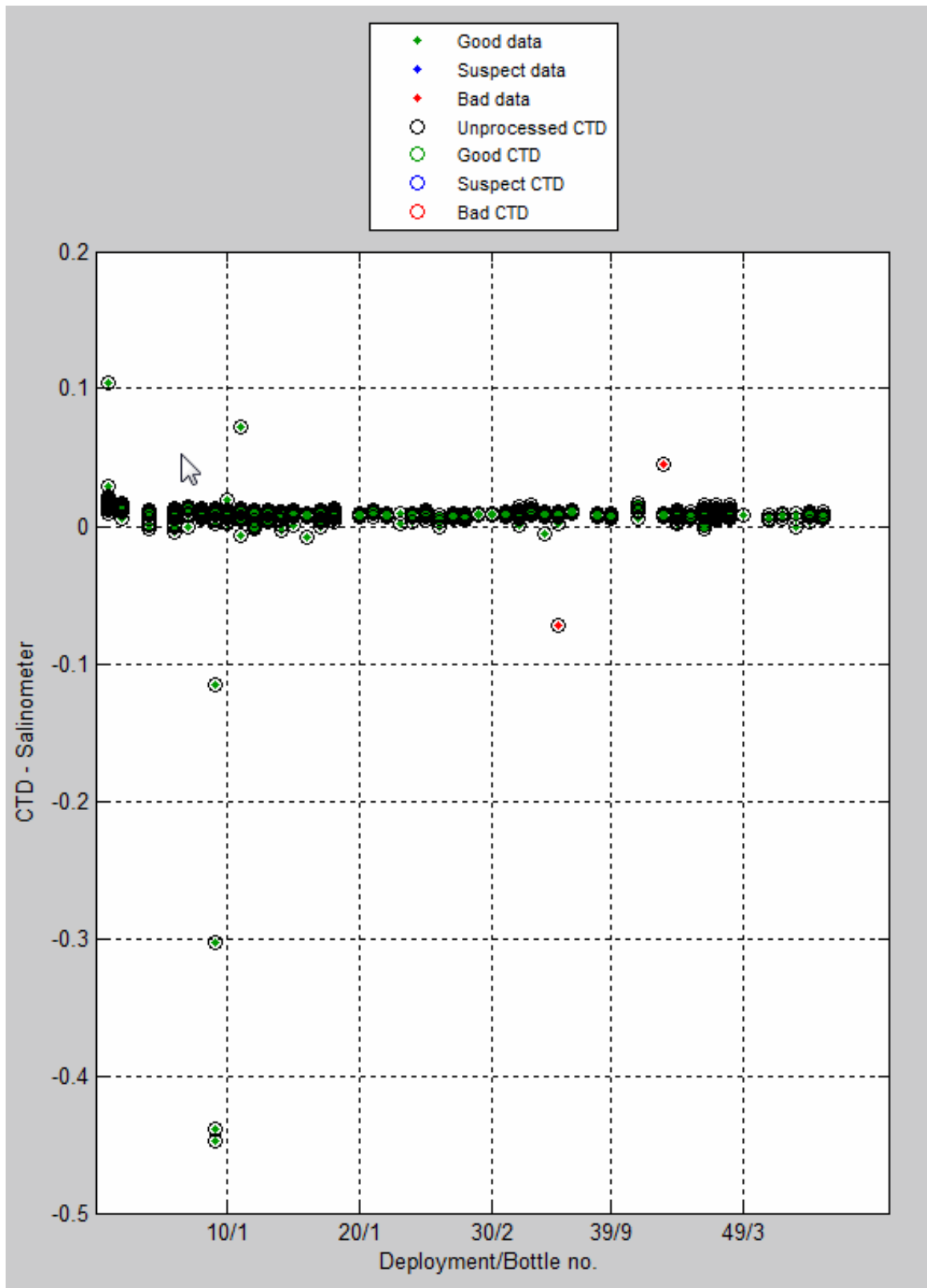
### 4.3 Salinities

- Files for this voyage are named in2016\_v01sal001-023
- Bath temperature set to 24°C.
- Room temperature ranged from 20.0-22.5°C

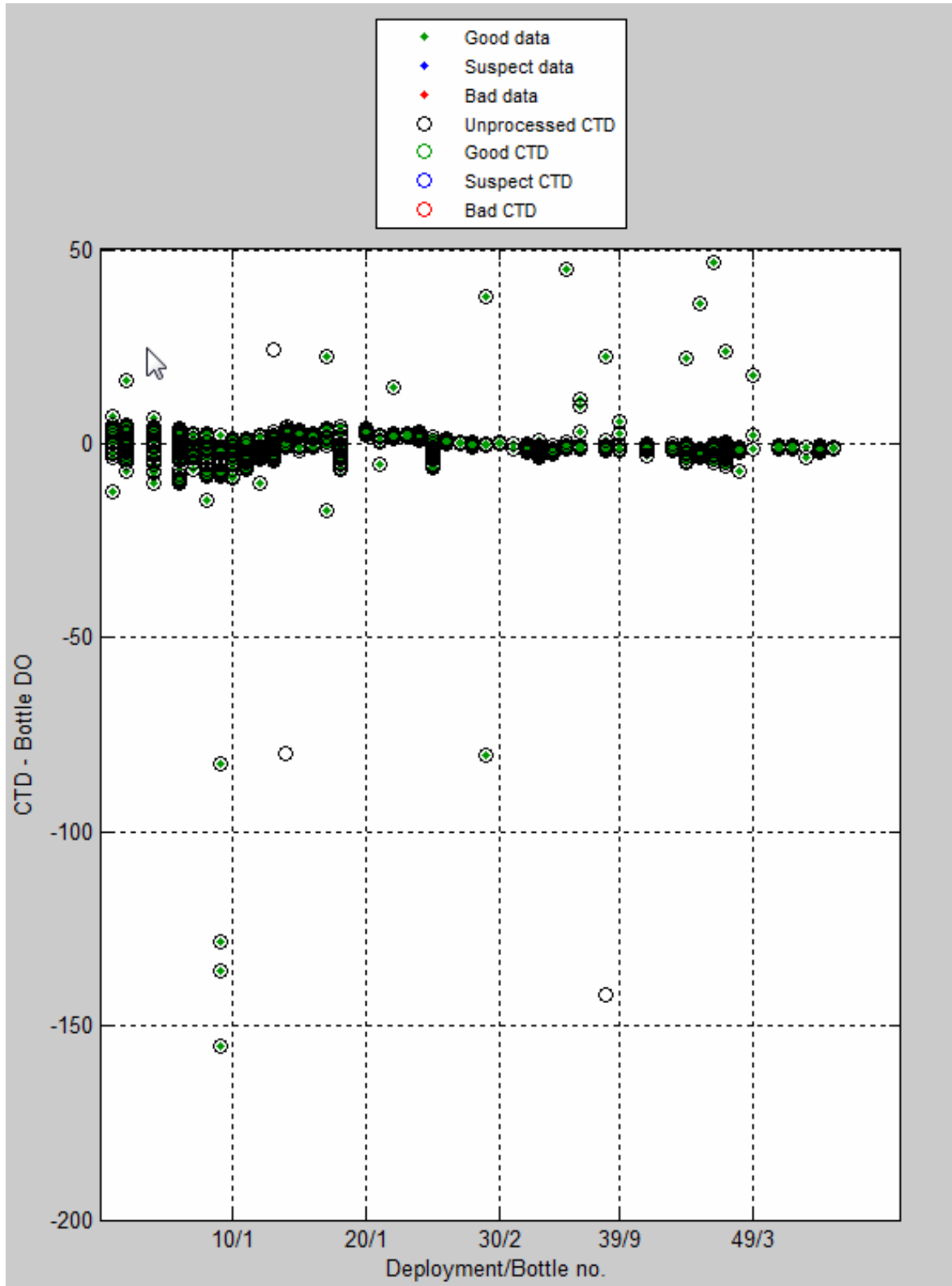
### 4.4 Dissolved oxygen

- Files for this voyage are named in2016\_v01oxy001-oxy055

### 4.5 CTD vs Hydro salinities

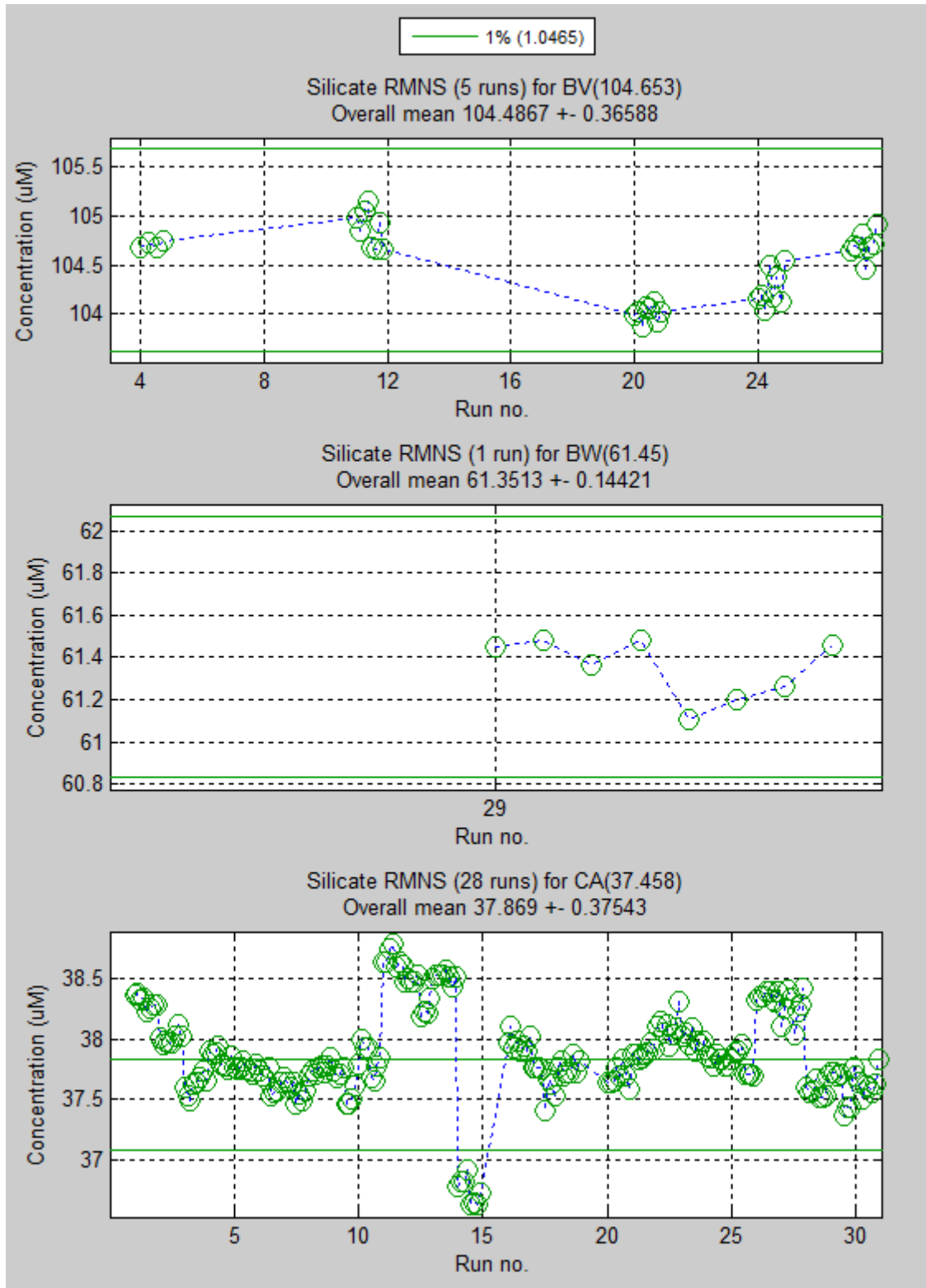


## 4.6 CTD vs Hydro Oxygen

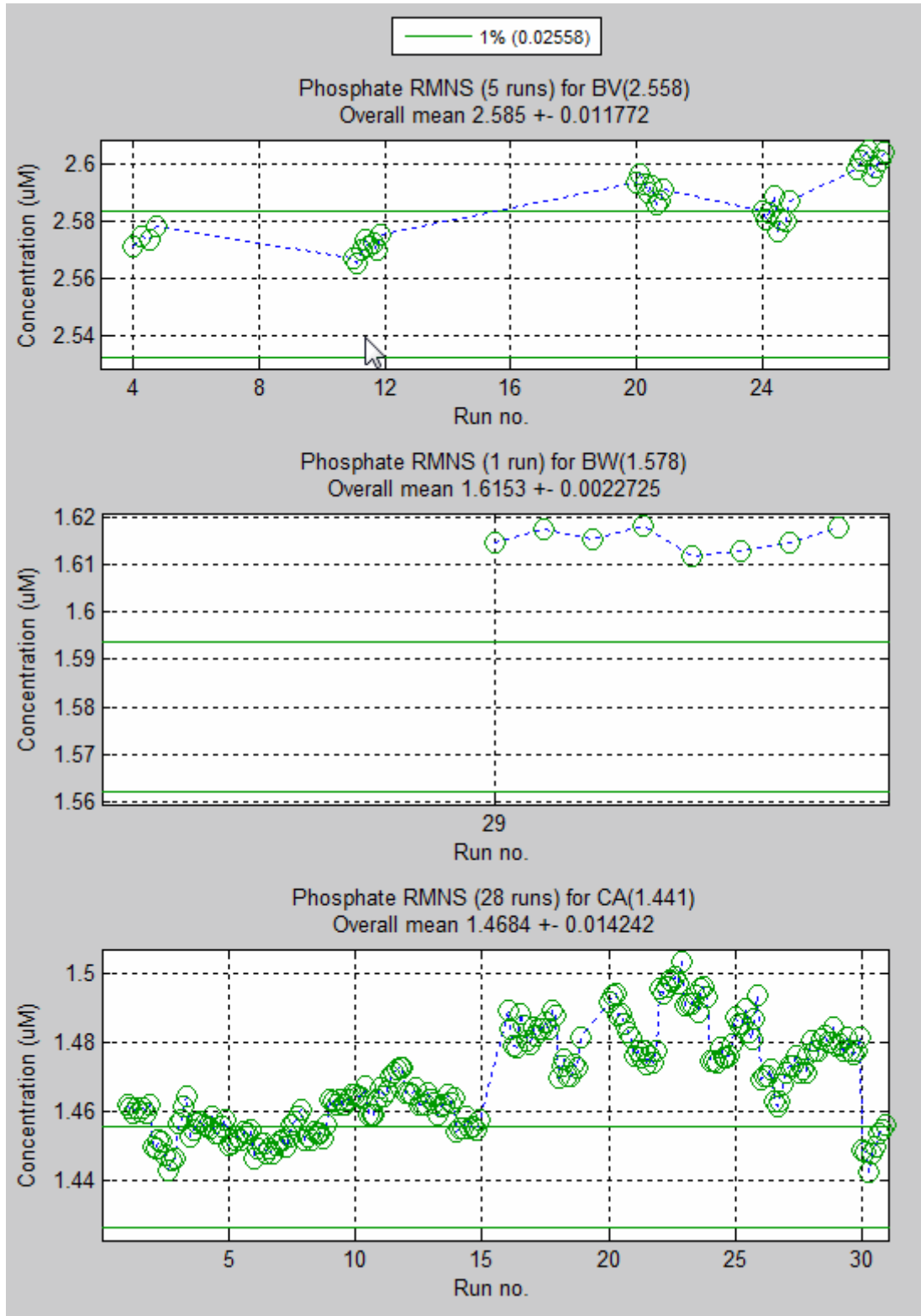


## 4.7 HyPro checks

### 4.7.1 Silicate RMNS

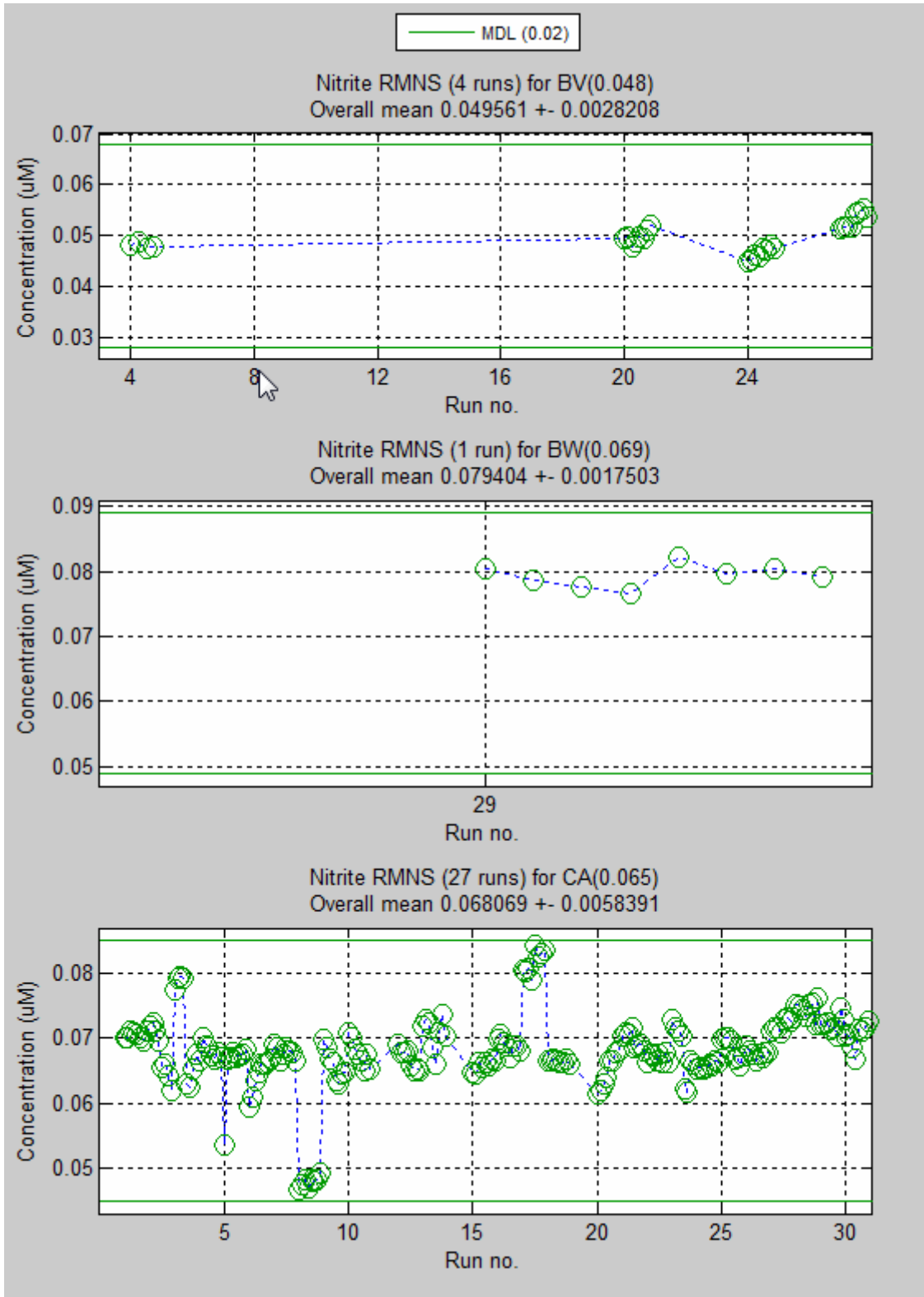


### 4.7.2 Phosphate RMNS

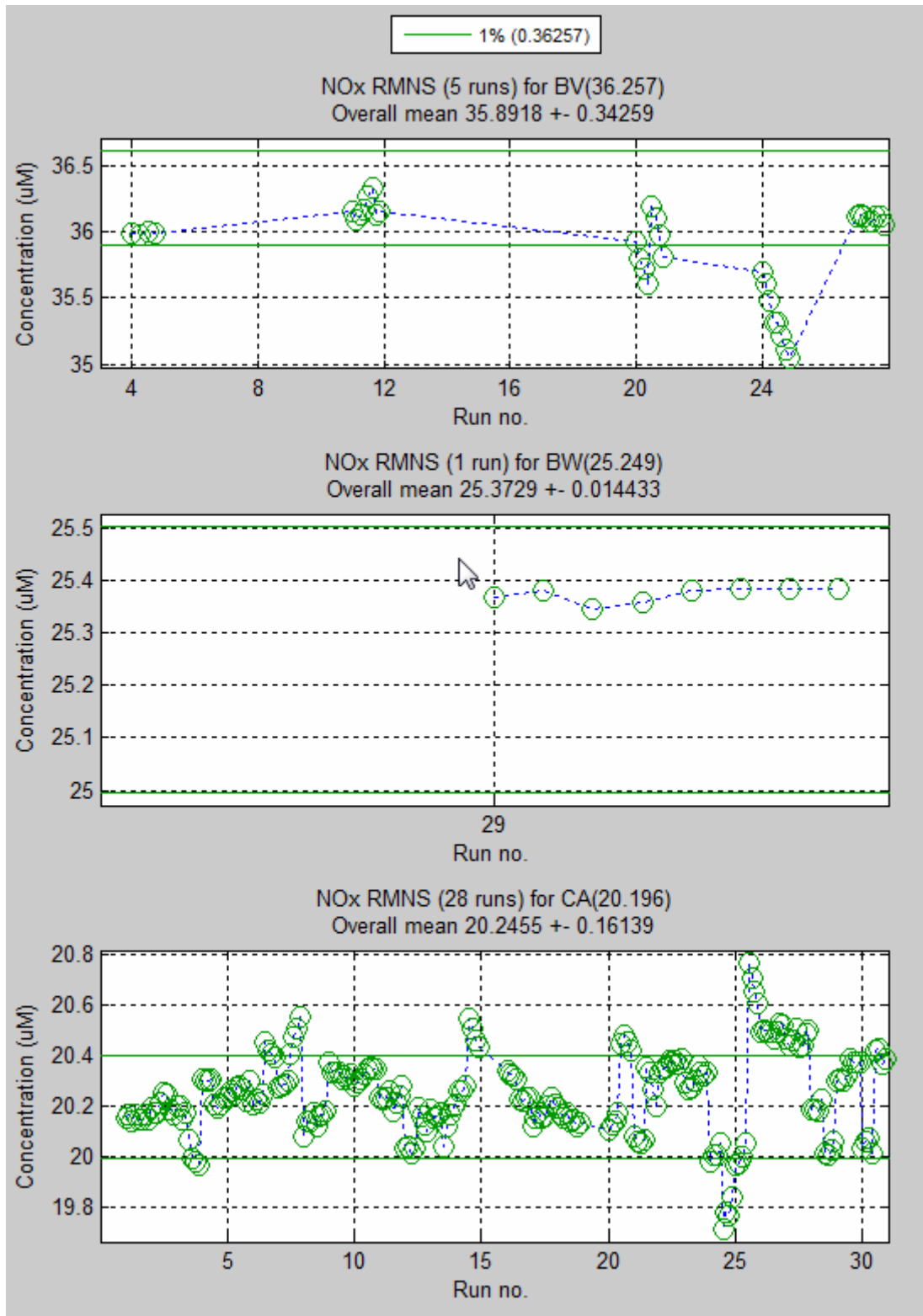




### 4.7.3 Nitrite RMNS



#### 4.7.4 NO<sub>x</sub> RMNS



#### 4.8 Precision

## 4.9 Investigation of missing data and actions required

| Deployment | RP | Analysis | Reason for removal | Action taken |
|------------|----|----------|--------------------|--------------|
| # 13       | 19 | Oxygen   | Poor titration     | Removed      |
| # 14       | 01 | Oxygen   | Poor titration     | Removed      |
| # 38       | 06 | Oxygen   | Poor titration     | Removed      |
| # 35       | 09 | Salinity | Bad measurement    | Removed      |
| # 43       | 04 | Salinity | Bad measurement    | Removed      |

## 5 Appendix

### 5.1 Nutrient Reference Materials

| RMNS | NO <sub>x</sub> | NO <sub>2</sub> | PO <sub>4</sub> | SiO <sub>4</sub> |
|------|-----------------|-----------------|-----------------|------------------|
| 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.