

PacX Fluorometer Calibration

Pac X Vehicle	Papa Mau	Benjamin	Piccard Maru	Fontaine Maru
C3 Serial #	0315	0241	0230	0316

All four of these fluorometers were calibrated in the LRI sensor lab on September 28th, 2011. All instruments had identical channels.

Fontaine Maru (0316) was recovered and the calibration rechecked on February 13, 2013.

Papa Mau (0315) was recovered and the calibration rechecked on February 18, 2013.

Benjamin (0241) was recovered and the calibration rechecked on March 22, 2013

Channel	Reagent
1) Crude Oil	Quinine Sulfate(250 mg/L)
2) chl-A	Basic Blue 3(1.0119 mg/mL)
3) Turbidity	Turbidity Standard(3000 NTU)

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Crude Oil Channel

Serial Number	Date	Y-intercept	Slope rfu/ppb	Date	Y-intercept	Slope rfu/ppb
0315	09/28/2011	85.79	0.55	02/18/2013	33.91	0.81 ⁽¹⁾
0241	09/28/2011	86.44	0.61	03/22/2013	44.32	1.06 ⁽¹⁾
0230 ⁽²⁾	09/28/2011	92.54	0.62			
0316	09/28/2011	88.08	0.62	2/13/2013	41.93	0.54

(1): See Notes

(2): See Notes

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Chlorophyll-A Channel

Serial Number	Date	Y-intercept	Slope rfu/ppb	Date	Y-intercept	Slope rfu/ppb
0315	09/28/2011	18.8	7.73	02/18/2013	106.2	31.4 ⁽³⁾
0241	09/28/2011	22.7	8.79	03/22/2013	188.4	37.6 ⁽³⁾
0230	09/28/2011	2.4	8.50			
0316	09/28/2011	44	6.62	02/13/2013	89.5	22.5 ⁽³⁾

(3): See Notes

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Turbidity Channel

Serial Number	Date	Y-intercept	Slope rfu/ntu	Date	Y-intercept	Slope rfu/ntu
0315	09/28/2011	13.39	20.73	02/18/2013	5.60	21.00
0241	09/28/2011	17.65	20.02	03/22/2013	13.2	19.52
0230	09/28/2011	15.36	22.26			
0316	09/28/2011	13.15	20.67	02/13/2013	3.27	0.15 ⁽⁴⁾

(4): See Notes

NOTES

(1) Oil

The post-deployment slopes for serial numbers 0241 and 0315 were higher when compared to the pre-deployment slopes. Because of the typical degradation of optical instruments in the field, this result is unlikely. For ease of use, the quinine sulfate solution was made up using water in place of the recommended sulfuric acid. The stability of QS is unknown when prepared in this manner and is a likely source of the discrepancy. As an alternative to our calibration, both instruments were sent to Turner for testing to check for any degradation in response. Below are the results of the testing performed at Turner.

Serial Number	Date	Gain	Date	Gain	Percent Change
0241	09/2011	274.32mv	04/2013	297.45mv	+8
0315	09/2011	255.95mv	04/2013	270.17mv	+6

Turner Designs considers these units to be unchanged. The target gain for Turner is ~270mv with a range of 240-300mv

NOTES

(2) Serial number 0230 has not been recovered.

(3) Chlorophyll-a

The Basic Blue powder used to make up the post deployment calibration standard is 25% dye content. The concentration of the pre-deployment calibration standard was labeled as 1.0119 mg/ml. The post-deployment calibration standard was mixed to match the concentration of the pre-deployment standard but when comparing the post deployment and pre-deployment slopes, the post deployment values were roughly 4 times. This condition was observed across all 3 chl-A channels. The most likely explanation for this discrepancy is that the original solution could have been a concentration of 0.253 mg/ml ($0.25 * 1.0119 \text{ mg/ml}$) on account of the technician not being aware of the 25% dye content.

NOTES

Chlorophyll-A Channel

Slope values in red are assuming that the basic blue concentration was 0.253mg/ml for the pre-deployment calibration

Serial Number	Date	Y-intercept	Slope rfu/ppb	Date	Y-intercept	Slope rfu/ppb
0315	09/28/2011	18.8	30.9	2/18/2013	106.2	31.4
0316	09/28/2011	44	26.5	2/13/2013	89.5	22.5
0241	09/28/2011	22.7	35.2	3/22/2013	188.4	37.6

NOTES

(4) **Turbidity**

The turbidity channel for C3 serial number 0316 had little to no response during the post-deployment calibration. While we can't be absolutely certain, this is likely due to the removal of the instrument from the vehicle. The anti-fouling copper plates fused together and we had to cut them off the instrument. The data were reviewed for evidence of a catastrophic failure but nothing was found.