

SATURN-03 Chlorophyll Sensor Field Calibration (1/1/15 – 12/31/15)

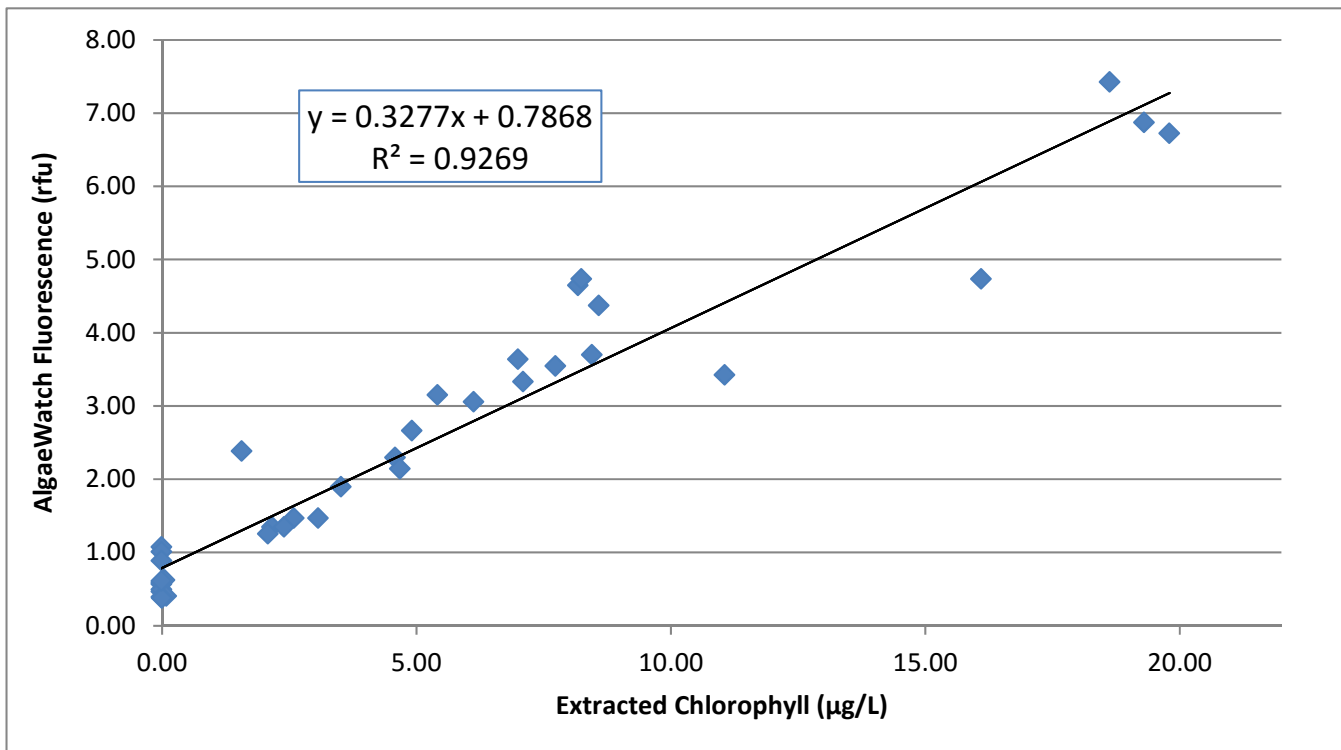
Update Notice, August 2016:

The calibration has been updated from the previously released version of data. See the end of this document for a description of changes made and the resulting change in final data values.

Note: these changes affect only data between January & June 15th 2015.

Calibration Details:

This sensor was calibrated against extracted chlorophyll samples taken from weekly field samples collected between February and December 2015. The corresponding sensor reading was determined by interpolating the *in situ* sensor data to the grab sample time-point. Data from 25 grab samples and 14 in-situ DI readings made at SATURN-03 were used to calculate the relationship between sensor response and extracted chlorophyll concentration (see table below). The resulting calibration equation is: Chlorophyll ($\mu\text{g/L}$) = $3.052 * \text{rfu} - 2.401$. The calibration quality has been flagged as good (QL1).



Field Sample Data for calibration (depth =0 are in situ DI water readings):

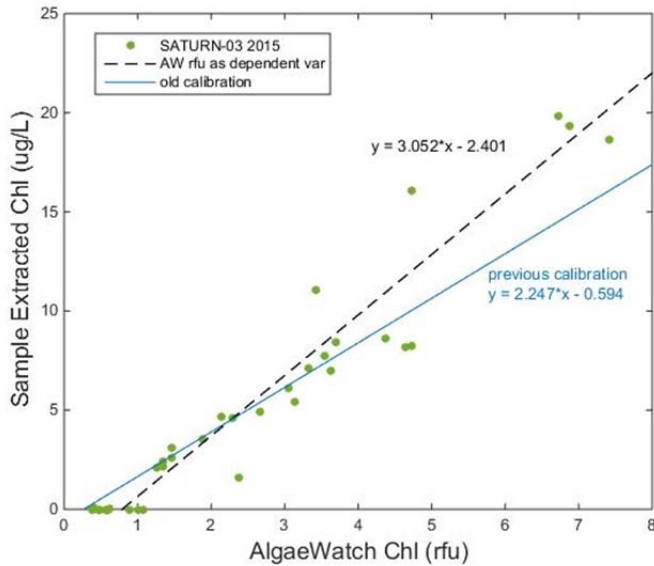
date	Chl. Conc. (µg/L)	stnChl (RFU)	level (cm)
02/24/15	0.06	0.62	DI
03/13/15	0.00	0.56	DI
04/16/15	0.00	0.58	DI
04/20/15	0.00	0.46	DI
05/14/15	0.00	0.49	DI
05/21/15	0.09	0.40	DI
05/21/15	19.31	6.87	13
05/21/15	19.80	6.72	2
05/21/15	18.63	7.42	8
06/02/15	11.06	3.42	2
06/02/15	16.10	4.73	8
06/02/15	0	0.39	DI
07/09/15	7.103	3.33	1300
07/09/15	2.5945	1.47	240
07/09/15	4.9174	2.66	820
07/21/15	4.5865	2.29	1300
07/21/15	3.5197	1.89	820
07/21/15	2.1674	1.34	240
08/17/15	3.0707	1.47	1300
08/17/15	2.4011	1.34	820
08/17/15	2.0894	1.25	240
08/20/15	-0.0043	0.44	DI
08/26/15	8.456	3.69	820
08/26/15	6.1323	3.05	240
08/26/15	8.5904	4.37	1300
08/26/15	0.0023	0.37	DI
09/09/15	0	1.07	DI
10/06/15	-0.0138	0.65	DI
10/06/15	5.4225	3.14	240
10/06/15	8.1801	4.64	1300
10/06/15	8.2492	4.73	820
10/19/15	7.7408	3.54	820
10/19/15	7.0017	3.63	1300
10/19/15	4.6821	2.14	240
12/09/15	0	1.01	DI
12/14/15	0	0.88	DI
12/23/15	0	0.61	DI
12/23/15	1.5705	2.38	1300

Revised Calibration vs. Previous Calibration:

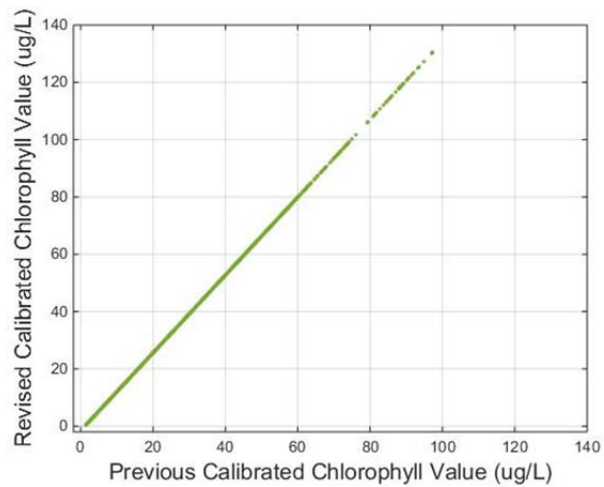
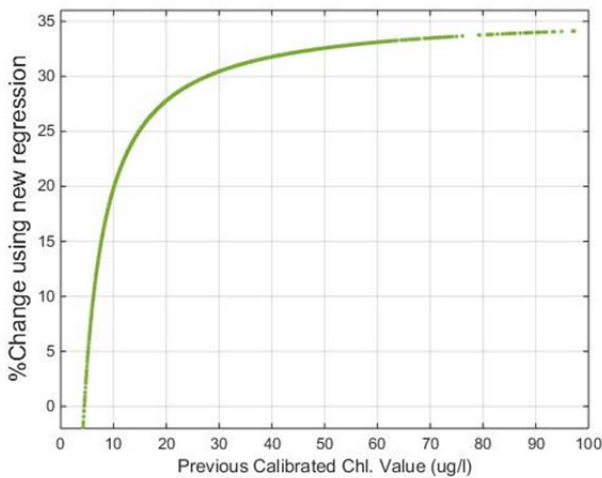
****only relevant to data between January & June 2015. Data after June 2015 were not previously calibrated***

The original calibration included samples through June 2nd 2015. Samples from 2014 were included due to the small number of 2015 samples. With the processing of additional samples from 2015, sample data have been

re-grouped and the calibration updated. The current calibration is based solely on data from 2015. Two samples from 4/20/15 have been excluded from the updated calibration due to issues noted with sample processing. In addition, the fit was corrected so that extracted chlorophyll concentration ($\mu\text{g/L}$) was defined as the independent variable and sensor output (RFU) as the dependent variable. Revising the fit to the one shown at the top of this document (with sensor output as the dependent variable) changed the resulting equation from: $\text{Chl}(\mu\text{g/L}) = 2.247 * \text{rfu} - 0.594$ to: $\text{Chl}(\mu\text{g/L}) = 3.052 * \text{rfu} - 2.401$.



Approximately 82% of the change in chlorophyll values are within $\pm 2 \mu\text{g/L}$, however high chlorophyll values increased by more than 30% of their previous values with the new calibration. Changes to the chlorophyll data are summarized in the following figures.



****only data between January & June 2015 are affected. Data after June 2015 were not previously calibrated and are not included her).***