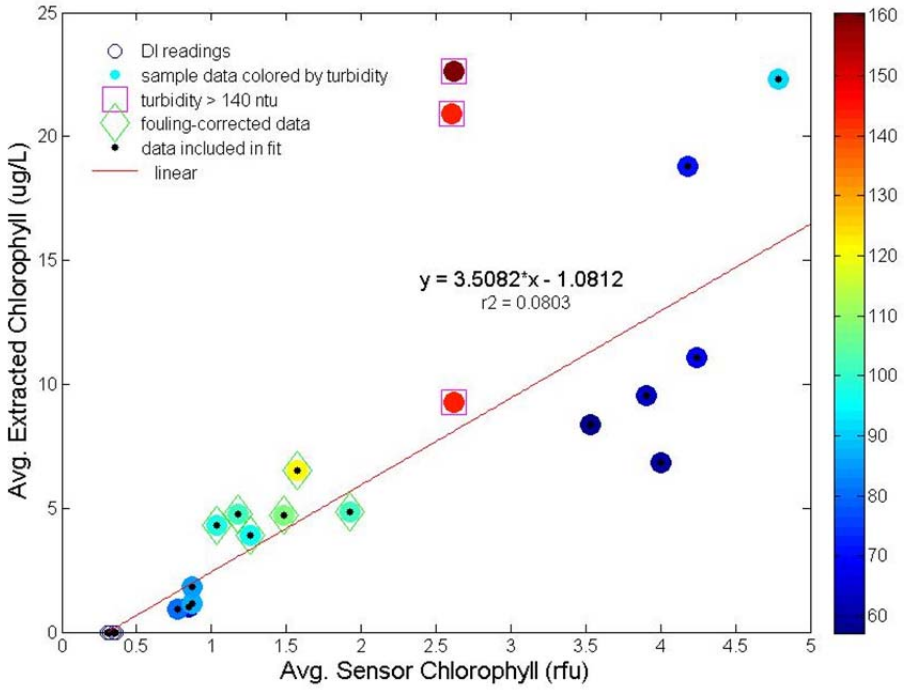
SATURN-03 Chlorophyll Sensor Field Calibration (Oct.2010 – Sept.2011)

NOTICE: This calibration was revised and replaced on August 5, 2016



Calibration Details:

This sensor was calibrated against extracted chlorophyll samples taken from periodic field samples collected between October 2010 and September 2011. Field samples prior to January 2011 were analyzed for extracted chlorophyll using the acidification method for chlorophyll determination, while samples after this date were analyzed using the Welschmeyer non-acidification method of chlorophyll determination. The corresponding sensor reading was determined by interpolating the *in situ* sensor data to the grab sample time point. Three samples (points enclosed in squares on the plot above) were excluded from the calibration due to high turbidity levels at the time of sampling (known to have an effect on the sensor chlorophyll readings). In addition, the sensor data for 6 time points are taken from periods when the data were corrected for sensor fouling using frequent DI measurements (see note s3-chl02). Several sensor DI measurements were also included in the calibration (see table below). The resulting calibration equation is: Chlorophyll (ug/L) = 3.51 * rfu – 1.08. The calibration quality has been flagged as less than good (QL3) because it lacks samples from periods of high biomass, is based on only 17 samples from 6 sampling times, and because some of the sensor data is from periods where the data was corrected for fouling.

Field Sample Data included in Calibration:

Method	Sample Date	Depth	Avg Chl	St.dev.	n
Acid	10/13/09 11:50	0.3	4.72	0.19	2
Acid	3/3/10 11:30	0.3	5.79	0.46	2

Acid	4/7/10 8:20	0.3	12.02	0.56	2
NA	10/22/10 11:08	0.3	1.58	0.04	2
Acid	1/10/11 9:47	8.6	2.24	0.21	3
NA	1/10/11 9:58	30	1.95	0.34	3
NA	4/28/11 14:01	860	13.38	2.96	3
NA	5/31/11 15:14	860	9.21	0.26	3
NA	5/31/11 15:12	30	9.66	0.59	3
NA	7/26/11 14:06	860	8.23	0.55	3
NA	7/26/11 14:08	30	6.58	0.16	3
NA	9/7/11 14:52	860	1.65	0.00	1
NA	9/7/11 14:42	30	3.85	0.00	1

Sample Collection: Whole water samples were collected from the pump at the station. The samples were stored in amber HDPE bottles and shipped overnight on blue ice to the Peterson/Needoba lab at OGI in Beaverton. The samples were then stored refrigerated until processing within 24 hours of receipt.

Sample Processing Details:

1. 100mL of sample is filtered onto a Whatman GF/F under low vacuum. The filter is folded, placed into a cryovial and stored at -80°C.
2. When ready to process the samples, the filters are placed in glass test tubes and 5mL of 90% acetone is added (under dimmed lights). Three acetone blank test tub are also prepared.
3. Samples are allowed to extract for 24 hours in the dark at -20°C.
4. After extracting, samples are allowed to warm to room temperature in the dark.
5. Measure the extracted sample on benchtop fluorometer:
    a. Non-Acidification Method (used after January 2011)
        - Vortex test tube.
        - Filter removed with forceps and discarded
        - Wipe test tube with kimwipe.
        - Measure Raw Fluorescence (F0).
        - Measure the 3 acetone blanks

    b. Acidification Method (used prior to January 2011)
        - Vortex test tube.
        - Filter removed with forceps and discarded
        - Wipe test tube with kimwipe.
        - Measure Raw Fluorescence (F0).
        - Add 3 drops 10% HCl.
        - Invert test tube.
        - Measure Raw Fluorescence (Fa = acidified)
        - Measure 3 Blanks without adding acid.