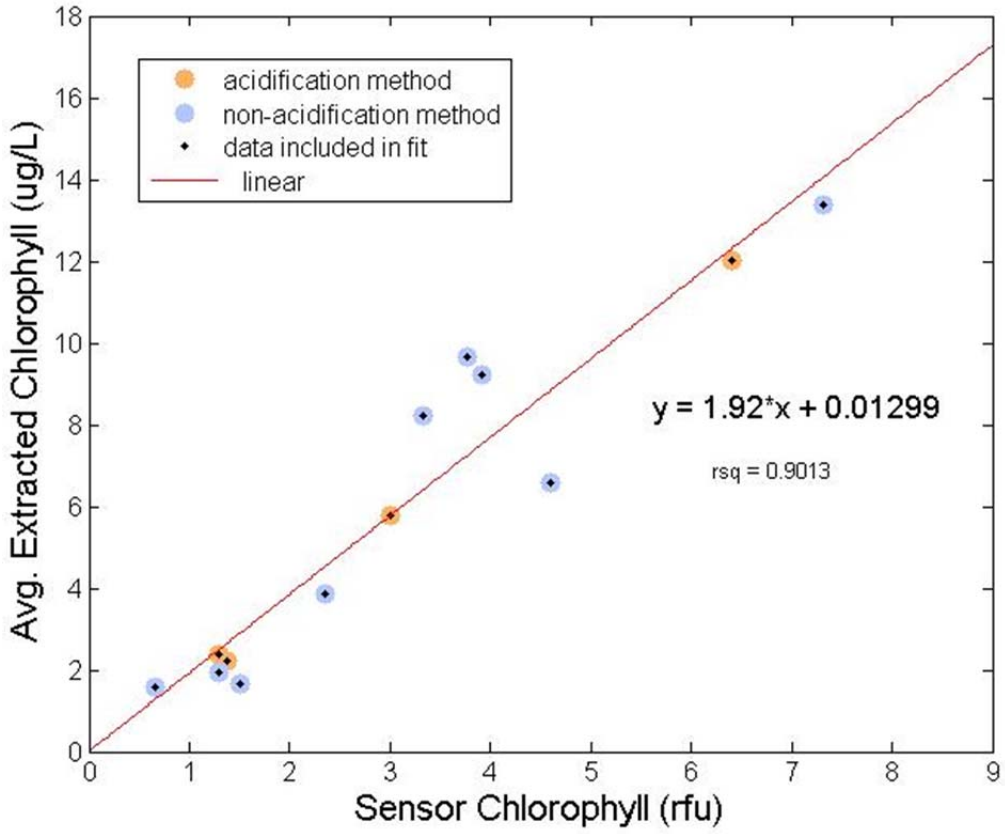
SATURN-04 Chlorophyll Sensor Field Calibration (March 2010 – Sept.2011)

***NOTICE: This calibration was revised and replaced on August 11, 2016***




***Calibration Details:***

This sensor was calibrated against extracted chlorophyll samples taken from periodic field samples collected between March 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. The resulting calibration equation is: Chlorophyll (ug/L) = 1.92 * rfu + 0.013. The calibration quality has been flagged as less than good (QL2) because it lacks samples from periods of high biomass (with chlorophyll levels exceeding 14 ug/L) and requires a greater number of samples for a robust calibration (this calibration is based on 13 samples from 10 sampling times). A conservative approach is to apply this calibration only during the time the samples were collected (March 2010 – Sept. 2011), however, it may be appropriate to apply this calibration from 9/1/09 – 4/13/12 because there were no obvious shifts in the baseline or changes in the sensor response during this time. The sensor baseline (and possibly the slope of the response) changed on 4/13/12 and the calibration should not be applied after this time (see s4-chlcal-02 for a field calibration for this time period)

***Field Sample Data included in Calibration:***

| Method | Sample Date | Depth | Avg Chl | St.dev. | n | Sensor(rfu) |
|---|---|---|---|---|---|---|
| Acid | 3/3/10 11:30 | 0.3 | 5.79 | 0.46 | 2 | 3.01 |
| Acid | 4/7/10 8:20 | 0.3 | 12.02 | 0.56 | 2 | 6.40 |
| Acid | 10/22/10 11:08 | 0.3 | 1.58 | 0.04 | 2 | 0.66 |
| NA | 1/10/11 9:47 | 8.6 | 2.24 | 0.21 | 3 | 1.38 |
| Acid | 1/10/11 9:58 | 0.3 | 1.95 | 0.34 | 3 | 1.30 |
| NA | 1/10/11 9:58 | 0.3 | 2.38 | 0.32 | 3 | 1.30 |
| NA | 4/28/11 14:01 | 8.6 | 13.38 | 2.96 | 3 | 7.31 |
| NA | 5/31/11 15:14 | 8.6 | 9.21 | 0.26 | 3 | 3.91 |
| NA | 5/31/11 15:12 | 0.3 | 9.66 | 0.59 | 3 | 3.77 |
| NA | 7/26/11 14:06 | 8.6 | 8.23 | 0.55 | 3 | 3.33 |
| NA | 7/26/11 14:08 | 0.3 | 6.58 | 0.16 | 3 | 4.60 |
| NA | 9/7/11 14:52 | 8.6 | 1.65 | 0.00 | 1 | 1.51 |
| NA | 9/7/11 14:42 | 0.3 | 3.85 | 0.00 | 1 | 2.35 |

***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.