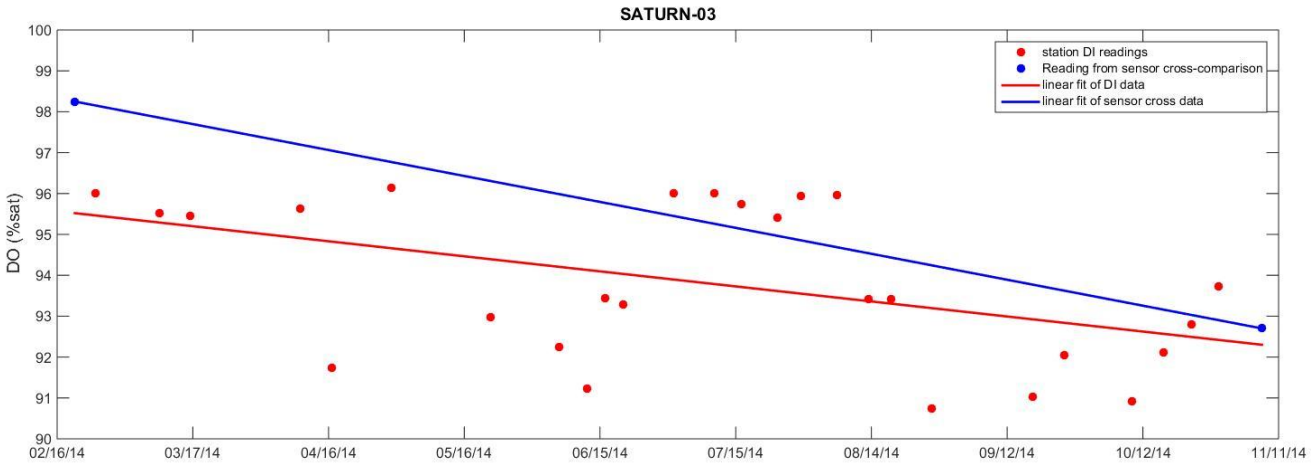
Correction of Dissolved Oxygen Measurements from Saturn03 (2/20/14 – 11/8/14)

Summary:

The calibration of the dissolved oxygen sensor deployed at SATURN-03 was recovered for calibration evaluation and comparison to other dissolved oxygen sensors on 2/20/14 and again on 11/8/14. During these sensor checks the sensor is placed in 100% aerated DI with several other sensors. A reading is made with the sensor in the condition it was recovered from the field in. The sensor is then cleaned and readings are again made in aerated DI. The table below shows the results of this sensor's calibration evaluations.

Date	Reading (%saturation) in 100% aerated DI water	state
2/20/14	91.15%	Dirty (as recovered)
2/20/14	98.25%	Clean (after cleaning)
11/8/2014	92.7%	Dirty (as recovered)
11/8/14	96.6%	Clean (after cleaning)

On 2/20/14 the sensor was reading 98.25% in 100% aerated DI after being serviced and it was re-deployed to the station. On 11/8/14 it read 92.70% in 100% aerated DI as recovered from the field, indicating the sensor had drifted during deployment. The following plot shows these sensor cross-check data in blue. Aerated DI is also transported to the station and is pumped through the system on a regular basis. These 'on-station DI readings' (red points in plot below) are another mechanism to monitor the performance of the sensor *in situ*. These data do not show any abrupt changes in sensor response that would have occurred due to an individual fouling event. They do suggest the sensor was reading lower than is indicated by the sensor cross-check data, however, these readings are subject to greater variability and sources of error whereas the sensor cross-check readings are made in a more controlled environment. Therefore, the cross-check data alone were used to correct the sensor for linear drift between 2/20/14 & 11/8/14. The data have been flagged as QL3 because the drift exceeded 5%.



Calibration Correction Details:

The correction factor (CF) is the ratio of the known good reading/observed reading :

CF = 100%/(100% - %offset) ; Corrected data = raw data * CF.

CF as deployed on 2/20/14 = 100/98.25 = 1.018; CF as recovered on 11/8/14 = 100/92.7 = 1.07

A linear interpolation of the CF at the beginning of deployment to the maximum CF on 11/8/14 was used to correct the data.