Calibration Intervals
Originated by Robbie Laird (WHOI) on 13 Jan 2014

From: Robbie Laird (WHOI) on Mon, 13 Jan 2014

Hi

I think I asked a variation on this last year, but it's come up internally again. Perhaps this is a somewhat more fine grained look at the question.

Most instruments measure something that can be defined, like temperature, or conductivity. However, fluorometers are not so simple. The signal depends on the creature being measured. (and it also depends on flow rate, how many folks have that in there data? We don't) If it was $50 to calibrate, this would be a no brainer, but it's quite expensive.

So, are fluorometer calibrations useful? What's everyone else doing? There is likely some merit in all doing it the same way throughout the fleet, but there is also some debate about whether it's worth it. If someone was to look at this data in 20 years, would the recently calibrated data be more useful than the less recently calibrated data? Do we need to measure flow rate to even begin to make the calibration useful?

Robbie Laird
WHOI/SSSG

Reply From: "Forcucci, David " (USCG) on Mon, 13 Jan 2014

Robbie,
As you said the signal is dependent on the pigment from the creature. Below is a blurb I found on the web which articulates what I think is the most important thing to understand about Fluorometer calibration. The user needs to calibrate with in situ water collection. I am not aware of any ships that do this as part of their underway sampling, which is unfortunate.

I did some slight editing.
"The best calibration method is to capture in situ bottle samples, assay these chemically, then match fluorometer response with the results. If no quantitative calibration is available, then the fluorometer will still provide a qualitative indication of the distribution of chlorophyll in the water column." From
http://www.pme.com/USB_smanual/calibration5.htm.

As far as factory calibrations, I would say maybe every 5 years unless a problem arises sooner with the unit.

Dave

Seattle

Reply From: Peter Ortner (RSMAS, U. Miami) on Mon, 13 Jan 2014

this is a complex topic as any biological oceanographer will tell you but the answer you get depends upon the plankton species (really pigment) composition and that varies radically in time and space.

for our work where we use this for plankton biomass, we have calibration samples in each relevant water mass for each season or cruise and on either sides of frontal features (and within them)

Peter B. Ortner, Research Professor and Director
Cooperative Institute for Marine & Atmospheric Studies
Rosenstiel School of Marine and Atmospheric Science
University of Miami

Reply From: "Forcucci, David " (USCG) on Mon, 13 Jan 2014

As Peter indicated, when science is on board and they are interested in the data they collect calibration samples. For other cruises or transits, calibration samples require filtering a small amount of flow through seawater and then freezing the filter paper. These would later need to be processed by a lab for Chl a and other pigments and those data can be used to calibrate the fluorometer reading for that water mass at that point in time.

So, theoretically you could set up a notification when the fluorometer reading changes a certain amount to take a sample and/or when the ship transits so many miles to take a new calibration sample.

Dave

Reply From: "David O'Gorman" (OSU) on Mon, 13 Jan 2014

At OSU we just keep it clean and send the unit back every few years for preventative maintenance.
Dave

David O'Gorman
Marine Technician Superintendent OSU CEOAS
STARC

Reply From: Andy Nunn (USAP) on Tue, 14 Jan 2014

In the USAP we calibrate Wet-Labs ECO-FL fluorometers used on the CTD in a pre-post cruise factory calibration cycle, and the same model unit on the underway seawater system is an annual cal cycle with monthly cleanings. We have a rotary flowmeter with digital output to record the flow rate across the fluorometer as well.

Calibration at Wet-Labs runs ~$435 per unit.

For older Turner 10-AU fluorometers they provide relative measurements only unless the science team does calibrated comparison runs. We don't use these any more on the underway system.

Andy Nunn

Marine Electronic Technician Supervisors
Lockheed Antarctic Support Contract

Reply From: John Ahern (LUMCON) on Tue, 14 Jan 2014

We have both the Eco and 10au in our flow thru. We try to clean daily with a bottle brush and shoot for annual cal on the Eco. If we want to save money we stretch out the Eco cal. However some of our scientists are really interested in that data and they like the annual cal. We also have two Chelsea aquatracka3 with chla. We've had them both done in the last year but these are expensive and they go to the uk so we are thinking about what really makes sense. We also have a turner c3 but turner doesn't do calibrations. It has a crude oil and chlorophyla channel. We do a functional check on this one with a solid standard. If a scientist wants to quantify data they need to do in situ cal.
