2013 – Fluorometer #2228

This fluorometer malfunctioned in 2013 and was eventually taken out of service. It was used on 9 cruises during 2013.

The problem may have started in 2012 but was not major with dark values of about 0.1ug/L at 325db. That is an order of magnitude larger than in the spring, but not enough to cause alarm. Through 2013 the dark values increased.

* 2013-01 – Feb - 0.08 at 3400db
* 2013-12 – April - 0.1 at 260db
* 2013-35 – April - 0.17 at 157db
* 2013-36 – May - 0.1 at 1300db
* 2013-38 – May - 0.3 at 2100db
* 2013-17 – June - 1.1 at 4000db (but drifted through cruise from 0.5 to 1.5 at 2000db)
* 2013-50 – June - 1.5 at 679db
* 2013-18 – Aug - early casts removed; after cable change 0.12 at 4000db
* 2013-58 – Sept- fluorescence removed

The dark values definitely stand out, but how are the shallow values?

* For 2013-01 the fluorescence/CHL comparison looks normal with the fluorometer reading too high for very low CHL and too low for CHL>1ug/L.
* The 2013-12 results look reasonable for the Strait of Georgia with no sign of fluorescence being out of line near the surface.
* There are no CHL data for 2013-35 and 2013-36. For 2013-38 the fit of CHL vs Fluorescence does not stand out as odd, with fluorescence reading lower than CHL in most cases, which is typical when CHL values are high, as was the case for that cruise. It is not surprising that this cruise doesn’t look very different given that an error of 0.3ug/L would hardly be noticed at high CHL.
* The comparison for 2013-17 looks a little odd, with the fluorometer reading much higher than CHL at very low CHL. The ratio of FL/CHL appears to increase with time, though that is a little hard to judge because the offshore FL/CHL ratio always looks higher than near-shore because CHL values are low.
* The 2013-50 results look odd, but there isn’t much CHL data and the areas sampled are prone to poor flushing of Niskin bottles.
* The 2013-18 fluorescence values were so low that they were removed from the early casts. There was confusion at sea about the gain used and what voltage the sensor was mounted on. After a cable change values seemed better with dark values not as bad as they had been on the previous few cruises, but still a little high.
* For 2013-58 the fluorescence was low near the top of the cast and dark values high. The channel was removed from the files before archiving.

Shallow values are definitely bad for 2013-58 and maybe for other cruises, but it is hard to judge that. It is best left to users to decide what to do with these data. As usual, we state that the fluorescence is nominal.

Based on these observations a comment will be added to the CTD and CHE files for cruises 2013-38, 2013-17, 2013-50 and 2013-18 as follows:

WARNING: SeaPoint Fluorometer #2228 malfunctioned during the latter half of 2013. There were large values at great depth that got steadily higher through the year until it was removed from service.

The data have been left in the file so researchers can see the shape of the profile.

Comparison with extracted chlorophyll is recommended.