APPLICATION NOTE NO. 77   May 2005

Entering Calibration Coefficients for the Seapoint *Ultraviolet* Fluorometer

The Seapoint ultraviolet fluorometer is used for in situ measurements of chromophoric dissolved organic matter (CDOM). This fluorometer uses modulated ultraviolet LED lamps and excitation filter to excite CDOM present in water. The fluorescent light emitted by the CDOM passes through a blue emission filter and is detected by a silicon photodiode. The low level signal is then processed, generating an output voltage proportional to CDOM concentration.

Sensitivity of this fluorometer is determined by two control lines that allow the user to change the range and sensitivity as required for a particular application. Jumper cables may be purchased from Sea-Bird to allow the sensor range to be changed by inserting the jumper cable in line with the original cable purchased.

Gain	Sensitivity [V / (µg/l)]	Range [µg/l]
30X	0.1	50
10X	0.033	150
3X	0.01	500
1X	0.0033	1500

When setting up the configuration (.con) file in the Windows or DOS version of our software package, the Seapoint Ultraviolet Fluorometer is not available in the list of voltage sensors. However, our software includes a user-polynomial function that allows you to define an equation to relate the sensor output voltage to calculated engineering units:

User-Polynomial in Sea-Bird software: **Value = a0 + (a1 * V) + (a2 * V^2) + (a3 * V^3)**
> *where*:
> Value = output in desired engineering units
> V = voltage from sensor (Volts)
> a0, a1, a2, and a3 = user-defined sensor polynomial coefficients

For this fluorometer:
Value (µg/l) = (Voltage * Range / 5) + Offset
Setting this equal to the user-polynomial equation and using consistent notation (Voltage = V):
(V * Range / 5) + Offset = a0 + (a1 * V) + (a2 * V^2) + (a3 * V^3)
Left side of equation has no V^2 or V^3 terms, so a2 and a3 are 0; rearranging:
Offset + (Range / 5) V = a0 + (a1 * V)
a0 = Offset   a1 = (Range / 5)   a2 = a3 = 0

Notes:
- The CTD configuration (.con) file is edited using the Configure menu (in SEASAVE or SBE Data Processing in our SEASOFT-Win32 programs) or SEACON (in SEASOFT-DOS). The software allows you to enter the sensor name, which will appear in the data file header, as well as the coefficients.
- The fluorometer is adjusted at the factory for a nominal range and sensitivity for a given gain setting. Factors such as fouling, scratches, or lamp degradation reduce the sensor sensitivity and/or create the need for an offset (a0) to account for discrepancies in the equation. When greater accuracy is desired, calibrate the sensor prior to deployment. Consult the fluorometer operating manual or Seapoint Sensors, Inc. (http://www.seapoint.com) for maintenance and calibration procedures.