



# YSI Turbidity Sensor Stability

## Typical Drift in Field Studies

Occasionally, YSI Technical Support is requested to provide information on what can be expected with regard to the long-term drift of our 6026 and 6136 turbidity sensors. This document is designed to meet this need.

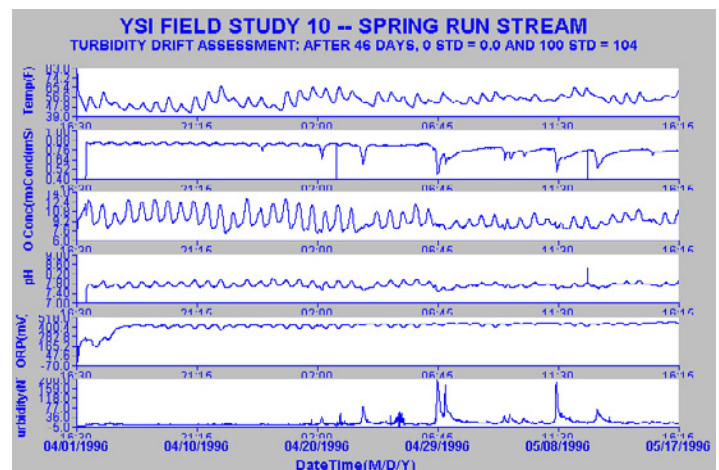
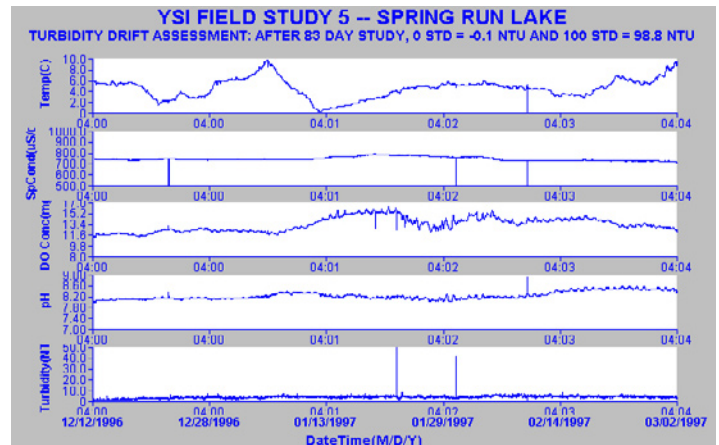
In general, the answer is simple: we have found that the probe optics for these sensors are very stable even over long periods of usage. This information on stability can be ascertained partially from the fact that we have had very few complaints about drifting for the large number (> 1000) of probes which are currently being used by our customers. In addition, however, YSI not only rigorously tests new sensors at our field testing sites before product release, but also continues to test them long after introduction in applications similar to those experienced by our users. The results of these long-term YSI studies provide quantitative data to assess typical turbidity sensor drift.

For the field studies described below, the turbidity systems of our sondes (6920 and 6600) are calibrated with 0 and 100 NTU formazin standards prior to deployment. After completion of the studies (usually 50-90 days), the sonde is placed back in freshly-prepared 0 and 100 NTU standards and the readings recorded to quantify the offset and slope drift associated with the sensor. The table below contains data from 15 deployments at two of our Ohio test sites -- Spring Run Lake (1-9) and Spring Run Stream (10-15) which were carried out from 1996 to the present.

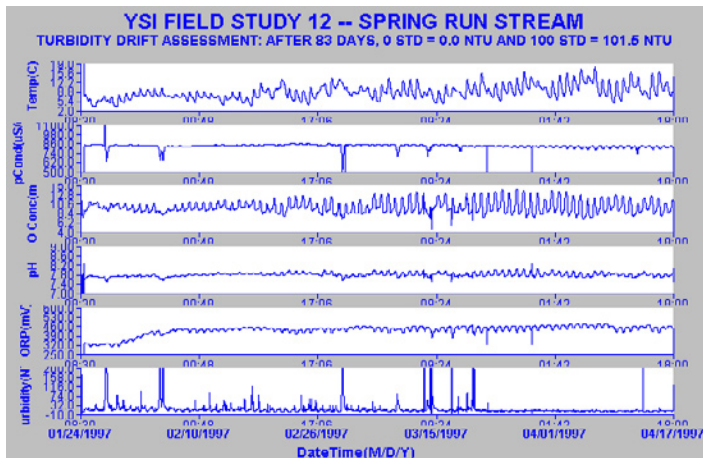
Study #	0 NTU After Recovery	100 NTU After Recovery	Study Length, days
1	-0.3	102.5	63
2	0.3	99	57
3	0.0	104	42
4	-0.5	102	55
5	-0.1	99	83
6	0.2	101.5	56
7	0.0	103	50
8	0.4	97	61
9	0.1	101	85
10	0.0	104	46
11	0.0	101	84
12	0.0	101.5	84
13	0.1	99.8	84
14	0.4	96	91
15	0.0	101.5	55

The data indicate that the long-term drifts are usually <3 % and this behavior has been typical for our turbidity sensors in all of our other studies since the 6026 was first introduced in 1995. Note that the standard itself is only certified to +/- 2 %, so it is possible that there was even less drift than is shown.

To supplement the information shown in the table, the actual plots of turbidity (and all other parameters monitored in the studies) vs. time are shown below for Studies 5, 10, and 12. The noise level and occasional spikes shown in the plots for the field studies are also typical of the YSI turbidity probe performance. Also note the excellent inverse relationship shown between turbidity and specific conductance during the frequent rainfall events in studies 10 and 12.



(continued)



The usual reason for apparent turbidity drift after a field study is the use of contaminated standards in either the pre-deployment or post-deployment calibration checks. This contamination can result from fouling left on the sonde after the deployment. Thus, when checking turbidity drift, be certain to (a) clean the probes, sonde bulkhead, and sonde guard before placing the sonde in turbidity standards and (b) place the sonde in clear water first and inspect the water visually to make sure no debris is being released from the sonde. A secondary reason for apparent drift of turbidity sensors is the presence of bubbles on the optics when the readings are taken. To prevent this problem, be sure to activate the wiper on the probe several times during the calibration check until a stable reading is observed.

In conclusion, extensive YSI long-term testing indicates that our turbidity sensors typically show excellent stability. However, as for all sensors subjected to harsh environmental deployments, turbidity probe malfunction can happen in rare instances. If you suspect optical malfunction of your YSI turbidity sensor: (1) make certain that your standards have been prepared properly and have not been contaminated and (2) check for bubbles on the optics during your calibrations or calibration checks. If problems still occur, contact YSI Technical Support for advice.

*For additional information please contact*

**YSI Environmental**

Tel. +1 937 767 7241

US 800 897 4151

Fax +1 937 767 1058

Email. [environmental@ysi.com](mailto:environmental@ysi.com)

Web. [www.ysi.com](http://www.ysi.com)