Metadata: Pier 26 Water Quality Station

Location: Pier 26, New York, NY (40.721538 N, 74.015600 W)

Data collection period: September 16th, 2016 – present

Parameters: acidity, dissolved oxygen, salinity, specific conductance, turbidity, water depth, and water temperature.

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Data Quality Assurance:

Data collection and verification have been performed since the establishment of this station according to the HRECOS Quality Assurance Project Plan, which is available at www.hrecos.org (“About HRECOS” -> “Supporting Documents”). See relevant section on following pages for QAQC flag and comment code definitions.

Location and equipment:

The purpose of the Hudson River Park Pier 26 station is to generate a consistent and precise stream of water quality data to the general public and interested stakeholders. The goal in collecting this data is to ultimately inform Hudson River management policies, restoration efforts, and extreme event planning. This station was selected due to its location near the NYC Harbor and in lower Manhattan, one of the world’s most heavily developed and densely populated urban environments.

The Hudson River Park Pier 26 station is located on the northwestern piling at the end of Pier 26 (40.721538 N, 74.015600 W). The water depth at this location ranges from 4.0 to 6 meters. Sensors are deployed on a YSI EXO2 sonde, approximately 2 meters off the bottom and record Dissolved Oxygen (mg/L and %sat), pH, Specific Conductance (µS/cm) and Salinity (ppt), Turbidity (NTU), Depth* (m), and Water Temperature (°C) (see sensor specs section for details).

Data is recorded by a CR200 datalogger and transmitted every 15 minutes to the HRECOS database via a cellular modem.

*Depth measurements corrected for influence of atmospheric pressure in real-time (see here for more information). This calculation is performed within the data logger using barometric pressure from the co-located weather station, applied to the following equation:

\[
\text{Corrected depth} = \text{measured depth} + ((1013 - \text{barometric pressure}) \times 0.0102)
\]
**Post-deployment calibration values:**

The sonde is calibrated before each deployment and checked against standards at the end of each deployment. Sondes are never deployed longer than 6 weeks, except in special circumstances. The following table lists the post-deployment check values:

<table>
<thead>
<tr>
<th>Sonde</th>
<th>Date deployed</th>
<th>Date Retrieved</th>
<th>DO % saturation</th>
<th>Specific Cond.</th>
<th>pH</th>
<th>Turbidity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>16H</td>
<td>9/20/2016</td>
<td>10/27/2016</td>
<td>104.5</td>
<td>50.715</td>
<td>7.06, 10.22</td>
<td>-1.1, 116.5</td>
<td></td>
</tr>
<tr>
<td>14L</td>
<td>10/27/2016</td>
<td>1/26/2017</td>
<td>99.5</td>
<td>48.729</td>
<td>(fail)</td>
<td>-0.2, 121.3</td>
<td></td>
</tr>
<tr>
<td>12J</td>
<td>1/26/2017</td>
<td>2/1/2017</td>
<td>97.8</td>
<td>49.634</td>
<td>7.06, 9.97</td>
<td>0.1, 120.0</td>
<td></td>
</tr>
<tr>
<td>16H</td>
<td>2/01/2017</td>
<td>4/13/2017</td>
<td>100.9</td>
<td>49.672</td>
<td>7.27, 10.12</td>
<td>-0.63, 119.16</td>
<td></td>
</tr>
<tr>
<td>14L</td>
<td>4/13/2017</td>
<td>4/25/2017</td>
<td>99.9</td>
<td>50.660</td>
<td>6.95, 10.07</td>
<td>-1.66, 128.34 Conductivity dampened; copper sleeve removed</td>
<td></td>
</tr>
<tr>
<td>14L</td>
<td>4/25/2017</td>
<td>6/28/2017</td>
<td>99.8</td>
<td>48.398</td>
<td>7.07, 10.05</td>
<td>0.16, 124.21</td>
<td></td>
</tr>
<tr>
<td>12J</td>
<td>6/28/2017</td>
<td>7/24/2017</td>
<td>94.1</td>
<td>51.165</td>
<td>7.06, 10.06</td>
<td>0.47, 123.68</td>
<td></td>
</tr>
<tr>
<td>16H</td>
<td>7/24/2017</td>
<td>8/30/2017</td>
<td>103.8</td>
<td>51.453</td>
<td>7.08, 10.09</td>
<td>0.01, 124.42 Conductivity sensor replaced</td>
<td></td>
</tr>
<tr>
<td>14L</td>
<td>8/30/2017</td>
<td>9/19/2017</td>
<td>100.6</td>
<td>None</td>
<td>7.06, 10.04</td>
<td>0.19, 125.27</td>
<td></td>
</tr>
<tr>
<td>12J</td>
<td>9/19/2017</td>
<td>10/25/2017</td>
<td>105.3</td>
<td>56.549</td>
<td>7.05, 9.98</td>
<td>0.28, 114.06 Post repair</td>
<td></td>
</tr>
<tr>
<td>12J</td>
<td>10/25/2017</td>
<td>11/14/2017</td>
<td>97.8</td>
<td>50.092</td>
<td>6.95, 10.06</td>
<td>0.08, 129.71</td>
<td></td>
</tr>
</tbody>
</table>

**Special notes:**

- **2/1/2017 –** 12J Noticeable drift so taken in to check template for Conductivity and pH
- **4/13/2017 –** 14L pH sensor replaced; Conductivity sensor replaced
- **6/28/2017 –** Fish found in 14L sonde cage
- **7/24/2017 –** 16H Conductivity probe not reading on EXO program. Replaced and recalibrated before deployment
- **9/11/2017 –** 14L Cond and DO show drift. Replaced and recalibrated.
- **9/20/2017 –** Data logging issue. Sonde logging internally.
- **11/28/2017 –** Resolved modem transmission issues.
QAQC flag definitions:

Provisional Data Flags

0  Acceptable data
5  Data that demonstrate a dramatic increase or decrease from the previous value
6  Flat lined data
30 Data outside three standard deviations of the seasonal mean
40 Data outside four standard deviations of the seasonal mean
100 Data outside the range of the instrument

Final Data Flags

0  Data determined to be acceptable after a final review by the site manager
10000 Suspicious data according to a final review by the site manager
20000 Corrected data
500000 Rejected data according to a final review by the site manager

QAQC Comment Code definitions:

General Errors

[GIM] instrument malfunction
[GIT] instrument recording error, recovered telemetry data
[GM] no instrument deployed due to maintenance/calibration
[GP] power failure/low battery
[GQ] rejected due to QAQC checks
[GSD] see metadata
[GI] no instrument deployed due to ice
[GN] deployment tube clogged/no flow
[GOW] out of water event

Sensor Errors

[SBO] blocked optic
[ST] catastrophic temperature sensor failure
[SC] conductivity sensor failure
[SD] depth port frozen
[SDP] DO membrane puncture
[SDO] DO suspect
[SIC] incorrect calibration/contaminated standard
[SN] negative value
[SP] post calibration out of range
[SS] sensor drift
[SM] sensor malfunction
[SO] sensor out of water
[SR] sensor removed (not deployed)
[ST] turbidity spike
[S] wiper malfunction/loss

Comments

(CAB) algal bloom
(CAF) acceptable calibration/accuracy error of sensor
(CA) depth sensor in water, affected by atmospheric pressure
(CB) biofouling
(CC) cause unknown
(CD) DO hypoxia < 28 percent saturation
(CD) disturbed bottom
(CD) data appear to fit conditions
(CF) fish kill
(CIP) surface ice present at sample station
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLT</td>
<td>low tide</td>
</tr>
<tr>
<td>CMC</td>
<td>in field maintenance/cleaning</td>
</tr>
<tr>
<td>CMD</td>
<td>mud in probe guard</td>
</tr>
<tr>
<td>CND</td>
<td>new deployment begins</td>
</tr>
<tr>
<td>CRE</td>
<td>significant rain event</td>
</tr>
<tr>
<td>CSM</td>
<td>see metadata</td>
</tr>
<tr>
<td>CTS</td>
<td>turbidity spike</td>
</tr>
<tr>
<td>CVT</td>
<td>possible vandalism/tampering</td>
</tr>
<tr>
<td>CWD</td>
<td>data collected at wrong depth</td>
</tr>
<tr>
<td>CWE</td>
<td>significant weather event</td>
</tr>
</tbody>
</table>
## Sensor Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Sensor type</th>
<th>Model</th>
<th>Range</th>
<th>Accuracy</th>
<th>Resolution</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acidity</strong></td>
<td>Hydrogen ion concentration (pH)</td>
<td>Glass combination electrode</td>
<td>EXO2 - 599702</td>
<td>0 – 14 units</td>
<td>±0.1 pH units within ±10°C of calibration temp; ±0.2 pH units for entire temp range</td>
<td>0.01 units</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Conductivity</strong></td>
<td>Microsiemens per cm (µS/cm)</td>
<td>4-electrode cell with auto ranging</td>
<td>EXO2 - 599870</td>
<td>0 – 200 µS/cm</td>
<td>0 to 100: ±0.5% of reading or 0.001 mS/cm, w.i.g.; 100 to 200: ±1% of reading</td>
<td>0.0001 – 0.01 µS/cm (range dependent)</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Dissolved oxygen</strong></td>
<td>Air saturation (%)</td>
<td>Optical</td>
<td>EXO2 - 599199</td>
<td>0 – 500%</td>
<td>0 – 20%: ±1%</td>
<td>0.1%</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calculated</td>
<td></td>
<td>0 – 50 mg/L</td>
<td>200 – 500%: ±5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 – 20 mg/L: ±0.1 mg/L or 1% (whichever is greater); 20 – 50 mg/L: ±5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Salinity</strong></td>
<td>Parts per thousand (ppt)</td>
<td>Calculated from conductivity and temperature</td>
<td>EXO2 - 599870</td>
<td>0 to 70 ppt</td>
<td>+/- 1.0% of reading or 0.1 ppt, whichever is greater</td>
<td>0.01 ppt</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Turbidity</strong></td>
<td>Nephelometric Turbidity Units (NTU)</td>
<td>Optical</td>
<td>EXO2 - 599101</td>
<td>0 – 4000 NTU</td>
<td>0 to 999 NTU: 0.3 NTU or ±2% of reading, w.i.g.; 1000 to 4000 NTU: ±5% of reading</td>
<td>0 to 999 NTU = 0.01 NTU; 1000 to 4000 NTU = 0.1 NTU</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Water level</strong></td>
<td>Meters (m)</td>
<td>Pressure Transducer</td>
<td>Integral in EXO2 sonde</td>
<td>0 – 10 m</td>
<td>0 – 15 ft: ±0.01 ft (0.003 m); 15 – 35 ft: ±0.065%; 35 – 50 ft (0.006 m)</td>
<td>Max. traceable rate of change: 3 ft/minute</td>
<td>Non-vented</td>
</tr>
<tr>
<td><strong>Water temperature</strong></td>
<td>Celsius (°C)</td>
<td>Thermistor</td>
<td>EXO2 - 599870</td>
<td>-5 to 35 °C</td>
<td>±0.04% FS (±0.004 m or ±0.013 ft)</td>
<td>0.001 °C</td>
<td>NA</td>
</tr>
</tbody>
</table>