# SSHCZO Metadata Worksheet

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| Data File Name | **Hyporheic Seepage Data** |
| Date Prepared | 3/15/2016 |
| Descriptive Title | streambed water temperature  |
| Update Frequency | yearly |
| Abstract | Streambed water temperature was monitored at 6 streambed piezometers at the Shale Hills Critical Zone Observatory since May 2015 at a 15-min interval. These are RAW data to estimate the groundwater seepage rates. Each piezometer has two thermal probes at about vertically 15-20cm apart. The daily seepage rate is inferred from the amplitude and phases differences between the two streambed temperature measurements (Hatch et al., 2006).  |
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| Data Value Descriptions | * Col1: label = TmStamp; value=TIMESTAMP, UTCOffset=-4, TimeZone=EDT, format=YYYY-MM-DD hh:mm:ss.0000000
* Col2 : label = CZ\_20; Units = deg(C)
* Col3 : label = CZ\_21; Units = deg(C)
* Col4 : label = CZ\_35; Units = deg(C)
* Col5 : label = CZ\_36; Units = deg(C)
* Col6 : label = CZ\_22; Units = deg(C)
* Col7 : label = CZ\_23; Units = deg(C)
* Col8 : label = CZ\_24; Units = deg(C)
* Col9 : label = CZ\_25; Units = deg(C)
* Col10 : label = CZ\_26; Units = deg(C)
* Col11 : label = CZ\_27; Units = deg(C)
* Col12 : label = CZ\_28; Units = deg(C)
* Col13 : label = CZ\_29; Units = deg(C)
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| Keywords | streambed temperature, seepage rate  |
| Methods | The daily seepage rate at each streambed piezometer point is inferred from the amplitude and phase differences between a pair of water temperature measurements. The detailed method is available in Hatch et al. (2006). Matlab codes for the seepage rate computation are available (contact Tess Russo at russo@psu.edu). Hatch C.E., Andrew T. Fisher, Revenaugh J. S., Constantz J., and Ruehl C. (2006) Quantifying surface water-groundwater interactions using time series analysis of streambed thermal records: Method development. Water Resources Research, 42, W10410. doi:10.1029/2005WR004787 |
| Sites |

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| piezometer | Name | Latitude | Longitude | Offset1(cm) | Offset2(cm) | Elevation(m) |
| 1 | CZ-20 | 40.66475 | -77.9071 | -43 | -24 | 260.05 |
| CZ-21 | 40.66475 | -77.9071 | -10 | -9 | 260.05 |
| 2 | CZ-35 | 40.66467 | -77.907 | -7.2 | -6 | 260.27 |
| CZ-36 | 40.66467 | -77.907 | -42 | -24 | 260.27 |
| 3 | CZ-22 | 40.6646 | -77.9068 | -1 | -1 | 260.88 |
| CZ-23 | 40.6646 | -77.9068 | -36 | -18 | 260.88 |
| 4 | CZ-24 | 40.66446 | -77.9057 | -16.5 | -15 | 264.94 |
| CZ-25 | 40.66446 | -77.9057 | -52 | -33.5 | 264.94 |
| 5 | CZ-26 | 40.66445 | -77.9054 | -16.5 | -11 | 266.69 |
| CZ-27 | 40.66444 | -77.9054 | -50 | -30 | 266.6 |
| 6 | CZ-28 | 40.66448 | -77.9052 | -20.5 | -8 | 266.74 |
| CZ-29 | 40.66448 | -77.9052 | -53 | -25 | 266.74 |

1 initial deployment – the distance between two thermal probes (May/1/2014-3/7/2016)2 the distances between thermal probes were adjusted (3/7/2016-)  |
| Publications | The data is not yet published. Please embargo public access.  |
| Citation | The following acknowledgment should accompany any publication or citation of these data: Logistical support and/or data were provided by the NSF-supported Susquehanna Shale Hills Critical Zone Observatory. |
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