

Red Dog Mine Long-Term Permafrost and Groundwater Monitoring Program for the Tailing Impoundment 2013 Annual Report

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Introduction

Teck Alaska, Incorporated (TAK) tasked WHPacific, Incorporated with the preparation of the Red Dog Mine Long-Term Permafrost and Groundwater Monitoring Program 2013 data report. A specific contract deliverable is the submission of an annual report which include a data collection summary, a quality assurance and control summary, and a description of the status of the monitoring program.

Background

The Red Dog Mine is located in northwestern Alaska near the DeLong Mountains of the western Brooks Range. The mine is on NANA owned land and operated by TAK. The mine has two open pit operations for the extraction of zinc and lead bearing ore. The facilities include an ore milling and a concentration facility, worker housing, construction camp, runway, and power generation. There are approximately 300 acres of waste rock piles and a tailings pond behind an earthen dam. The pond receives drainage from the open pit areas, natural surface run-off, and process waters from the milling operation. The following Figures 1 and 2 illustrate the regional setting, general location, and specific layout of the mine facilities.

The tailing pond has the potential to affect both permafrost and groundwater in one or more adjacent drainages. Efforts to develop a monitoring system started with the Groundwater Monitoring Supplemental Environmental Project in the mid 1990s. Results from this project were used to develop the Long-Term Permafrost and Groundwater Monitoring Plan was originally prepared by Water Management Consultants, Inc. (WMCI) for Cominco Alaska, Inc. (now TAK), and Hartig, Rhodes, Norman, Mahoney, and Edwards, Inc. in 2001.

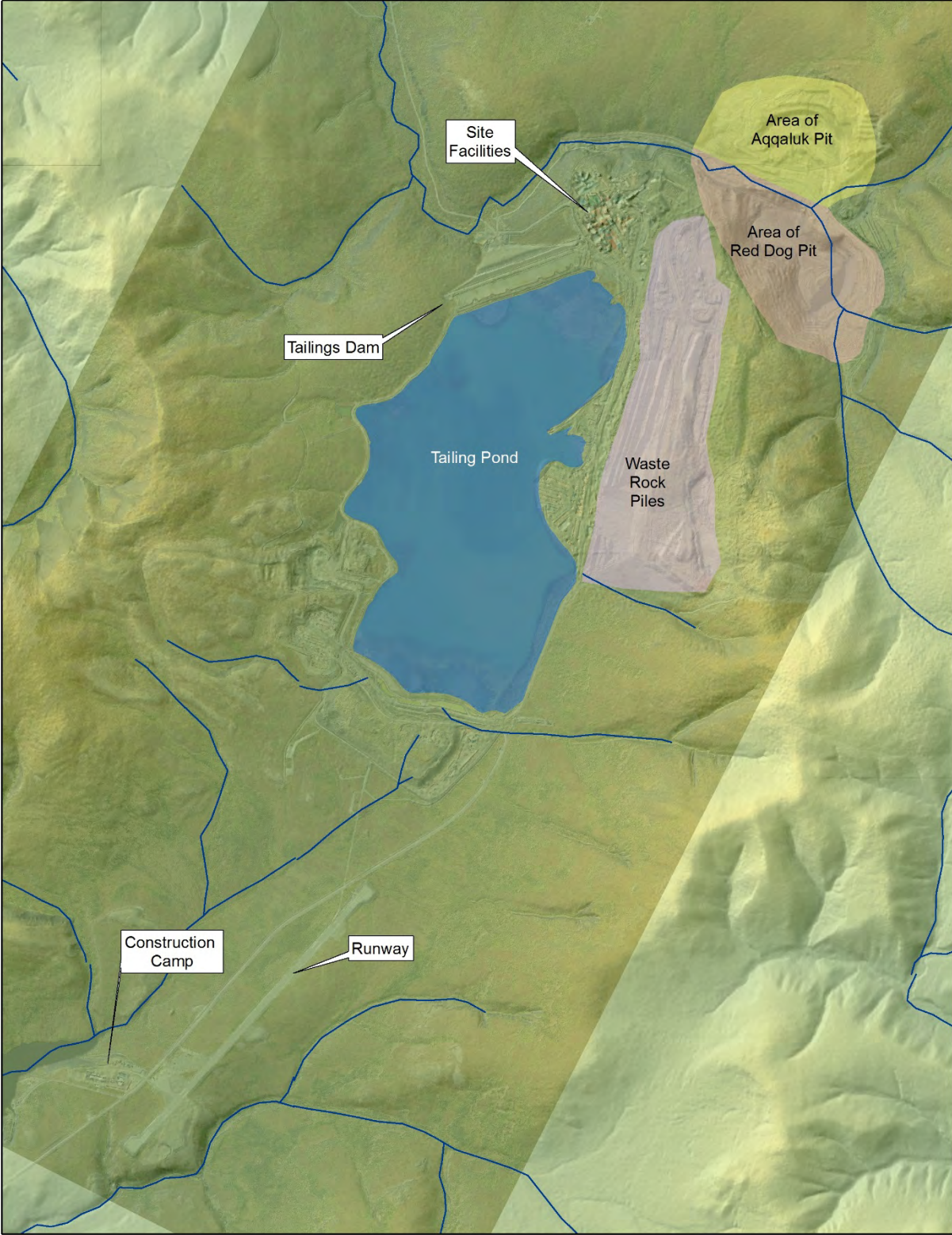
The key elements of the monitoring program are,

- The quarterly monitoring of 15 thermistors at background, overburden stockpile, and dam area locations
- The quarterly monitoring of 9 piezometers at background and dam area locations
- Data reduction, presentation, and management
- Annual data reports
- Assessment of trends on a five year basis

Figure 1 Red Dog Mine and Vicinity



Figure 2 Red Dog Mine Site Layout



2013 Data Collection

On February 26th, 2014 TAK personnel delivered project thermistor and piezometer data to WHPacific by email for review and presentation. WHP personnel extracted 2013 data, organized data tables, transformed data, and presented raw field notes in Appendix A.

Data objectives were to monitor temperature and ground water levels adding to the observed trends of the permafrost beneath the tailings pond dam, the tailings impoundment, and the overburden stockpile as compared to the background permafrost.

Thermistor Data

The following table provides a quarterly summary of the thermistor sites monitored in 2013.

Table 1 Summary of the 2013 Quarterly Thermistor Data Collection

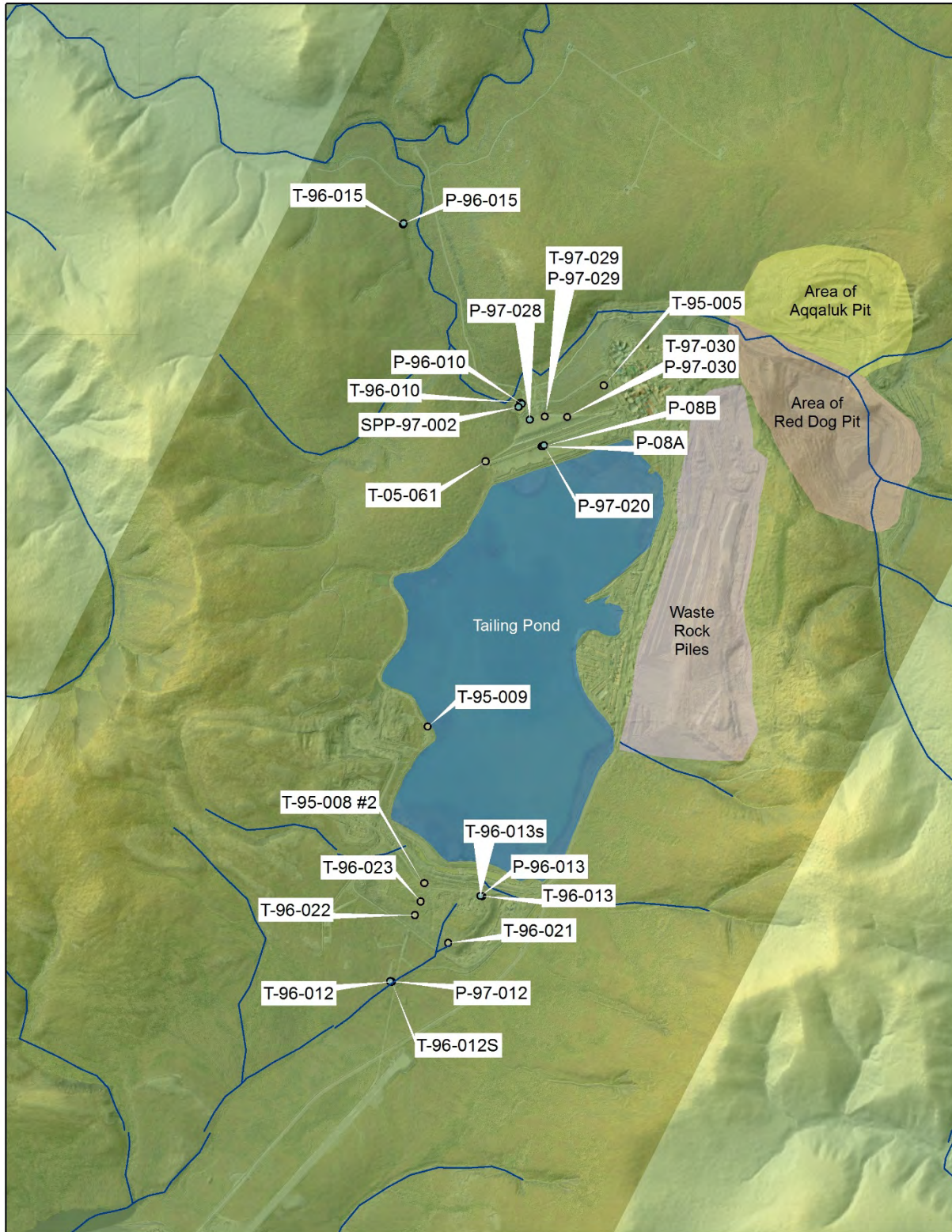
Thermistor	Presented in 2013 report	General Location	Q1			Q2			Q3			Q4		
			2/15/2013	-	-	5/6/2013	-	-	8/4/2013	-	-	-	-	-
T05-61	Yes	Dam Area	2/15/2013	-	-	5/6/2013	-	-	8/4/2013	-	-	-	-	-
T95-5	Yes	Dam Area	2/16/2013	-	-	5/7/2013	-	-	8/4/2013	-	-	11/4/2013	-	-
T95-8#2	Yes	Overburden Stockpile	1/7/2013	2/15/2013	3/24/2013	4/21/2013	5/7/2013	6/3/2013	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T96-10	Yes	Dam Area	2/15/2013	-	-	5/6/2013	-	-	8/4/2013	-	-	11/4/2013	-	-
T96-12	Yes	Bons Creek	2/15/2013	-	-	4/5/2013	4/20/2013	5/6/2013	8/4/2013	-	-	11/3/2013	-	-
T96-12s	Yes	Bons Creek	-	-	-	4/5/2013	4/20/2013	5/6/2013	8/4/2013	-	-	11/3/2013	-	-
T96-13	Yes	Overburden Stockpile	1/7/2013	2/16/2013	3/24/2013	4/21/2013	5/8/2013	6/4/2013	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T96-13s	No	Overburden Stockpile	1/7/2013	2/16/2013	3/24/2013	4/21/2013	5/8/2013	6/4/2013	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T96-15	Yes	Red Dog Creek	2/16/2013	-	-	5/8/2013	-	-	8/4/2013	-	-	11/4/2013	-	-
T96-19	No	Red Dog Pit	-	-	-	5/31/2013	-	-	-	-	-	-	-	-
T96-21	Yes	Overburden Stockpile	1/7/2013	2/16/2013	3/24/2013	4/21/2013	5/8/2013	6/3/2013	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T96-22	Yes	Overburden Stockpile	1/7/2013	2/16/2013	3/24/2013	4/21/2013	5/8/2013	6/3/2013	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T96-23	Yes	Overburden Stockpile	1/7/2013	2/16/2013	3/24/2013	4/21/2013	5/8/2013	-	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T96-24	No	Overburden Stockpile	1/7/2013	2/16/2013	3/24/2013	4/21/2013	5/8/2013	6/3/2013	7/4/2013	8/4/2013	9/25/2013	10/6/2013	11/3/2013	12/14/2013
T97-28	Yes	Dam Area	2/15/2013	-	-	5/6/2013	-	-	8/4/2013	-	-	11/4/2013	-	-
T97-29	Yes	Dam Area	2/16/2013	-	-	5/6/2013	-	-	8/4/2013	-	-	11/4/2013	-	-
T97-30	Yes	Dam Area	1/9/2013	2/16/2013	-	5/6/2013	-	-	7/4/2013	8/4/2013	-	10/6/2013	11/4/2013	-
T97-32	No	Dam Area	2/16/2013	-	-	5/8/2013	-	-	11/4/2013	-	-	-	-	-

T-95-009 could not be read in 2013 due to being submerged beneath rising waters in the tailings storage facility. TAK is planning to replace this thermistor during the summer of 2014.

WHP personnel prepared plots depicting the temperature dependence upon depth at 14 permanent sites installed with thermistor strings. Figure 3 indicates the location of the temperature monitoring sites. The three plots included in Appendix B were,

1. A temperature trumpet plot of data for all years (separate color for each year) and all depths at the specific location,
2. An average temperature versus depth plot accounting for the time span of the project or data of just the past year 2013,
3. A presentation of temperature at specific depth over the time span of the project monitoring data.

Figure 3 Red Dog Thermistor and Piezometer Locations



Piezometer Data

The following table provides a quarterly summary of the piezometers monitored in 2013.

Table 2 Summary of the 2013 Quarterly Piezometers Data Collection

Piezometer	General Location	Q1	Q2	Q3			Q4
P-08A	Dam Area	2/15/2013	5/6/2013	7/4/2013	-	8/4/2013	11/4/2013
P-08B	Dam Area	2/15/2013	5/6/2013	7/4/2013	-	8/4/2013	11/4/2013
P-96-010	Dam Area	2/15/2013	5/6/2013	-	-	8/4/2013	-
P-96-013	Overburden Stockpile	2/15/2013	5/8/2013	-	-	8/4/2013	11/3/2013
P-96-015	Red Dog Creek	2/15/2013	5/8/2013	-	-	8/4/2013	11/4/2013
P-97-012	Bons Creek	2/15/2013	5/6/2013	-	-	8/4/2013	11/3/2013
P-97-020	Dam Area	2/15/2013	5/6/2013	-	-	8/4/2013	11/4/2013
P-97-028	Dam Area	2/15/2013	5/6/2013	7/4/2013	-	-	-
SPP-97-002	Dam Area	3/24/2013	6/19/2013	-	-	9/8/2013	10/6/2013

The locations of the piezometers are illustrated in Figure 3. The piezometer data was collected by TAK personnel each quarter of 2013. WHP personnel prepared plots (hydrographs) depicting the water level depth at the individual wells installed with transducers over the time span of the project as presented in Appendix C.

Data Management

Thermistor and piezometer data collected by TAK personnel in 2013 was delivered to WHPacific for entry to the TAK Red Dog database. Microsoft Access and Excel software were used to generate plots of the data. Data collection was performed under a standard operating procedure outlined in the Red Dog Long-Term Groundwater Monitoring Plan.

Data collected from the thermistor cables was measured in resistance as kilo-ohms (kohm) using a Dryden Instrumentation T5KMUK Automated Thermistor String Reader. The measured resistance values were converted to temperature using calibration coefficients for each thermistor sensor. Data was reviewed for errors and omission, and then uploaded to the Microsoft Access database.

Readings that were not representative of true measurements, less than 0 or greater than 300°C, were deleted before upload. In the Appendix A Raw Data set, these values are shaded red. To eliminate outliers and reduce instrument noise in the dataset, thermistor site data extracted from the Red Dog Database was filtered with a maximum and minimum number criteria relative to the site and individual thermistor. The minimum number was established by taking the first quartile of the data range for the individual thermistor and subtracting three times the interquartile range, the maximum was established by taking the third quartile and adding three times the interquartile range. In the Appendix A Raw Data set, the outliers removed for graphical clarity are shaded grey.

Piezometer data was provided from vibrating wire and barometric transducers. Readings were recorded and emailed to WHPacific. Calibration of the transducers was provided at the time of installation. Data was reviewed for errors and omissions and then uploaded to the Microsoft Access database. Readings that were not representative of true measurements, obvious outliers, were deleted before upload.

Summary of Data QA/QC and System OM

Duplicate measurements were collected to ensure different operators and or equipment would not impact representativeness of the data. Standard operating procedures developed for the monitoring program were followed.

Thermistor QA/QC

Duplicate measurements were collected from the Dryden Instrumentation T5KMUK data logger and the Dryden Switchbox Fluke multimeter system to ensure repeatability and concurrence with the automated data logger system. Variations in the thermistor readings were also compared to previously collected data and trends.

Piezometer QA/QC

Duplicate measurements at SPP-97-002 were not collected in 2013.

Thermistor System Maintenance

Thermistors readings indicate that several are malfunctioning and require replacement.

Piezometer System Maintenance

Vibrating wire transducers are functioning with no data deficiencies.

References

Geomatrix Consultants, Inc. (Geomatrix), 2007, Five-Year Permafrost and Groundwater Data Analysis Report for the Long-Term Permafrost and Groundwater Monitoring Program, April, 2007.

Water Management Consultants, Inc. (WMCI), 2001a, Red Dog Mine – Long-Term Permafrost and Groundwater Monitoring Plan for the Tailing Impoundment, March, 2001.

Appendix A
Raw Data

SiteID	Num Therm	Date/Time	pt-01	pt-02	pt-03	pt-04	pt-05	pt-06	pt-07	pt-08	pt-09	pt-10	pt-11	pt-12	pt-13	pt-14	pt-15	pt-16	pt-17	pt-18	pt-19	pt-20	pt-21	pt-22	pt-23	pt-24
T05-61	6	2/15/13 11:15	22.306	17.236	16.908	17.258	17.508	17.719																		
T05-61	6	5/6/13 15:49	21.675	18.644	17.391	17.306	17.462	17.683																		
T05-61	6	8/4/13 14:40	14.326	17.713	17.77	17.561	17.496	17.652																		
T95-5	24	2/16/13 16:23	15.785	15.625	14.529	14.544	25.82	22.296	-38.09	-32.46	-41.02	-64.84	-78.18	20.651	17.548	16.886	16.815	16.746	9999.9	16.538	16.413	16.235	16.106	15.926	15.764	15.59
T95-5	24	5/7/13 16:11	-23.94	-17.31	17.927	18.53	20.039	20.547	-30.21	26.844	-42.31	-95.23	-49.05	17.454	17.772	16.892	16.822	16.752	9999.9	16.546	16.42	16.242	16.113	15.934	15.773	15.597
T95-5	24	8/4/13 14:51	-33.16	-21.63	20.816	-24.39	29.885	24.827	-53.51	21.56	-74.29	-90.95	-114.4	18.422	17.303	16.857	16.81	16.716	-9999	16.537	16.407	-13.33	16.099	15.898	15.759	15.562
T95-5	24	11/4/13 17:15	-105.4	-31.82	-106.7	-68.41	-27.34	-170.7	-848.5	-120.9	-63.4	-670.8	-100.9	-19.31	18.703	16.687	16.572	16.488	-3001	15.764	15.92	16.158	16.023	15.843	15.678	15.504
T95-8	24	1/7/13 15:33	9999.9	9999.9	-5840	9999.9	-280.7	19.389	16.974	16.938	17.03	17.048	9999.9	17.023	17.043	17.108	17.068	17.108	17.116	17.108	17.133	17.167	17.158	17.159	17.216	17.253
T95-8	24	2/15/13 9:46	21.633	-22.4	16.899	16.947	16.93	16.959	16.949	16.994	17.028	17.052	17.045	17.024	17.043	17.108	17.068	17.108	17.116	17.108	17.133	17.168	17.157	17.16	17.217	17.253
T95-8	24	3/24/13 15:45	-9999	112.42	24.126	-34.33	16.938	16.985	29.693	16.944	17.029	17.047	17.047	17.023	17.043	17.109	17.068	17.108	17.115	17.108	17.132	17.167	17.156	17.16	17.216	17.252
T95-8	24	4/21/13 13:24	22.591	9999.9	16.899	16.944	16.933	16.959	-9999	16.942	17.034	17.058	17.046	17.02	17.044	17.104	17.069	17.104	17.116	17.104	17.132	17.167	17.158	17.156	17.216	17.248
T95-8	24	5/7/13 15:51	-1461	-116.8	16.983	16.933	16.922	16.962	16.96	16.933	17.023	17.036	17.04	17.019	17.037	17.102	17.061	17.1	17.11	17.102	17.126	17.16	17.154	17.158	17.214	17.251
T95-8	24	6/13/13 6:42	-166.6	-9999	17.117	-17.06	17.011	-120.8	-23.78	16.934	17.028	17.037	17.045	17.019	17.042	17.104	17.067	17.103	17.115	17.103	17.131	17.162	17.155	17.153	17.214	17.246
T95-8	24	7/4/13 11:26	9999.9	-9999	-17.09	9999.9	16.926	16.987	-121.4	16.932	17.022	17.034	17.041	17.016	17.036	17.101	17.06	17.099	17.107	17.099	17.124	17.158	17.149	17.151	17.207	17.243
T95-8	24	8/4/13 11:47	-2977	-539.3	-63.12	-25.93	16.927	16.959	17.81	16.941	17.024	17.037	17.043	17.017	17.038	17.103	17.061	17.101	17.109	17.101	17.126	17.16	17.15	17.152	17.208	17.244
T95-8	24	9/25/13 9:48	9999.9	-9999	-19.42	-63.35	16.918	16.95	16.935	16.922	17.012	17.026	17.035	17.006	17.026	17.092	17.05	17.09	17.098	17.089	17.114	17.148	17.137	17.141	17.196	17.232
T95-8	24	10/6/13 14:53	-9999	-79.31	-9999	16.937	16.827	16.872	16.853	16.828	17.008	17.02	17.027	16.983	17.02	17.087	17.045	17.085	17.092	17.084	17.109	17.143	17.132	17.134	17.191	17.227
T95-8	24	11/3/13 10:55	-9999	9999.9	-18.08	16.953	16.919	16.974	17.035	16.941	17.013	17.034	17.03	17.006	17.026	17.092	17.049	17.09	17.097	17.089	17.113	17.147	17.137	17.139	17.195	17.231
T95-8	24	12/14/13 13:58	9999.9	-23.9	-9999	16.961	16.931	16.959	16.946	16.935	17.024	17.037	17.04	17.018	17.037	17.103	17.06	17.1	17.107	17.1	17.123	17.157	17.147	17.15	17.206	17.241
T96-10	24	2/15/13 15:49	24.362	-101.9	-481.3	25.611	-53.69	22.506	-85.34	23.146	-218.9	-31.74	27.011	26.613	15.647	16.232	17.662	15.08	17.15	16.117	14.741	-13.9	14.668	14.158	22.727	14.354
T96-10	24	5/6/13 14:56	22.324	21.755	20.769	19.603	18.543	17.616	17.054	16.866	16.71	16.642	16.608	16.491	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-10	24	8/4/13 15:44	21.222	-151.6	-127.4	-139.5	-85.6	34.536	-57.59	-44.89	-84.15	41.899	-50.18	26.552	19.92	15.858	17.293	14.514	13.543	15.553	14.509	-13.74	14.619	-13.96	22.743	14.158
T96-10	24	11/4/13 14:41	-55.2	-9999	-181.6	-142.4	-1738	-56.81	65.541	-31.92	-172.9	-29.18	12.078	-36.79	-41.53	16.273	17.828	15.076	15.107	16.147	14.755	-13.94	14.679	14.157	23.138	14.426
T96-12	24	2/15/13 9:53	18.162	17.115	17.277	-102.4	-71.5	17.304	-25.73	17.368	17.522	-100.7	-435.3	17.129	-242.2	-337.4	-510.3	-175.4	-653.4	-23.83	16.374	-1542	-32.51	21.81	-161.9	
T96-12	24	4/4/13 15:06	17.26	9999.9	9999.9	9999.9	-9999	-9999	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-12	24	4/20/13 8:37	17.38	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-12	24	4/20/13 8:39	-28.06	-9999	9999.9	-42.02	-91.30	-563.6	17.356	9999.9	-9999	72.451	9999.9	-9999	17.14	9999.9	-9130	546.24	-119.9	-91.30	16.835	16.406	9999.9	-7650	9999.9	-214.5
T96-12	24	5/6/13 12:21	20.056	-18.01	-9999	17.277	-106.7	-7315	-393.1	-9999	-2289	20.989	-9999	17.132	9999.9	-546.5	-1086	60.498	-9999	27.346	16.404	-9999	-9999	38.786	15.894	
T96-12	24	8/4/13 10:45	17.362	-21.46	-9985	-244	19.676	-57.32	-52.73	17.968	-71.64	-45.97	-27.49	-51.23	16.883	-496.6	40.613	-890.7	16.86	-3378	16.63	16.4	9999.9	-16.58	-52.34	18.599
T96-12	24	11/3/13 11:32	16.649	17.4	-9999	-9999	31.671	-214	9999.9	-183.1	17.393	-221.4	17.293	-9999	17.106	-9999	-56.09	-1543	16.815	-9999	16.54	16.384	9999.9	18.22	-47.78	15.861
T96-12s	24	4/5/13 0:00	17.261	9999.9	-9999	-9999	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-12s	24	4/20/13 0:00	17.38	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	81067	81067	-9999	-9999	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-12s	24	5/6/13 0:00	20.055	-106.9	-9999	17.276	-91.89	-8659	-3549	9999.9	-9999	-9999	-9999	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-12s	24	5/30/13 0:00	-9999	9999.9	9999.9	9999.9	-9999	9999.9	-9999	-9999	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-12s	24	8/4/13 0:00	17.698	-188.5	-188.1	9999.9	-9999	9999.9	-9999	-1457	-1495	9999.9	9999.9	-1321	-1050	-943.9	-827.5	-1055	-1008	-198.2	-195.7	-3646	3703.7	-73.97	-63.32	-333.8
T96-12s	24	11/3/13 0:00	17.411	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9	9999.9
T96-13	24	1/7/13 14:56	20.105	15.751	15.594	16.609	16.796	16.91	17.001	17.051	17.156	17.206	17.274	17.315	17.855	9999.9	17.473	17.255	17.288	17.097	17.812	16.901	16.798	9999.9	16.59	16.406
T96-13	24	2/16/13 15:57	19.905	15.997	15.653	16.609	16.795	16.909	17.002	17.049	17.153	17.203	17.272	17.314	-48.54	9999.9	17.478	17.253	17.285	17.094	17.831	16.899	16.797	-9999	16.576	16.399
T96-13	24	3/24/13 16:41	19.937	16.138	15.68	16.563	16.749	16.861	16.958	17.001	17.107	17.156	17.225	17.266	9999.9	17.62	17.433	17.208	17.239	17.049	17.801	16.853	16.752	9999.9	16.532	16.407
T96-13	24	4/21/13 15:24	20.342	16.303	15.742	16.605	16.794	16.903	17.006	17.043	17.153	17.197	17.269	17.307	17.811	9999.9	9999.9	-96.24	17.286	17.596	17.864	16.901	16.844	16.681	-1787	6.6141
T96-13	24	5/8/13 15:59	19.634	16.375	15.798	16.607	16.794	16.907	17.005	17.046	17.15	17.201	17.268	17.31	17.781	17.694	17.482	17.252	17.285	17.094	17.872	16.899	16.797	16.709	16.576	16.405
T96-13	24	6/4/13 14:43	16.845	16.479	15.585	16.601	16.793	16.903	17.007	17.041	17.152	17.196	17.268	17.306	17.764	17.998	17.984	17.249	17.285	17.091	17.866	16.896	16.798	-9999	16.58	16.415
T96-13	24	7/4/13 11:04	14.13	16.565	-20.68	16.612	1																			

T96-21	24	9/25/13 9:26	-9999	15.54	13.465	13.88	14.615	15.27	14.682	14.353	14.18	14.16	14.372	14.629	14.961	15.386	15.675	16.063	16.493	16.629	16.74	16.844	9999.9	16.932	16.993	17.196	
T96-21	24	10/6/13 14:30	-475.8	14.568	12.258	-11.61	12.981	13.301	13.178	-11.65	12.289	-10.63	12.82	12.21	13.291	13.757	14.11	14.535	14.785	14.941	15.097	15.215	-19.79	15.397	15.434	17.217	
T96-21	24	11/3/13 9:34	9999.9	17.643	15.014	14.512	14.424	14.914	14.546	14.408	14.298	14.302	14.456	14.695	14.993	15.404	15.691	16.068	16.52	16.635	16.739	16.848	-18.97	16.941	16.99	17.197	
T96-21	24	12/14/13 13:47	9999.9	18.098	9999.9	9999.9	14.561	14.8	14.369	14.296	14.267	14.289	14.413	14.673	15.017	15.441	15.715	16.078	16.521	16.639	16.741	16.849	16.897	16.94	16.989	17.139	
T96-22	24	1/7/13 15:15	9999.9	-735.3	9999.9	15.129	9999.9	-9999	14.782	-20.85	16.007	-28.57	16.615	-9999	9999.9	16.84	9999.9	16.954	17.046	17.009	13.052	-14.04	17.264	16.985	-299.2	16.987	
T96-22	24	2/16/13 16:04	41.278	22.195	9999.9	15.632	14.849	-17.58	15.021	-19.99	16.048	34.619	16.635	25.2	16.783	16.855	9999.9	16.963	17.068	17.058	17.12	9138.2	-26.18	17.242	-698	16.96	
T96-22	24	3/24/13 16:47	34.025	21.905	9999.9	15.899	15.172	15.035	15.236	-21.13	16.064	31.777	16.602	16.746	16.747	16.82	9999.9	16.928	17.034	17.024	-9999	17.302	17.131	17.207	-403.4	16.928	
T96-22	24	4/21/13 15:15	11.726	-24.47	9999.9	-949.8	15.762	9999.9	-150.2	-8309	24.777	-29.31	16.648	16.753	16.786	16.854	9999.9	16.962	17.074	17.059	-9999	-9999	9999.9	17.243	-27.99	7.0341	
T96-22	24	5/8/13 16:16	11.304	20.618	9999.9	16.164	15.442	16.035	15.464	-16.64	16.254	16.507	16.637	-9999	16.785	16.857	9999.9	16.966	17.073	17.059	17.122	17.151	17.162	17.244	21.003	17.113	
T96-22	24	6/3/13 6:26	11.332	15.458	9999.9	16.253	15.549	-802.1	-615.3	-15.81	-47.87	16.437	16.637	17.502	16.786	16.853	9999.9	16.962	17.073	17.054	17.122	26.156	17.162	17.239	17.175	17.025	
T96-22	24	7/4/13 11:13	9.9729	10.704	9999.9	16.282	15.774	-9999	15.641	-115.9	16.111	16.46	16.631	16.73	16.779	16.85	9999.9	16.959	17.067	17.051	17.115	17.175	17.155	17.236	17.792	17.334	
T96-22	24	8/4/13 11:05	8.6452	-40.39	9999.9	16.267	15.818	15.675	15.755	-17.73	16.133	16.427	16.632	16.728	16.782	16.852	-9999	16.96	17.069	17.05	17.116	17.142	17.153	17.238	17.161	17.303	
T96-22	24	9/25/13 9:30	18.68	15.528	9999.9	14.822	15.401	15.645	15.832	15.962	16.266	16.449	16.645	16.732	16.78	16.852	9999.9	16.96	17.046	17.051	17.116	17.14	17.155	17.233	17.163	17.35	
T96-22	24	10/6/13 14:35	10.227	11.471	568.39	9.0558	15.131	-31.99	15.746	-107.8	-19.39	16.422	6.7677	6.8324	6.9232	7.0537	9999.9	16.924	17.024	17.006	7.0668	7.0799	7.0931	7.1456	7.0931	17.347	
T96-22	24	11/3/13 9:38	23.559	17.012	9999.9	14.862	-38.87	-9999	15.689	-16.08	-71.73	16.439	16.643	16.731	16.78	16.852	9999.9	16.96	17.068	17.051	17.115	17.14	17.154	17.235	17.162	17.349	
T96-22	24	12/14/13 13:49	49.873	17.254	9999.9	15.195	15.078	15.276	15.589	9999.9	-74.85	16.435	16.63	16.733	16.782	16.854	9999.9	16.961	17.069	17.053	17.115	17.141	17.155	17.235	17.161	17.323	
T96-23	24	1/7/13 15:20	9999.9	9999.9	18.647	16.163	15.889	16.043	16.167	16.373	16.138	16.228	16.6	16.775	16.839	16.895	16.928	16.995	16.899	17.068	17.156	17.188	16.988	16.766	17.236	17.344	
T96-23	24	2/16/13 16:06	9999.9	9999.9	18.731	16.417	16.235	16.274	16.217	16.319	16.15	16.235	16.65	16.777	16.803	16.865	16.626	16.986	16.78	16.906	17.068	17.146	17.172	15.405	16.758	16.707	17.093
T96-23	24	3/24/13 16:52	-9999	-9999	18.579	16.519	16.42	16.428	16.382	16.478	16.231	16.246	16.681	16.799	16.859	16.917	16.616	17.014	16.923	17.09	17.173	17.208	17.009	16.772	17.251	17.342	
T96-23	24	4/21/13 15:17	9999.9	9999.9	18.811	16.682	16.477	16.478	16.406	16.426	16.283	16.242	16.683	16.797	16.863	16.915	16.657	17.012	16.94	17.087	17.177	17.205	16.934	16.792	17.254	17.337	
T96-23	24	5/8/13 16:21	9999.9	9999.9	18.427	16.887	16.489	16.499	16.409	16.497	16.317	16.248	16.682	16.8	16.861	16.918	16.617	17.016	16.942	17.09	17.175	17.208	16.946	16.794	17.252	17.34	
T96-23	24	7/4/13 11:32	9999.9	9999.9	9.4156	13.032	15.102	15.354	15.526	15.485	14.95	15.778	16.66	16.777	16.832	16.888	16.645	16.969	16.819	17.027	17.068	17.127	16.824	16.736	17.239	16.804	
T96-23	24	8/4/13 11:11	9999.9	9999.9	8.4689	10.443	14.531	15.167	15.292	15.417	14.731	15.731	16.675	16.797	16.859	16.915	16.641	17.009	16.834	17.073	17.106	17.196	16.857	16.687	17.247	16.79	
T96-23	24	9/25/13 9:40	8865	-8865	14.752	12.514	14.246	14.736	14.949	15.363	-14.47	15.143	15.928	16.556	16.617	16.673	16.153	16.708	16.483	16.45	16.921	16.956	16.705	16.217	16.956	16.764	
T96-23	24	10/6/13 14:39	9999.9	9999.9	15.799	13.526	14.892	15.215	15.404	15.677	-14.86	15.372	16.303	16.796	16.859	16.917	16.256	16.927	16.711	16.698	17.106	17.203	16.945	-16.3	17.192	16.797	
T96-23	24	11/3/13 10:46	9999.9	-9999	16.357	15.32	15.382	15.549	15.687	16.109	-15.14	15.512	16.534	16.792	16.856	16.914	16.124	16.83	16.542	16.689	17.164	17.197	16.991	-16.18	17.144	16.8	
T96-23	24	12/14/13 13:54	9999.9	9999.9	16.399	15.964	15.882	16.029	16.06	16.301	15.42	15.8	16.651	16.794	16.855	16.904	15.451	15.881	16.167	16.876	17.657	17.197	17.164	-16.23	17.148	16.795	
T96-24	24	1/7/13 15:26	37.018	37.14	37.467	21.537	15.763	13.774	13.015	12.951	12.532	13.056	14.109	14.614	15.281	15.893	16.428	16.647	16.732	-9999	16.76	16.761	16.722	16.799	16.788	16.755	
T96-24	24	2/16/13 16:09	45.758	43.507	39.987	21.2	16.493	14.586	13.608	13.301	13.436	13.788	14.159	14.639	15.278	15.892	16.414	16.639	16.735	9999.9	16.75	16.751	16.712	16.786	16.774	16.784	
T96-24	24	3/24/13 16:49	37.746	34.423	33.021	21.81	17.104	15.069	14.017	13.567	13.559	13.831	14.165	14.618	15.239	15.845	16.374	16.608	16.704	9999.9	16.721	16.722	16.683	16.758	16.747	16.565	
T96-24	24	4/21/13 15:20	10.208	10.248	11.284	21.552	17.63	15.425	14.345	13.809	13.715	13.93	14.237	14.665	15.273	15.862	16.405	16.64	16.742	9999.9	16.759	16.756	16.724	16.795	16.785	16.776	
T96-24	24	5/8/13 16:19	13.008	11.9	12.831	20.371	17.735	15.609	14.501	13.931	13.789	13.976	14.262	14.68	15.273	15.858	16.398	16.64	16.739	-9999	16.757	16.757	16.719	16.868	16.784	16.775	
T96-24	24	6/3/13 6:34	10.912	11.078	11.398	17.143	17.344	15.797	14.733	14.109	13.889	13.887	14.169	14.467	15.082	15.841	16.391	16.636	16.739	-9999	16.757	16.788	16.724	16.791	16.783	16.791	
T96-24	24	7/4/13 11:41	9.7377	9.8535	9.8683	11.469	16.636	15.815	14.938	14.347	14.04	14.042	14.191	14.508	15.166	15.821	16.37	16.627	16.725	9999.9	16.74	16.74	16.696	16.771	16.743	15.423	
T96-24	24	8/4/13 11:18	8.6379	8.6379	8.5955	10.194	14.854	15.781	15.119	14.549	14.211	14.221	14.344	14.584	15.181	15.835	16.369	16.632	16.734	9999.9	16.752	16.752	16.718	16.788	16.776	15.416	
T96-24	24	9/25/13 9:34	18.187	18.252	18.039	14.108	12.184	12.946	13.829	14.204	14.213	14.273	14.415	14.551	15.056	15.661	16.157	16.407	16.509	9273.5	16.527	16.526	16.483	16.561	16.552	15.352	
T96-24	24	10/6/13 14:45	15.152	15.331	15.389	15.1	12.878	12.827	13.787	14.191	14.35	14.447	14.12	13.894	12.579	13.022	13.497	13.703	13.853	840.7	13.421	13.257	13.7	16.78	16.766	15.382	
T96-24	24	11/3/13 10:37	21.22	22.017	22.352	16.178	14.013	13.385	13.531	13.944	14.263	14.486	14.668	14.83	15.295	15.905	16.367	16.616	16.718	9999.9	16.734	16.734	16.688	16.769	16.759	-2566	
T96-24	24	12/14/13 13:51	47.39	47.929	46.229	17.098	14.975	14.004	13.737	13.878	14.168	14.459	14.684	14.915	15.408	15.931	16.377	16.626	16.732	9999.9	16.749	16.749	16.703	16.785	16.775	-334.2	
T97-28	24	2/15/13 15:04	17.708	13.879	13.782	13.841	13.873	13.629	13.298	13.16	13.136	13.245	13.451	13.775	14.084	14.281	14.743	15.344	15.15	15.209	15.352	15.486	15.508	-9999	-3518	15.49	
T97-28	24	5/6/13 13:45	-10.67	-10.6	-46.93	14.337	14.366	14.217	13.948	13.321	13.471	13.411	13.405	13.723	14.081	-9.628	-12.93	14.904	15.16	15.22	15.354	15.407	15.369	-5009	4054.7	15.551	
T97-28	24	8/4/13 15:15	-8.095	-10.79	12.07	12.925	1																				

Quarterly Thermistor QA / QC

Location: T95-4

Date: 2-15-13

Technician: AW

Start Time: 10:58

Stop Time: 11:01

Node	Ohms	Comments	Node	Temperature	Read these locations on noted month.	
Test	16.35		Test		Month	Location
1	15.87		1		Jan-12	T 95-8
2	15.49		2		Feb-12	T 96-21
3	15.76		3		Mar-12	T 96-12
4	16.07		4		Apr-12	T 96-23
5	16.35		5		May-12	T 96-13
6	16.67		6		Jun-12	T 95-7
7	16.86		7		Jul-12	T 96-22
8	17.04		8		Aug-12	T 95-4
9	17.29		9		Sep-12	T 96-20
10	17.24		10		Oct-12	T 96-15
11	17.29		11		Nov-12	T 96-12S
12	17.32		12		Dec-12	T 95-5
13	17.32		13		Jan-13	T 96-10
14	17.26		14		Feb-13	T 97-29
15	17.19		15		Mar-13	T 97-30
16	17.11		16			
17	16.95		17			
18	16.83		18			
19	17.05		19			
20	16.55		20			
21	16.28		21			
22	OPEN		22			
23	15.9		23			
24	15.68		24			
Test	16.35		Test			

Make a comment if reading jumps around and takes a long time to stabilize.
 QA / QC readings to be done on 5% of SEP required thermistors - see above schedule.
 Record test readings before and after other readings.
 HP200 & multimeter readings are to be taken within 5 minutes of each other.

Teck

Quarterly Thermistor QA / QC

Location: T 96 21

Date: 5-8-13

Technician: DSS / VB Start Time: 17:09

Stop Time: 17:12

Node Test	Ohms	Comments	Node Test	Temperature	Read these locations on noted month.	
					Month	Location
1	16.28		1		Jan-12	T 95-8
2	0L	open	2		Feb-12	T 96-21
3	21.04		3		Mar-12	T 96-12
4	19.93		4		Apr-12	T 96-23
5	17.17		5		May-12	T 96-13
6	15.47		6		Jun-12	T 95-7
7	14.92		7		Jul-12	T 96-22
8	13.98		8		Aug-12	T 95-4
9	13.69	unstable	9		Sep-12	T 96-20
10	13.79		10		Oct-12	T 96-15
11	14.04		11		Nov-12	T 96-12S
12	14.41		12		Dec-12	T 95-5
13	14.85		13		Jan-13	T 96-10
14	15.31		14		Feb-13	T 97-29
15	15.59		15		Mar-13	T 97-30
16	15.99		16			
17	16.48		17			
18	16.61		18			
19	16.71		19			
20	16.81		20			
21		open	21			
22	16.91		22			
23	16.95		23			
24	17.02		24			
Test	16.28		Test			

Make a comment if reading jumps around and takes a long time to stabilize.
 QA / QC readings to be done on 5% of SEP required thermistors - see above schedule.
 Record test readings before and after other readings.
 HP200 & multimeter readings are to be taken within 5 minutes of each other.

Teck

Quarterly Piezometer Readings

Box #: 392

Row #: 4

Read By: A Willman

Date: 2/15/13

Col.	Well	Location	Reading	Comments	Time
1	Barometric transducer	Box above Seep Dam	4917.4		14:44
30	P1	Red Dog Creek Dam	9671.6		15:28
31	P2	Red Dog Creek Dam	9743.8		15:27
32	P3	Red Dog Creek Dam	9235.6		15:25
33	P4	Red Dog Creek Dam	9247.5		15:27
34	P5	Red Dog Creek Dam	9549.8	No Temp.	15:26
35	P6	Red Dog Creek Dam	9435.9	No Temp.	15:28
36	P7	Red Dog Creek Dam	9089.4		15:26
5	* P - 08A	Box above Seep Dam	8843.4		10:42
6	* P - 08B	Box above Seep Dam	8465		10:44
7	P - 09A	Box above Seep Dam	8652		14:45
8	P - 09B	Box above Seep Dam	8336.5		14:46
9	P - 10A	Box above Seep Dam	8822.1		14:46
10	P - 10B	Box above Seep Dam	8346.9		14:47
17	* P97 - 28	Box above Seep Dam	7267		14:48
18	P97 - 29	Box above Seep Dam	8507.3		14:48
19	P97 - 30	Box above Seep Dam	8440.8	2/16	16:34
11	P-11	Tailings Dam	9245.1		10:52
12	P-12A	Tailings Dam	8643.7		10:33
13	P-12B	Tailings Dam	9190.17		10:31
14	P-13	Tailings Dam	8797.6		10:27
20	P97 - 31	Box above Seep Dam	10194.5		14:49
15	P - 14A	W. Tailings Dam	8716.5		10:24
71	P06 - 74	W. Tailings Dam	8085.5		10:49
59	P05 - 62	Bottom of Dam	8087.4		14:56
60	P05 - 63	East of Pond	8804.1		14:34
62	P05 - 65	East of Pond	8532.1	2/16	17:12
64	P05 - 67	East of Pond	8578.2	2/16	14:48
65	P05 - 68	East of Pond		No Cable	---
66	P05 - 69	East of Pond	8831.7	2/16	16:37
21	* P96 - 10	Tailings Dam	8460.5		15:42
22	* P97 - 20	Tailings Dam	7430.7		10:38
23	* P96 - 15	Lower Red Dog Creek	7550.5	2/16	17:04
24	* P97 - 12	Overburden Dump	6217.8		9:55
25	* P96 - 13	Overburden Dump	6832.9	2/16	15:53
26	* P99-7 R	Landfill Site	Buried	Buried	

2/16 - 5111.2 @ 14:23

Select one of the SEP (*) piezometers to do the duplicate reading . Do not enter into Geokon as that will overwrite the first reading. Record the reading above.
Read the Barometric Transducer every day readings are taken.

* = location to perform a QAQC

Red Dog Environmental



File: 6.30.50

Box #: 392

Row# 7, 6, 8, 9 + 10

Read By: N. Baker D. Sheldon

Date: May 6, 2013 / 5-8-13

Col	Well	Location	Reading	Temp C	Comments	Date	Time	
1	Baro. transducer	Box abv Seep Dam	5030.1 5118.0	3.5	Row 8/6 7-13/16:02	5-6-2013	14:30	
7	P-09A	Box abv Seep Dam	8323.6 8634.4	3.3				
8	P-09B	Box abv Seep Dam	8323.6	3.3				
9	P-10A	Box abv Seep Dam	8810.7	2.5				
10	P-10B	Box abv Seep Dam	8339.9	3.9				
17	* P97-28	Box abv Seep Dam	7240.8	3.8				
18	P97-29	Box abv Seep Dam	8479.2	0.3				
20	P97-31	Box abv Seep Dam	10724.7 10756.8	10.8 8.8	Abnormal Reading			
21	* P96-10	Seepage Pond	8452.0	0.8	Damaged Cable		15:51	
59	P05-62	W. Slope of Dam	8076.0	2.6			14:45	
19	P97-30	W. Slope of Dam	8480.7	1.6	Row 6		17:20	
15	P-14A	Top of Tailings Dam	8715.7	1.7		5-6-2013	16:20	
14	P-13	Top of Tailings Dam	8804.0	3.5			16:23	
12	P-12A	Top of Tailings Dam	8634.8	3.1			16:26	
13	P-12B	Top of Tailings Dam	9172.6	-0.1			16:26	
5	* P-08A	Top of Tailings Dam	8443.7	3.0			16:30	
6	* P-08B	Top of Tailings Dam	8823.4	2.5			16:30	
71	P-06-74	Top of Tailings Dam	7951.5	2.7			16:34	
11	P-11	Top of Tailings Dam	9234.6	3.8	Row 6		16:37	
22	* P97-20	Top of Tailings Dam	7422.8	1.7			16:30	
30	P1	Red Dog Creek Dam	9675.9			5-6-2013	16:10	
31	P2	Red Dog Creek Dam	9739.7	-0.3				
32	P3	Red Dog Creek Dam	9241.6	0.0				
33	P4	Red Dog Creek Dam	9251.2	-0.1				
34	P5	Red Dog Creek Dam	9542.1	-0.1				
35	P6	Red Dog Creek Dam	9440.3	0.4				
36	P7	Red Dog Creek Dam	9094.4	0.2				
60	P05-63	Mine Property	8737.2	2.5		5-7-2013	16:28	
62	P05-65	Mine Property	8512.8	1.1		5-7-2013	15:53	
64	P05-67	Mine Property	8529.7	0.1		5-7-2013	15:45	
65	P05-68	Mine Property	8832.0	0.2	No cable			
66	P05-69	Mine Property	W. 8832.0	0.2	W. Slope of Dam	Row 6	5-6-2013	17:17
23	* P96-15	Lower Red Dog Creek	7552.3	0.6		5-8-13	18:38	
24	* P97-12	Overburden Dump	6240.0	0.2		15-06-2013	13:20	
25	* P96-13	Overburden Dump	6838.5	0.4		5-8-13	17:01	
80	P11-83A	Backdam	8558.4	1.6		5-8-13	18:00	
81	P11-84	Backdam	8469.8	0.0			18:01	
82	P11-85A	Backdam	8011.9	1.3			18:04	
83	P11-86A	Backdam	8356.9	0.9			18:05	
84	P11-87A	Backdam	8071.8	1.2			18:07	
85	P11-88	Backdam	8466.1	0.5			18:08	
86	P11-89	Backdam	7137.8	0.0			18:10	
87	P11-90	Backdam	7573.3	0.1			18:11	
87	P-11-90	Backdam						

Read the Barometric Transducer every day readings are taken
 Do not enter into Geokon as that will overwrite the first reading.
 Select one of the SEP (*) piezometers to do the duplicate reading.

Additional Comments: Row 9+10 baro reading @ 18:07
 QA/QC on P96-15 7552.3 @ 0.6°C 18:40
 baro. Row 9+10 5261.4 m/m @ 10.8°C 5-8-13
 5-7-13 Row 8 baro. 5133.0 @ 9.5°C; Row 7 baro 5118.0 @ 3.5
 5-6-13

Red Dog Environmental

File: 6.30.50

Qualtrax\Red Dog Document Control\Environmental\Technical\Forms and Checklists\Thermistors & Piezometers Forms



Box #: 06-13815

Row# 16

Read By: DSS/ND/TA

Date: 8-4-13

Col	Well	Location	Reading	Temp C	Comments	Date/Time
1	Baro. transducer	Box abv Seep Dam	4774.9	12.6		15:20
7	P-09A	Box abv Seep Dam	8634.6	0.8		↓
8	P-09B	Box abv Seep Dam	8318.4	1.2		
9	P-10A	Box abv Seep Dam	8813.4	0.9		
10	P-10B	Box abv Seep Dam	8339.1	2.1		
17	* P97-28	Box abv Seep Dam	6937.4	1.6		
18	P97-29	Box abv Seep Dam	8331.1	1.7		
20	P97-31	Box abv Seep Dam			Could Not locate cable	↓
21	* P96-10	Seepage Pond	8440.8	0.0		15:44
59	P05-62	W. Slope of Dam	8118.7	6.4		15:14
19	P97-30	W. Slope of Dam	8013.8	-0.2		15:06
66	P05-69	W. Slope of Dam	8841.1	2.1		15:02
15	P-14A	Top of Tailings Dam	8742.1	0.0	water weasel depth 91.22'	14:14
14	P-13	Top of Tailings Dam	8744.2	1.8		14:17
12	P-12A	Top of Tailings Dam	8641.4	0.9		14:22
13	P-12B	Top of Tailings Dam	9167.9	-1.0		14:21
5	* P-08A	Top of Tailings Dam	8831.2	1.3		14:26
6	* P-08B	Top of Tailings Dam	8451.4	1.2		14:27
71	P-06-74	Top of Tailings Dam	7375.9	3.5		14:21
11	P-11	Top of Tailings Dam	9243.5	2.7		14:33
22	* P97-20	Top of Tailings Dam	7418.2	0.7		15:31
30	P1	Red Dog Creek Dam	9655.3	-1.9		15:50
31	P2	Red Dog Creek Dam	104.3	-2.8		↓
32	P3	Red Dog Creek Dam	9221.8	-5.3		
33	P4	Red Dog Creek Dam	9233.6	-0.3		
34	P5	Red Dog Creek Dam	9544.6	3.4		
35	P6	Red Dog Creek Dam	9419.0	-1.2		
36	P7	Red Dog Creek Dam	9077.3	1.2		
60	P05-63	Mine Property	8599.5	0.8		
62	P05-65	Mine Property	8580.8	-0.8		14:03
64	P05-67	Mine Property	8542.0	-2.3		13:43
65	P05-68	Mine Property			taken w/ water weasel on weekly sheet	
23	* P96-15	Lower Red Dog Creek	7542.2	-1.2		18:30 *
24	* P97-12	Overburden Dump	6236.8	-1.7		10:46
25	* P96-13	Overburden Dump	6839.1	-1.5		10:54
80	P11-83A	Backdam			gone for now	8-4-13
81	P11-84	Backdam			↓	
82	P11-85A	Backdam				
83	P11-86A	Backdam				
84	P11-87A	Backdam				
85	P11-88	Backdam				
86	P11-89	Backdam				
87	P11-90	Backdam				

Read the Barometric Transducer every day readings are taken
 Do not enter into Geokon as that will overwrite the first reading.
 Select one of the SEP (*) piezometers to do the duplicate reading .

Additional Comments:



Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
2/3/2013						
	P-11-83		14:35	-2	B	8603.8
	P-11-90		15:35	-18	B	7570.2
2/4/2013						
	P-11-91		17:10	9.9	B	8452.6
	P-11-92		17:22	5.6	B	8838.8
	P-11-93		17:46	3.9	B	8555
	T-DamBaro		16:53	-13.2	B	4870.9
2/10/2013						
	P-11-83		15:38	2.3	B	8592.8
	P-11-84		15:39	-0.1	B	7313.1
	P-11-84A		15:40	0.1	B	8520.6
	P-11-85A		15:50	1.2	B	8046.5
	P-11-86		15:52	-0.1	B	7793.5
	P-11-86		15:51	-0.3	B	7181
	P-11-86A		15:52	0.9	B	8484.6
	P-11-87		16:02	-0.1	B	6441.6
	P-11-87A		16:02	1.2	B	8105.7
	P-11-88		16:09	0	B	6866
	P-11-88A		16:09	0.5	B	8476.7
	P-11-89		16:15	0	B	7171.8
	P-11-89A		16:15	1.2	B	8040.6
	P-11-90		16:17	0.1	B	7581
	P-11-91		14:13	9.9	B	8464.6
	P-11-92		14:19	5.7	B	8839.8
	P-11-93		14:28	3.8	B	8567.7
	T-DamBaro		15:25	-3.3	B	4409.7
	T-DamBaro		13:55	-4	B	4395.6

Piezometer Monitoring Data:

2/24/2014

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
2/13/2013						
	P-11-85A		15:35	1.2	B	8034.6
	T-DamBaro		15:47	-1.9	B	4807.5

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
2/15/2013	P-05-62		14:56	3.3	B	8087.4
	P-05-63		14:34	5.3	B	8804.1
	P-06-074		10:49	3	B	8085.5
	P-08A	4	10:42	3	B	8843.4
	P-08B	4	10:44	3.3	B	8465
	P-09A	4	14:45	3	B	8652
	P-09B	4	14:46	3.4	B	8336.5
	P-10A	4	14:46	3.1	B	8822.1
	P-10B	4	14:47	4.1	B	8346.9
	P-11	4	10:52	3.9	B	9245.1
	P-12A	4	10:33	3.1	B	8643.7
	P-12B	4	10:31	-0.1	B	9190.1
	P-13	4	10:27	3.5	B	8797.6
	P-14A	4	10:24	1.6	B	8716.5
	P-96-010	4	15:42	0.8	B	8460.5
	P-97-012	2	9:55	0.2	B	6217.8
	P-97-020	4	10:38	1.7	B	7430.7
	P-97-028	4	14:48	4.2	B	7269
	P-97-029	4	14:48	0.3	B	8509.3
	P-97-031	4	14:49	5.5	B	10194.5
	RDC-P1	3	15:28	-0.2	B	9671.6
	RDC-P2	3	15:27	0	B	9743.8
	RDC-P3	3	15:25	0.3	B	9235.6
	RDC-P4	3	15:27	0	B	9247.5
	RDC-P5	3	15:26	99999	B	9549.8
	RDC-P6	3	15:28	99999	B	9435.9
	RDC-P7	3	15:26	0.6	B	9089.4
	T-DamBaro		14:44	-12.4	B	4917.4

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
2/16/2013						
	P-05-65		17:12	1.9	B	8532.1
	P-05-67		14:48	0.4	B	8578.2
	P-05-69		16:37	0.3	B	8831.7
	P-96-013	2	15:53	0.4	B	6832.9
	P-96-015	3	17:04	0.6	B	7550.5
	P-97-030	4	16:34	1.5	B	8440.8
	T-DamBaro		14:23	-13.5	B	5111.2
2/17/2013						
	P-11-91		16:05	10	B	8443
	P-11-92		15:45	5.5	B	8821.6
	P-11-93		15:12	3.8	B	8547.3
	T-DamBaro		16:11	-21	B	5251.9
2/24/2013						
	P-11-91		15:47	9.8	B	8457.5
	P-11-92		15:56	5.6	B	8832.7
	P-11-93		16:12	3.7	B	8561
	T-DamBaro		15:39	-11.3	B	4745.8

Piezometer Monitoring Data:

2/24/2014

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
5/5/2013						
	P-11-91		13:32	5.7	B	8445.1
	P-11-92		13:35	2.2	B	8815.8
	P-11-93		13:44	-0.6	B	8552

Piezometer Monitoring Data:**2/24/2014**

Date of Reading 5/6/2013	Site Name	Week #	Time	Temp (C)	Switch	Reading
	P-05-62		13:44	2.6	B	8076
	P-05-69		16:16	0.2	B	8832
	P-06-074		15:35	2.7	B	7951.5
	P-08A	4	15:32	2.5	B	8823.4
	P-08B	4	15:31	3	B	8443.7
	P-09A	4	13:34	2.5	B	8634.3
	P-09B	4	13:34	3.3	B	8323.6
	P-10A	4	13:35	2.5	B	8810.7
	P-10B	4	13:35	3.9	B	8339.9
	P-11	4	15:38	3.8	B	9234.6
	P-12A	4	15:26	3.1	B	8634.8
	P-12B	4	15:26	-0.1	B	9172.6
	P-13	4	15:23	3.5	B	8804
	P-14A	4	15:21	1.7	B	8715.7
	P-96-010	4	14:51	0.8	B	8452
	P-97-012	2	12:19	0.2	B	6240
	P-97-020	4	15:30	1.7	B	7422.8
	P-97-028	4	13:36	3.8	B	7240.8
	P-97-029	4	13:37	0.3	B	8479.2
	P-97-030	4	16:22	1.6	B	8480.7
	P-97-031	4	13:38	59.8	B	10756.8
	RDC-P1	3	15:06	99999	B	9675.9
	RDC-P2	3	15:06	-0.3	B	9739.7
	RDC-P3	3	15:07	0	B	9241.6
	RDC-P4	3	15:08	-0.1	B	9251.2
	RDC-P5	3	15:08	-0.1	B	9542.1
	RDC-P6	3	15:09	0.4	B	9440.3
	RDC-P7	3	15:09	0.2	B	9094.4

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
	T-DamBaro		14:30	3.5	B	5118
	T-DamBaro		13:33	3.5	B	5118
5/7/2013						
	P-05-63		15:29	2.5	B	8737.2
	P-05-65		14:52	1.1	B	8512.8
	P-05-67		14:46	0.1	B	8529.7
	T-DamBaro		15:01	9.5	B	5133
5/8/2013						
	P-11-83		16:49	1.6	B	8558.4
	P-11-84		16:50	0	B	8469.8
	P-11-85		16:52	1.3	B	8011.9
	P-11-86		16:53	0.9	B	8356.9
	P-11-86		16:53	0.9	B	8356.9
	P-11-87		16:55	1.2	B	8071.8
	P-11-87		16:55	1.2	B	8071.8
	P-11-88		16:55	0.5	B	8466.1
	P-11-88		16:55	0.5	B	8466.1
	P-11-89		16:57	0	B	7137.8
	P-11-89		16:57	0	B	7137.8
	P-11-90		16:58	0.1	B	7573.3
	P-11-90		16:58	0.1	B	7573.3
	P-96-013	2	15:59	0.4	B	6838.5
	P-96-015	3	17:36	0.6	B	7552.3
	T-DamBaro		17:25	10.8	B	5261.4
	T-DamBaro		17:25	10.7	B	5260.9
	T-DamBaro		17:25	10.7	B	5260.9

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
5/12/2013						
	P-11-91		17:03	6	B	8450.6
	P-11-92		17:15	1.3	B	8820.1
	P-11-93		17:32	-16.9	B	8552.3
	T-DamBaro		16:34	3	B	4909.2
5/28/2013						
	P-11-91		17:55	7.1	B	8446.1
	P-11-91		17:55	7.1	B	8446.1
	P-11-92		18:48	3	B	8771.6
	P-11-92		18:48	3	B	8771.6
	P-11-93		20:15	0.2	B	8534.1
	P-11-93		20:15	0.2	B	8534.1
	T-DamBaro		17:25	22	B	5023.5
5/29/2013						
	T-DamBaro		8:21	99999	B	99999999
5/31/2013						
	P-97-019	3	10:32	-2.2	B	7315.1
	P-99-036	3	10:06	-2.6	B	7404.8
	T-DamBaro		9:24	1.8	B	5196.3

Piezometer Monitoring Data:

2/24/2014

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
7/3/2013	P-07-75		9:51	1.7	B	6151.7
	P-97-019	3	9:31	0.6	B	7305.1
	T-DamBaro		9:21	11.7	B	4834.7

Piezometer Monitoring Data:**2/24/2014**

Date of Reading 7/4/2013	Site Name	Week #	Time	Temp (C)	Switch	Reading
	P-05-62		9:15	2.4	B	8073.2
	P-05-65		16:00	1.2	B	8605.1
	P-06-074		9:57	4.1	B	7556.2
	P-08A	4	9:54	2.3	B	8815.6
	P-08B	4	9:52	2.9	B	8434
	P-09A	4	8:58	2.7	B	8620.5
	P-09B	4	8:58	3.2	B	8309.7
	P-10A	4	8:59	2.4	B	8804.8
	P-10B	4	9:00	3.6	B	8334.3
	P-11	4	9:04	4.8	B	9776.9
	P-11-91		14:36	10.6	B	8434.5
	P-11-91		14:36	10.6	B	8434.5
	P-11-92		15:06	4.6	B	8800.2
	P-11-92		15:06	4.6	B	8800.2
	P-11-93		15:48	3.1	B	8540.4
	P-11-93		15:48	3.1	B	8540.4
	P-12A	4	9:48	2.6	B	8639.1
	P-12B	4	9:49	-0.1	B	9157.7
	P-13	4	9:47	3.5	B	8744.9
	P-14A	4	9:45	1.7	B	8730.6
	P-97-028	4	9:01	3.3	B	6910.8
	P-97-029	4	9:02	3.6	B	8175.7
	P-97-030	4	9:39	1.7	B	8067.7
	T-DamBaro		8:54	9.7	B	4882.6
	T-DamBaro		8:54	9.7	B	4882.6

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
7/14/2013	P-11-91		8:21	7.1	B	8430
	P-11-92		8:46	2.6	B	8798.3
	P-11-93		9:09	1	B	8538.5
	T-DamBaro		8:03	14	B	5054.5
7/21/2013	P-11-91		10:56	5.7	B	8428.7
	P-11-92		11:10	1.2	B	8795.3
	P-11-93		11:41	0.1	B	8534.9
	T-DamBaro		10:27	7.9	B	5119.1
7/30/2013	P-11-91		16:18	6.8	B	8389.6
	P-11-92		16:35	1.6	B	8796.7
	P-11-93		17:02	0.2	B	8530.1
	T-DamBaro		16:01	7.7	B	5184.8
8/18/2013	P-11-91		15:52	8.4	B	8433.6
	P-11-92		16:19	4.3	B	8801.3
	P-11-93		17:05	3.2	B	8527.3
	T-DamBaro		15:26	13.6	B	4807.3
9/8/2013	P-11-91		10:05	5.5	B	8427.4
	P-11-92		10:09	1.6	B	8815.1
	P-11-93		10:13	0.6	B	8540.8
	T-DamBaro		9:58	-18.6	B	4849
9/15/2013	P-11-91		10:22	5.2	B	8419.7
	P-11-92		10:17	0.9	B	8794.7
	P-11-93		10:08	-0.6	B	8528.7
	T-DamBaro		9:04	-21.5	B	5174.4

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
9/22/2013						
	P-11-91		10:26	3.7	B	8442.5
	P-11-92		10:58	-20.9	B	8820
	P-11-93		17:16	-1.3	B	8536.5
	T-DamBaro		11:15	-0.5	B	4820
9/27/2013						
	P-07-75		15:30	1.7	B	6141.2
	P-99-036	3	16:24	1	B	7269.2
	T-DamBaro		9:40	-10.3	A	4689.3
9/28/2013						
	T-DamBaro		10:23	-1.8	A	4812.4
9/29/2013						
	P-05-62		9:34	-0.9	B	8297.6
	P-05-65		9:52	-1.9	B	8648.3
	P-09A	4	9:29	-0.9	B	8870.3
	P-09B	4	9:29	-0.6	B	8501
	P-10A	4	9:30	-0.3	B	9018.1
	P-10B	4	9:28	-0.6	B	8515
	P-97-030	4	9:41	-17.3	B	8023.9
	T-DamBaro		9:27	-23.7	B	4988.6

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
11/3/2013	P-05-67		15:27	-1.9	B	8555.9
	P-11-91		15:07	6.6	B	8404.7
	P-11-92		16:01	3.5	B	8803.2
	P-96-013	2	9:22	-2.2	B	6806.2
	P-97-012	2	11:36	-1.3	B	6248.6
	T-DamBaro		17:21	-3.4	B	4618.7

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
11/4/2013	P-05-62		14:59	-18.9	B	8268.8
	P-05-69		15:12	-20.4	B	8843.9
	P-08A	4	16:39	-23	B	8963.9
	P-08B	4	16:41	-23.8	B	8597
	P-09A	4	14:15	-17.1	B	8839.2
	P-09B	4	14:16	-2.1	B	8478.5
	P-10A	4	14:18	-1.6	B	9004.6
	P-10B	4	14:19	-1.9	B	8511.1
	P-11	4	16:36	-23.8	B	9241.6
	P-12A	4	16:48	-23.4	B	8644.5
	P-12B	4	16:46	-25.7	B	9277.7
	P-13	4	16:51	-22.8	B	8803.2
	P-14A	4	16:55	-24.1	B	8749
	P-96-015	3	13:53	-19.4	B	7542.4
	P-97-020	4	16:43	-24.4	B	7442.9
	P-97-028	4	14:22	-17.3	B	7123.9
	P-97-029	4	14:20	-19.1	B	8673.5
	P-97-030	4	15:25	-19	B	8029.1
	P-97-031	4	14:45	-24.6	B	8456.6
	RDC-P1	3	11:09	-2	B	9690.2
	RDC-P2	3	11:10	-1.2	B	9750.4
	RDC-P3	3	11:11	-0.2	B	9254.9
	RDC-P4	3	11:12	-0.6	B	9268.2
	RDC-P5	3	11:14	-3	B	9558.3
	RDC-P6	3	11:15	-1.6	B	9454.8
	RDC-P7	3	11:16	-1.3	B	9108.4
	T-DamBaro		14:12	-22.5	B	4638.7

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
11/3/2013	P-05-67		15:27	-1.9	B	8555.9
	P-11-91		15:07	6.6	B	8404.7
	P-11-92		16:01	3.5	B	8803.2
	P-96-013	2	9:22	-2.2	B	6806.2
	P-97-012	2	11:36	-1.3	B	6248.6
	T-DamBaro		17:21	-3.4	B	4618.7

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
11/4/2013	P-05-62		14:59	-18.9	B	8268.8
	P-05-69		15:12	-20.4	B	8843.9
	P-08A	4	16:39	-23	B	8963.9
	P-08B	4	16:41	-23.8	B	8597
	P-09A	4	14:15	-17.1	B	8839.2
	P-09B	4	14:16	-2.1	B	8478.5
	P-10A	4	14:18	-1.6	B	9004.6
	P-10B	4	14:19	-1.9	B	8511.1
	P-11	4	16:36	-23.8	B	9241.6
	P-12A	4	16:48	-23.4	B	8644.5
	P-12B	4	16:46	-25.7	B	9277.7
	P-13	4	16:51	-22.8	B	8803.2
	P-14A	4	16:55	-24.1	B	8749
	P-96-015	3	13:53	-19.4	B	7542.4
	P-97-020	4	16:43	-24.4	B	7442.9
	P-97-028	4	14:22	-17.3	B	7123.9
	P-97-029	4	14:20	-19.1	B	8673.5
	P-97-030	4	15:25	-19	B	8029.1
	P-97-031	4	14:45	-24.6	B	8456.6
	RDC-P1	3	11:09	-2	B	9690.2
	RDC-P2	3	11:10	-1.2	B	9750.4
	RDC-P3	3	11:11	-0.2	B	9254.9
	RDC-P4	3	11:12	-0.6	B	9268.2
	RDC-P5	3	11:14	-3	B	9558.3
	RDC-P6	3	11:15	-1.6	B	9454.8
	RDC-P7	3	11:16	-1.3	B	9108.4
	T-DamBaro		14:12	-22.5	B	4638.7

Piezometer Monitoring Data:**2/24/2014**

Date of Reading	Site Name	Week #	Time	Temp (C)	Switch	Reading
12/1/2013						
	P-11-91		14:25	9.6	B	8418
	P-11-92		15:19	4.6	B	8822
	P-11-93		16:00	3.2	B	8525
	T-DamBaro		16:10	-5.1	B	5279

Piezometer Monitoring Data:**4/25/2012**

Date of Reading 4/15/2012	Site Name	Week #	Time	Temp (C)	Switch	Reading
	P-05-65		16:38	3.7	B	8587.2
	P-06-074		15:03	3.7	B	8327.8
	P-08A	4	15:05	3.6	B	8923.4
	P-08B	4	15:05	3.3	B	8552.3
	P-09A	4	14:52	3.4	B	8742.6
	P-09B	4	14:52	3.4	B	8406.2
	P-10A	4	14:52	3.6	B	8884.1
	P-10B	4	14:52	4.1	B	8396.4
	P-11	4	15:02	3.7	B	9242.8
	P-12A	4	15:09	3	B	8645
	P-12B	4	15:09	-0.2	B	9260.4
	P-13	4	15:11	3.2	B	8807.2
	P-97-028	4	14:53	5.1	B	7457.6
	P-97-029	4	14:53	0.2	B	8747.7
	P-97-030	4	11:06	1.3	B	8559.9
	P-97-031	4	14:53	2.3	B	10779.5
	T-DamBaro		14:52	16.2	B	4978

Meyers, James

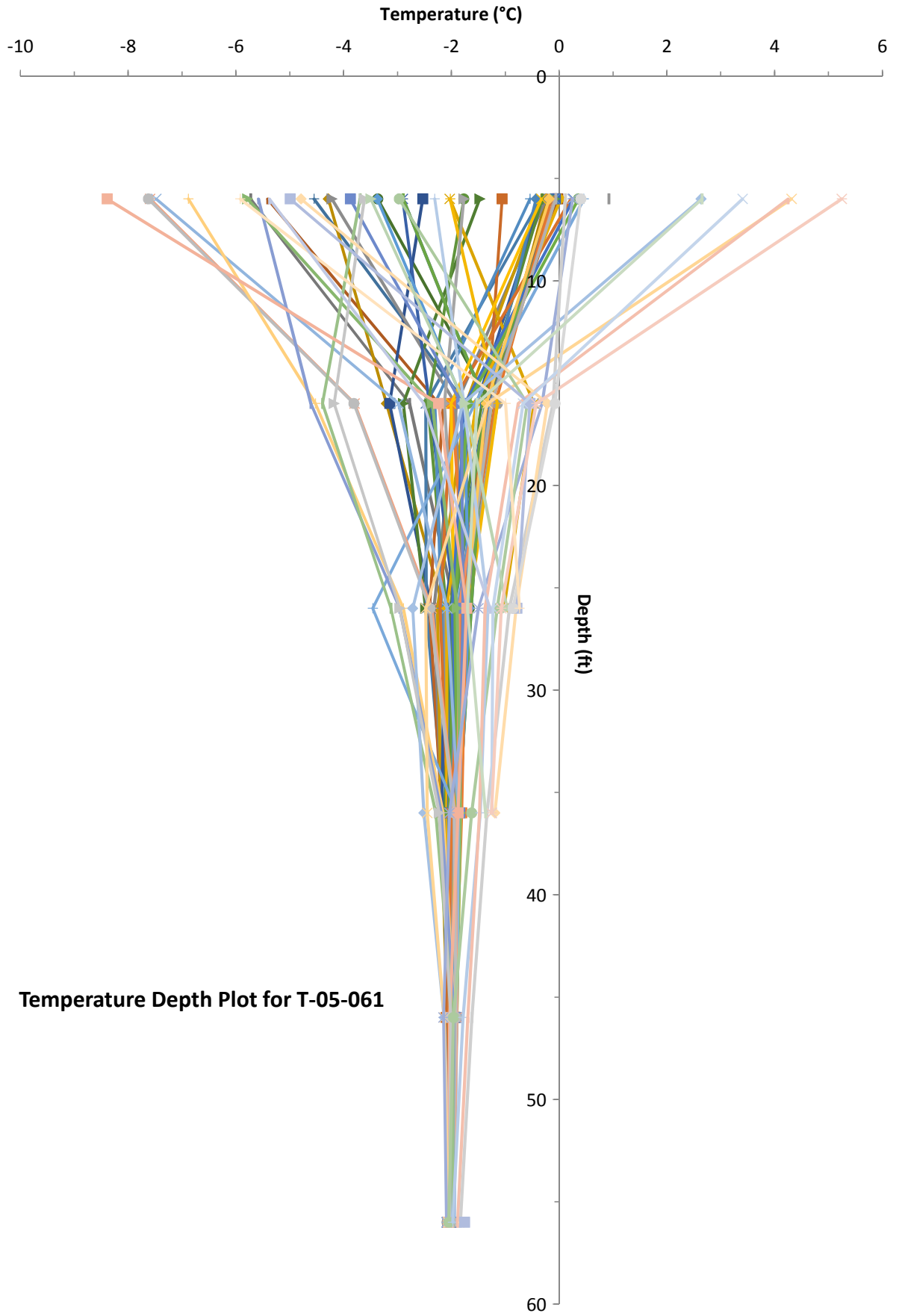
From: Willman Andrew RDOG <Andrew.Willman@teck.com>
Sent: Wednesday, April 23, 2014 9:48 AM
To: Menefee Charles RDOG
Subject: SPP-002 for 2013

Chris, here are the readings for SPP-002 for 2013.

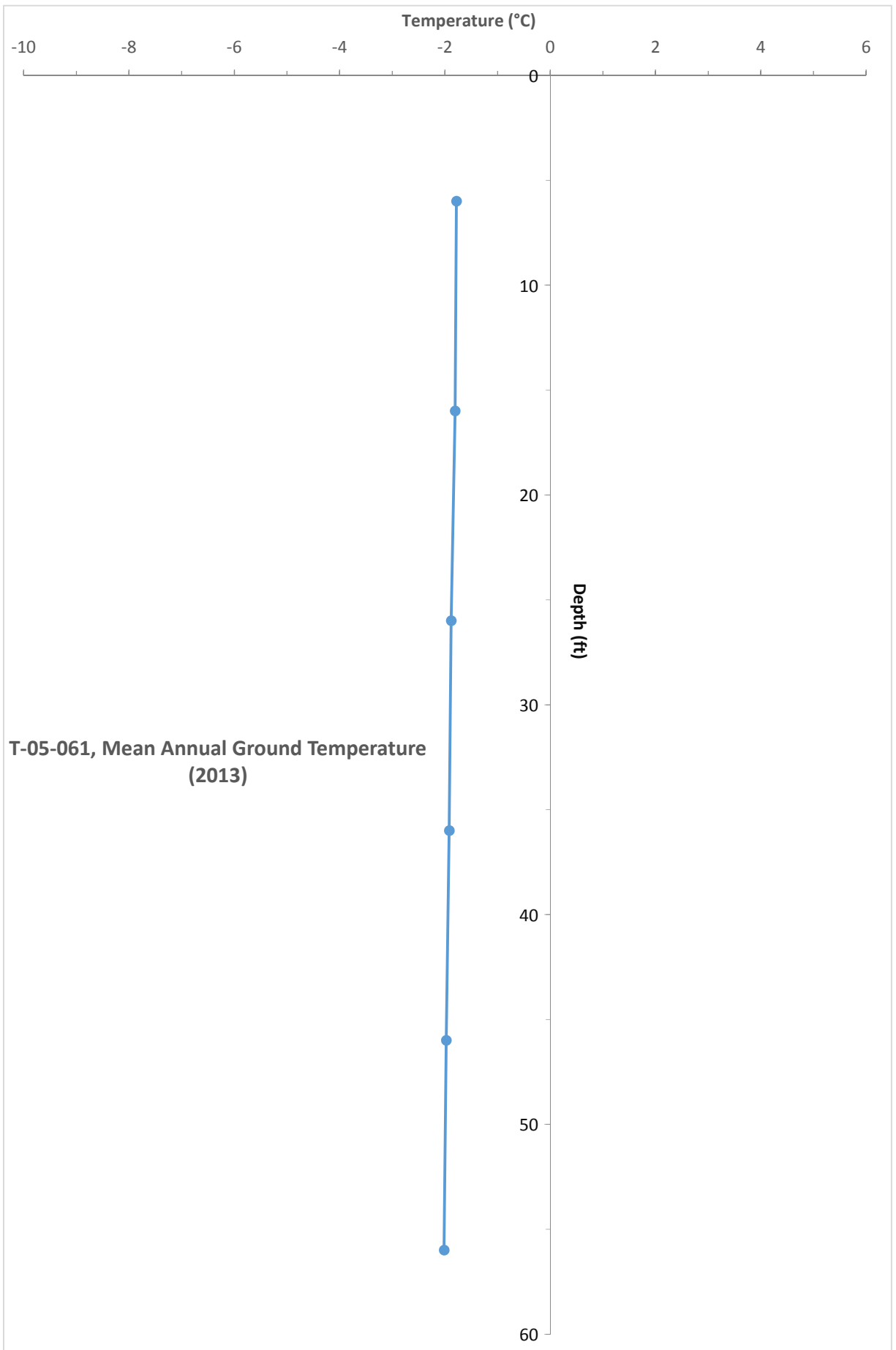
3/24/13 14:03 21.2ft
6/19/13 14:45 21.12ft
9/8/13 11:24 21.8ft
10/6/13 11:19 22.1ft

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Fax: +1.907.426.2177
eMail: Andrew.Willman@teck.com
www.teck.com

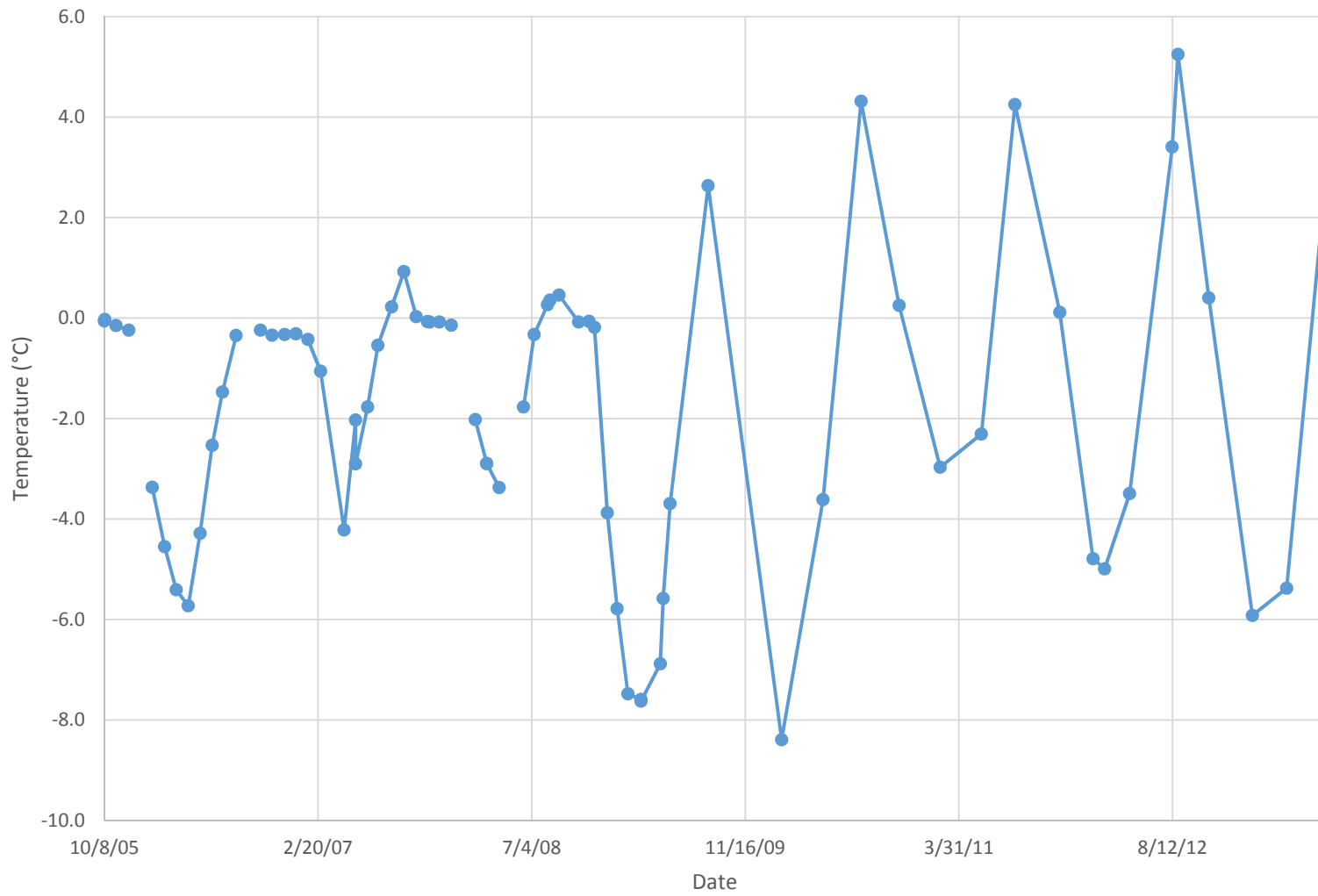
Appendix B
Thermistor Plots



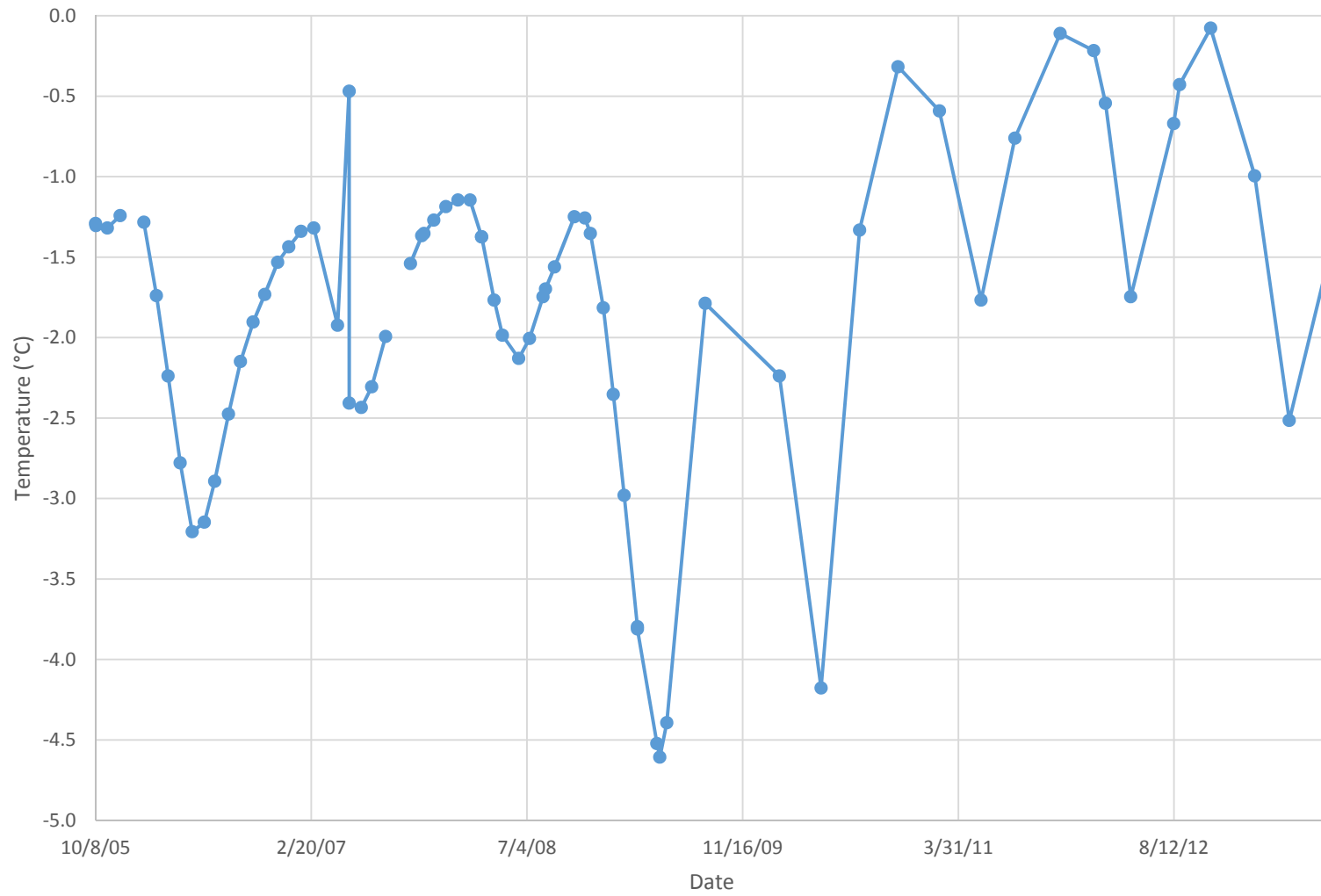
Temperature Depth Plot for T-05-061



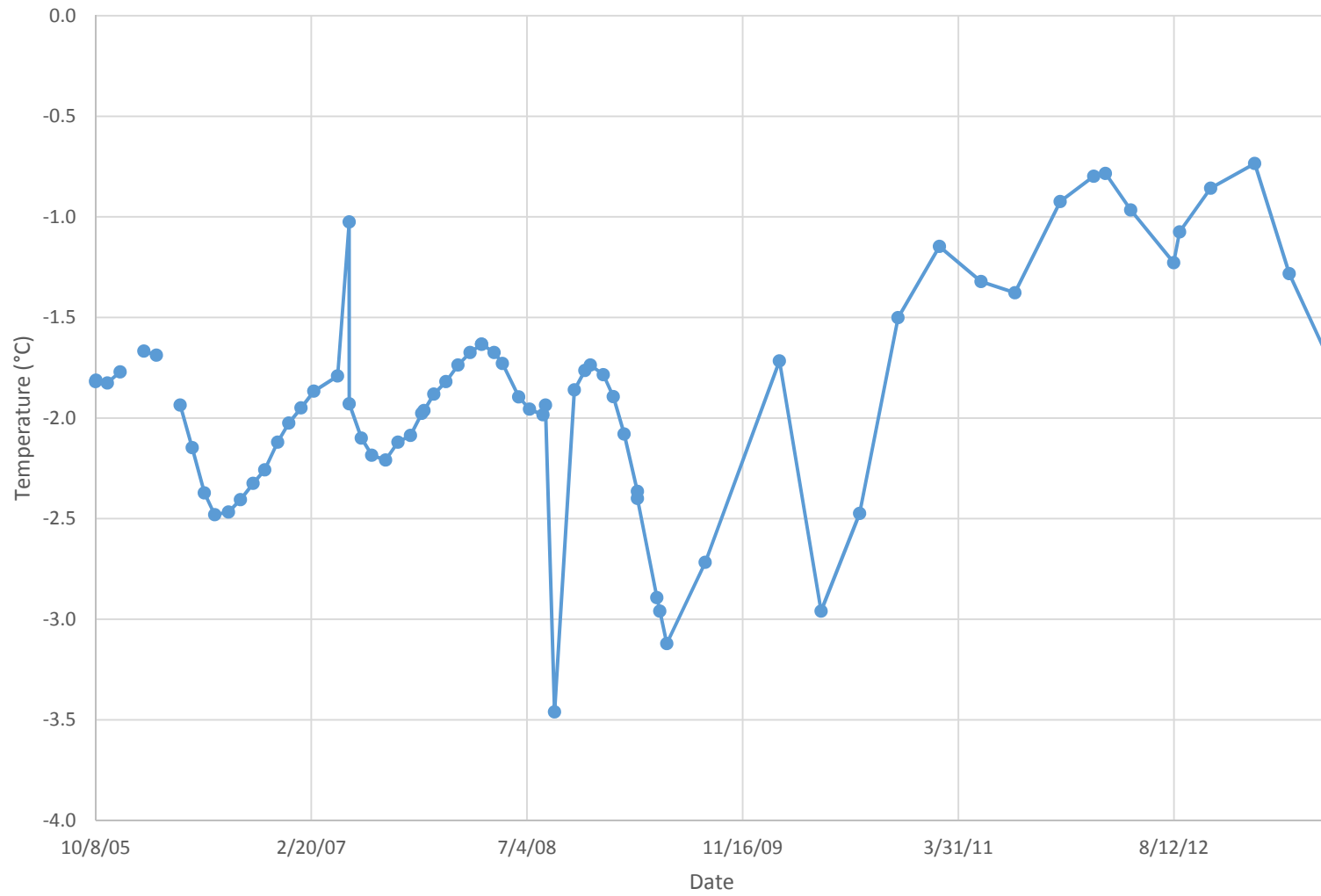
T-05-061: Temperature at 6 feet



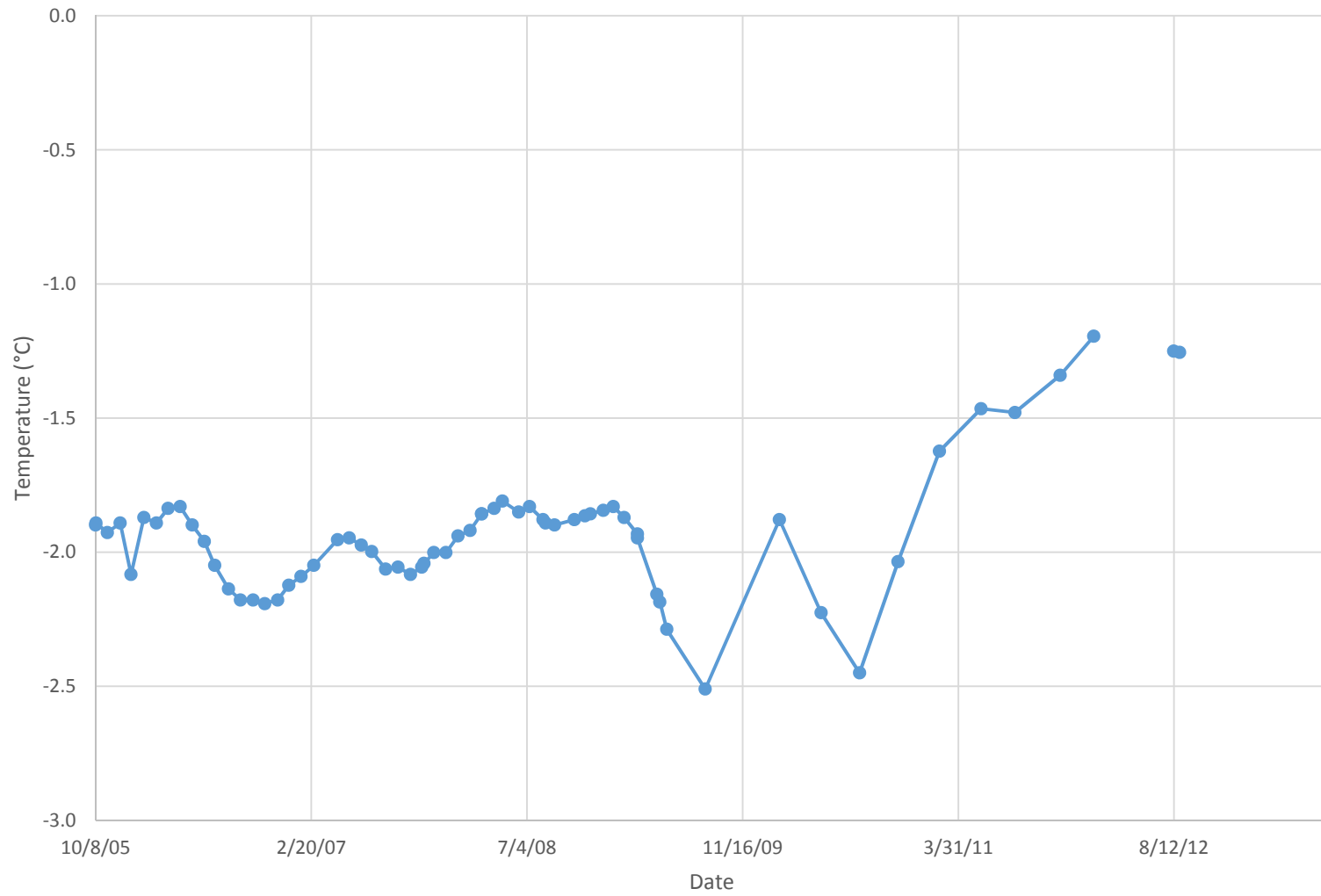
T-05-061: Temperature at 16 feet



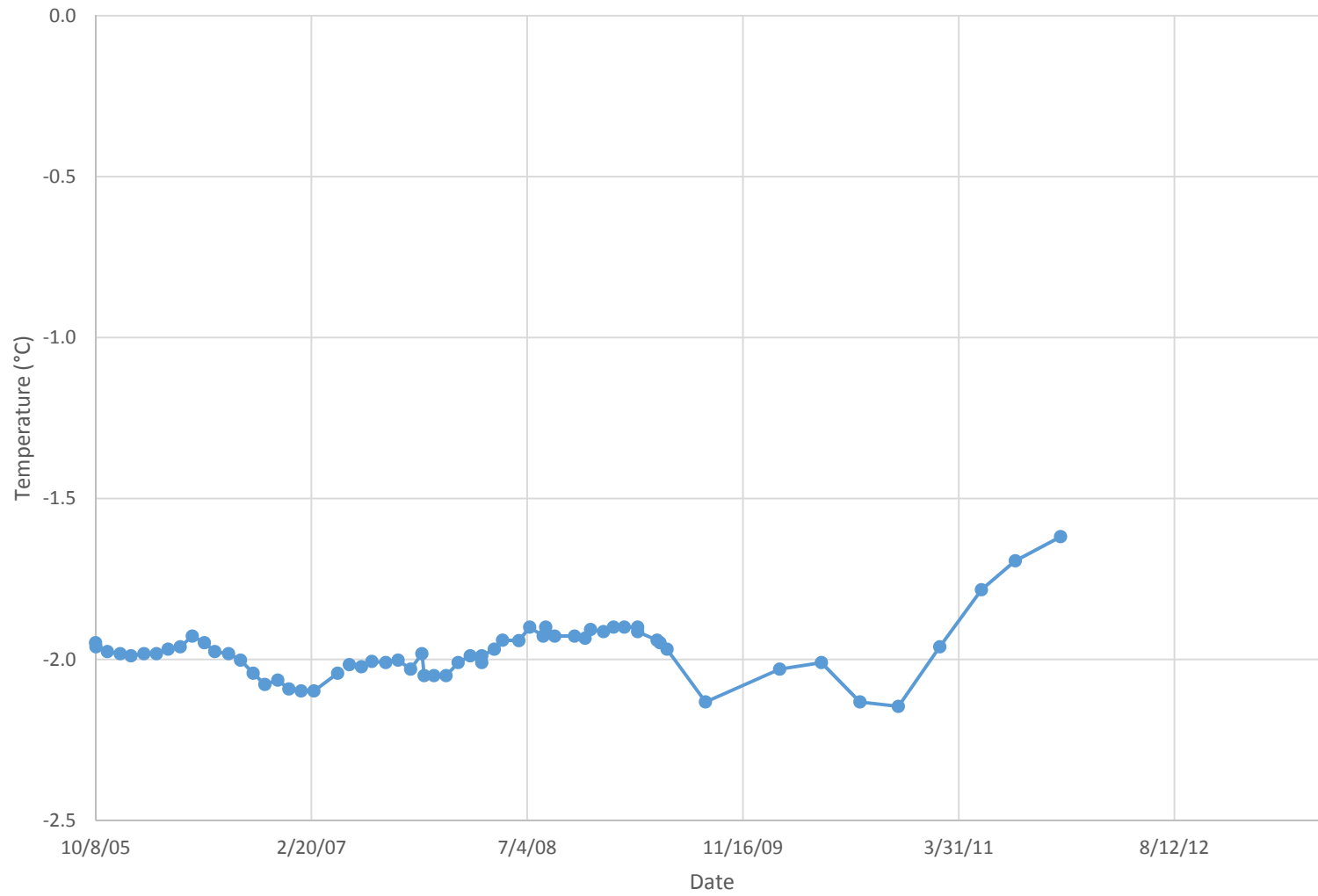
T-05-061: Temperature at 26 feet



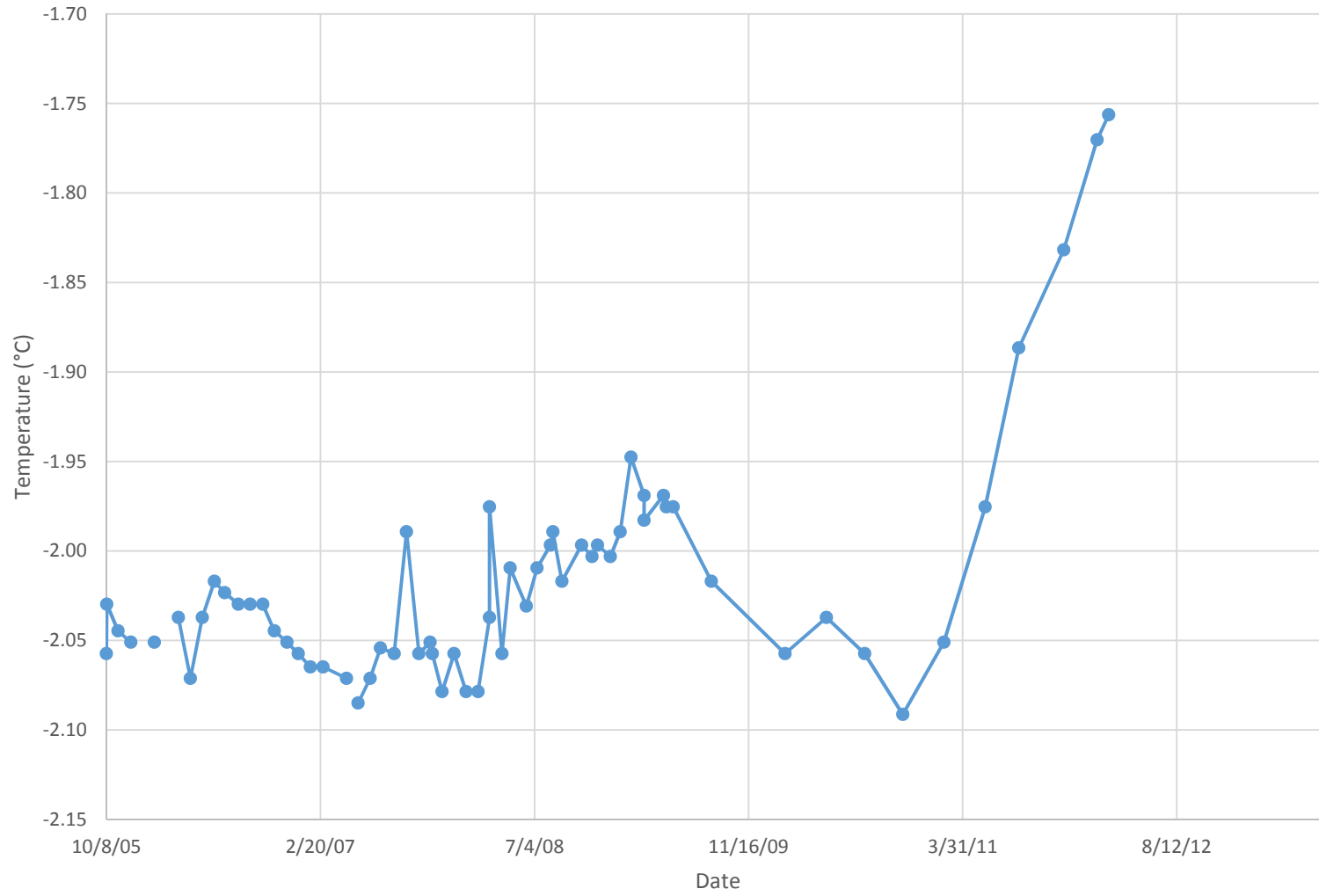
T-05-061: Temperature at 36 feet

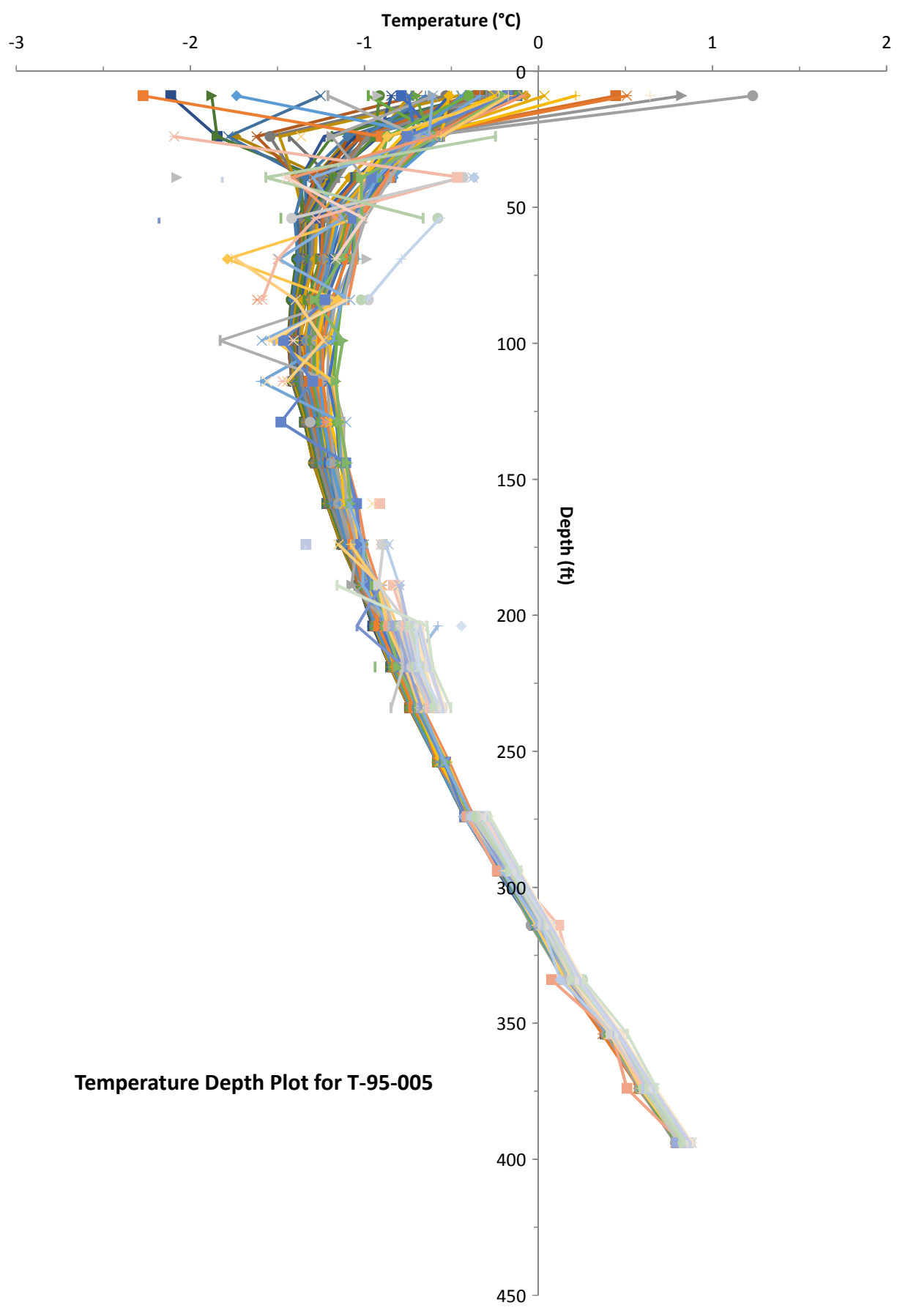


T-05-061: Temperature at 46 feet

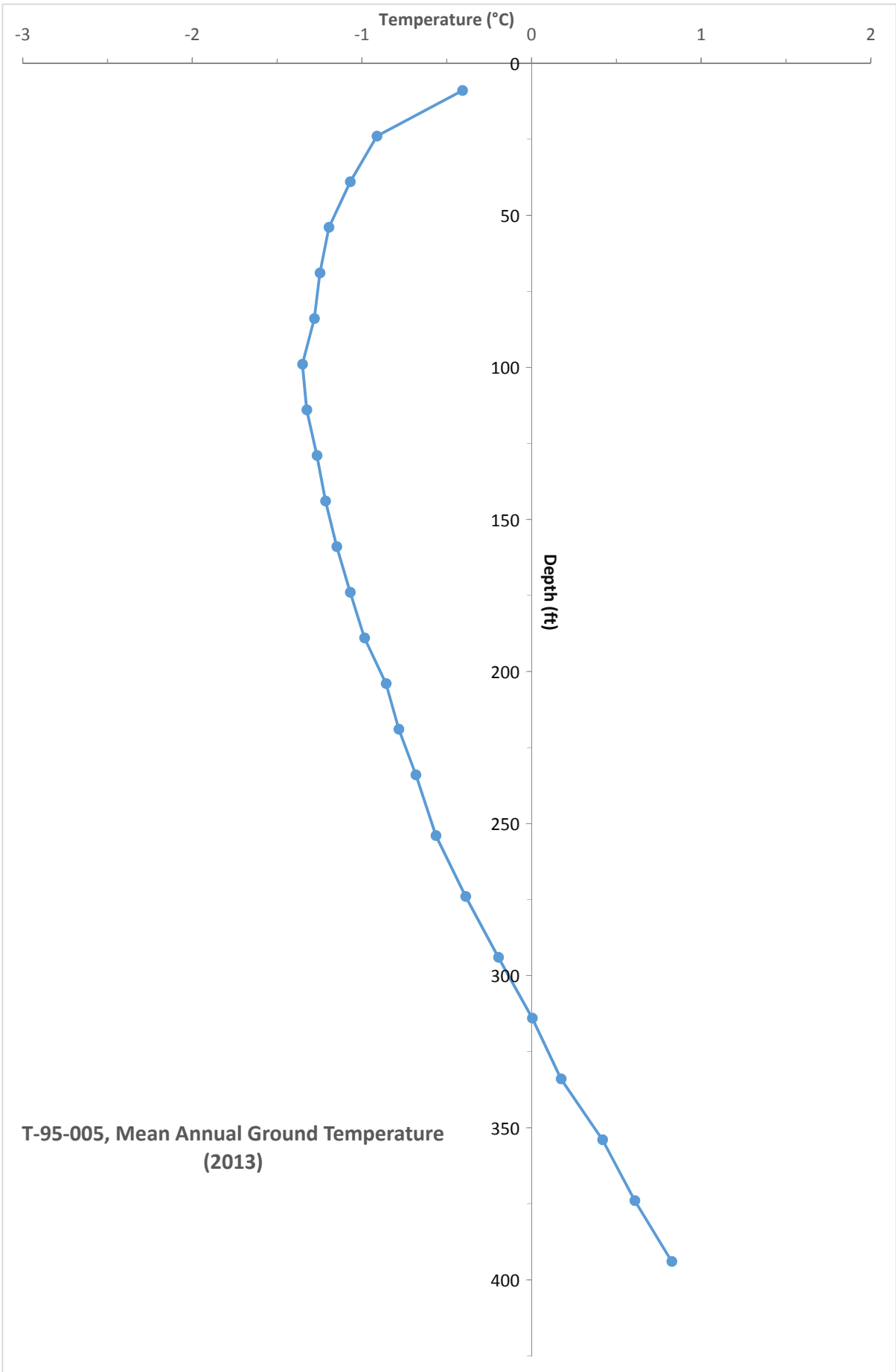


T-05-061: Temperature at 56 feet

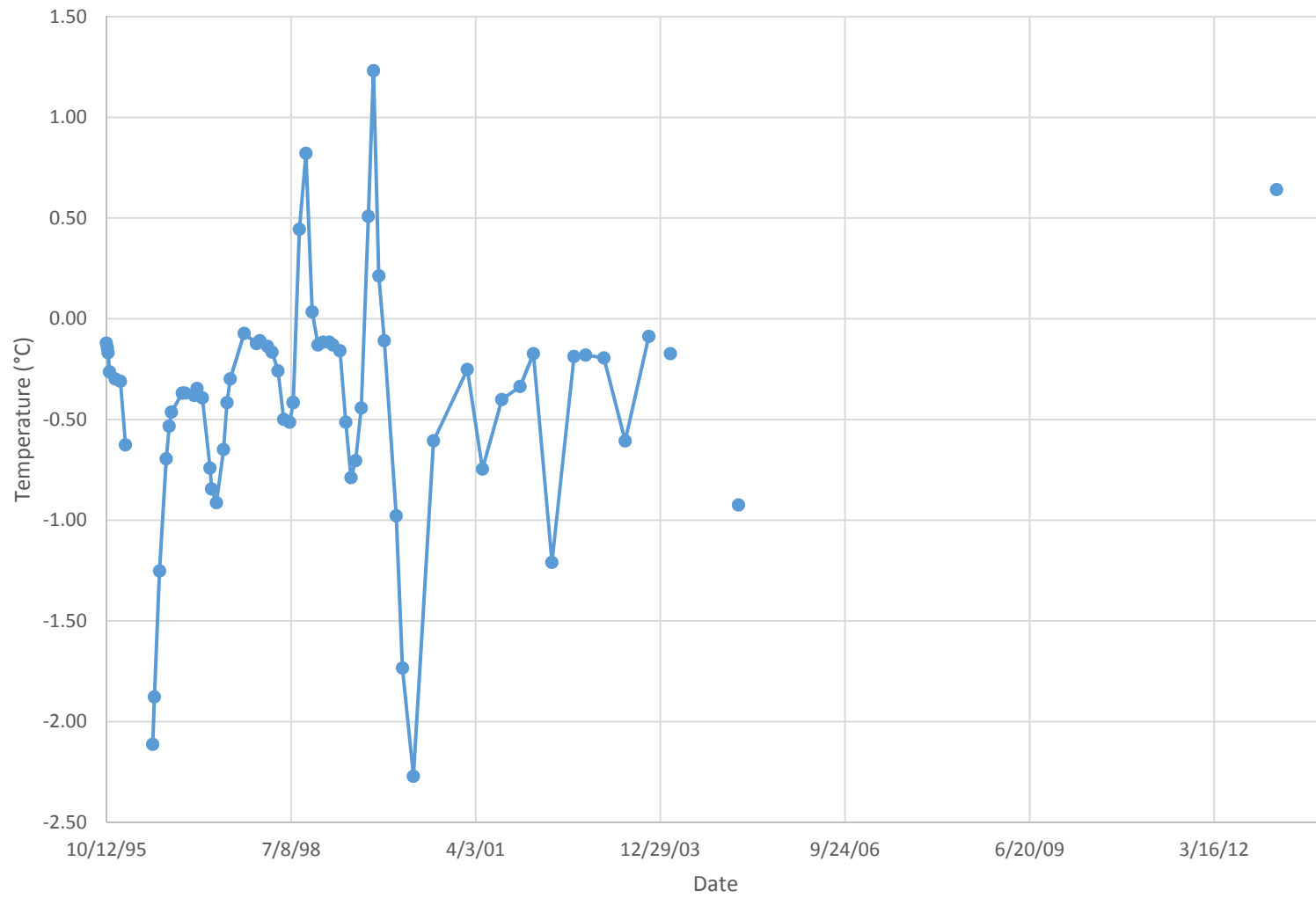




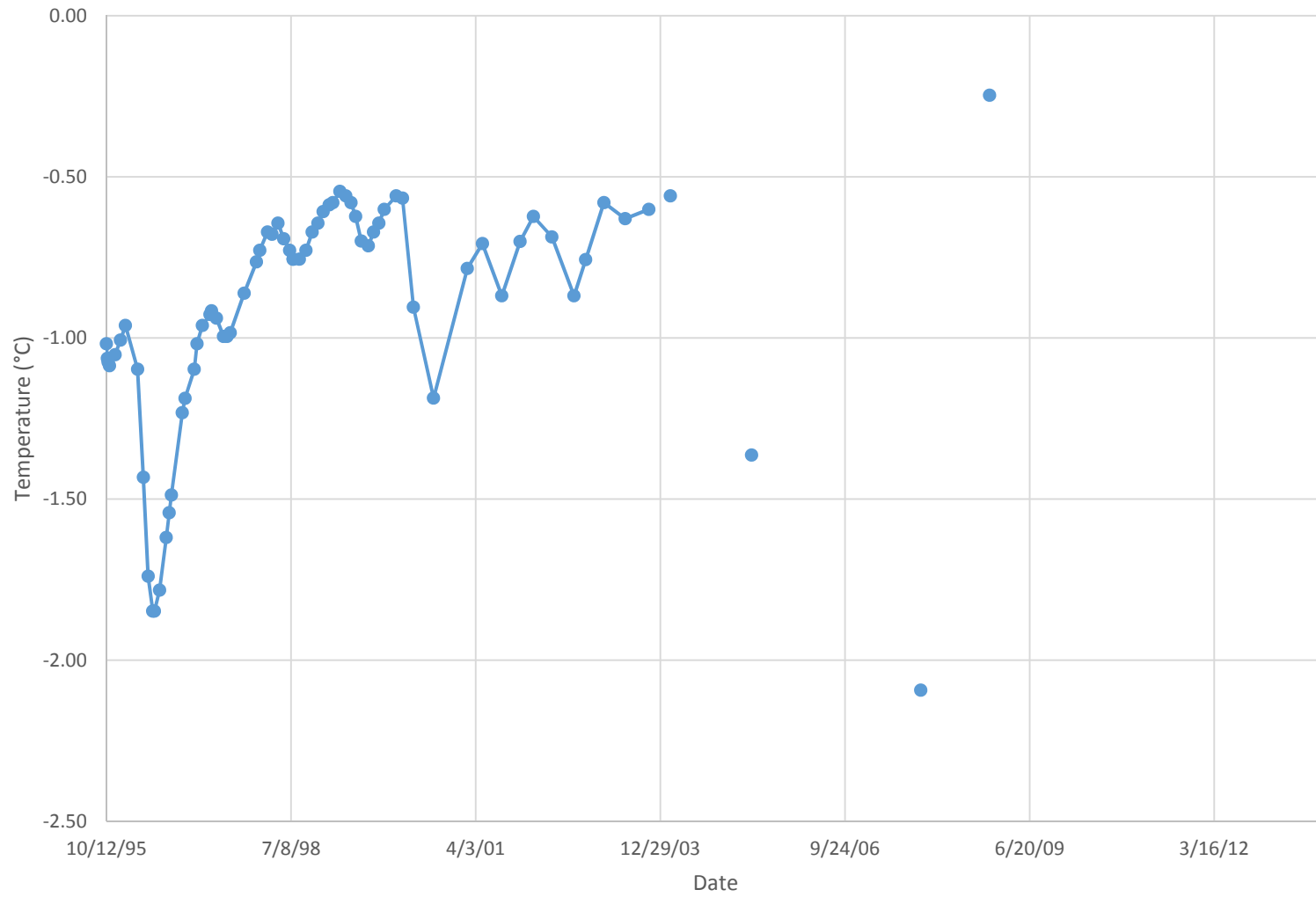
Temperature Depth Plot for T-95-005



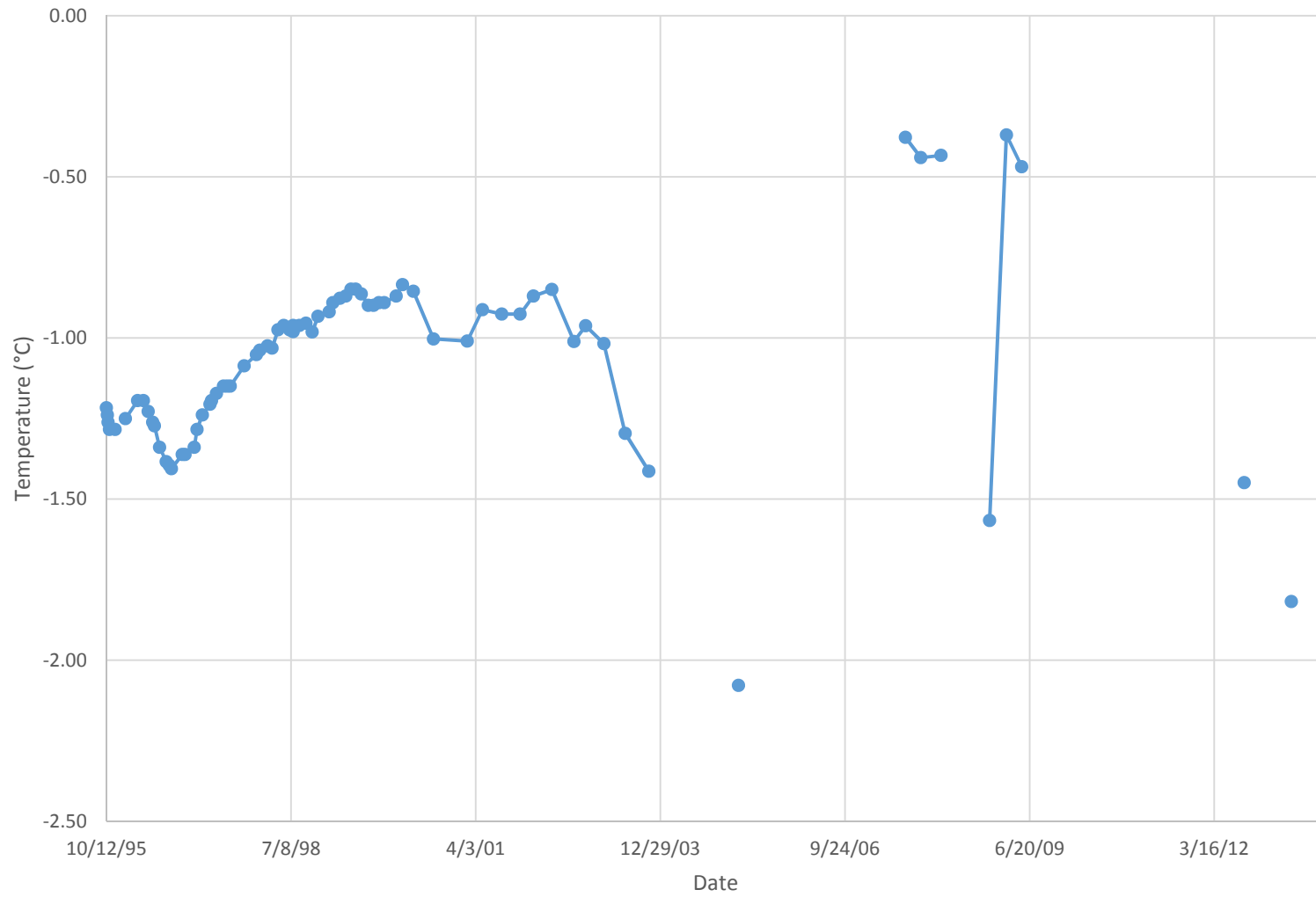
T-95-005: Temperature at 9 feet



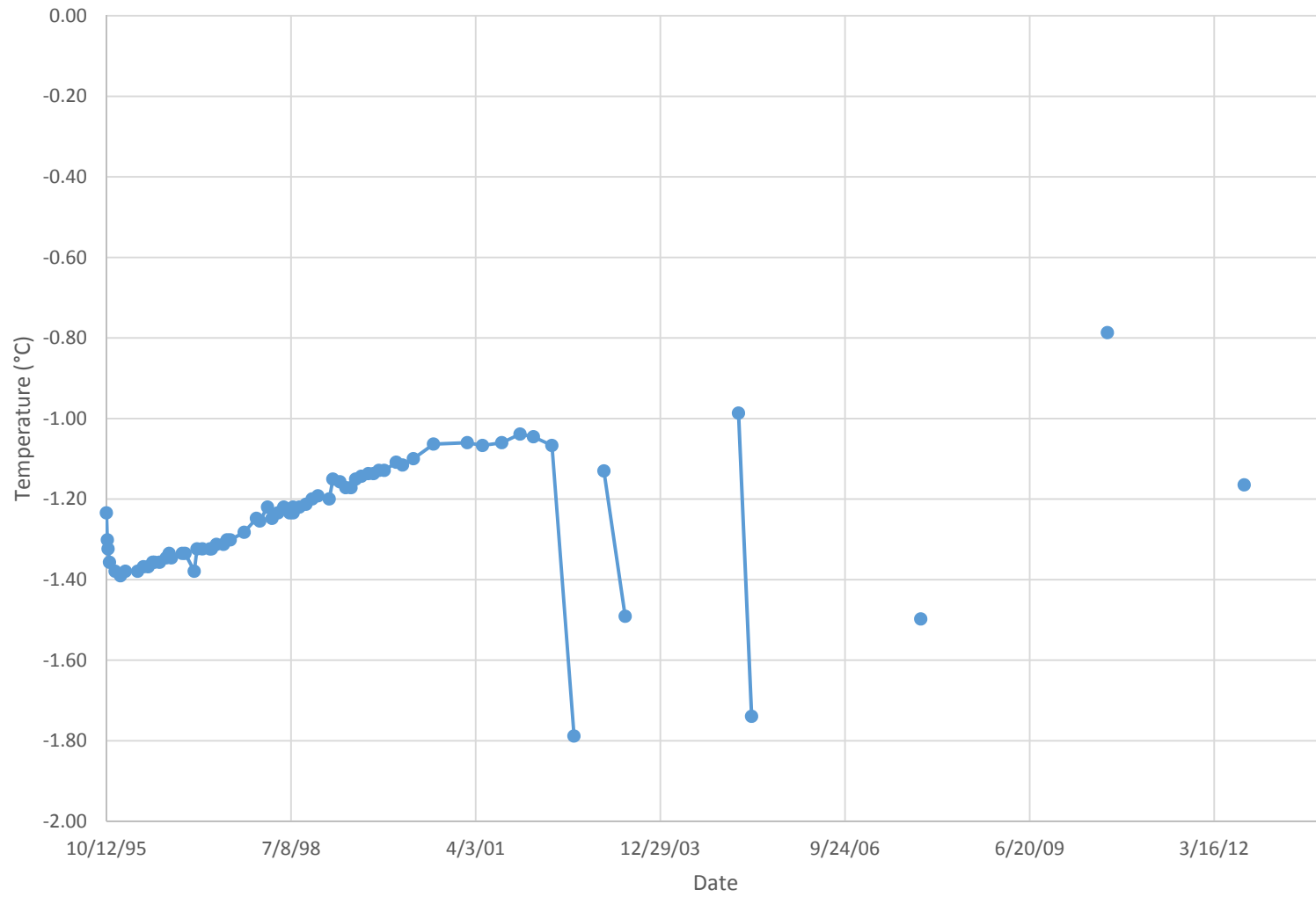
T-95-005: Temperature at 24 feet



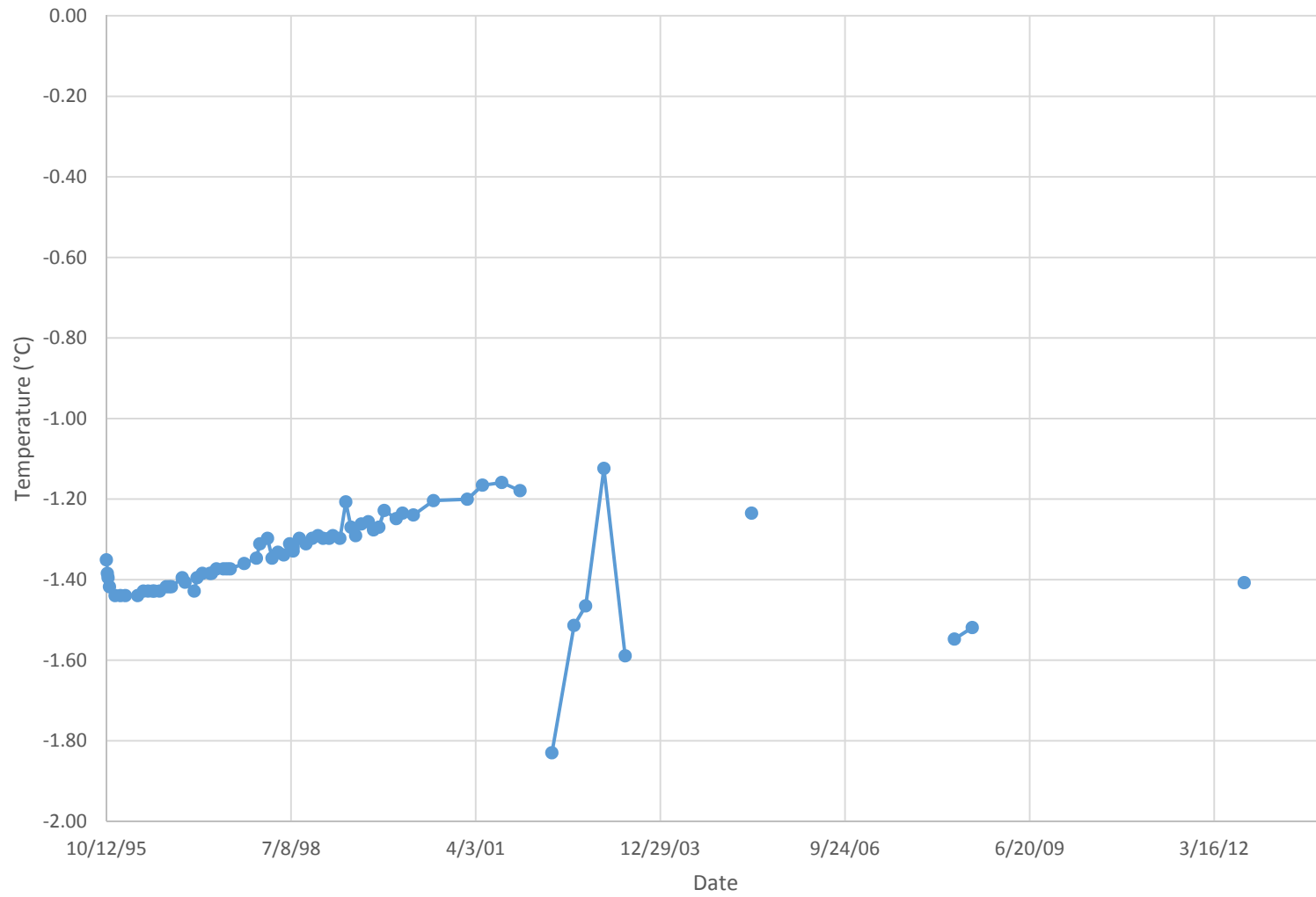
T-95-005: Temperature at 39 feet



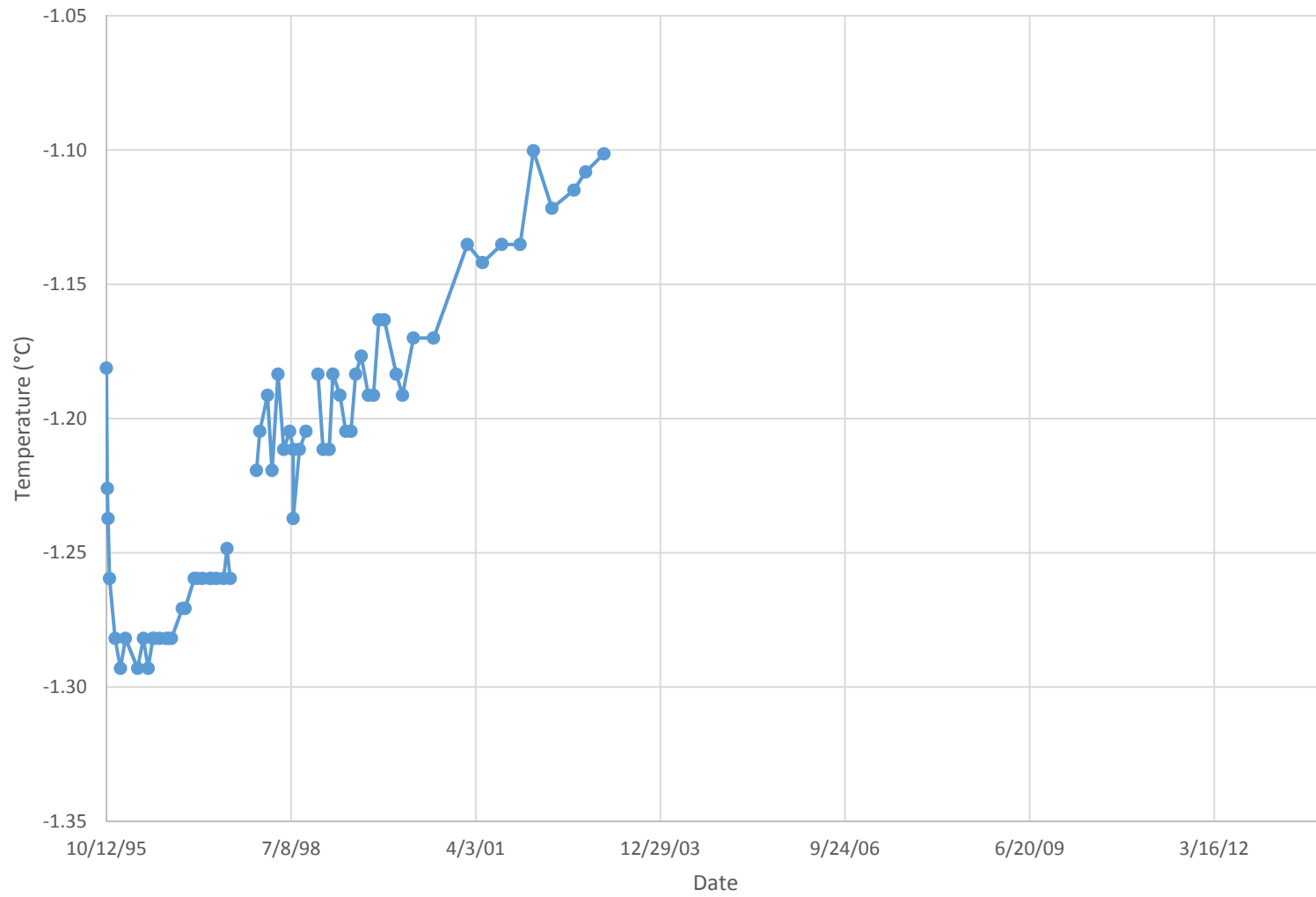
T-95-005: Temperature at 69 feet



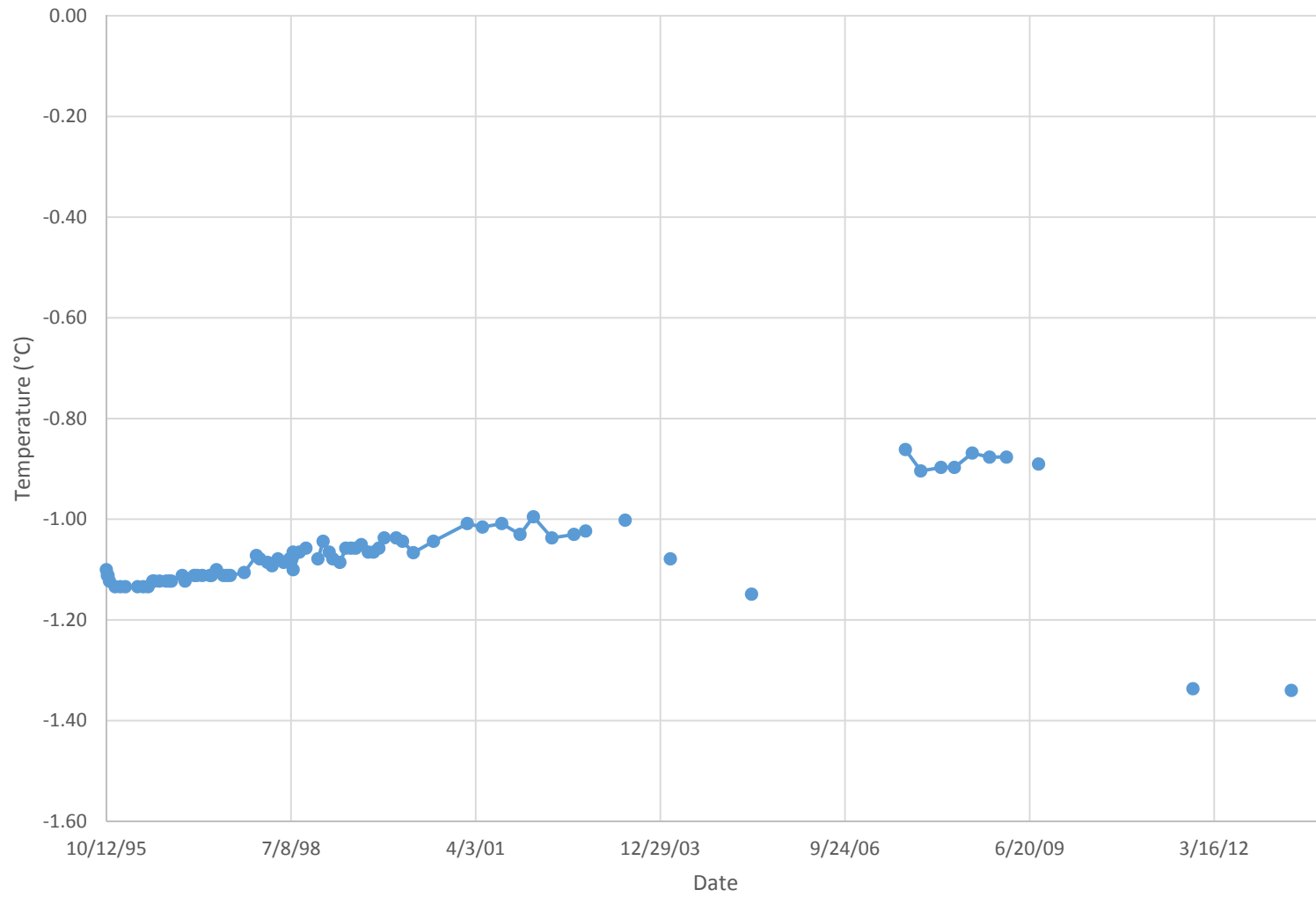
T-95-005: Temperature at 99 feet



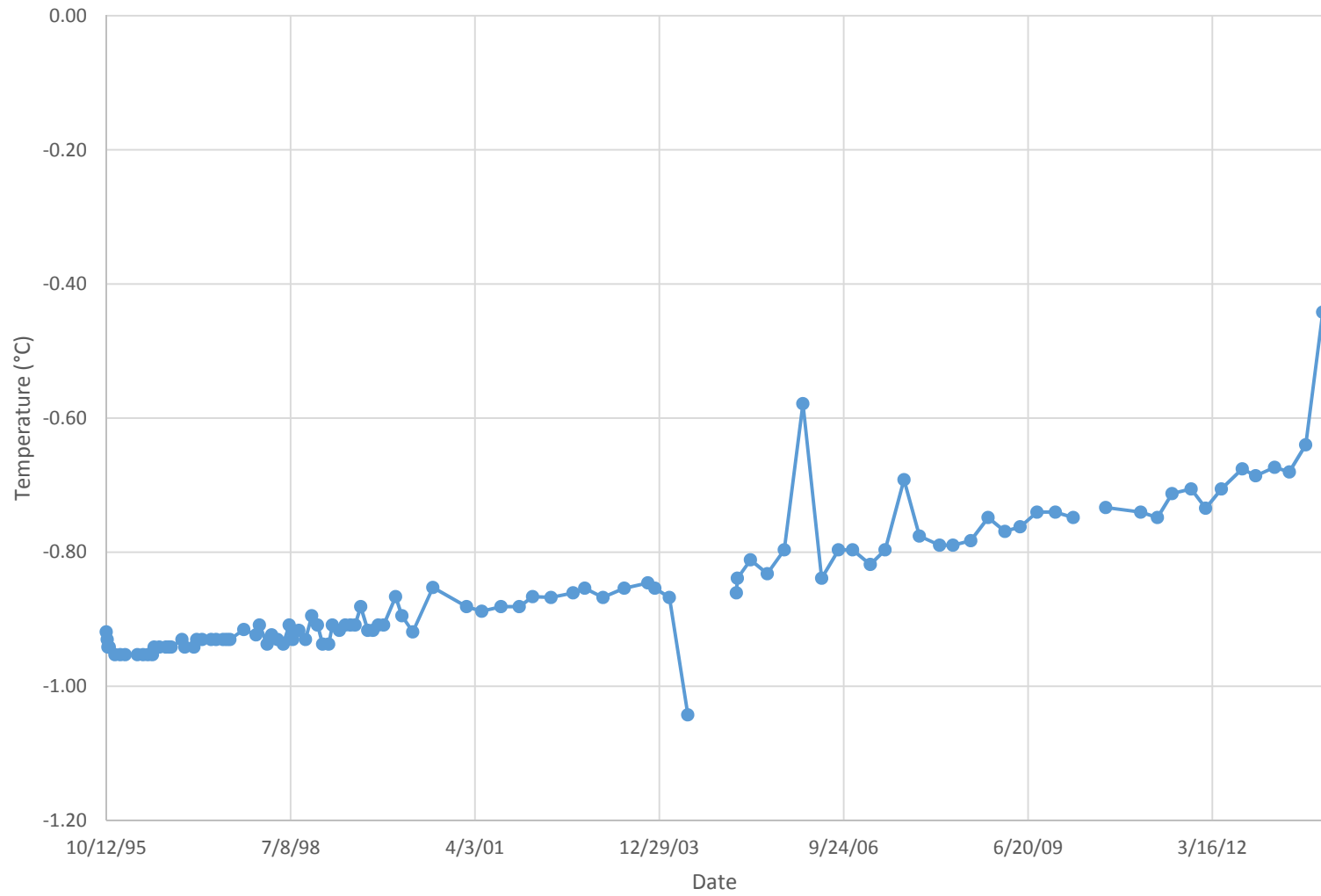
T-95-005: Temperature at 144 feet



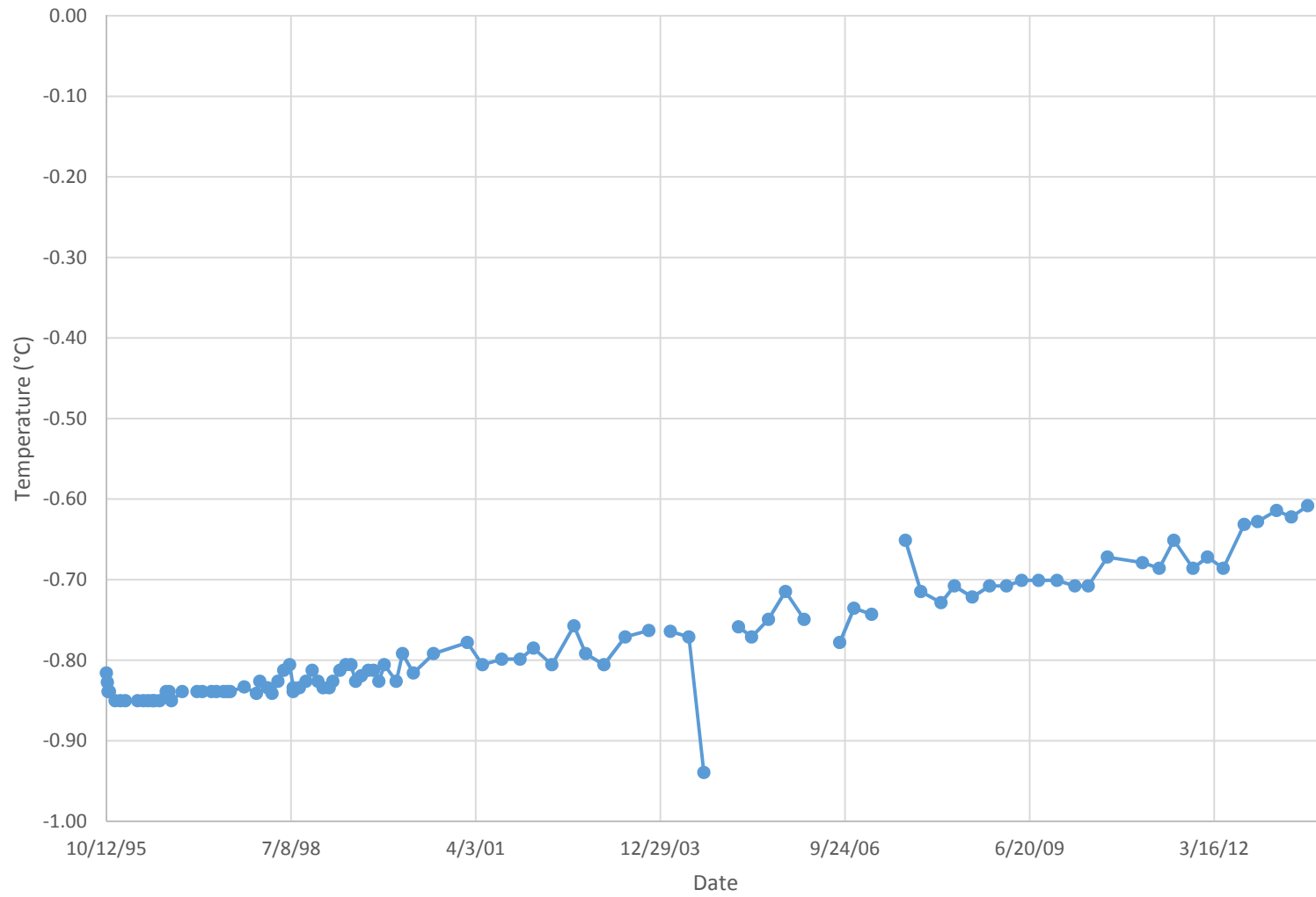
T-95-005: Temperature at 174 feet



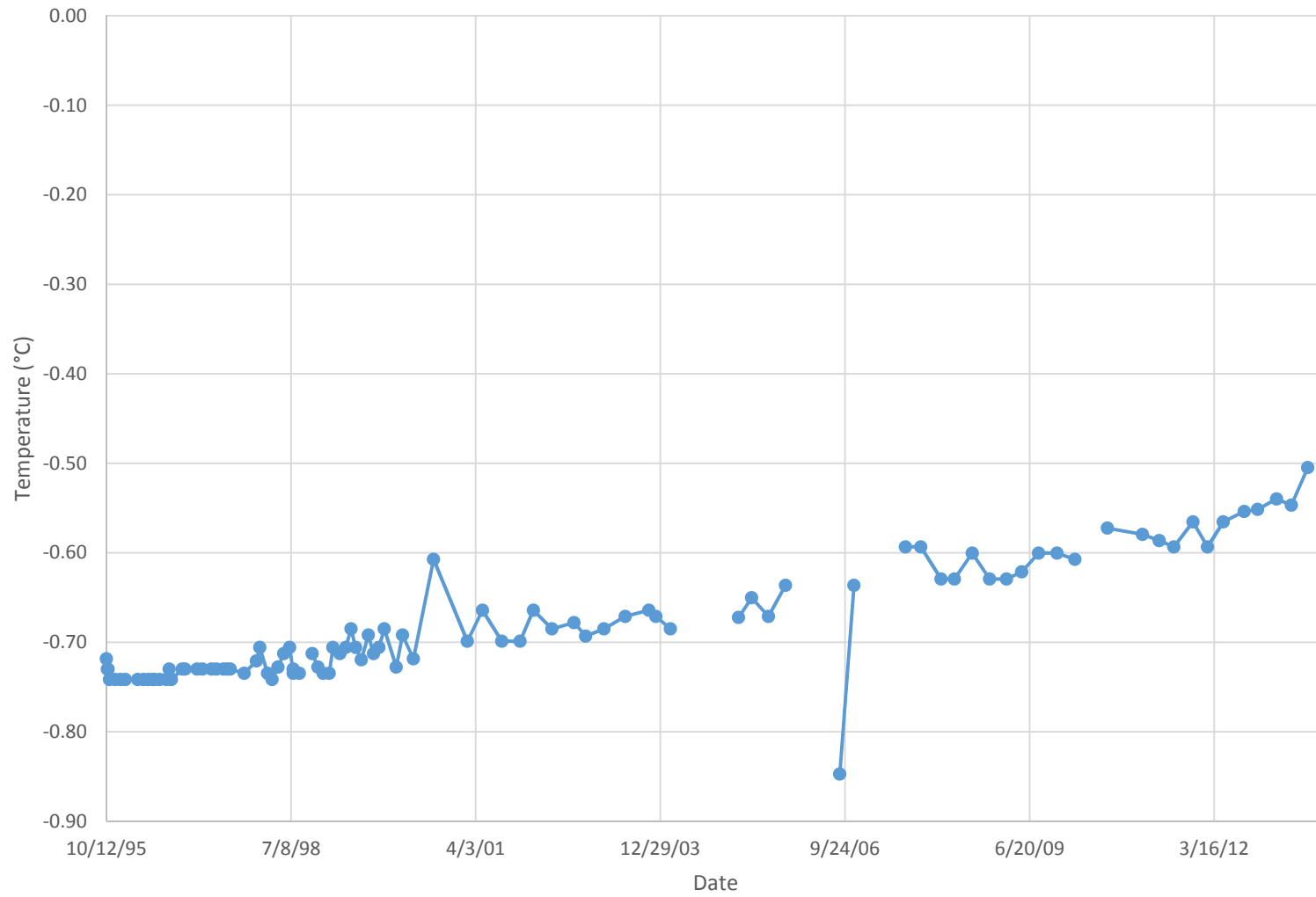
T-95-005: Temperature at 204 feet



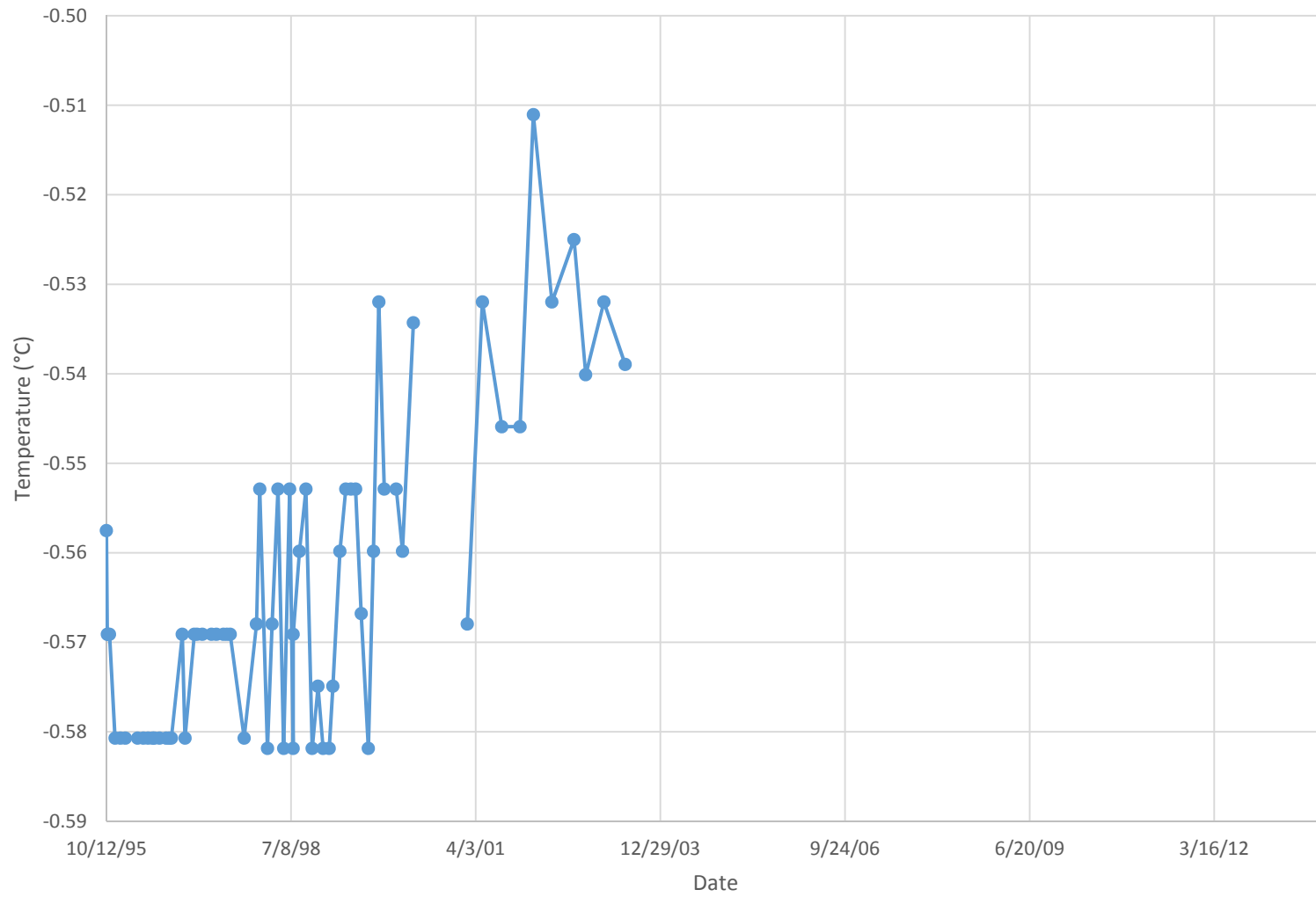
T-95-005: Temperature at 219 feet



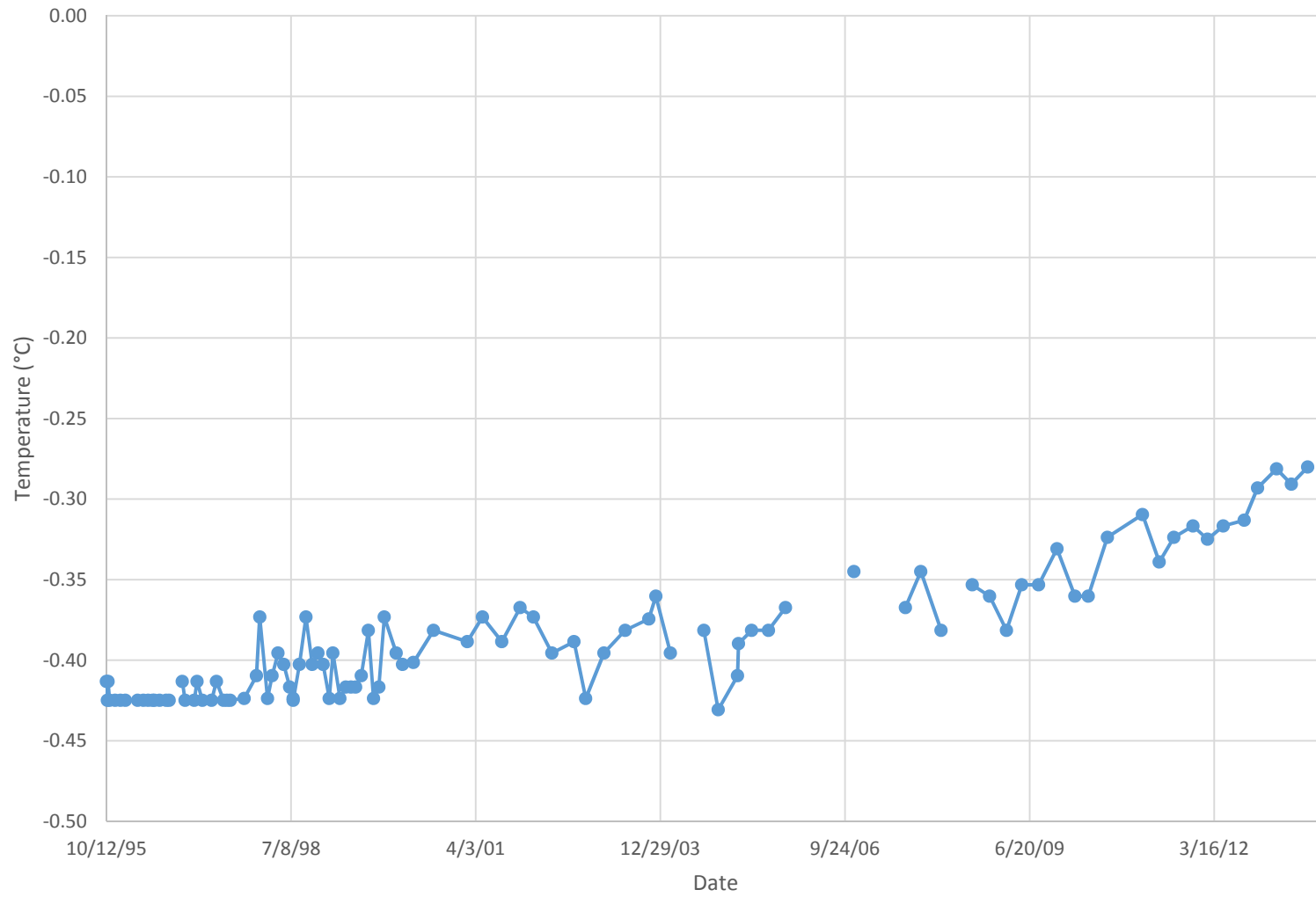
T-95-005: Temperature at 234 feet



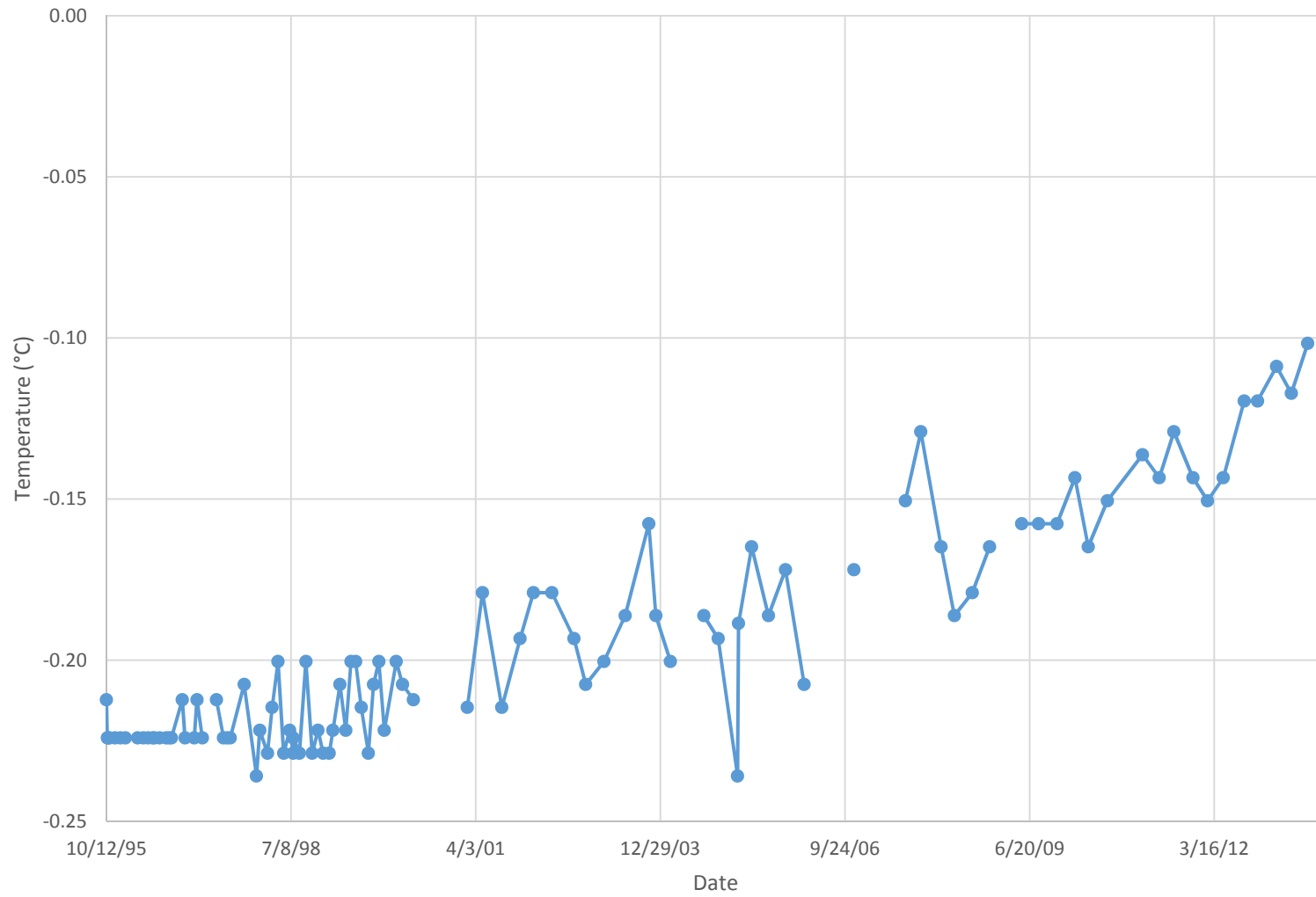
T-95-005: Temperature at 254 feet



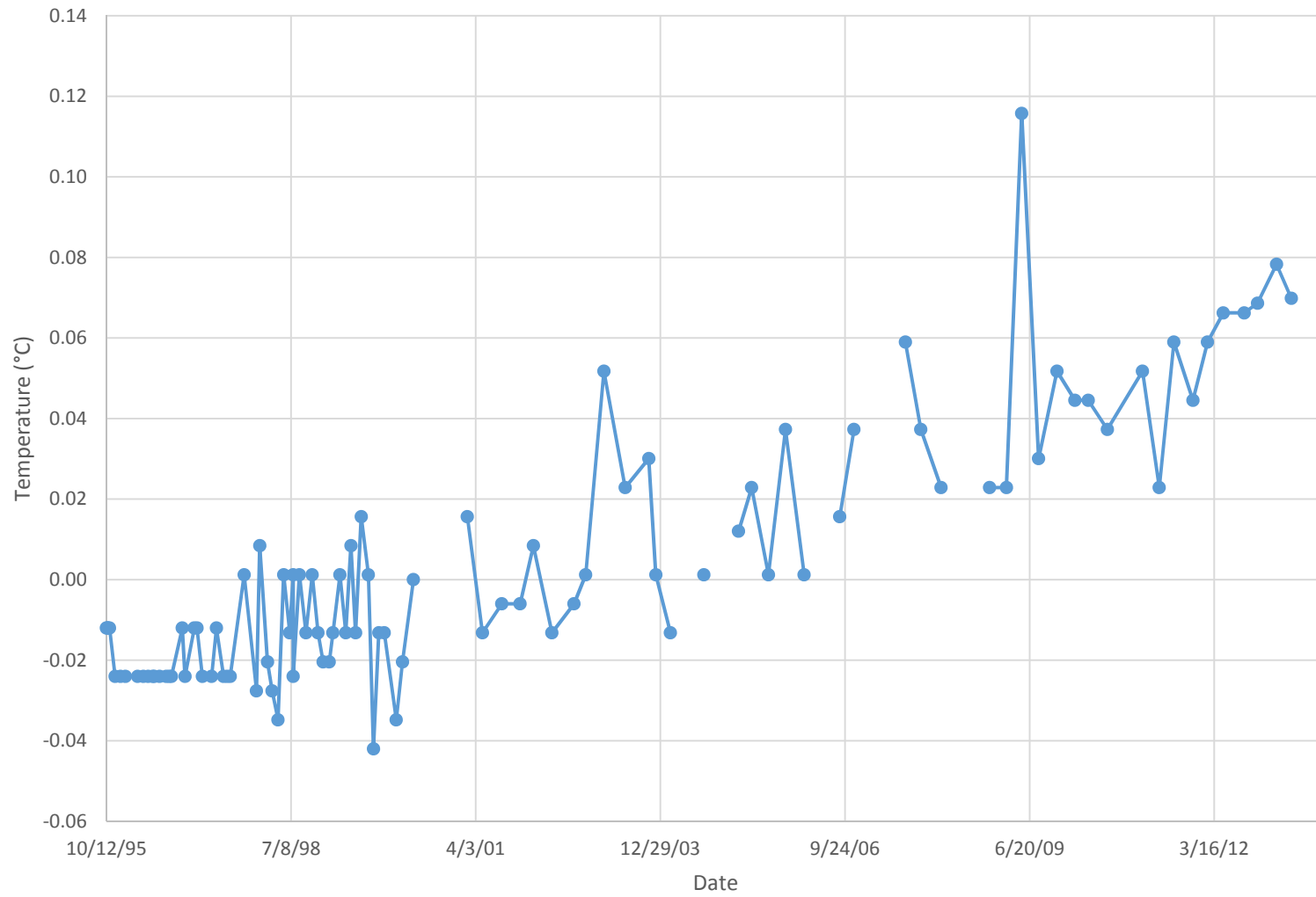
T-95-005: Temperature at 274 feet



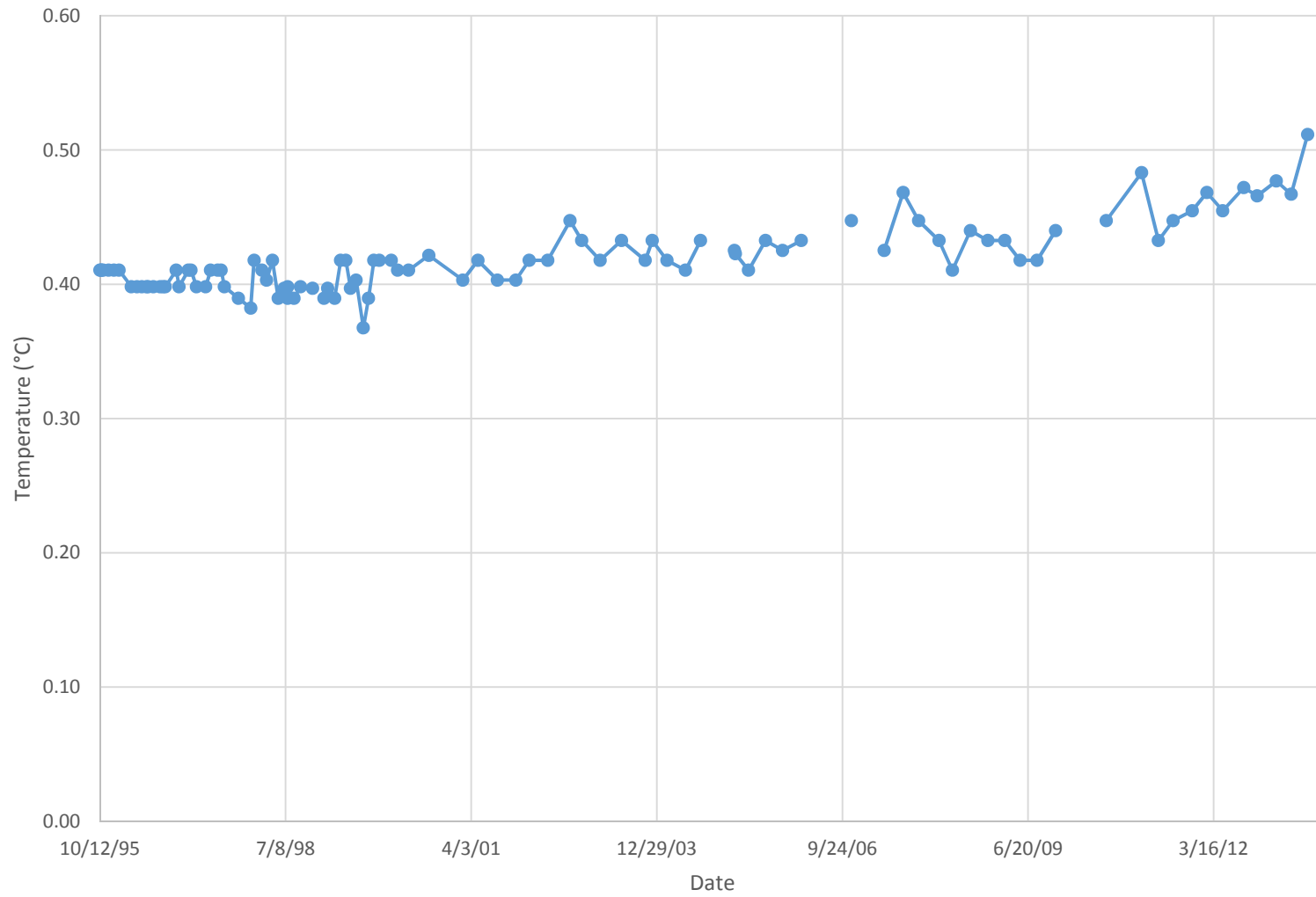
T-95-005: Temperature at 294 feet



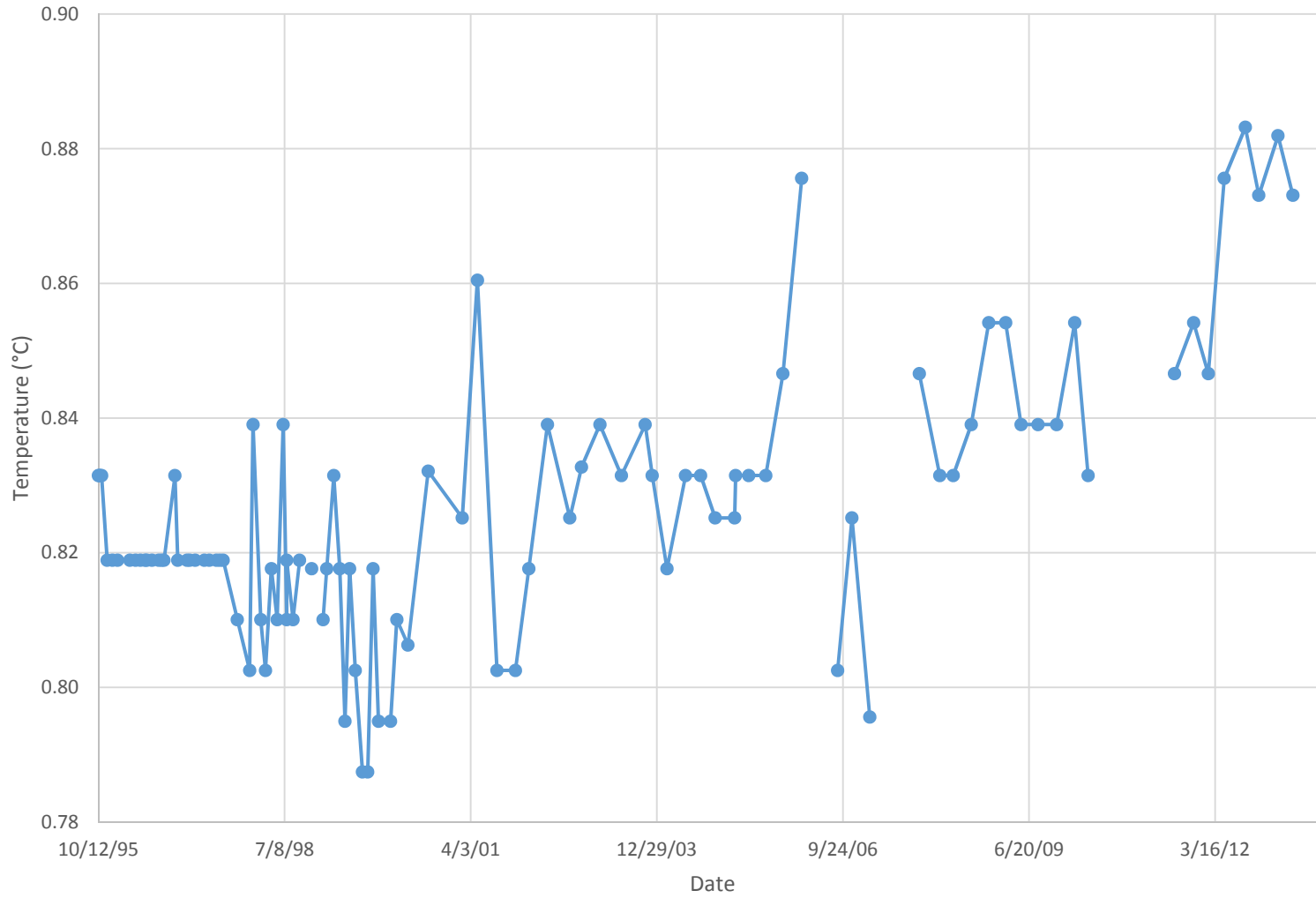
T-95-005: Temperature at 314 feet

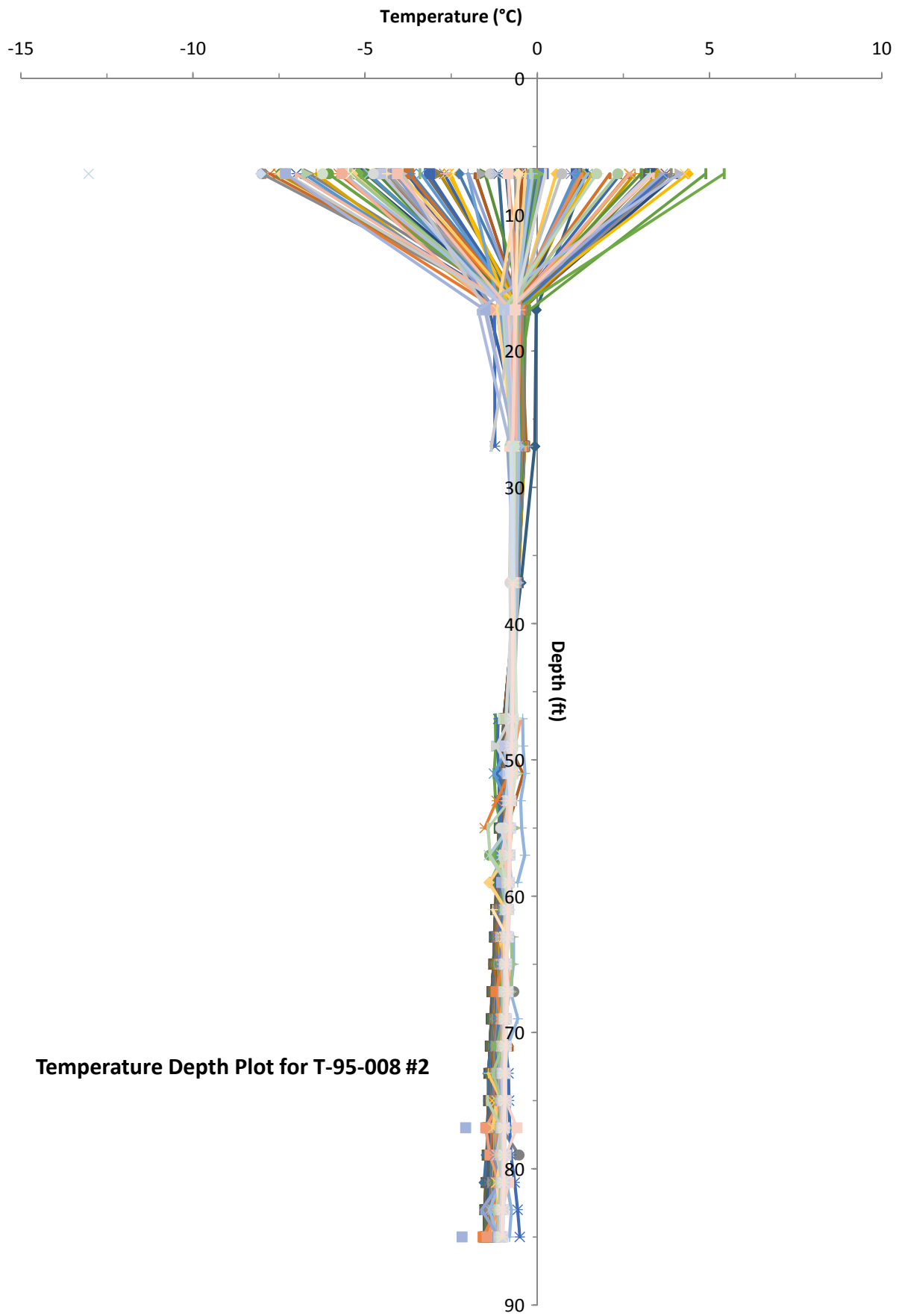


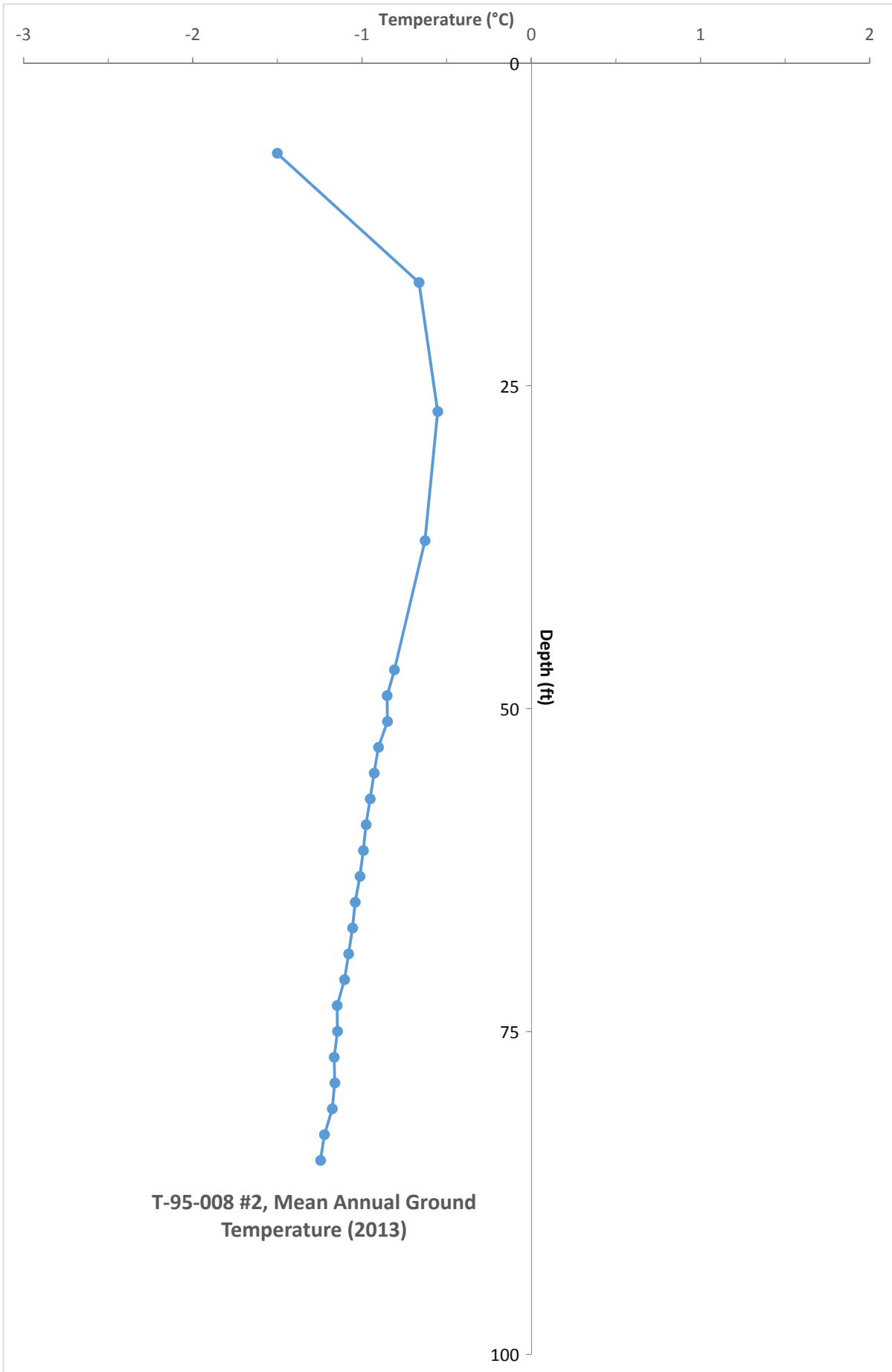
T-95-005: Temperature at 354 feet



T-95-005: Temperature at 394 feet

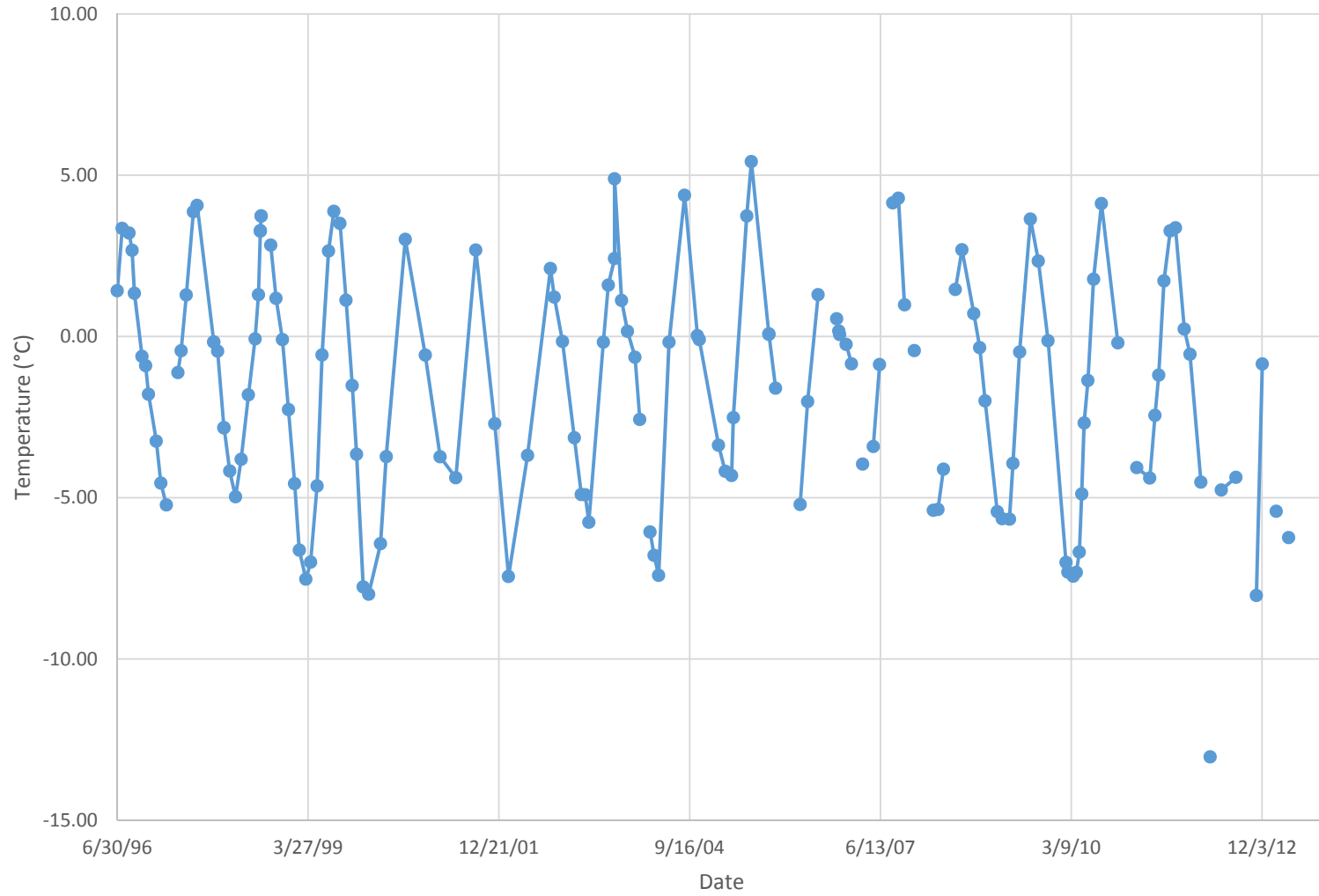




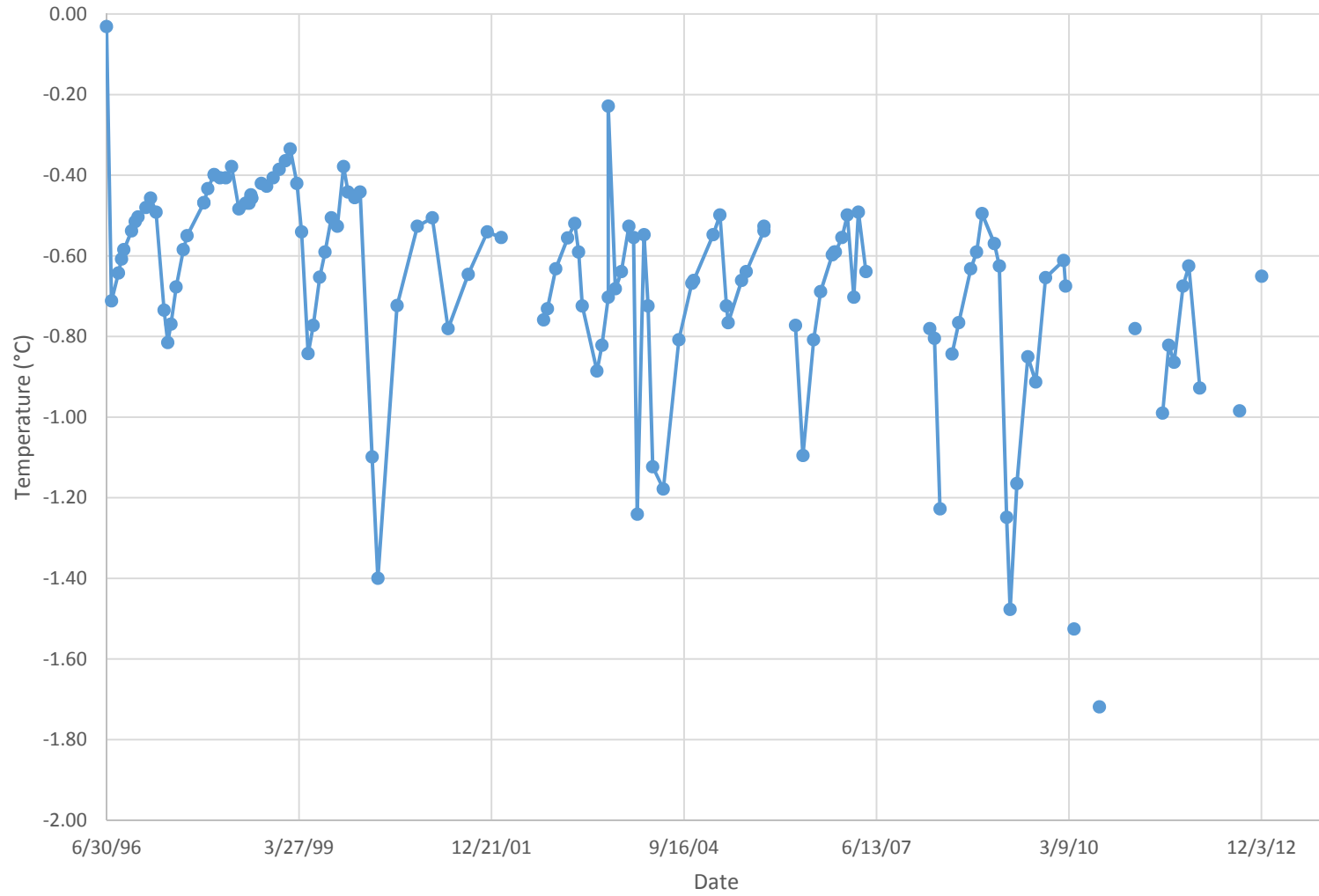


T-95-008 #2, Mean Annual Ground Temperature (2013)

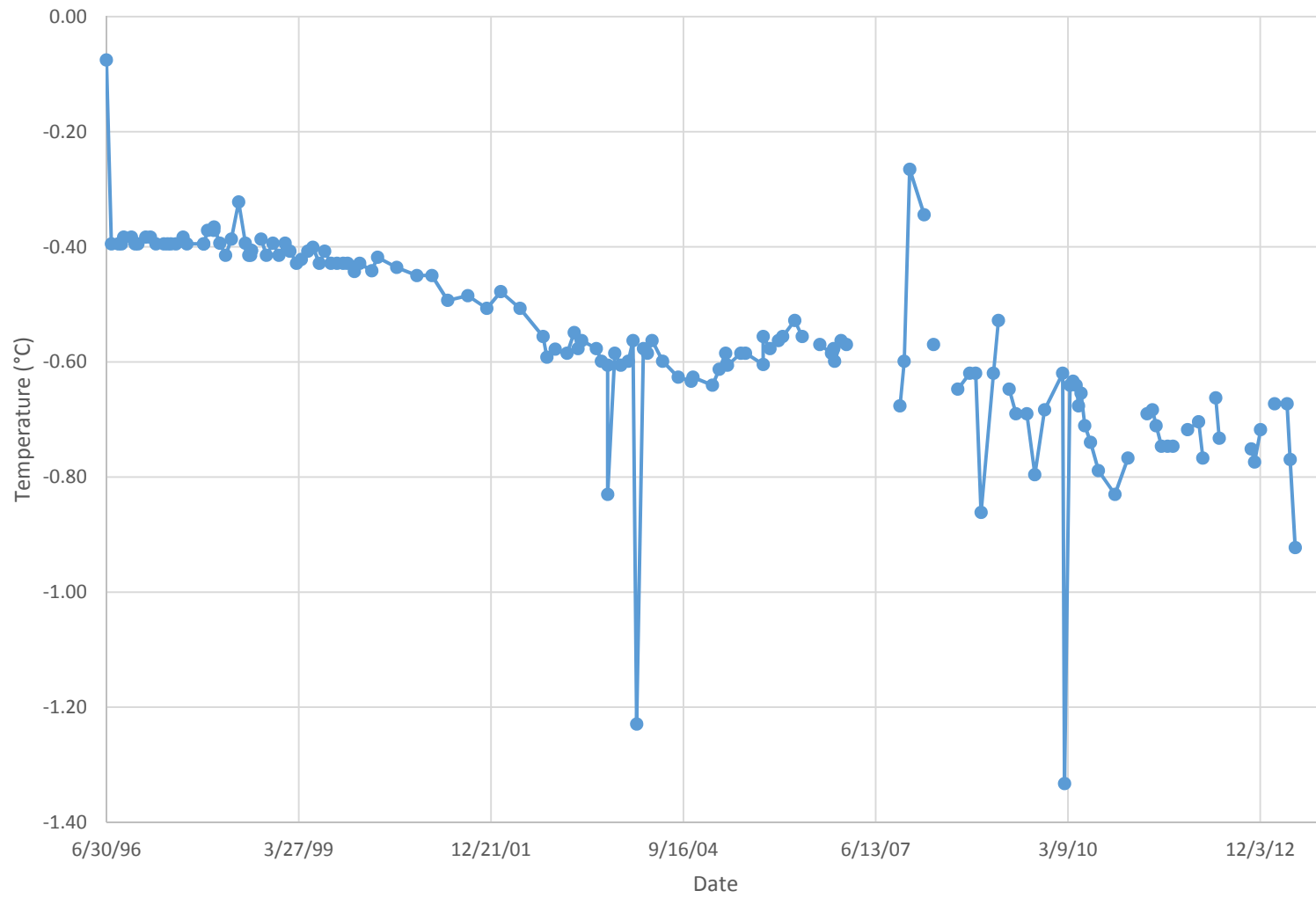
T-95-008 #2: Temperature at 7 feet



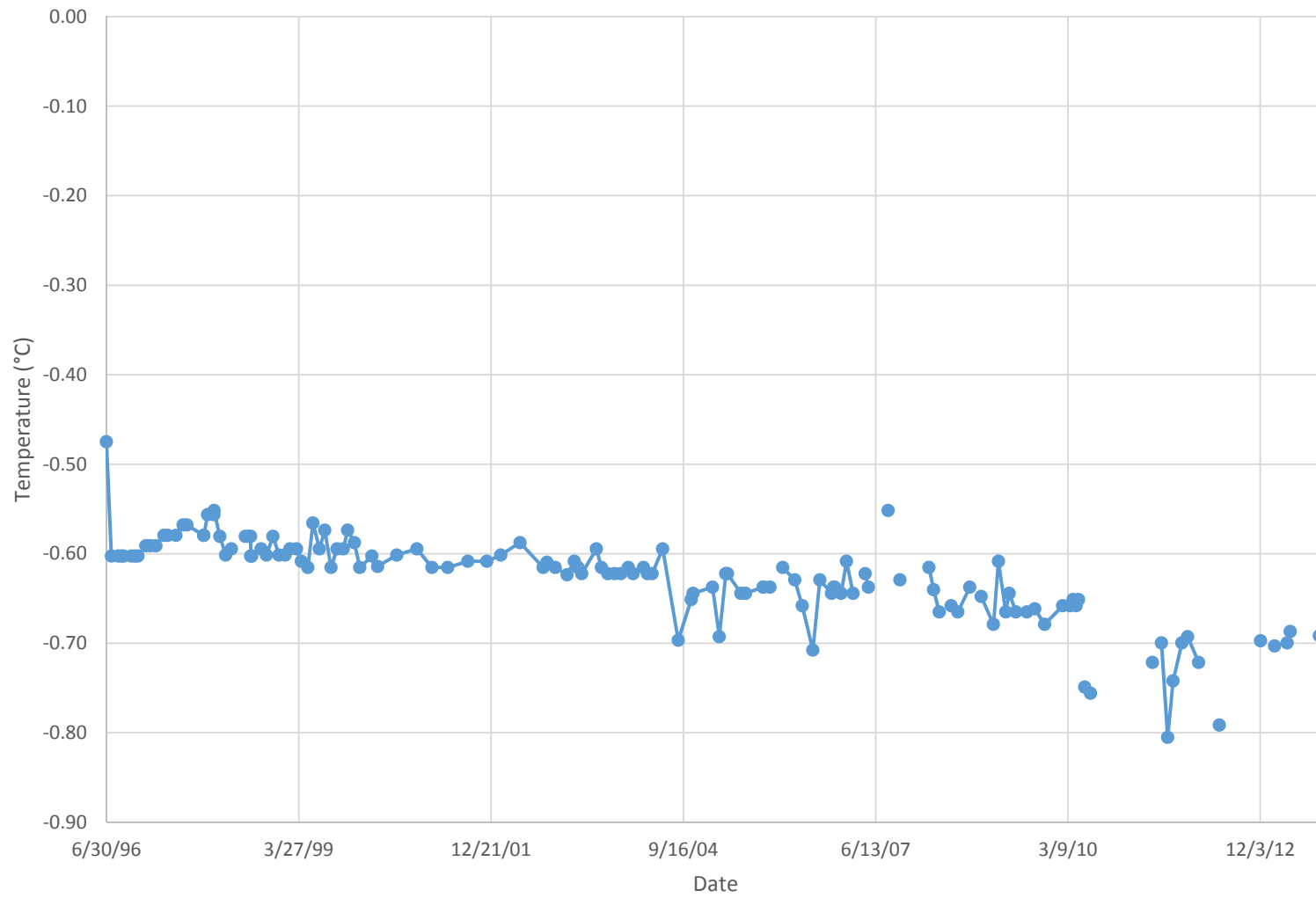
T-95-008 #2: Temperature at 17 feet



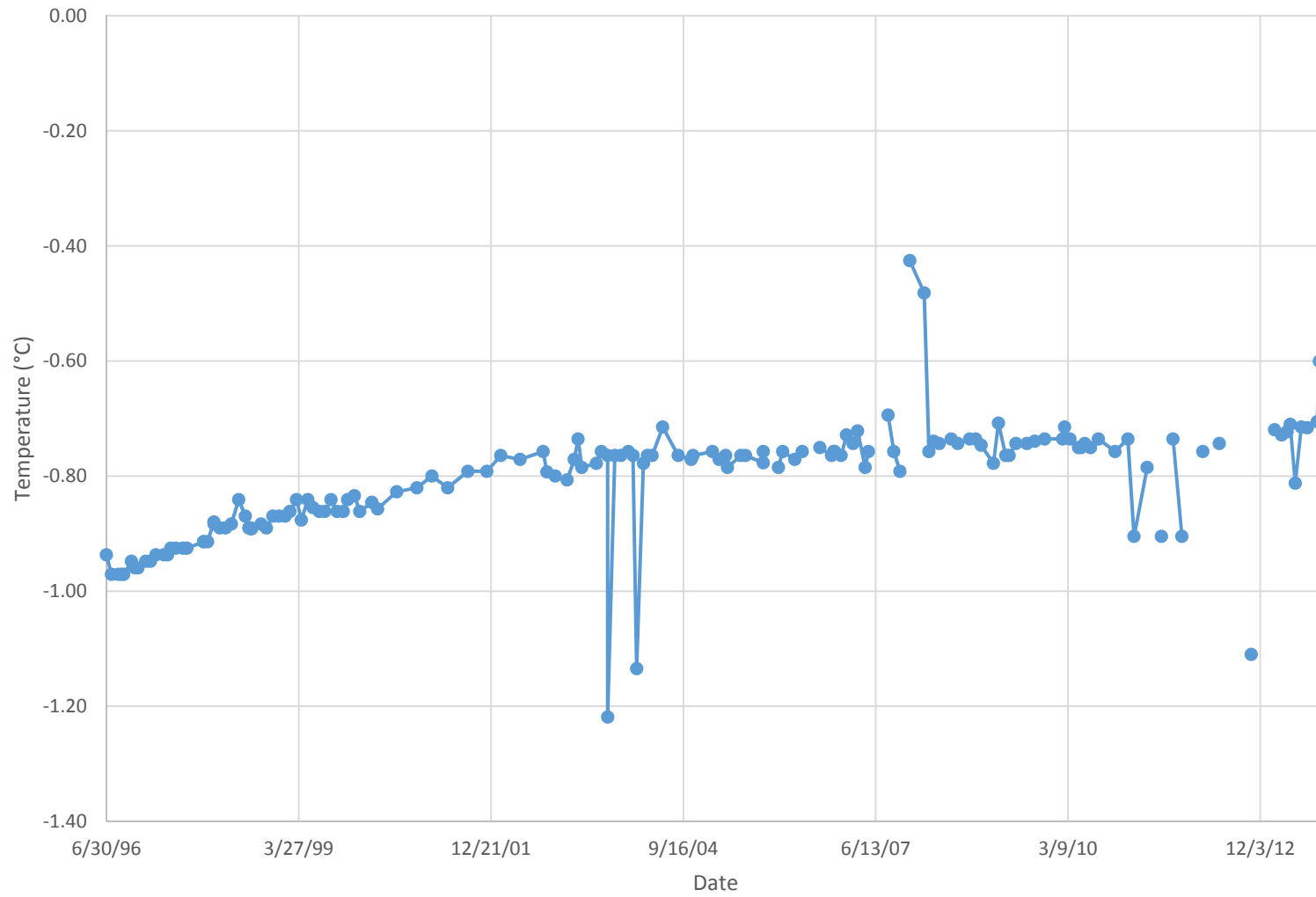
T-95-008 #2: Temperature at 27 feet



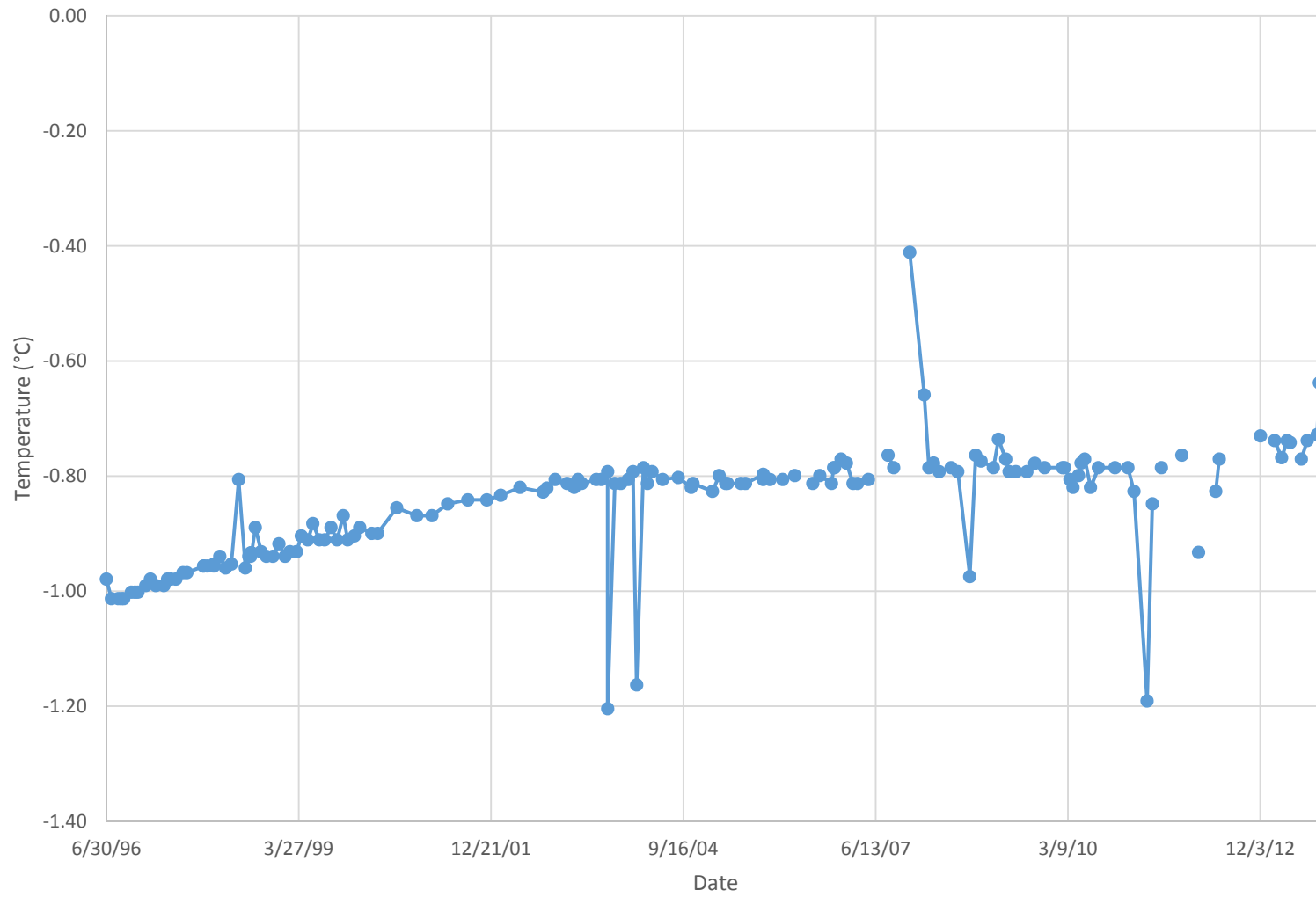
T-95-008 #2: Temperature at 37 feet



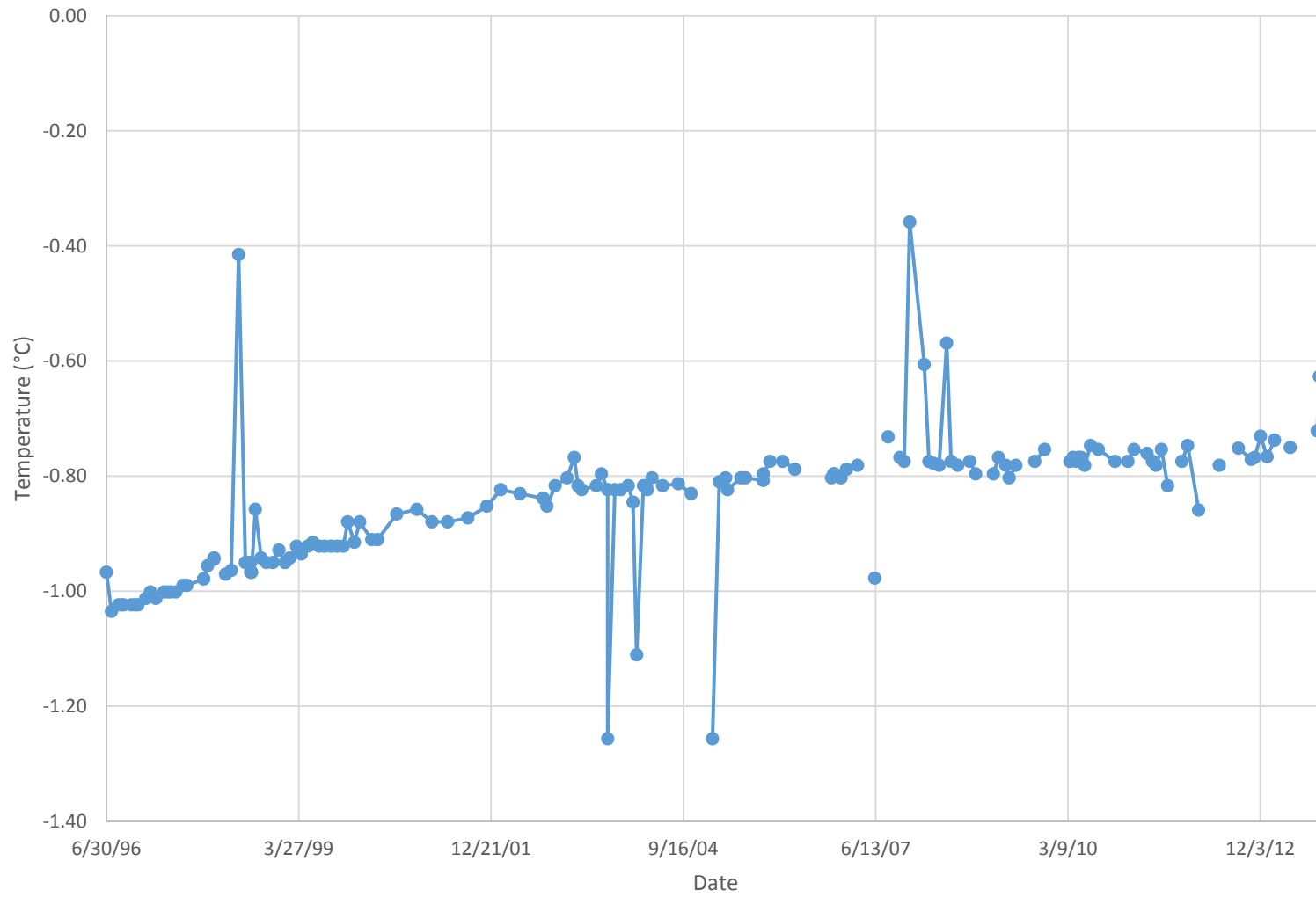
T-95-008 #2: Temperature at 47 feet



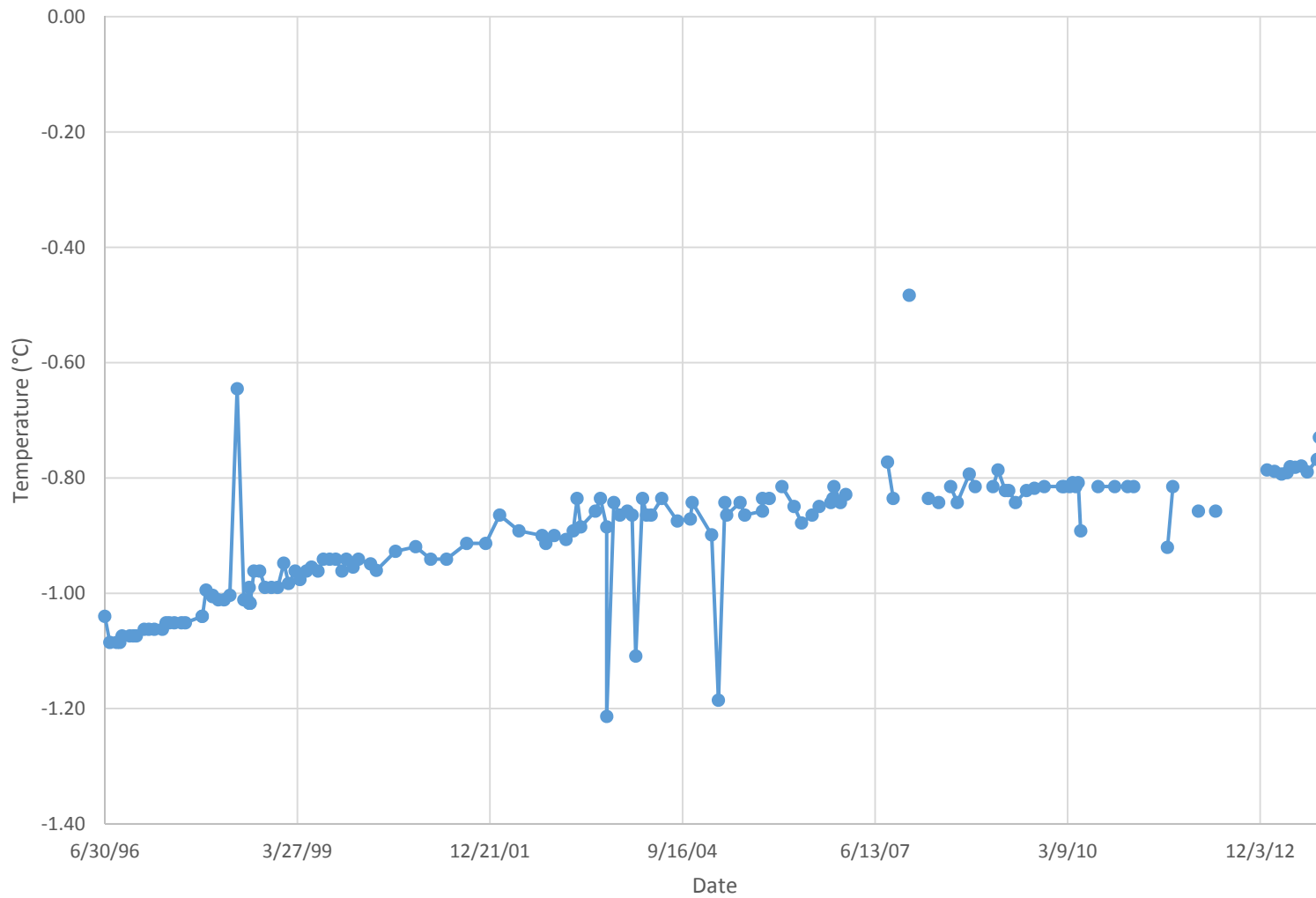
T-95-008 #2: Temperature at 49 feet



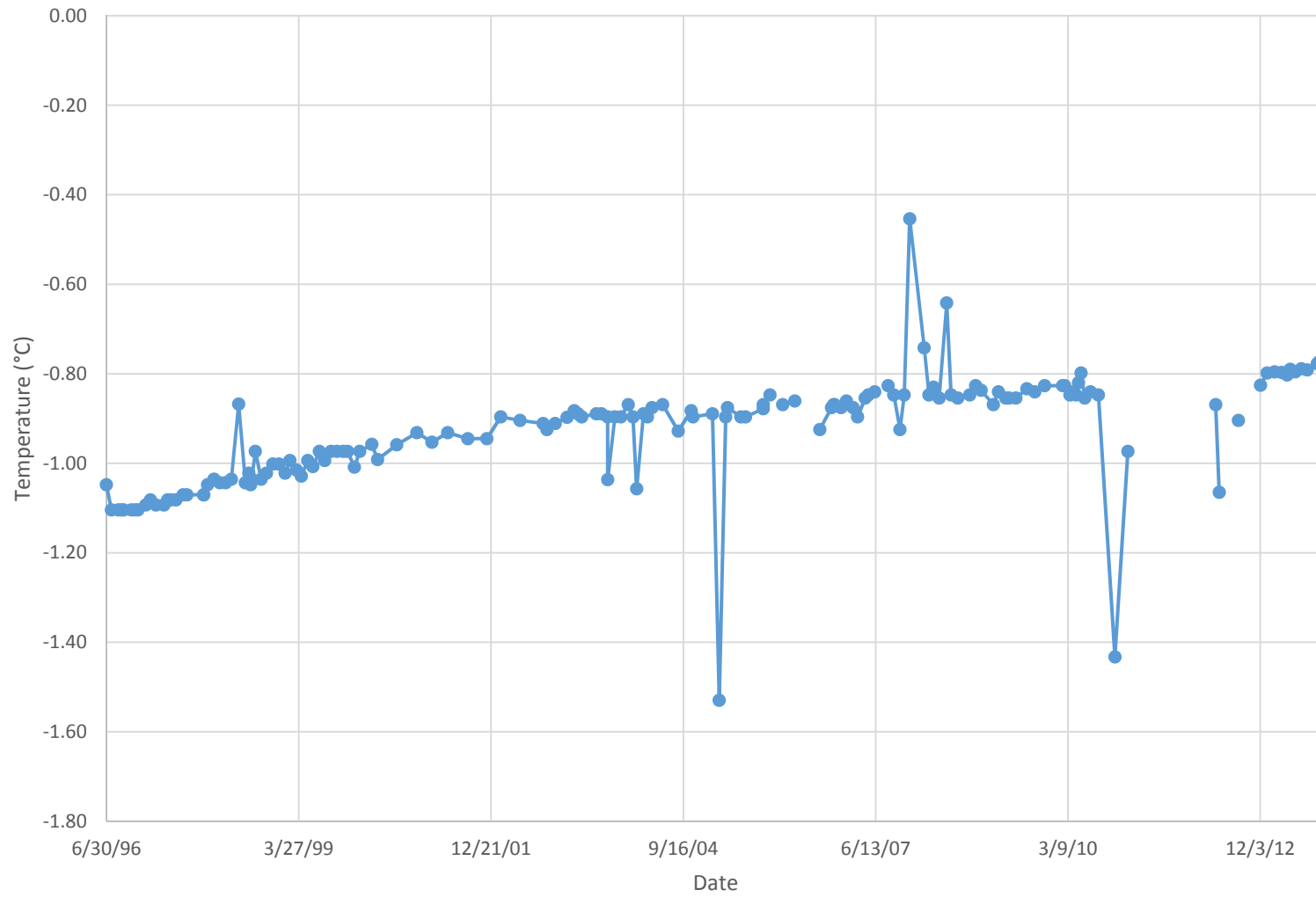
T-95-008 #2: Temperature at 51 feet



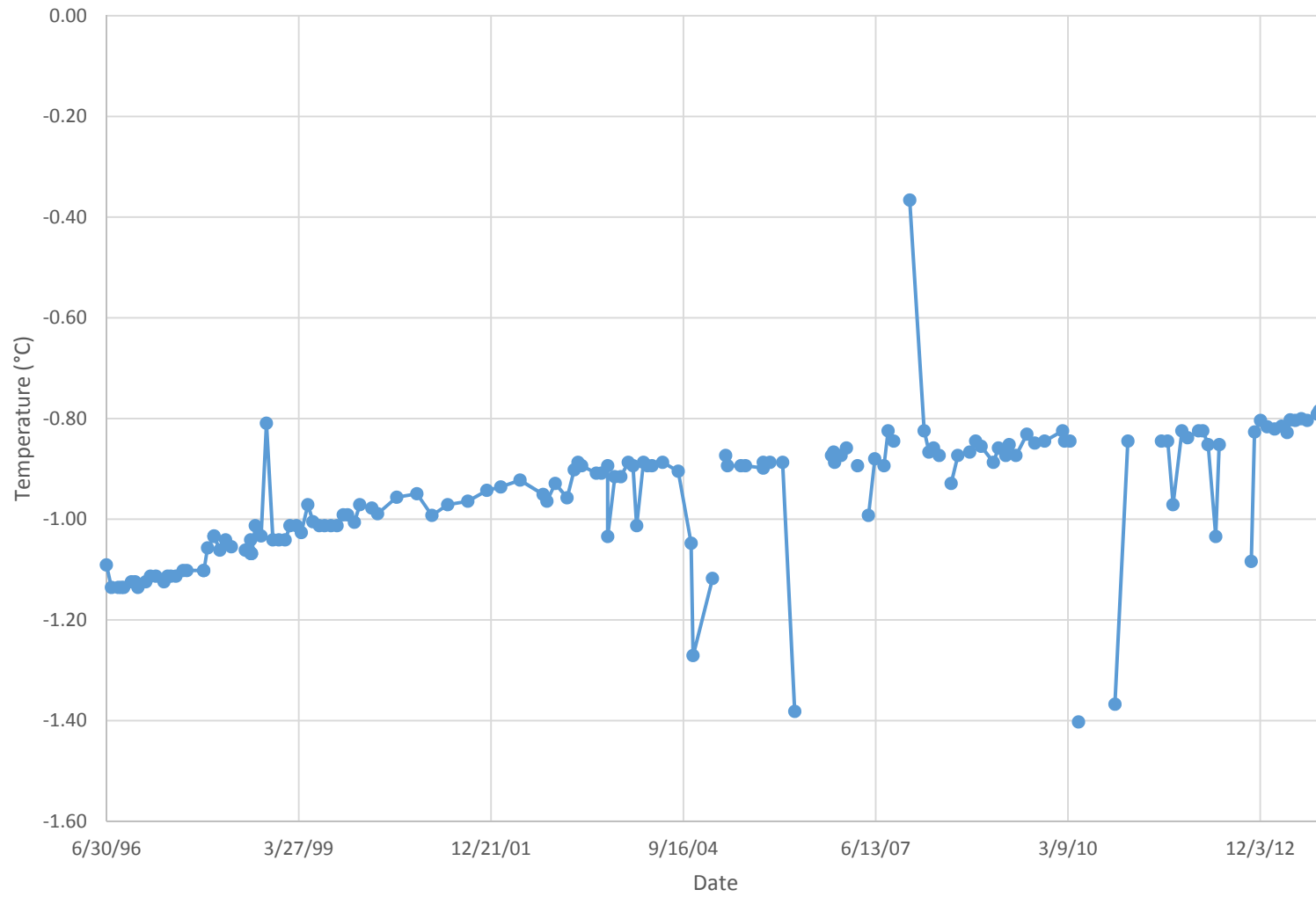
T-95-008 #2: Temperature at 53 feet



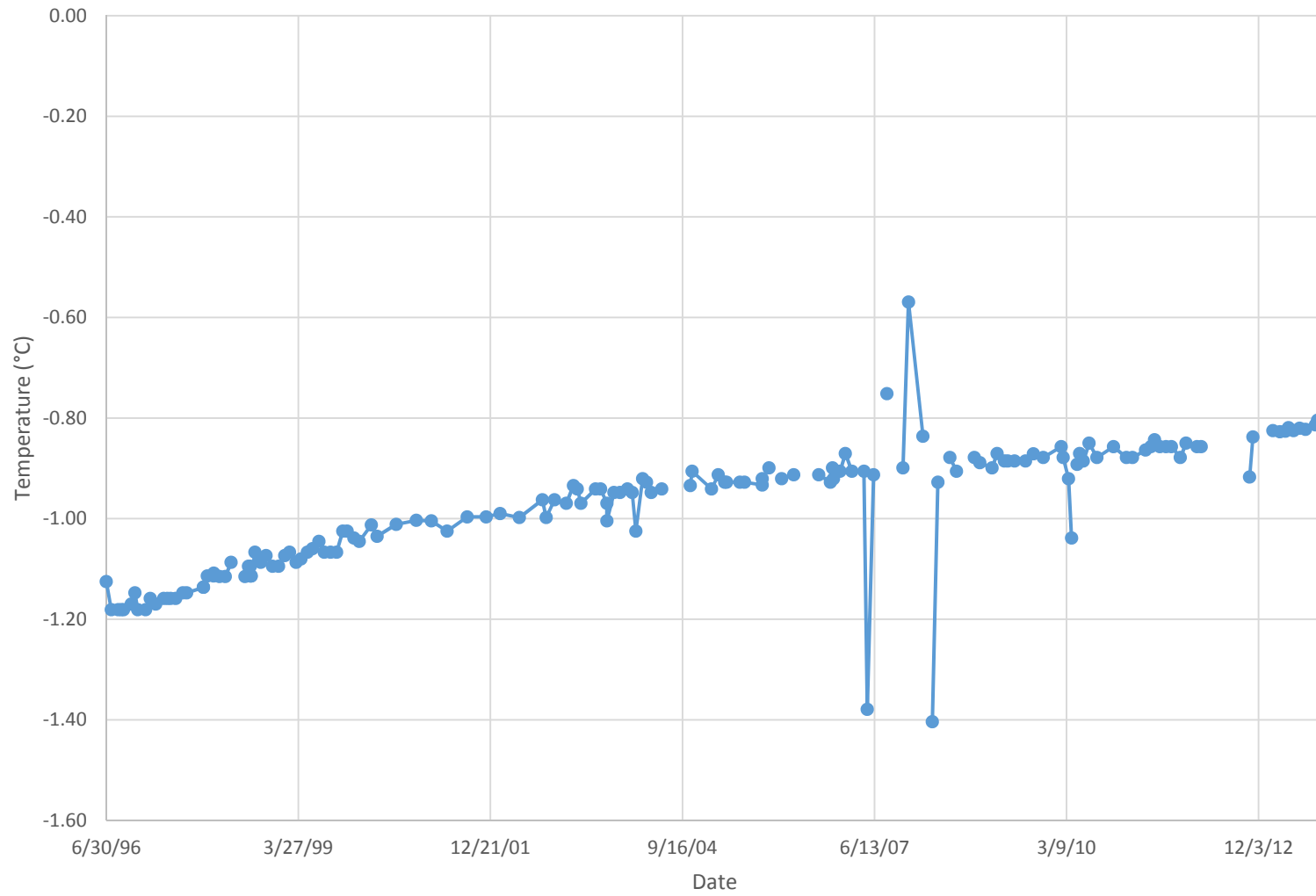
T-95-008 #2: Temperature at 55 feet



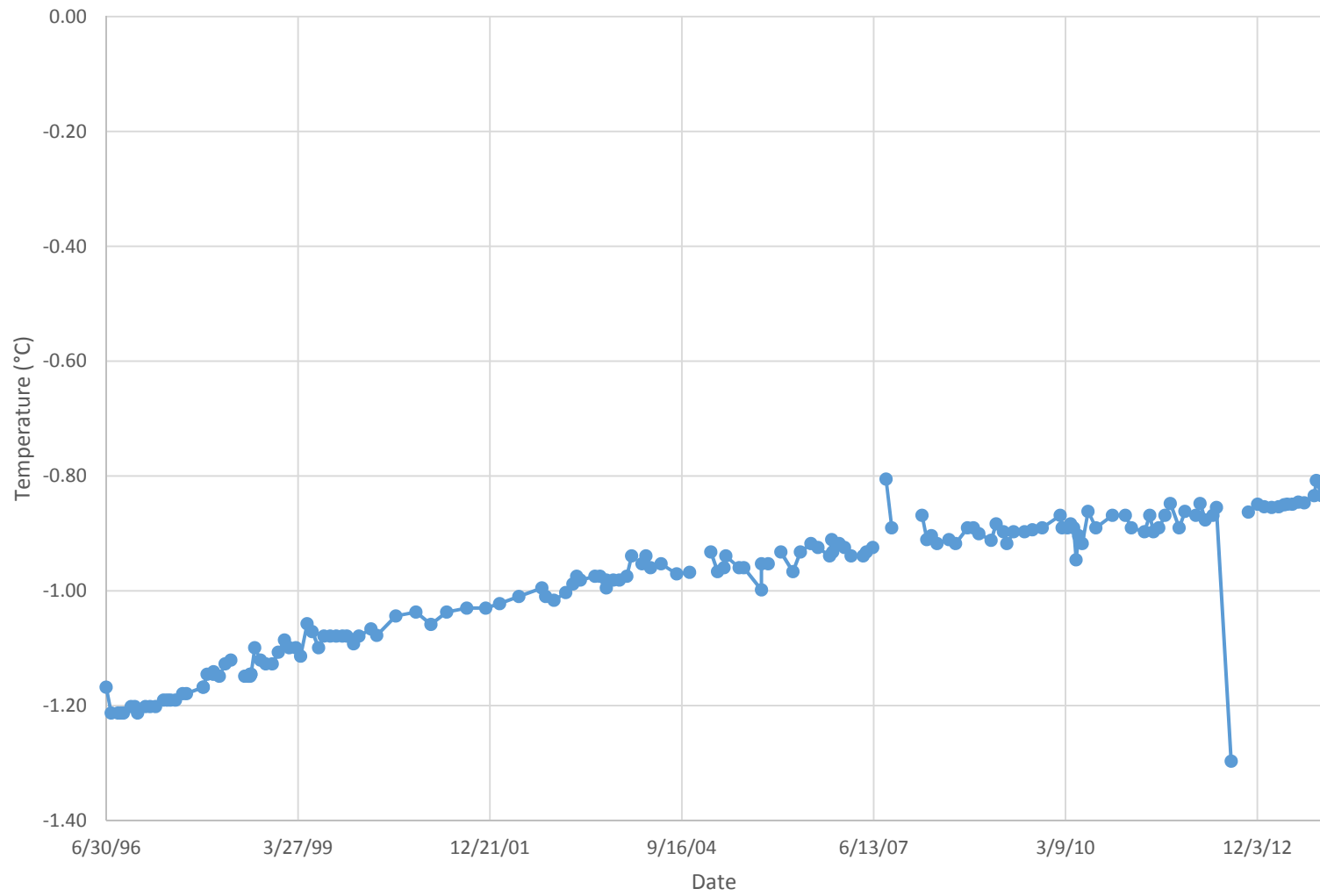
T-95-008 #2: Temperature at 57 feet



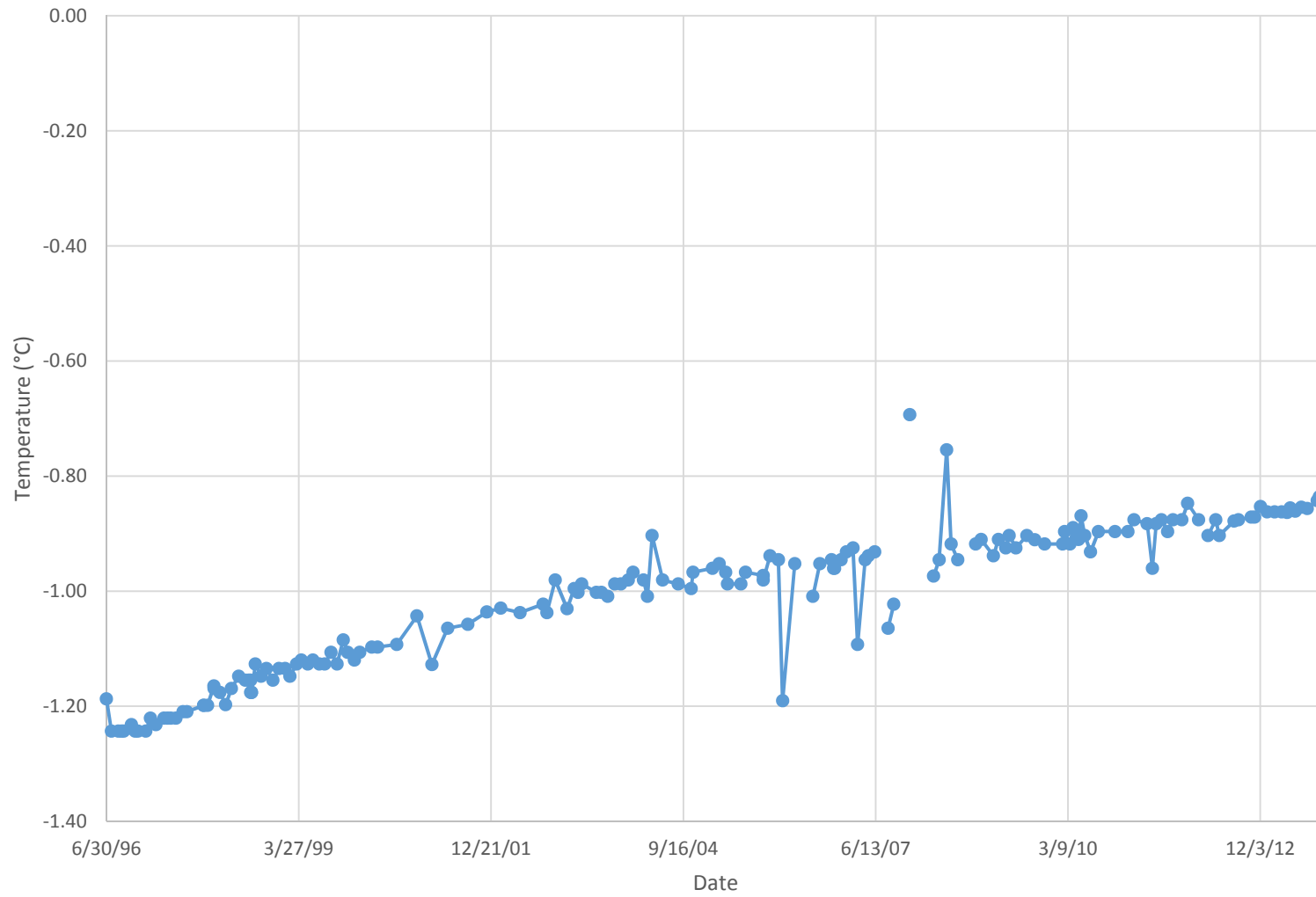
T-95-008 #2: Temperature at 59 feet



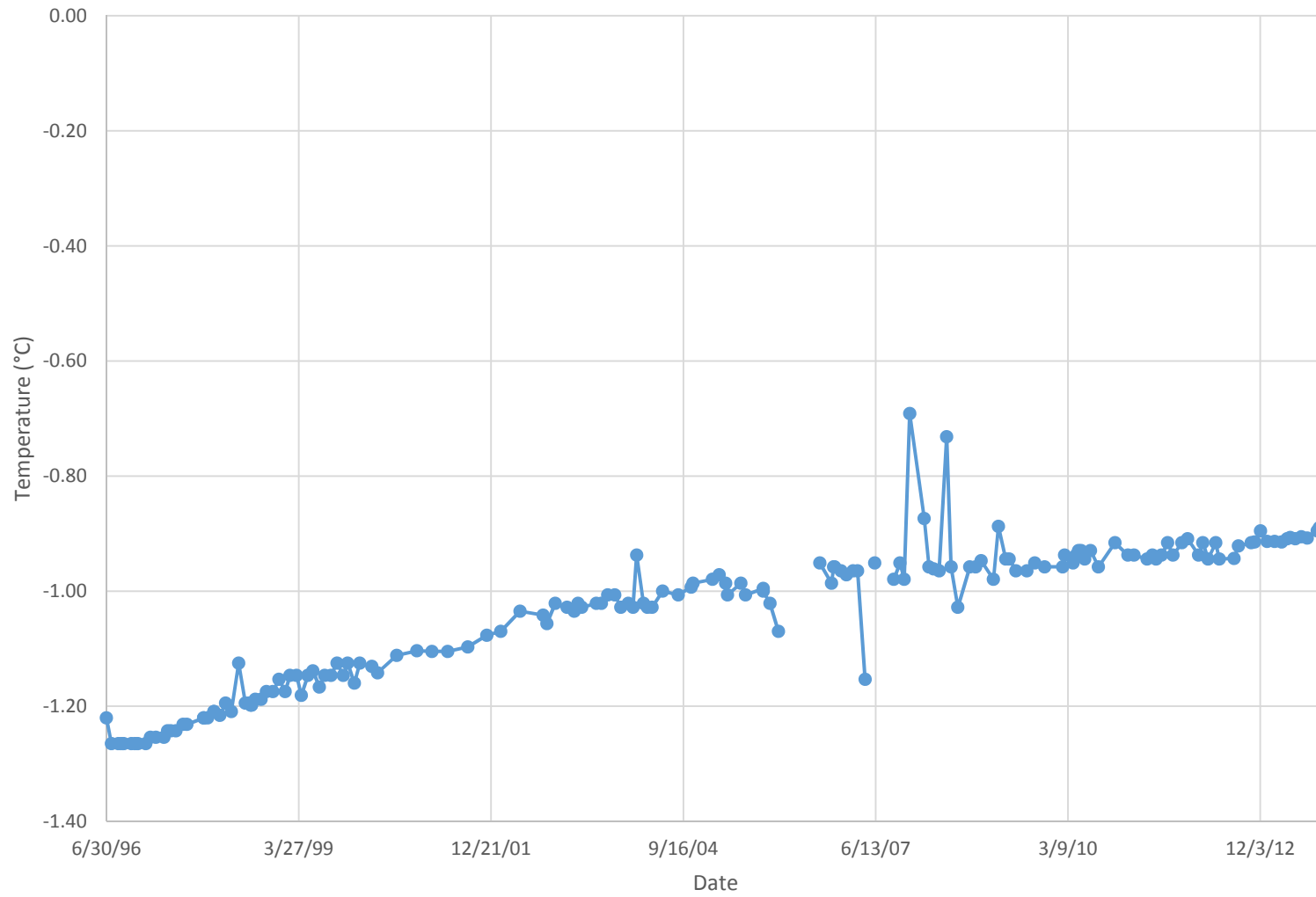
T-95-008 #2: Temperature at 61 feet



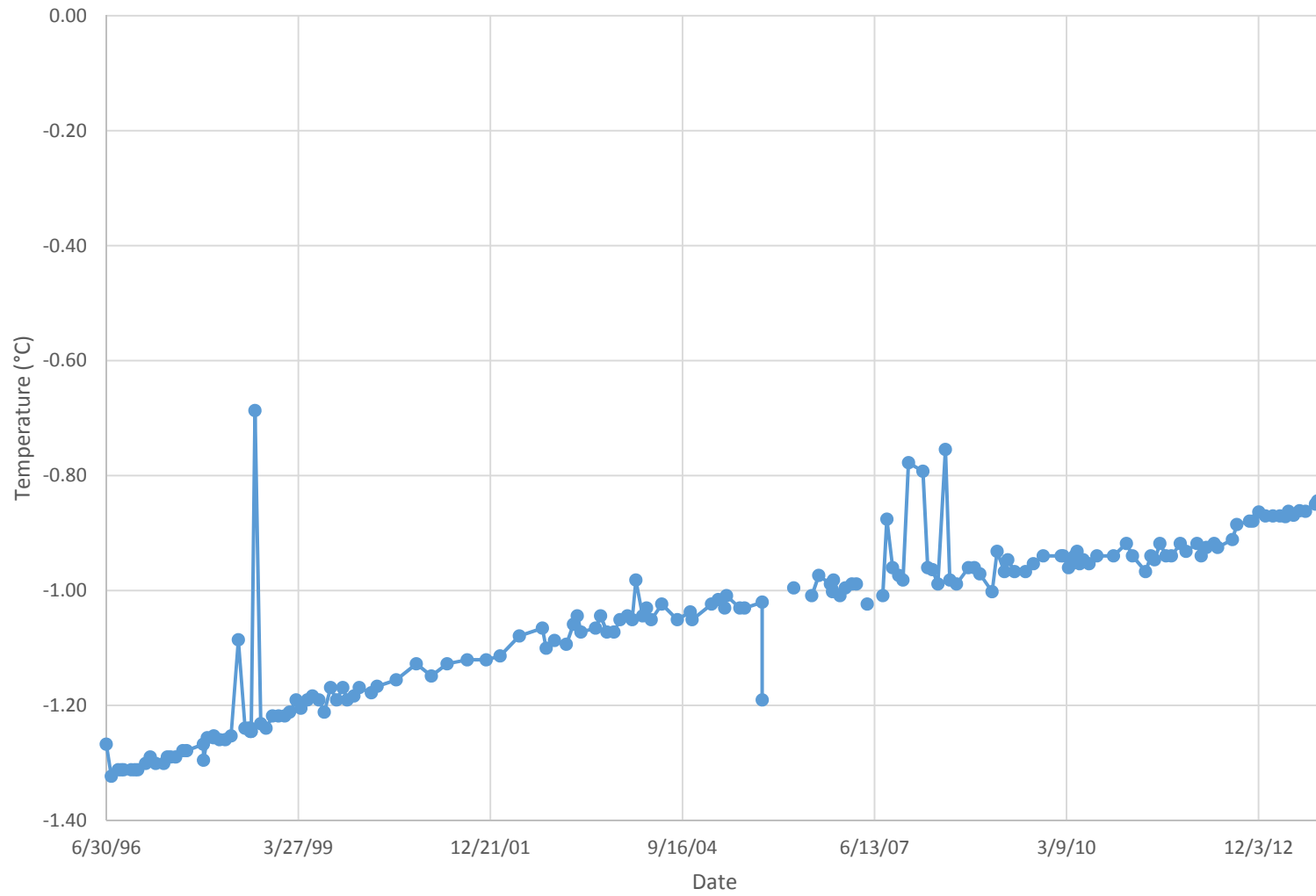
T-95-008 #2: Temperature at 63 feet



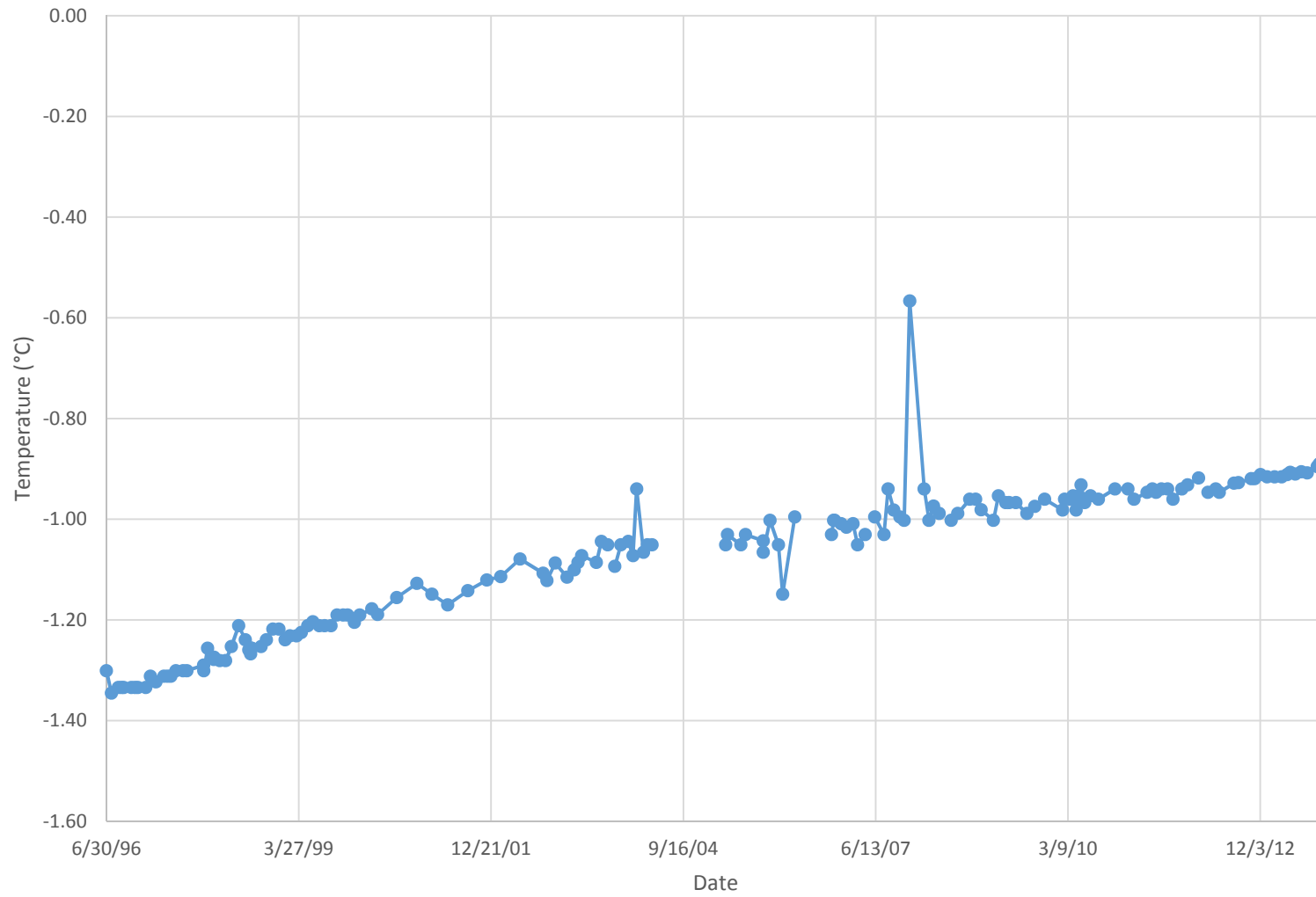
T-95-008 #2: Temperature at 65 feet



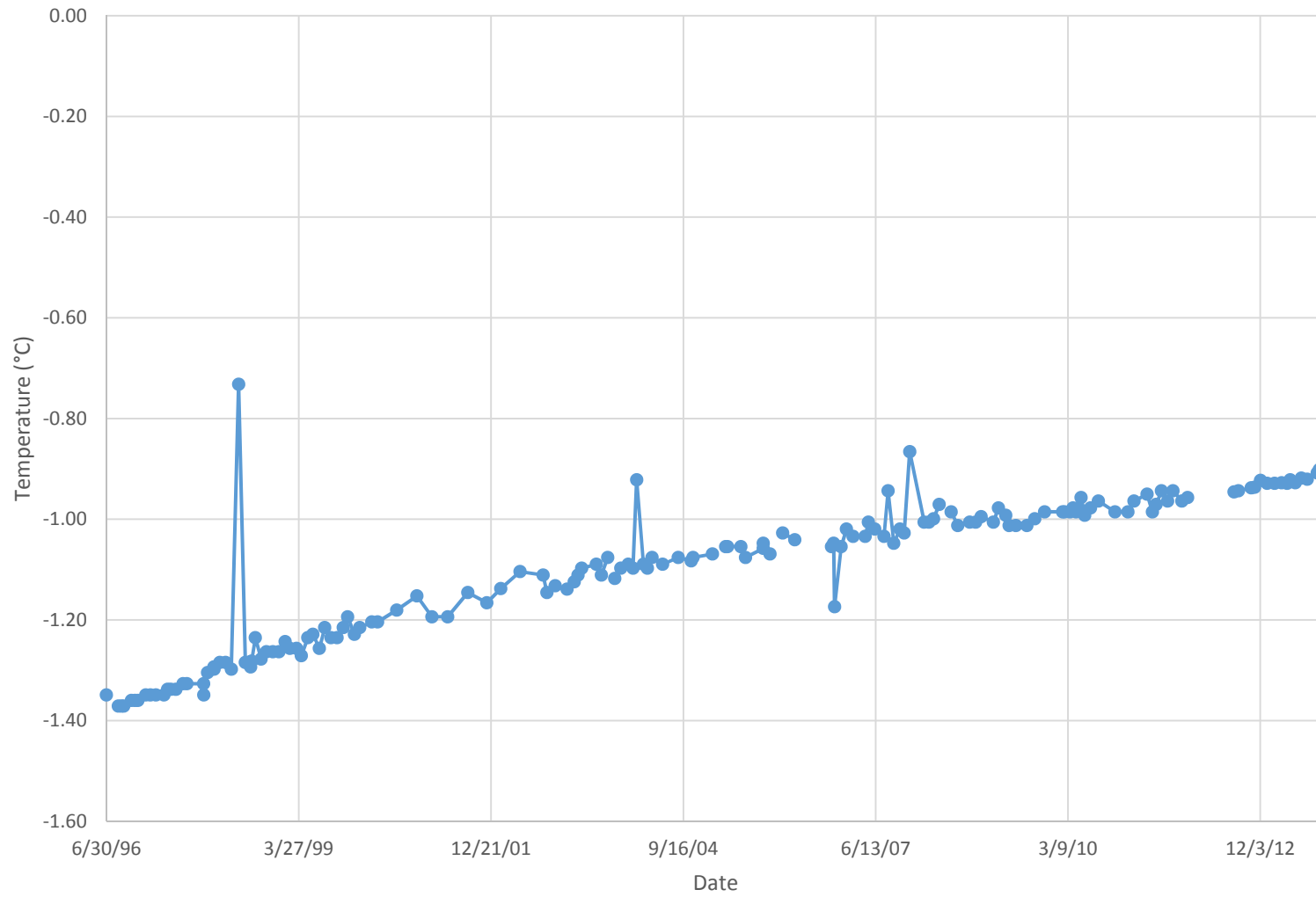
T-95-008 #2: Temperature at 67 feet



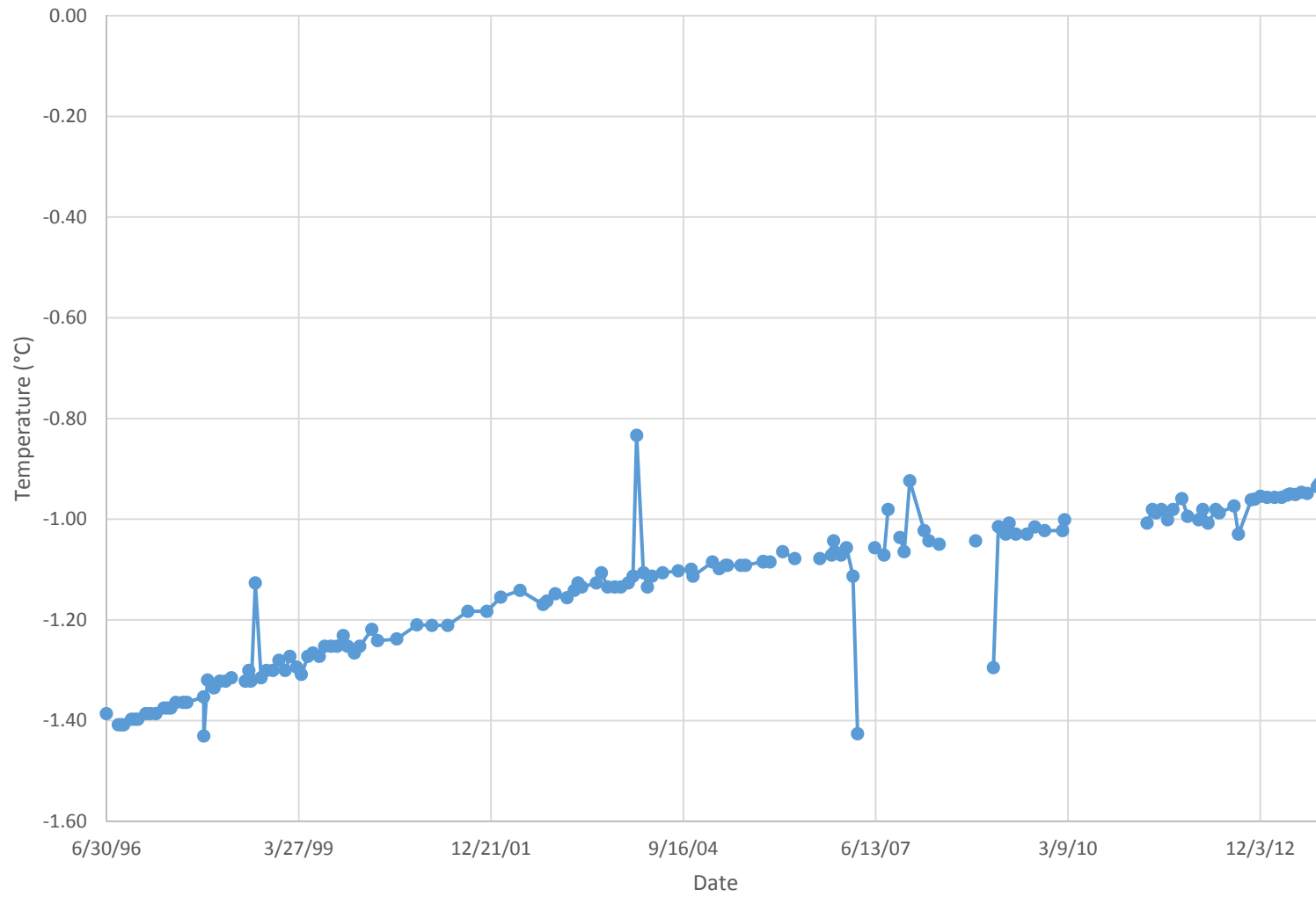
T-95-008 #2: Temperature at 69 feet



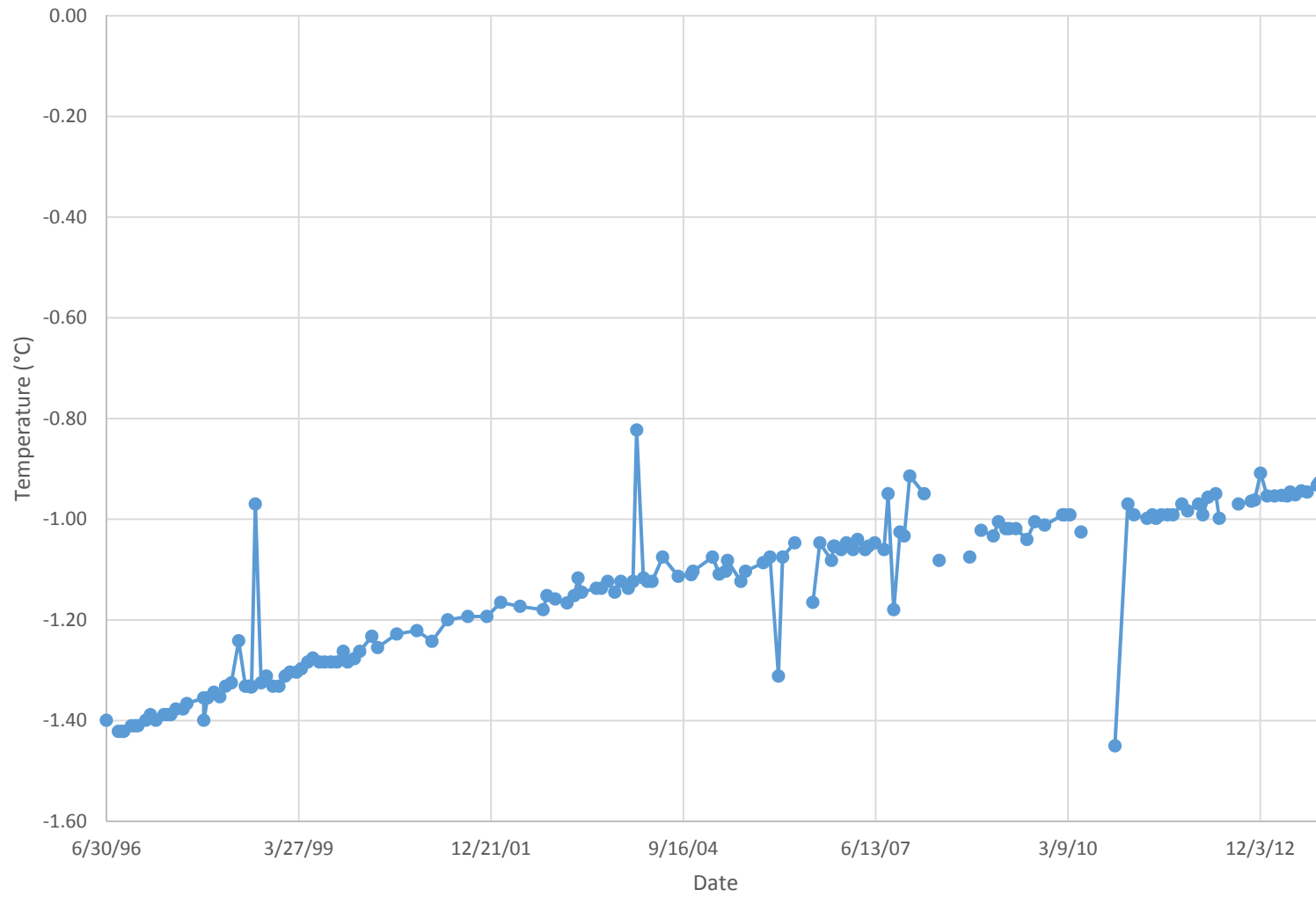
T-95-008 #2: Temperature at 71 feet



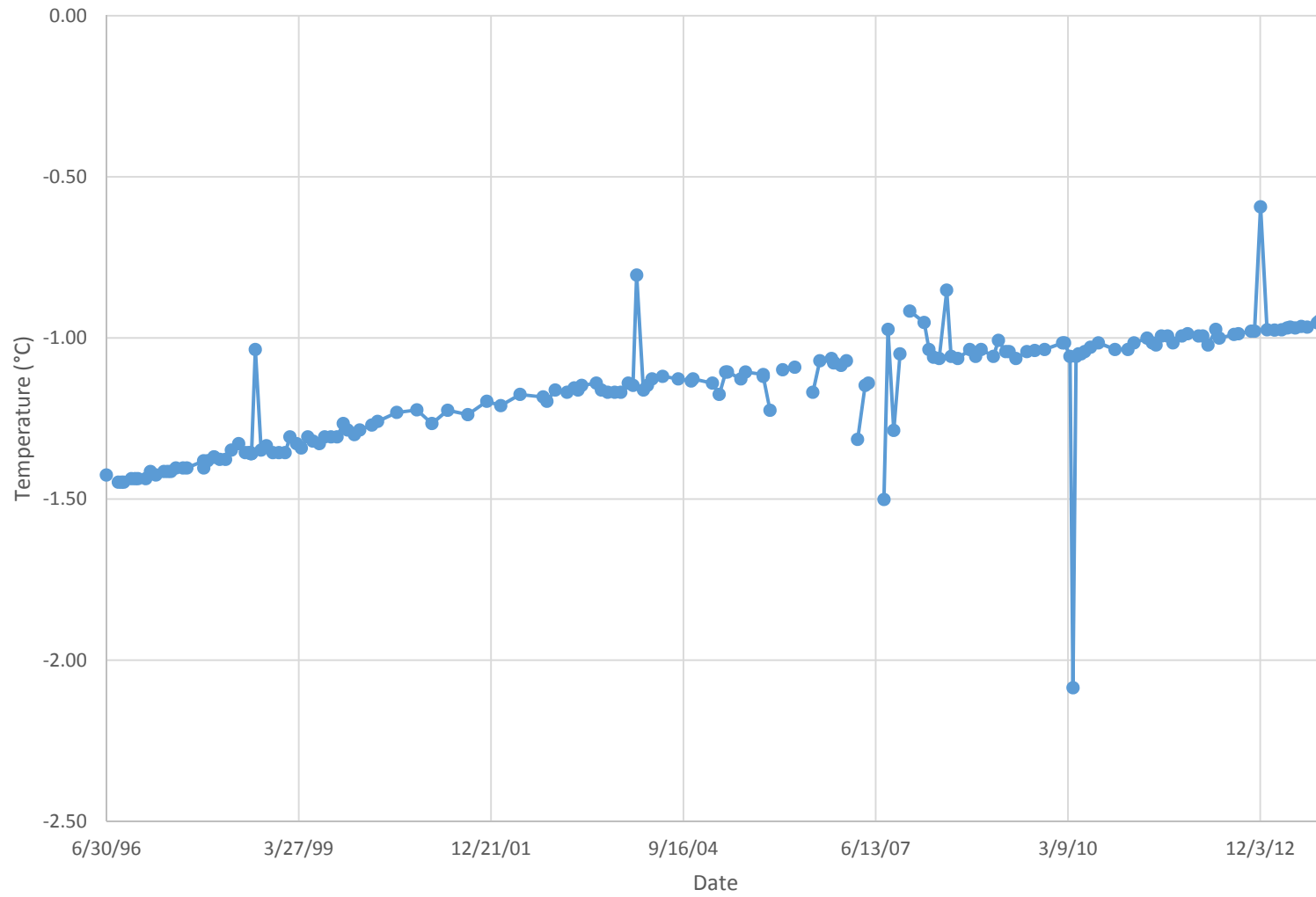
T-95-008 #2: Temperature at 73 feet



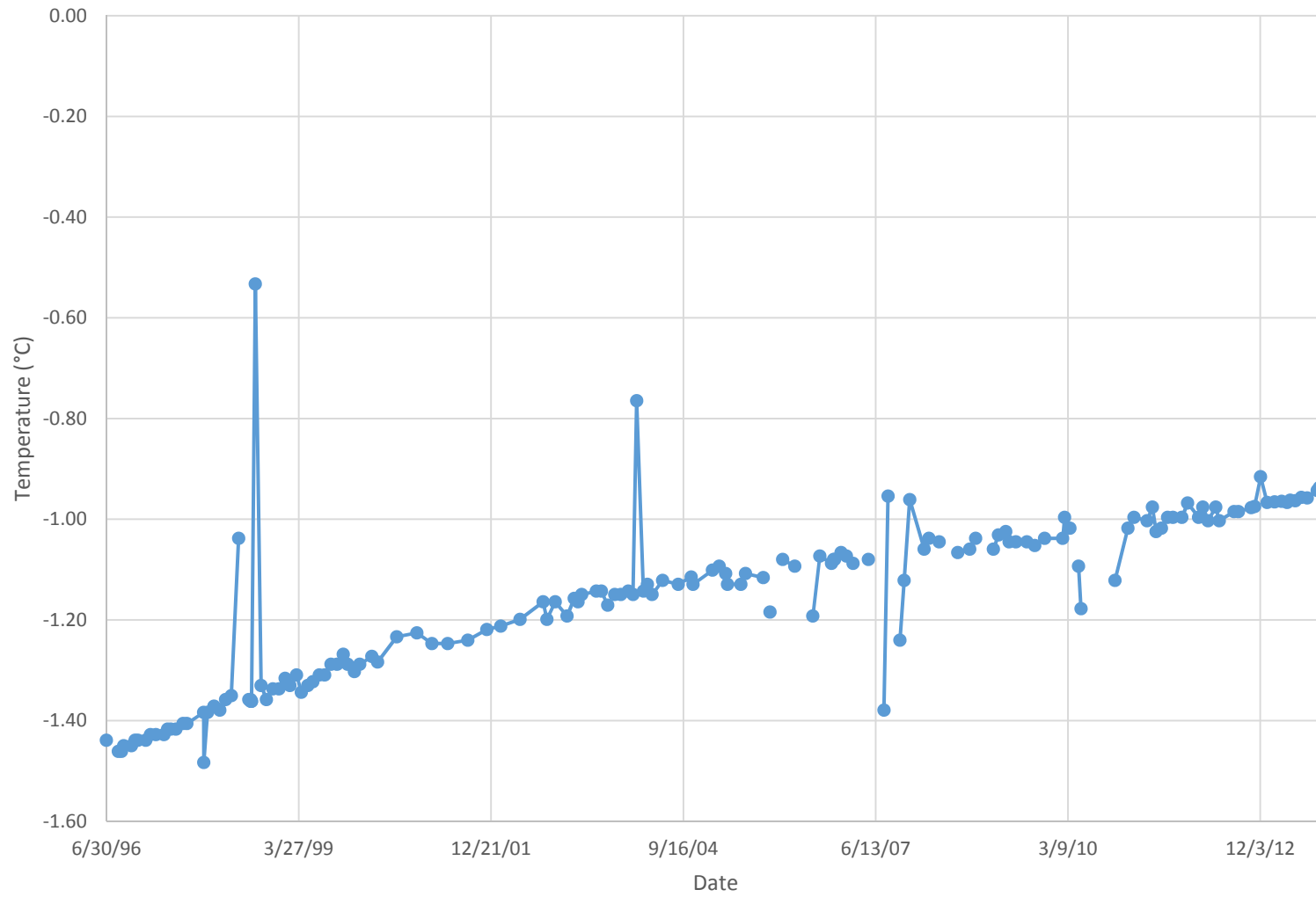
T-95-008 #2: Temperature at 75 feet



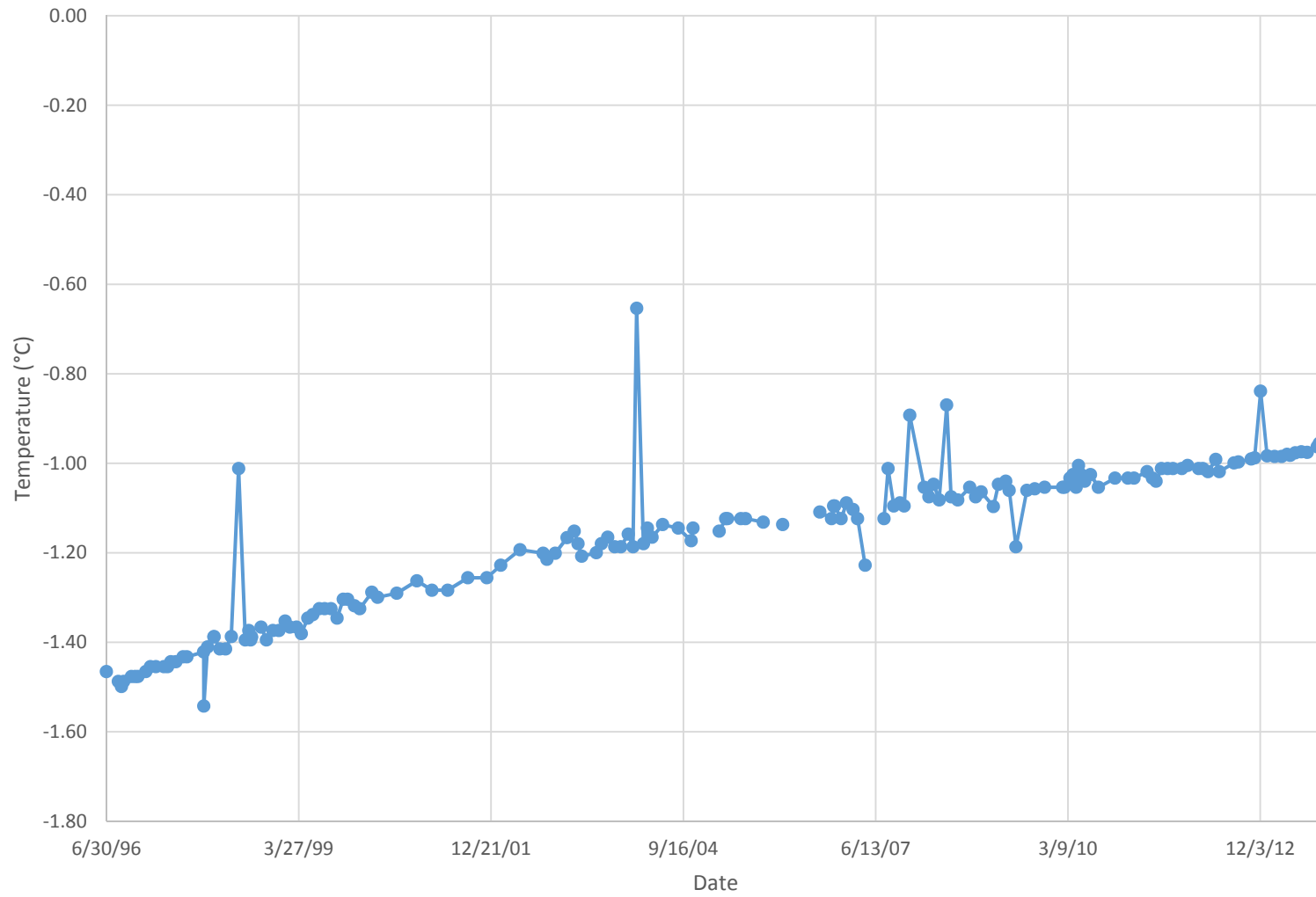
T-95-008 #2: Temperature at 77 feet



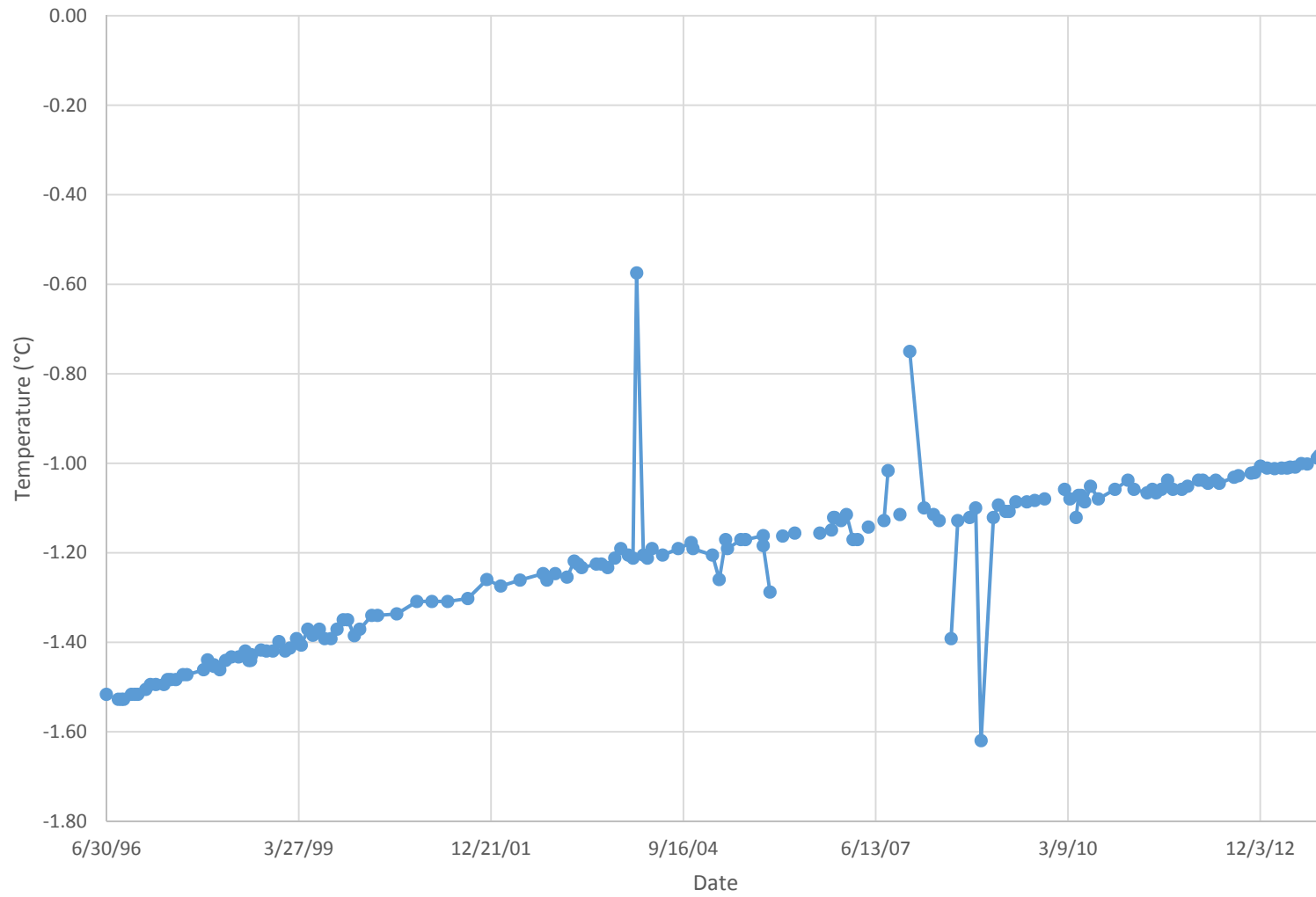
T-95-008 #2: Temperature at 79 feet



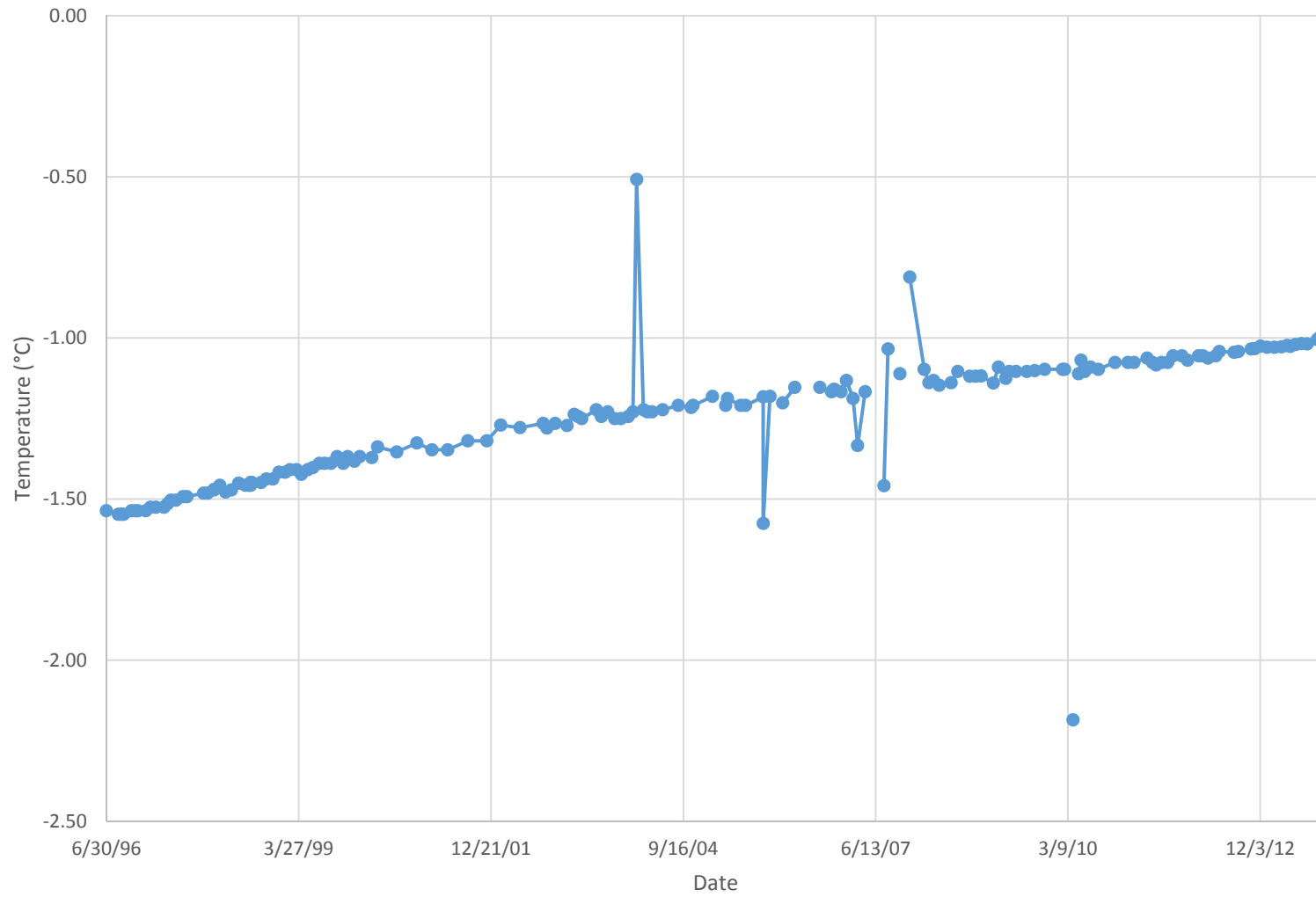
T-95-008 #2: Temperature at 81 feet

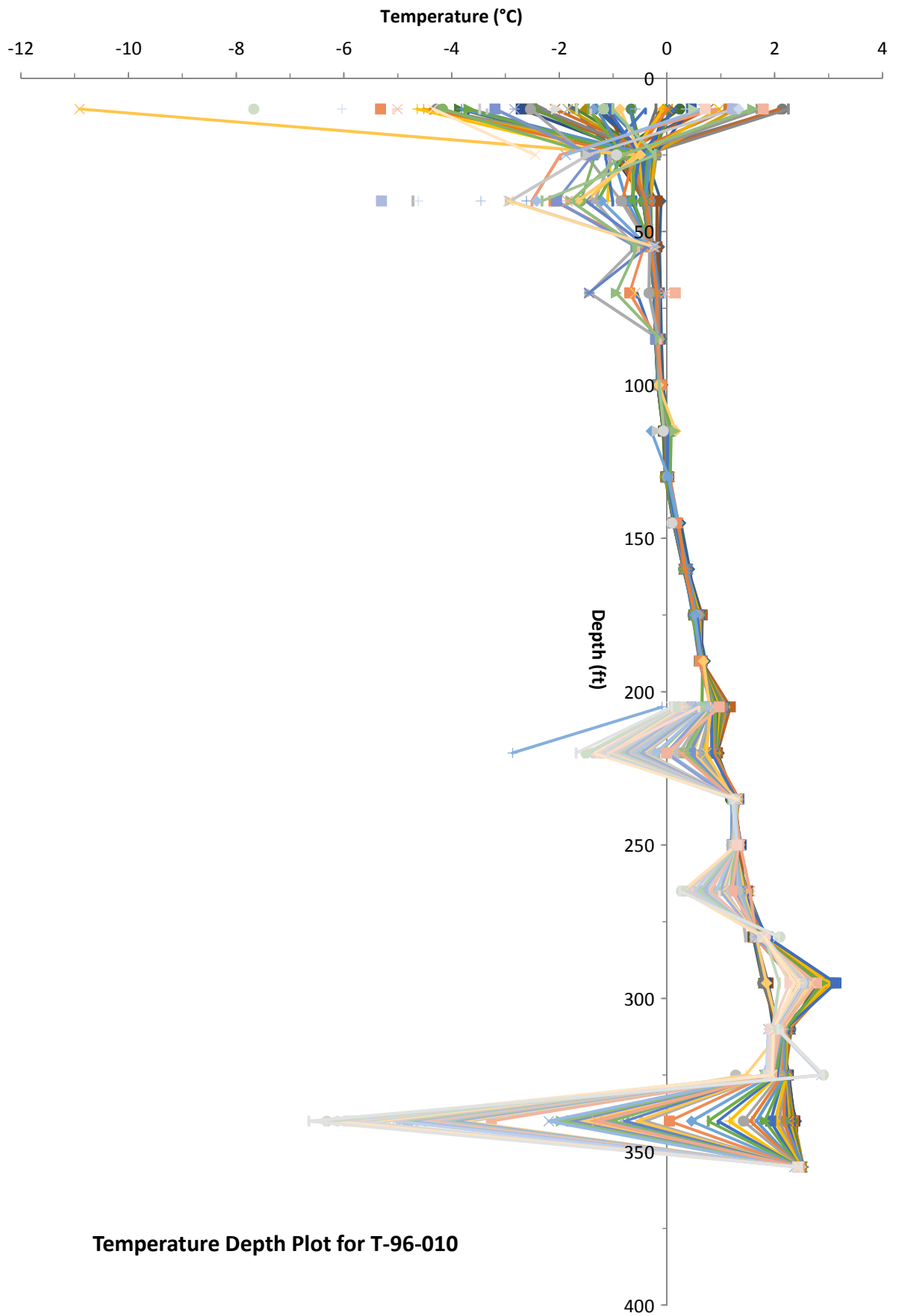


T-95-008 #2: Temperature at 83 feet

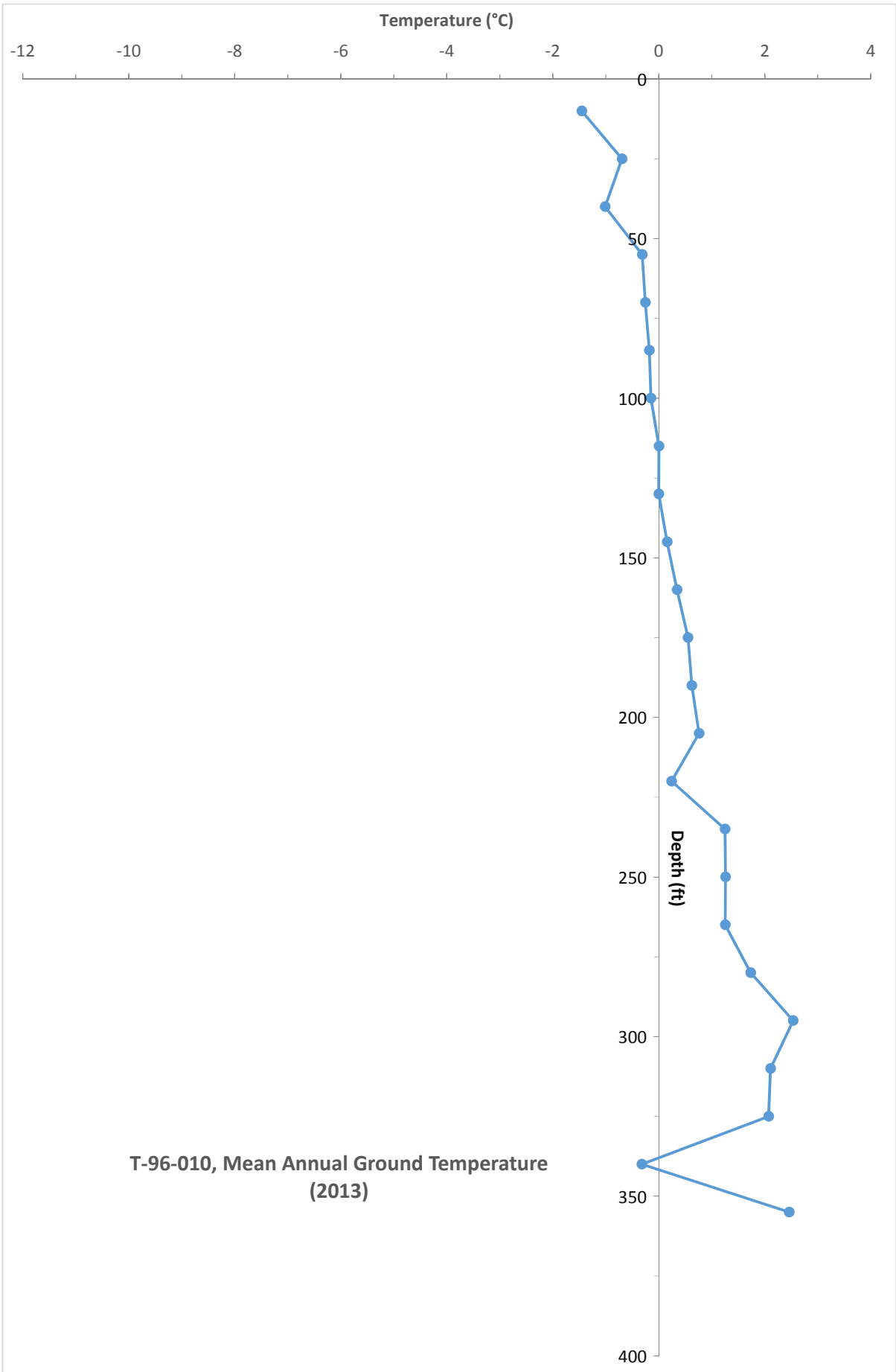


T-95-008 #2: Temperature at 85 feet

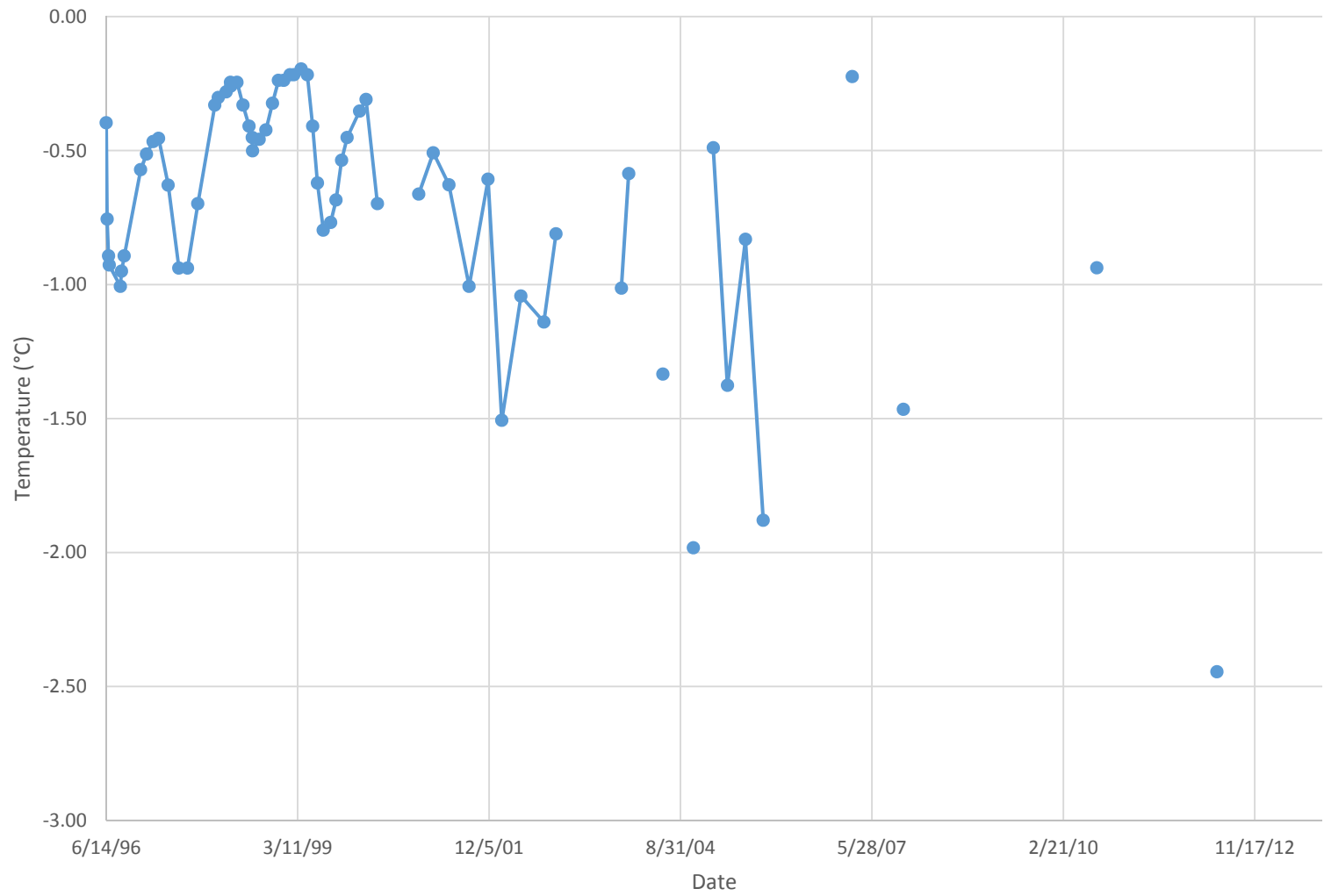




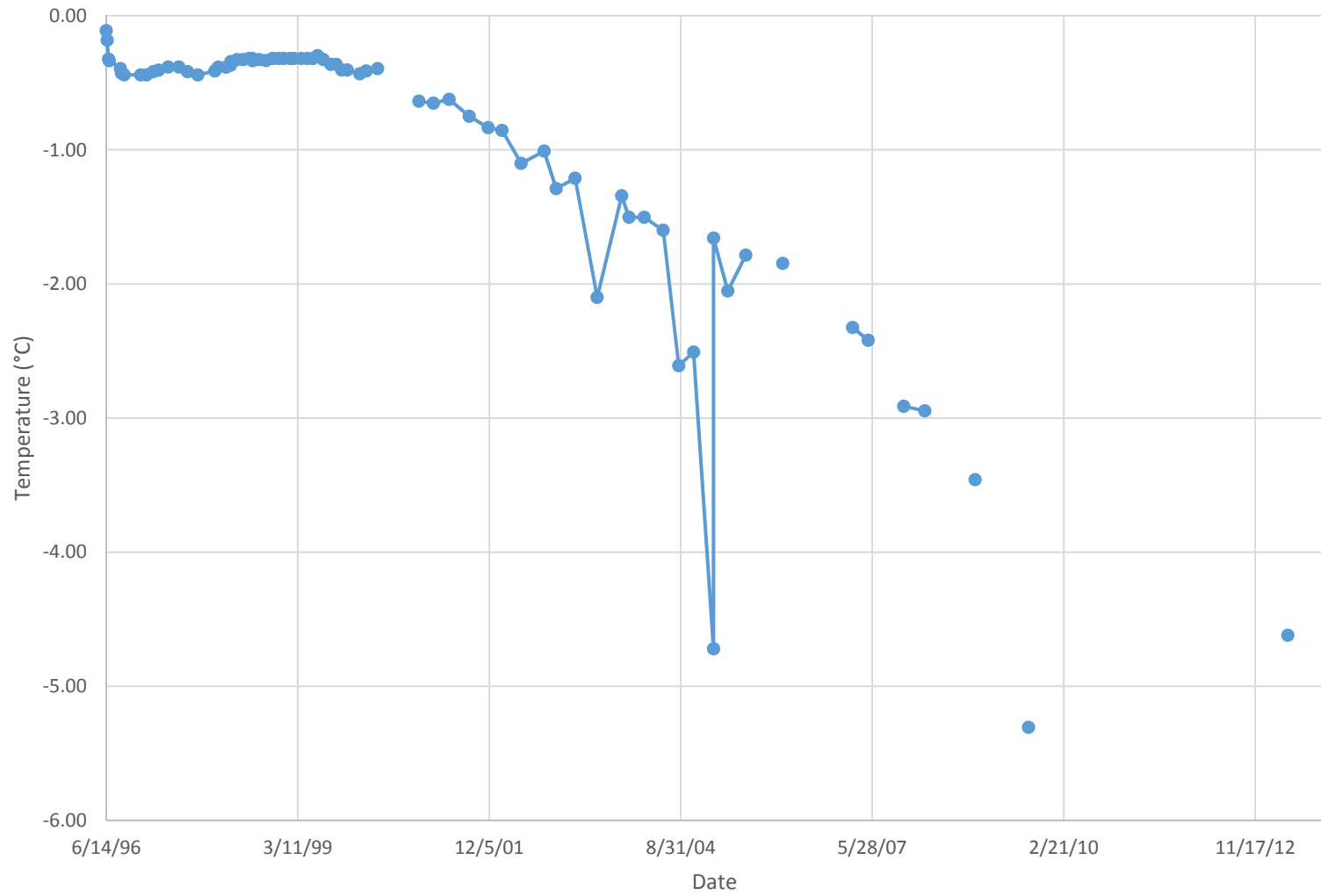
Temperature Depth Plot for T-96-010



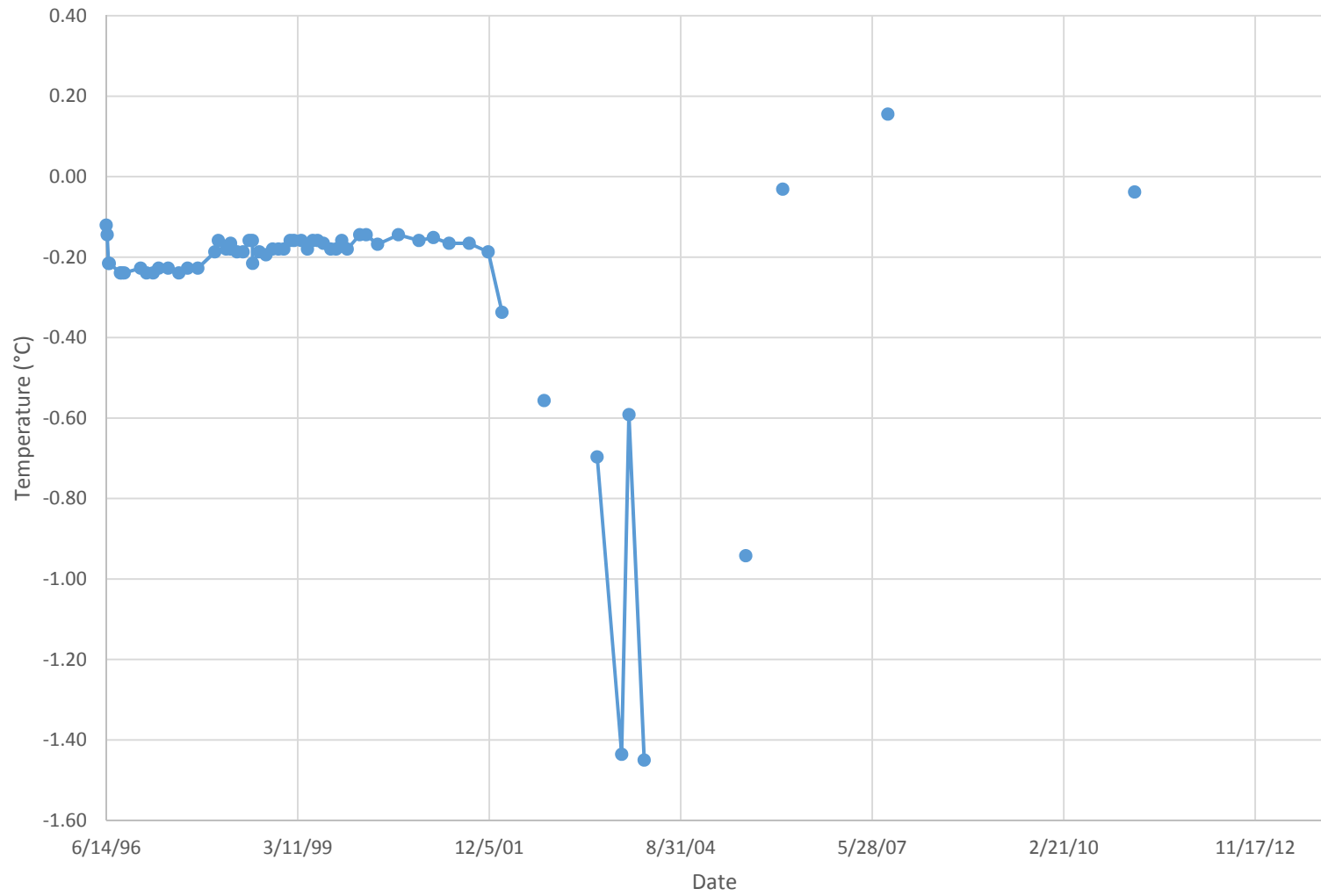
T-96-010: Temperature at 25 feet



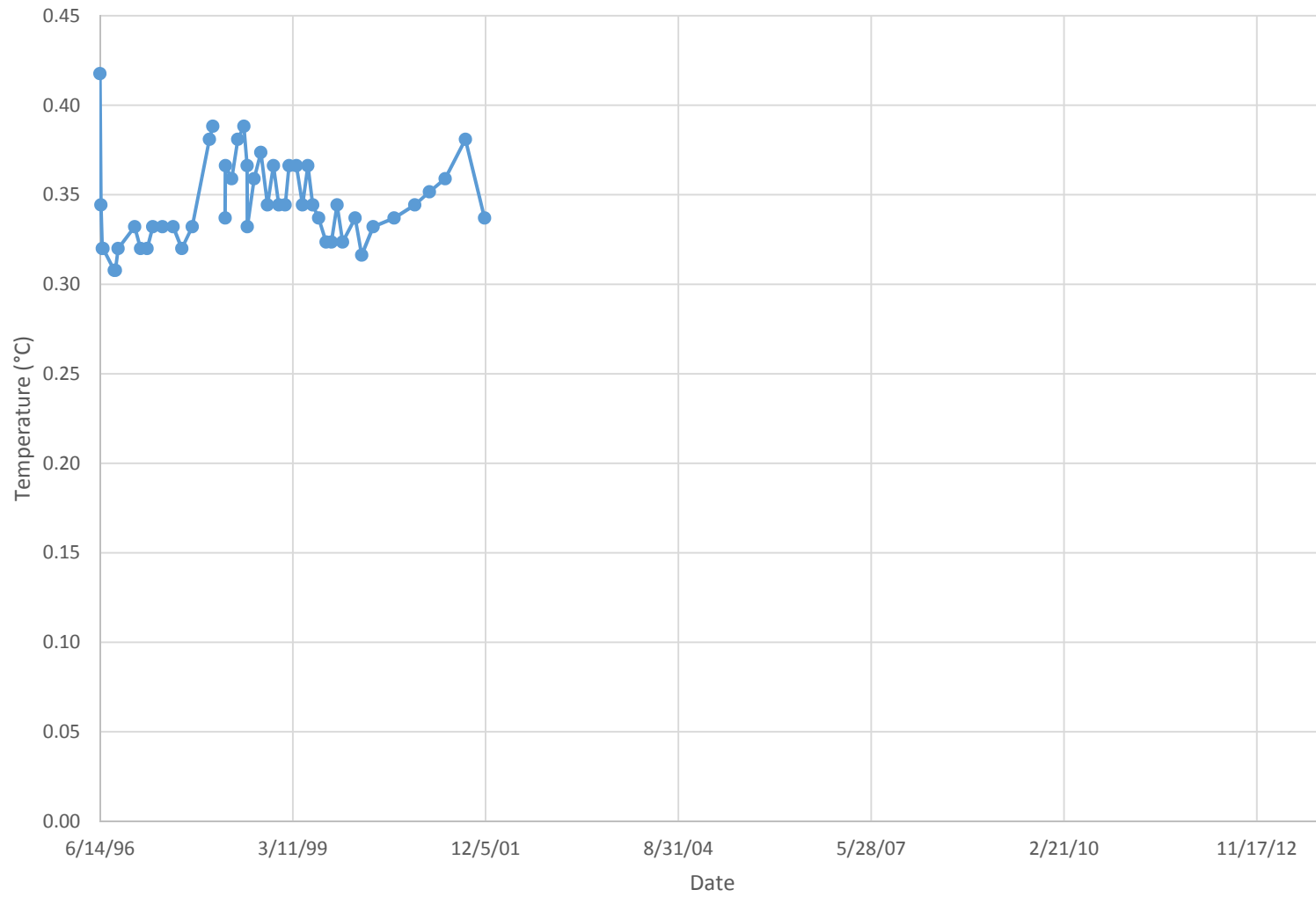
T-96-010: Temperature at 40 feet



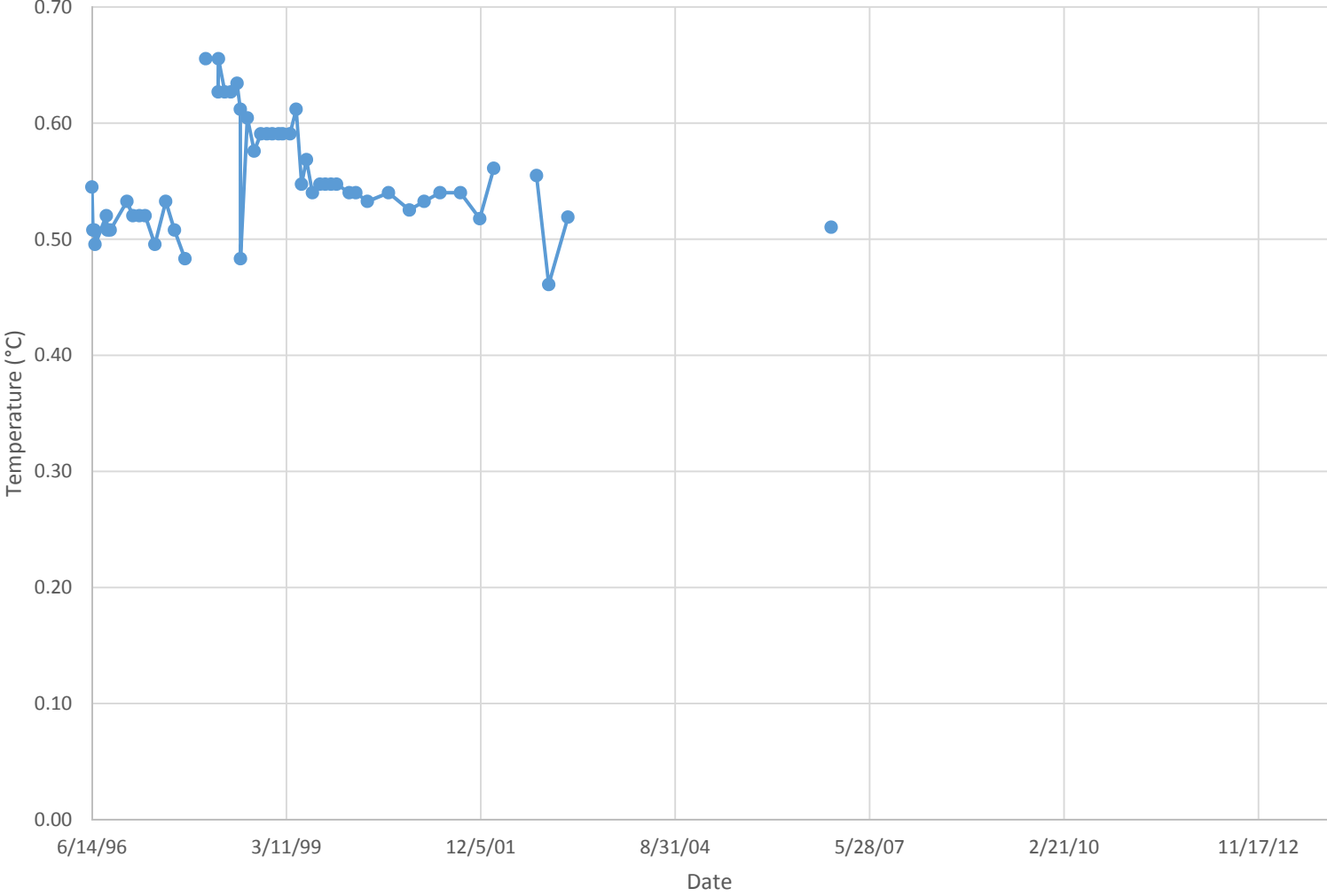
T-96-010: Temperature at 70 feet



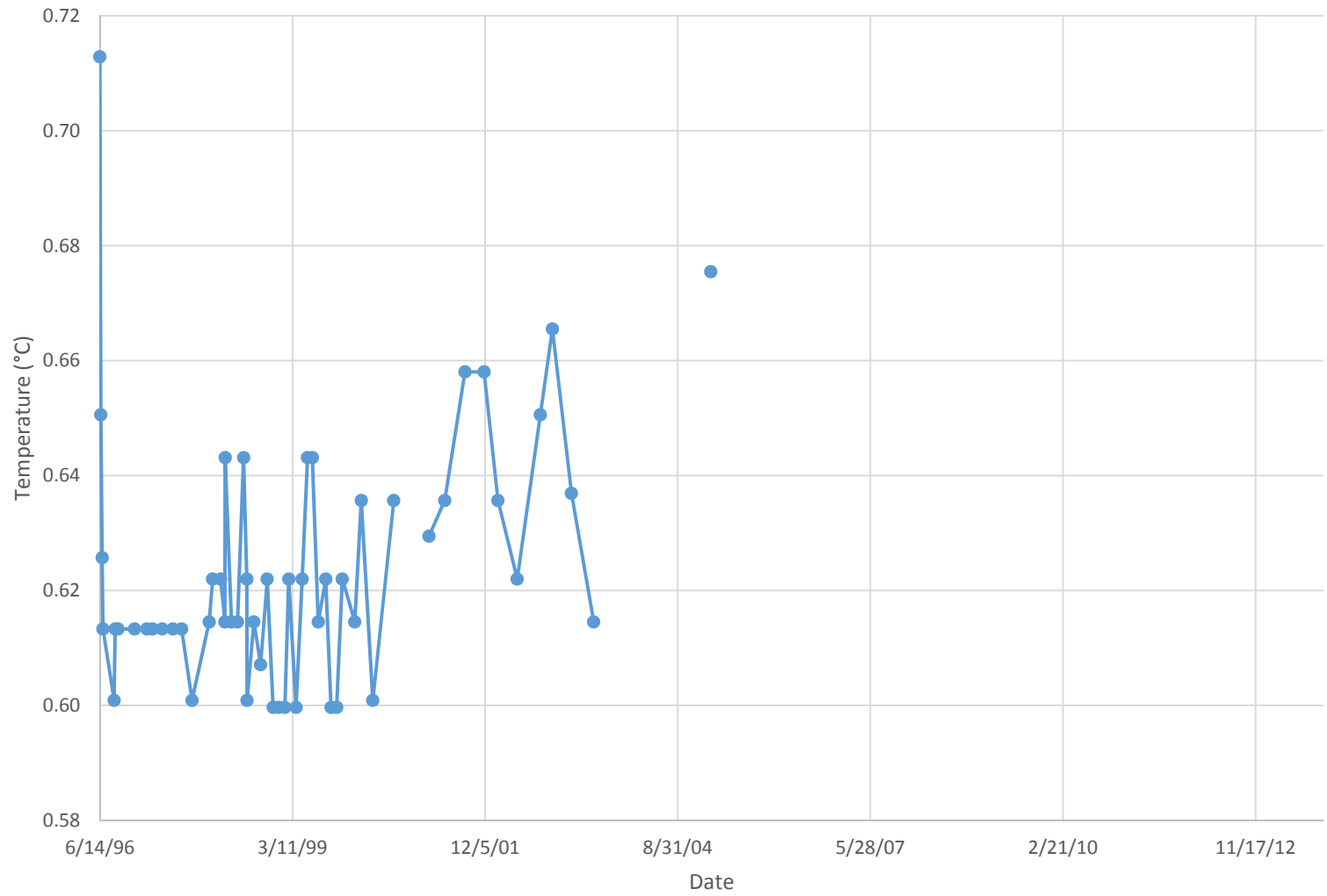
T-96-010: Temperature at 160 feet



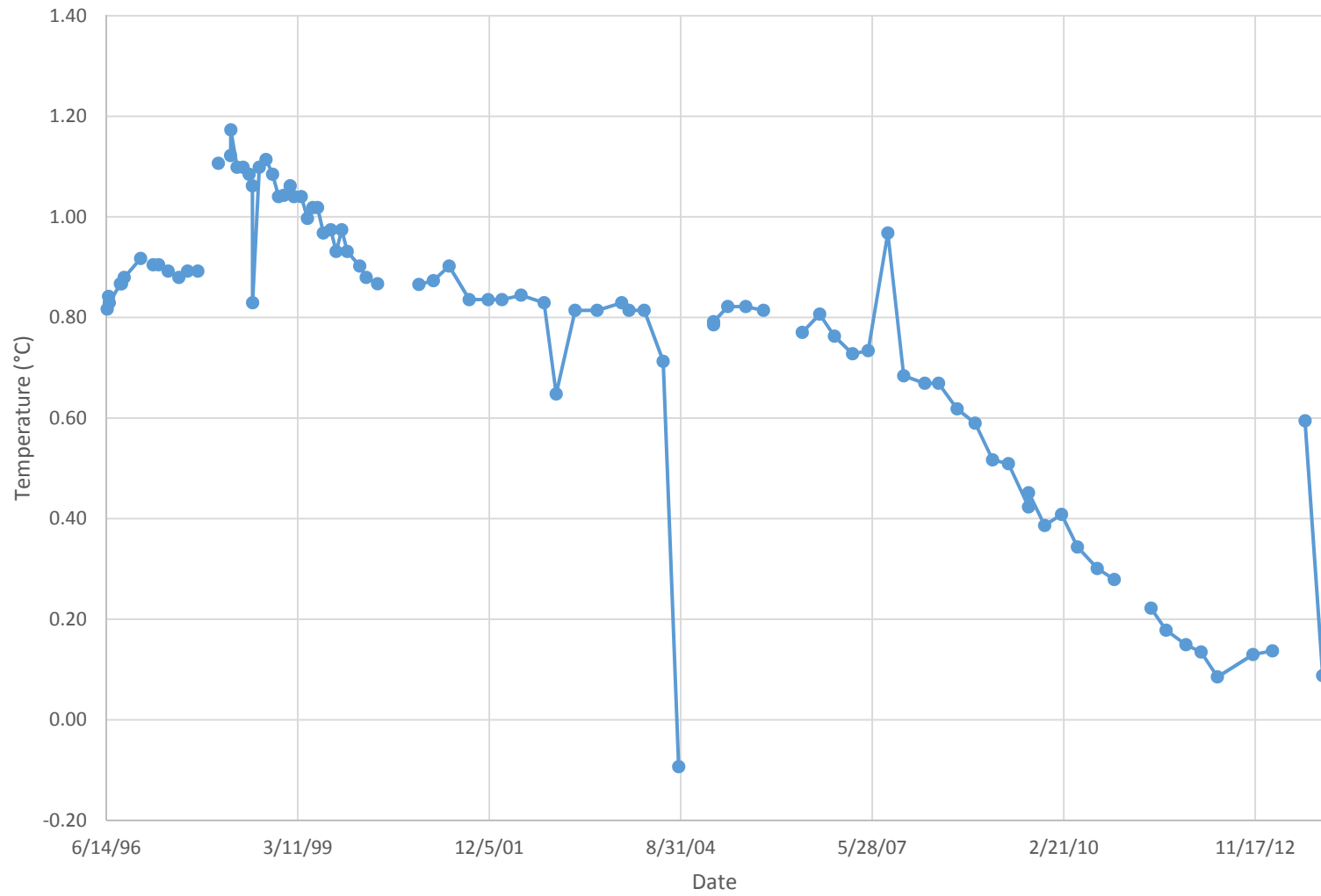
T-96-010: Temperature at 175 feet



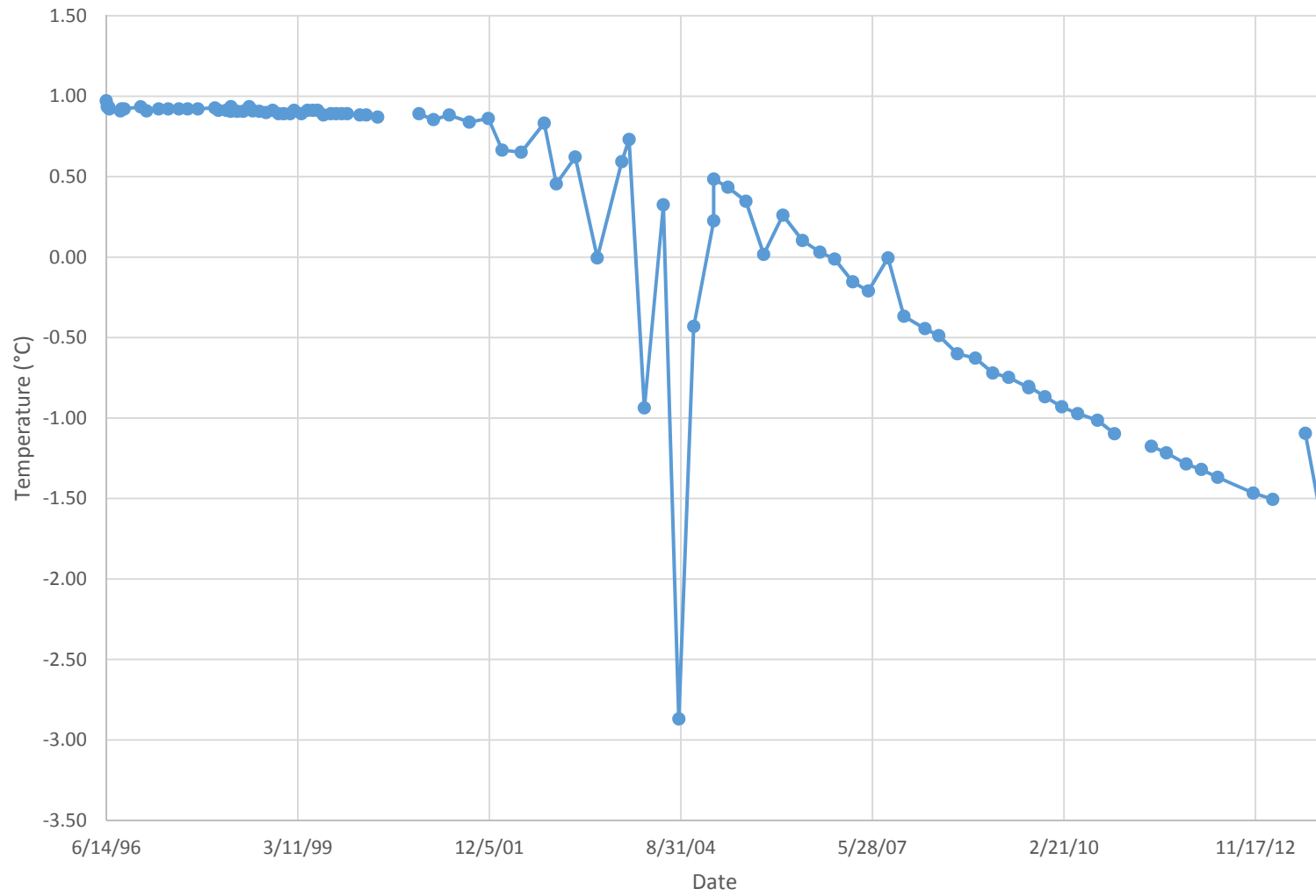
T-96-010: Temperature at 190 feet



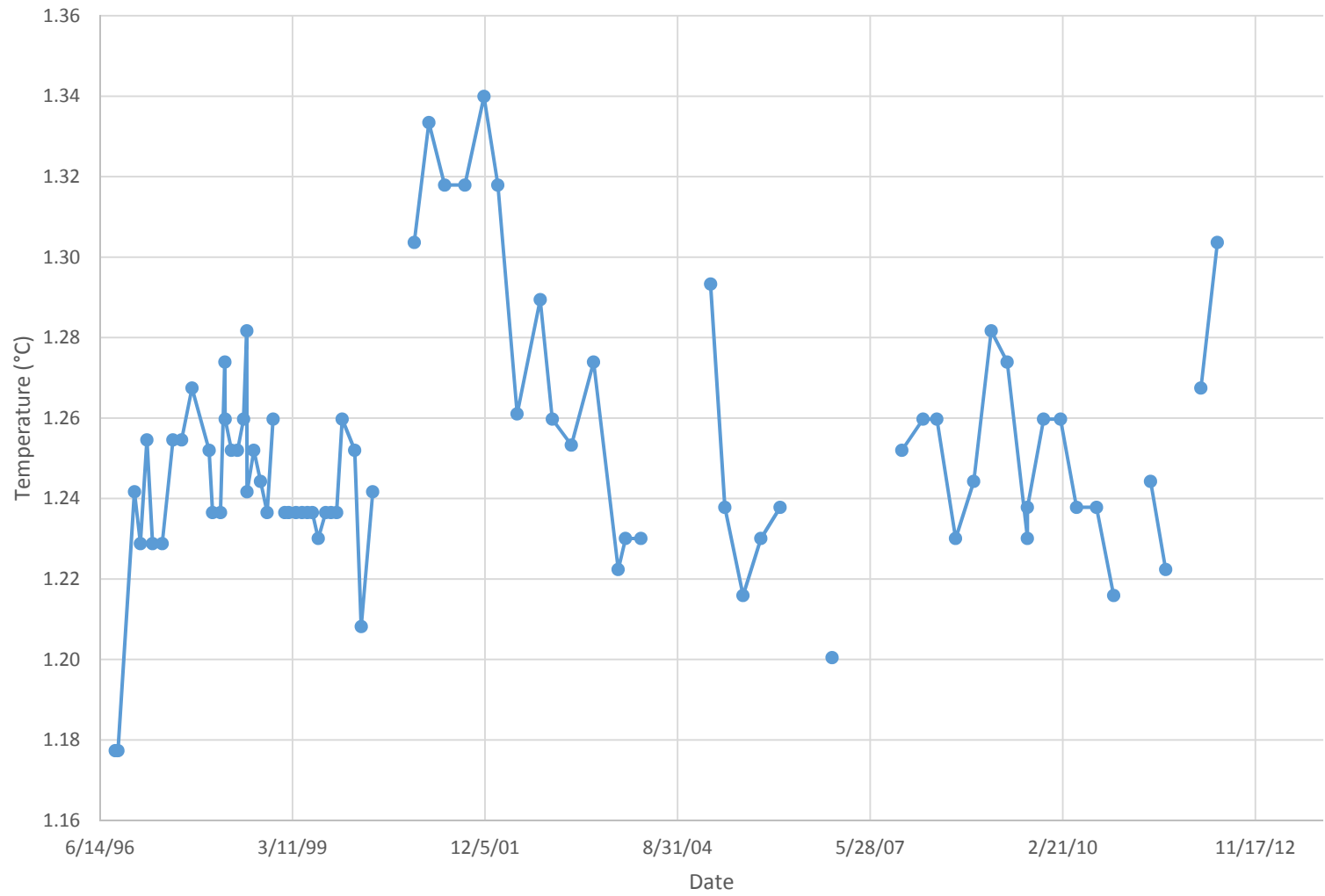
T-96-010: Temperature at 205 feet



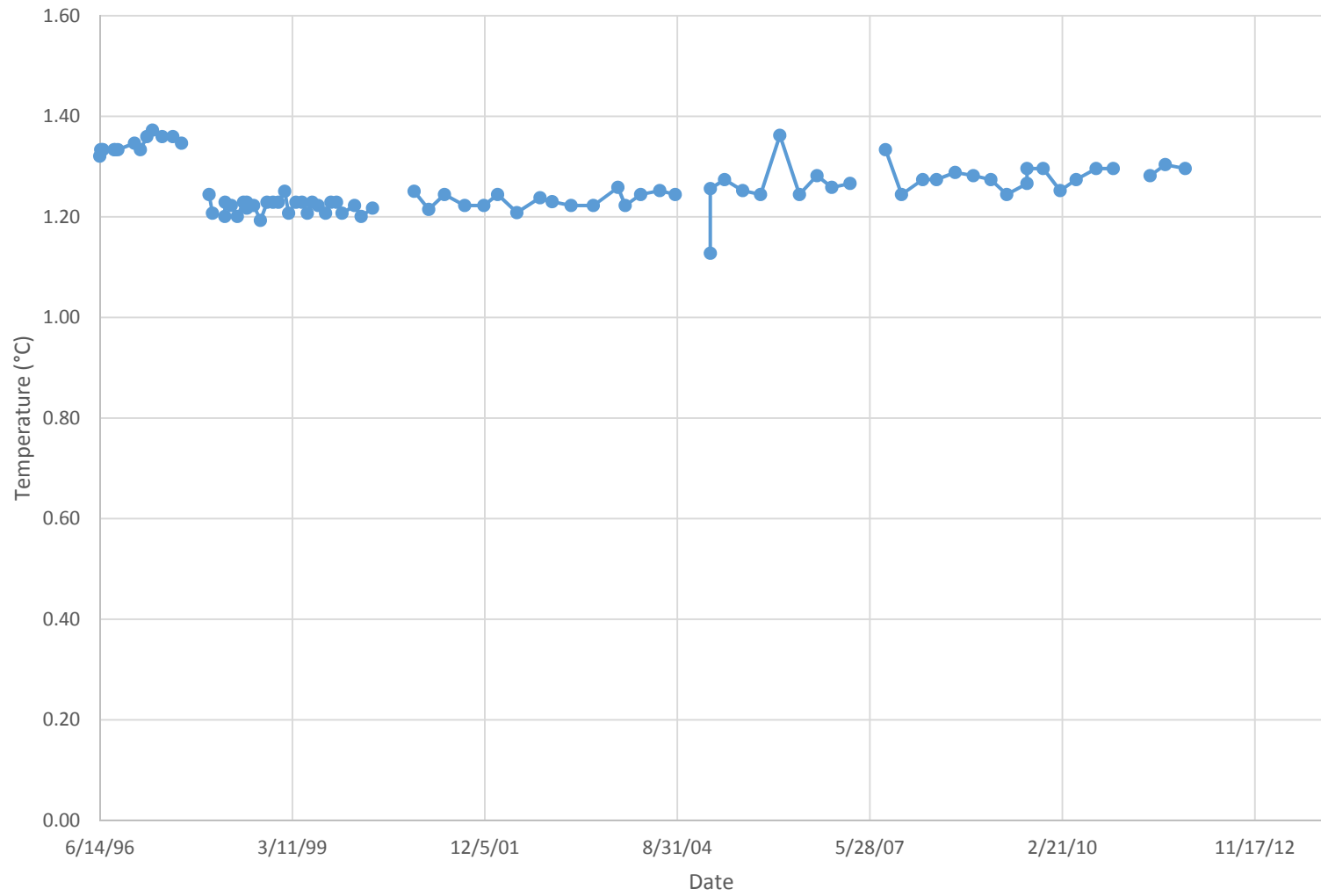
T-96-010: Temperature at 220 feet



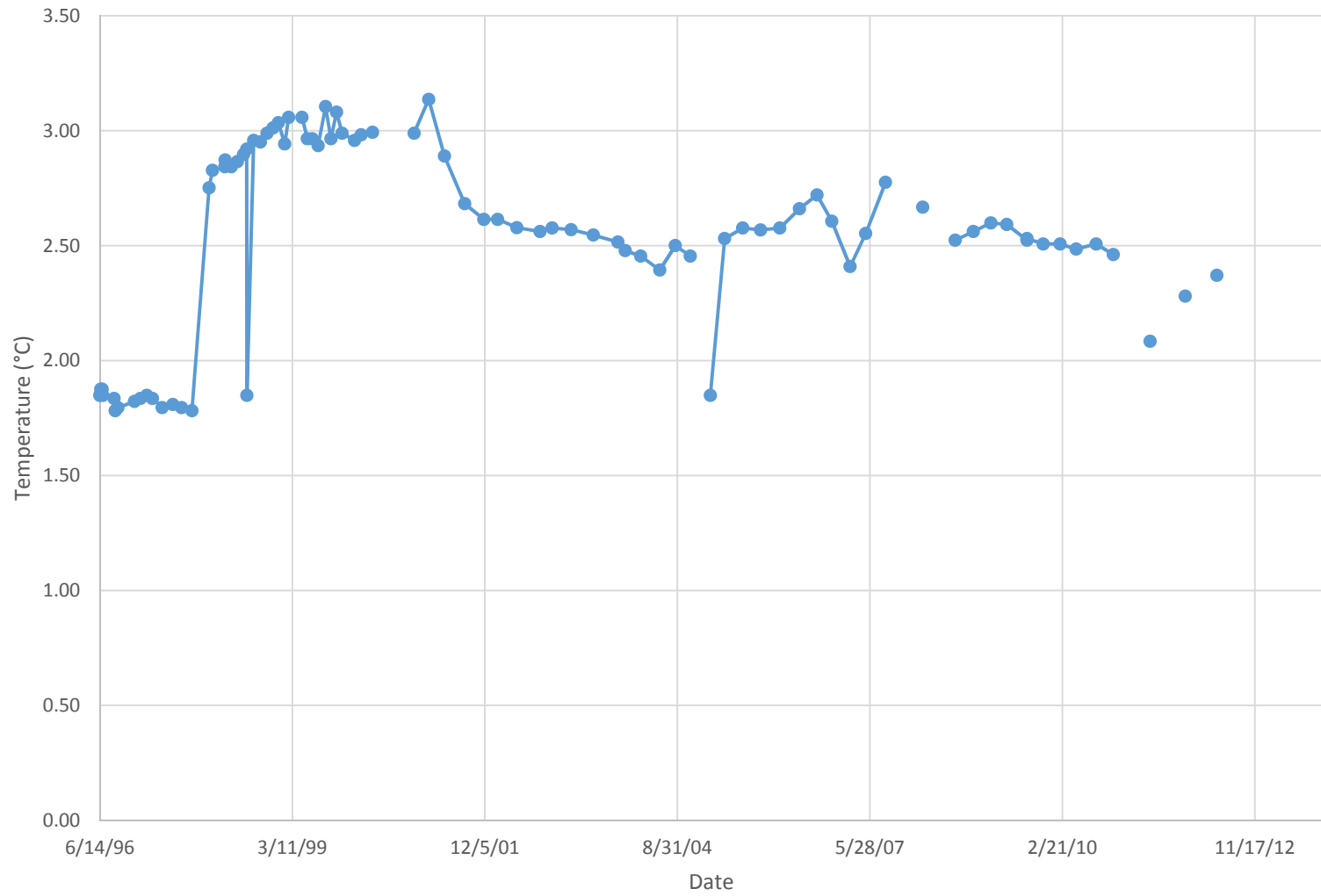
T-96-010: Temperature at 235 feet



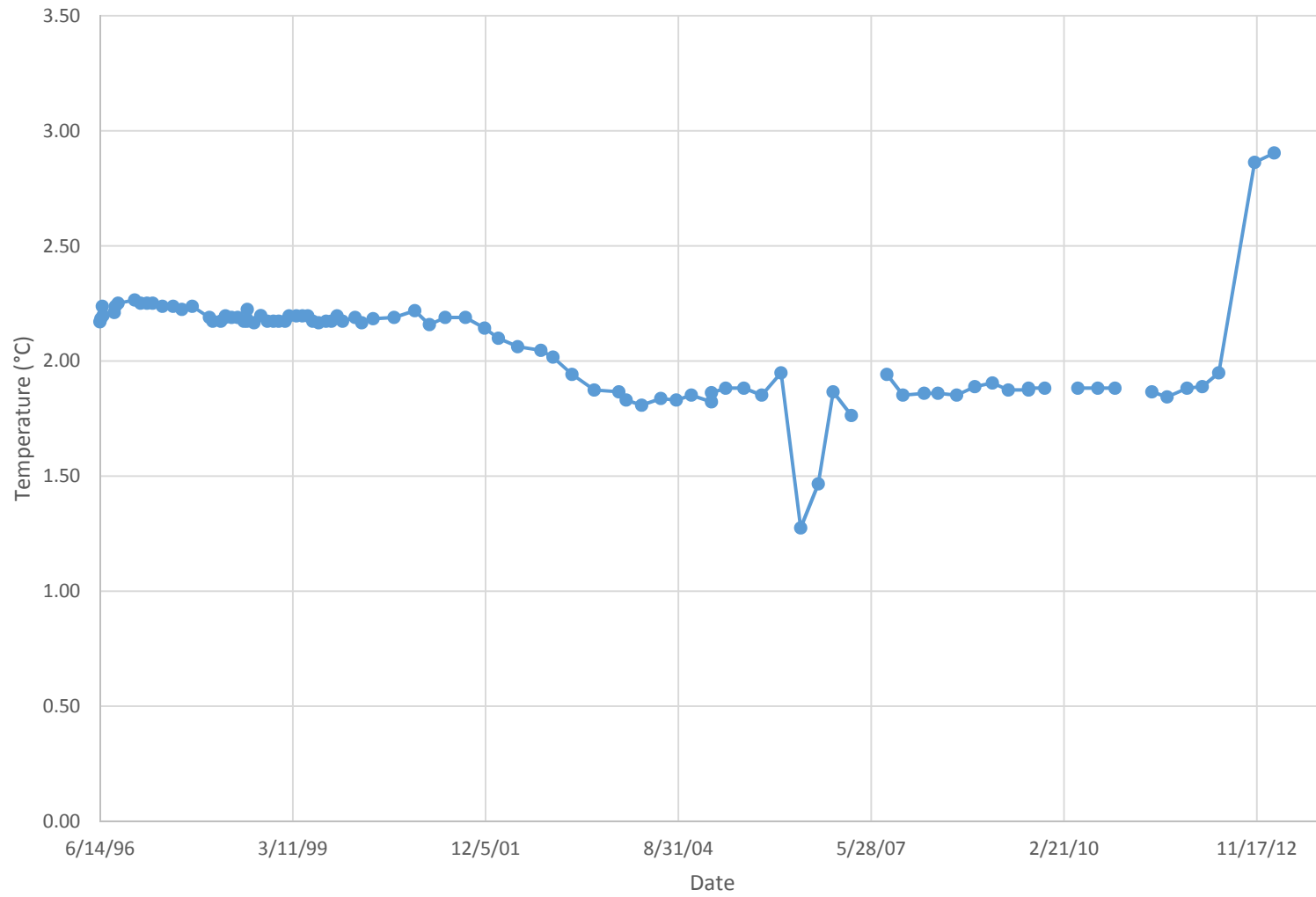
T-96-010: Temperature at 250 feet



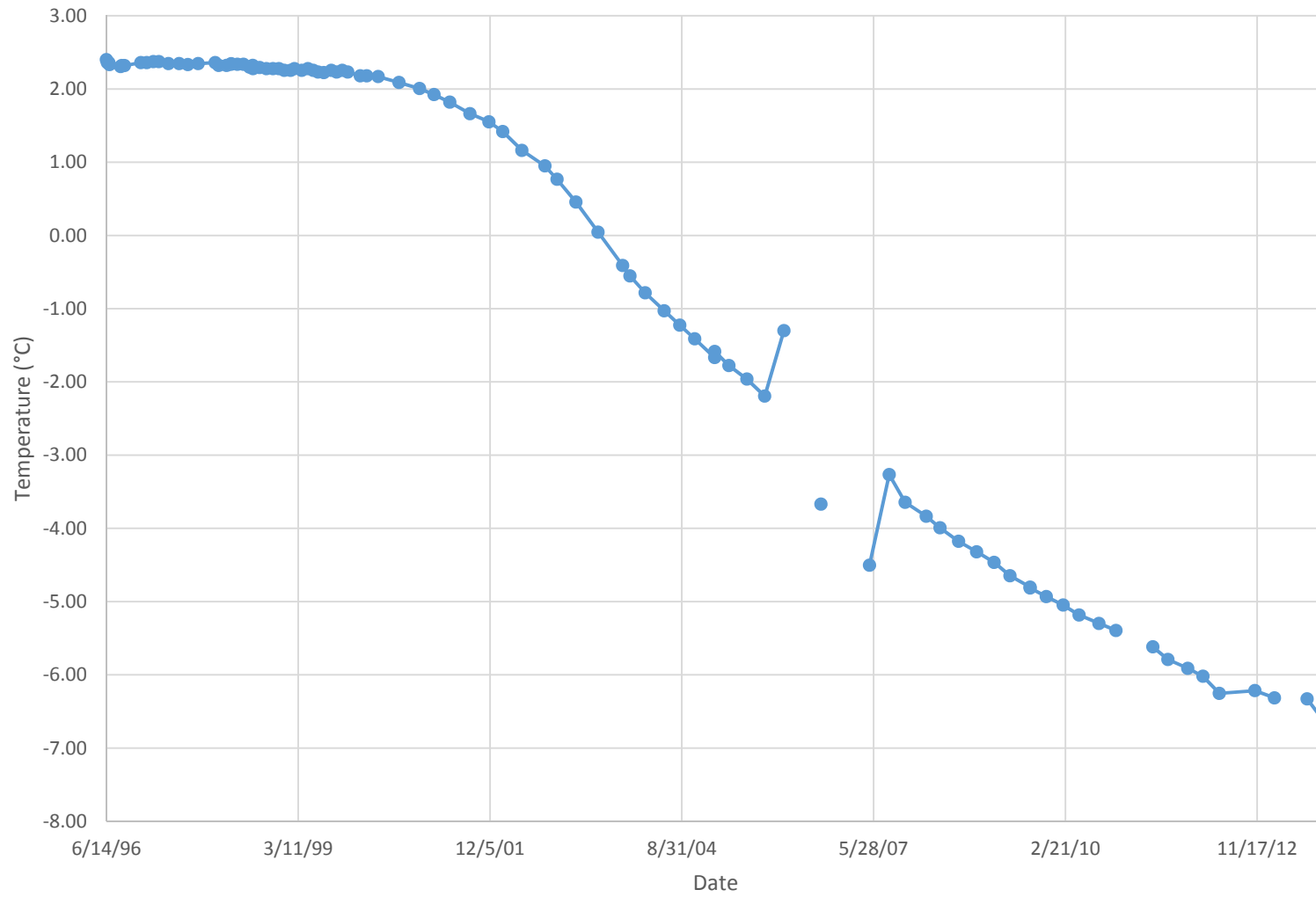
T-96-010: Temperature at 295 feet

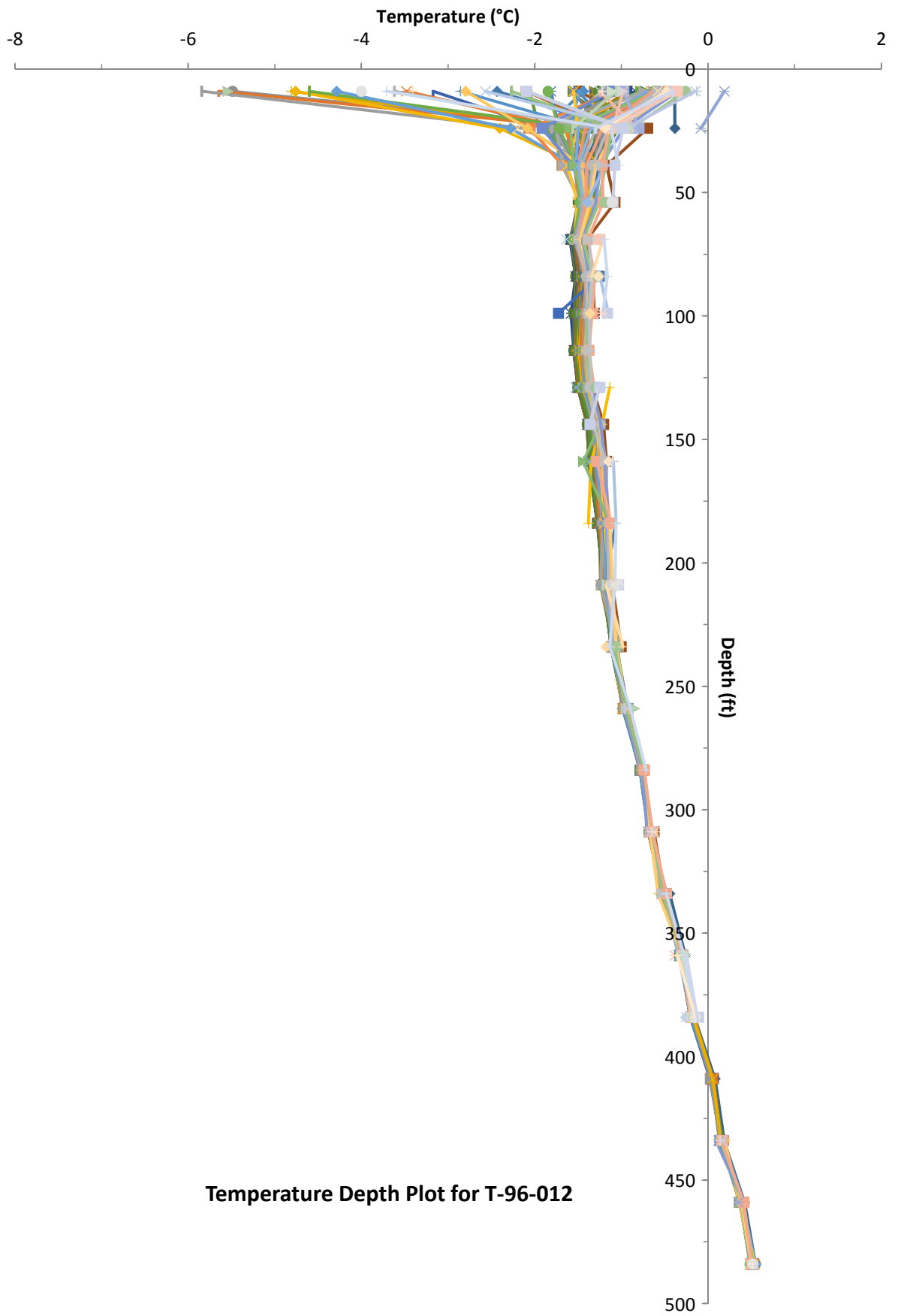


T-96-010: Temperature at 325 feet

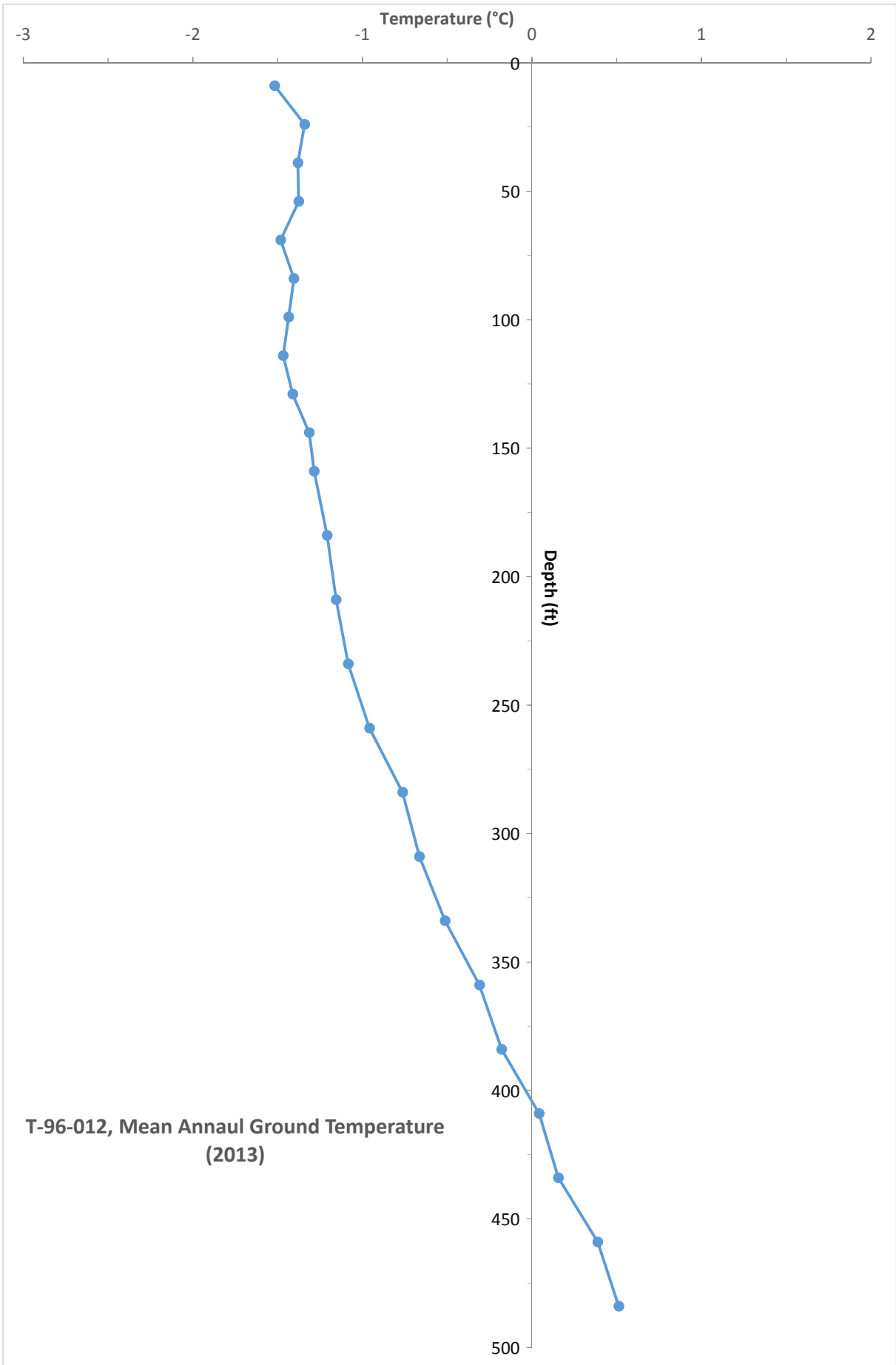


T-96-010: Temperature at 340 feet



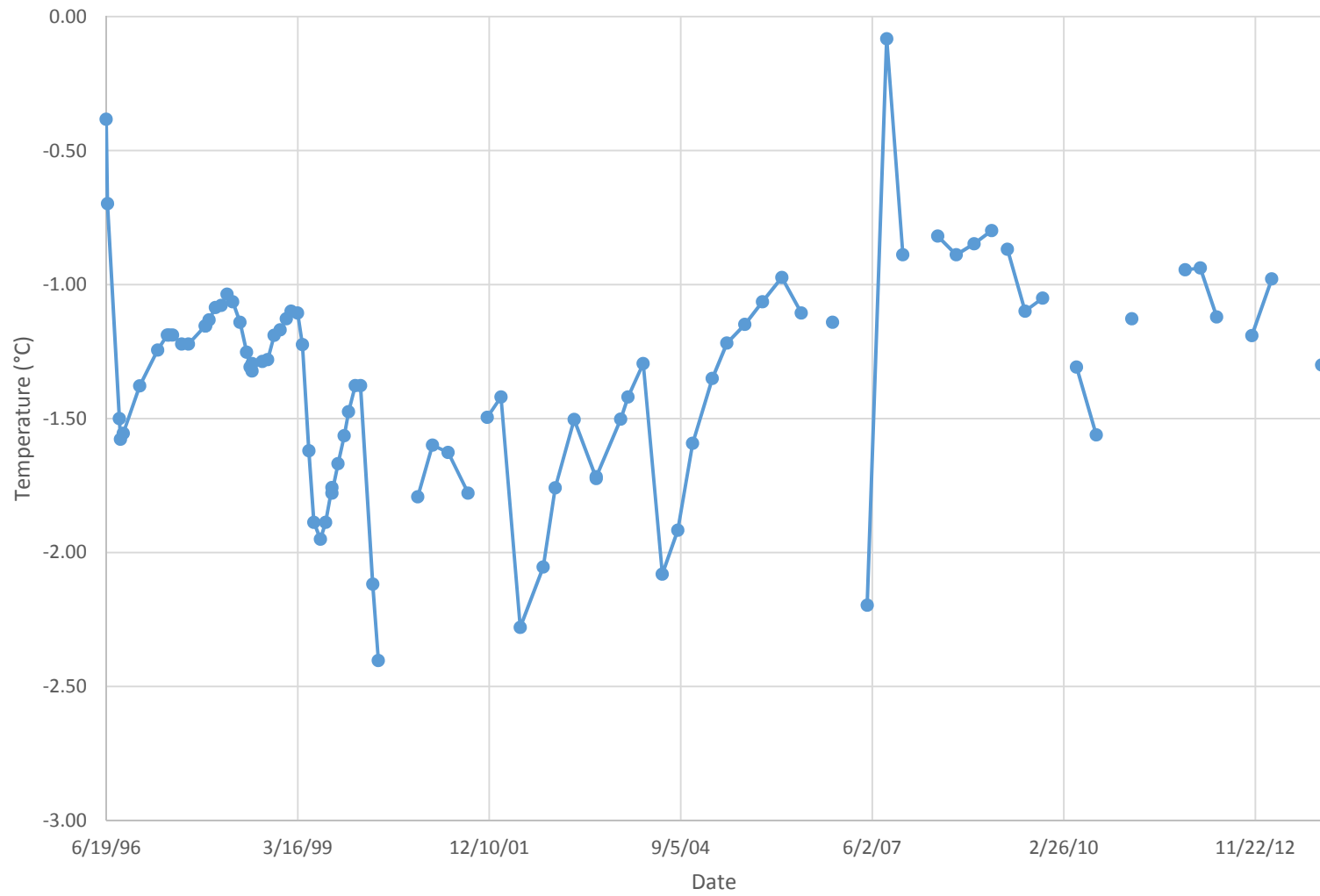


Temperature Depth Plot for T-96-012

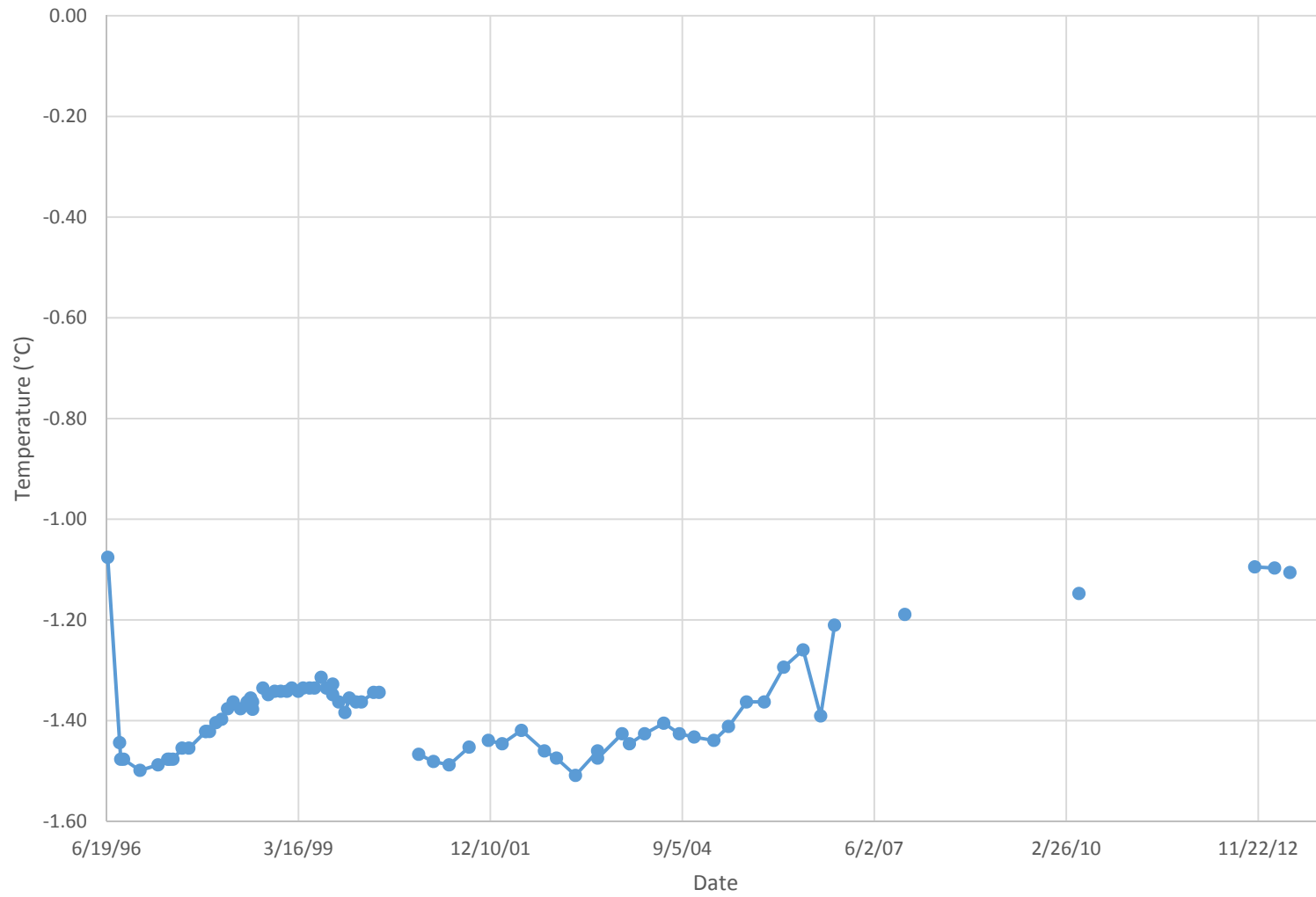


T-96-012, Mean Annual Ground Temperature (2013)

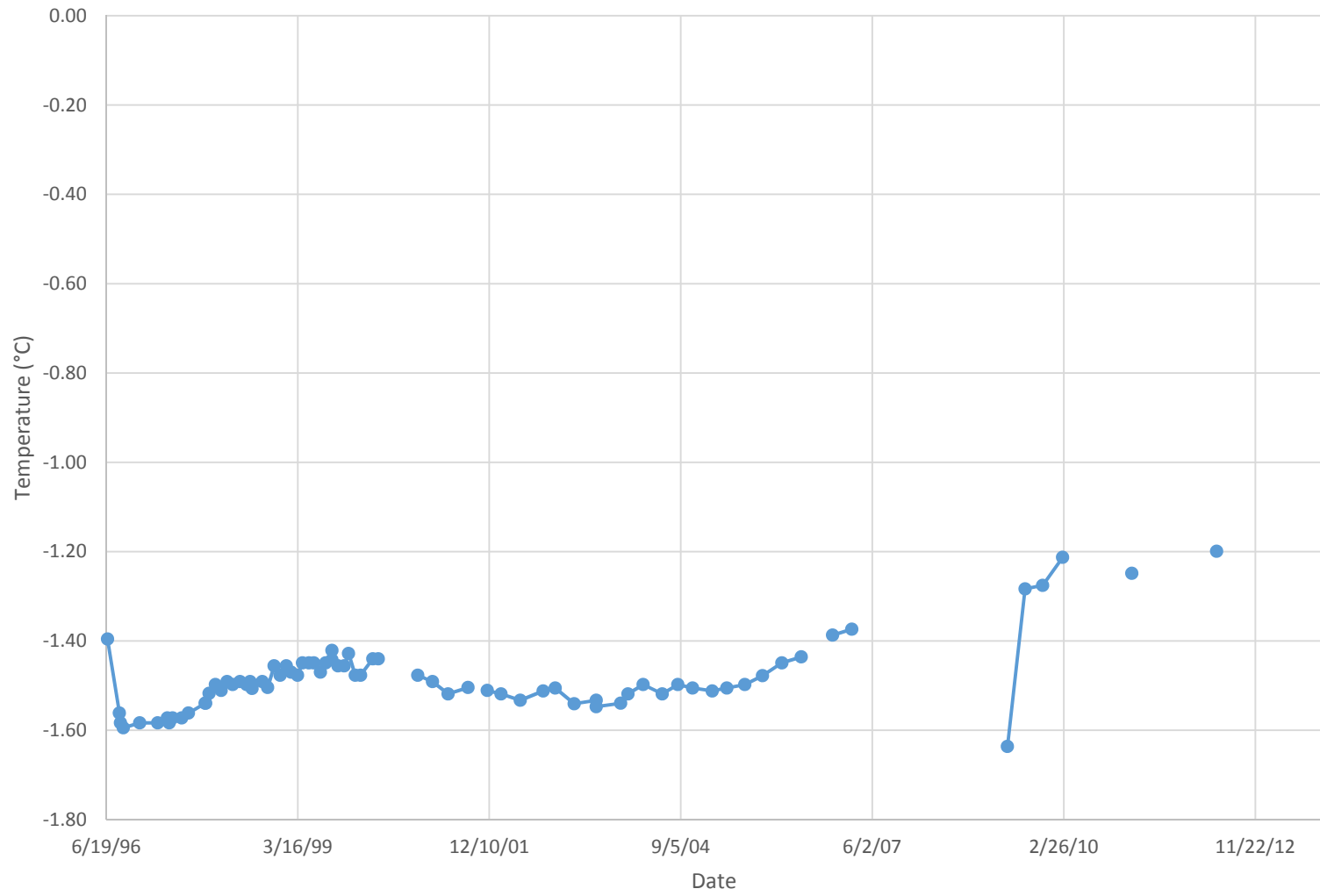
T-96-012: Temperature at 24 feet



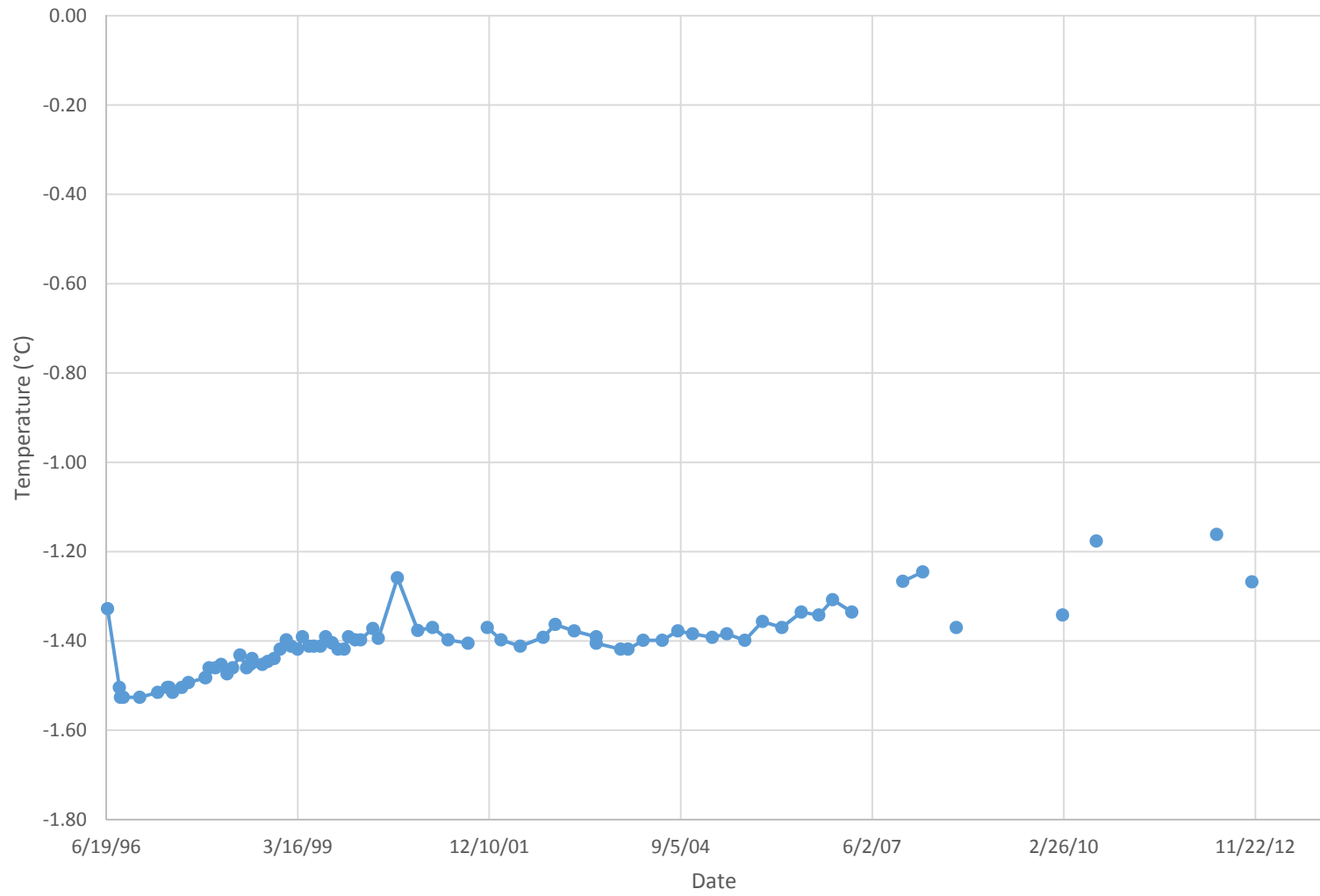
T-96-012: Temperature at 54 feet



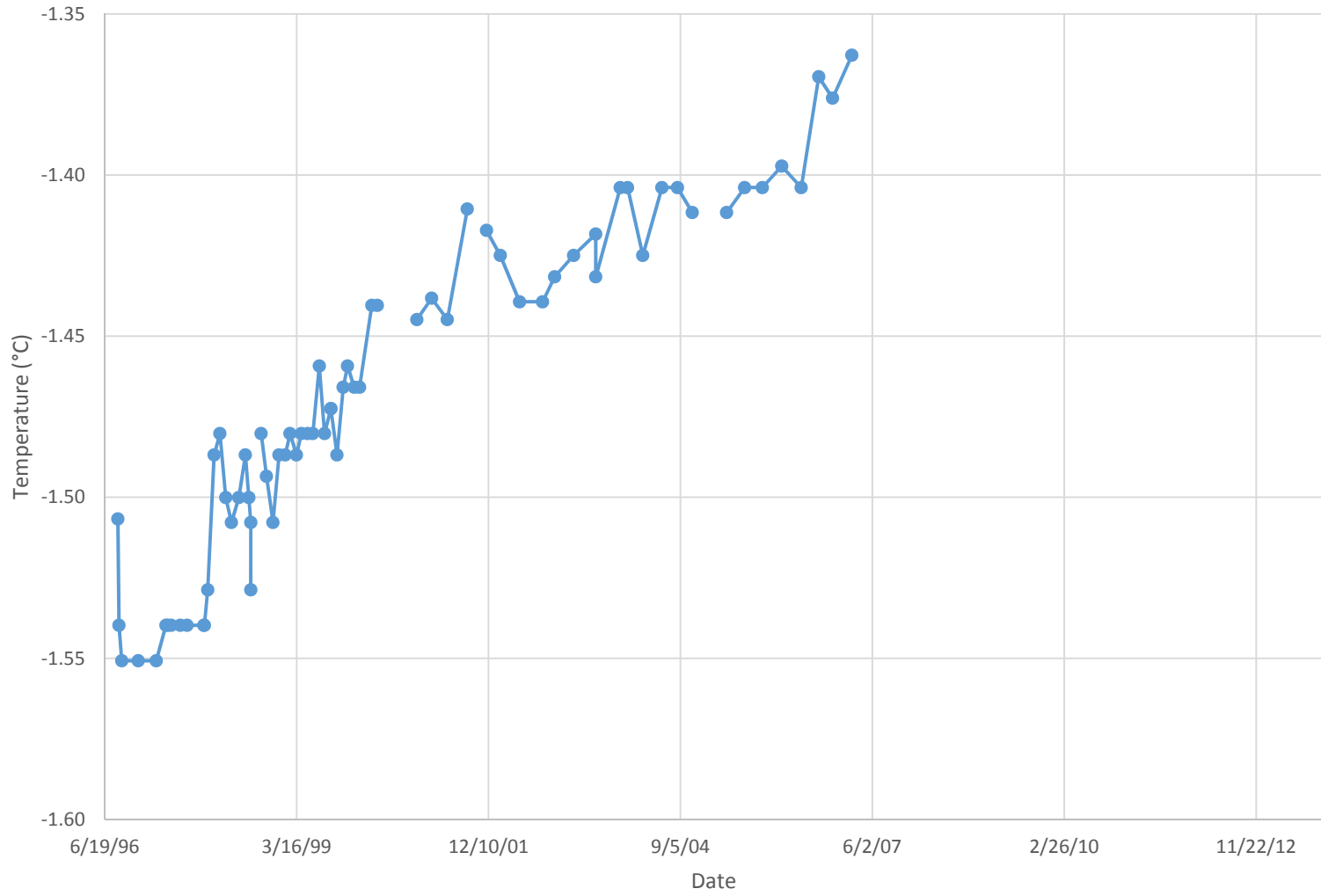
T-96-012: Temperature at 69 feet



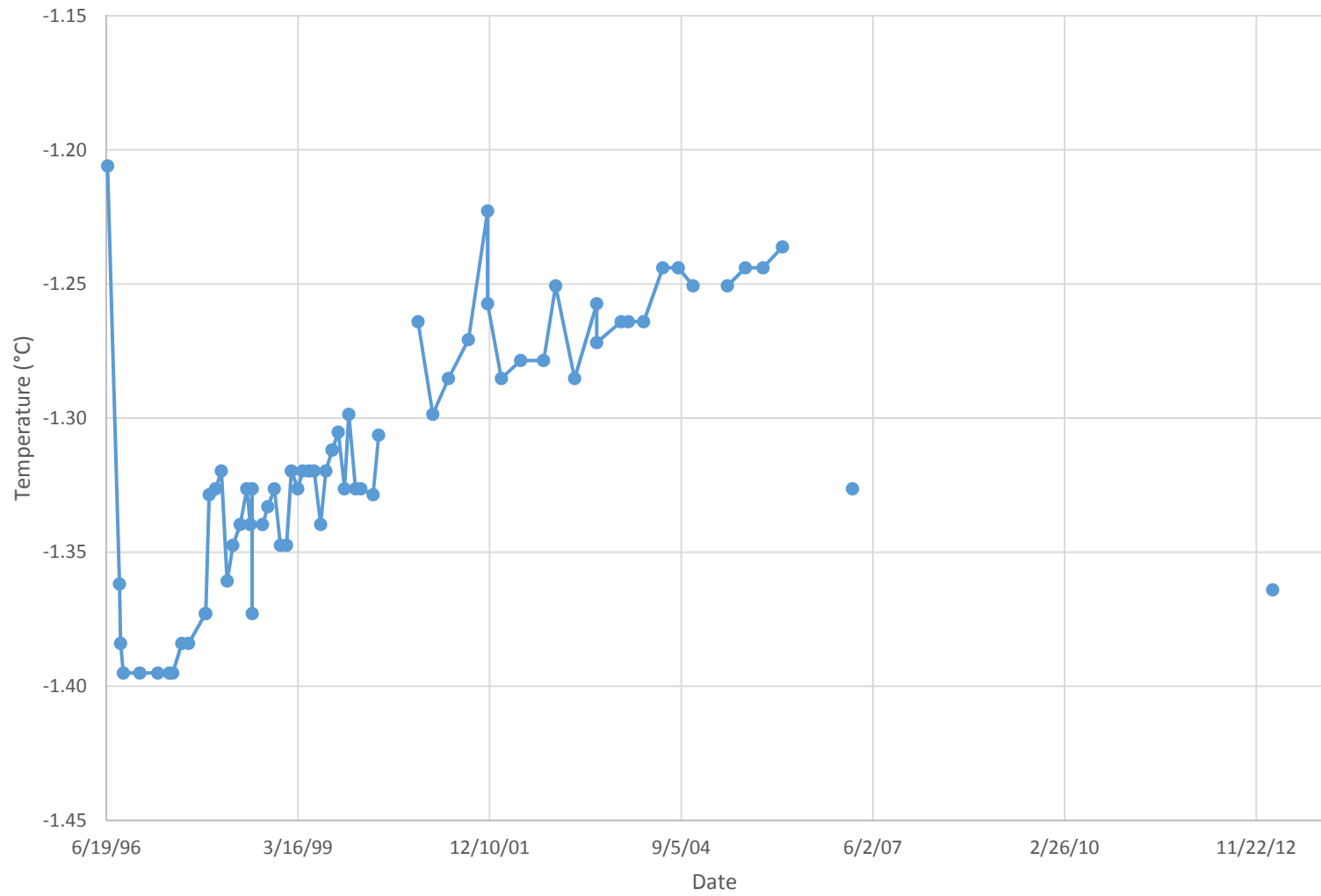
T-96-012: Temperature at 84 feet



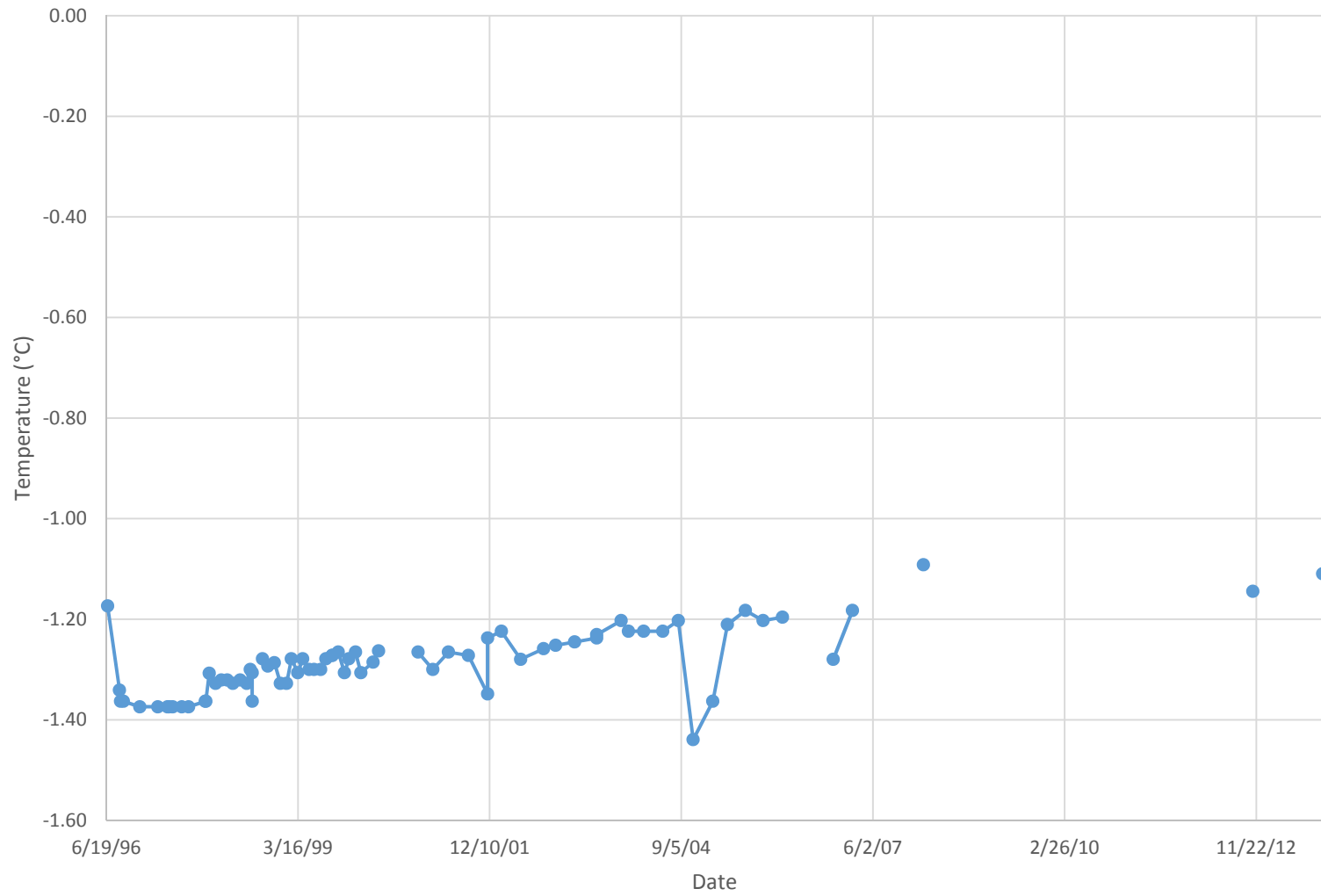
T-96-012: Temperature at 114 feet



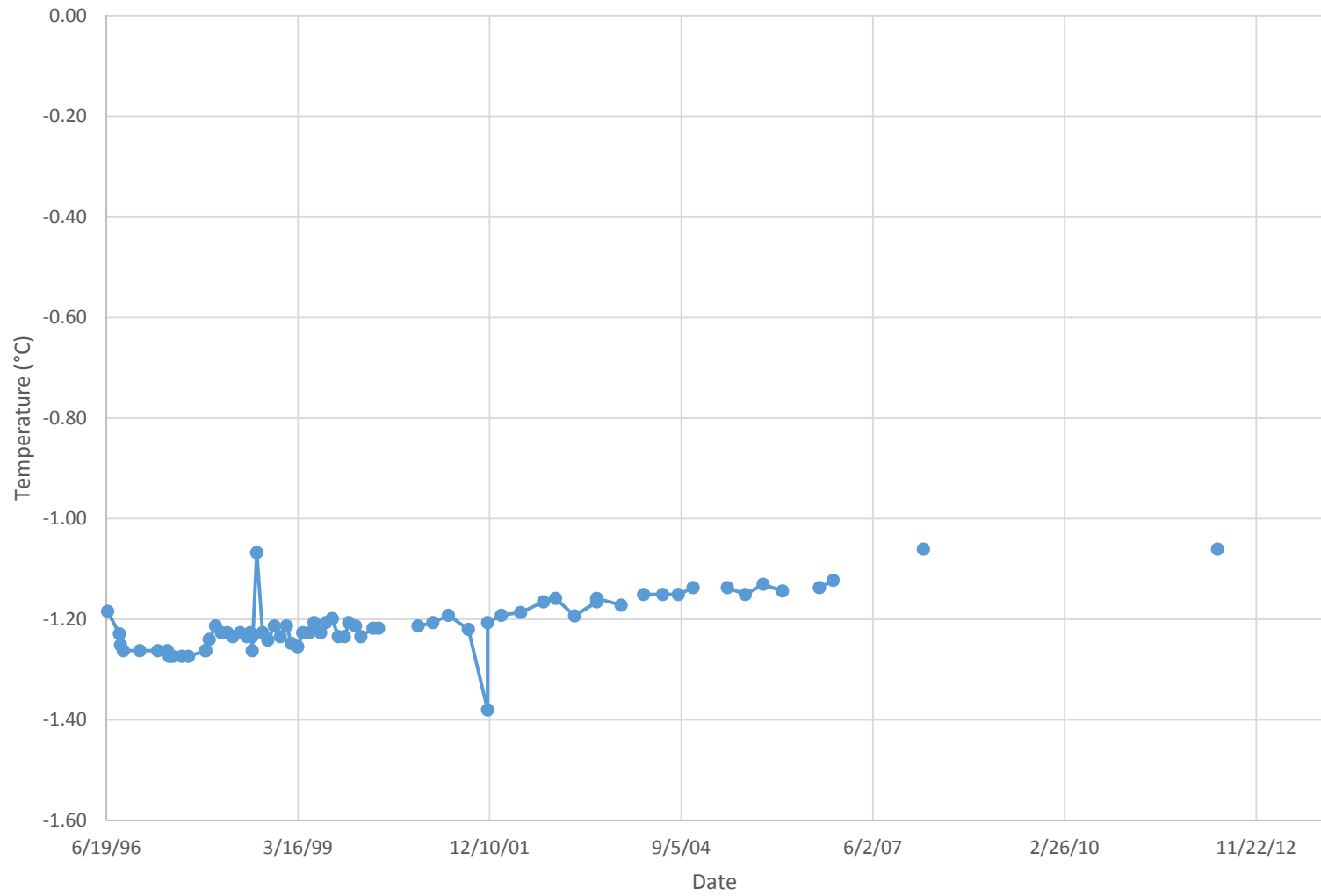
T-96-012: Temperature at 144 feet



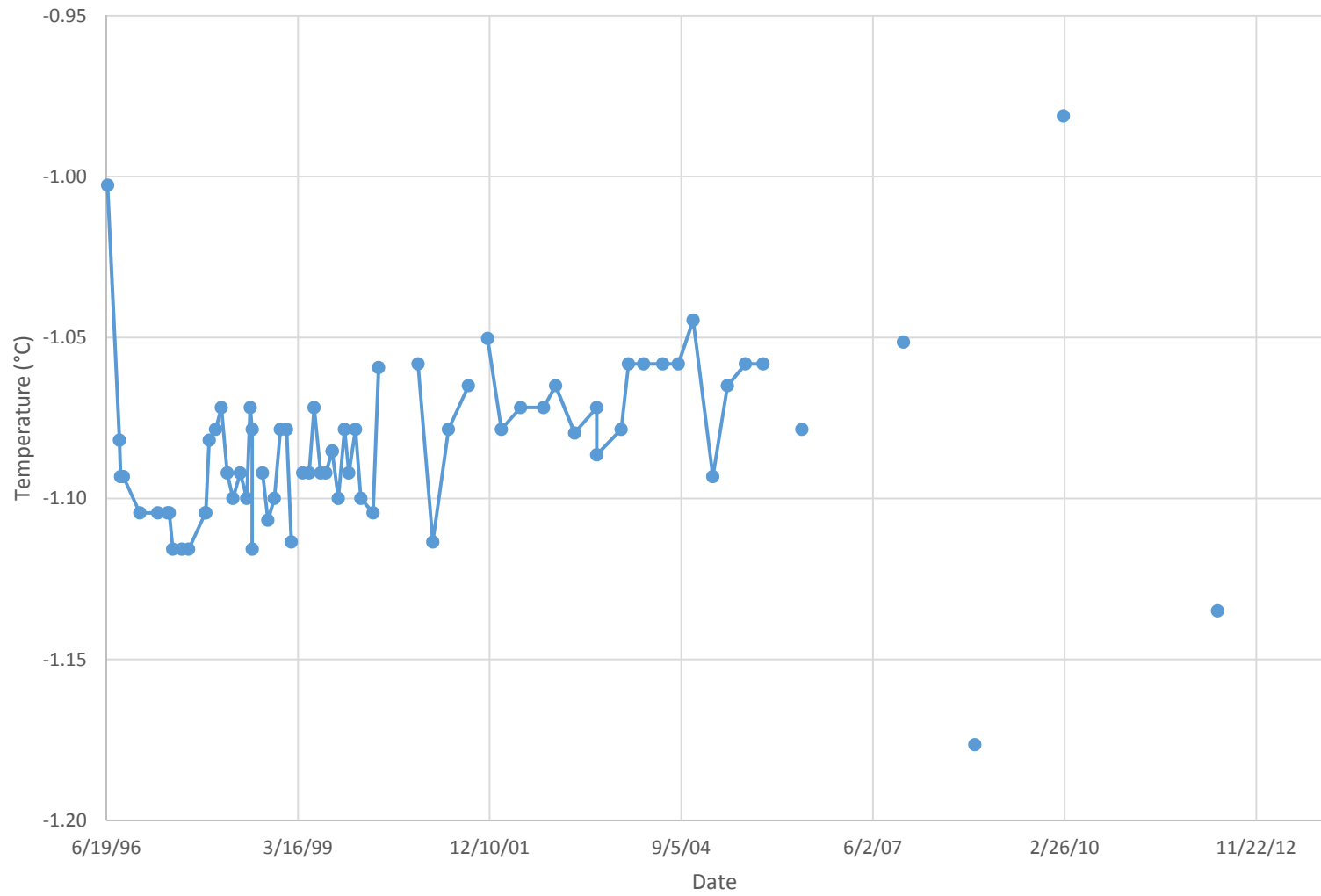
T-96-012: Temperature at 159 feet



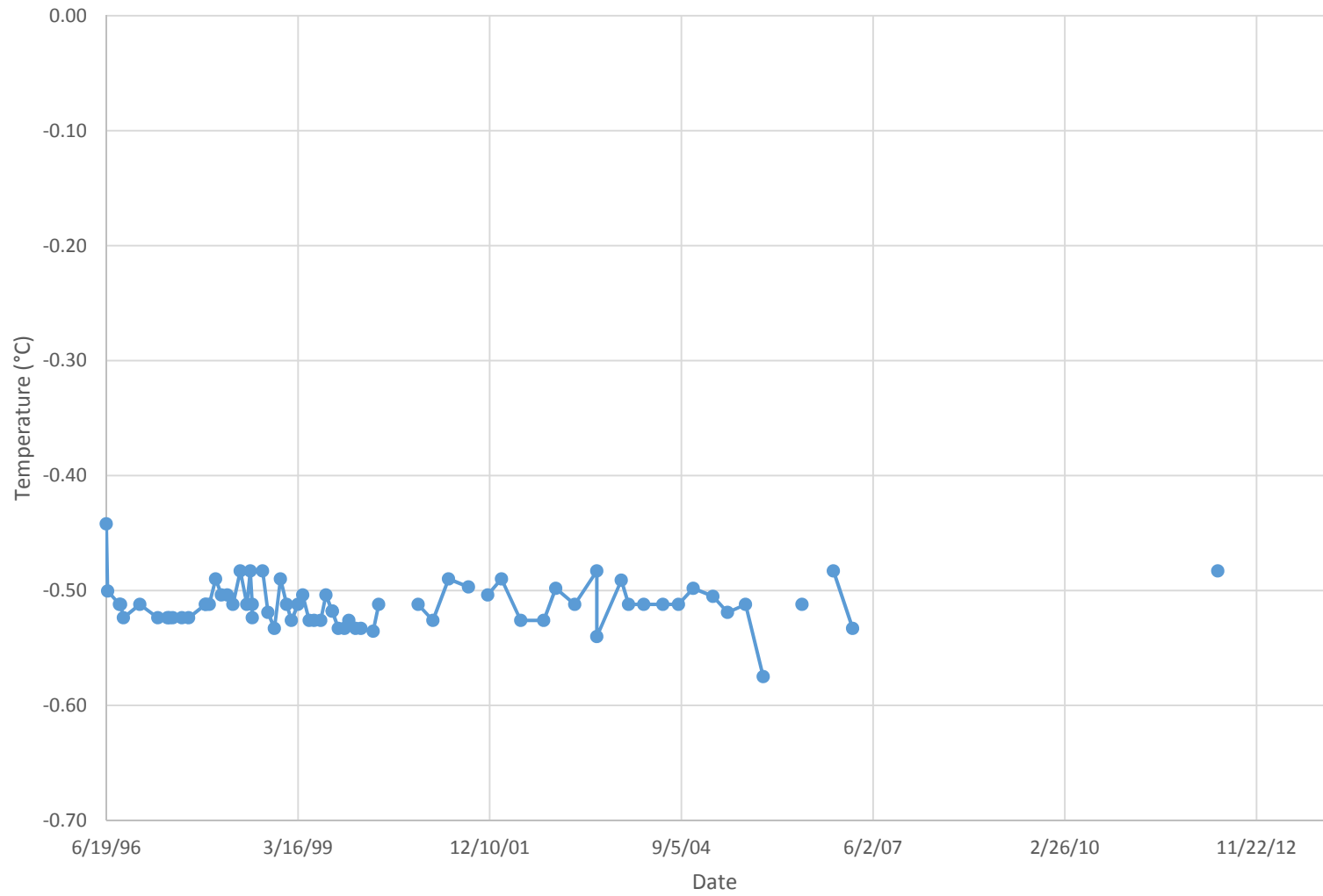
T-96-012: Temperature at 184 feet



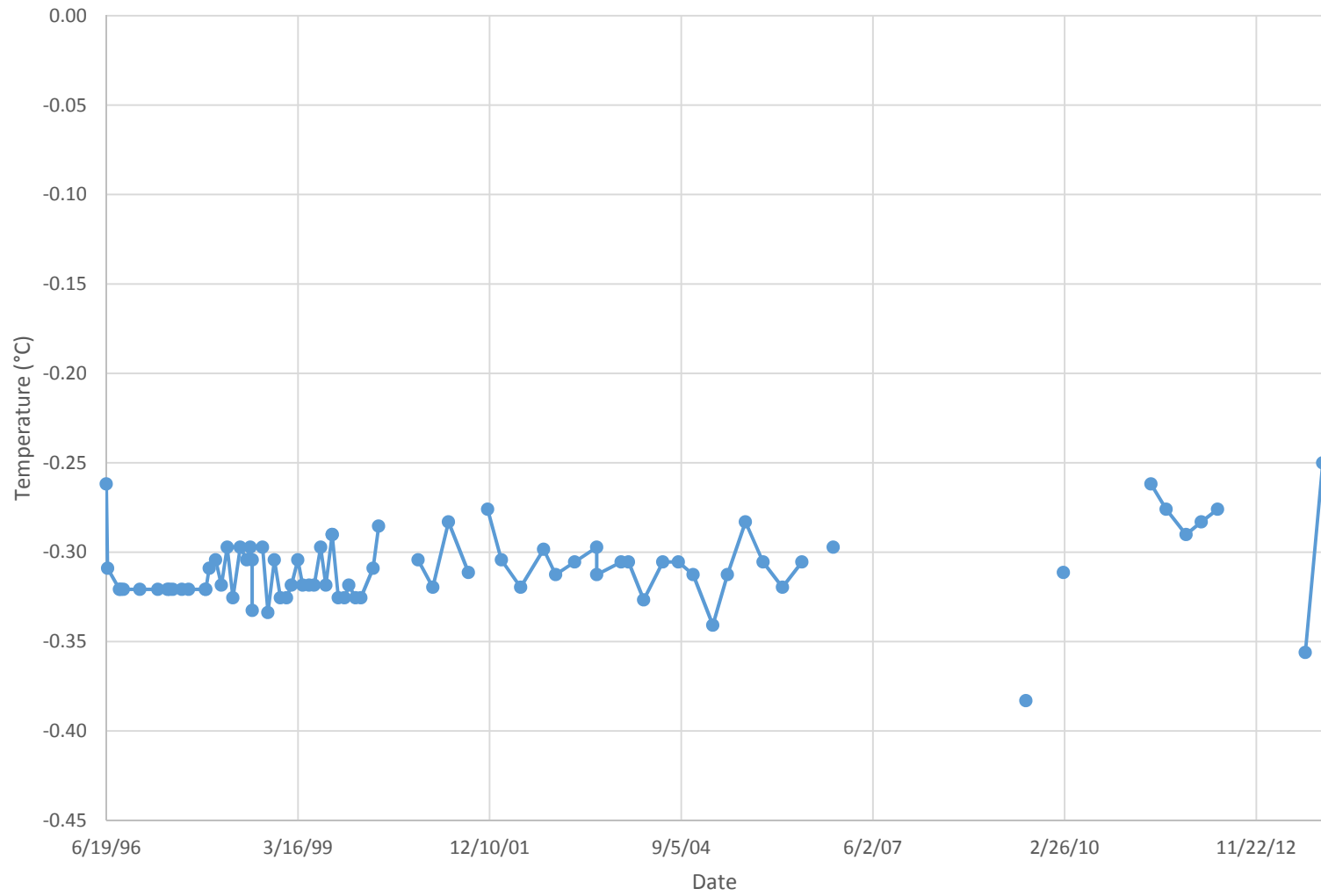
T-96-012: Temperature at 234 feet



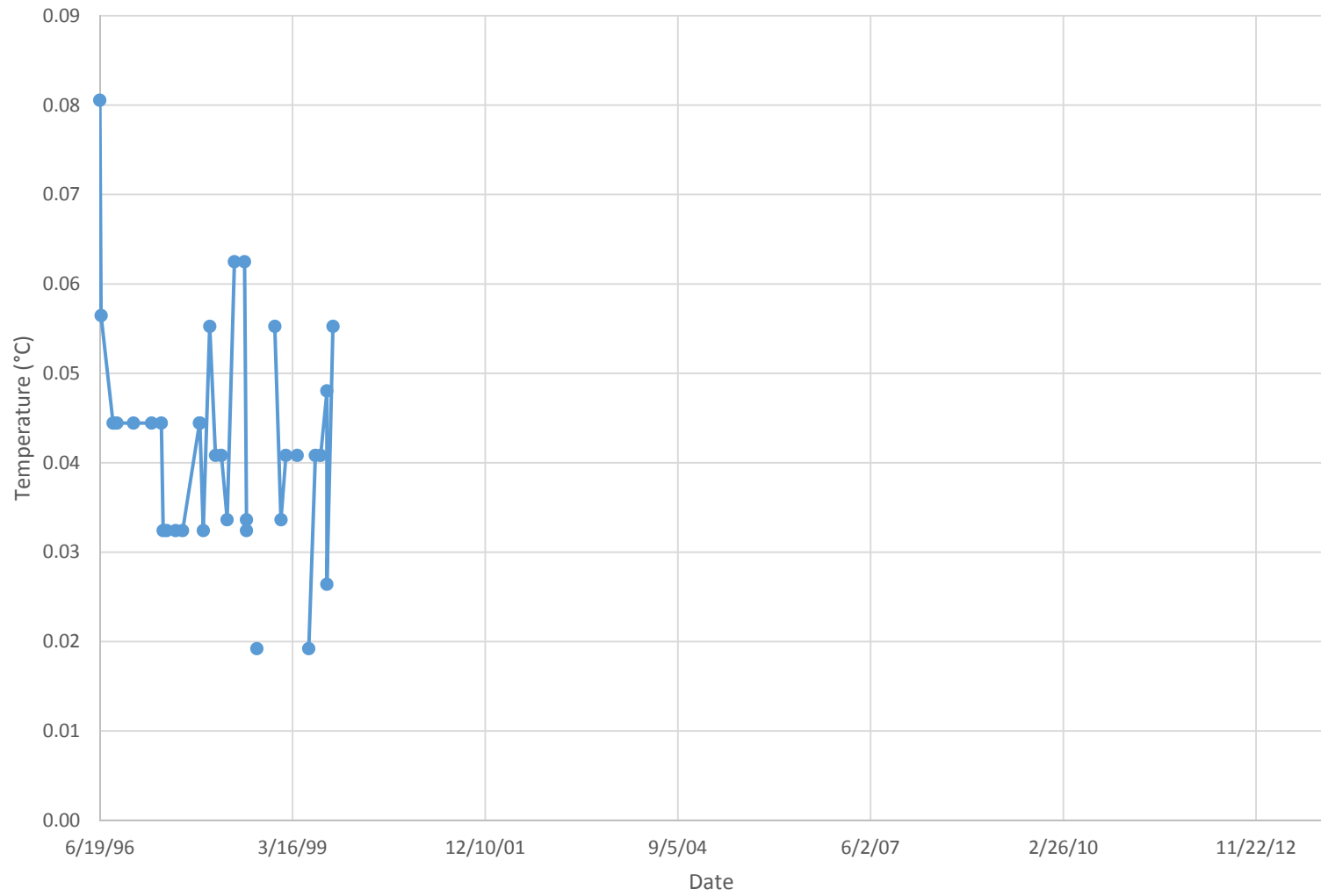
T-96-012: Temperature at 334 feet

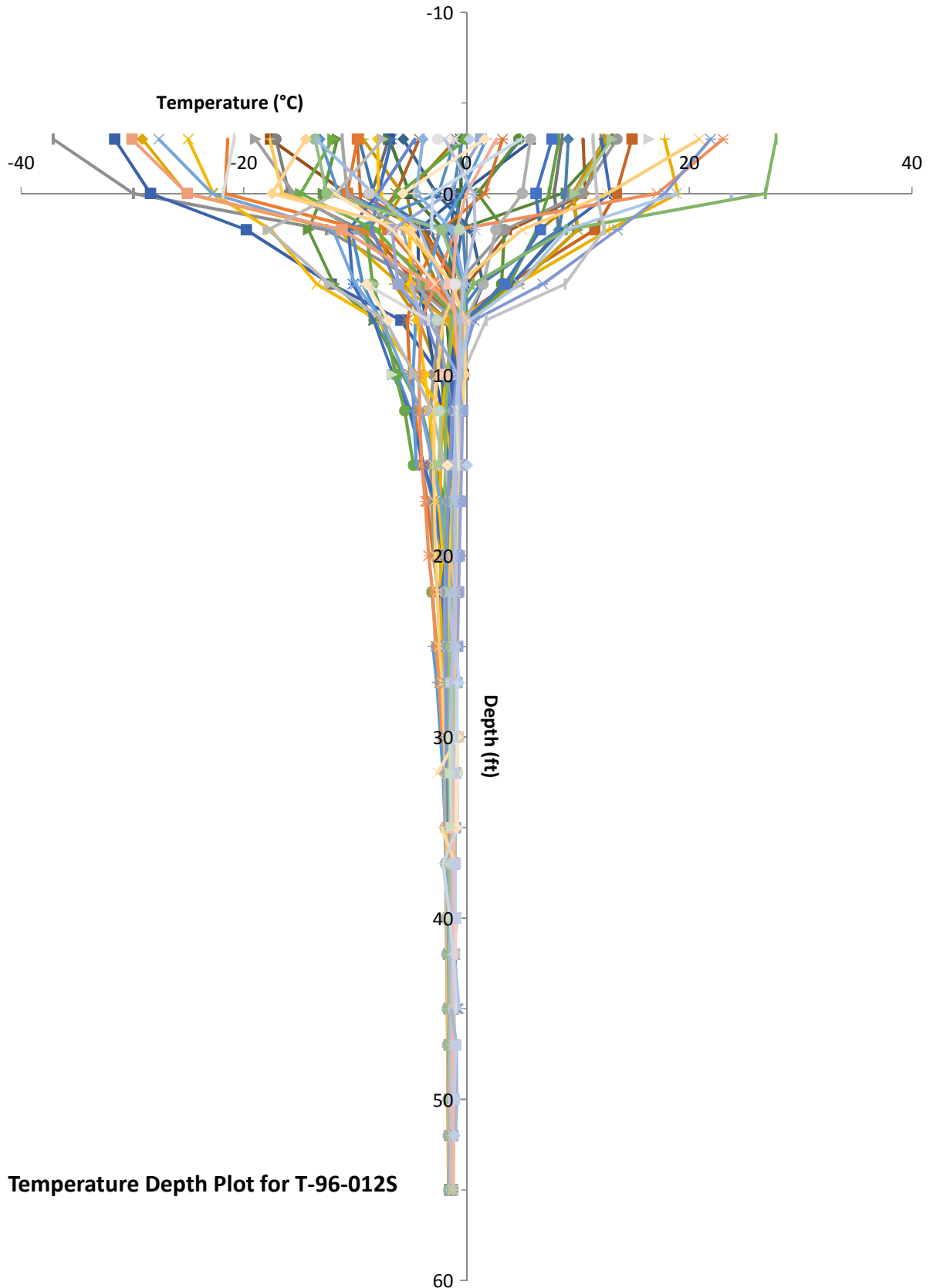


T-96-012: Temperature at 359 feet



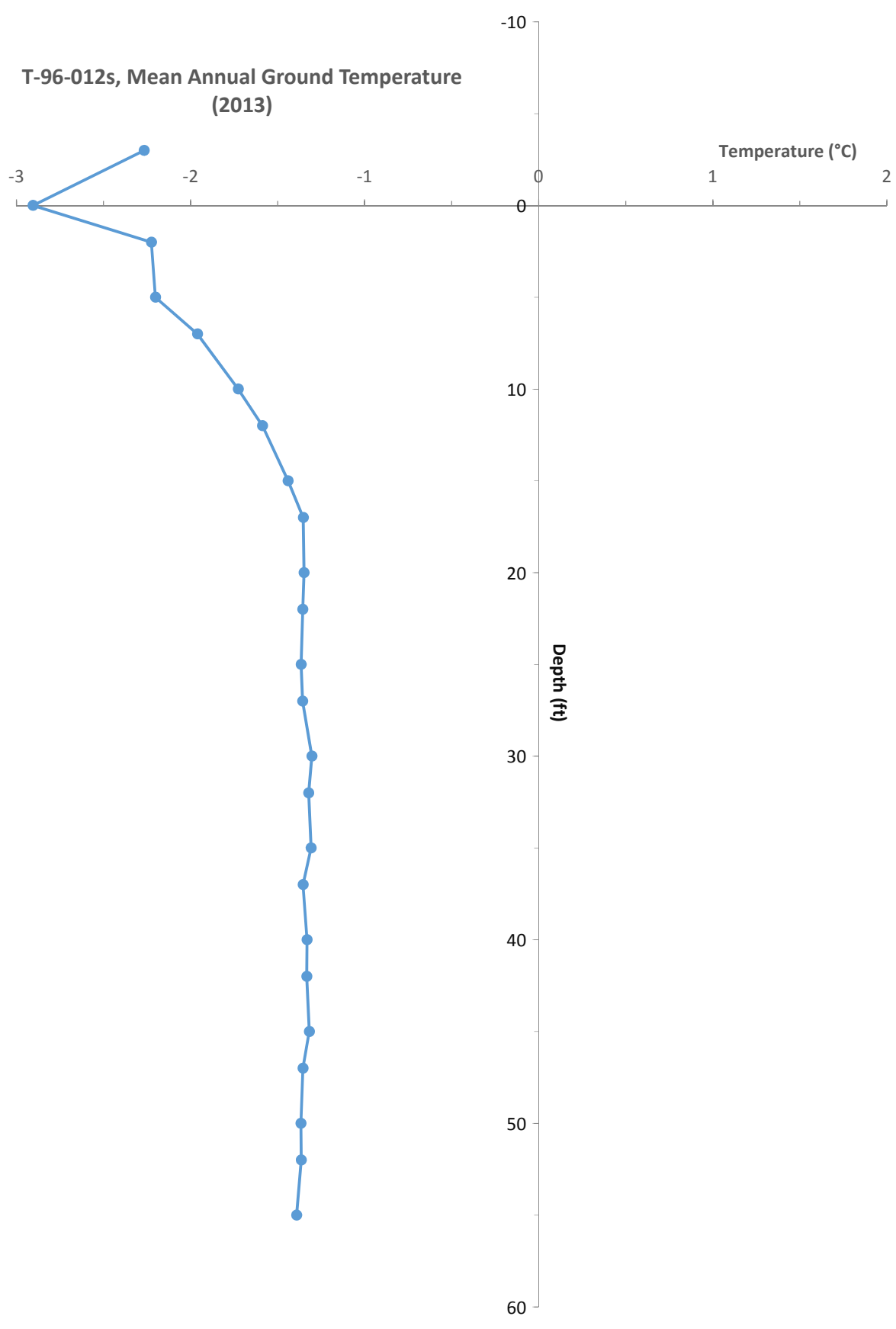
T-96-012: Temperature at 409 feet



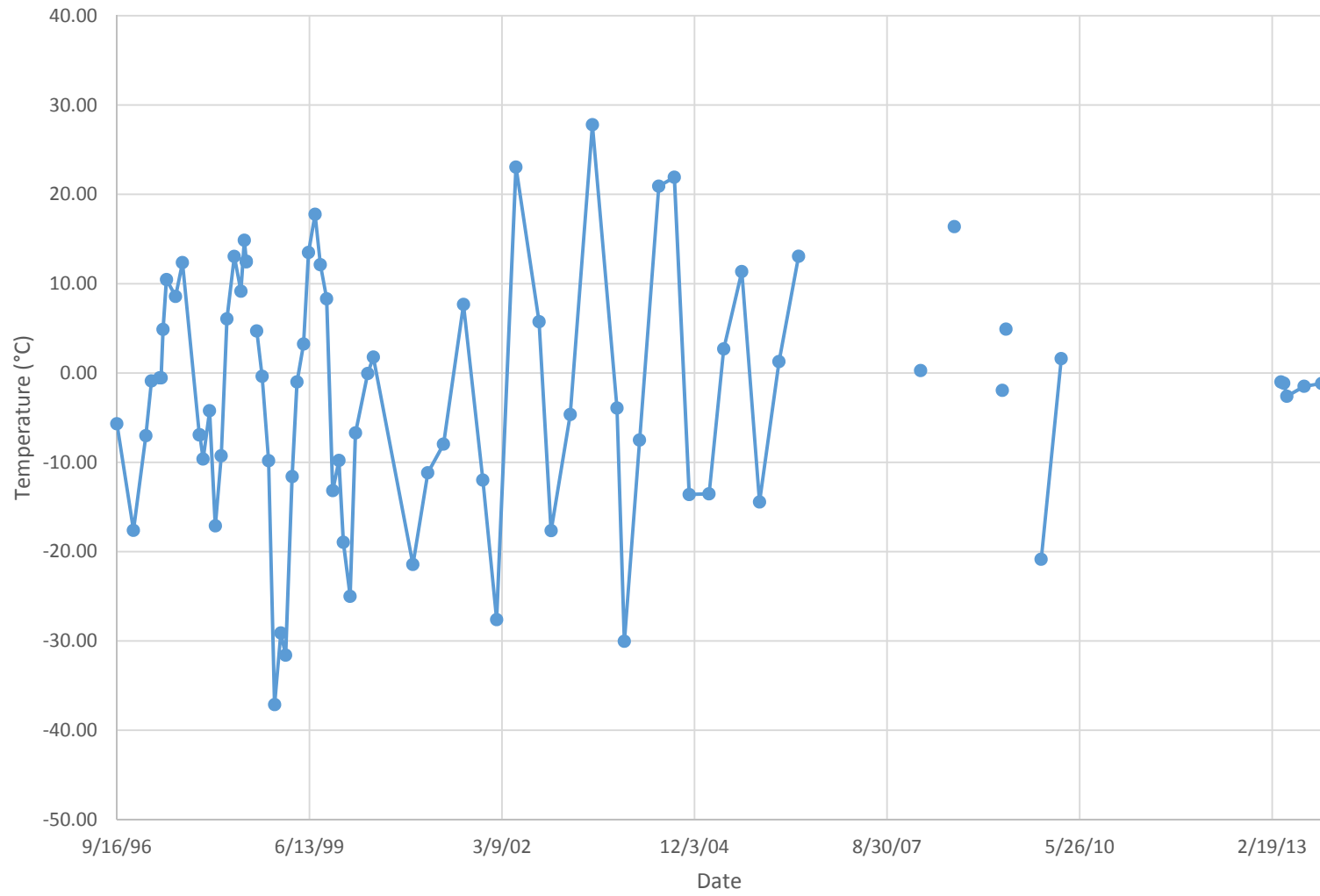


Temperature Depth Plot for T-96-012S

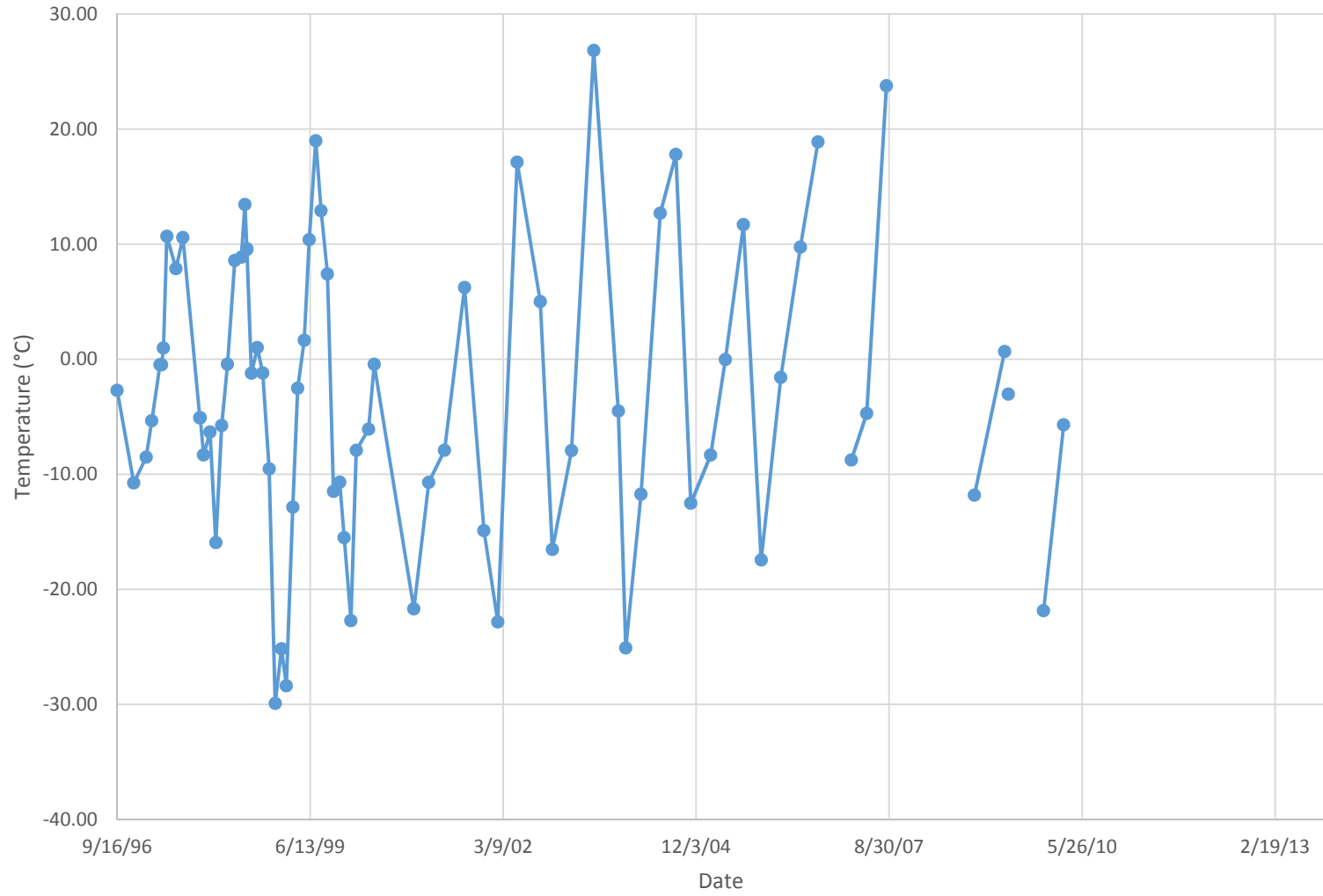
T-96-012s, Mean Annual Ground Temperature (2013)



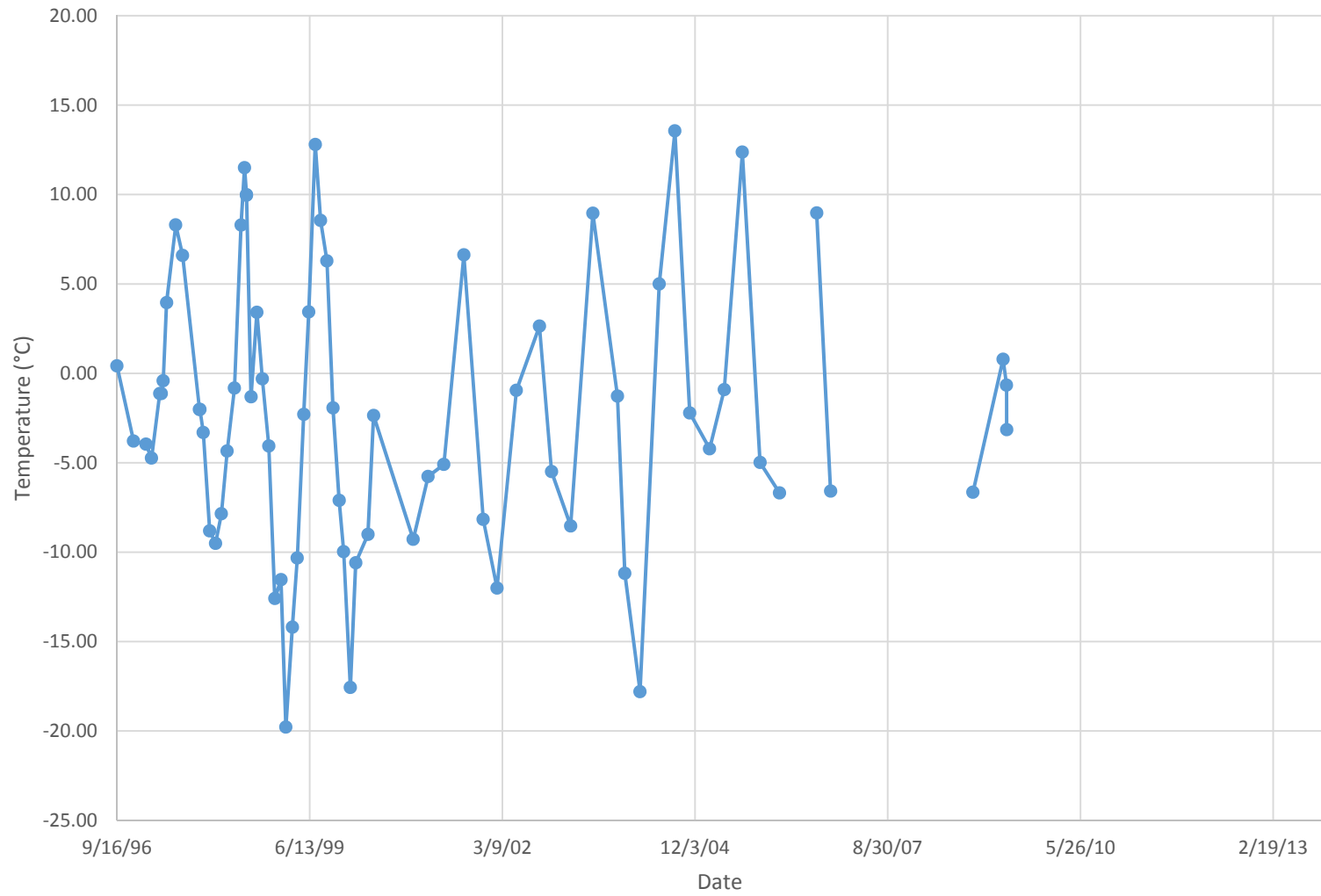
T-96-012S: Temperature at -3 feet



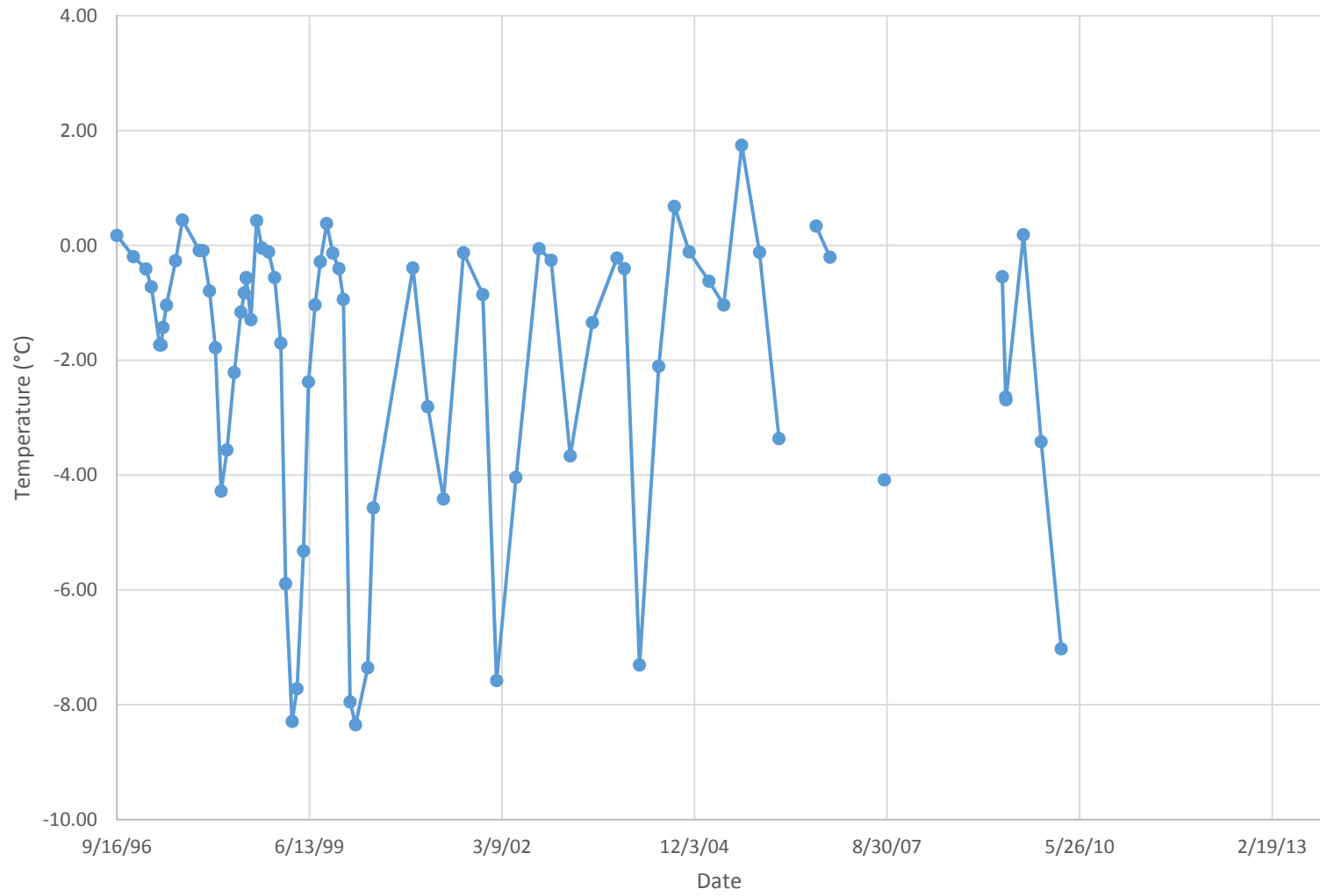
T-96-012S: Temperature at 0 feet



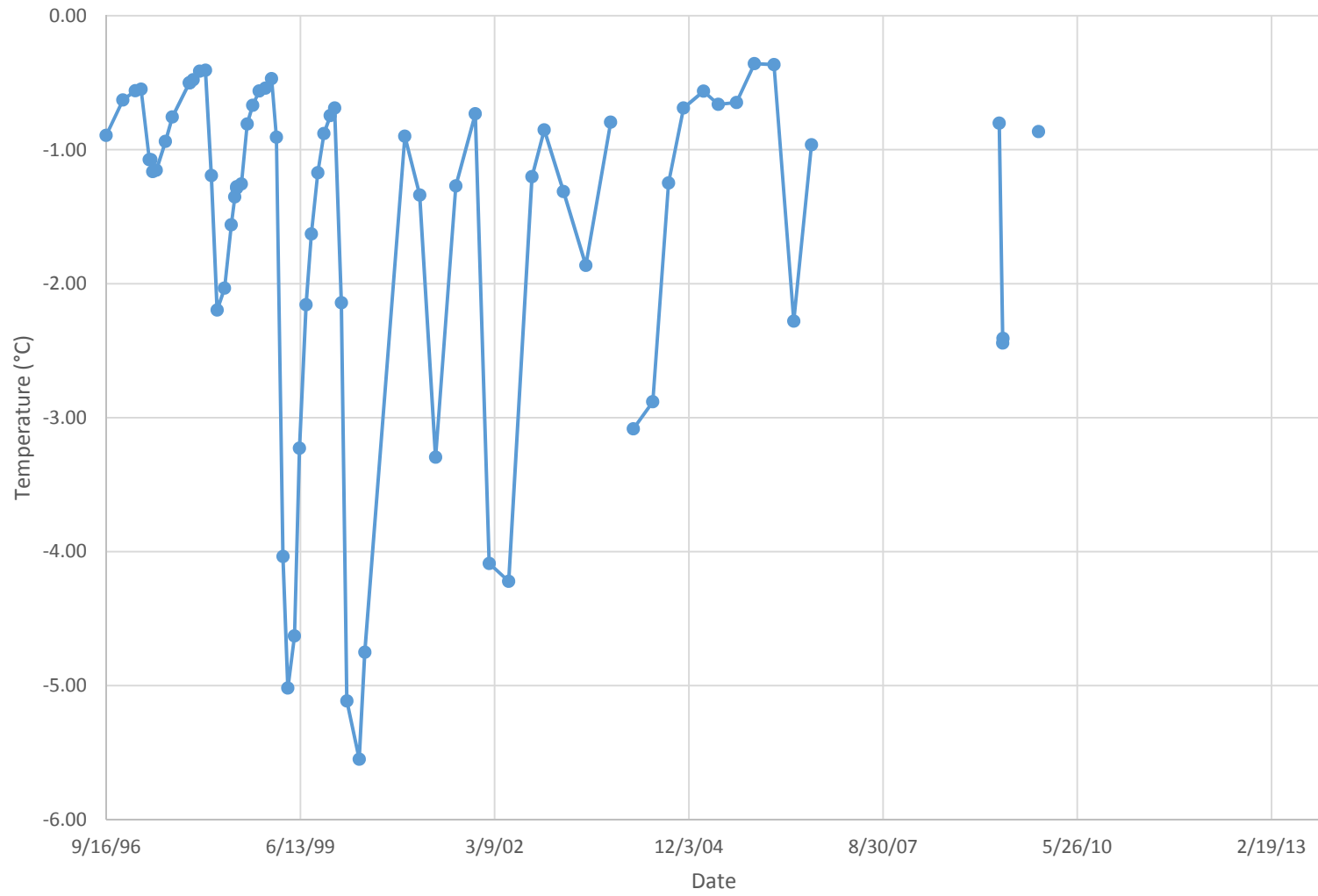
T-96-012S: Temperature at 2 feet



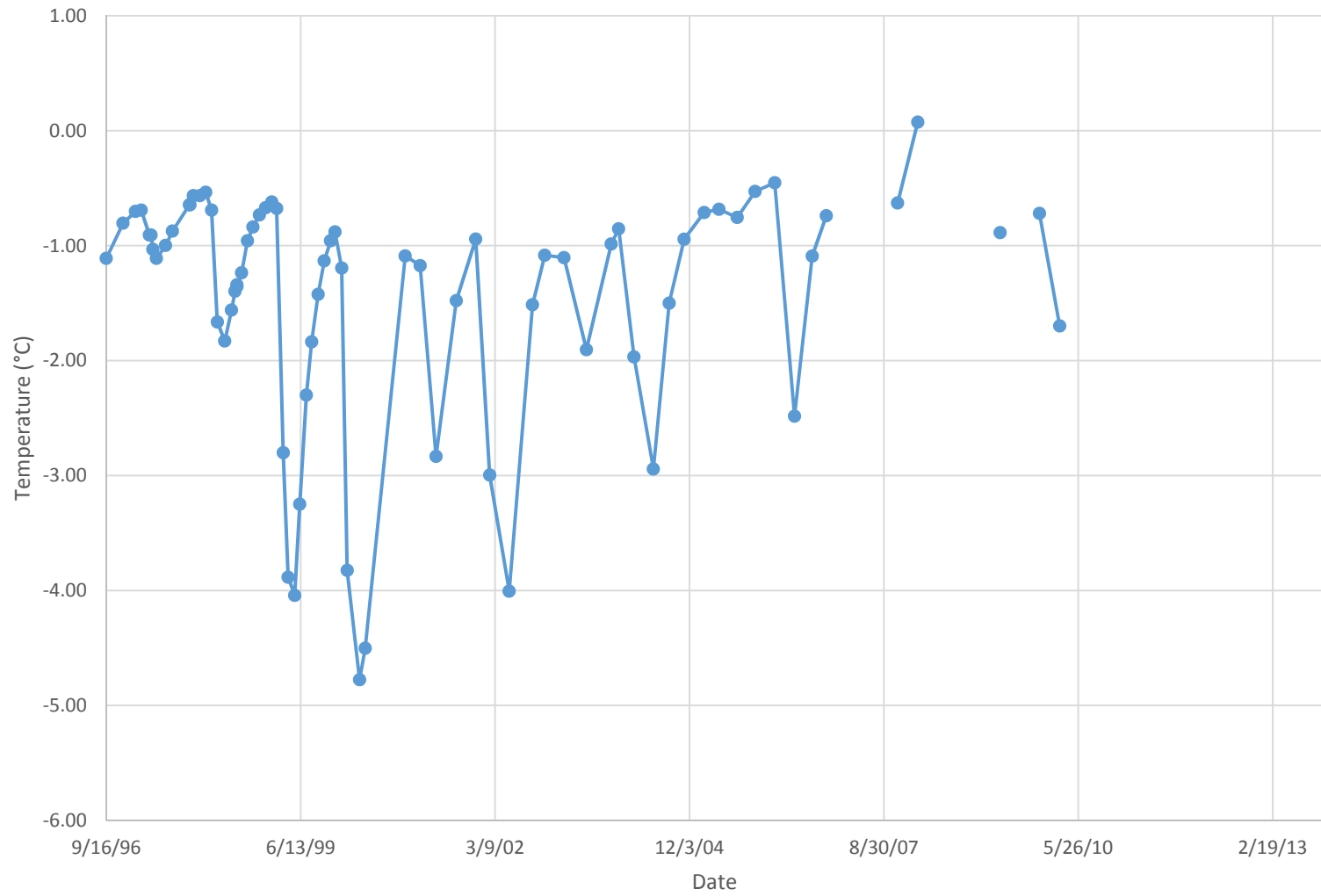
T-96-012S: Temperature at 7 feet



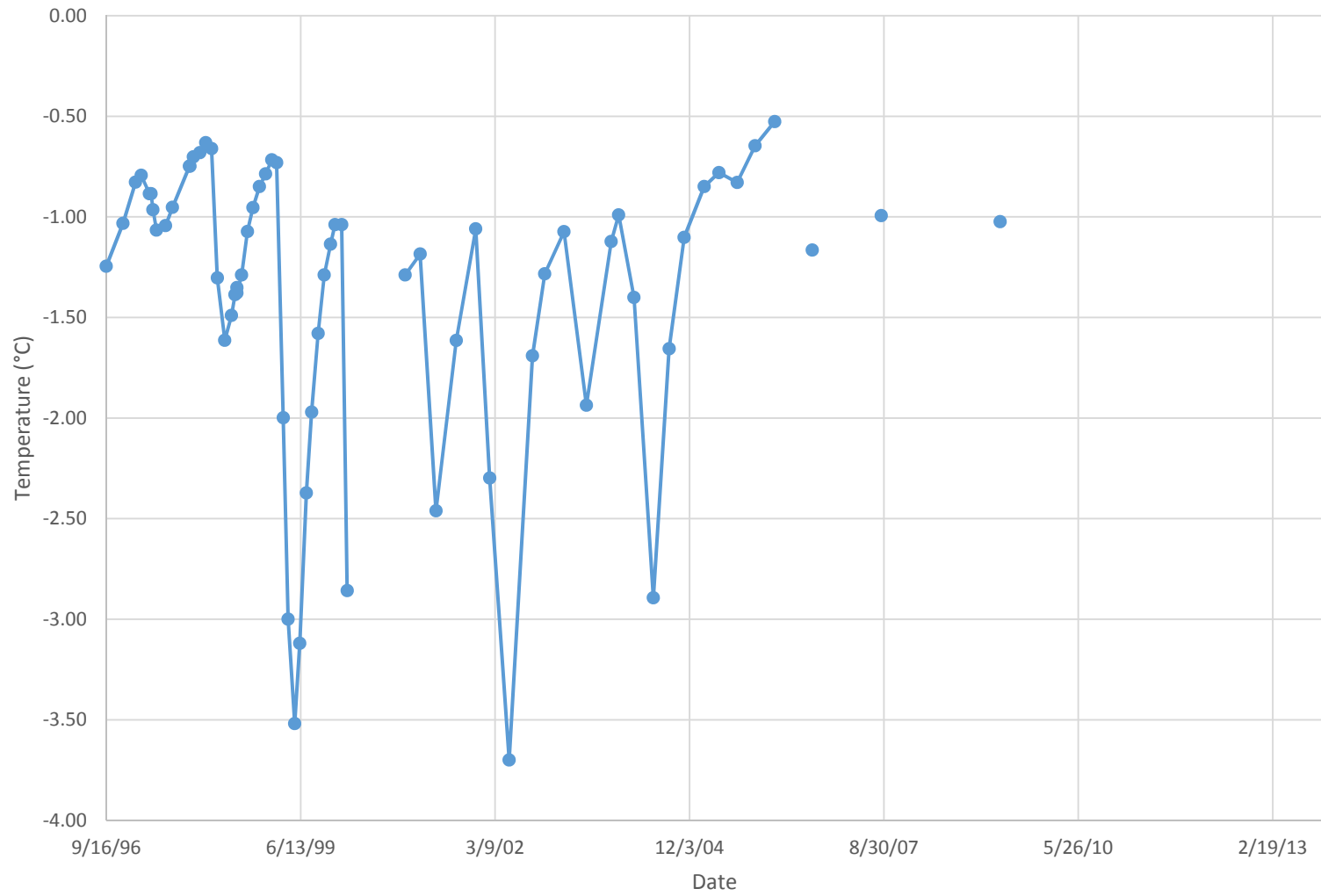
T-96-012S: Temperature at 12 feet



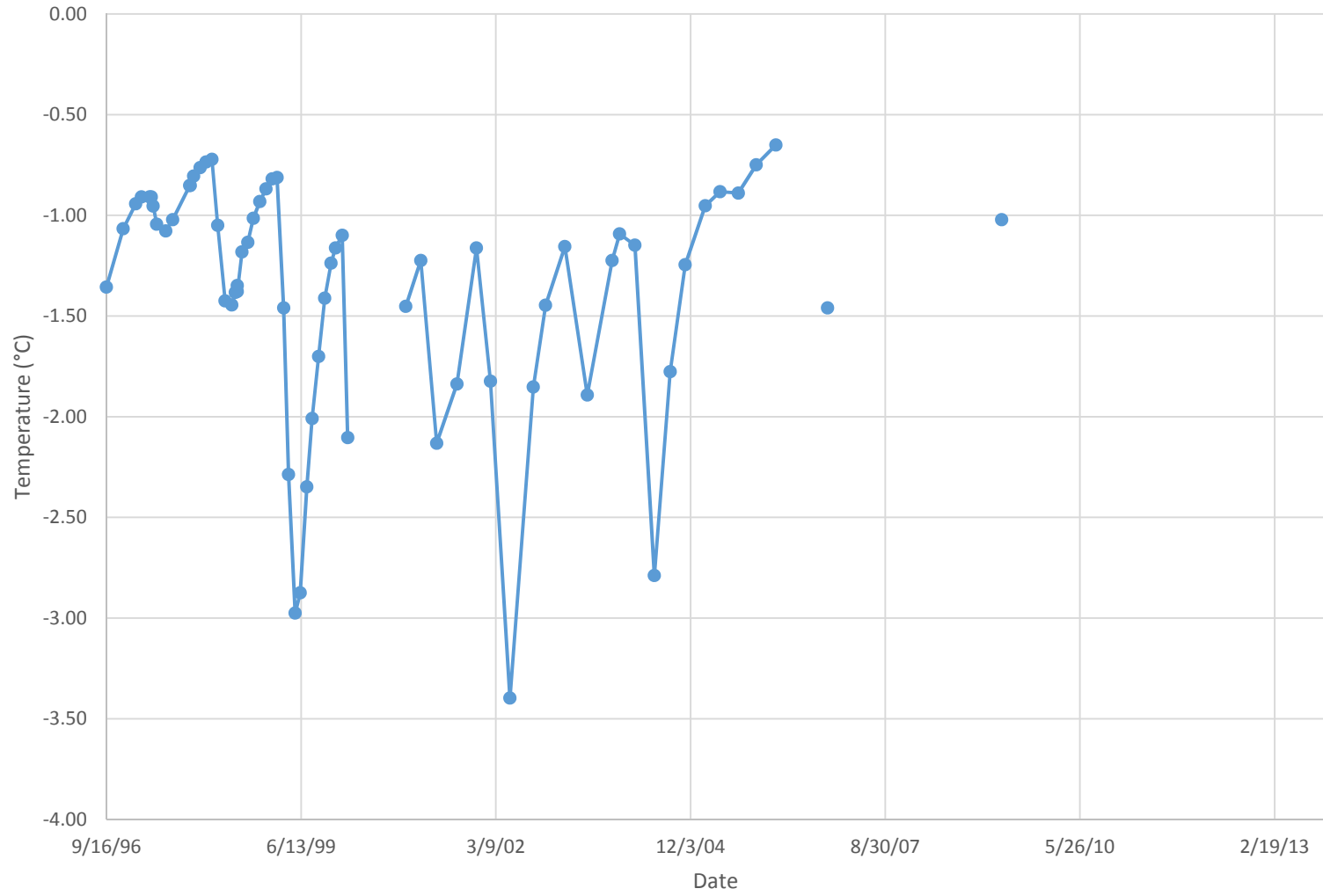
T-96-012S: Temperature at 15 feet



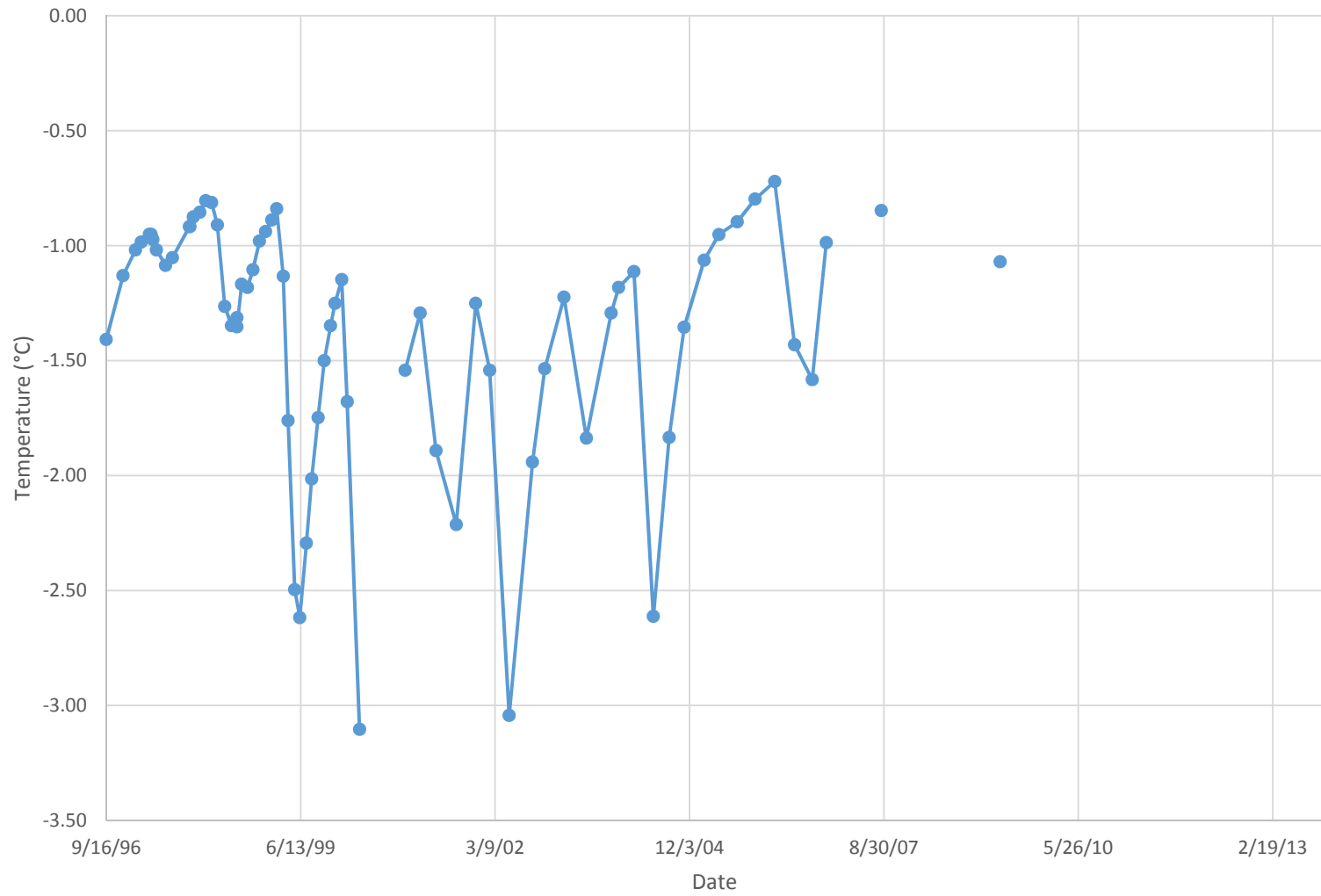
T-96-012S: Temperature at 17 feet



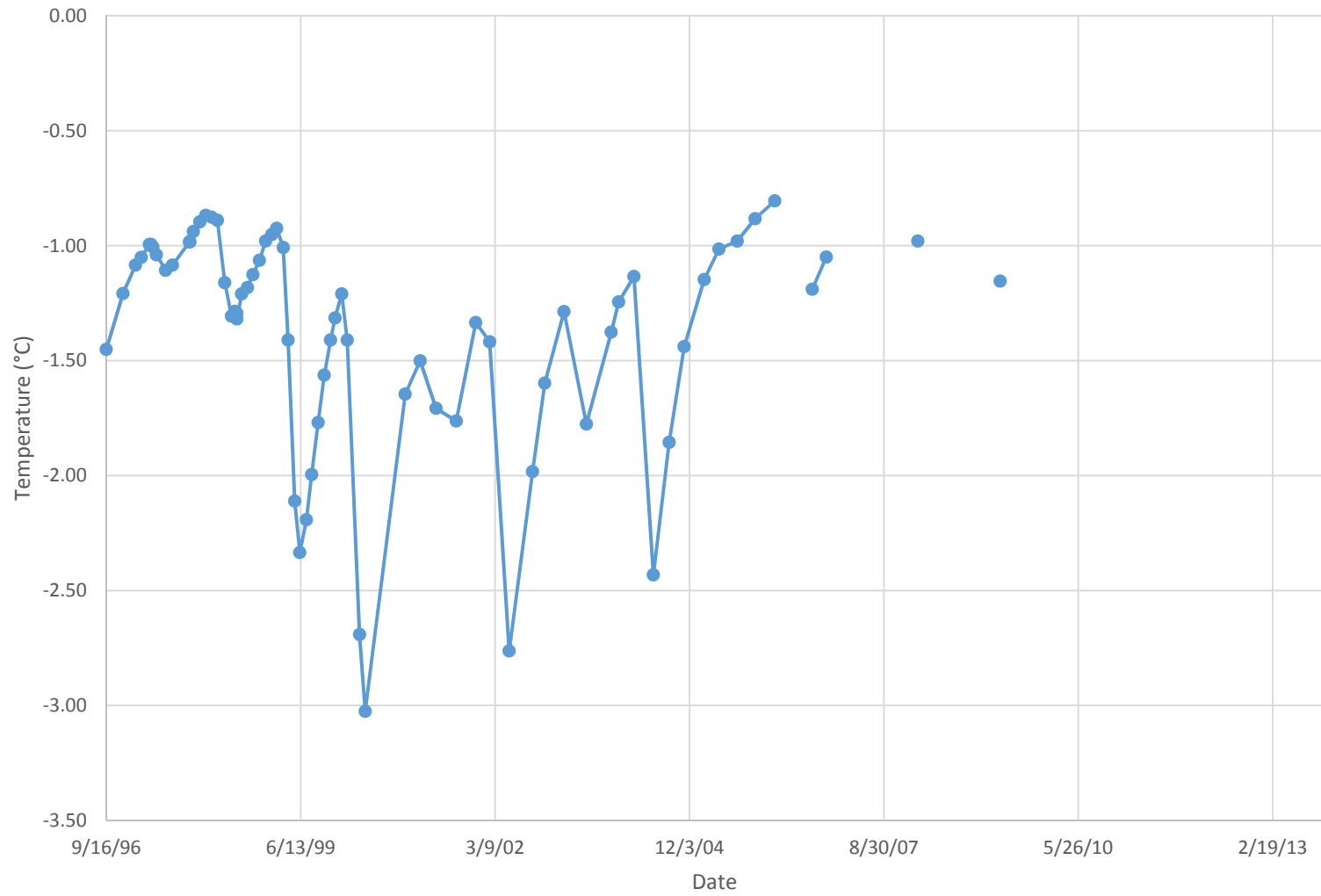
T-96-012S: Temperature at 20 feet



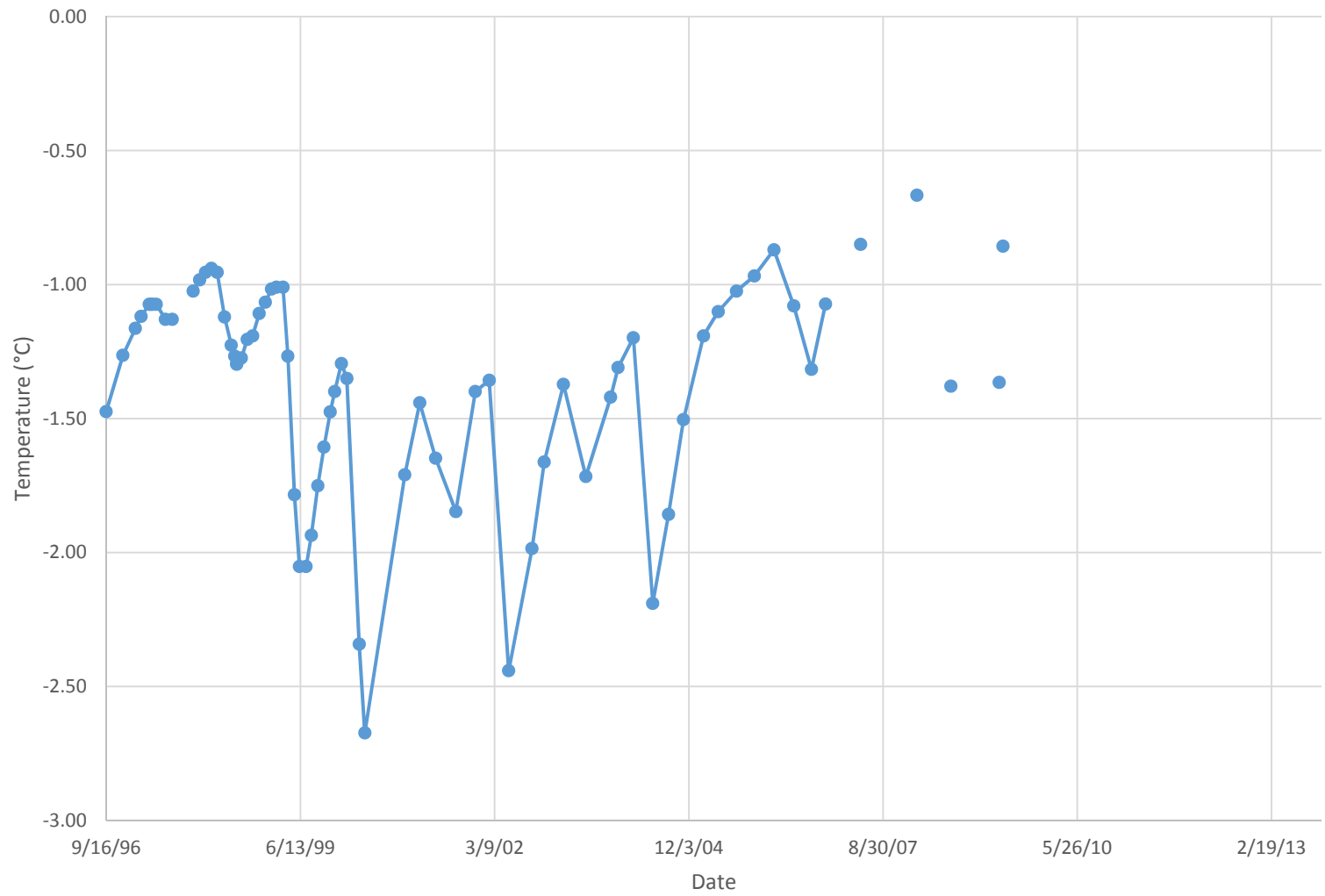
T-96-012S: Temperature at 22 feet



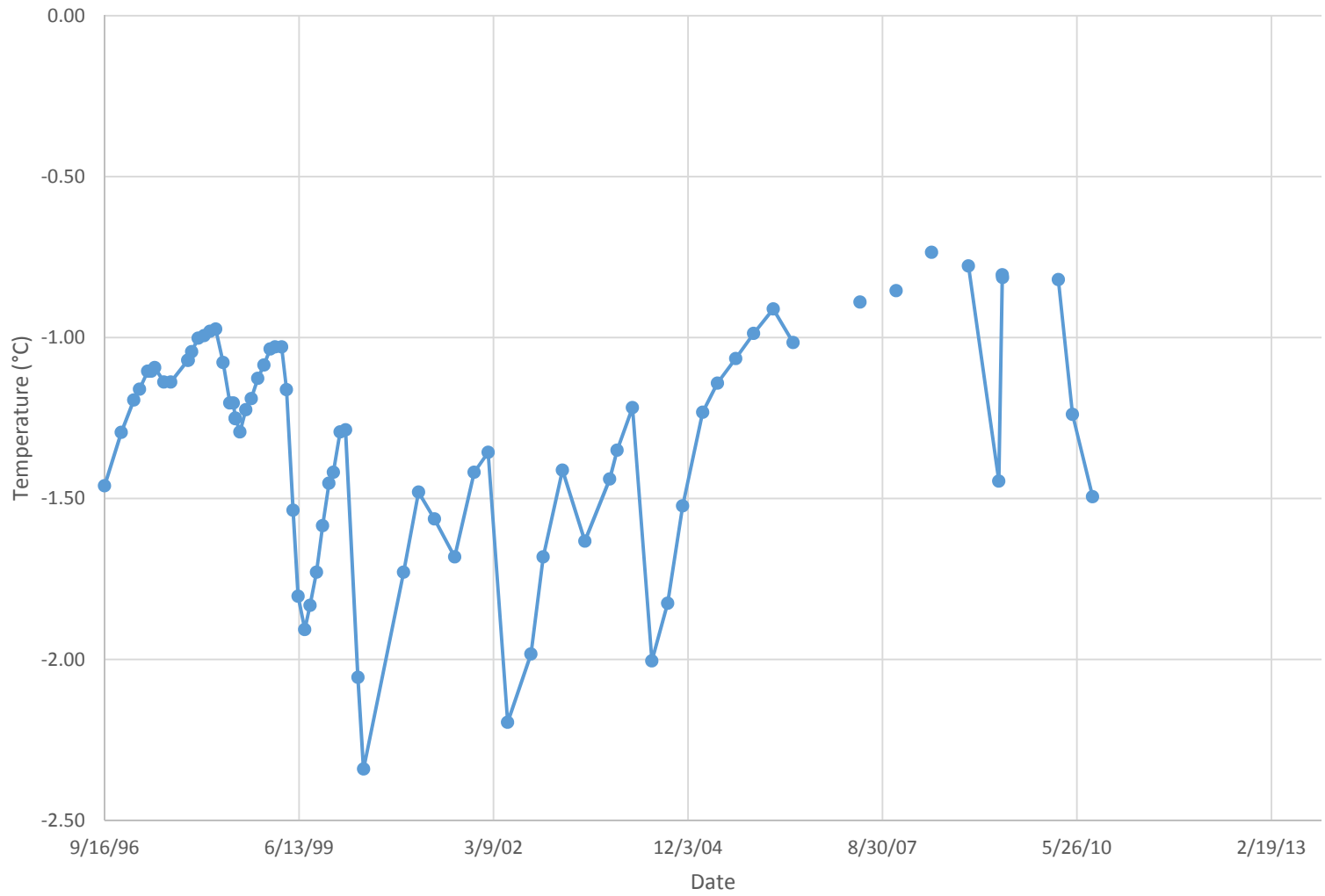
T-96-012S: Temperature at 25 feet



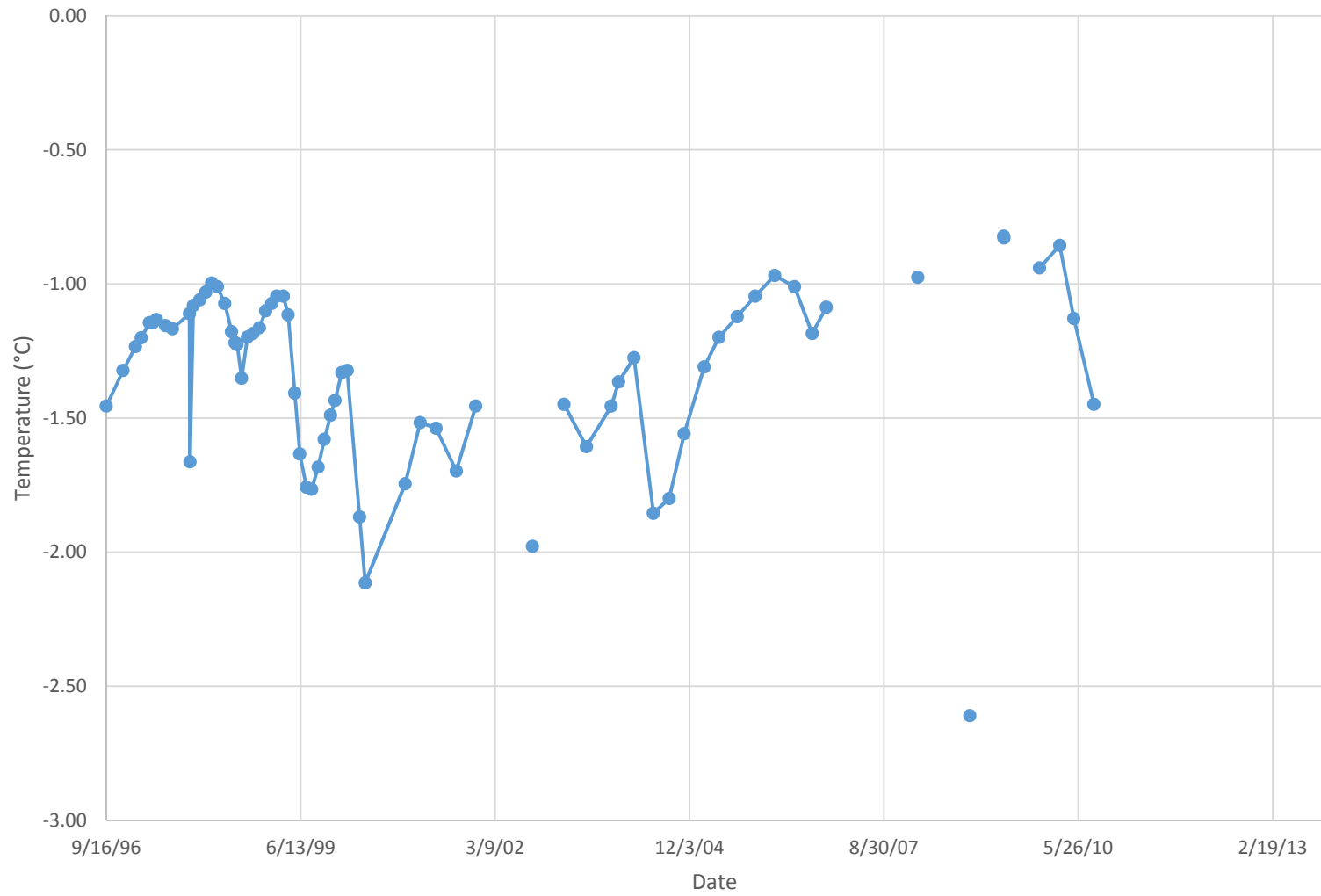
T-96-012S: Temperature at 27 feet



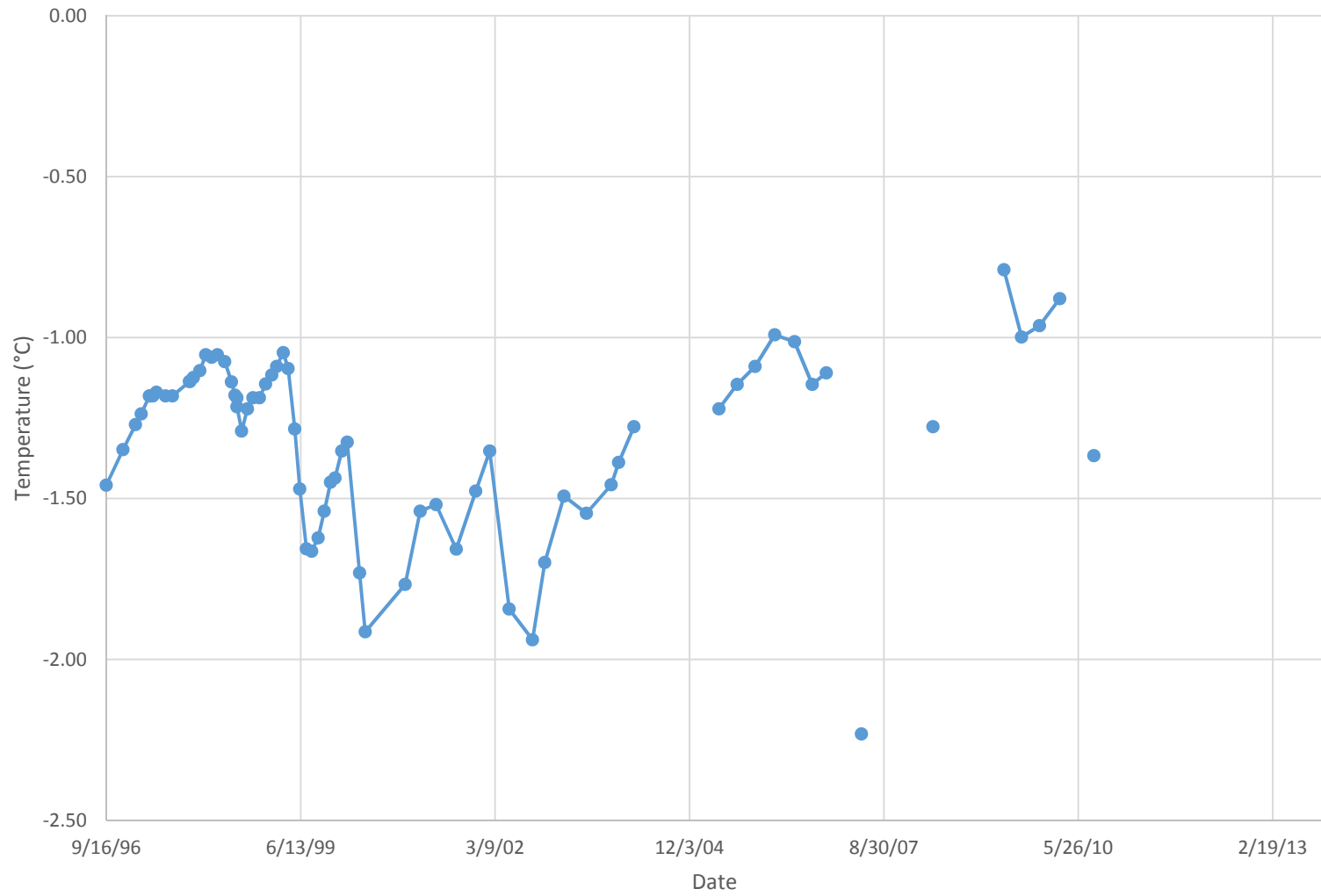
T-96-012S: Temperature at 30 feet



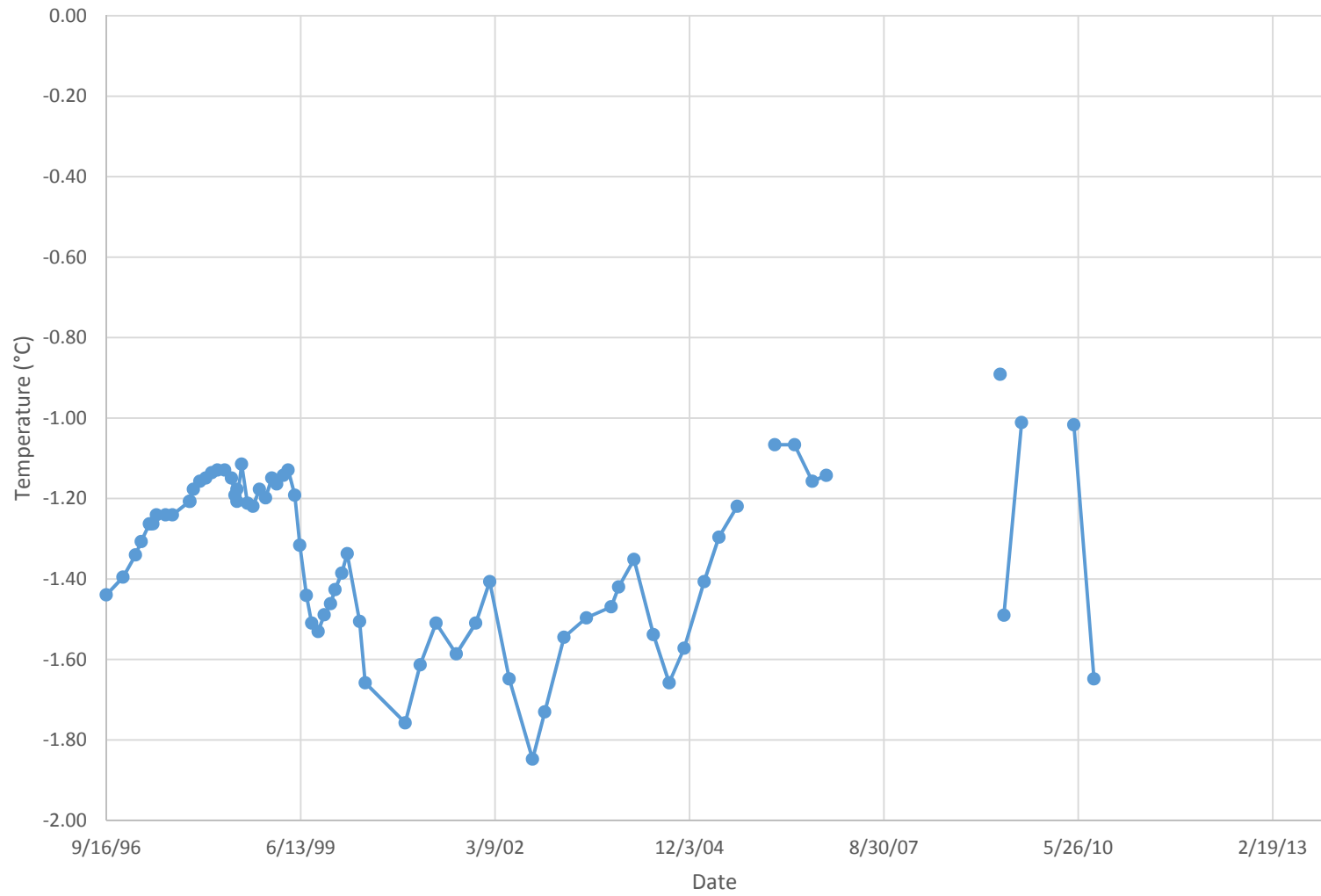
T-96-012S: Temperature at 32 feet



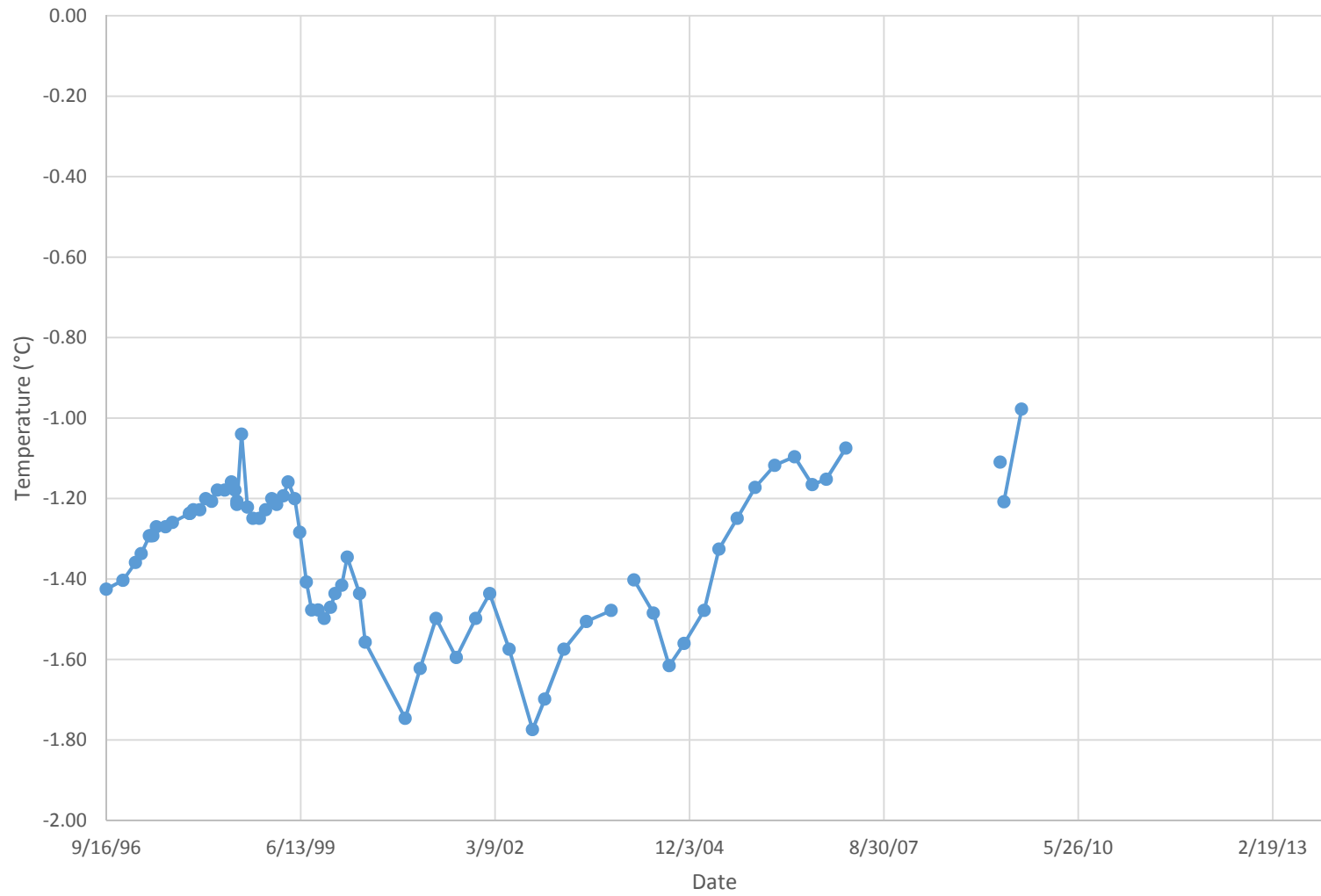
T-96-012S: Temperature at 35 feet



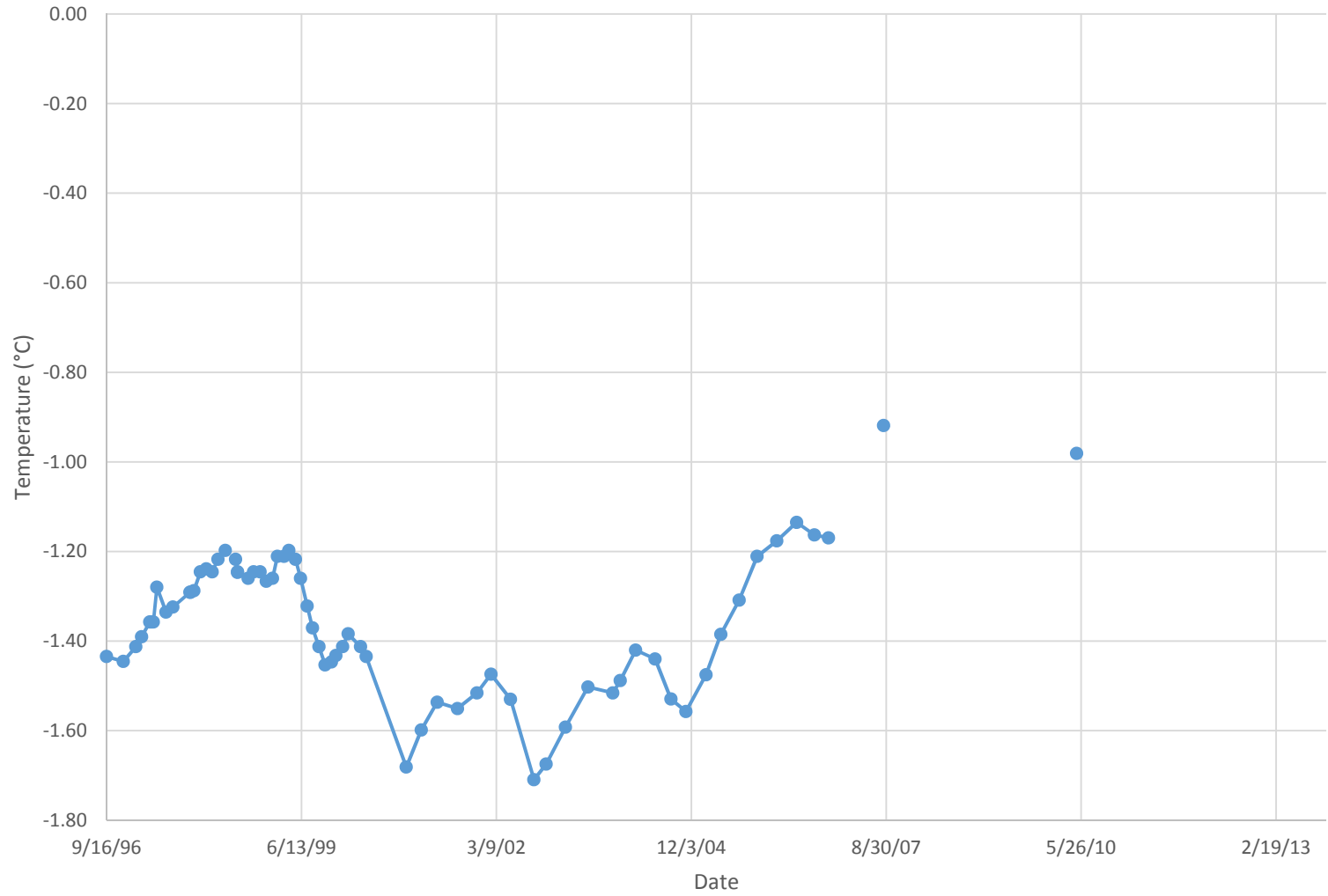
T-96-012S: Temperature at 40 feet



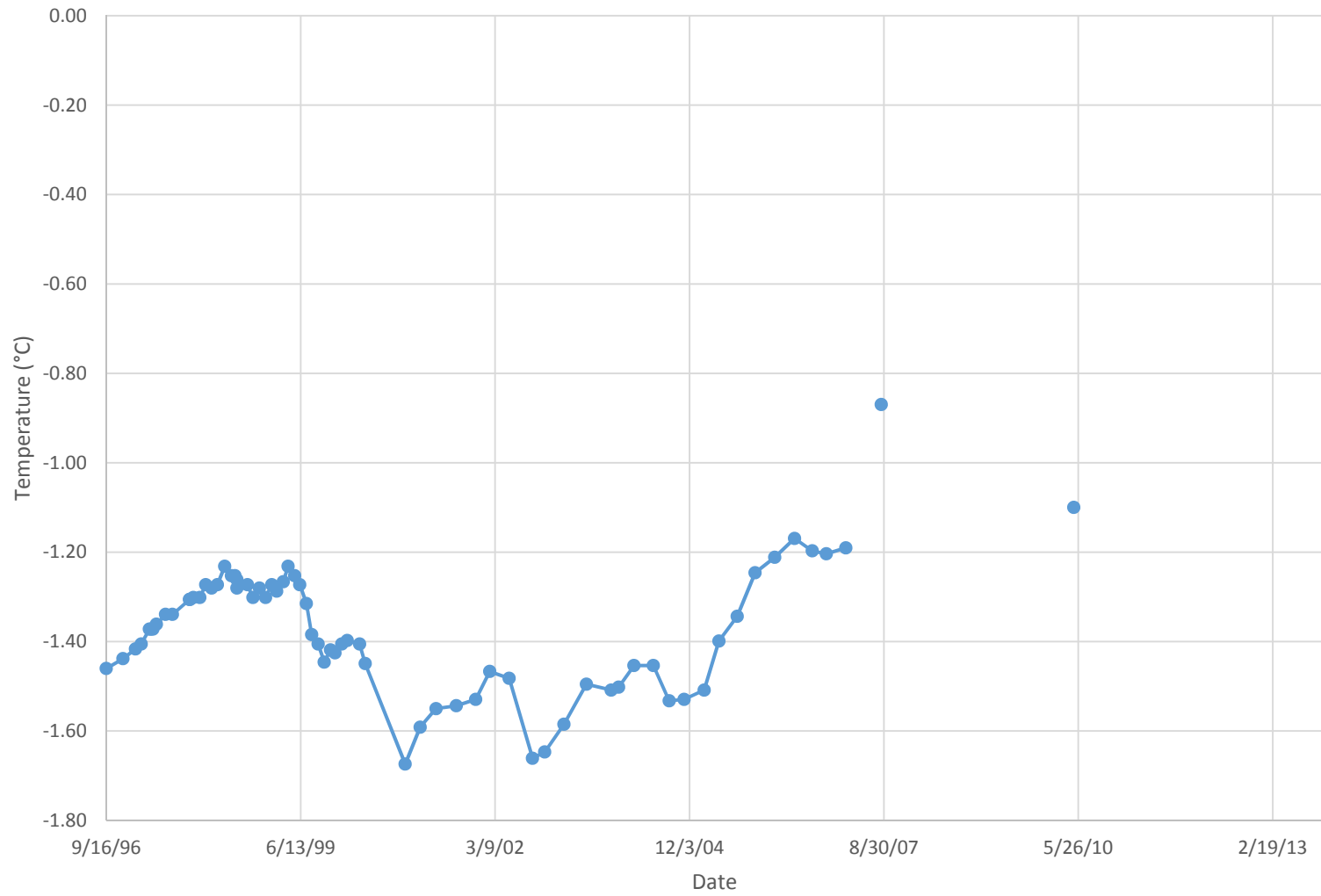
T-96-012S: Temperature at 42 feet



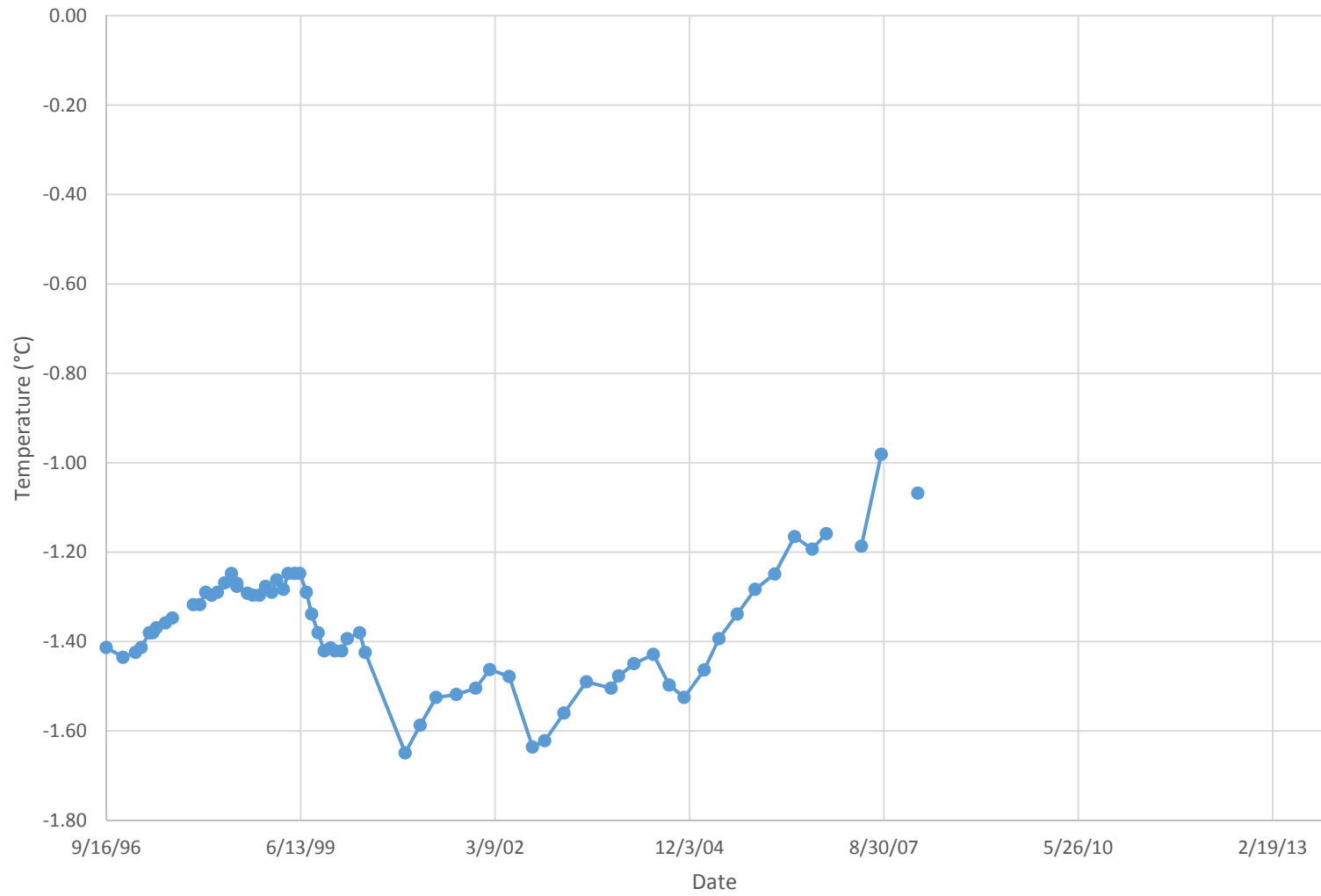
T-96-012S: Temperature at 47 feet



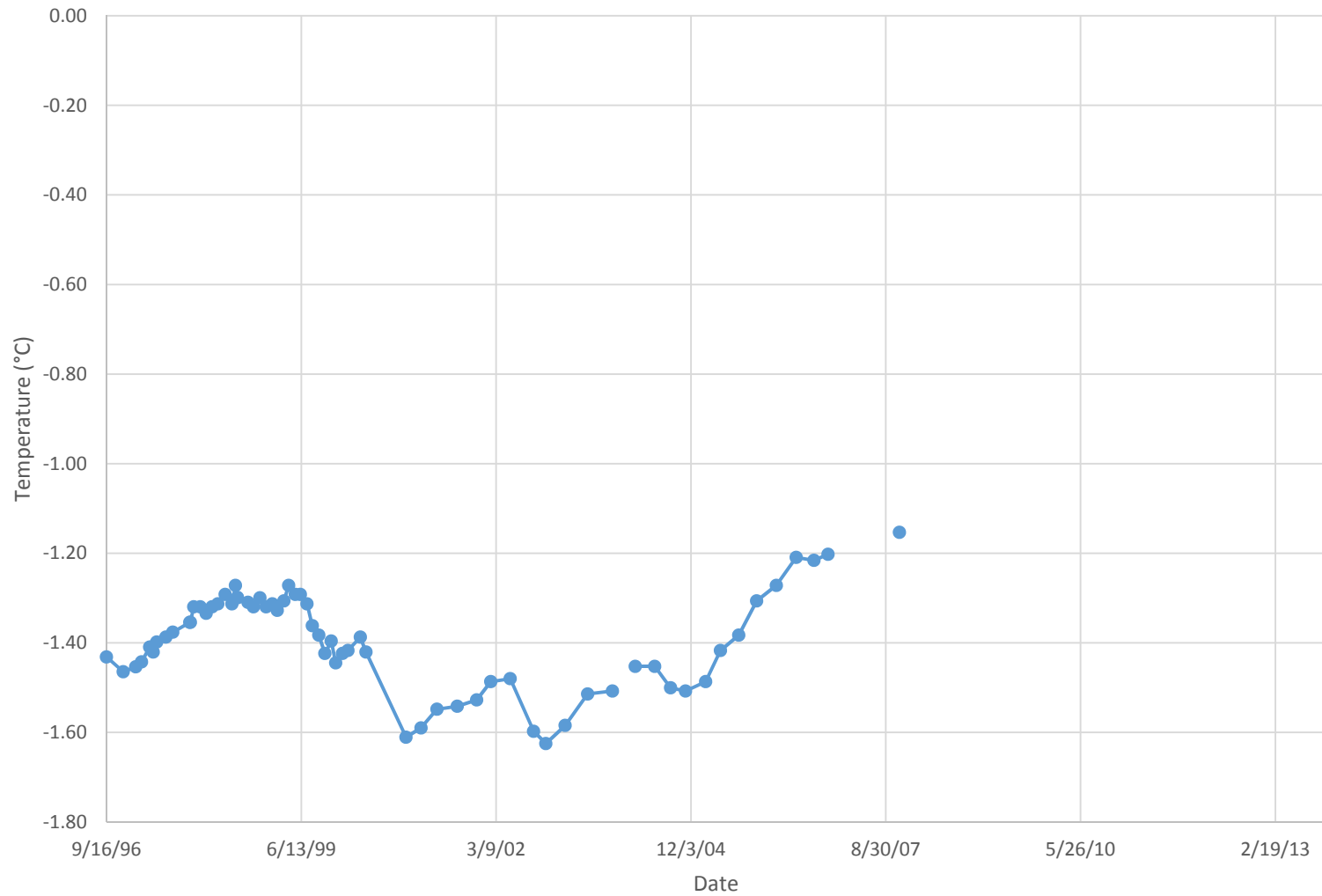
T-96-012S: Temperature at 50 feet



T-96-012S: Temperature at 52 feet

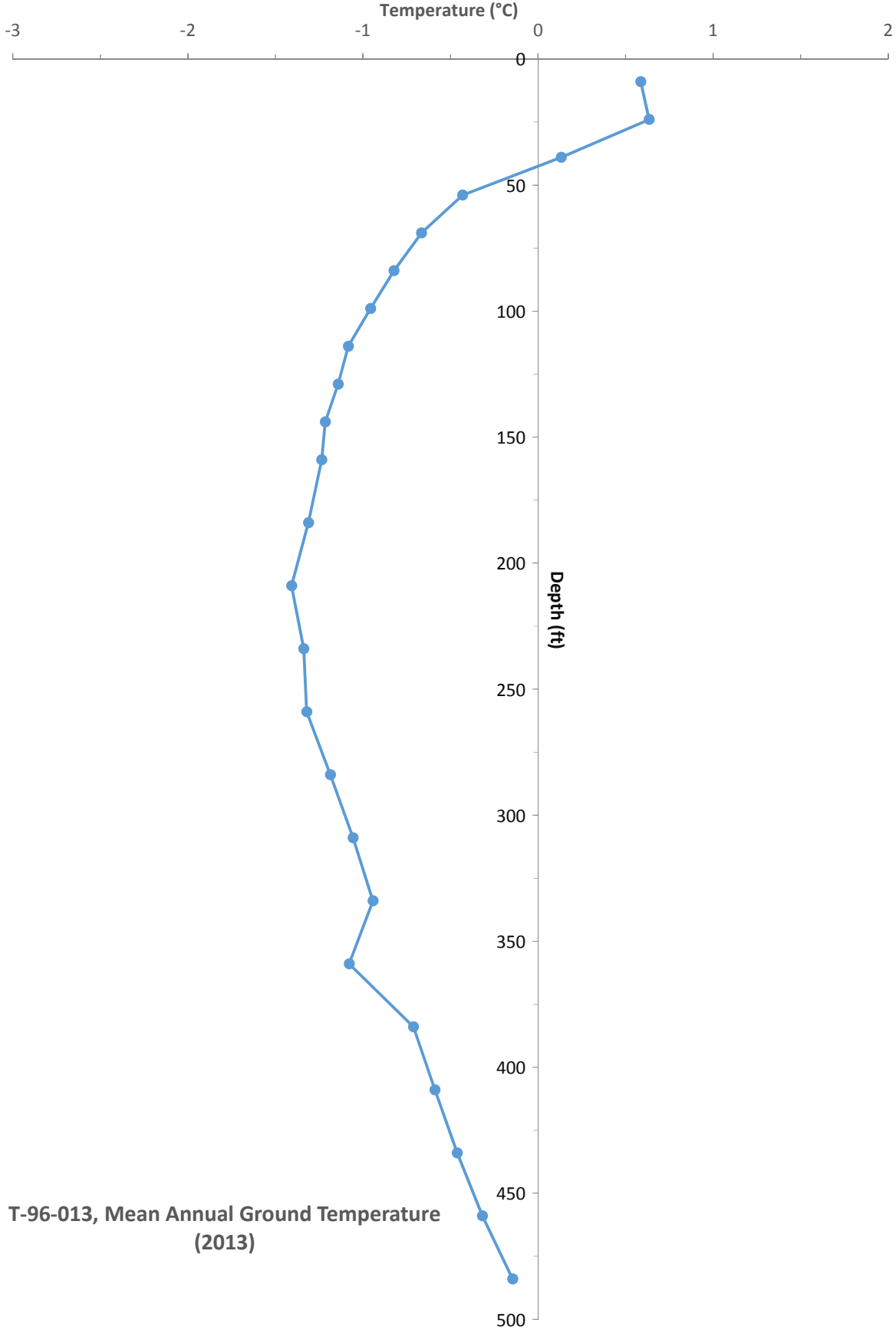


T-96-012S: Temperature at 55 feet



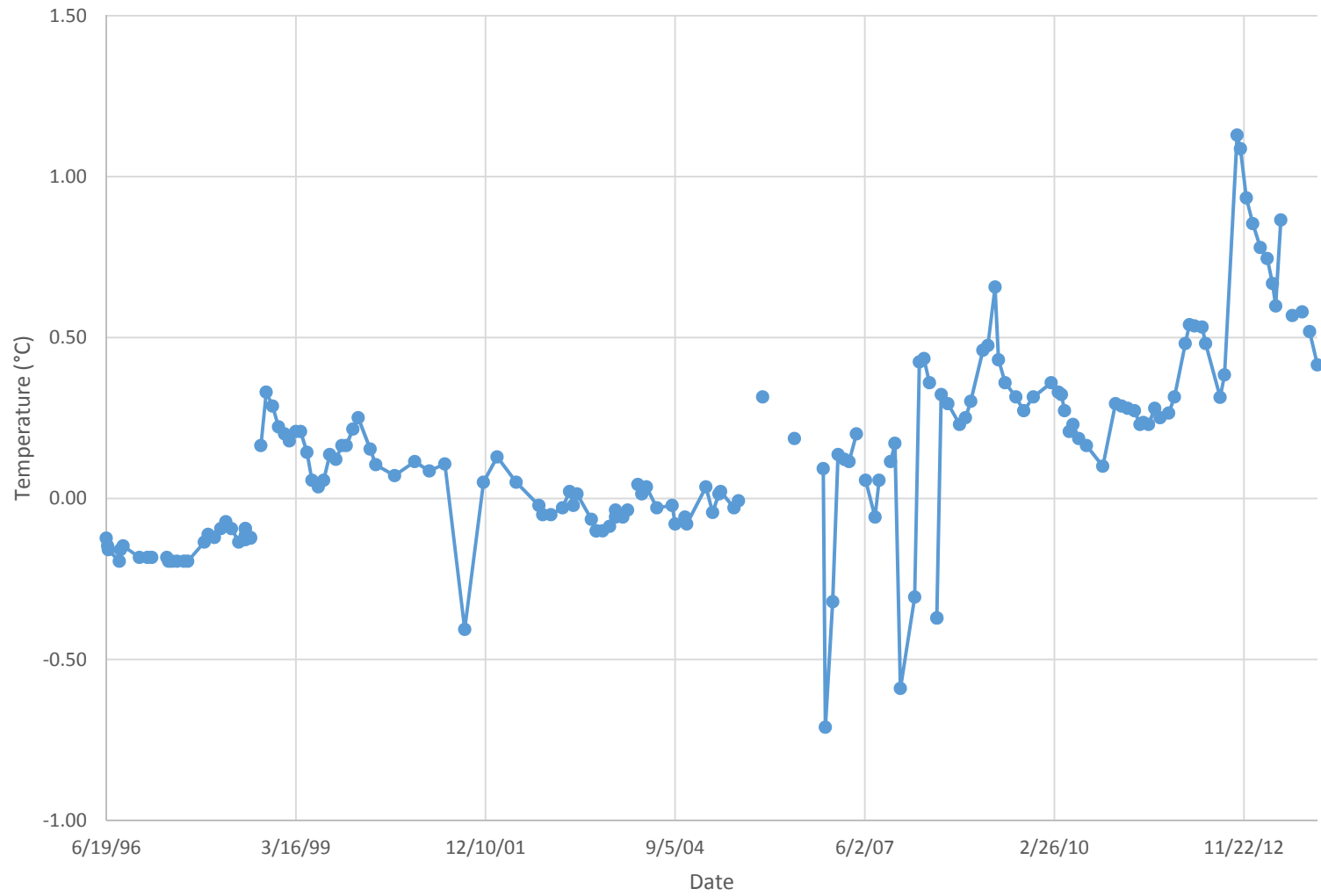


Temperature Depth Plot for T-96-013

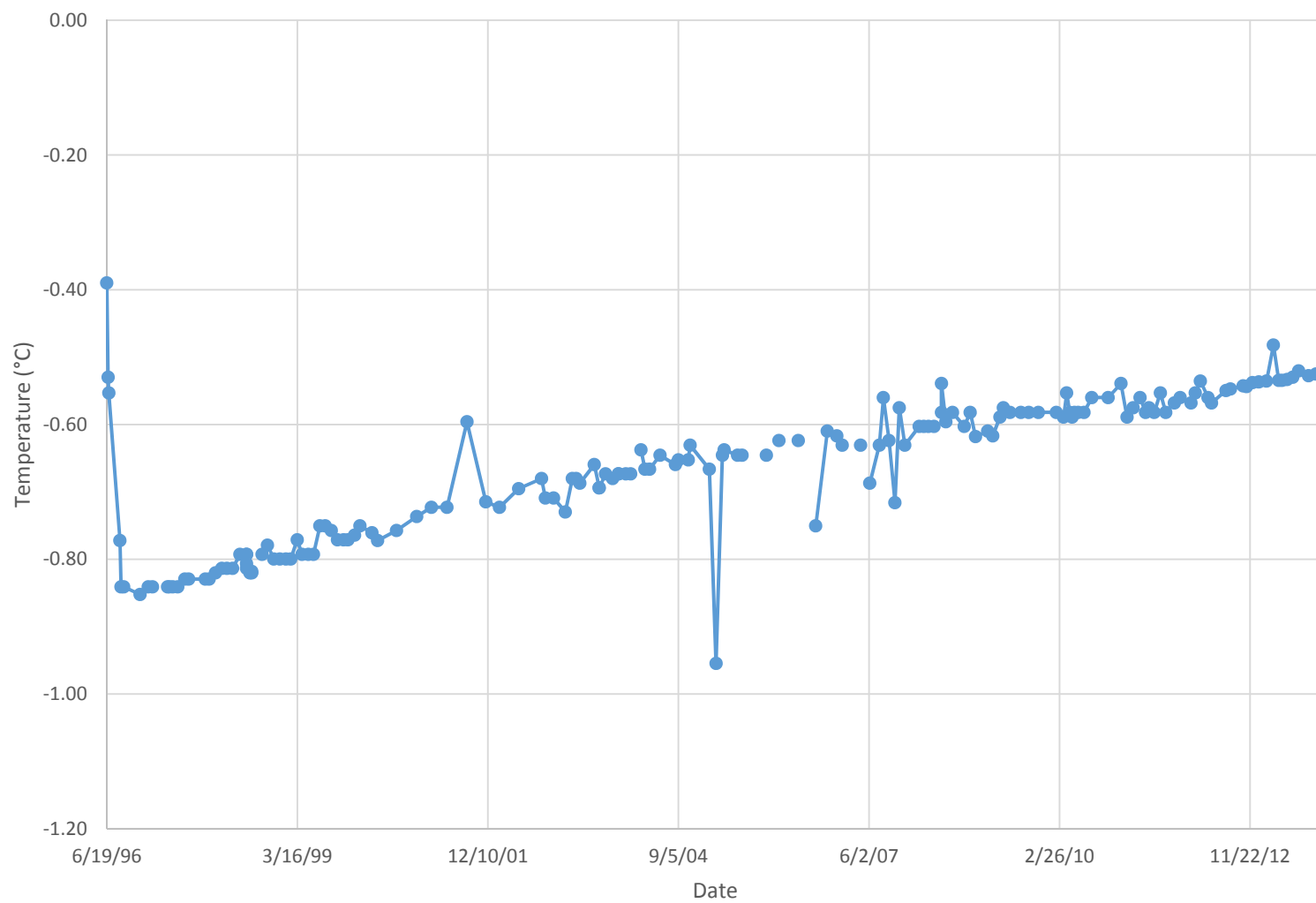


T-96-013, Mean Annual Ground Temperature (2013)

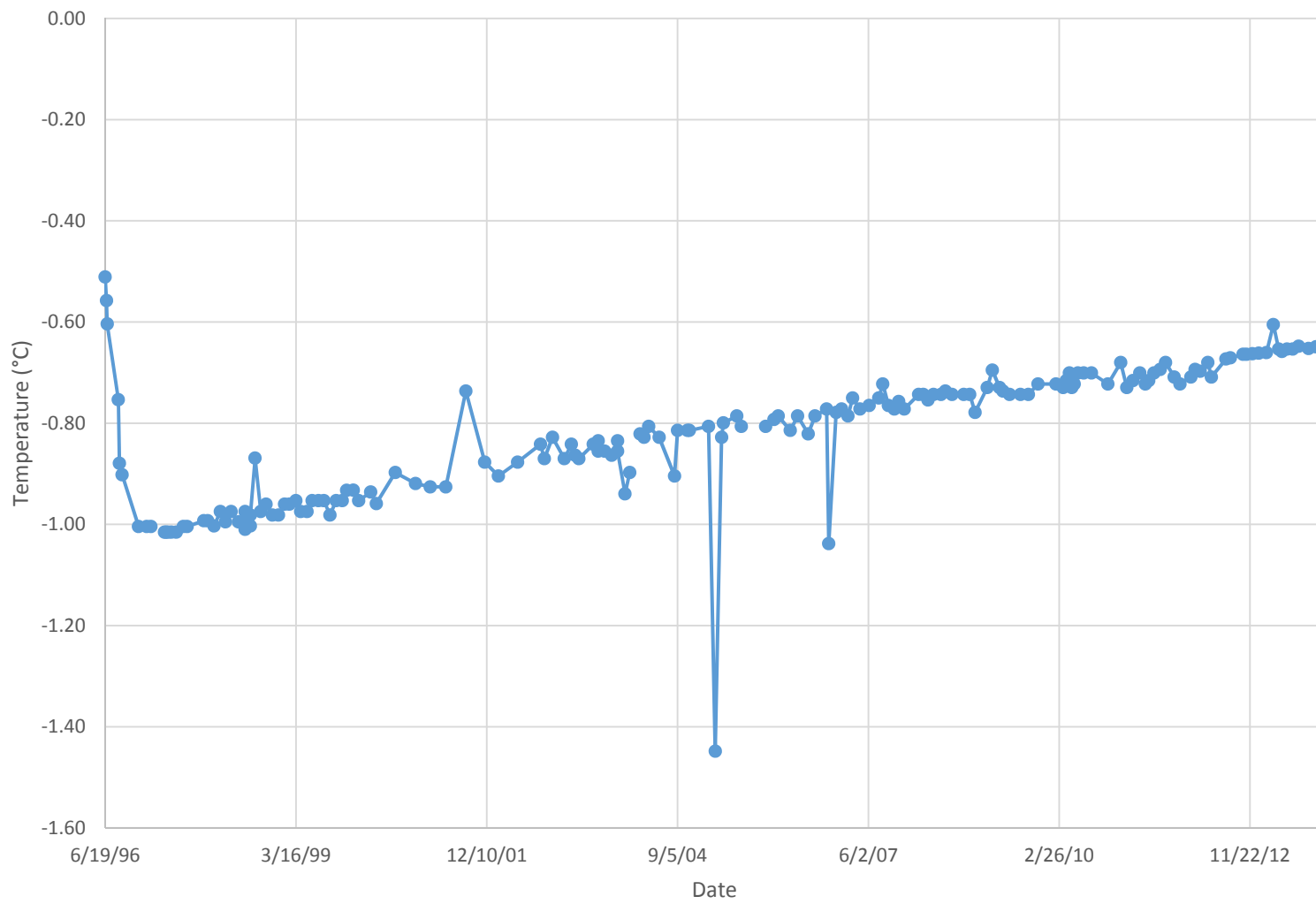
T-96-013: Temperature at 39 feet



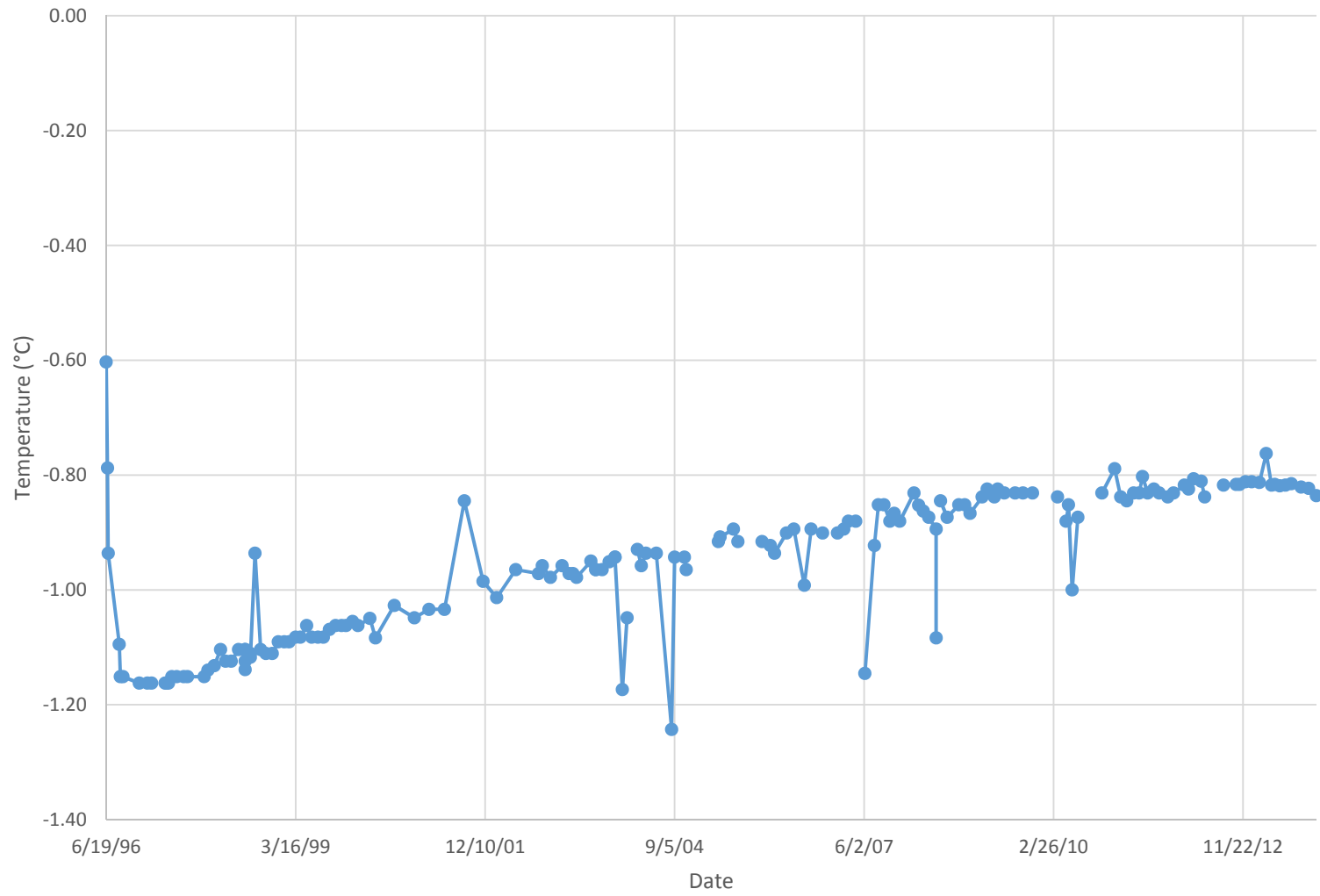
T-96-013: Temperature at 69 feet



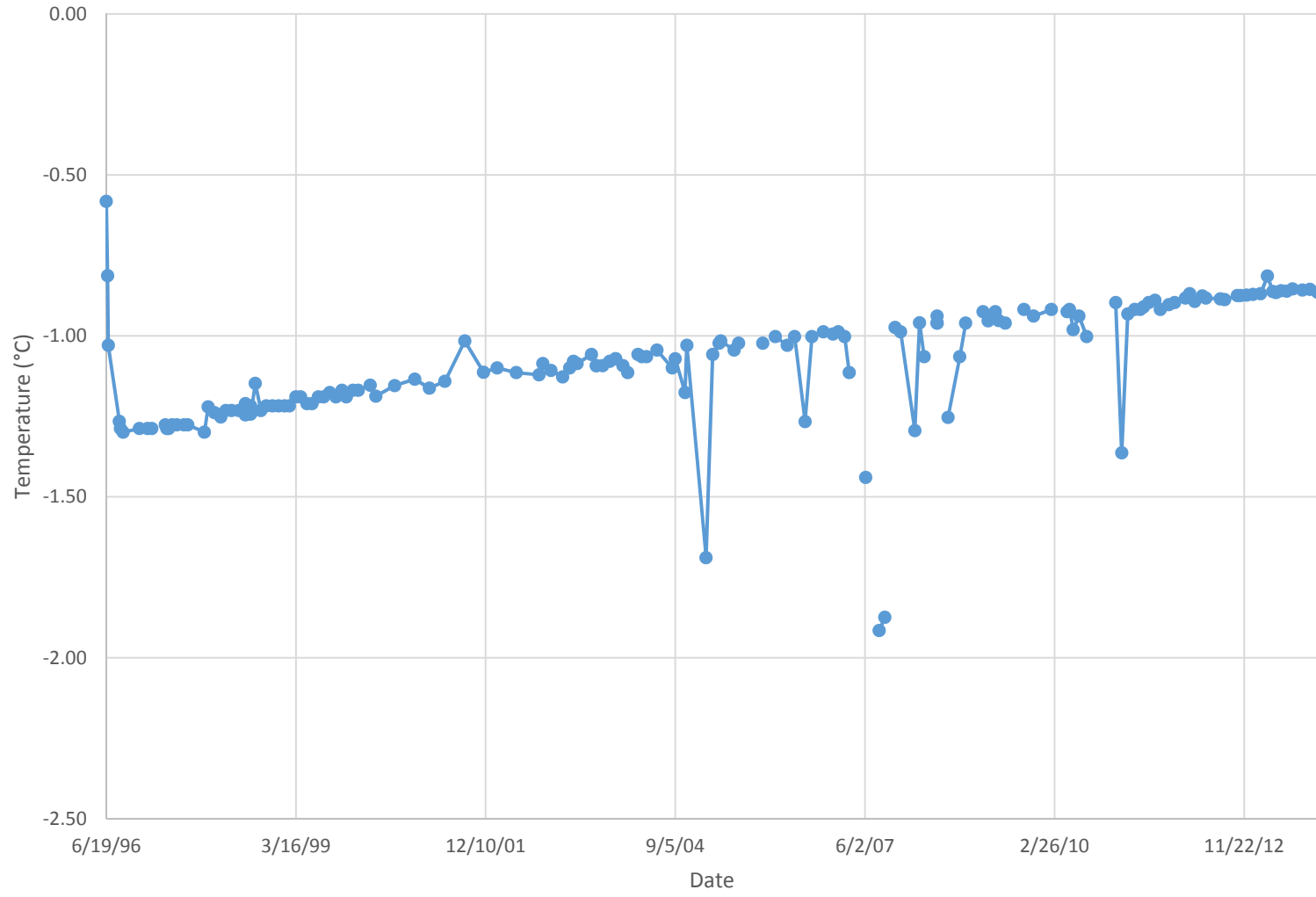
T-96-013: Temperature at 84 feet



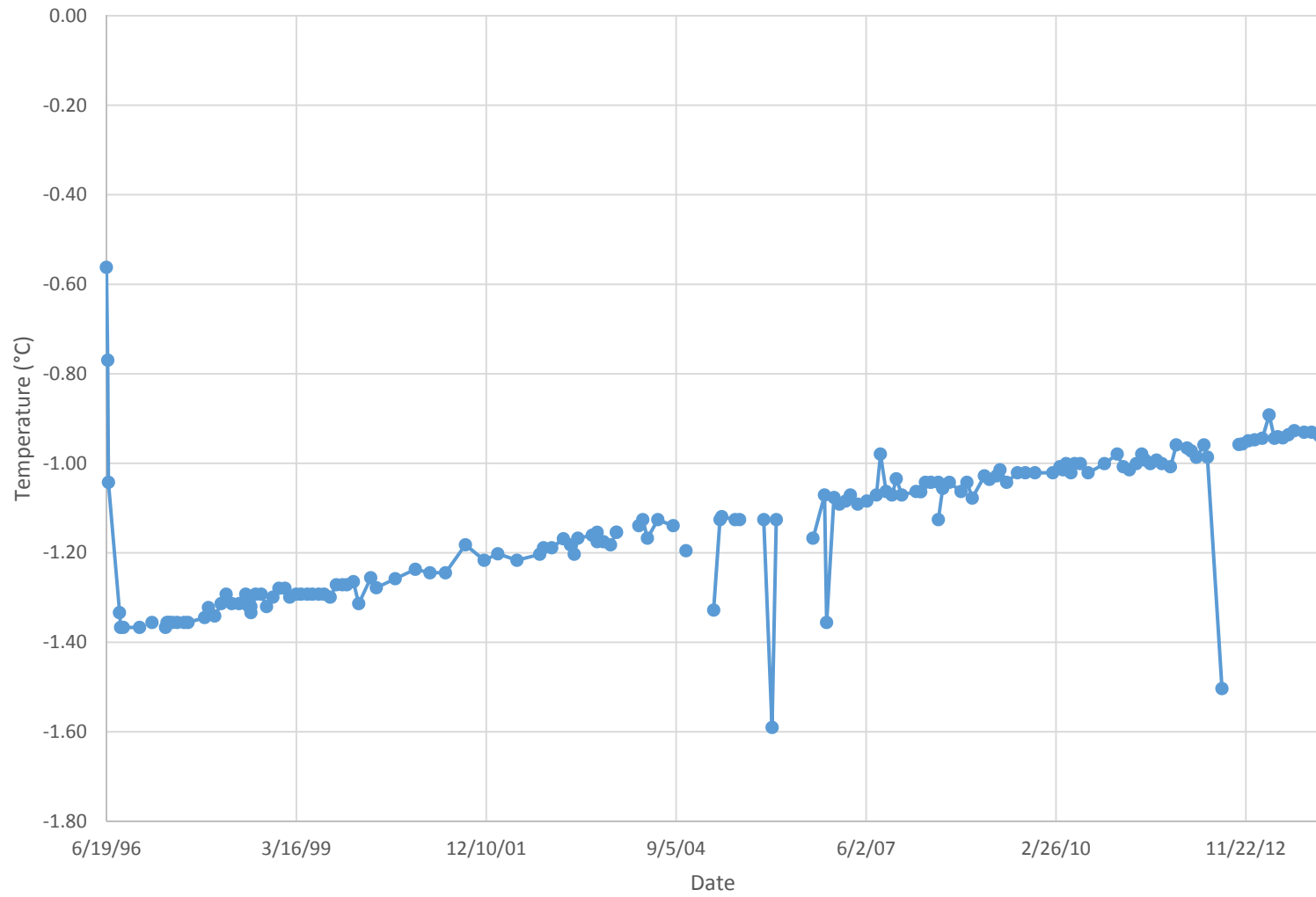
T-96-013: Temperature at 99 feet



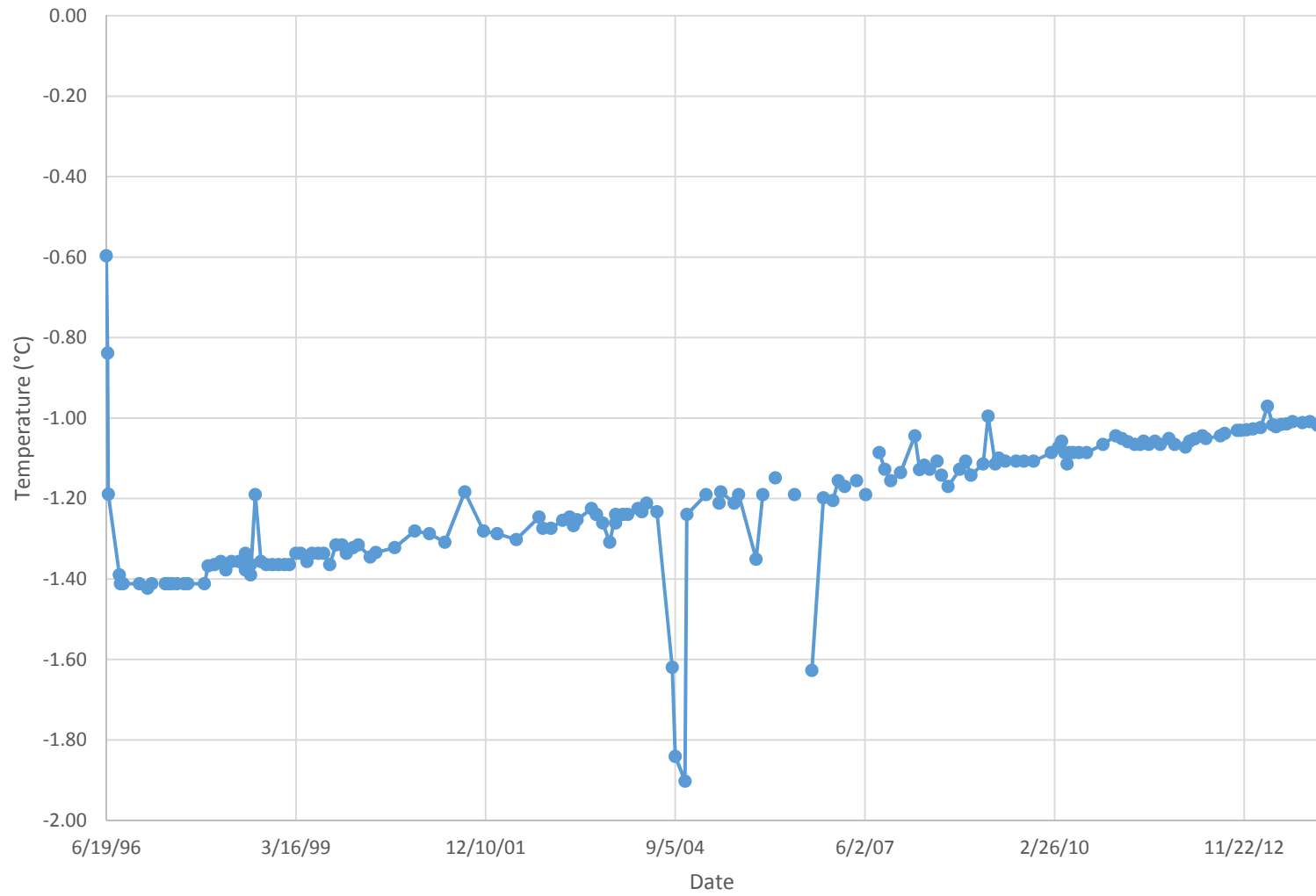
T-96-013: Temperature at 114 feet



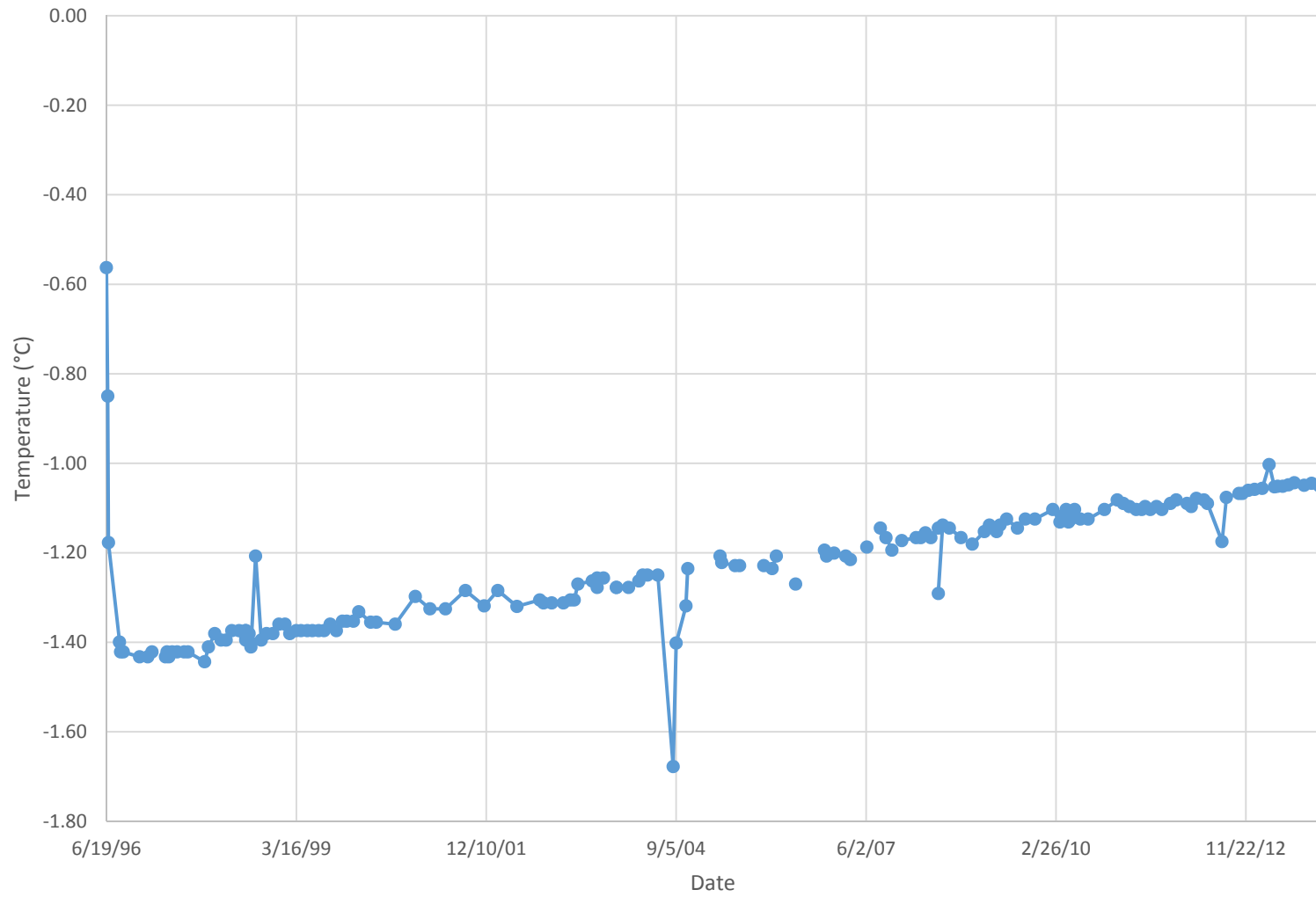
T-96-013: Temperature at 129 feet



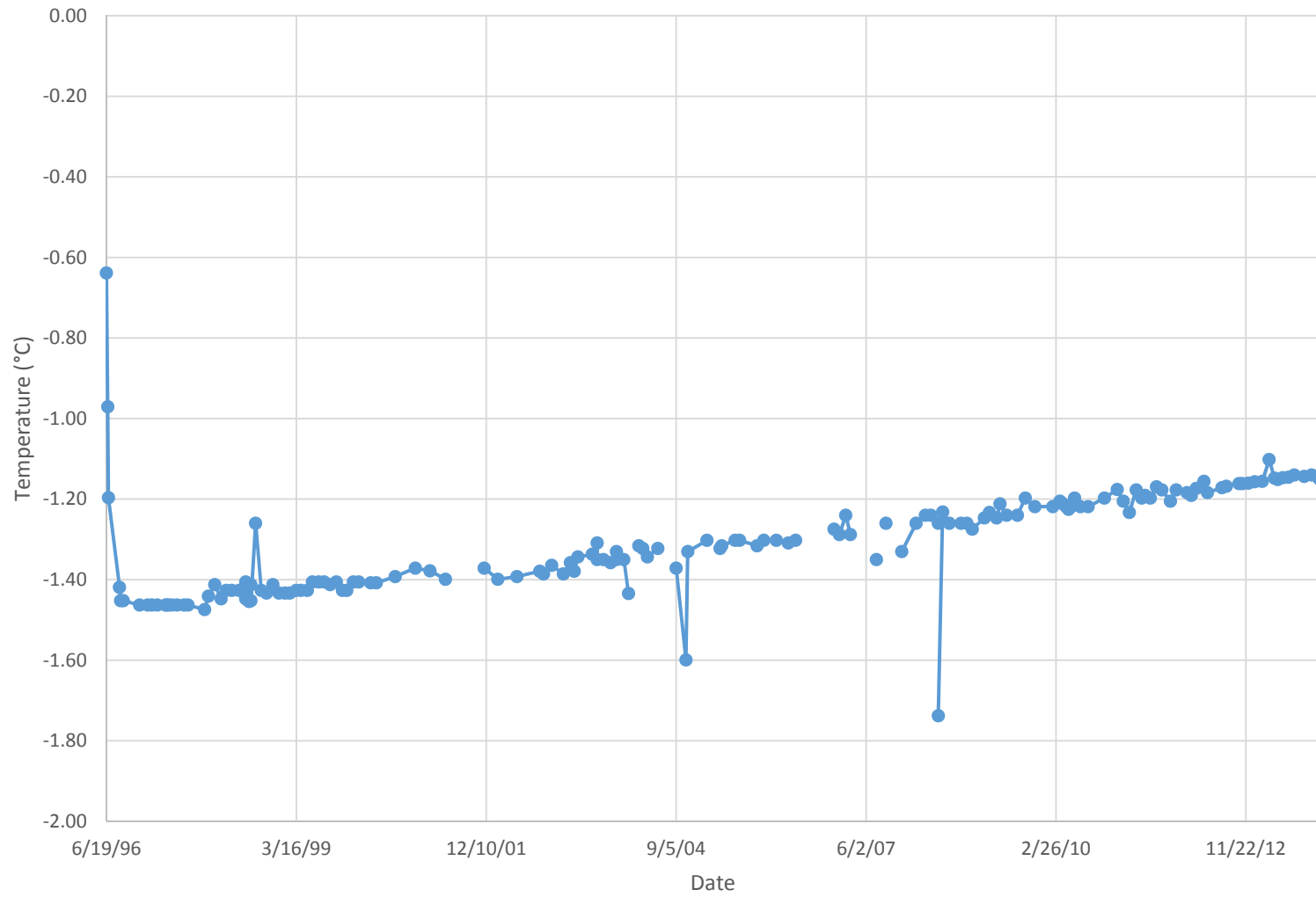
T-96-013: Temperature at 144 feet



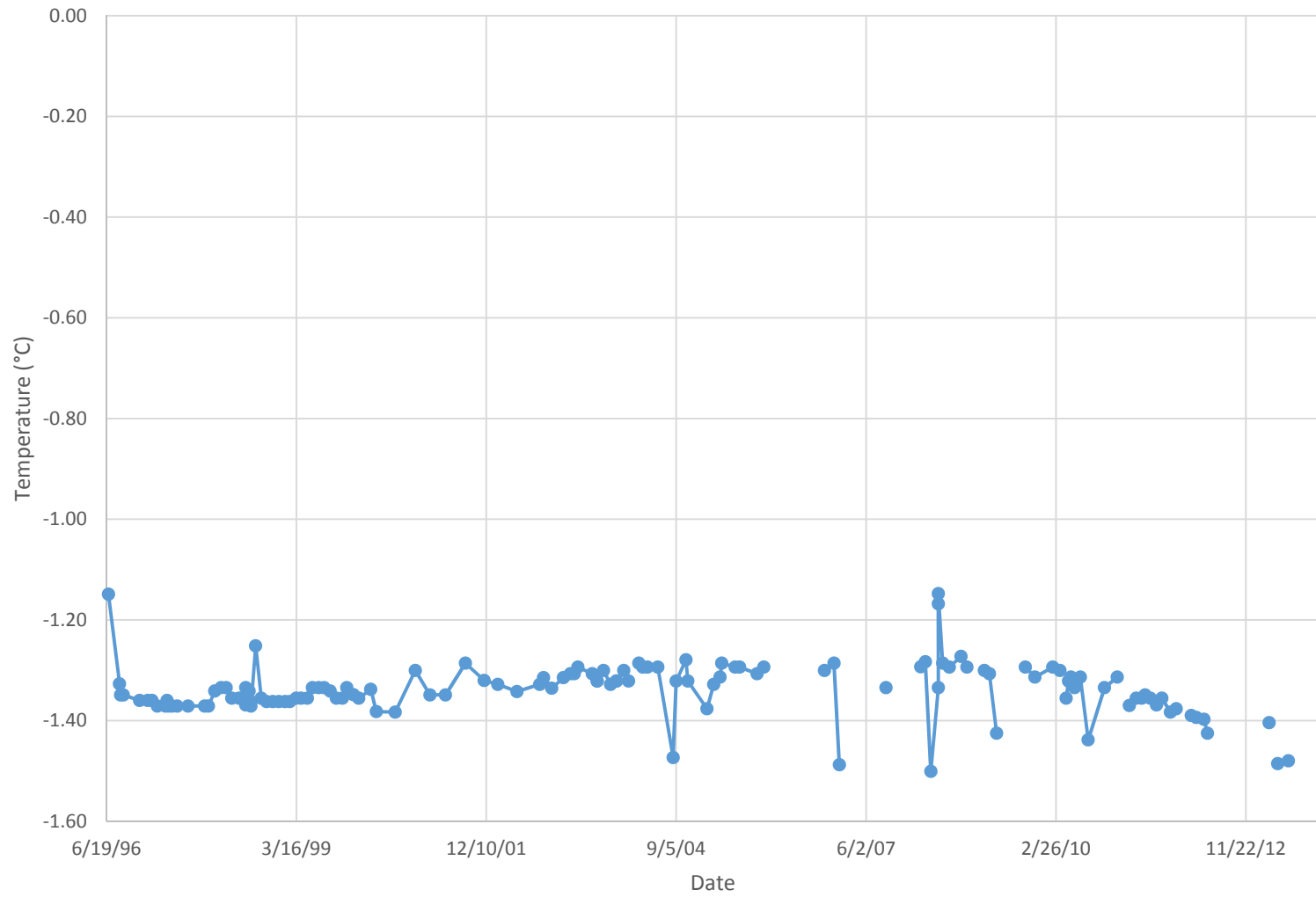
T-96-013: Temperature at 159 feet



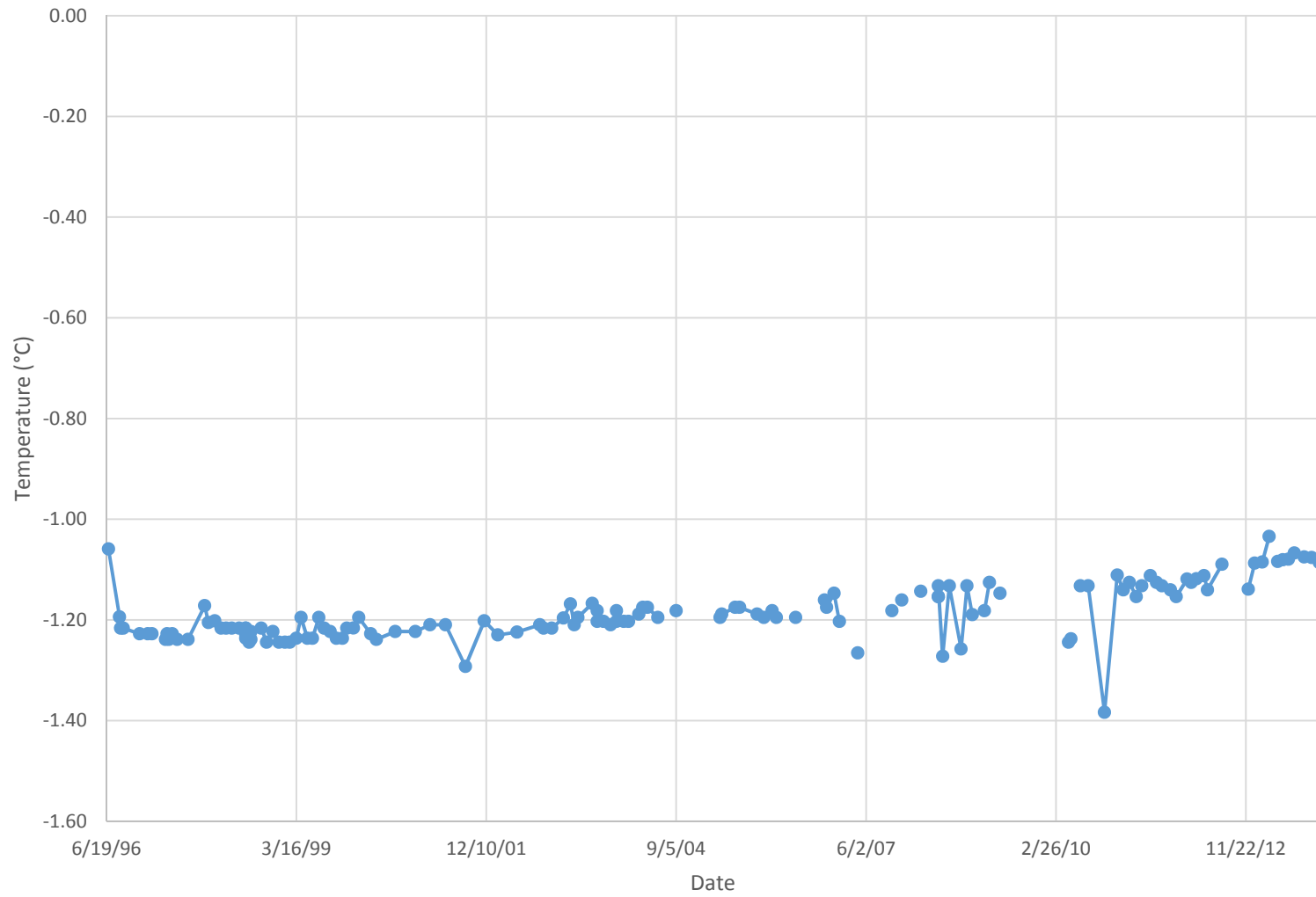
T-96-013: Temperature at 184 feet



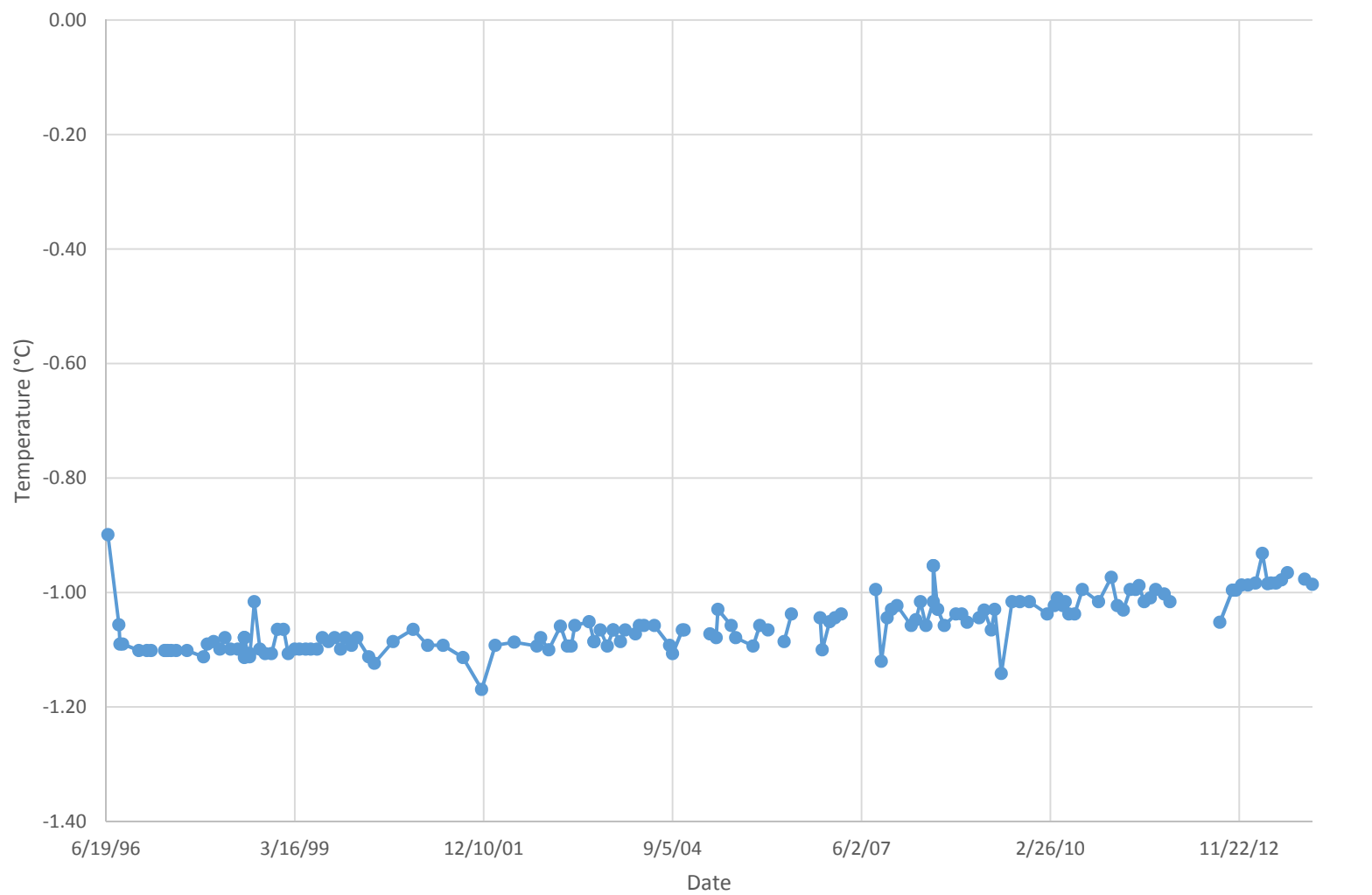
T-96-013: Temperature at 234 feet



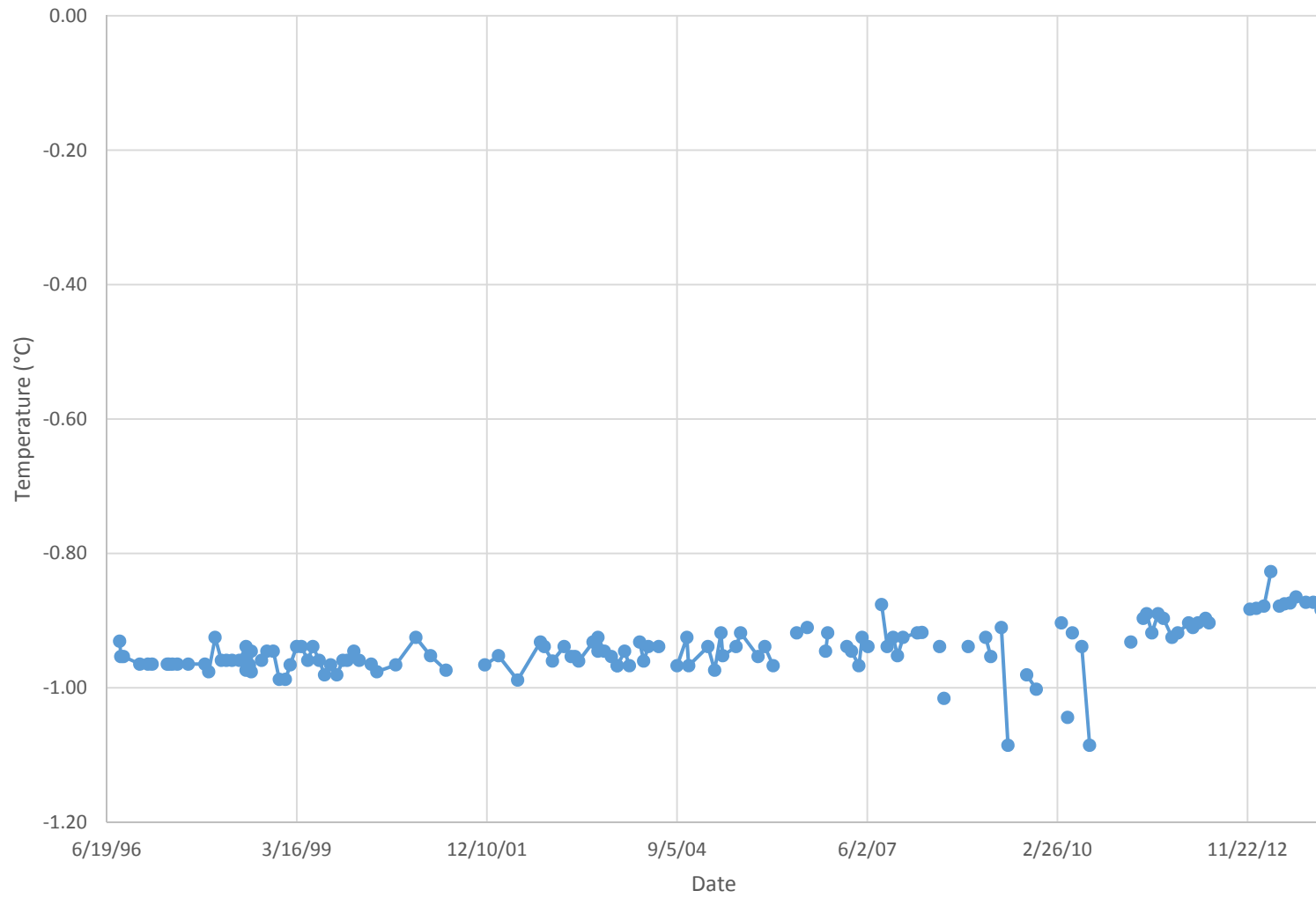
T-96-013: Temperature at 284 feet



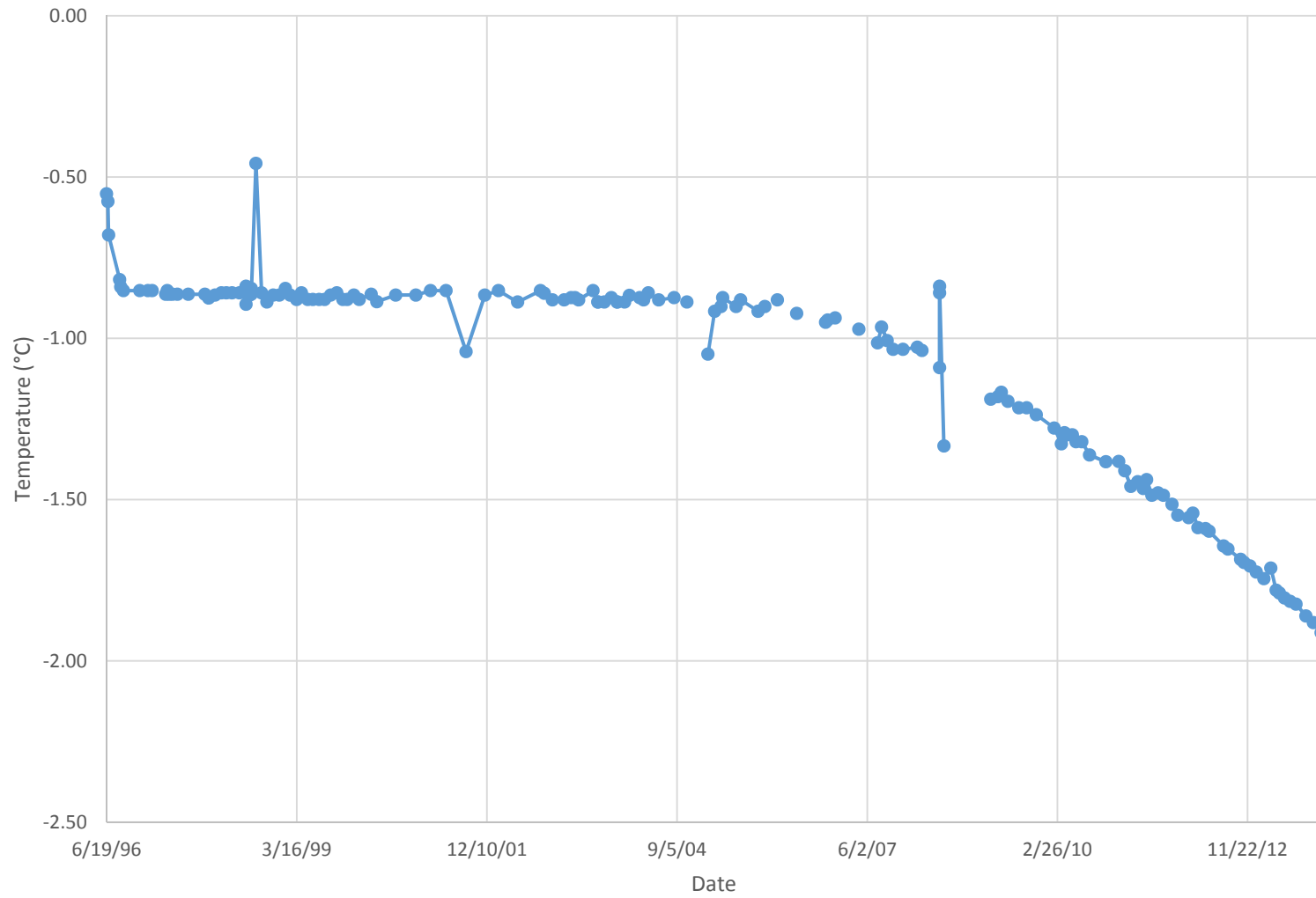
T-96-013: Temperature at 309 feet



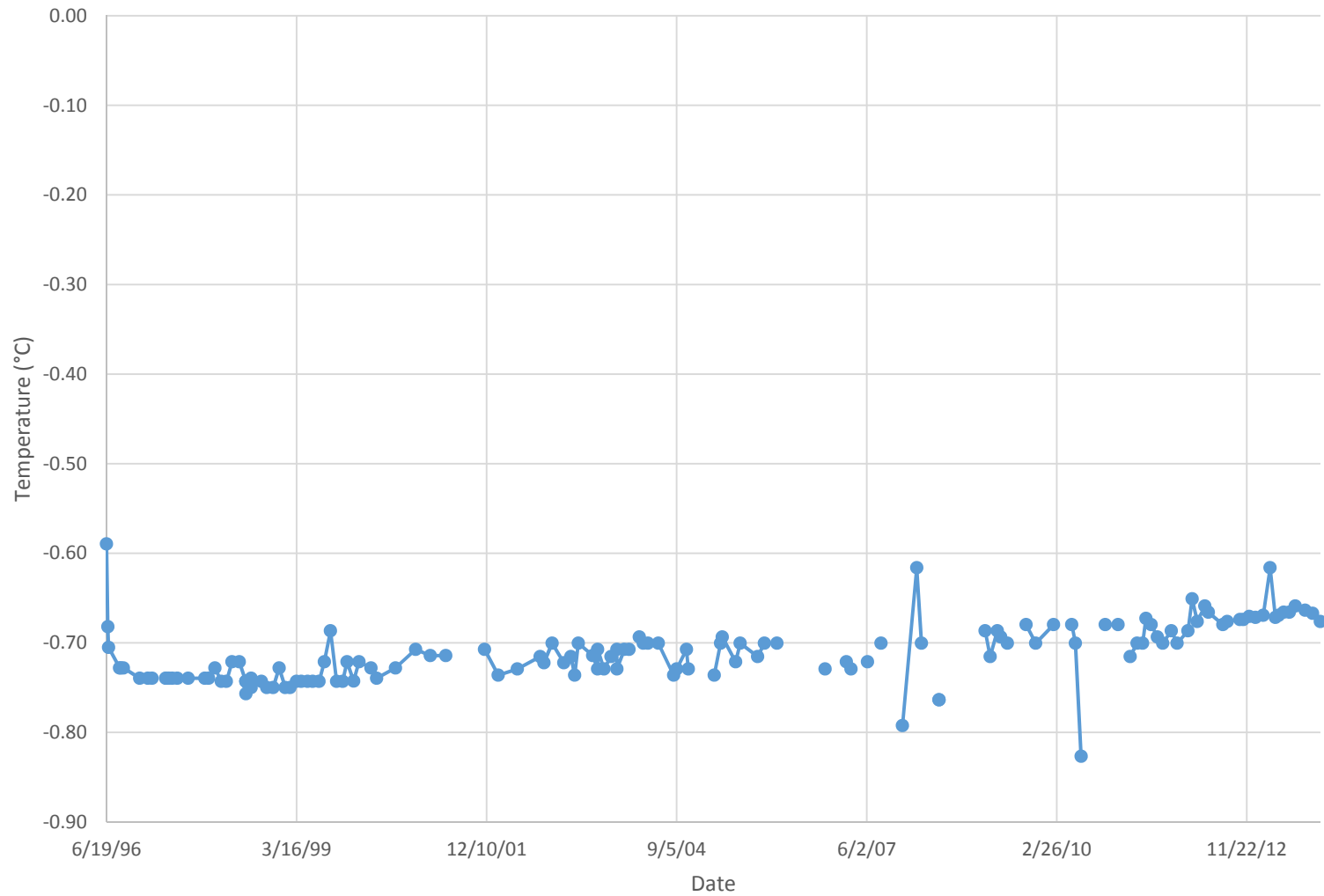
T-96-013: Temperature at 334 feet



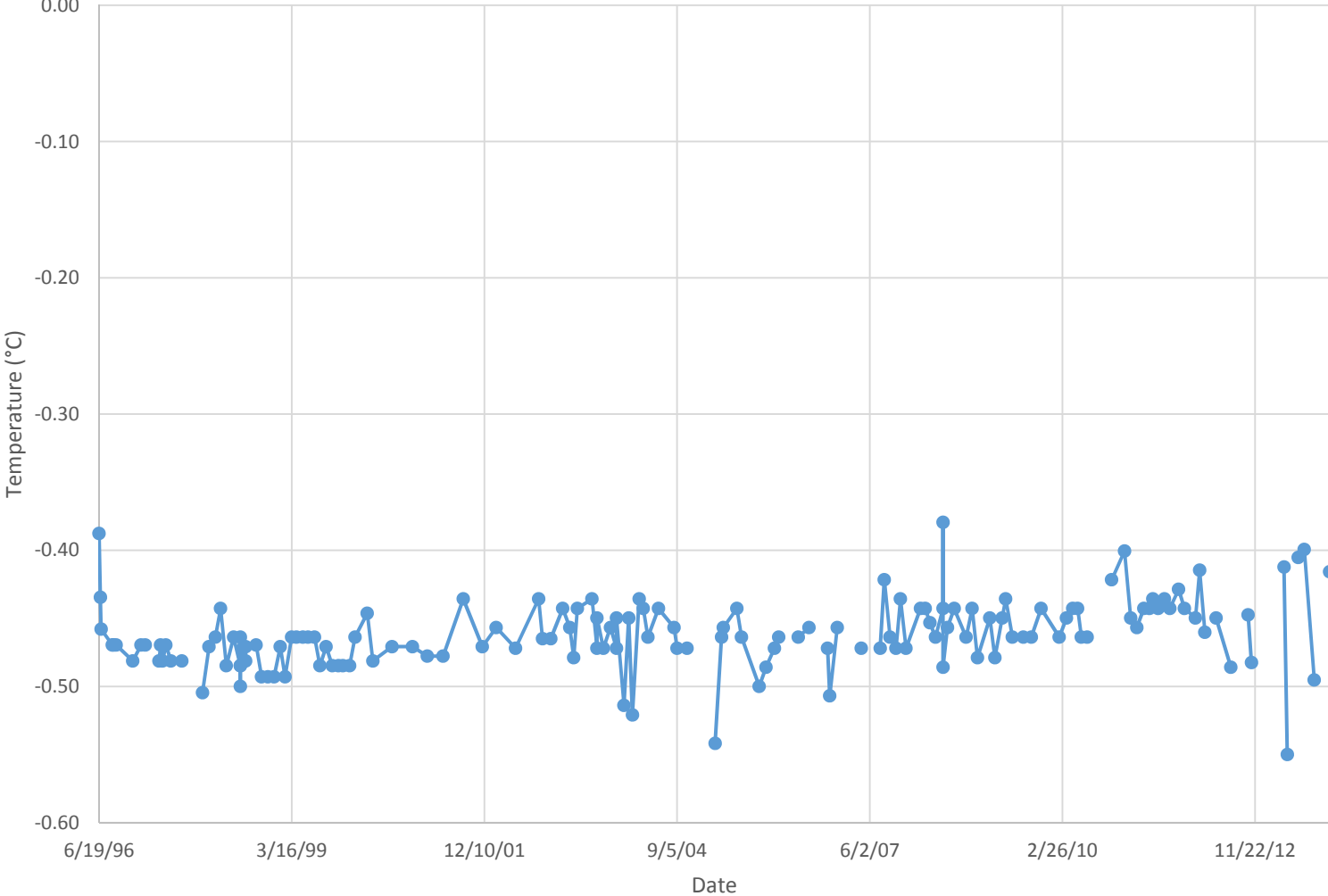
T-96-013: Temperature at 359 feet



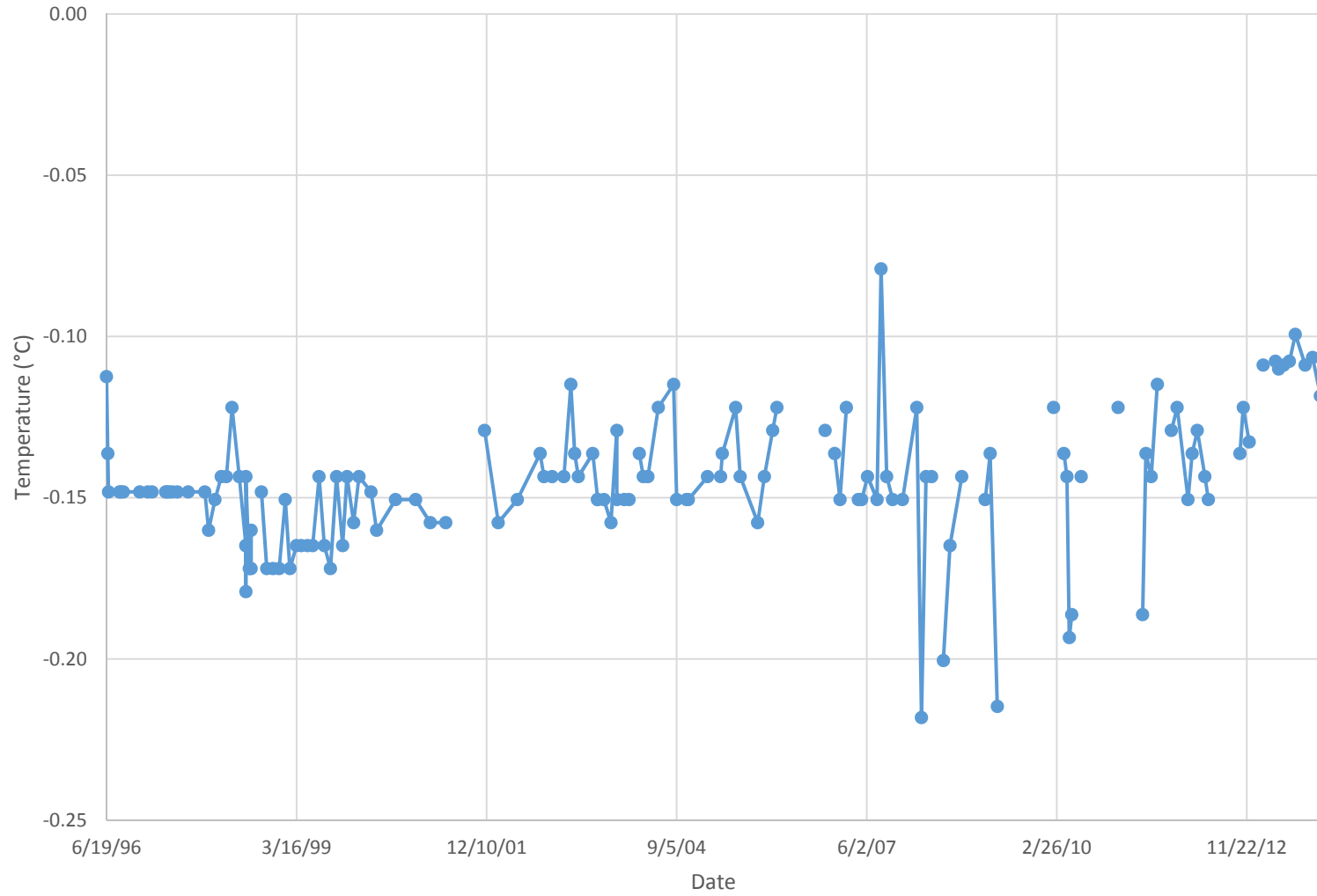
T-96-013: Temperature at 384 feet

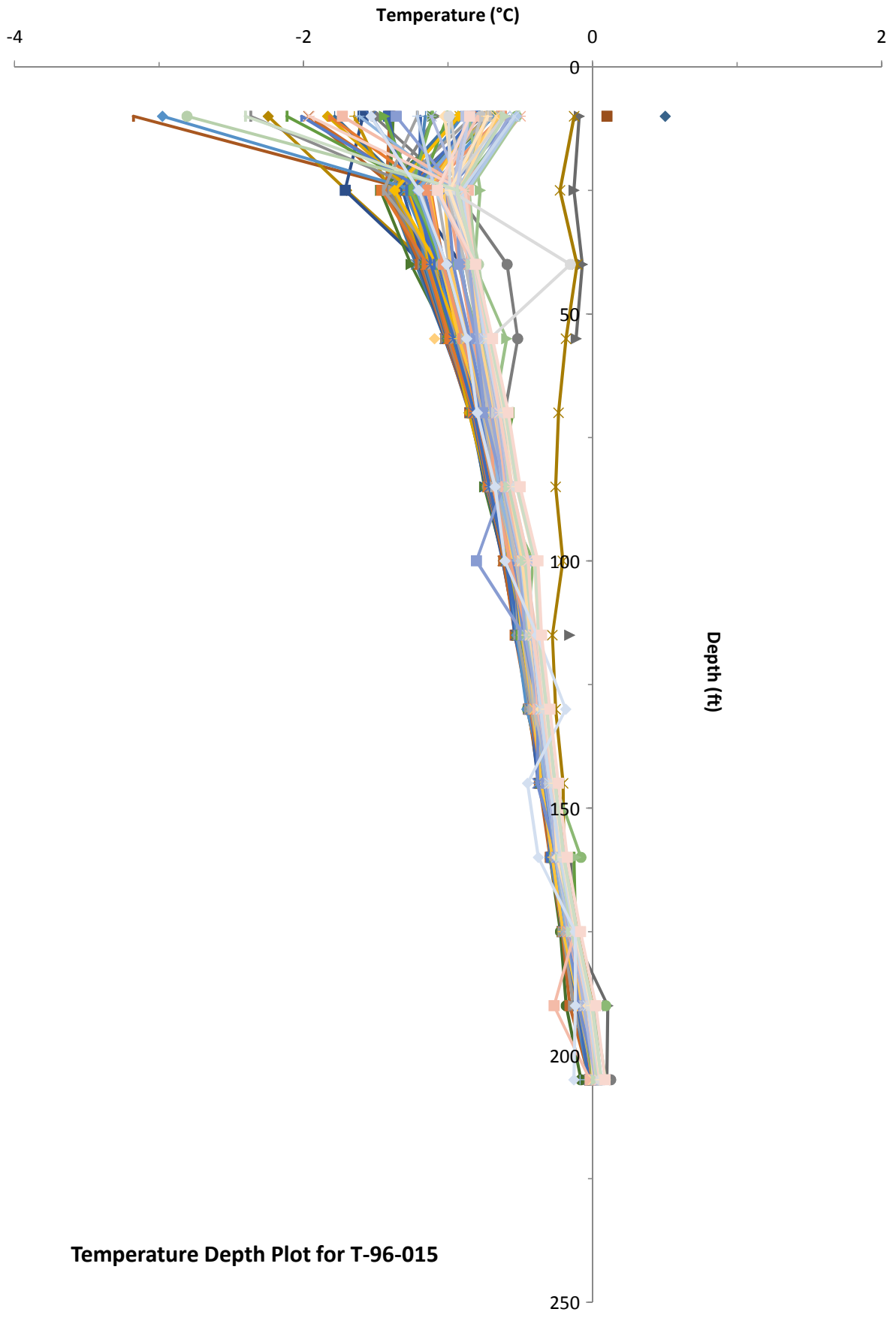


T-96-013: Temperature at 434 feet

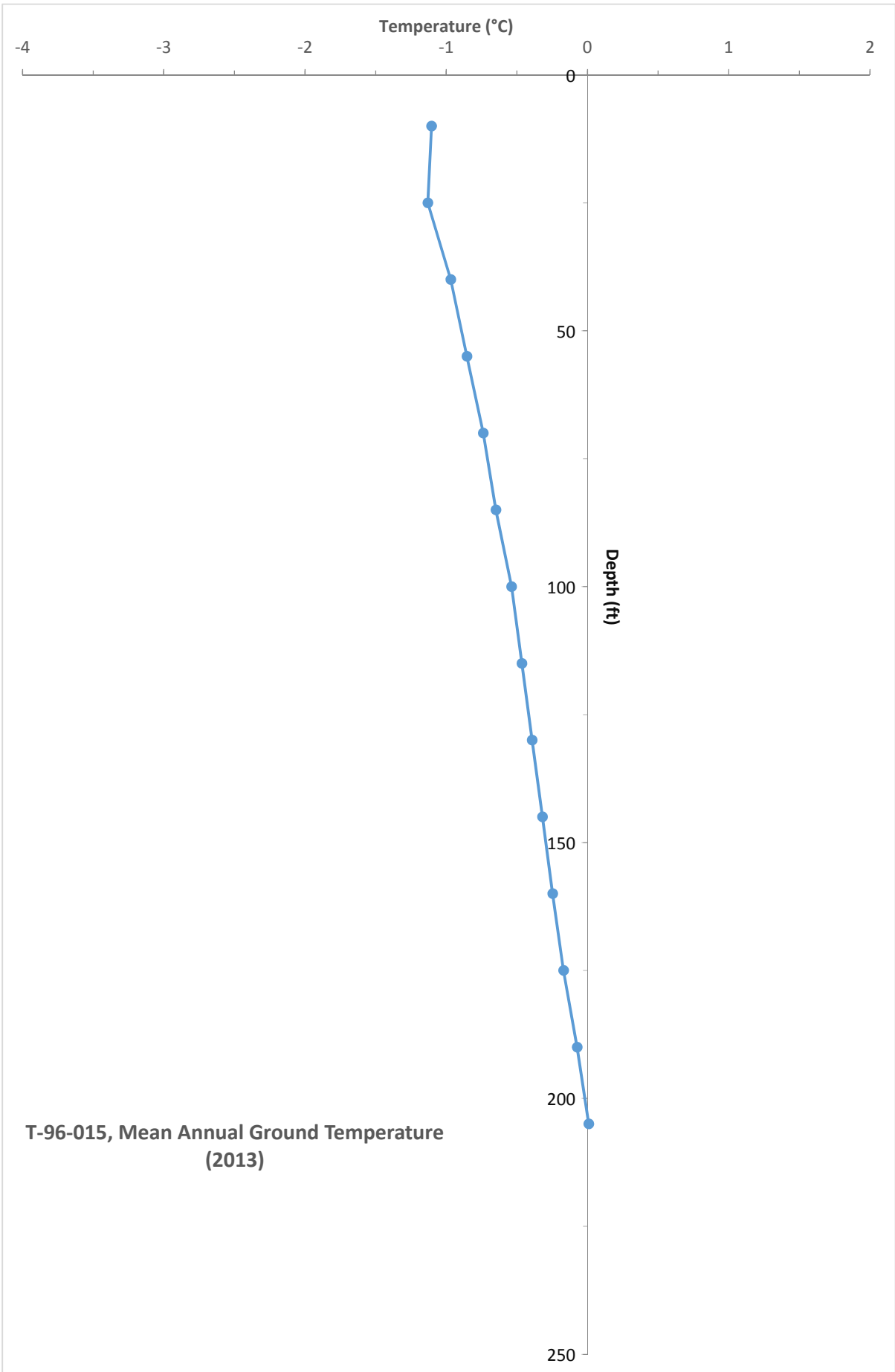


T-96-013: Temperature at 484 feet



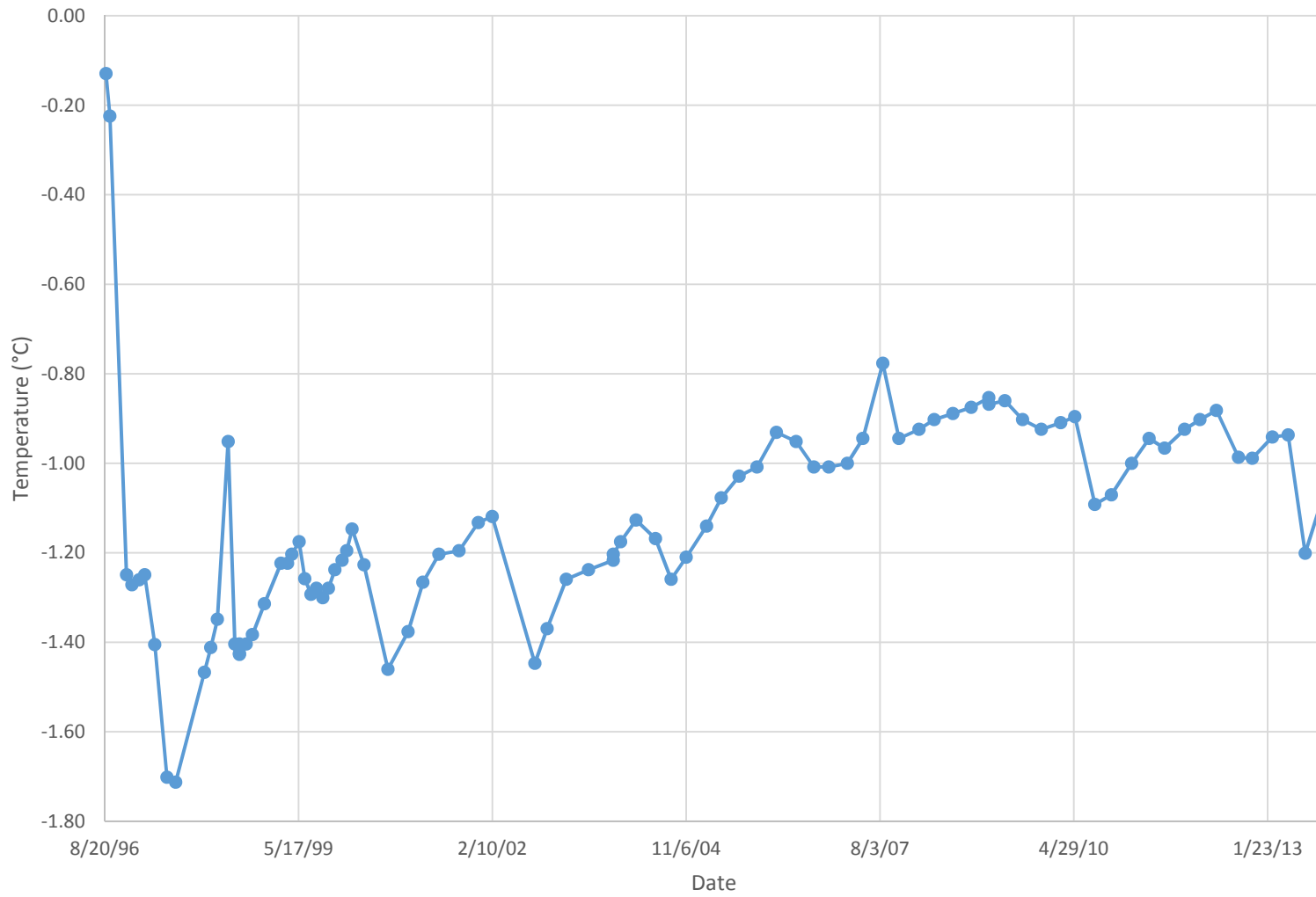


Temperature Depth Plot for T-96-015

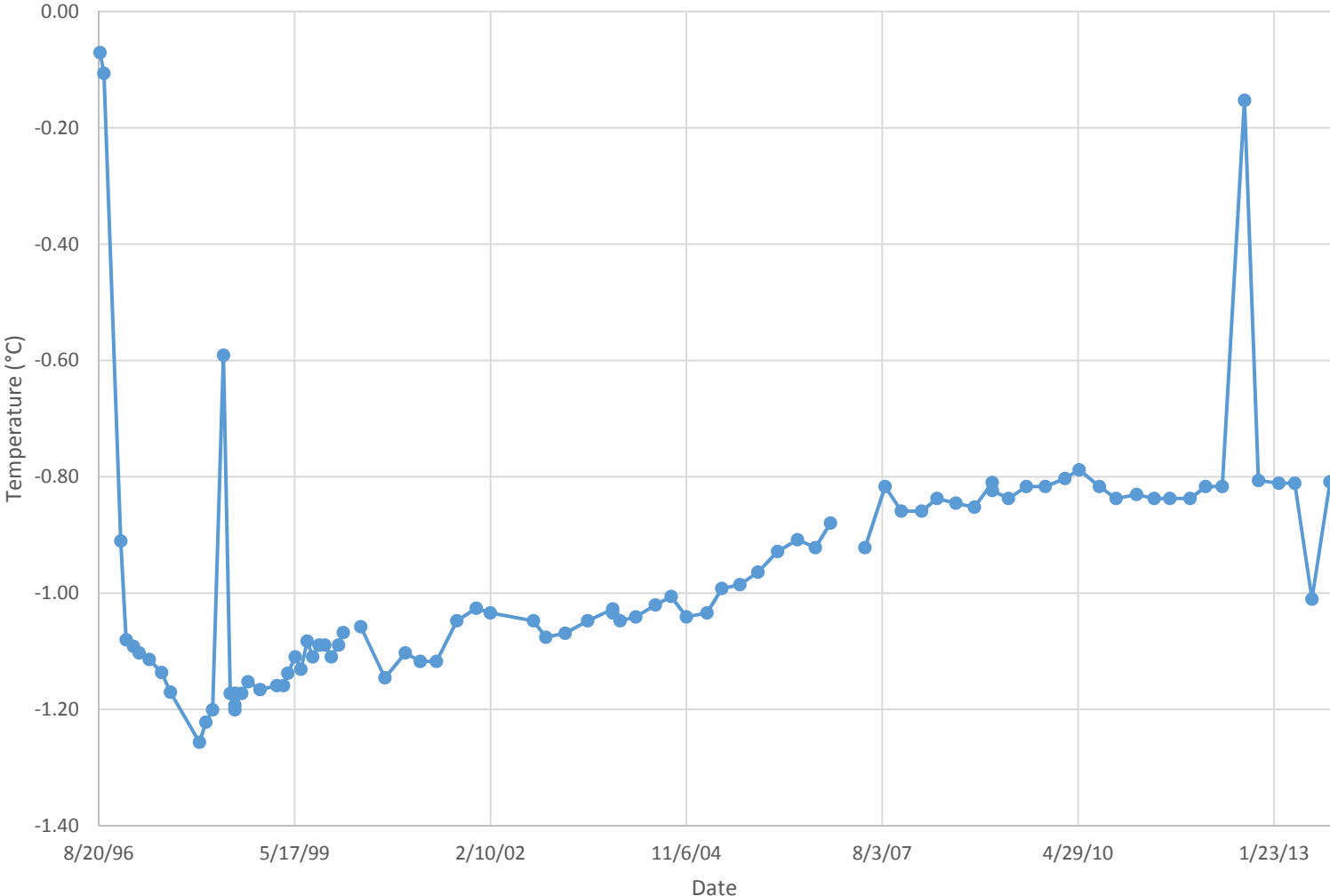


T-96-015, Mean Annual Ground Temperature (2013)

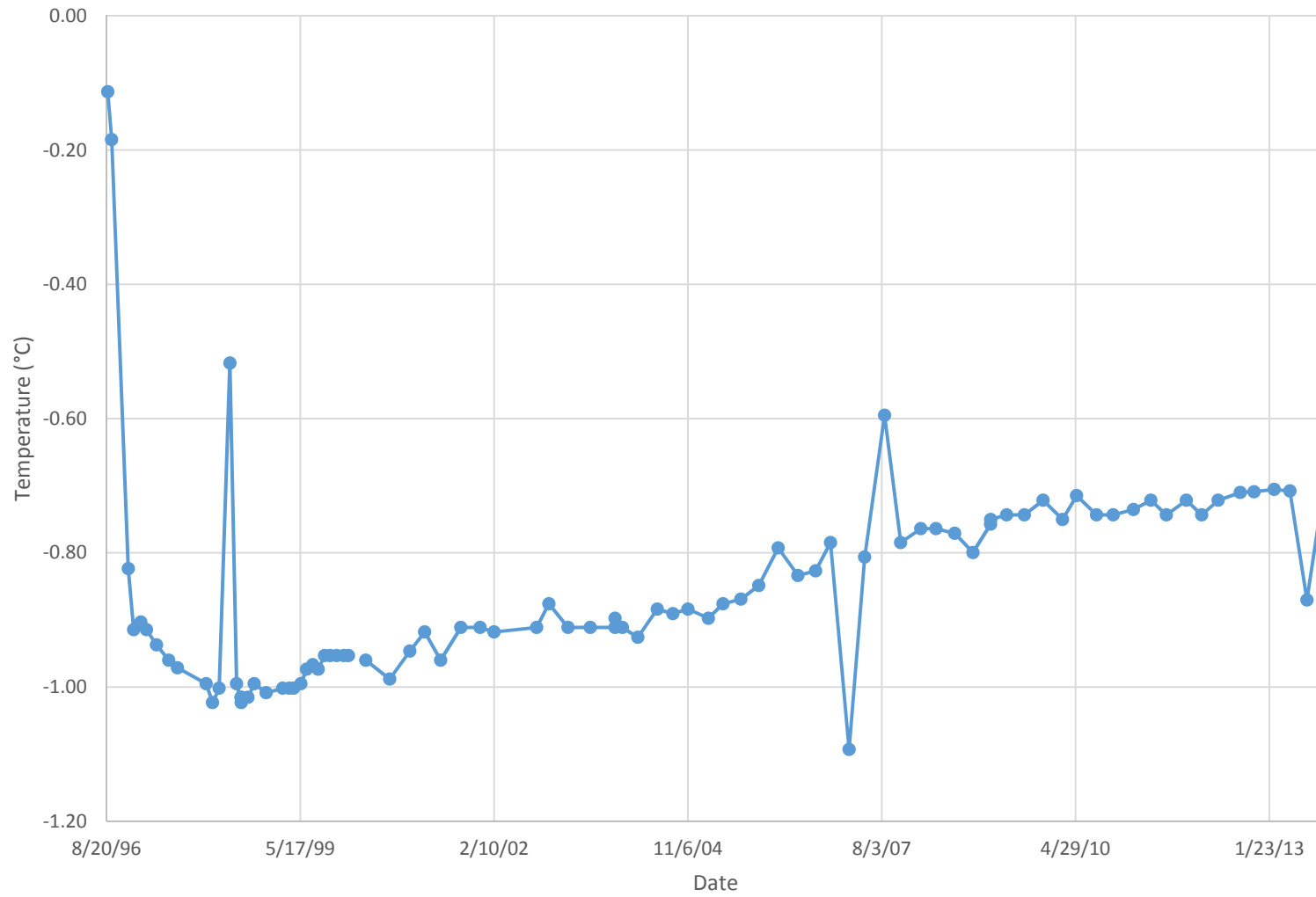
T-96-015: Temperature at 25 feet



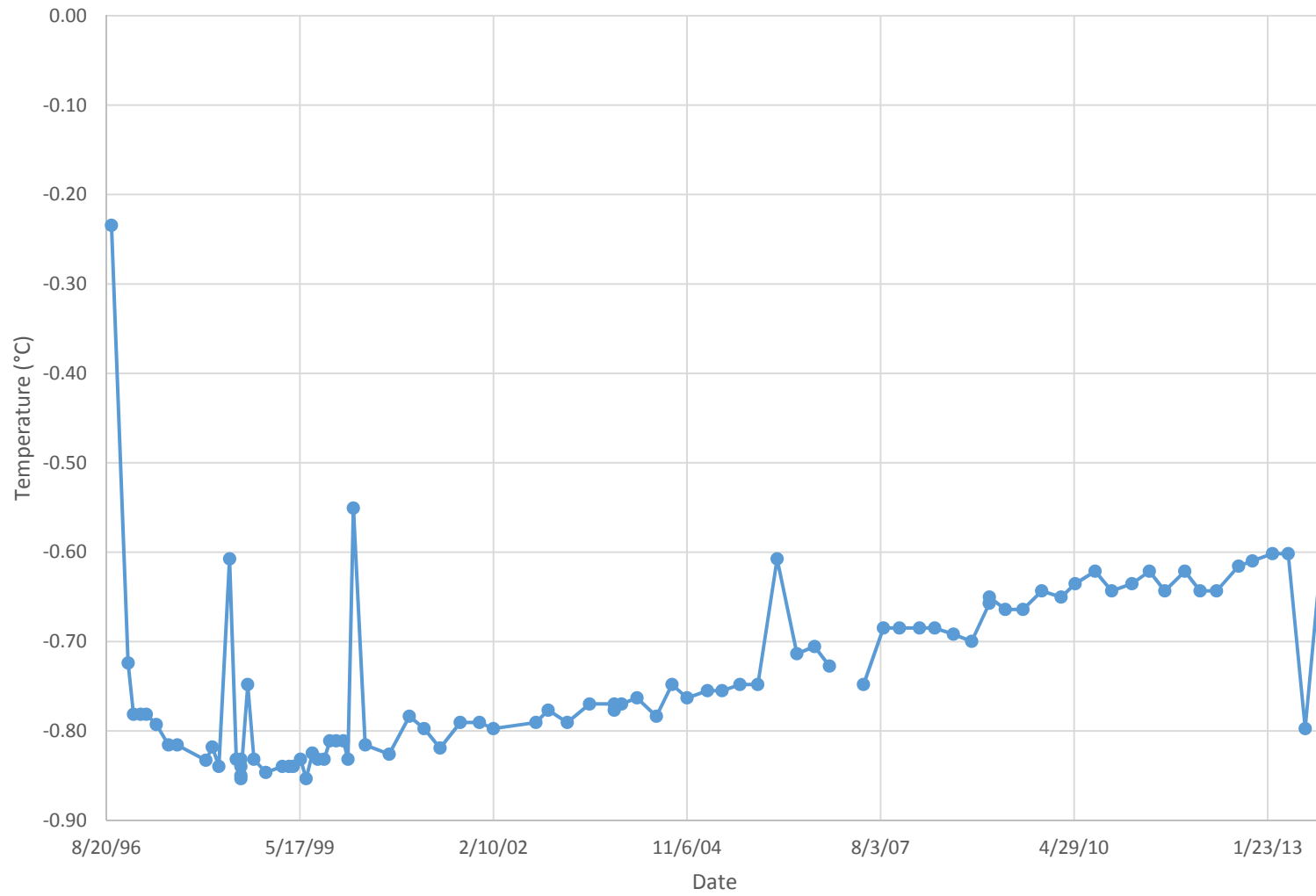
T-96-015: Temperature at 40 feet



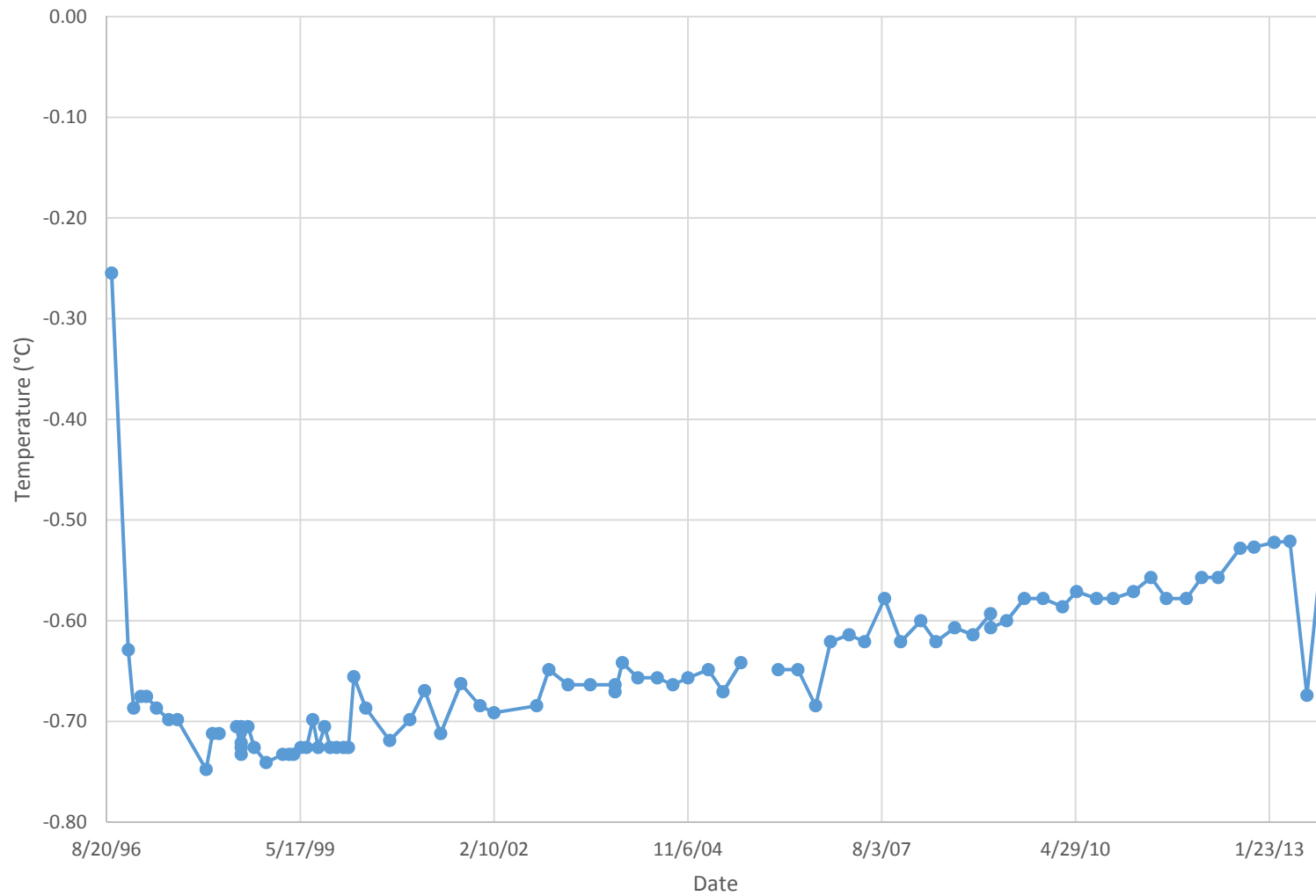
T-96-015: Temperature at 55 feet

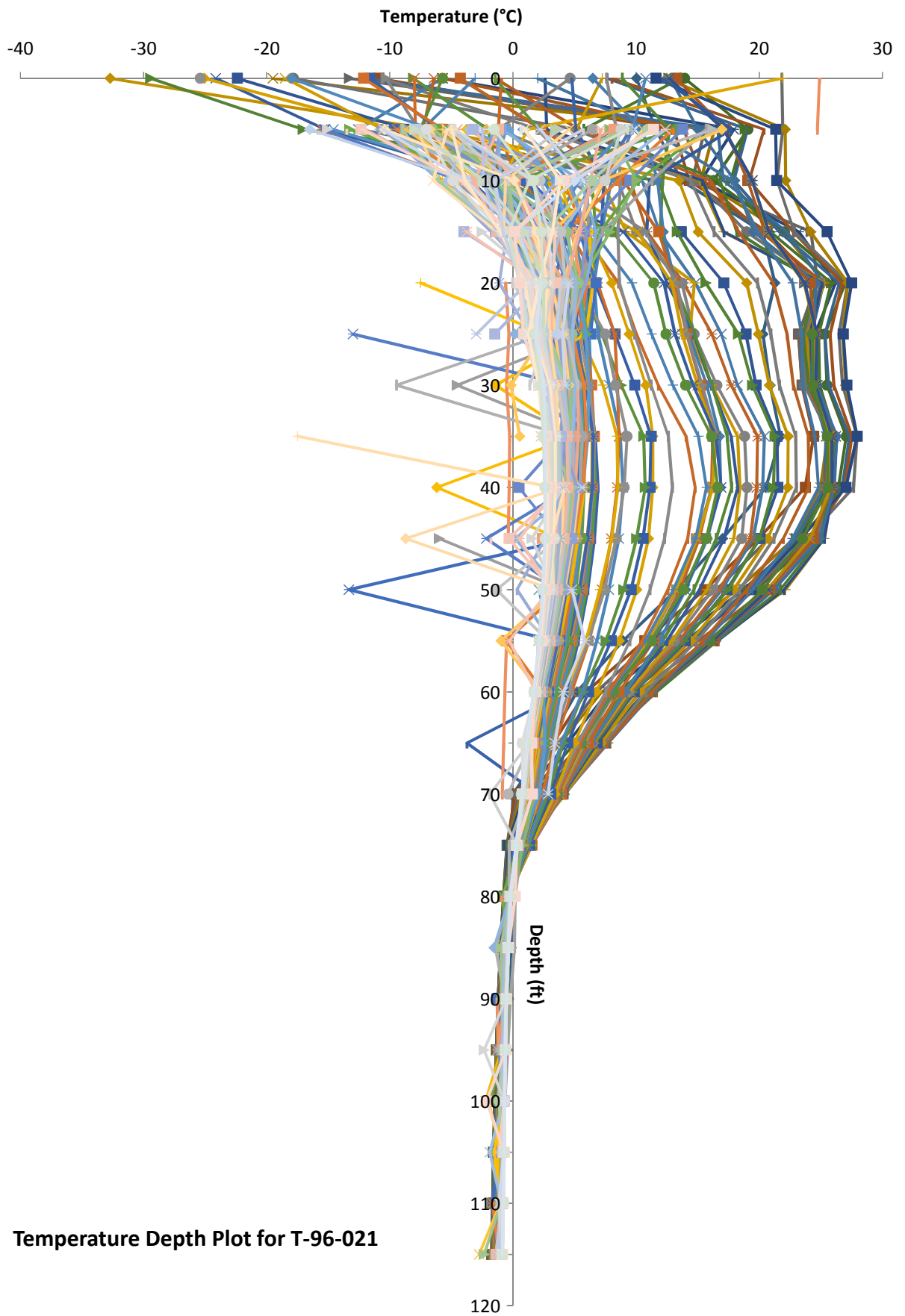


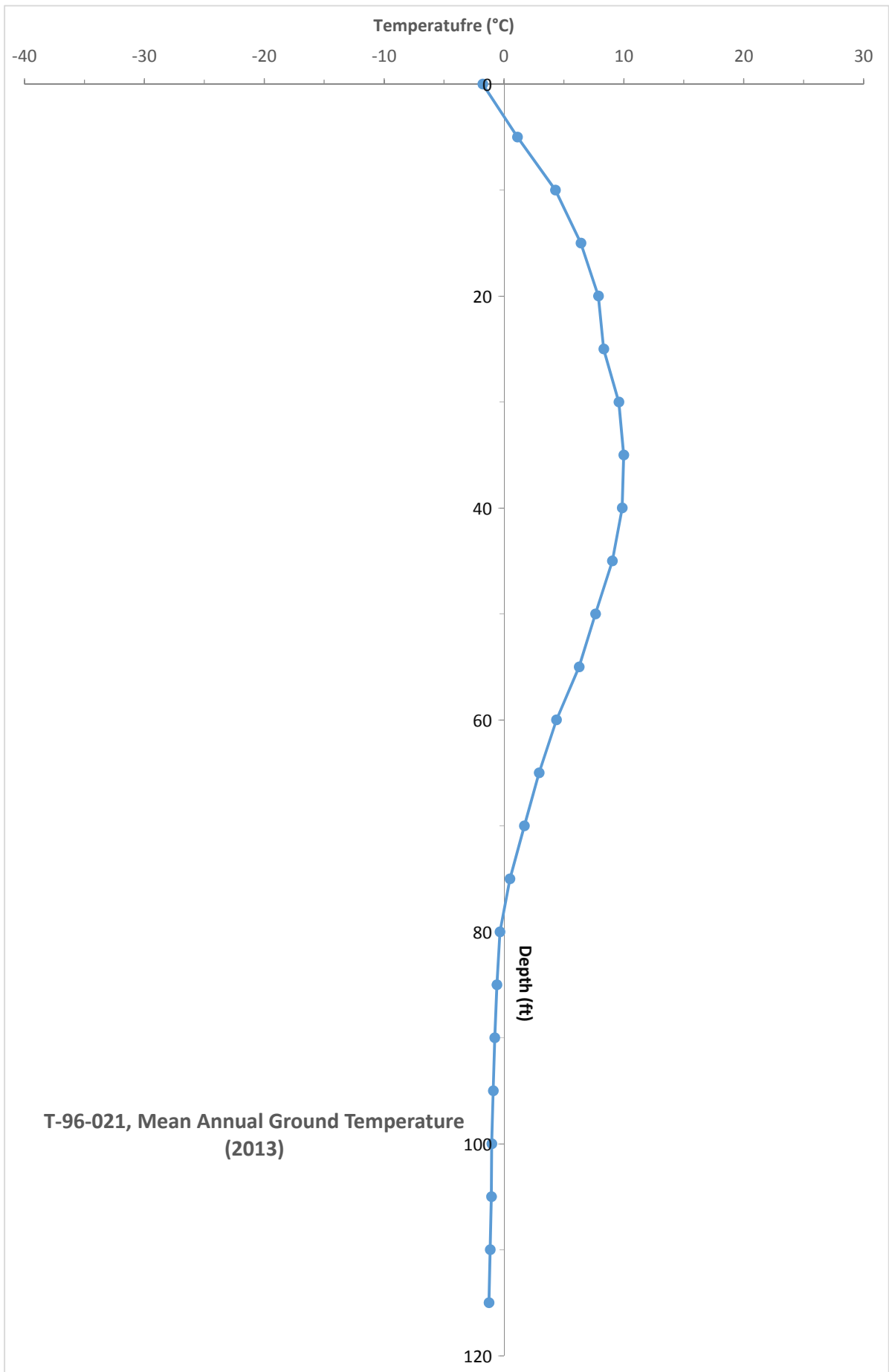
T-96-015: Temperature at 70 feet



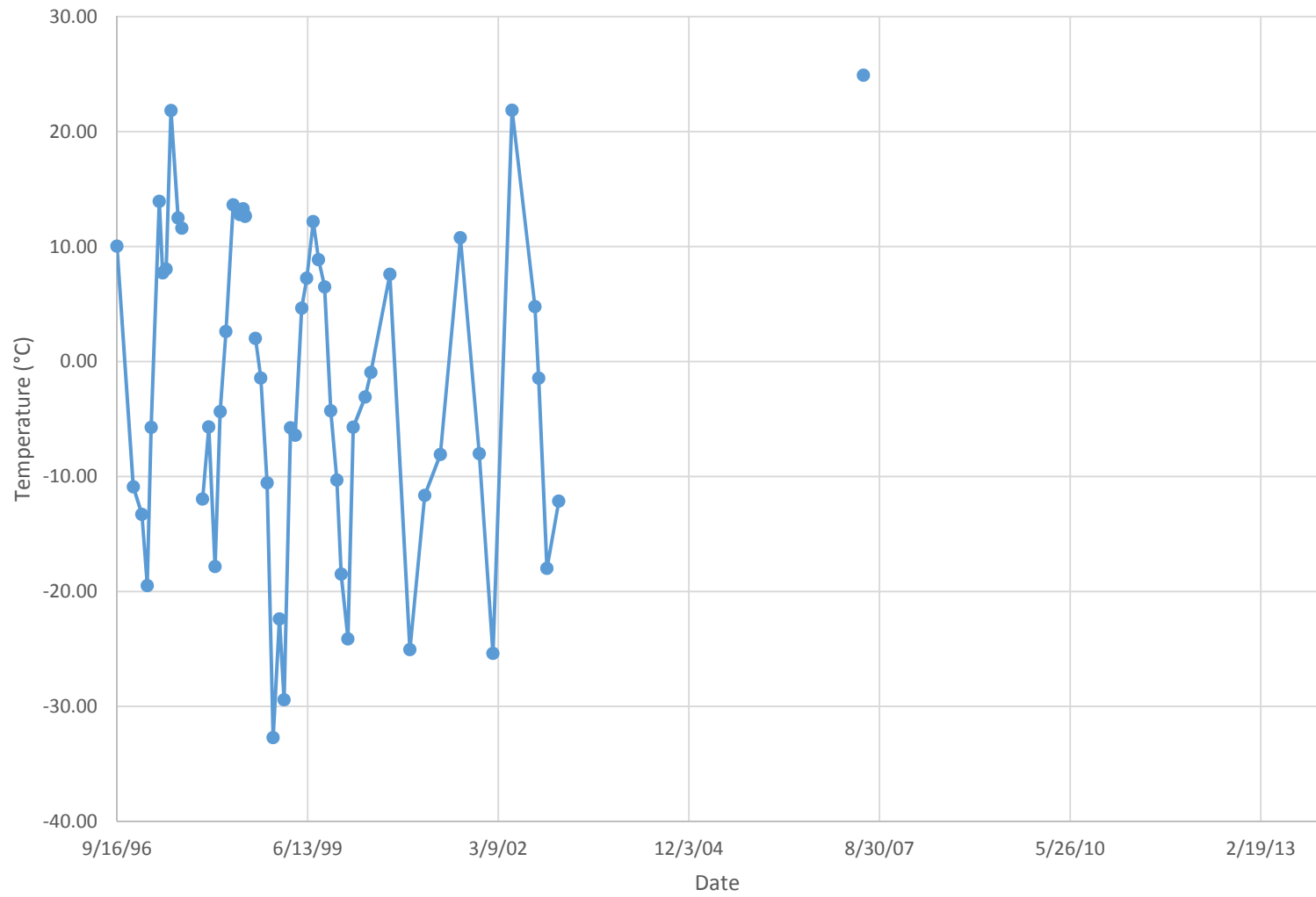
T-96-015: Temperature at 85 feet



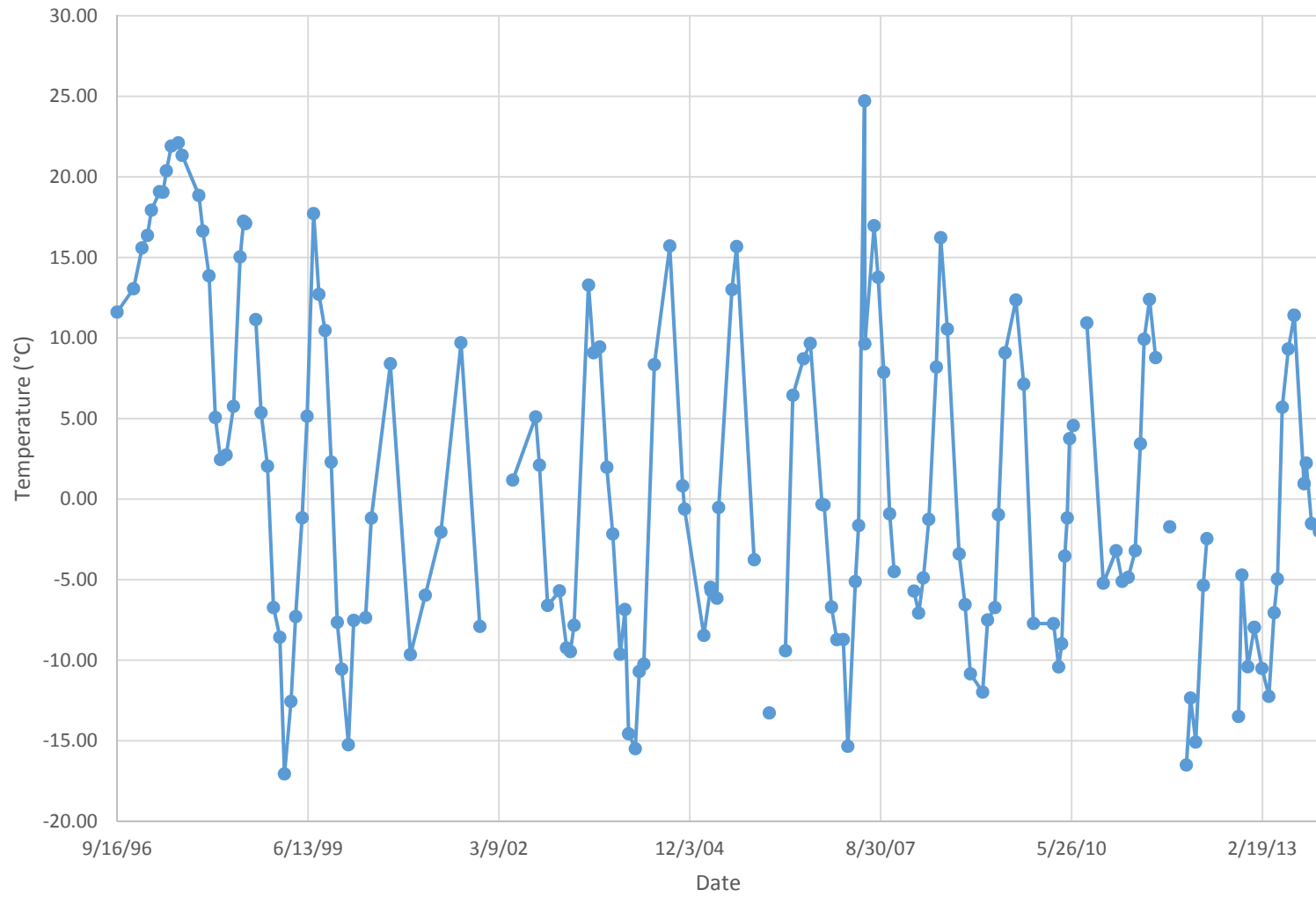




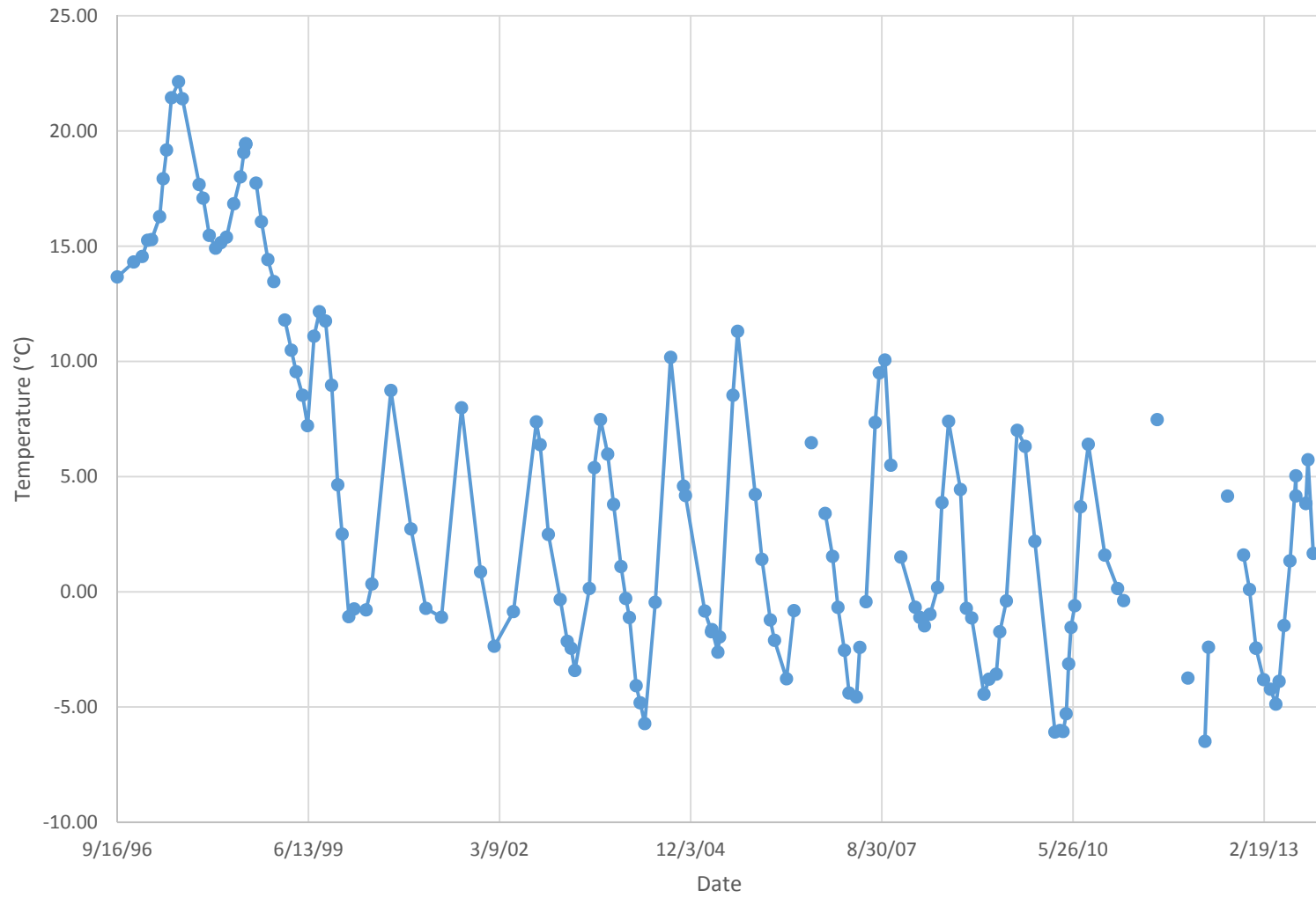
T-96-021: Temperature at 0 feet



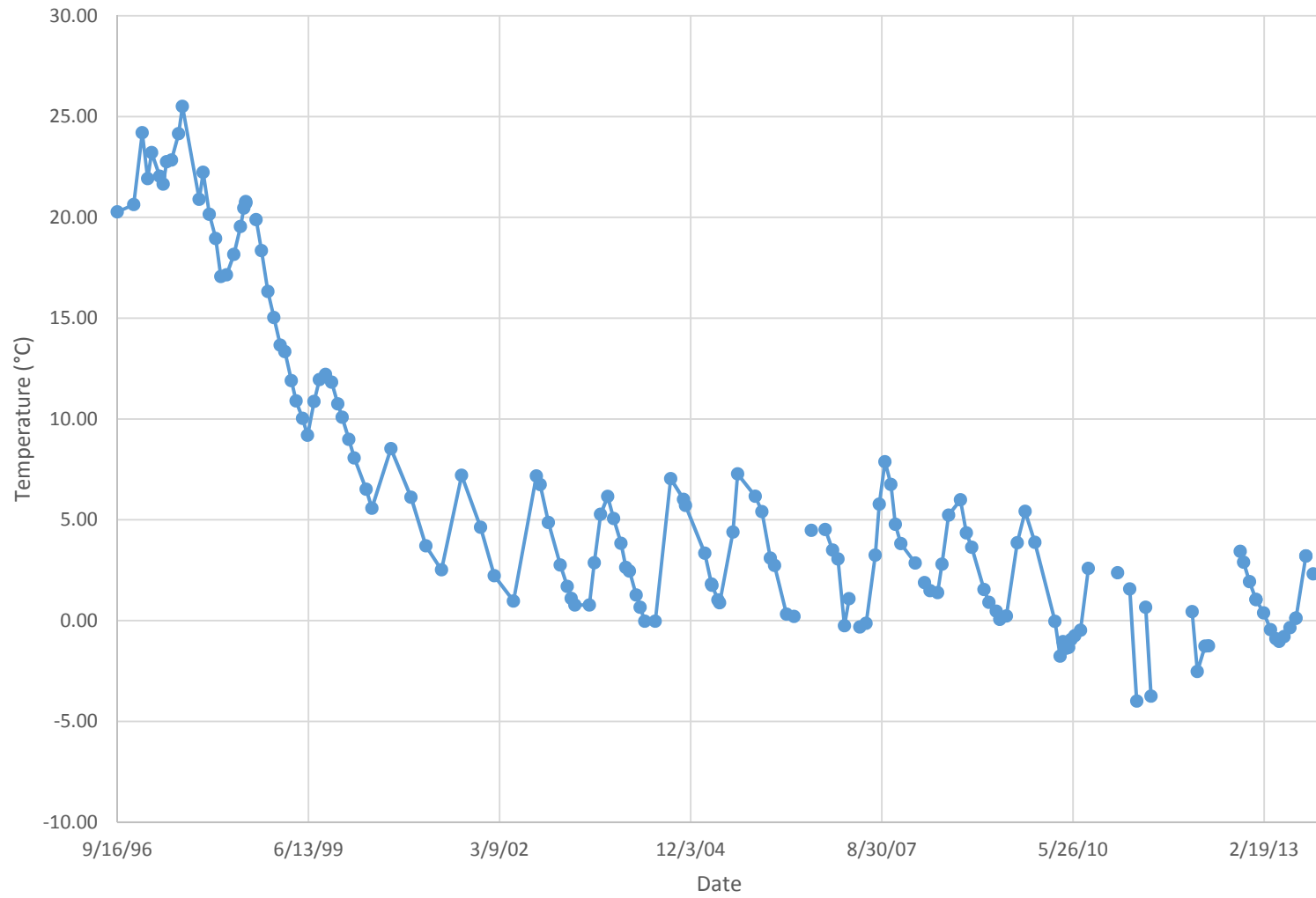
T-96-021: Temperature at 5 feet



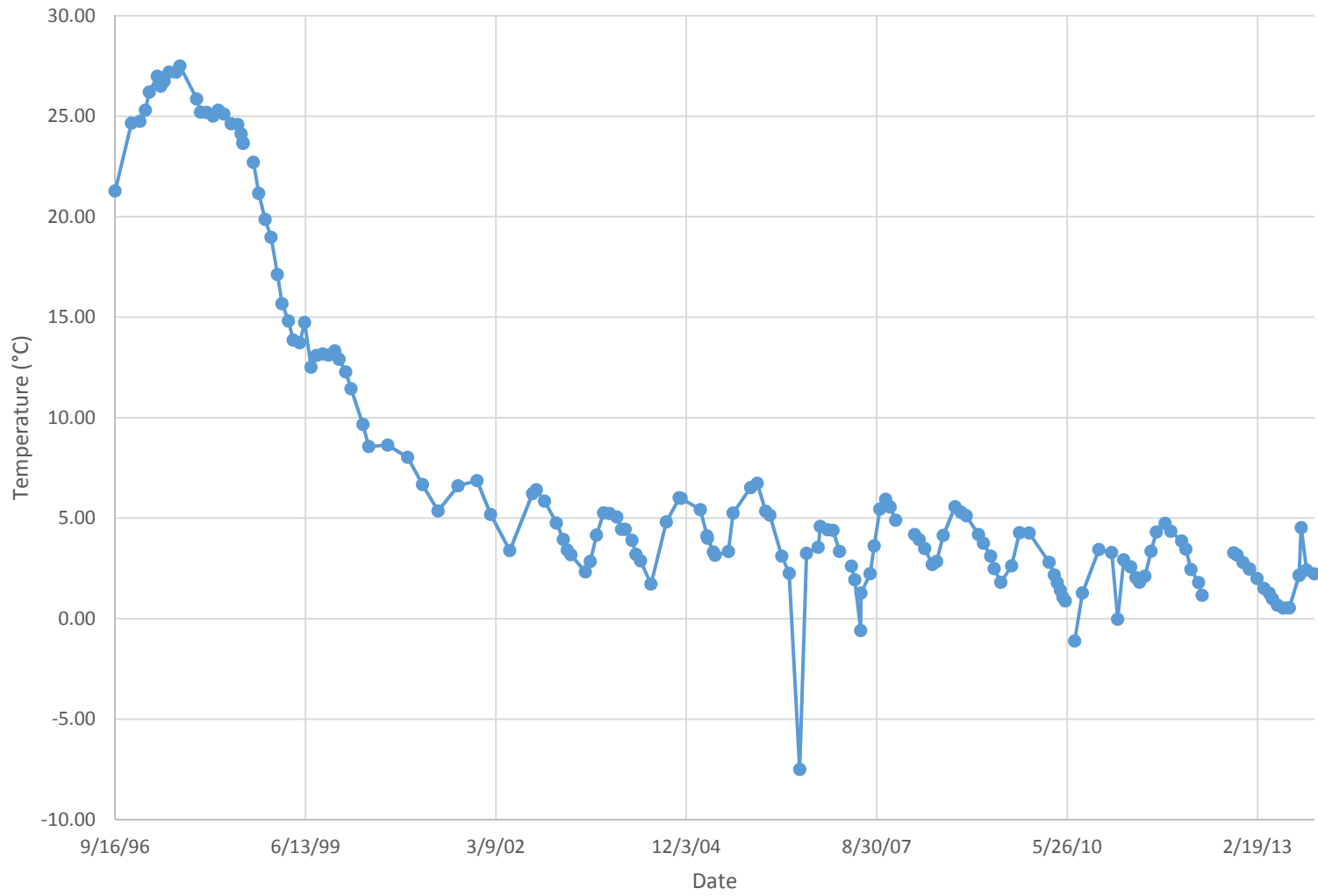
T-96-021: Temperature at 10 feet



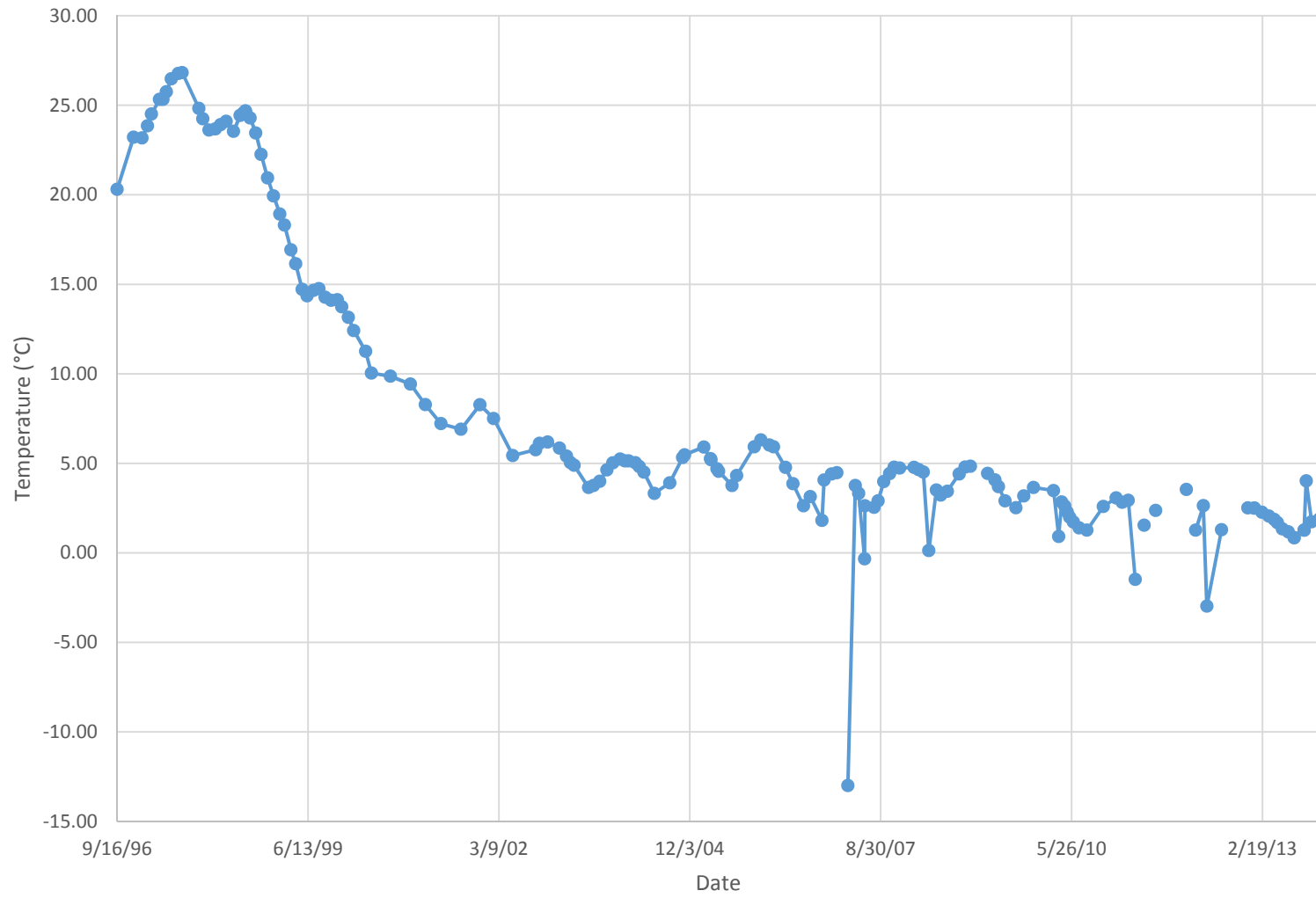
T-96-021: Temperature at 15 feet



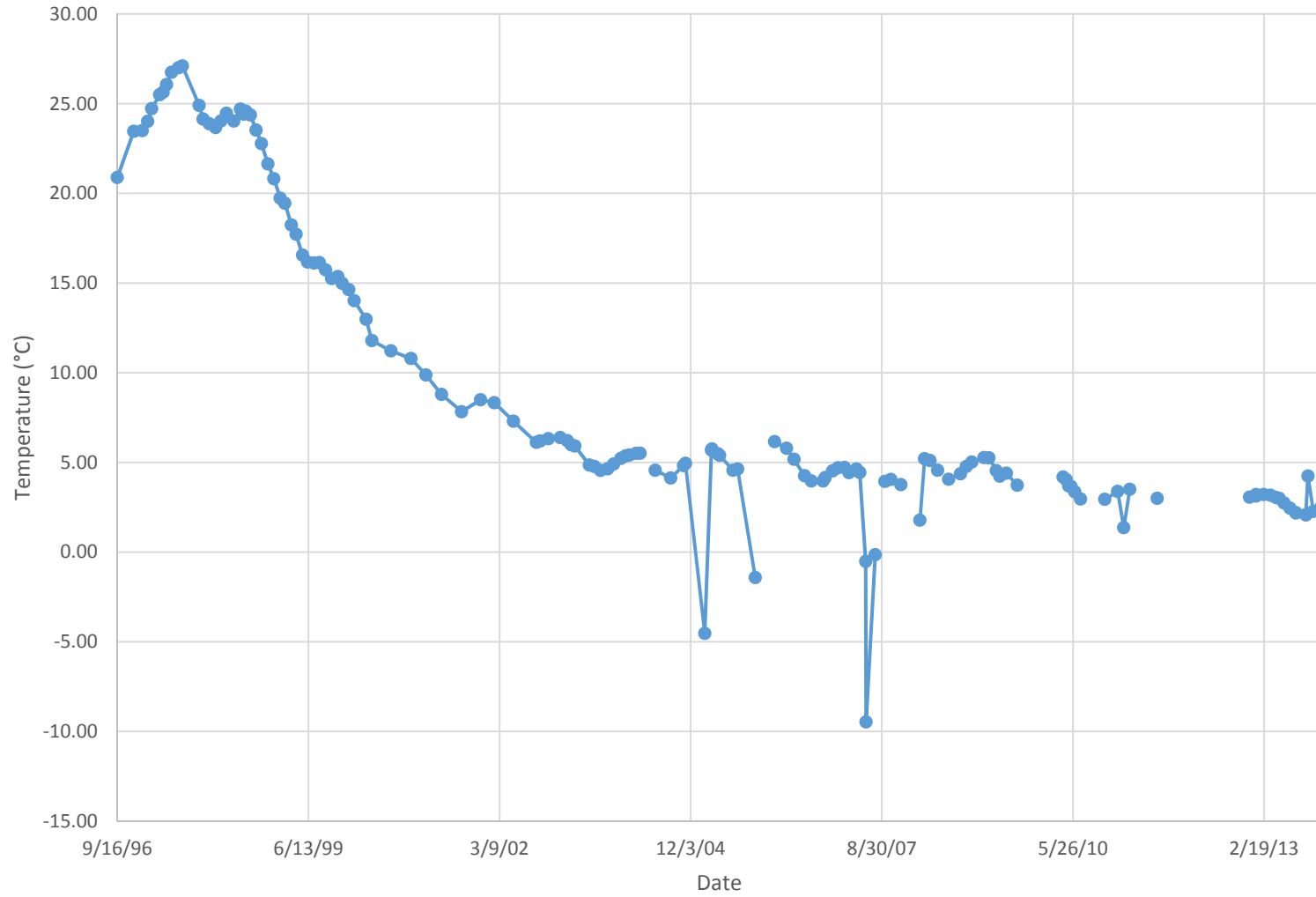
T-96-021: Temperature at 20 feet



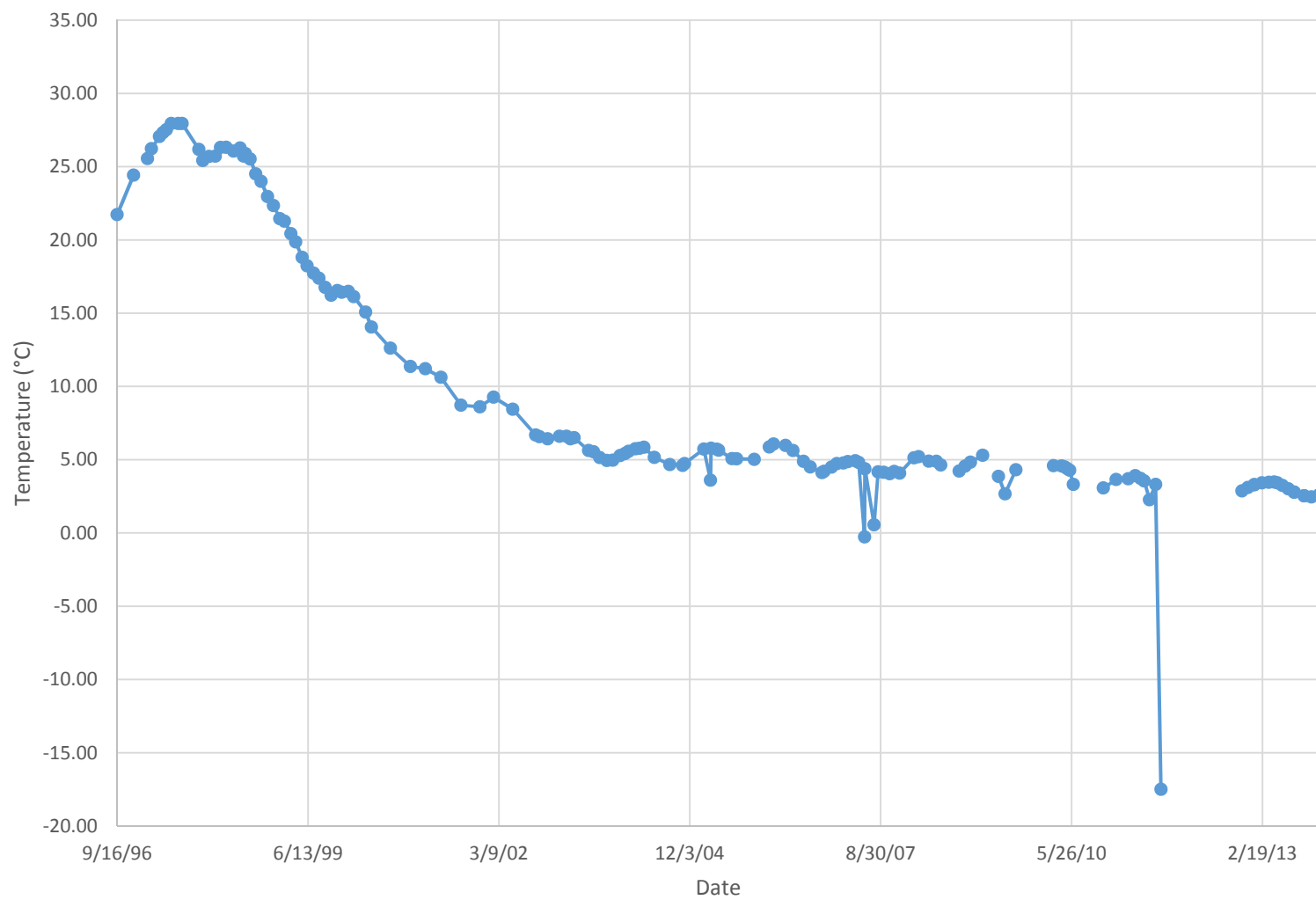
T-96-021: Temperature at 25 feet



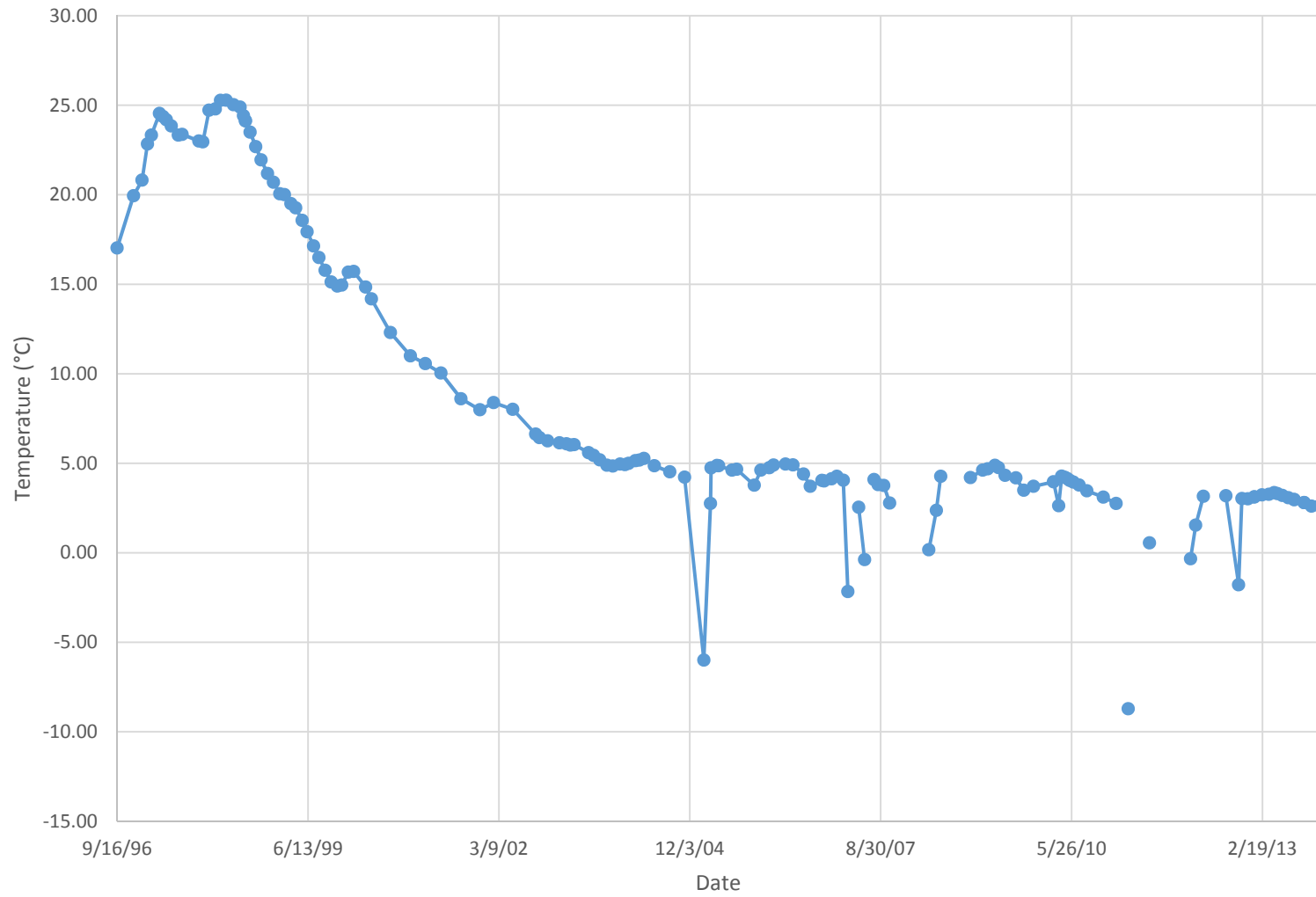
T-96-021: Temperature at 30 feet



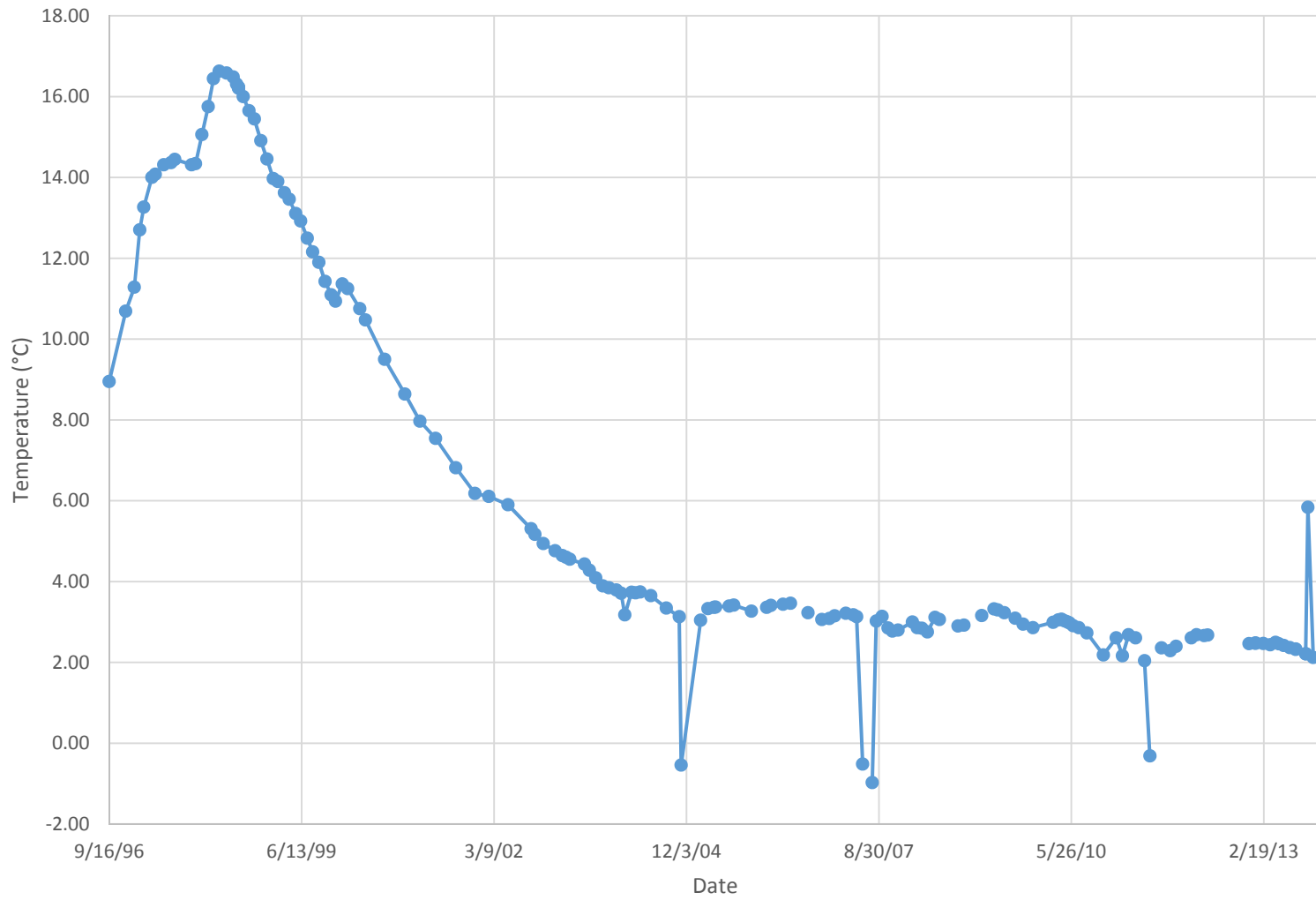
T-96-021: Temperature at 35 feet



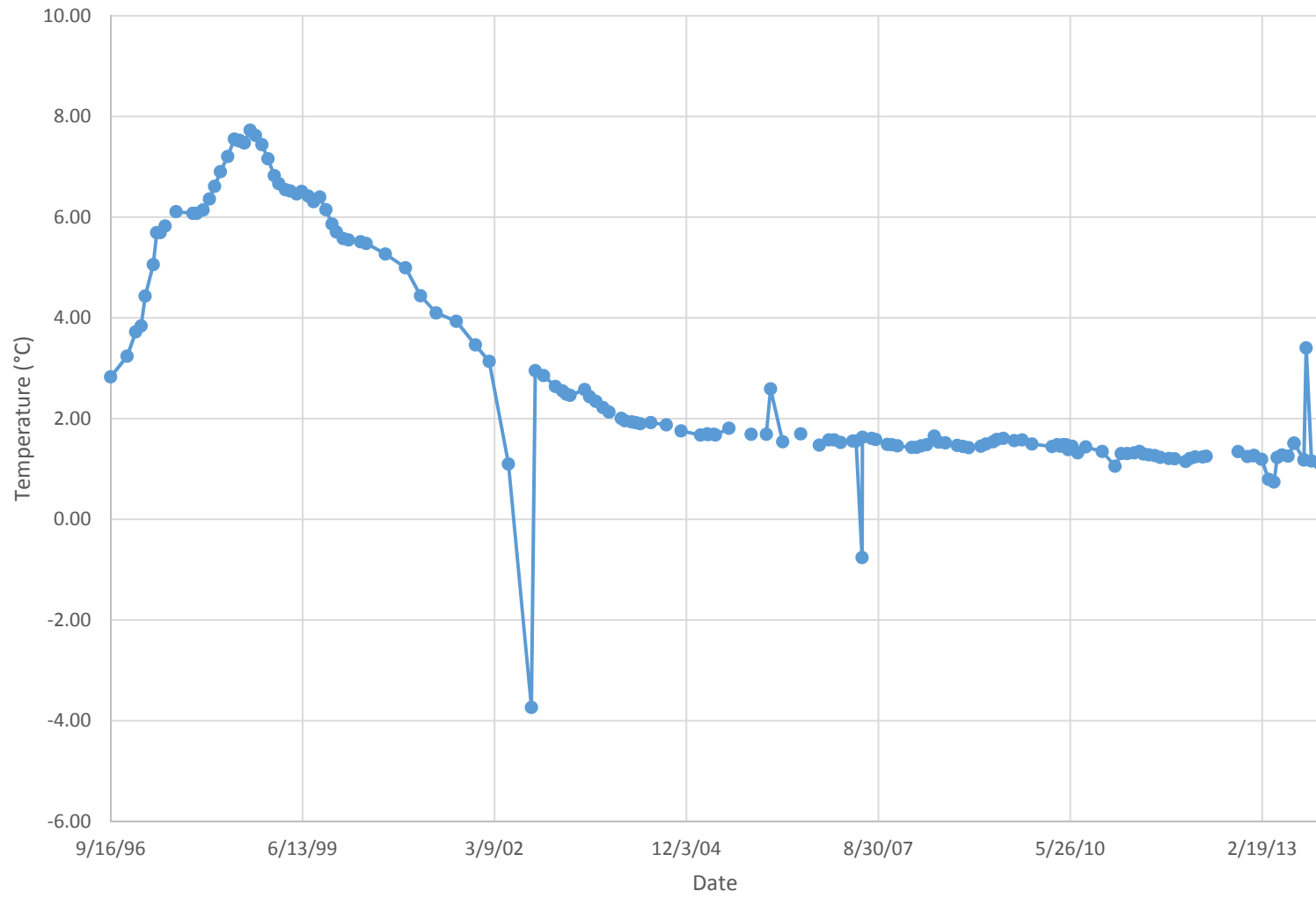
T-96-021: Temperature at 45 feet



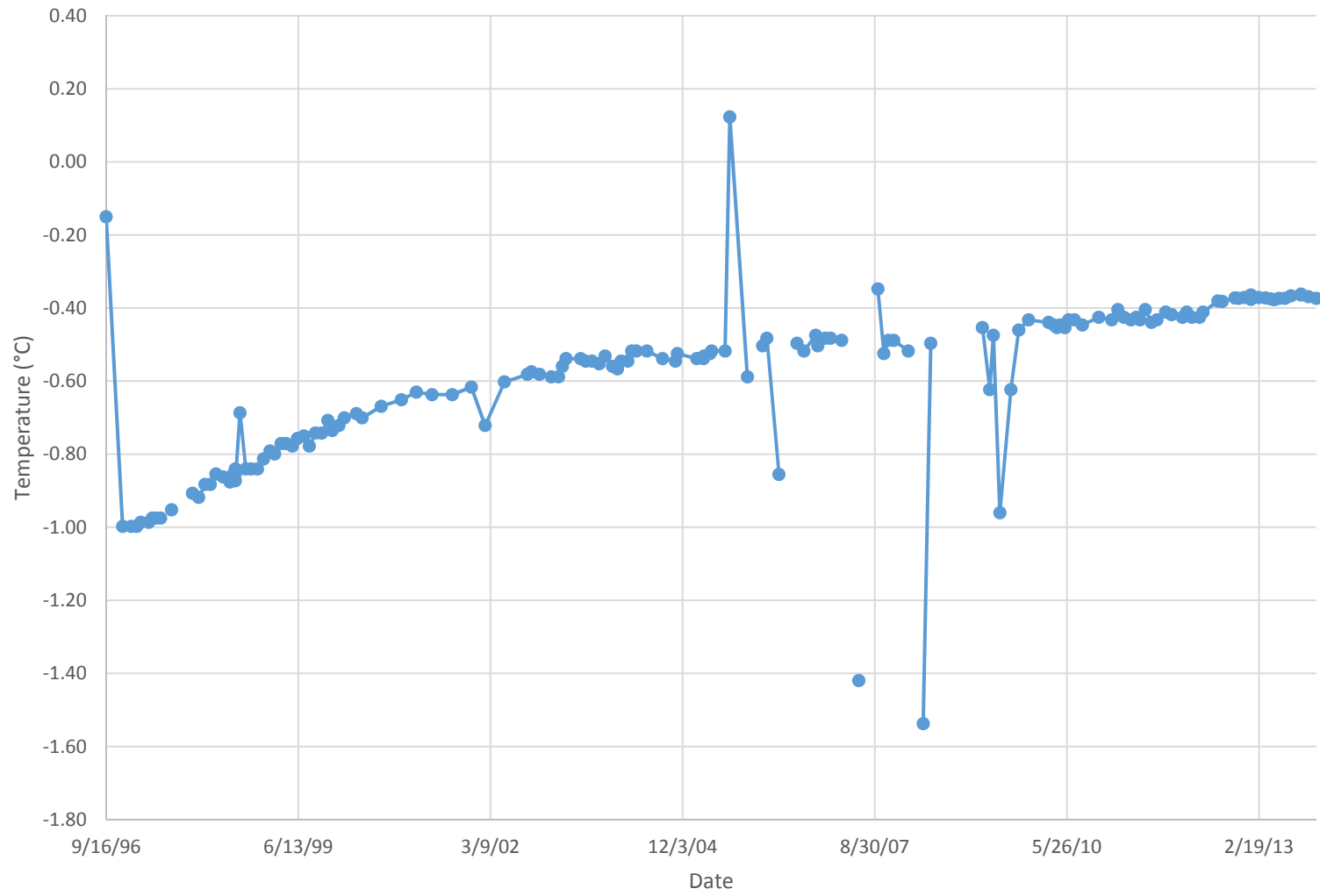
T-96-021: Temperature at 55 feet



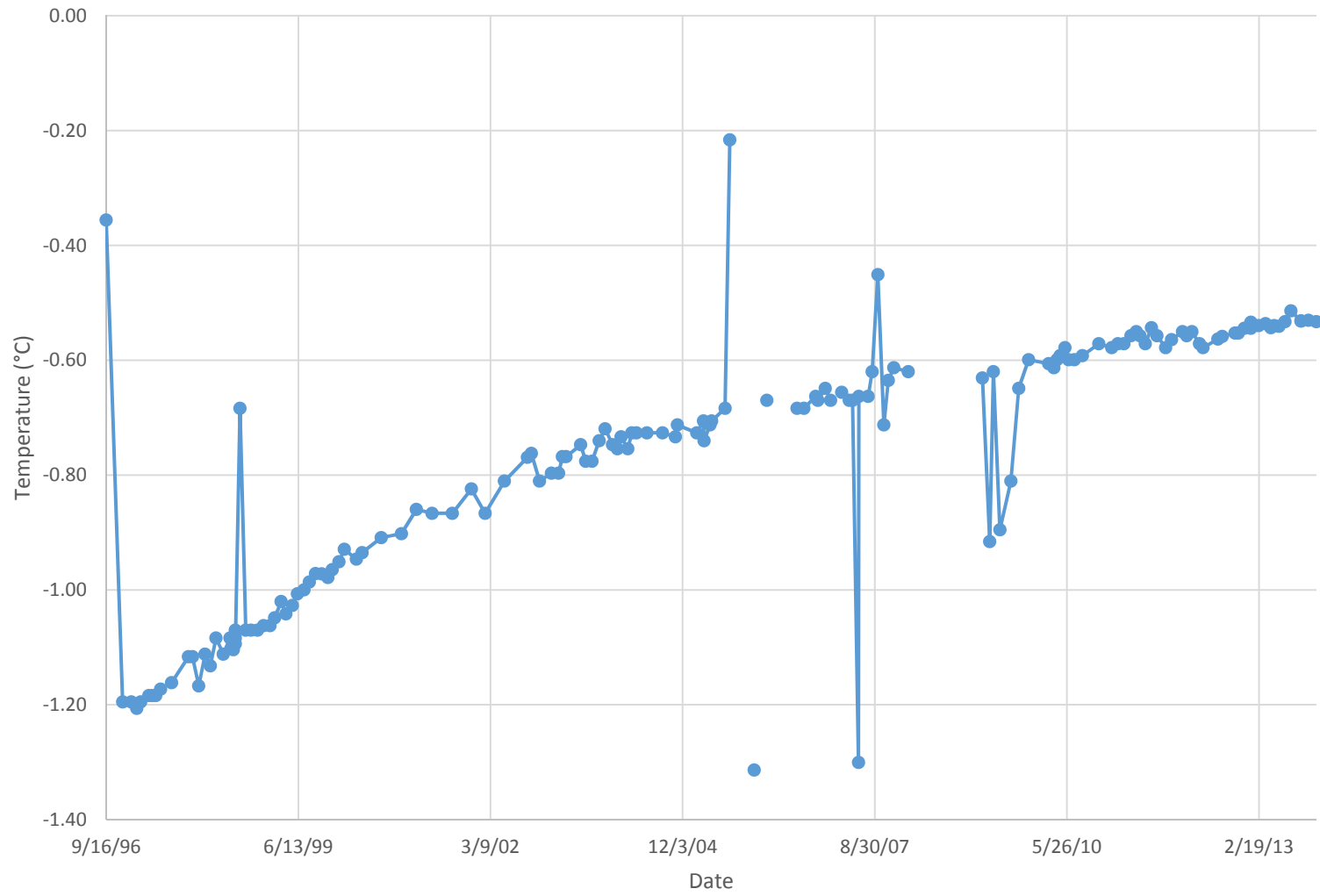
T-96-021: Temperature at 65 feet



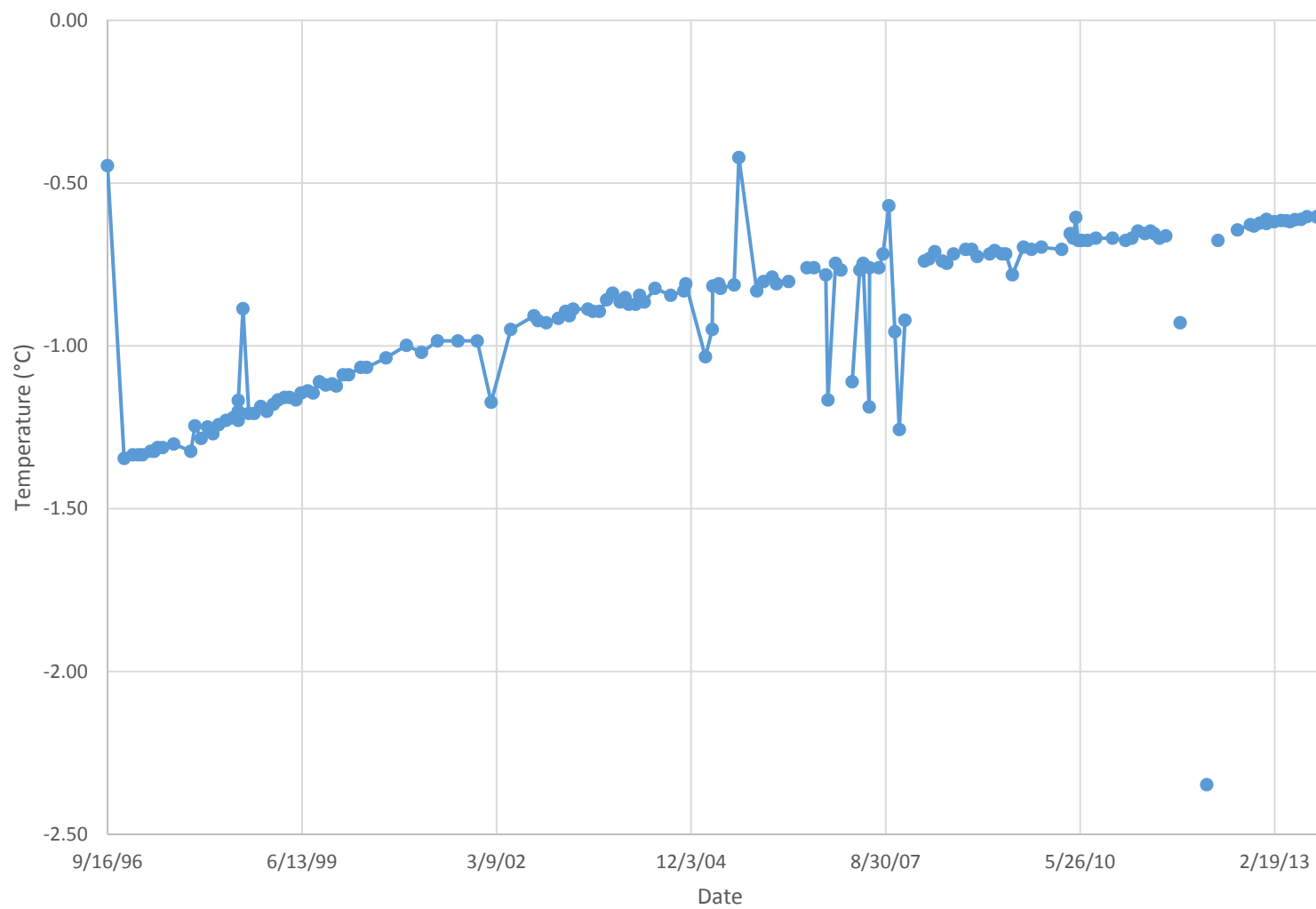
T-96-021: Temperature at 85 feet



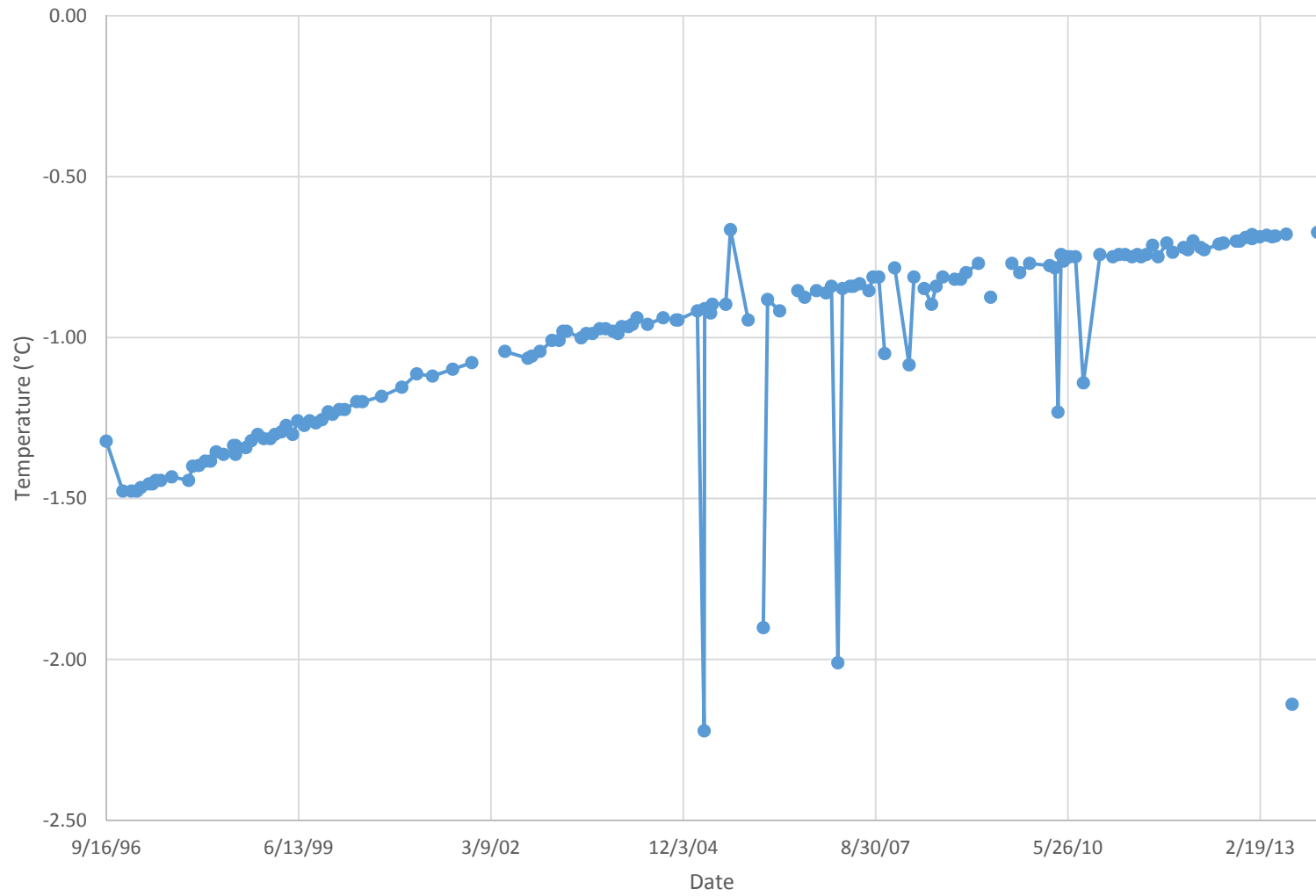
T-96-021: Temperature at 90 feet



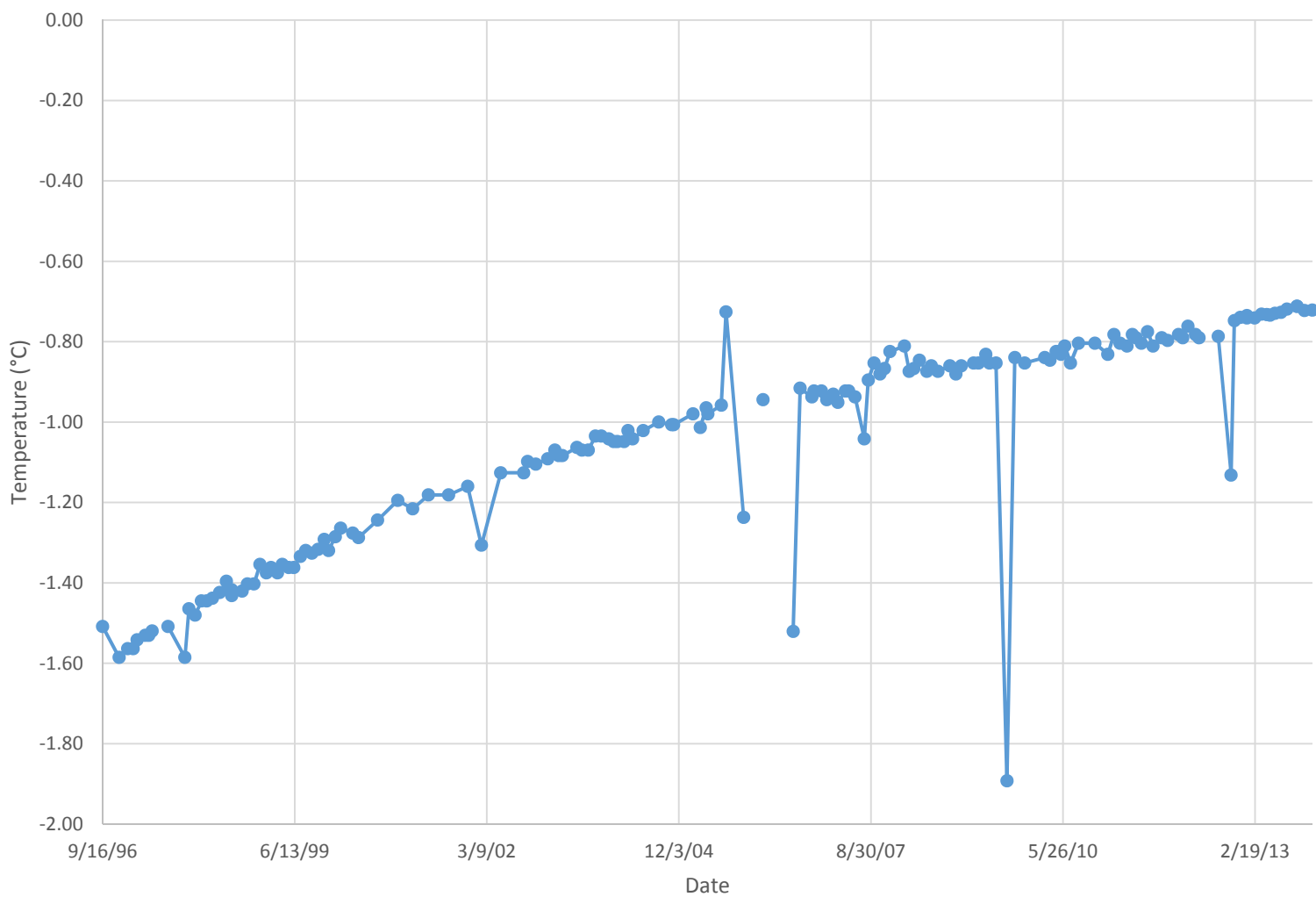
T-96-021: Temperature at 95 feet



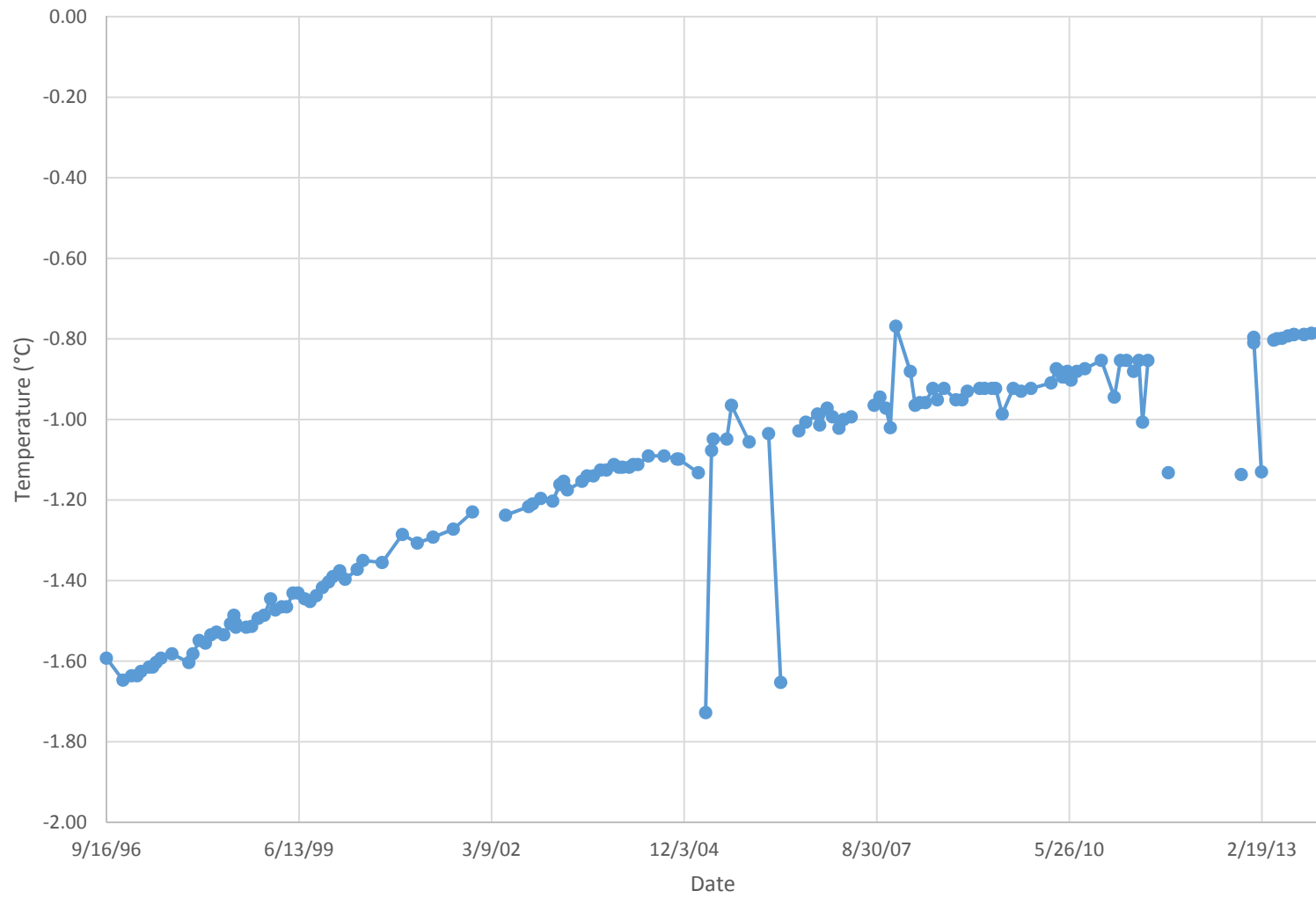
T-96-021: Temperature at 100 feet



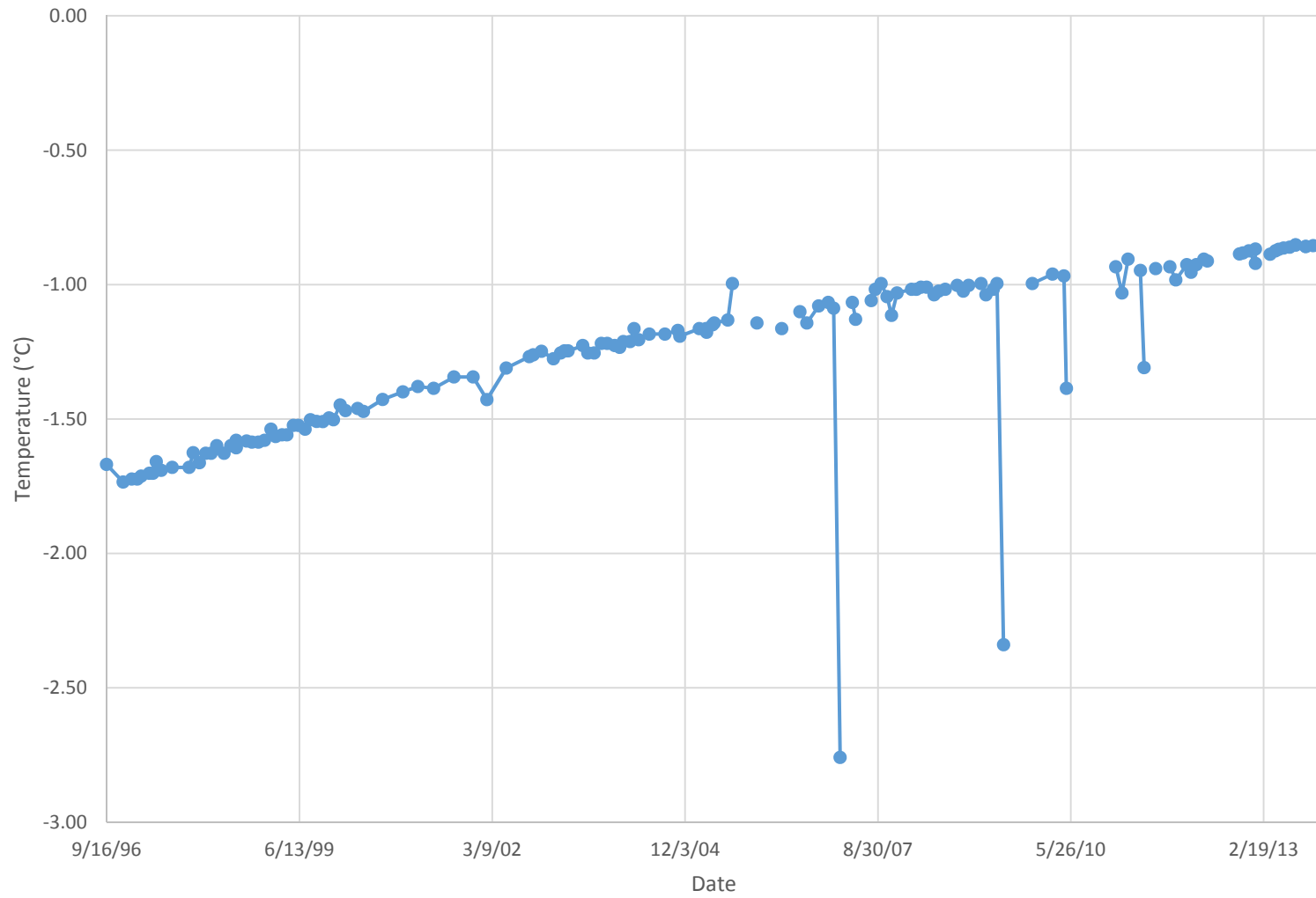
T-96-021: Temperature at 105 feet

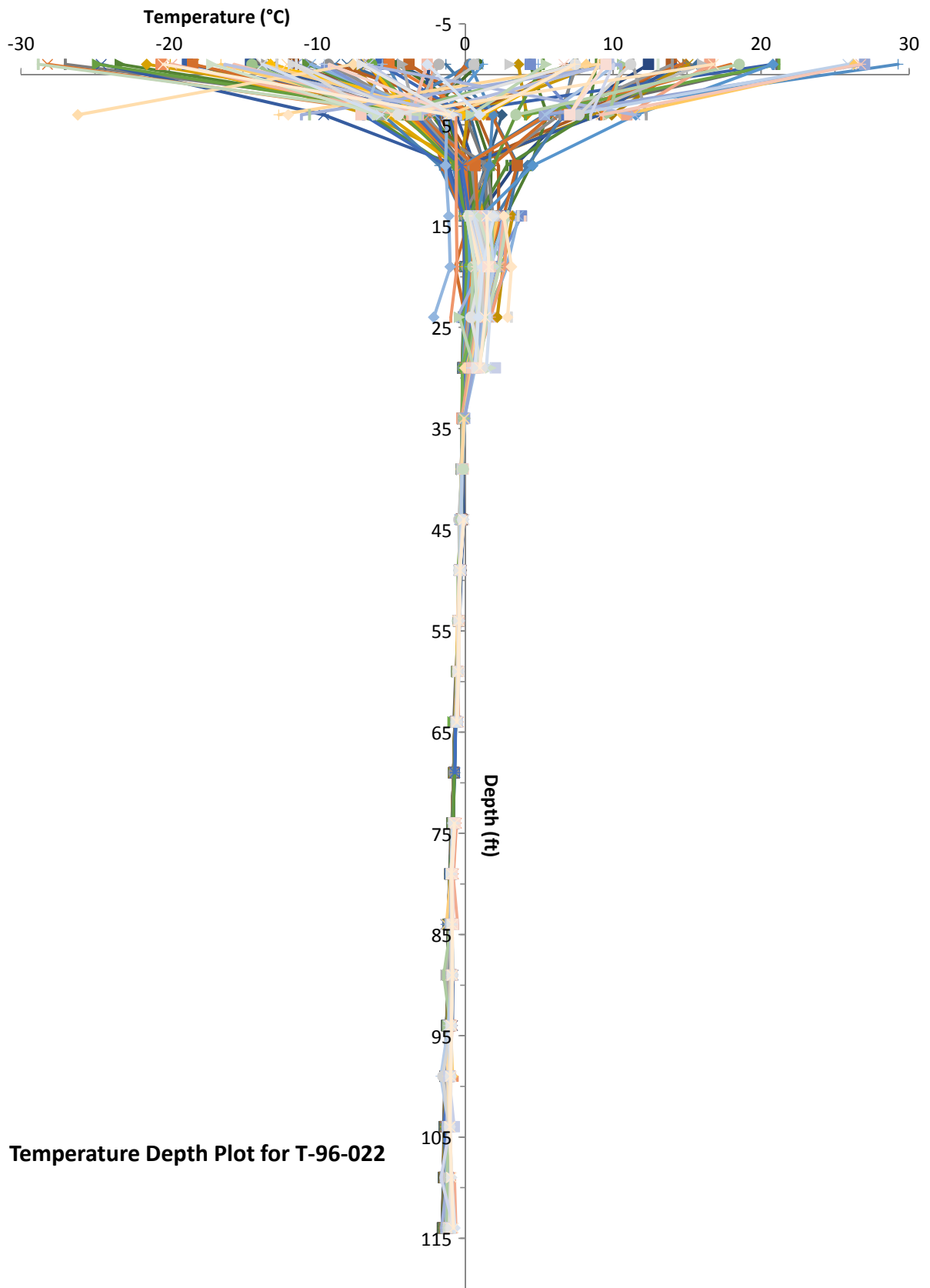


T-96-021: Temperature at 110 feet

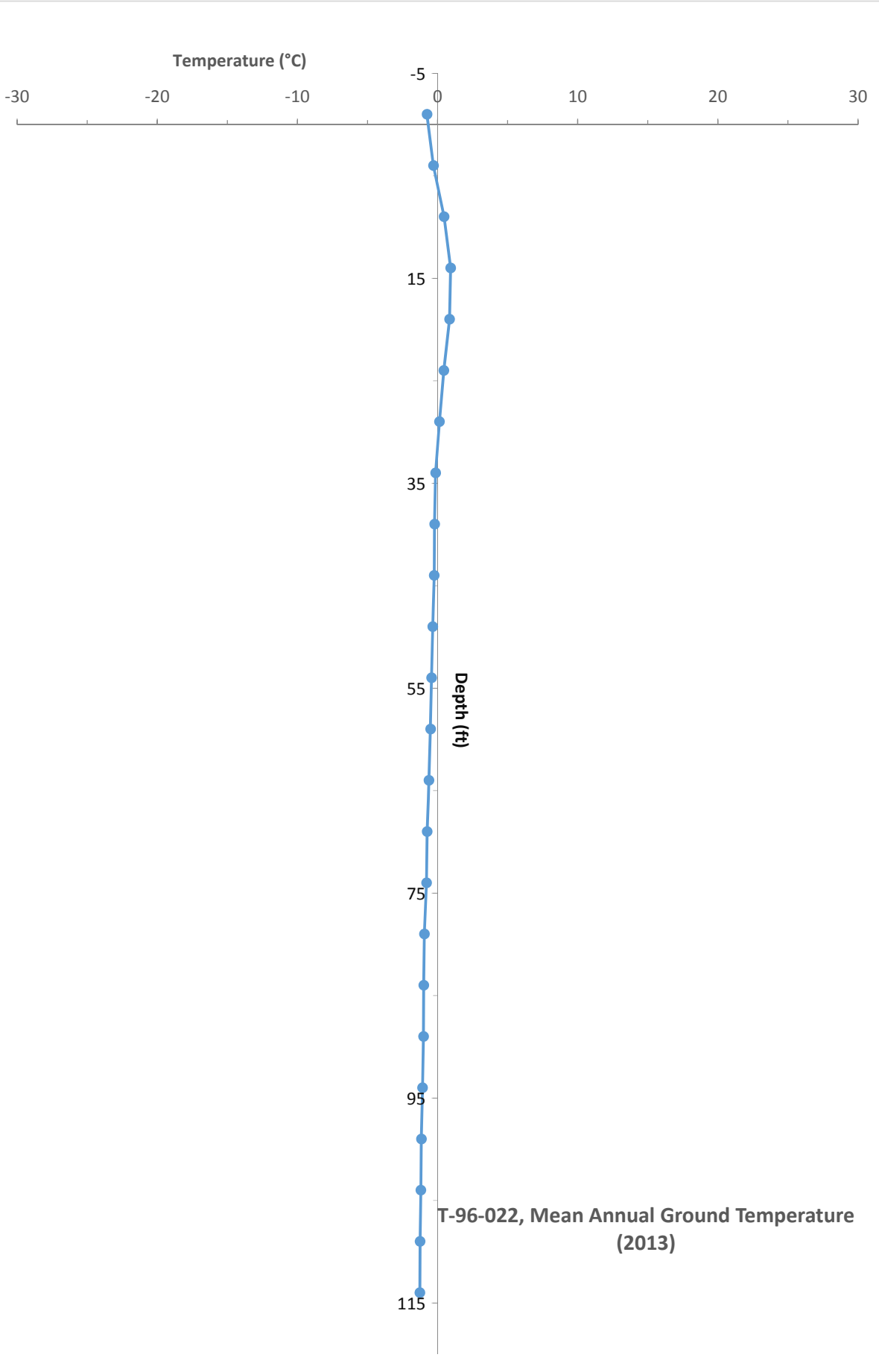


T-96-021: Temperature at 115 feet

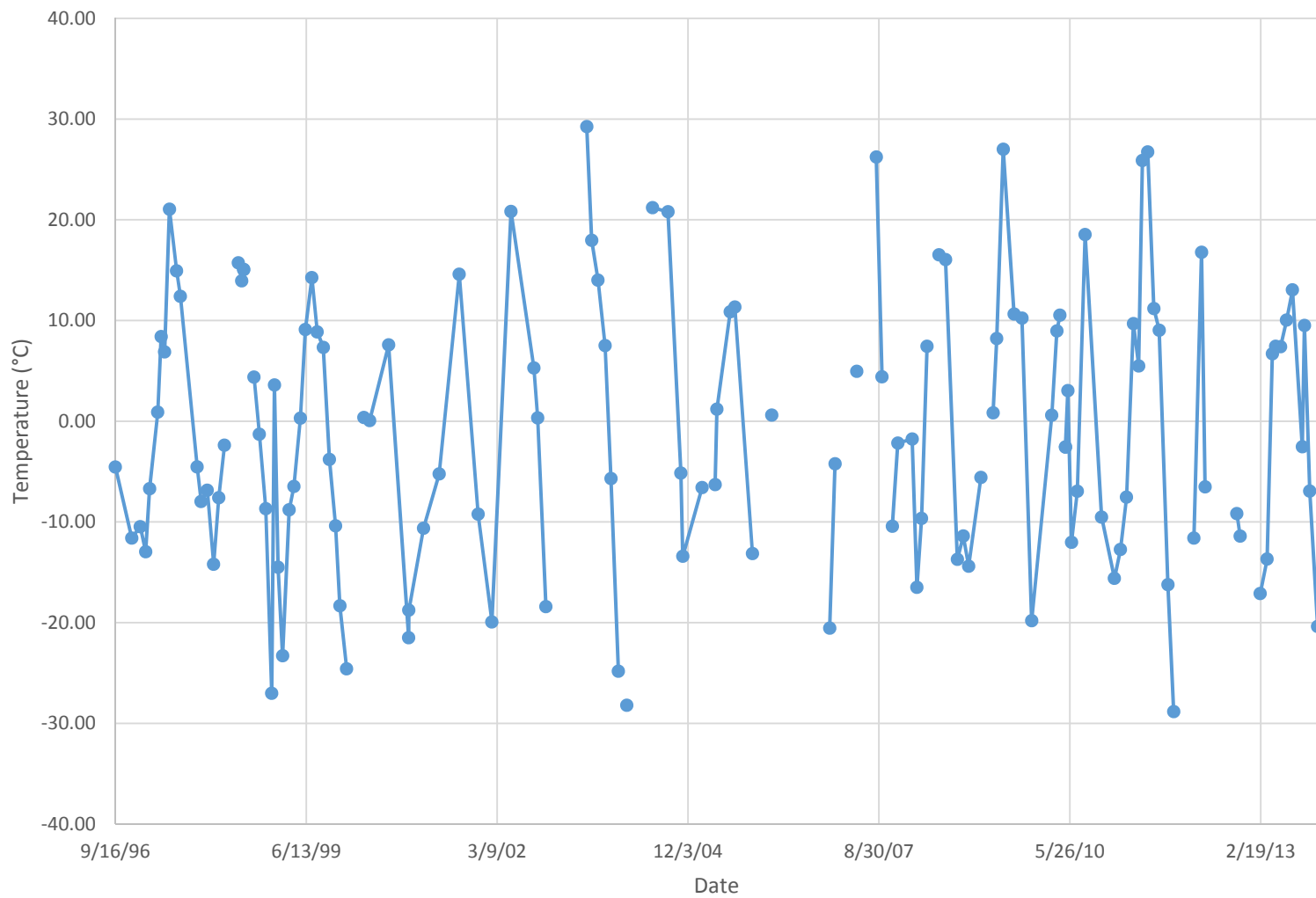




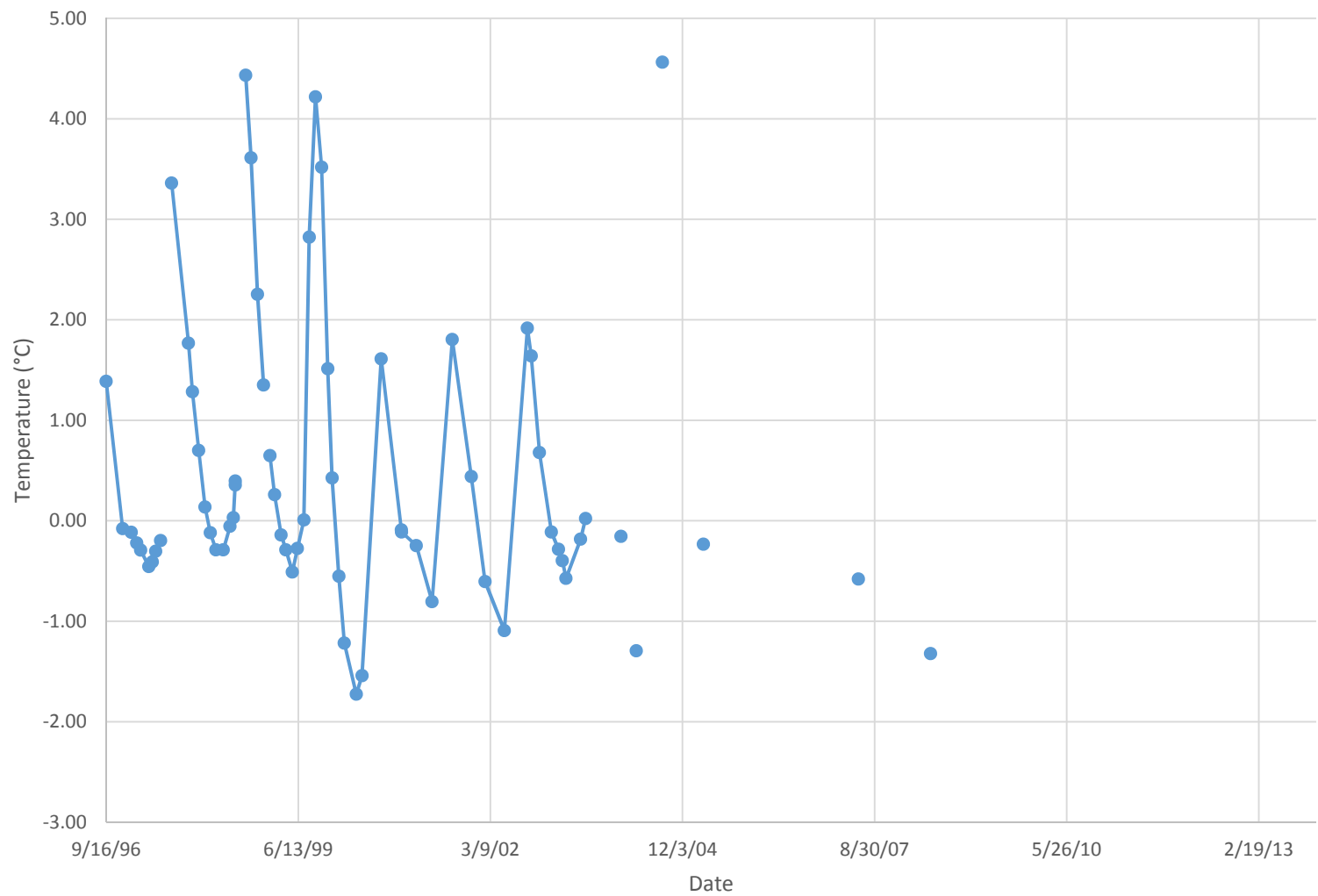
Temperature Depth Plot for T-96-022



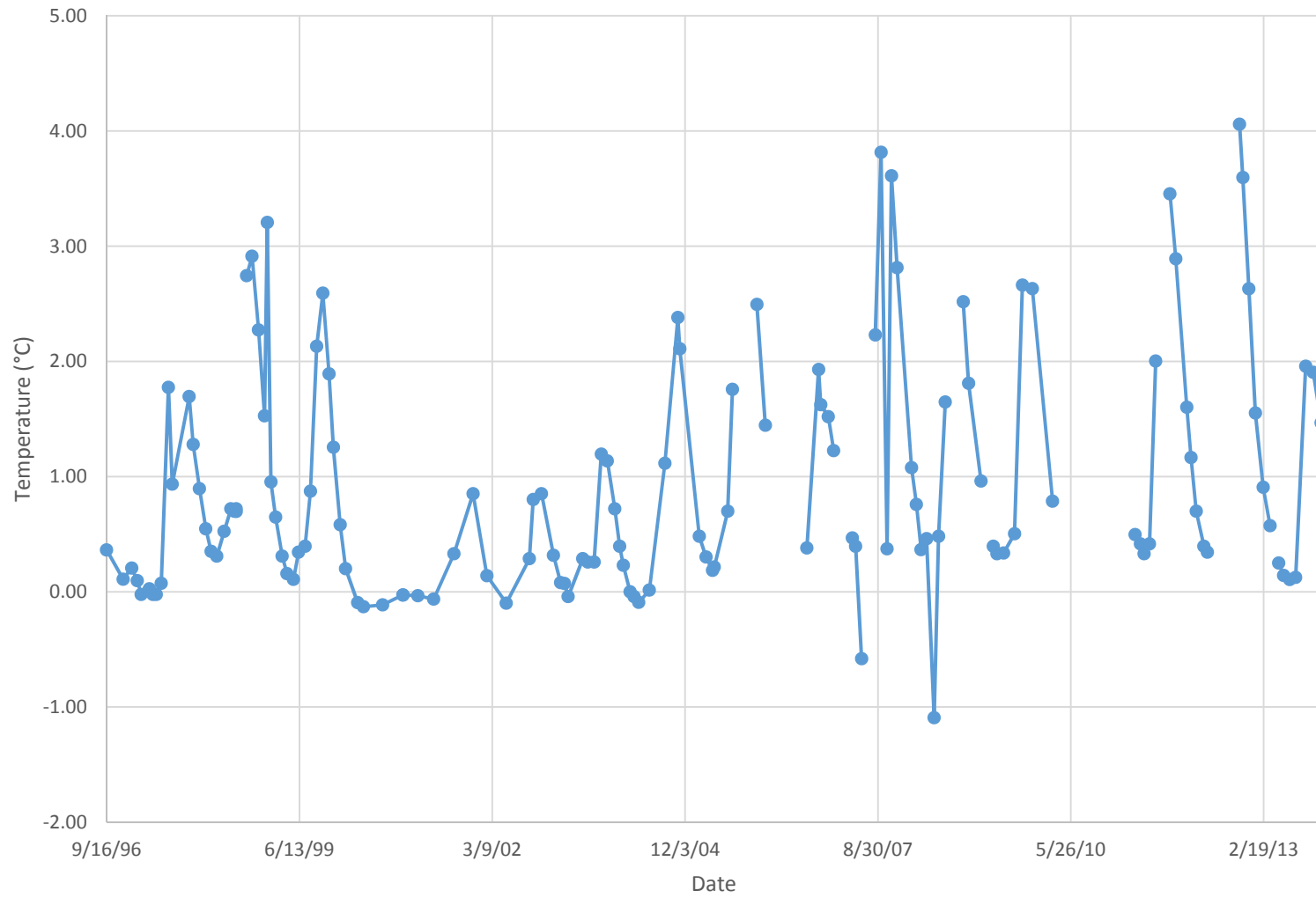
T-96-022: Temperature at -1 feet



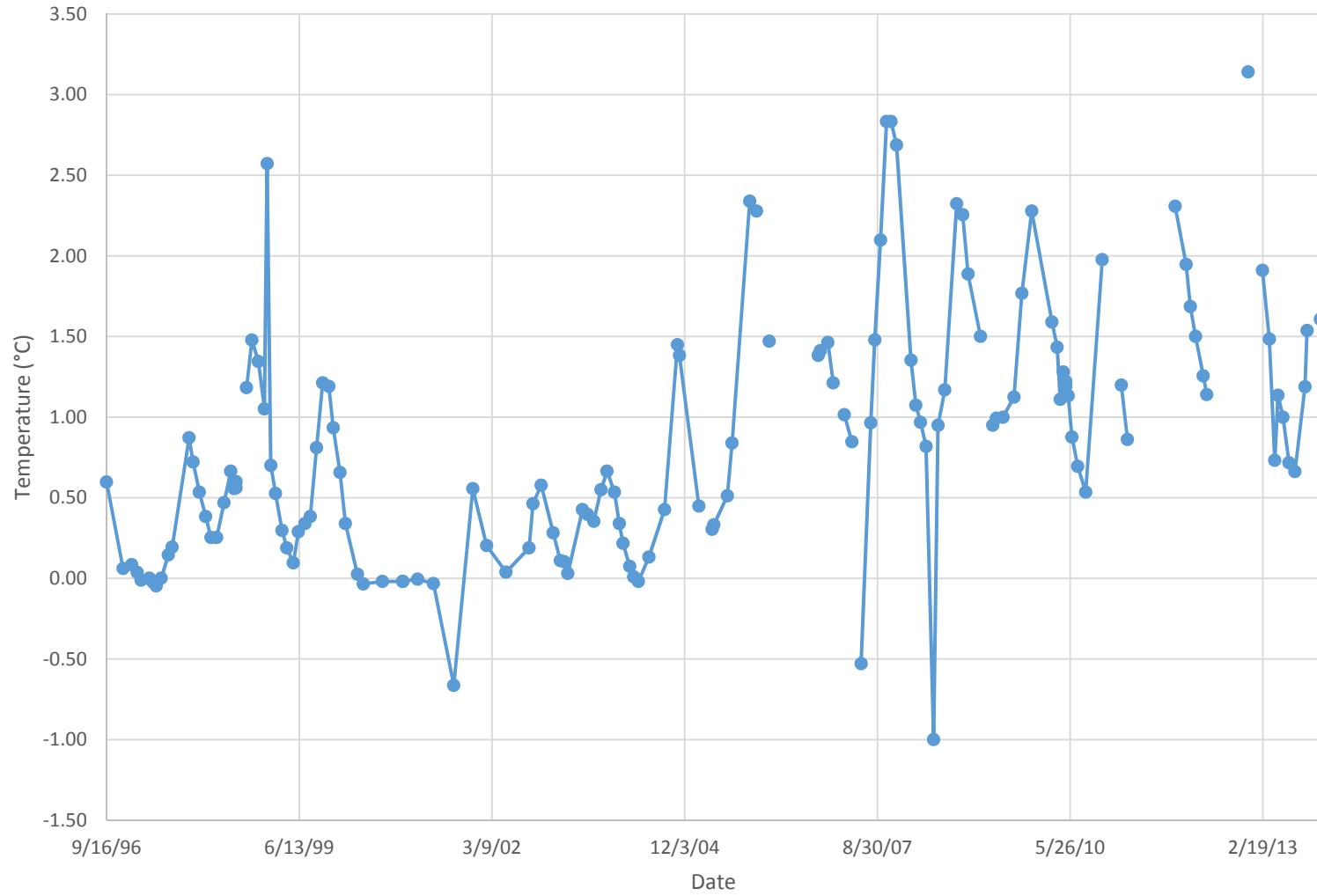
T-96-022: Temperature at 9 feet



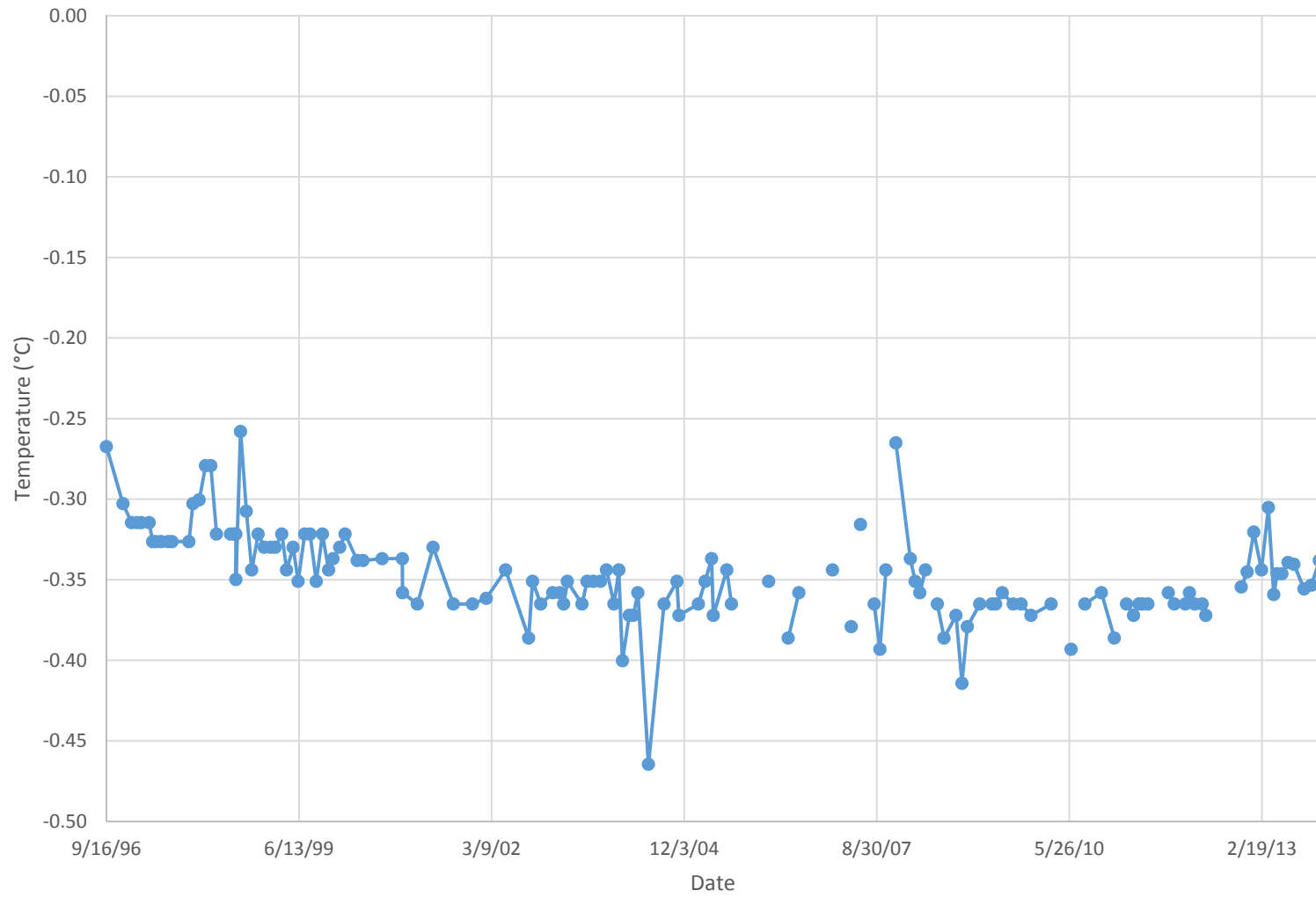
T-96-022: Temperature at 14 feet



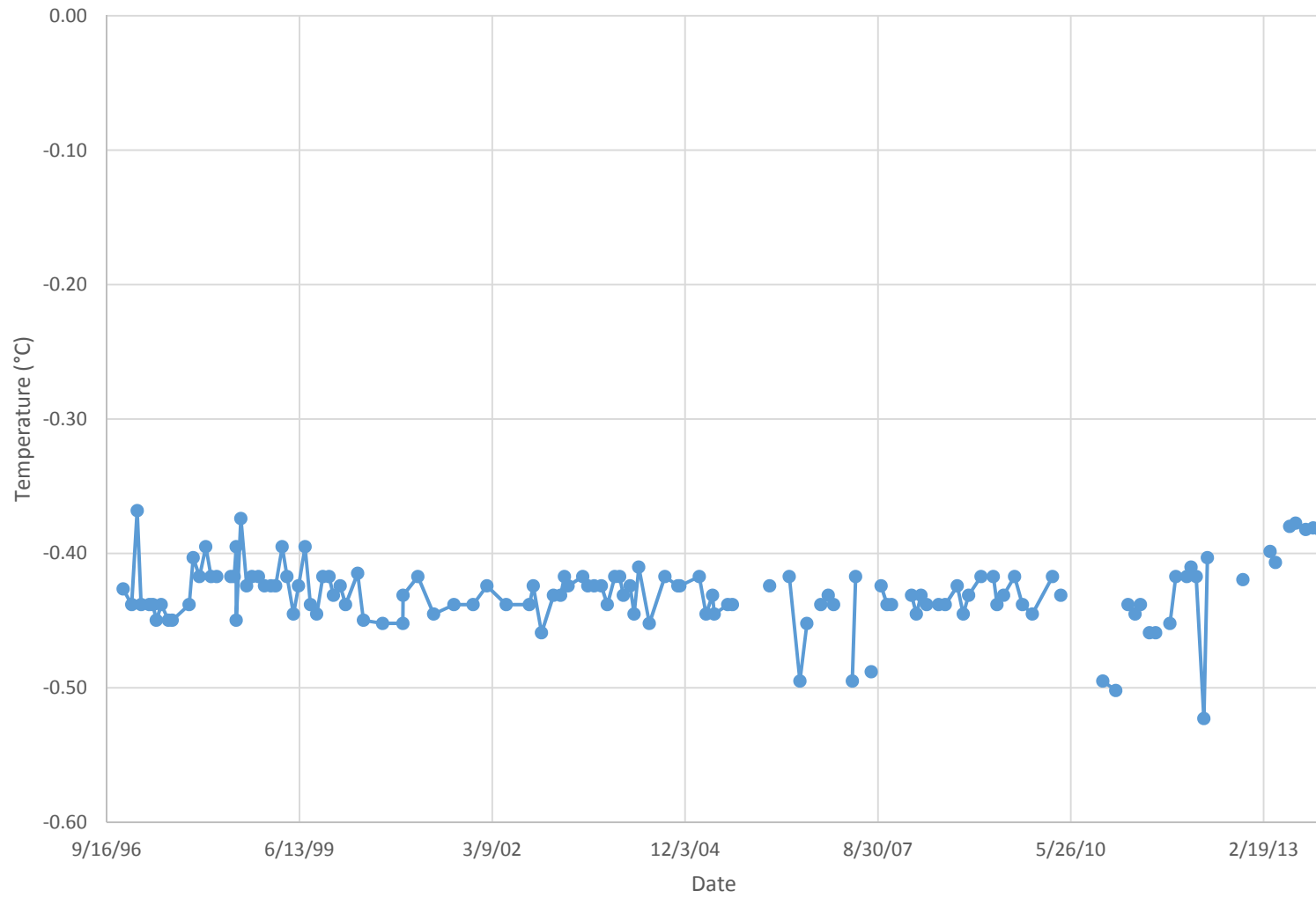
T-96-022: Temperature at 19 feet



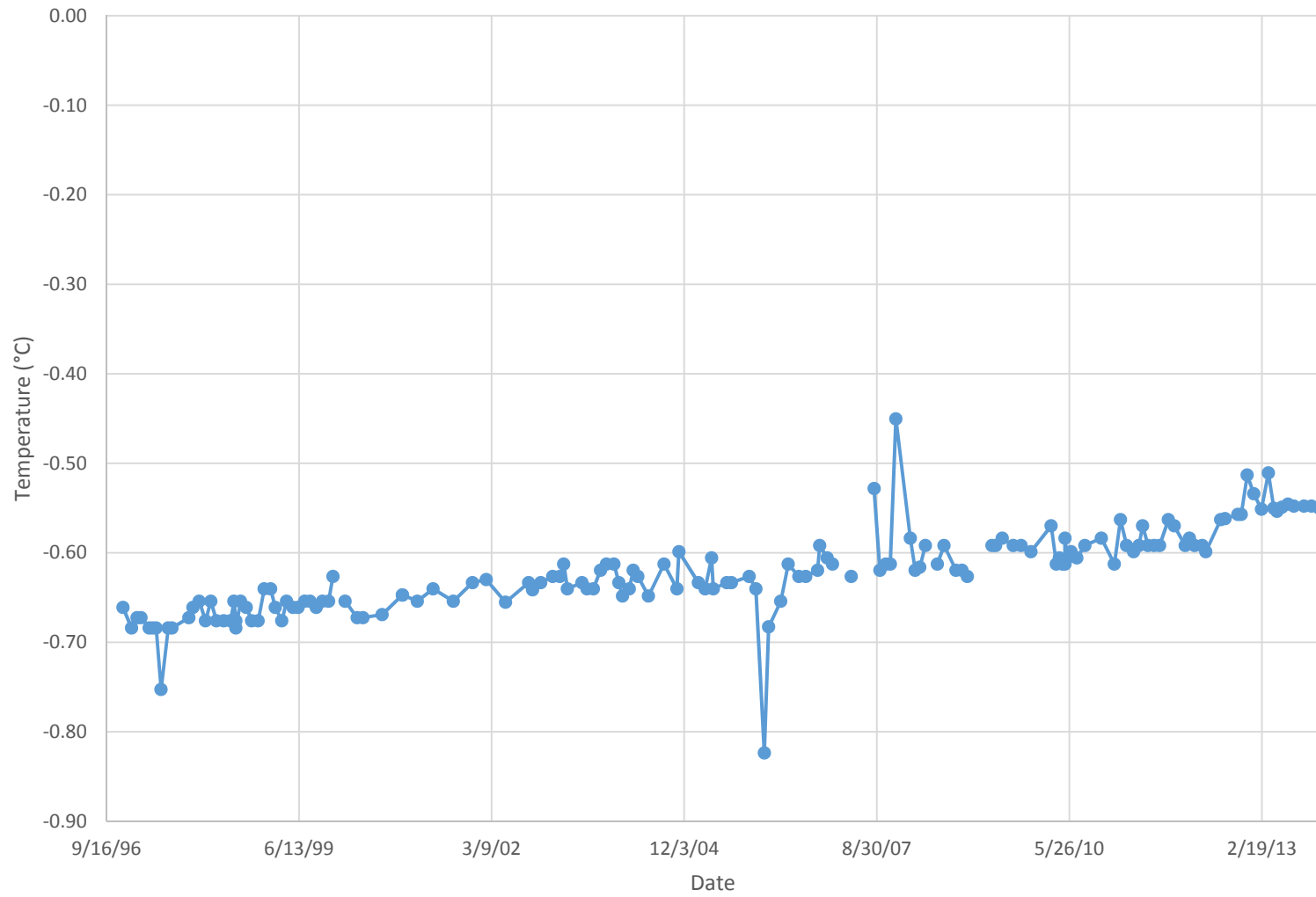
T-96-022: Temperature at 49 feet



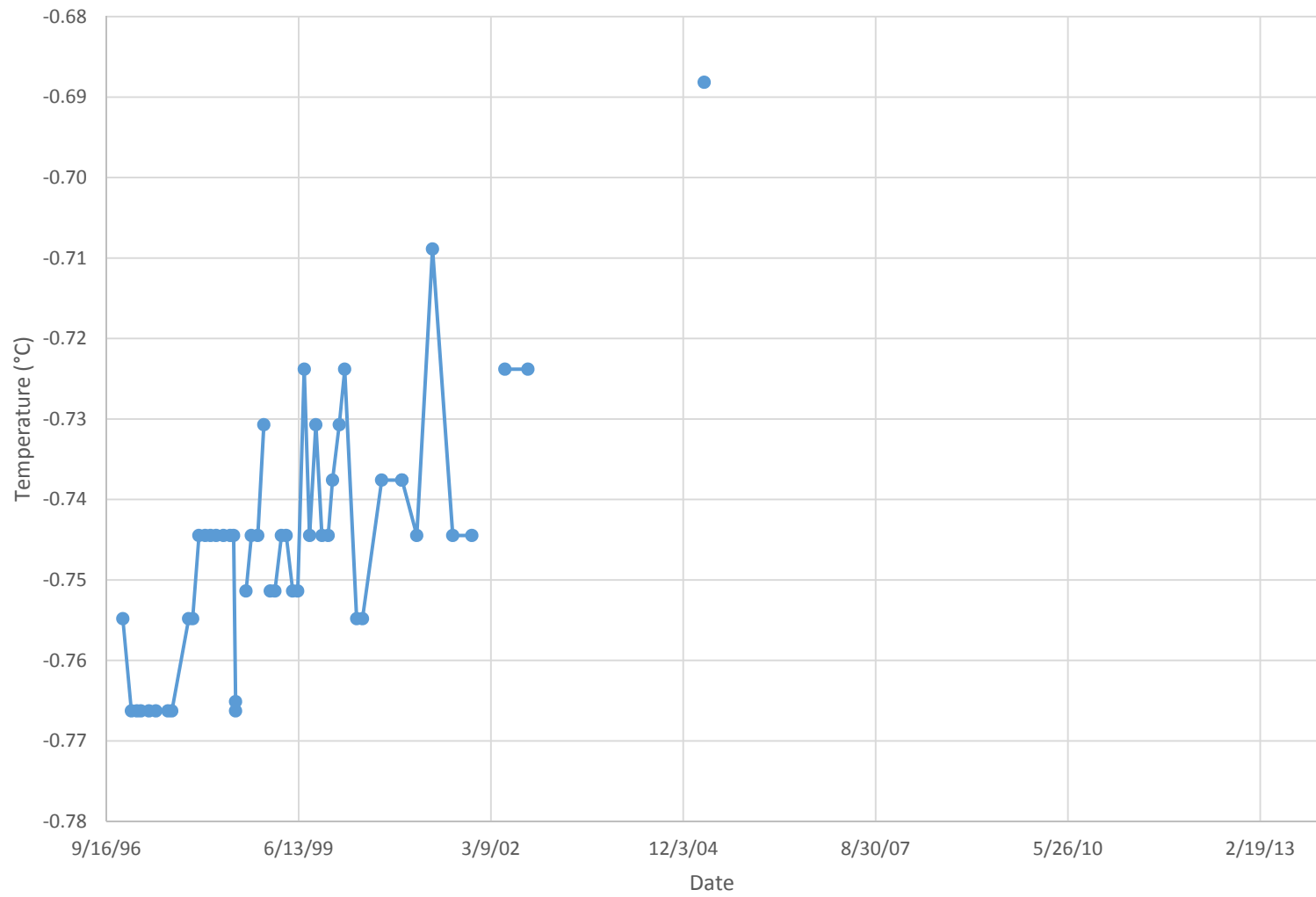
T-96-022: Temperature at 54 feet



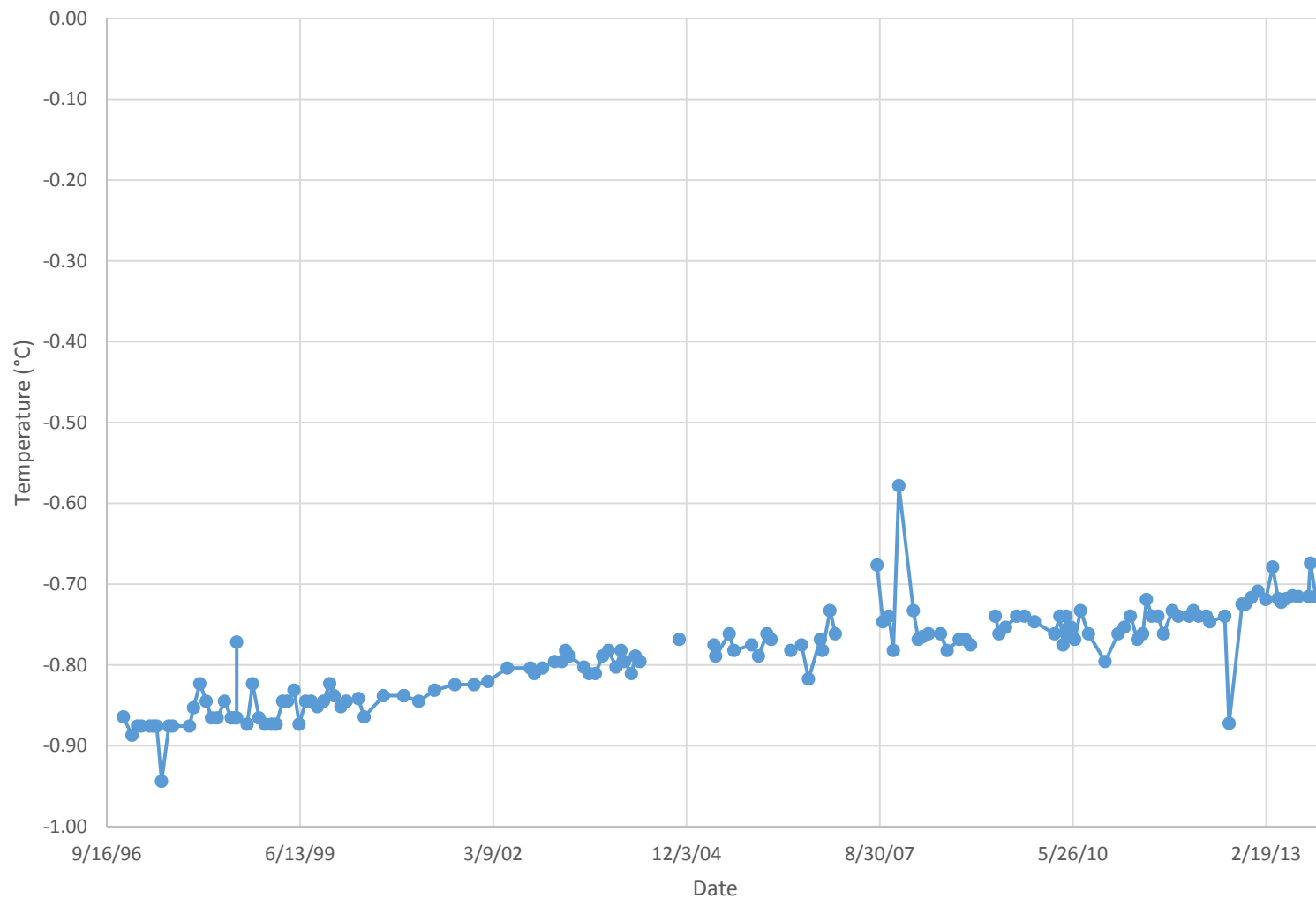
T-96-022: Temperature at 64 feet



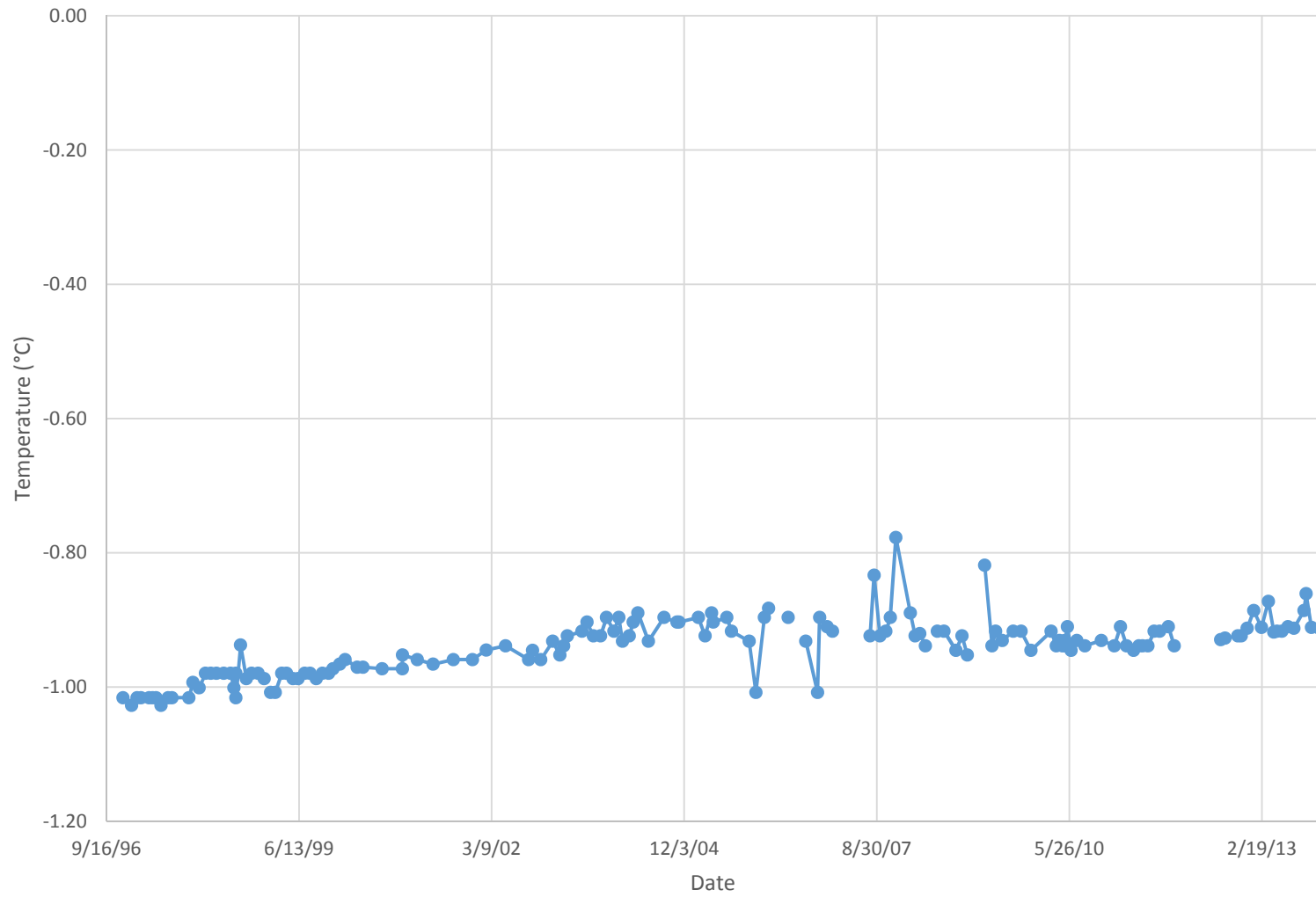
T-96-022: Temperature at 69 feet



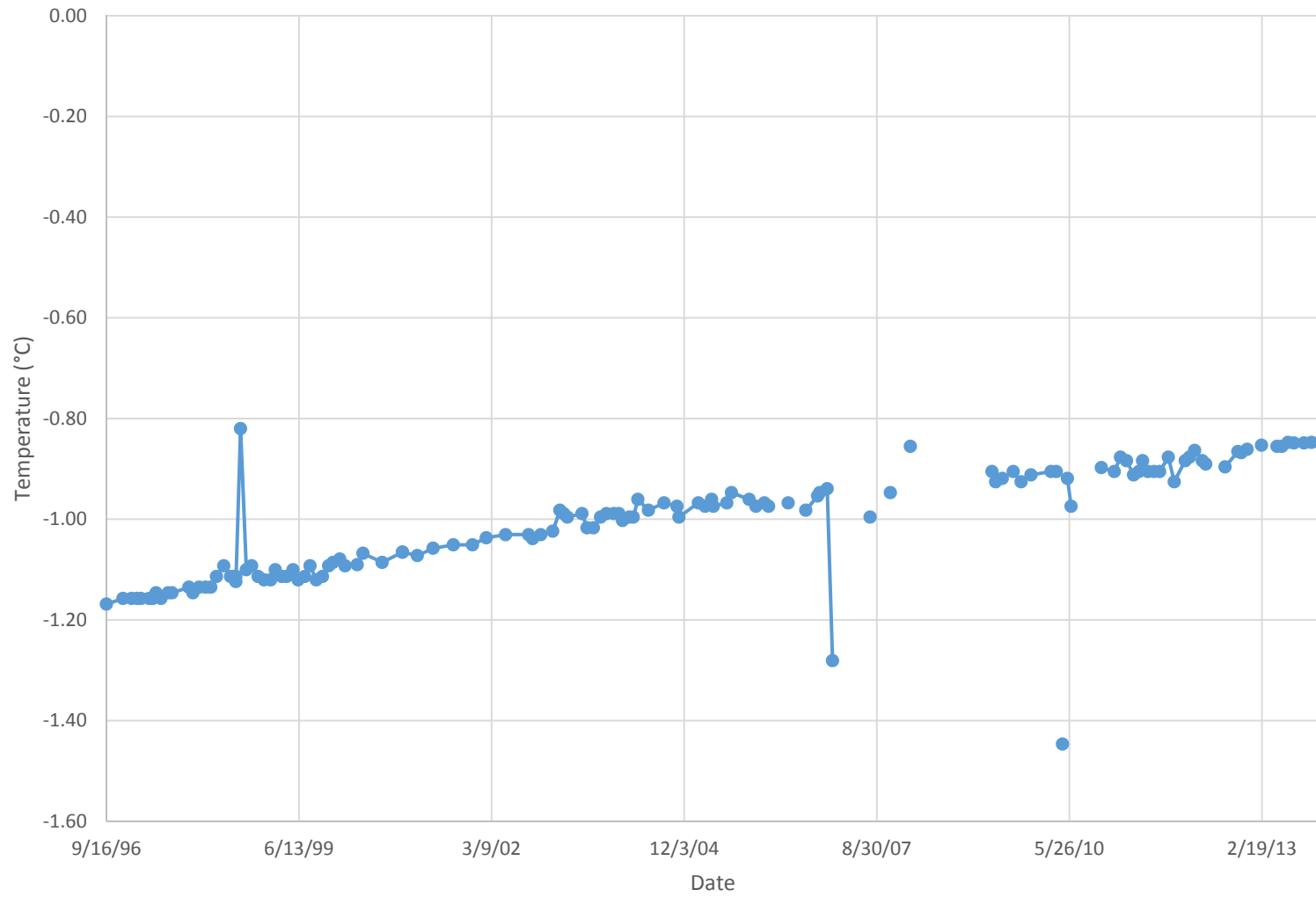
T-96-022: Temperature at 74 feet



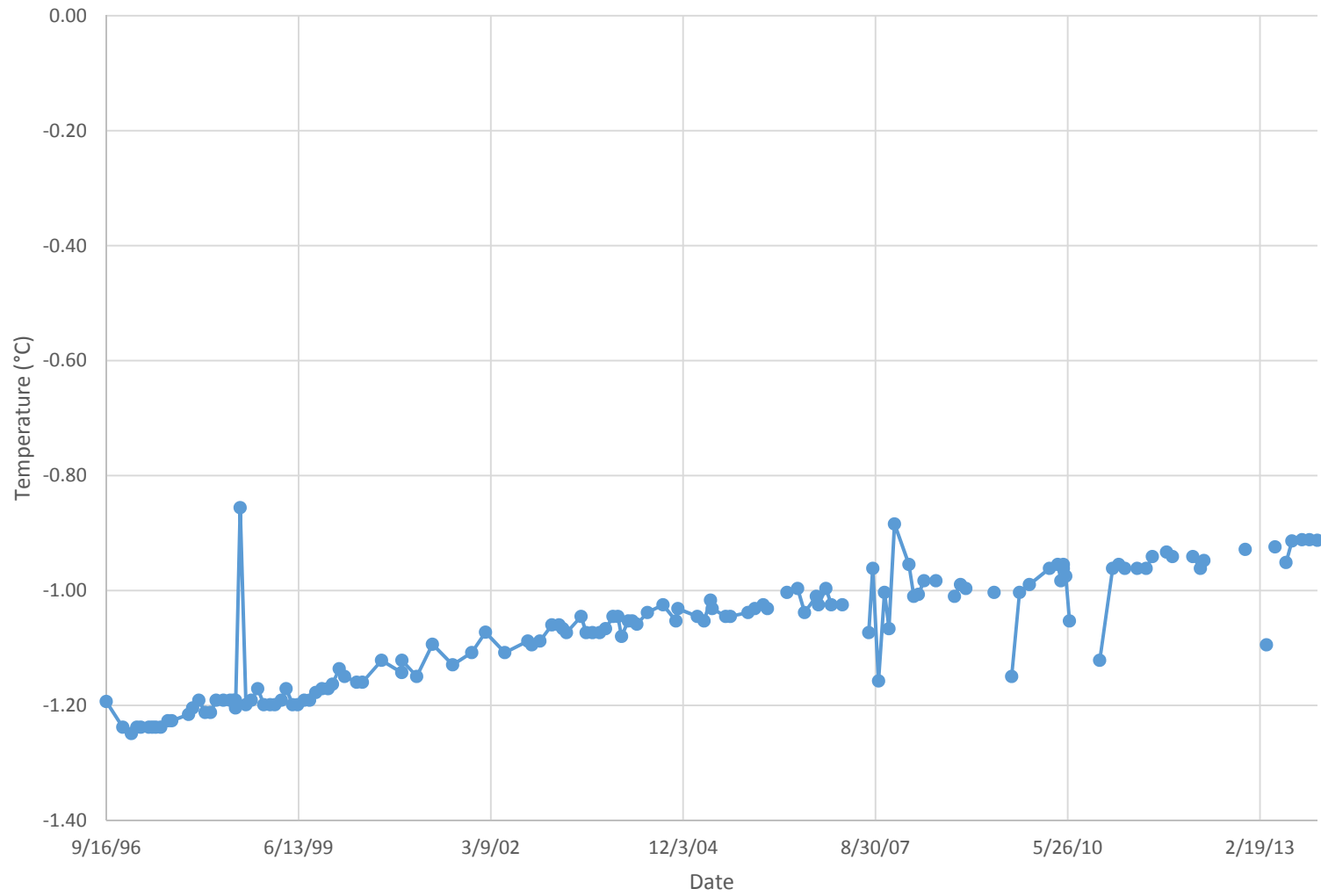
T-96-022: Temperature at 79 feet



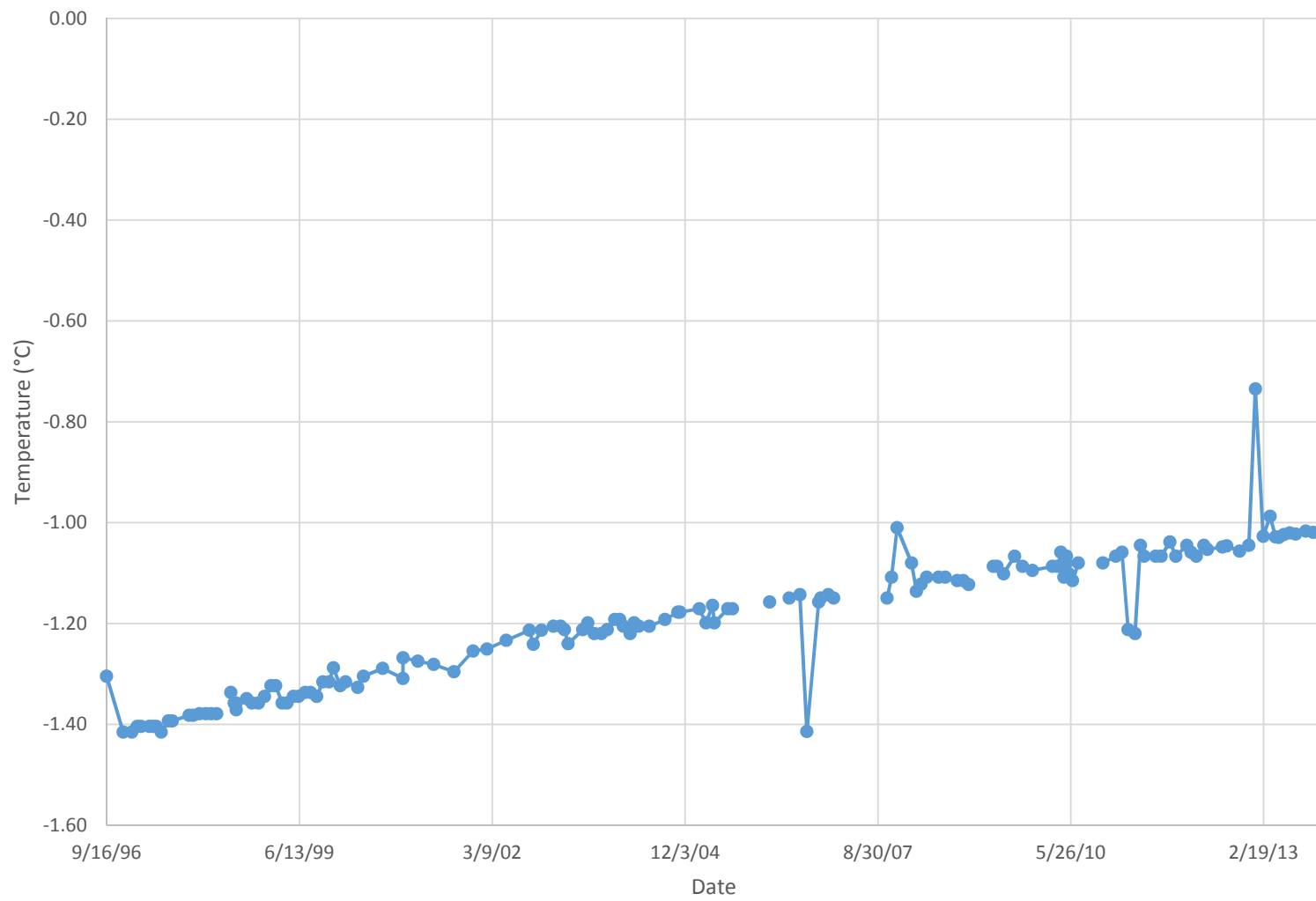
T-96-022: Temperature at 89 feet



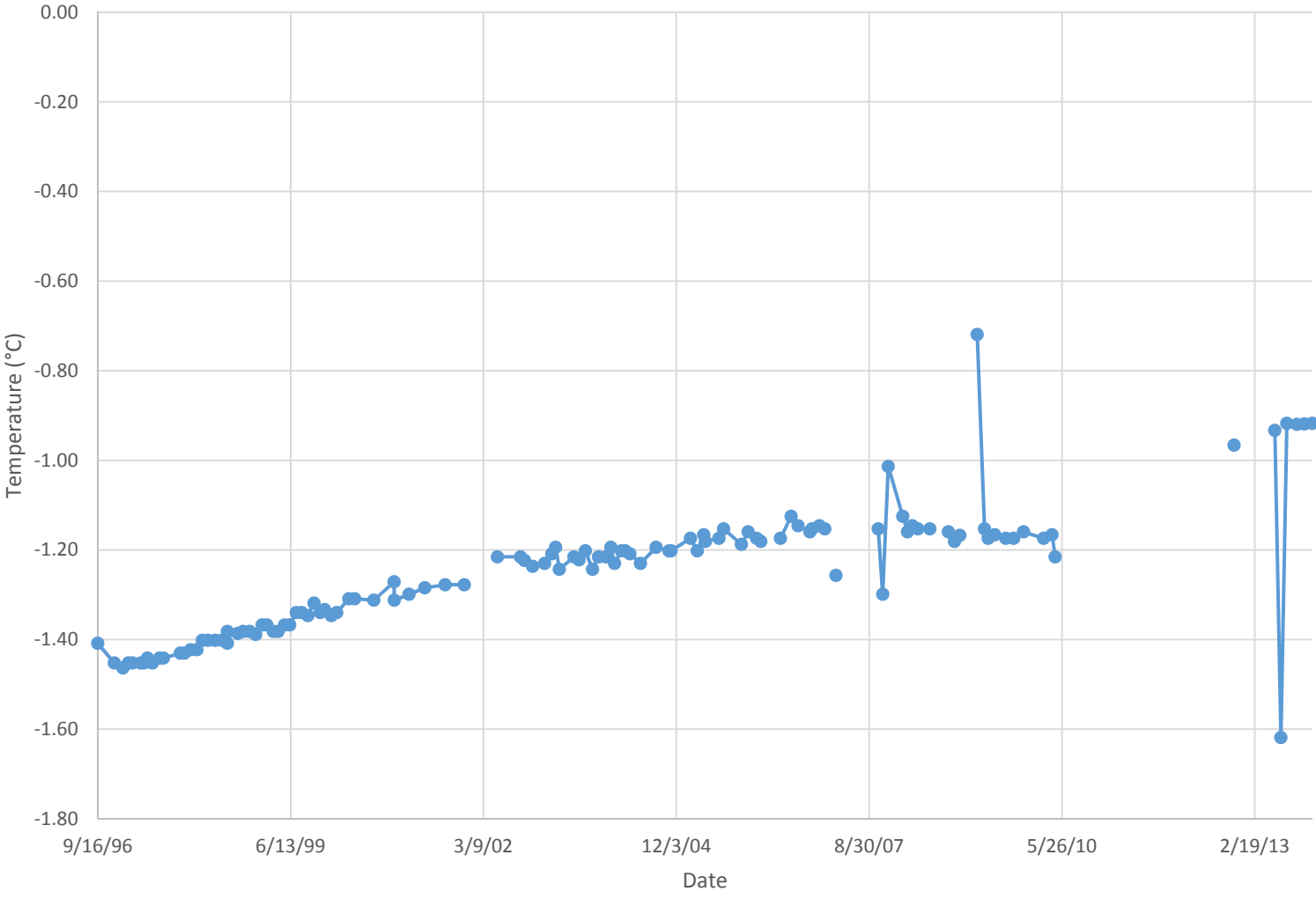
T-96-022: Temperature at 94 feet



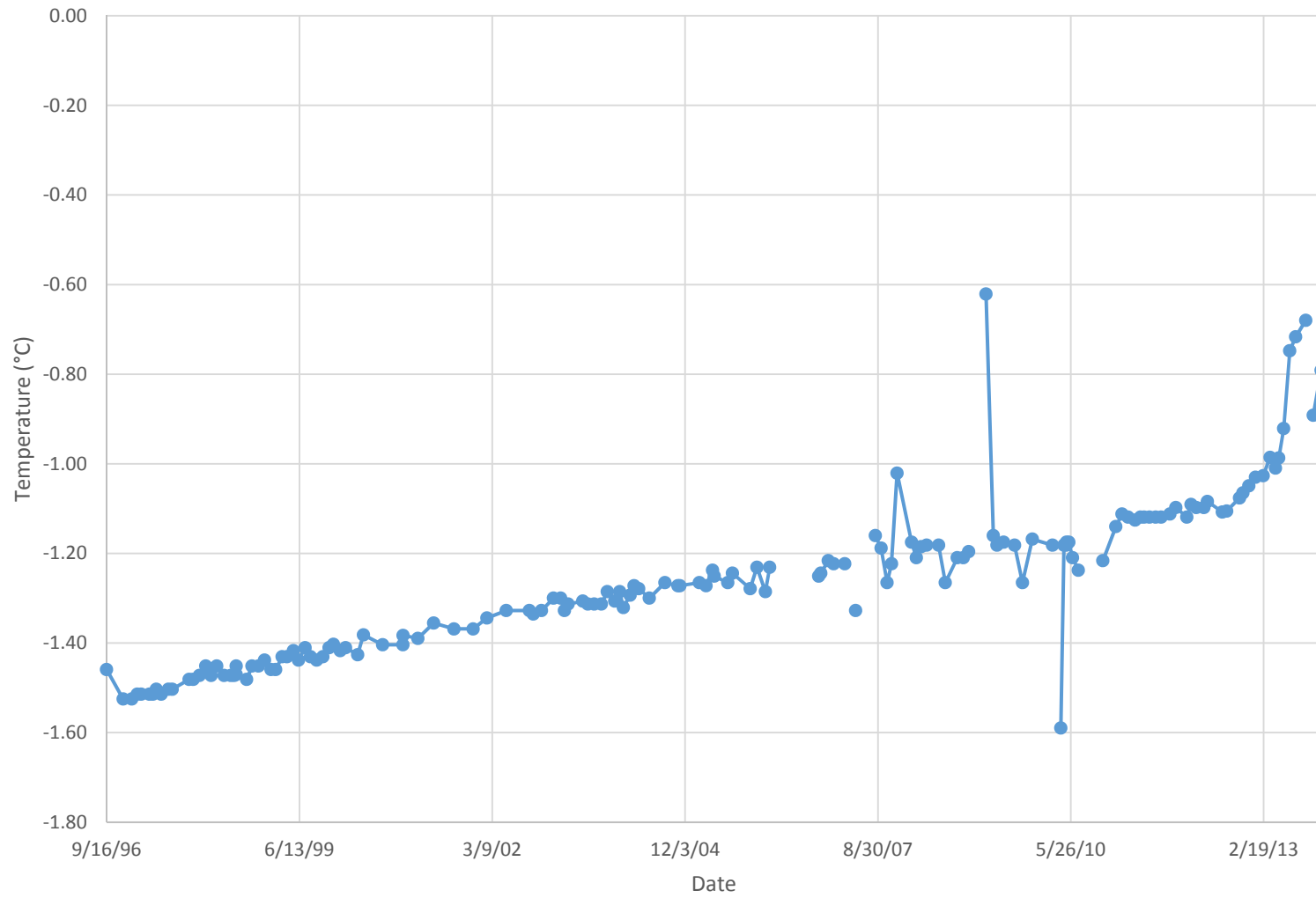
T-96-022: Temperature at 104 feet

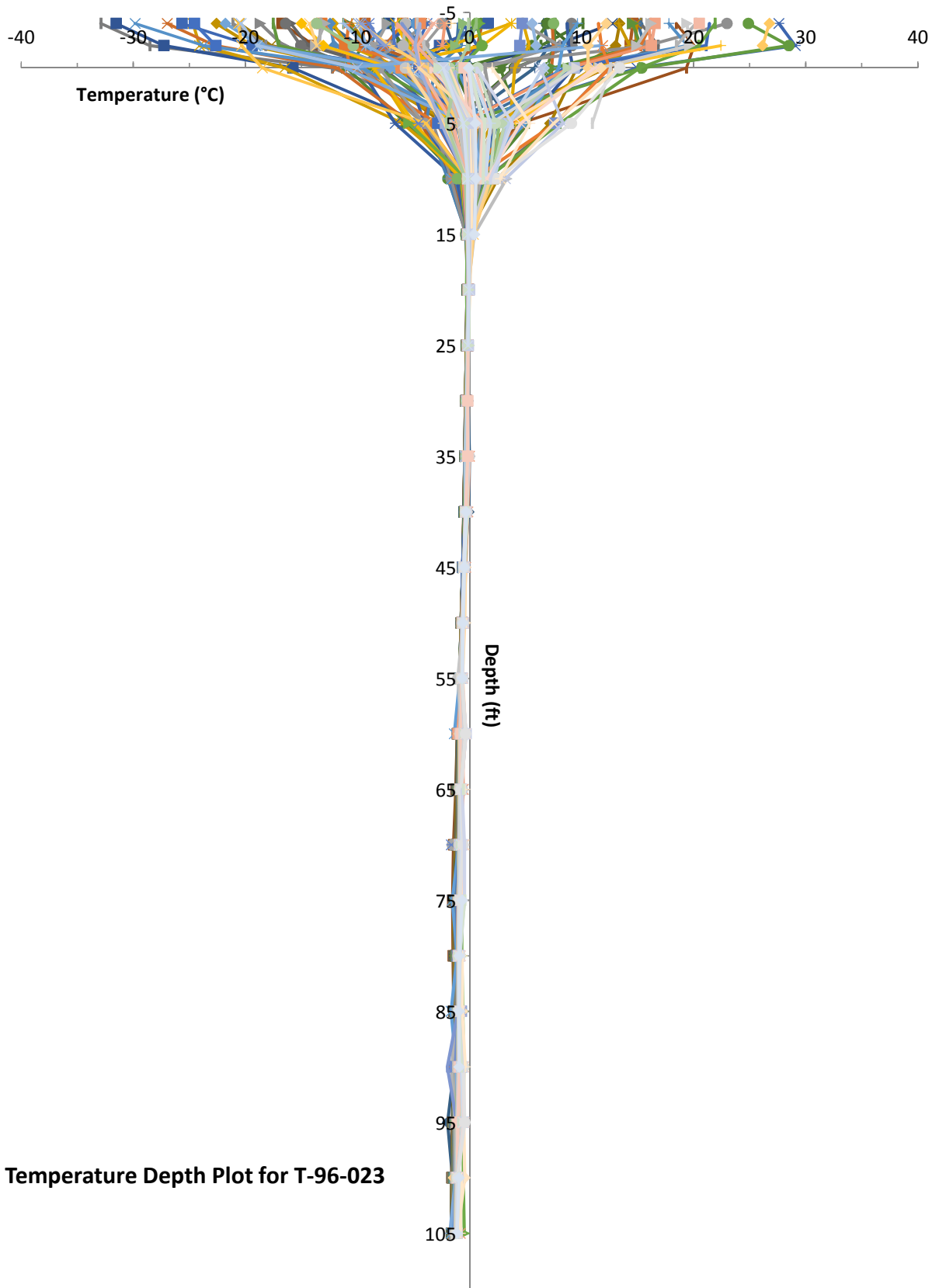


T-96-022: Temperature at 109 feet

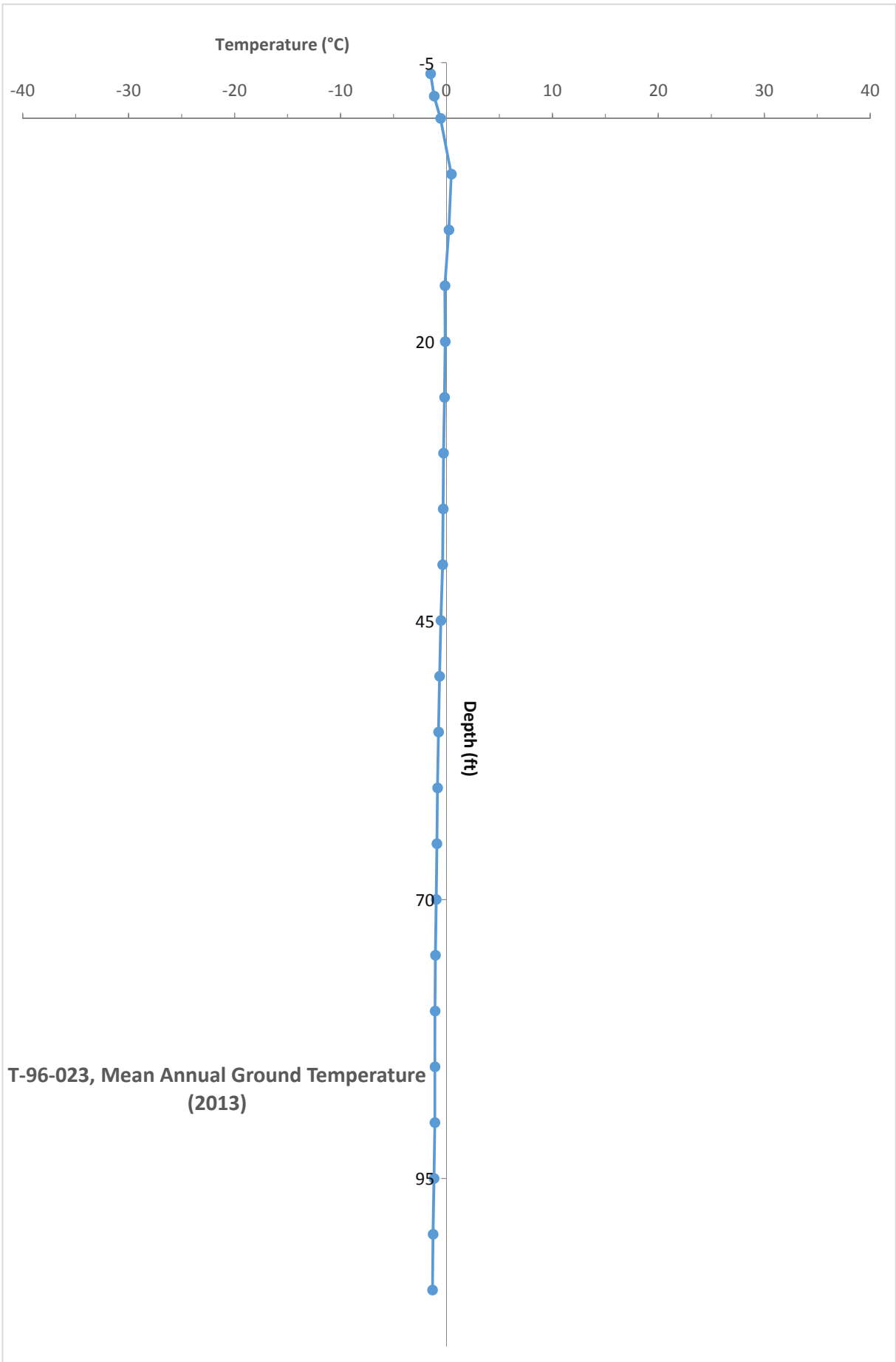


T-96-022: Temperature at 114 feet

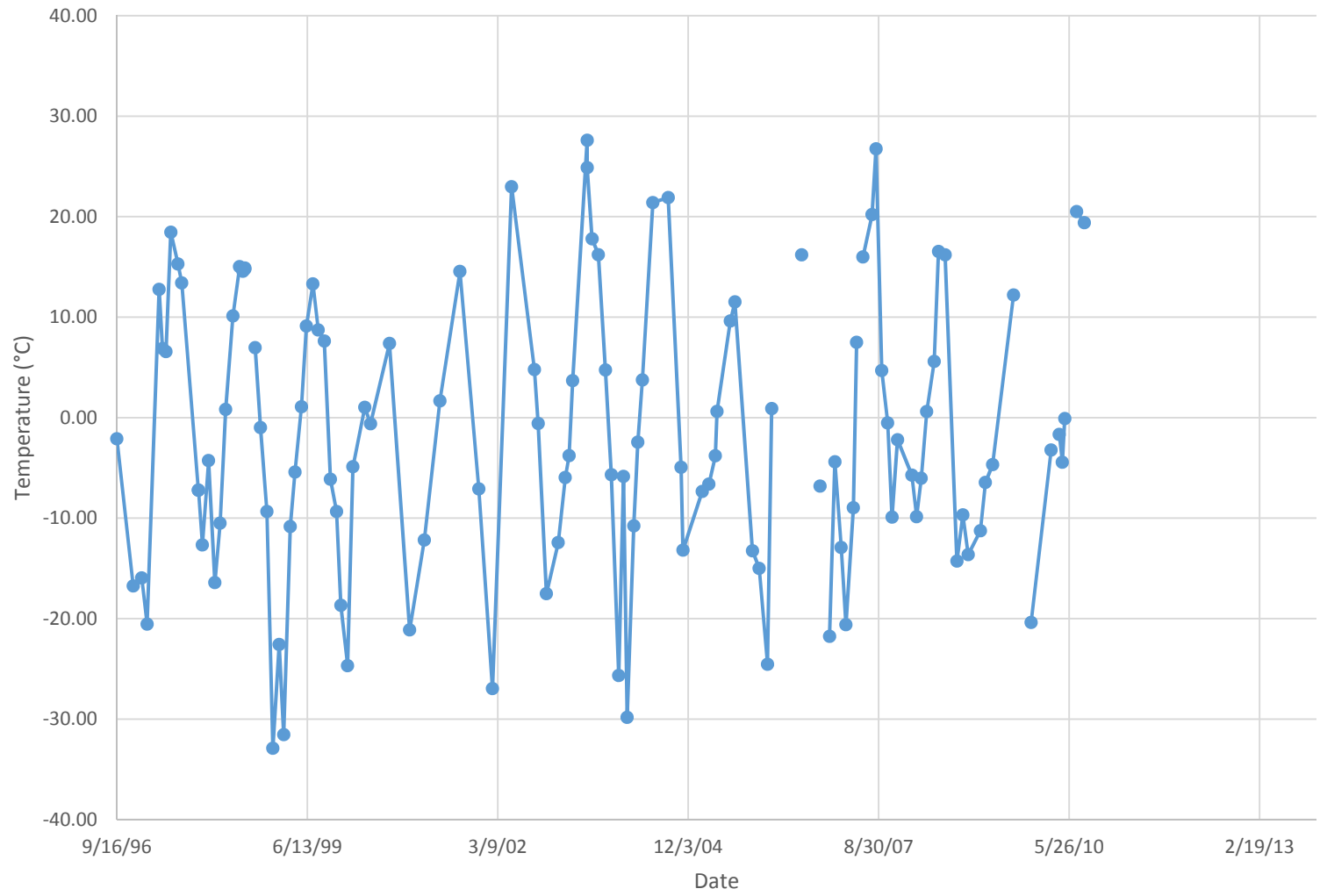




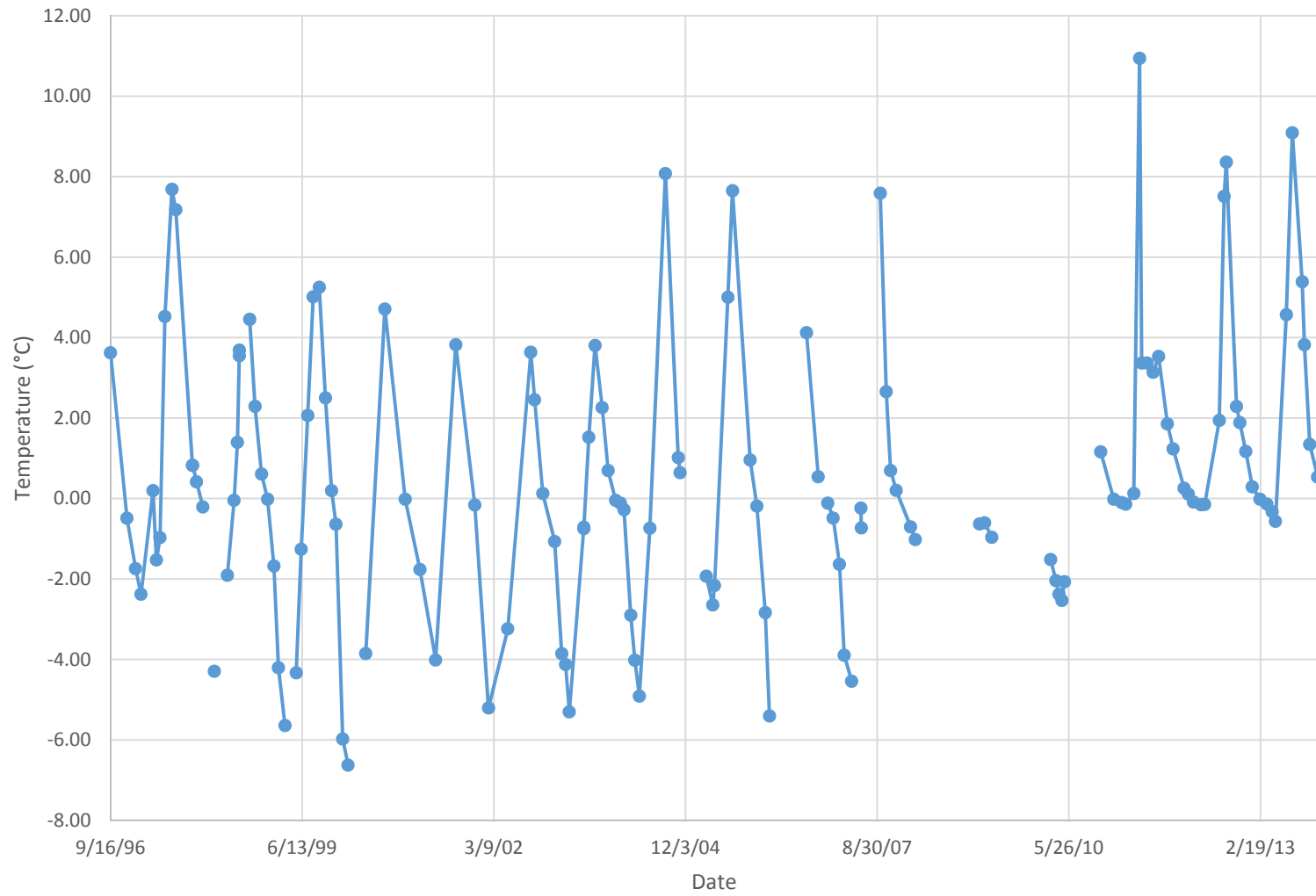
Temperature Depth Plot for T-96-023



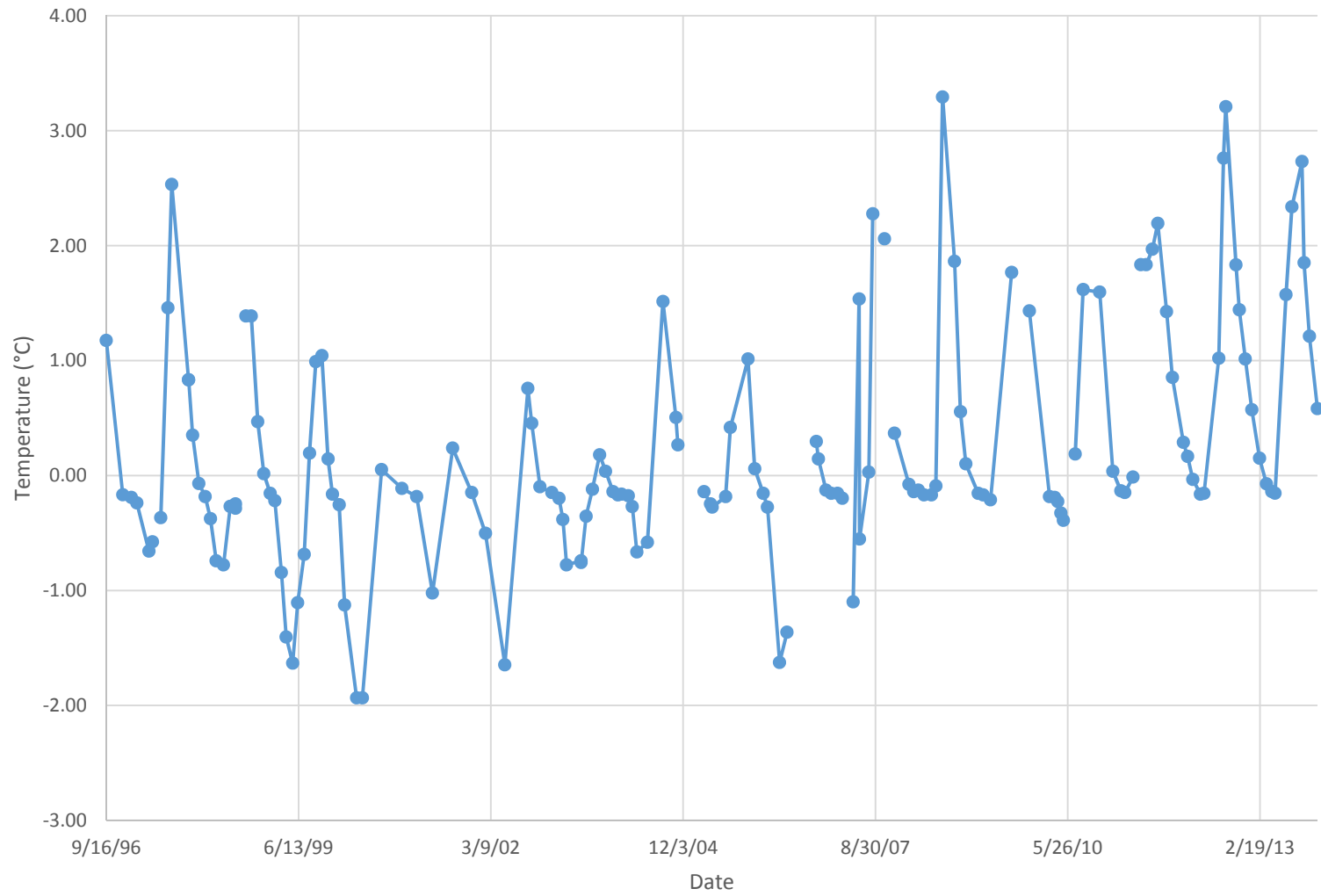
T-96-023: Temperature at -4 feet



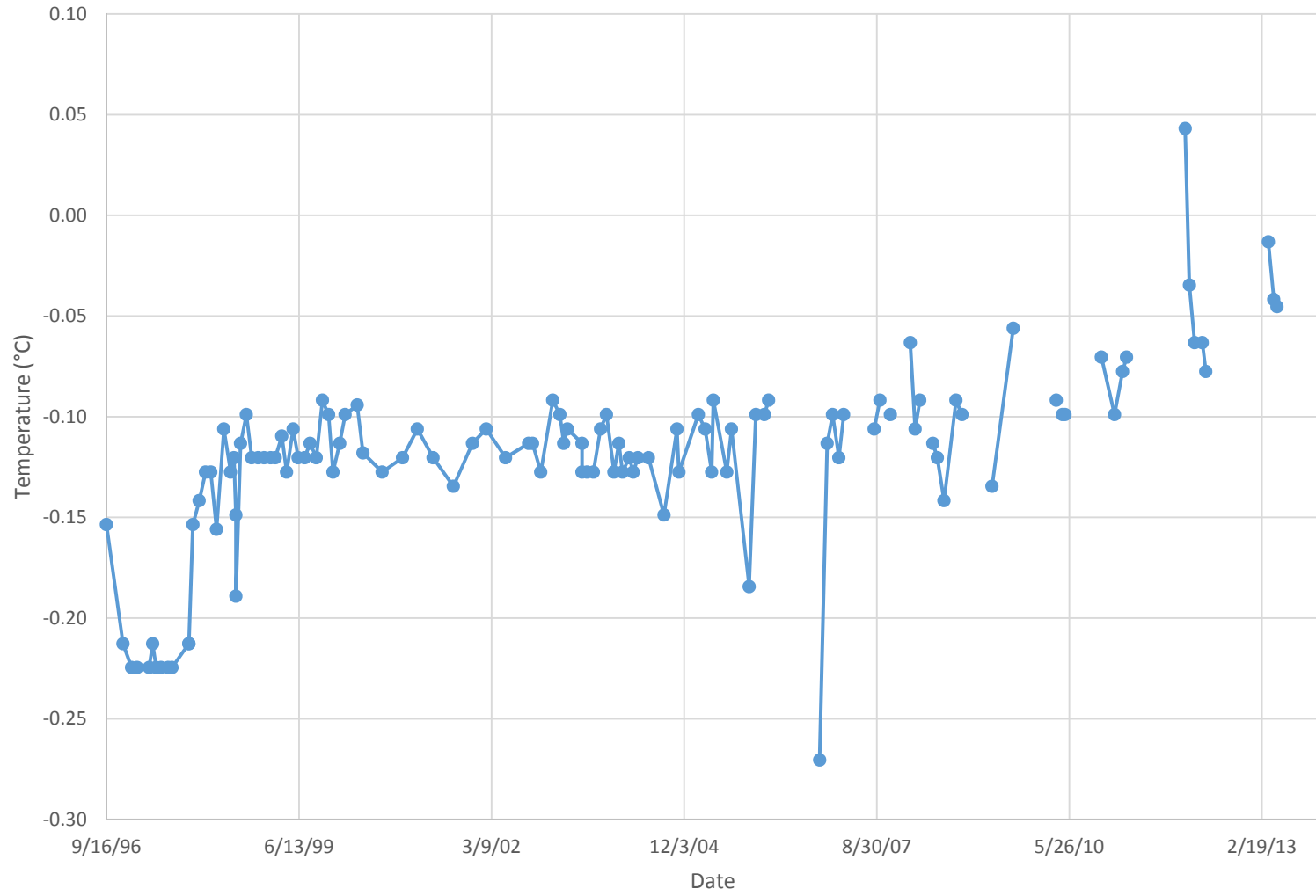
T-96-023: Temperature at 5 feet



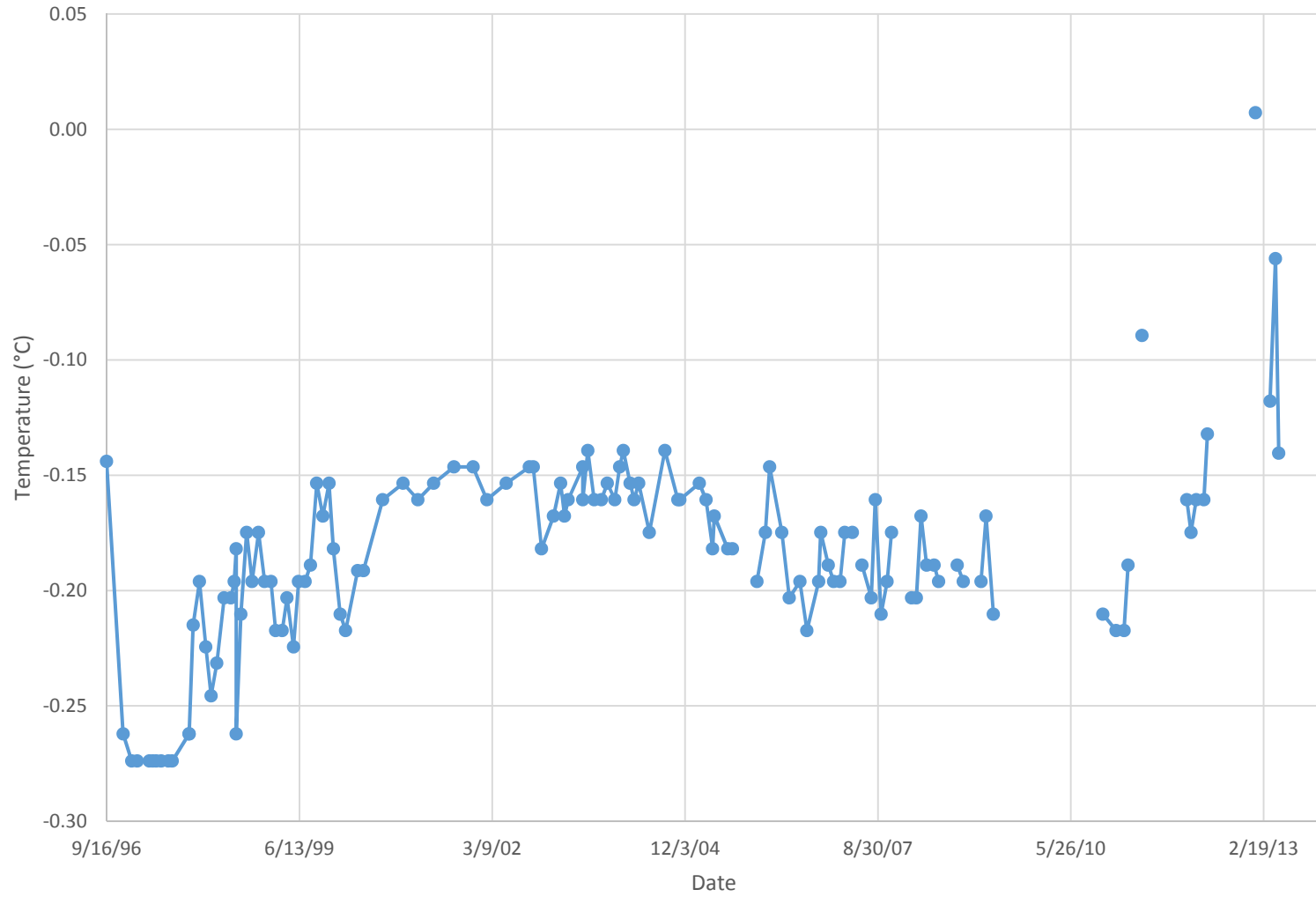
T-96-023: Temperature at 10 feet



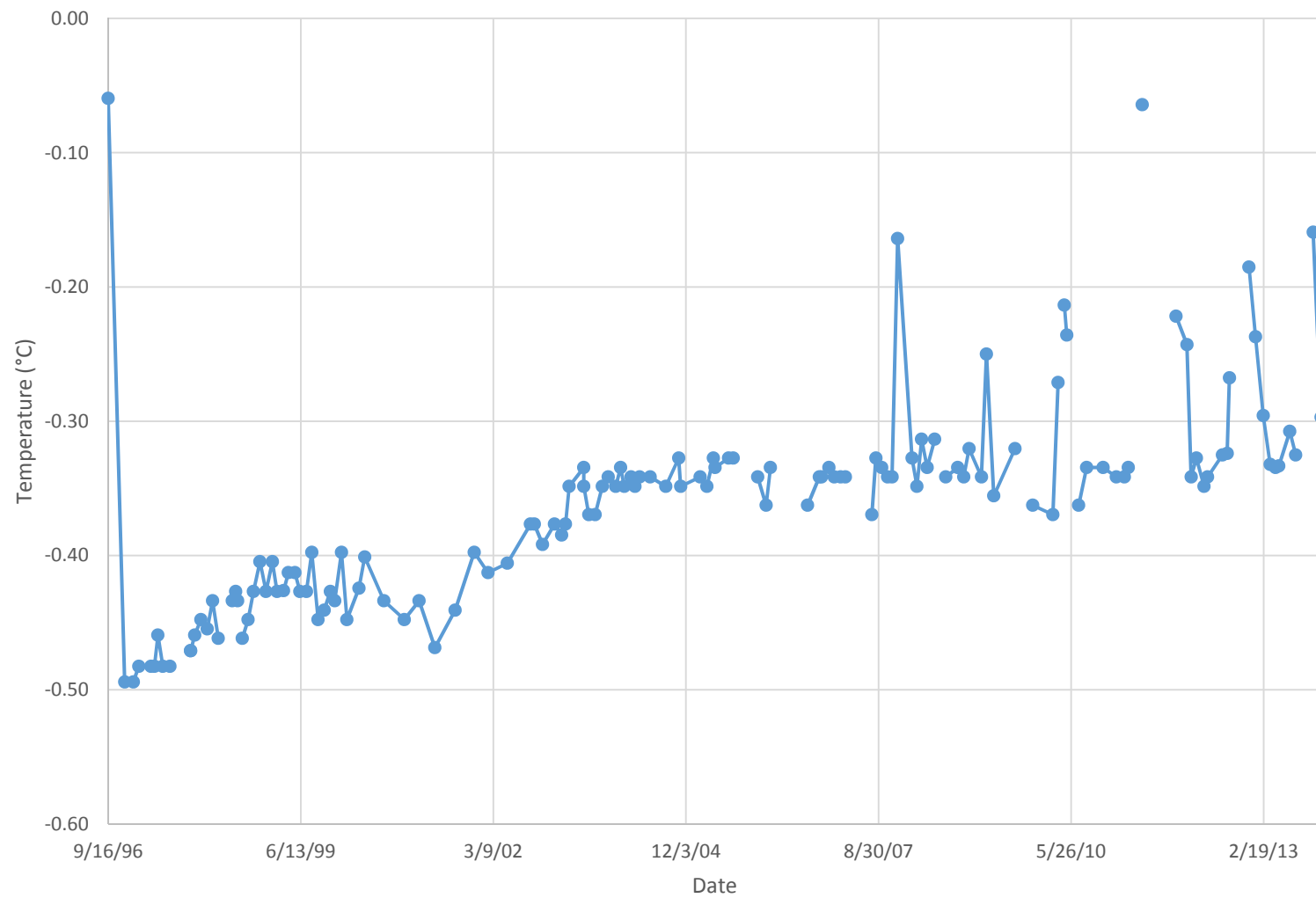
T-96-023: Temperature at 20 feet



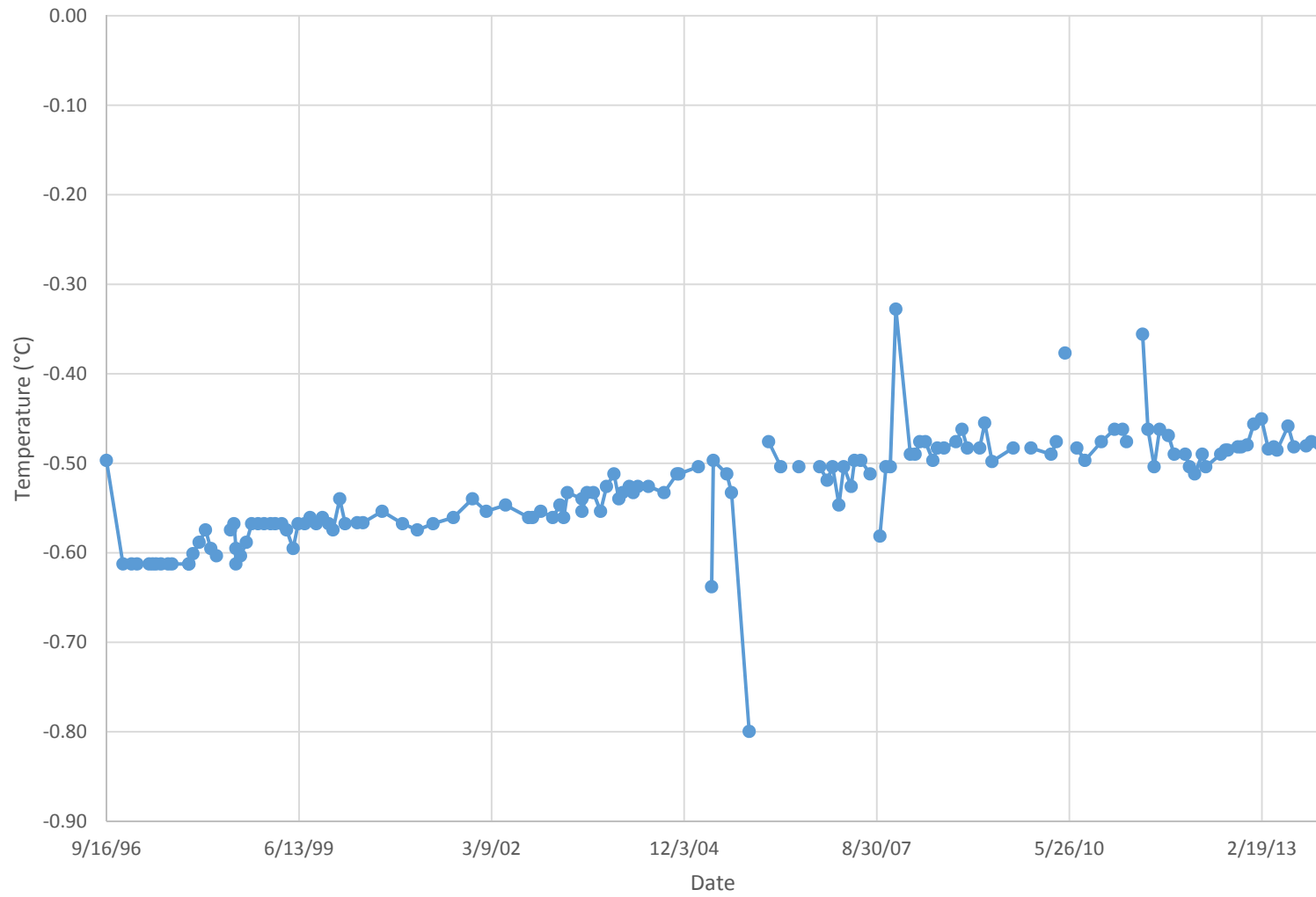
T-96-023: Temperature at 25 feet



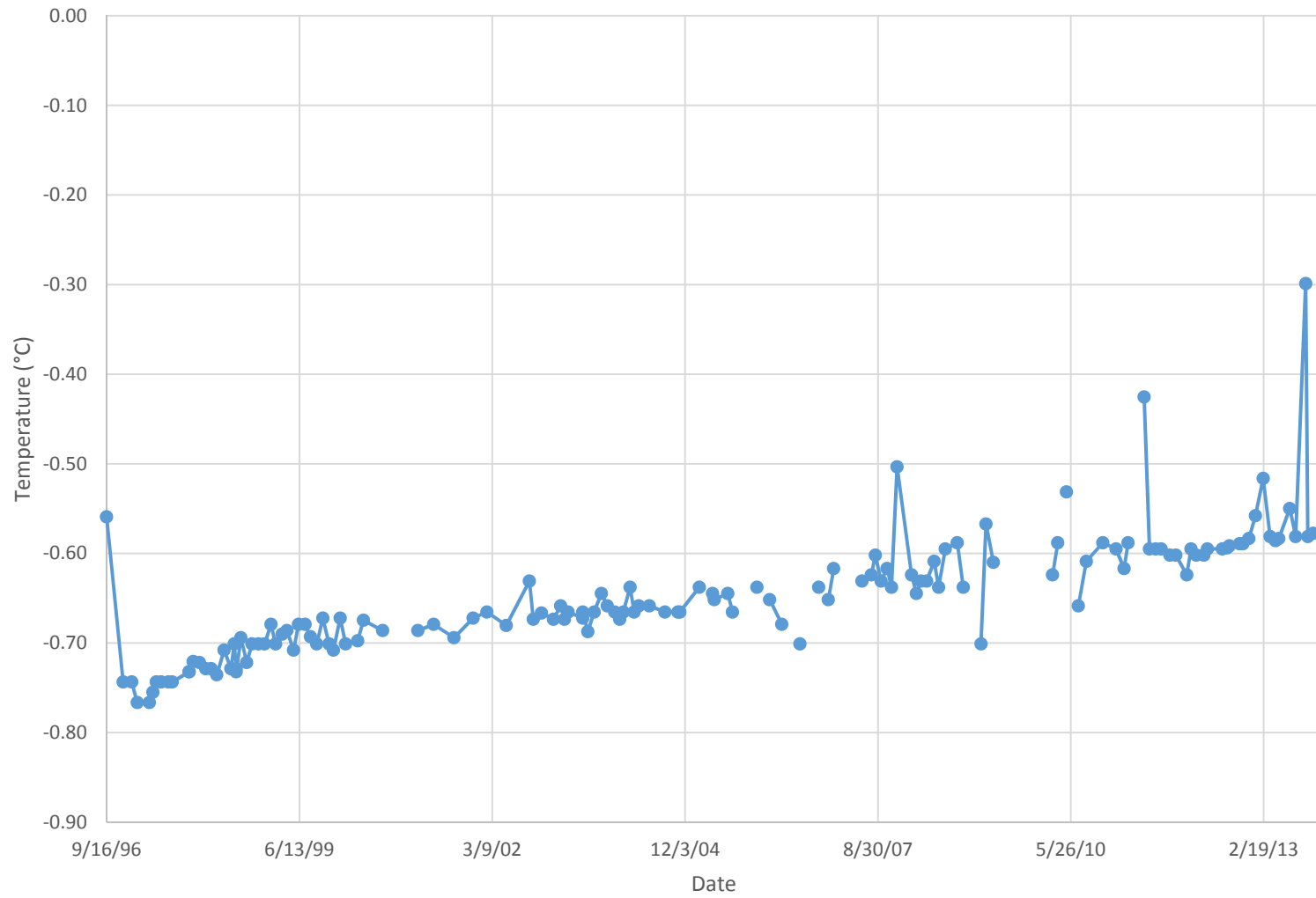
T-96-023: Temperature at 40 feet



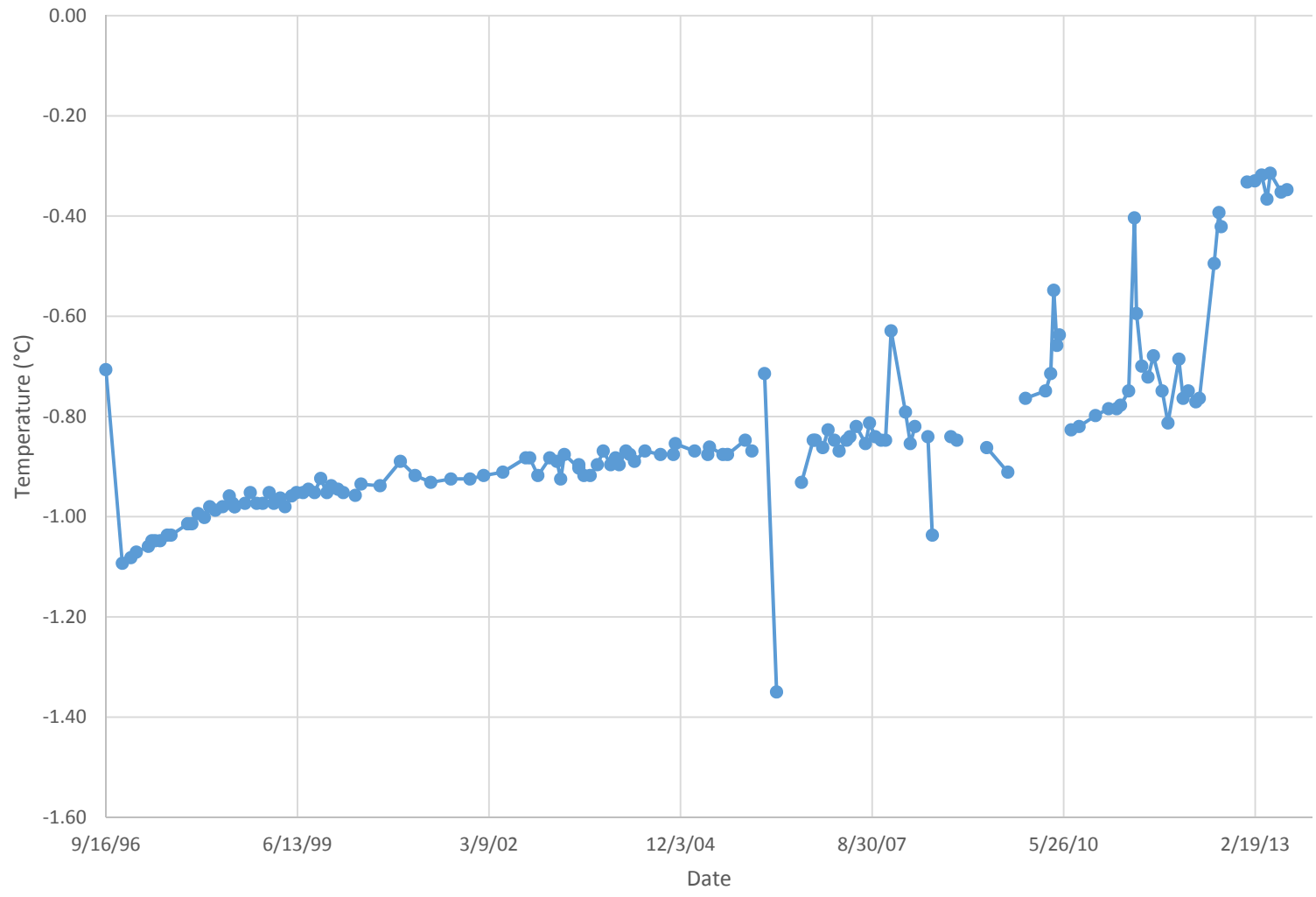
T-96-023: Temperature at 45 feet



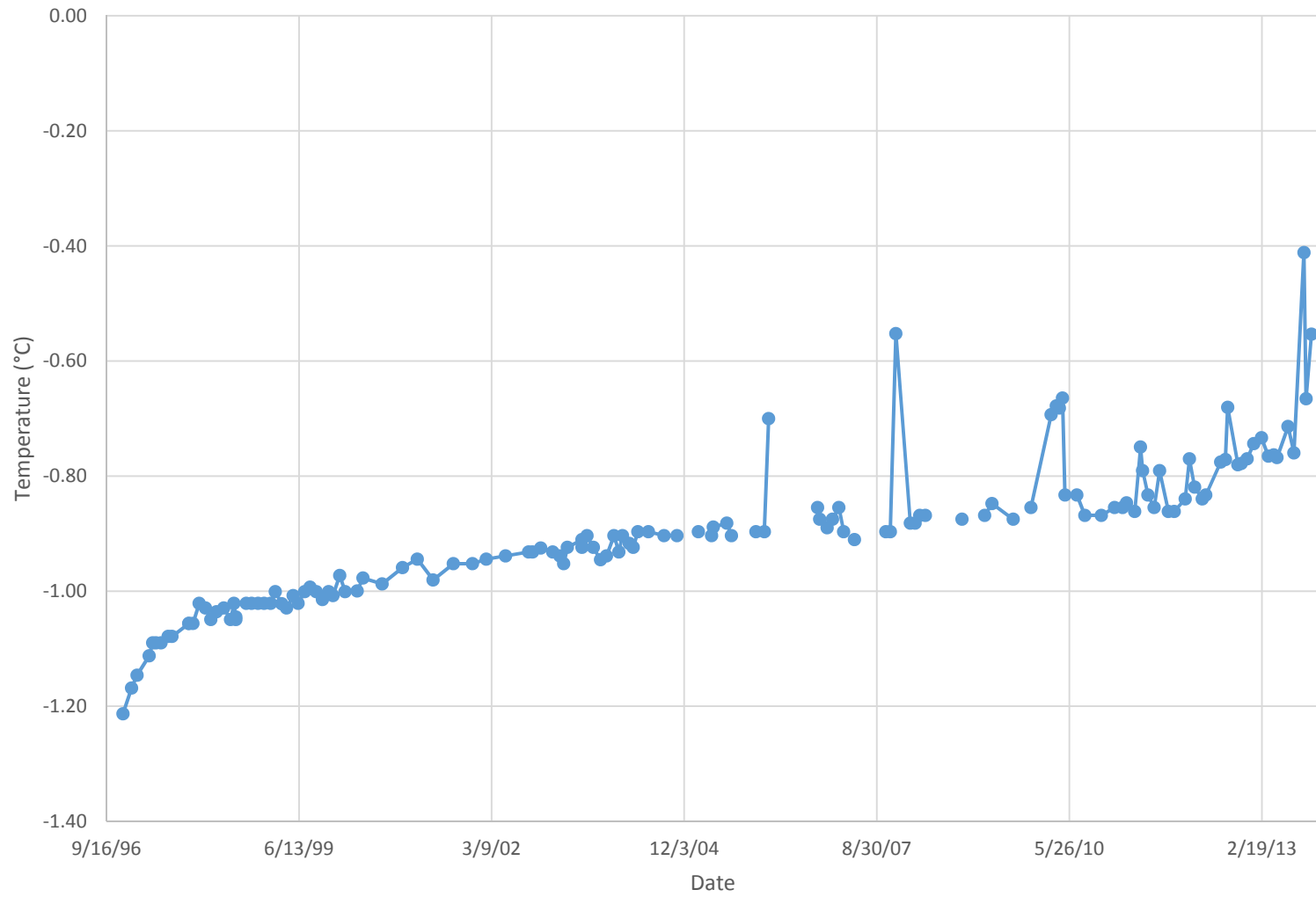
T-96-023: Temperature at 50 feet



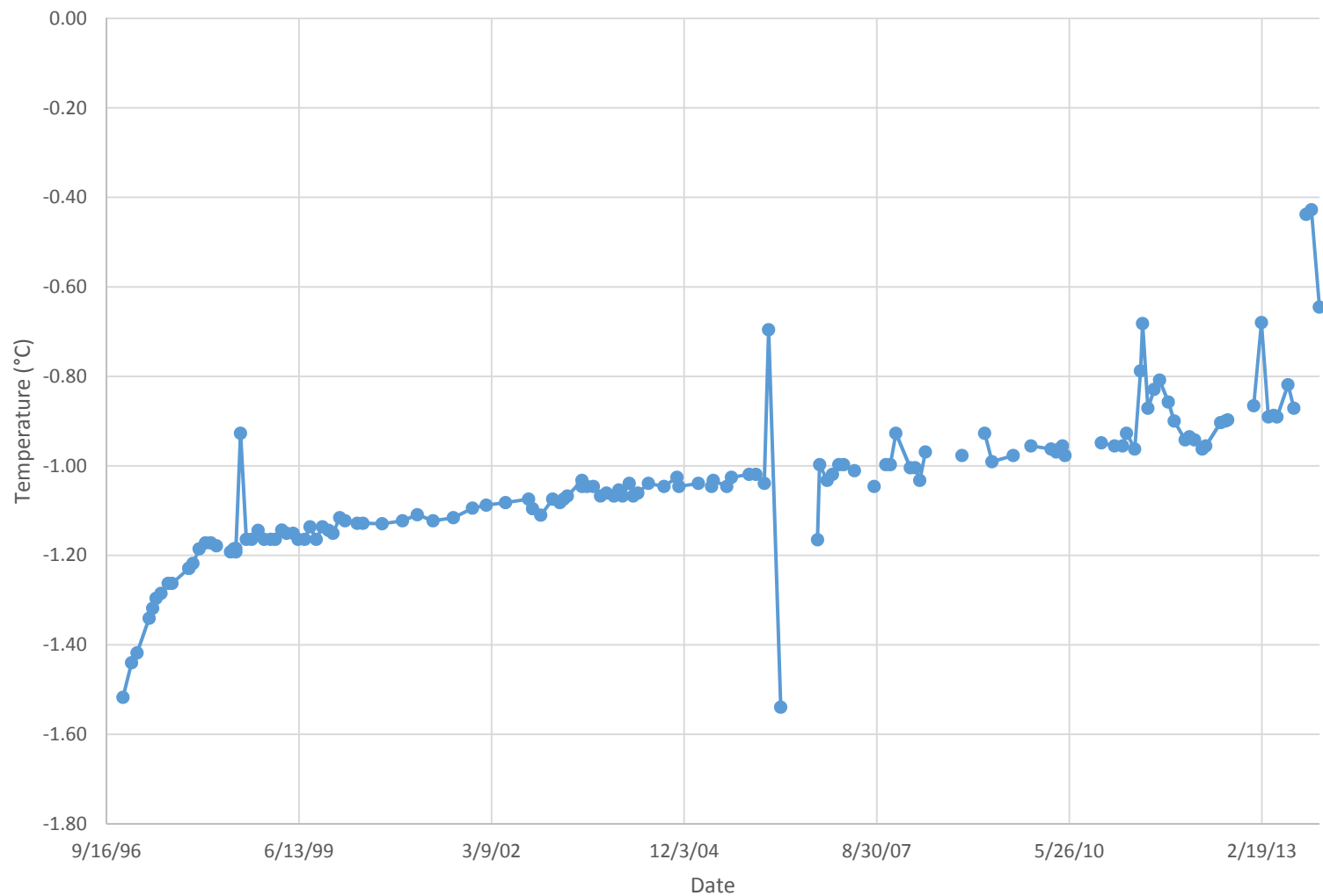
T-96-023: Temperature at 60 feet



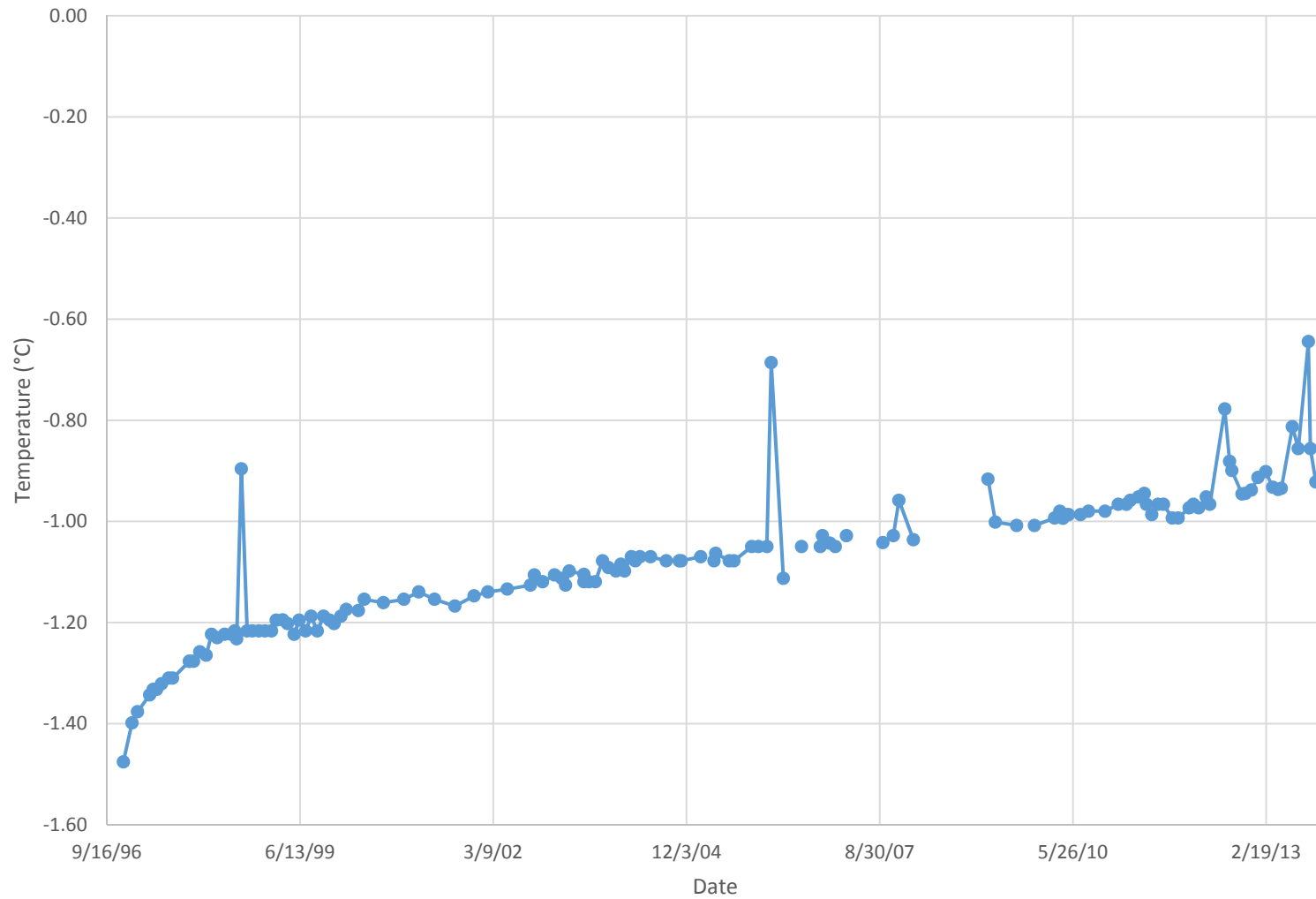
T-96-023: Temperature at 65 feet



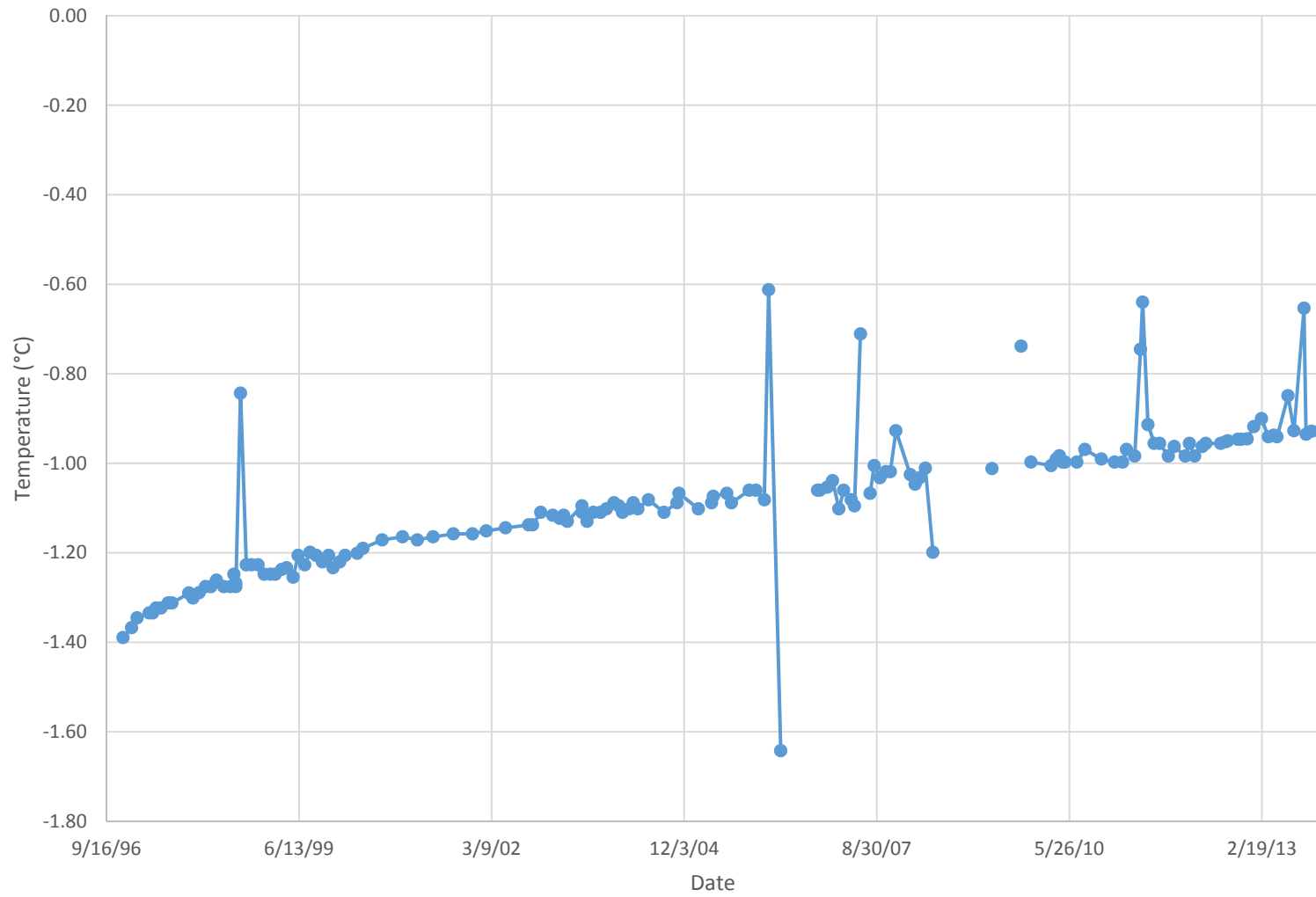
T-96-023: Temperature at 75 feet



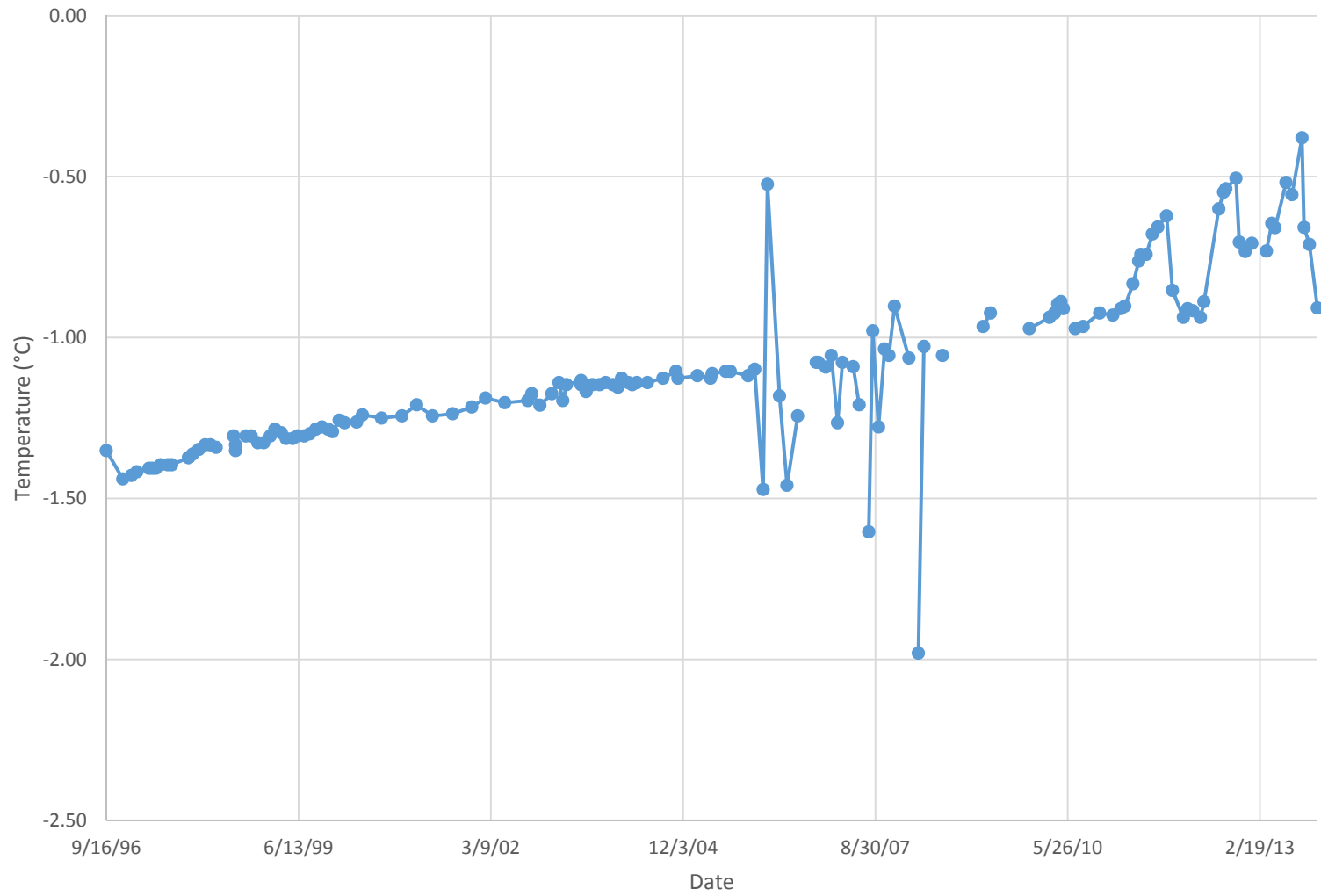
T-96-023: Temperature at 80 feet



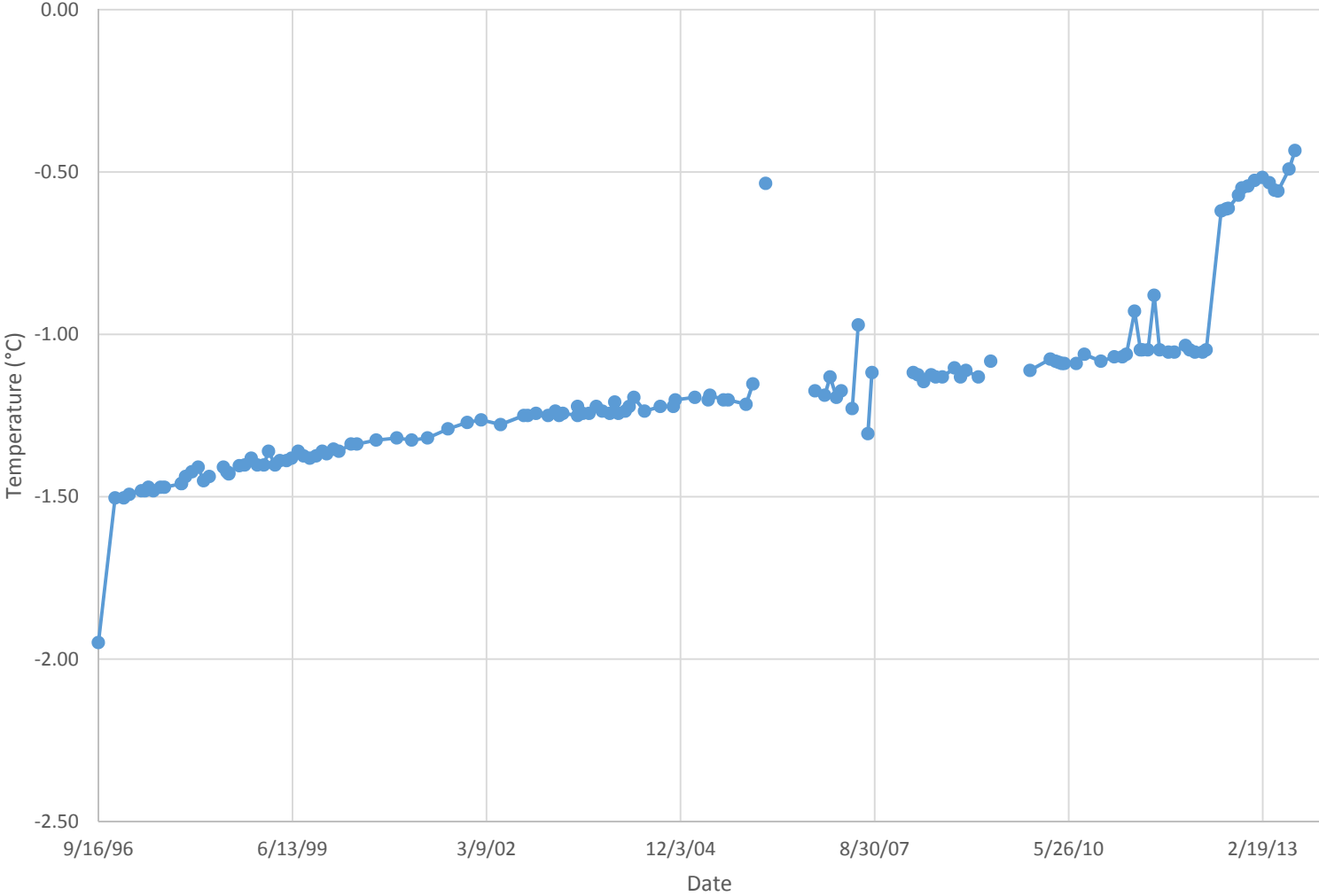
T-96-023: Temperature at 85 feet



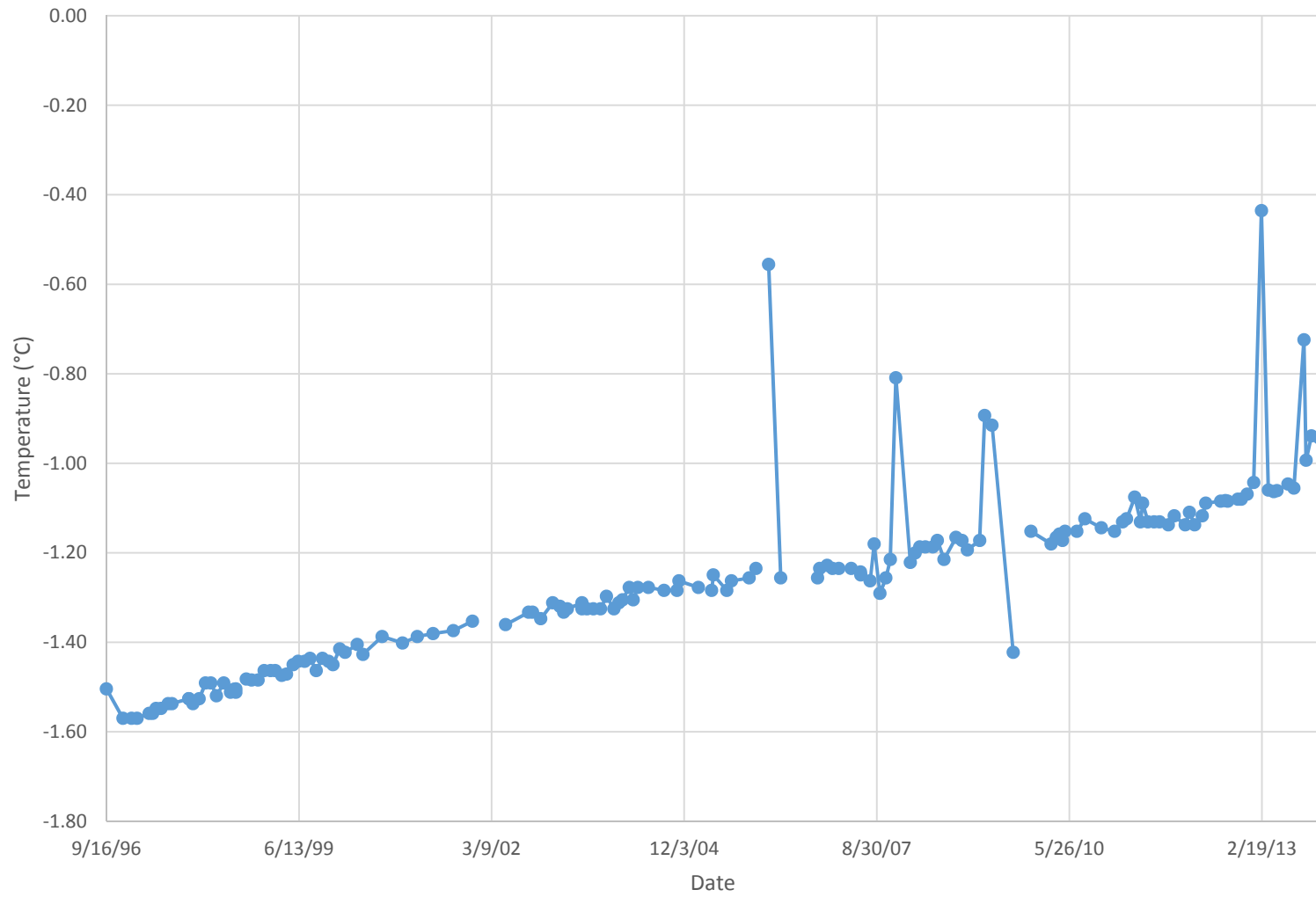
T-96-023: Temperature at 90 feet



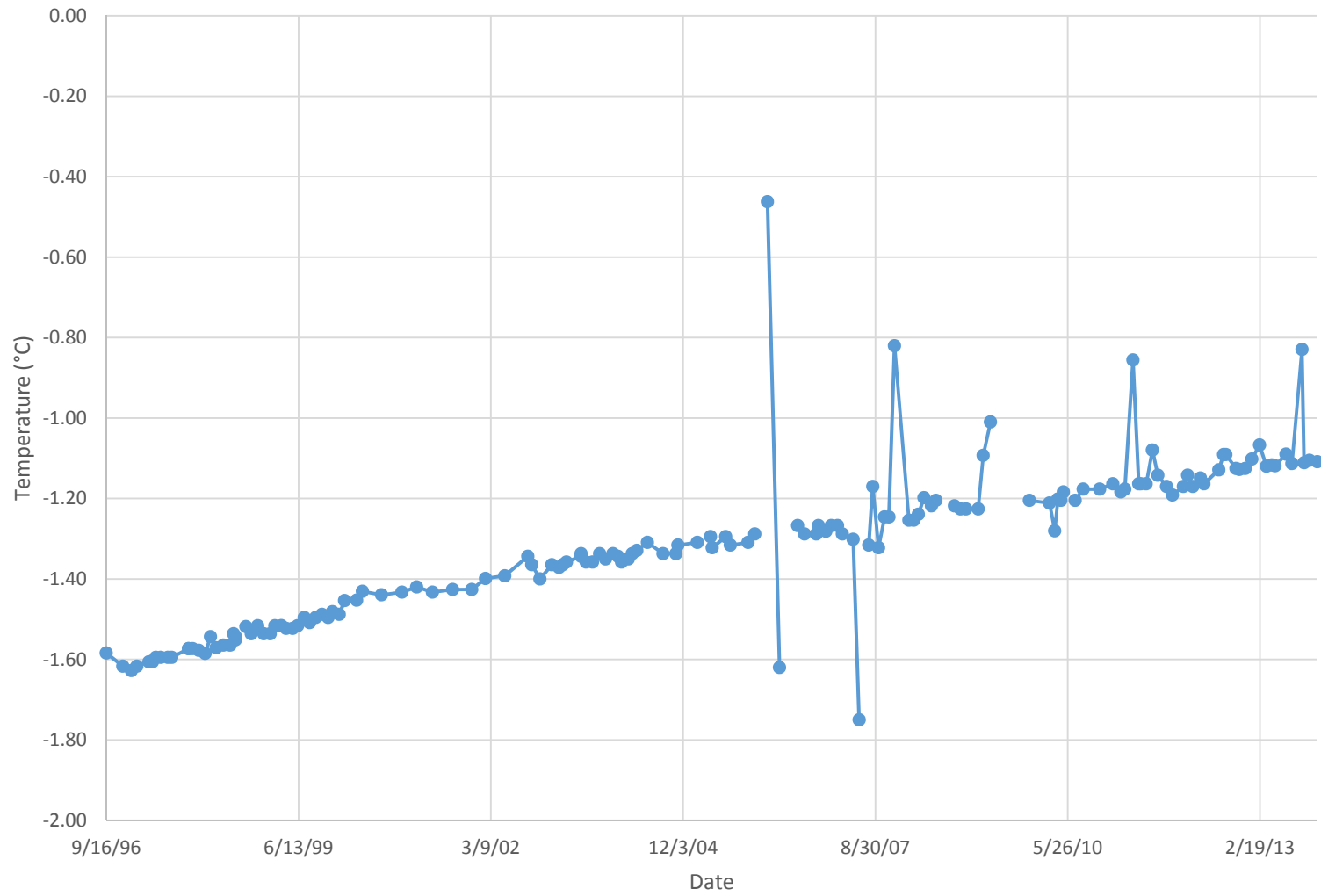
T-96-023: Temperature at 95 feet

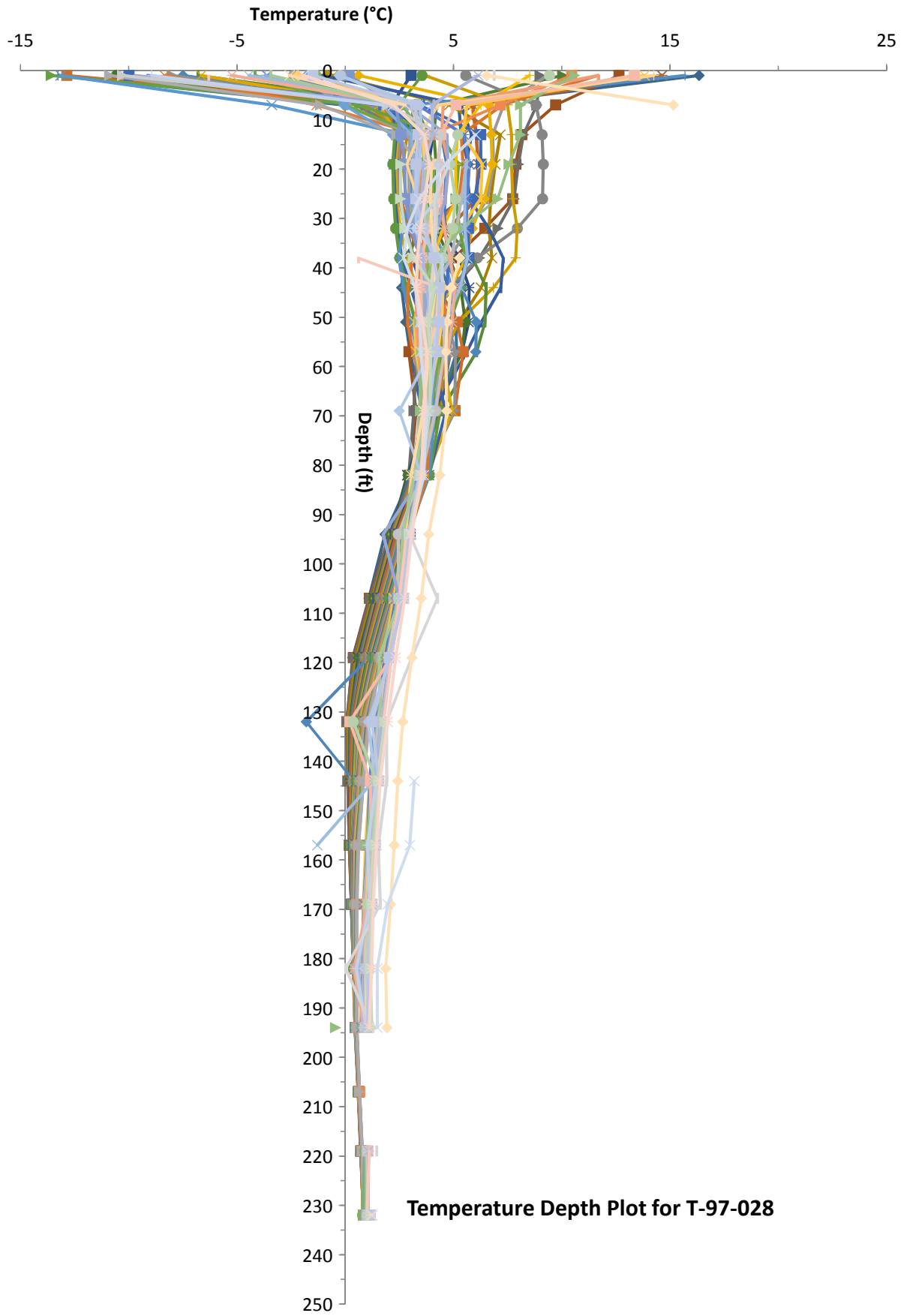


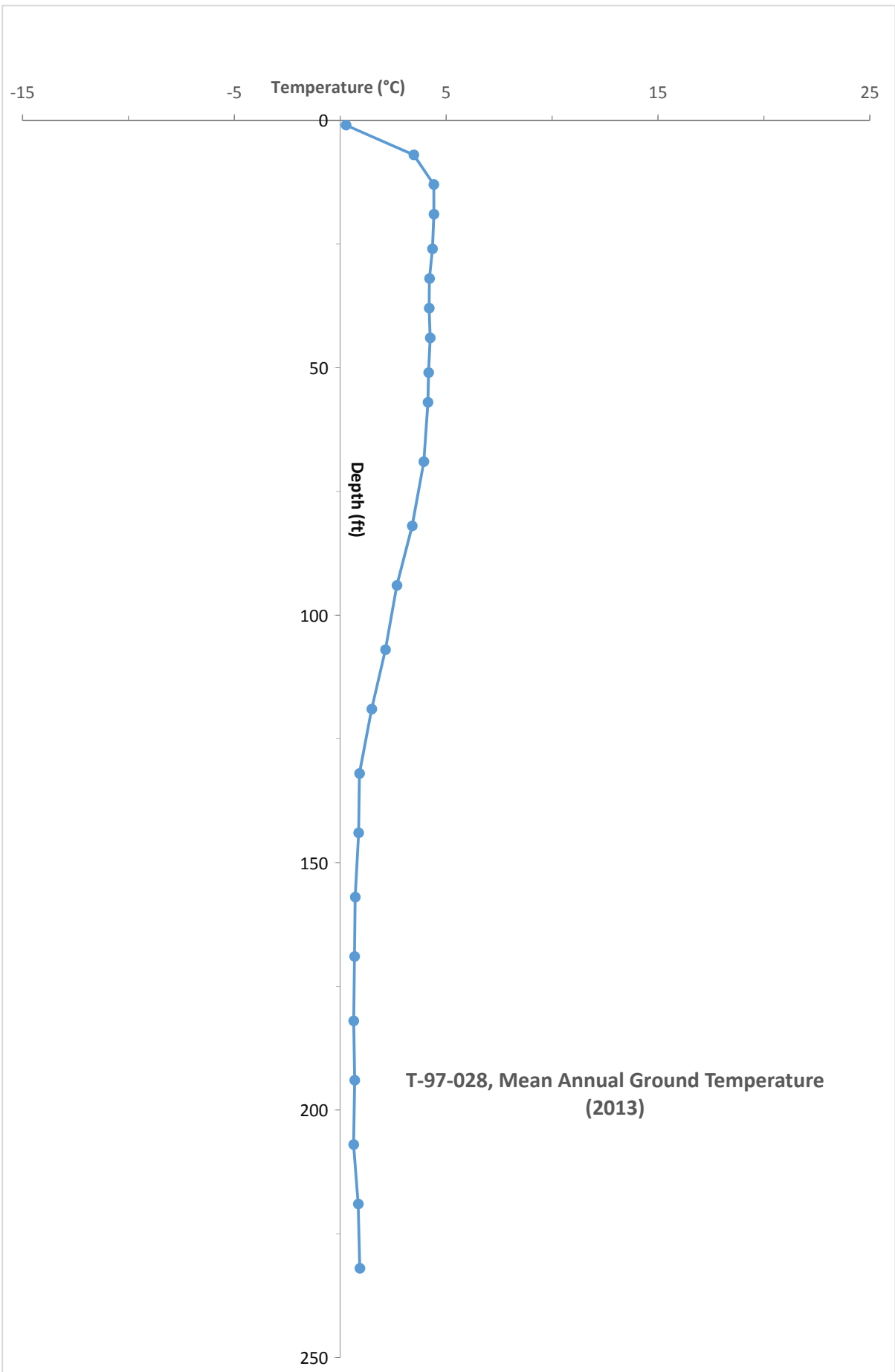
T-96-023: Temperature at 100 feet



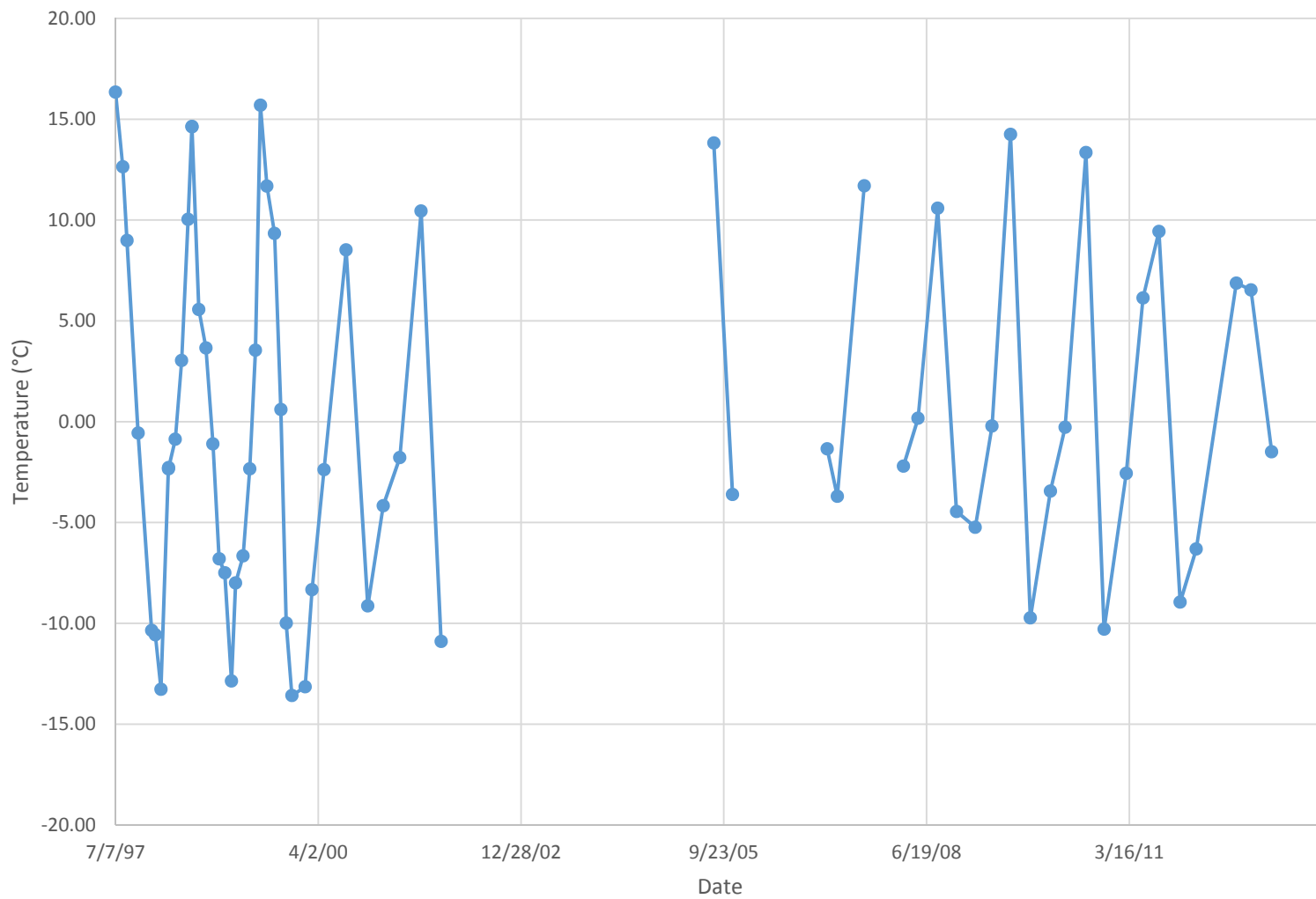
T-96-023: Temperature at 105 feet



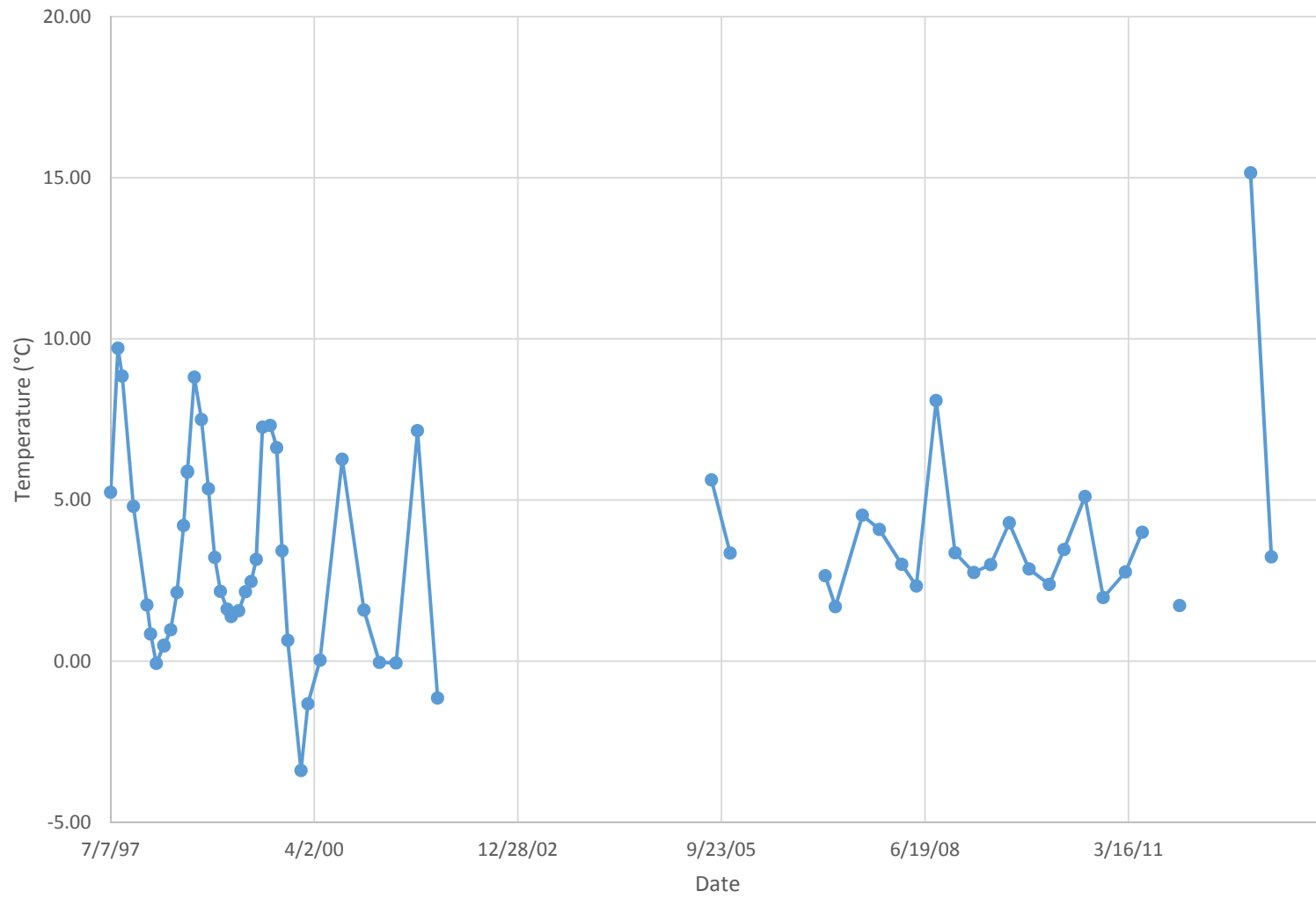




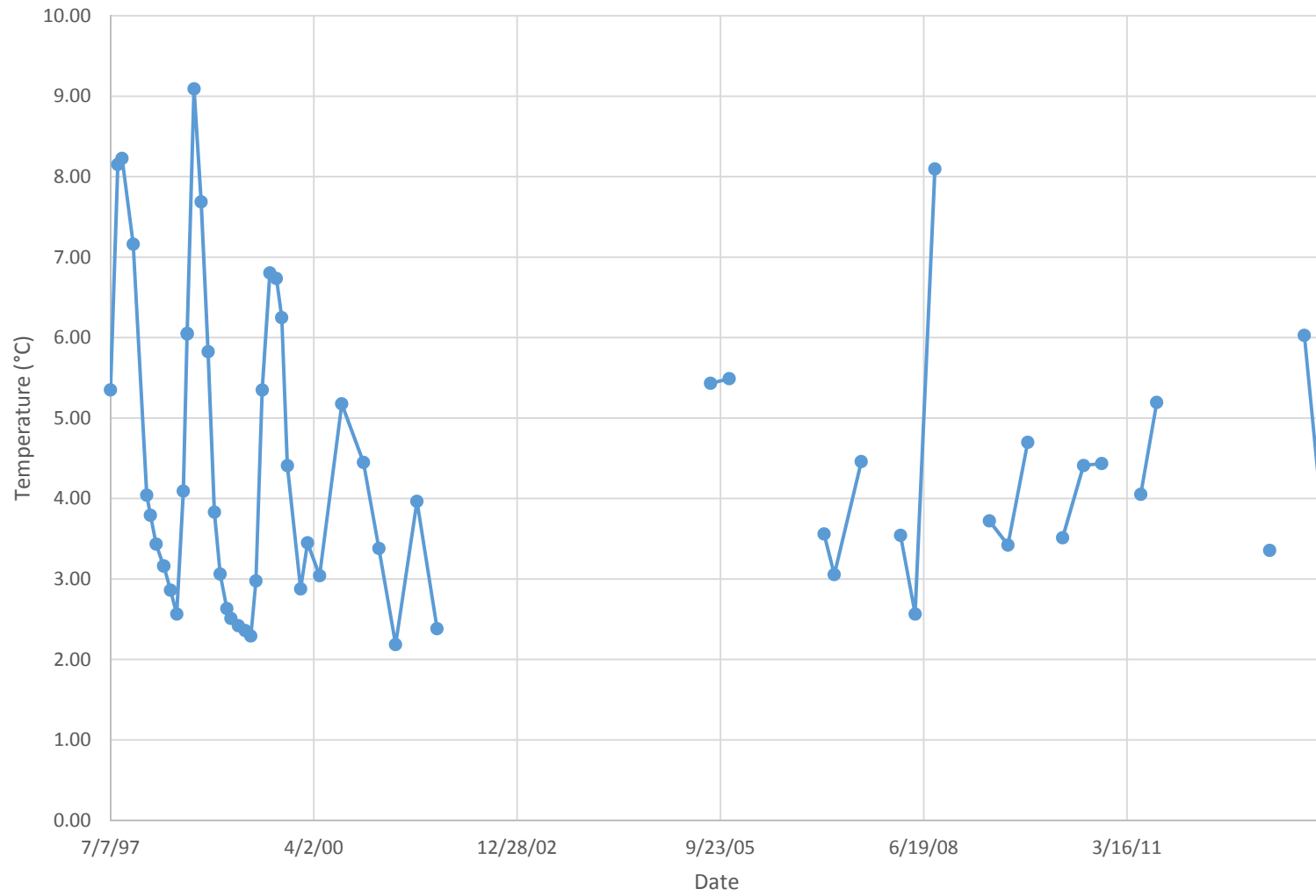
T-97-028: Temperature at 1 foot



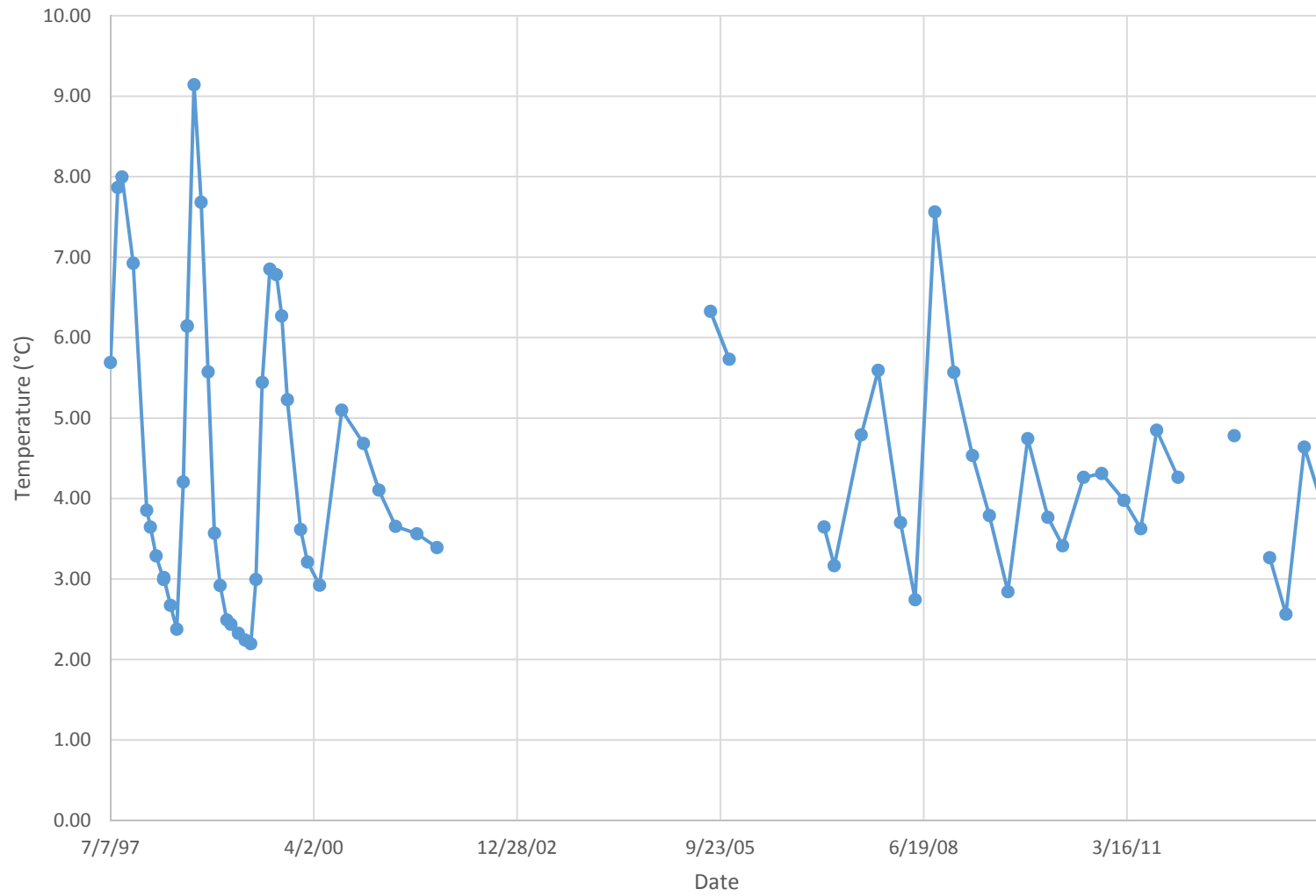
T-97-028: Temperature at 7 feet



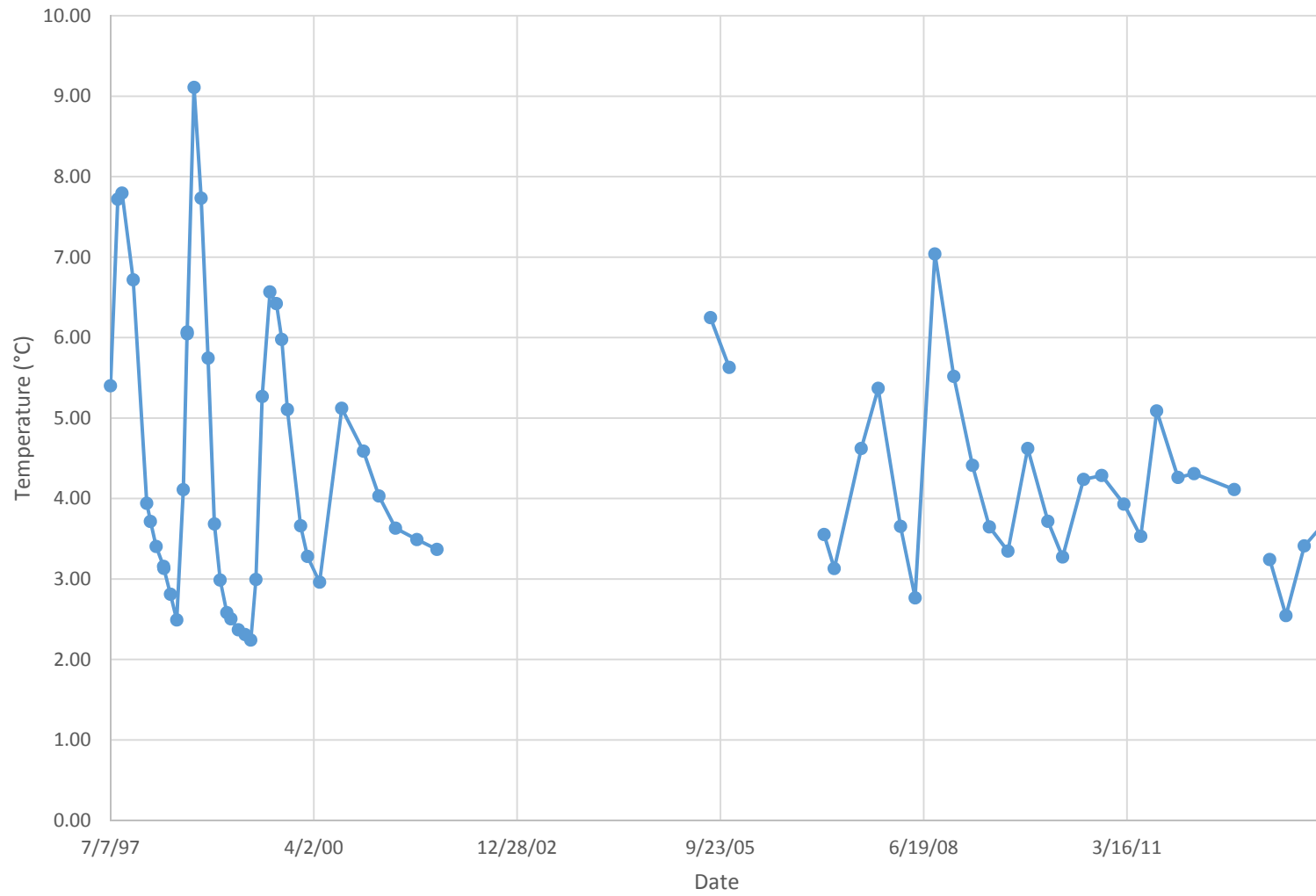
T-97-028: Temperature at 13 feet



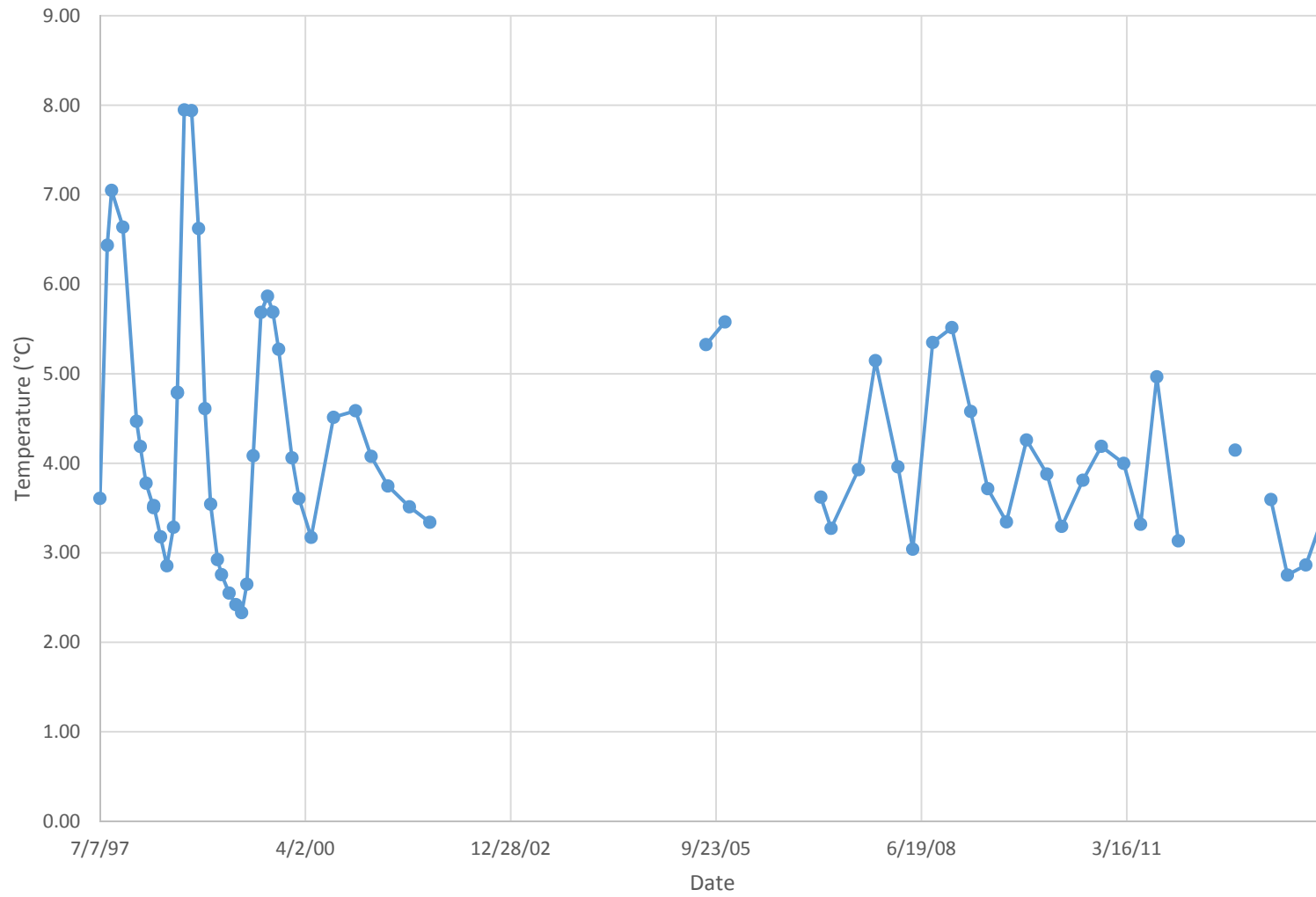
T-97-028: Temperature at 19 feet



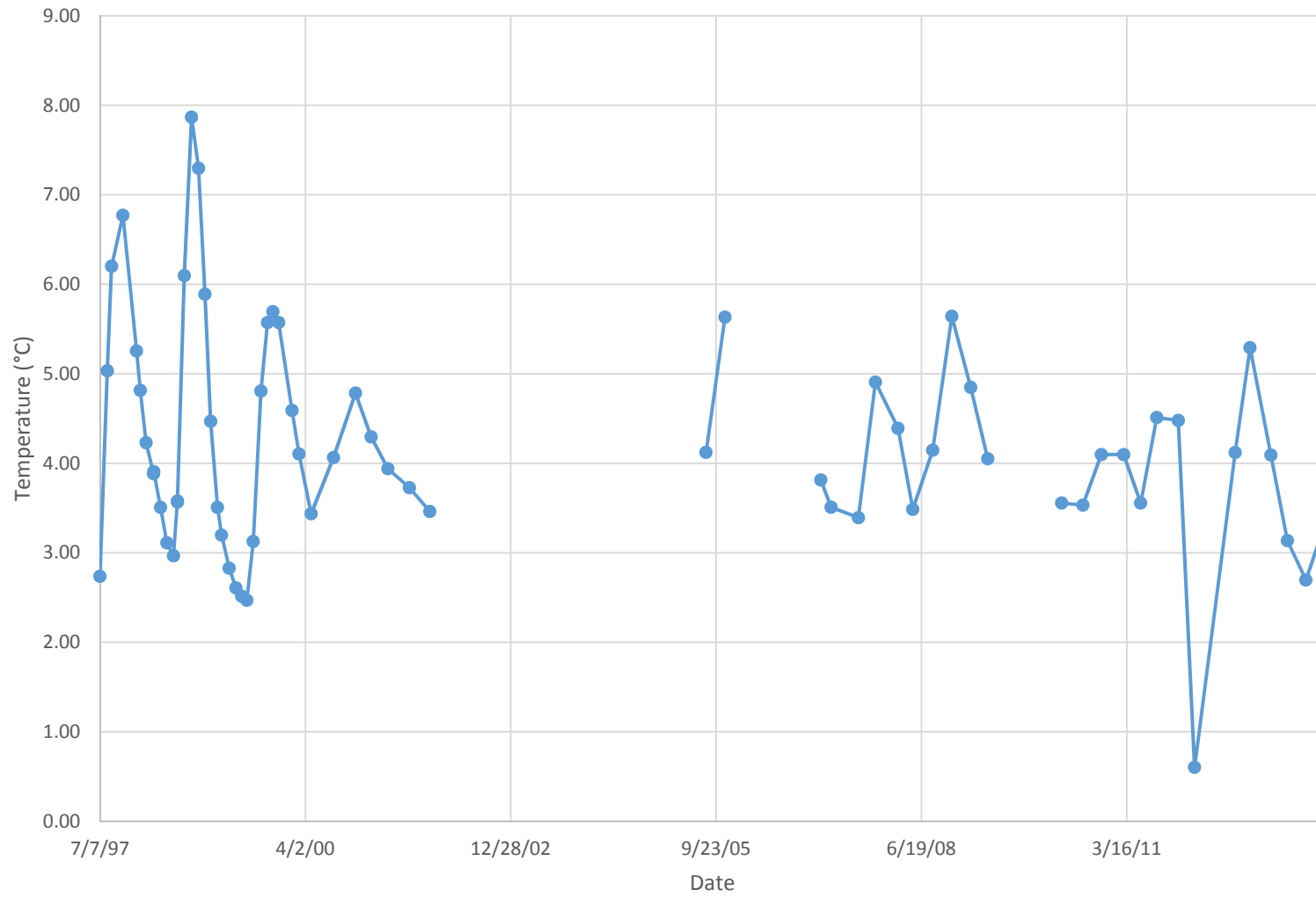
T-97-028: Temperature at 26 feet



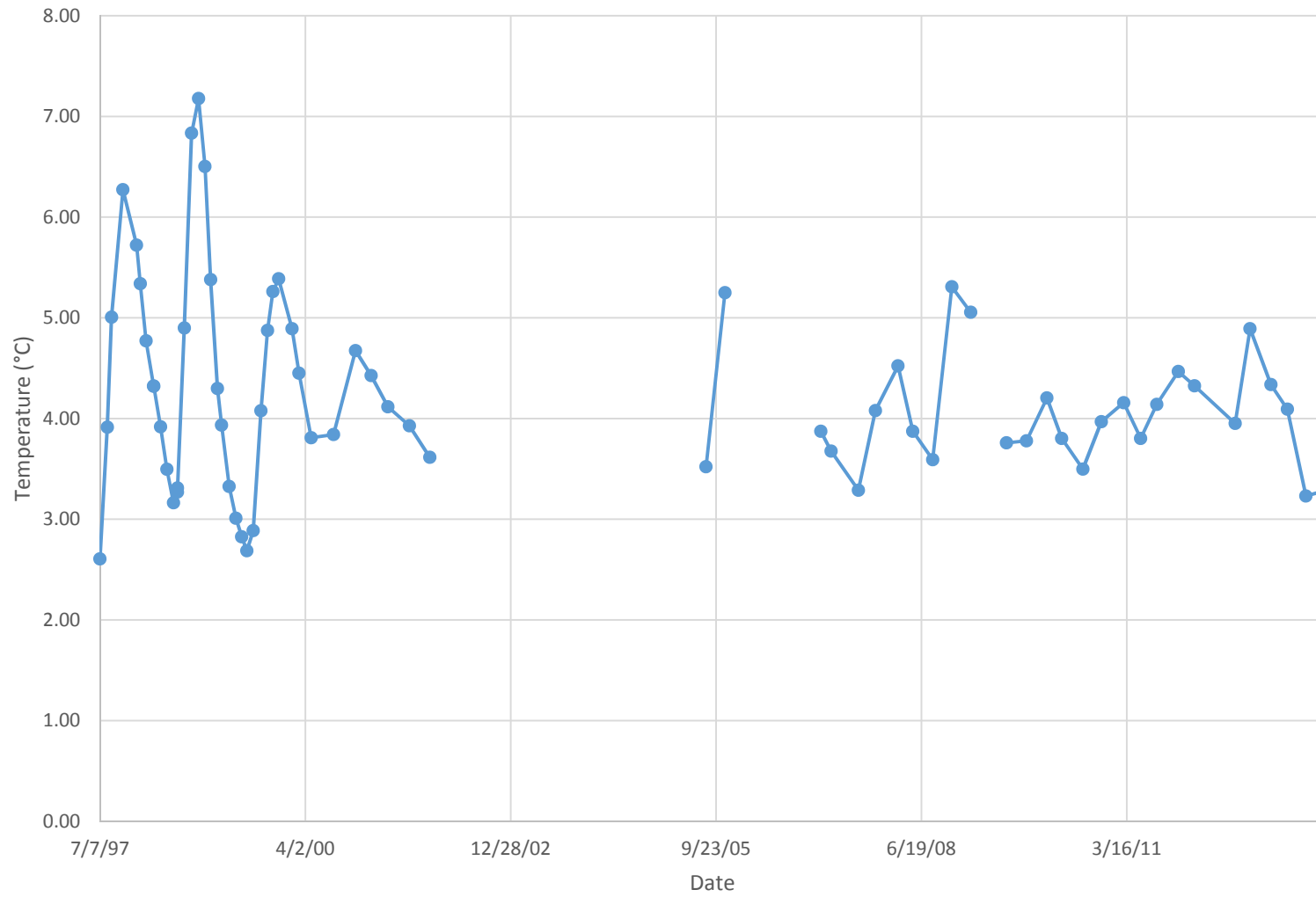
T-97-028: Temperature at 32 feet



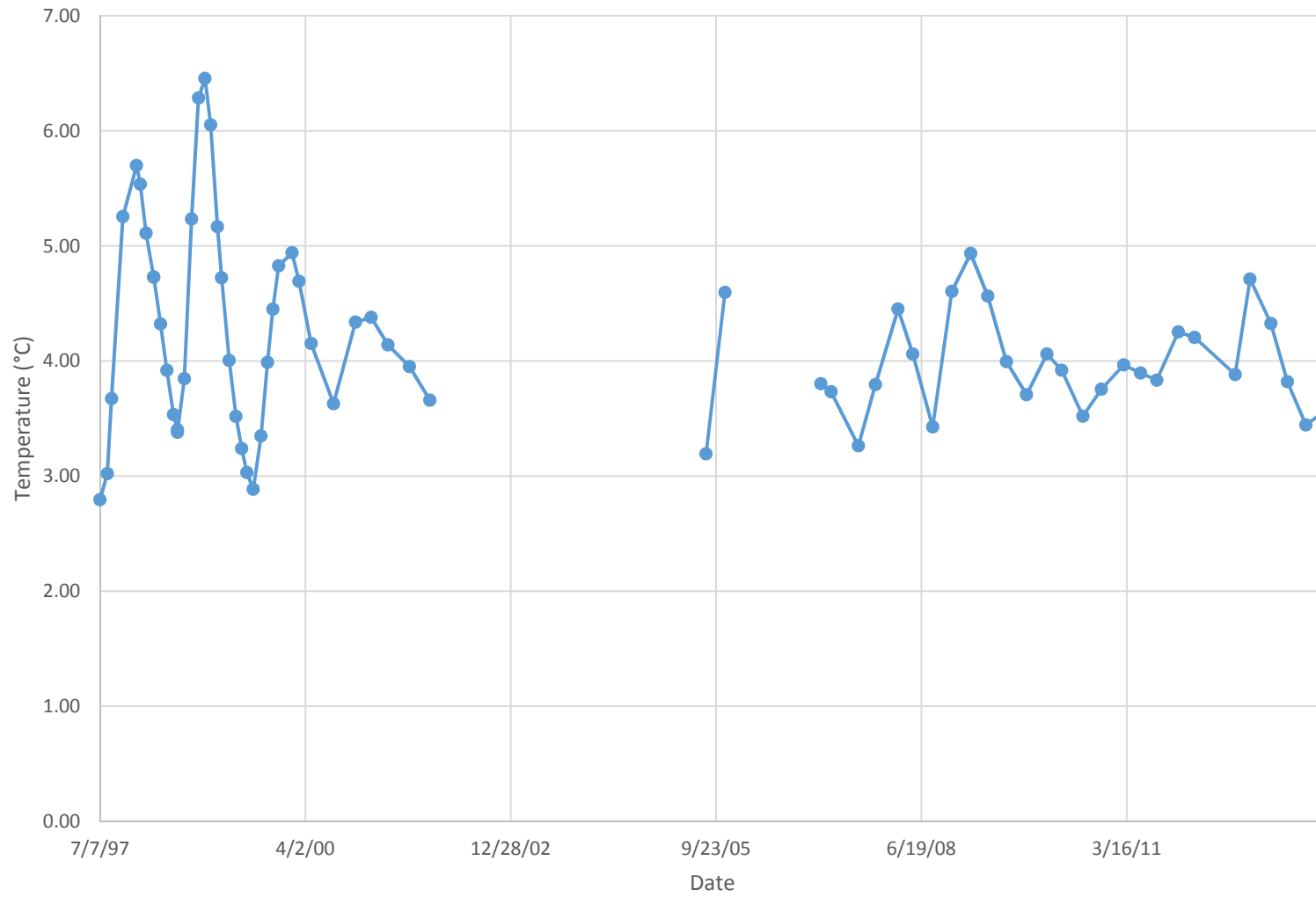
T-97-028: Temperature at 38 feet



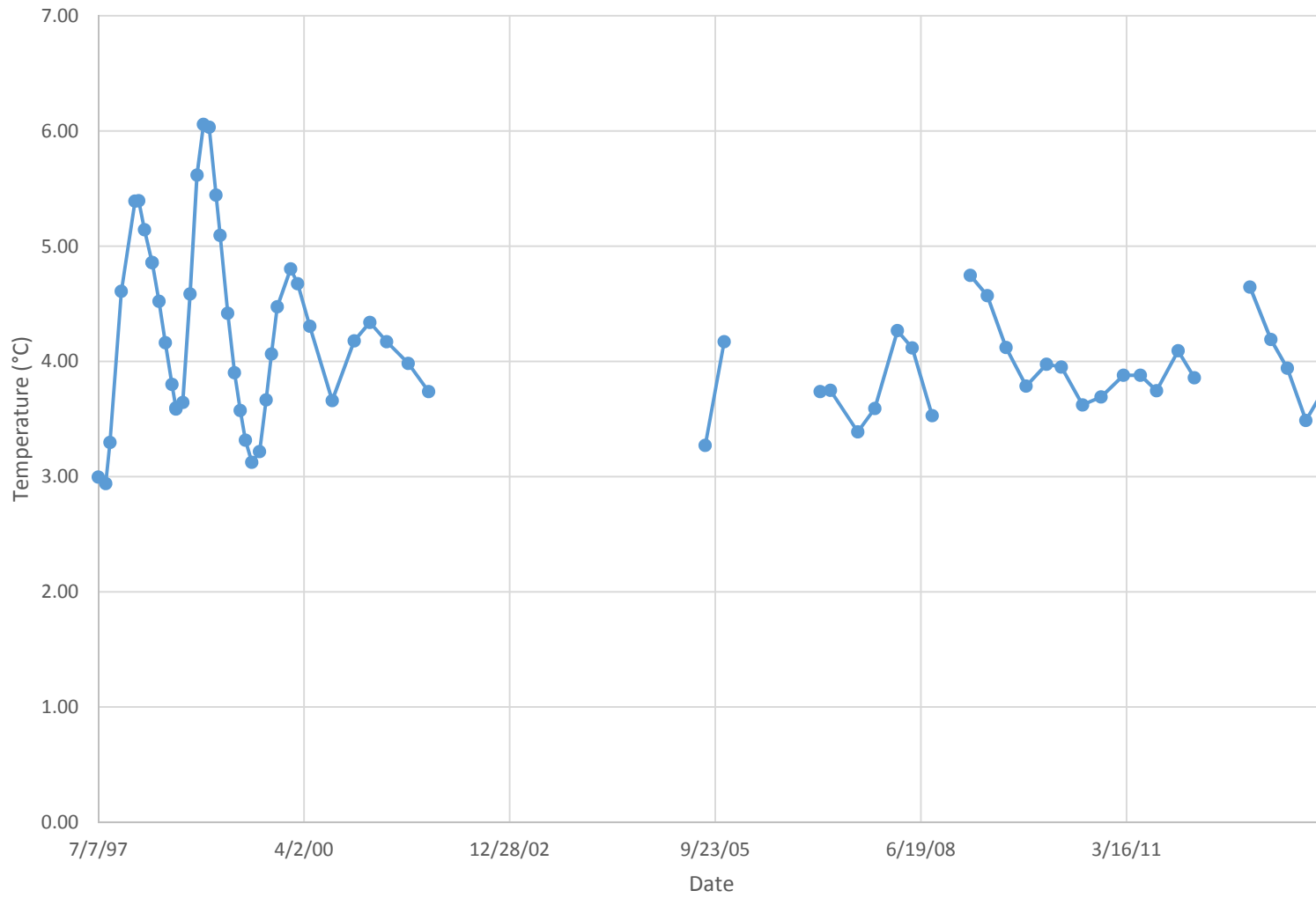
T-97-028: Temperature at 44 feet



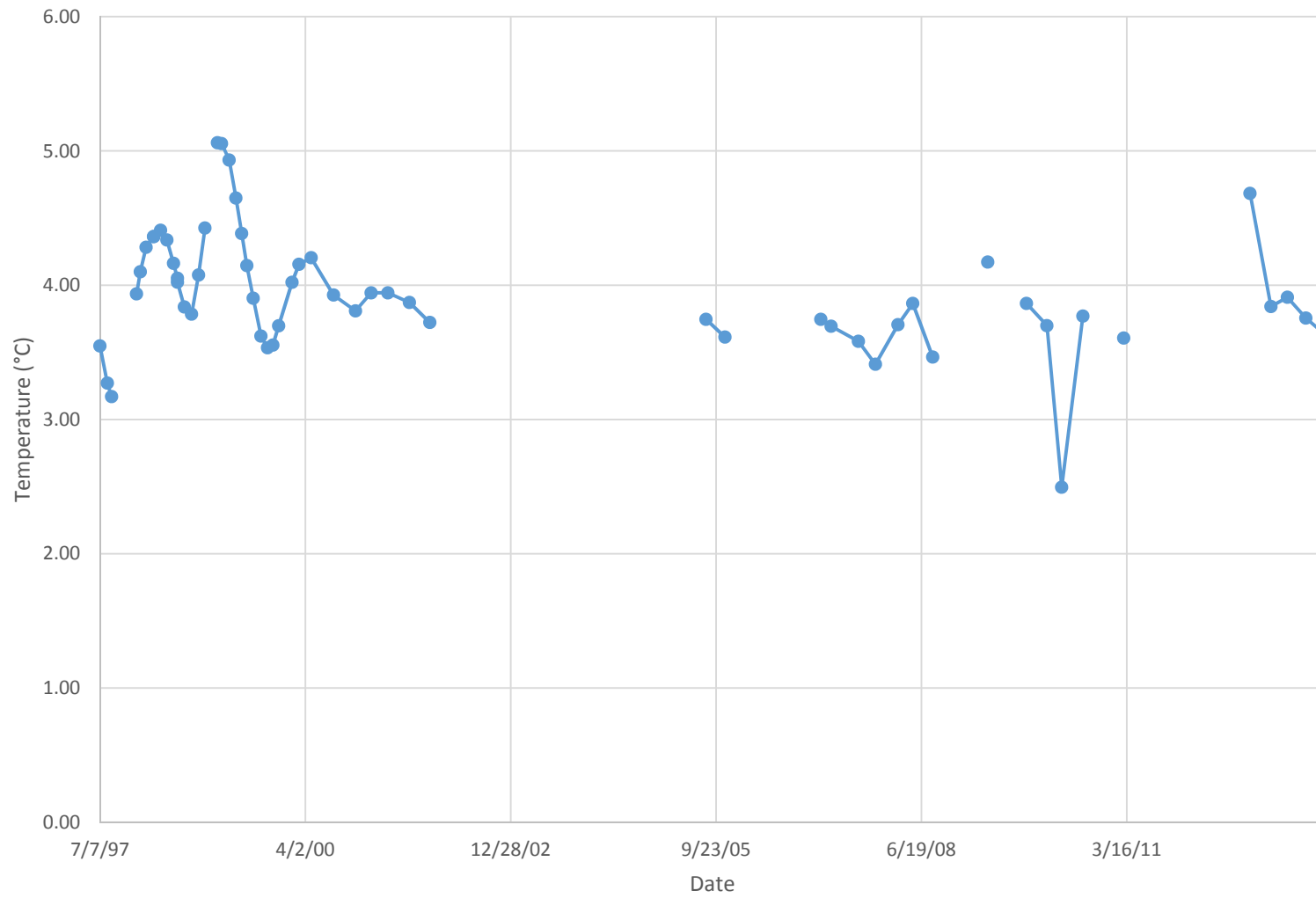
T-97-028: Temperature at 51 feet



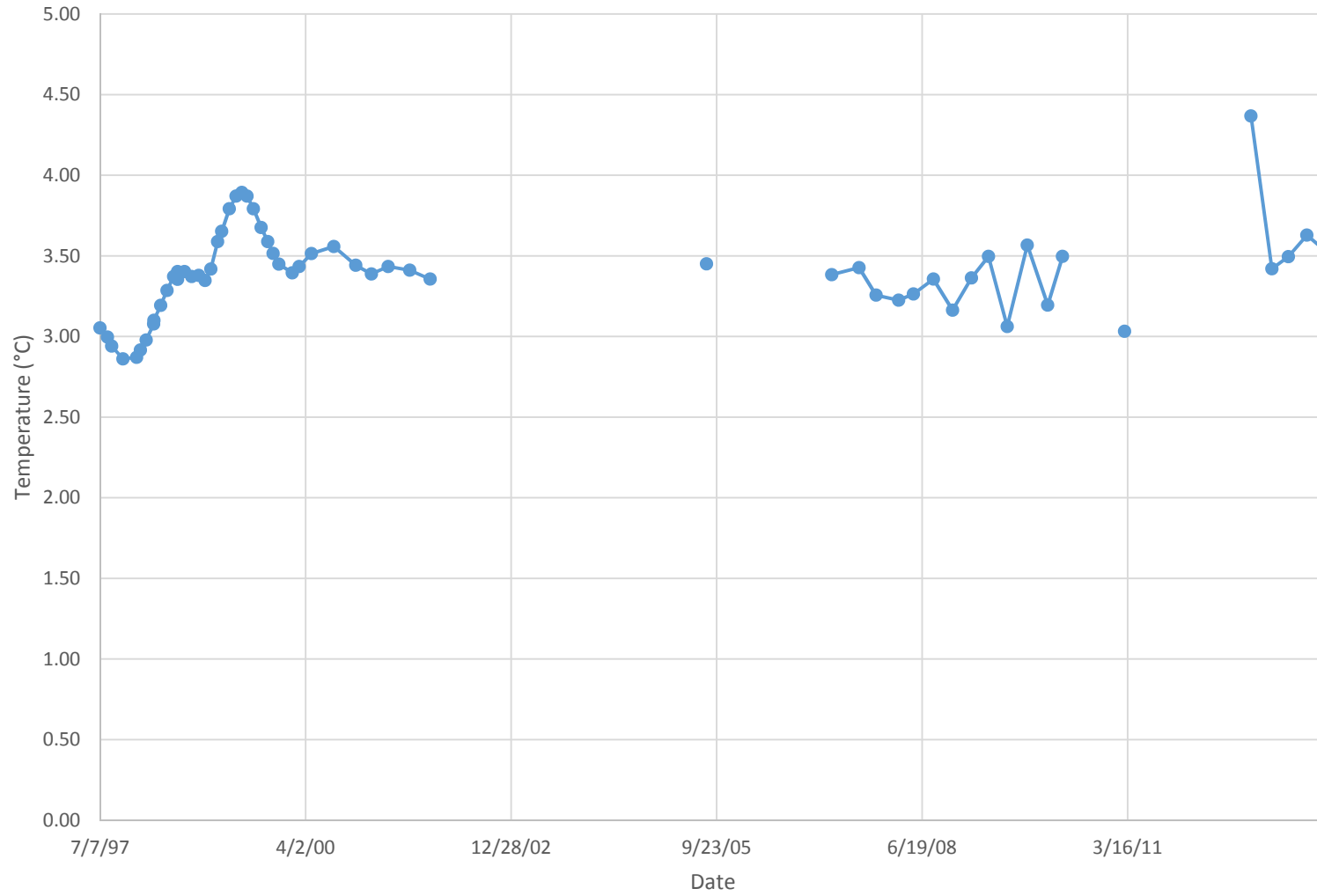
T-97-028: Temperature at 57 feet



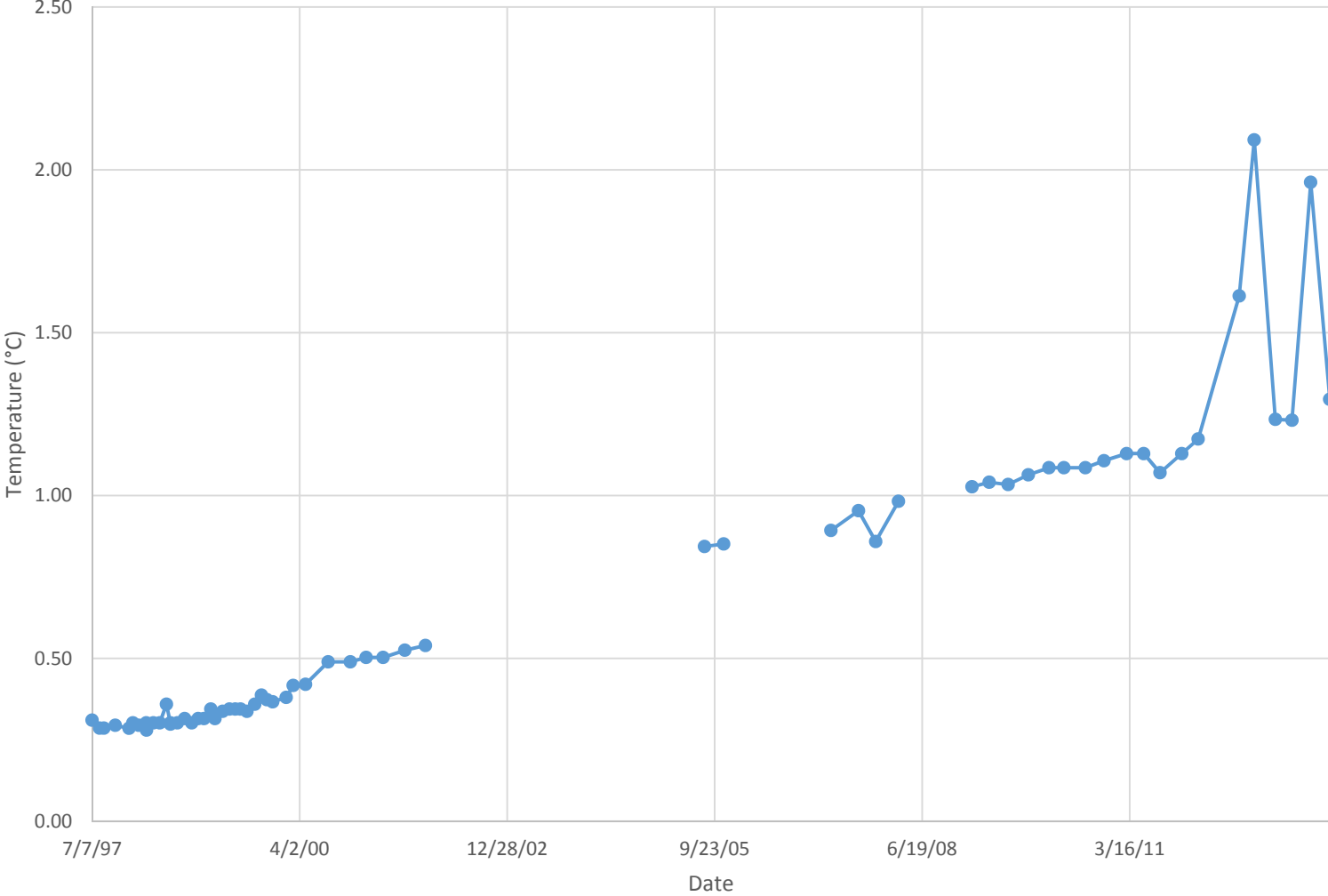
T-97-028: Temperature at 69 feet



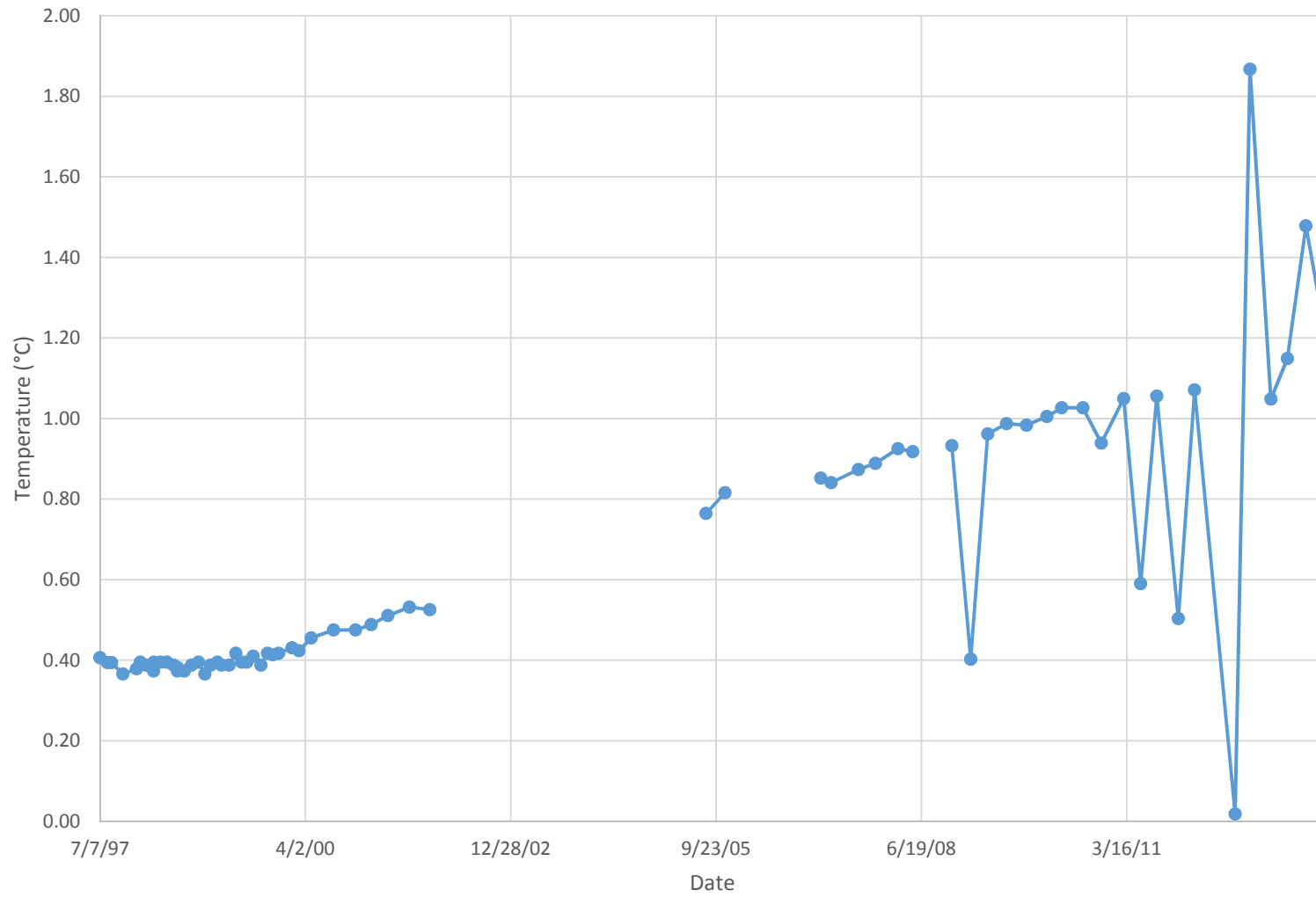
T-97-028: Temperature at 82 feet



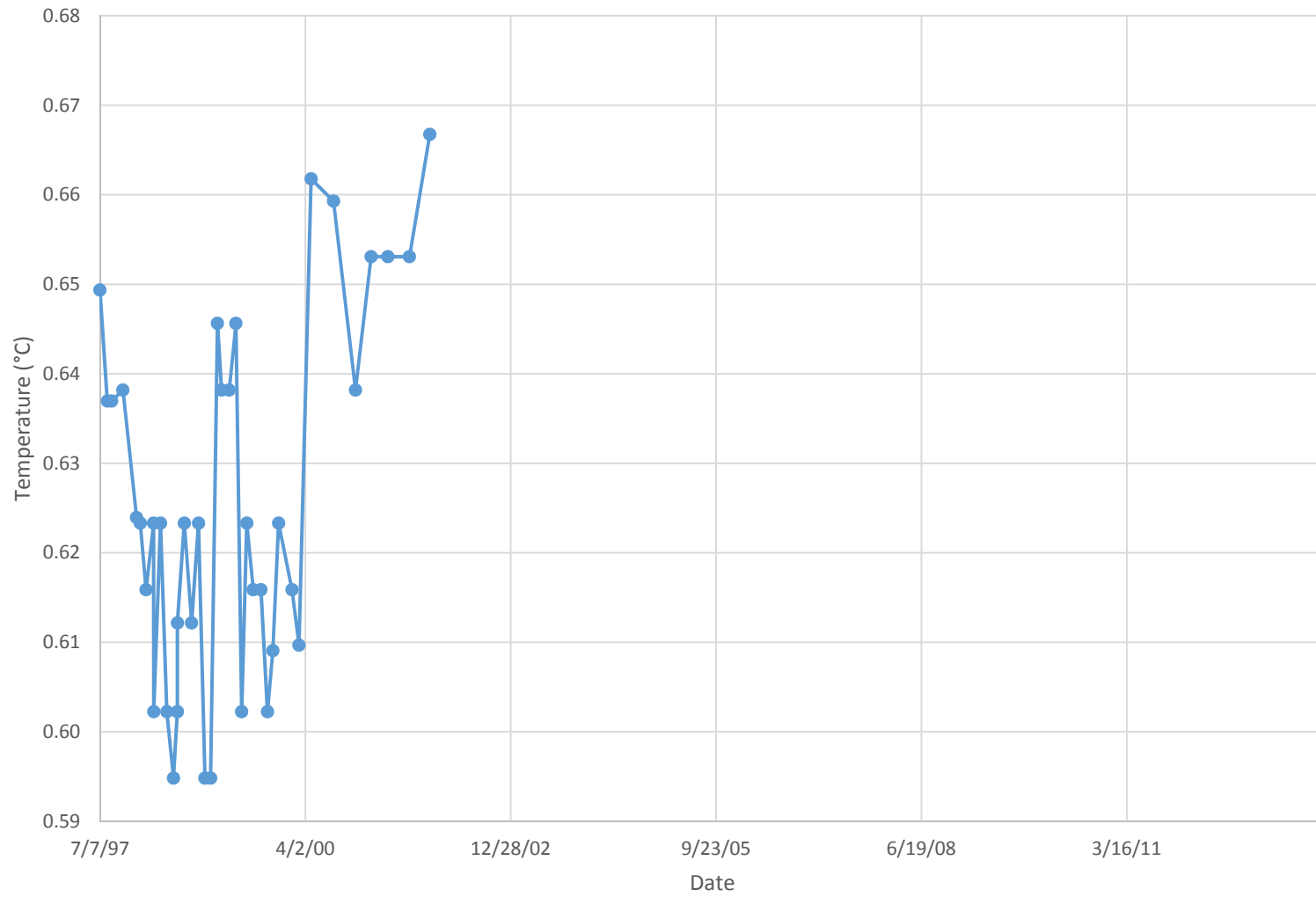
T-97-028: Temperature at 169 feet

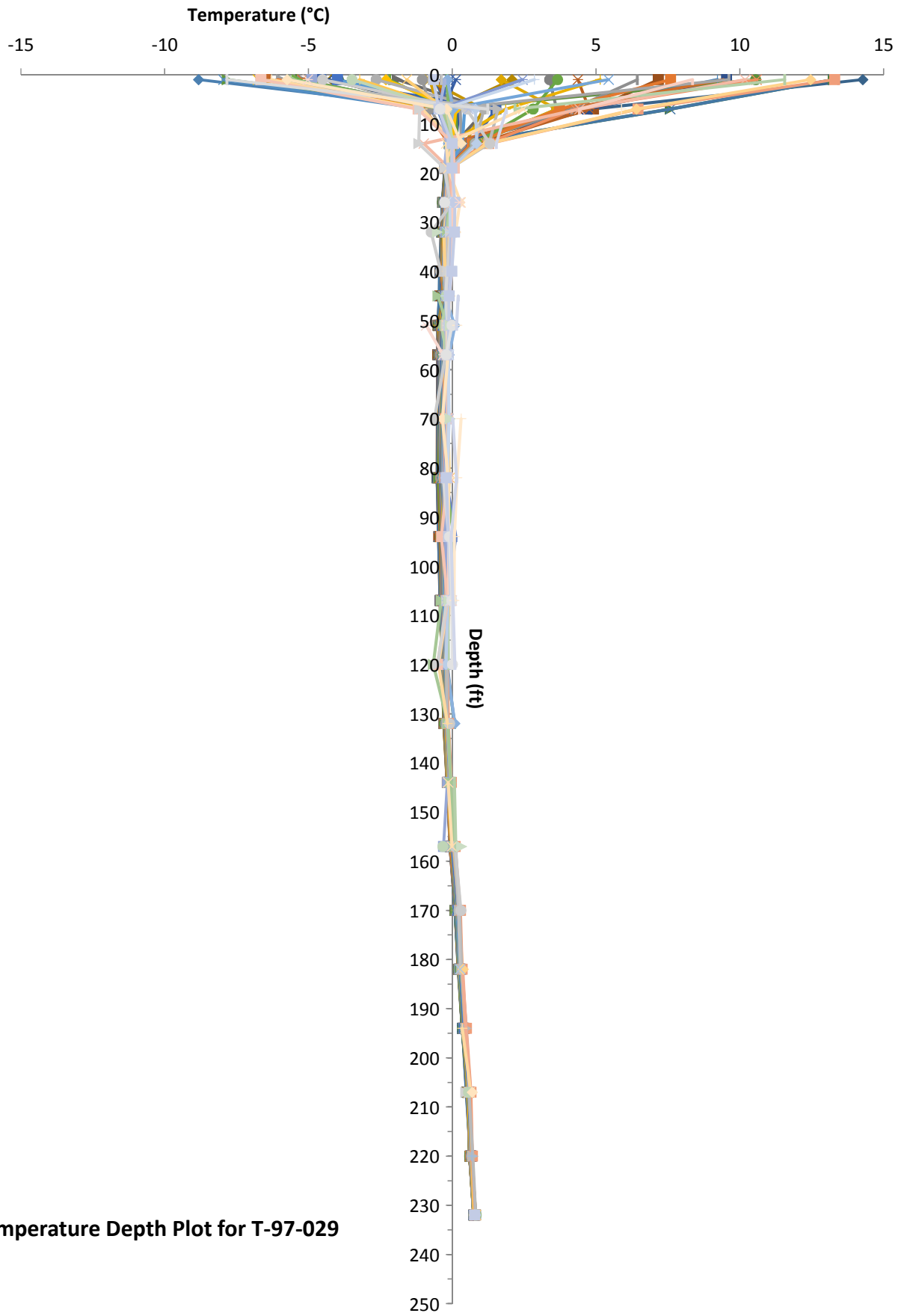


T-97-028: Temperature at 182 feet

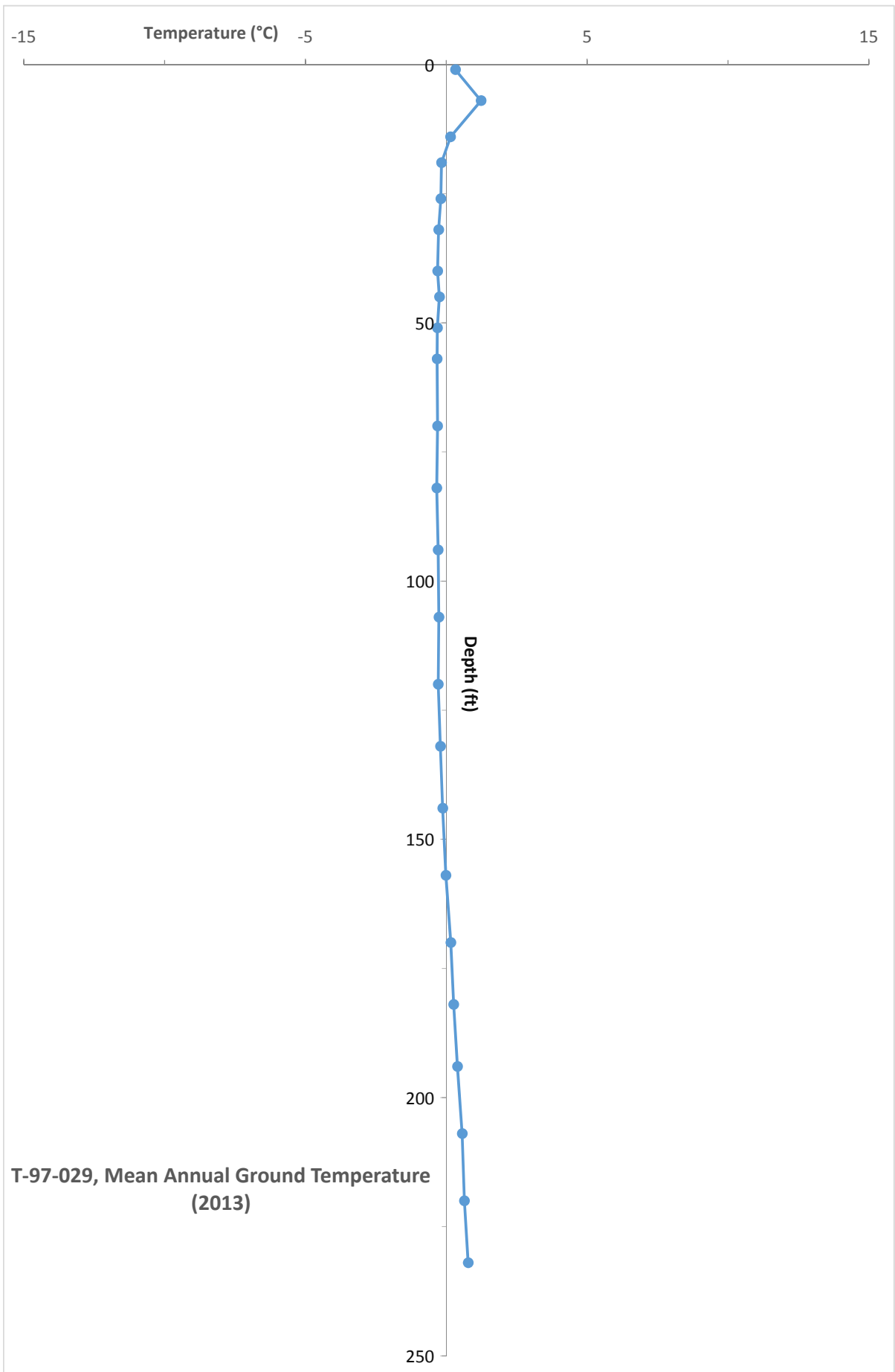


T-97-028: Temperature at 207 feet

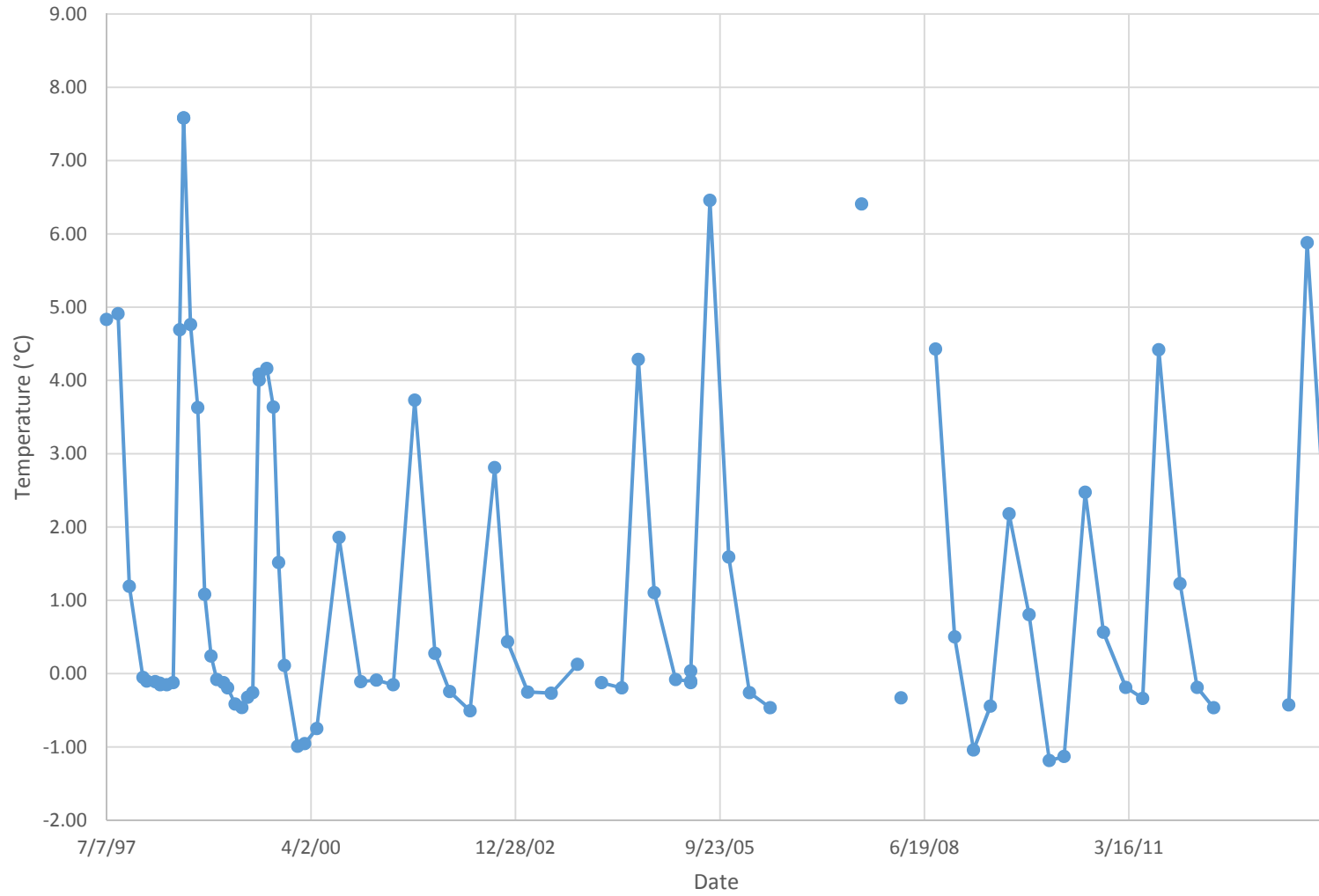




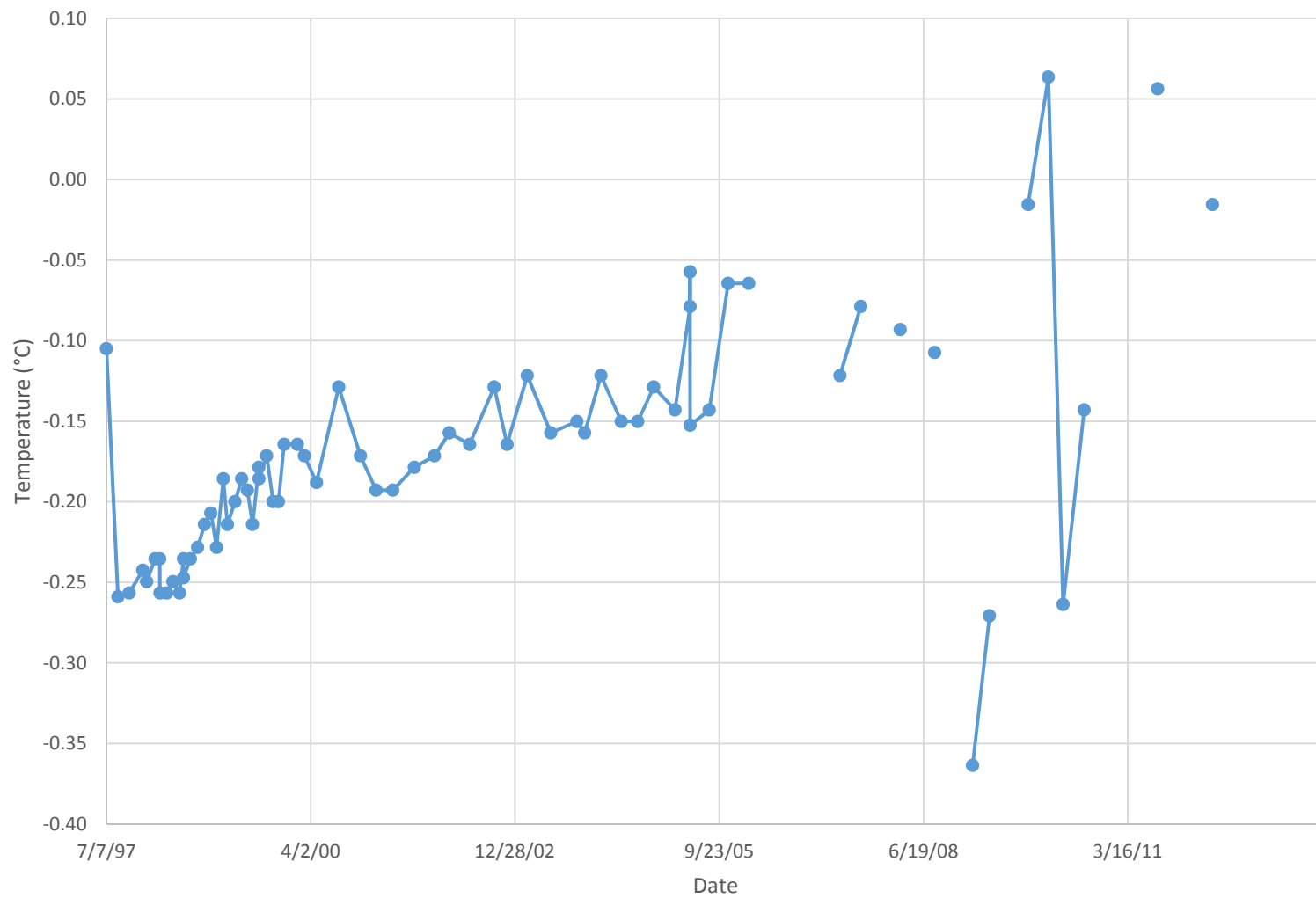
Temperature Depth Plot for T-97-029



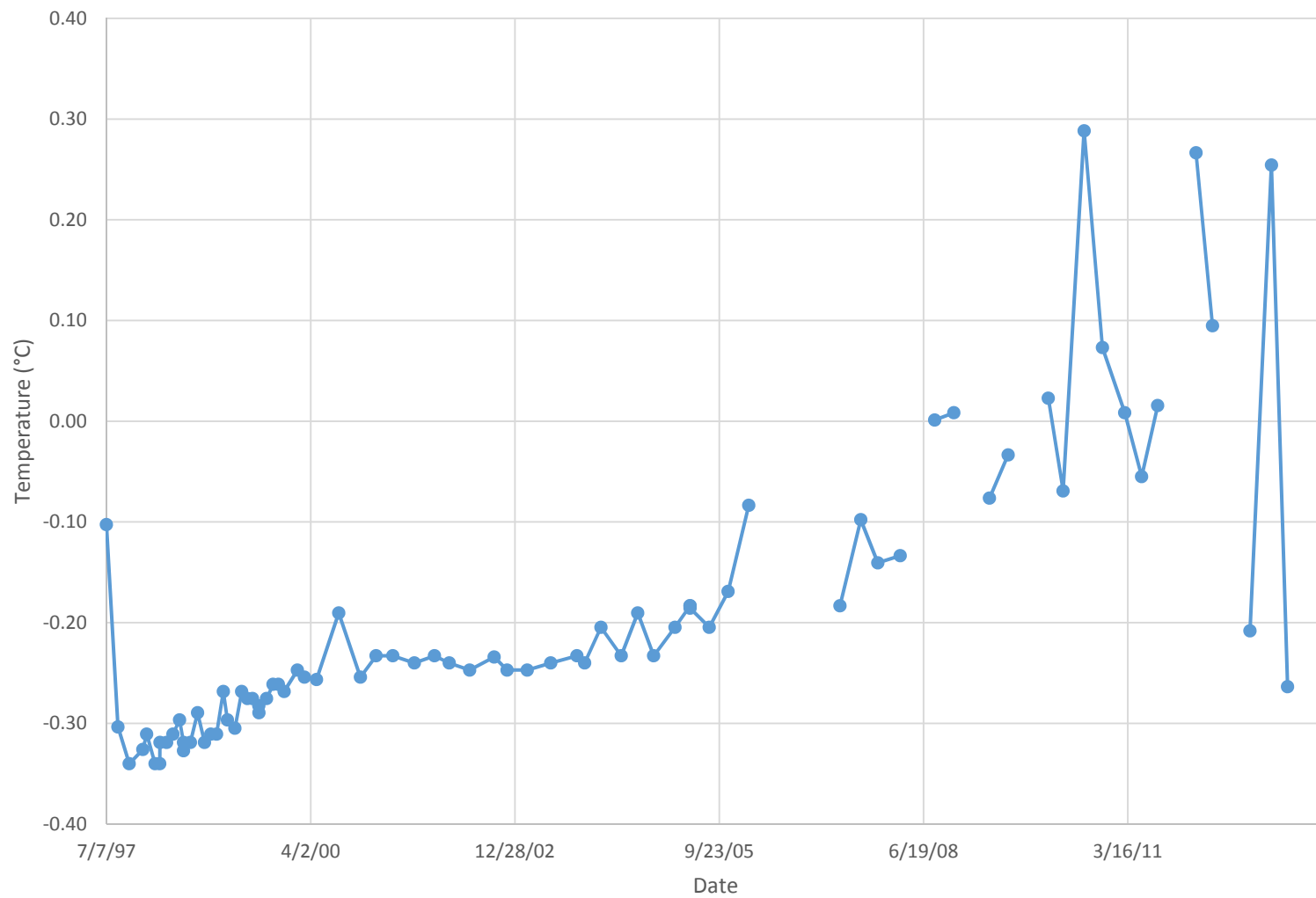
T-97-029: Temperature at 7 feet



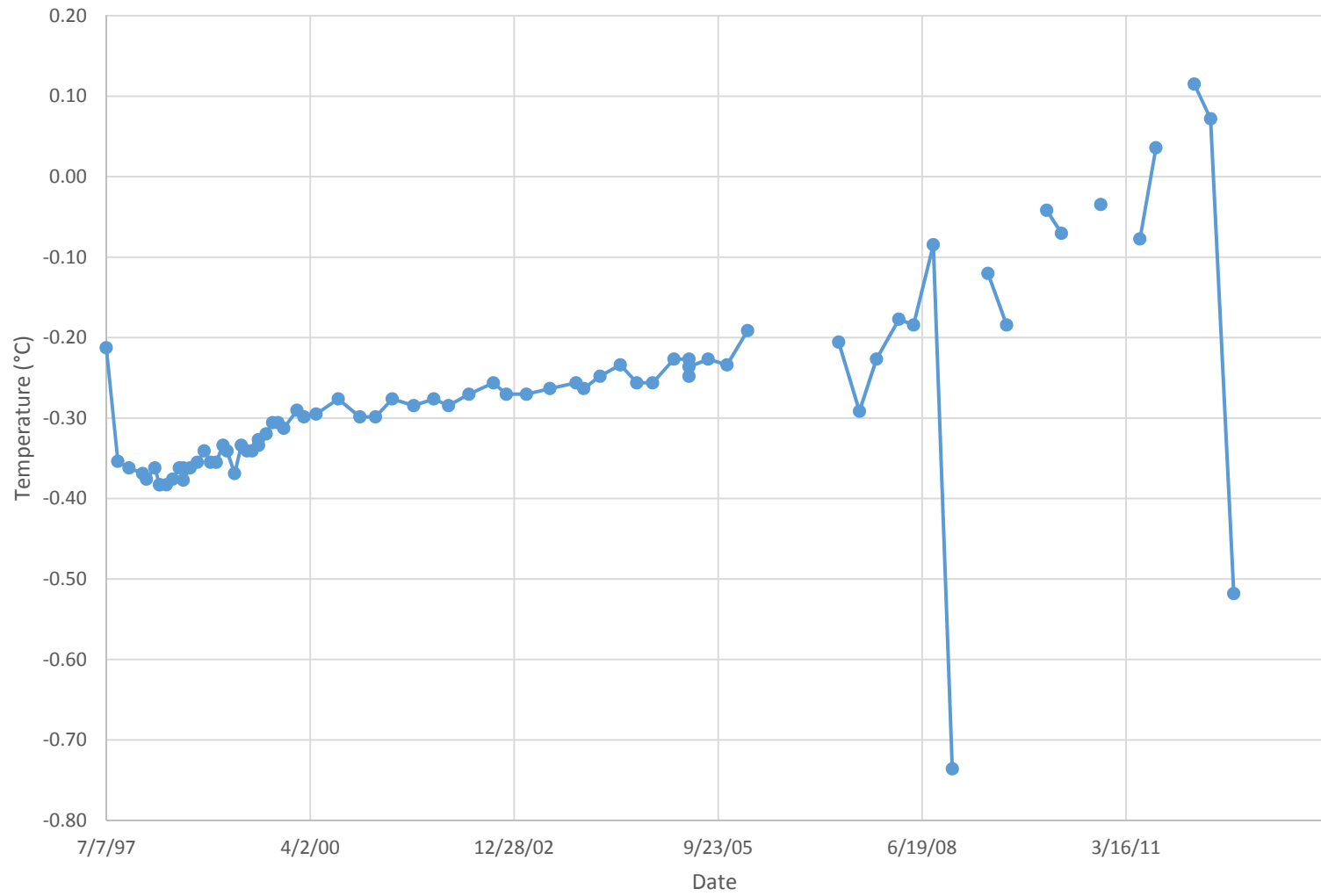
T-97-029: Temperature at 19 feet



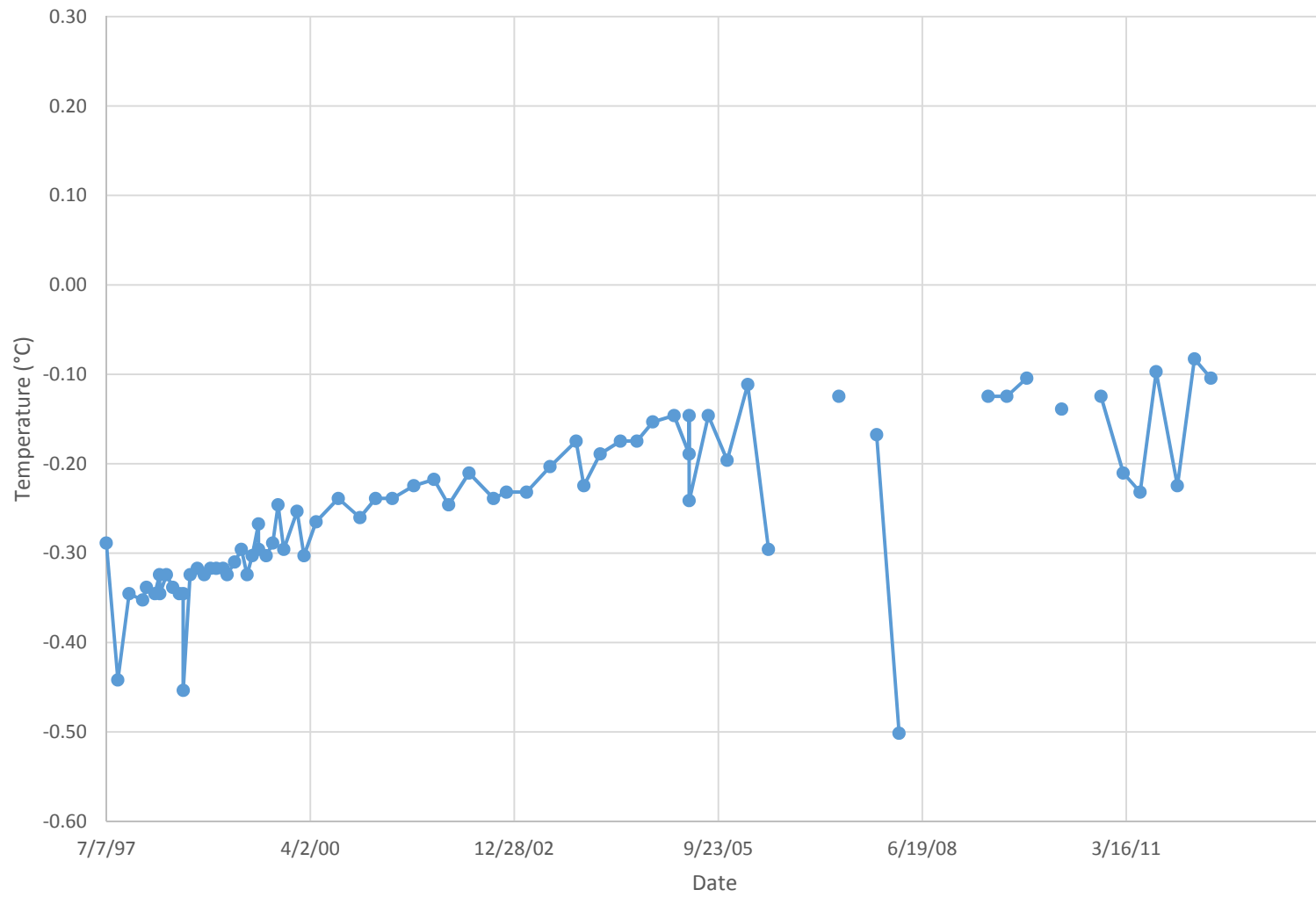
T-97-029: Temperature at 26 feet



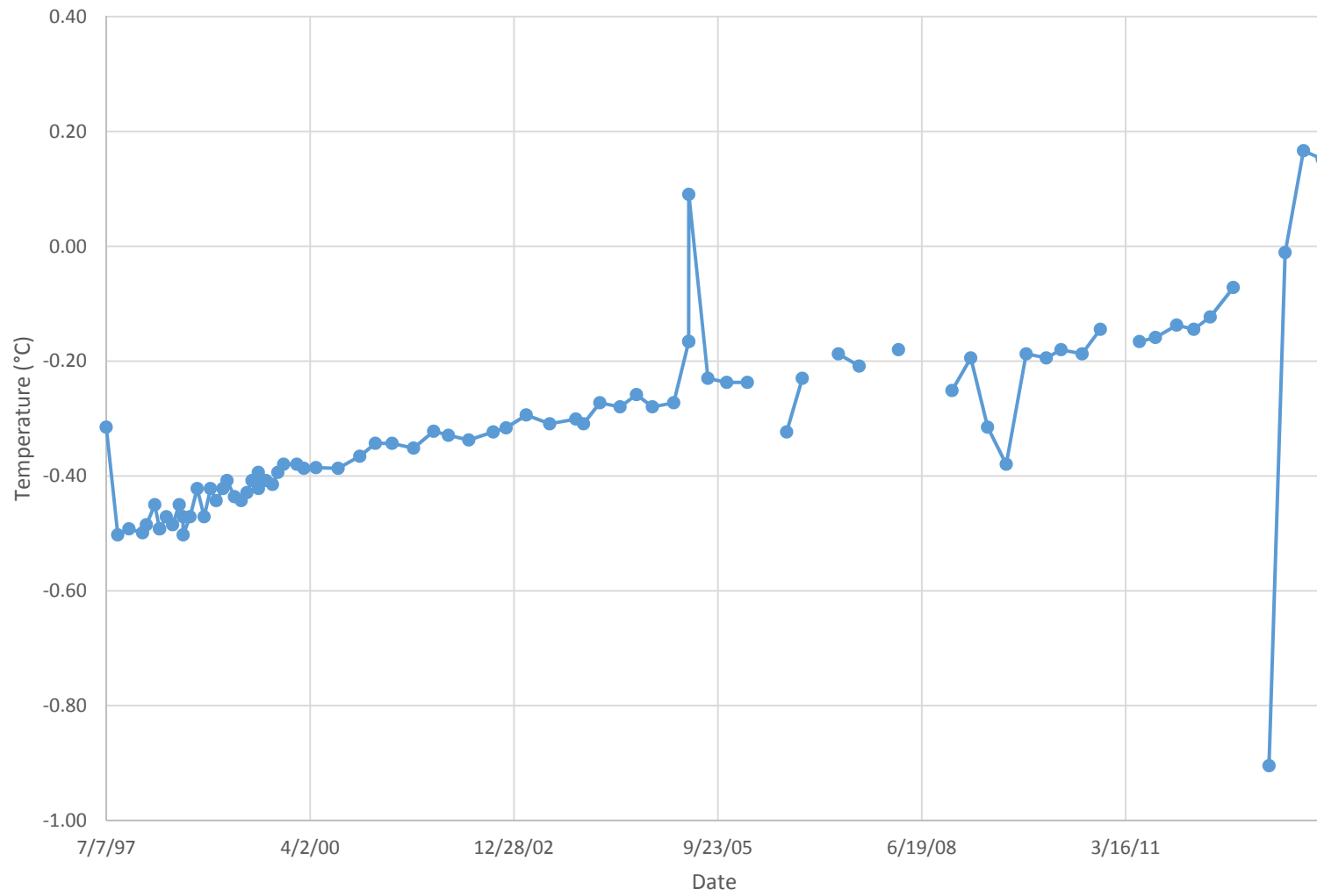
T-97-029: Temperature at 32 feet



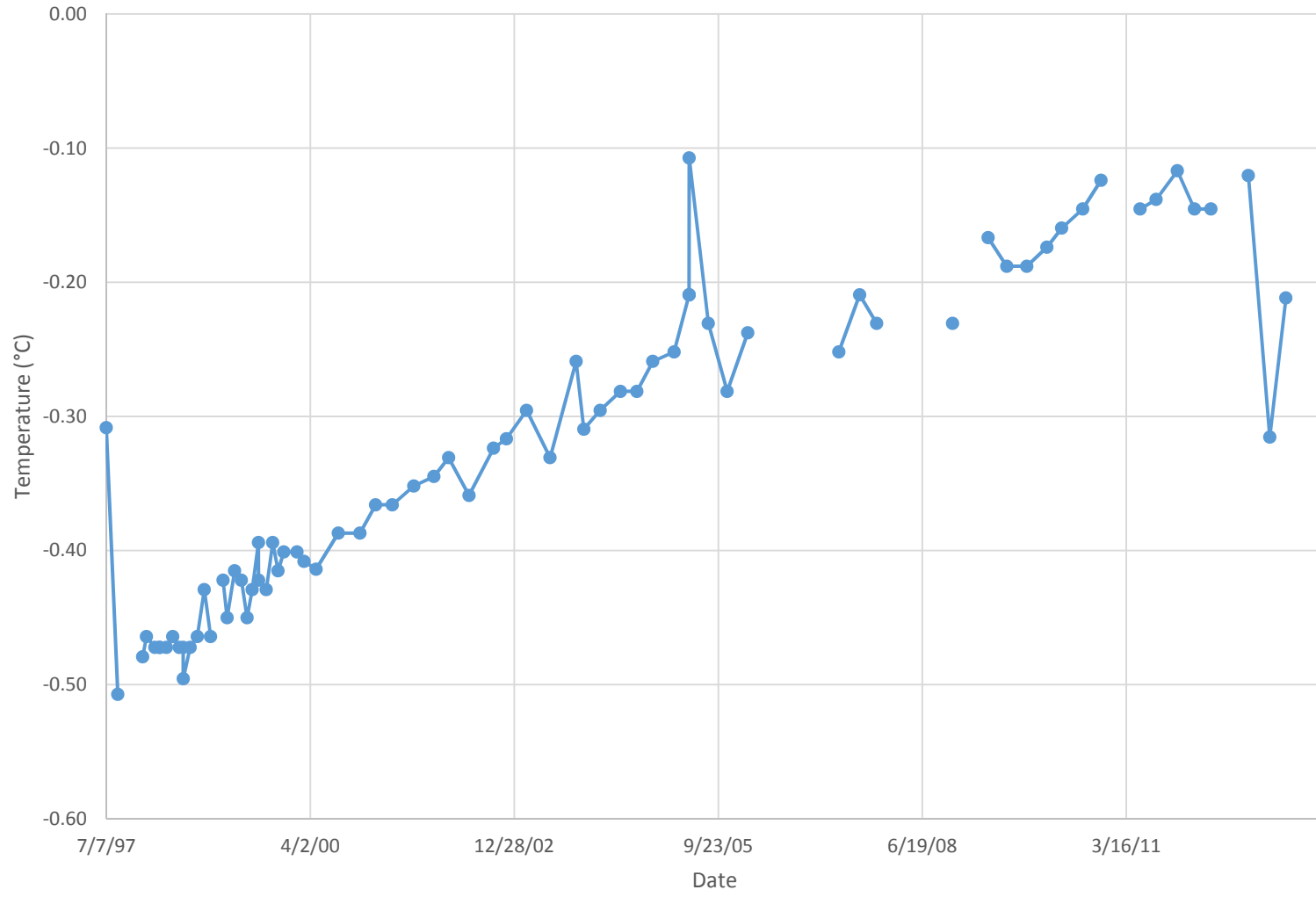
T-97-029: Temperature at 45 feet



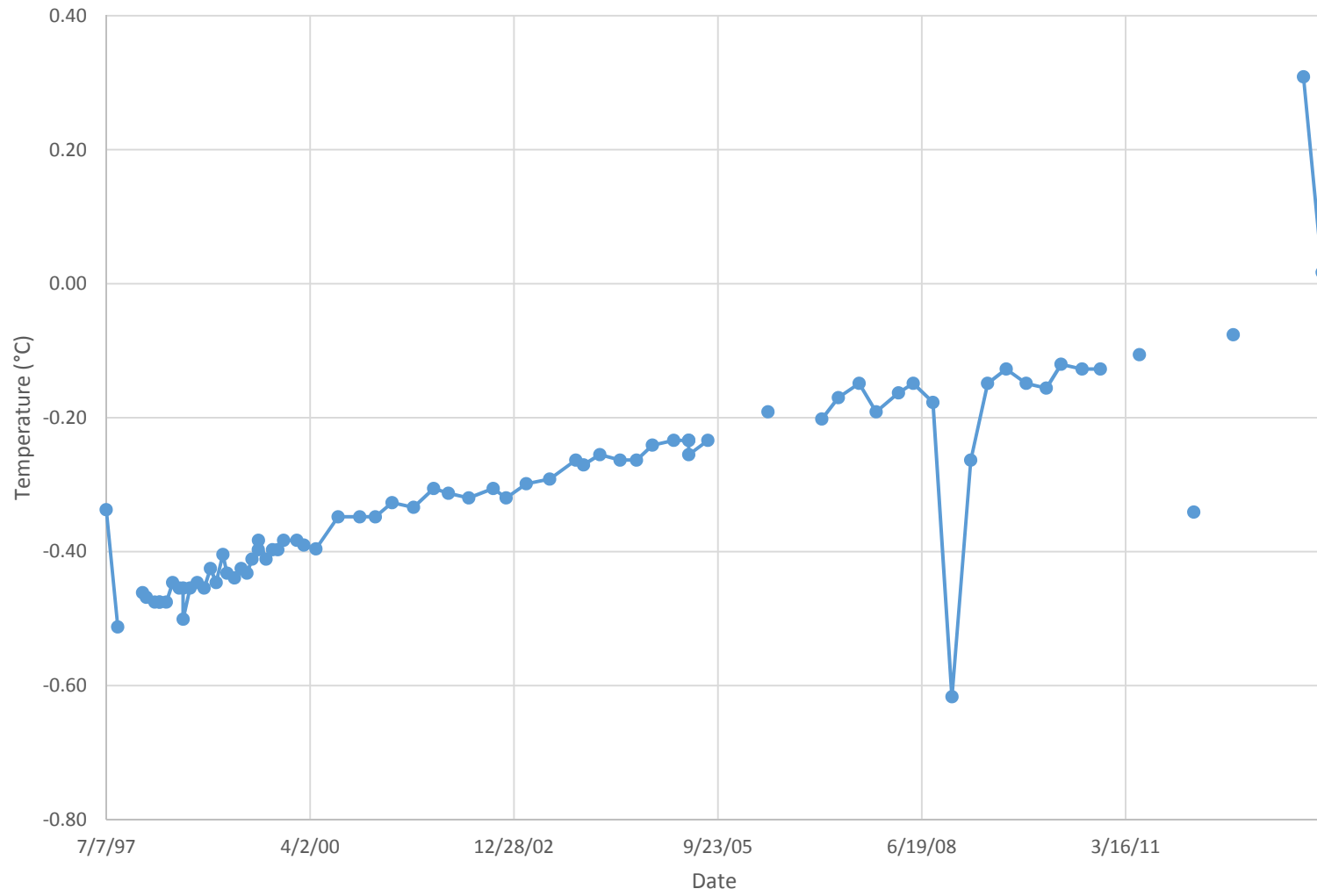
T-97-029: Temperature at 51 feet



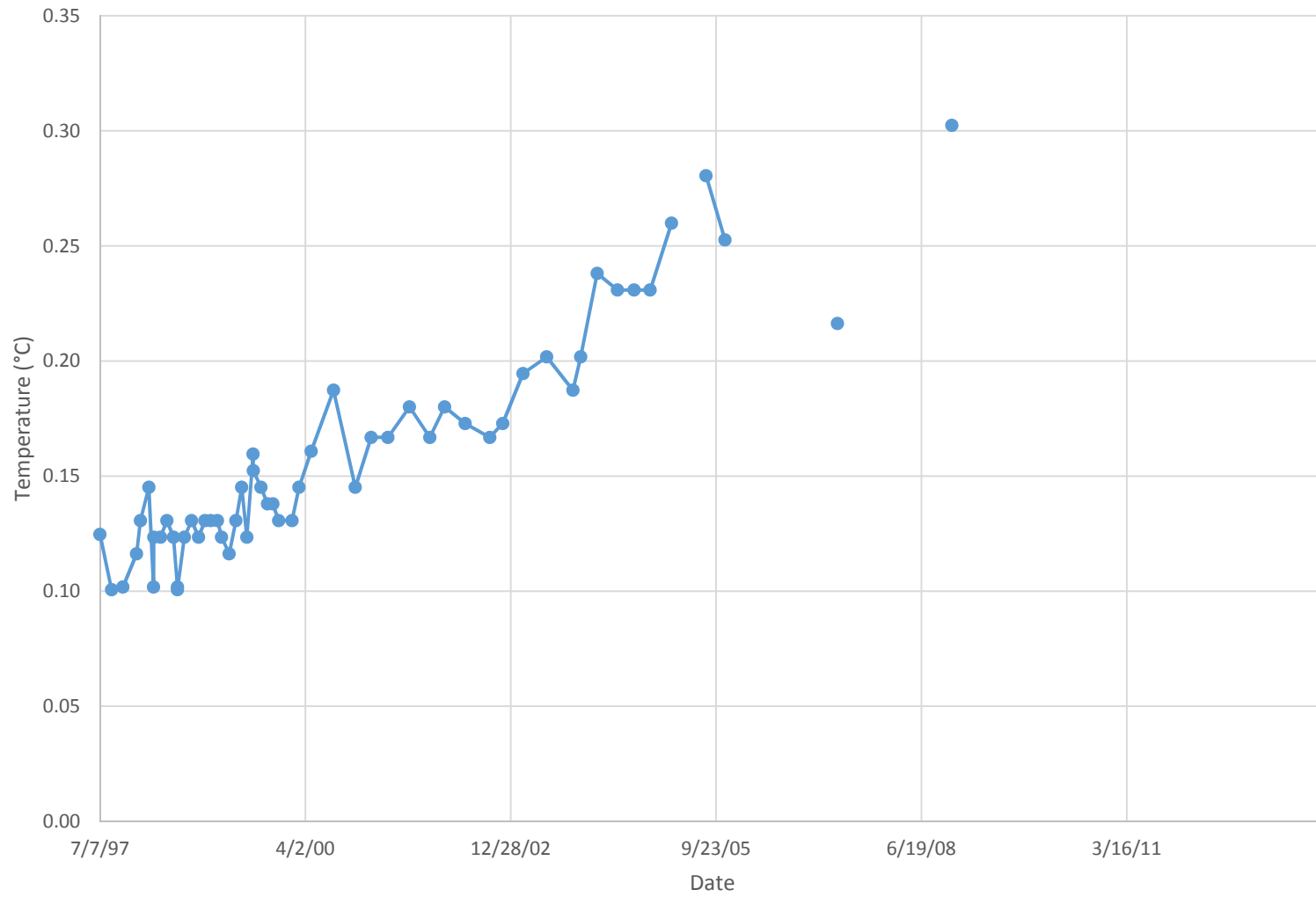
T-97-029: Temperature at 57 feet



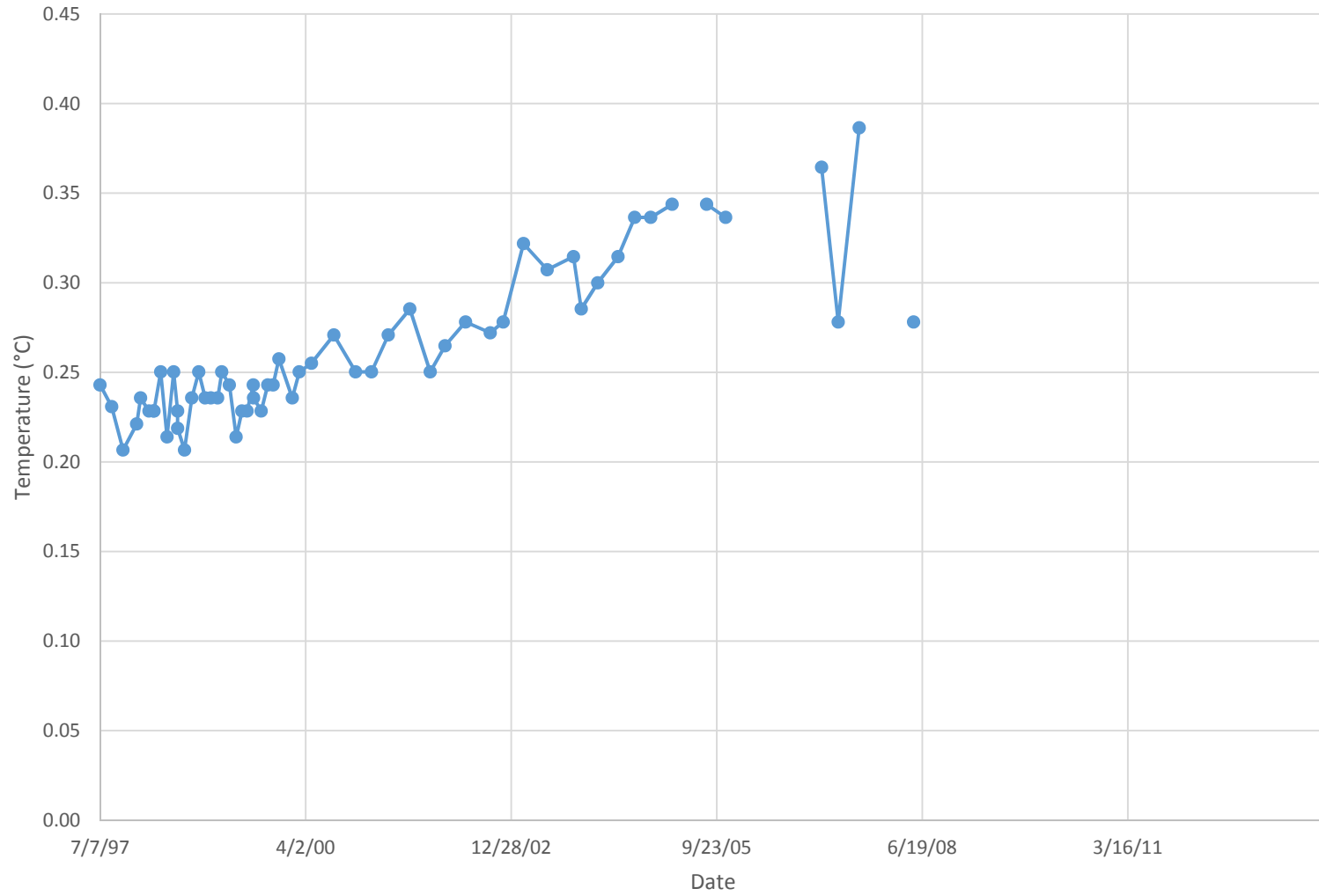
T-97-029: Temperature at 70 feet



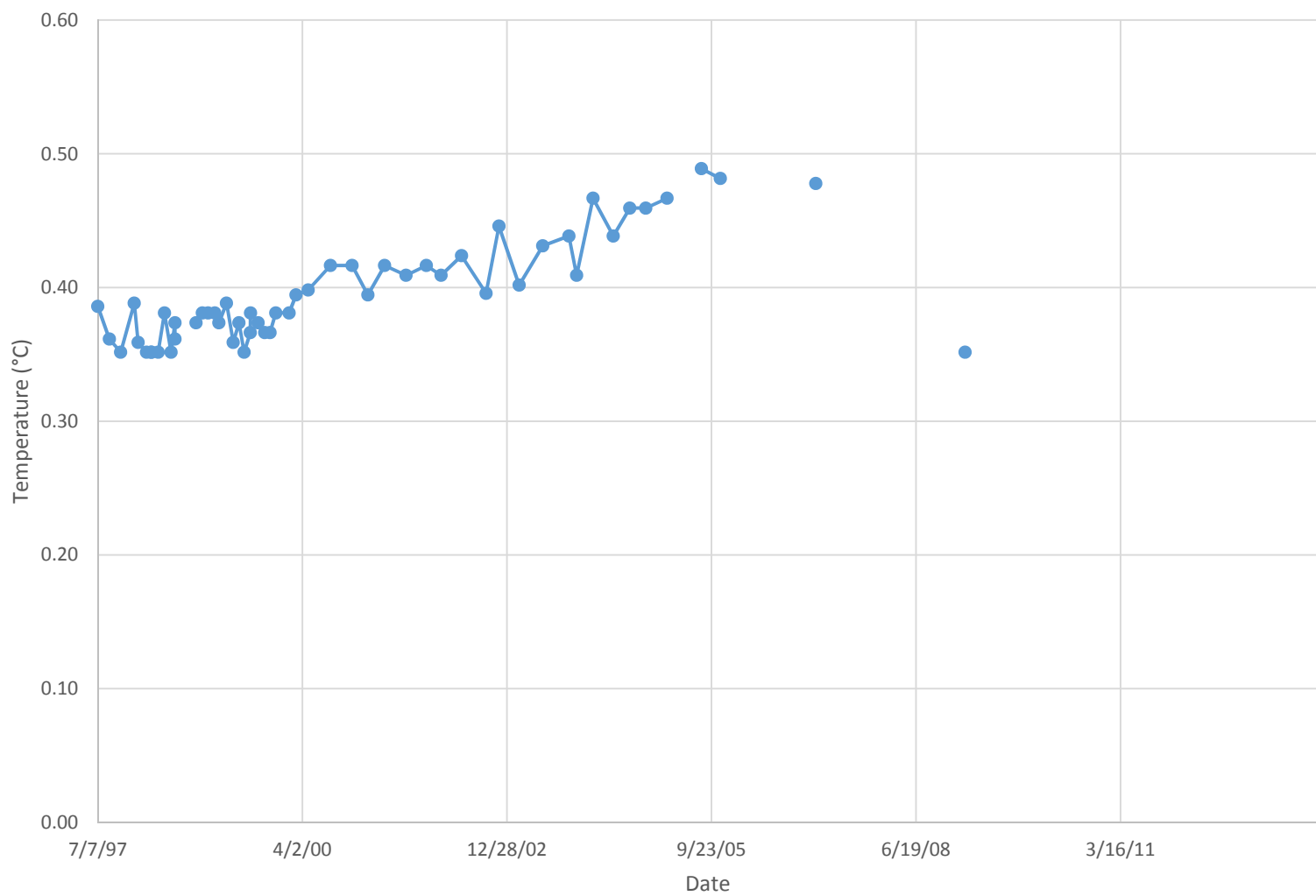
T-97-029: Temperature at 170 feet



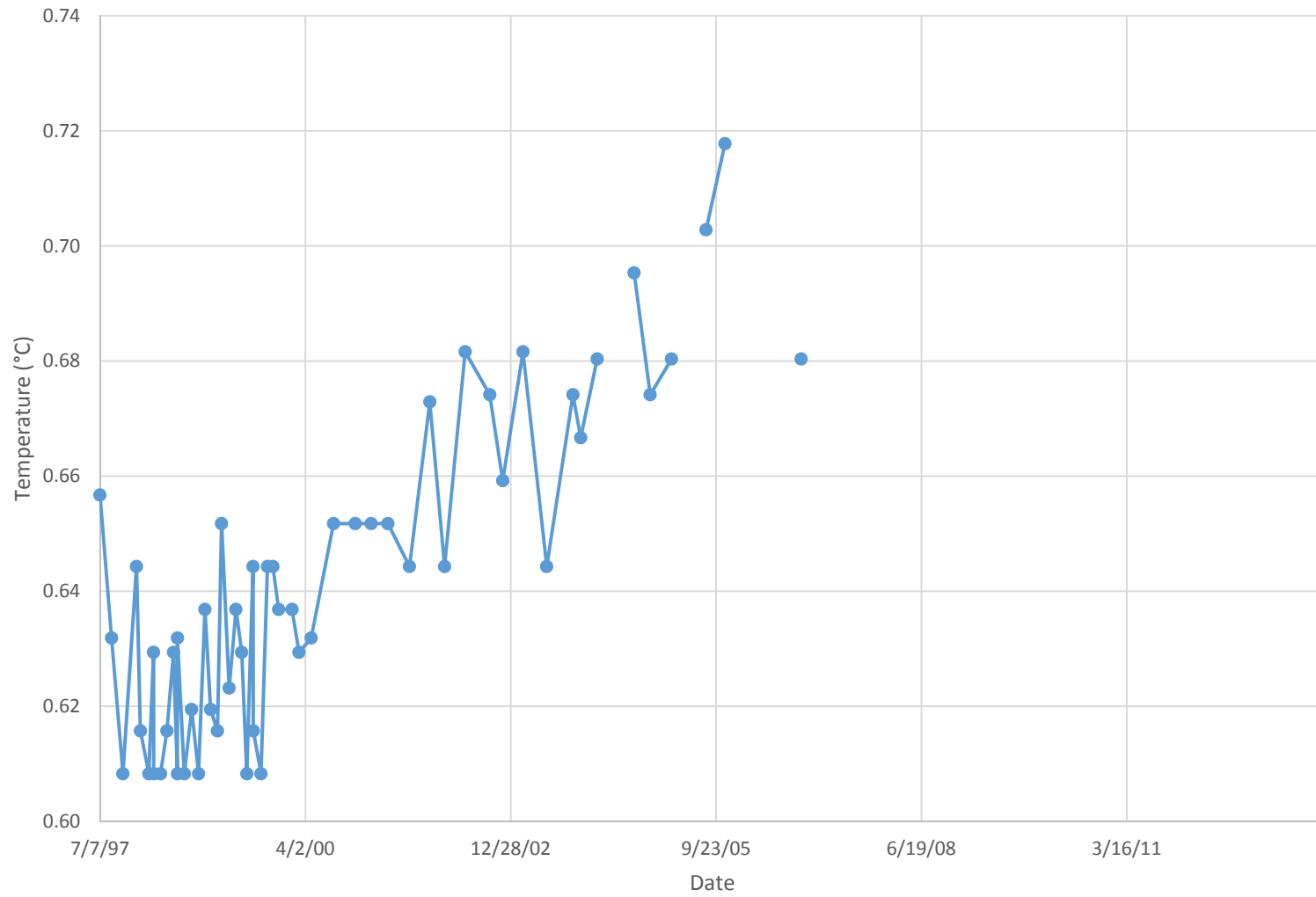
T-97-029: Temperature at 182 feet



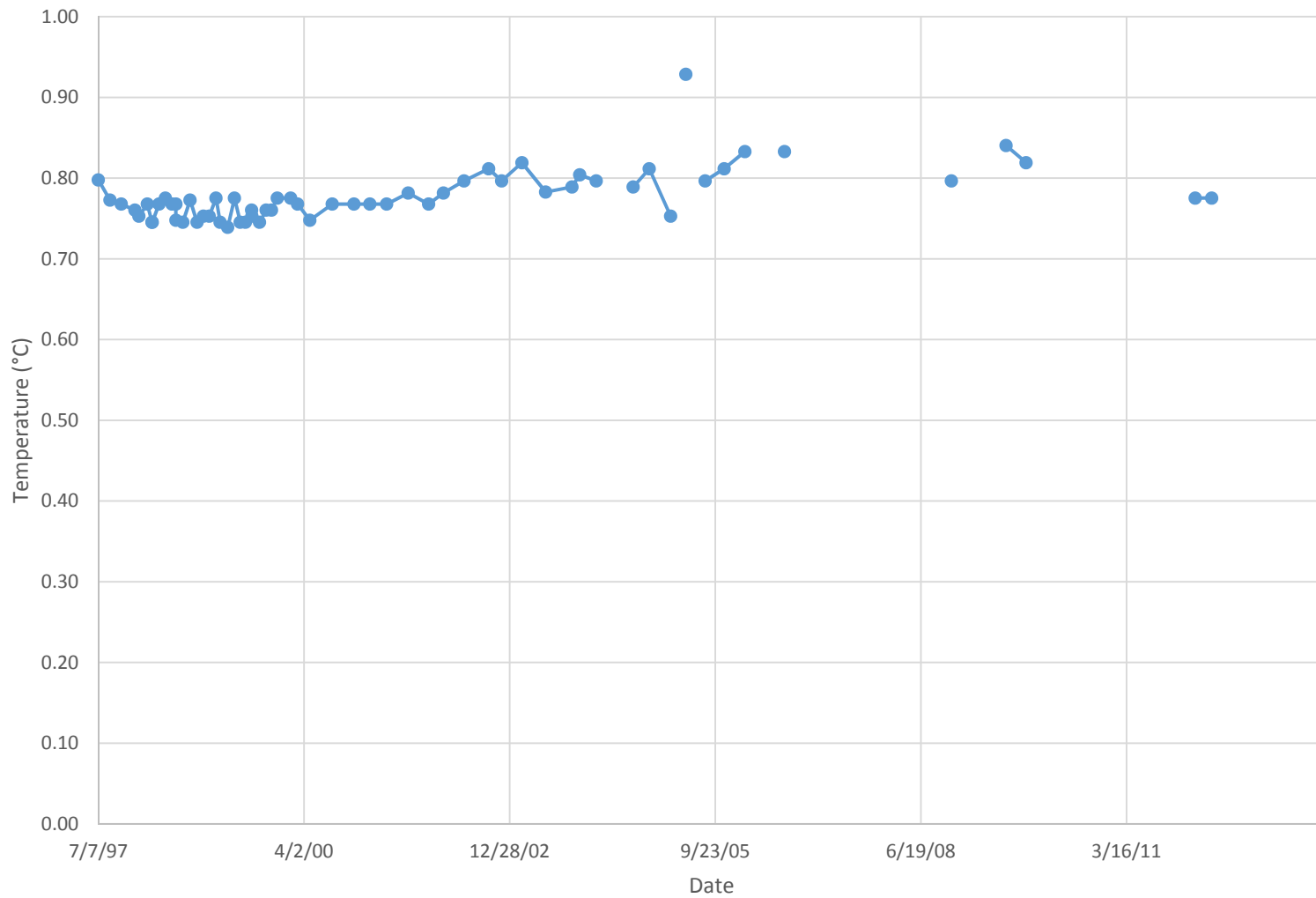
T-97-029: Temperature at 194 feet

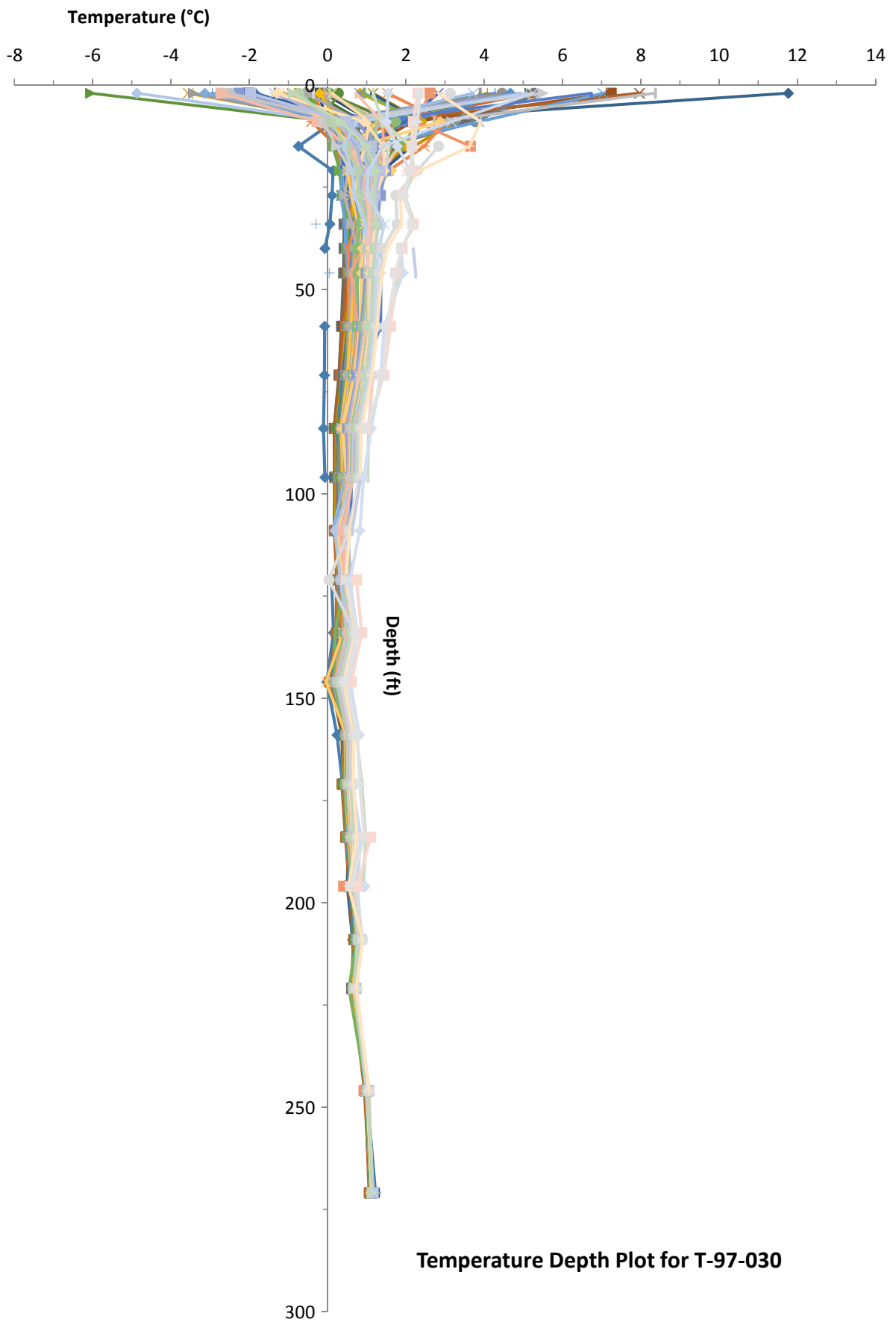


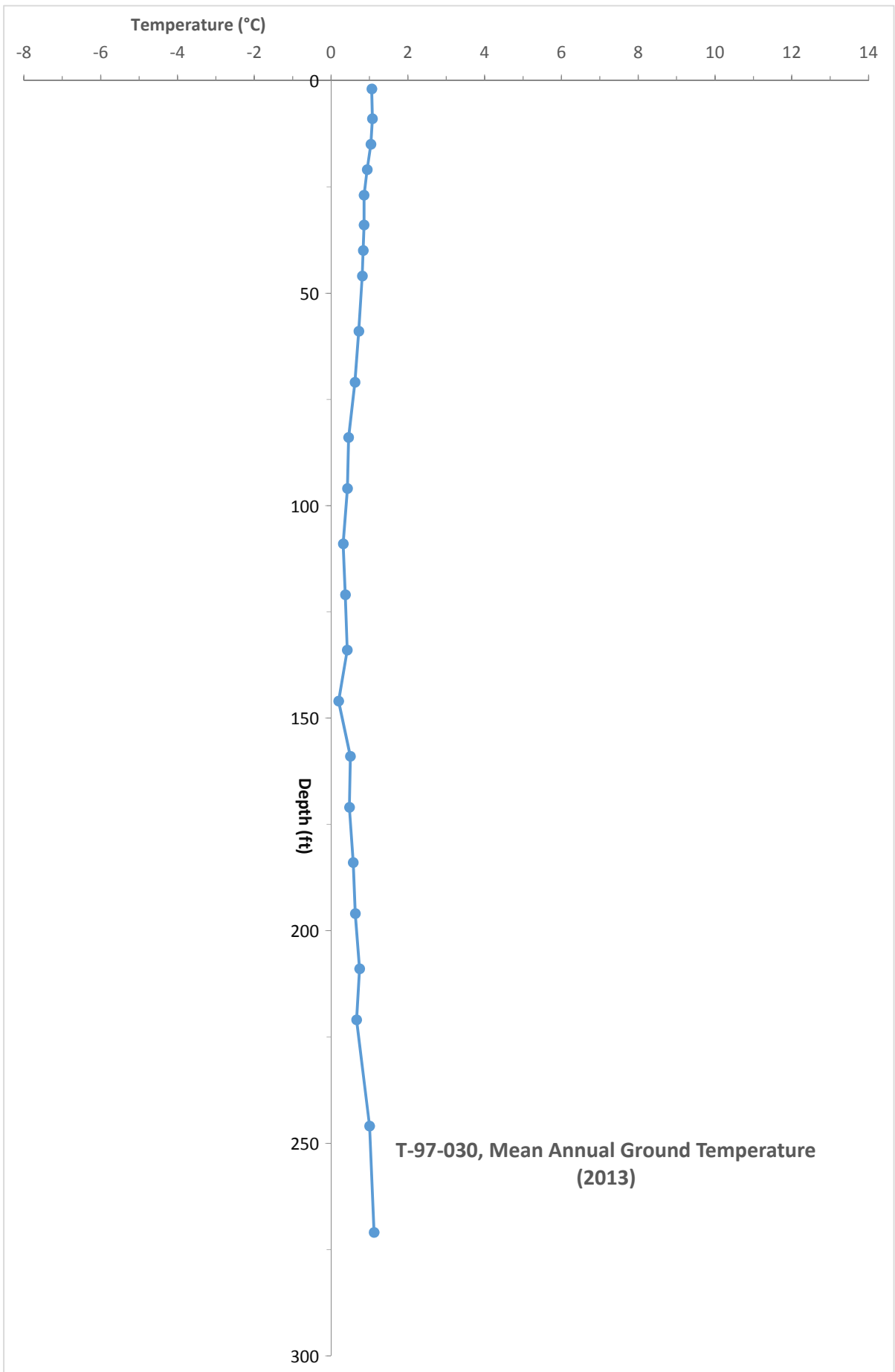
T-97-029: Temperature at 220 feet



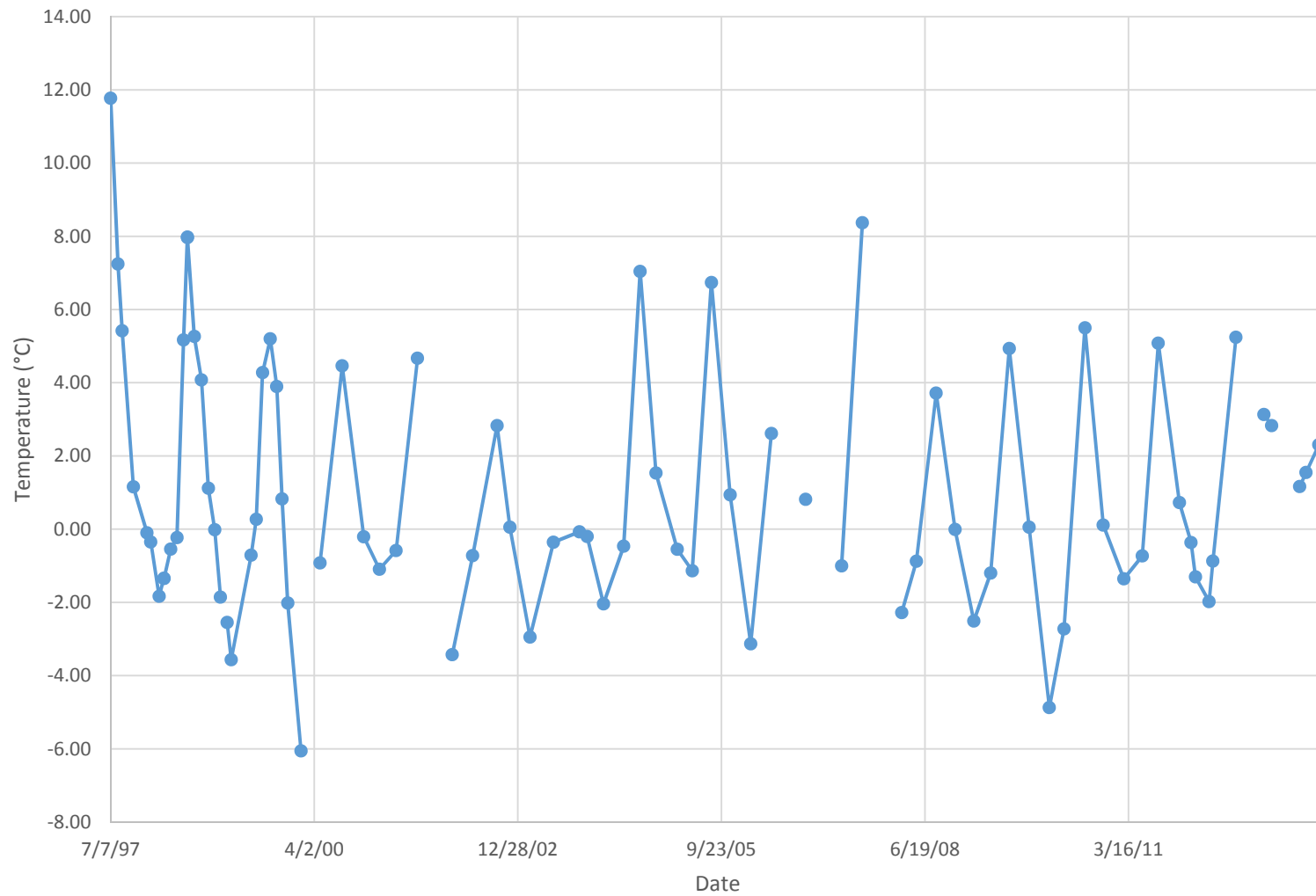
T-97-029: Temperature at 232 feet



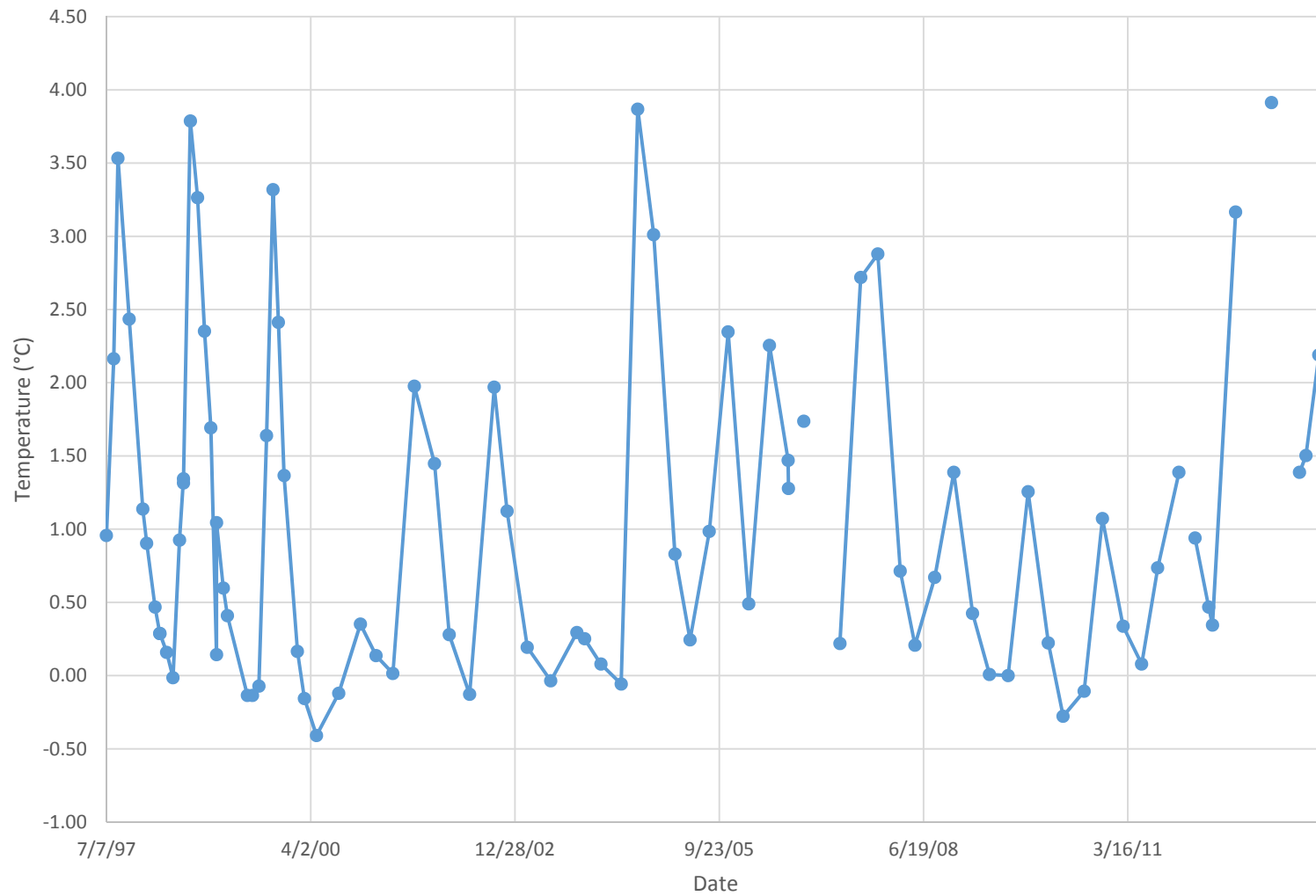




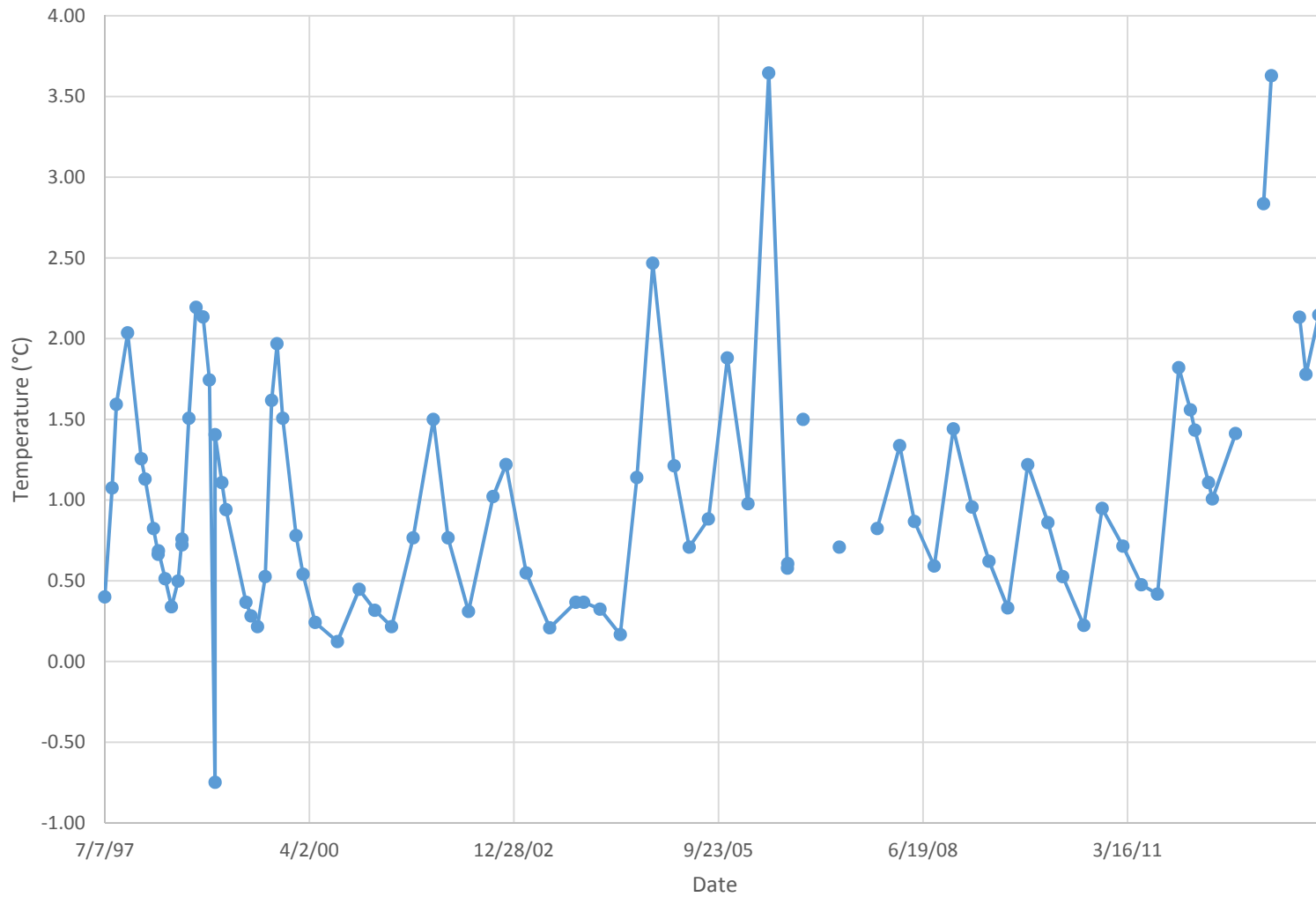
T-97-030: Temperature at 2 feet



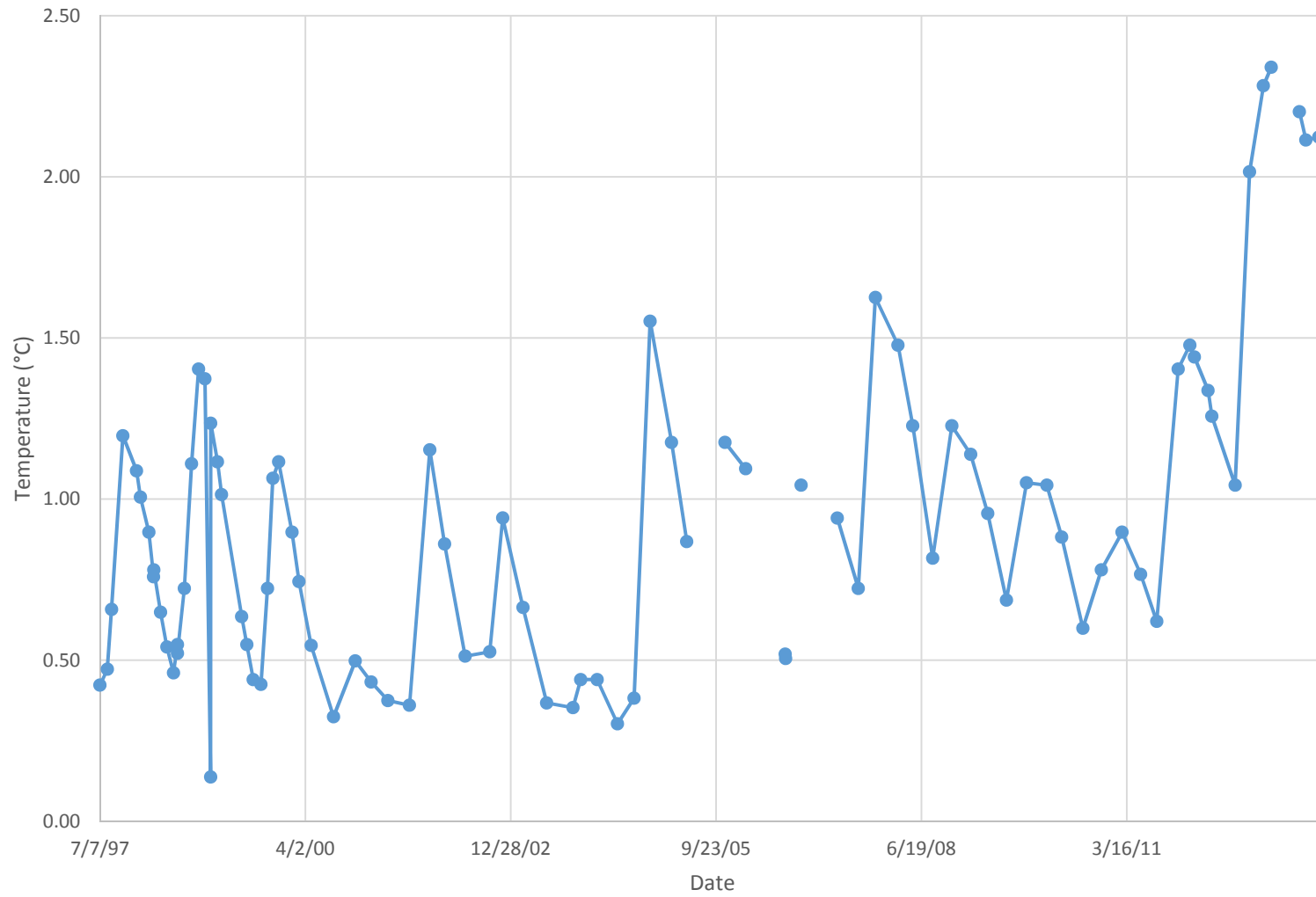
T-97-030: Temperature at 9 feet



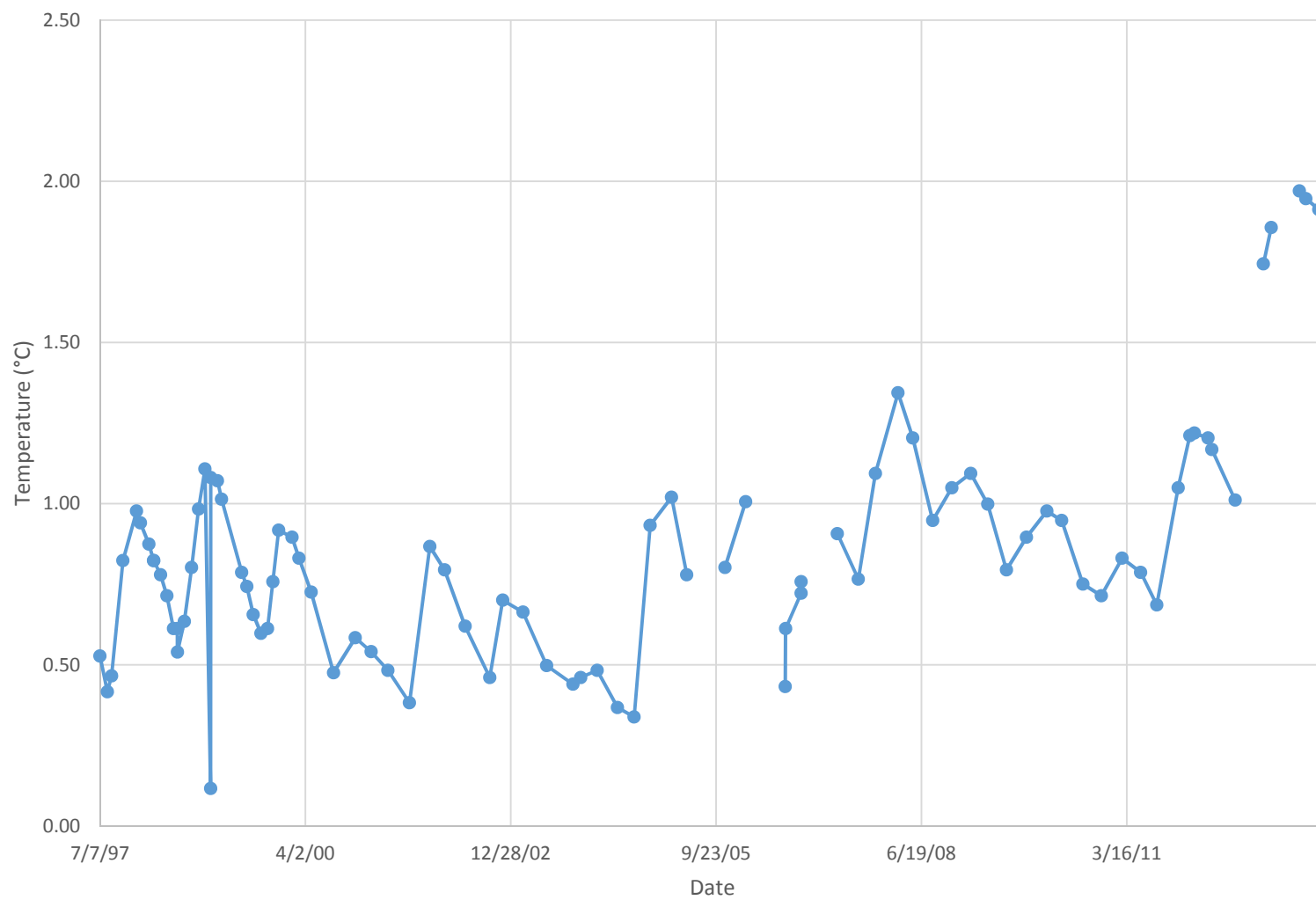
T-97-030: Temperature at 15 feet



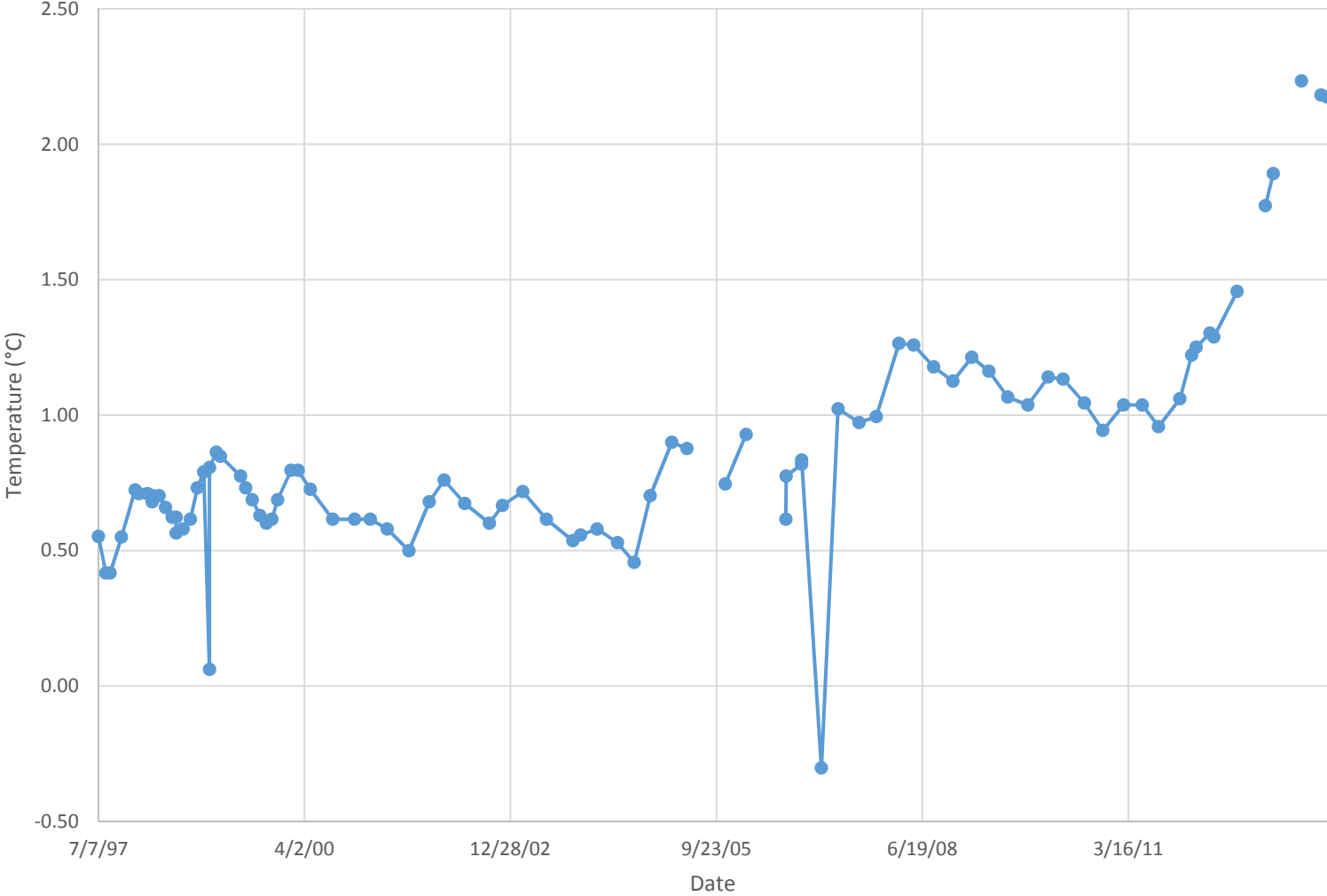
T-97-030: Temperature at 21 feet



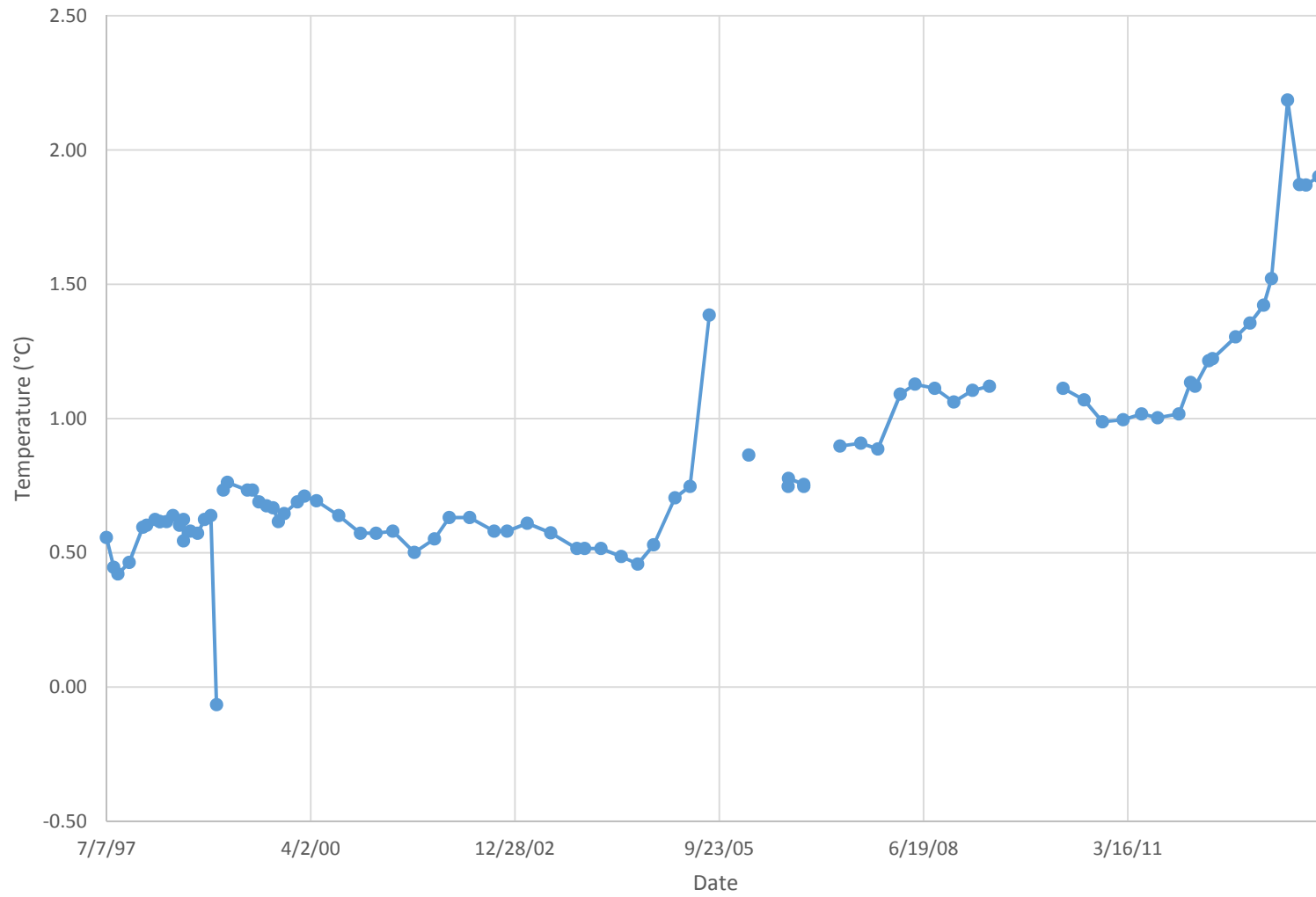
T-97-030: Temperature at 27 feet



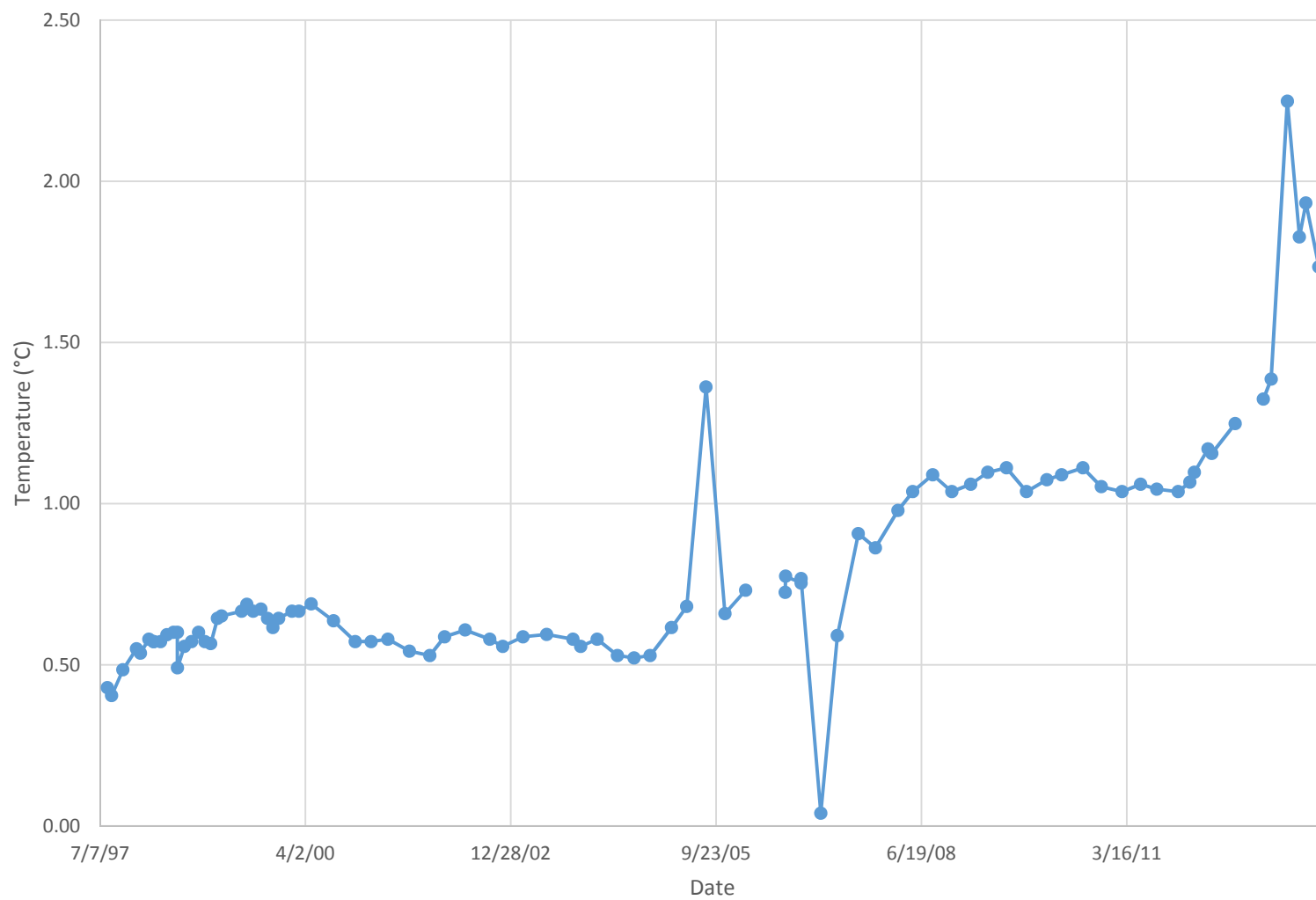
T-97-030: Temperature at 34 feet



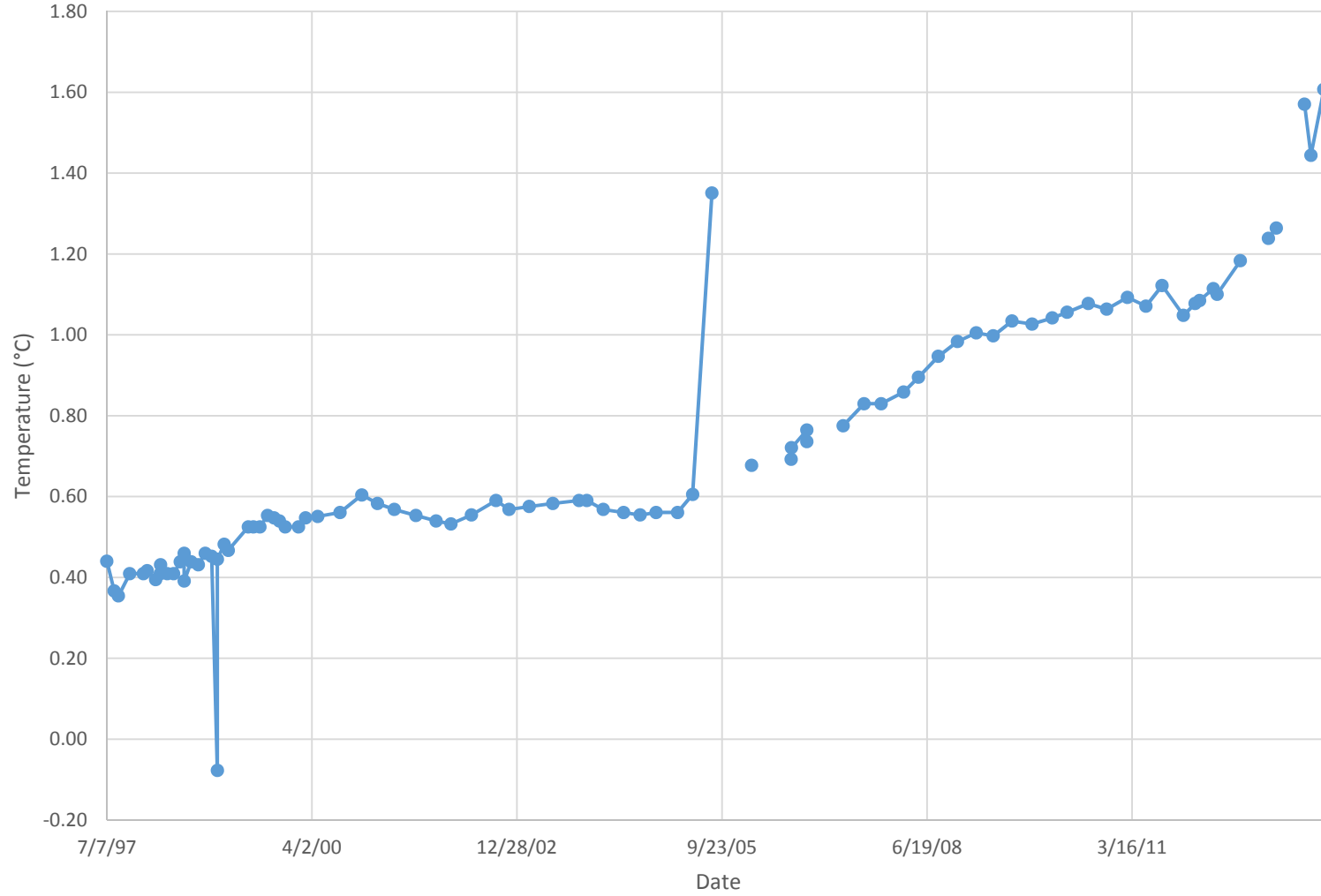
T-97-030: Temperature at 40 feet



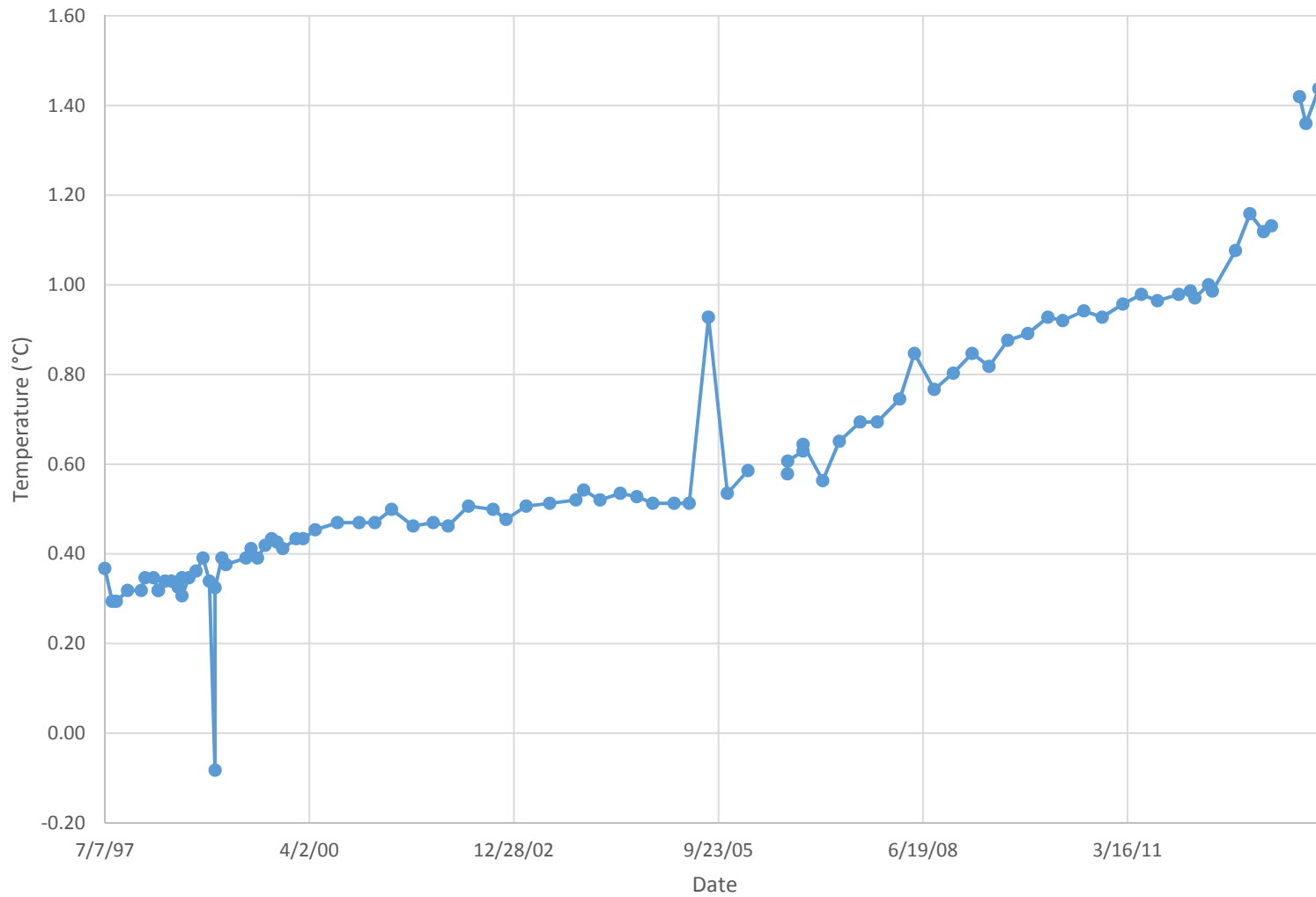
T-97-030: Temperature at 46 feet



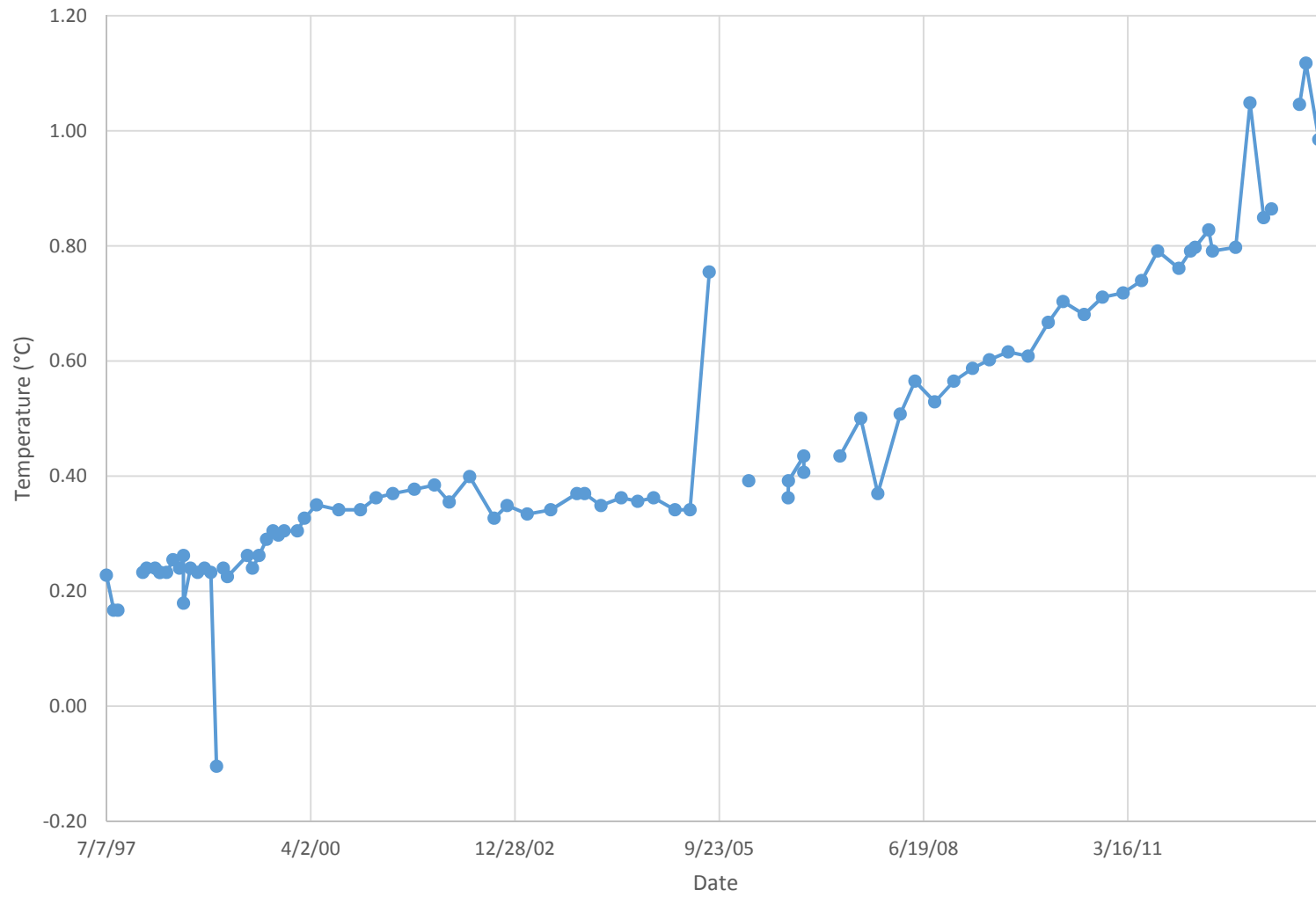
T-97-030: Temperature at 59 feet



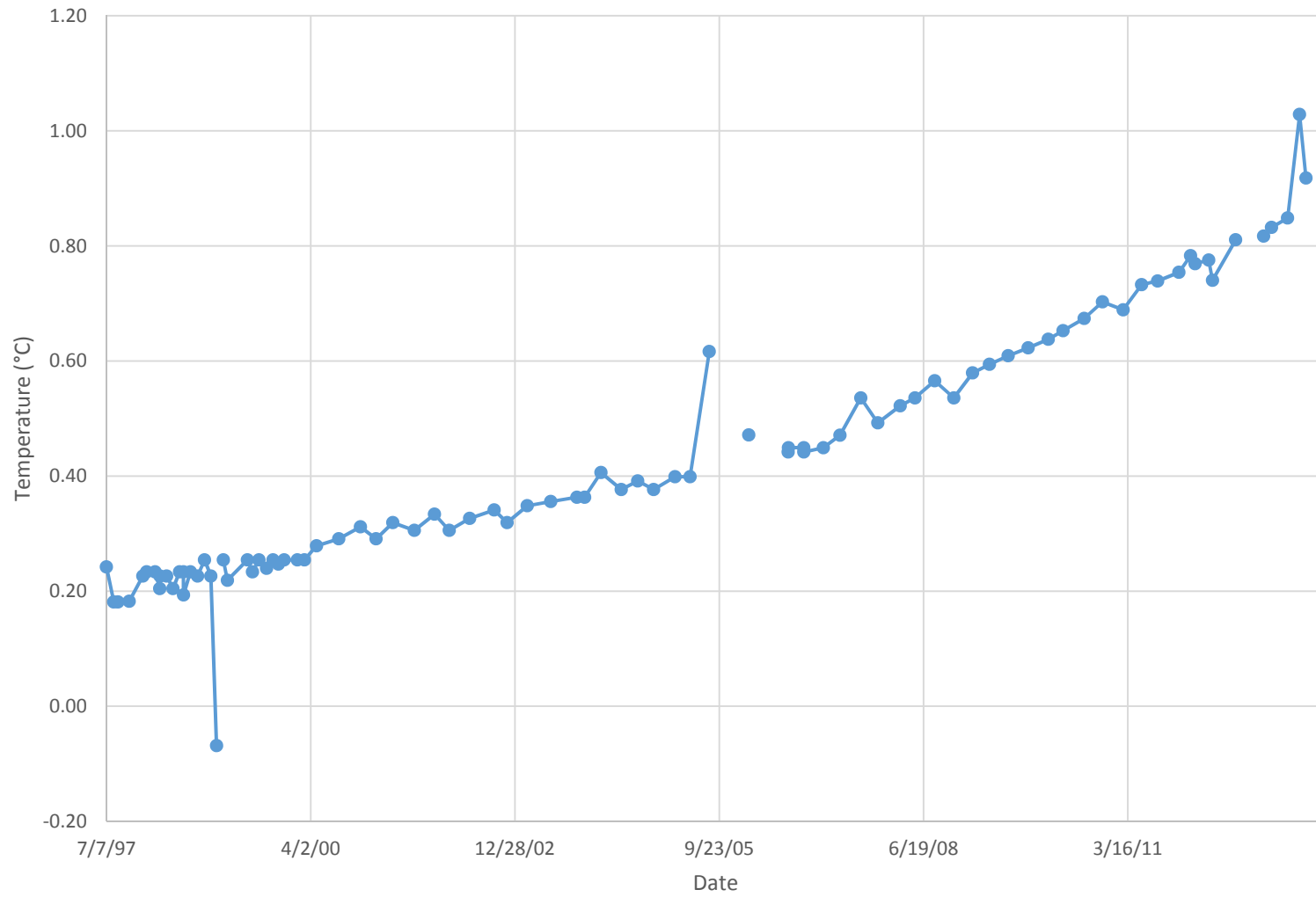
T-97-030: Temperature at 71 feet



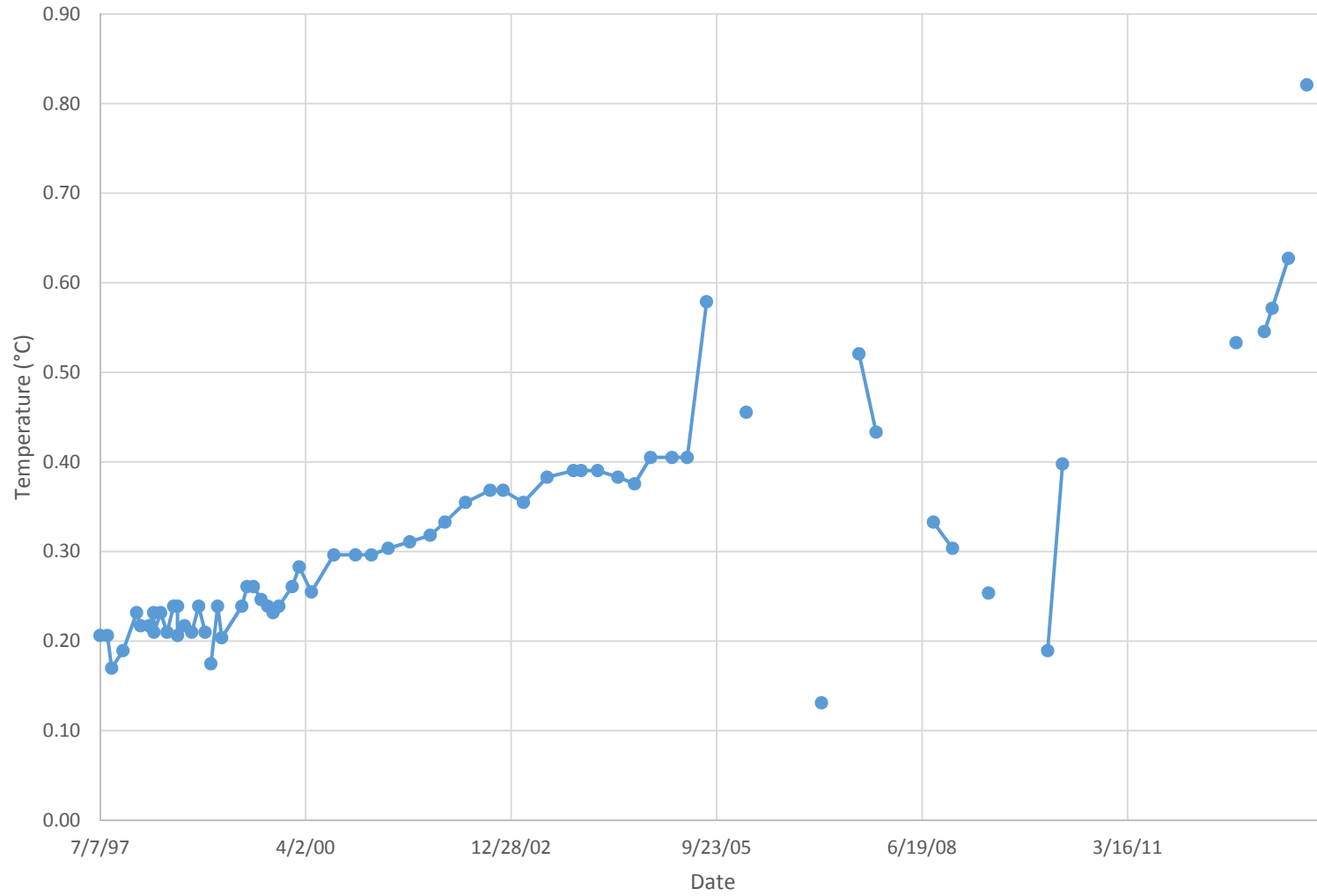
T-97-030: Temperature at 84 feet



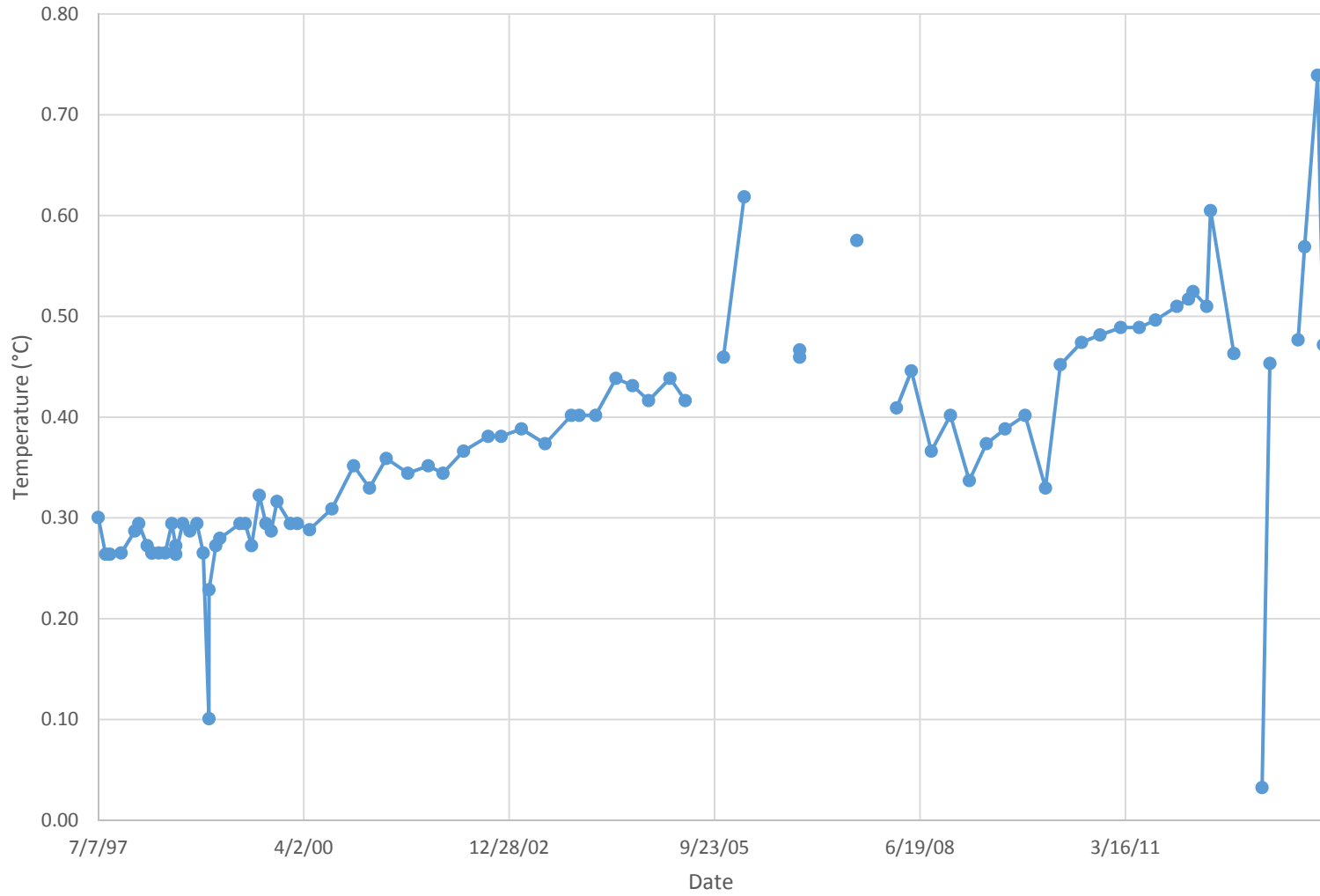
T-97-030: Temperature at 96 feet



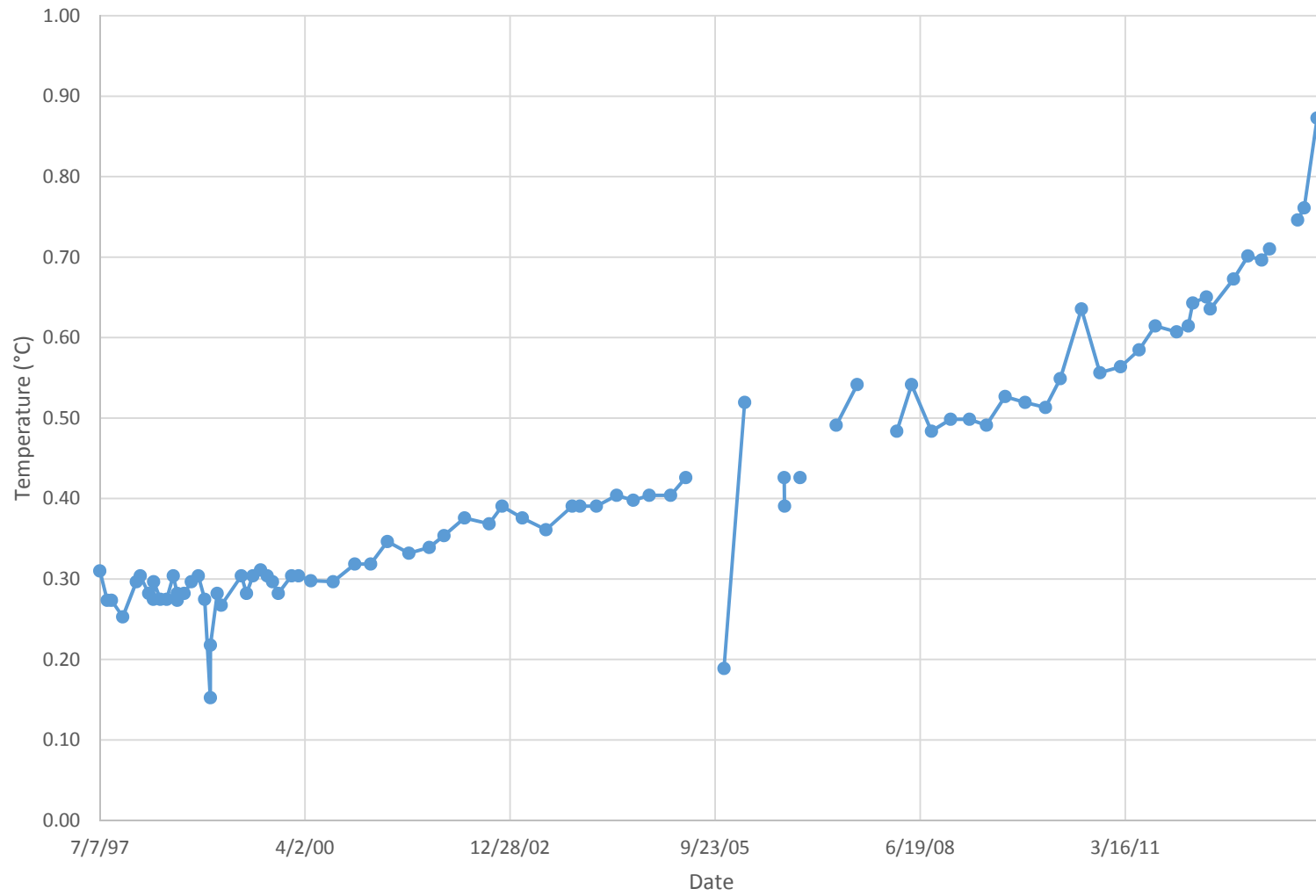
T-97-030: Temperature at 109 feet



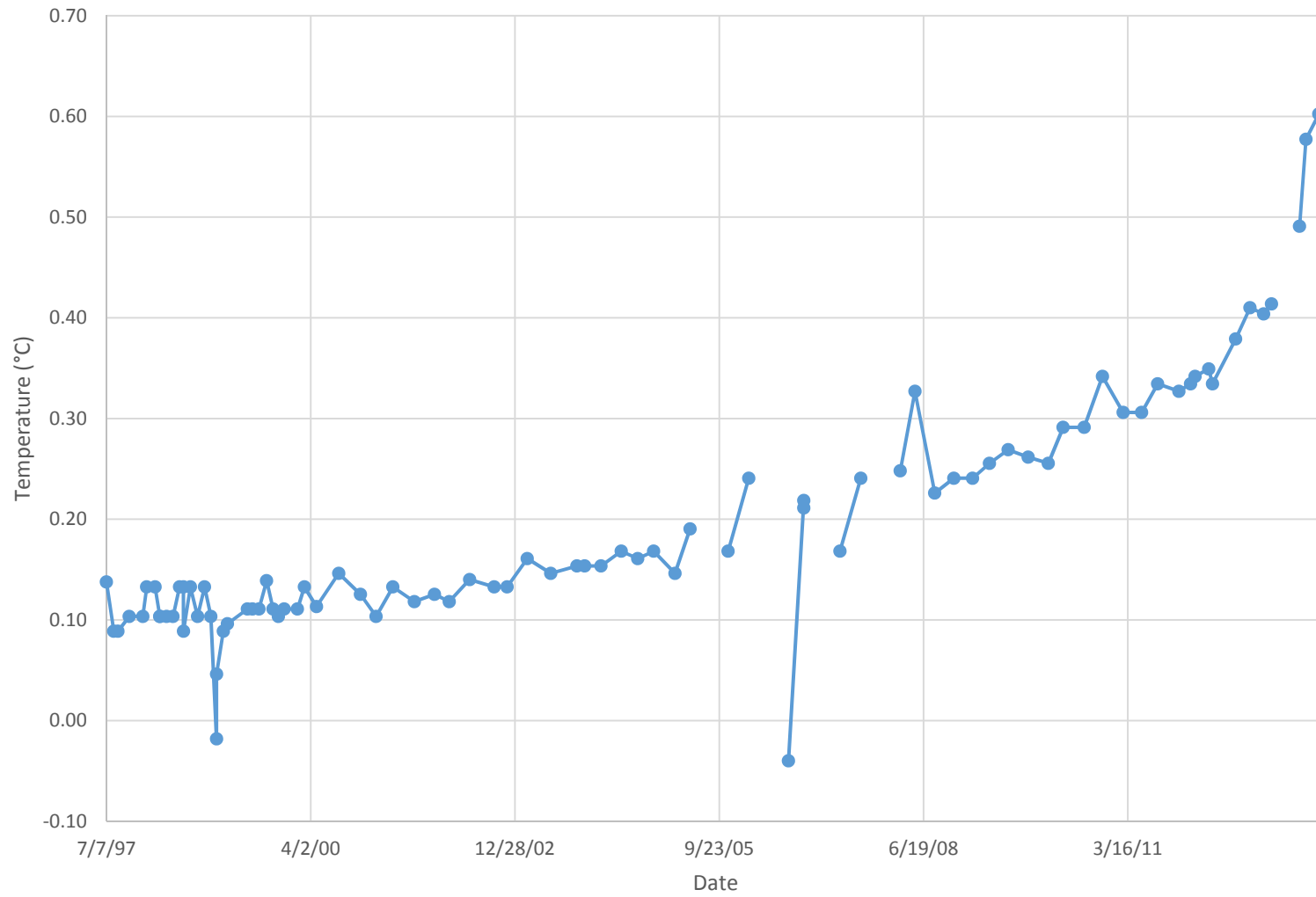
T-97-030: Temperature at 121 feet



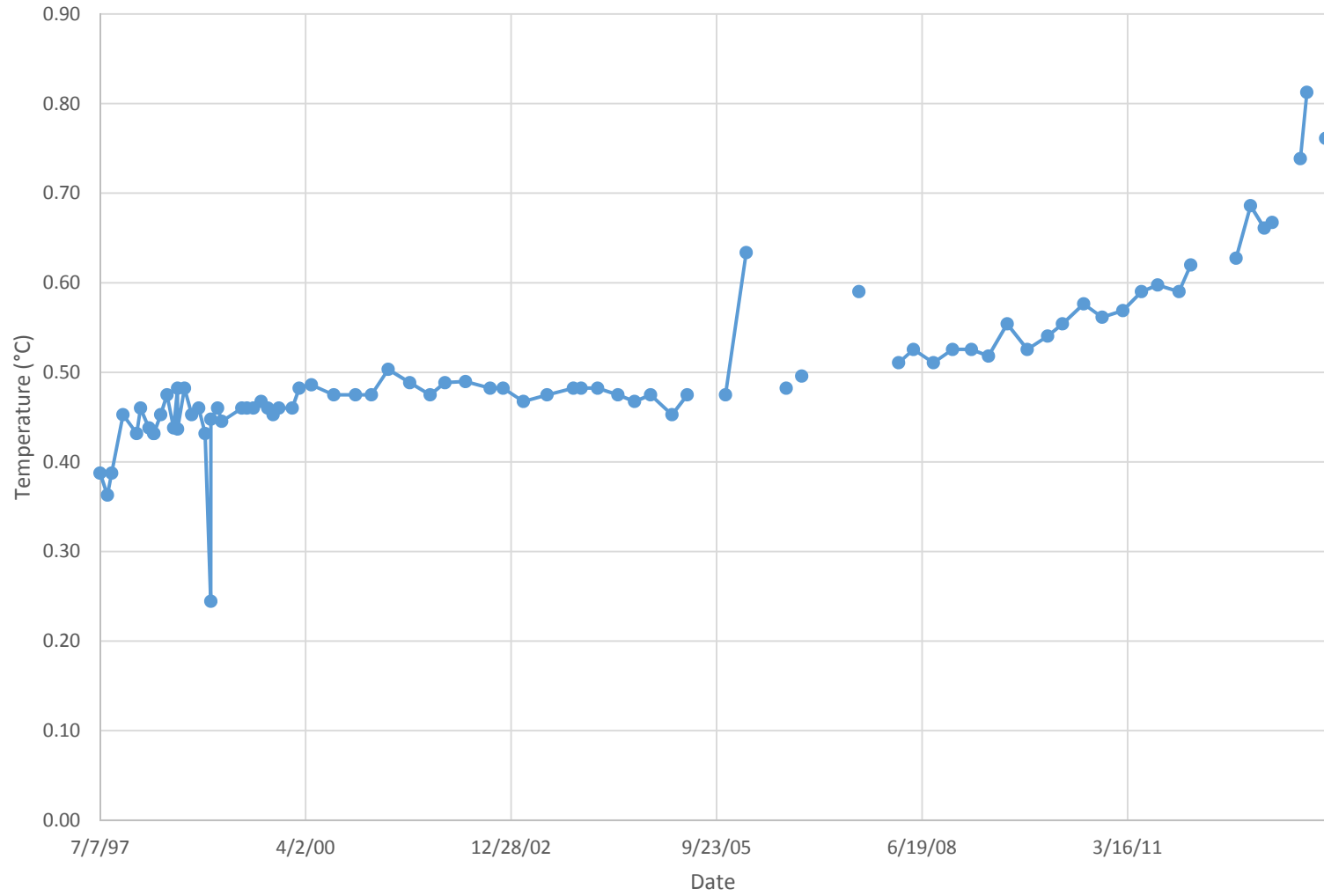
T-97-030: Temperature at 134 feet



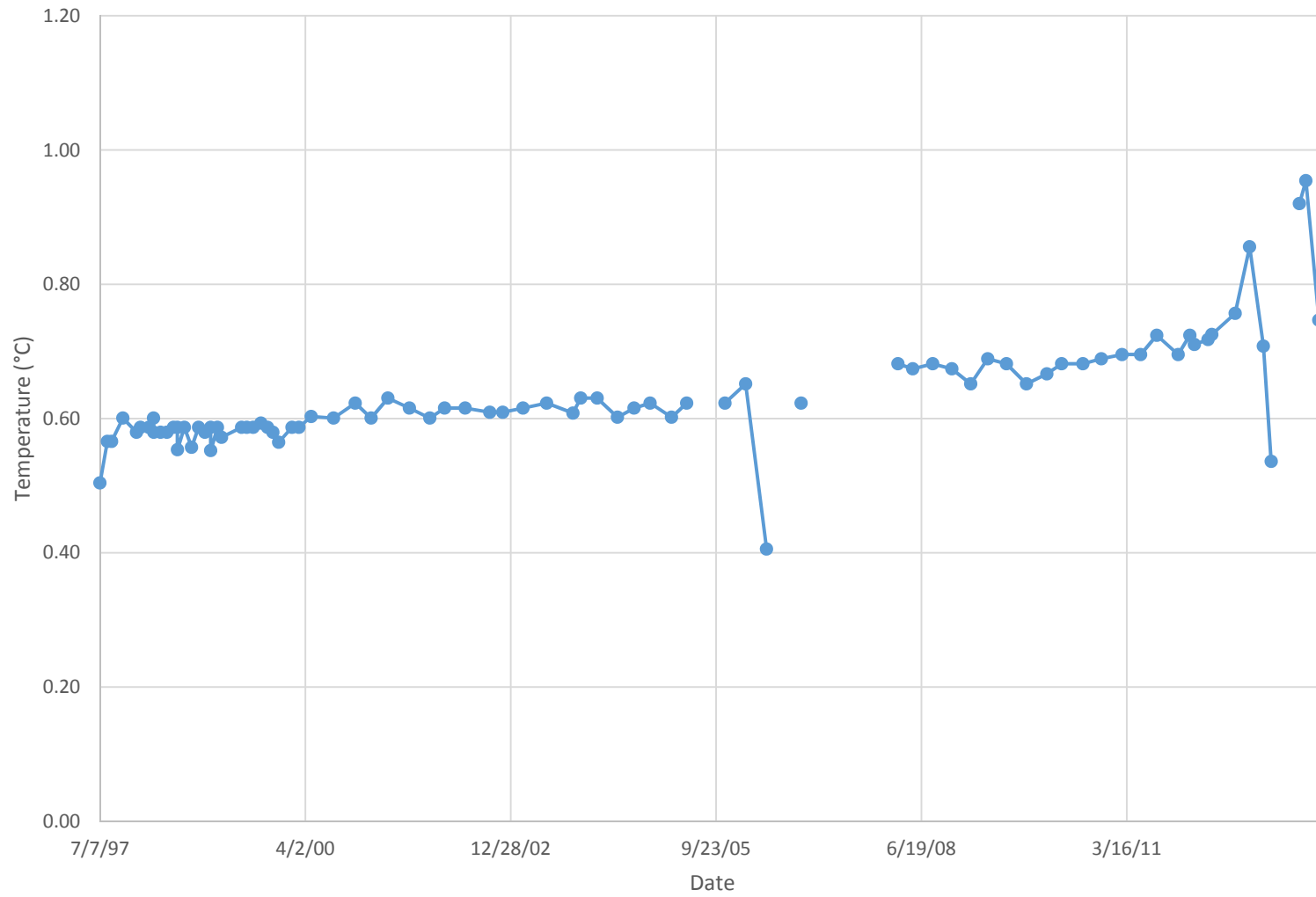
T-97-030: Temperature at 146 feet



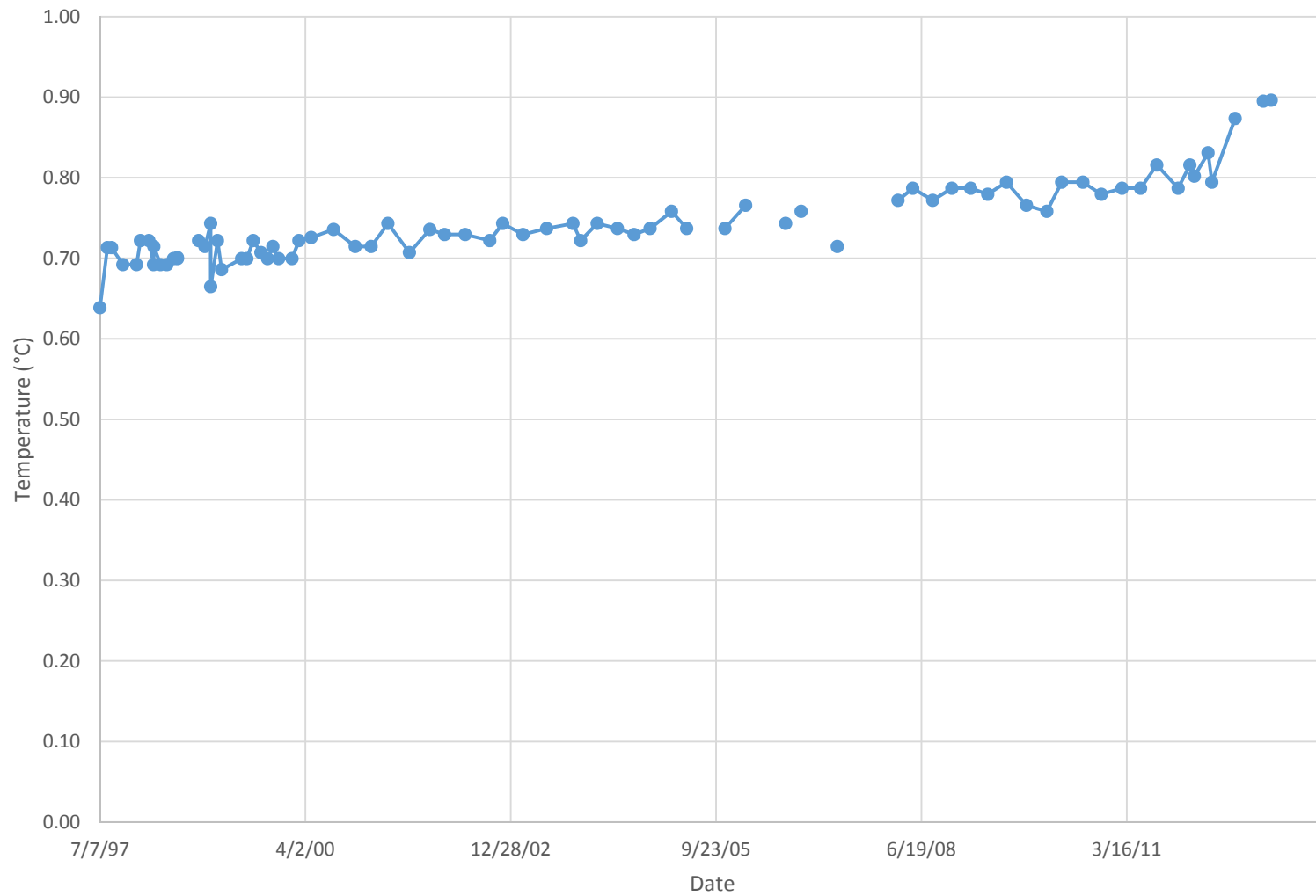
T-97-030: Temperature at 159 feet



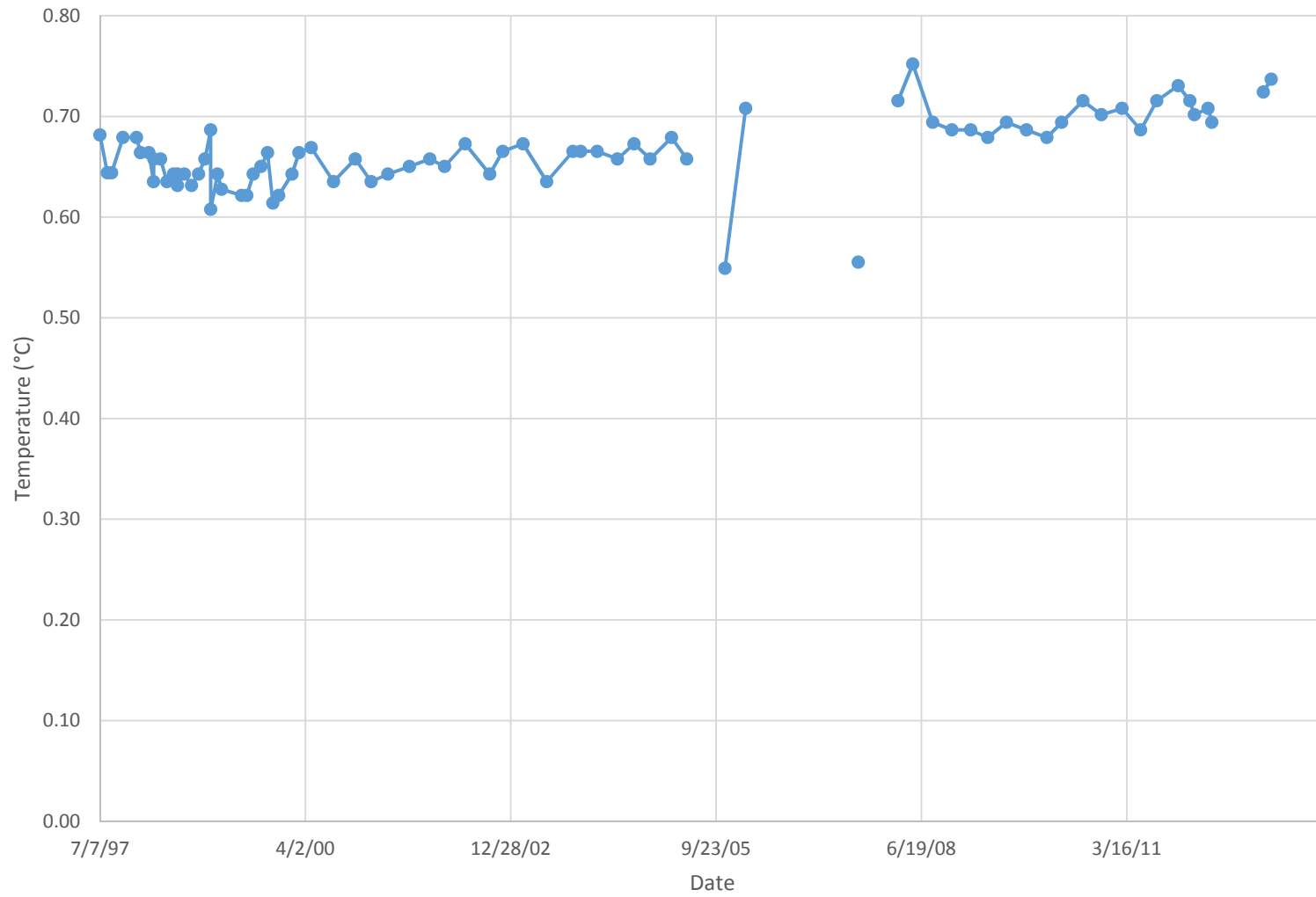
T-97-030: Temperature at 196 feet



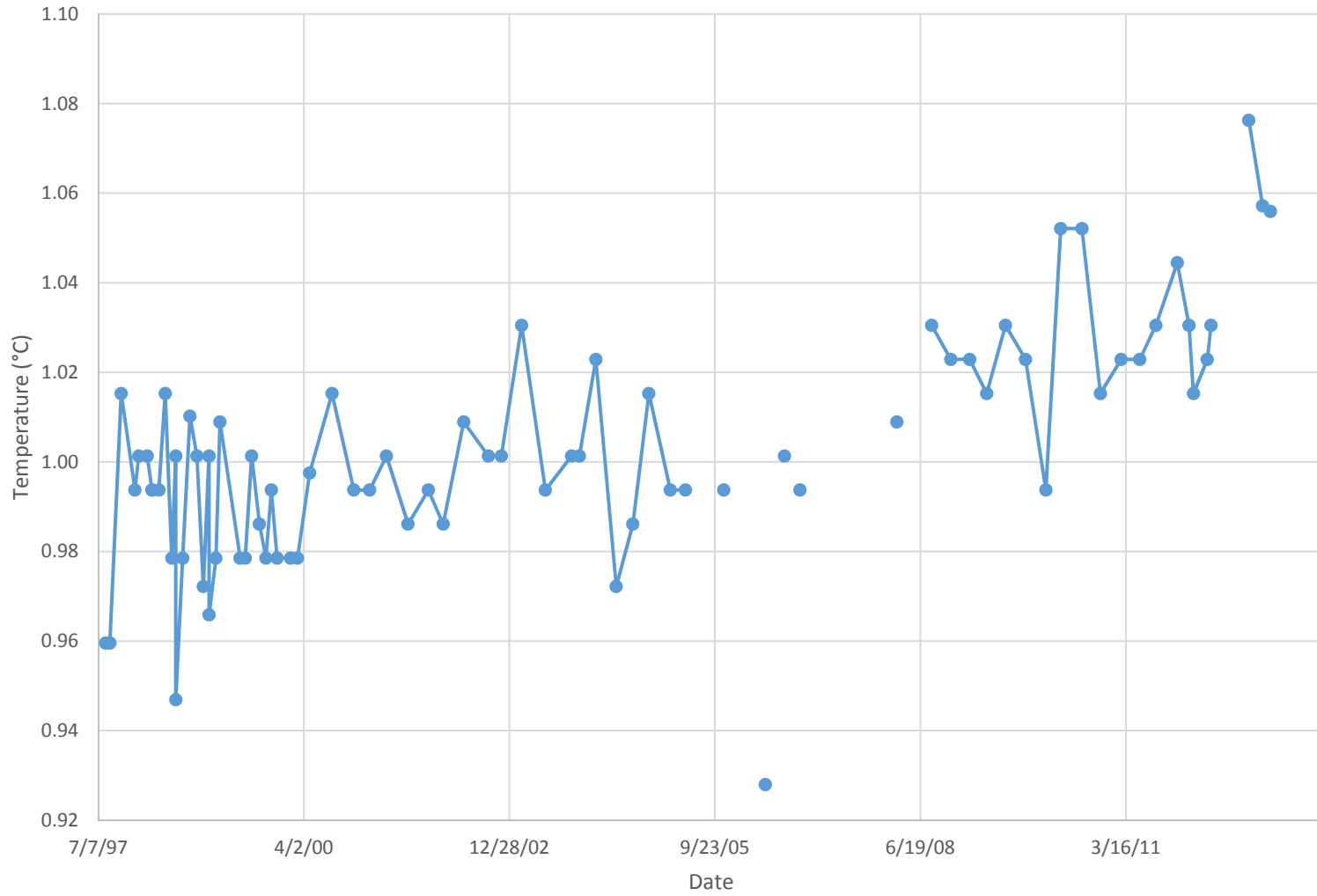
T-97-030: Temperature at 209 feet



T-97-030: Temperature at 221 feet

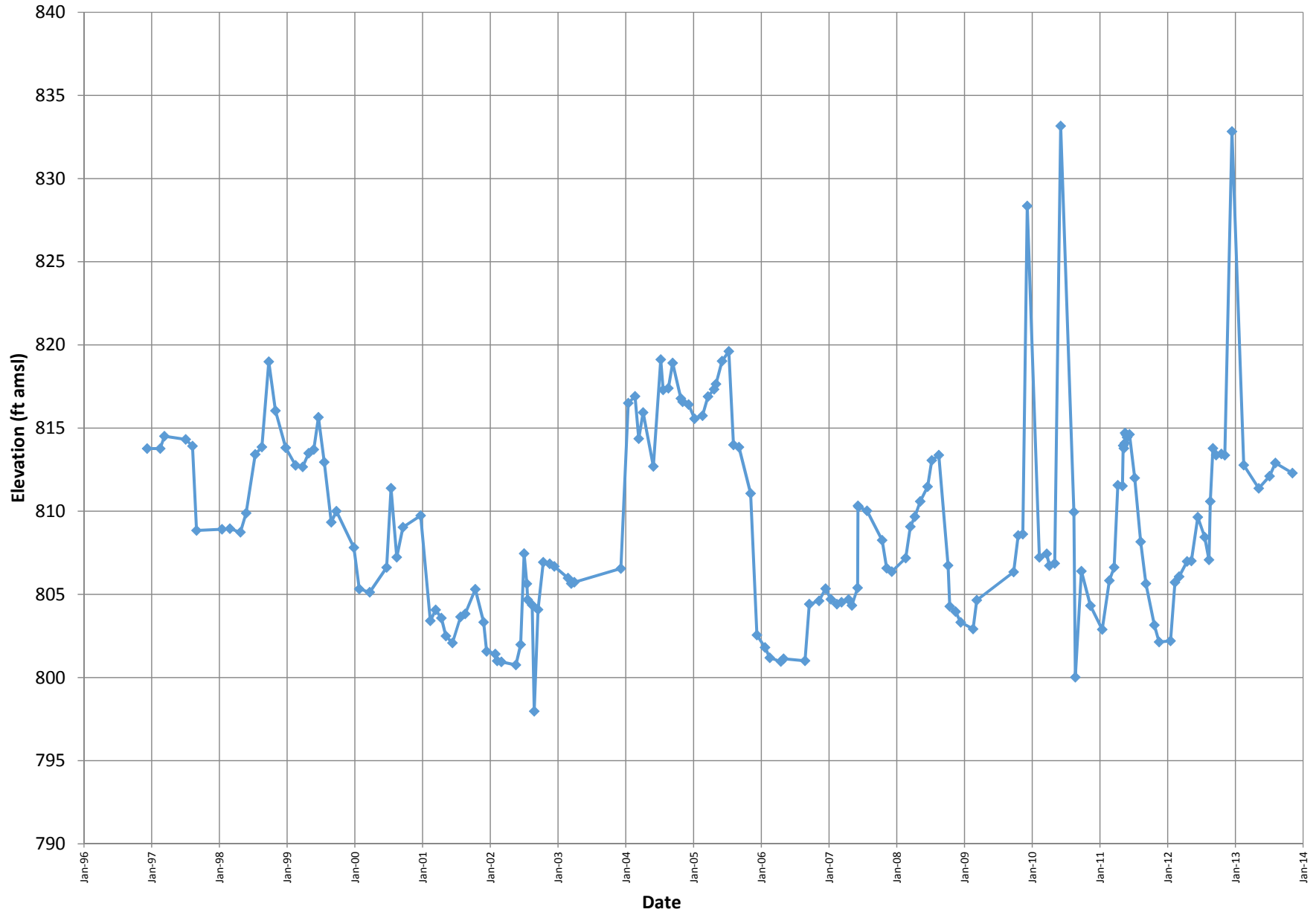


T-97-030: Temperature at 246 feet

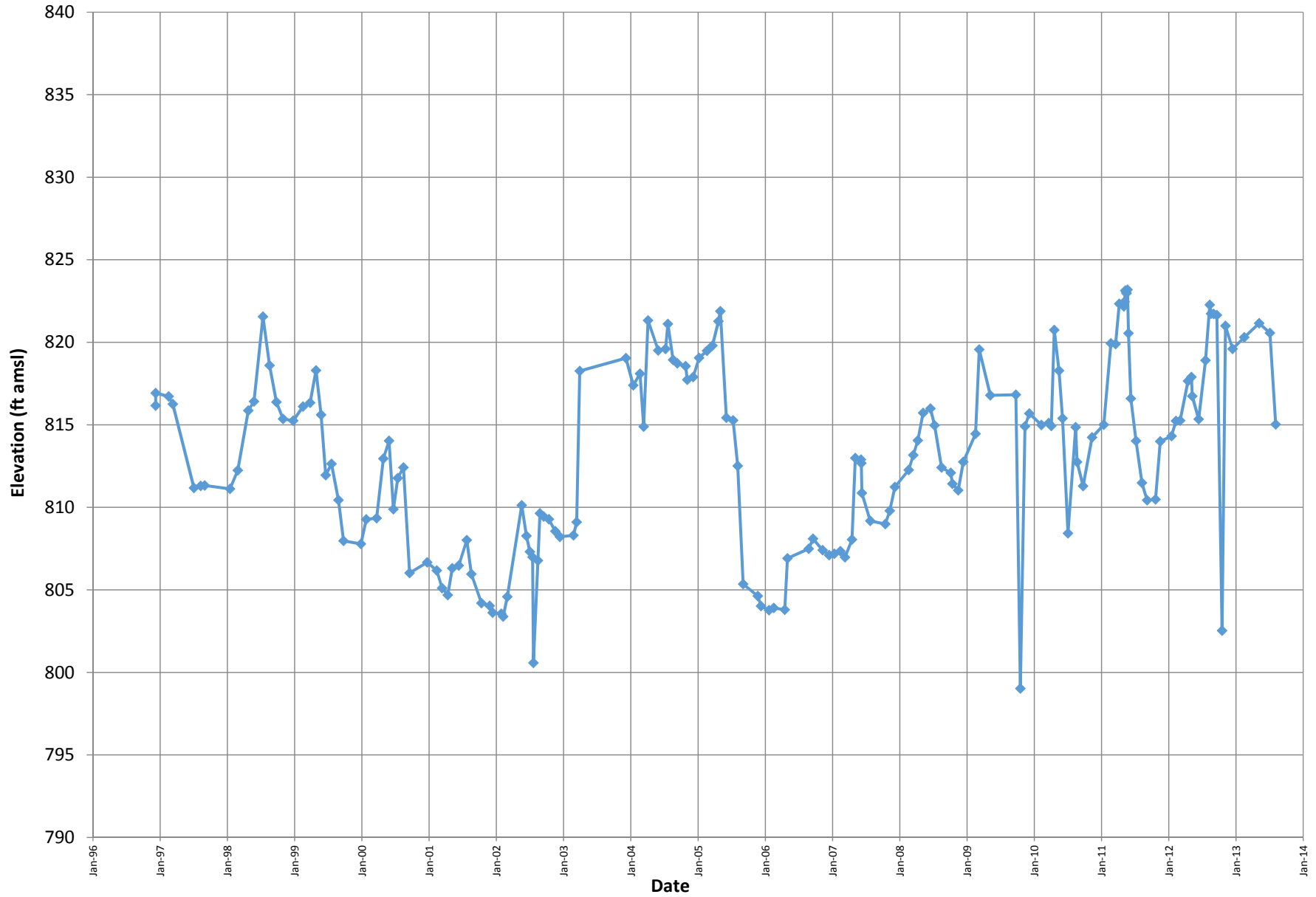


Appendix C
Piezometer Plots

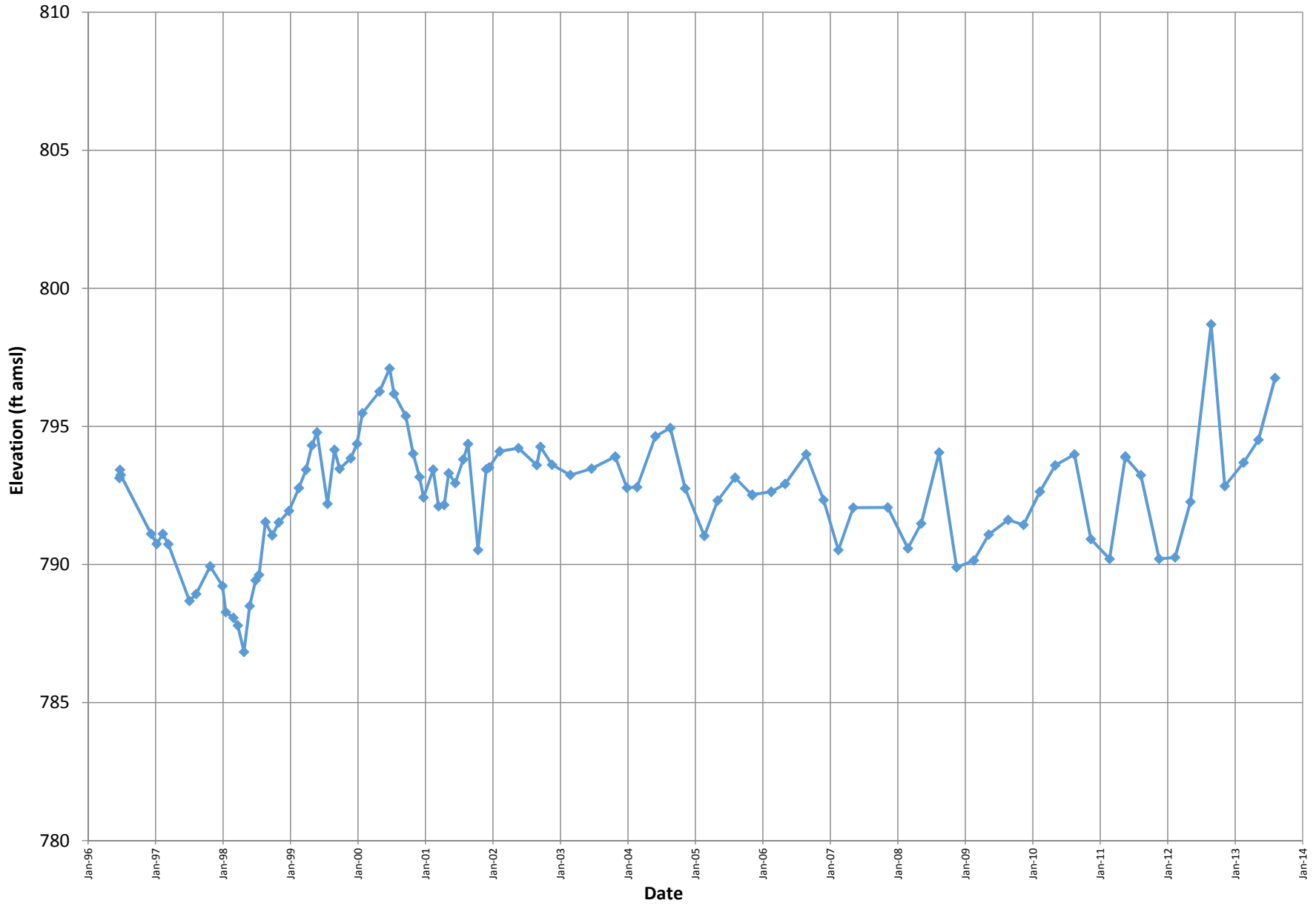
Elevation Hydrograph for P-08A



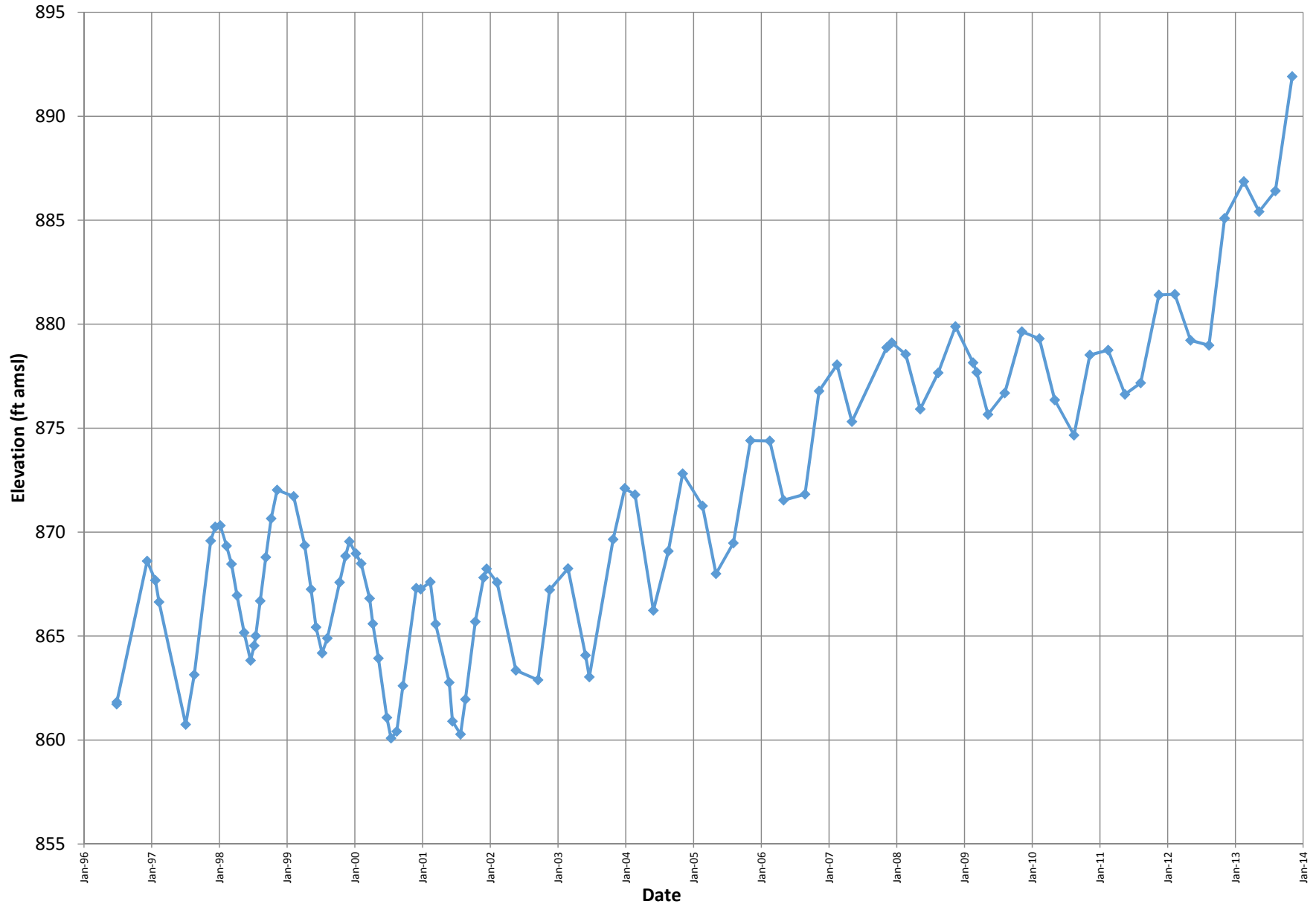
Elevation Hydrograph for P-08B



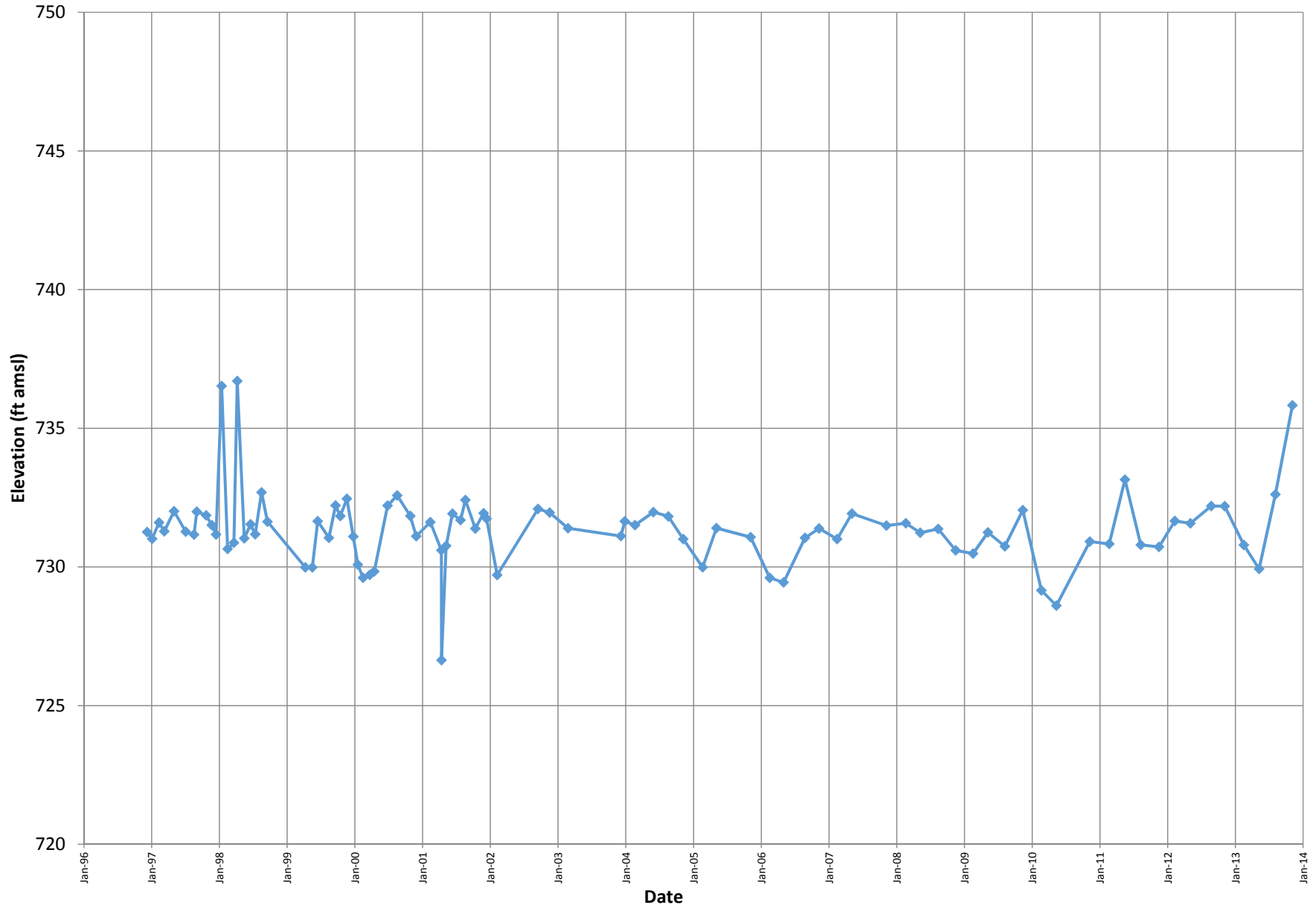
Elevation Hydrograph for P-96-010



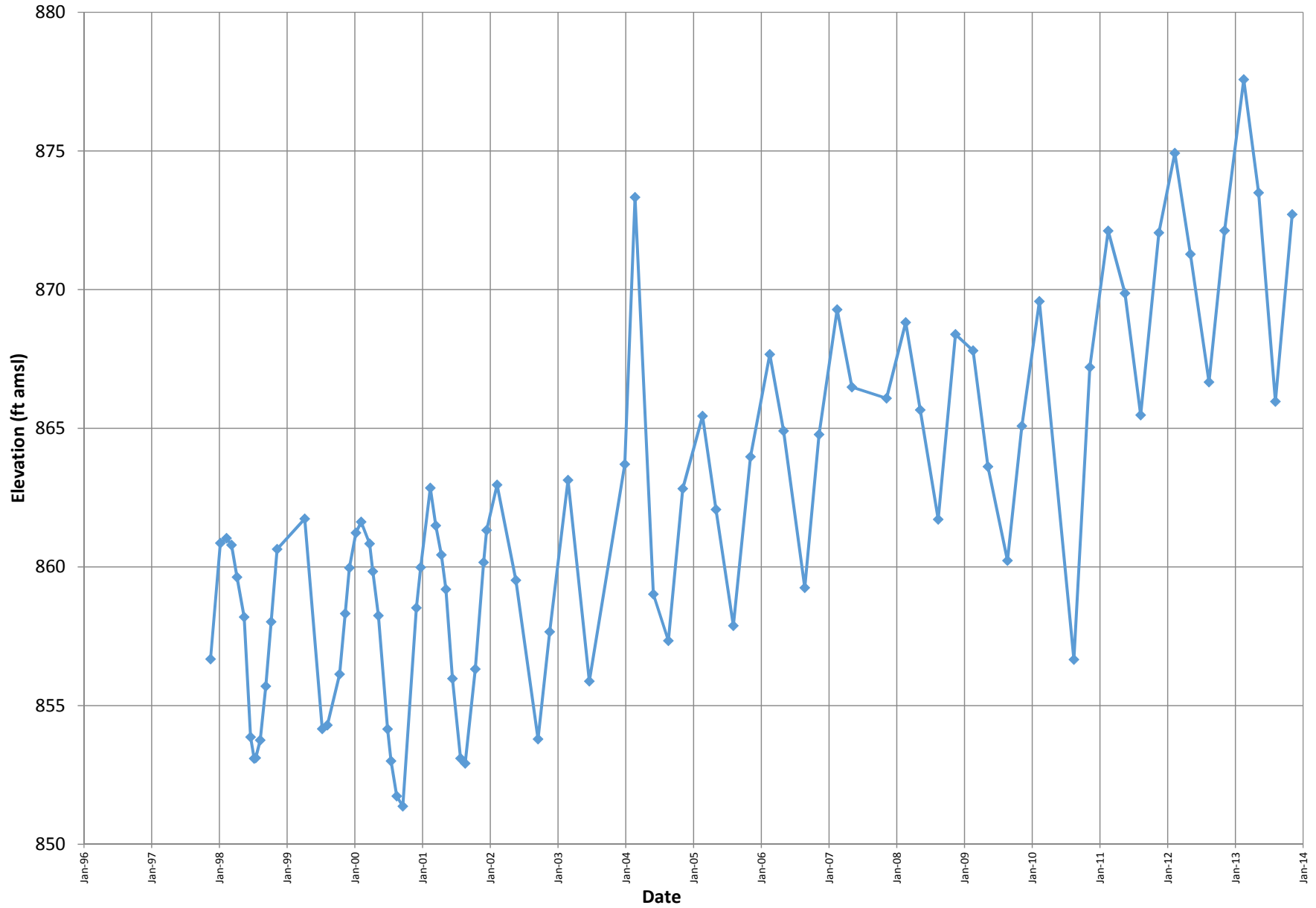
Elevation Hydrograph for P-96-013



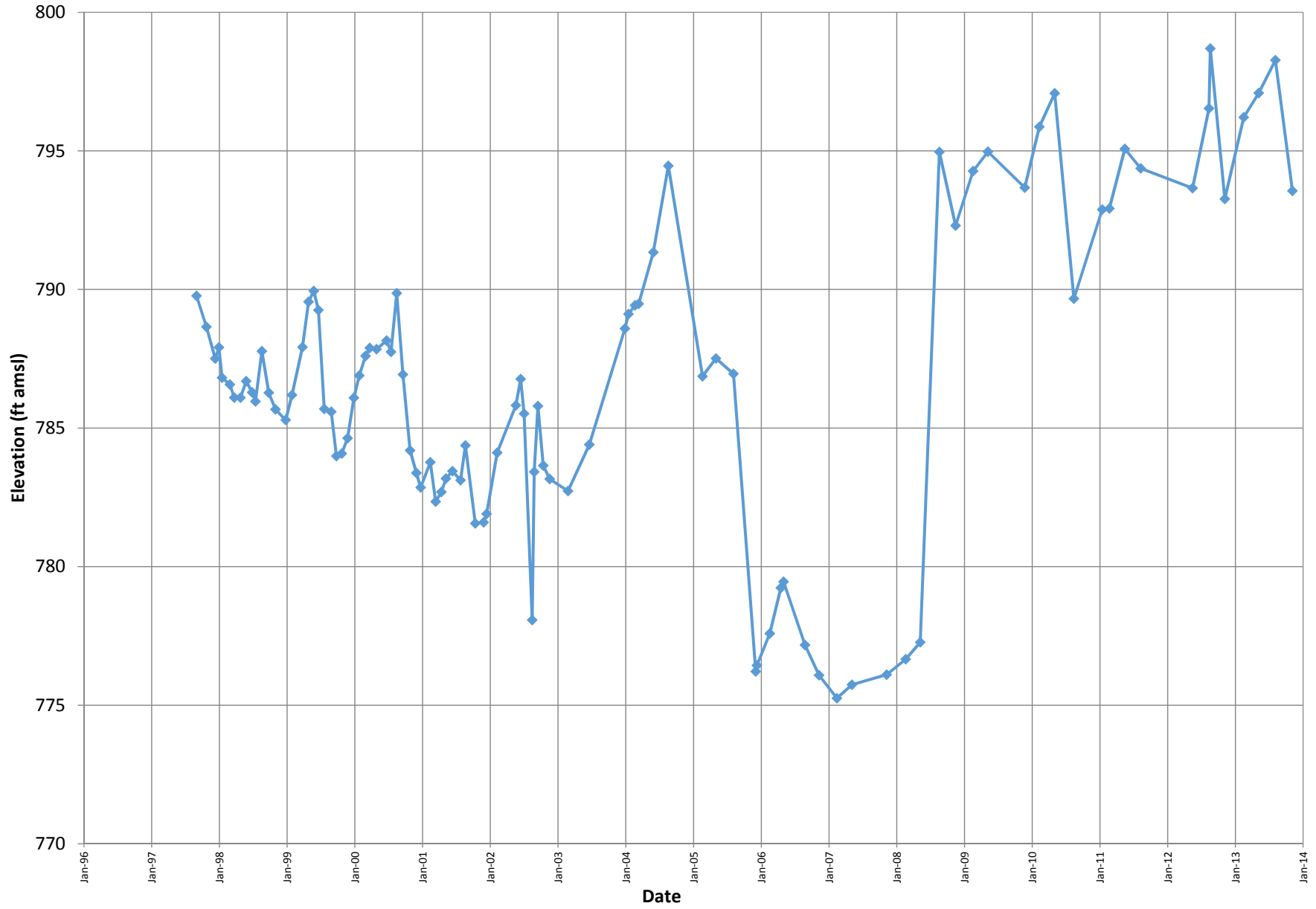
Elevation Hydrograph for P-96-015



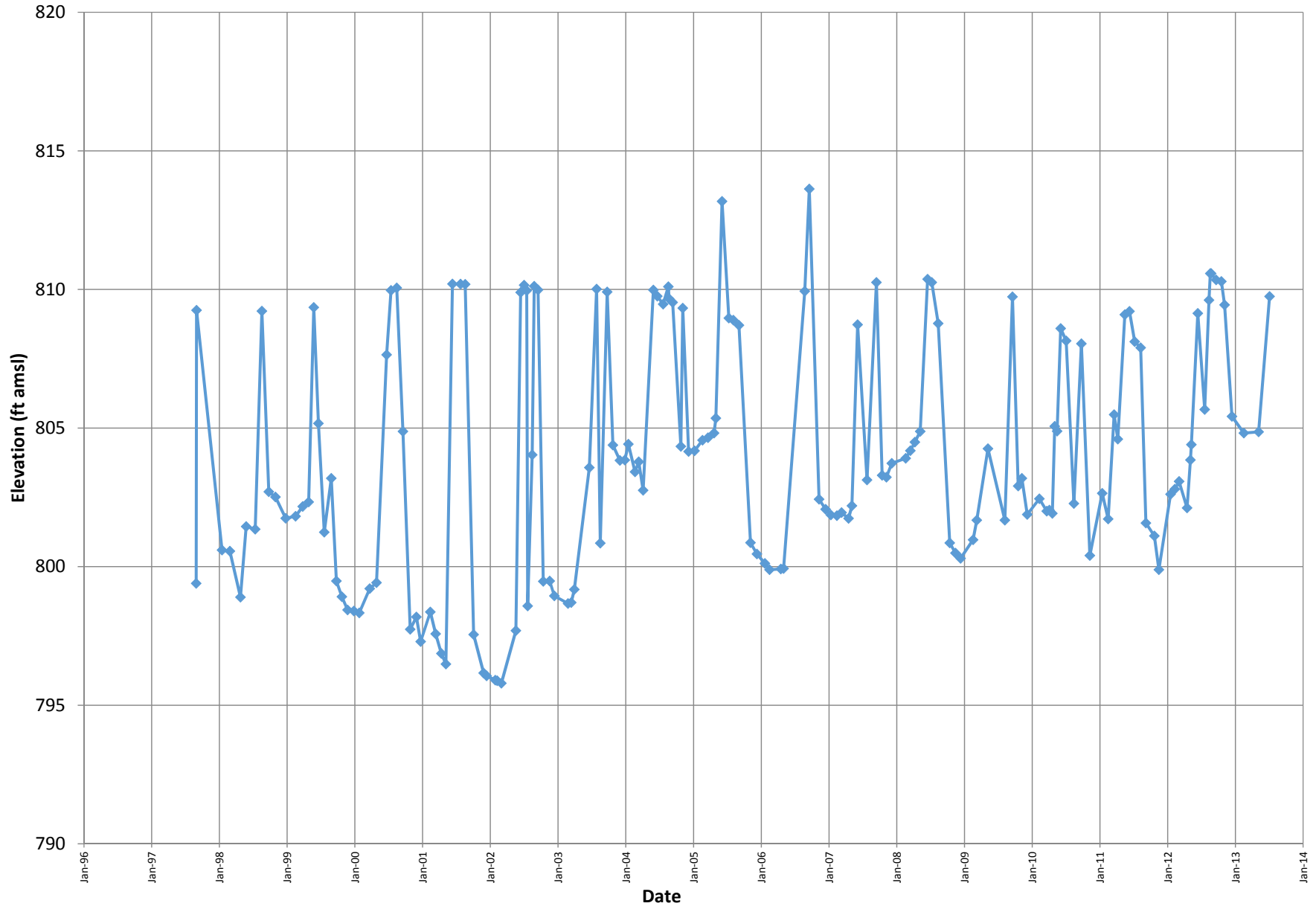
Elevation Hydrograph for P-97-012



Elevation Hydrograph for P-97-020



Elevation Hydrograph for P-97-028



Elevation Hydrograph for SPP-97-002

