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October 22, 2010

Mr. Allan Palmer
Public Service Co. of New Hampshire
780 North Commercial Street
Manchester, NH 03105

Dear Mr. Palmer:

This letter report provides the thermal data requested by the United States Environmental Protection Agency (USEPA) as part of the permit renewal process for Schiller Station. This document summarizes thermal data collected in the vicinity of Schiller Station for the period 15 September 2010 through 14 October 2010. The accompanying CD provides raw data files requested by USEPA for the first two months of temperature monitoring (15 August through 14 September, 2010 and 15 September through 14 October, 2010). Adjustments were made to data deployment use codes for a number of records in the 15 August through 15 September, 2010 time period and the updated data files provided with this letter report reflect those changes.

Thermistor Deployment

Thermistors (Onset HOBO U20 Water Level Loggers) are currently deployed at eleven locations in the Piscataqua River to continuously measure and record water temperature and depth (Figure 1). Stations 2 through 10 were deployed following the location information provided in the USEPA information request letter dated 4 May 2010. Stations 1 and 11 provide the requested upstream and downstream ambient Piscataqua River water temperature data. As requested, loggers at each station are positioned at the surface (Location A), mid (Location B) and bottom (Location C) of the water column and are programmed to collect temperature and depth data once every five minutes for a total of twelve readings per hour. Table 1 presents the coordinates for each monitoring station as well as their straight line distance from the bank and to Schiller Station. Straight line distances to the Station were measured to a point located between the two pump houses (N43° 5'53.26" W70°46'59.43").

Thermal Data

The hourly mean, minimum and maximum water temperature for each station (1-11) and location (A, B, C) are presented for the time period 15 August through 14 September, 2010 in Table 2 and the period 15 September through 14 October, 2010 in Table 3. Due to the number of records, Tables 2 and 3 can be found on the accompanying CD. Water temperatures for the period 15 September through 14 October at the surface, mid water and bottom sample locations for Stations 1 through 11 are presented in Figures 2 through 12. Per your request, additional tables were added to present the mean, maximum and minimum water temperatures at each

Station and Location for each monthly period. Table 4 presents the daily mean, maximum and minimum water temperatures for the time period 15 August through 14 September, 2010 and Table 5 presents the daily mean, maximum and minimum water temperatures for the time period 15 September through 14 October, 2010. These values were calculated using the hourly mean temperature values presented in Tables 2 and 3 and reflect only readings with a deployment use code = 1 and a station use code = 1, 3, or 4. The use of this set of station use codes does not include data records that were collected from logger strings that were not located on the correct station coordinates but does include records where logger depths may have been influenced by line twists around the mooring or interference from commercial fishing gear.

The accompanying CD also contains the raw data records for the period 15 August through 14 October 2010. Each record contains the sample date, sample time, station, location in the water column, thermistor ID, latitude, longitude, water temperature, sensor depth, deployment use code, station use code. Stations are numbered 1 through 11 with Station 1 being the upstream ambient reference and Station 11 the downstream ambient reference. Water column locations are A (surface), B (mid column) and C (bottom). Each data record was assigned a deployment and a station use code which will provide information on how they should be treated in future analysis (Table 6). The deployment use code indicates records in the data file which were impacted by weekly downloading activities. Records with a deployment use code of 1 are valid and can be used in data analysis. Records with a deployment use code of 2 should not be included in any analysis as they took place during a period of time where the sensor was onboard the boat and in the process of being downloaded. Deployment use codes were assigned based on the pull and reset times associated with equipment download as recorded by the field crew. Station use code indicates records in the file which were impacted by outside forces, i.e. extreme currents, lobster gear, etc. Table 7 presents a summary of time periods, stations, and locations impacted by outside forces during the 15 September through 14 October 2010 time period. Records with a station use code other than 1 should be evaluated prior to use in future analyses. Station use codes were assigned based on observations recorded by field crew members during weekly downloads.

If you have any questions or comments, please call Rick Simmons at (603) 472-5191 (x177) or email rsimmons@normandeau.com.

Sincerely,

Rick Simmons

Table 1. Coordinates, approximate distance from Schiller Station and approximate distance to shore for thermal monitoring stations 1 through 11 in the Piscataqua River.

Station	Location	Latitude	Longitude	Approx. distance from facility (ft)	Approx. distance to shore (ft)
1	A	43° 6'19.70"N	70°47'13.00"W	2,868	192
1	B	43° 6'19.70"N	70°47'13.00"W	2,868	192
1	C	43° 6'19.70"N	70°47'13.00"W	2,868	192
2	A	43° 5'56.10"N	70°47'4.40"W	466	114
2	C	43° 5'56.10"N	70°47'4.40"W	466	114
3	A	43° 5'56.30"N	70°47'2.50"W	380	177
3	B	43° 5'56.30"N	70°47'2.50"W	380	177
3	C	43° 5'56.30"N	70°47'2.50"W	380	177
4	A	43° 5'56.00"N	70°46'59.50"W	278	162
4	B	43° 5'56.00"N	70°46'59.50"W	278	162
4	C	43° 5'56.00"N	70°46'59.50"W	278	162
5	A	43° 5'55.10"N	70°46'58.40"W	200	137
5	B	43° 5'55.10"N	70°46'58.40"W	200	137
5	C	43° 5'55.10"N	70°46'58.40"W	200	137
6	A	43° 5'53.60"N	70°46'57.10"W	180	130
6	B	43° 5'53.60"N	70°46'57.10"W	180	130
6	C	43° 5'53.60"N	70°46'57.10"W	180	130
7	A	43° 5'50.10"N	70°46'56.90"W	358	95
7	B	43° 5'50.10"N	70°46'56.90"W	358	95
7	C	43° 5'50.10"N	70°46'56.90"W	358	95
8	A	43° 5'48.00"N	70°46'57.20"W	545	60
8	B	43° 5'48.00"N	70°46'57.20"W	545	60
8	C	43° 5'48.00"N	70°46'57.20"W	545	60
9	A	43° 5'46.60"N	70°46'56.90"W	688	55
9	B	43° 5'46.60"N	70°46'56.90"W	688	55
9	C	43° 5'46.60"N	70°46'56.90"W	688	55
10	A	43° 5'45.90"N	70°46'54.50"W	811	158
10	B	43° 5'45.90"N	70°46'54.50"W	811	158
10	C	43° 5'45.90"N	70°46'54.50"W	811	158
11	A	43° 5'42.50"N	70°46'7.04"W	4,040	157
11	B	43° 5'42.50"N	70°46'7.04"W	4,040	157
11	C	43° 5'42.50"N	70°46'7.04"W	4,040	157

Table 2. Hourly mean, maximum and minimum water temperatures by station and location for all dates during the period 15 August through 14 September, 2010 at Schiller Station monitoring stations 1-11.

This Table content can be found on the accompanying CD. Its file title is "Table 2".

Table 3. Hourly mean, maximum and minimum water temperatures by station and location for all dates during the period 15 September through 14 October, 2010 at Schiller Station monitoring stations 1-11.

This Table content can be found on the accompanying CD. Its file title is "Table 3".

Table 4. **Mean, maximum and minimum water temperatures by station and location for the period 15 August through 14 September 2010, Schiller Station monitoring stations 1-11.**

Station	Location	Minimum Water Temperature (°C)	Maximum Water Temperature (°C)	Mean Water Temperature (°C)
1	A	12.9	22.2	17.8
1	B	12.9	22.1	17.8
1	C	12.9	22.1	17.8
2	A	13.4	23.5	18.3
2	C	13.3	22.8	18.1
3	A	13.3	23.9	18.6
3	B	13.1	22.6	18.1
3	C	13.2	22.4	18.1
4	A	13.3	23.5	18.4
4	B	13.0	22.5	18.0
4	C	13.0	22.4	17.9
5	A	13.6	22.5	18.5
5	B	13.7	22.2	18.5
5	C	13.7	22.2	18.5
6	A	12.7	22.9	17.9
6	B	12.5	22.3	17.7
6	C	12.5	22.3	17.6
7	A	13.0	25.1	19.0
7	B	12.6	22.6	17.7
7	C	12.5	22.1	17.5
8	A	13.0	25.6	18.0
8	B	12.7	22.2	17.6
8	C	12.6	22.1	17.5
9	A	12.9	25.4	17.7
9	B	12.8	22.1	17.6
9	C	12.8	22.1	17.4
10	A	12.9	23.7	17.7
10	B	12.6	22.1	17.5
10	C	12.6	22.0	17.5
11	A	12.8	21.7	17.4
11	B	12.6	21.6	17.3
11	C	12.7	21.7	17.3

Table 5. Mean, maximum and minimum water temperatures by station and location for the period 15 September through 14 October 2010, Schiller Station monitoring stations 1-11.

Station	Location	Minimum Water Temperature (°C)	Maximum Water Temperature (°C)	Mean Water Temperature (°C)
1	A	13.2	17.2	15.1
1	B	13.2	17.2	15.1
1	C	13.2	17.2	15.1
2	A	13.3	18.7	15.7
2	C	13.3	18.0	15.4
3	A	13.3	19.0	15.9
3	B	13.3	17.8	15.4
3	C	13.4	17.6	15.4
4	A	13.4	18.1	15.6
4	B	13.3	17.4	15.3
4	C	13.3	17.4	15.2
5	A	13.3	17.5	15.2
5	B	13.2	17.1	15.0
5	C	13.2	17.1	15.0
6	A	13.2	17.4	15.3
6	B	13.2	17.1	15.0
6	C	13.1	17.0	15.0
7	A	13.3	19.0	16.1
7	B	13.2	17.2	15.2
7	C	13.1	17.0	15.0
8	A	13.3	17.9	15.3
8	B	13.4	17.1	15.1
8	C	13.3	17.1	15.0
9	A	13.5	17.4	15.3
9	B	13.4	17.1	15.1
9	C	13.4	17.1	15.1
10	A	13.4	17.2	15.1
10	B	13.2	17.1	15.0
10	C	13.3	17.1	15.0
11	A	13.2	16.8	14.9
11	B	13.1	16.8	14.8
11	C	13.1	16.8	14.9

Table 6. Deployment and Station use code descriptions. Use codes apply to data on the accompanying CD for the period 15 August through 14 October 2010.

Deployment Use Code	Definition
1	Logger in water and at Station
2	Logger on deck for downloading
5	Logger string missing

Station Use Code	Definition
1	Logger in water and at Station
2	Logger string not on Station coordinates
3	Logger string impacted by lobster gear
4	Logger string twisted on mooring
5	Logger string missing

Table 7. Station Use Codes and impacted time periods for thermal data impacted by outside forces during the time period 15 September through 14 October, 2010.

Station	Location	Station Use Code	Impacted Time Period				Field Observation
			Start Date	Start Time	End Date	End Time	
5	A	5	9/15/2010	0000	9/15/2010	1245	Logger string missing
5	B	5	9/15/2010	0000	9/15/2010	1245	Logger string missing
5	C	5	9/15/2010	0000	9/15/2010	1245	Logger string missing
5	A	3	9/15/2010	1250	9/23/2010	0730	Logger string impacted by lobster gear.
5	B	3	9/15/2010	1250	9/23/2010	0730	Logger string impacted by lobster gear.
5	C	3	9/15/2010	1250	9/23/2010	0730	Logger string impacted by lobster gear.
9	B	4	9/15/2010	0000	9/15/2010	0850	Logger string twisted on mooring
9	C	4	9/15/2010	0000	9/15/2010	0850	Logger string twisted on mooring

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Figure 1. Location of Schiller Station thermal monitoring stations 1 through 11 in the Piscataqua River. Note: Station 12 is the in-air reference logger for collecting the barometric pressure used for sensor depth calculations.

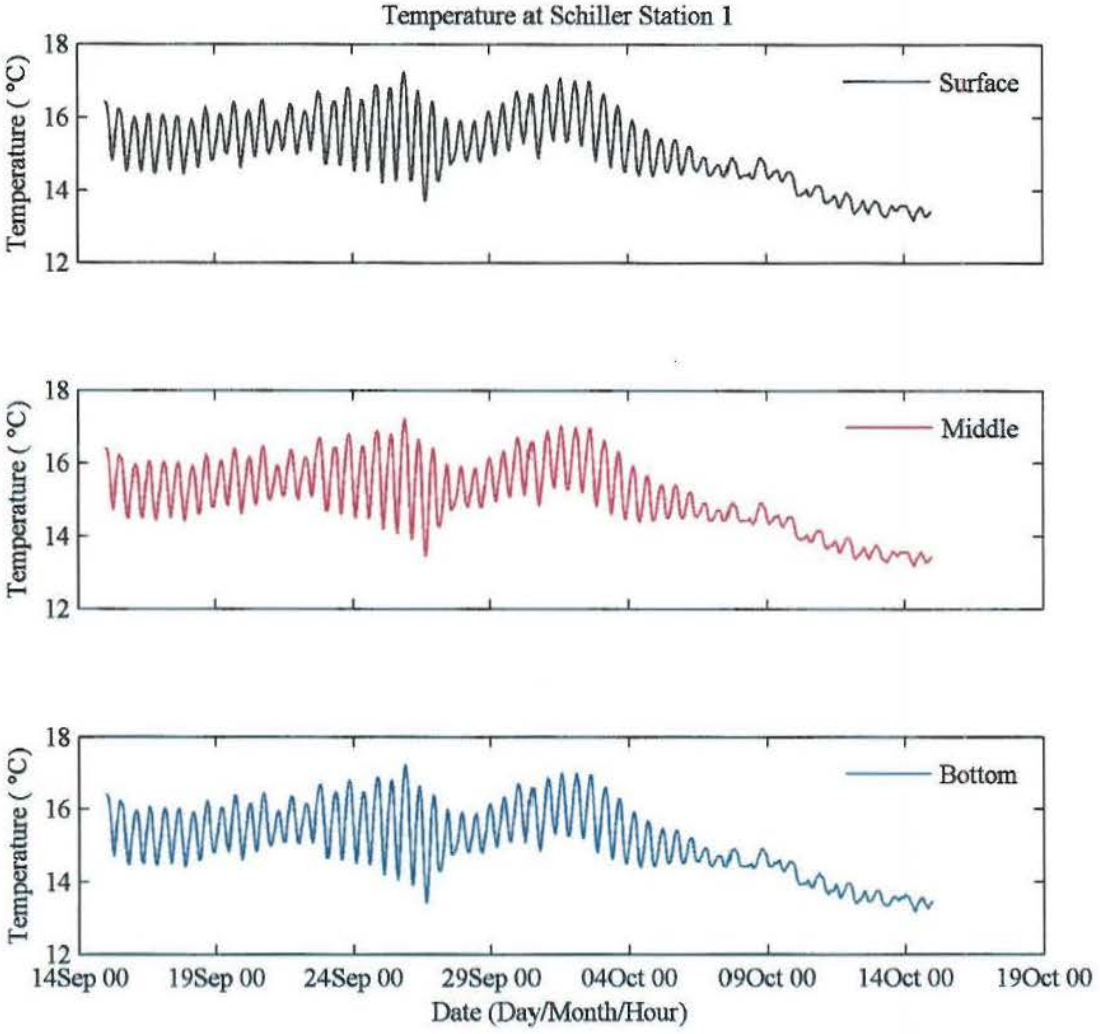

Figure 2. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 1 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

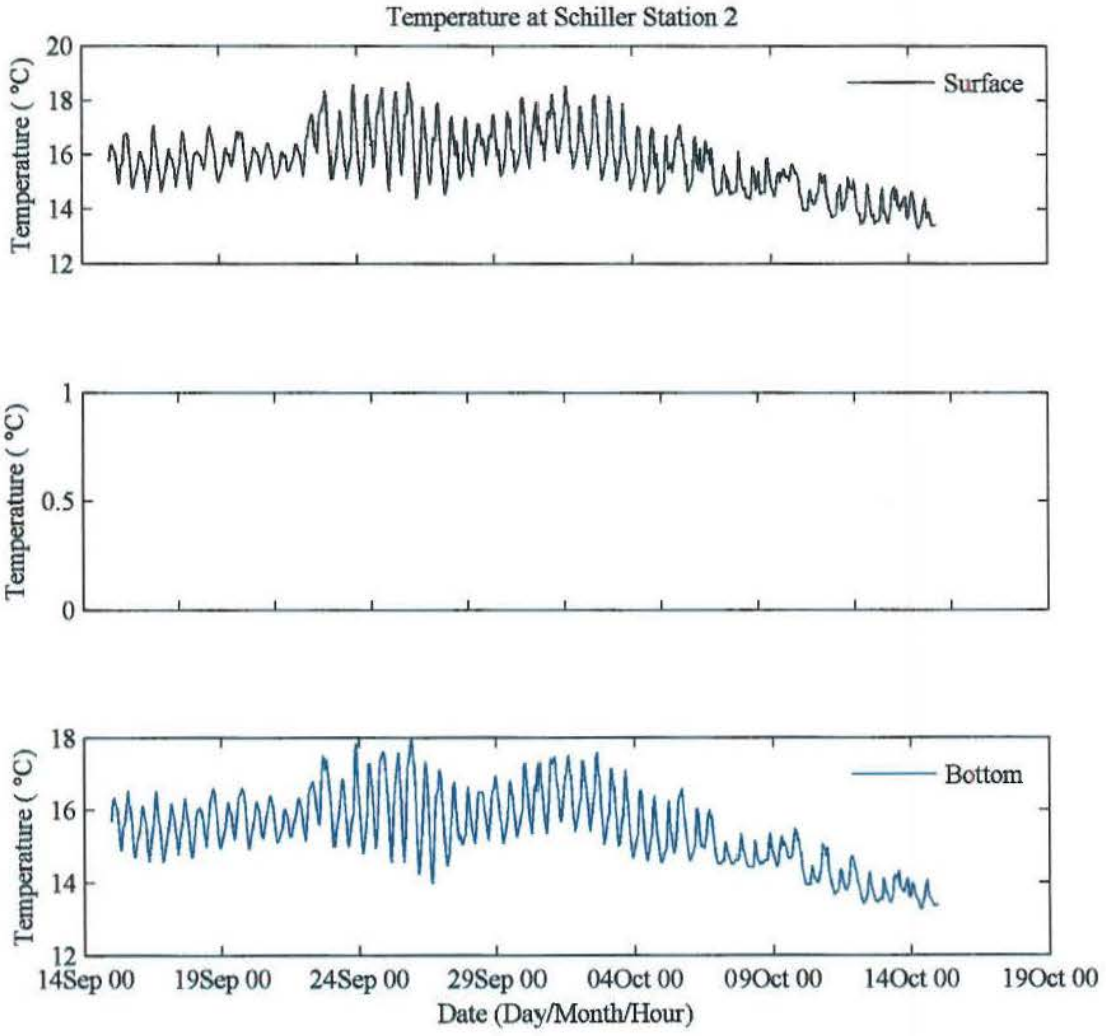

Figure 3. Plotted water temperature data recorded at locations A (surface) and C (bottom) at Station 2 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

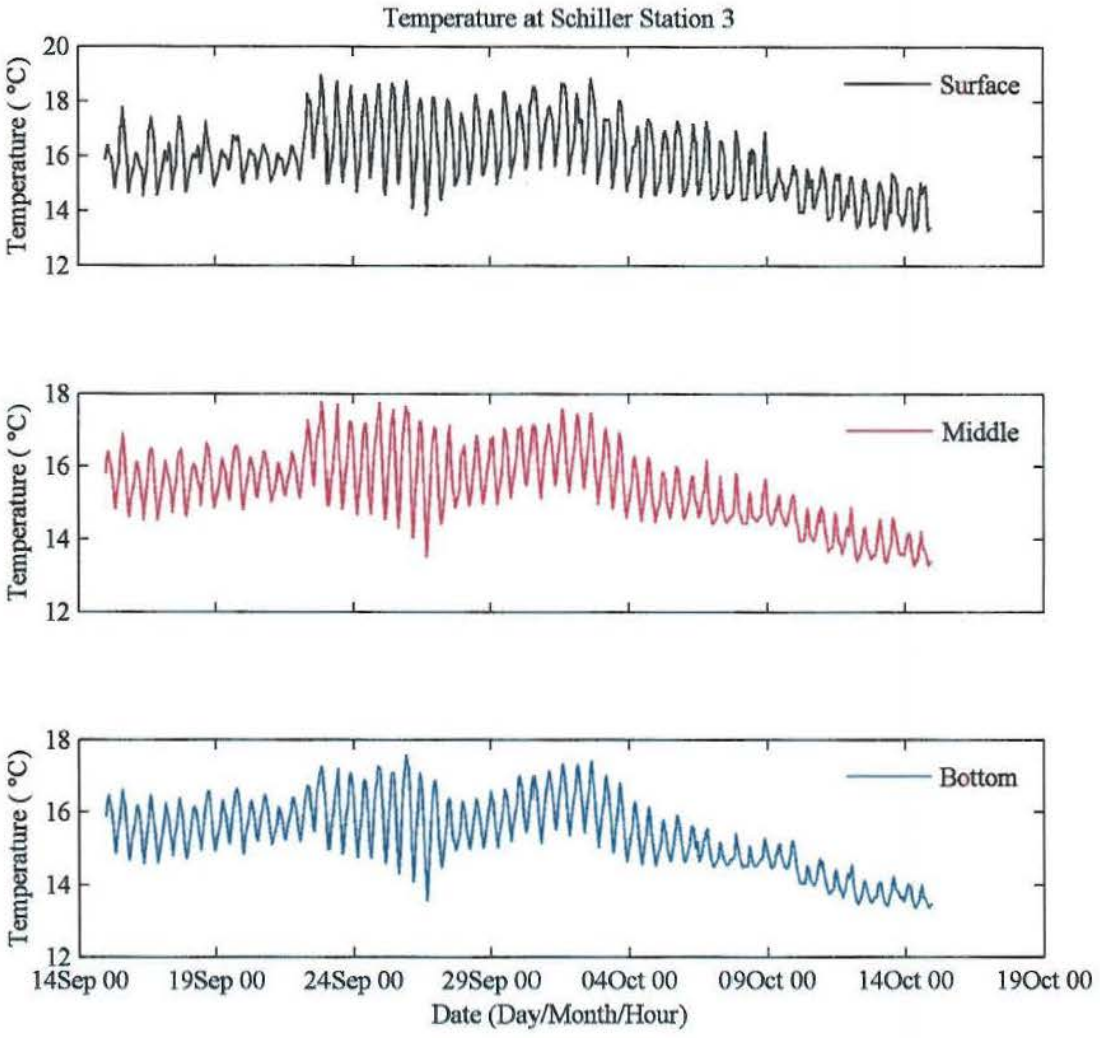

Figure 4. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 3 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

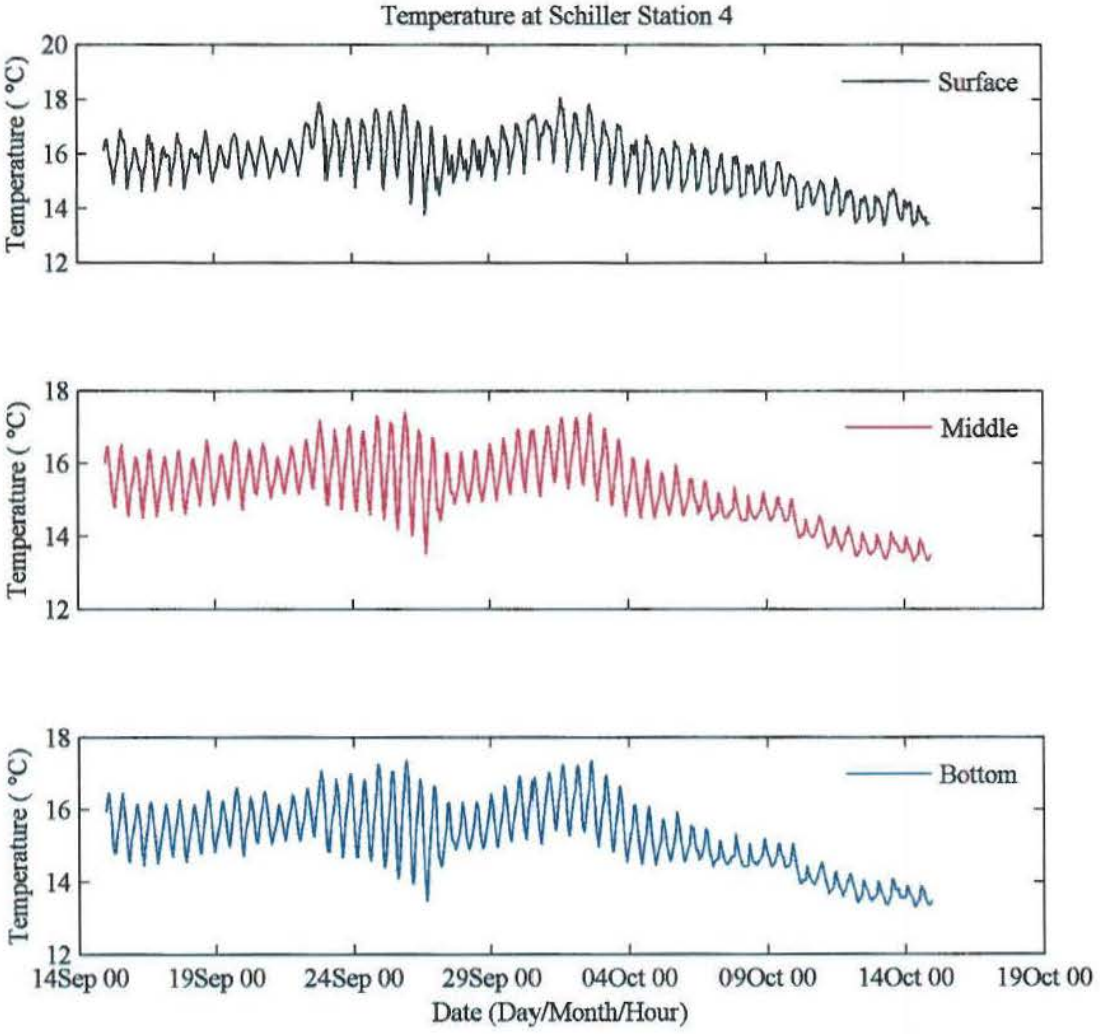

Figure 5. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 4 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

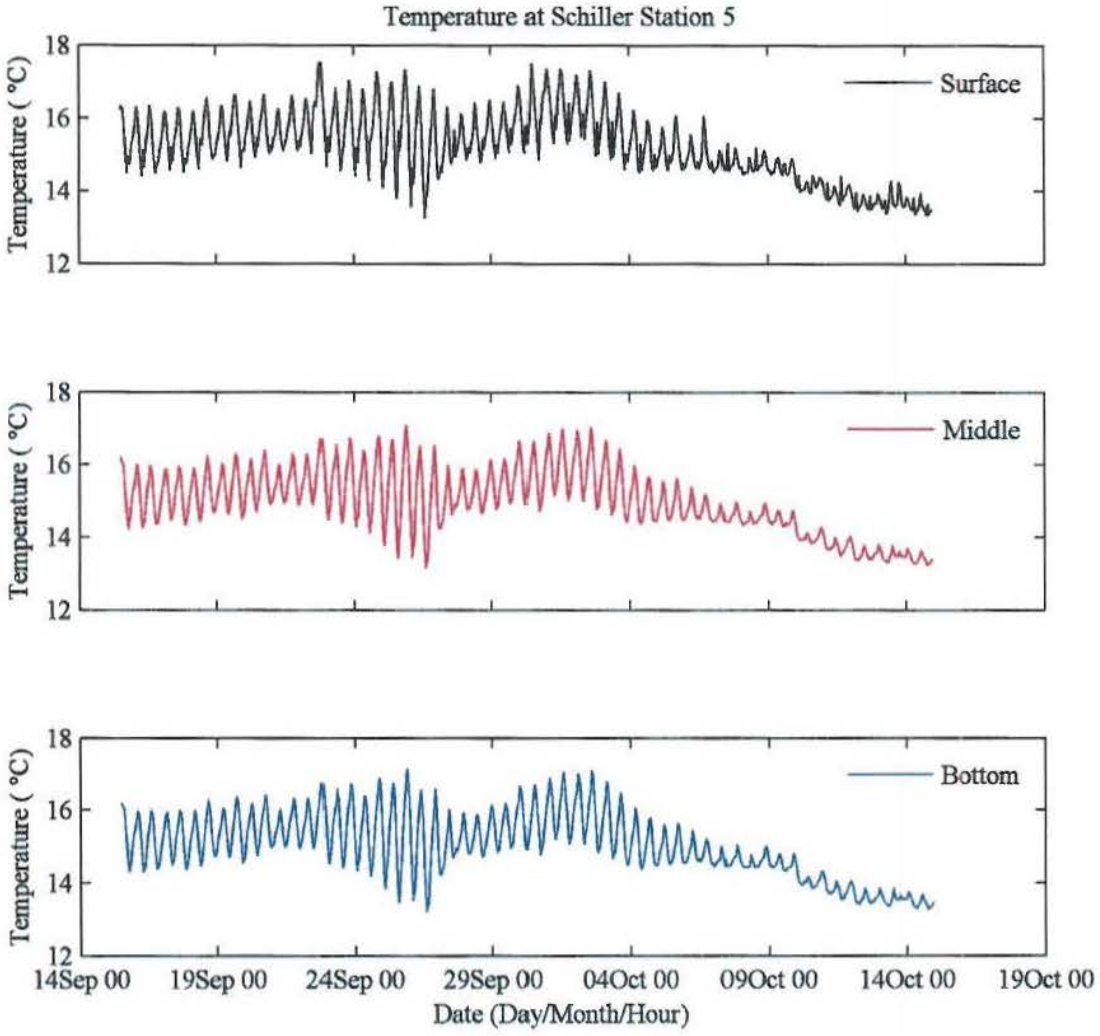

Figure 6. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 5 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

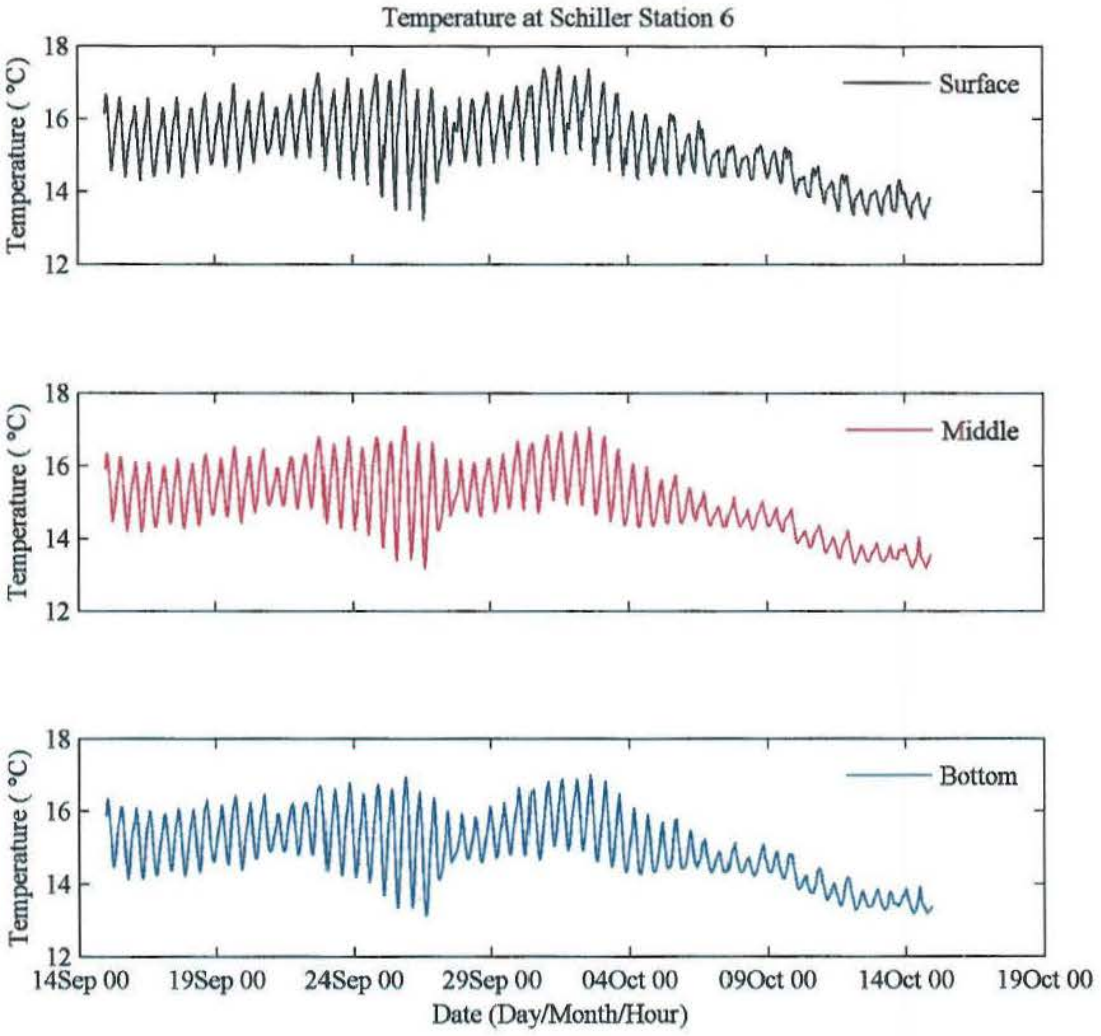

Figure 7. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 6 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

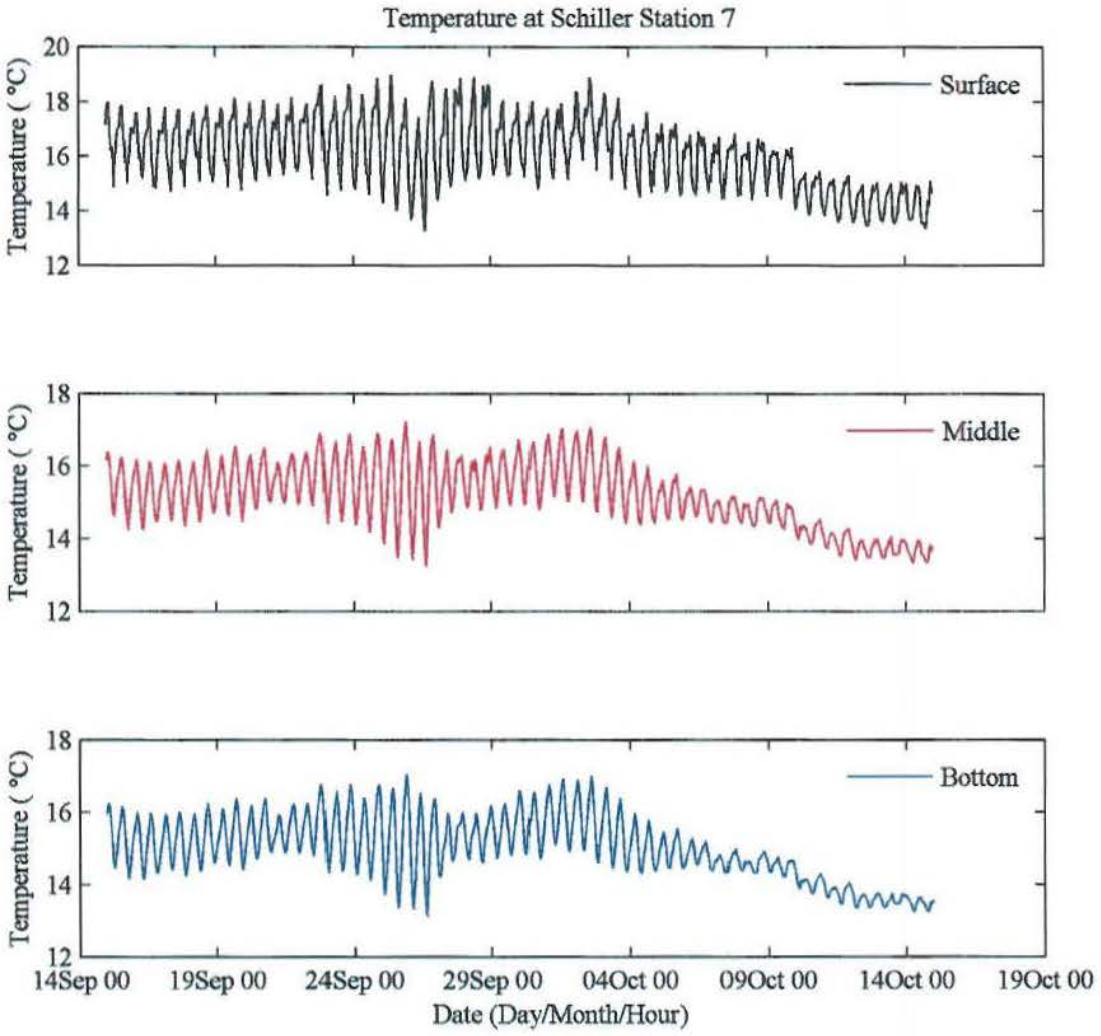

Figure 8. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 7 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

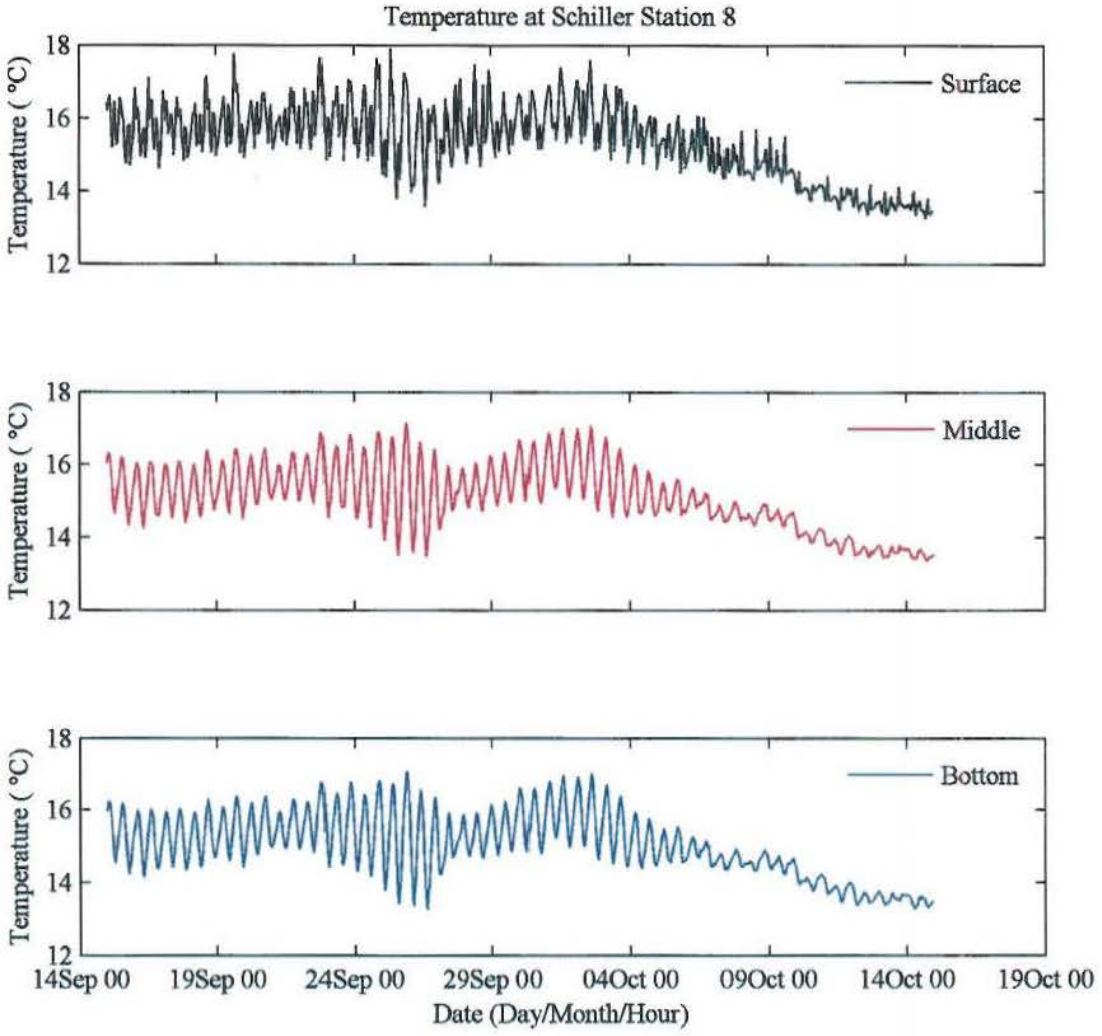

Figure 9. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 8 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

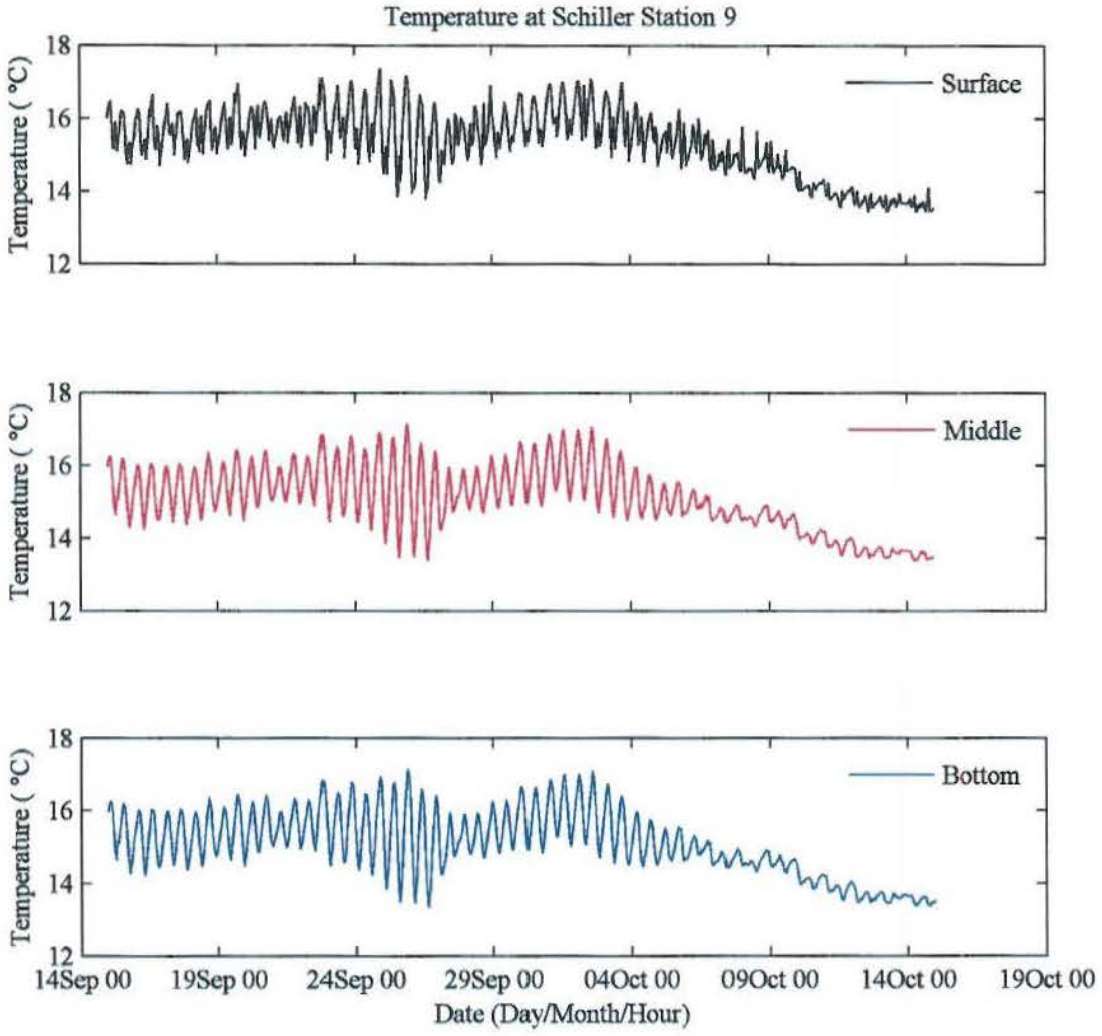

Figure 10. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 9 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

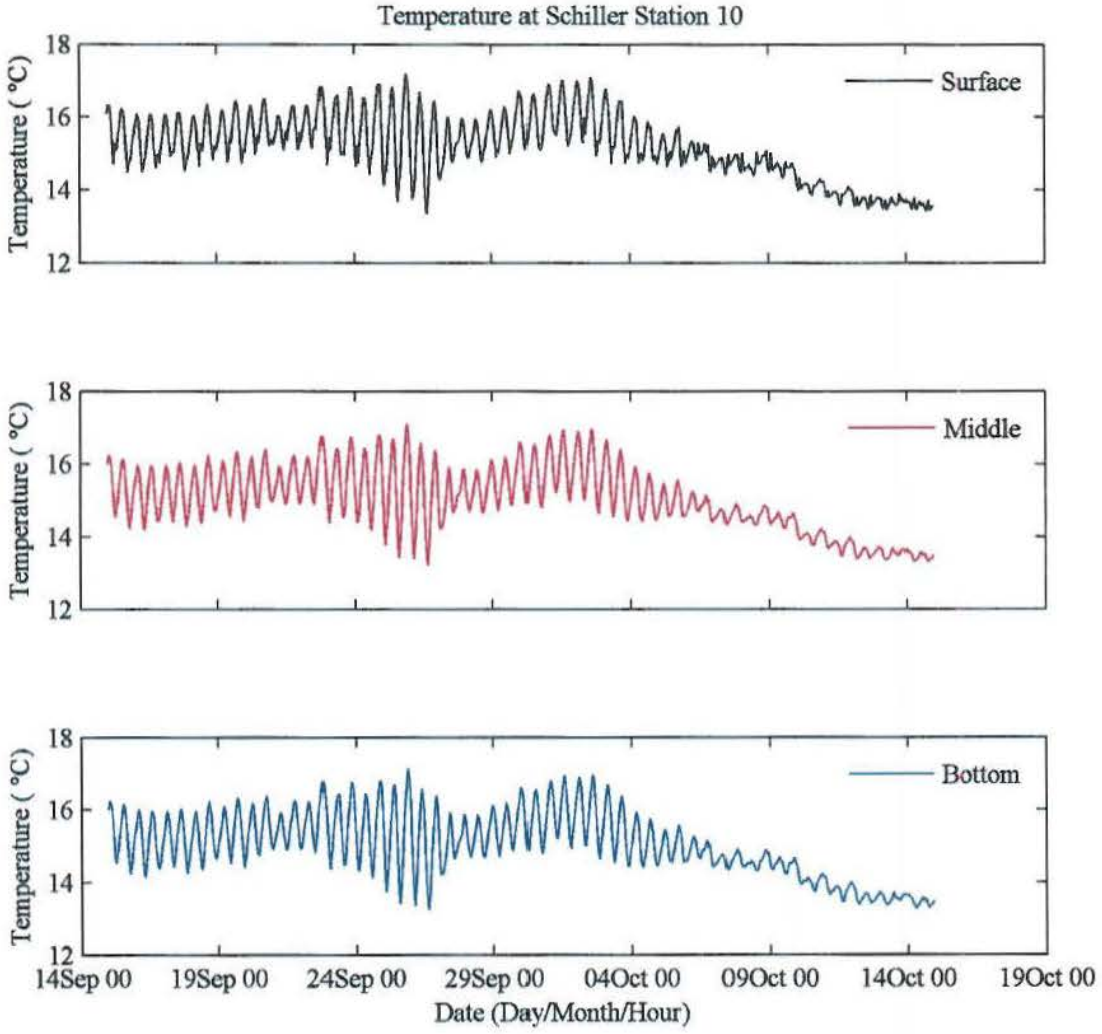

Figure 11. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 10 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.

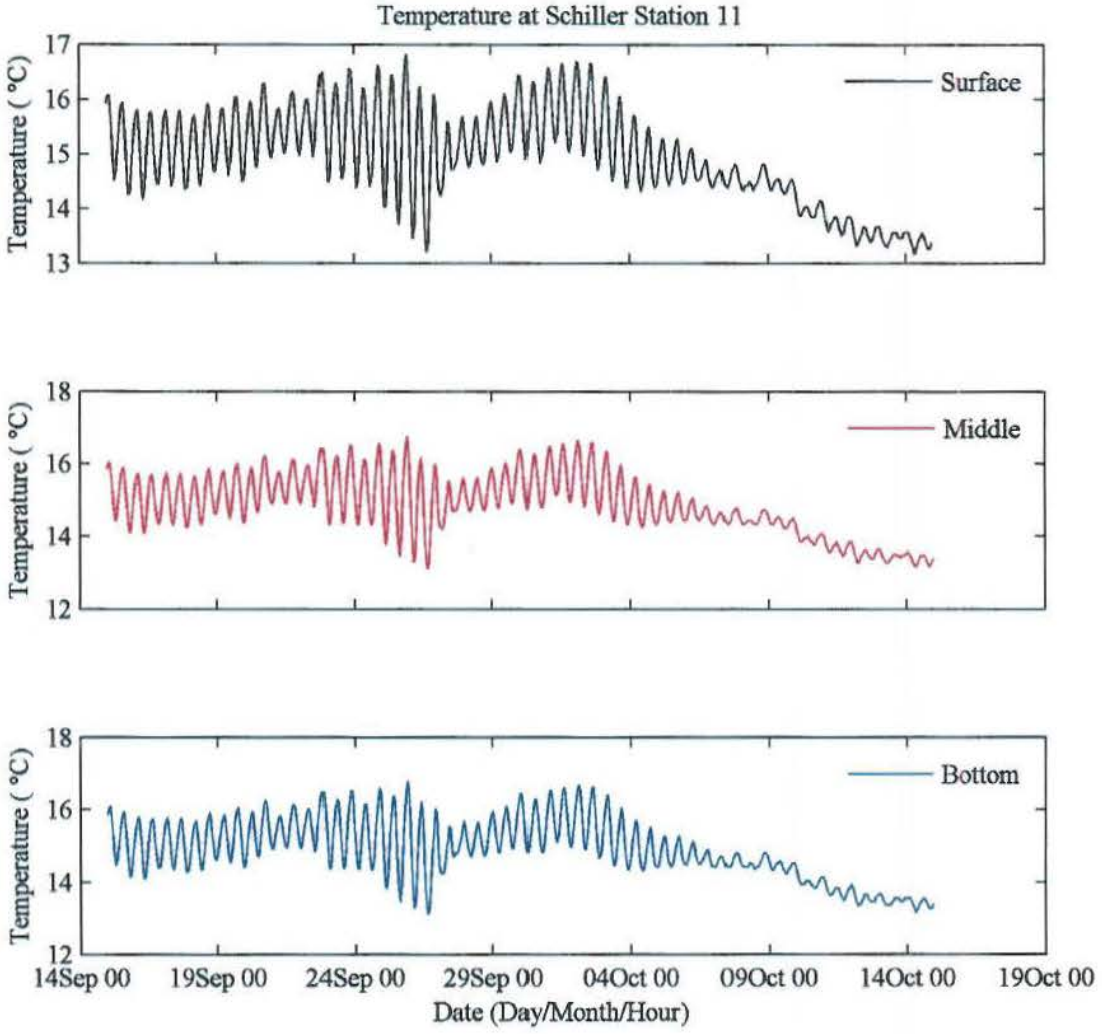

Figure 12. Plotted water temperature data recorded at locations A (surface), B (mid-depth) and C (bottom) at Station 11 for the Schiller Station thermal monitoring for the period 15 September through 14 October 2010.