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SUPPLEMENTARY MATERIAL

Reservoir trophic state under drought conditions

Hydrochemistry and trophic state change in a large reservoir in the Brazilian northeast region under intense drought conditions

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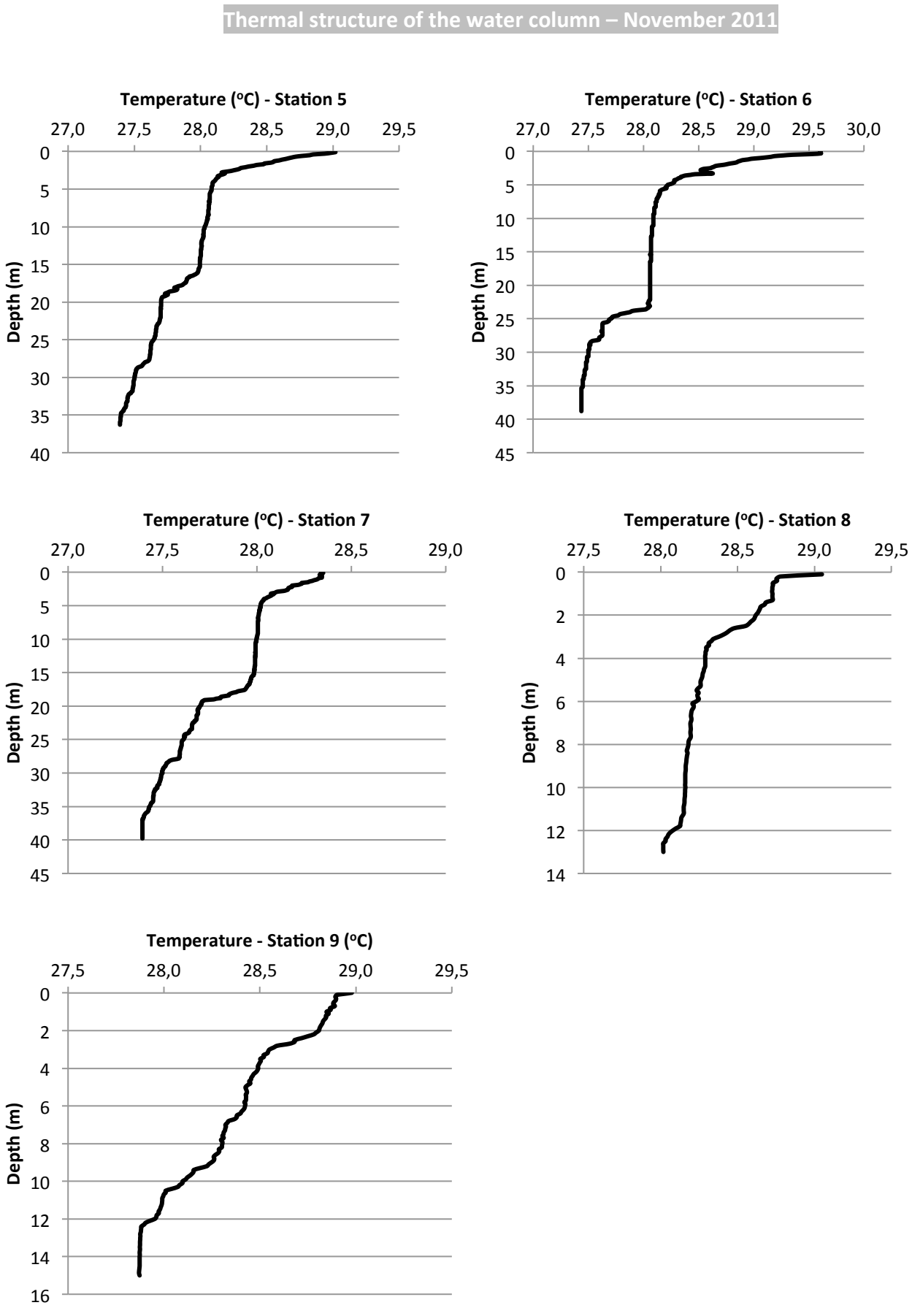
Supplementary Tab. 1. Physical and chemical variables measured in Castanhão reservoir from 2011 and 2014.

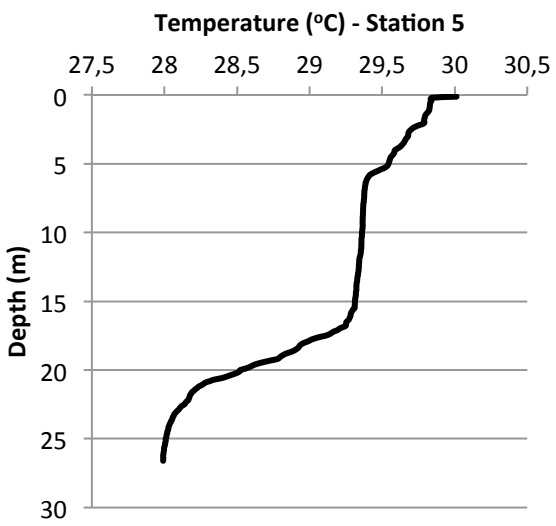
		Temperature (°C)	Secchi (m)	Turbidity (NTU)	Conductivity ($\mu S.cm^{-1}$)	DO ($mg.L^{-1}$)	pH	Chlorophyll *a* ($\mu g.L^{-1}$)	Total phosphorus ($\mu g.L^{-1}$)	Total nitrogen ($\mu g.L^{-1}$)
November 2011	Station 6	29.3	3.2	1.1	298	7.0	8.0	3.2±0.7	40.5±0.0	348.8±8.8
	Station 7	28.8	2.7	1.5	294	7.1	8.0	4.0±0.1	22.2±2.4	455.0±79.5
	Station 8	28.7	3.7	1.4	294	6.9	8.2	1.3±0.1	23.0±1.2	592.5±106.1
	Station 9	28.9	4.0	1.3	295	7.1	8.1	1.9±0.1	23.0±1.2	642.5±88.4
March 2012	Station 5	29.8	2.0	1.2	310	6.8	8.1	5.3±0.2	13.0±2.0	586.0±28.3
	Station 6	29.5	2.3	1.0	310	6.6	8.2	4.1±0.3	23.0±4.9	397.7±25.2
	Station 7	30.6	1.7	1.3	317	6.6	8.4	4.7±0.0	28.0±4.9	611.0±7.1
	Station 8	31.0	2.6	1.0	317	6.4	8.1	2.6±0.7	17.5±2.5	271.0±7.1
	Station 9	30.5	2.9	1.0	313	6.6	8.1	2.3±0.5	9.5±1.0	301.0±0.0
	Station 10	29.9	2.5	1.2	308	6.8	7.9	3.1±0.1	12.0±0.0	216.0±7.1
August 2012	Station 1	28.3	3.4	1.6	328	7.0	8.0	2.7±0.0	23.6±0.0	706.0±52.9
	Station 2	28.1	3.0	1.5	324	6.8	8.0	2.1±1.2	19.6±5.7	259.3±23.1
	Station 3	28.0	3.6	1.5	323	6.7	7.8	4.0±0.3	19.6±0.0	499.3±150.1
	Station 4	28.2	3.0	1.3	320	6.6	7.8	4.5±1.3	23.6±2.8	185.4±43.9
	Station 5	27.6	3.8	1.1	312	6.6	7.7	4.4±0.0	17.8±1.0	797.9±175.1
	Station 6	27.9	3.2	1.2	312	7.5	7.7	3.2±0.1	23.9±1.2	499.3±150.1
	Station 7	27.8	3.5	1.1	311	7.3	7.5	4.0±0.0	23.7±1.0	608.8±8.8
	Station 8	27.6	3.6	1.1	309	7.1	7.8	6.1±0.7	20.9±1.0	546.3±8.8
	Station 9	27.4	3.5	1.1	307	7.0	7.8	5.4±0.4	25.3±1.2	421.3±26.5
	Station 10	27.3	3.6	1.2	307	7.0	7.1	3.6±1.1	25.3±1.2	363.8±33.1

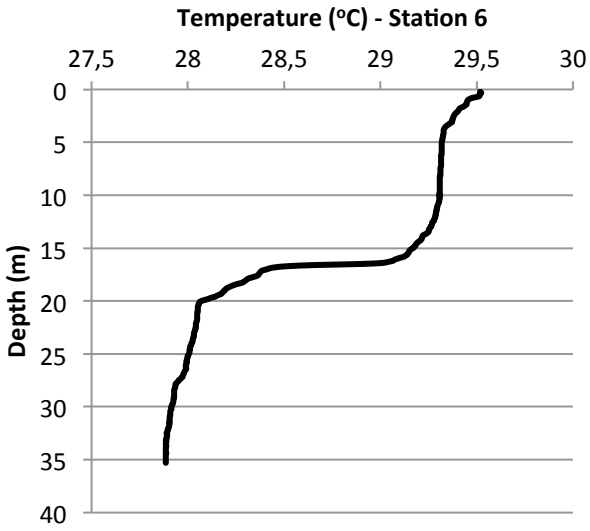
January 2013	Station 1	28.6	2.0	2.2	349	7.1	7.6	2.4±0.2	22.6±2.1	490.2±57.7
	Station 2	29.3	2.5	1.8	354	7.0	7.4	2.9±0.3	30.0±5.7	327.2±84.9
	Station 3	29.0	2.3	1.6	350	7.0	7.3	3.3±2.2	26.3±5.3	412.4±110.0
	Station 4	29.0	2.7	1.4	346	6.2	7.2	3.2±0.3	25.7±1.1	169.8±23.6
	Station 5	28.7	3.0	1.3	344	6.9	7.3	5.0±0.0	36.8±2.8	714.3±70.7
	Station 6	28.7	3.0	1.2	340	6.3	7.6	5.0±0.1	22.6±1.1	369.8±7.9
	Station 7	28.3	3.0	1.1	334	8.4	7.2	6.4±0.5	48.5±3.7	645.7±55.9
	Station 8	28.8	3.2	1.2	335	6.9	8.1	5.1±0.9	46.7±6.7	264.3±11.1
	Station 9	29.0	2.8	1.5	338	6.5	7.8	3.6±0.3	15.8±0.0	275.4±77.0
	Station 10	29.0	3.0	1.8	341	6.1	7.8	3.6±0.1	25.7±4.3	382.8±74.0
August 2013	Station 1	28.9	2.0	2.9	343	6.5	8.8	3.5±0.0	26.1±1.5	437.7±58.9
	Station 2	28.8	2.2	1.5	340	6.2	8.6	3.1±0.5	7.6±3.1	476.6±153.2
	Station 3	29.4	2.4	1.3	346	6.0	8.7	2.6±1.6	8.7±1.5	209.9±82.5
	Station 4	29.6	2.5	1.3	347	6.6	8.6	5.0±0.5	18.5±0.0	584.9±70.7
	Station 5	29.5	3.2	1.4	347	6.8	7.9	5.0±0.6	29.3±0.0	654.3±58.9
	Station 6	29.1	2.5	1.2	345	7.4	7.6	6.1±1.4	33.7±6.1	529.3±23.6
	Station 7	28.8	2.0	1.2	345	6..9	7.7	9.3±0.7	22.8±0.0	543.2±35.4
	Station 8	28.9	2.2	1.3	345	6.5	7.9	9.8±0.6	21.7±1.5	712.7±47.1
	Station 9	28.1	2.8	1.1	341	6.4	8.1	4.9±0.5	13.0±4.6	287.7±58.9
	Station 10	29.8	3.0	-	372	7.0	8.2	2.9±0.5	25.0±0.0	371.0±35.4
May 2014	Station 1	32.6	1.0	-	326	11.7	9.9	37.9±8.4	45.3±0.0	746.0±141.4
	Station 2	31.9	1.5	4.2	322	9.9	9.1	30.5±2.5	77.2±6.1	657.1±70.7
	Station 3	30.0	1.5	2.4	336	8.1	8.1	16.5±0.5	56.5±1.5	612.7±47.1
	Station 4	30.0	2.5	2.3	342	7.4	8.7	12.4±1.3	23.6±0.0	754.3±153.2
	Station 5	30.0	2.0	1.5	353	6.9	8.6	2.7±1.1	43.1±6.1	218.2±23.6
	Station 6	30.0	3.0	1.5	368	6.6	7.1	4.0±1.7	26.8±1.5	98.8±58.9
	Station 7	29.8	3.0	1.2	368	6.5	8.6	9.1±1.9	31.2±1.5	384.9±141.4
	Station 8	30.1	2.5	1.5	372	6.5	8.8	7.6±0.5	58.7±1.5	1209.9±11.8

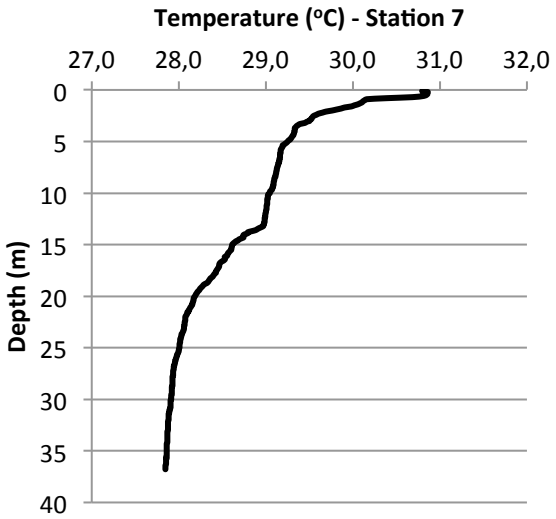
Station 9	29.7	3.0	1.2	371	6.8	9.1	17.6±0.0	76.1±10.8	707.1±70.7
Station 10	29.9	3.0	1.2	372	6.6	9.0	9.4±0.1	52.2±13.8	593.2±58.9

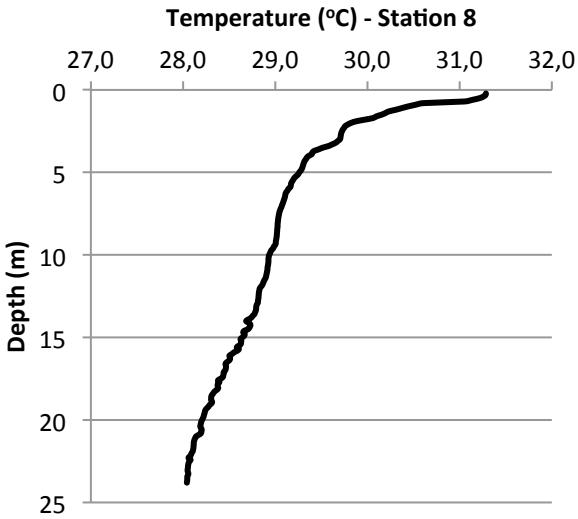
Supplementary Fig. 1. Thermal and oxygen stratification in the Castanhão reservoir between 2011 and 2014.

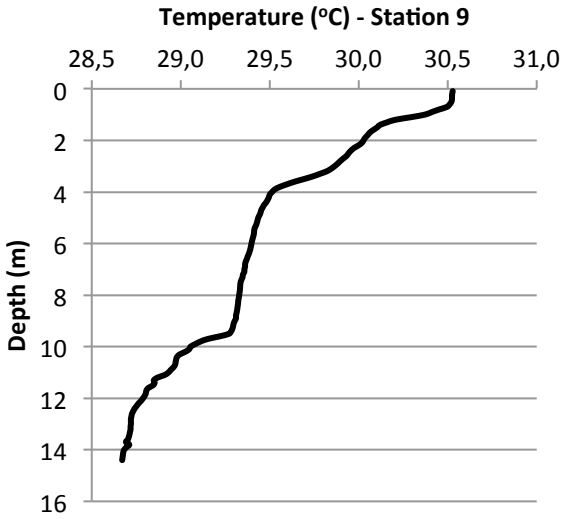


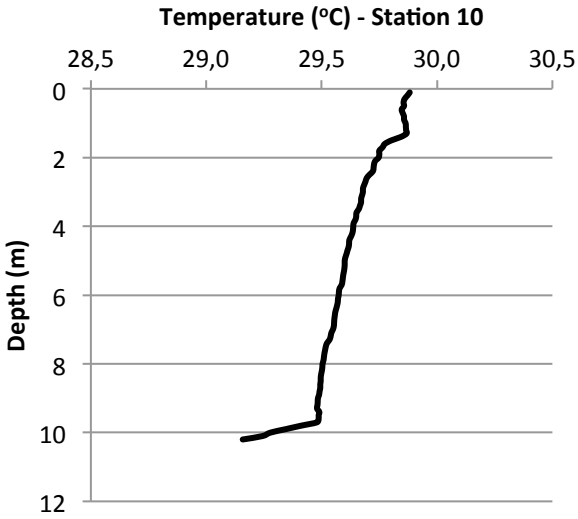

Temperature (°C) - Station 5
27,5 28 28,5 29 29,5 30 30,5
0 5 10 15 20 25 30
Depth (m)


Temperature (°C) - Station 6
27,5 28 28,5 29 29,5 30
0 5 10 15 20 25 30 35 40
Depth (m)

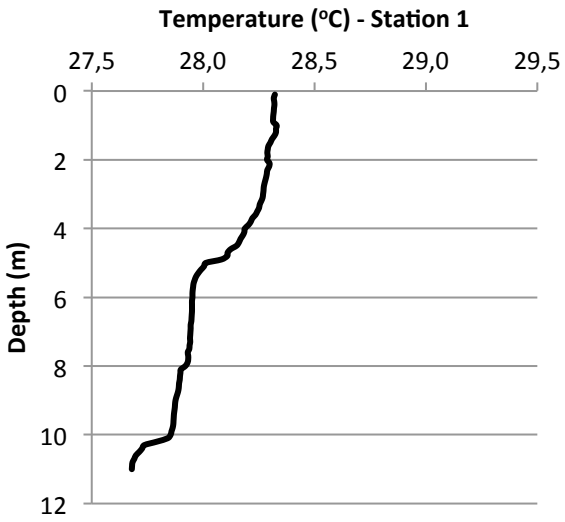

Temperature (°C) - Station 7
27,0 28,0 29,0 30,0 31,0 32,0
0 5 10 15 20 25 30 35 40
Depth (m)

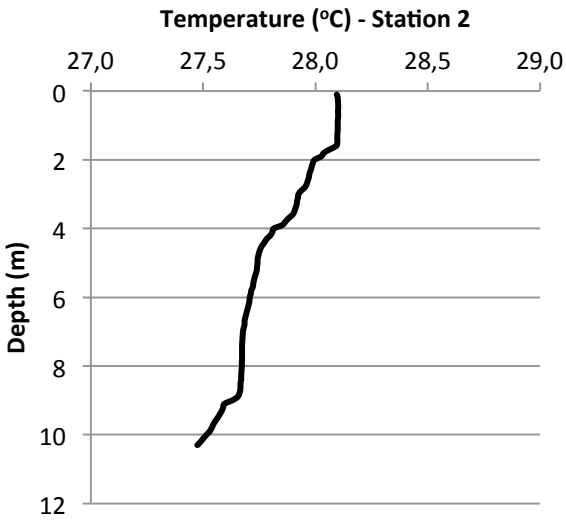

Temperature (°C) - Station 8
27,0 28,0 29,0 30,0 31,0 32,0
0 5 10 15 20 25
Depth (m)

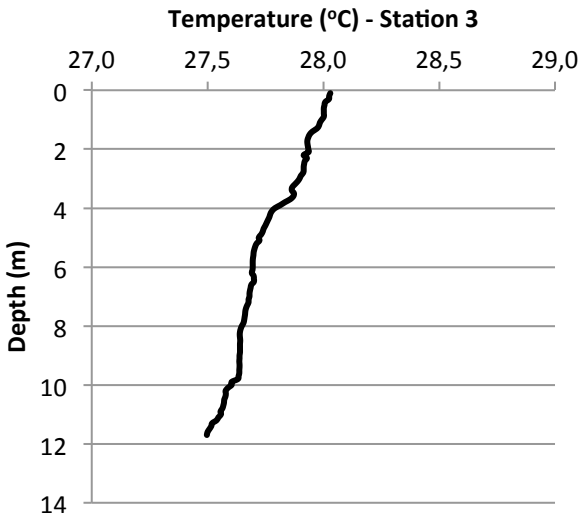

Temperature (°C) - Station 9
28,5 29,0 29,5 30,0 30,5 31,0
0 2 4 6 8 10 12 14 16
Depth (m)

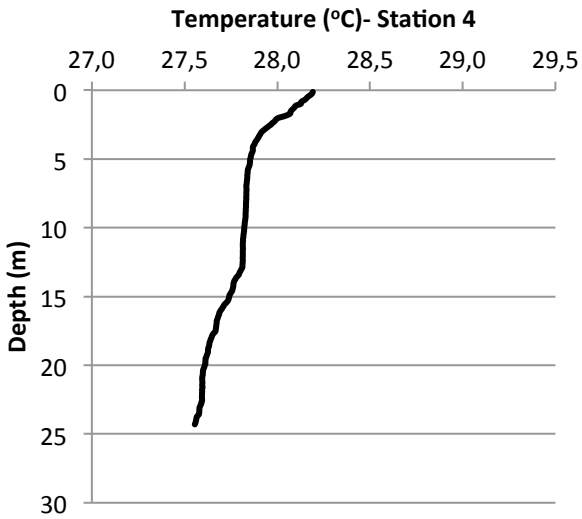

Temperature (°C) - Station 10
28,5 29,0 29,5 30,0 30,5
0 2 4 6 8 10 12
Depth (m)

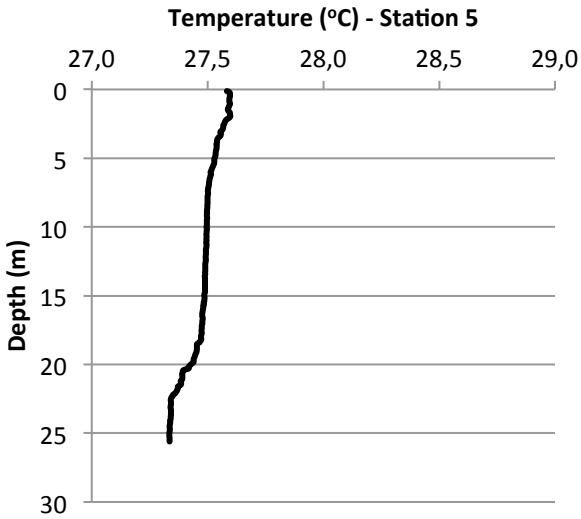
Thermal structure of the water column – August 2012

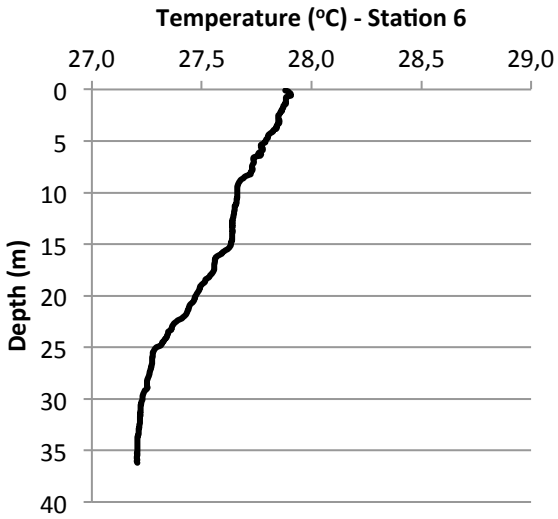


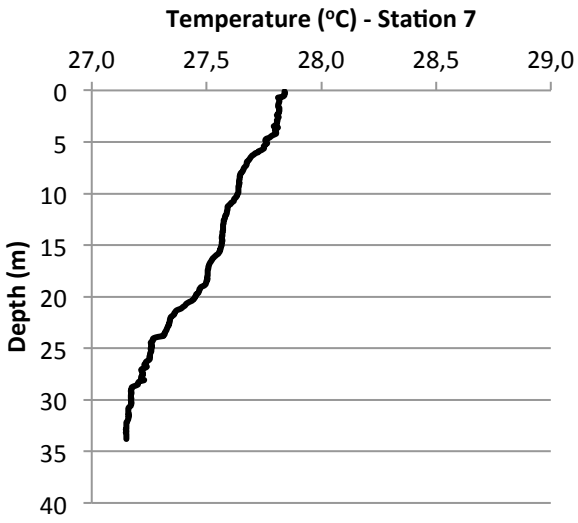


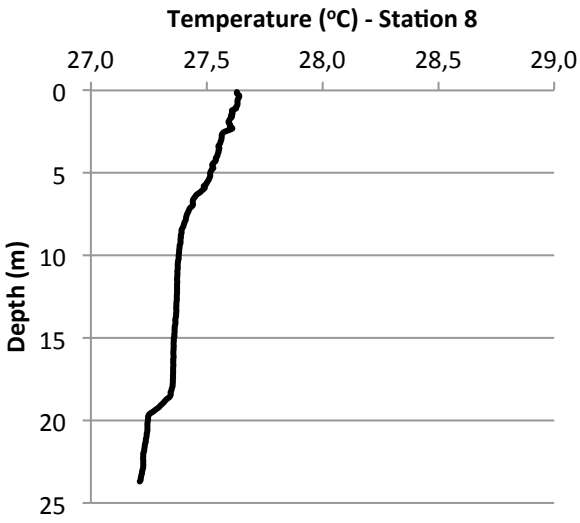


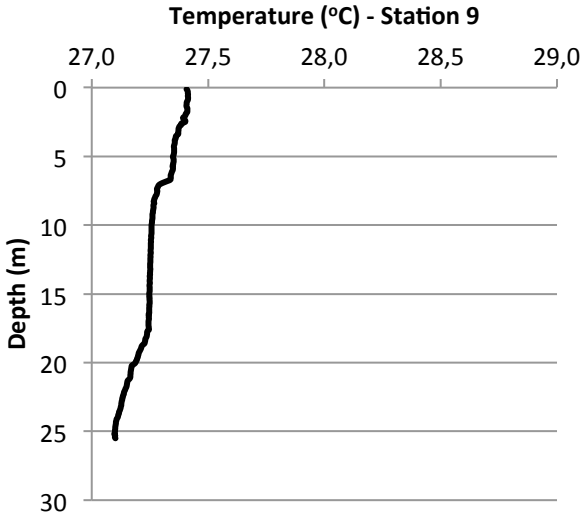


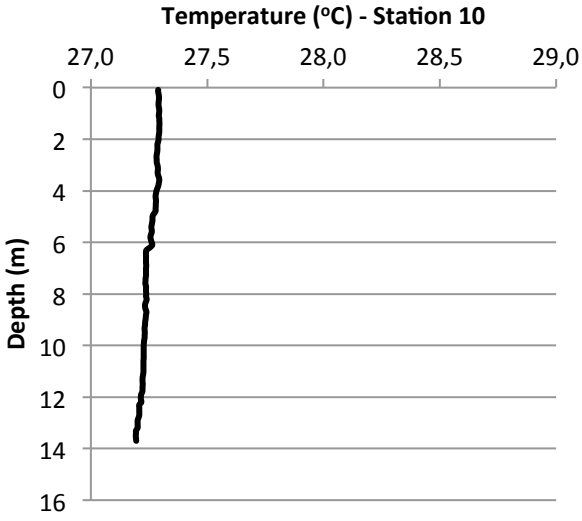




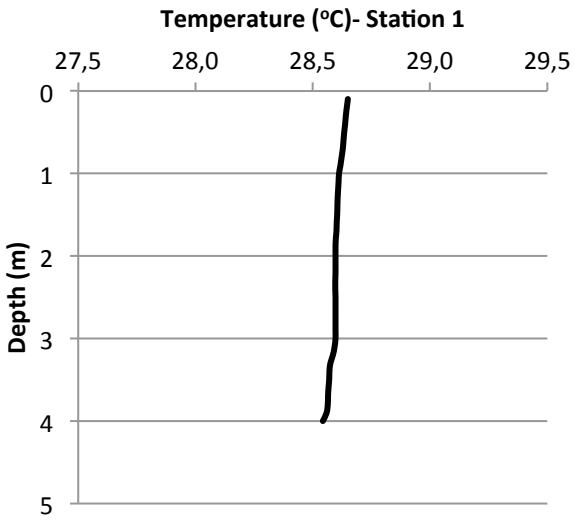

Temperature (°C) - Station 7
27,0
27,5
28,0
28,5
29,0
Depth (m)
0
5
10
15
20
25
30
35
40

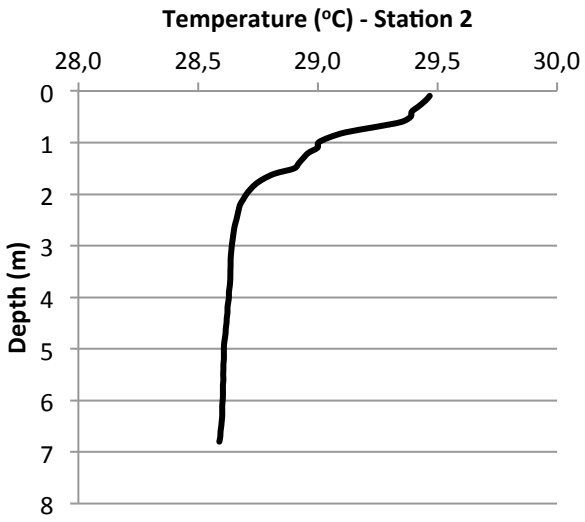

Temperature (°C) - Station 8
27,0
27,5
28,0
28,5
29,0
Depth (m)
0
5
10
15
20
25

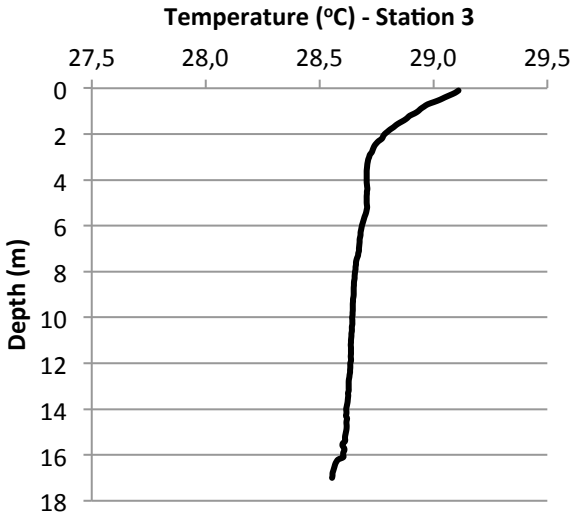

Temperature (°C) - Station 9
27,0
27,5
28,0
28,5
29,0
Depth (m)
0
5
10
15
20
25
30

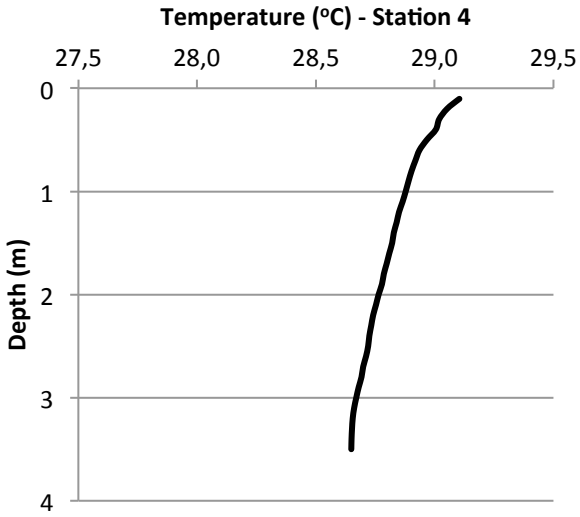

Temperature (°C) - Station 10
27,0
27,5
28,0
28,5
29,0
Depth (m)
0
2
4
6
8
10
12
14
16

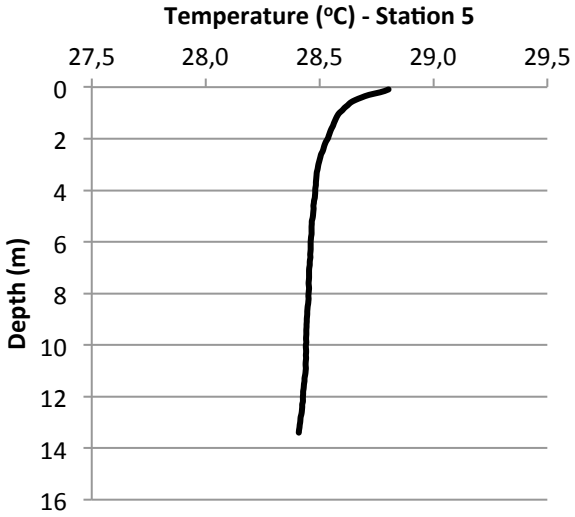
Thermal structure of the water column – January 2013

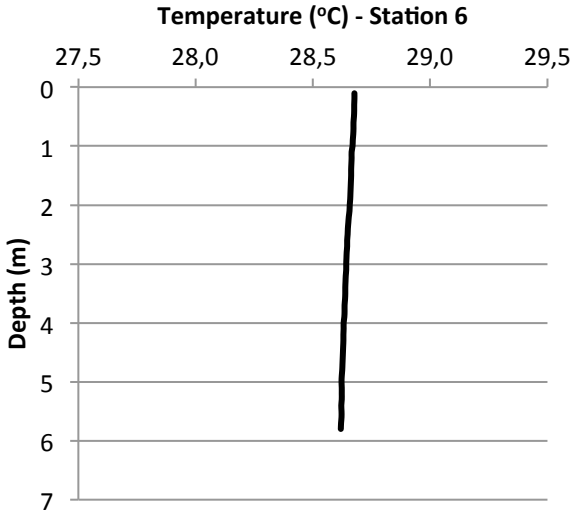


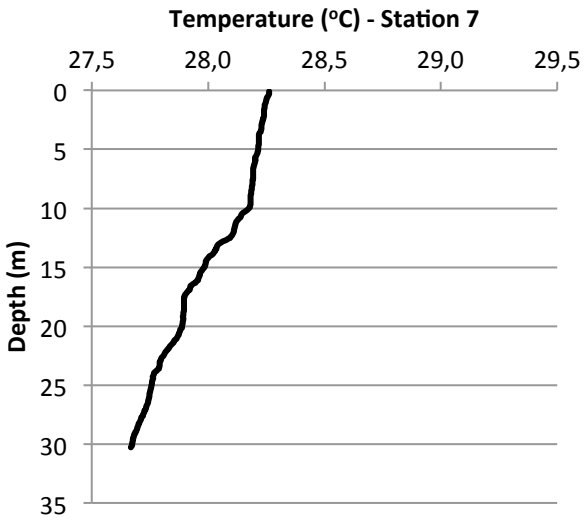


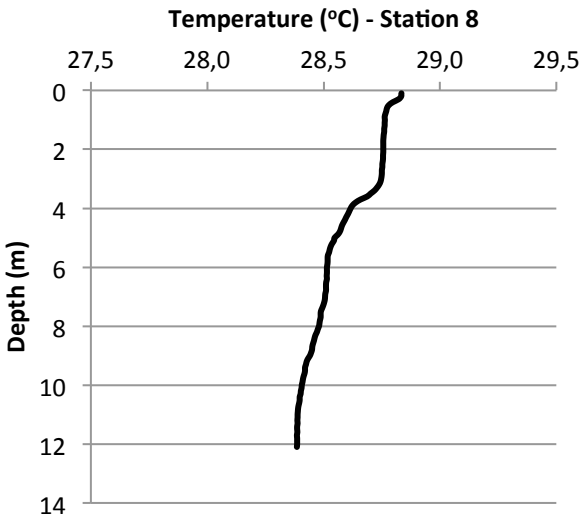


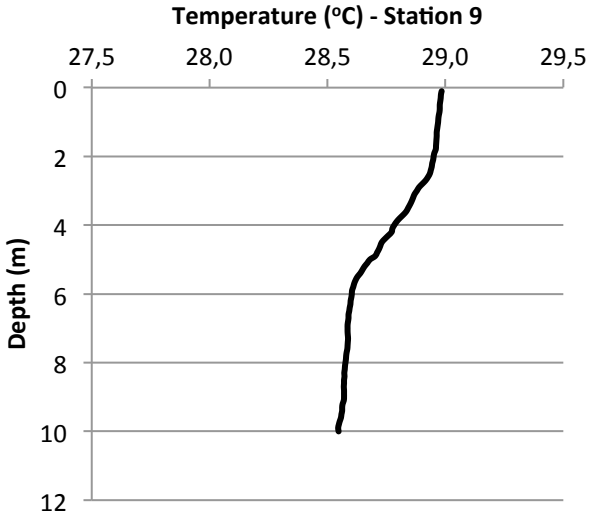


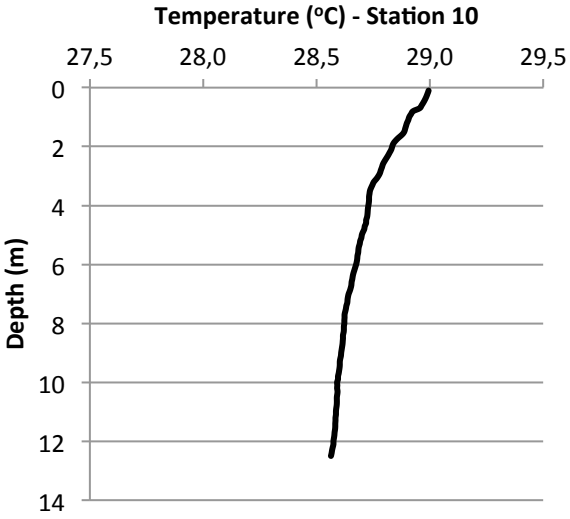




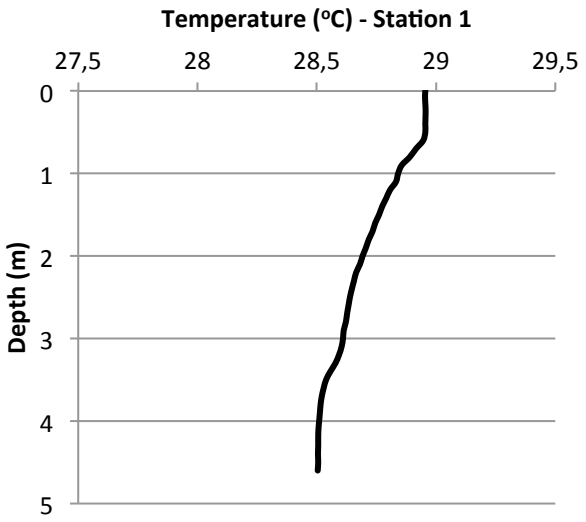

Temperature (°C) - Station 7
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
5
10
15
20
25
30
35

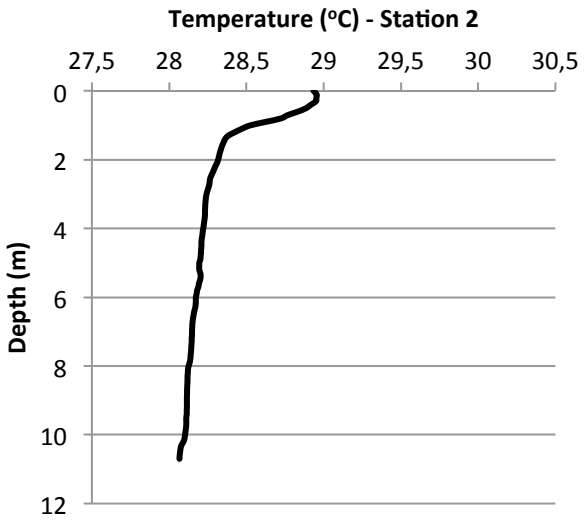

Temperature (°C) - Station 8
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
2
4
6
8
10
12
14

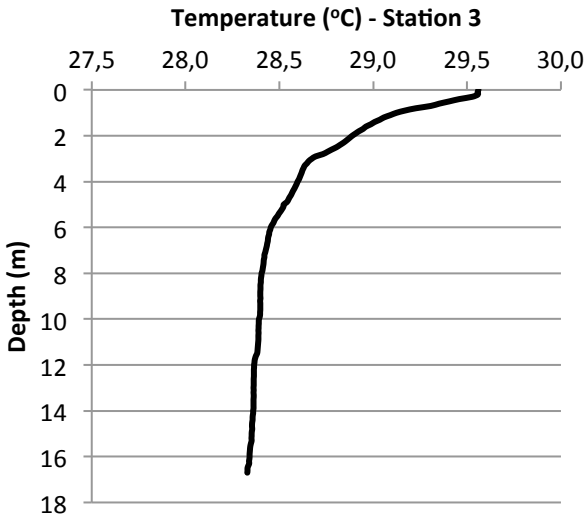

Temperature (°C) - Station 9
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
2
4
6
8
10
12

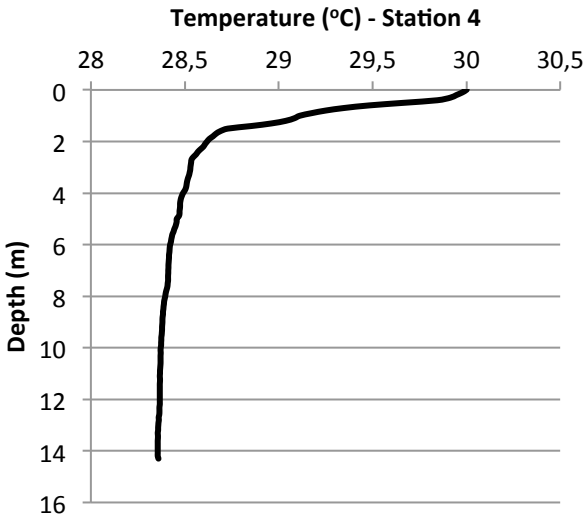

Temperature (°C) - Station 10
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
2
4
6
8
10
12
14

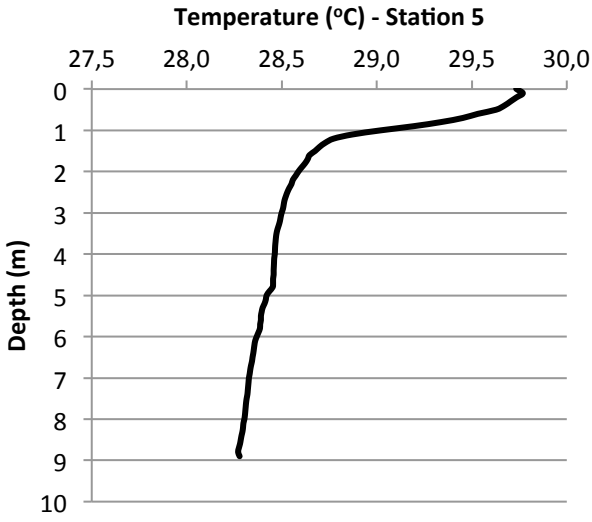
Thermal structure of the water column – August 2013

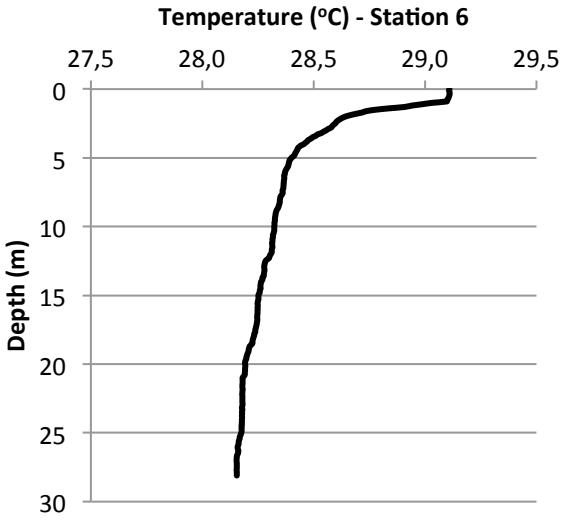


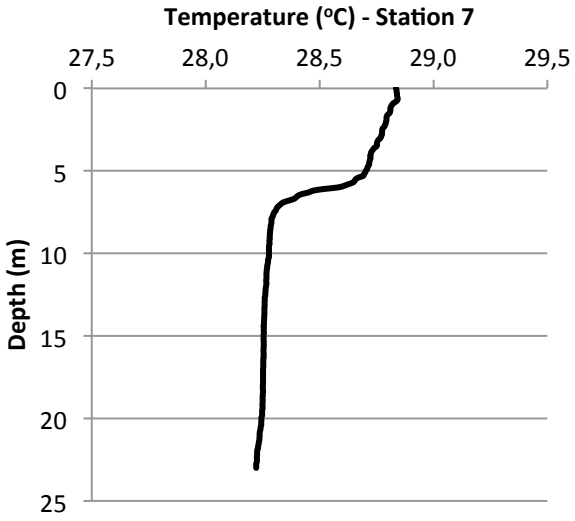


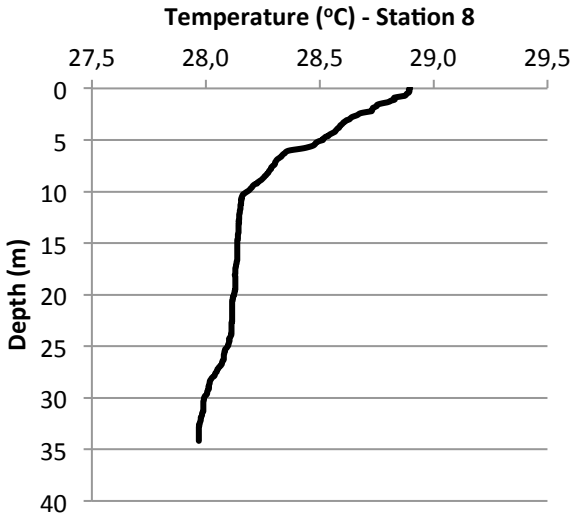


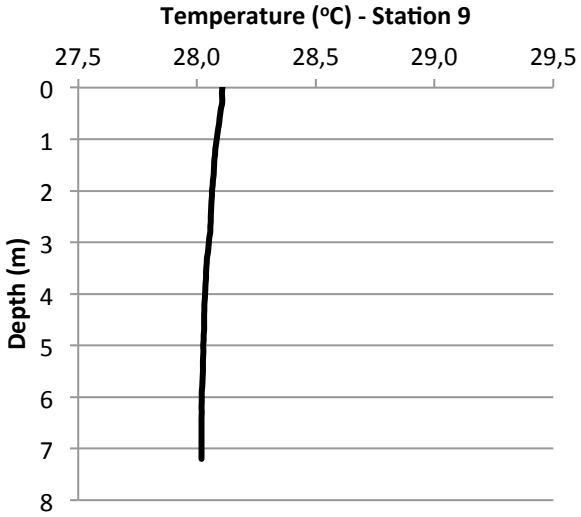




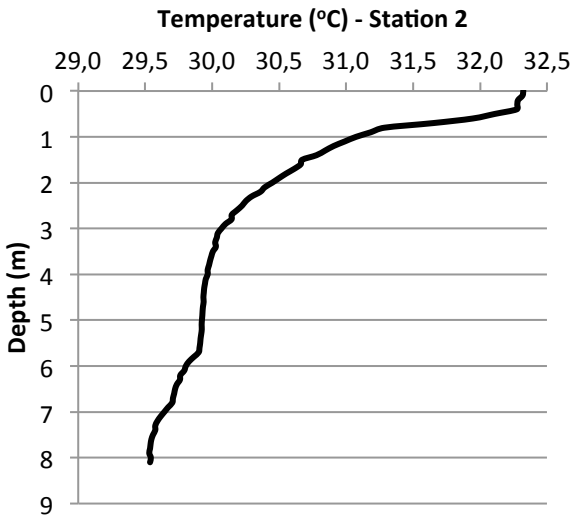


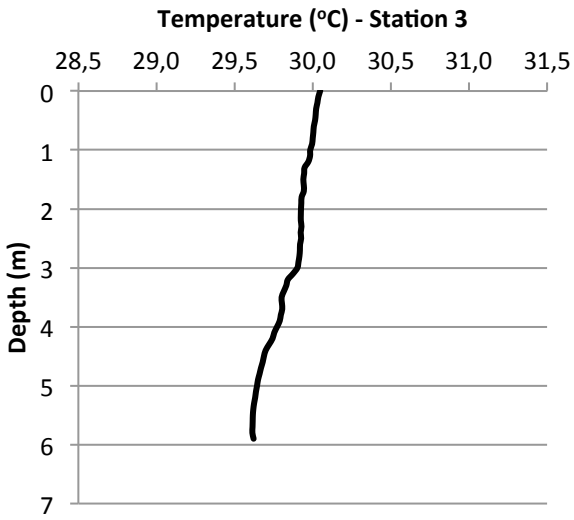

Temperature (°C) - Station 7
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
5
10
15
20
25

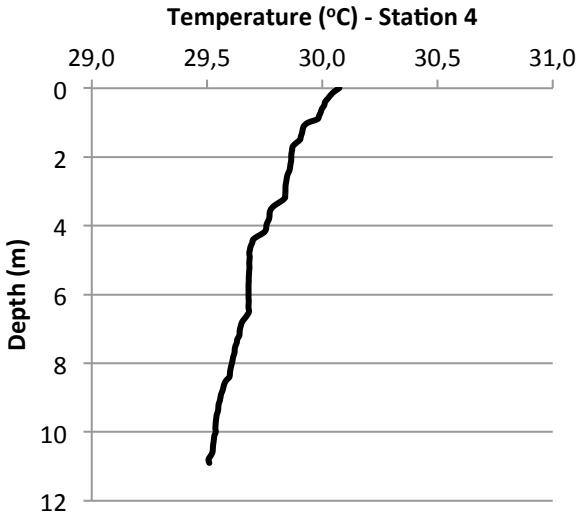

Temperature (°C) - Station 8
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
5
10
15
20
25
30
35
40

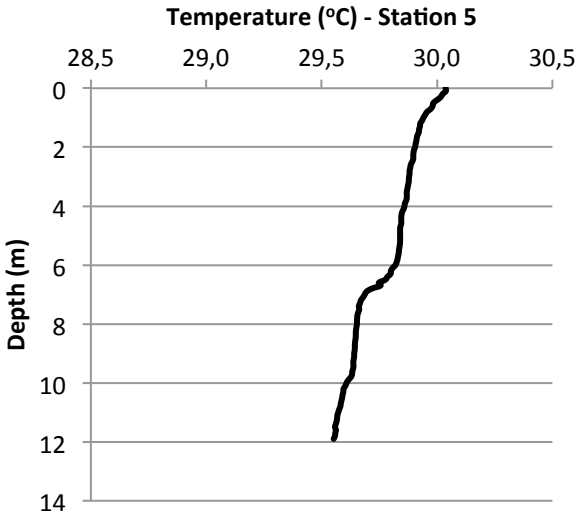

Temperature (°C) - Station 9
27,5
28,0
28,5
29,0
29,5
Depth (m)
0
1
2
3
4
5
6
7
8

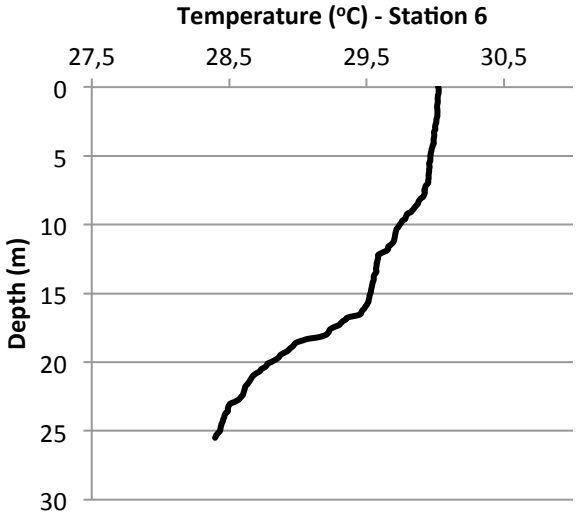
Thermal structure of the water column – May 2014

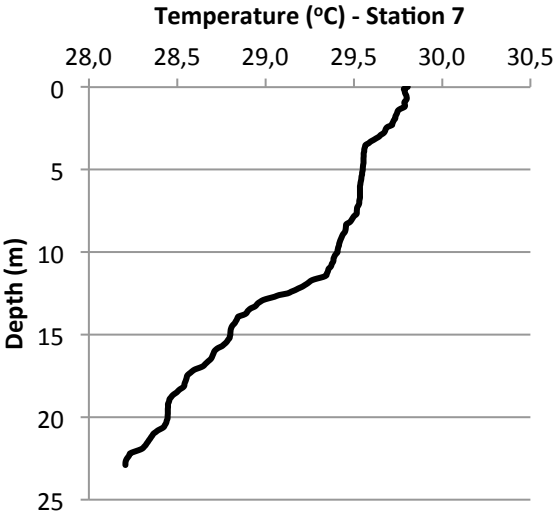


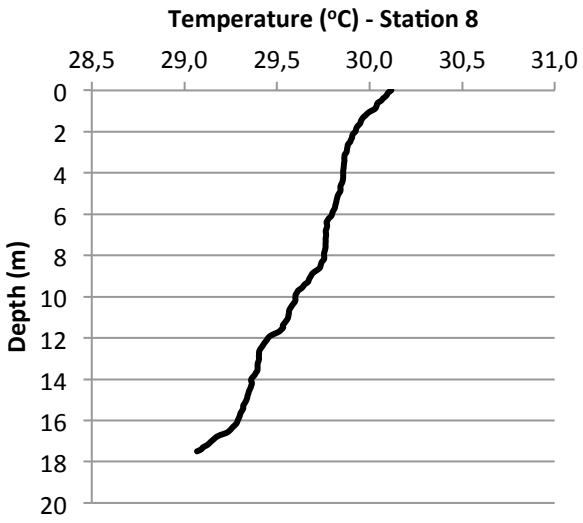


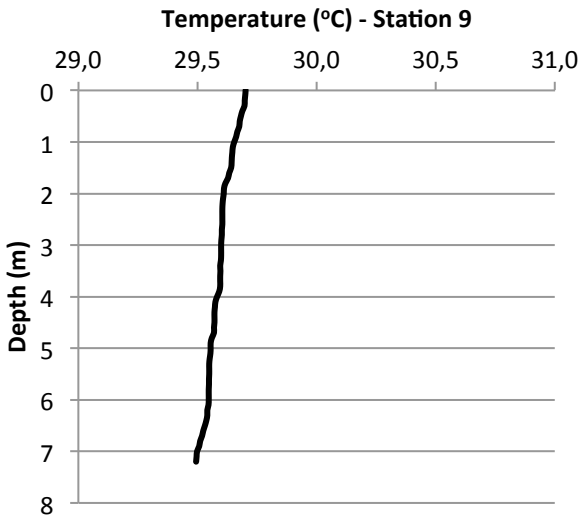


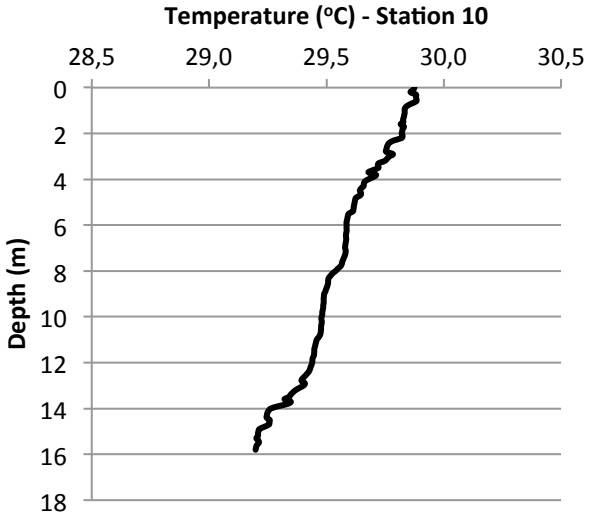




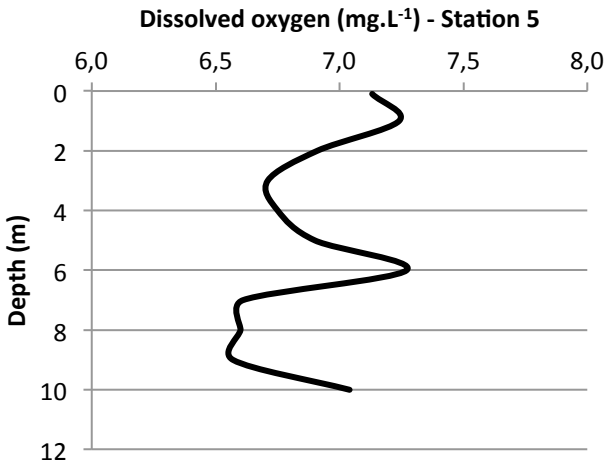


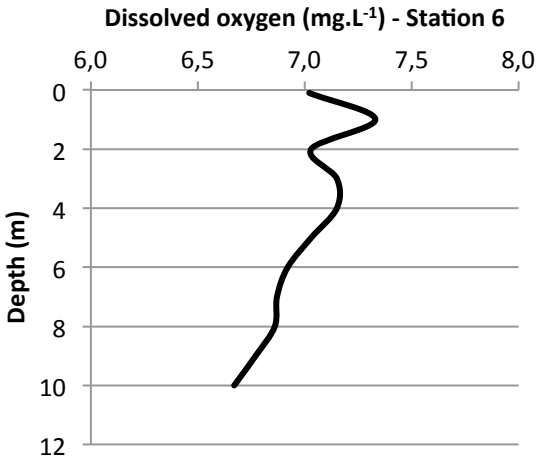

Temperature (°C) - Station 8
28,5
29,0
29,5
30,0
30,5
31,0
Depth (m)
0
2
4
6
8
10
12
14
16
18
20

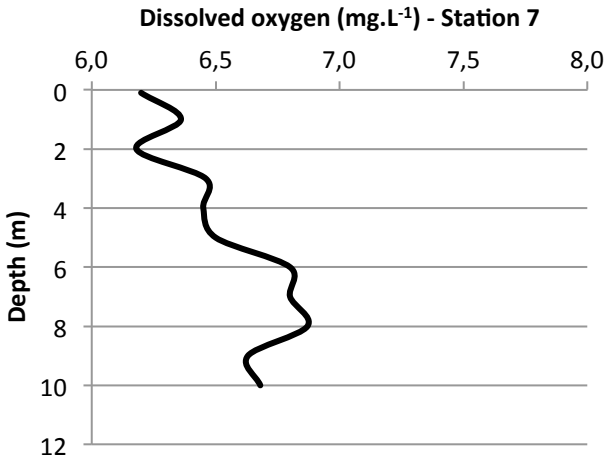

Temperature (°C) - Station 9
29,0
29,5
30,0
30,5
31,0
Depth (m)
0
1
2
3
4
5
6
7
8

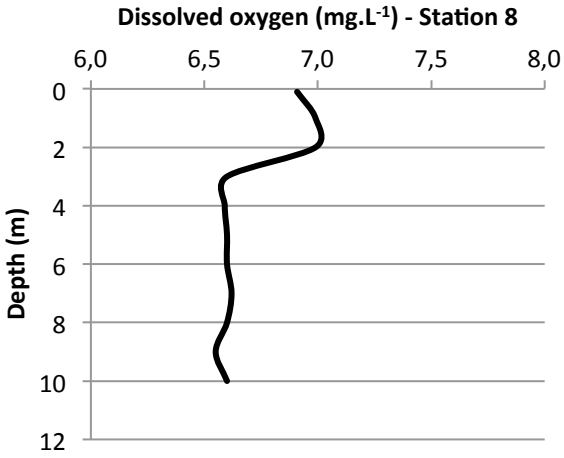

Temperature (°C) - Station 10
28,5
29,0
29,5
30,0
30,5
Depth (m)
0
2
4
6
8
10
12
14
16
18

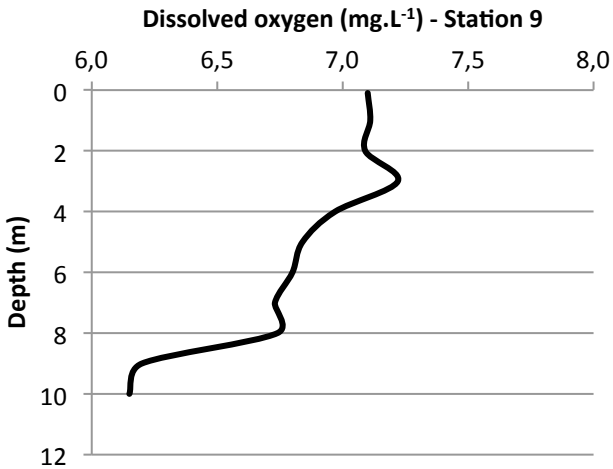
Dissolved oxygen stratification – November 2011



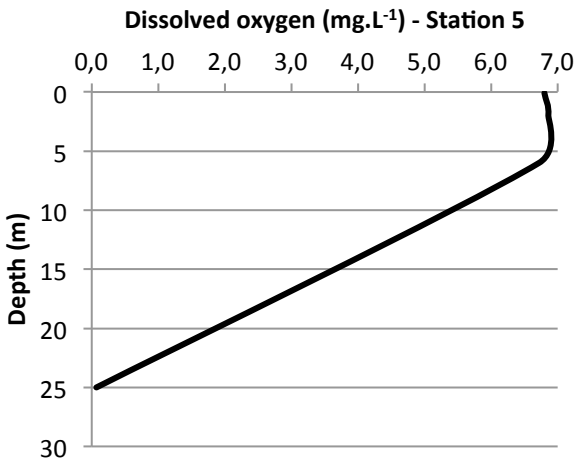


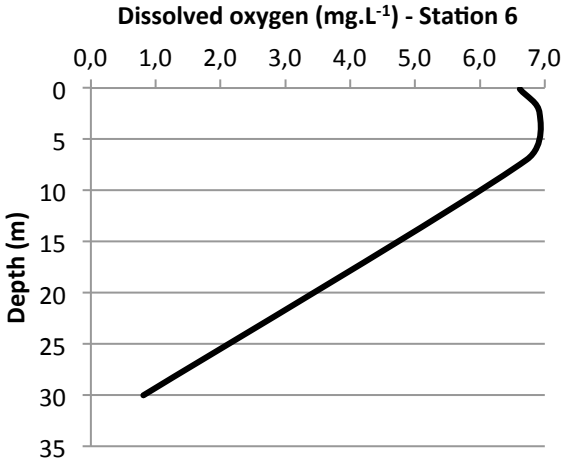


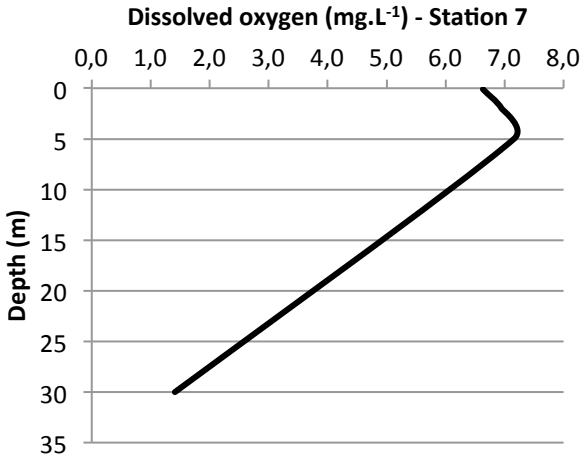


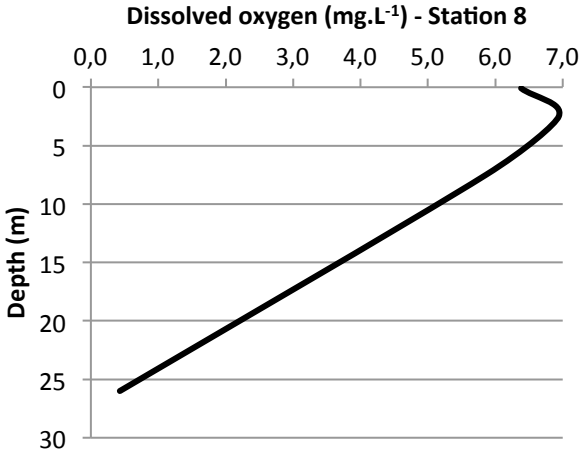


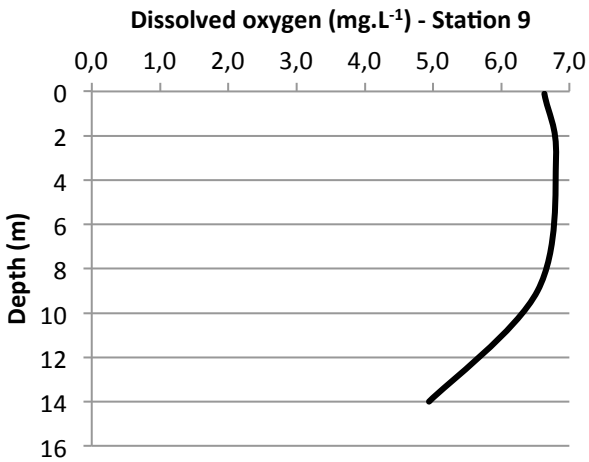
Dissolved oxygen stratification – March 2012

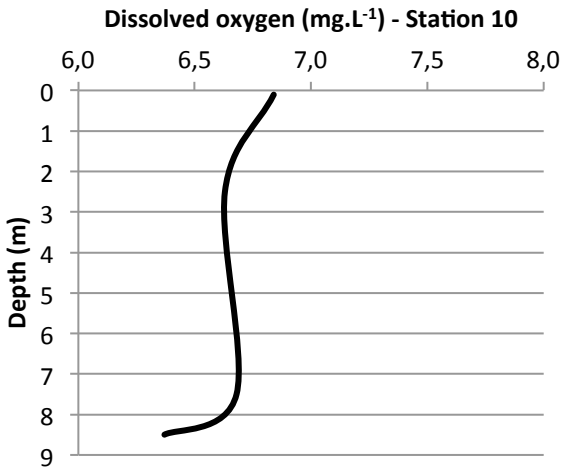




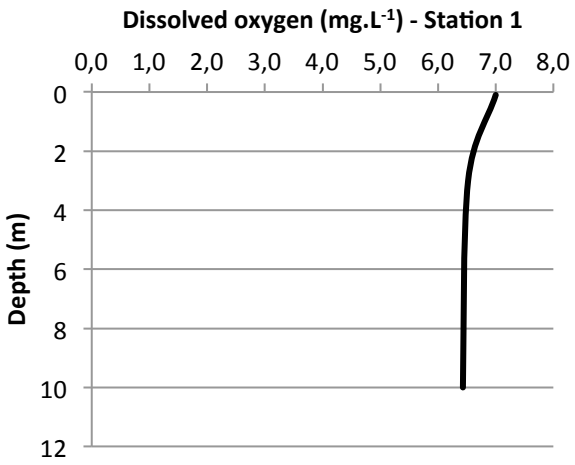


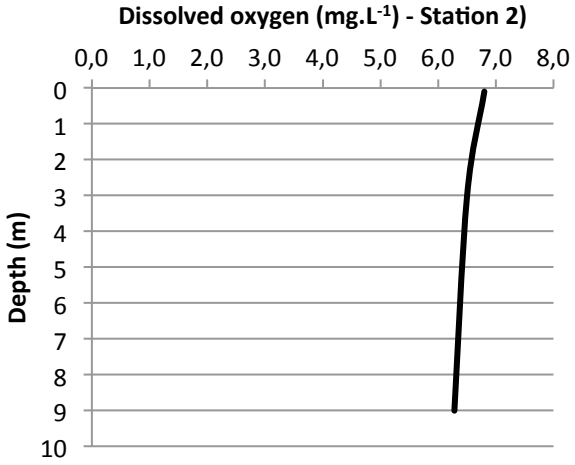


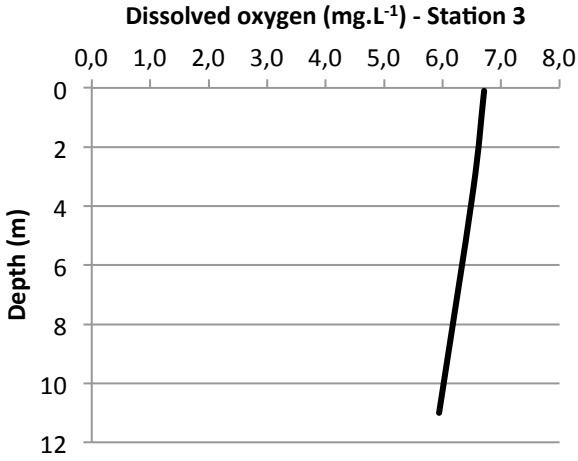


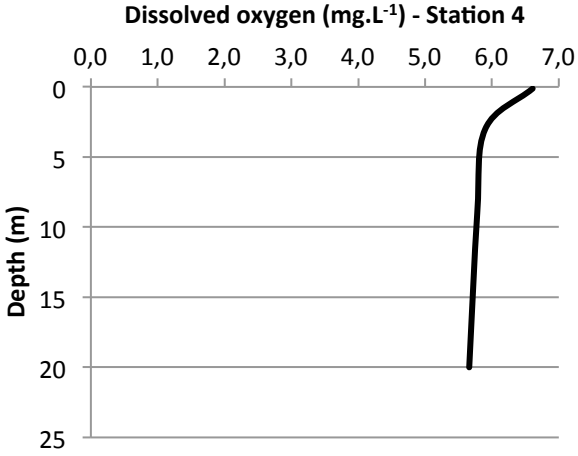


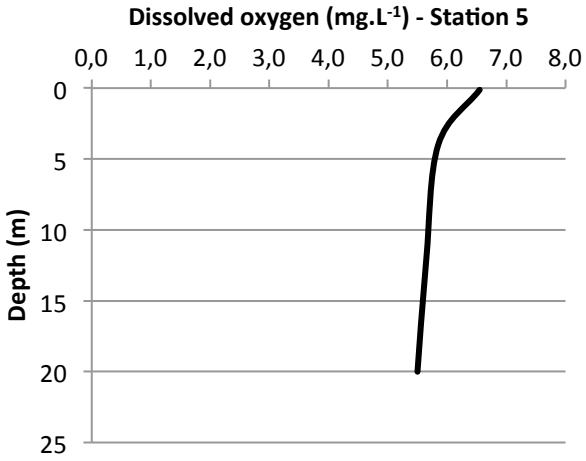
Dissolved oxygen stratification – August 2012

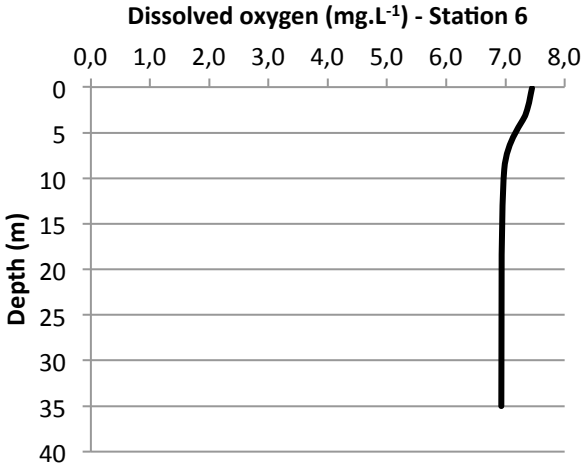


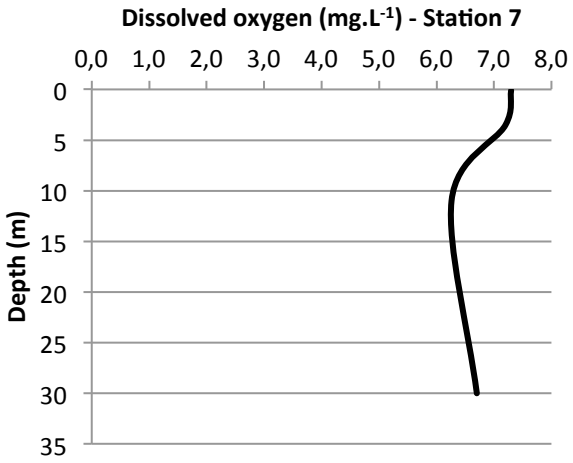


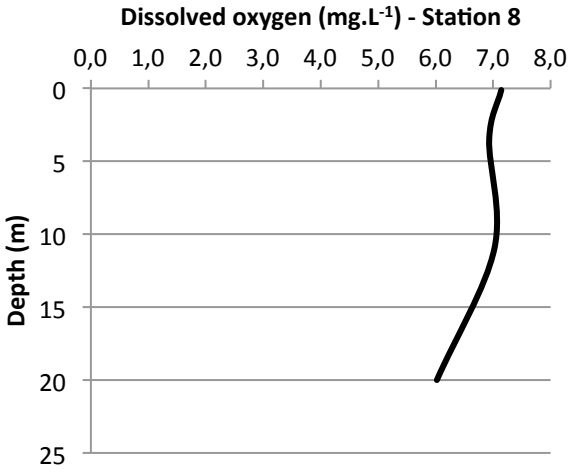


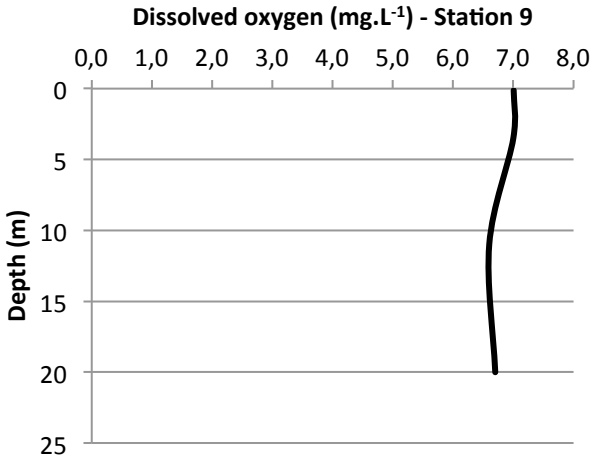


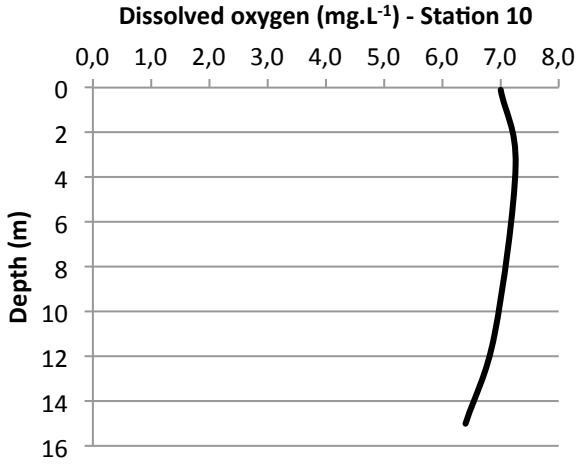




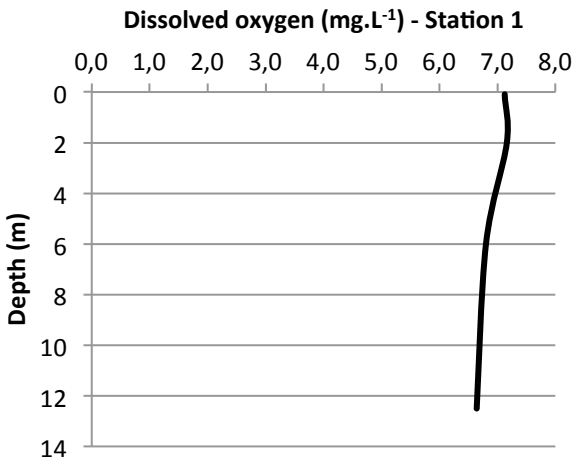

Dissolved oxygen (mg.L-1) - Station 7
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25 30 35

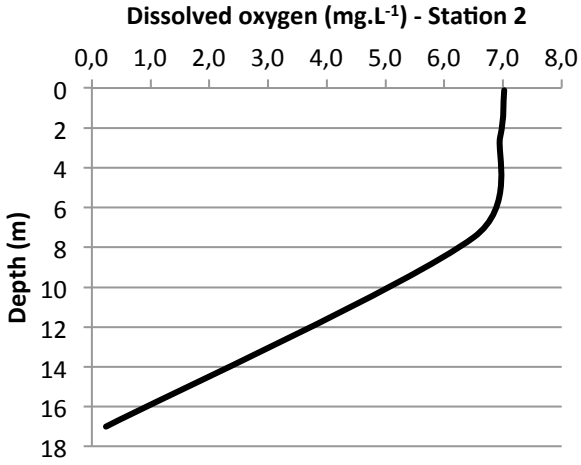

Dissolved oxygen (mg.L-1) - Station 8
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25

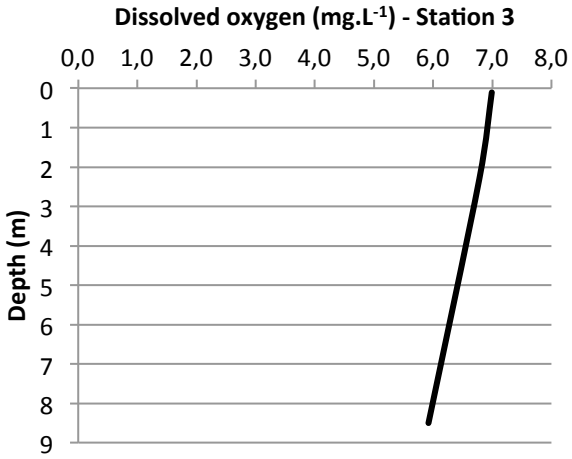

Dissolved oxygen (mg.L-1) - Station 9
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25

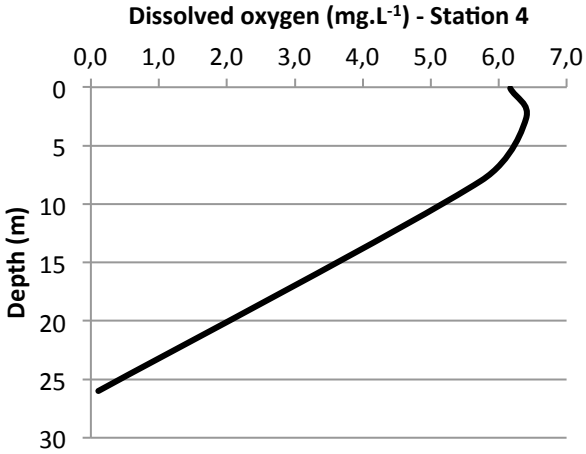

Dissolved oxygen (mg.L-1) - Station 10
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 2 4 6 8 10 12 14 16

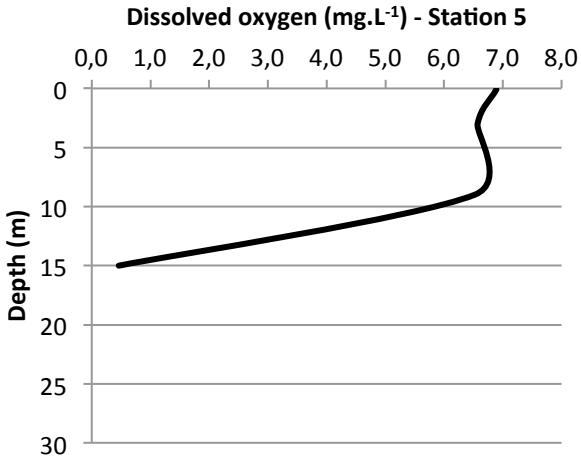
Dissolved oxygen stratification – January 2013

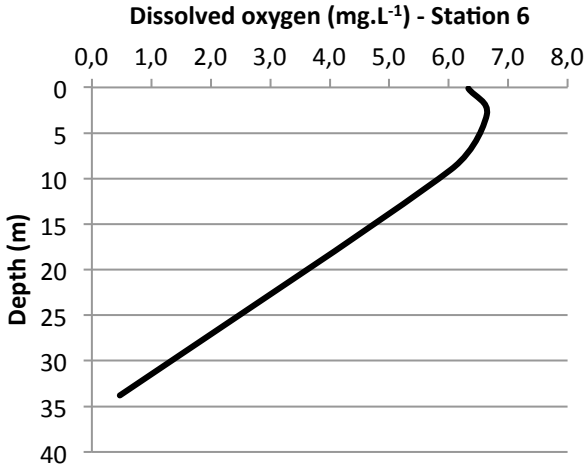


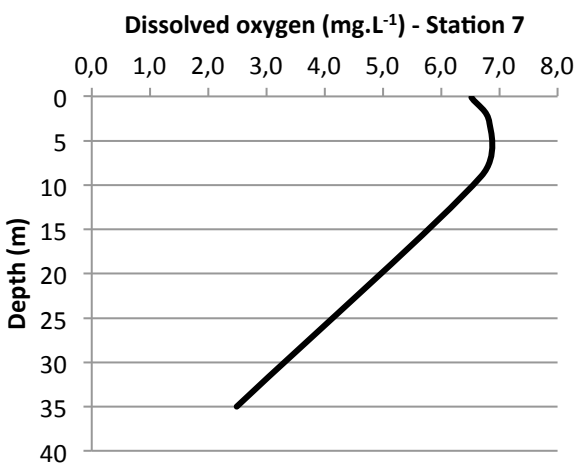


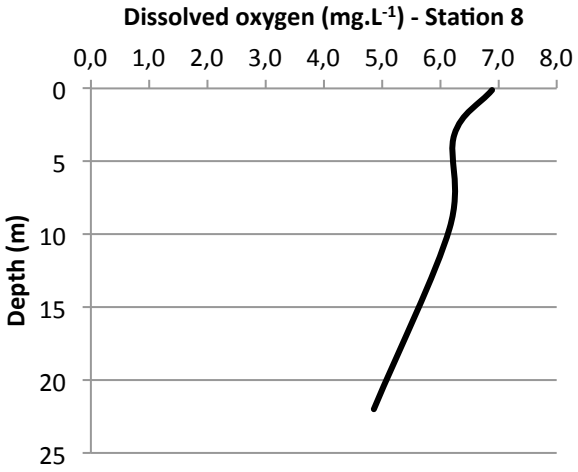


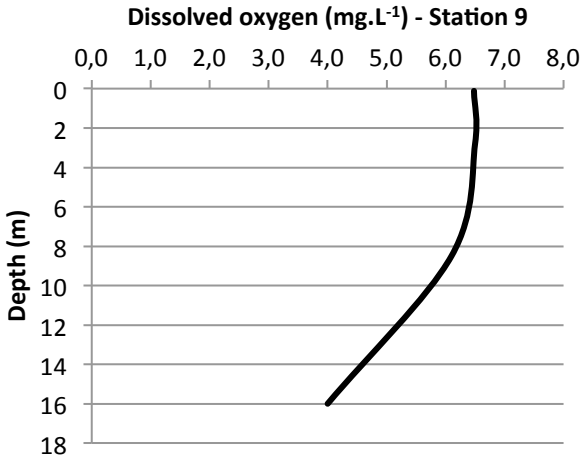


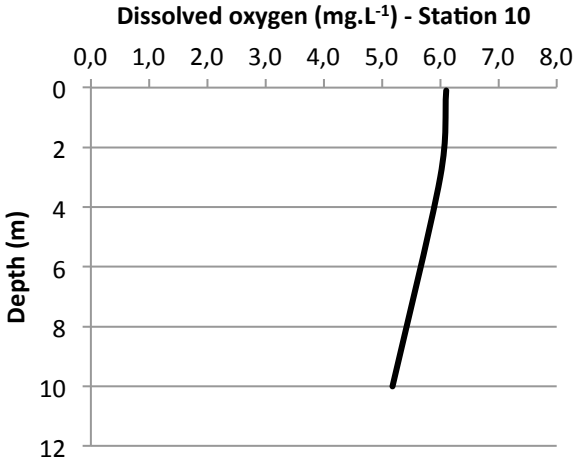




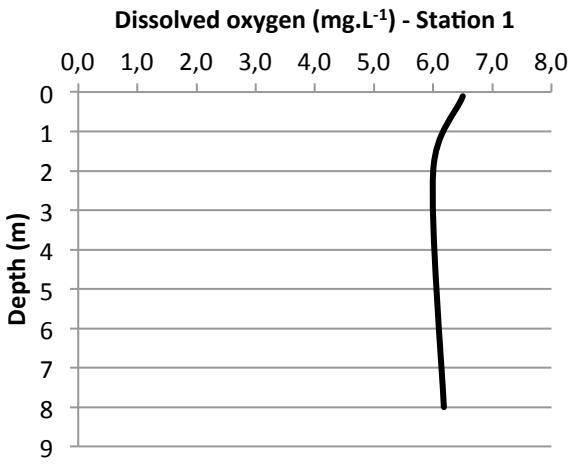

Dissolved oxygen (mg.L-1) - Station 7
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25 30 35 40

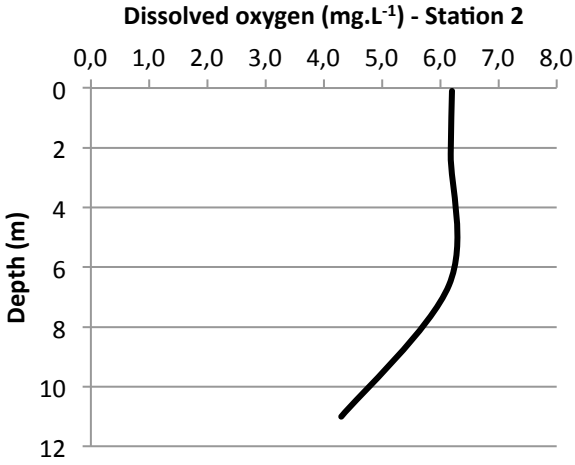

Dissolved oxygen (mg.L-1) - Station 8
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25

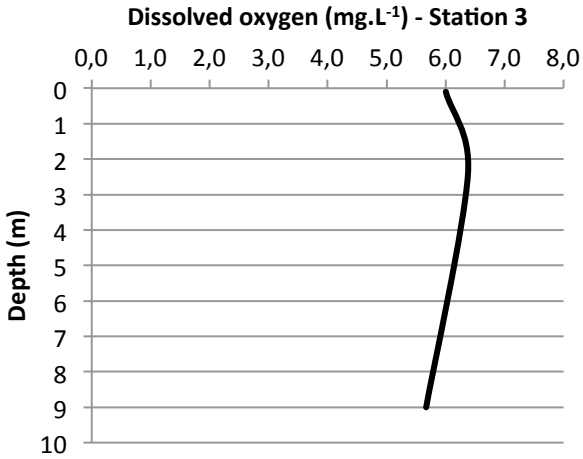

Dissolved oxygen (mg.L-1) - Station 9
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 2 4 6 8 10 12 14 16 18

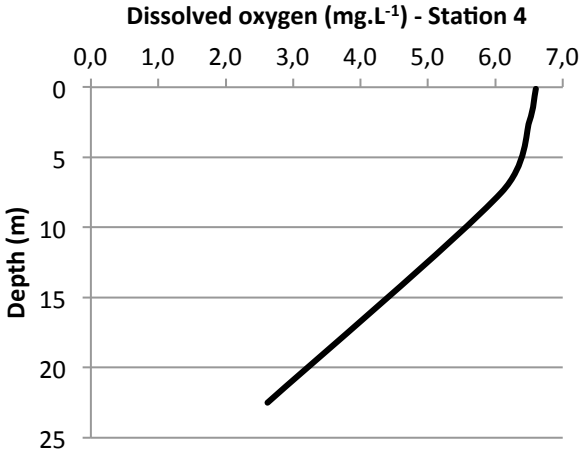

Dissolved oxygen (mg.L-1) - Station 10
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 2 4 6 8 10 12

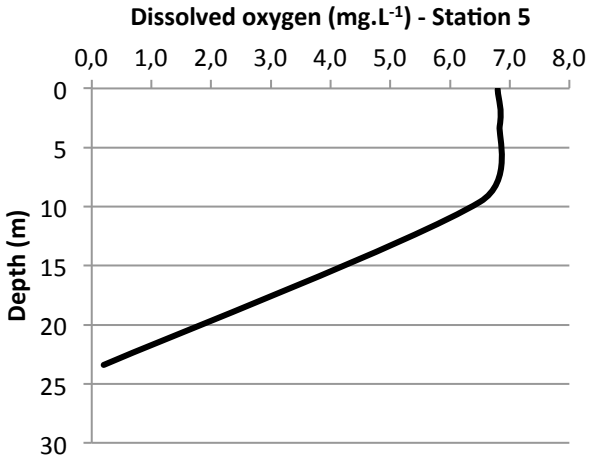
Dissolved oxygen stratification – August 2013

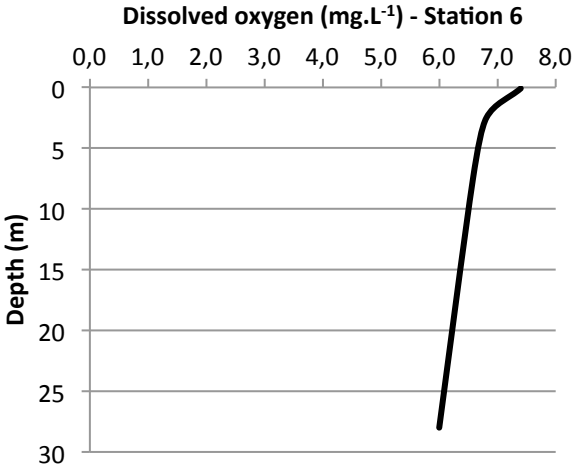


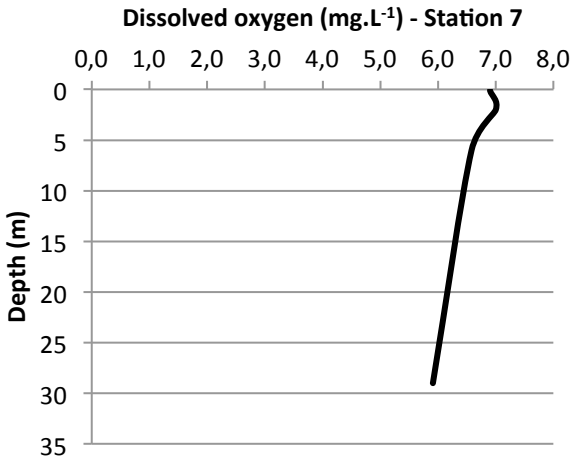


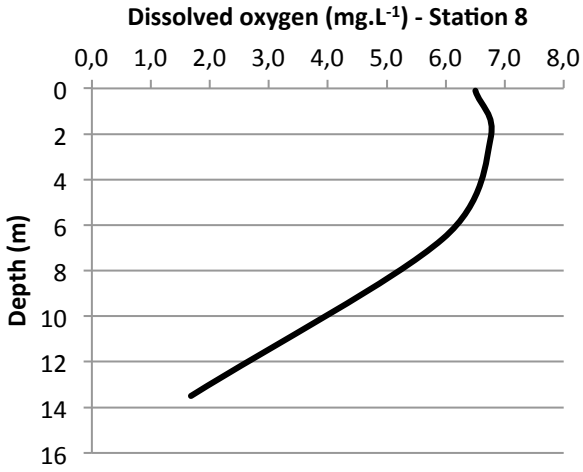


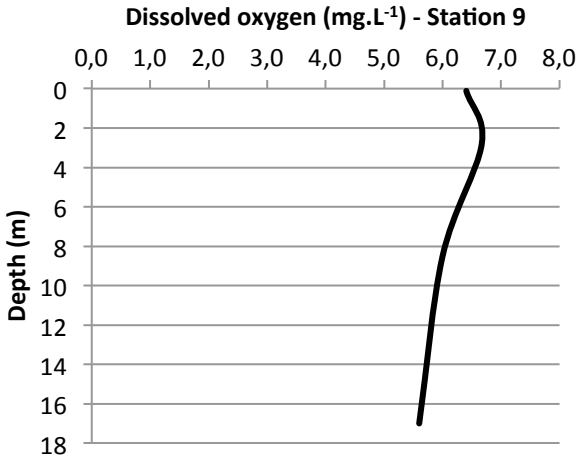


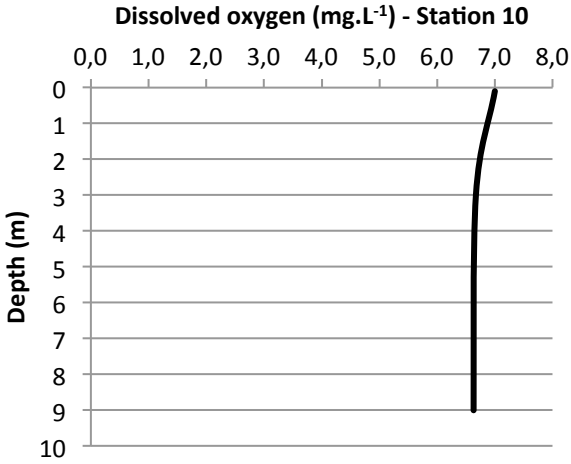




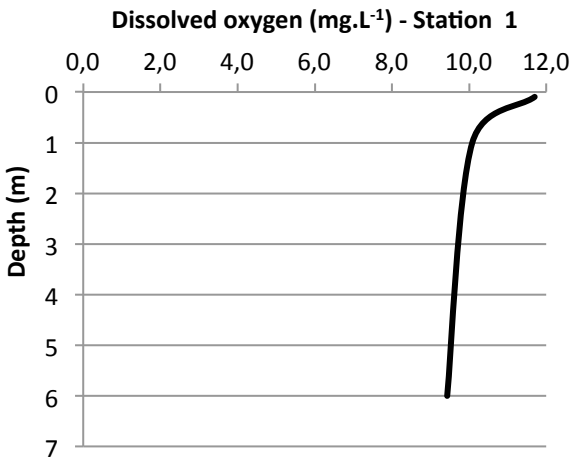

Dissolved oxygen (mg.L-1) - Station 7
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25 30 35

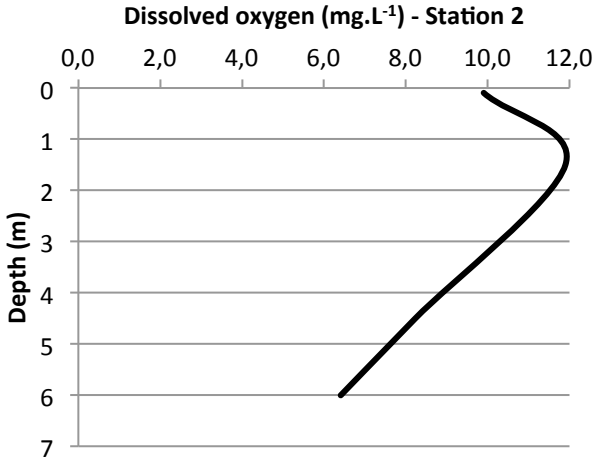

Dissolved oxygen (mg.L-1) - Station 8
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 2 4 6 8 10 12 14 16

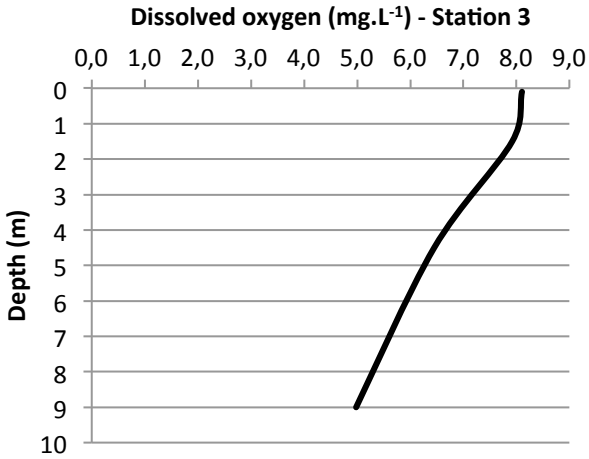

Dissolved oxygen (mg.L-1) - Station 9
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 2 4 6 8 10 12 14 16 18

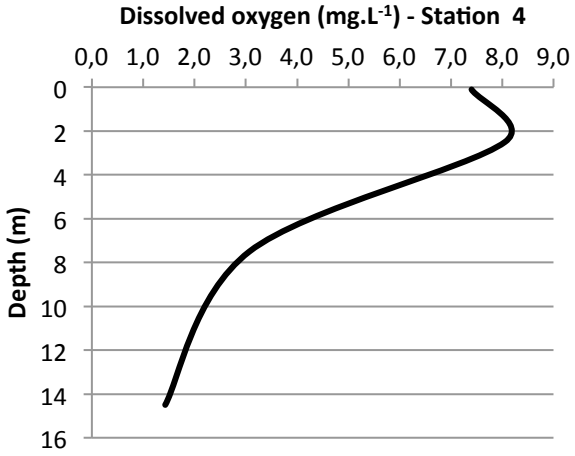

Dissolved oxygen (mg.L-1) - Station 10
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 1 2 3 4 5 6 7 8 9 10

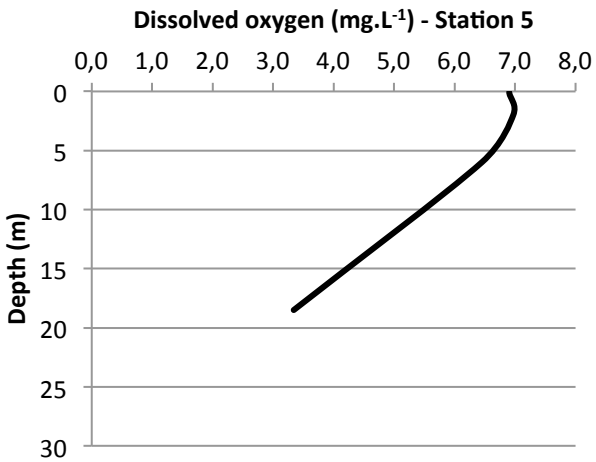
Dissolved oxygen stratification – May 2014

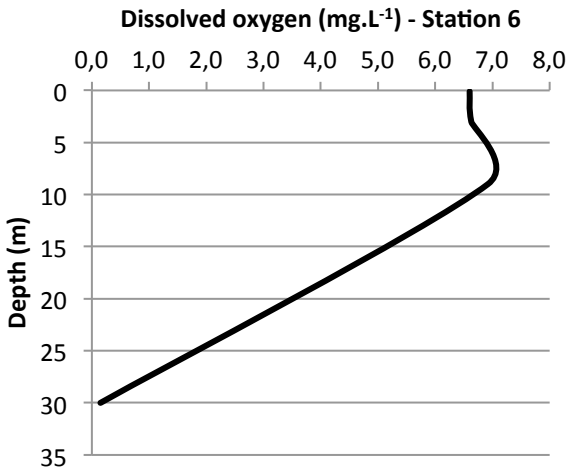


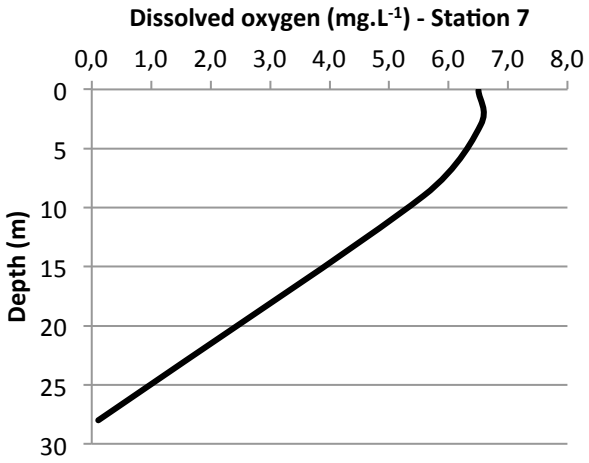


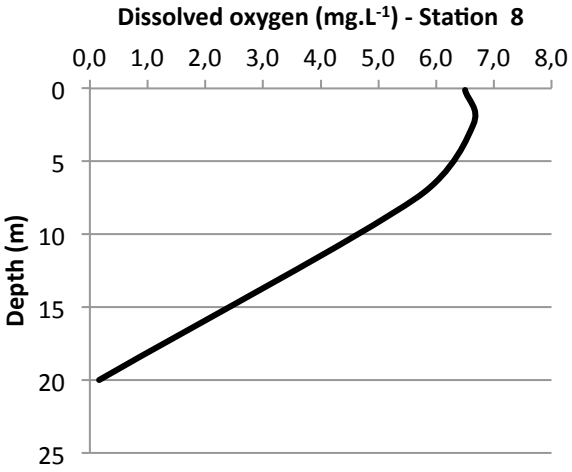


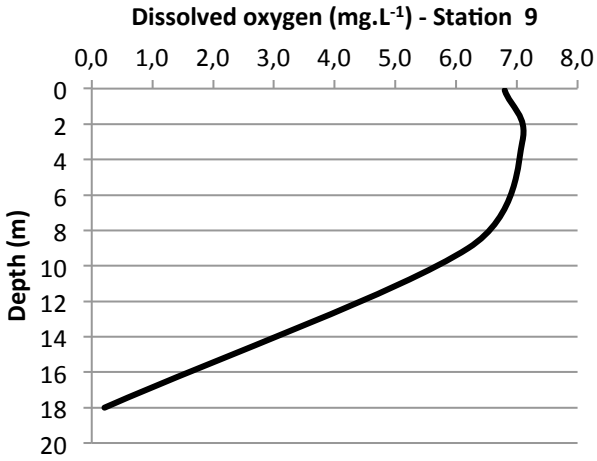


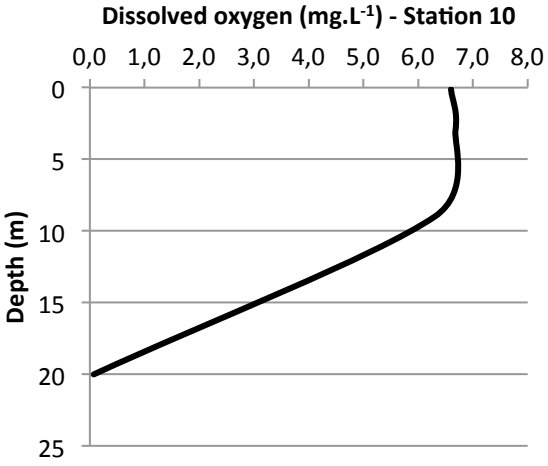





Dissolved oxygen (mg.L-1) - Station 7
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25 30


Dissolved oxygen (mg.L-1) - Station 8
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25


Dissolved oxygen (mg.L-1) - Station 9
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 2 4 6 8 10 12 14 16 18 20


Dissolved oxygen (mg.L-1) - Station 10
0,0 1,0 2,0 3,0 4,0 5,0 6,0 7,0 8,0
Depth (m)
0 5 10 15 20 25