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MESC

PUGET SOUND WASTEWATER TECHNOLOGY EVALUATION AND RESEARCH PROJECT

Companion Data Plots for Sinclair Inlet Water Quality Assessment Report

Final Repot

January 2004

By

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1 INTRODUCTION

This data report is a companion to the Water Quality Assessment Report generated for the Puget Sound Wastewater Technology Evaluation and Research Project. The data plots shown in this report provide the complete visualization of water quality data collected in Sinclair Inlet, Washington in September 1997, and March and July 1998 to:

- Establish baseline water quality conditions throughout the inlet
- Identify locations and extent of contaminants from storm water inflows
- Collect water current data throughout the Inlet for use in validating a hydrodynamic model under development by SSC San Diego

The majority of data used to generate these plots come from the measurements made by the Marine Environmental Survey Capability (MESC), a real-time data acquisition and processing system built to measure physical, chemical, and biological characteristics from a moving vessel. As such most of the data plots are synoptic or near-synoptic in nature. Some of the data plots were generated from analyses of discrete samples. The discrete plots were based on data pooled throughout the measurement period and are therefore not synoptic.

The data were collected over 19 total surveys performed during 3 time periods: September 1997, March 1998, and July 1998 (Table 1). All surveys fit into one of the following 5 survey types:

1. Axial
2. Cross-sectional
3. Surface Mapping
4. 3-D Mapping
5. Shoreline Mapping

MESC real-time data plots are presented in this document in the following order: 1) survey type, 2) sampling period, and 3) parameters. The parameter section includes survey track map, tidal condition, and parameter types. Table 2 outlines the typical parameter order and their respective units for these plots. Discrete data plots are grouped into two categories 1) receiving water distributions, and 2) combined effluent and receiving water distributions, then by parameter type.

The report in electronic form can be viewed in “web view” to make it easier to find plots.

Table 1. Puget Sound Wastewater Technology Evaluation And Research Project MESC Survey Summary.

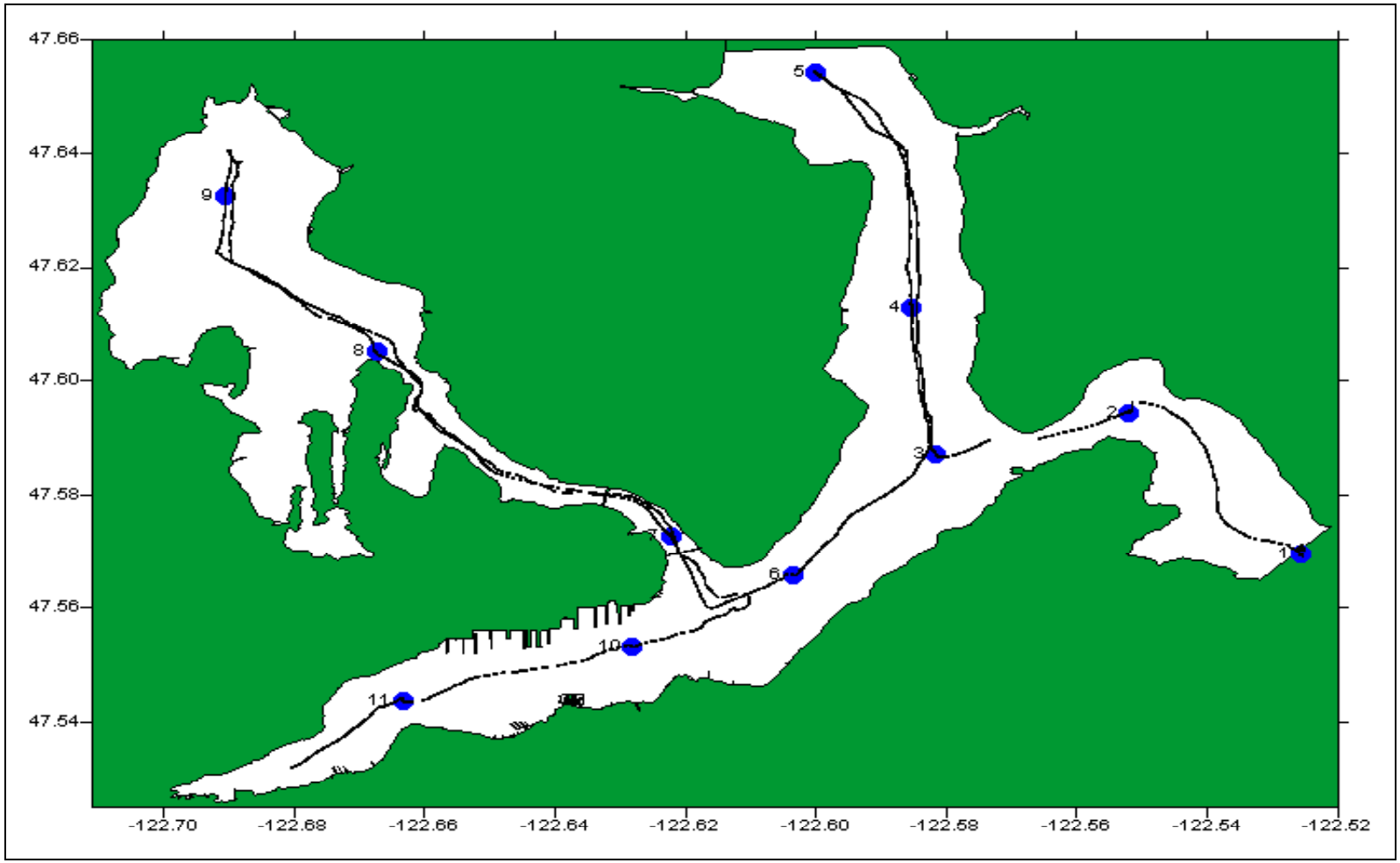
Survey	Date	Purpose
PS01	Sept 17, 1997	Axial Survey
PS02	Sept 18-19, 1997	Tow-Yo cross-section survey at mouth of Sinclair/Dyes Inlet
PS03	Sept 20-21, 1997	Baseline Surface Mapping Survey
PS04	Sept 22, 1997	POTW Sampling Survey
PS05	Sept 23, 1997	Effluent Survey (in and around Shipyard)
PS06	Sept 24, 1997	Effluent Survey (in close to PSNS Pier area)
PS07	Sept 25, 1997	Baseline Surface Mapping Survey #2
PS08	Sept 26, 1997	Pier Mapping & Axial Tow-Yos
PS09	Sept 27, 1997	Cross-sections at mouth of Sinclair/Dyes Inlet
PS10	March 11, 1998	Axial Survey
PS11	March 12, 1998	Baseline Surface Mapping Survey (Sinclair)
PS12	March 13, 1998	Baseline Vertical Mapping (Sinclair)
PS13	March 14, 1998	Shipyard and back Bay Mapping (Sinclair)
PS14	March 15, 1998	Shoreline Mapping of Sinclair Inlet
PS15	March 16, 1998	Shoreline Mapping of Sinclair Inlet
PS16	July 16, 1998	Axial Survey
PS17	July 17-18, 1998	Surface Mapping of Sinclair Inlet
PS18	July 19, 1998	Shoreline Mapping Survey
PS19	July 20, 1998	3-D (Vertical) Mapping Survey

Table 2. Guideline for MESC parameters and units listed in document.

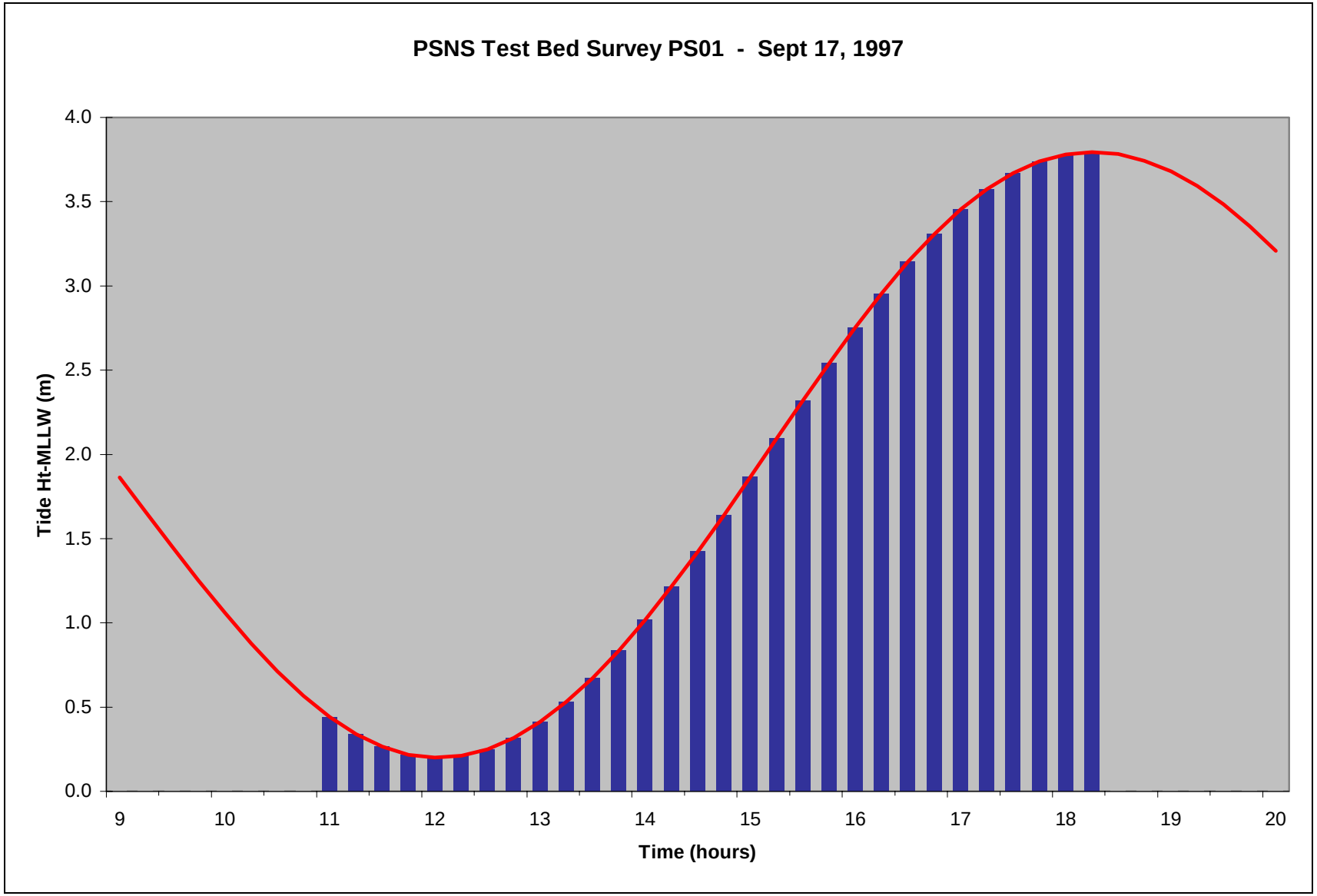
Parameter	Units
1. Temperature	Degrees Celsius
2. Salinity	Practical Salinity Units (psu)
3. Density	Sigma-t
4. Oxygen	milliLiter per Liter (mL/L)
5. Oxygen Saturation	Percent (%)
6. Total Suspended Solids	mg/L
7. Light Transmission	Percent (%)
8. Latitude	Decimal Degrees
9. Longitude	Decimal Degrees
10. Oil Fluorescence– on board fluorometer	Diesel Fuel Marine Equivalents (DFME)
11. Chlorophyll-a	Part per Billion

2.1 September 1997 – PS01

2.1.1 Track Map



2.1.2 Tide Chart



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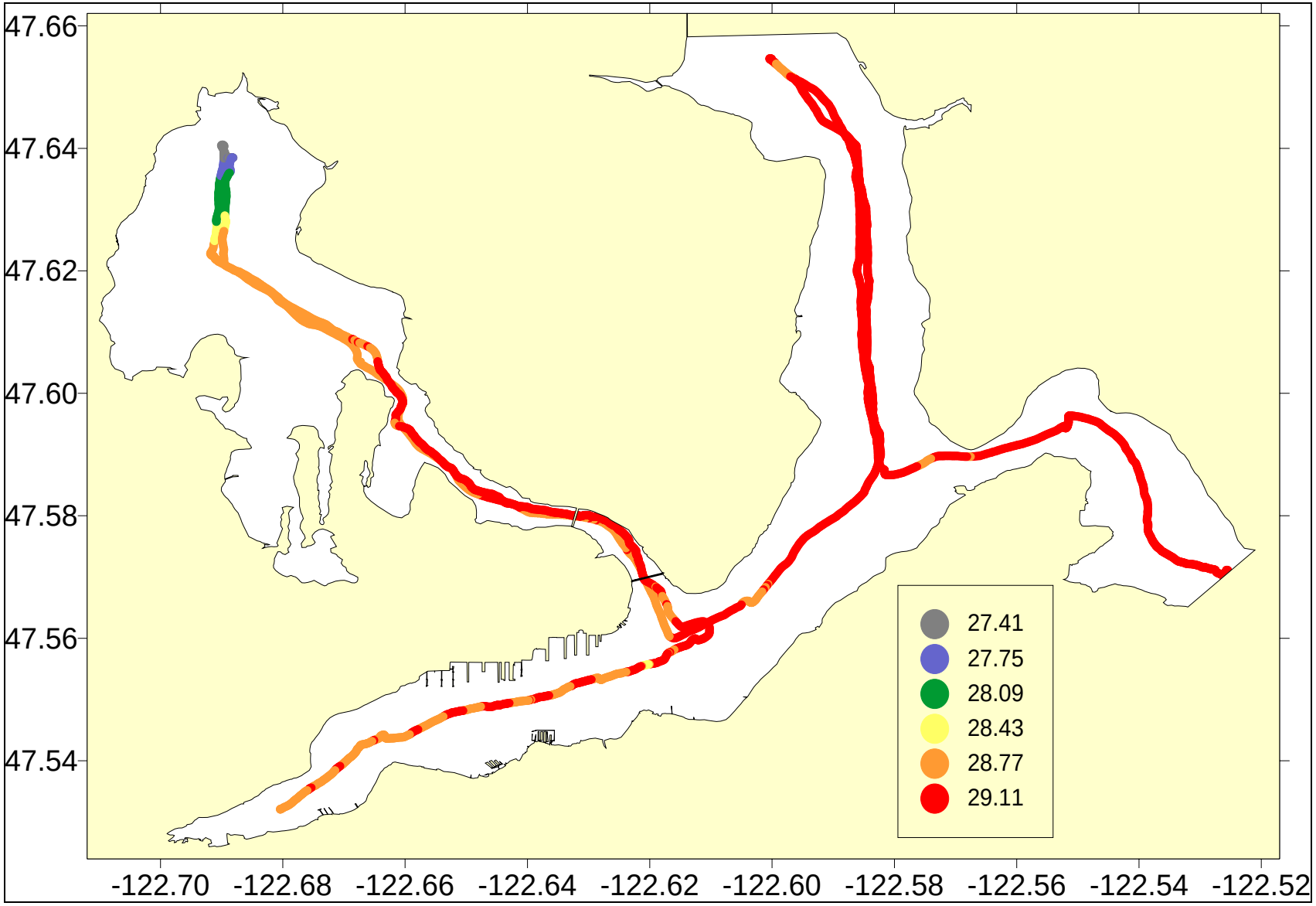

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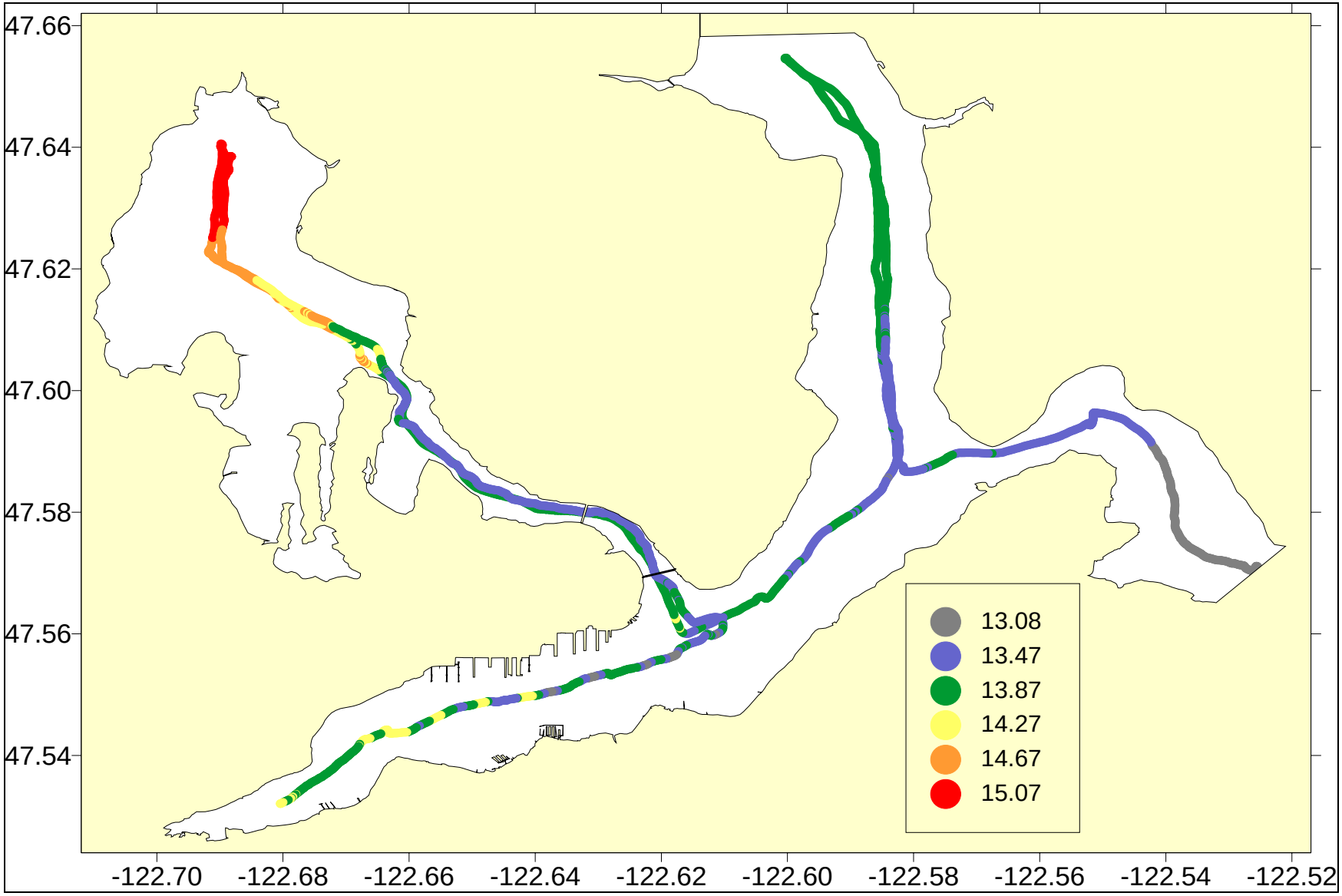

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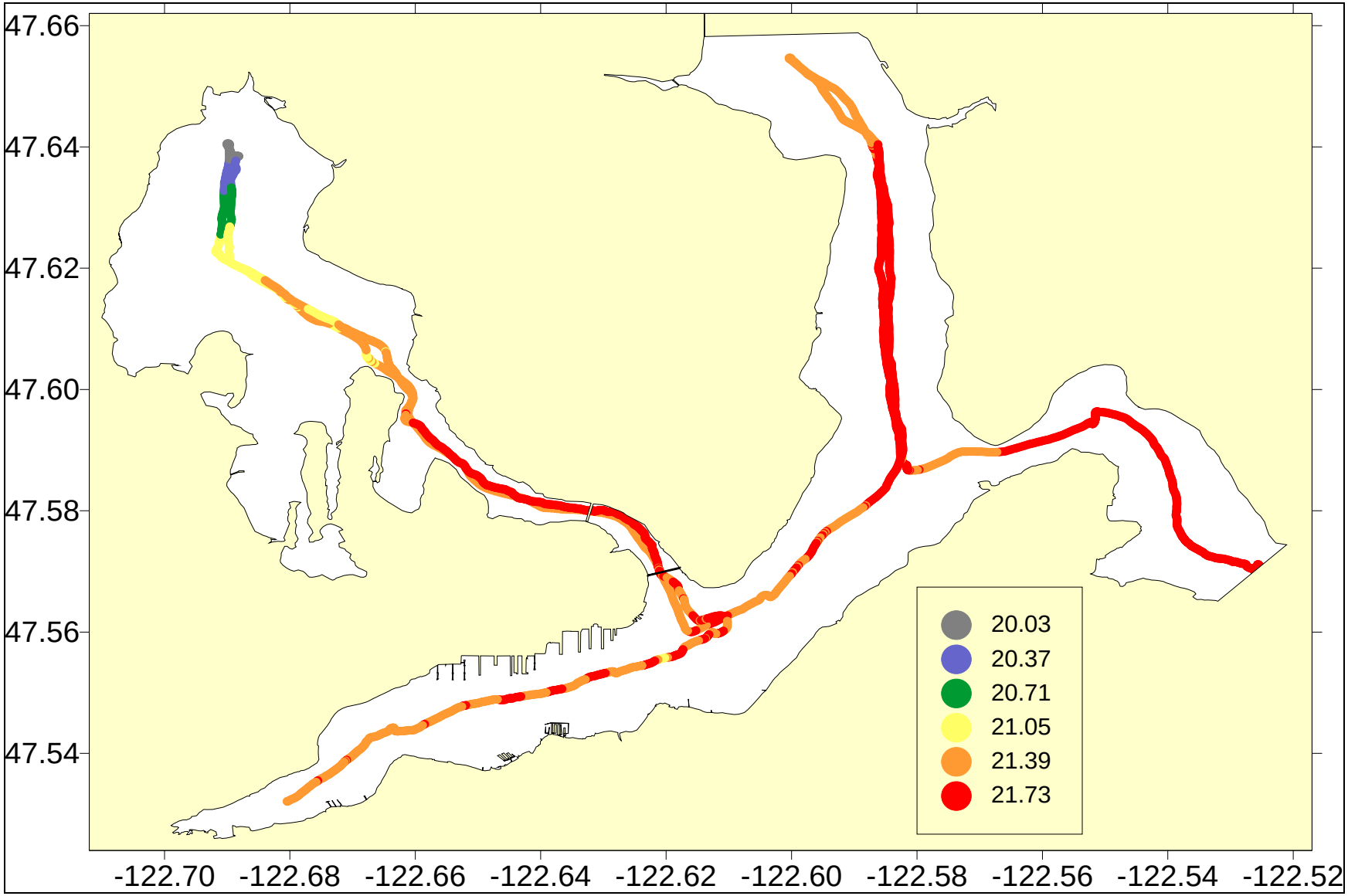
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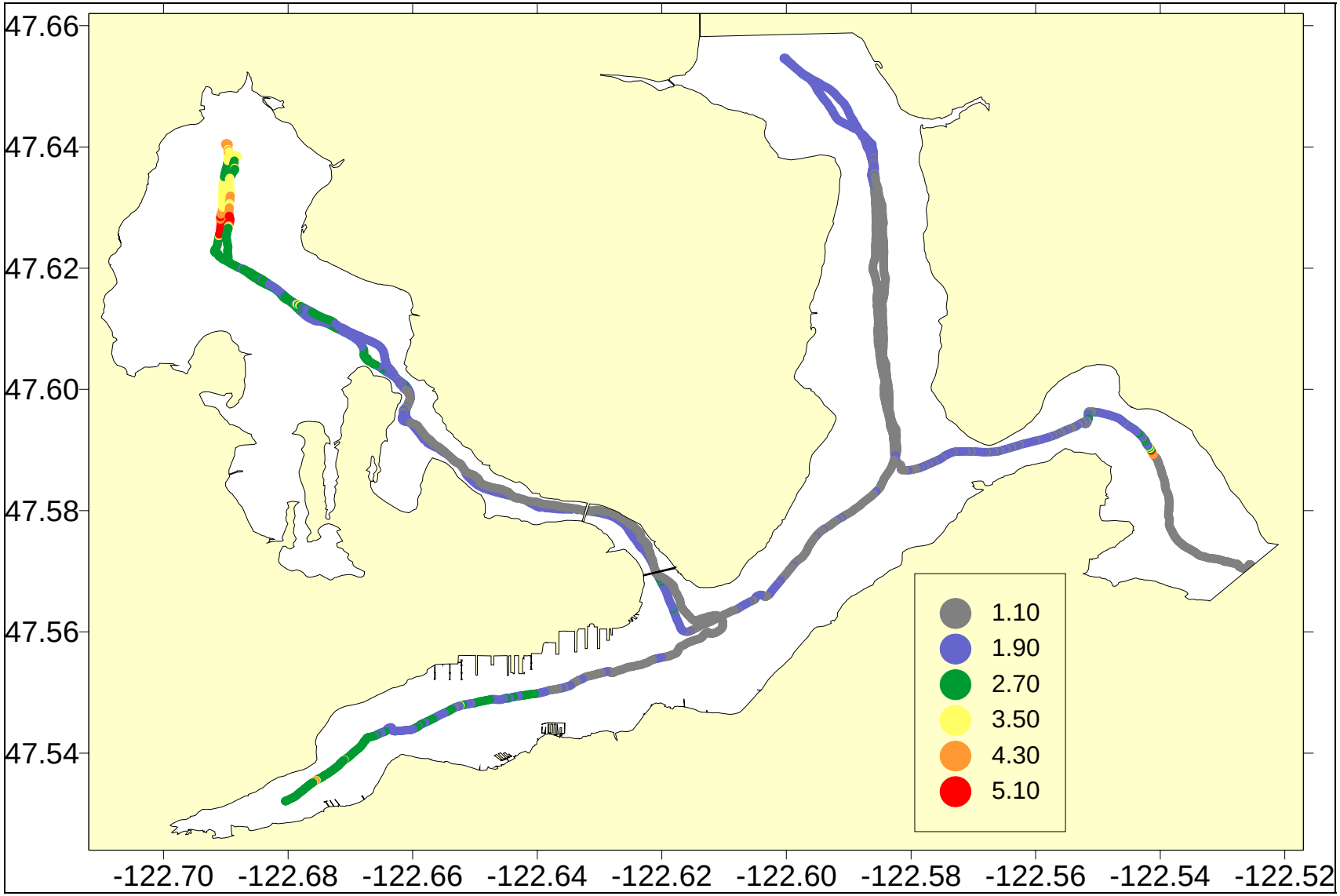
2.1.6 TSS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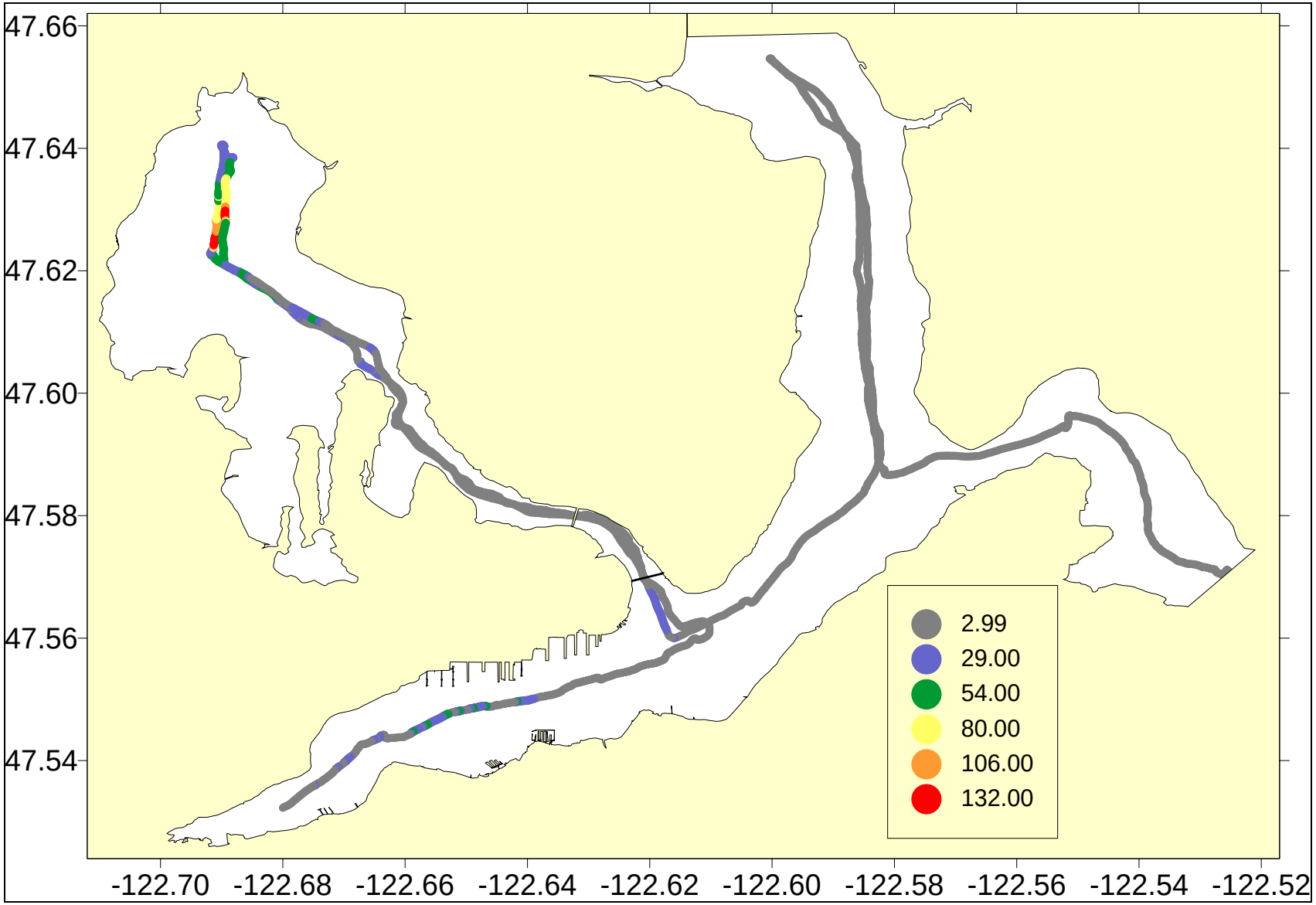

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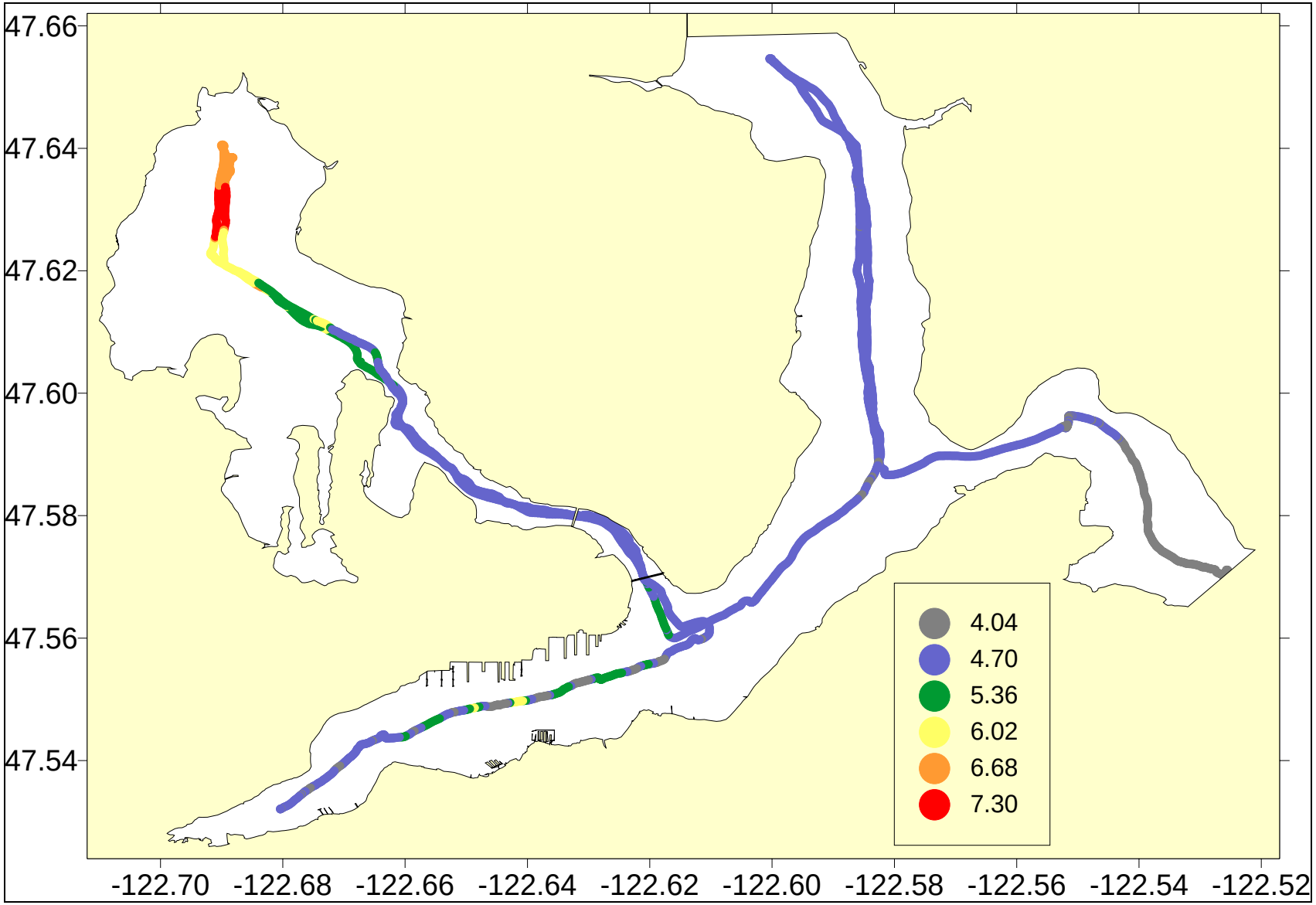
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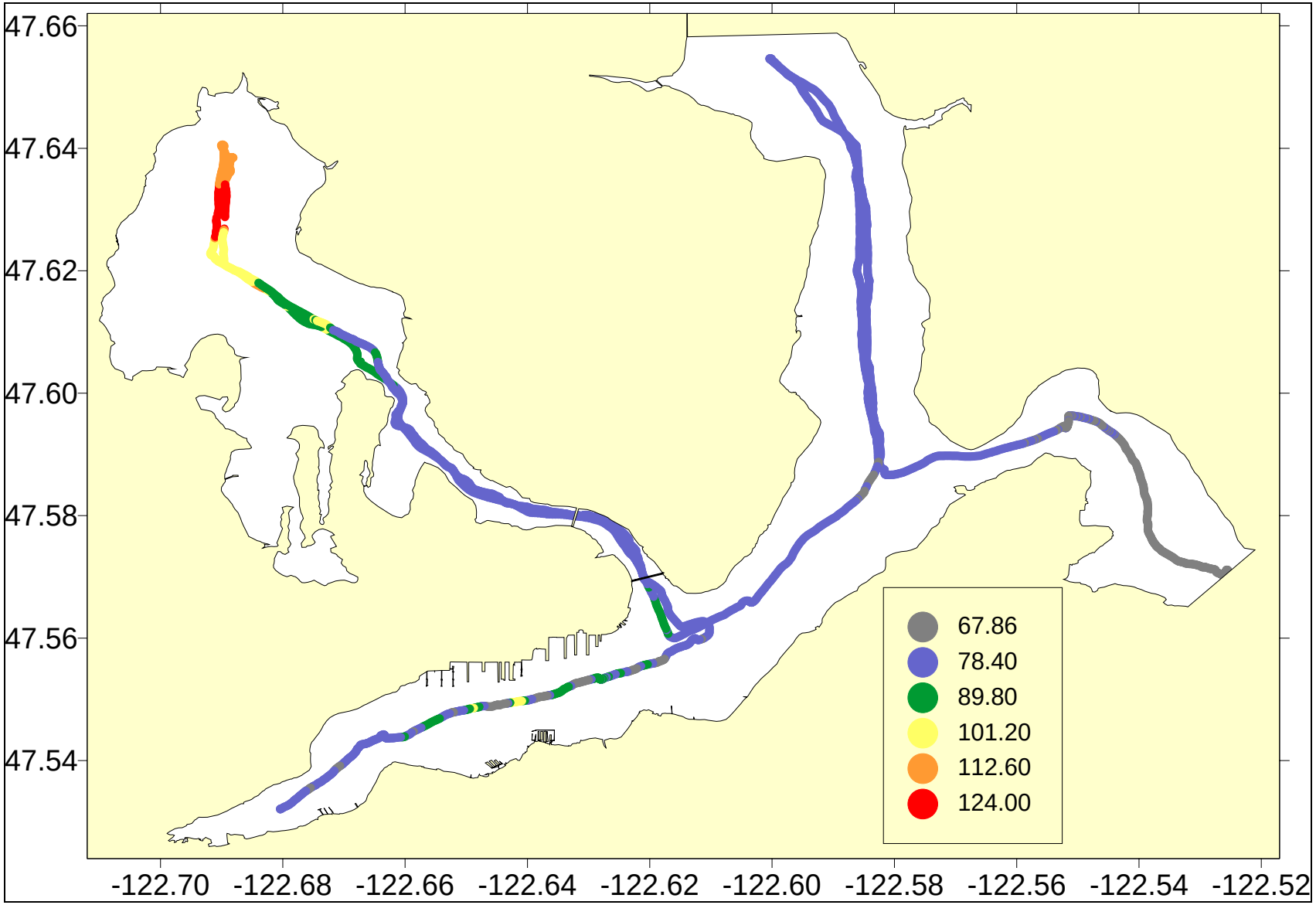

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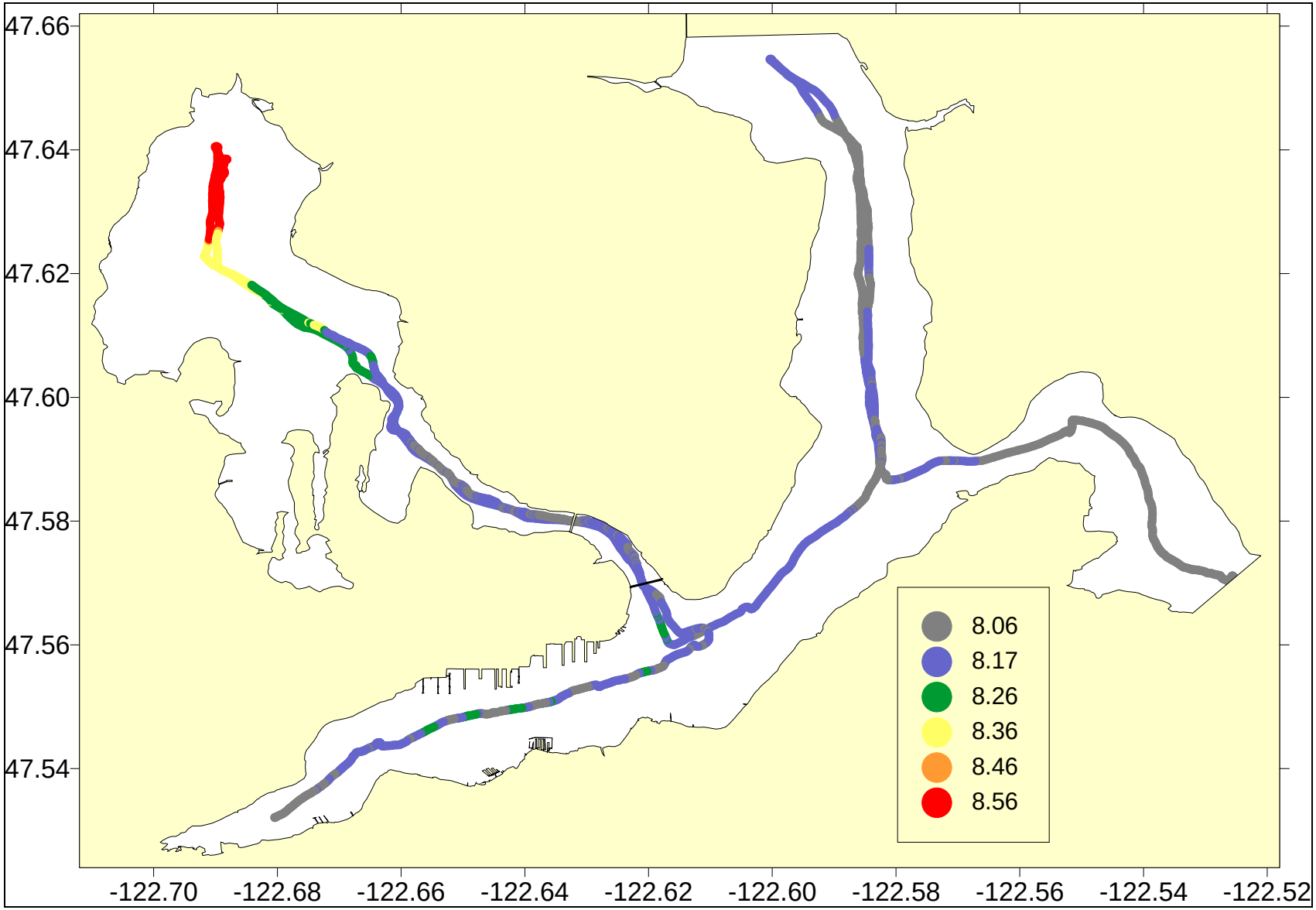
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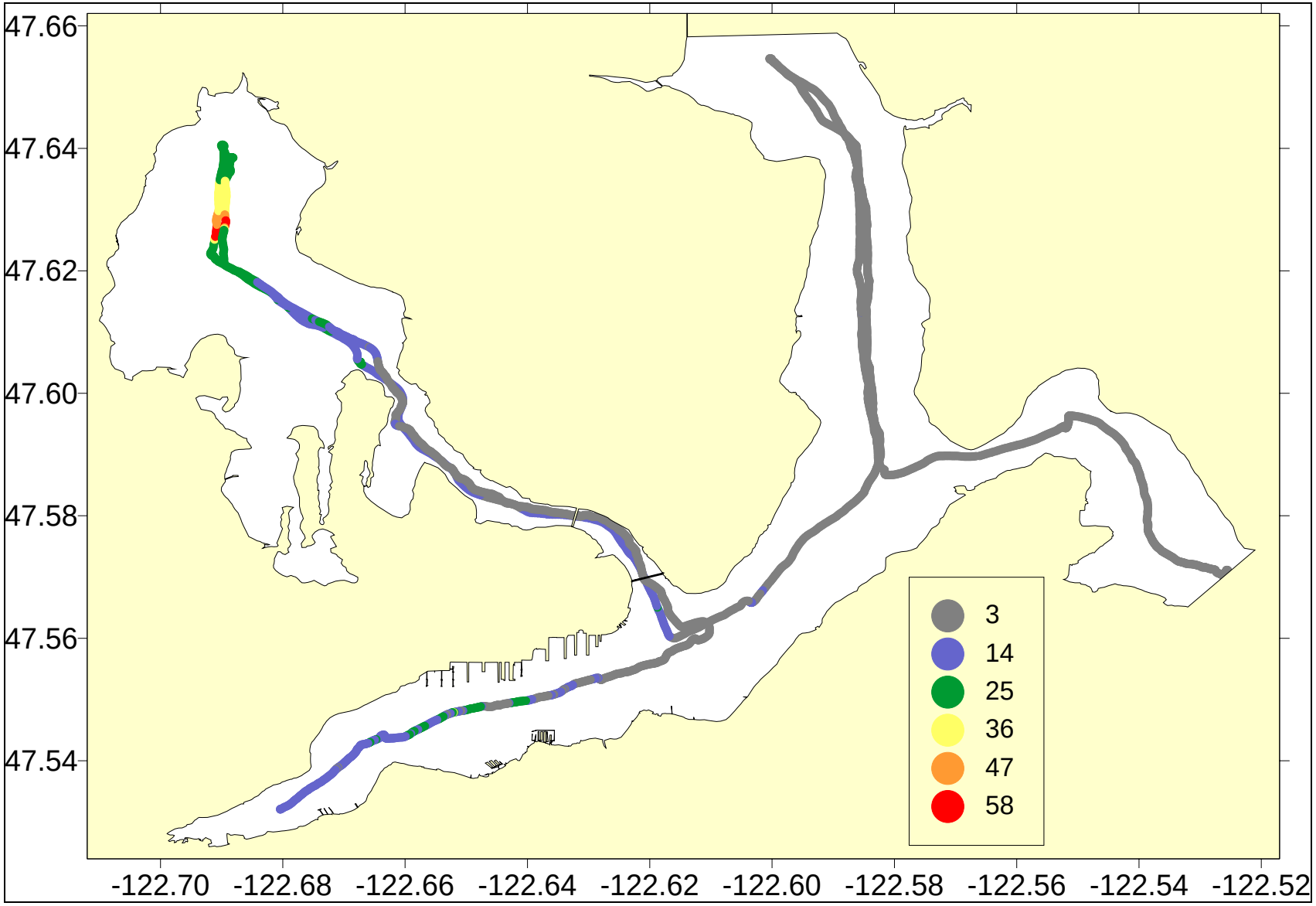
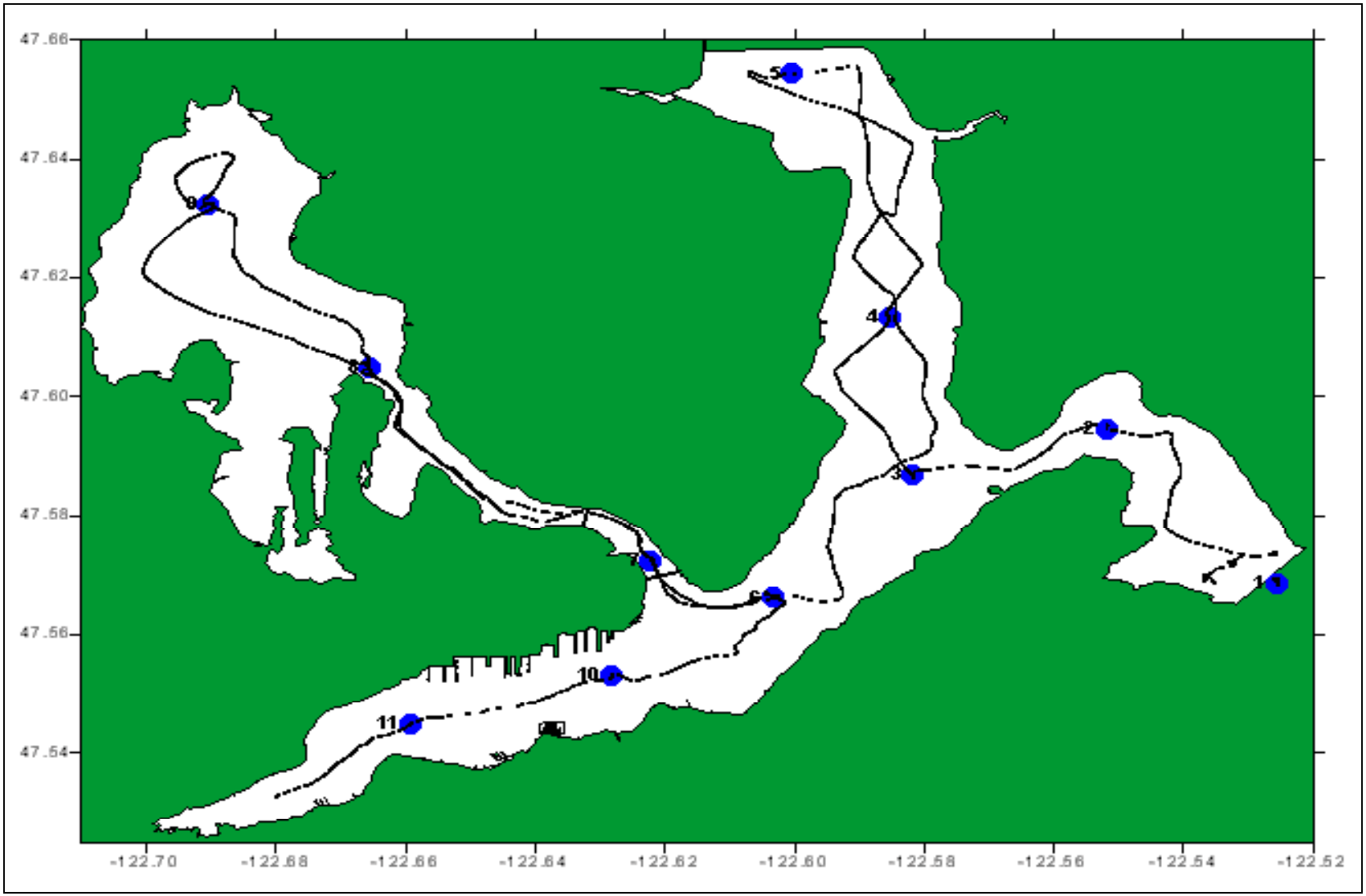
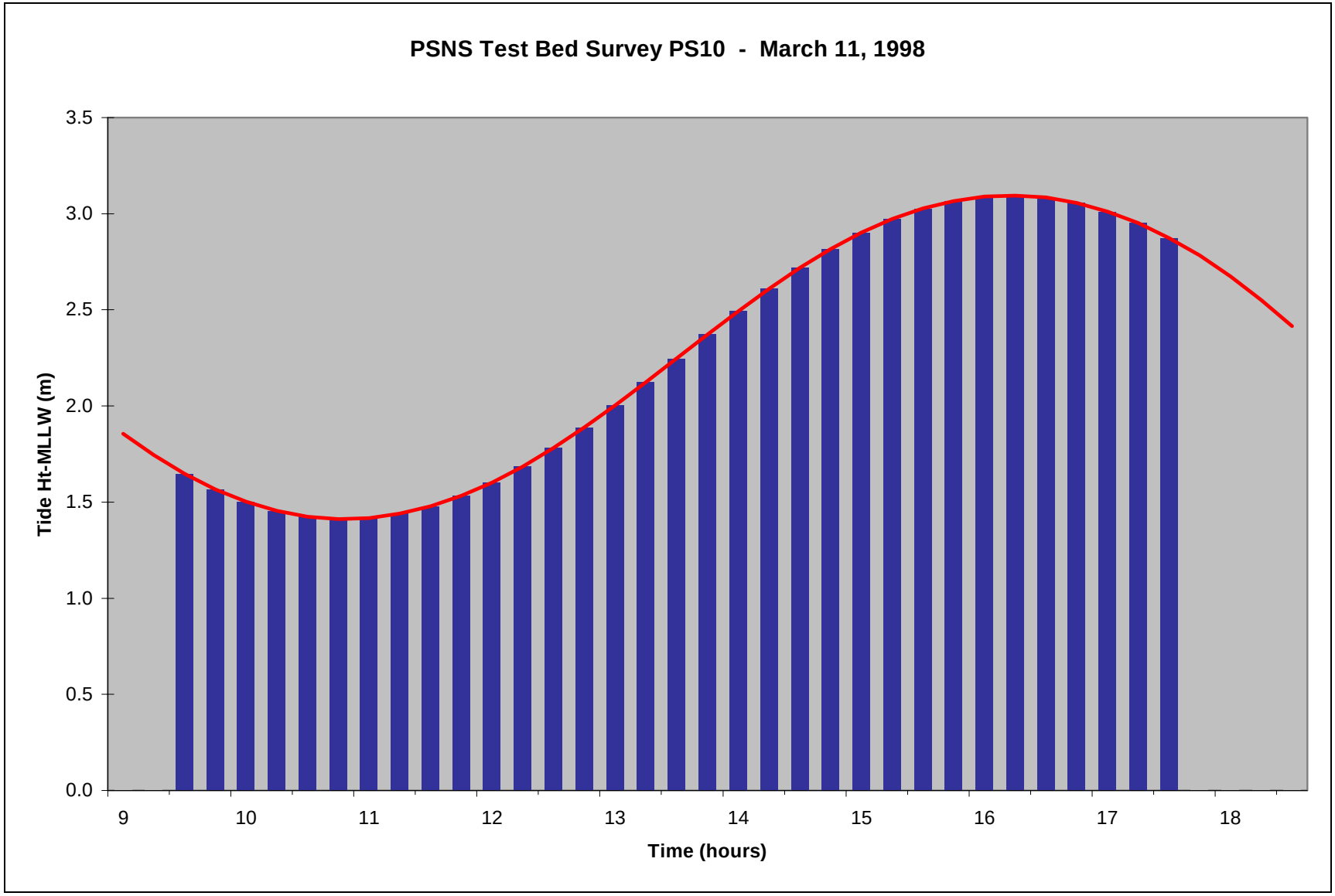


2.2 March 1998 – PS10

2.2.1 Track Map



2.2.2 Tide Chart



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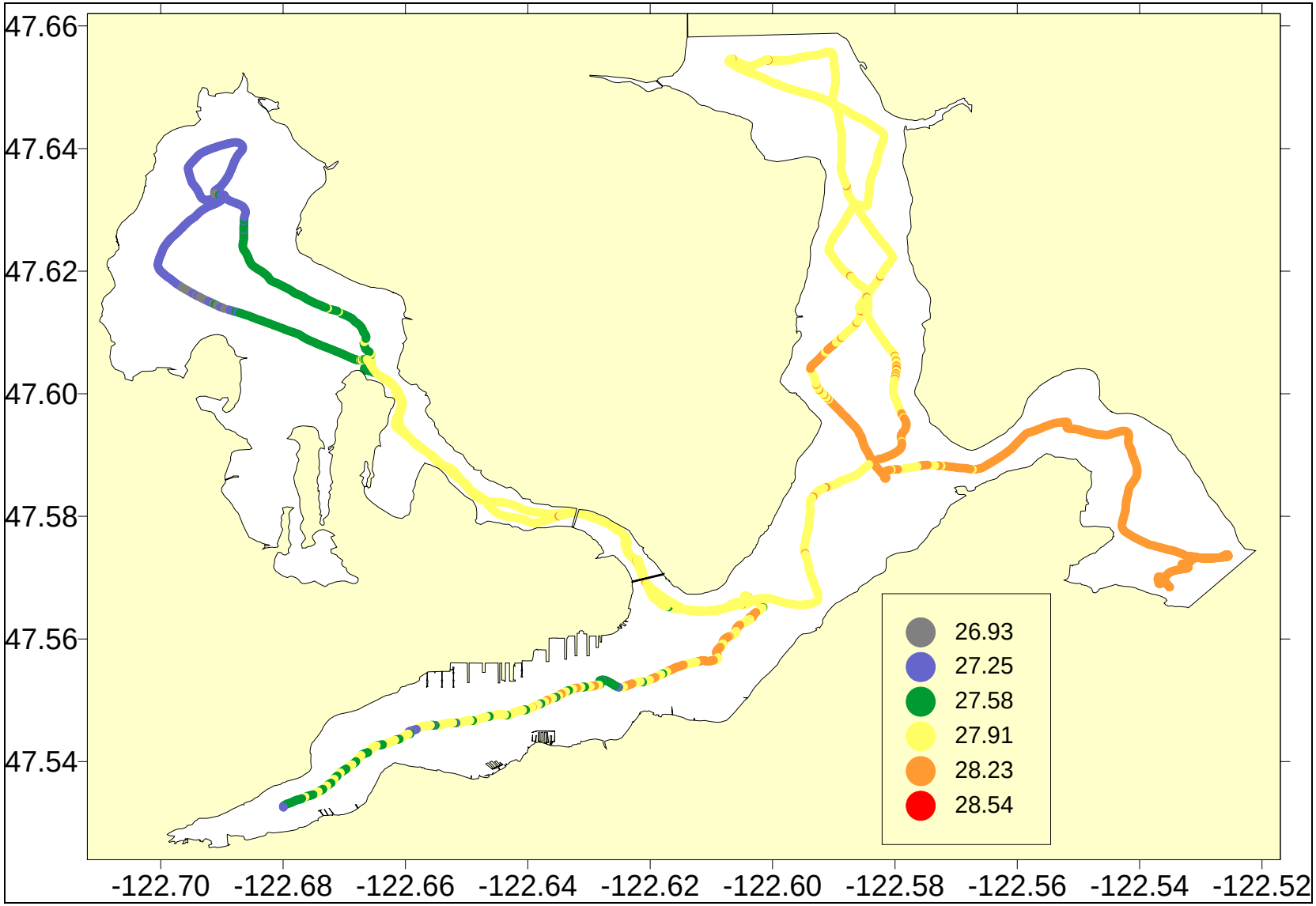

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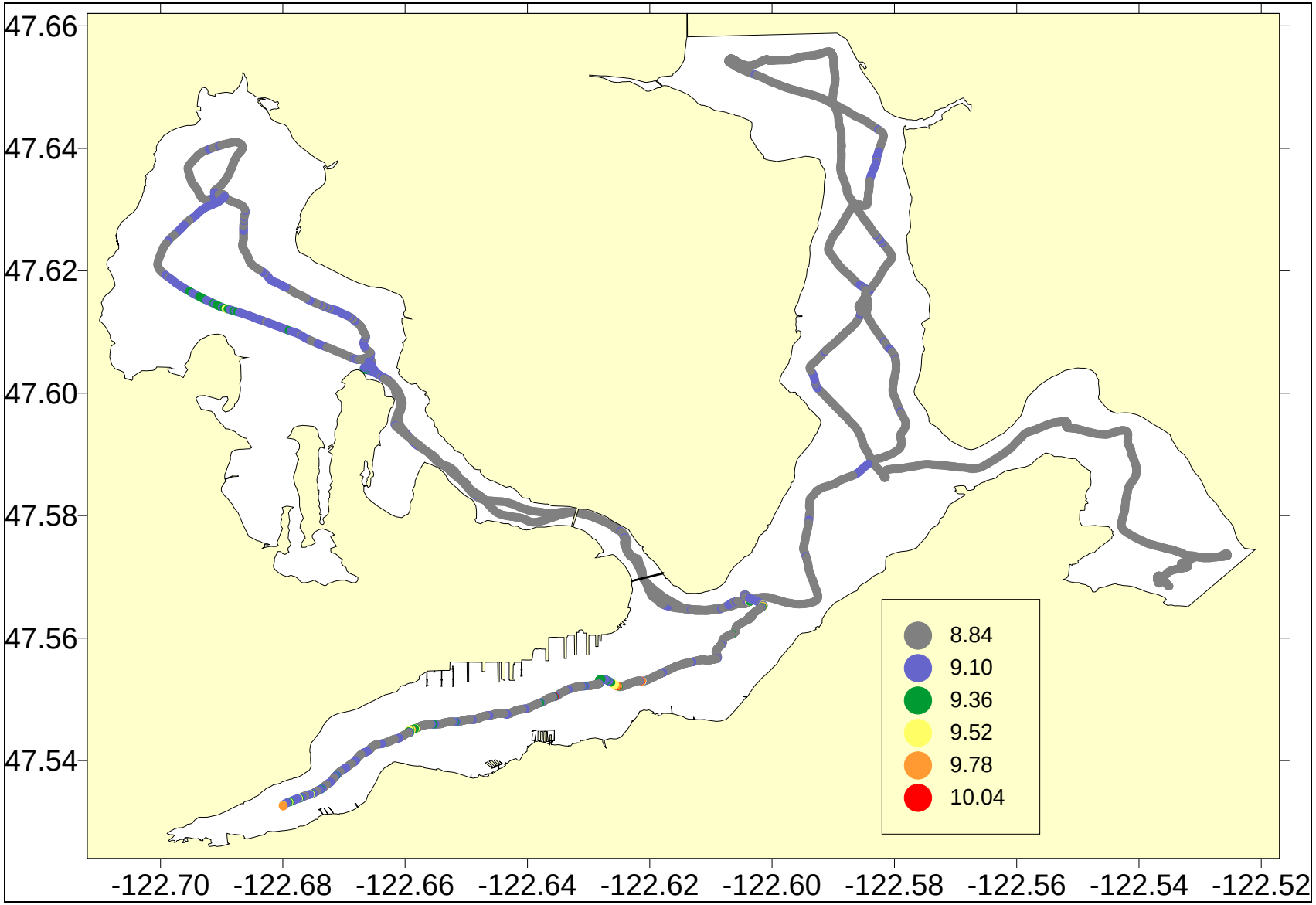

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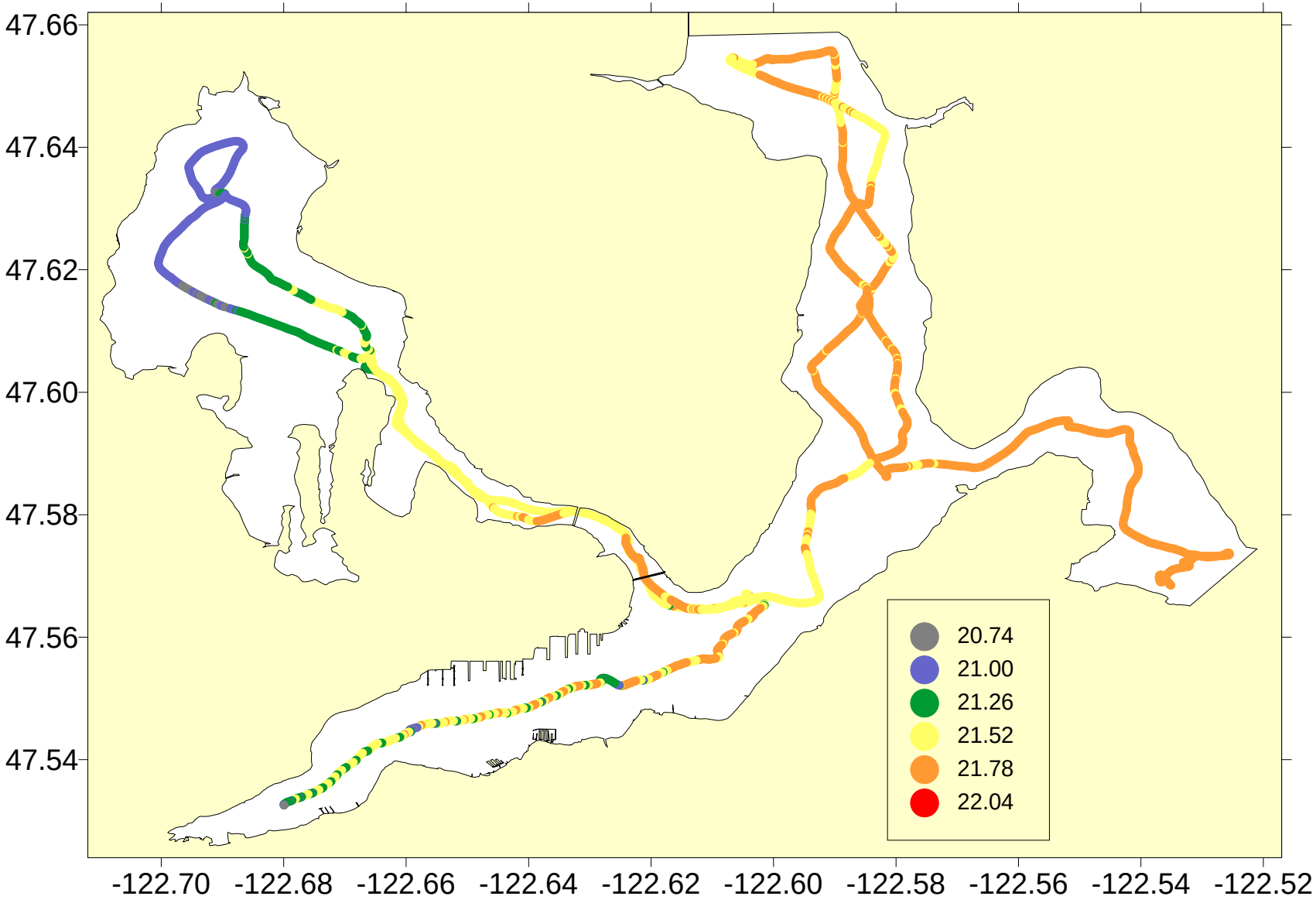
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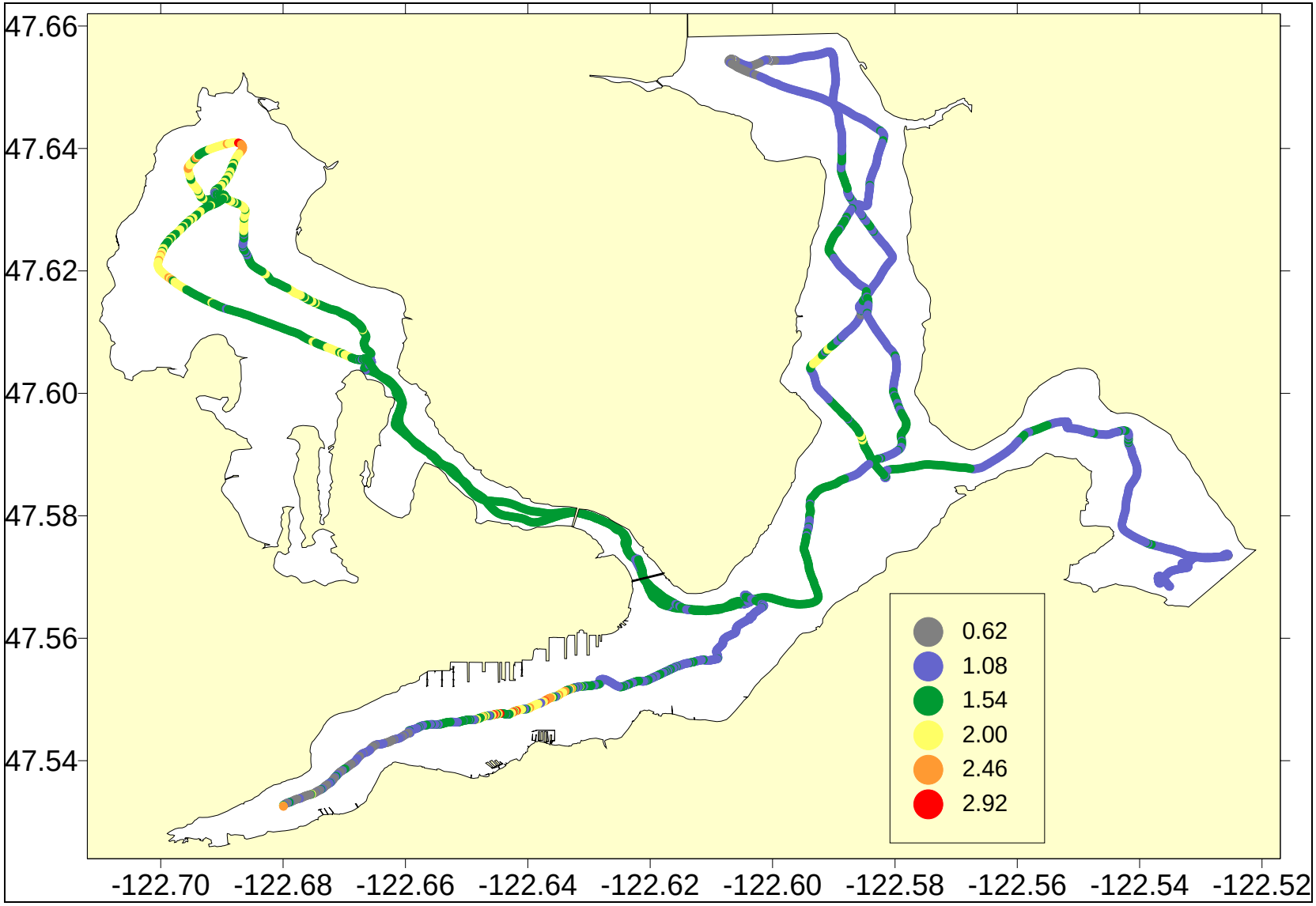
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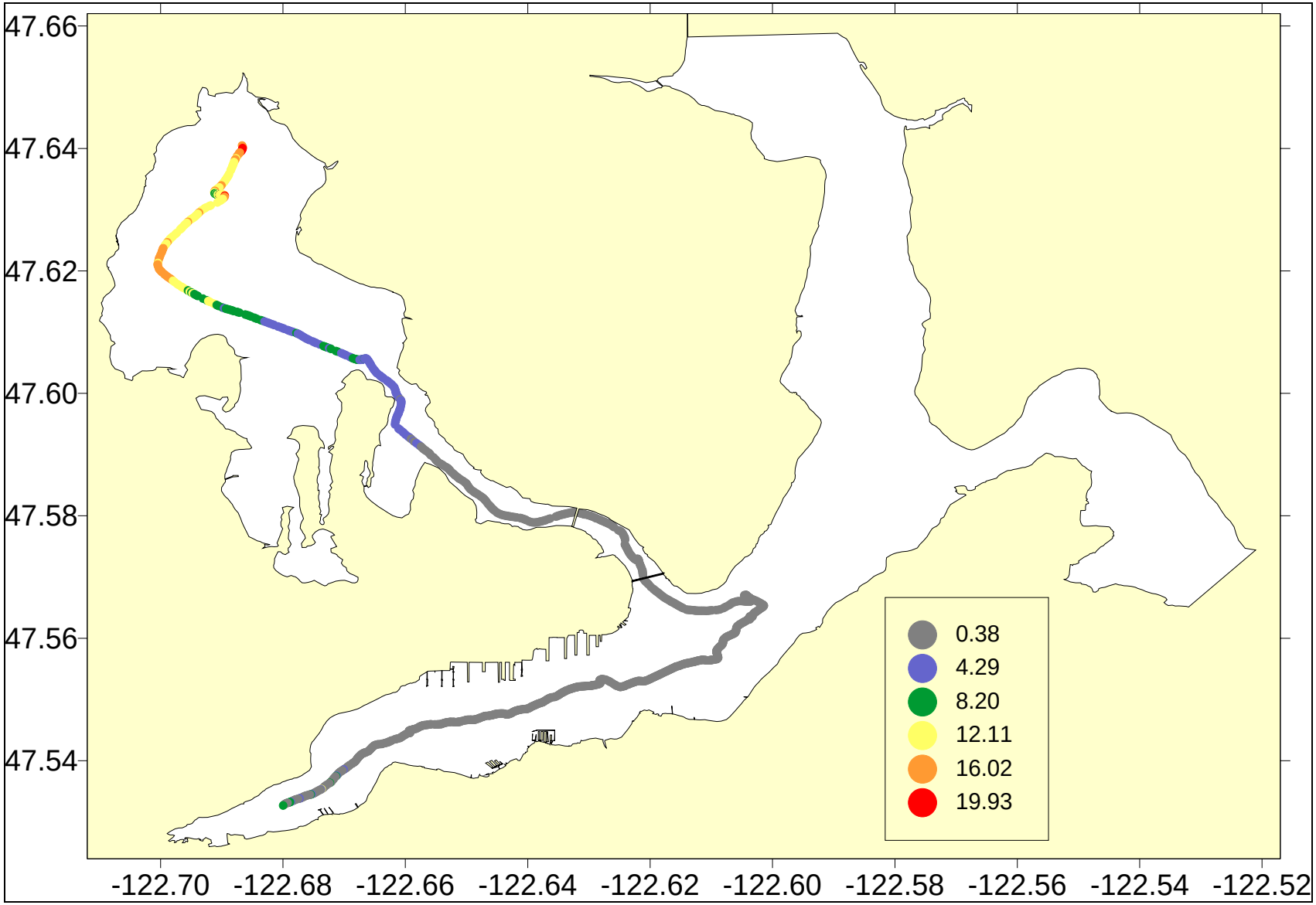

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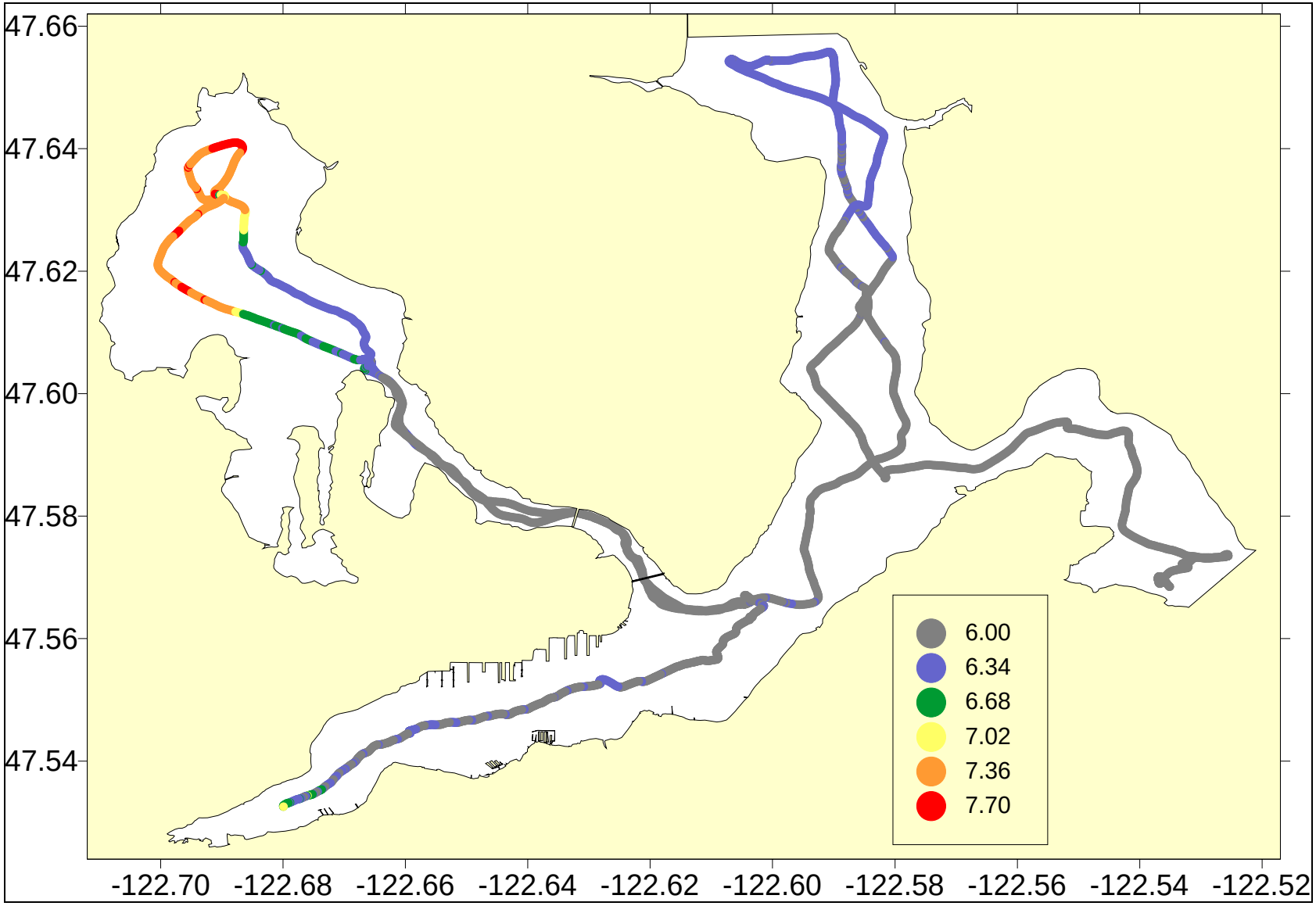
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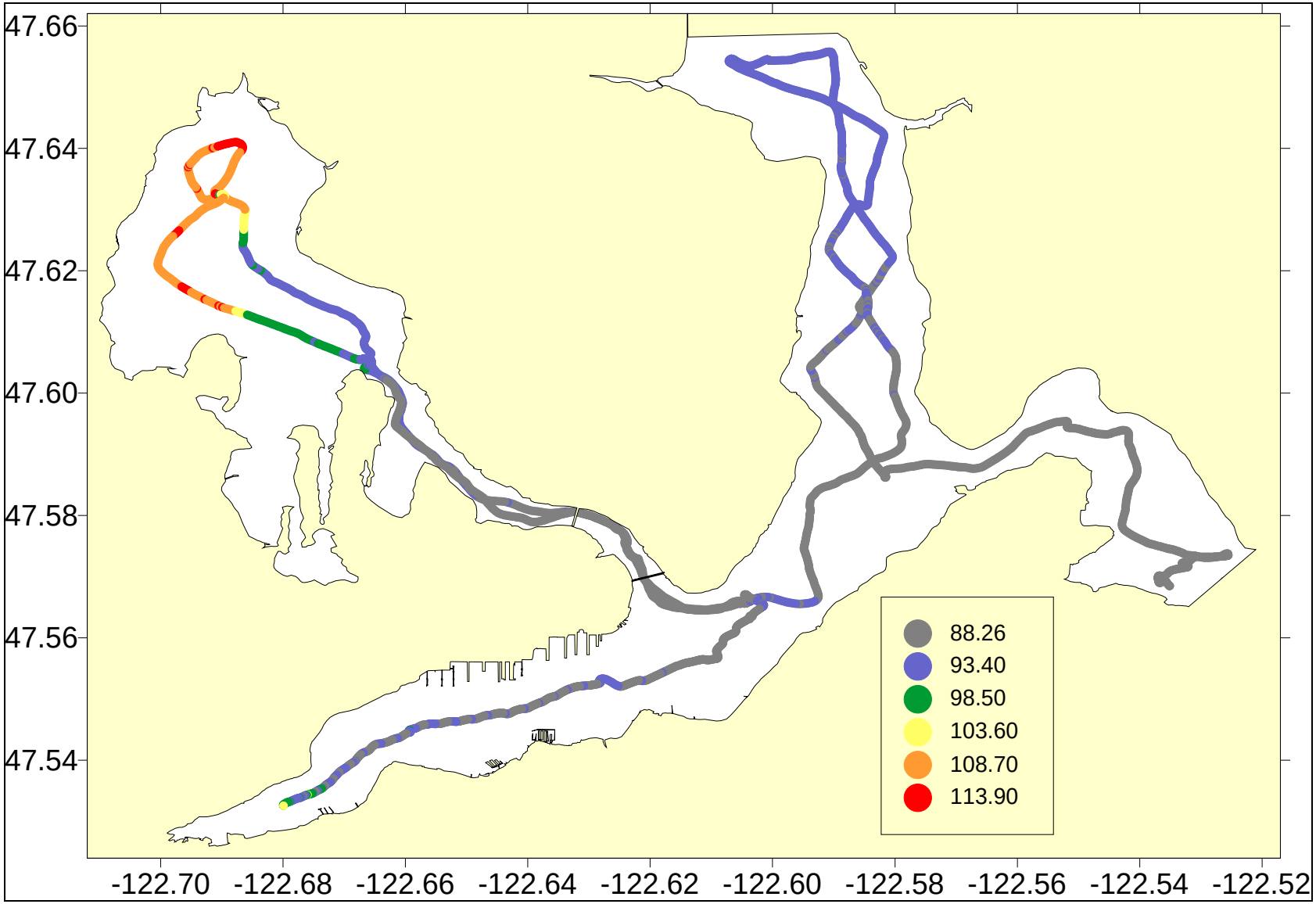
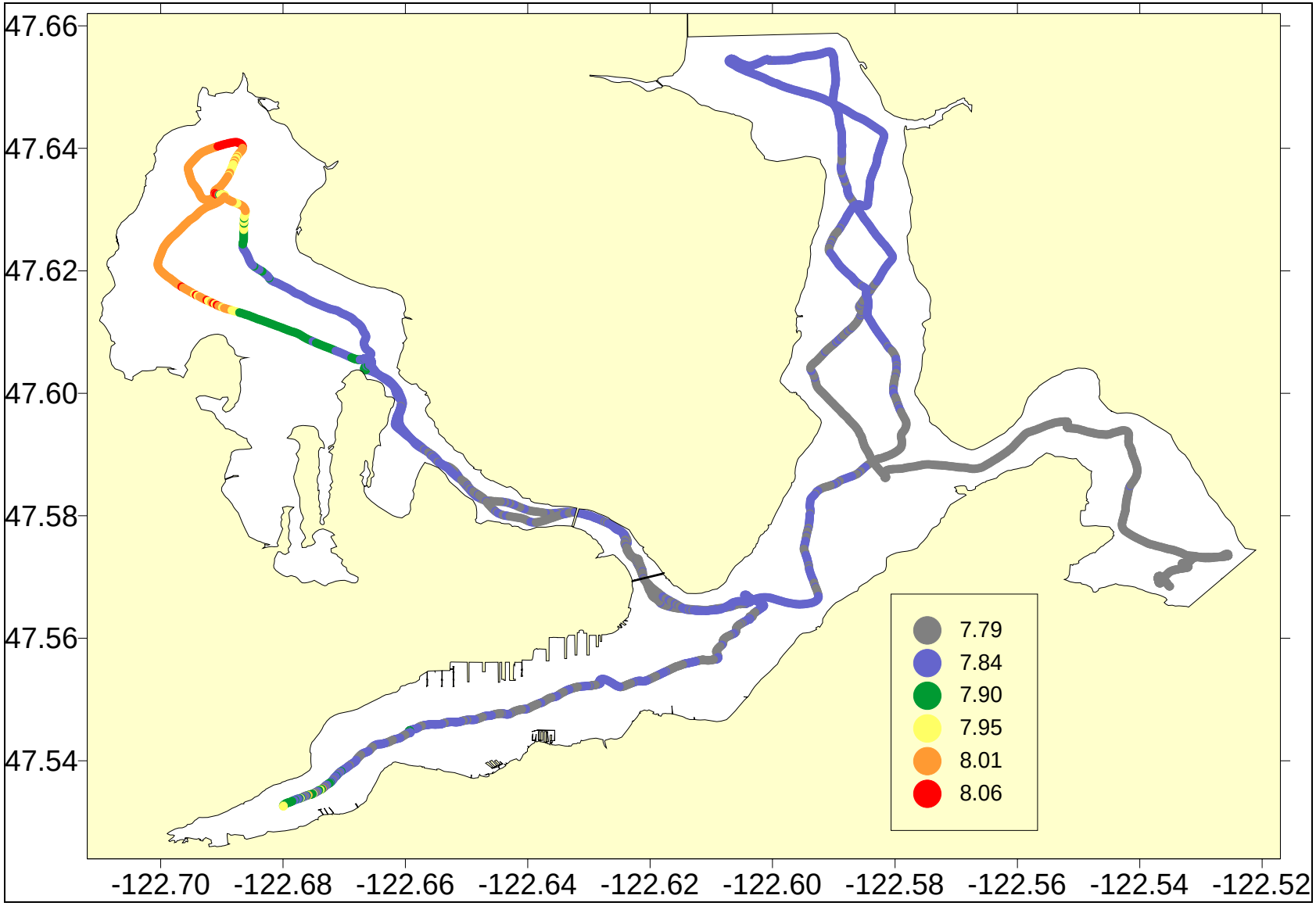
7.70

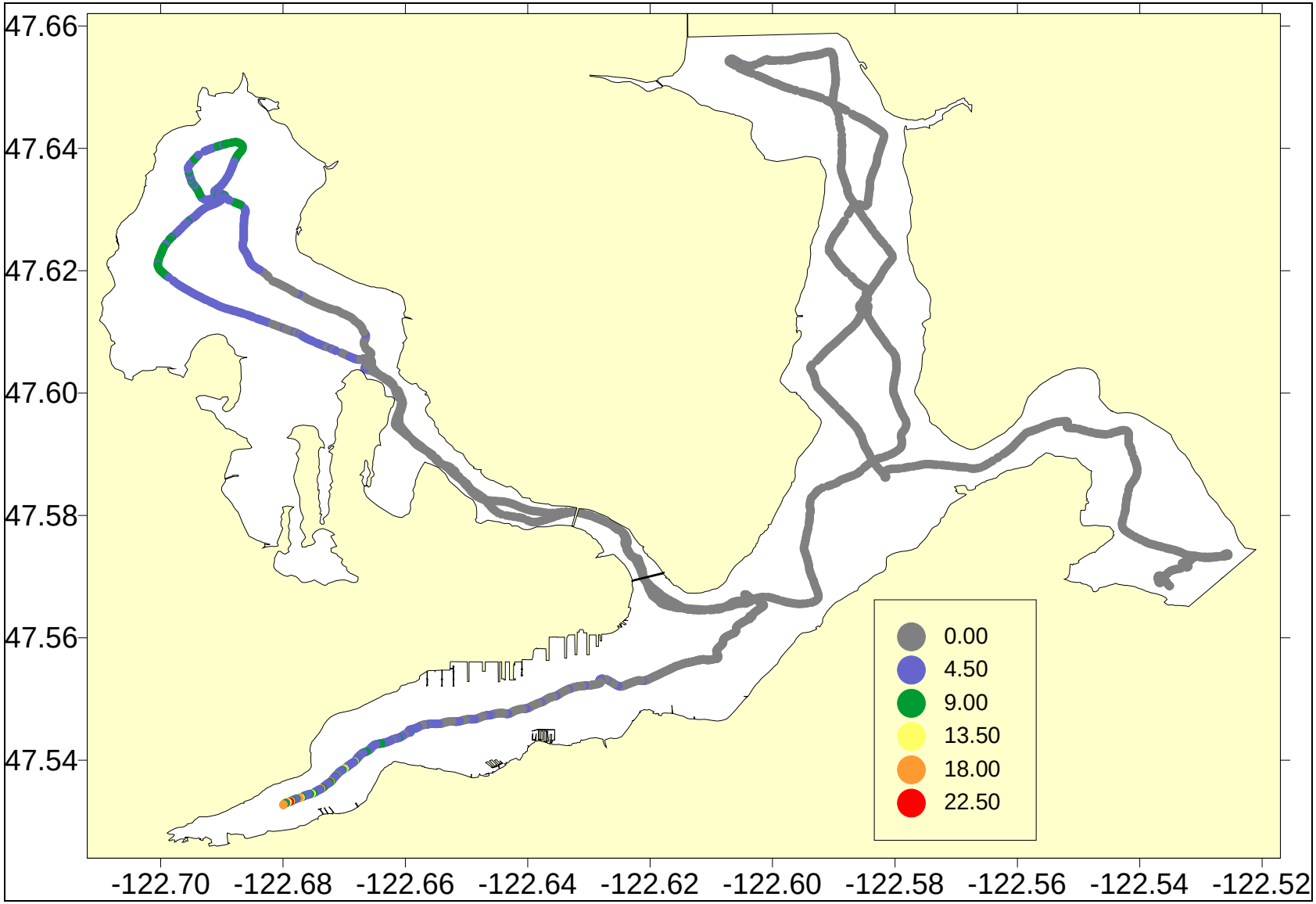
2.2.9 Oxygen Saturation



2.2.10 pH

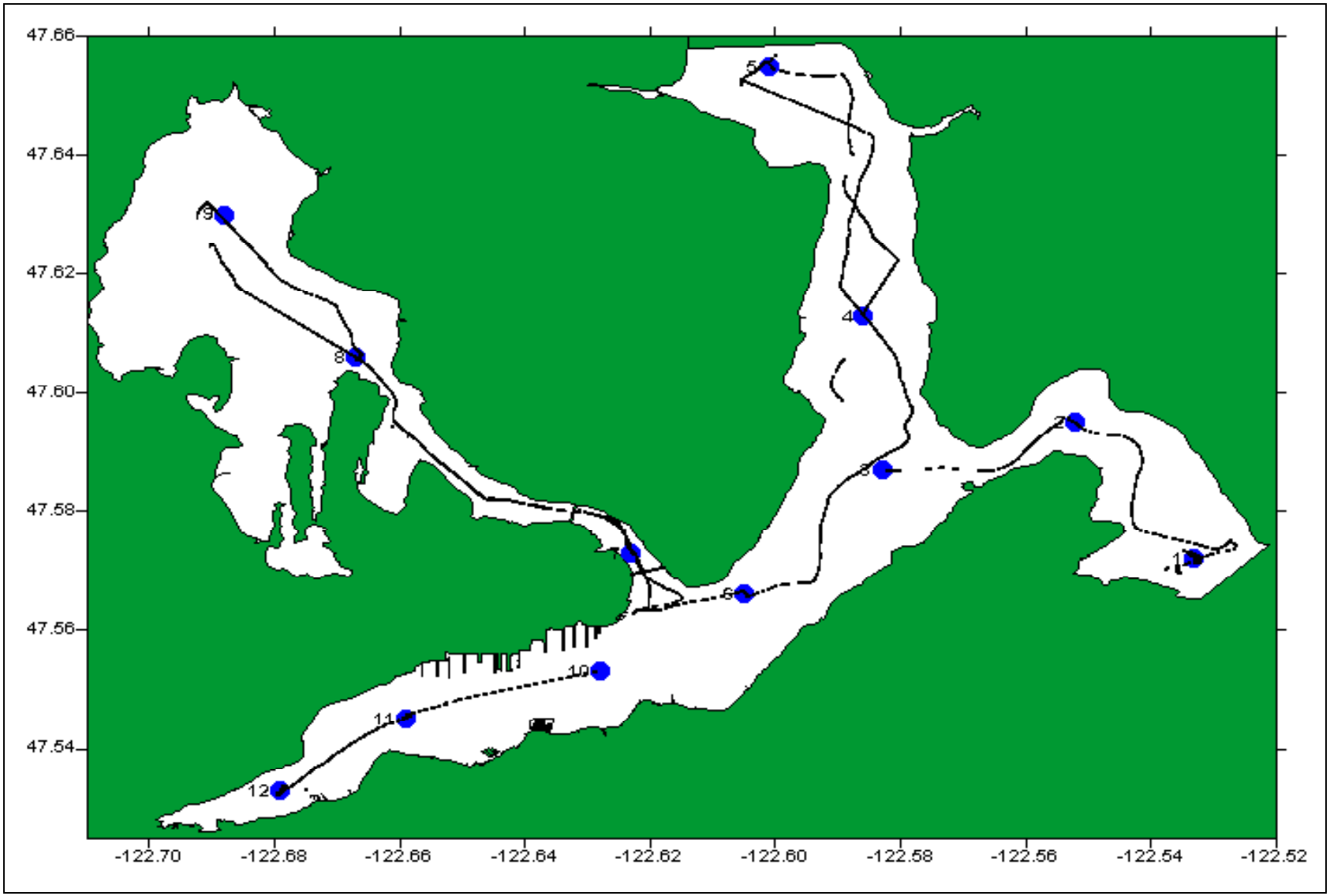

47.66
47.64
47.62
47.60
47.58
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
-122.58
-122.56
-122.54
-122.52
7.79
7.84
7.90
7.95
8.01
8.06

2.2.11 Oil Fluorescence

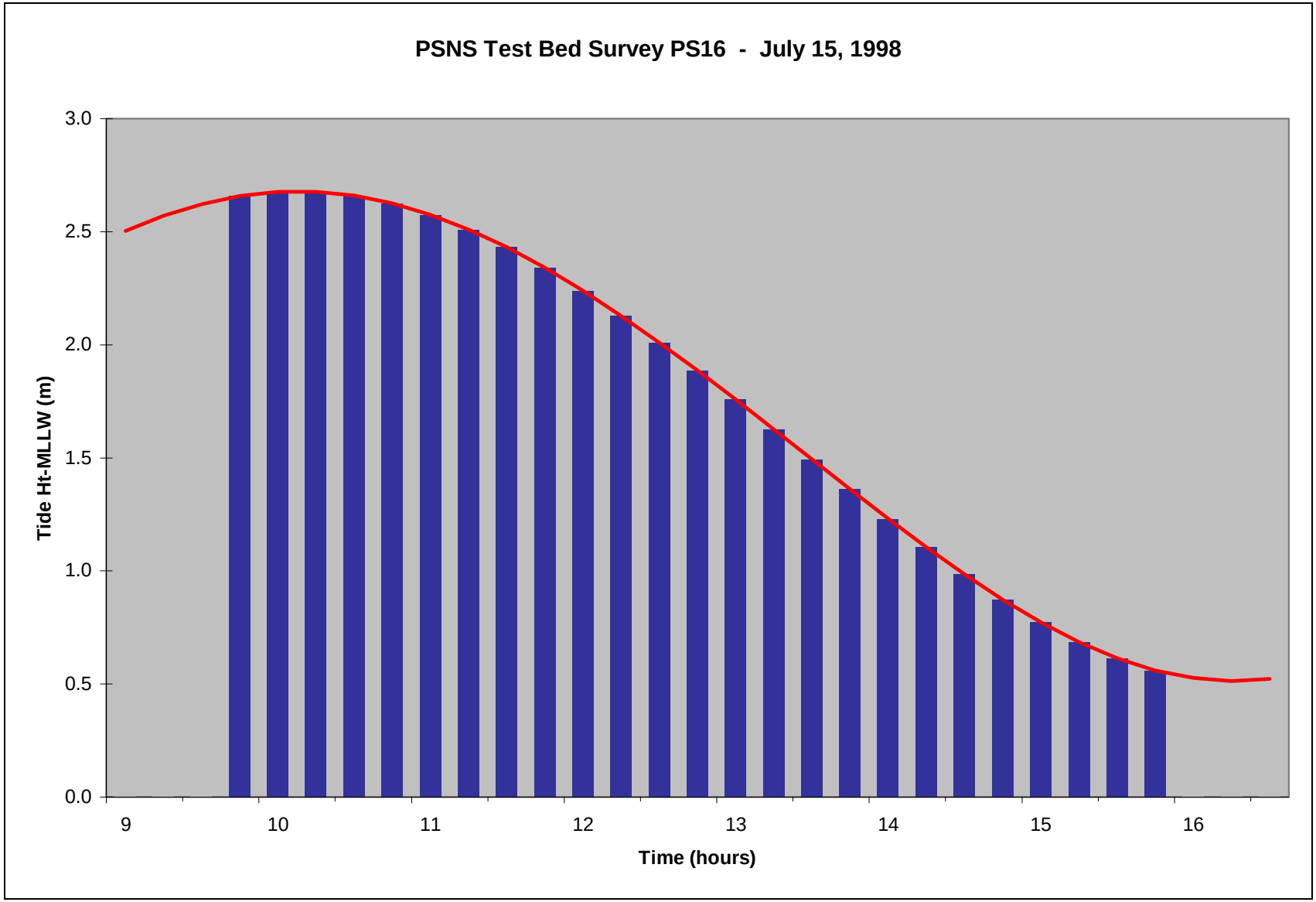


2.3 July 1998 – PS16

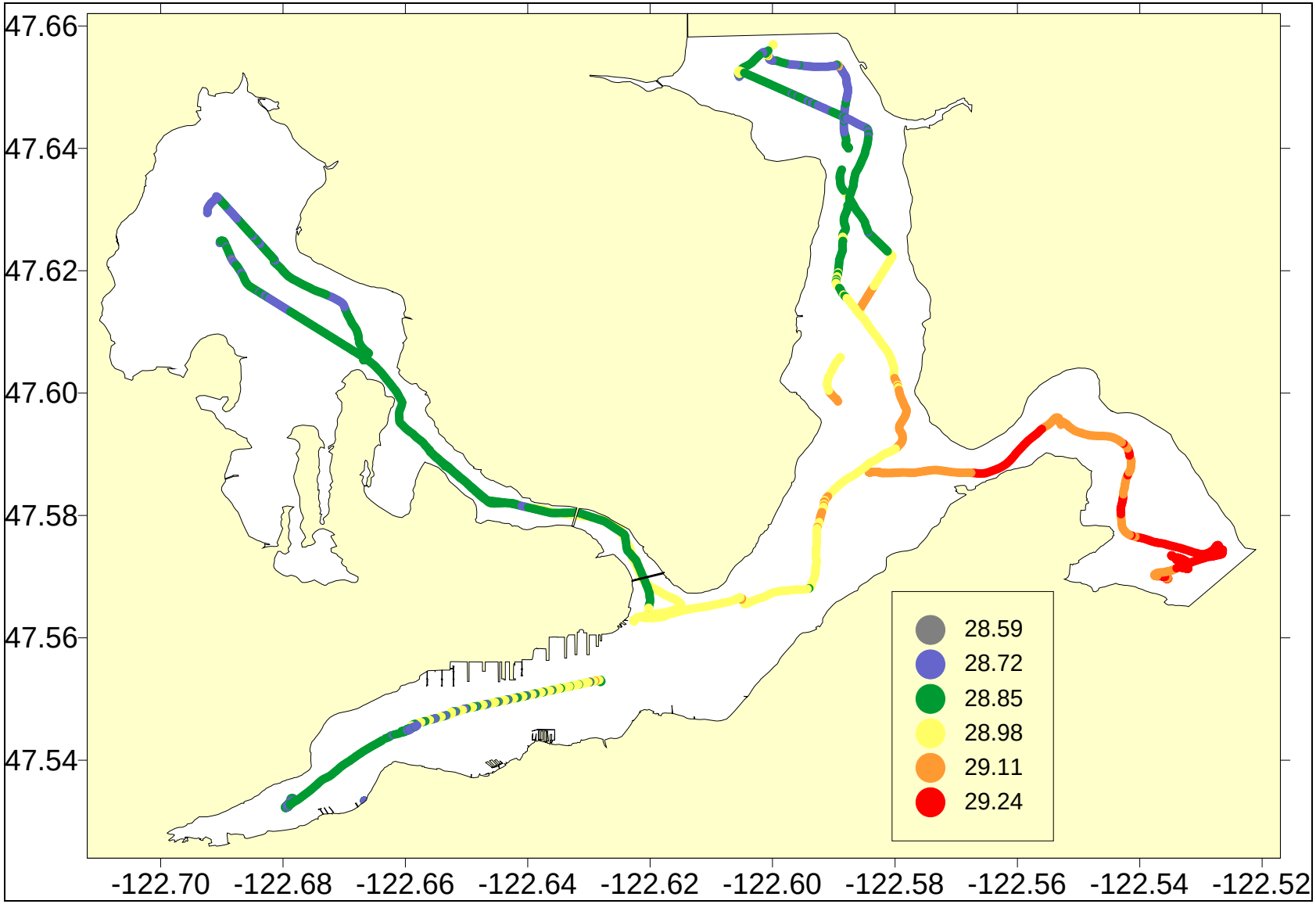
2.3.1 Track Map



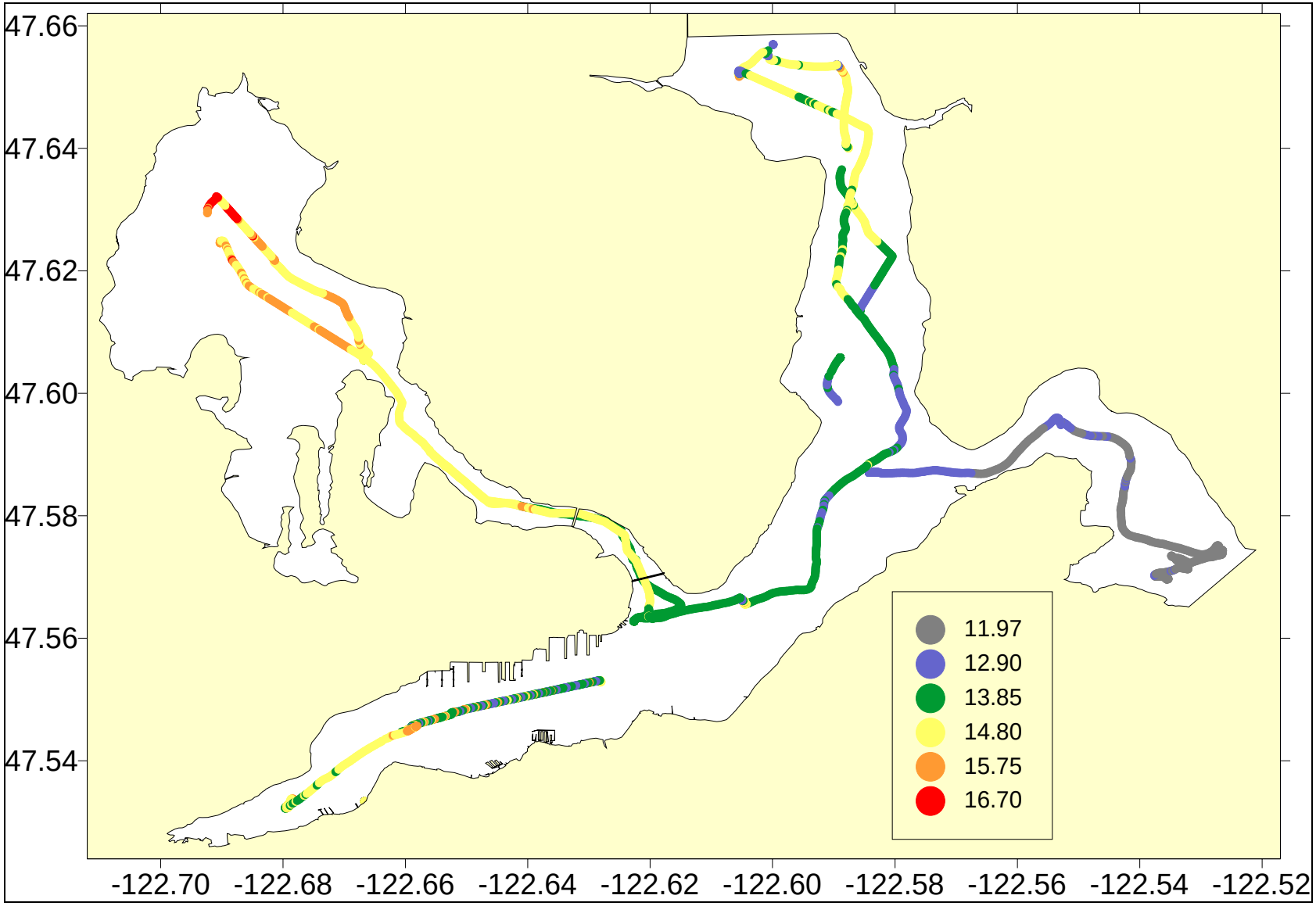
2.3.2 Tide Chart



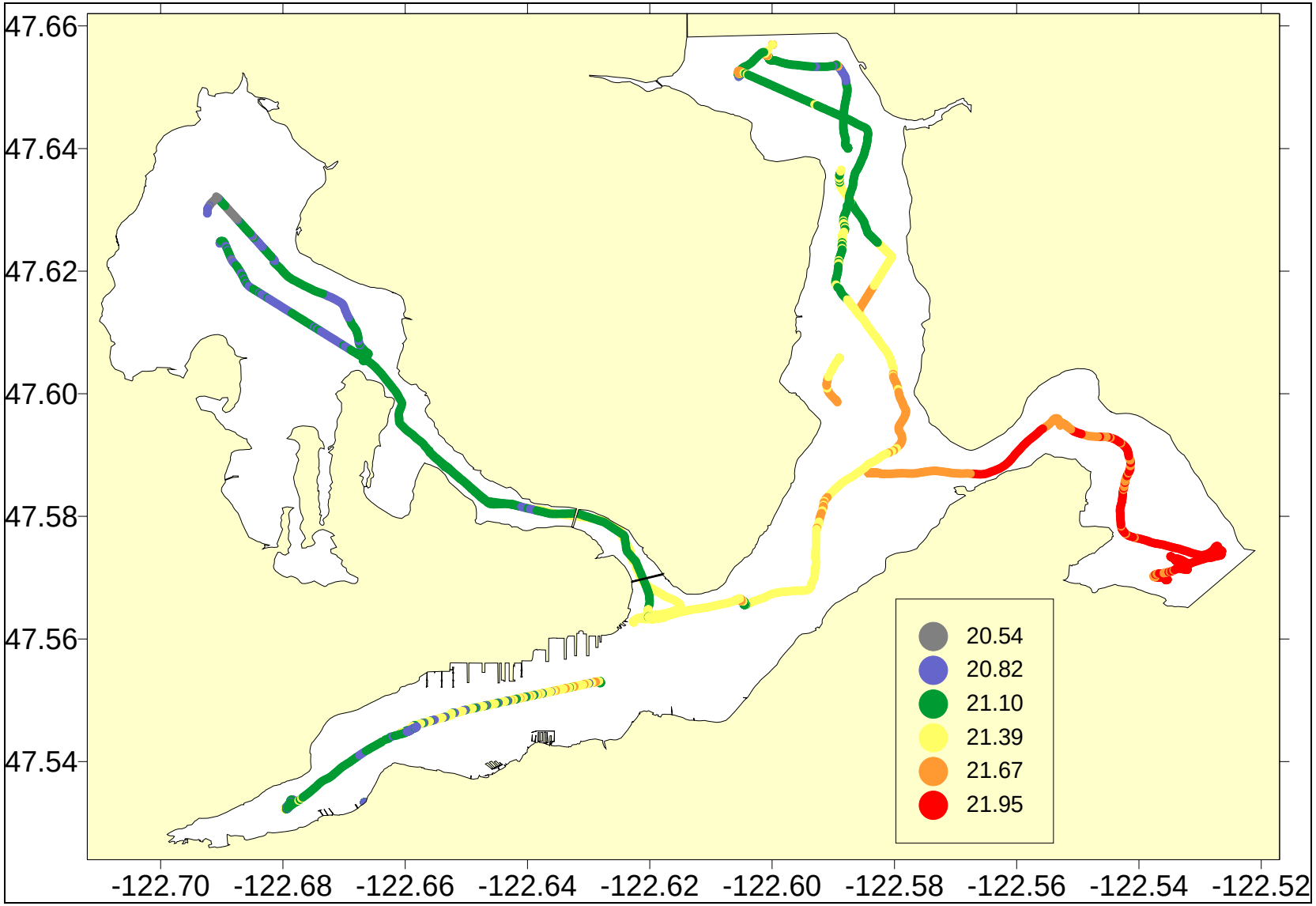
2.3.3 Salinity



2.3.4 Temperature



2.3.5 Density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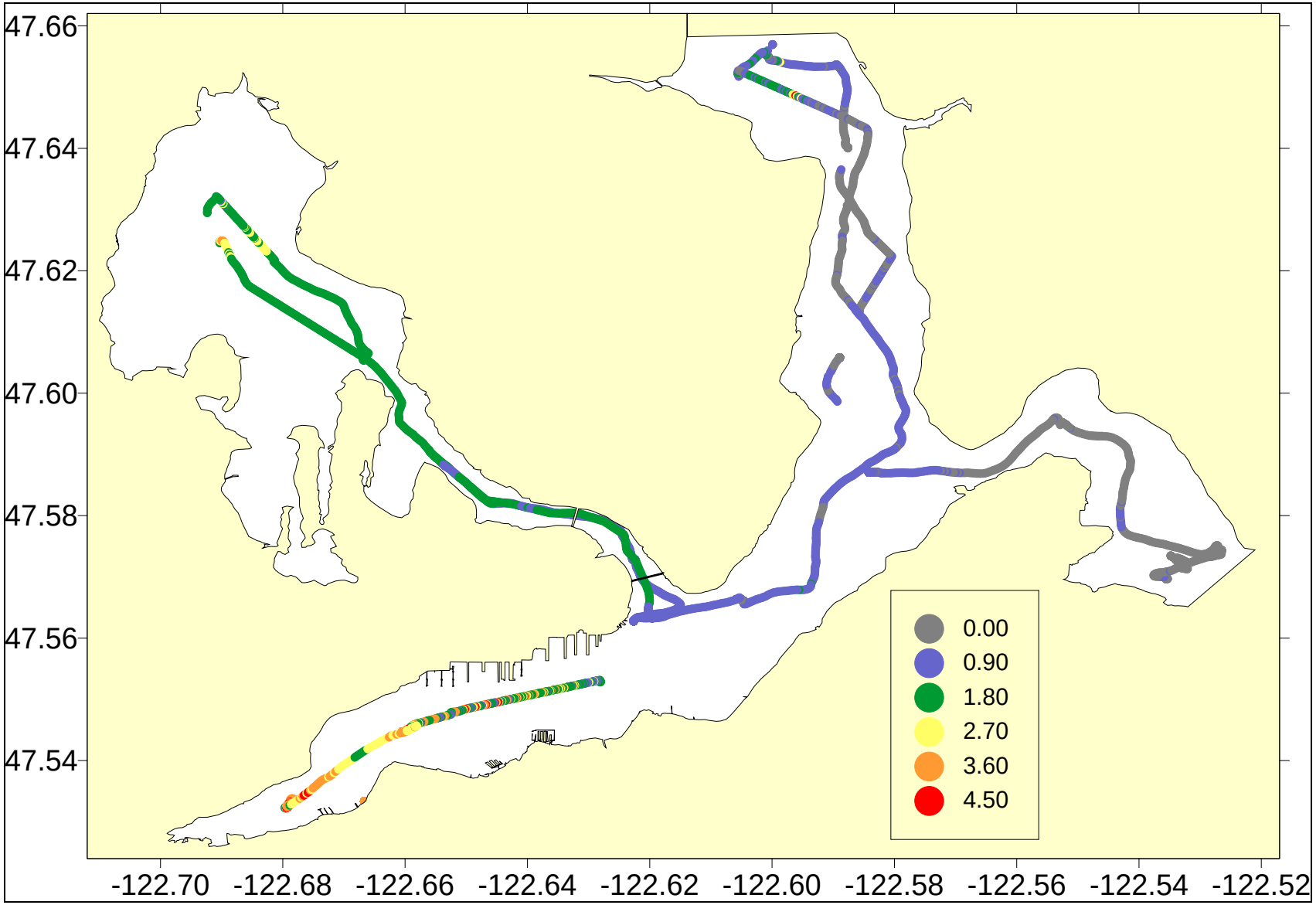
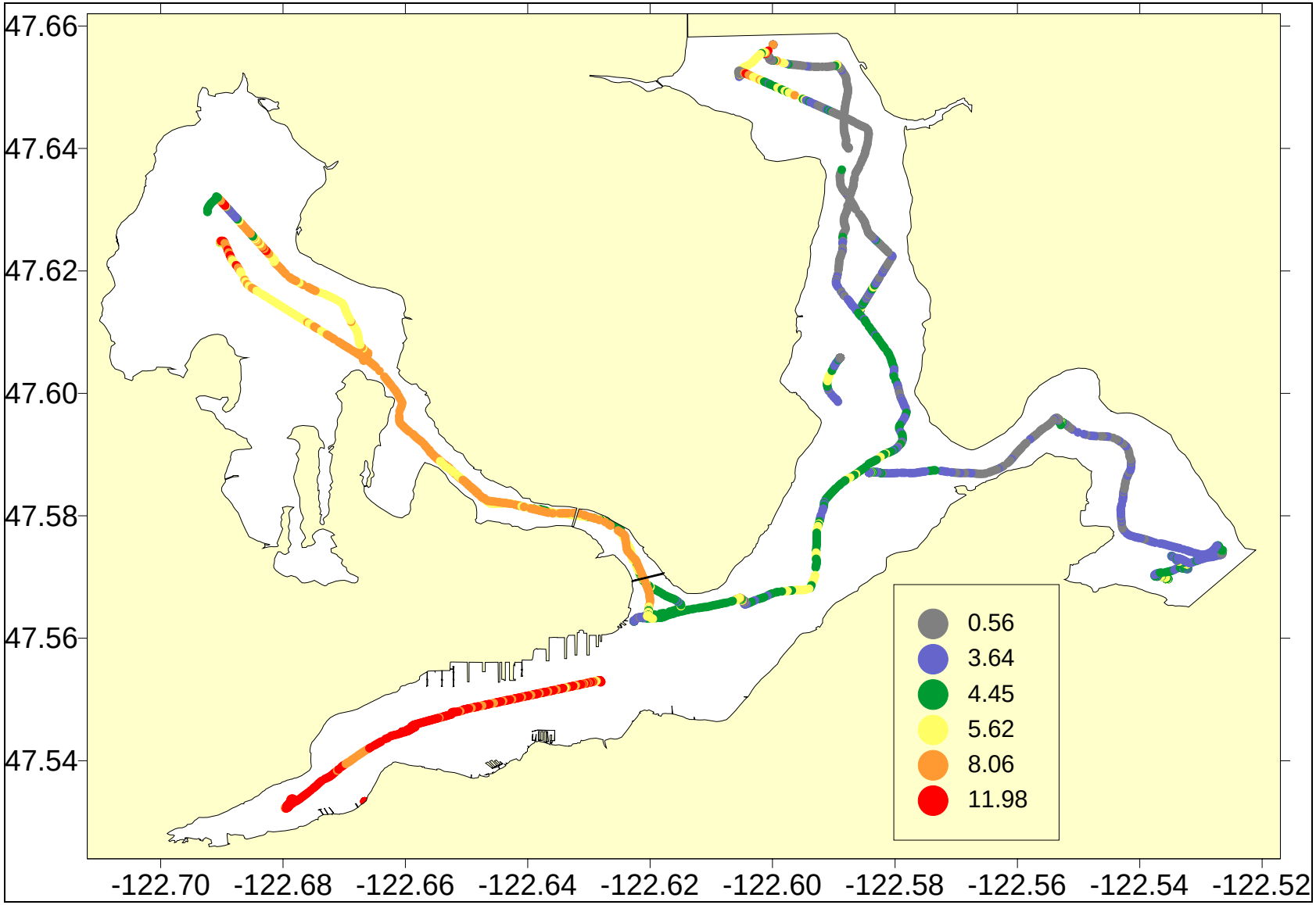
47.64
47.62
47.60
47.58
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
-122.58
-122.56
-122.54
-122.52
20.54
20.82
21.10
21.39
21.67
21.95

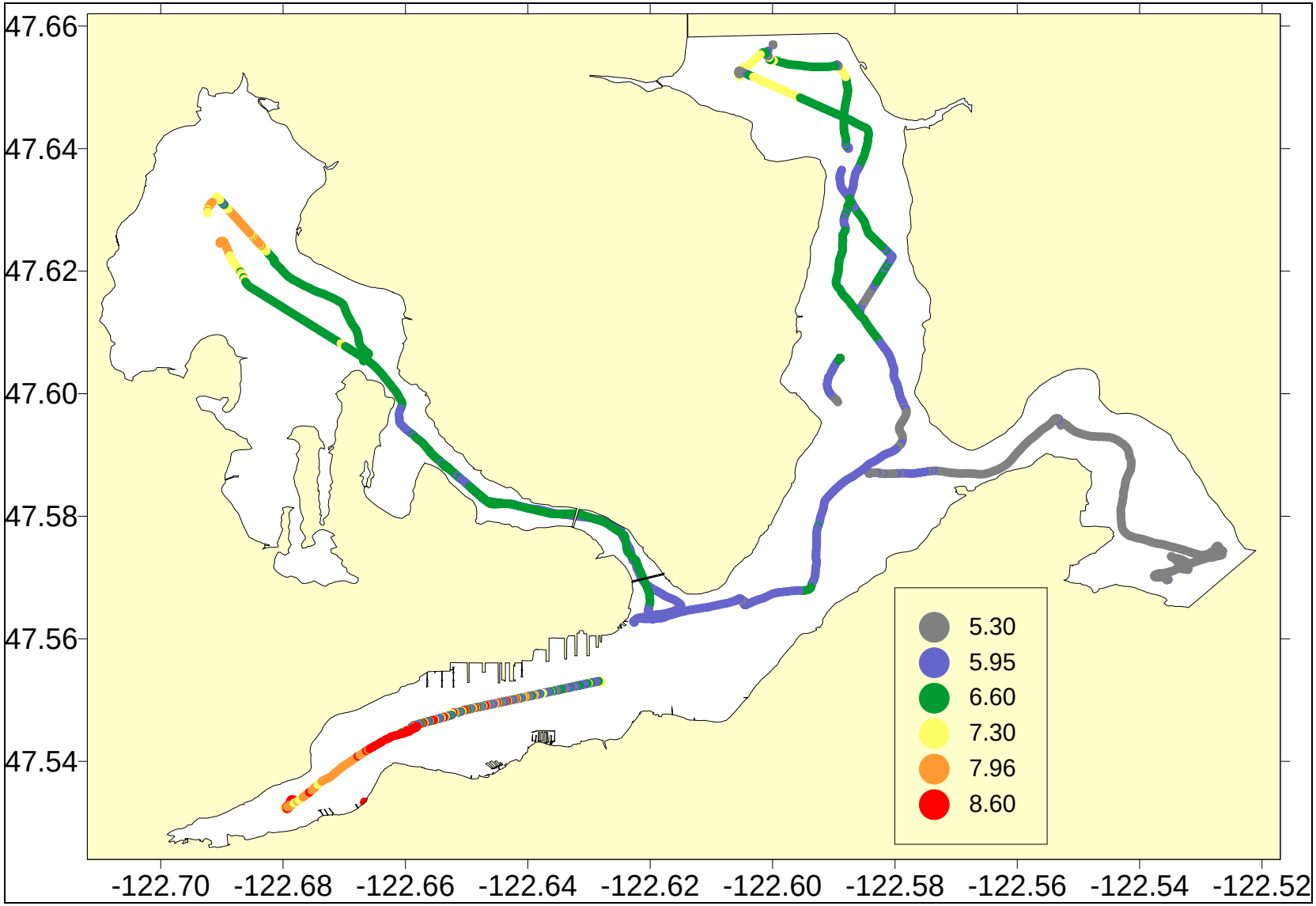
2.3.6 TSS


47.66
47.64
47.62
47.60
47.58
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
-122.58
-122.56
-122.54
-122.52
0.00
0.90
1.80
2.70
3.60
4.50

2.3.7 Chlorophyll *a*



2.3.8 Oxygen


47.66
47.64
47.62
47.60
47.58
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
-122.58
-122.56
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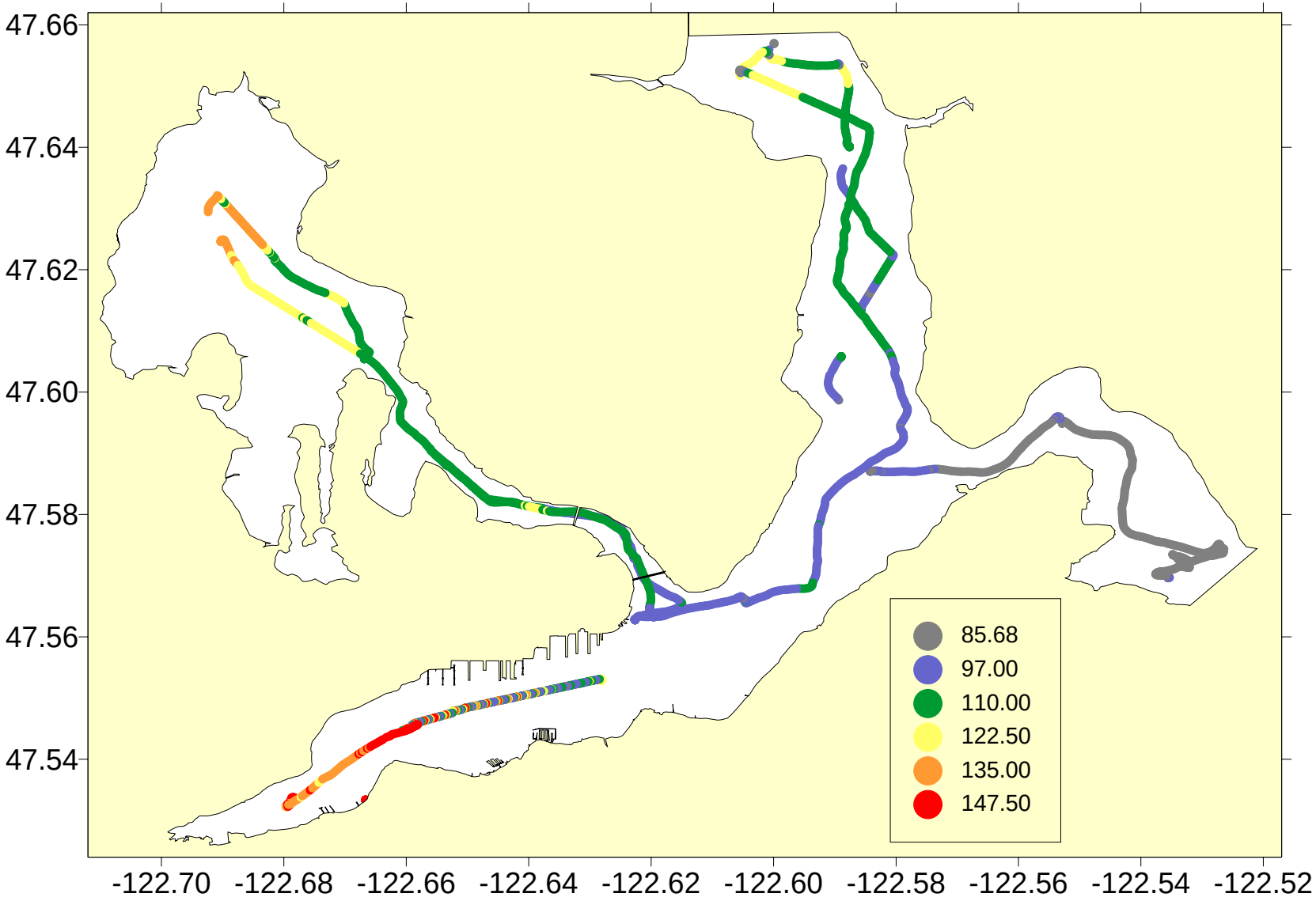
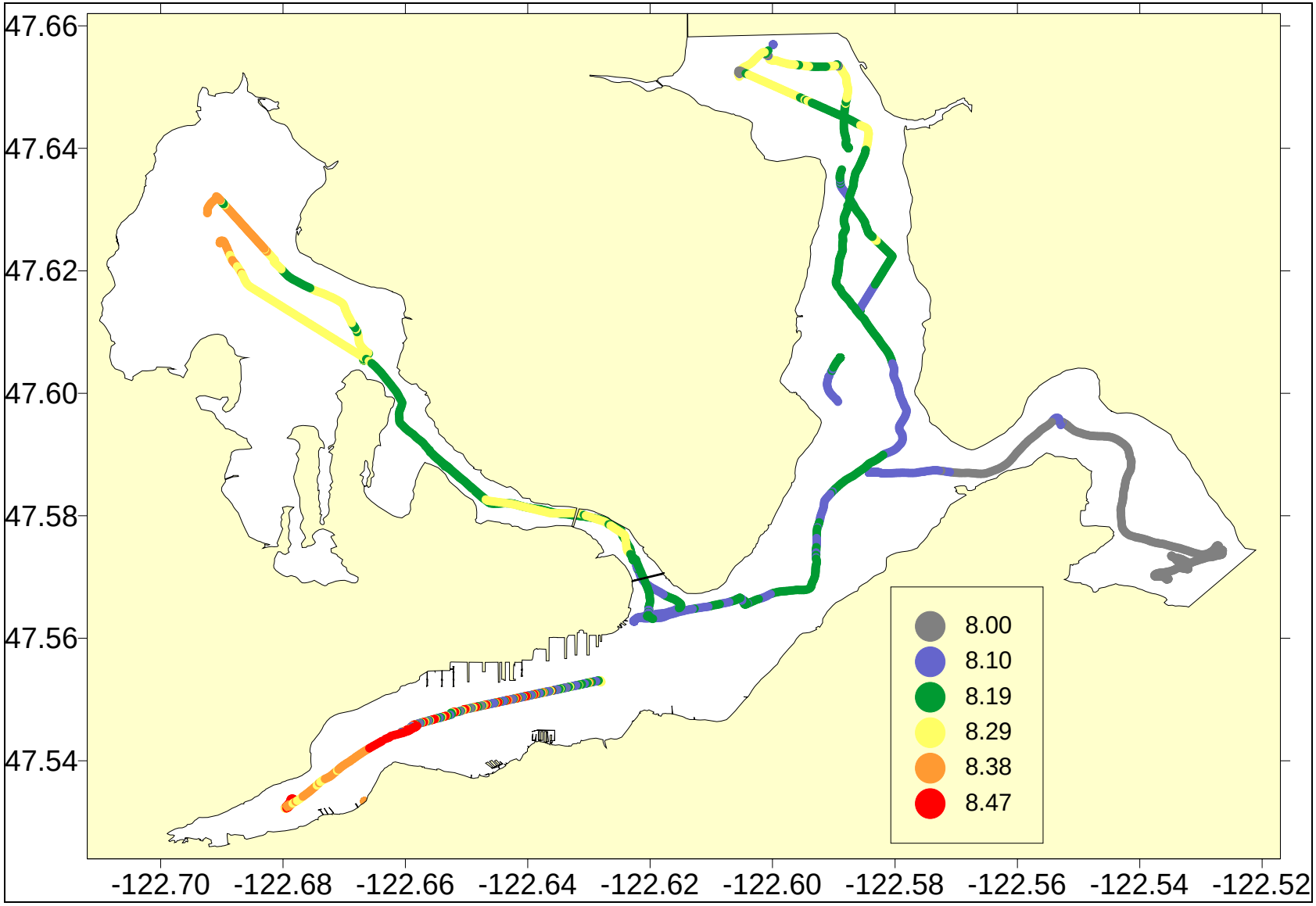
-122.52
5.30
5.95
6.60
7.30
7.96
8.60

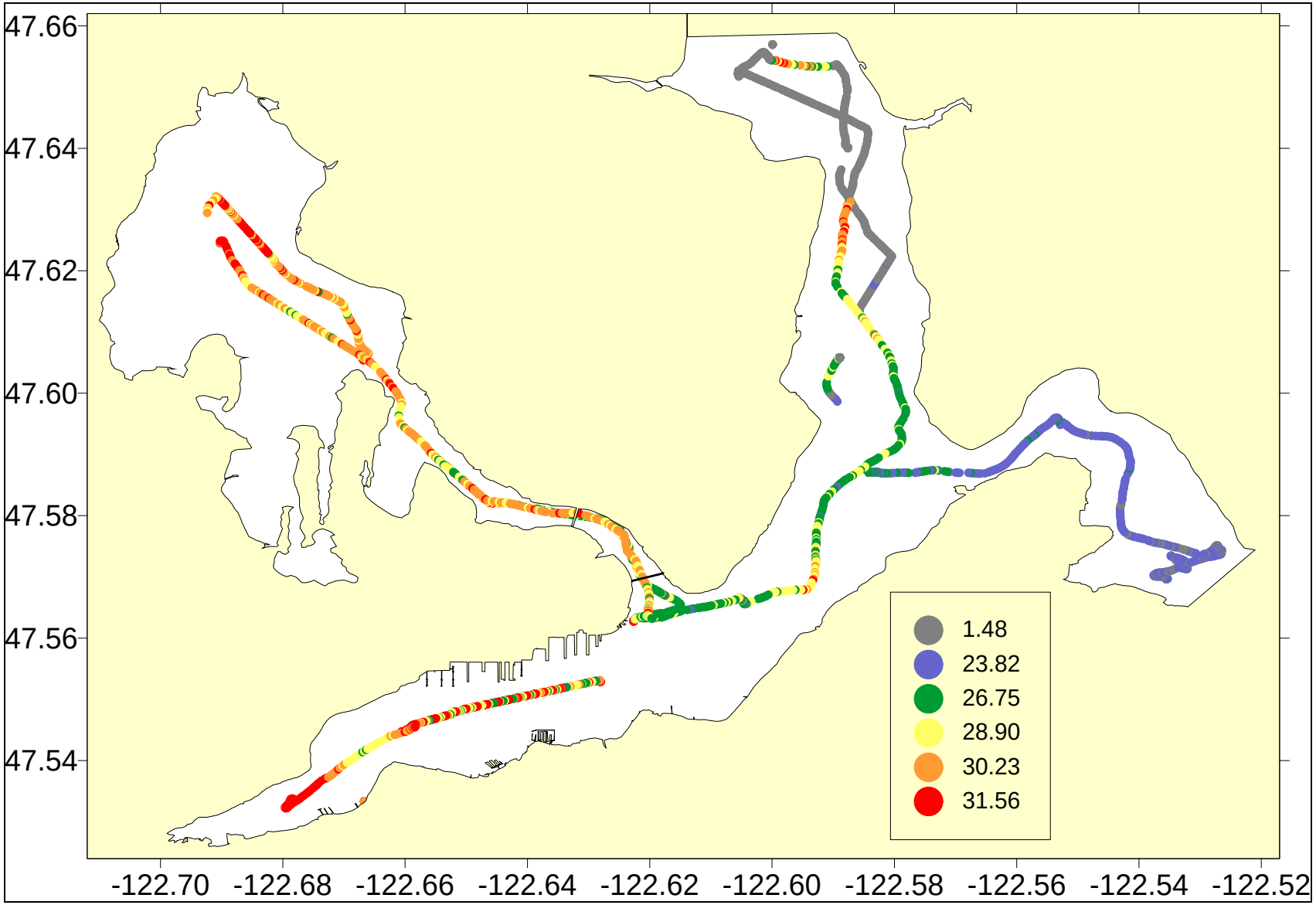
2.3.9 Oxygen Saturation



2.3.10 pH

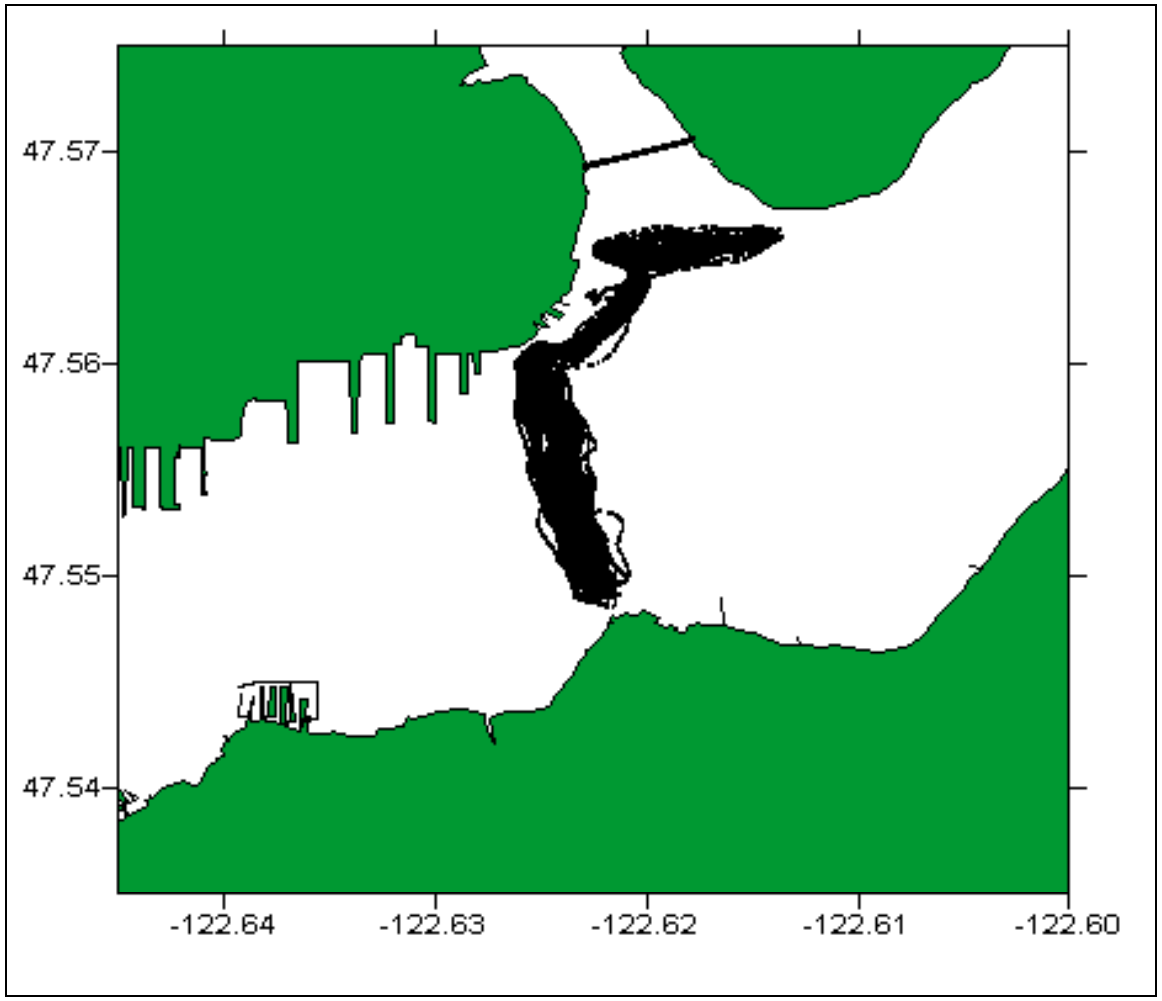

47.66
47.64
47.62
47.60
47.58
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
-122.58
-122.56
-122.54
-122.52
8.00
8.10
8.19
8.29
8.38
8.47

2.3.11 Oil Fluorescence

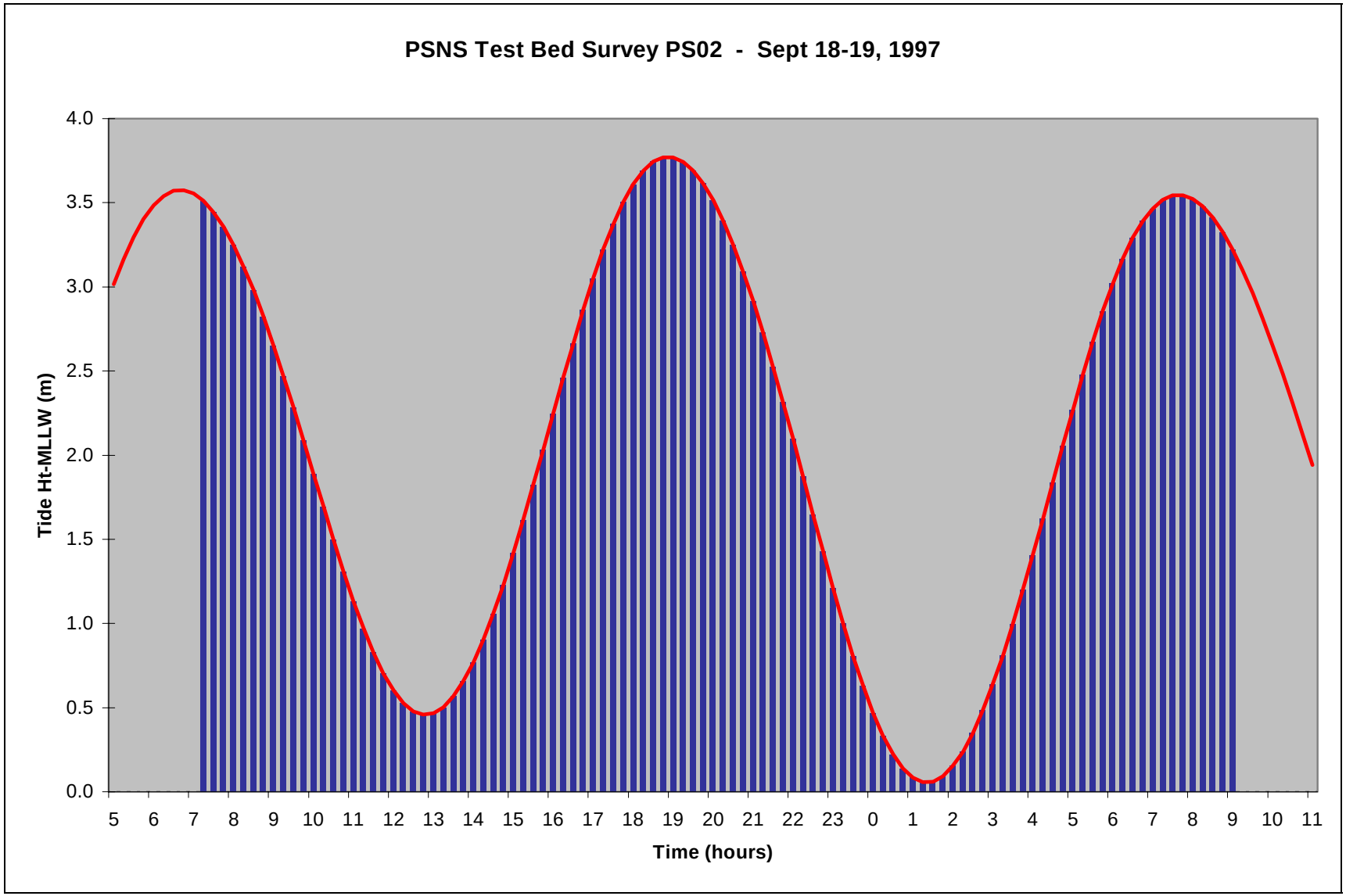


3 Sinclair – Dyes Inlets Cross Sections

3.1 Track Map

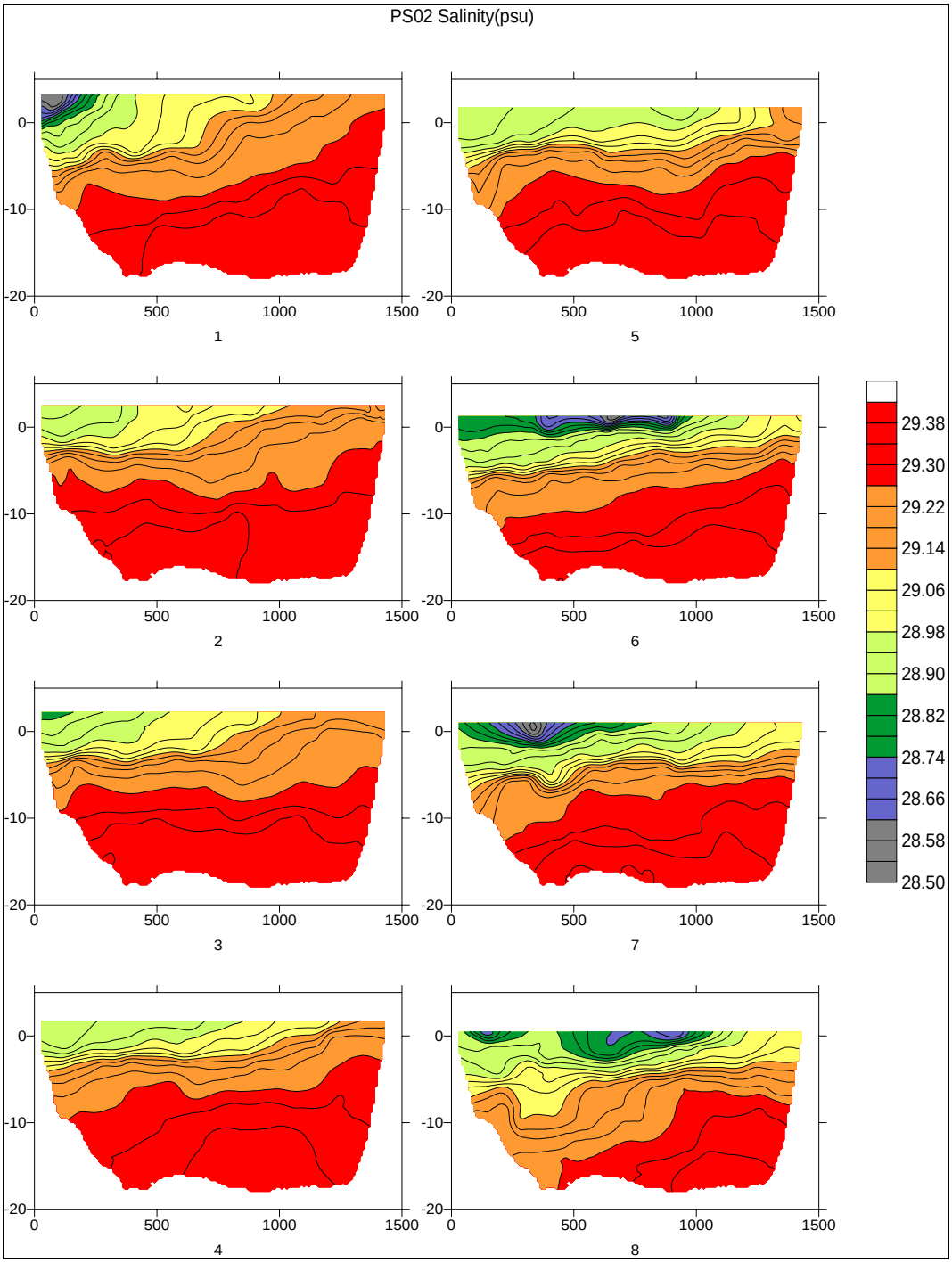


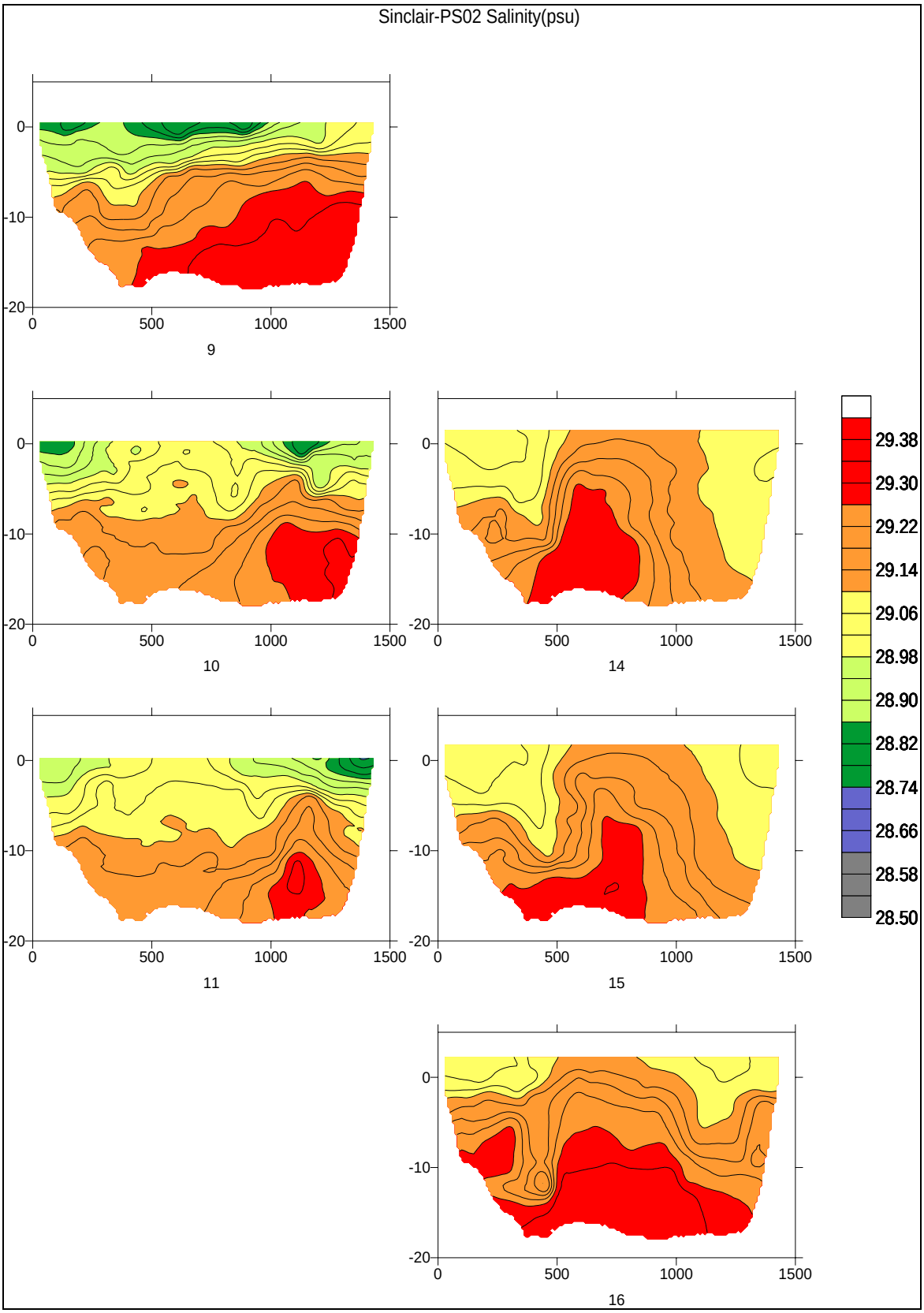
3.2 Tide Chart

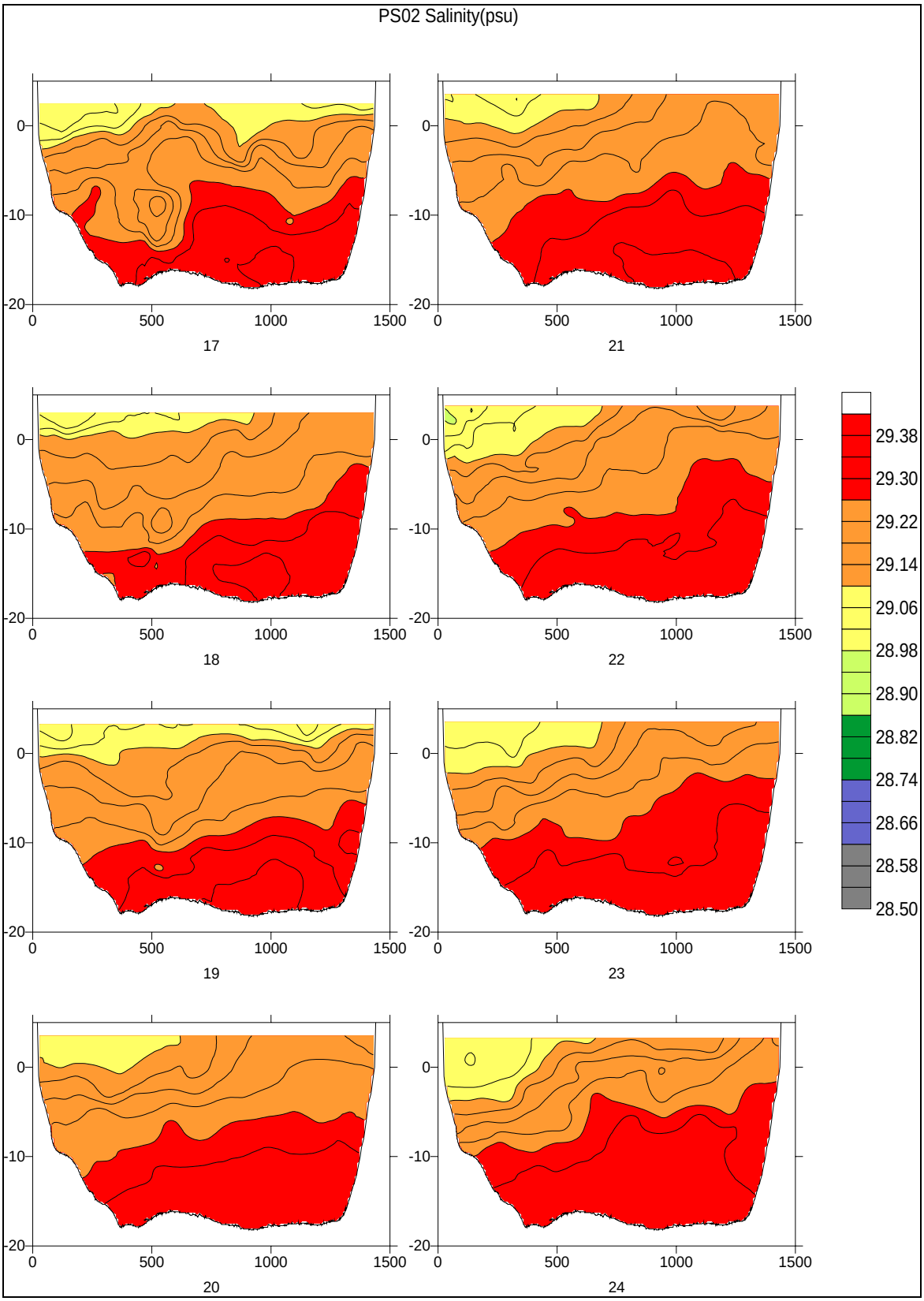


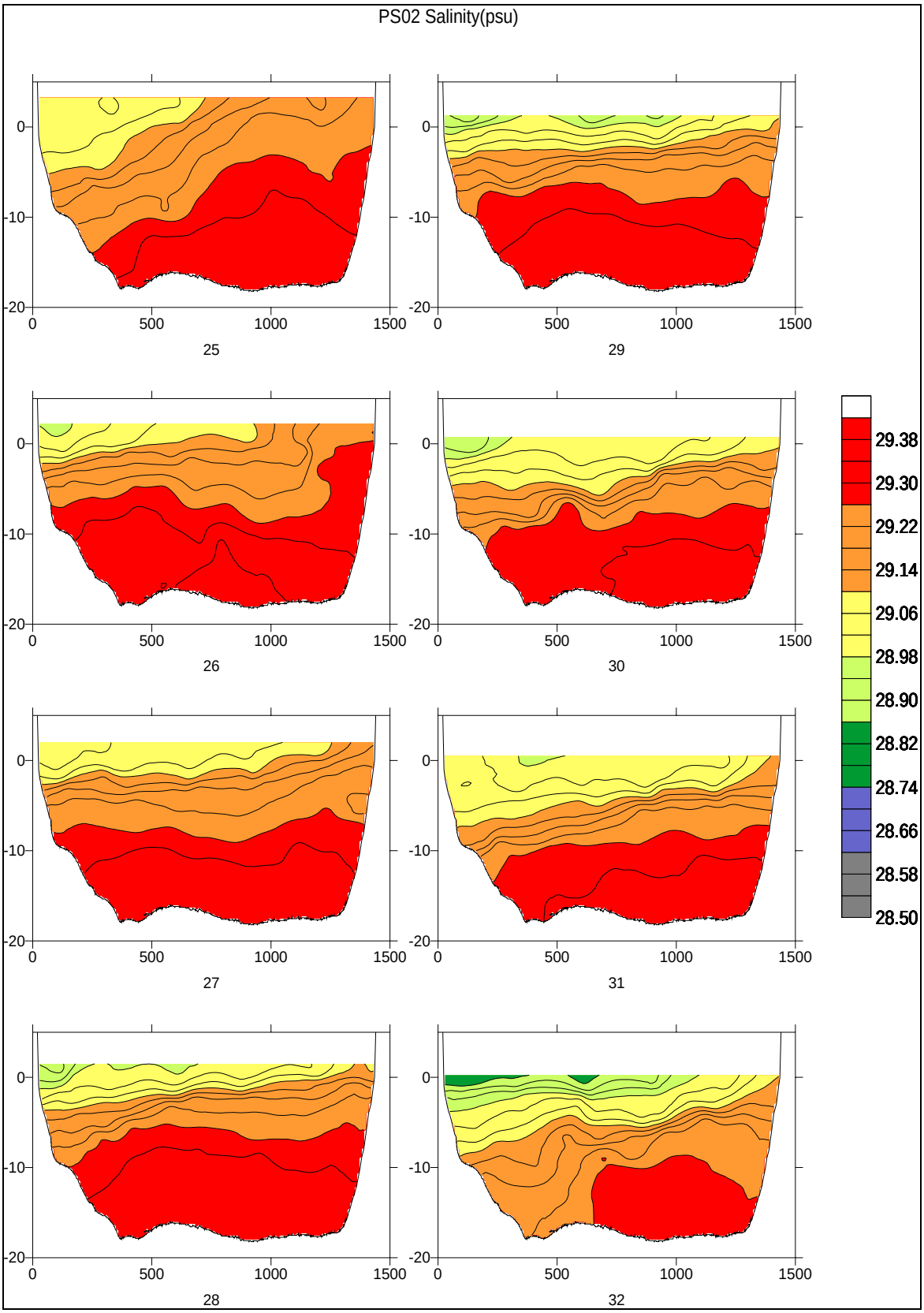
3.3 Sinclair - September 18-19, 1997 – PS02

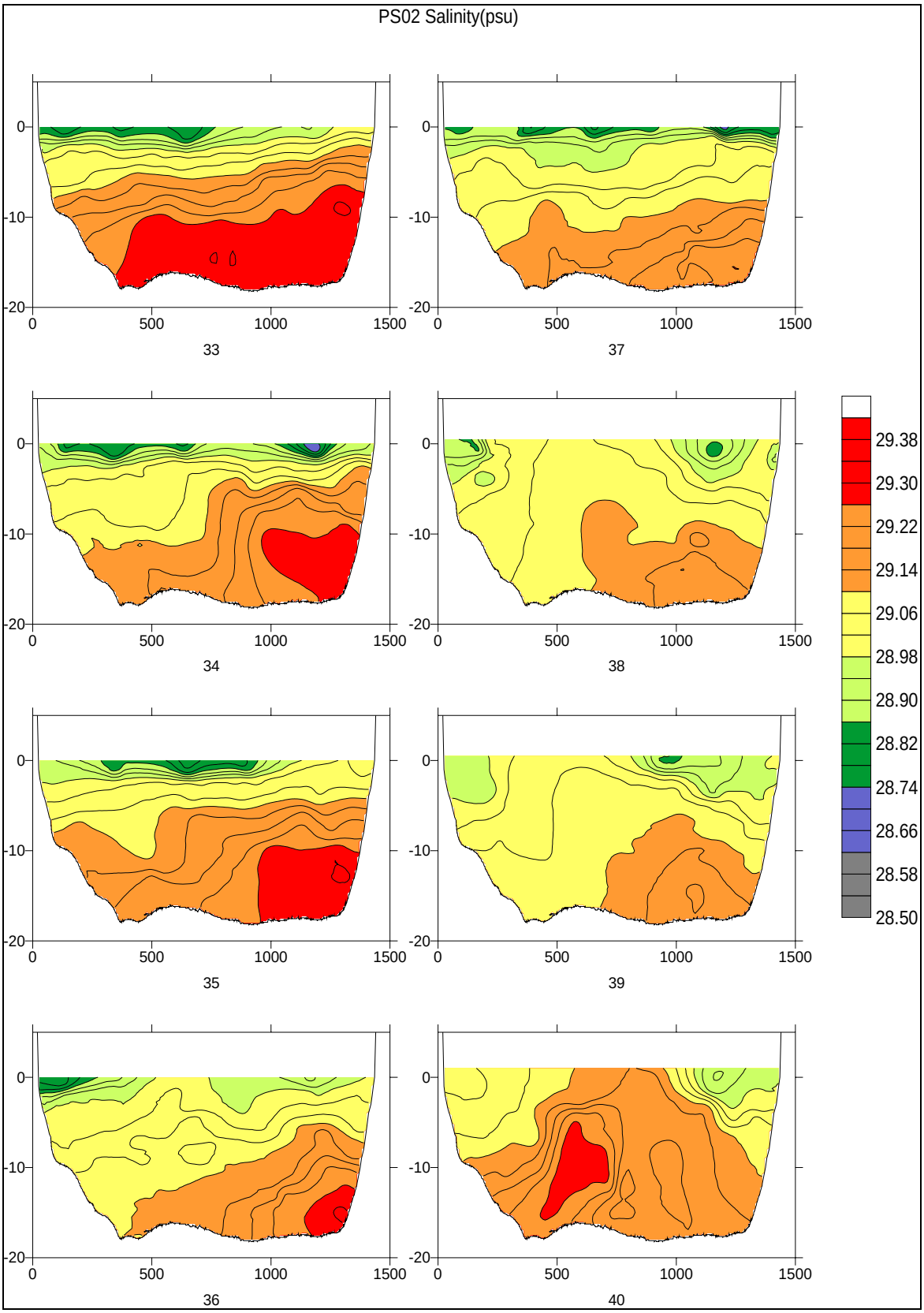
3.3.1 Salinity

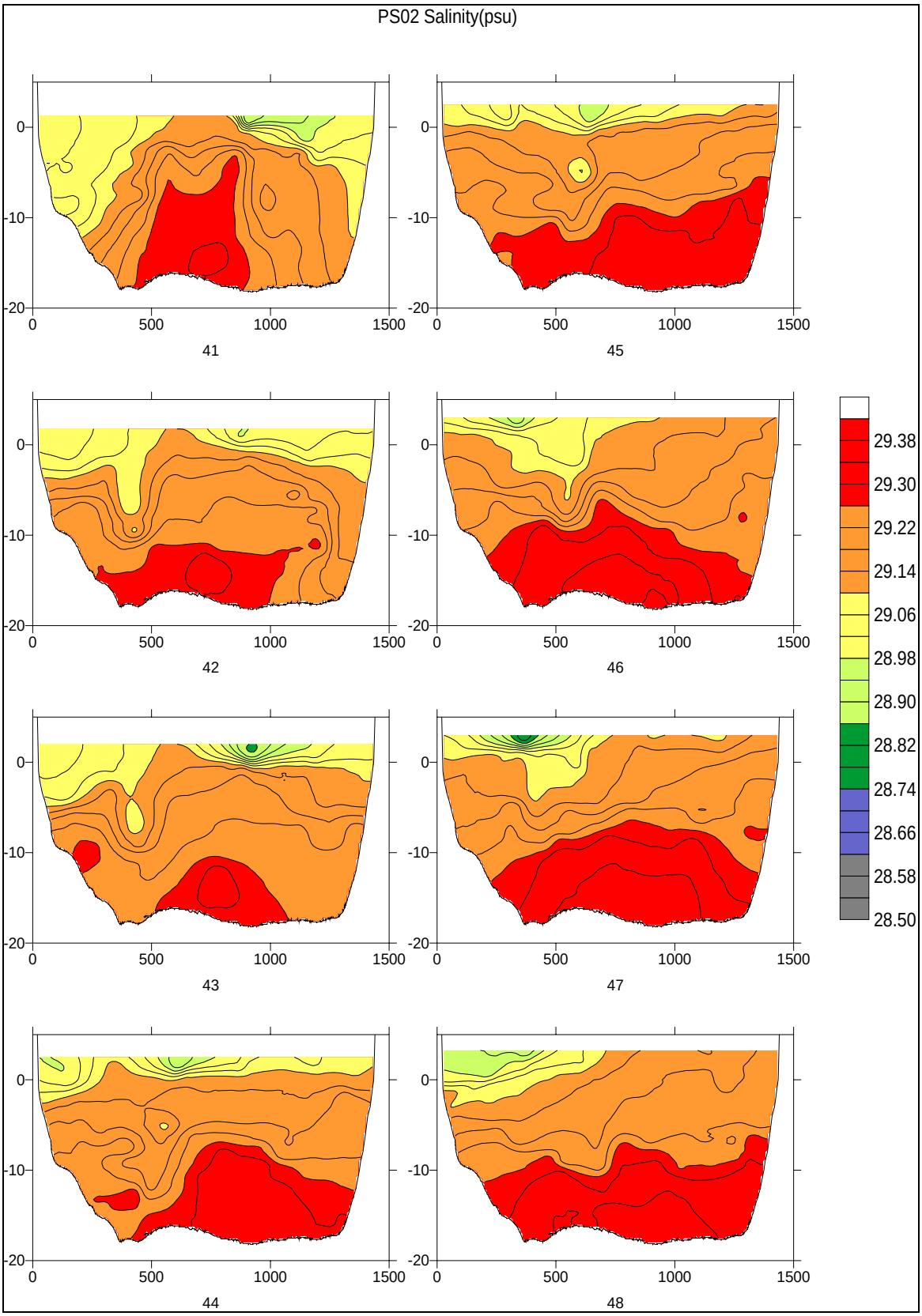


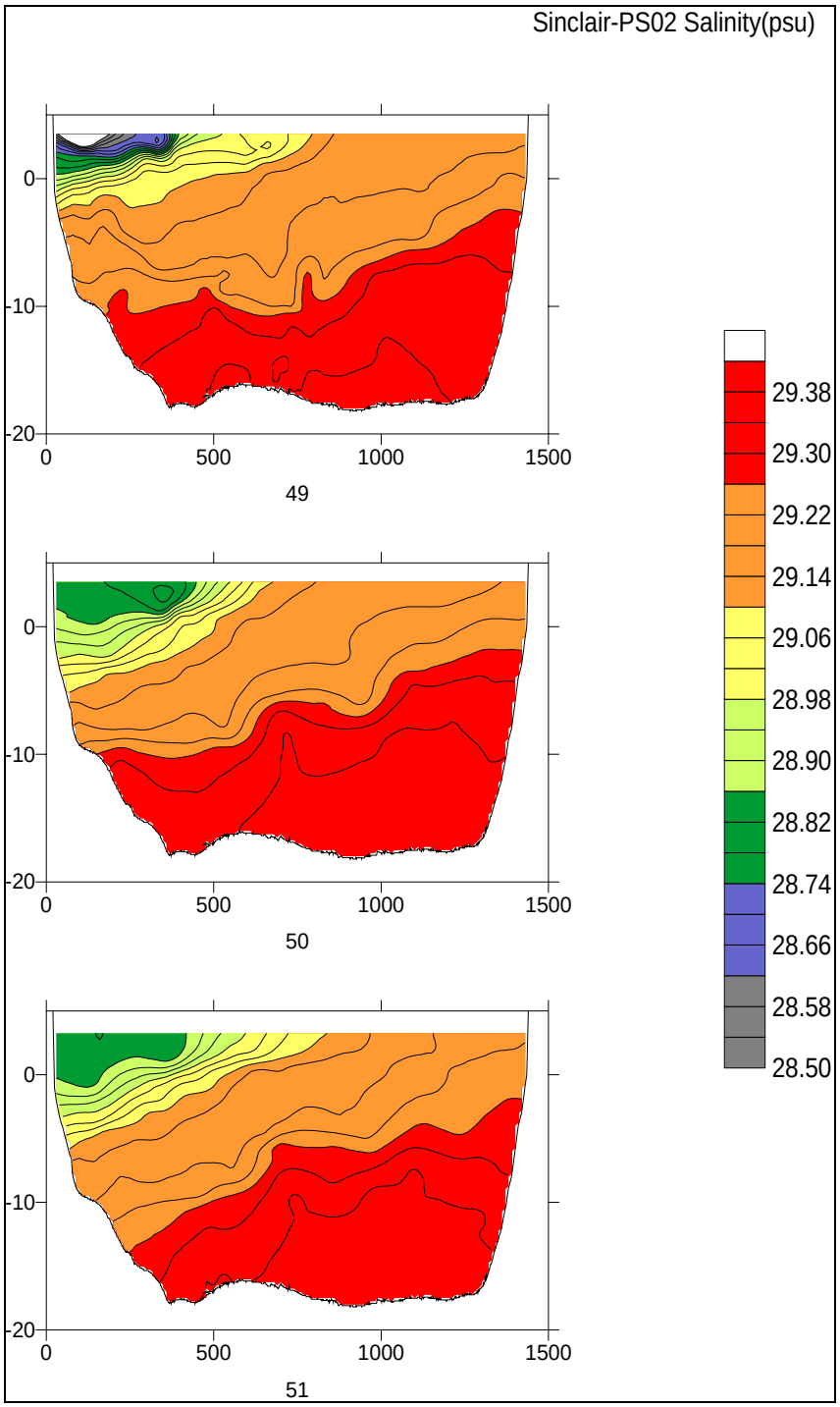

Sinclair-PS02 Salinity(psu)
0
-10
-20
0
500
1000
1500
9
10
14
11
15
16
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50


PS02 Salinity(psu)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

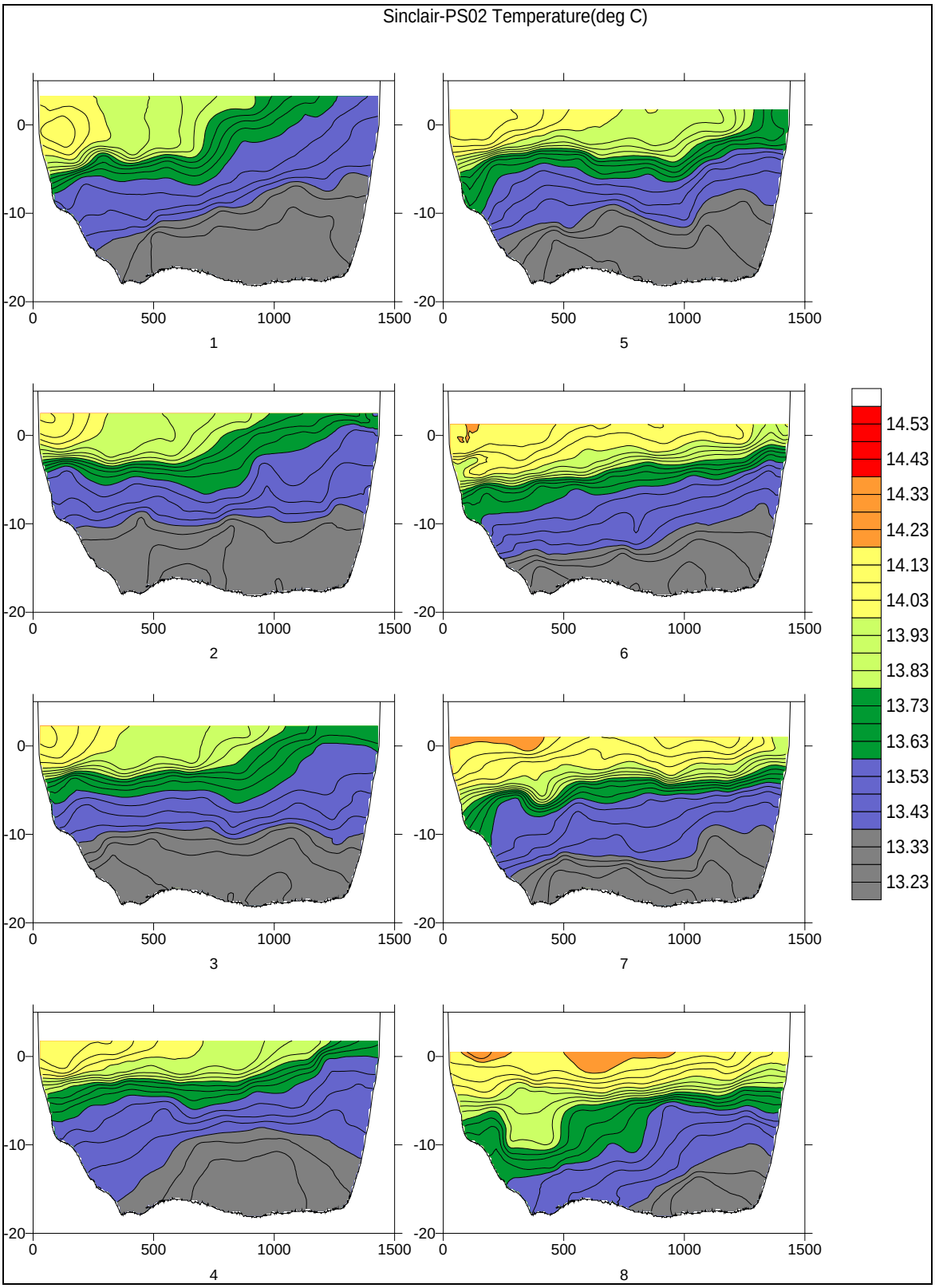

PS02 Salinity(psu)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

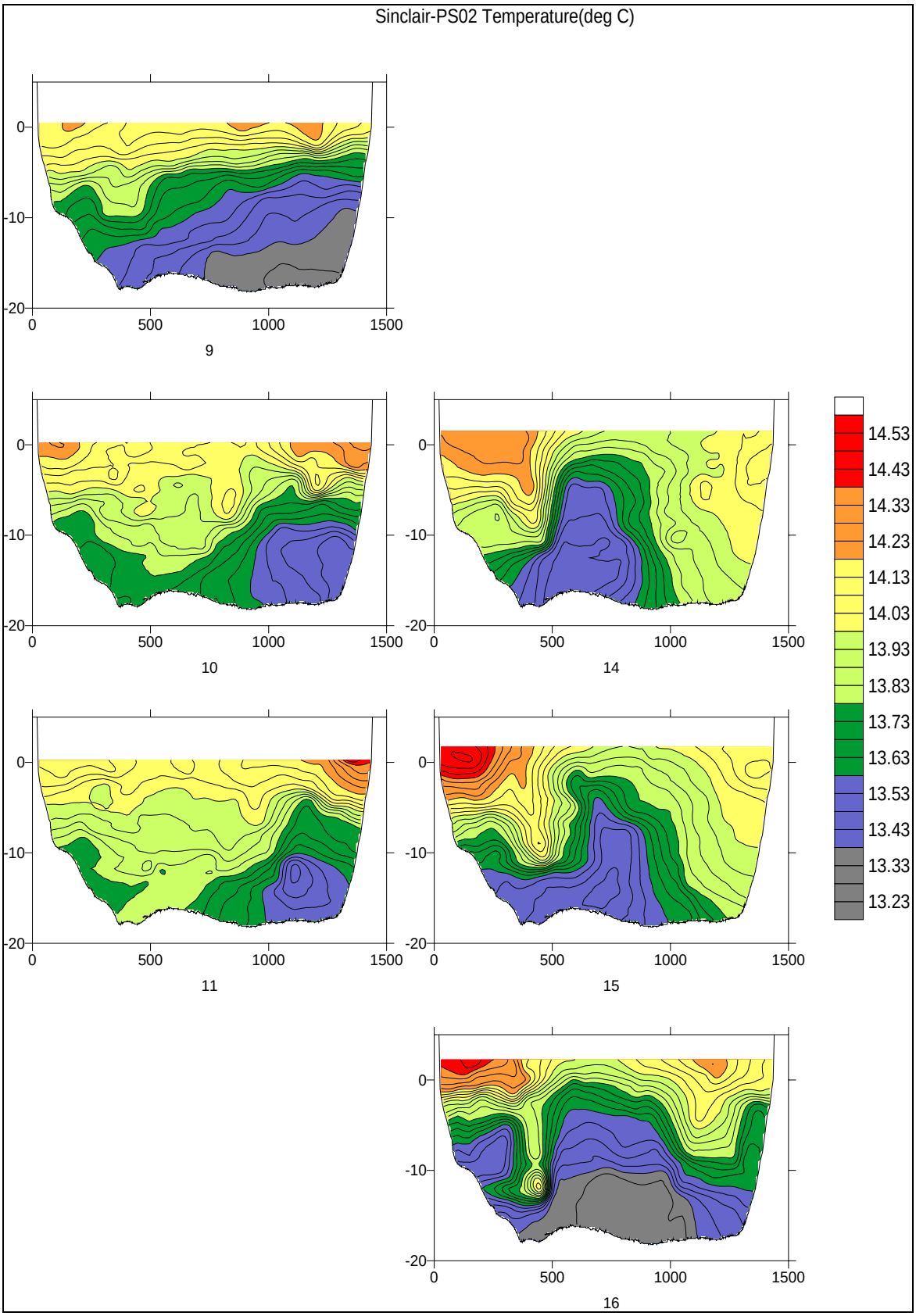

PS02 Salinity(psu)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

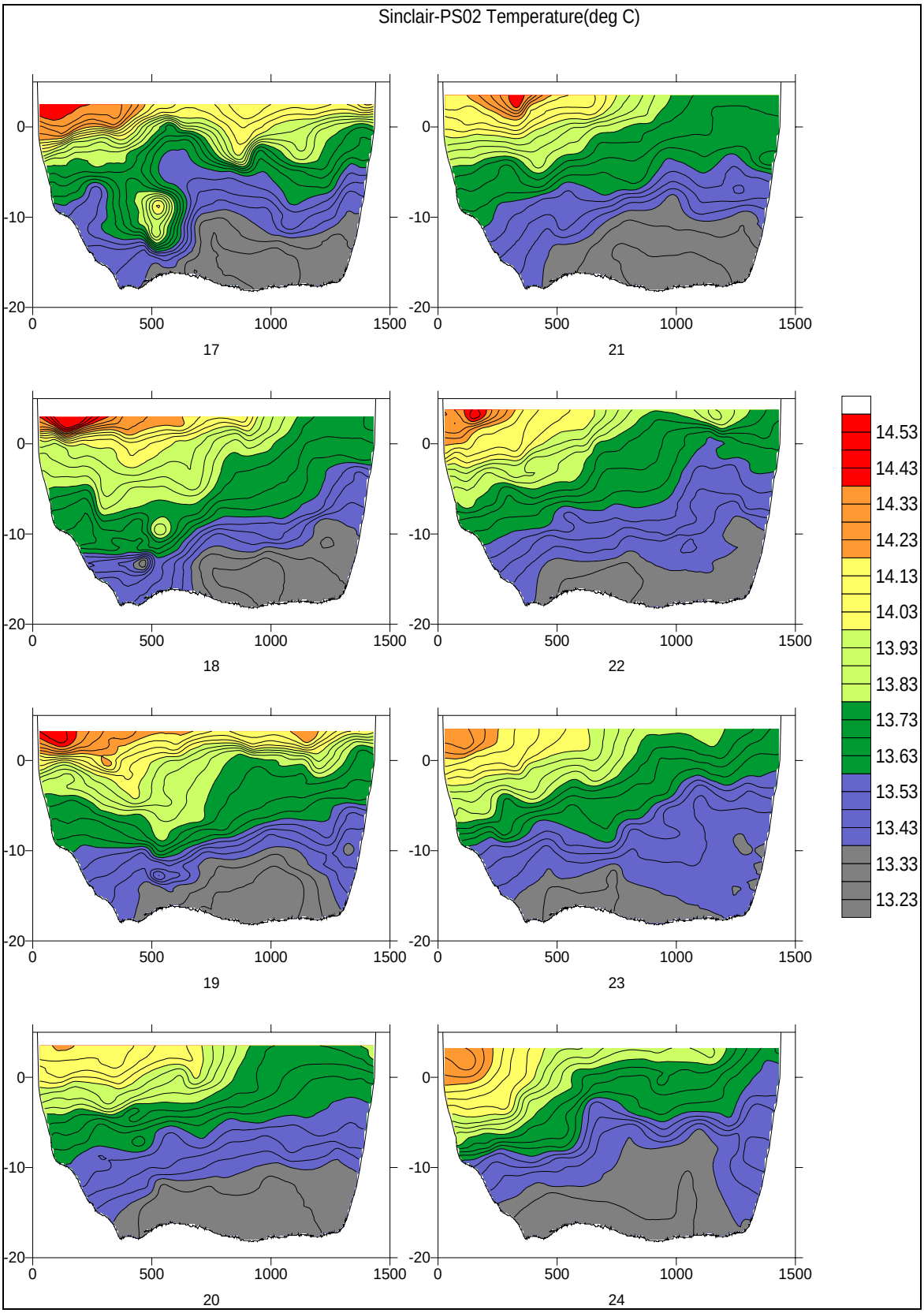

PS02 Salinity(psu)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

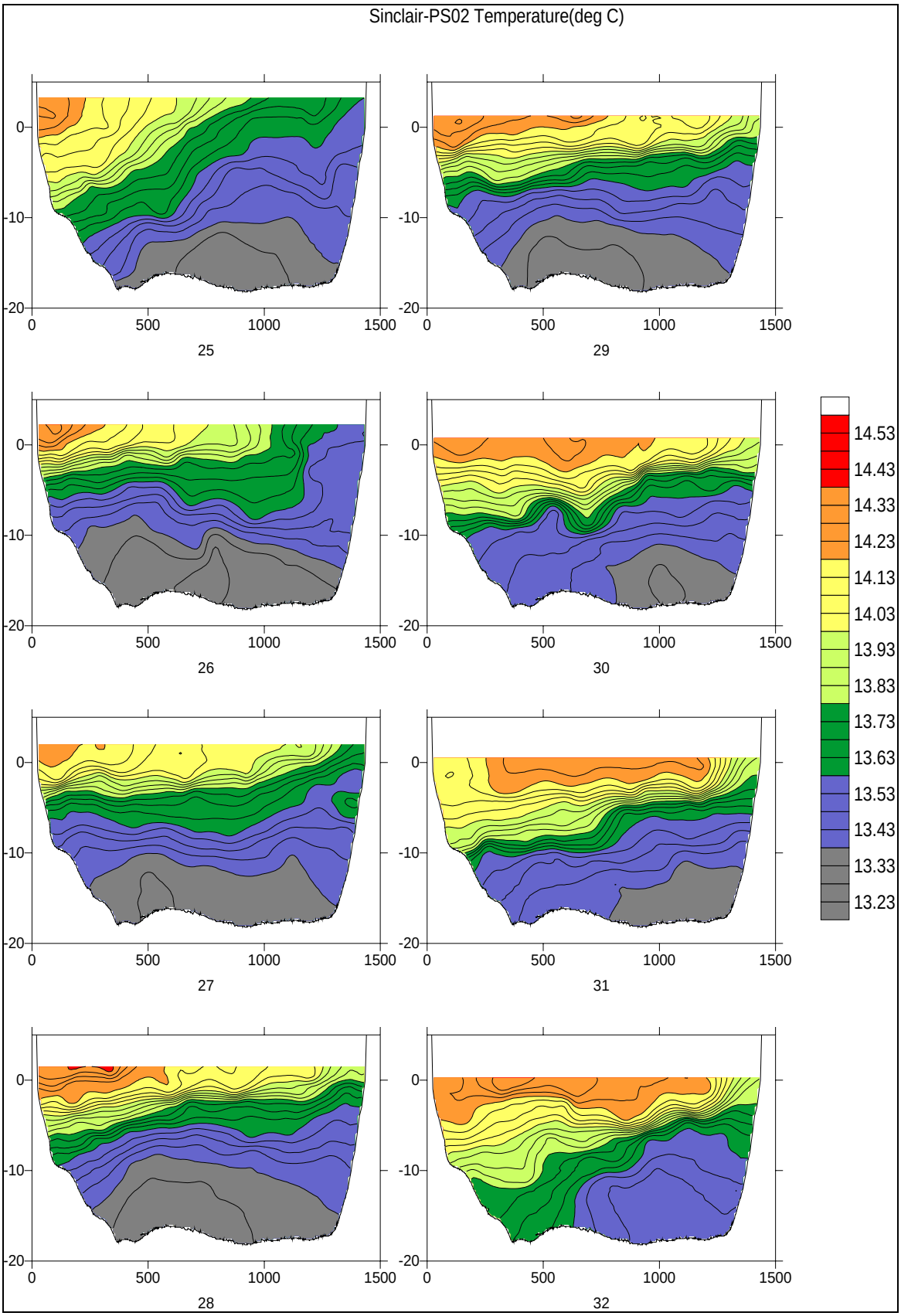

Sinclair-PS02 Salinity(psu)
0
-10
-20
0
500
1000
1500
49
50
51
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

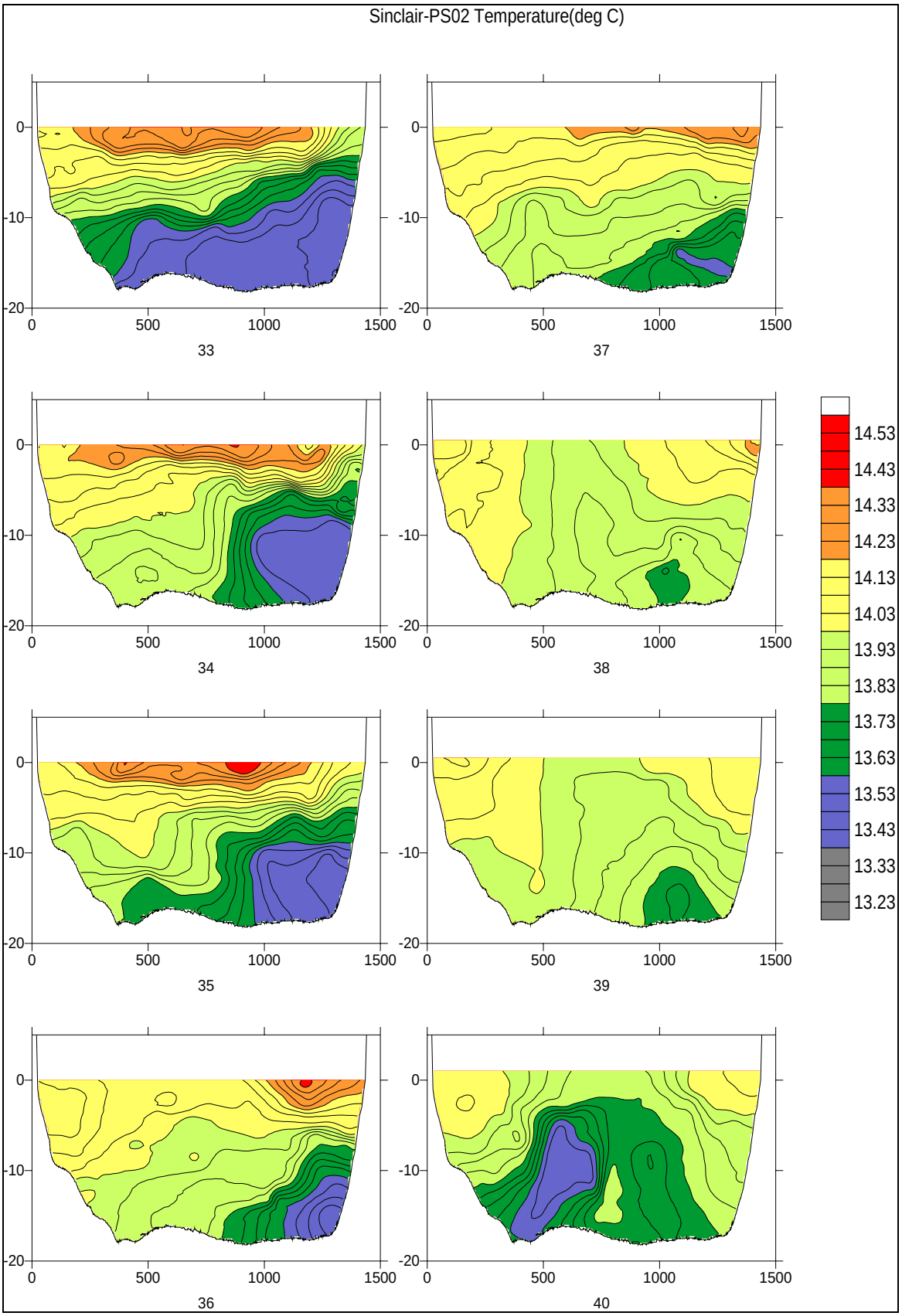
3.3.2 Temperature

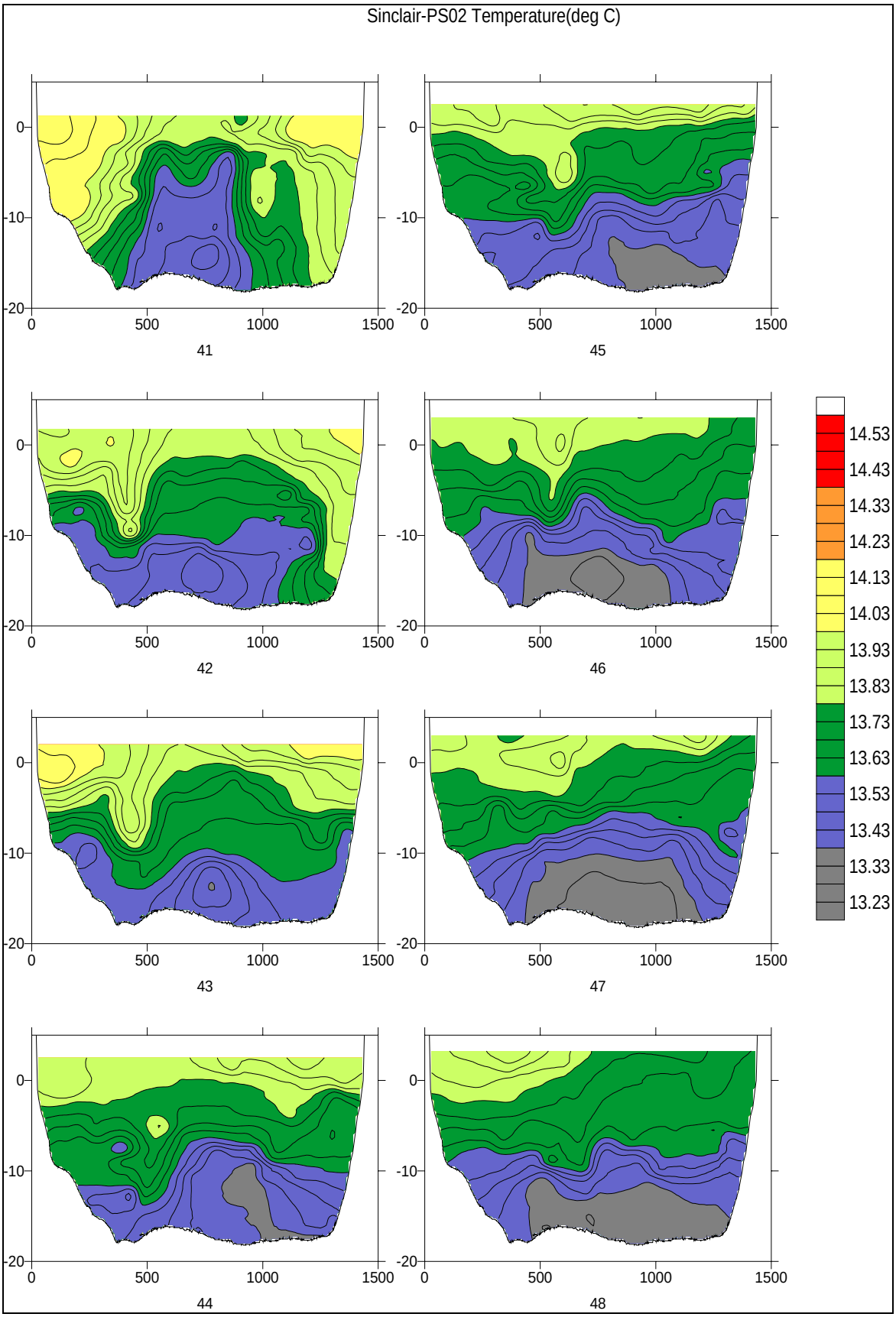


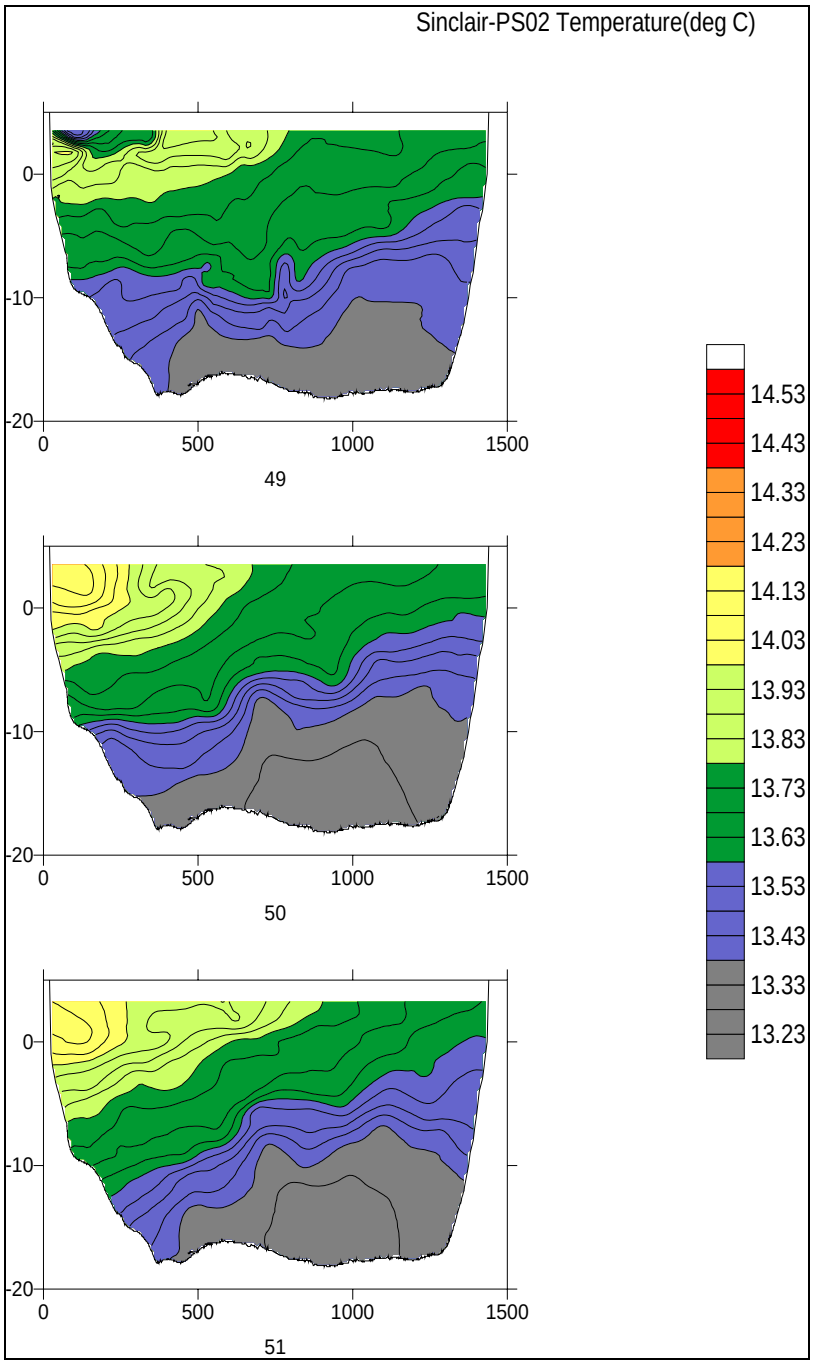

Sinclair-PS02 Temperature(deg C)
9
10
14
11
15
16
0
-10
-20
0
500
1000
1500
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23


Sinclair-PS02 Temperature(deg C)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

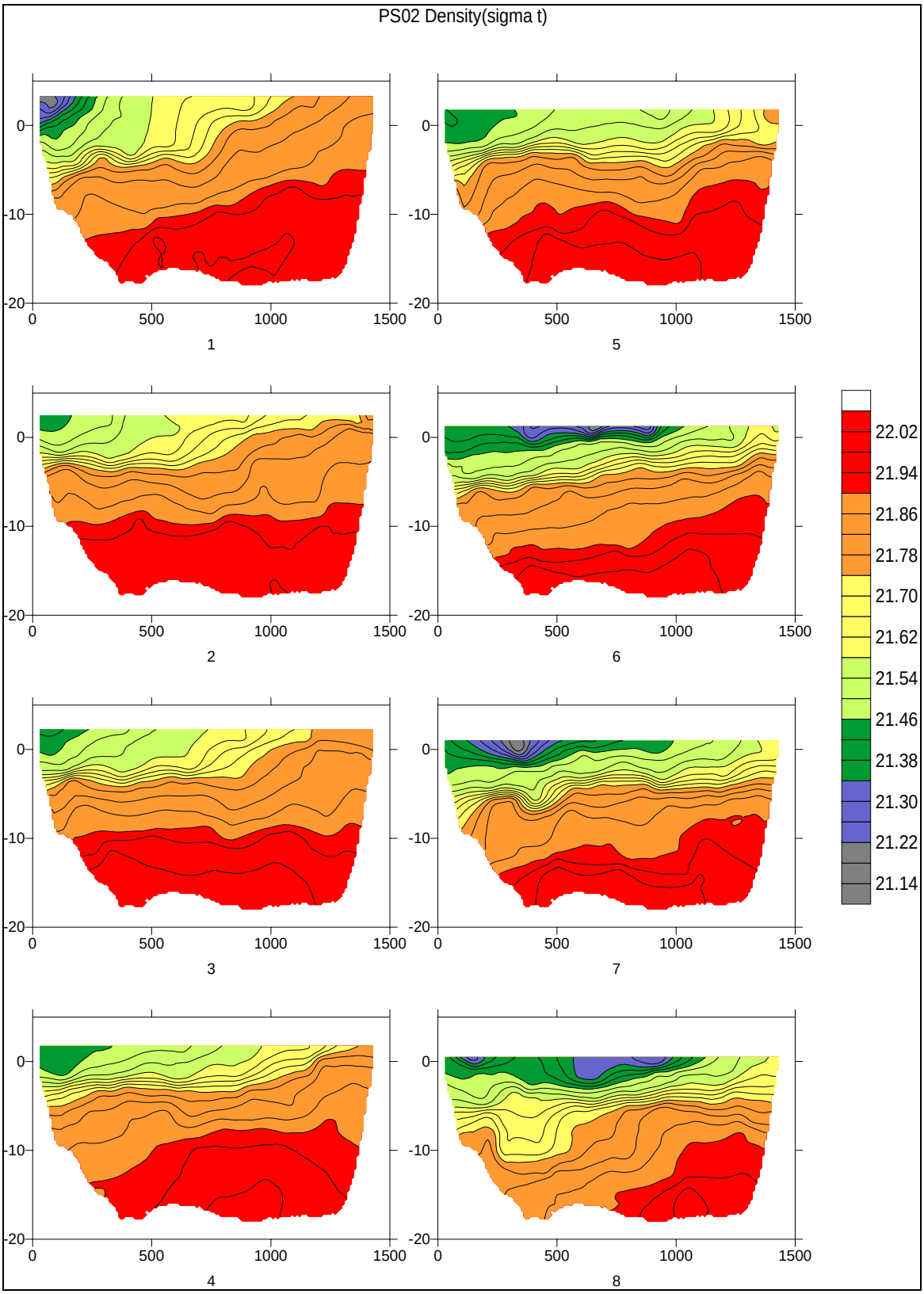

Sinclair-PS02 Temperature(deg C)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

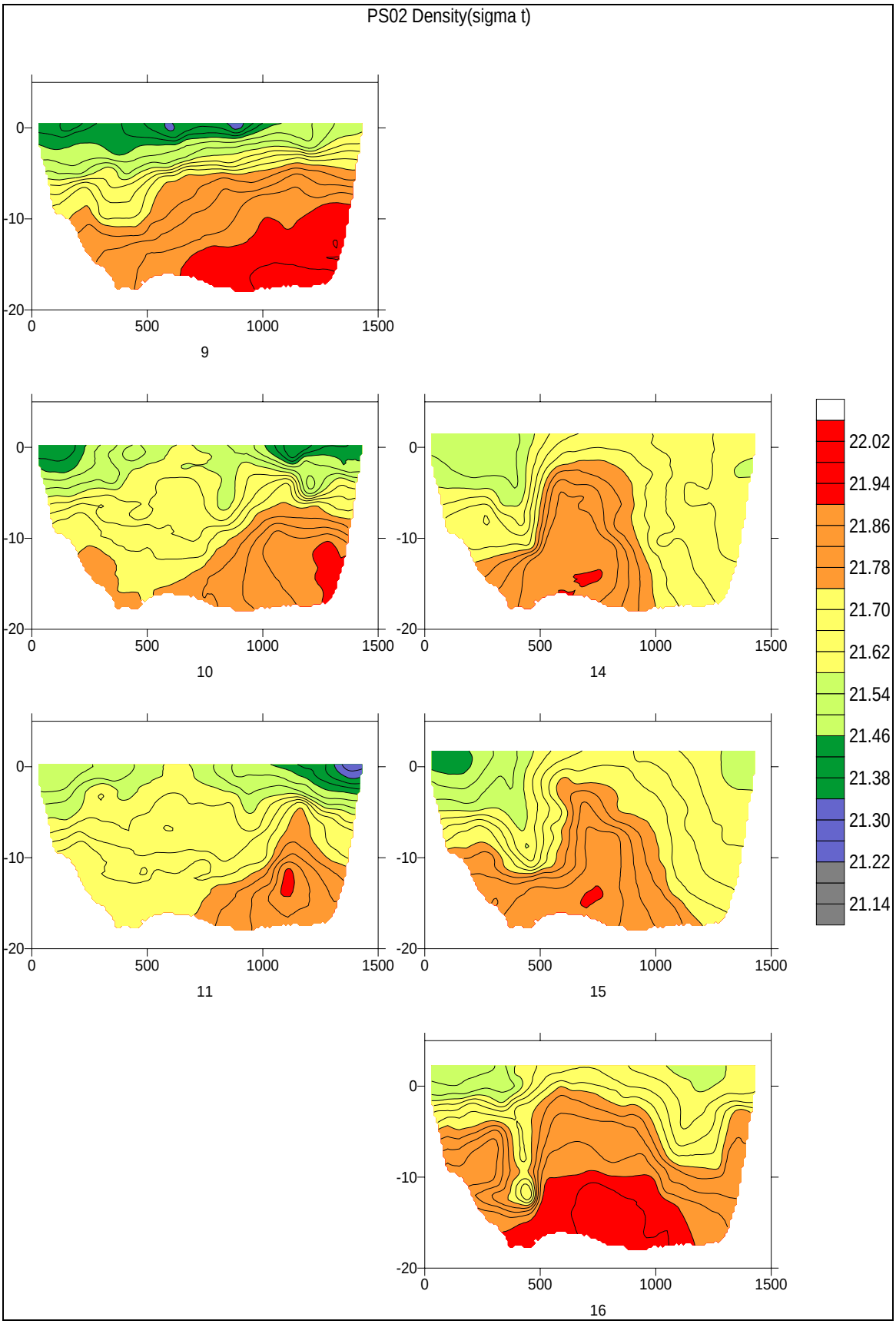

Sinclair-PS02 Temperature(deg C)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

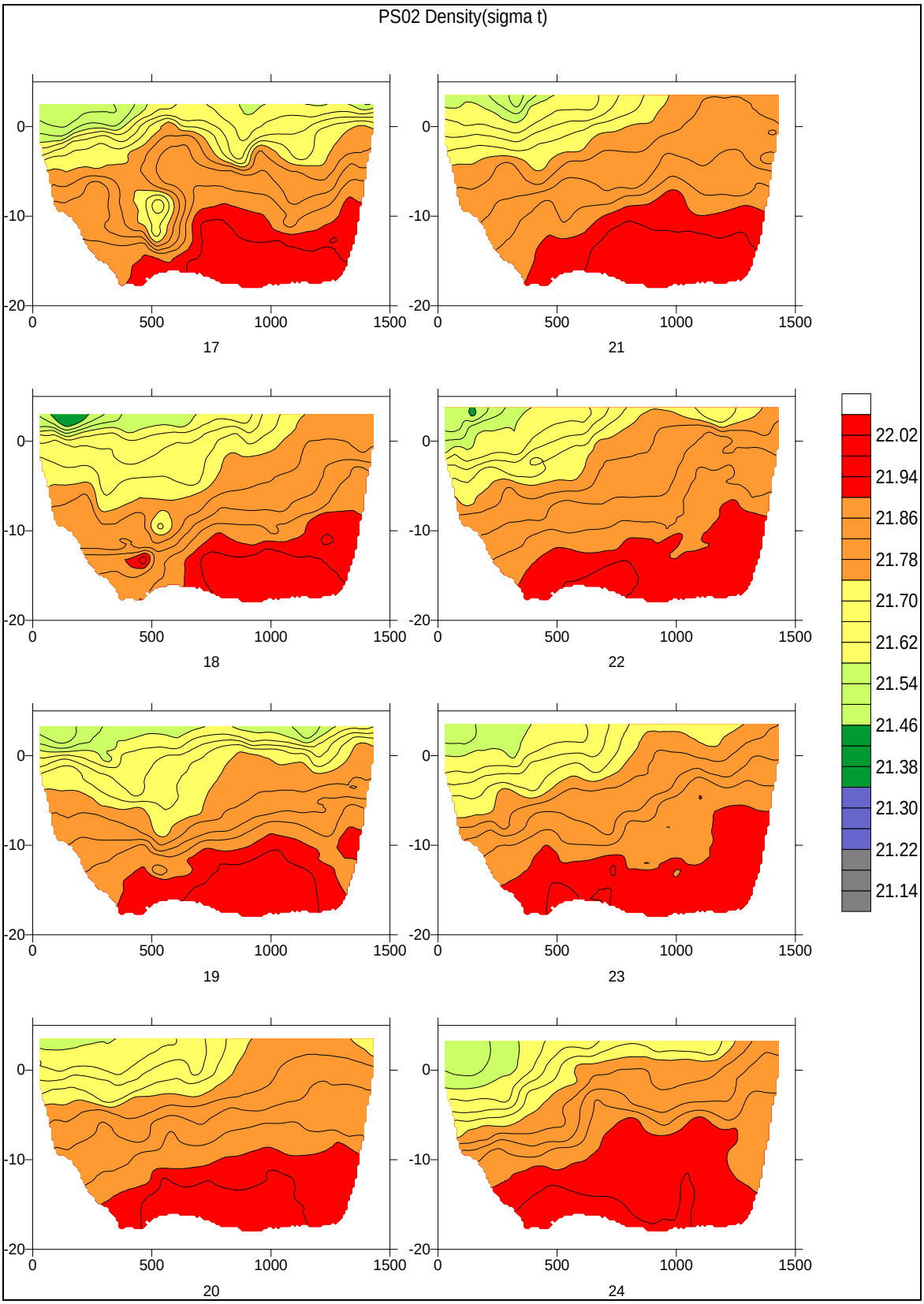

Sinclair-PS02 Temperature(deg C)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

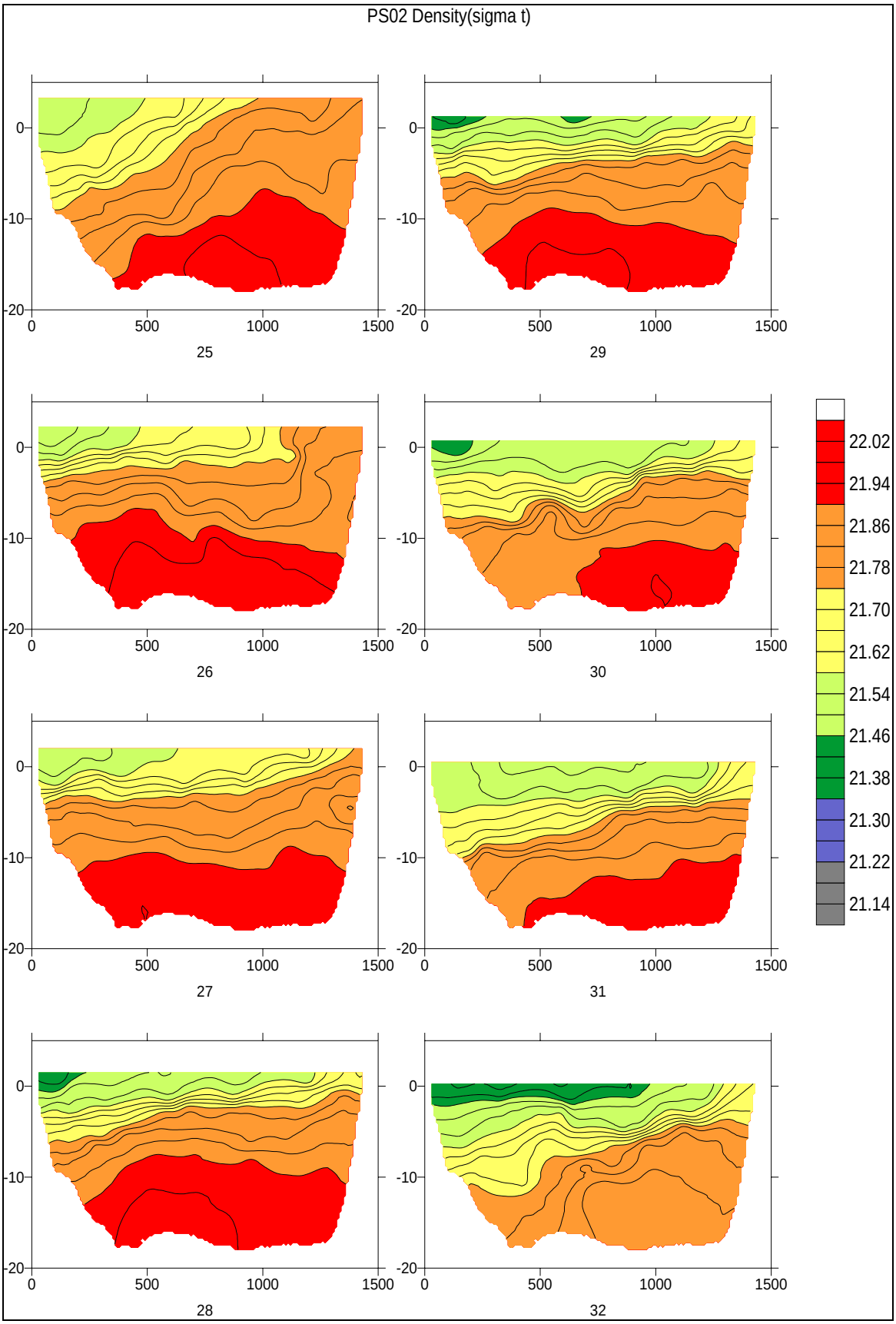

Sinclair-PS02 Temperature(deg C)
0
-10
-20
0
500
1000
1500
49
50
51
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

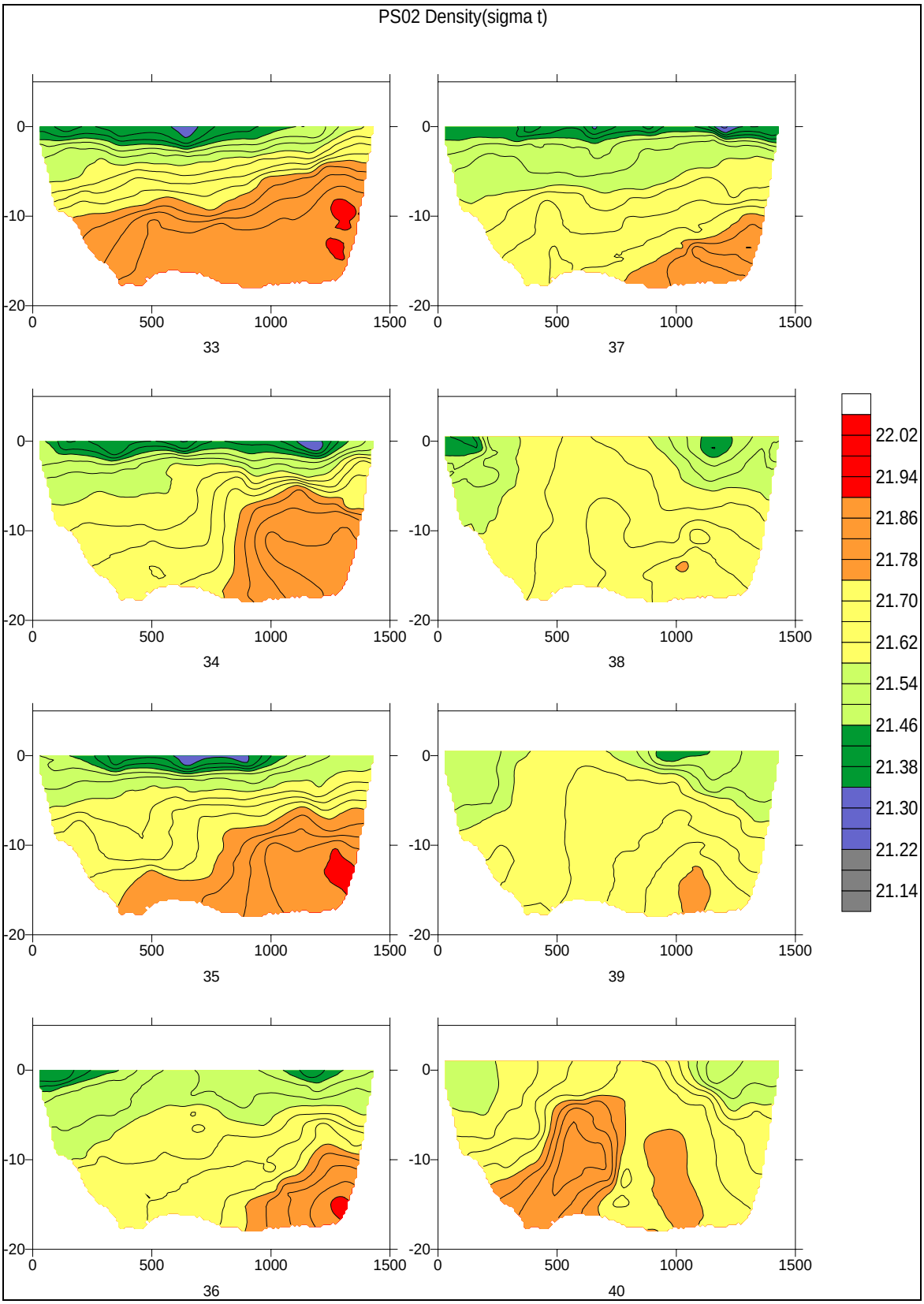
3.3.3 Density

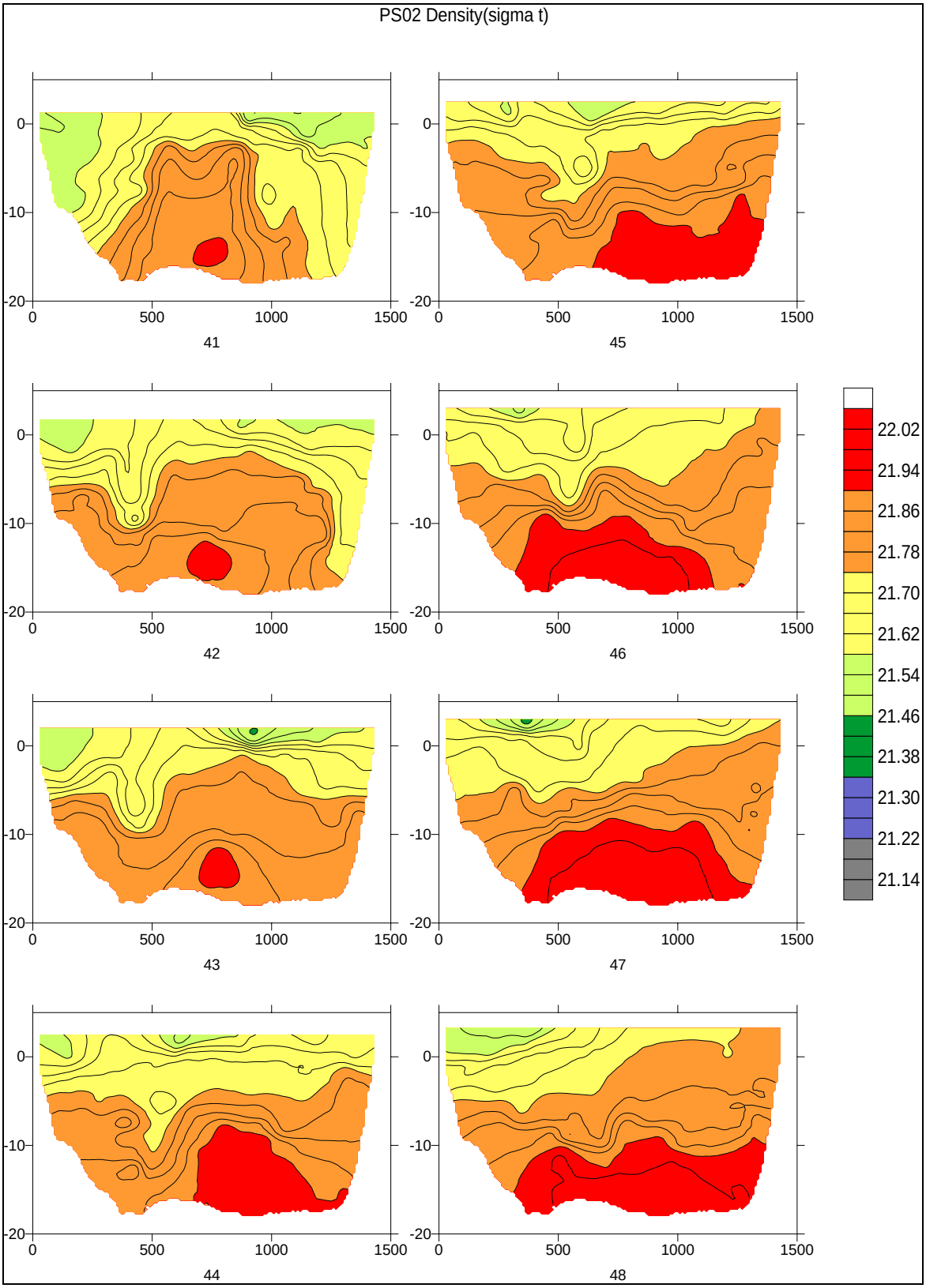

PS02 Density(sigma t)
0
-10
-20
0
500
1000
1500
1
2
3
4
5
6
7
8
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

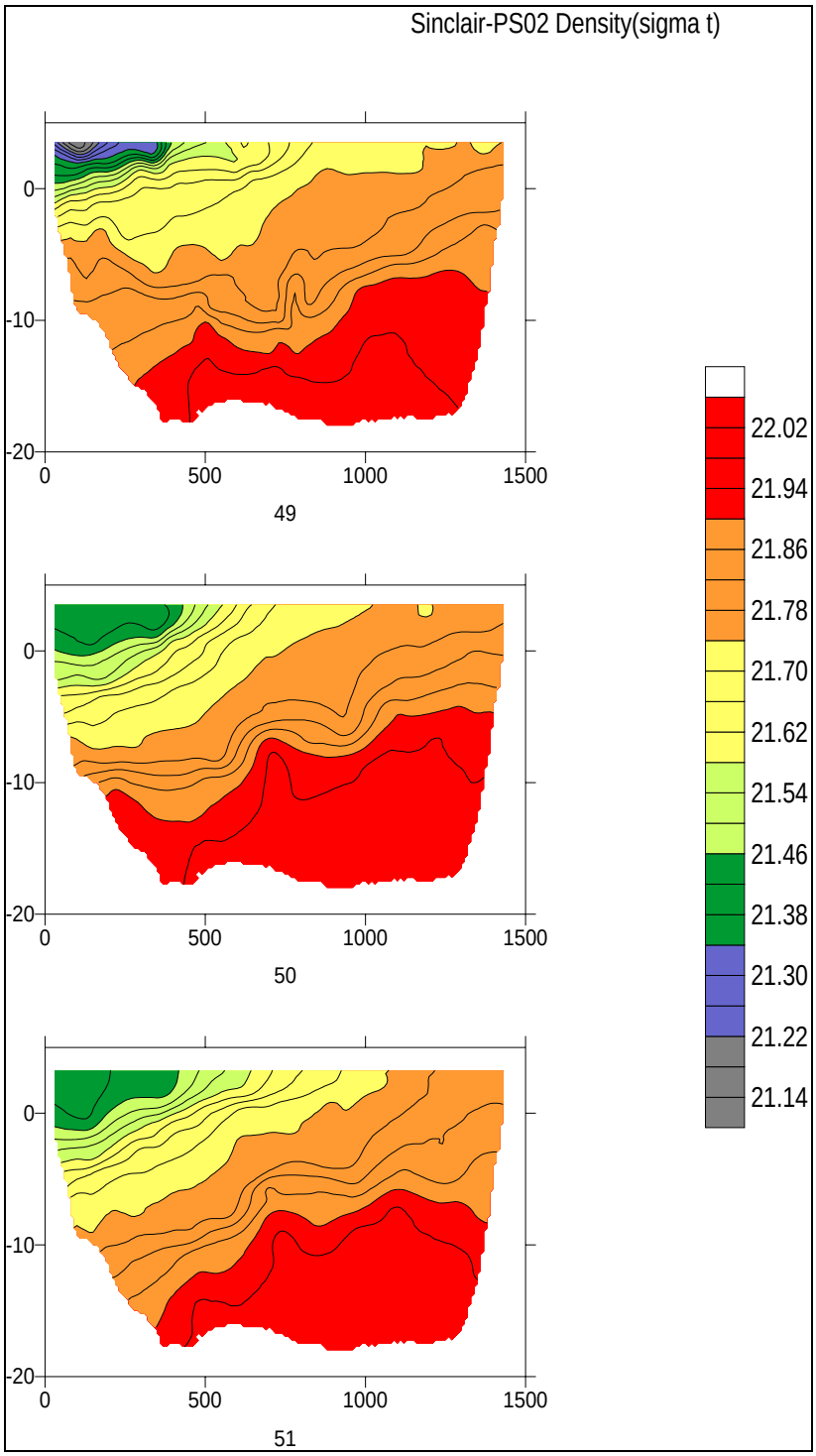

PS02 Density(sigma t)
0
-10
-20
0
500
1000
1500
9
10
14
11
15
16
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14


PS02 Density(sigma t)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

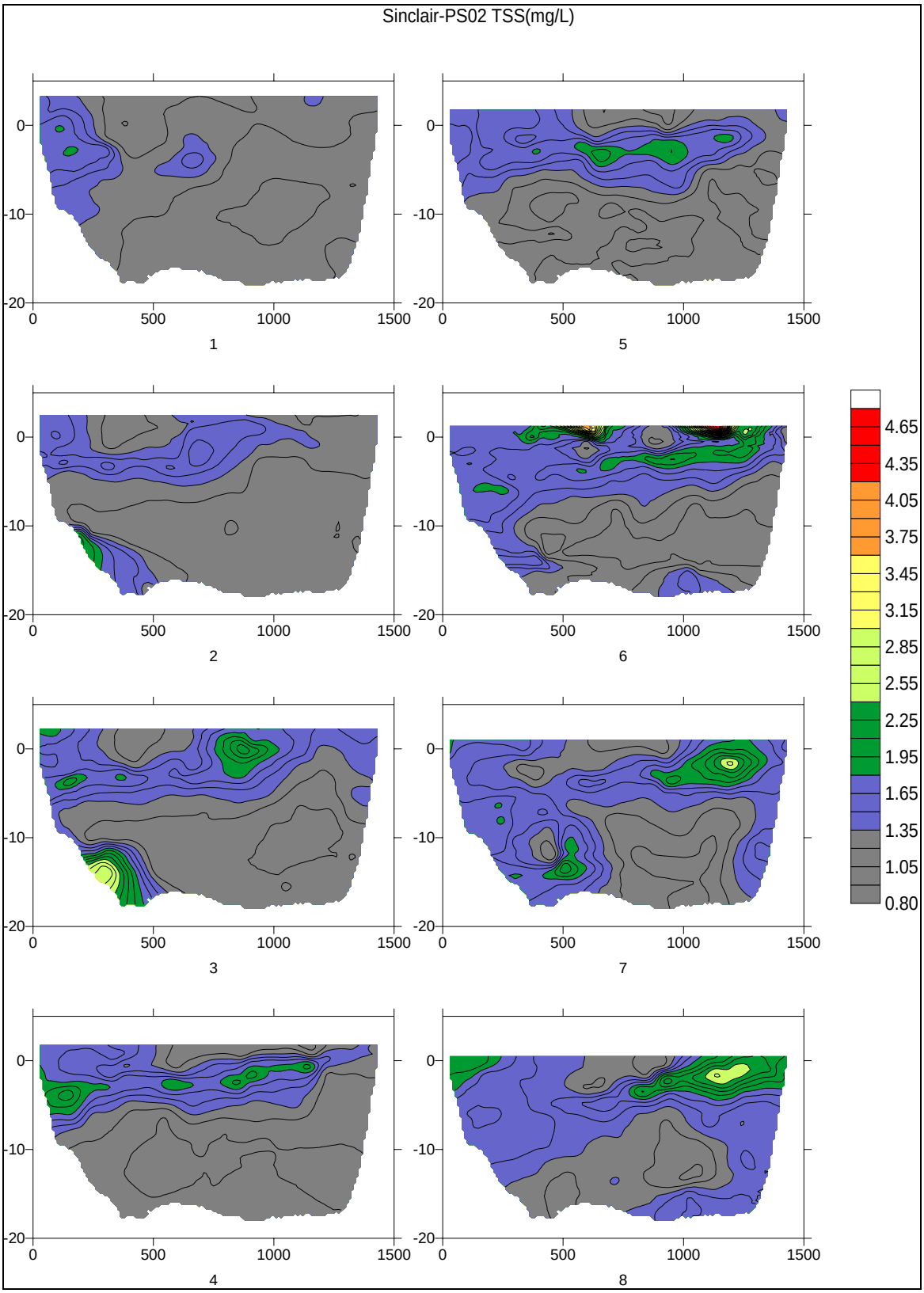

PS02 Density(sigma t)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

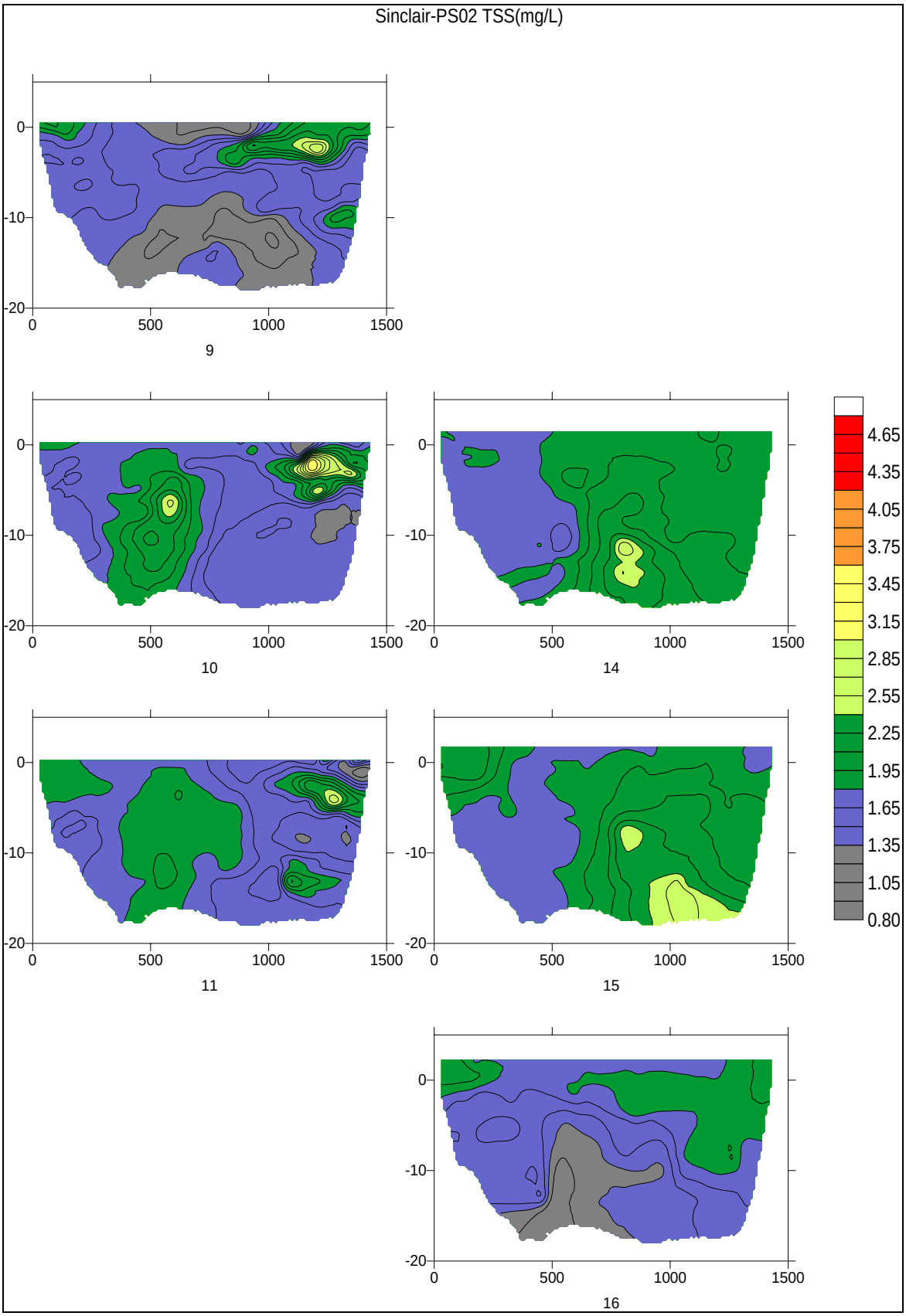

PS02 Density(sigma t)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

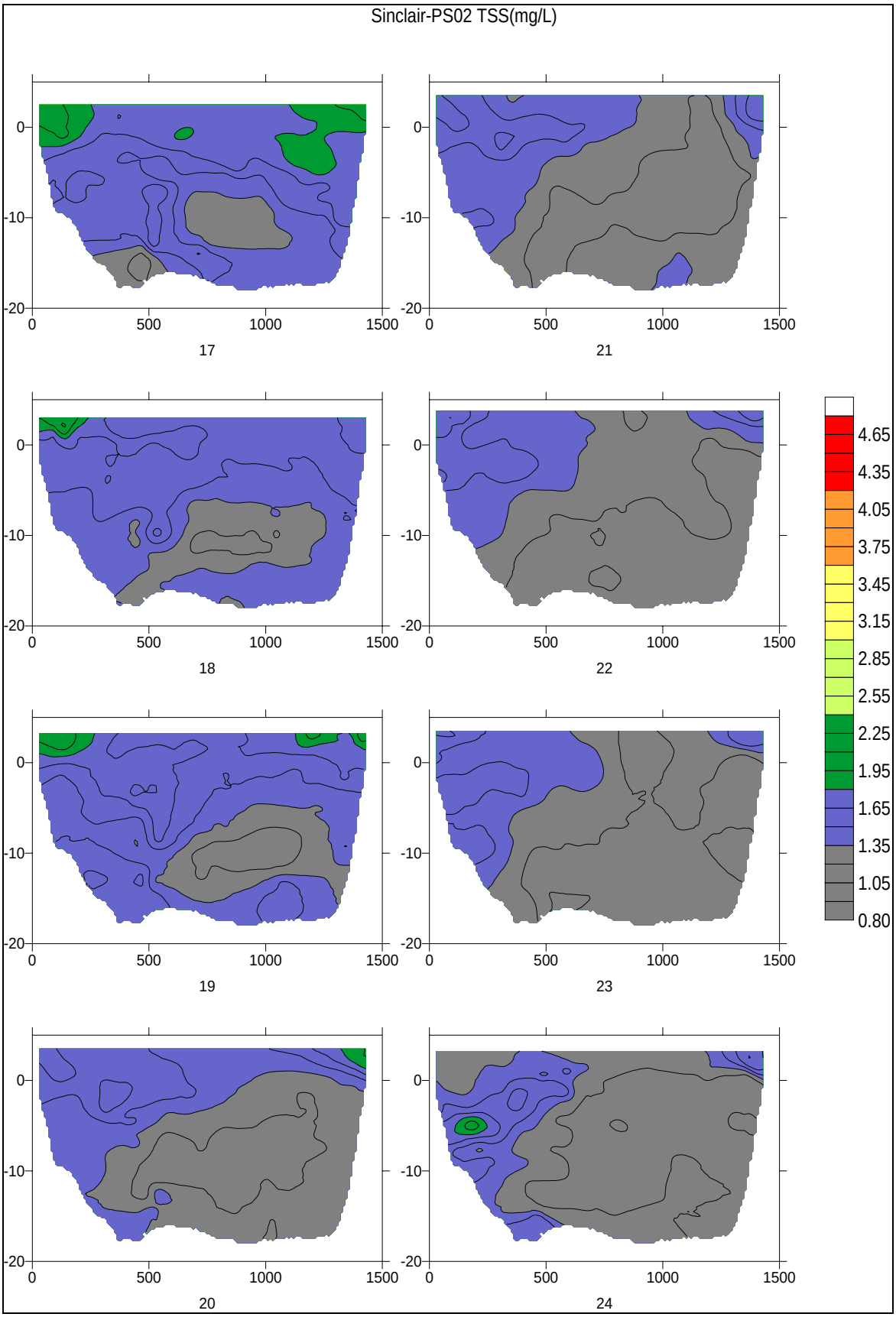

PS02 Density(sigma t)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

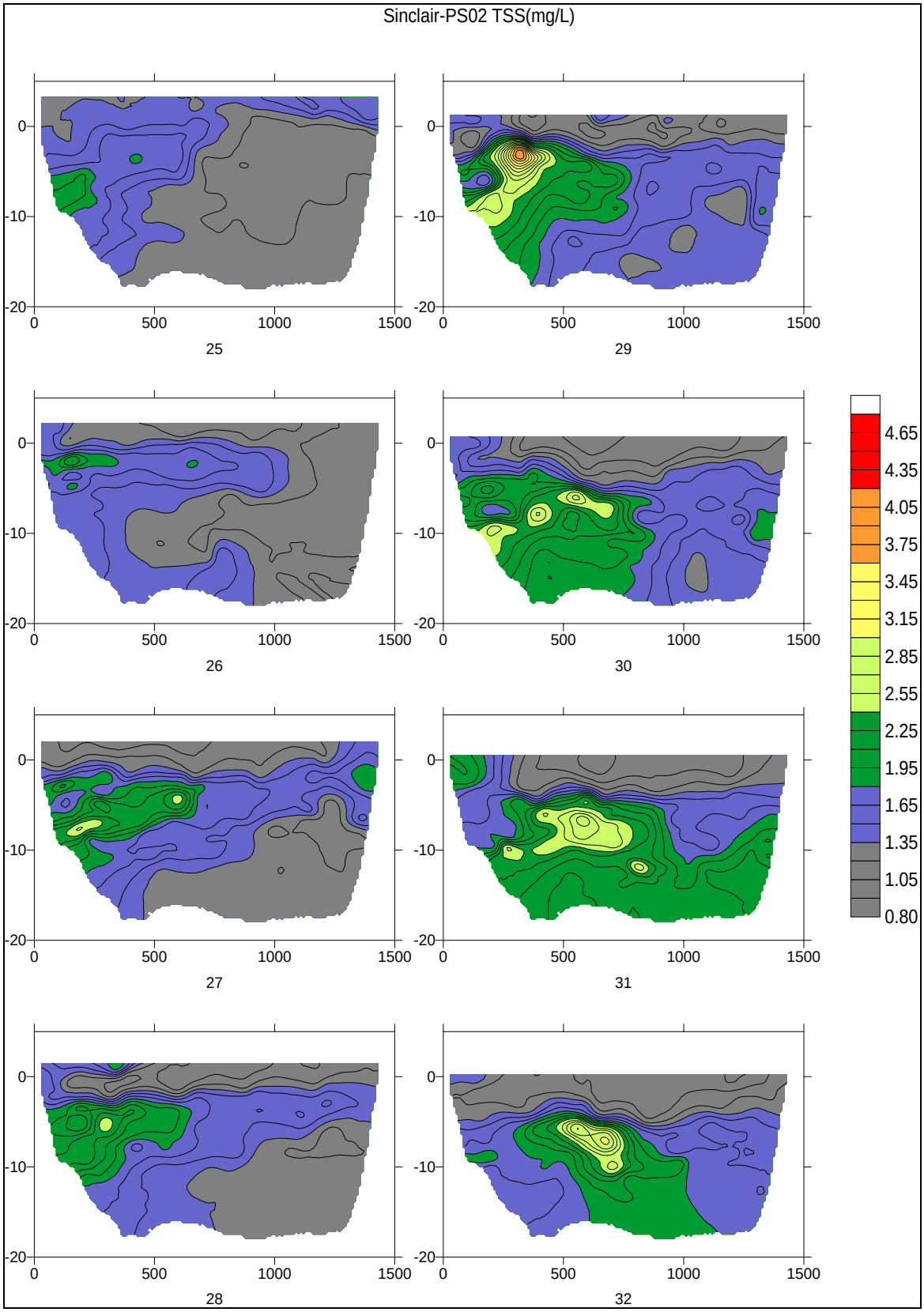

Sinclair-PS02 Density(sigma t)
0
-10
-20
0
500
1000
1500
49
50
51
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

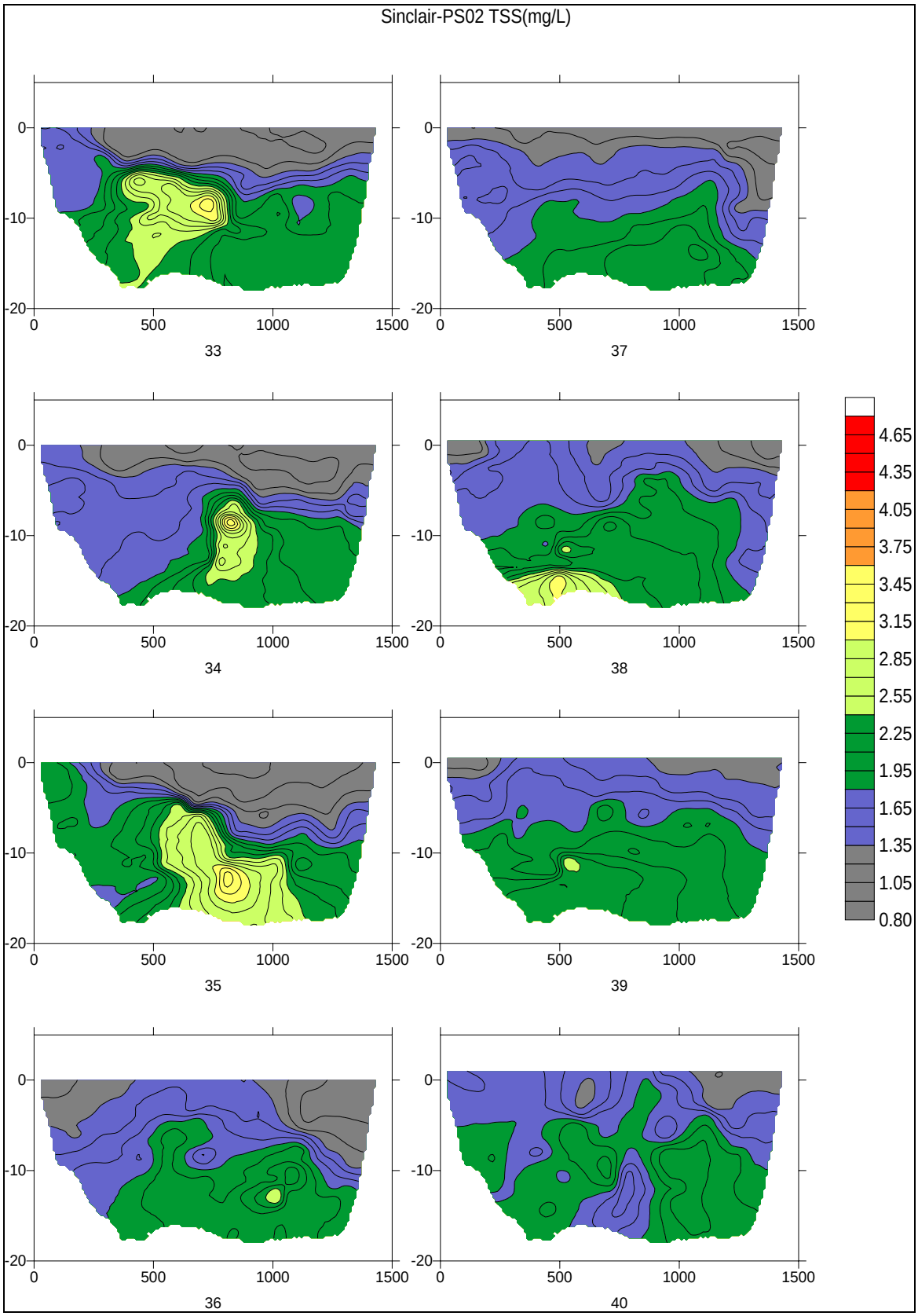
3.3.4 TSS

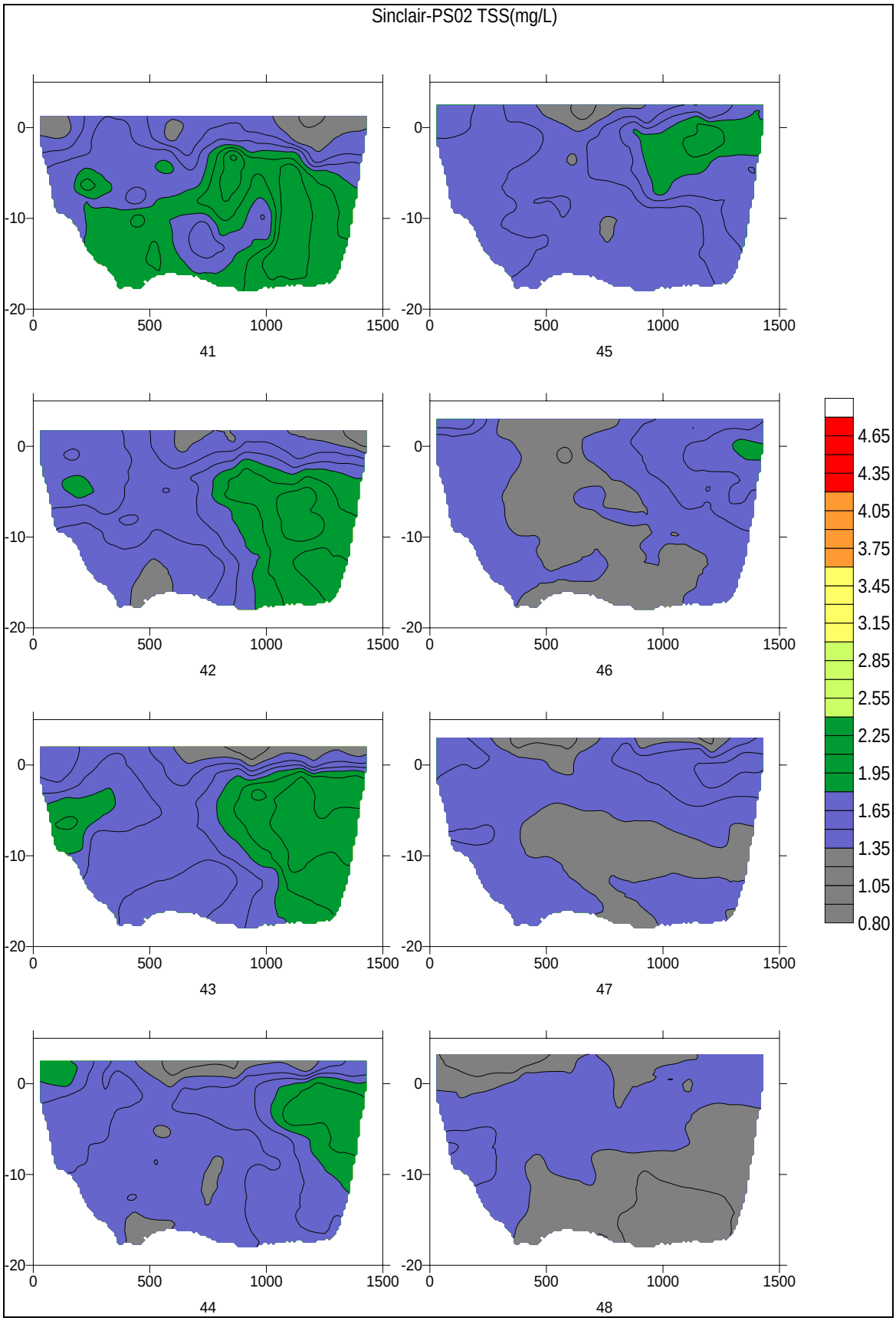

Sinclair-PS02 TSS(mg/L)
0
-10
-20
0
500
1000
1500
1
2
3
4
5
6
7
8
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

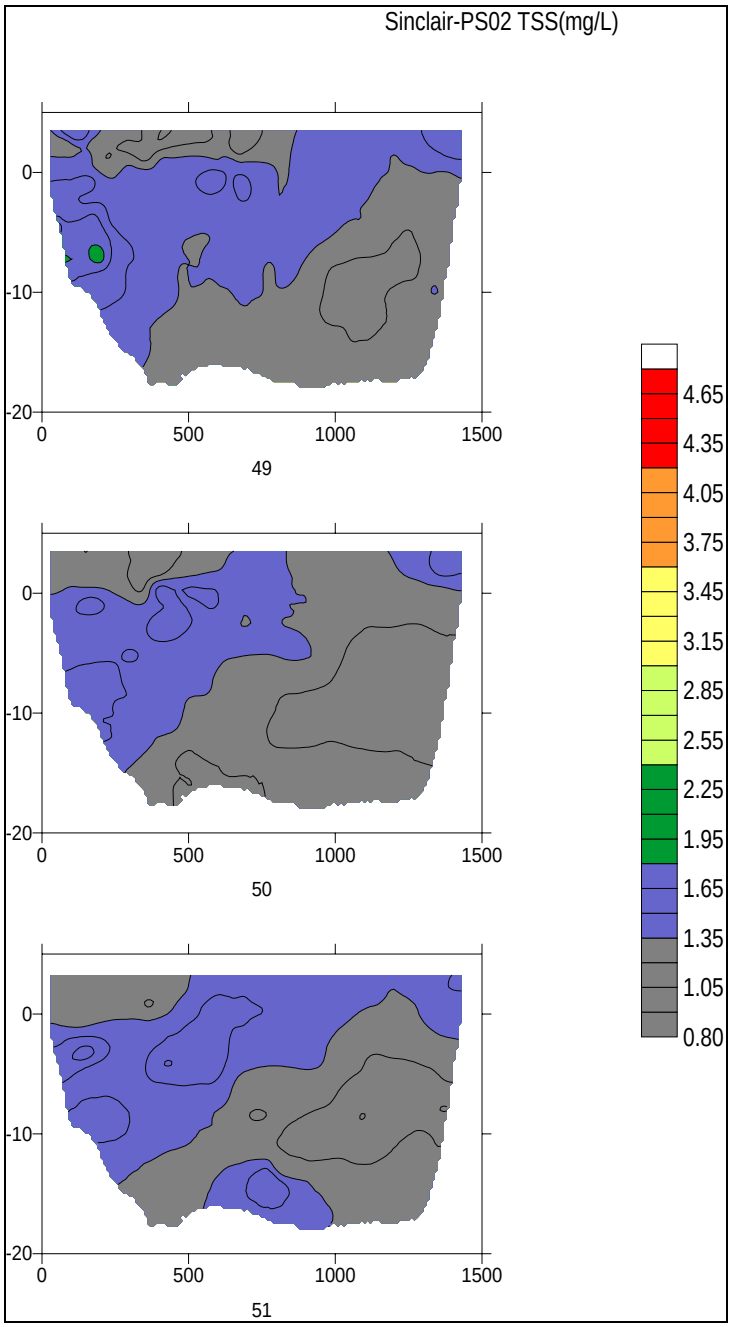

Sinclair-PS02 TSS(mg/L)
9
10
14
11
15
16
0
-10
-20
0
500
1000
1500
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80


Sinclair-PS02 TSS(mg/L)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

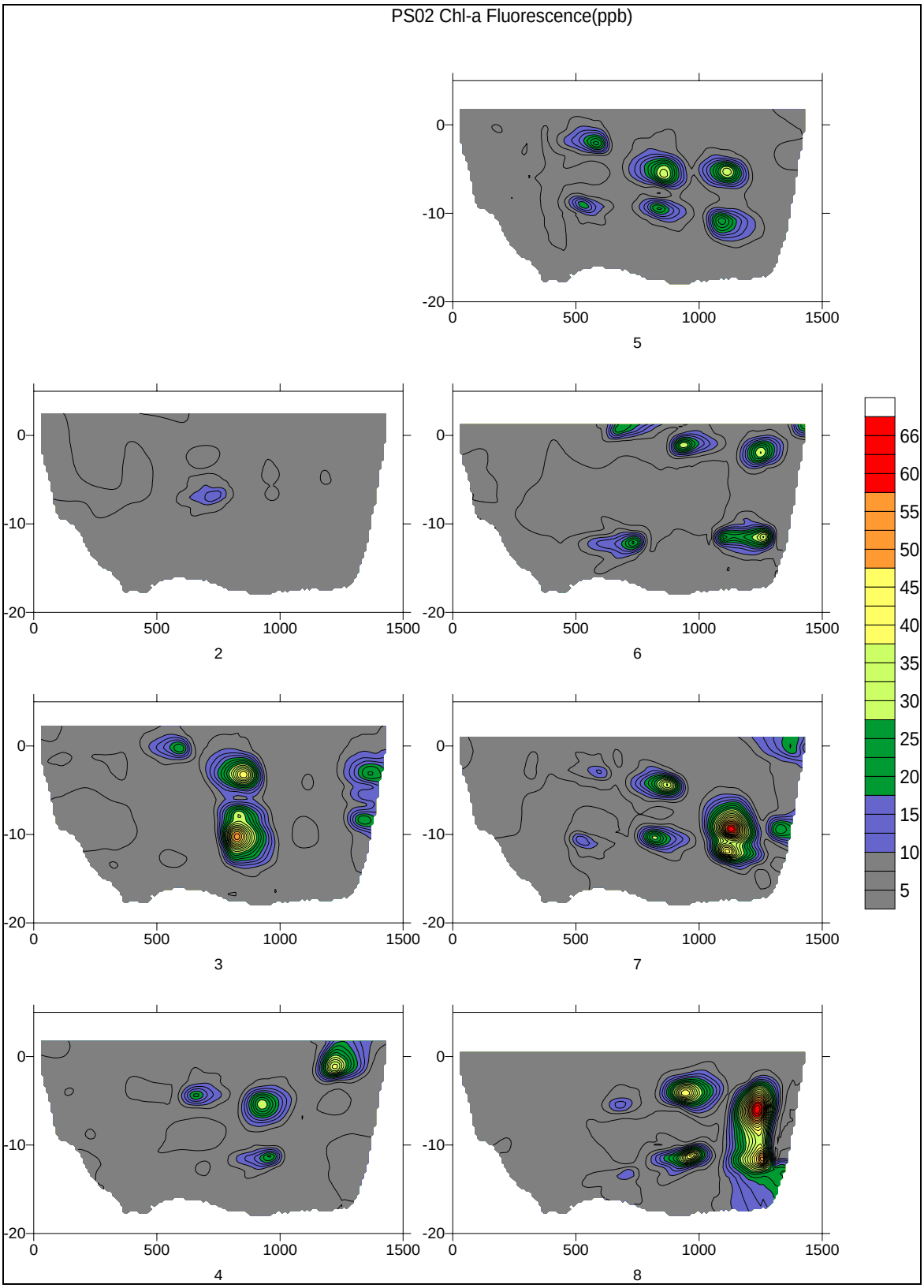

Sinclair-PS02 TSS(mg/L)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

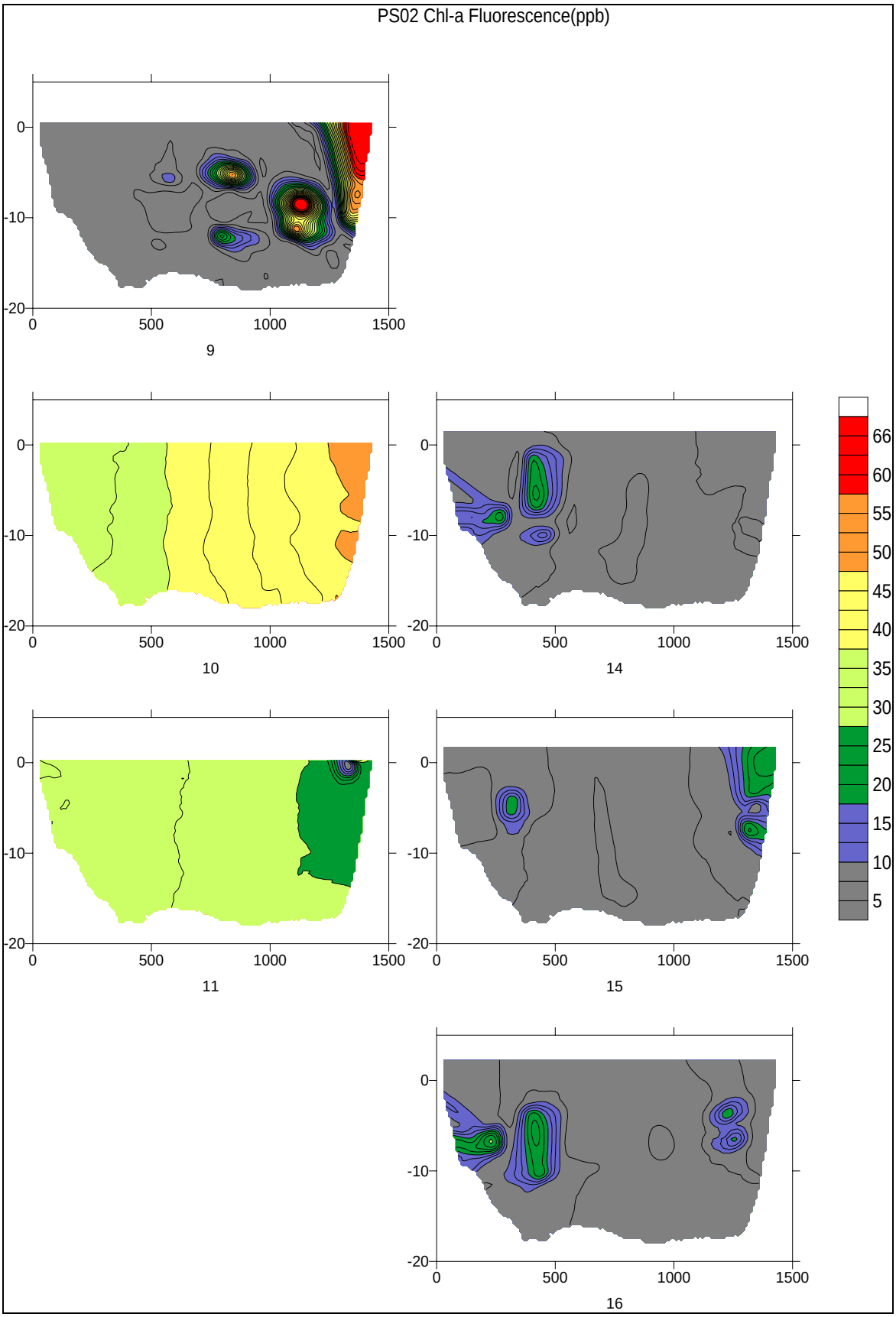

Sinclair-PS02 TSS(mg/L)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

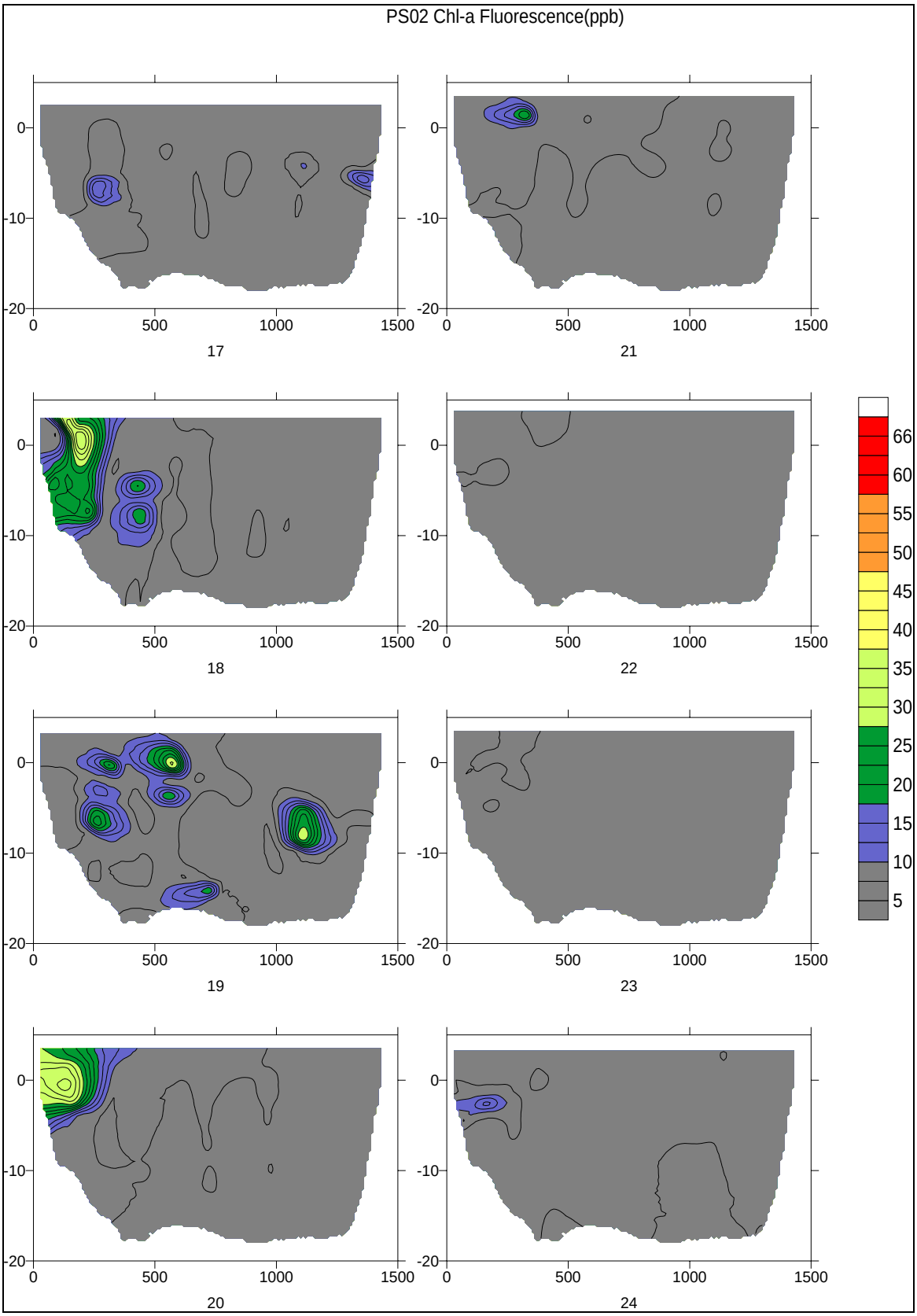

Sinclair-PS02 TSS(mg/L)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

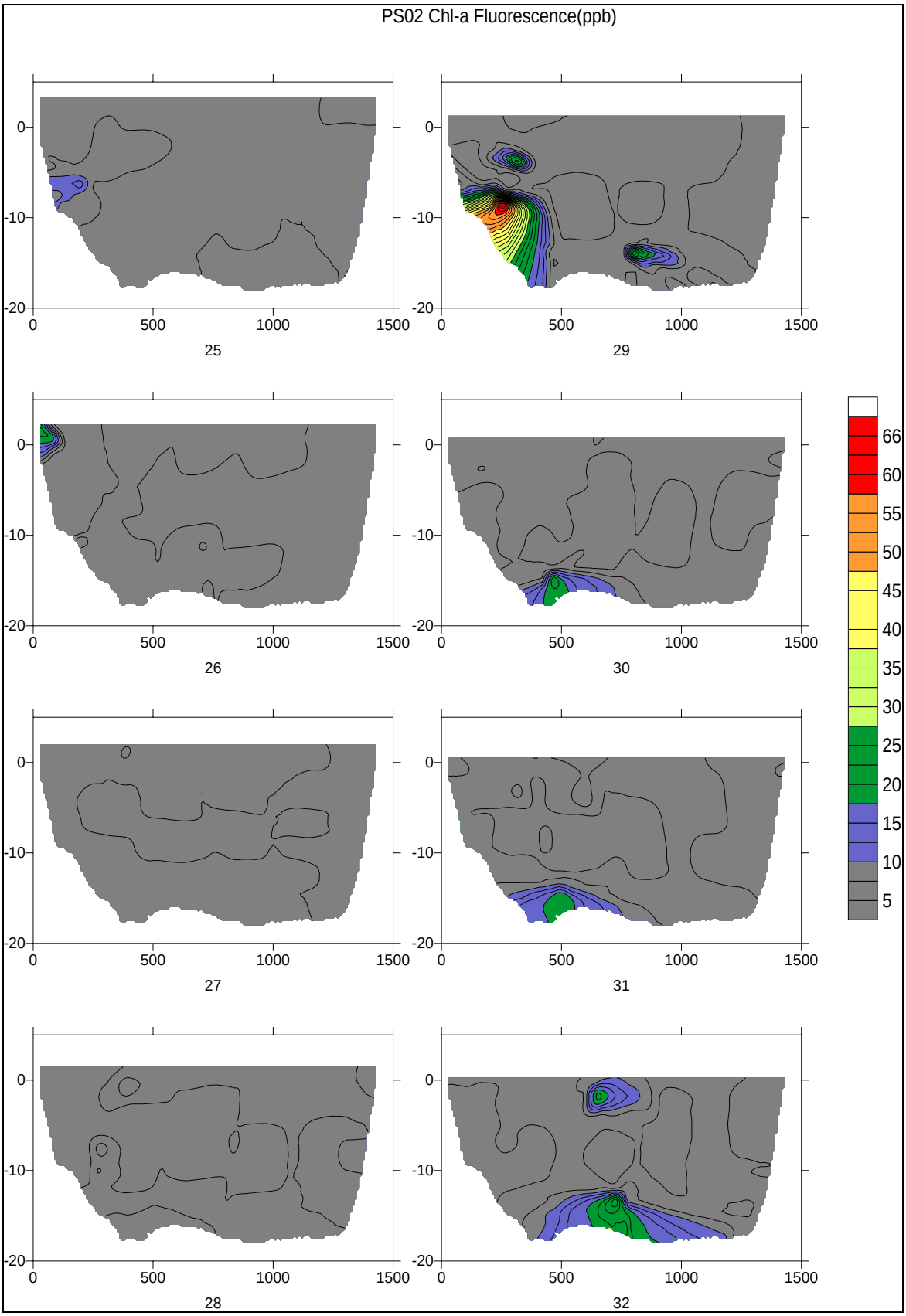

Sinclair-PS02 TSS(mg/L)
0
-10
-20
0
500
1000
1500
49
50
51
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

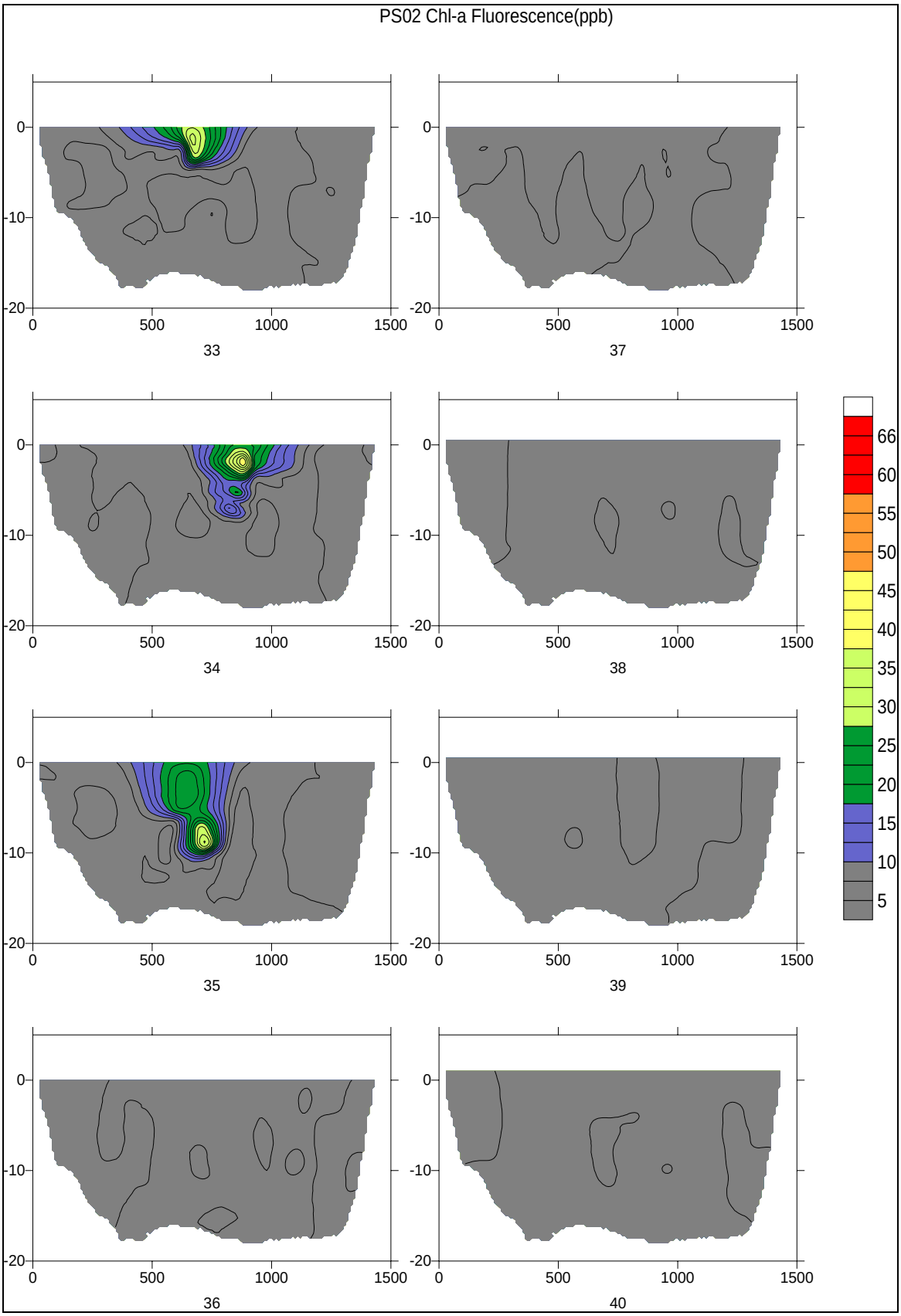
3.3.5 Chlorophyll *a*

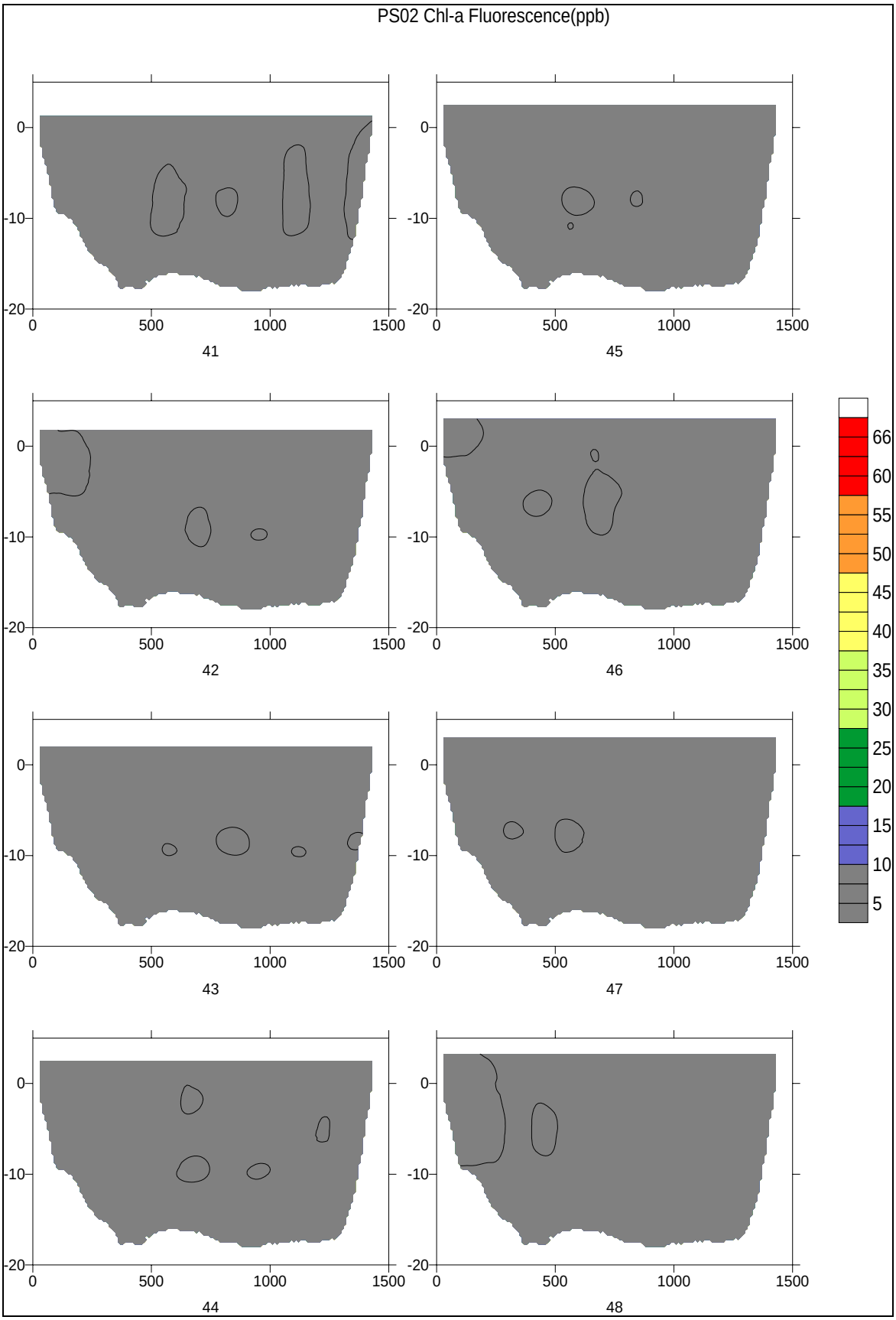


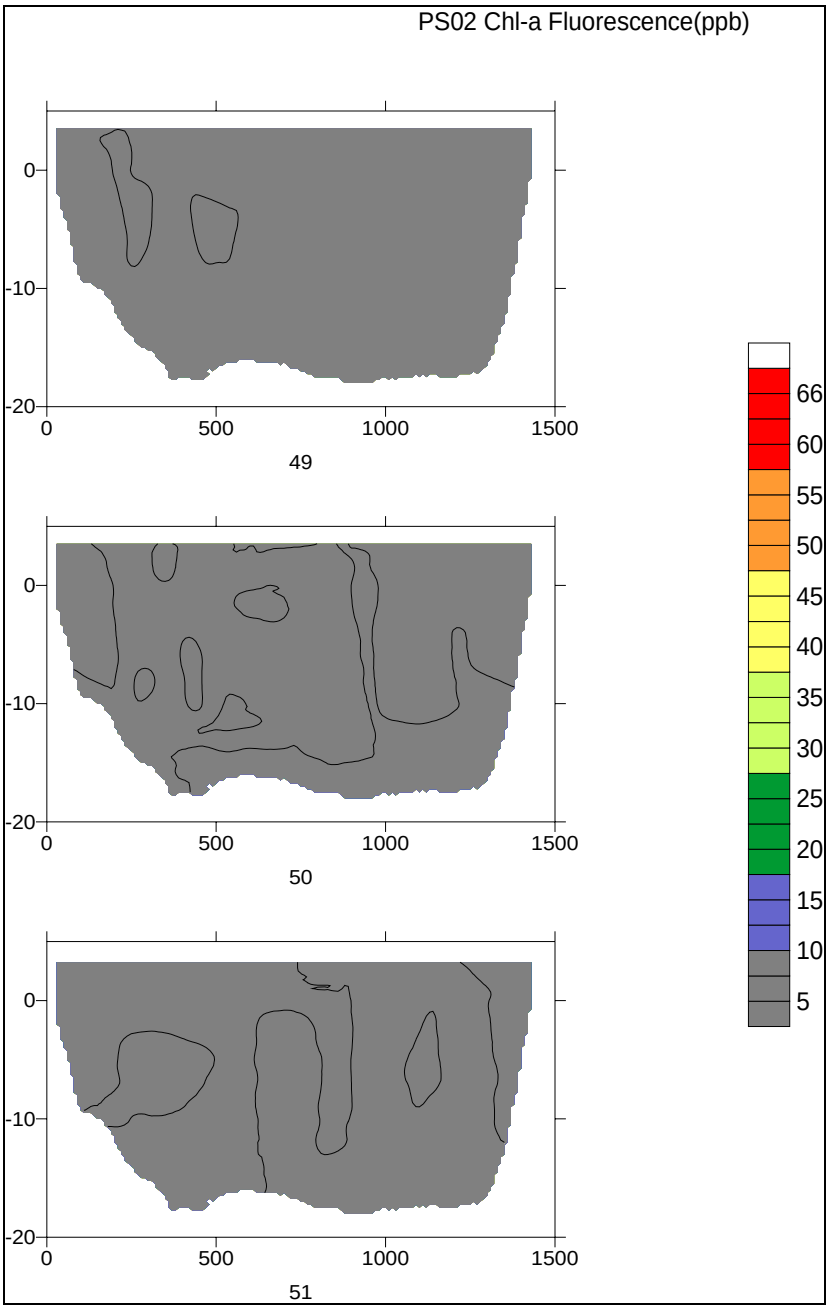

PS02 Chl-a Fluorescence(ppb)
9
10
14
11
15
16
0
-10
-20
0
500
1000
1500
66
60
55
50
45
40
35
30
25
20
15
10
5


PS02 Chl-a Fluorescence(ppb)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
66
60
55
50
45
40
35
30
25
20
15
10
5

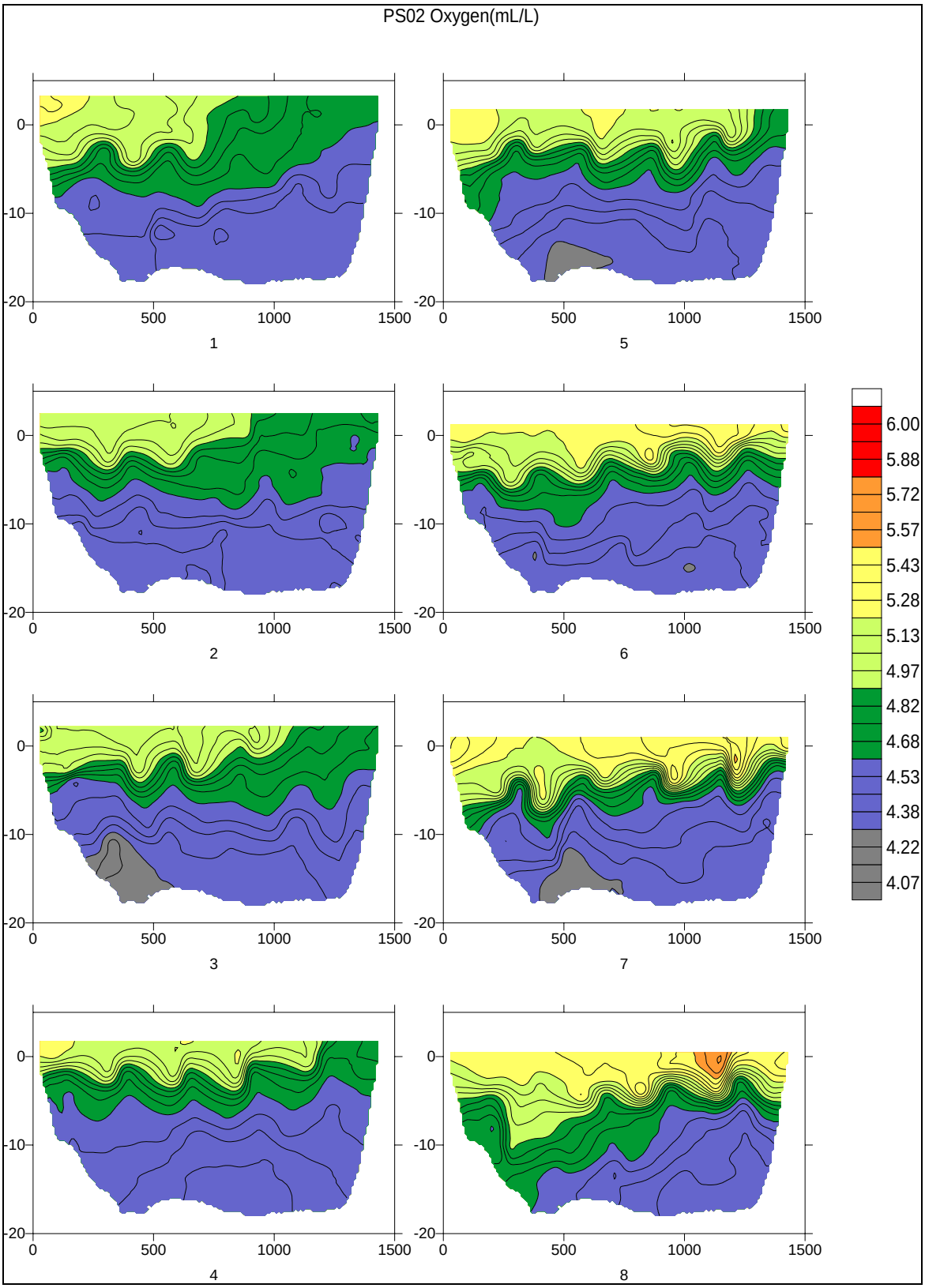

PS02 Chl-a Fluorescence(ppb)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
66
60
55
50
45
40
35
30
25
20
15
10
5

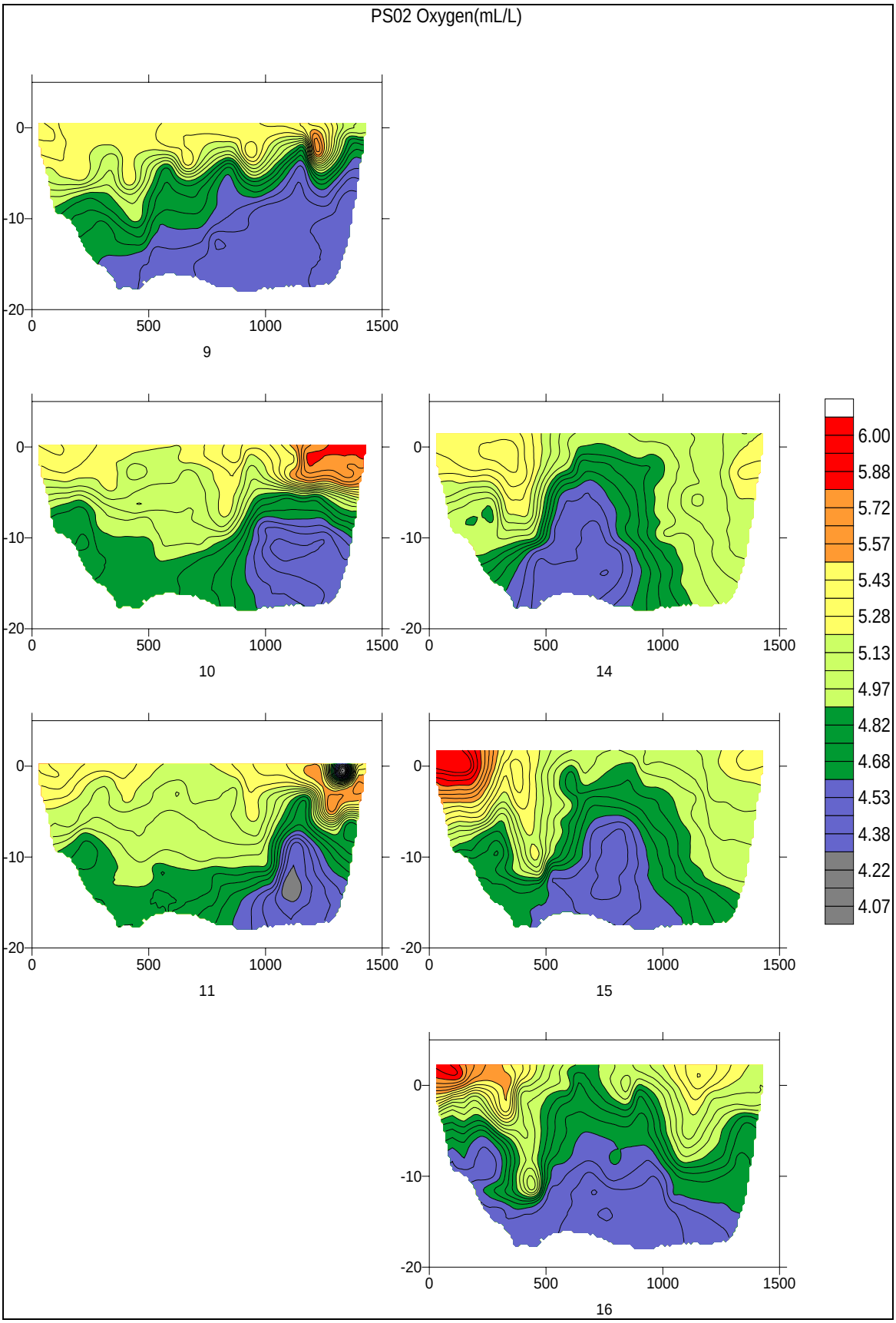

PS02 Chl-a Fluorescence(ppb)
0
-10
-20
0
500
1000
1500
33
37
34
38
35
39
36
40
66
60
55
50
45
40
35
30
25
20
15
10
5

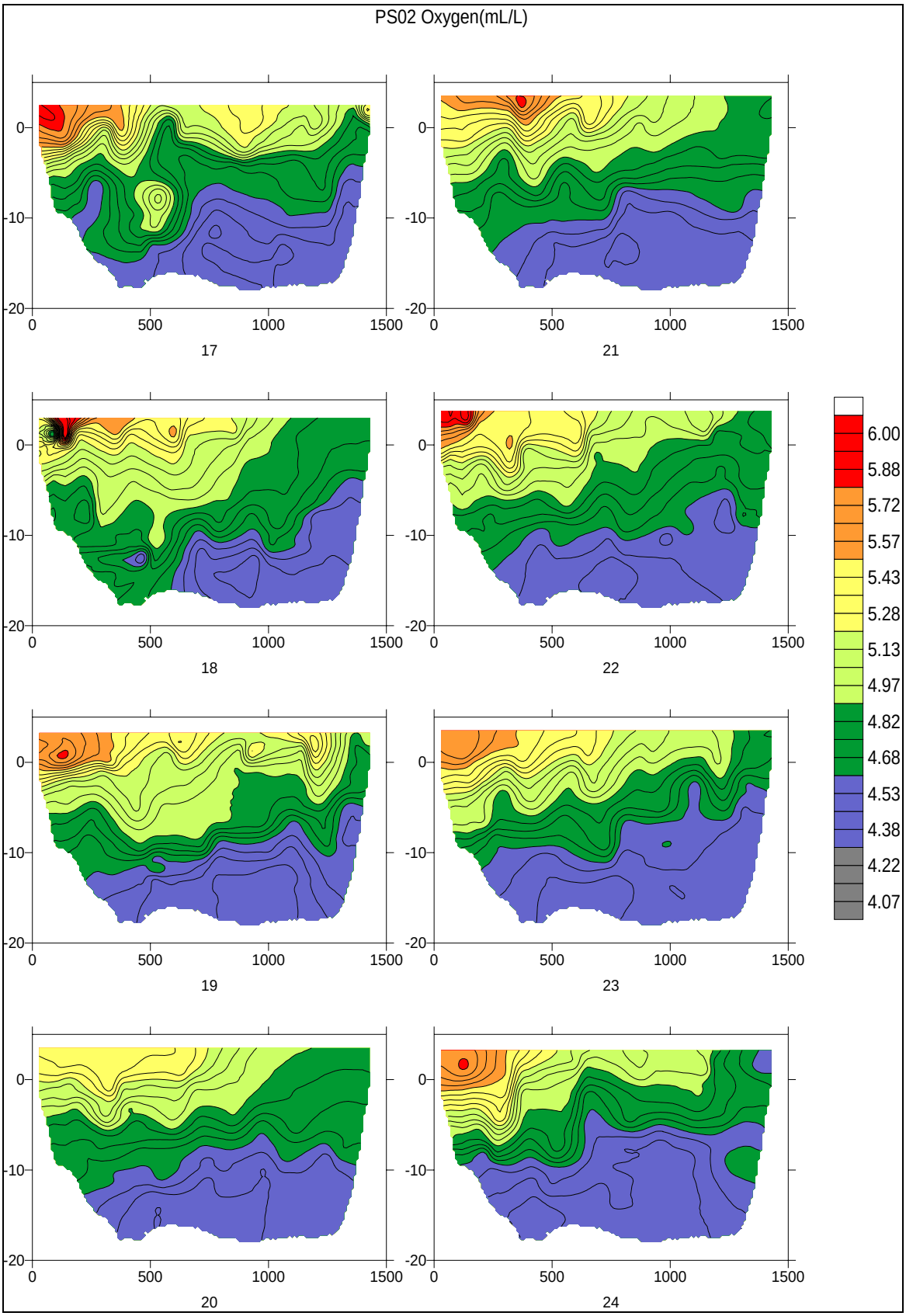

PS02 Chl-a Fluorescence(ppb)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
66
60
55
50
45
40
35
30
25
20
15
10
5

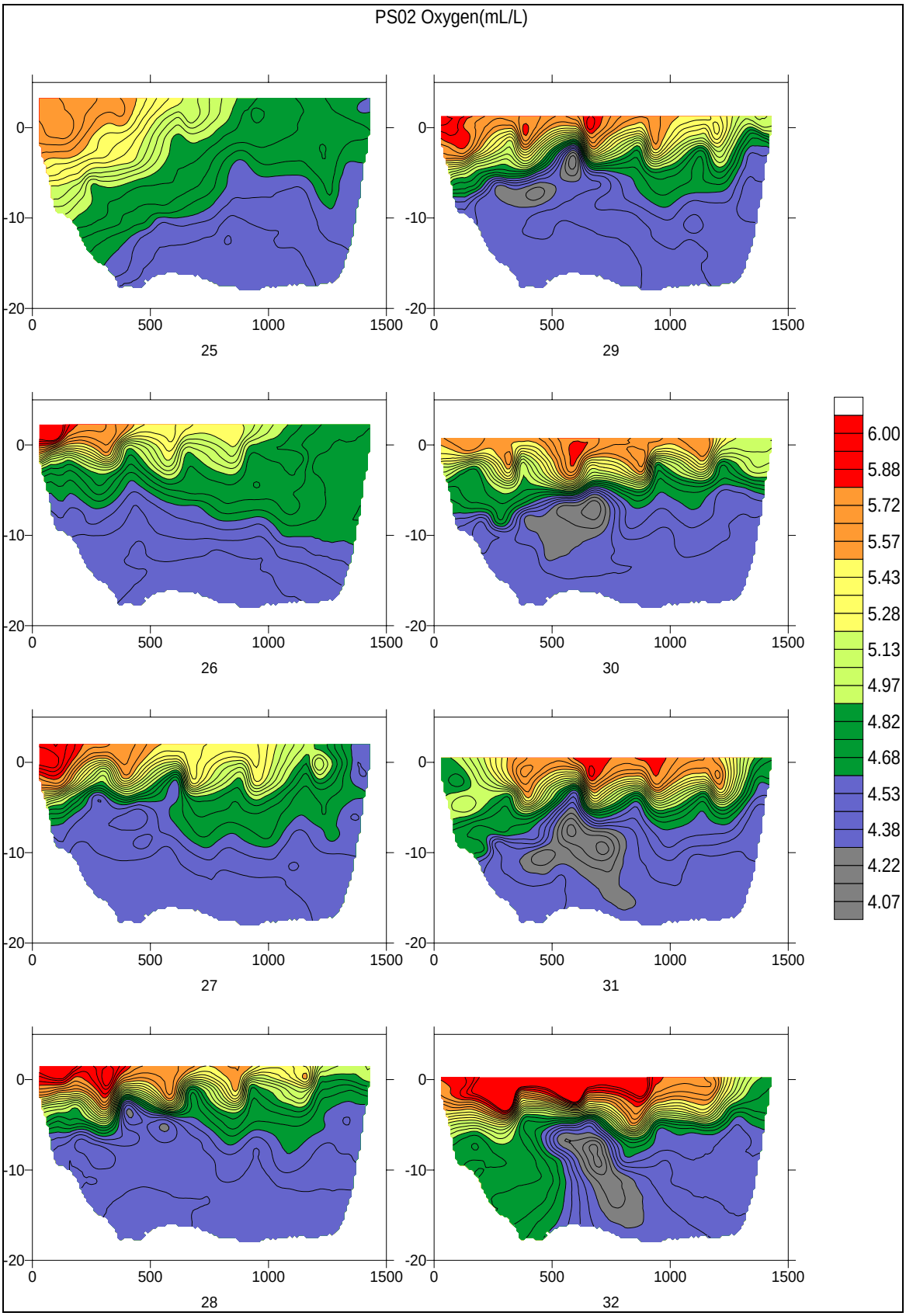

PS02 Chl-a Fluorescence(ppb)
0
-10
-20
0
500
1000
1500
49
50
51
66
60
55
50
45
40
35
30
25
20
15
10
5

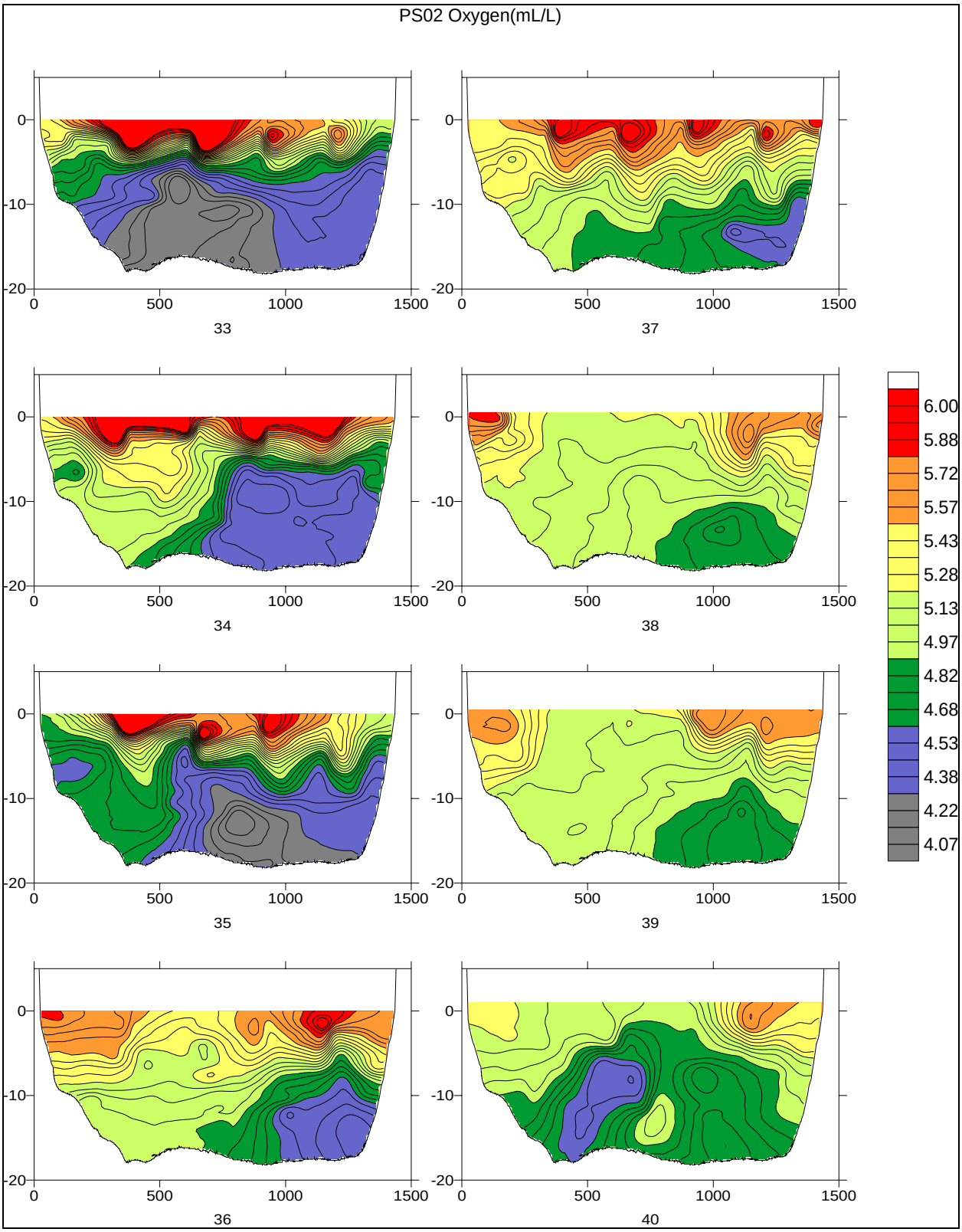
3.3.6 Oxygen

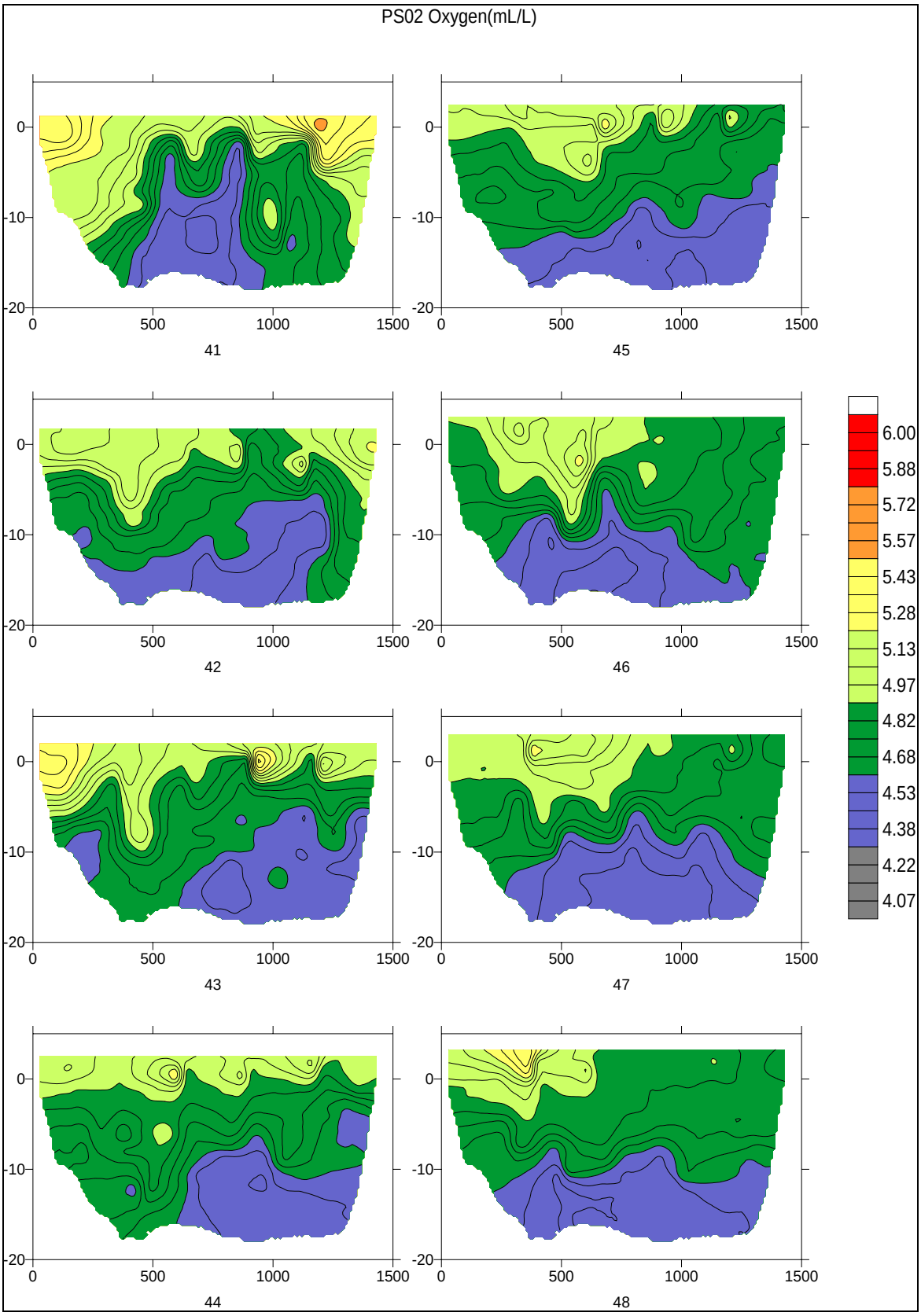

PS02 Oxygen(mL/L)
0
-10
-20
0
500
1000
1500
1
2
3
4
5
6
7
8
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

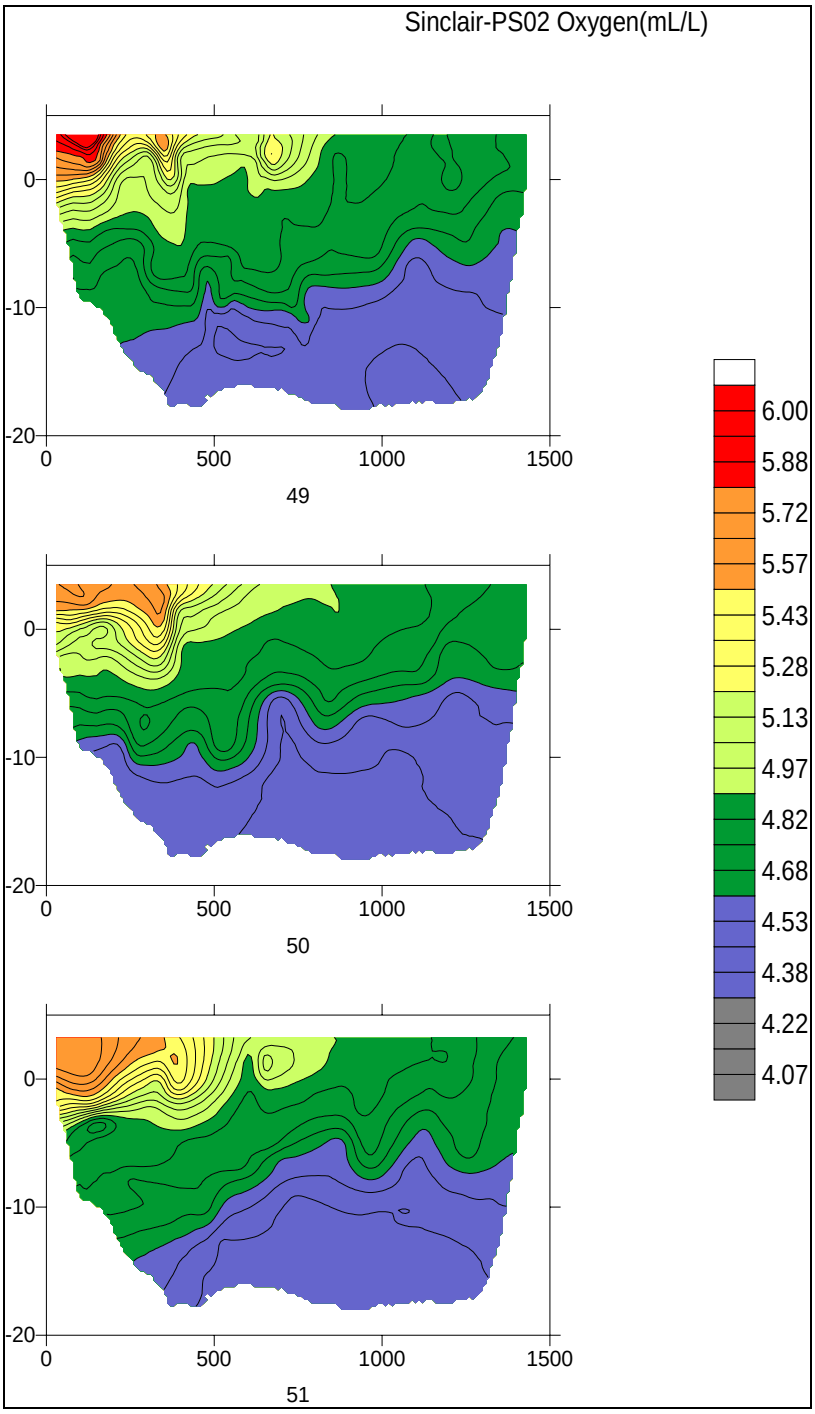

PS02 Oxygen(mL/L)
9
10
14
11
15
16
0
-10
-20
0
500
1000
1500
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07


PS02 Oxygen(mL/L)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

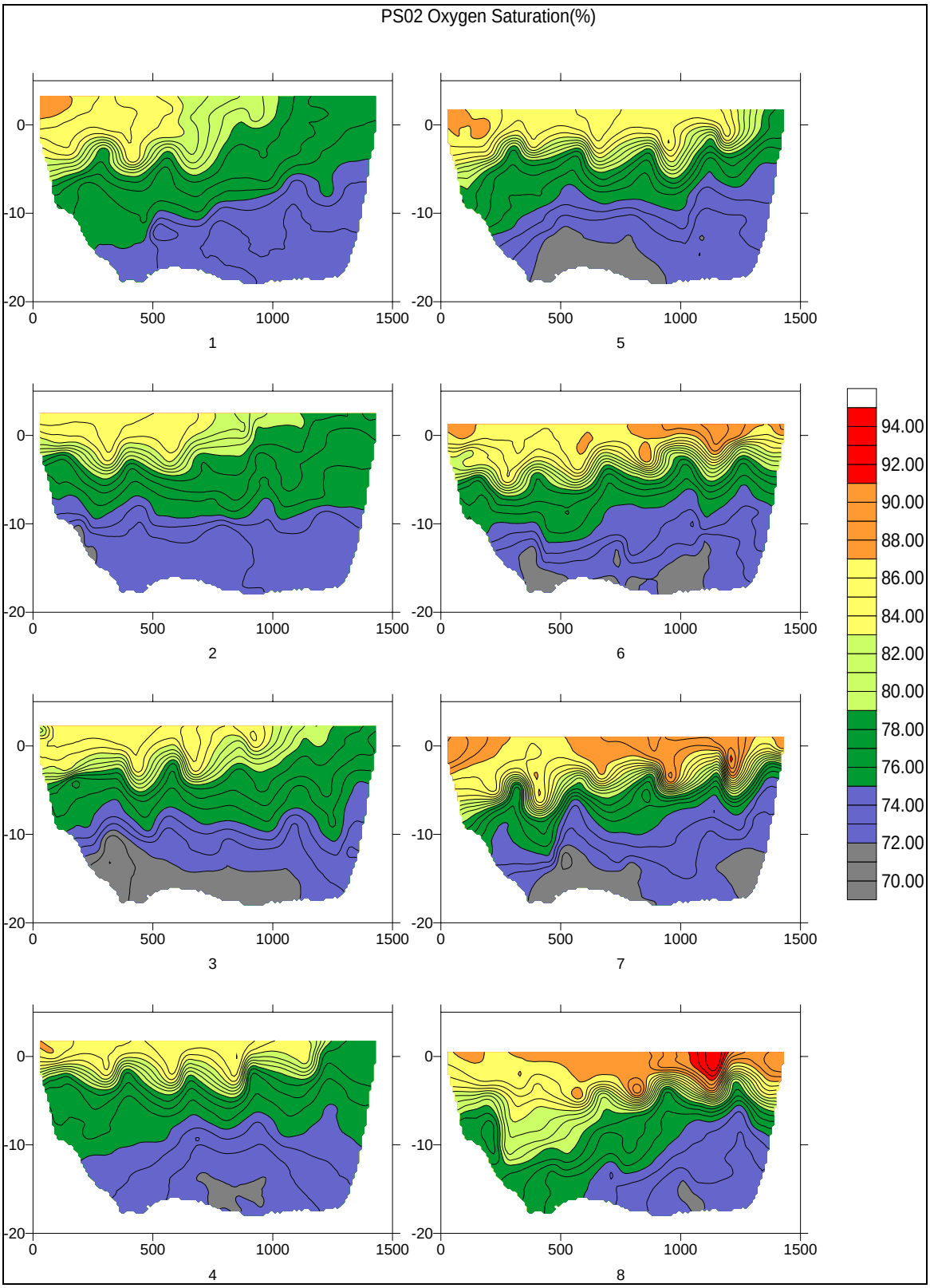

PS02 Oxygen(mL/L)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

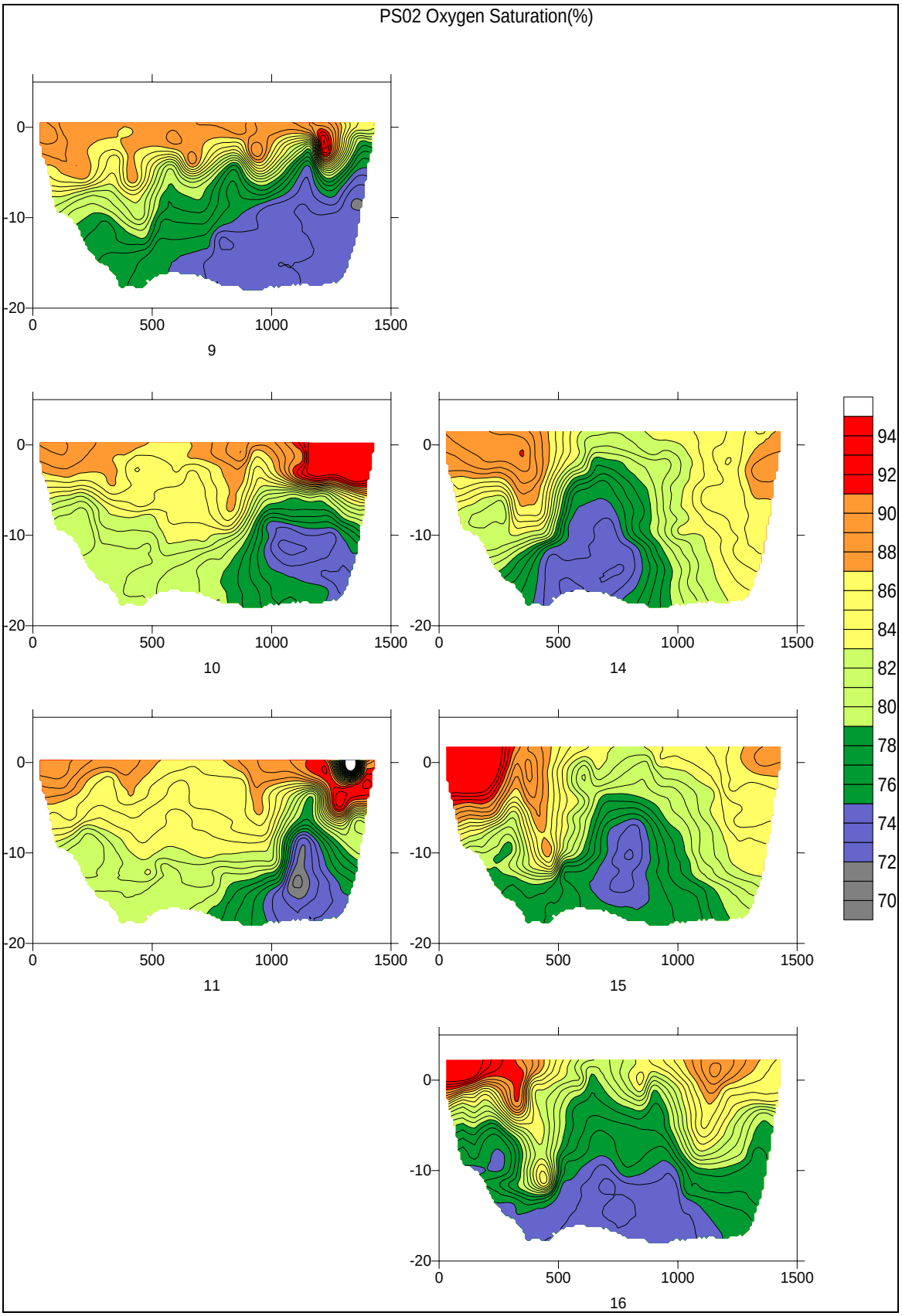

PS02 Oxygen(mL/L)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

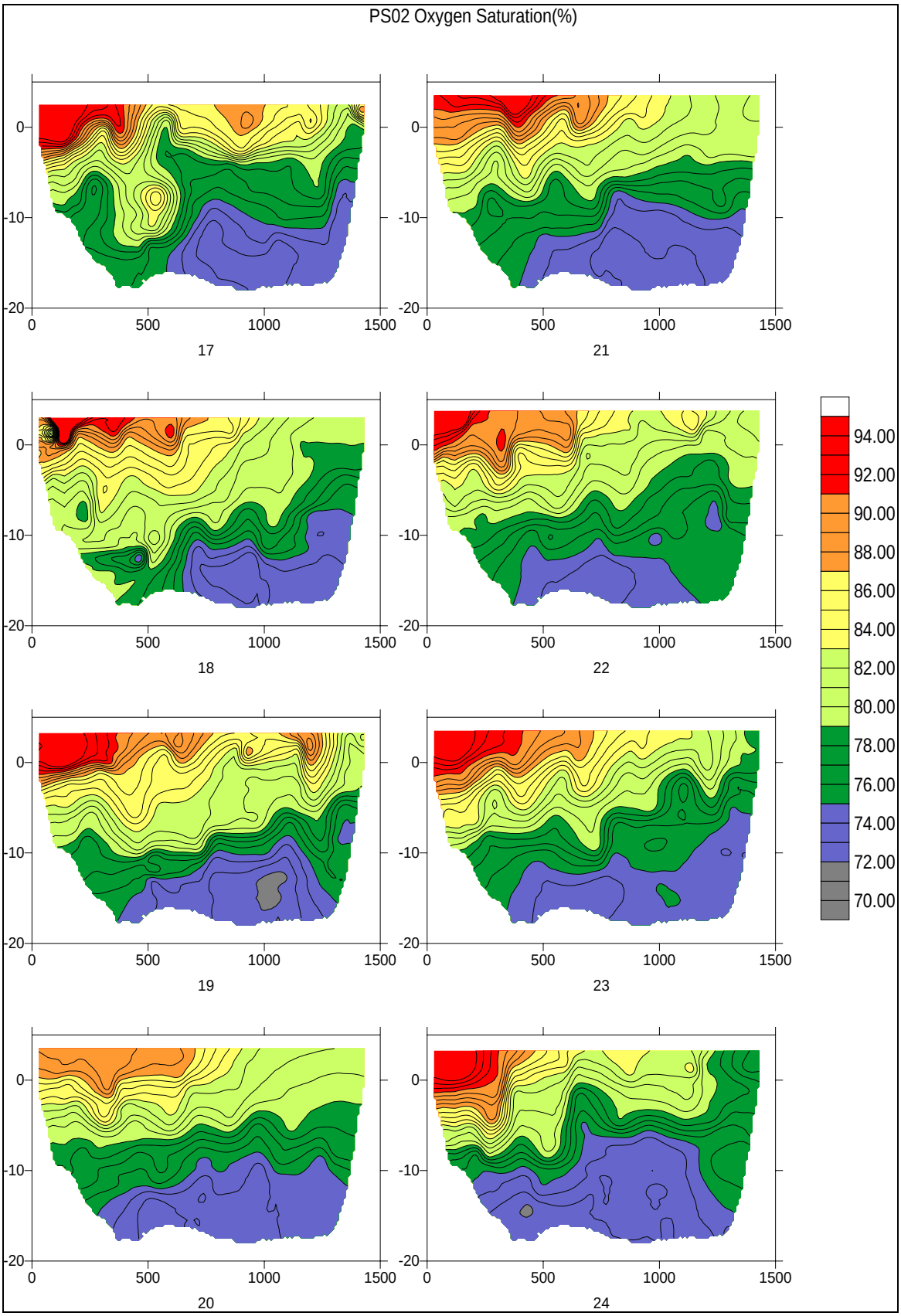

PS02 Oxygen(mL/L)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

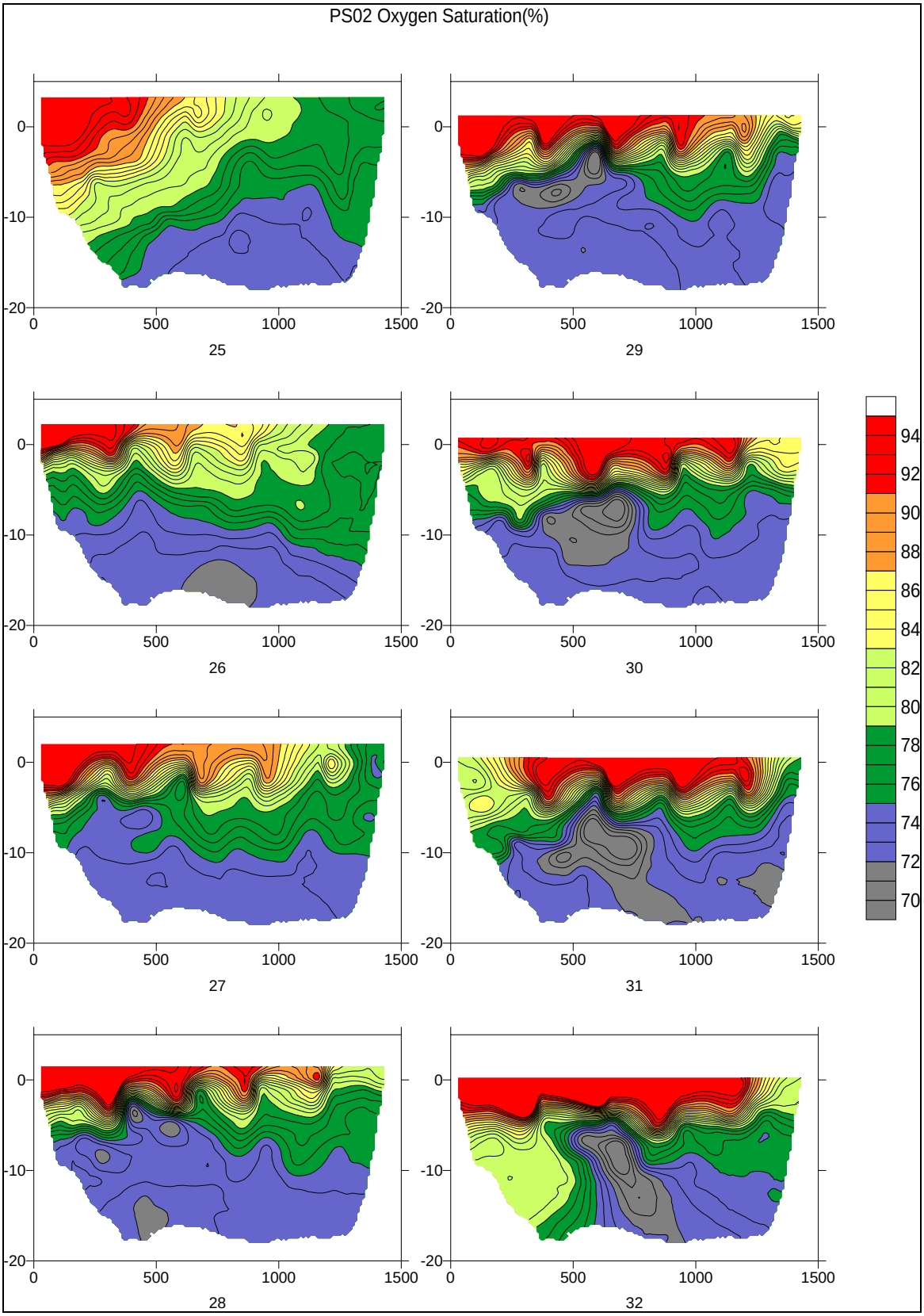

Sinclair-PS02 Oxygen(mL/L)
0
-10
-20
0
500
1000
1500
49
50
51
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

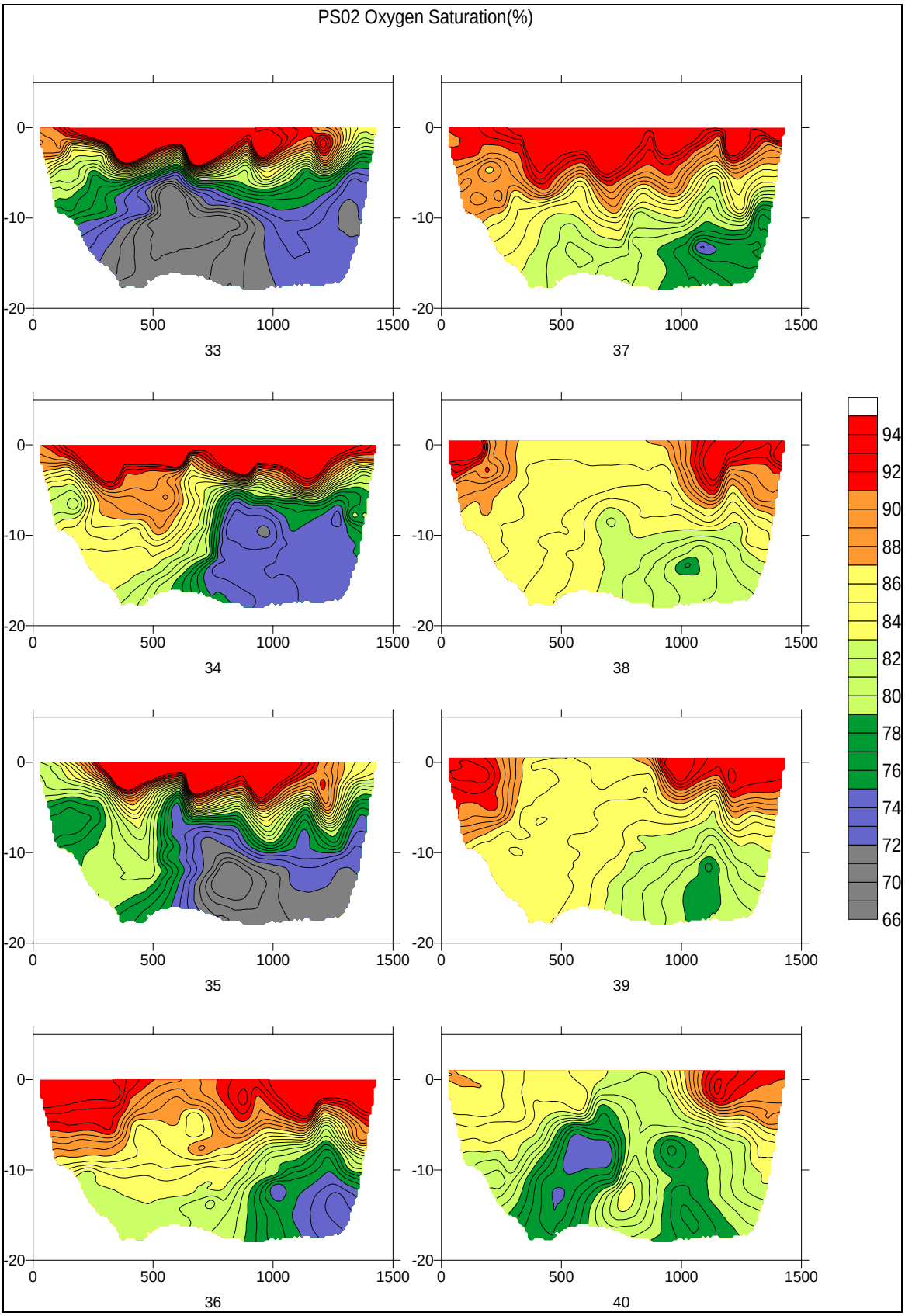
3.3.7 Oxygen Saturation

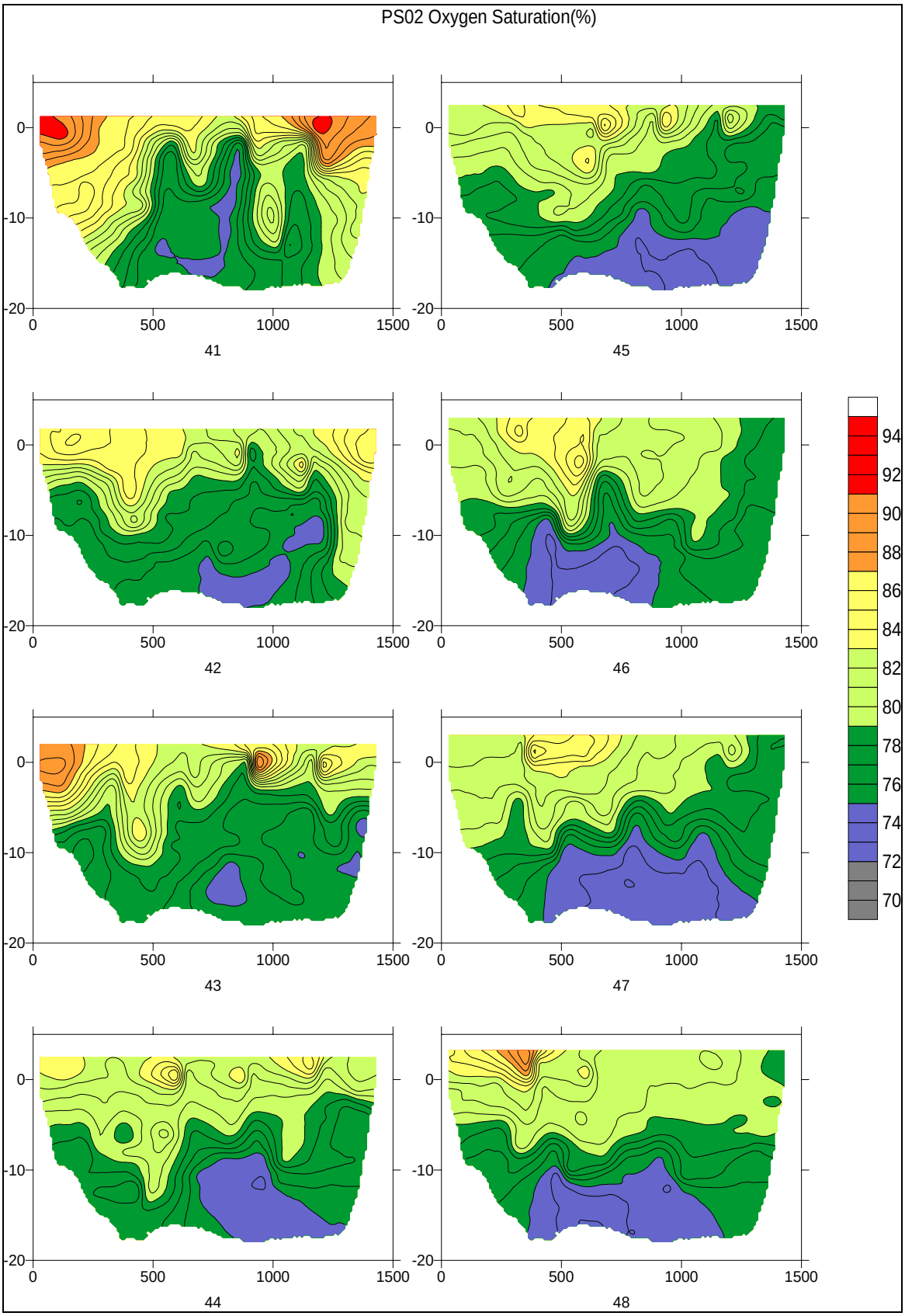


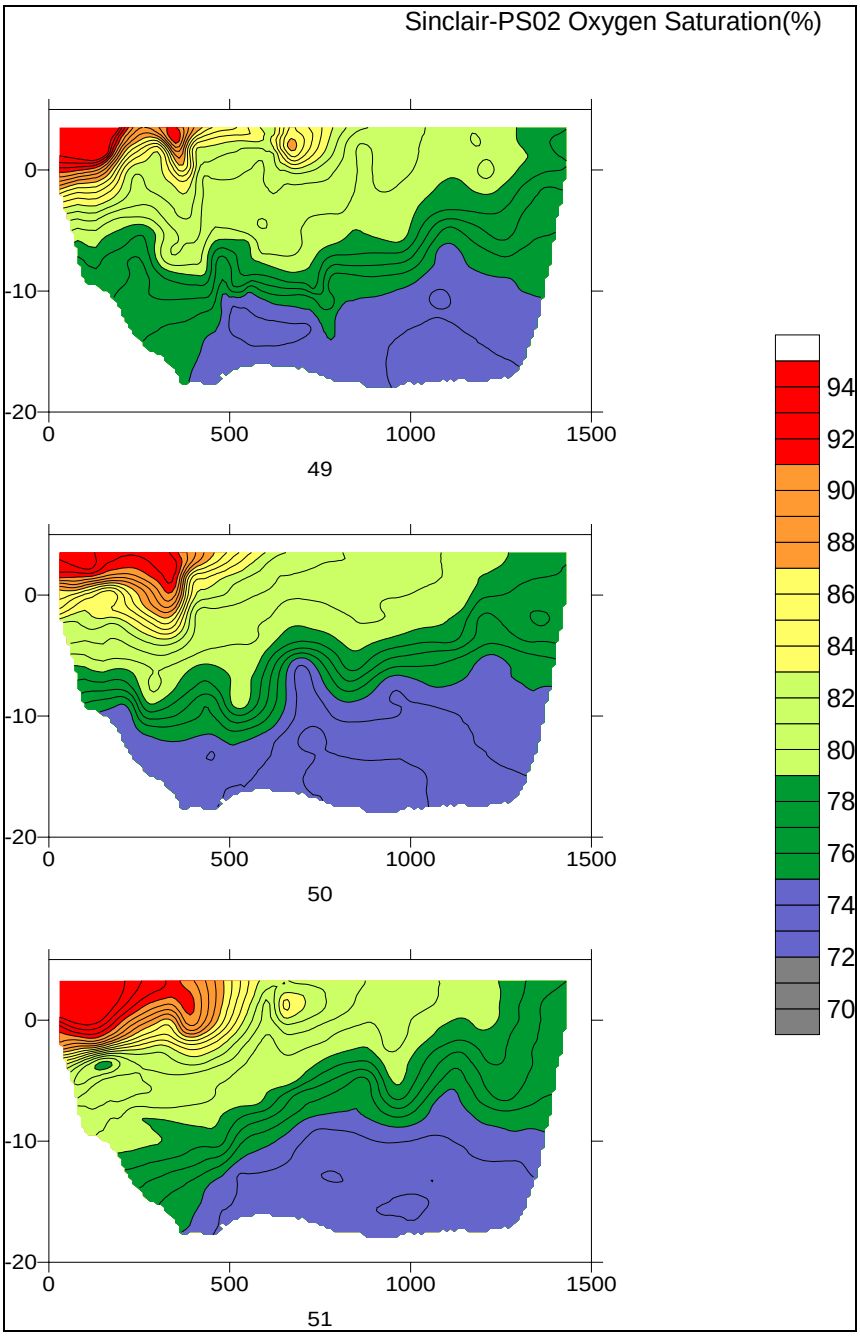

PS02 Oxygen Saturation(%)
0
-10
-20
0
500
1000
1500
9
10
14
11
15
16
94
92
90
88
86
84
82
80
78
76
74
72
70


PS02 Oxygen Saturation(%)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
94.00
92.00
90.00
88.00
86.00
84.00
82.00
80.00
78.00
76.00
74.00
72.00
70.00

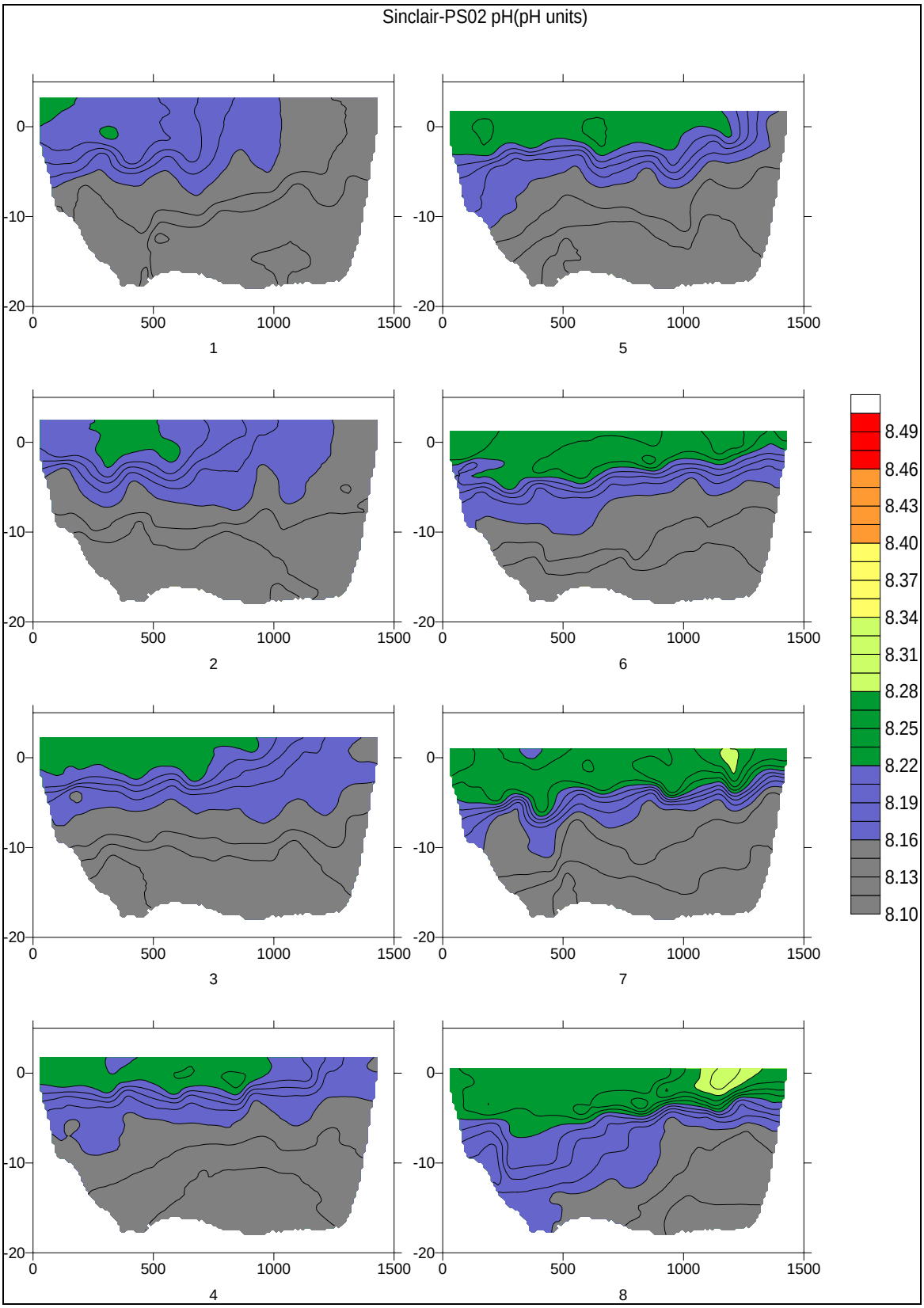

PS02 Oxygen Saturation(%)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
94
92
90
88
86
84
82
80
78
76
74
72
70

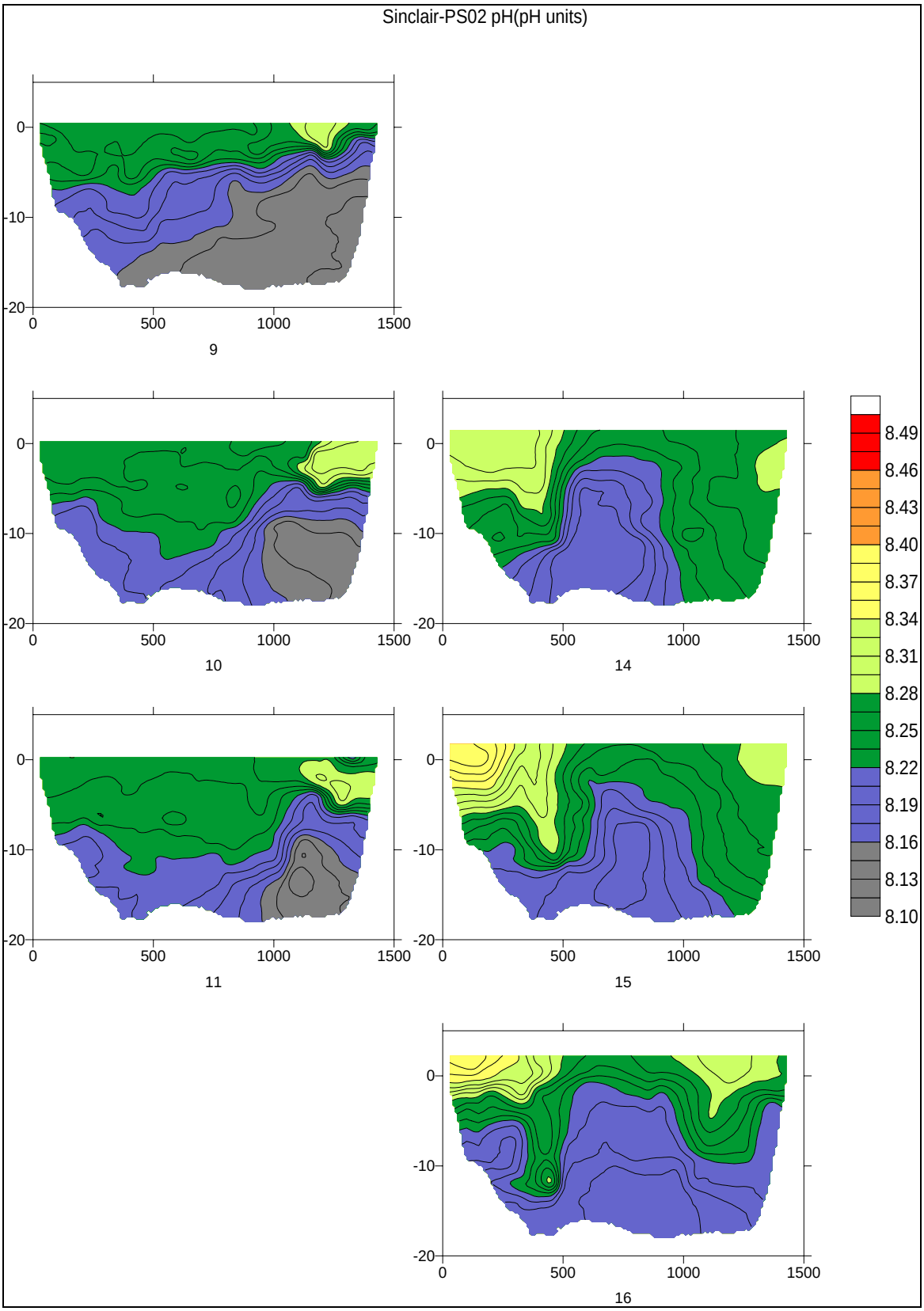

PS02 Oxygen Saturation(%)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
94
92
90
88
86
84
82
80
78
76
74
72
70
66

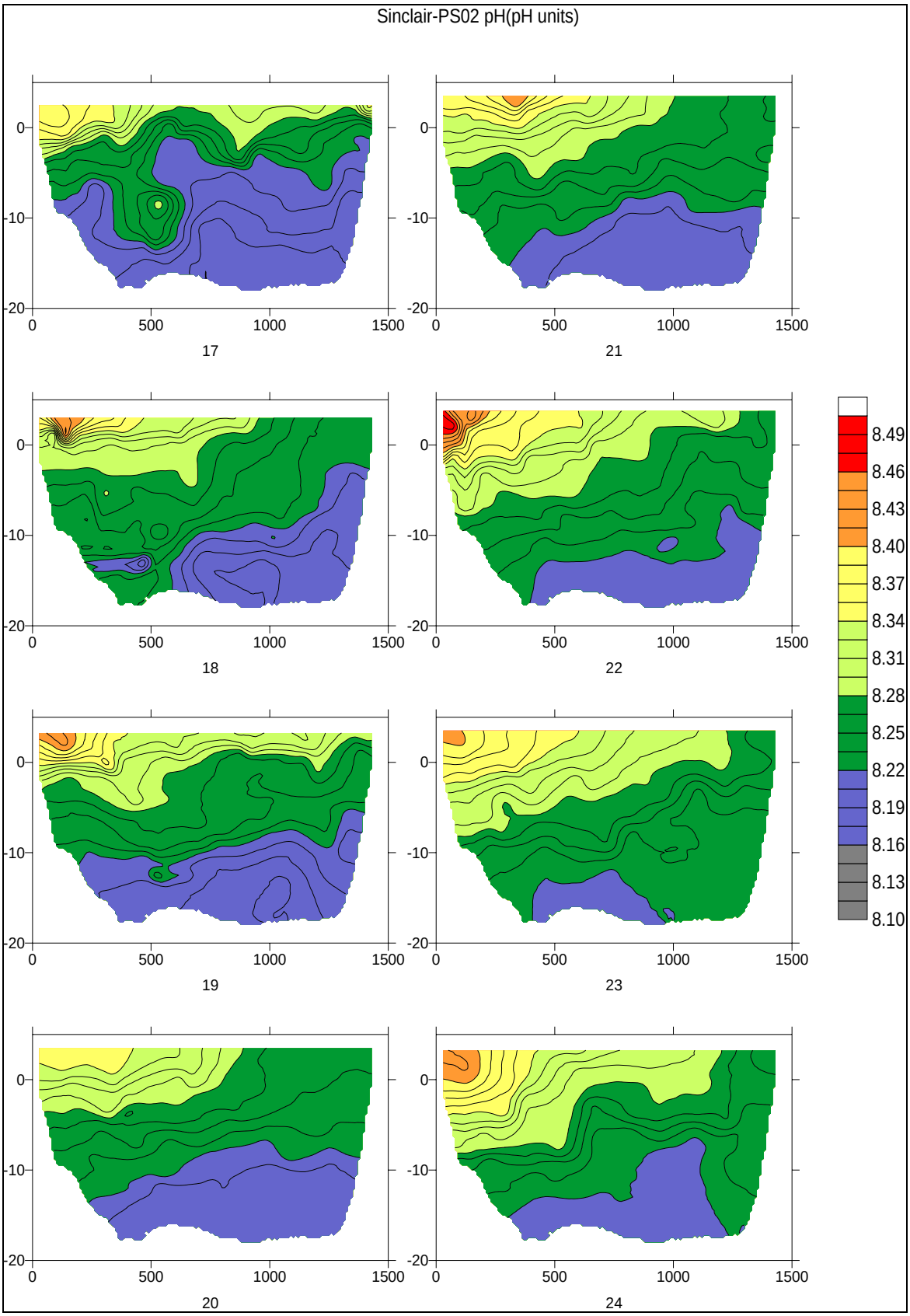

PS02 Oxygen Saturation(%)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
94
92
90
88
86
84
82
80
78
76
74
72
70

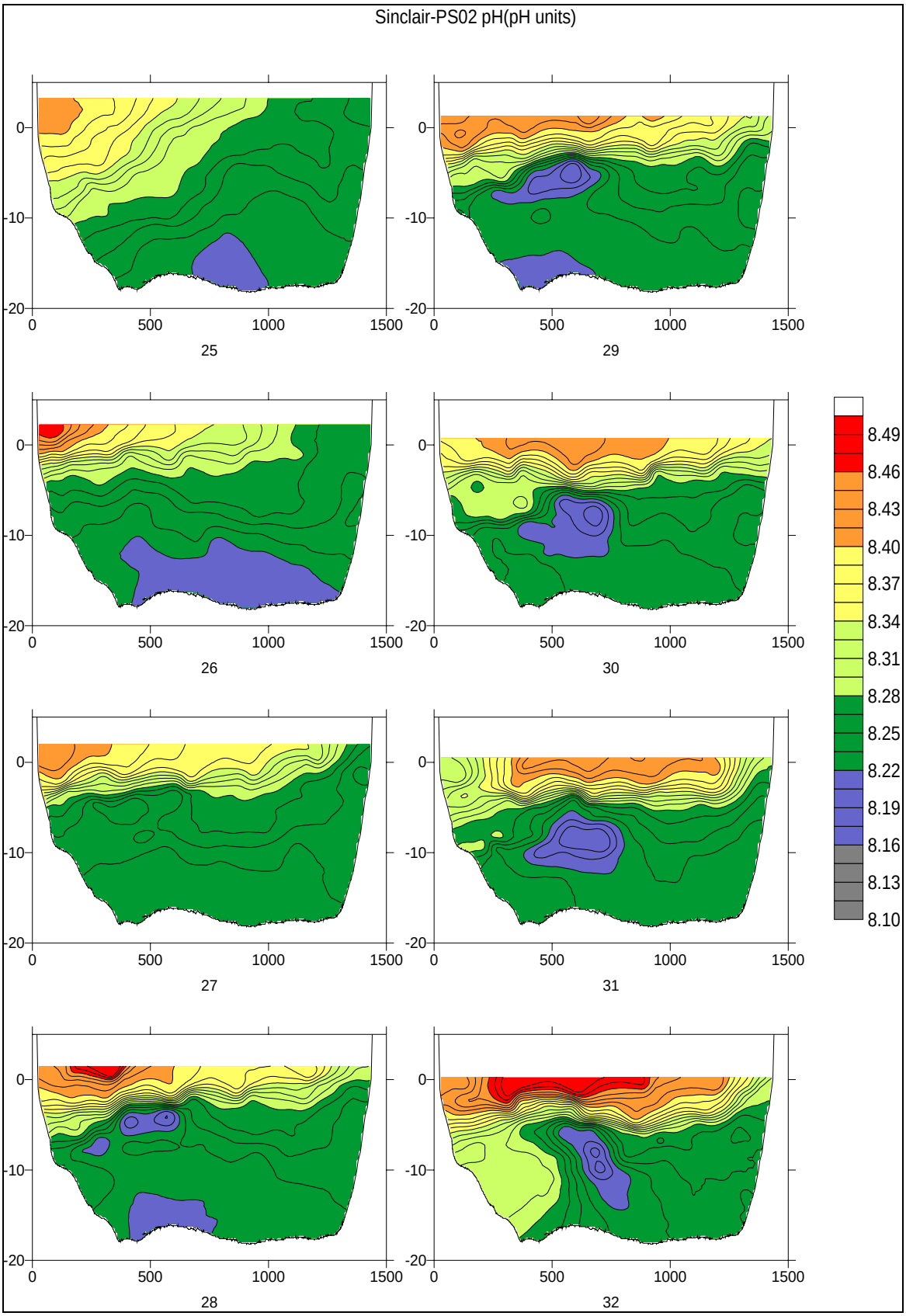

Sinclair-PS02 Oxygen Saturation(%)
0
-10
-20
0
500
1000
1500
49
50
51
94
92
90
88
86
84
82
80
78
76
74
72
70

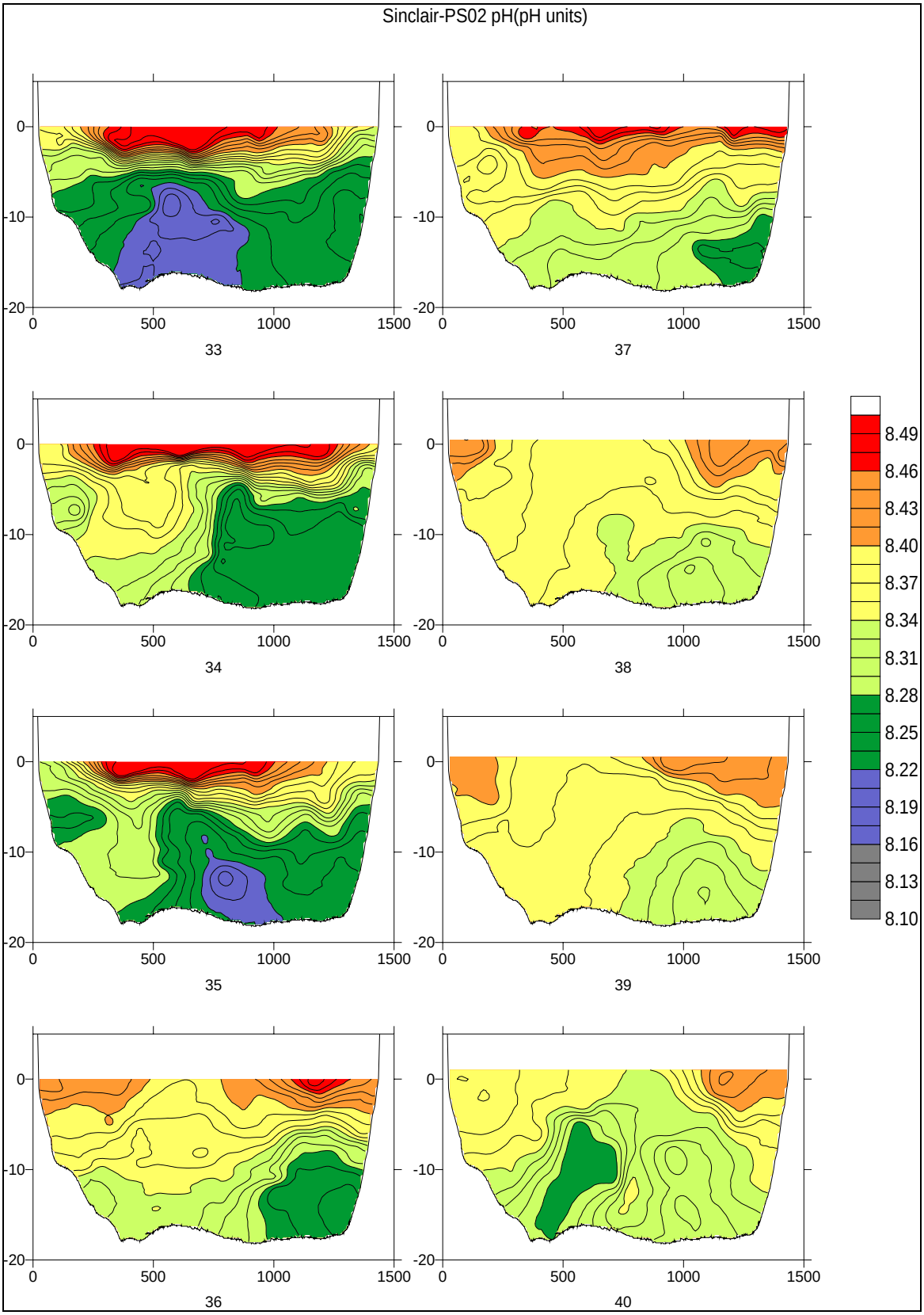
3.3.8 pH

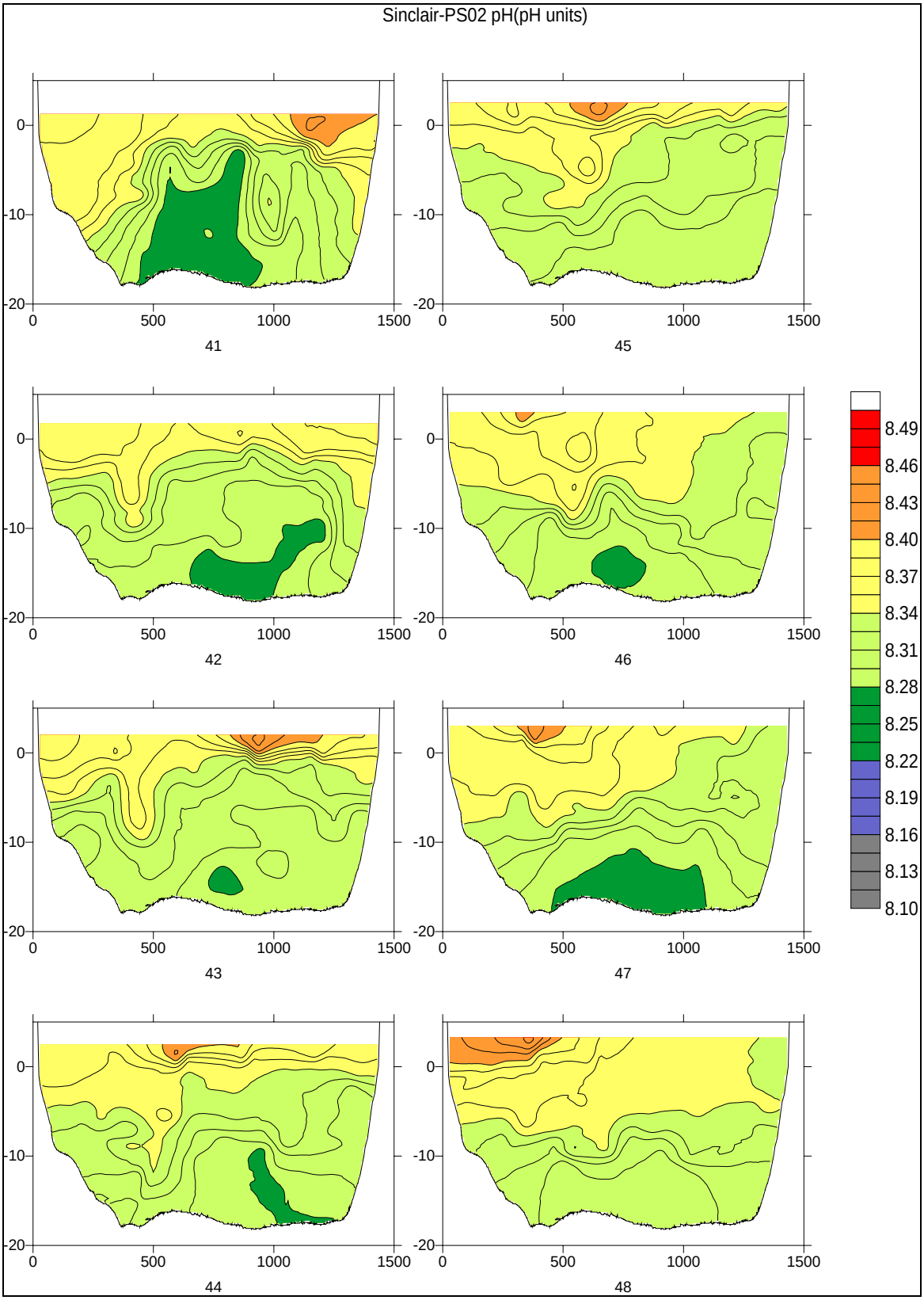

Sinclair-PS02 pH(pH units)
0
-10
-20
0
500
1000
1500
1
2
3
4
5
6
7
8
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

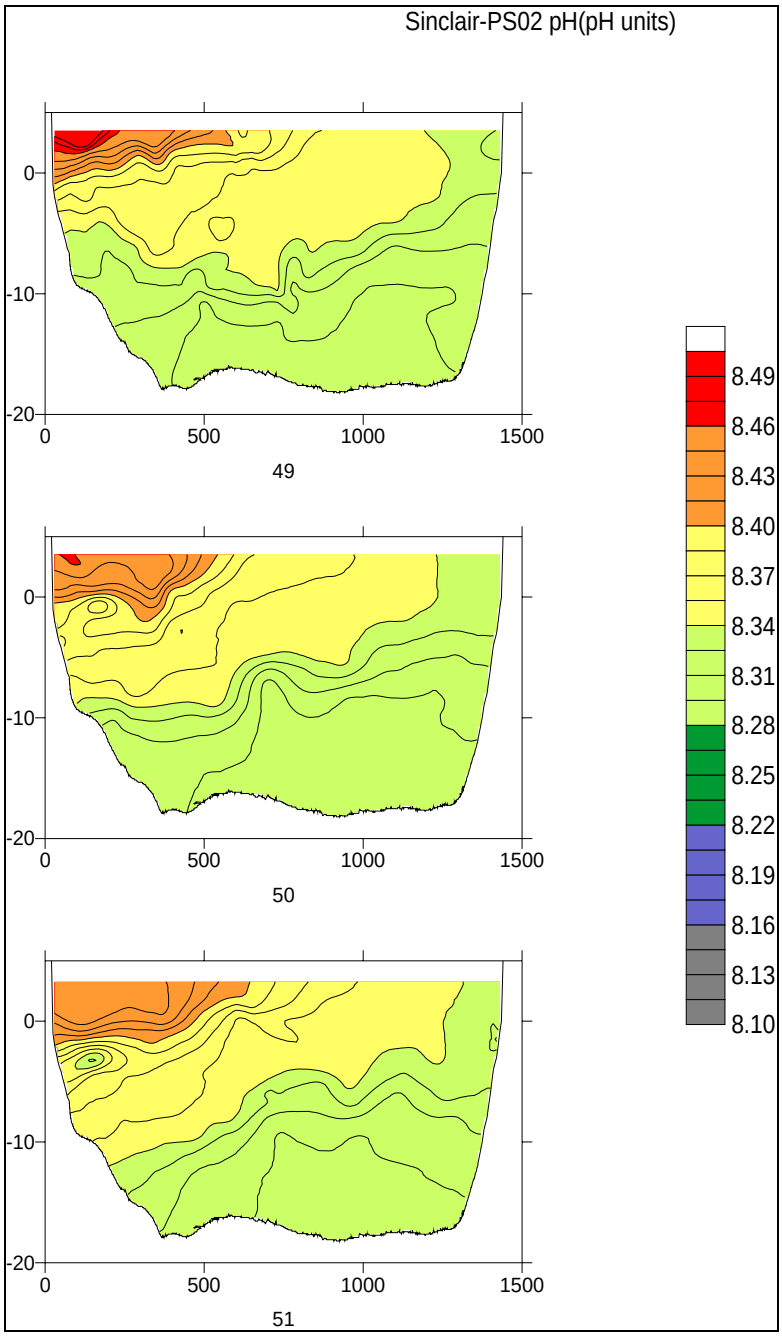

Sinclair-PS02 pH(pH units)
9
10
14
11
15
16
0
-10
-20
0
500
1000
1500
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10


Sinclair-PS02 pH(pH units)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

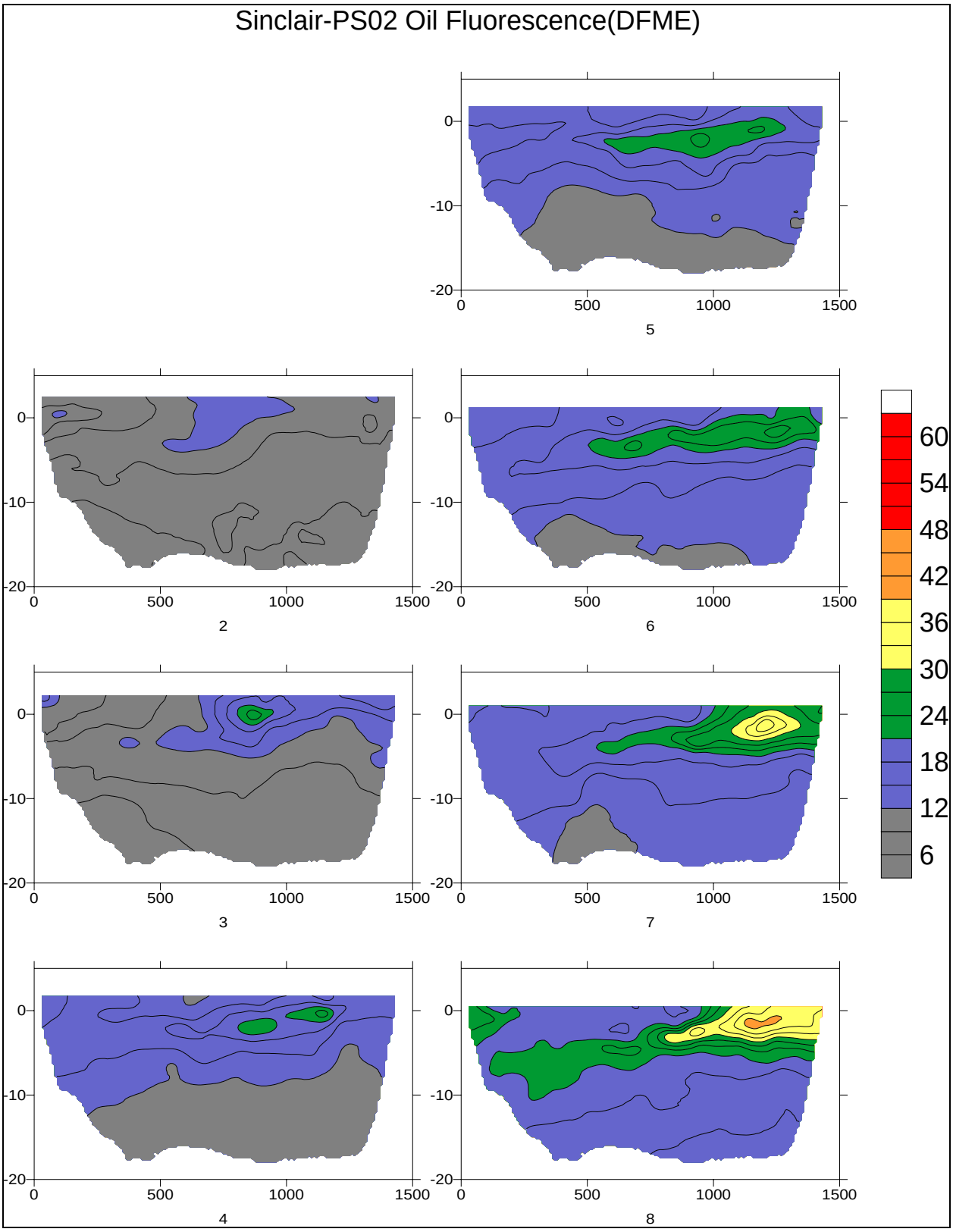

Sinclair-PS02 pH(pH units)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

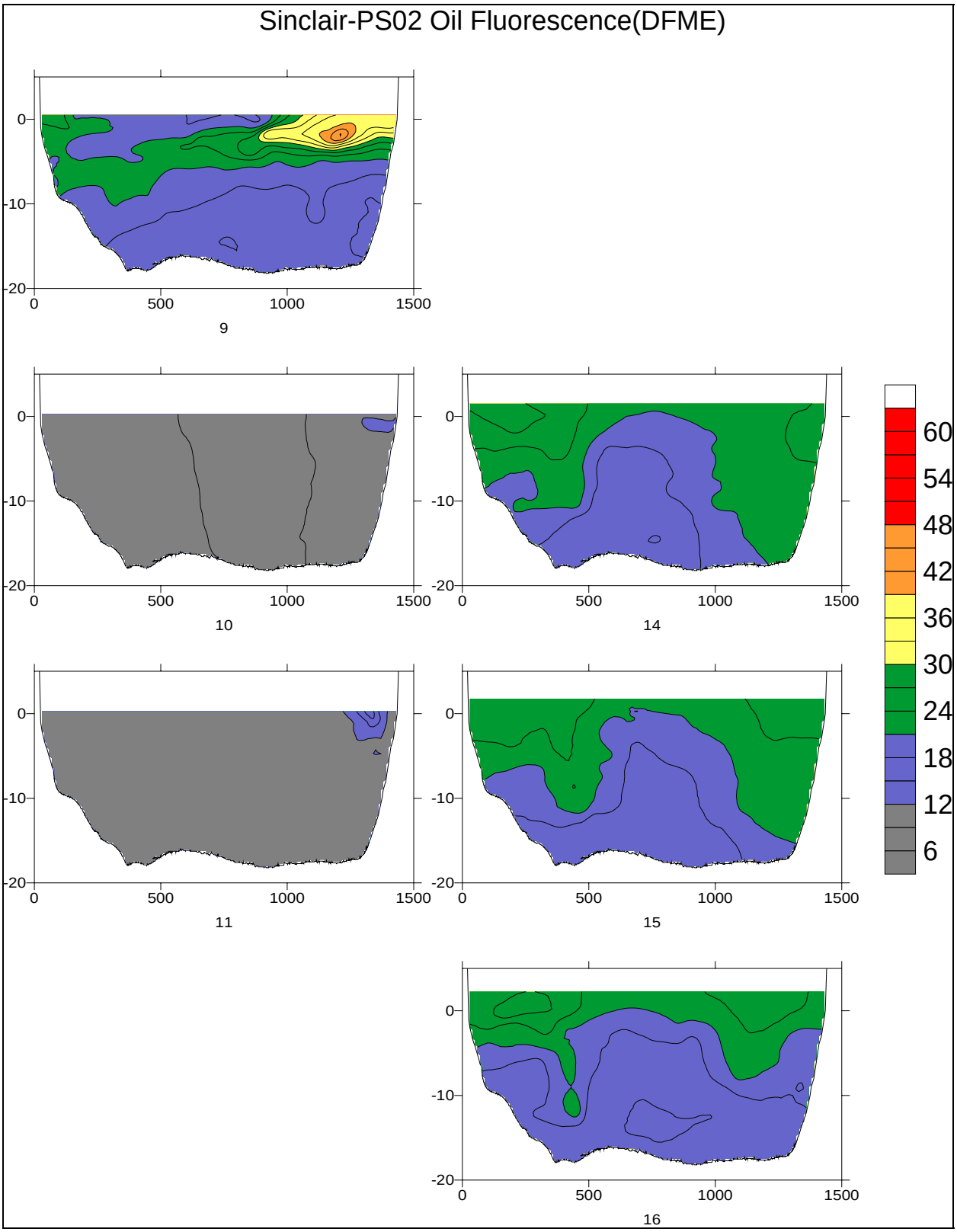

Sinclair-PS02 pH(pH units)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

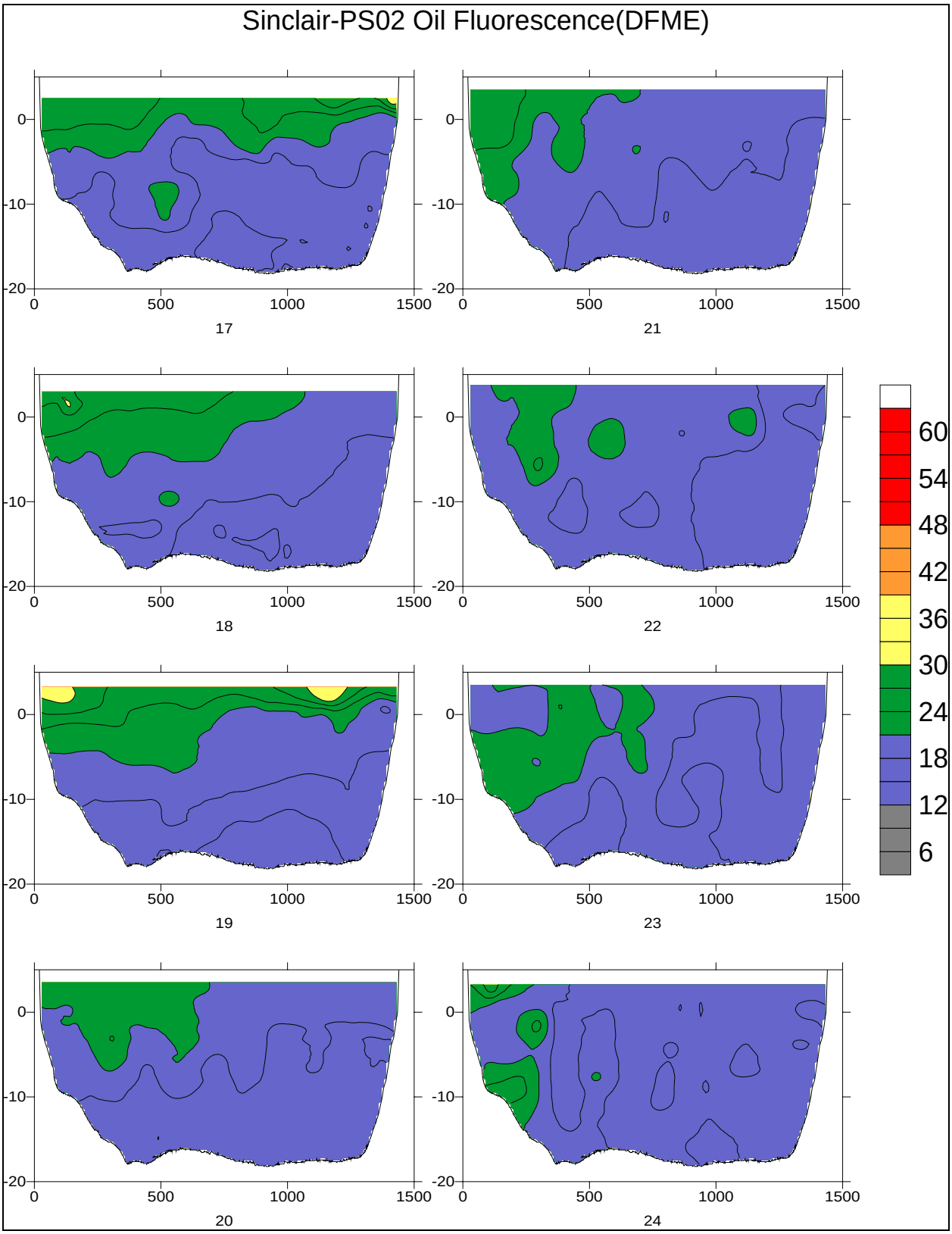

Sinclair-PS02 pH(pH units)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

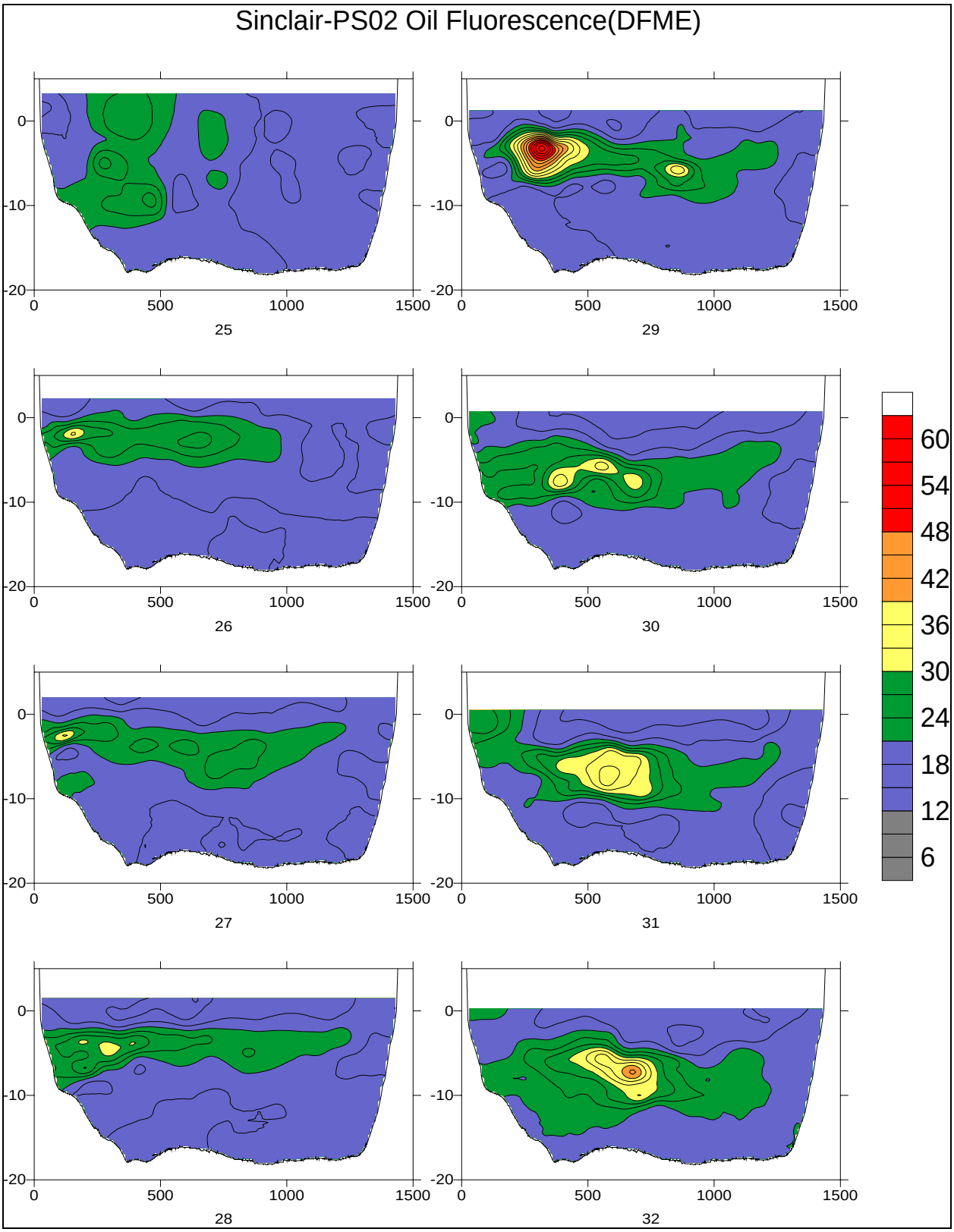

Sinclair-PS02 pH(pH units)
0
-10
-20
0
500
1000
1500
49
50
51
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

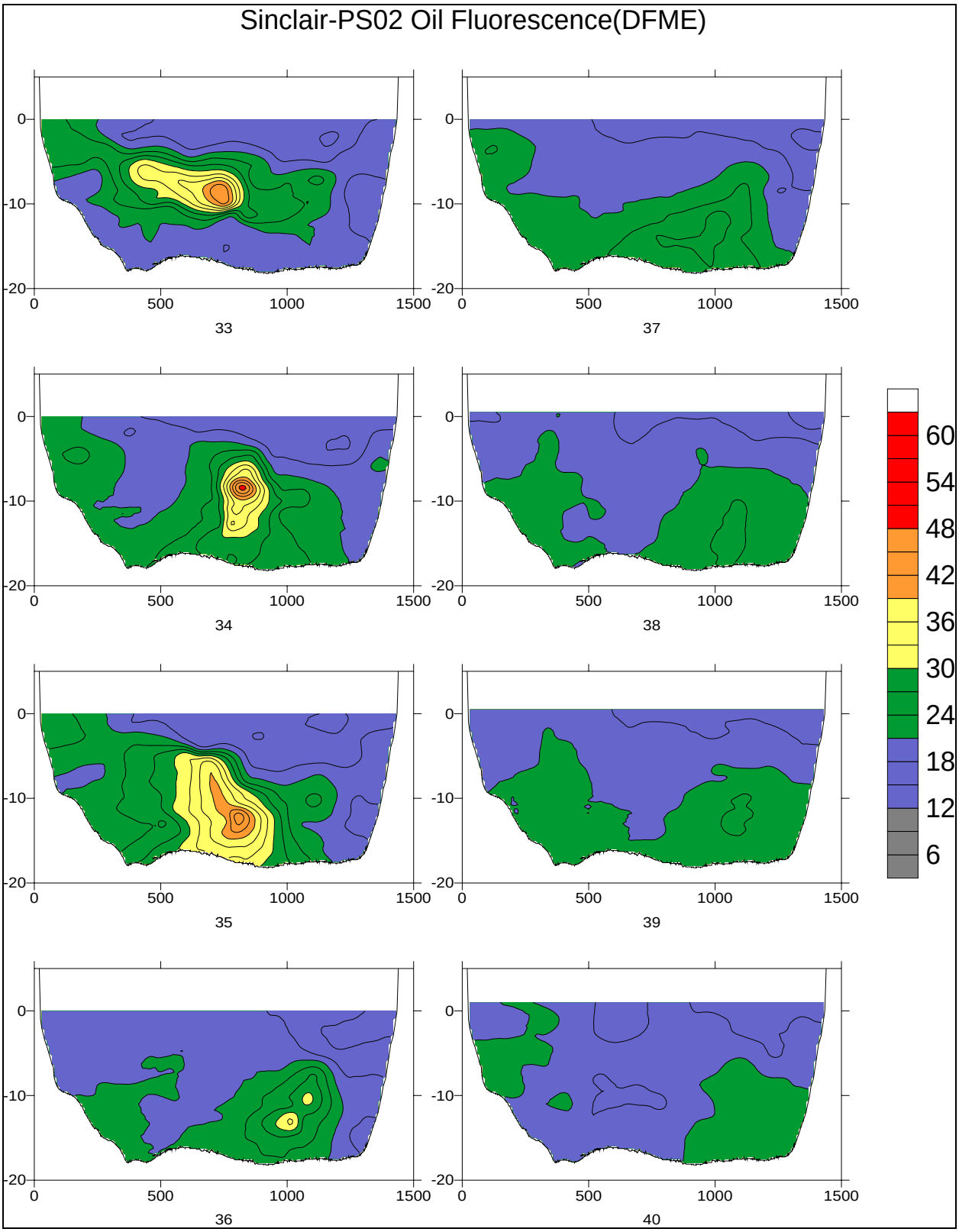
3.3.9 Oil Fluorescence

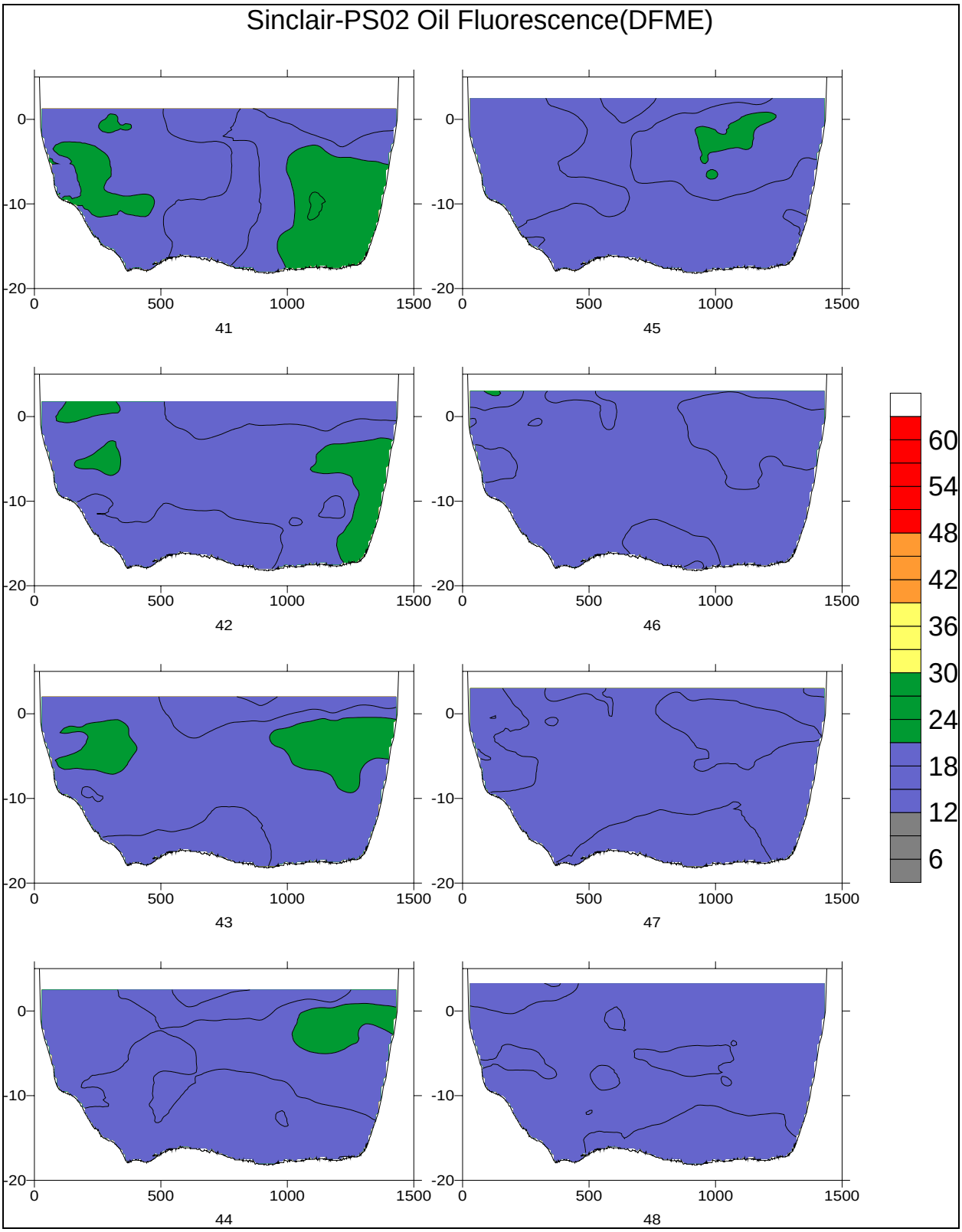


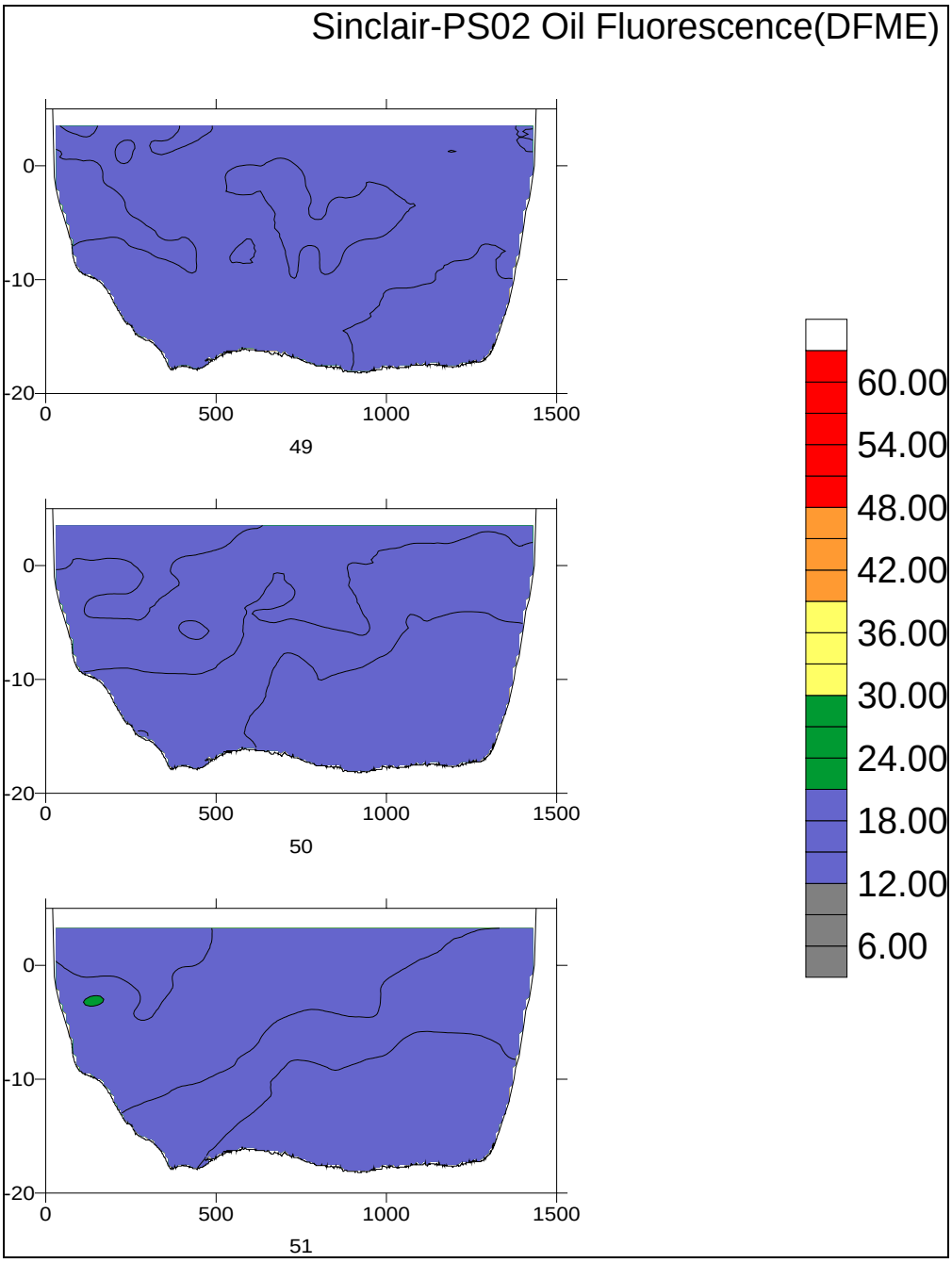

Sinclair-PS02 Oil Fluorescence(DFME)
0
-10
-20
0
500
1000
1500
9
10
14
11
15
16
60
54
48
42
36
30
24
18
12
6


Sinclair-PS02 Oil Fluorescence(DFME)
0
-10
-20
0
500
1000
1500
17
21
18
22
19
23
20
24
60
54
48
42
36
30
24
18
12
6

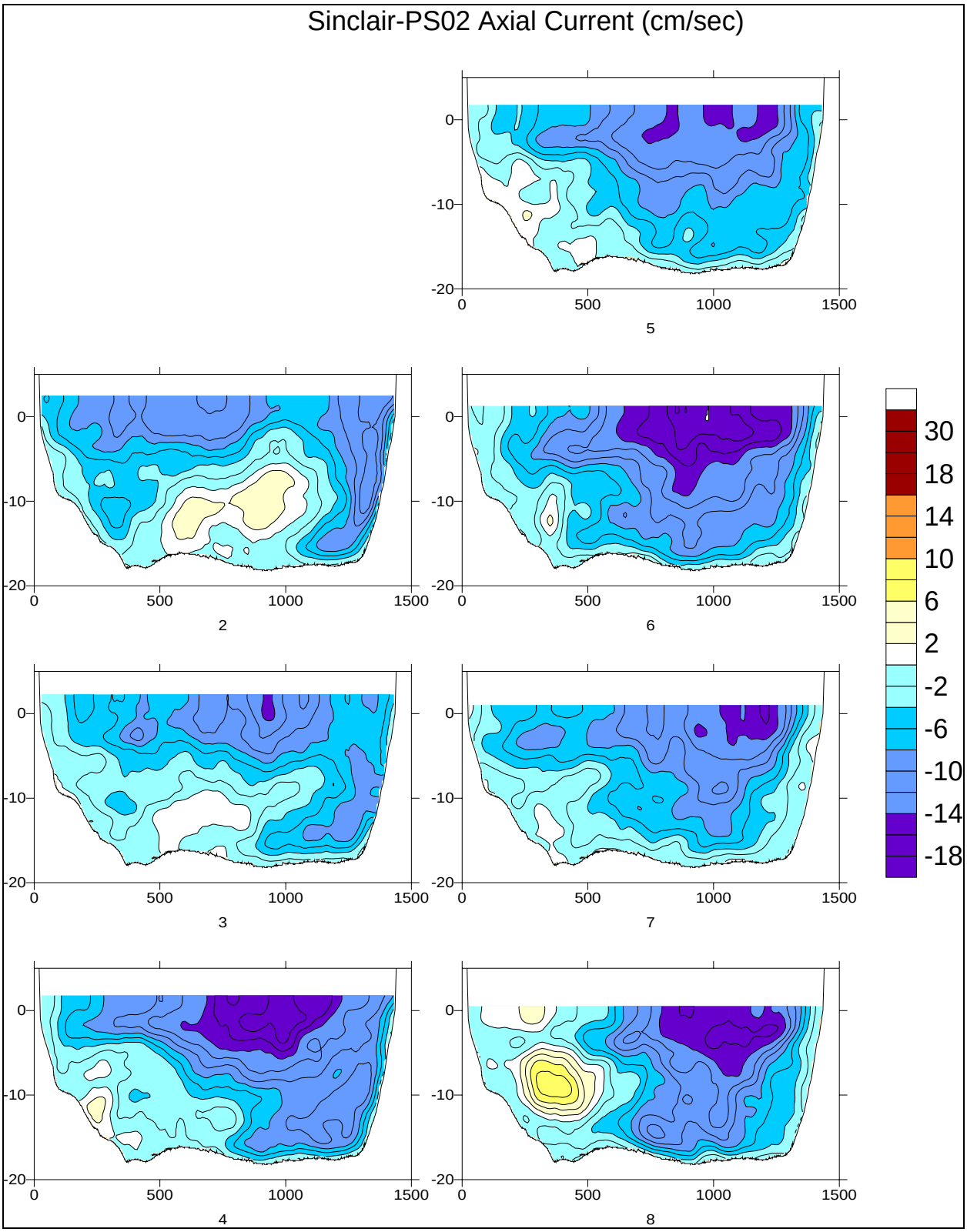

Sinclair-PS02 Oil Fluorescence(DFME)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
60
54
48
42
36
30
24
18
12
6

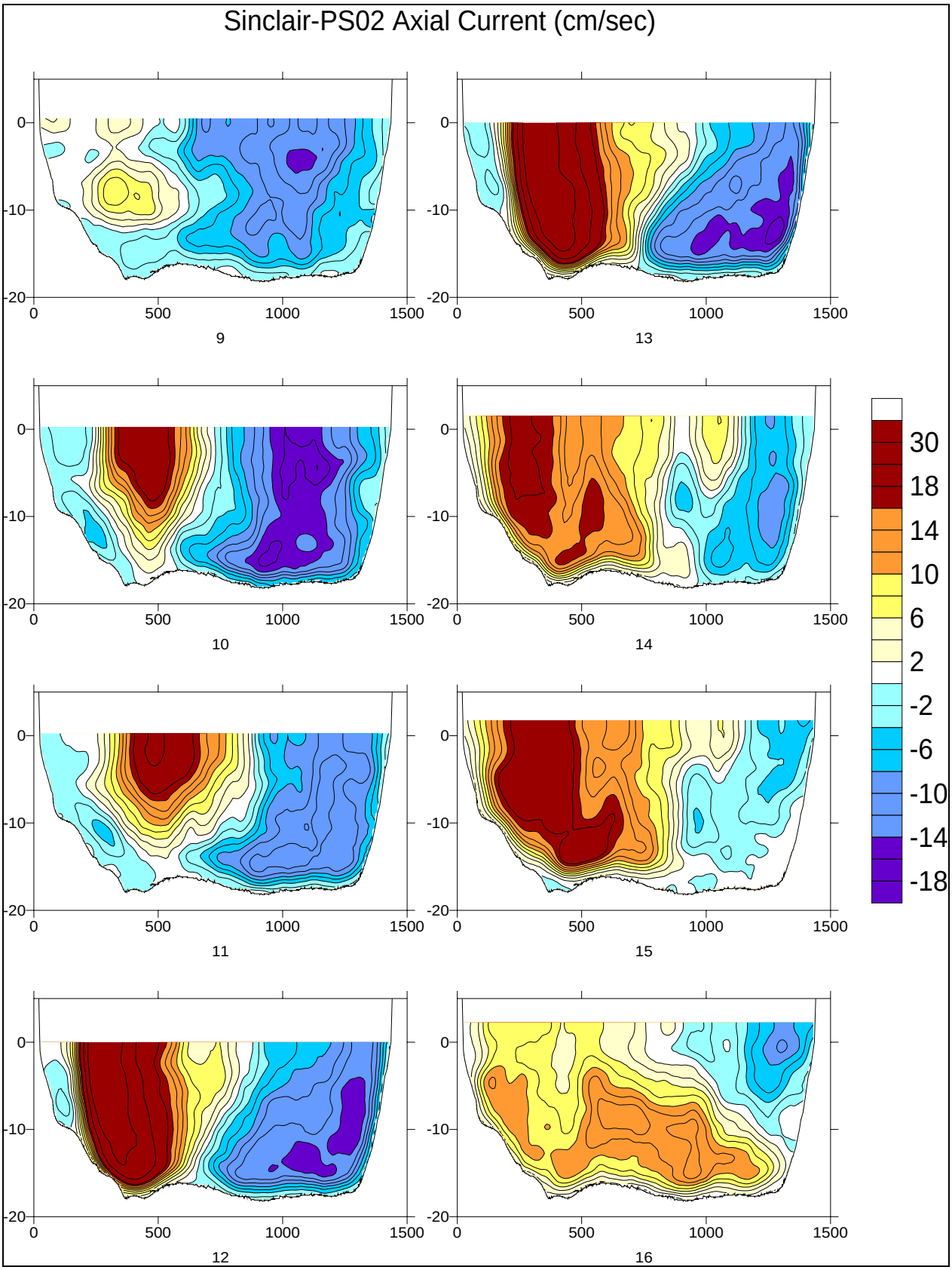

Sinclair-PS02 Oil Fluorescence(DFME)
0
-10
-20
0
500
1000
1500
33
37
34
38
35
39
36
40
60
54
48
42
36
30
24
18
12
6

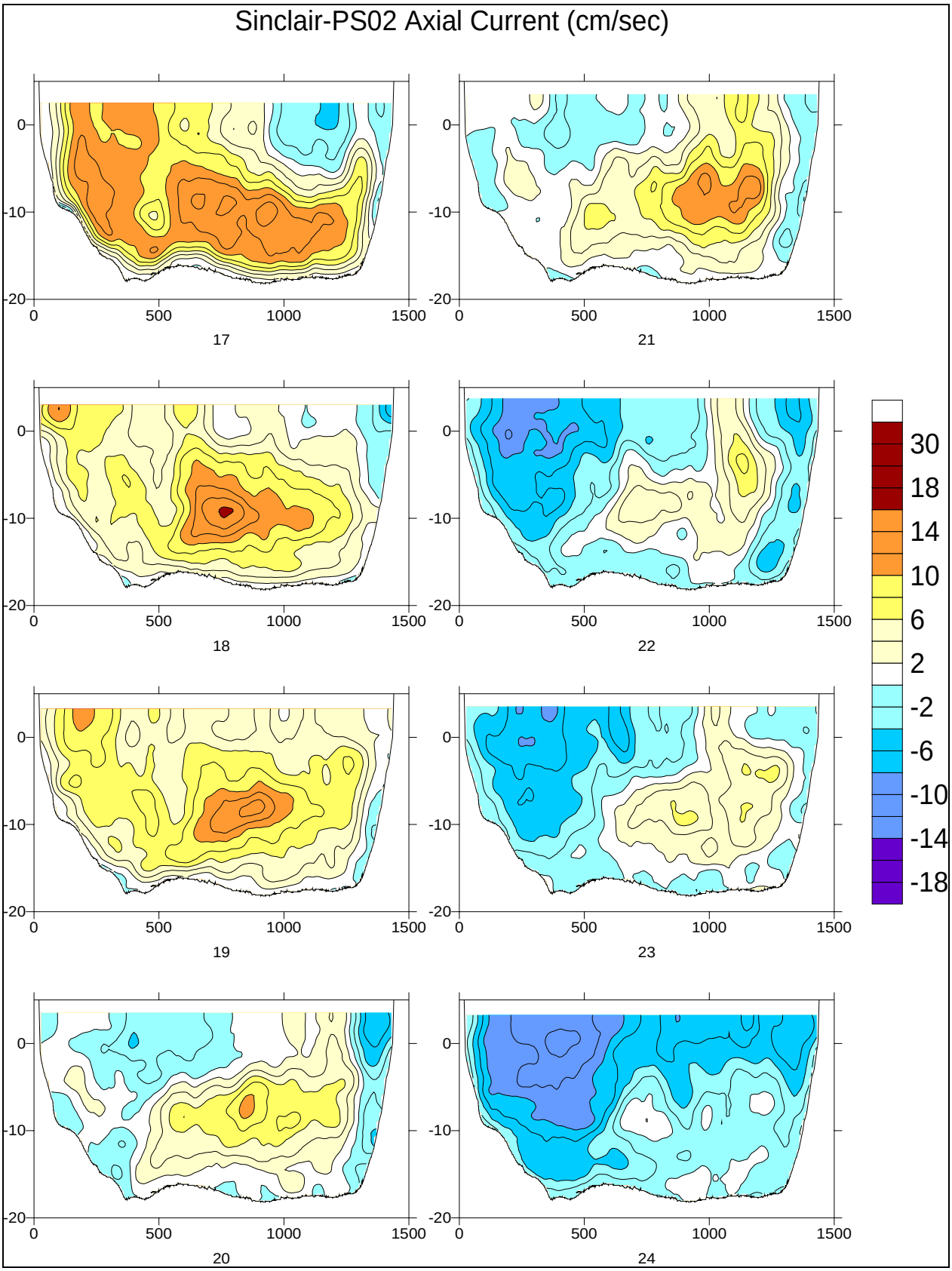

Sinclair-PS02 Oil Fluorescence(DFME)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
60
54
48
42
36
30
24
18
12
6

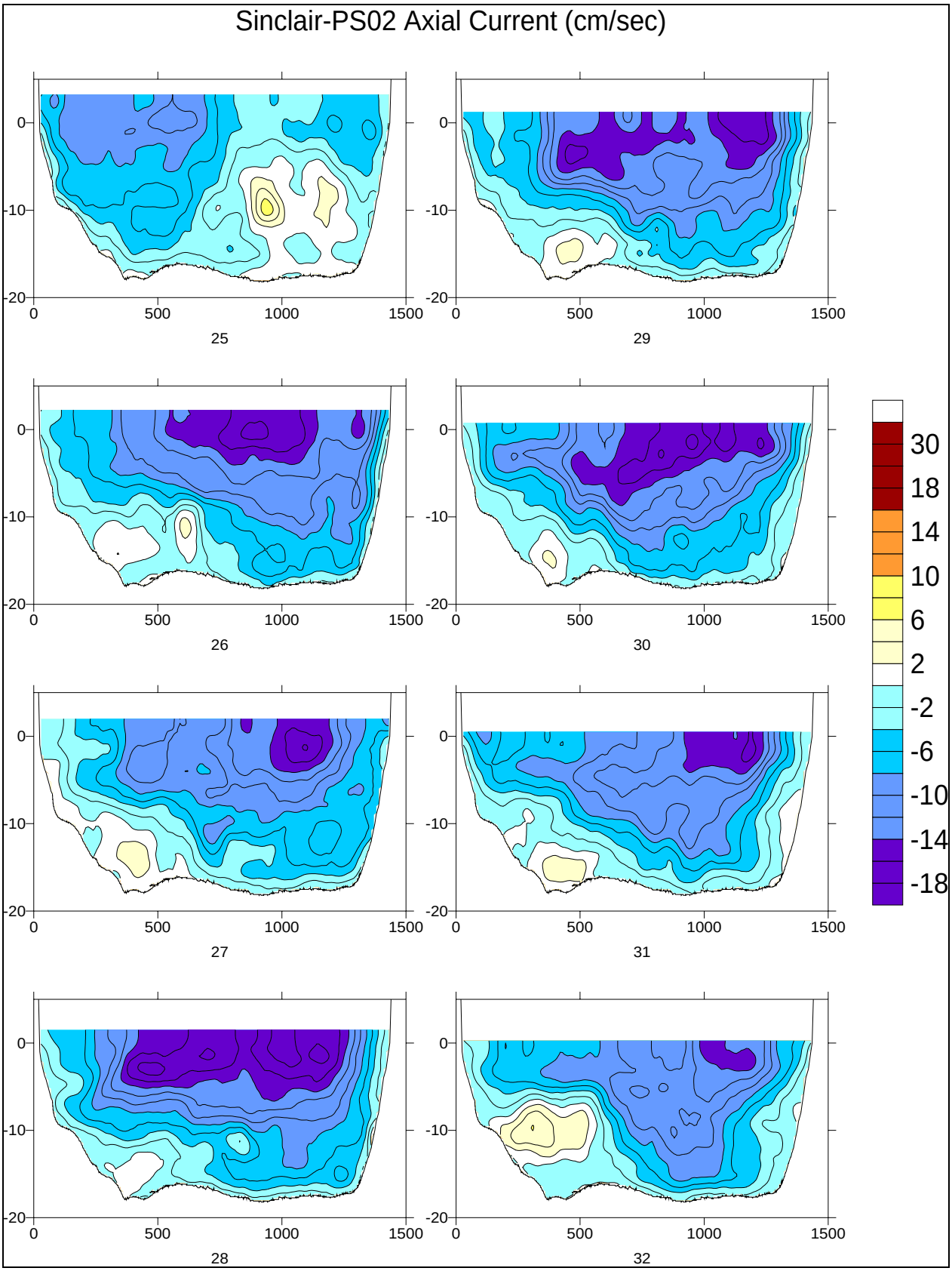

Sinclair-PS02 Oil Fluorescence(DFME)
0
-10
-20
0
500
1000
1500
49
50
51
60.00
54.00
48.00
42.00
36.00
30.00
24.00
18.00
12.00
6.00

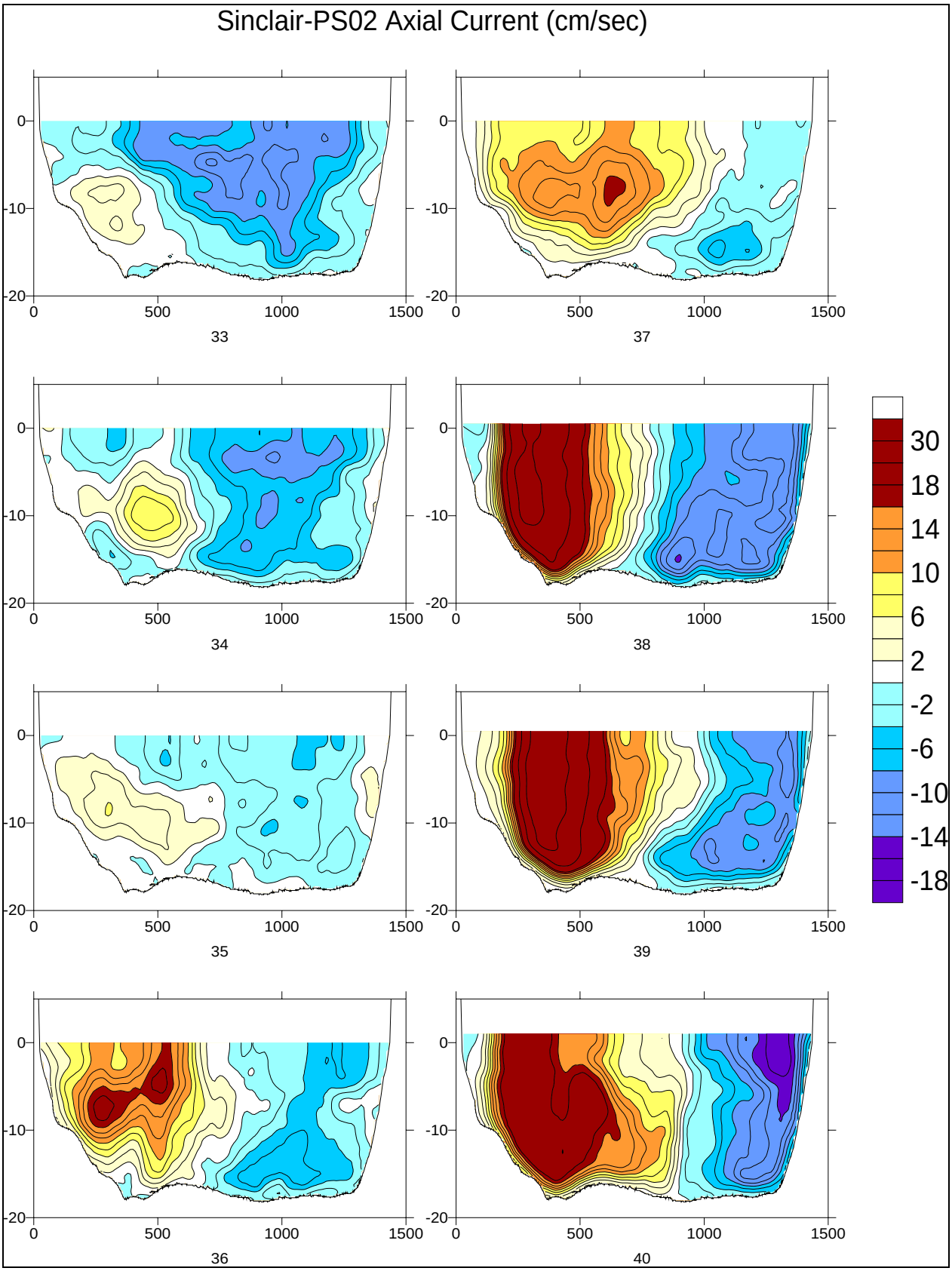
3.3.10 Axial Currents

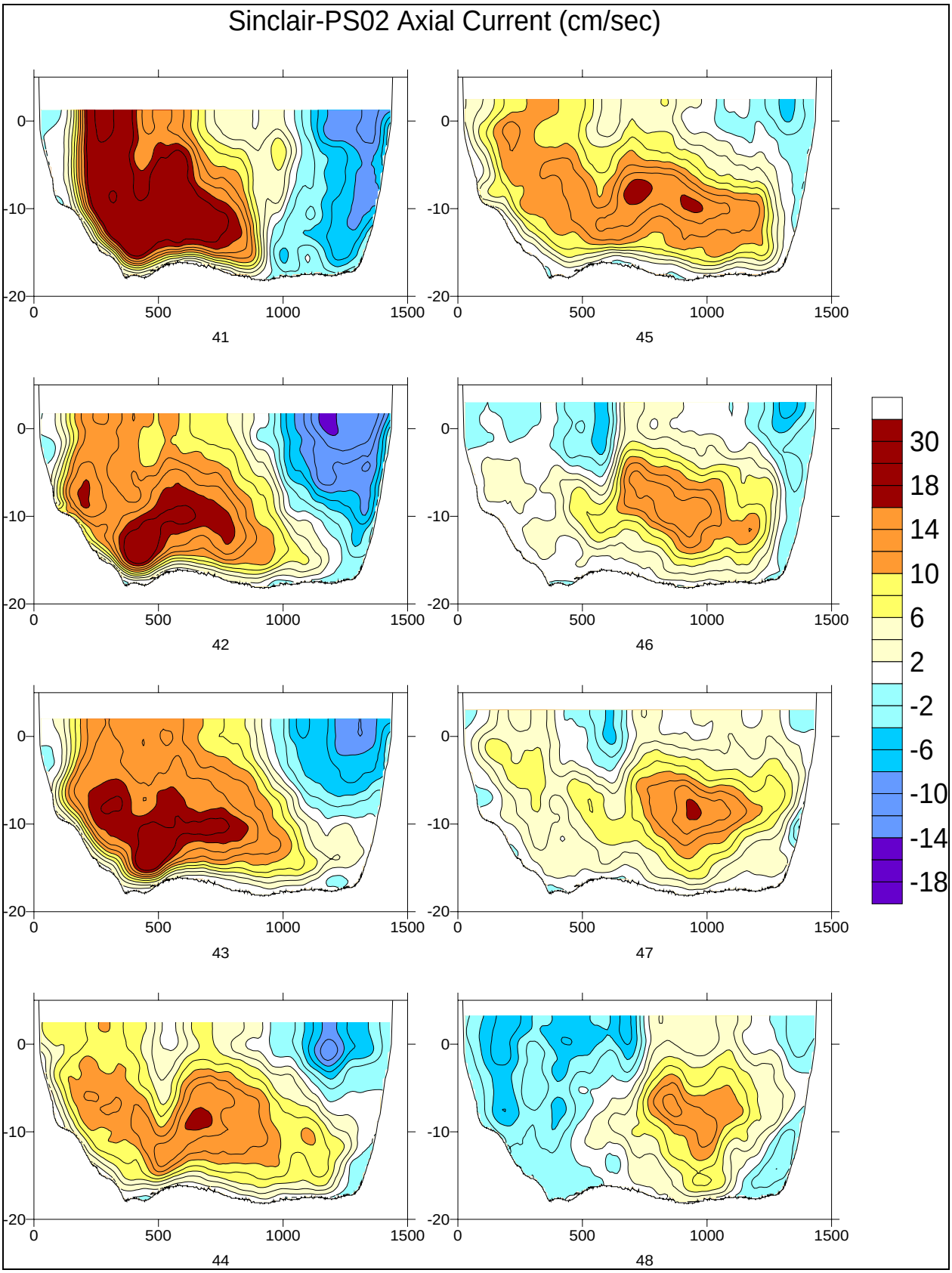


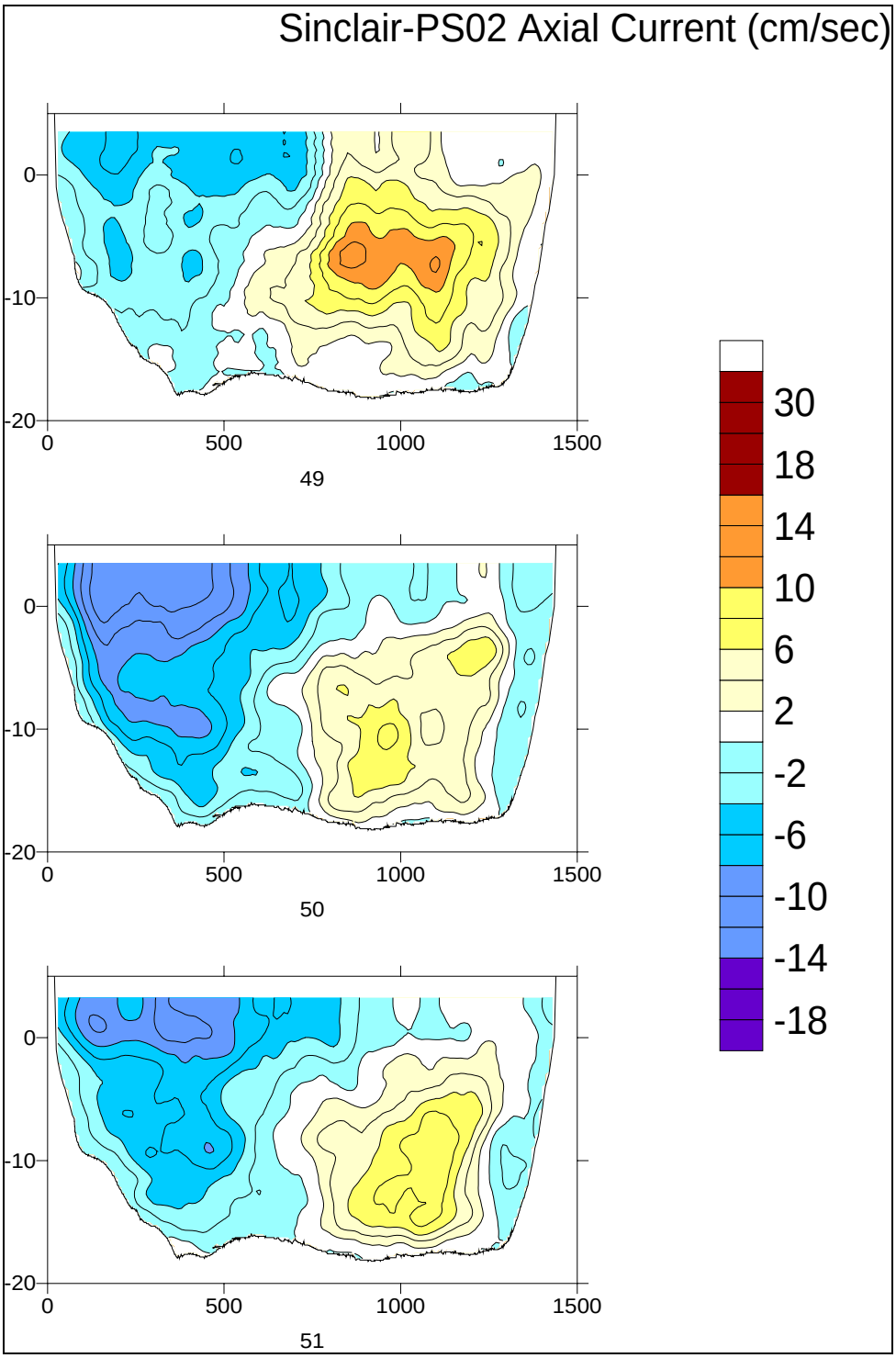

Sinclair-PS02 Axial Current (cm/sec)
0
-10
-20
0
500
1000
1500
9
13
10
14
11
15
12
16
30
18
14
10
6
2
-2
-6
-10
-14
-18


Sinclair-PS02 Axial Current (cm/sec)
17
21
18
22
19
23
20
24
0
-10
-20
0
500
1000
1500
30
18
14
10
6
2
-2
-6
-10
-14
-18

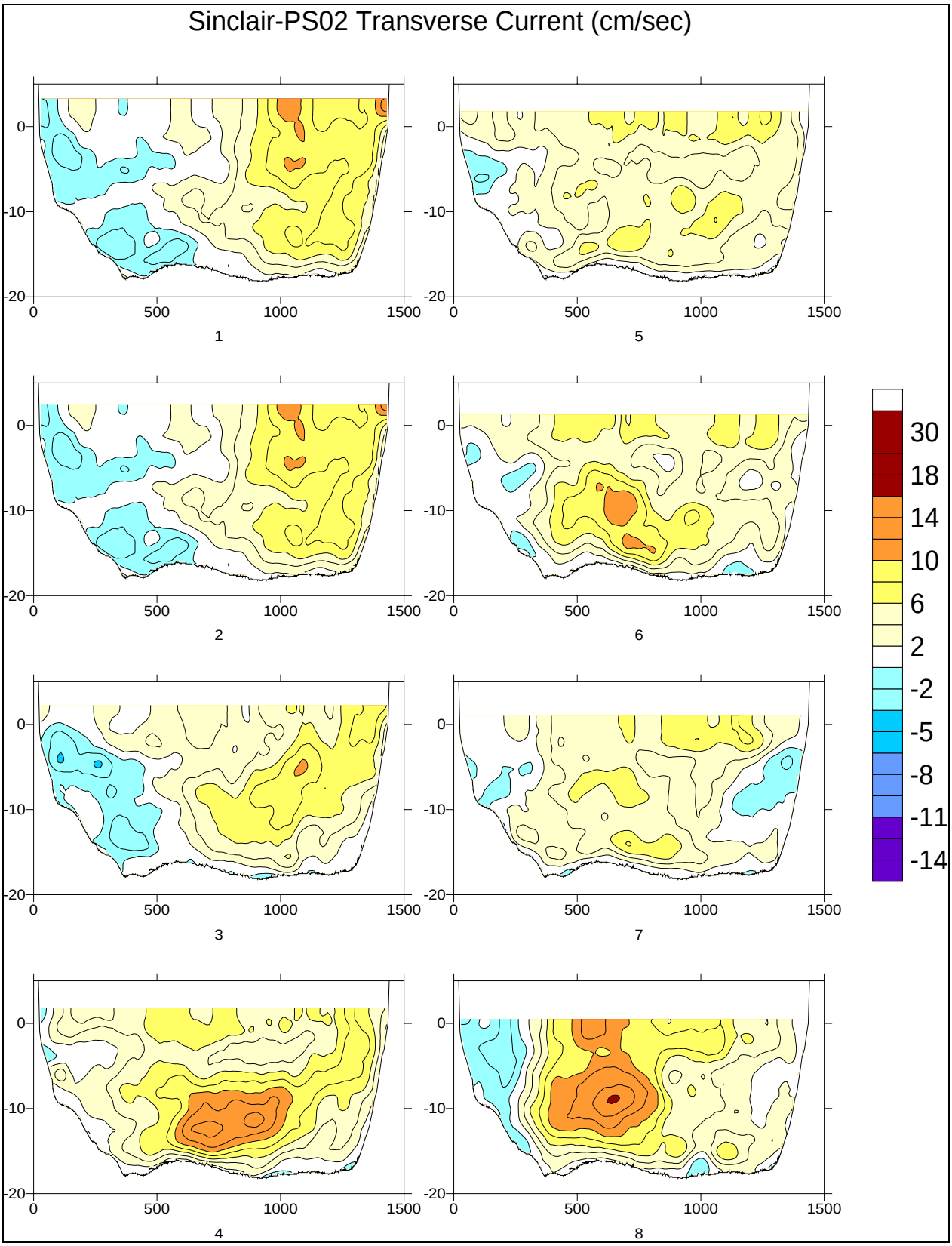

Sinclair-PS02 Axial Current (cm/sec)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
30
18
14
10
6
2
-2
-6
-10
-14
-18

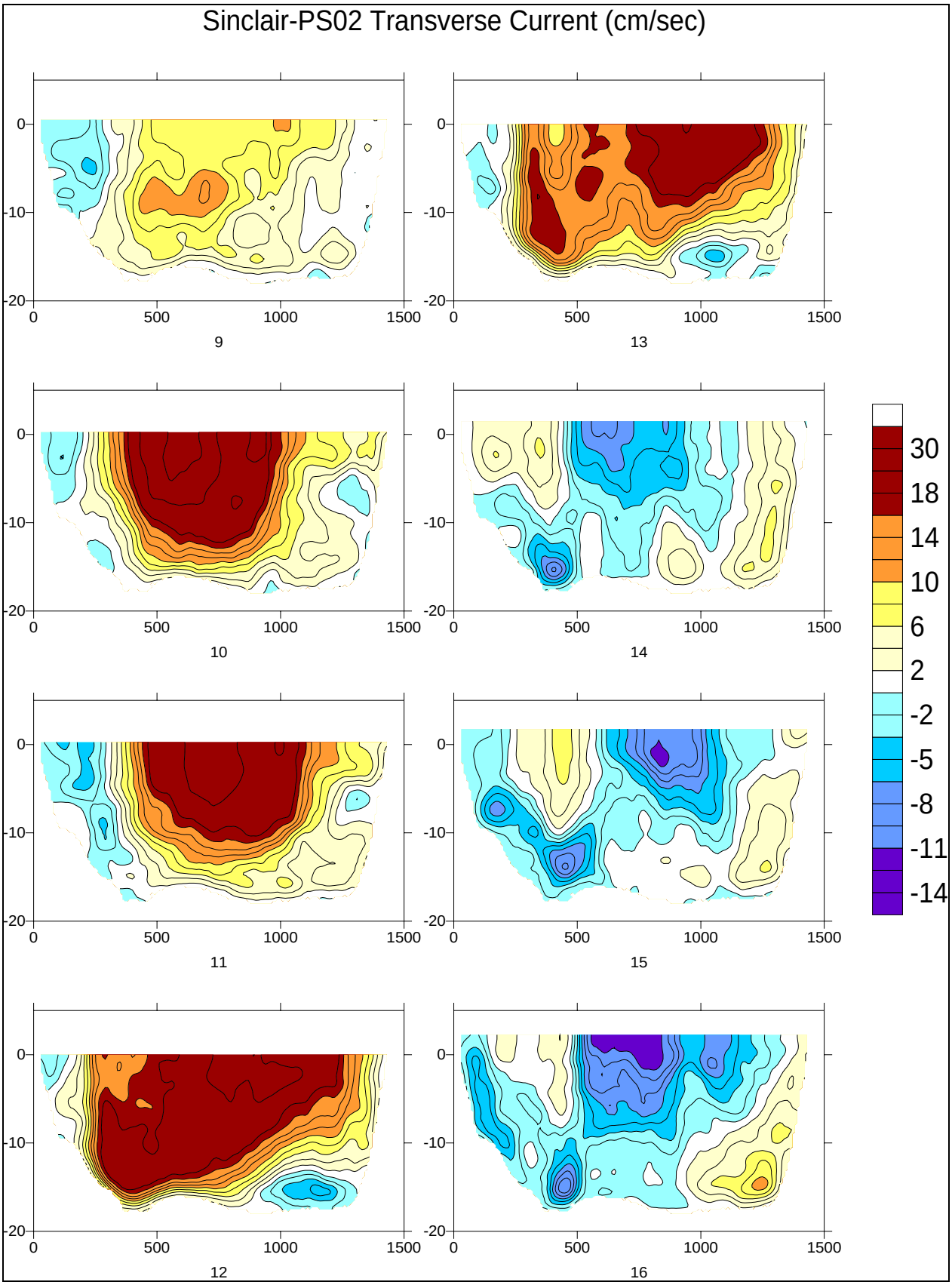

Sinclair-PS02 Axial Current (cm/sec)
0
-10
-20
0
500
1000
1500
33
37
34
38
35
39
36
40
30
18
14
10
6
2
-2
-6
-10
-14
-18

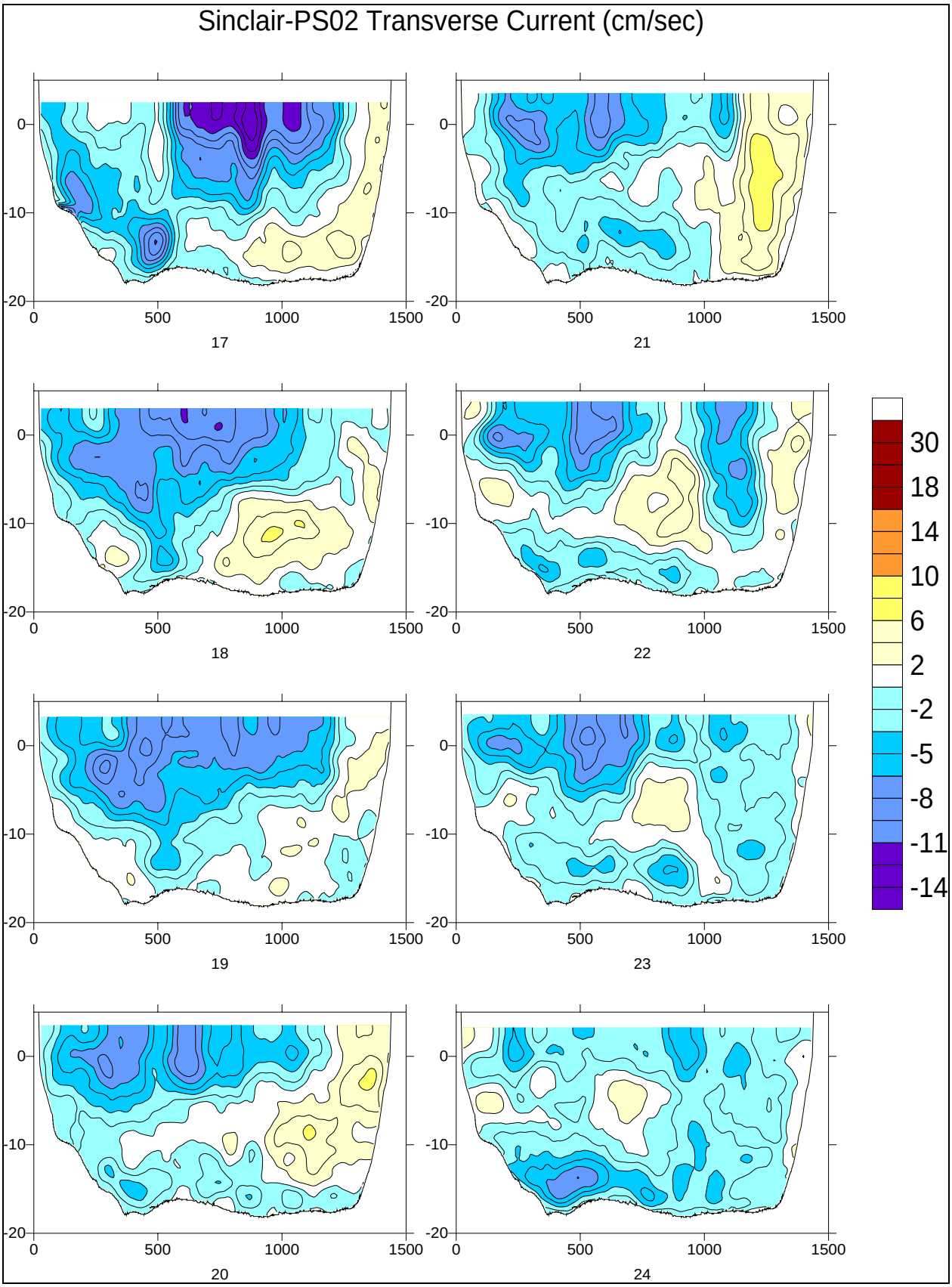

Sinclair-PS02 Axial Current (cm/sec)
41
45
42
46
43
47
44
48
0
-10
-20
0
500
1000
1500
30
18
14
10
6
2
-2
-6
-10
-14
-18

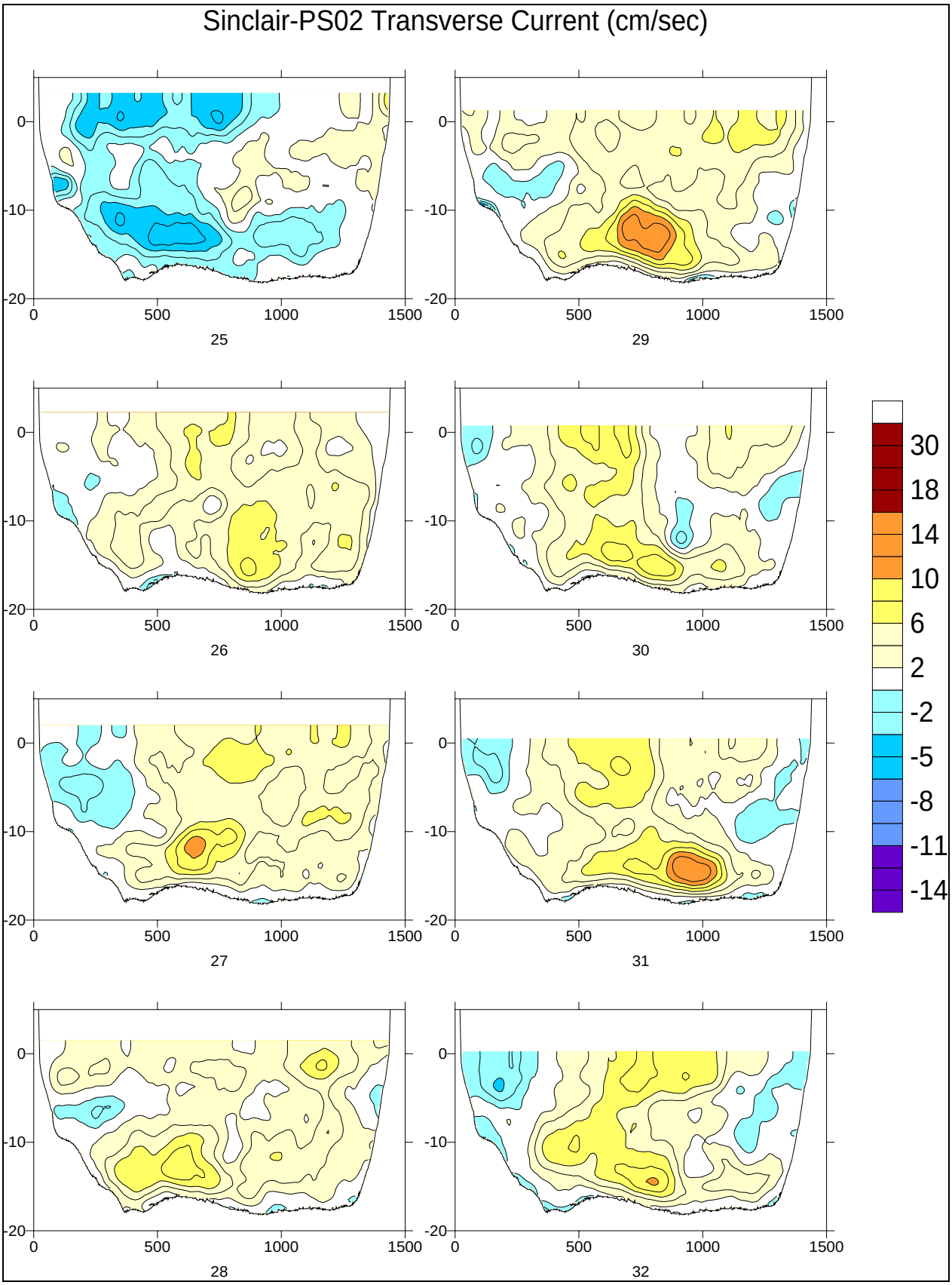

Sinclair-PS02 Axial Current (cm/sec)
0
-10
-20
0
500
1000
1500
49
50
51
30
18
14
10
6
2
-2
-6
-10
-14
-18

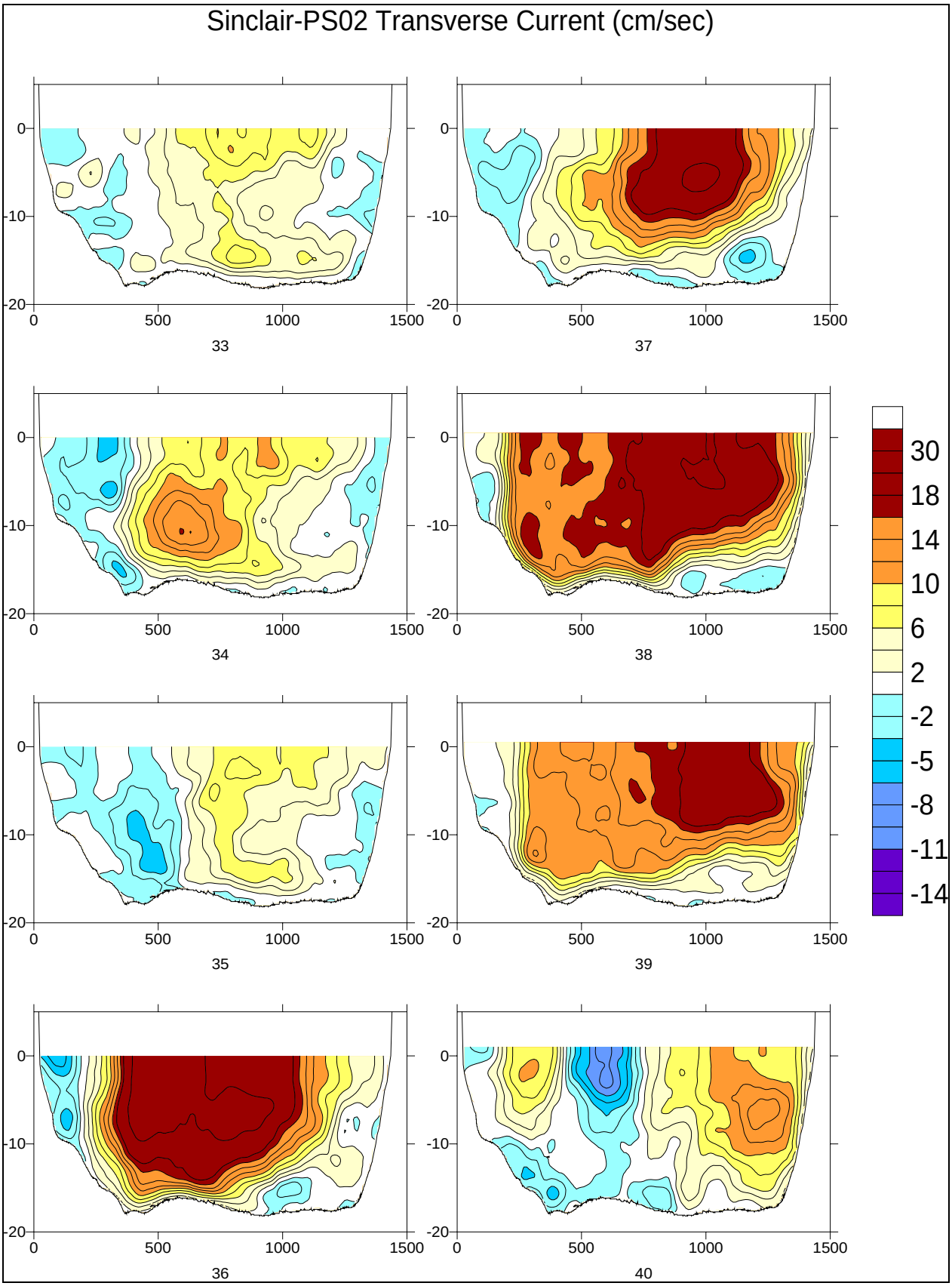
3.3.11 Transverse Currents

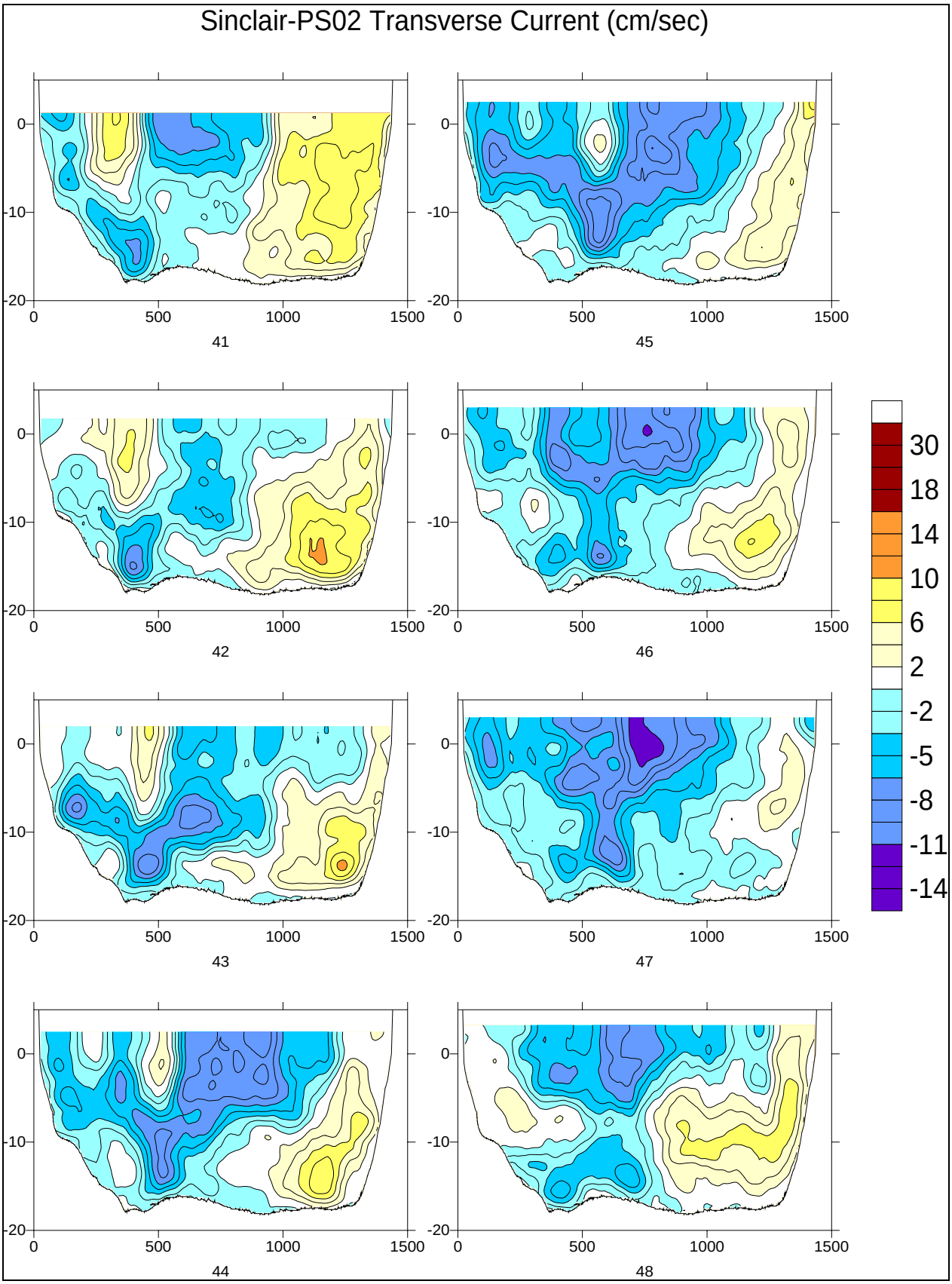


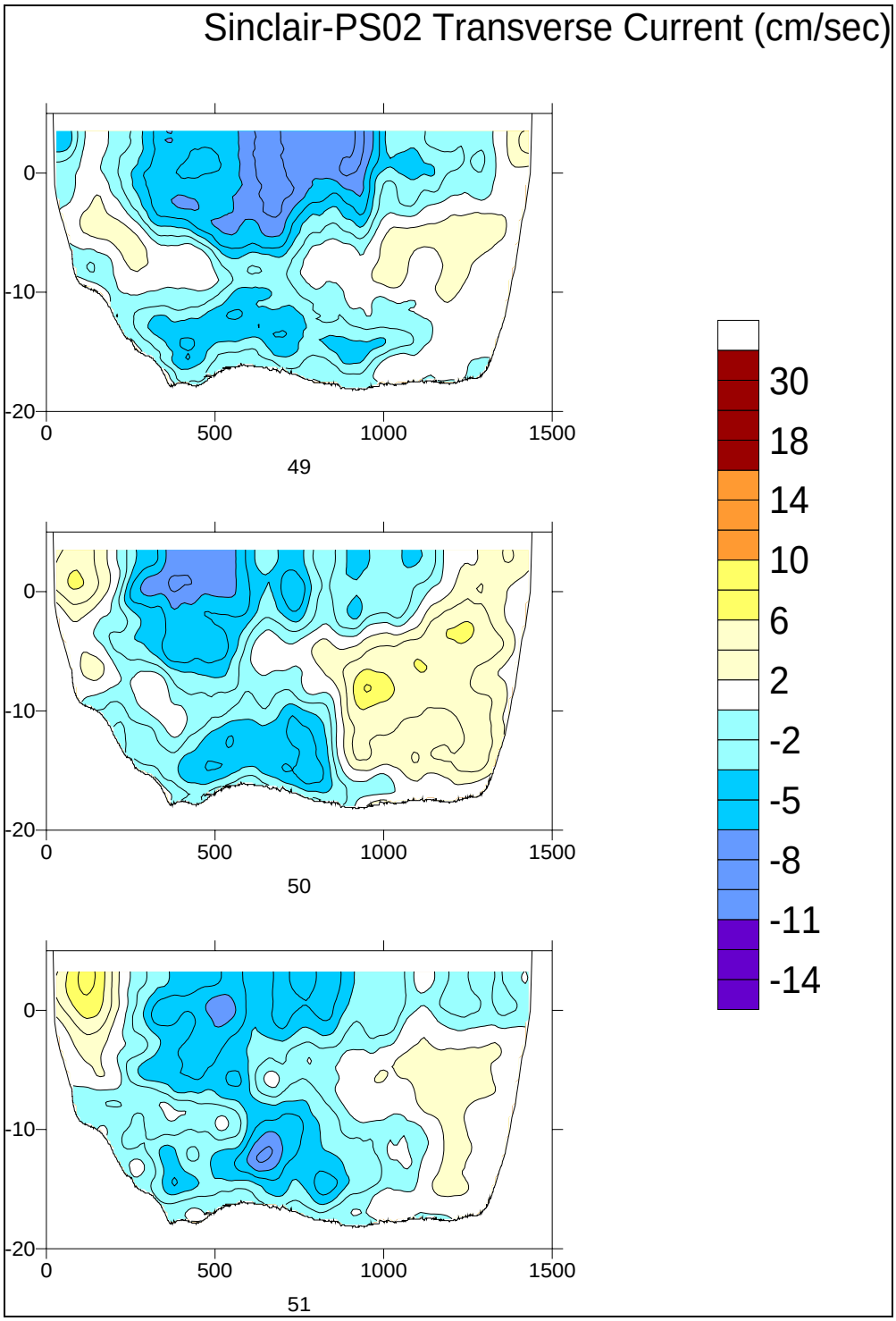

Sinclair-PS02 Transverse Current (cm/sec)
0
-10
-20
0
500
1000
1500
9
13
10
14
11
15
12
16
30
18
14
10
6
2
-2
-5
-8
-11
-14


Sinclair-PS02 Transverse Current (cm/sec)
0
-10
-20
0
500
1000
1500
17
21
18
22
19
23
20
24
30
18
14
10
6
2
-2
-5
-8
-11
-14


Sinclair-PS02 Transverse Current (cm/sec)
25
29
26
30
27
31
28
32
0
-10
-20
0
500
1000
1500
30
18
14
10
6
2
-2
-5
-8
-11
-14

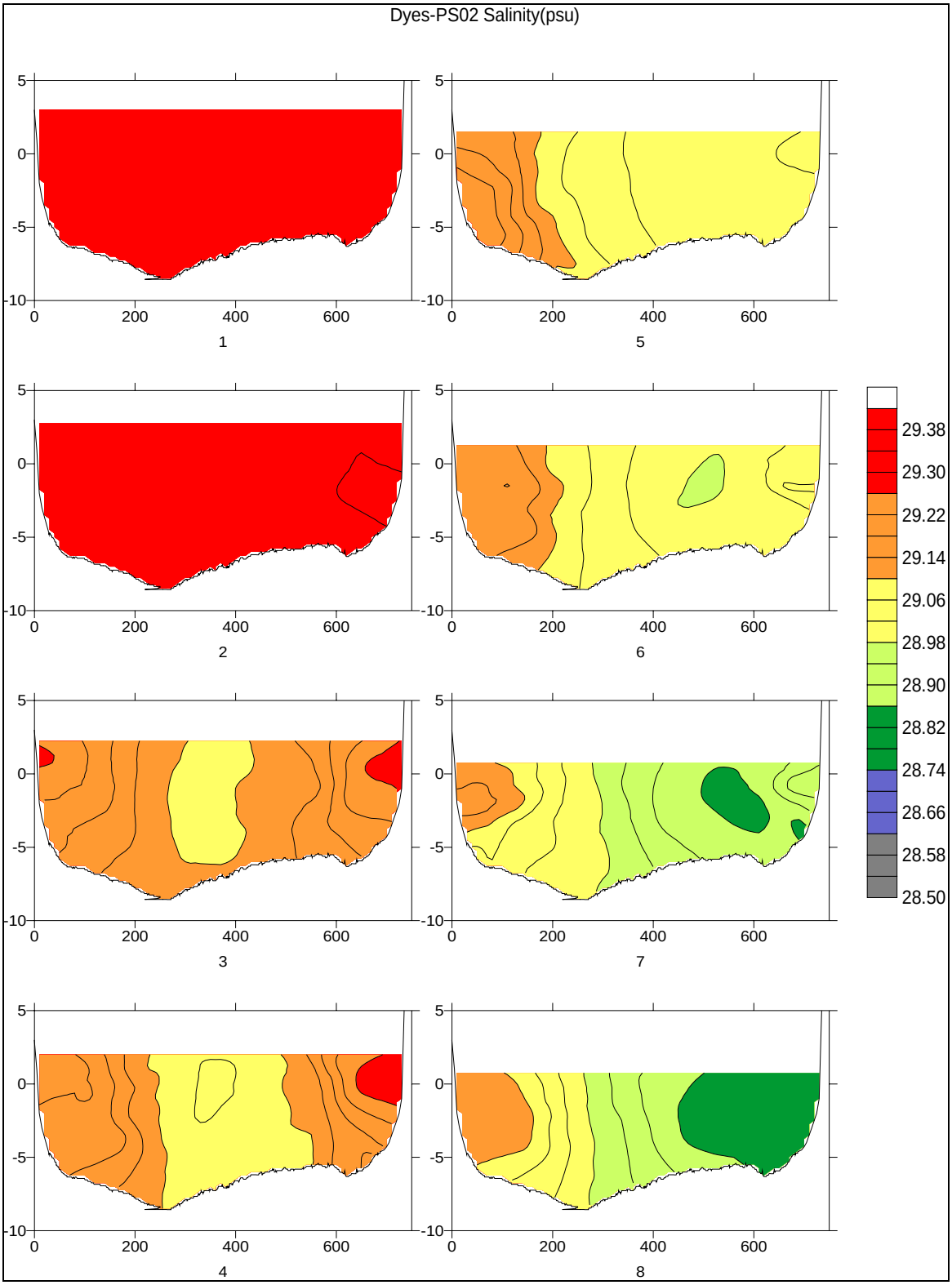

Sinclair-PS02 Transverse Current (cm/sec)
33
37
34
38
35
39
36
40
0
-10
-20
0
500
1000
1500
30
18
14
10
6
2
-2
-5
-8
-11
-14

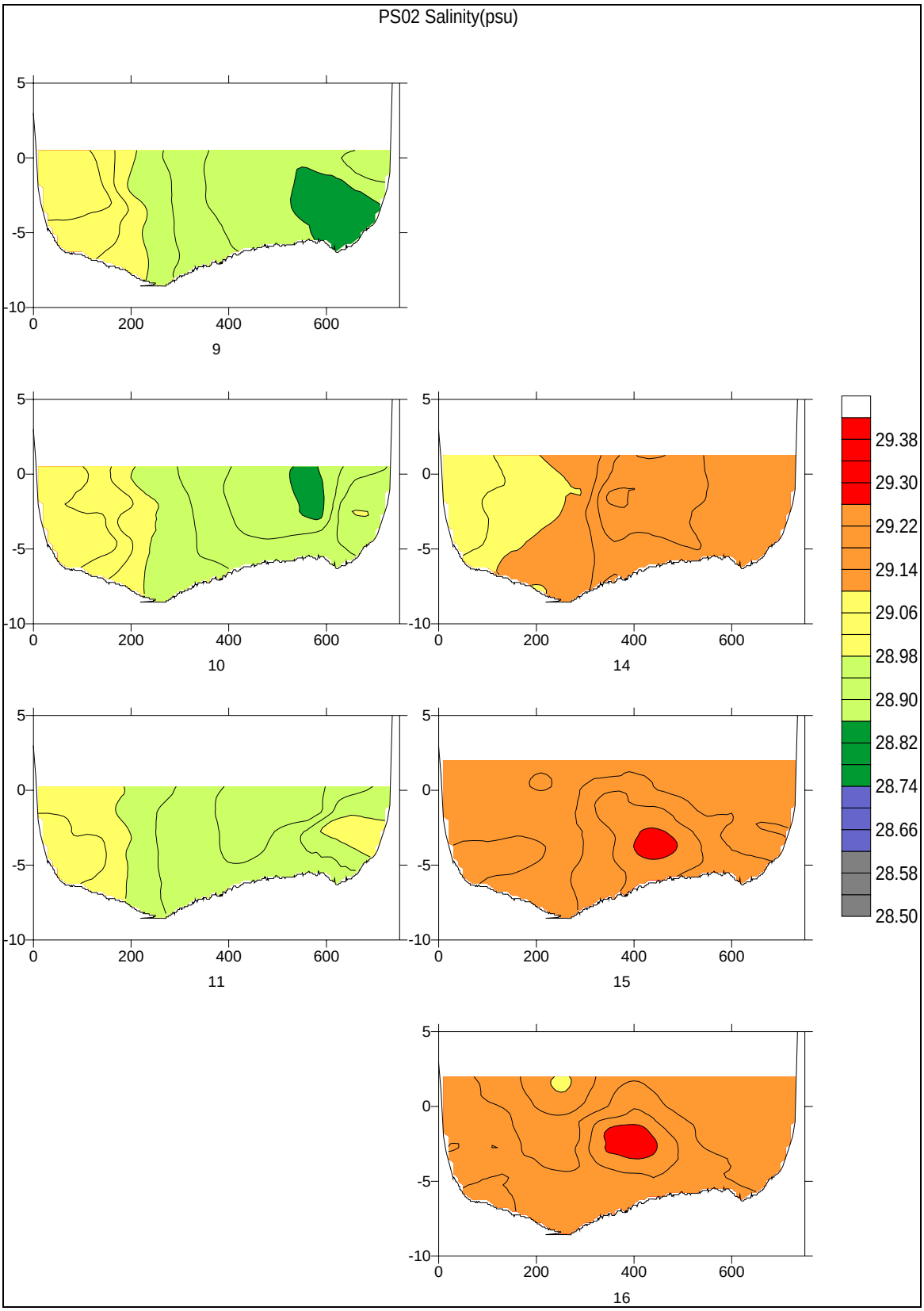

Sinclair-PS02 Transverse Current (cm/sec)
0
-10
-20
0
500
1000
1500
41
45
42
46
43
47
44
48
30
18
14
10
6
2
-2
-5
-8
-11
-14

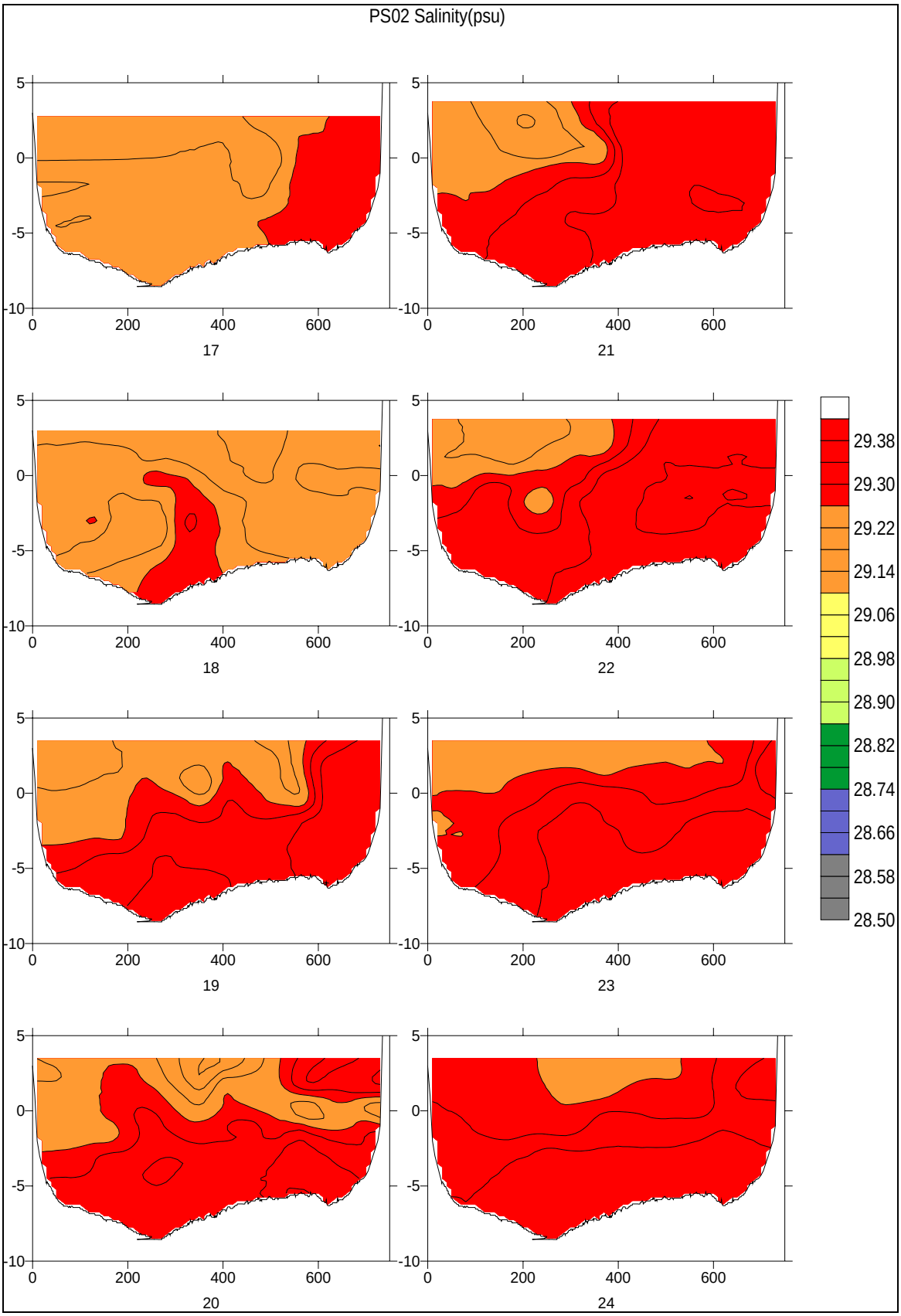

Sinclair-PS02 Transverse Current (cm/sec)
0
-10
-20
0
500
1000
1500
49
50
51
30
18
14
10
6
2
-2
-5
-8
-11
-14

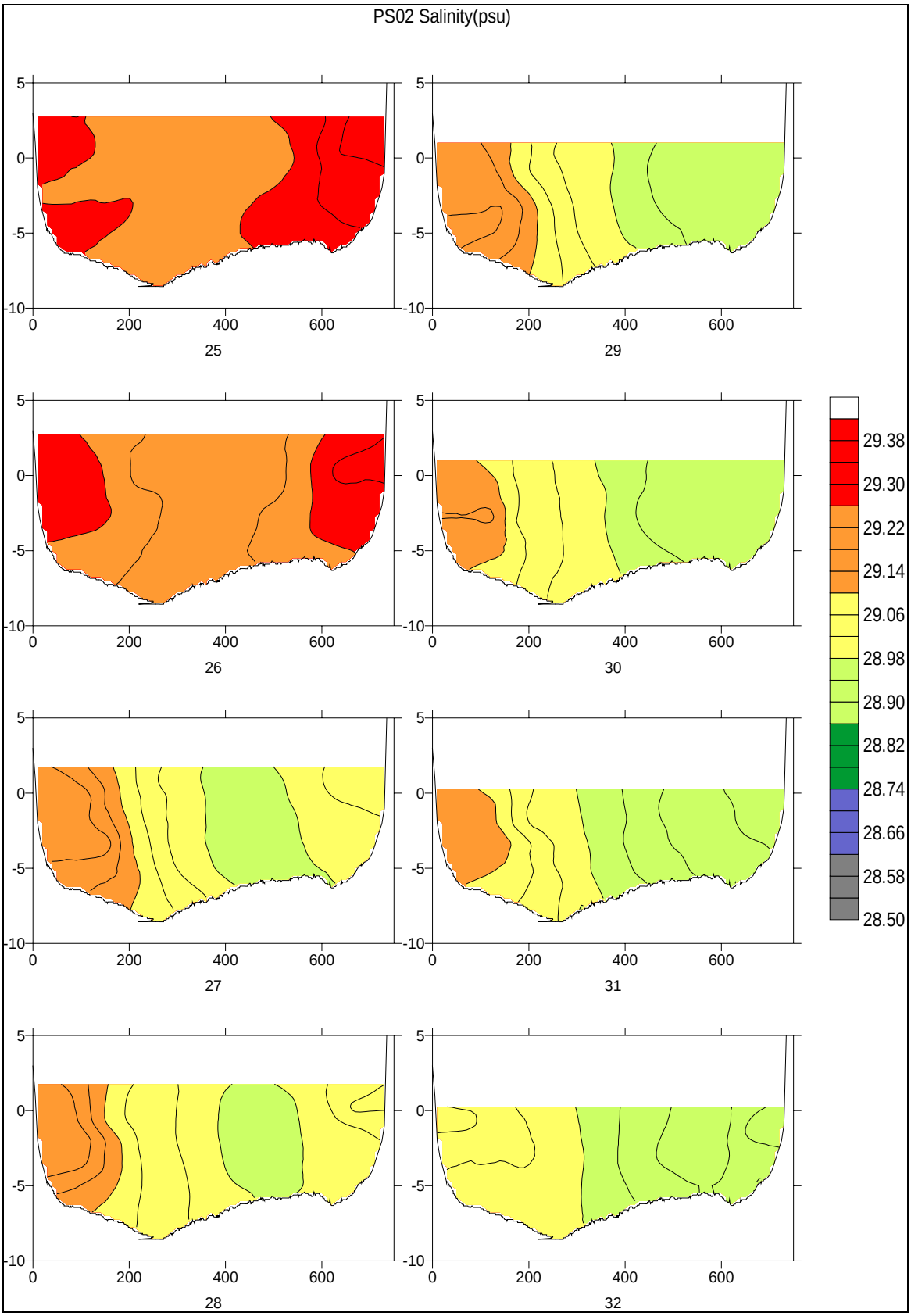
3.4 Dyes Inlet – September 18-19, 1997 – PS02

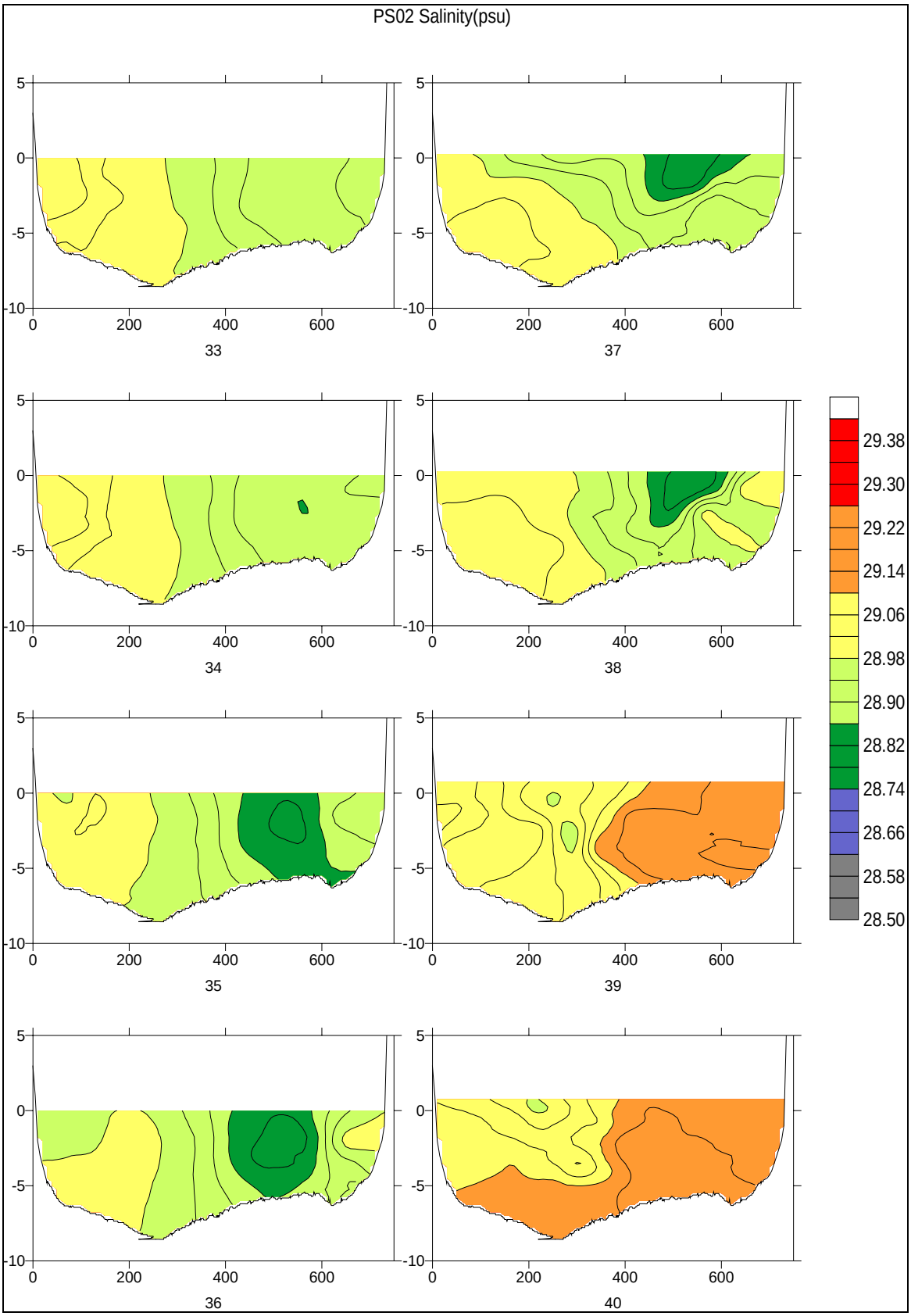
3.4.1 Salinity

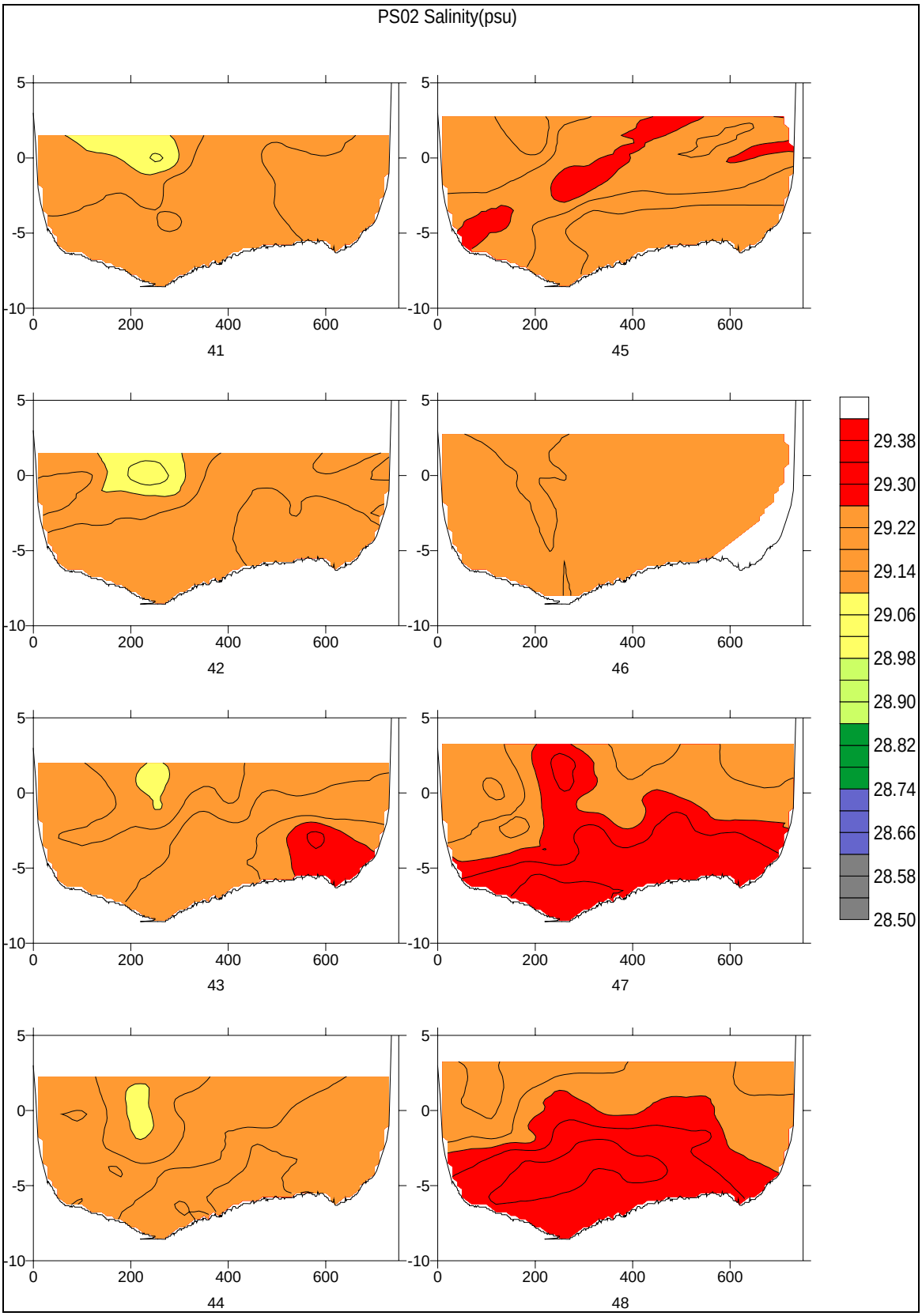


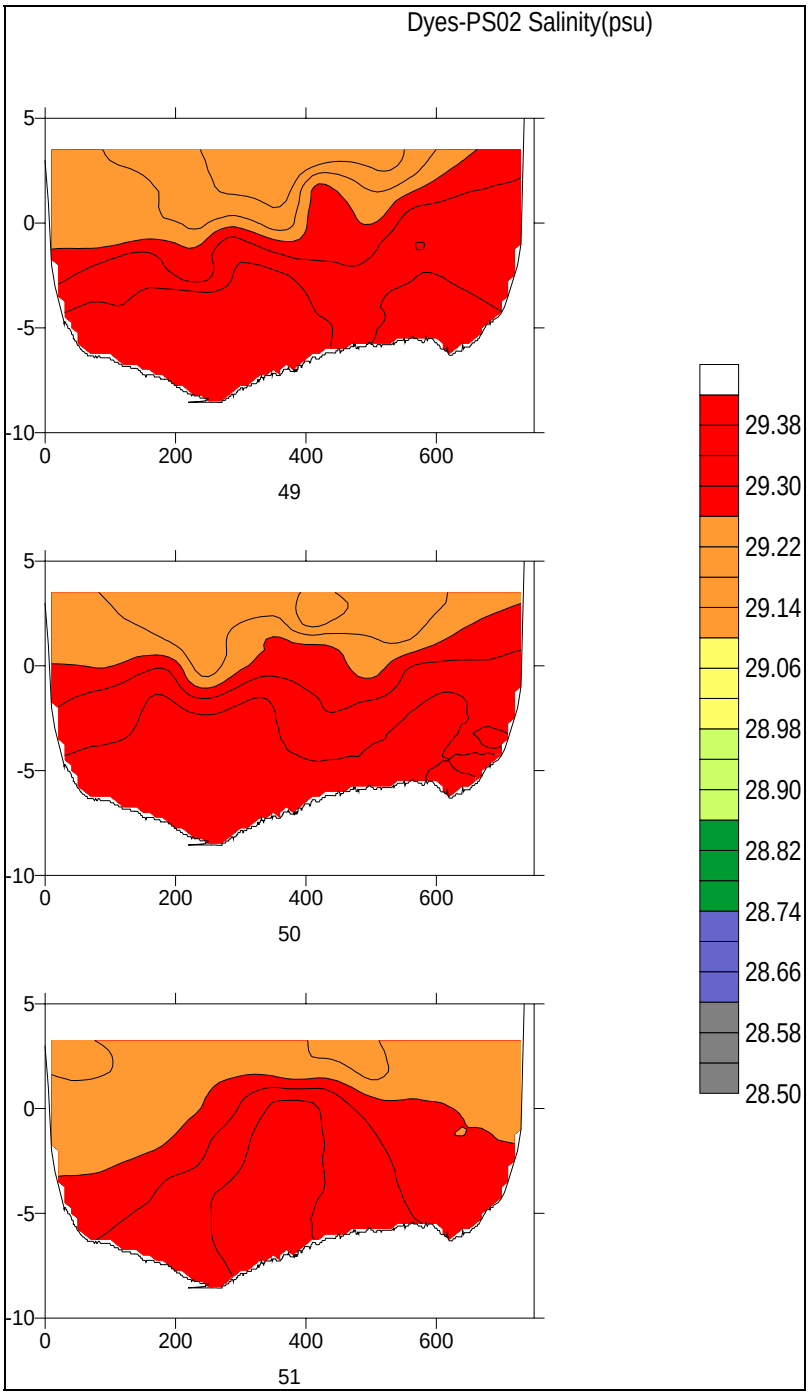

PS02 Salinity(psu)
9
10
11
14
15
16
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50


PS02 Salinity(psu)
17
18
19
20
21
22
23
24
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

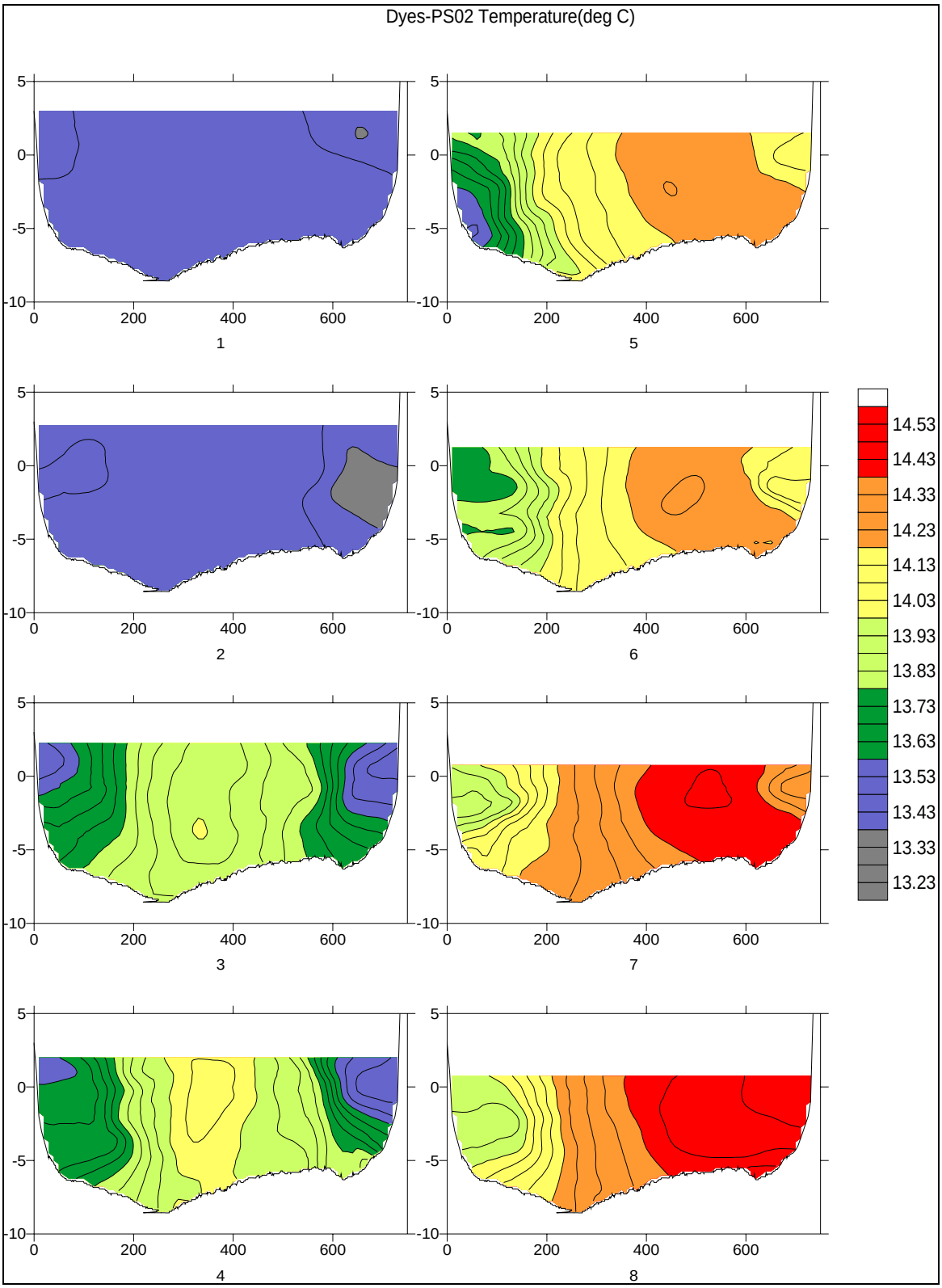

PS02 Salinity(psu)
25
29
26
30
27
31
28
32
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

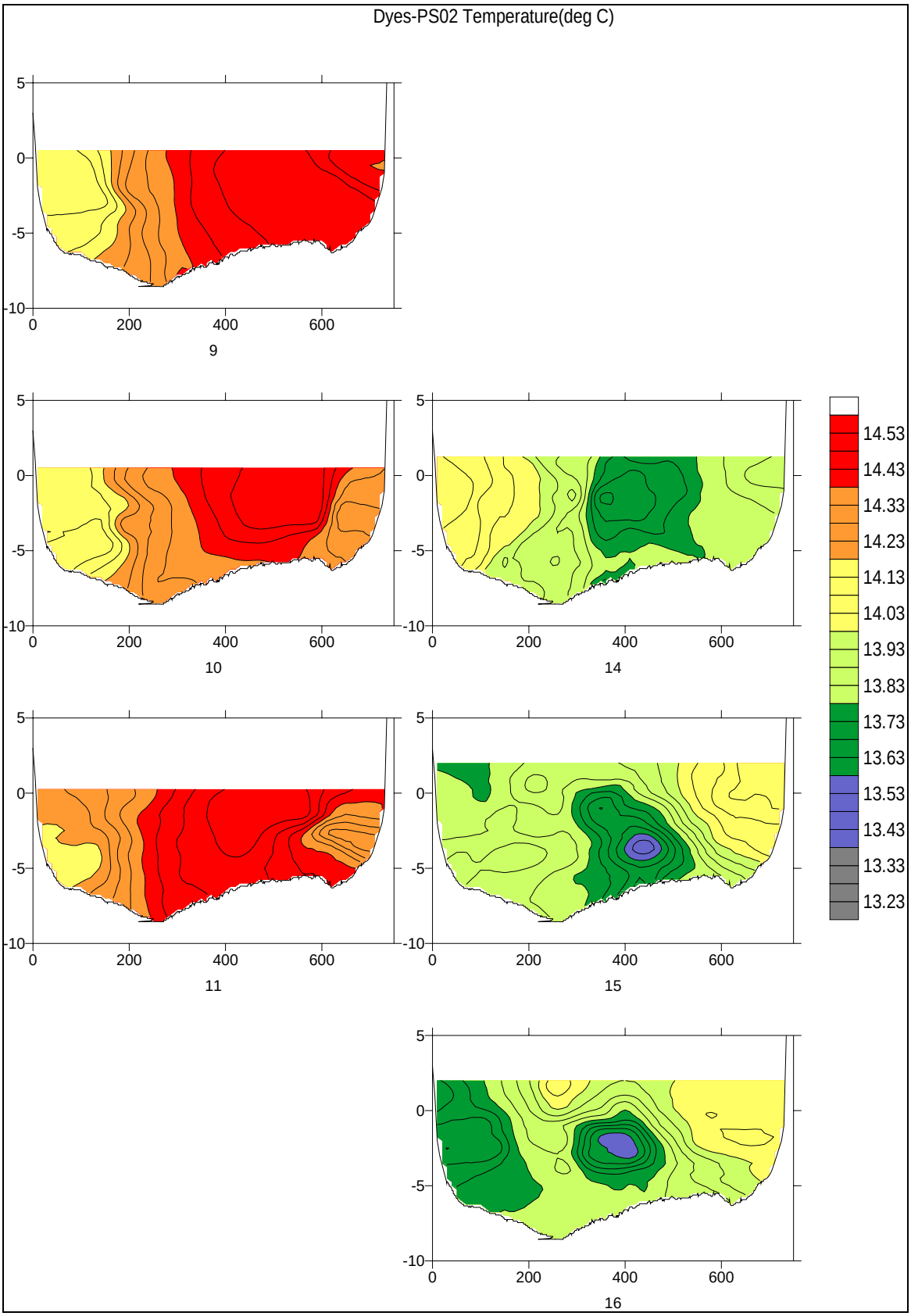

PS02 Salinity(psu)
33
37
34
38
35
39
36
40
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

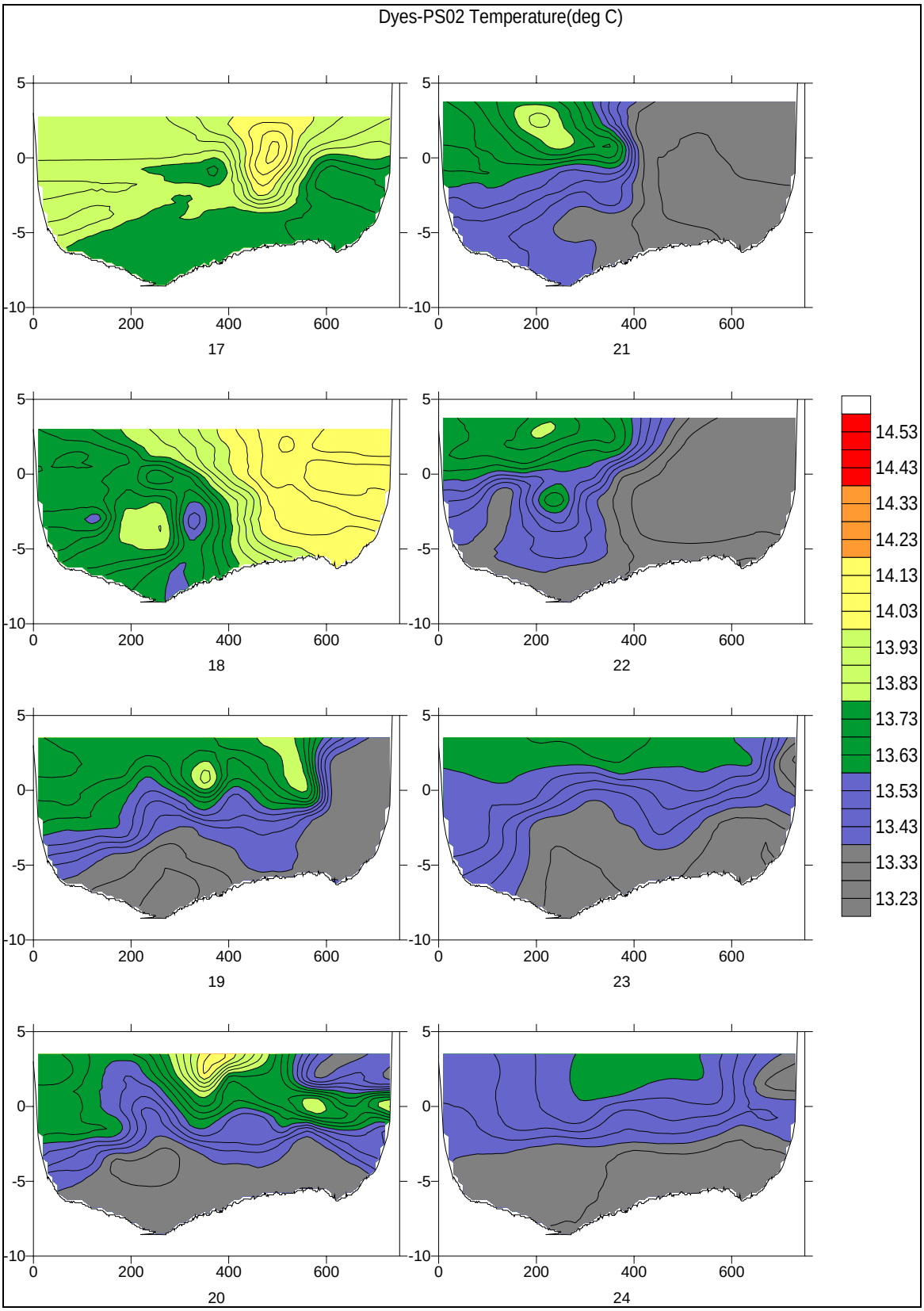

PS02 Salinity(psu)
41
45
42
46
43
47
44
48
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

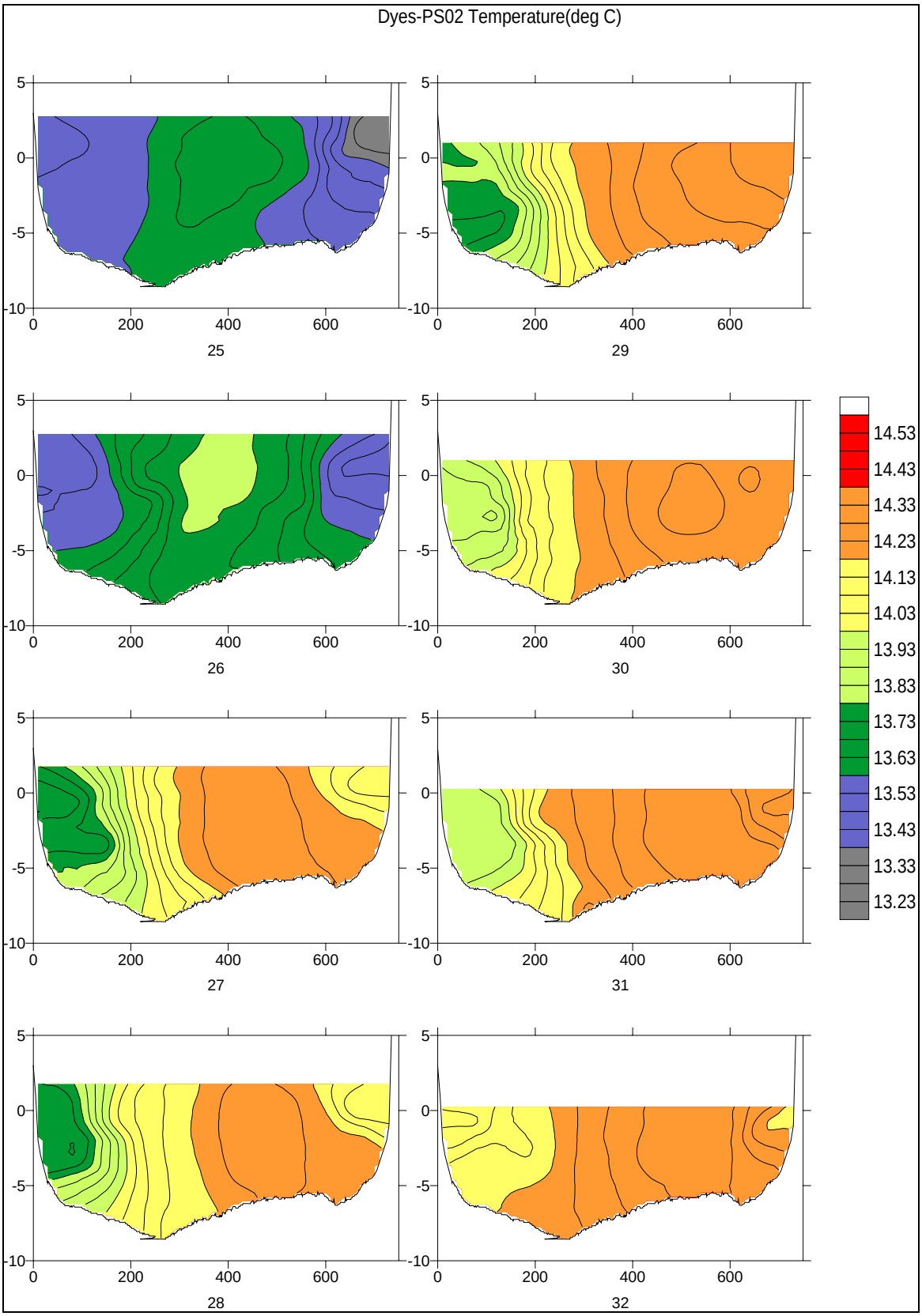

Dyes-PS02 Salinity(psu)
5
0
-5
-10
0
200
400
600
49
50
51
29.38
29.30
29.22
29.14
29.06
28.98
28.90
28.82
28.74
28.66
28.58
28.50

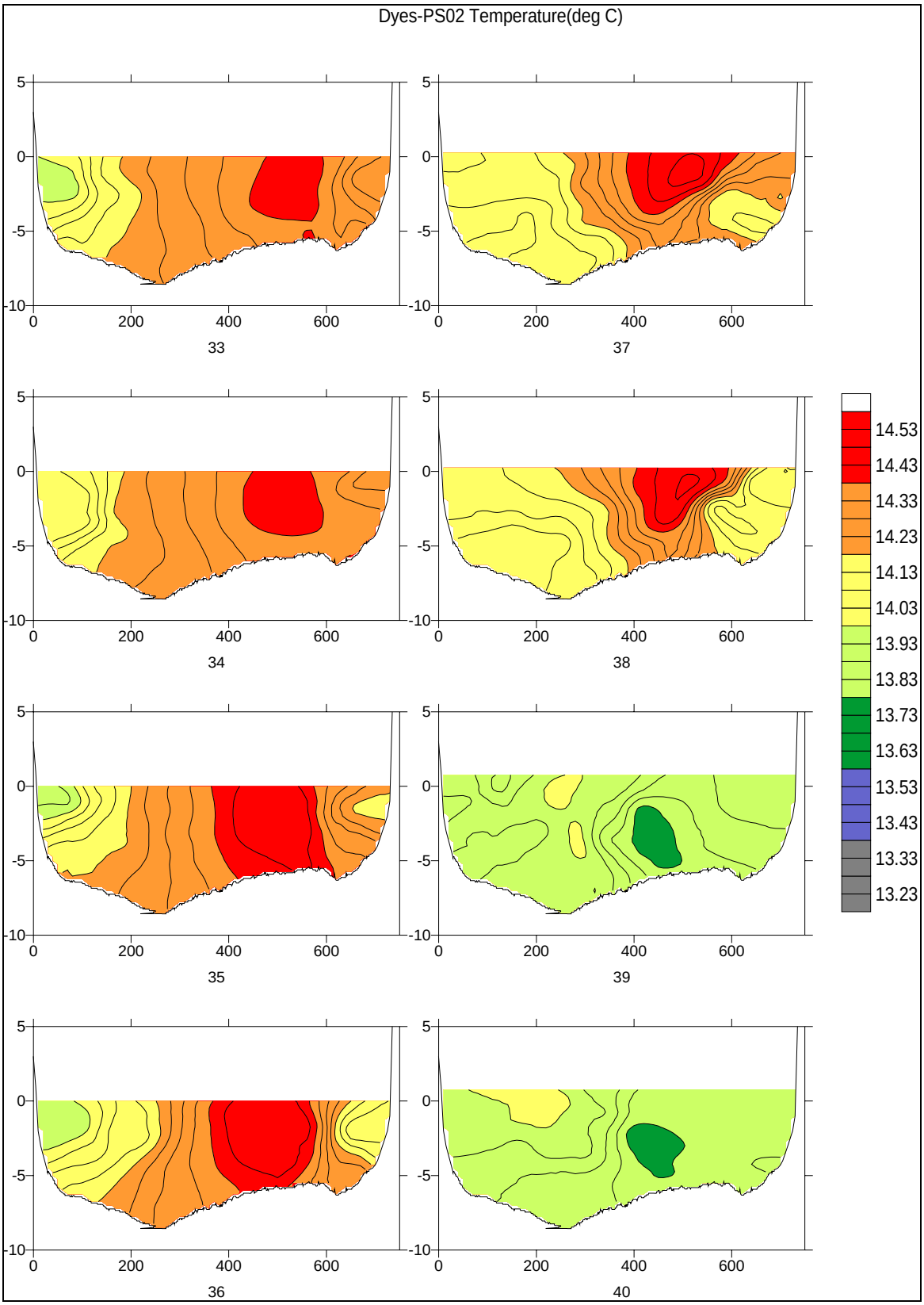
3.4.2 Temperature

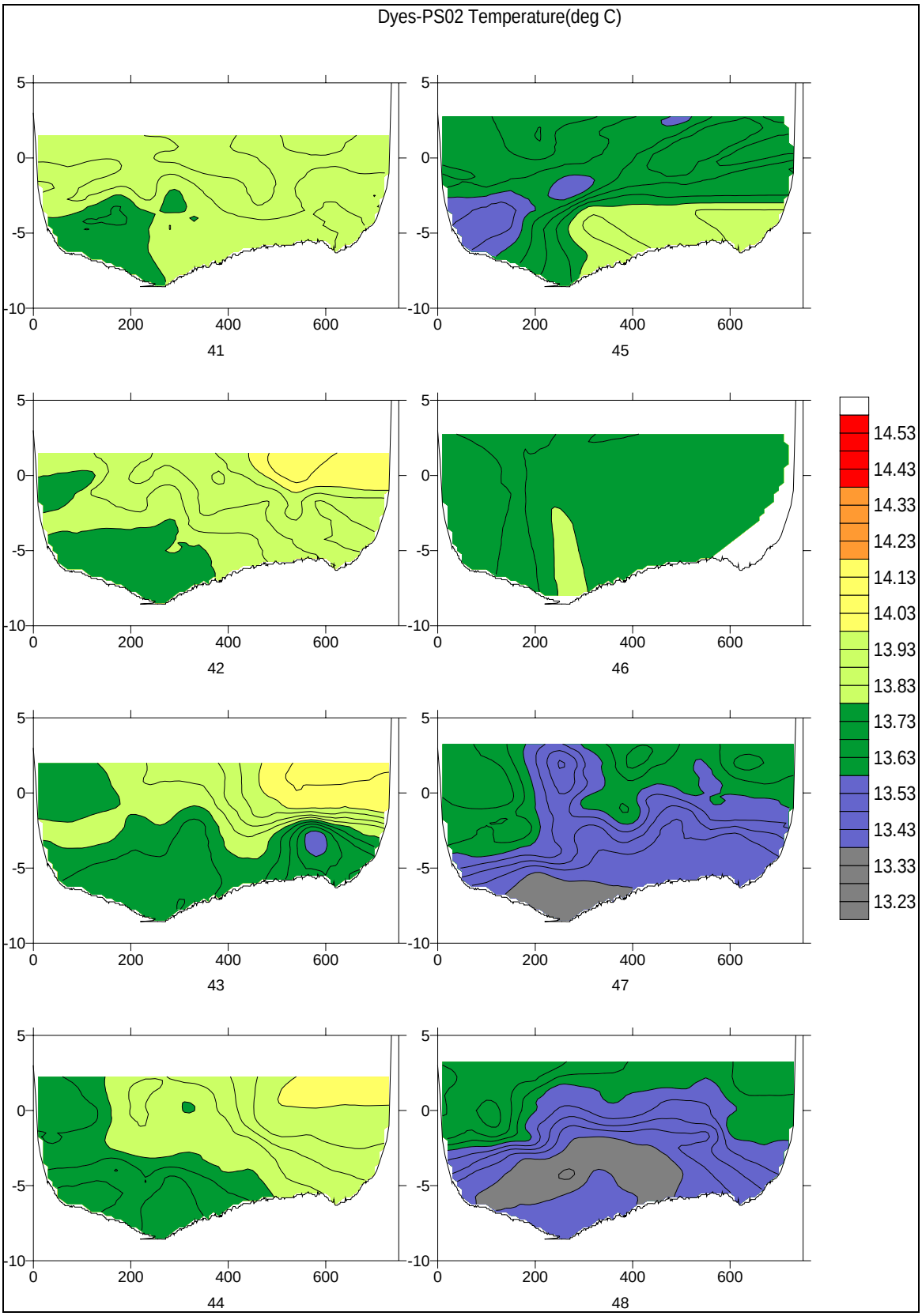


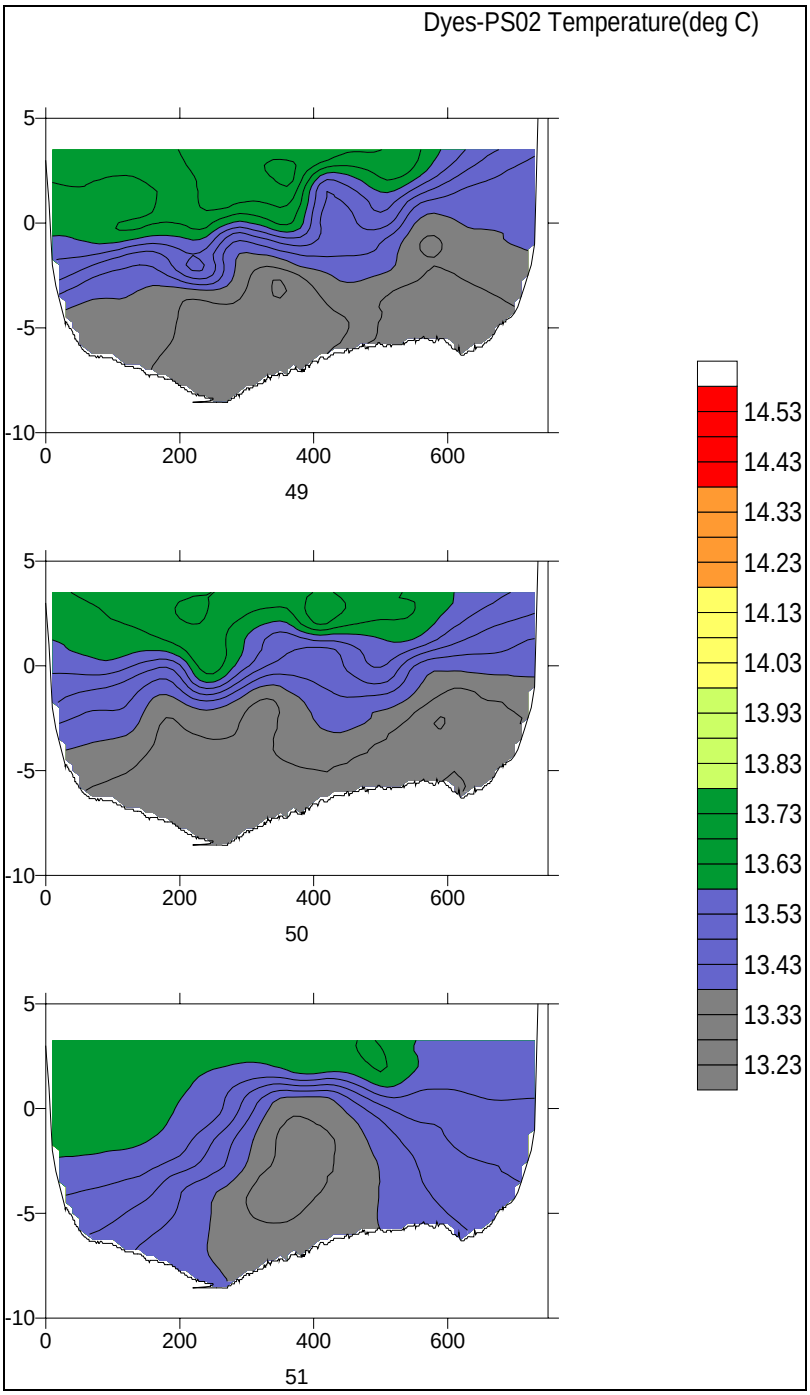

Dyes-PS02 Temperature(deg C)
9
10
14
11
15
16
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23


Dyes-PS02 Temperature(deg C)
17
21
18
22
19
23
20
24
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

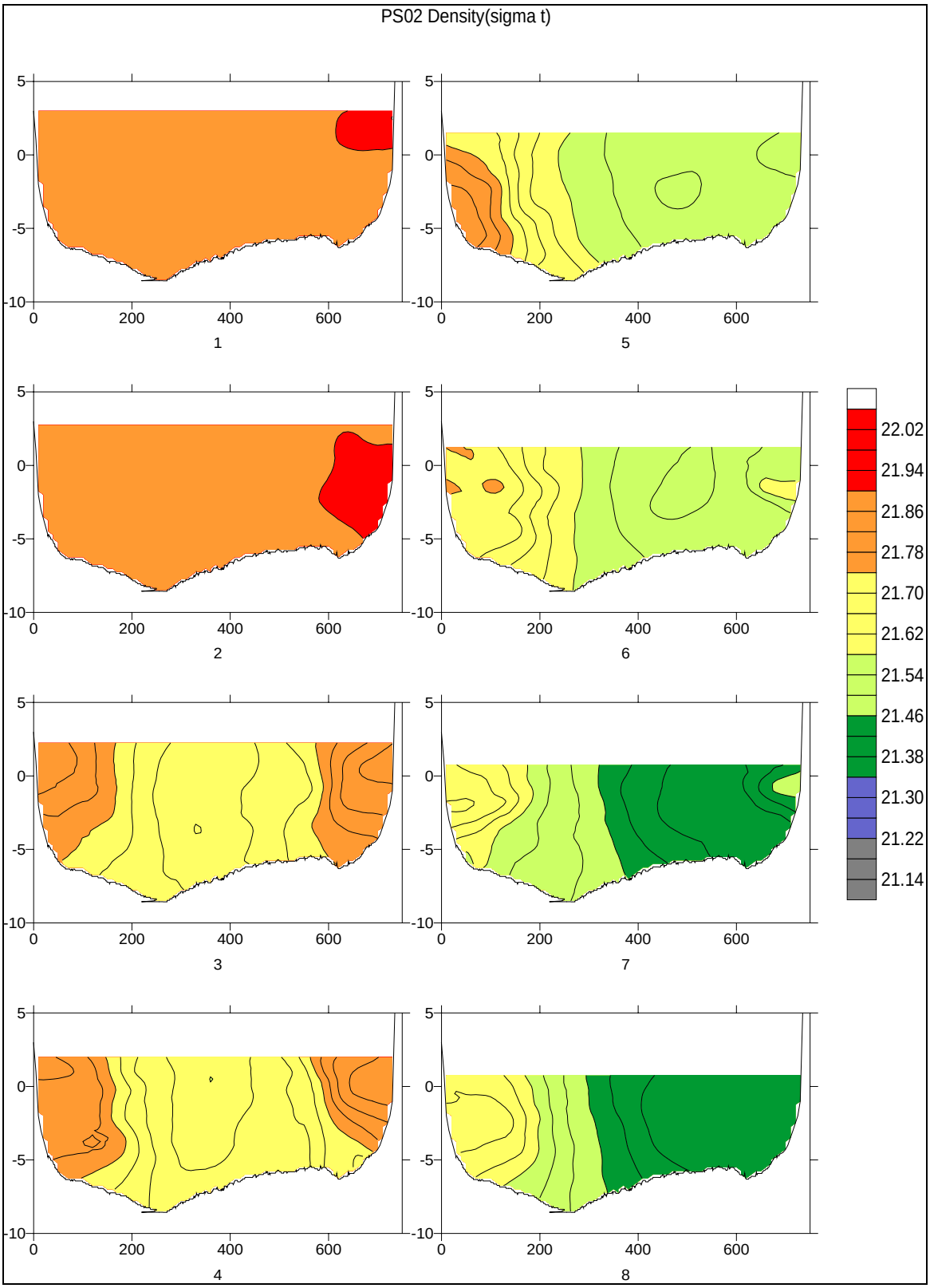

Dyes-PS02 Temperature(deg C)
25
29
26
30
27
31
28
32
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

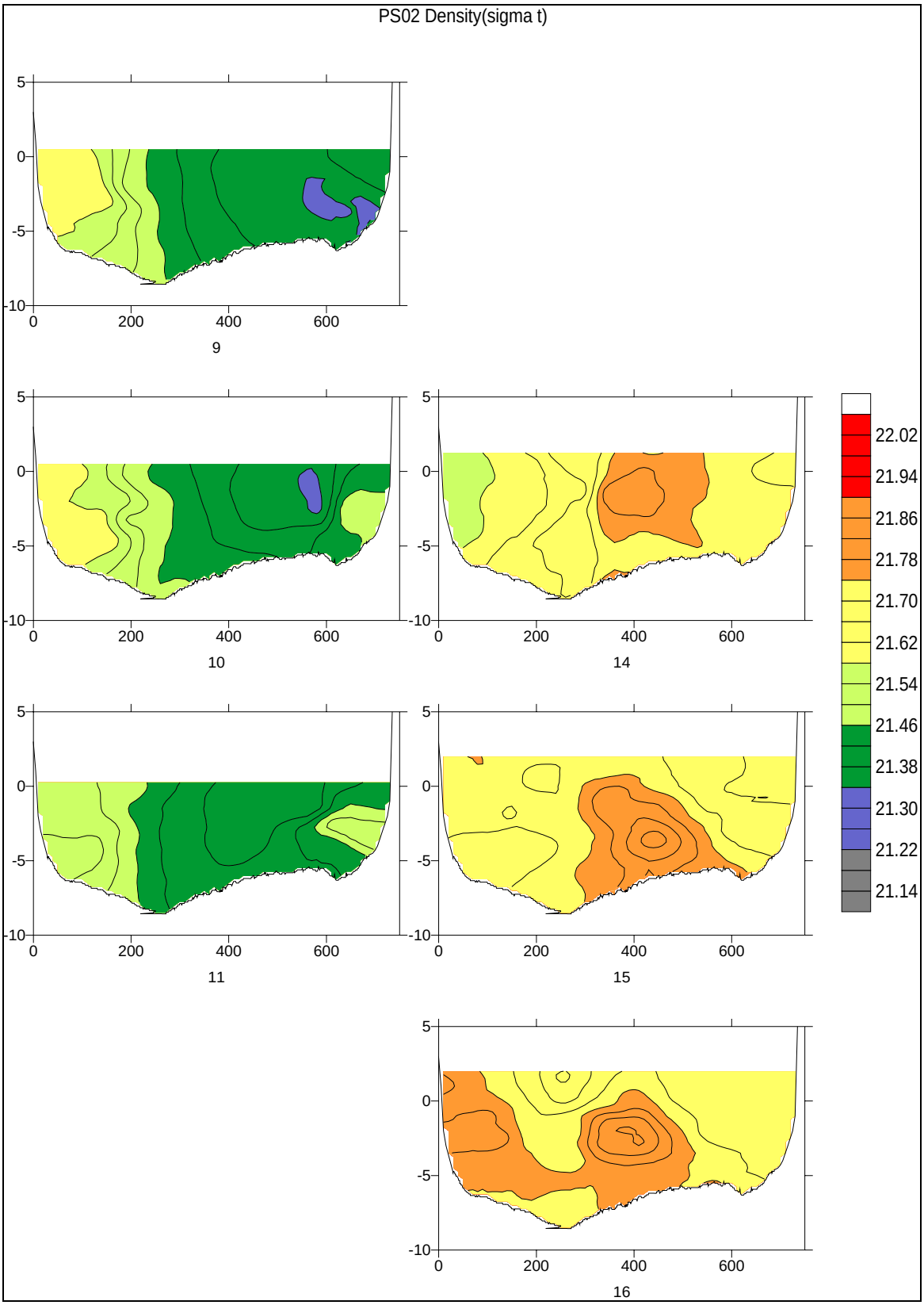

Dyes-PS02 Temperature(deg C)
5
0
-5
-10
0
200
400
600
33
37
34
38
35
39
36
40
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

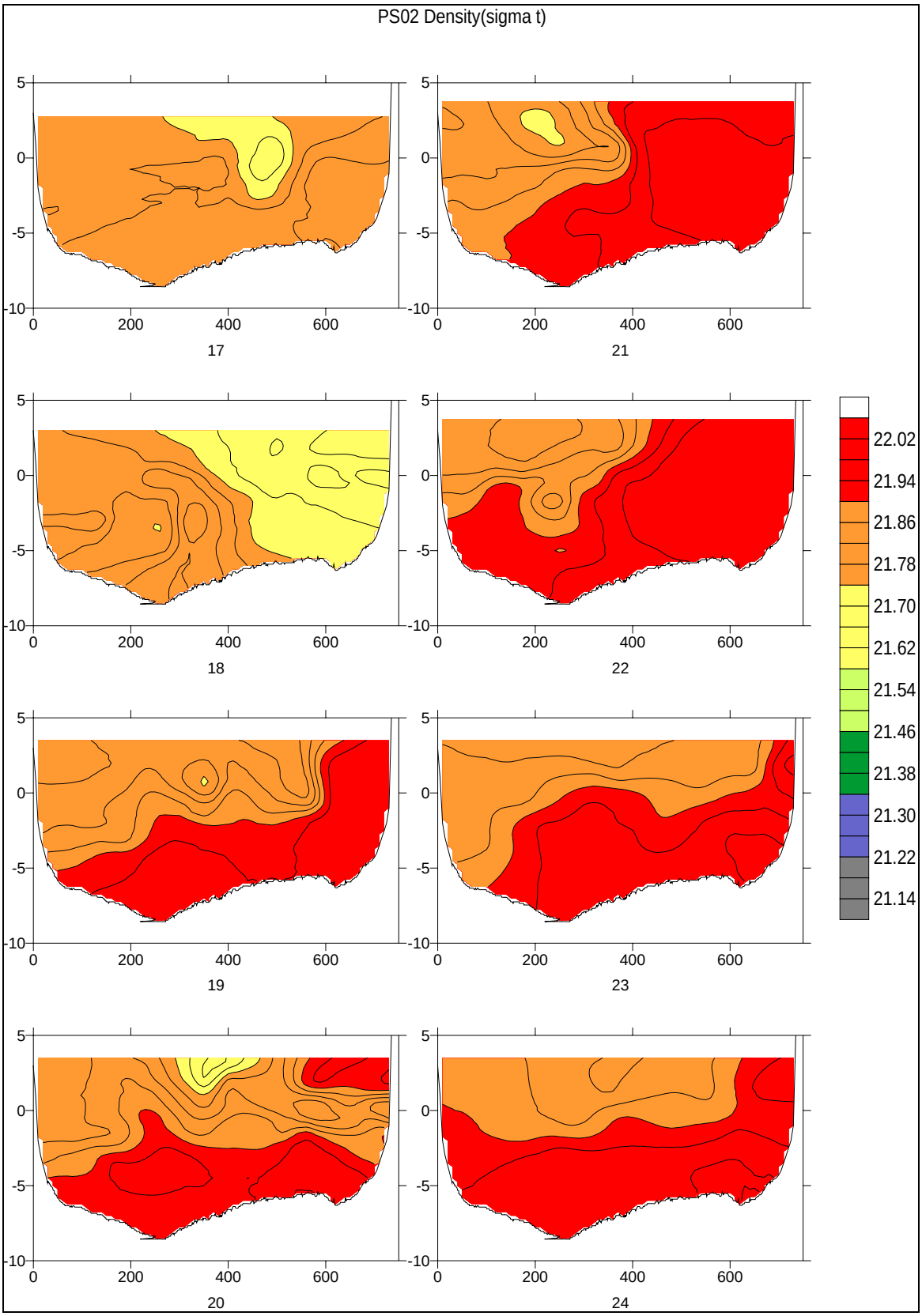

Dyes-PS02 Temperature(deg C)
41
45
42
46
43
47
44
48
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

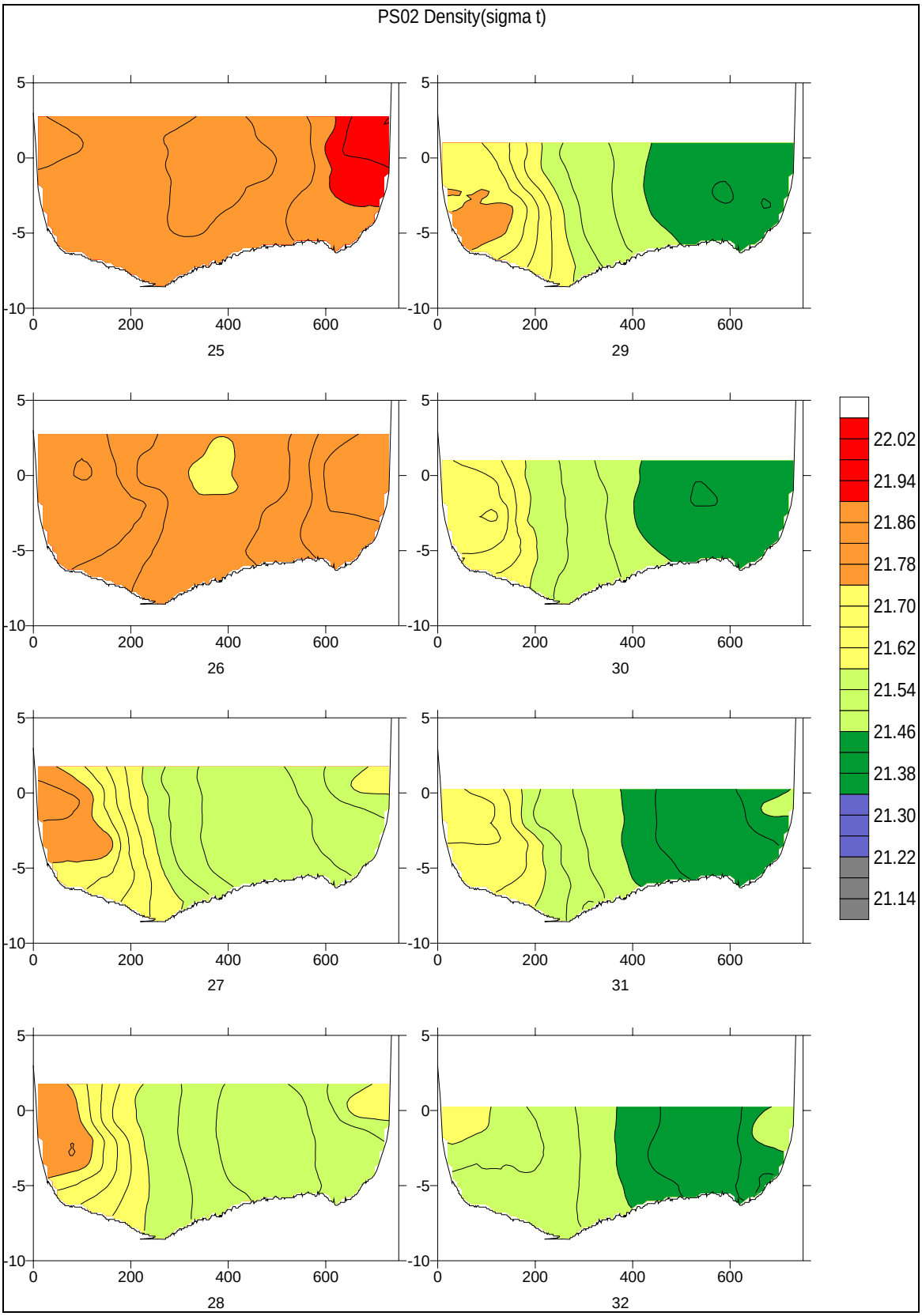

Dyes-PS02 Temperature(deg C)
5
0
-5
-10
0
200
400
600
49
50
51
14.53
14.43
14.33
14.23
14.13
14.03
13.93
13.83
13.73
13.63
13.53
13.43
13.33
13.23

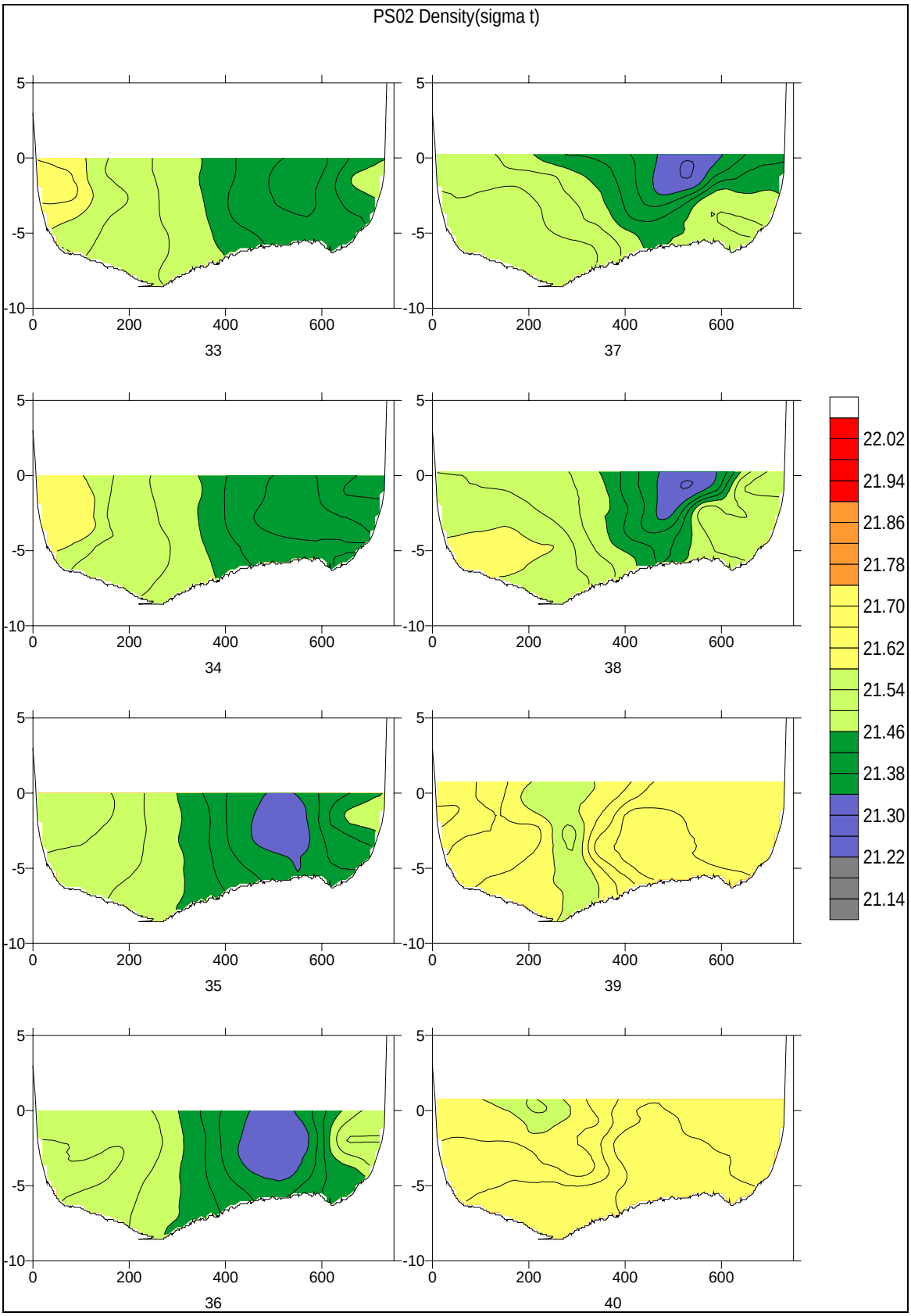
3.4.3 Density

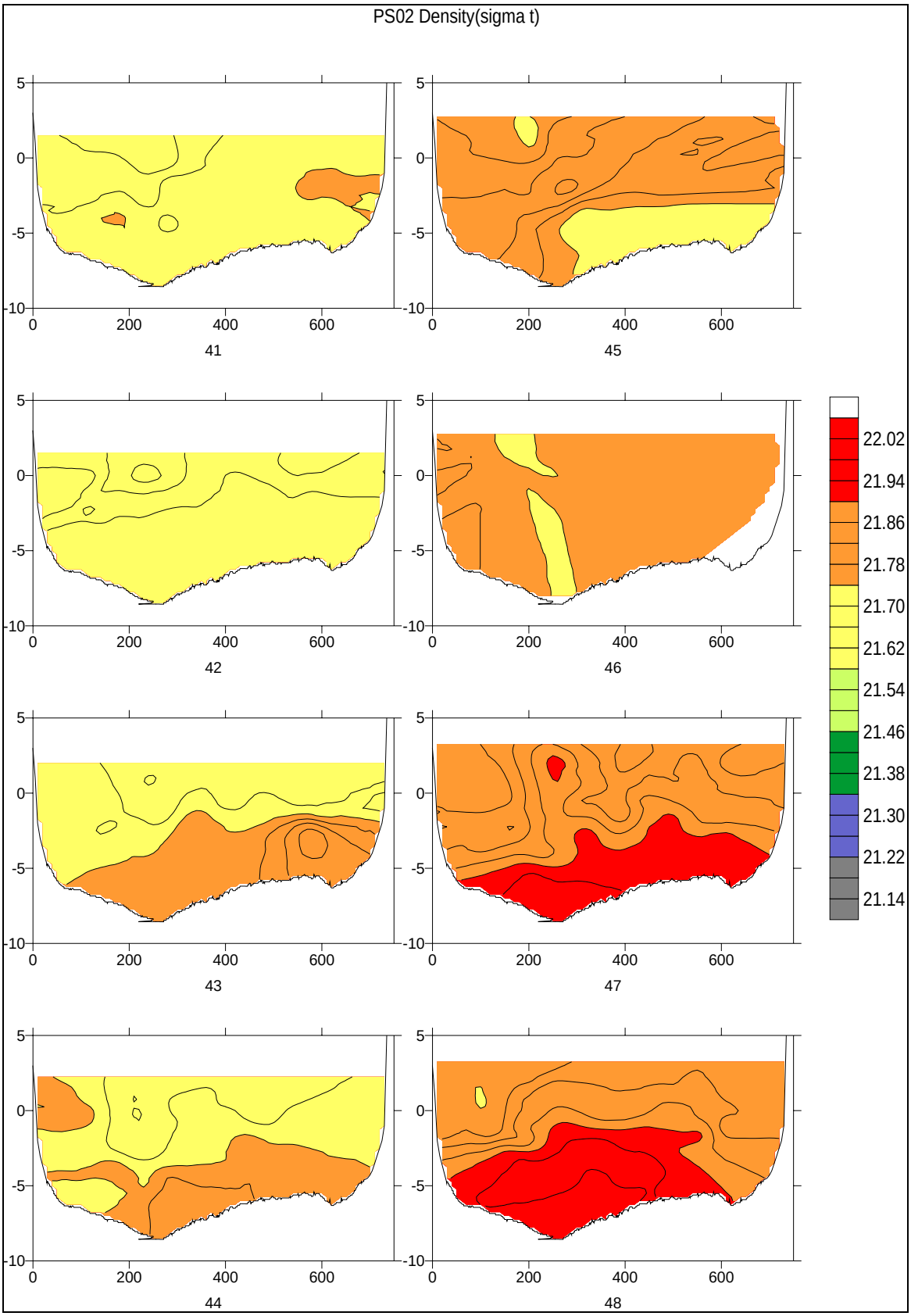

PS02 Density(sigma t)
1
2
3
4
5
6
7
8
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

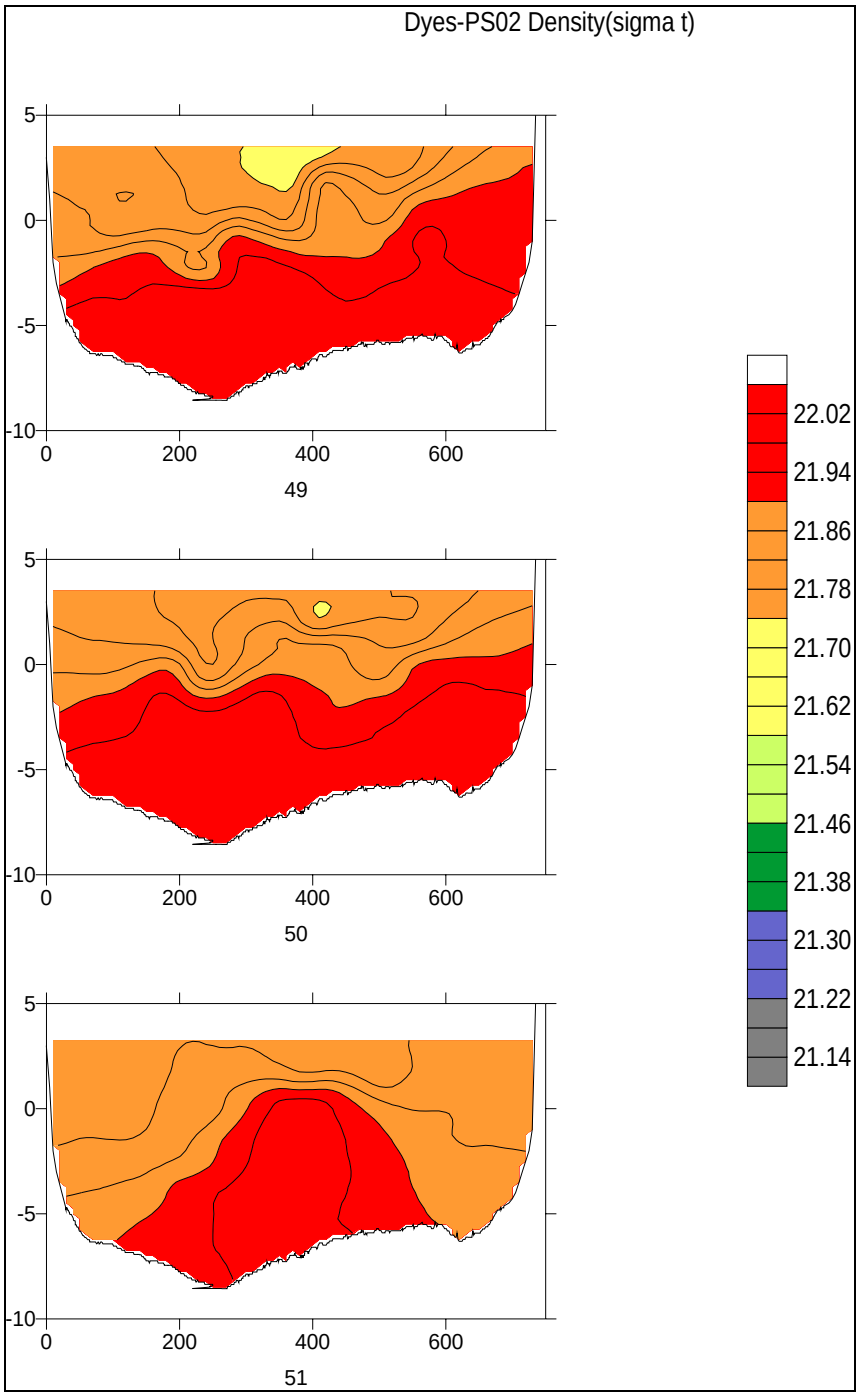

PS02 Density(sigma t)
9
10
11
14
15
16
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14


PS02 Density(sigma t)
17
18
19
20
21
22
23
24
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

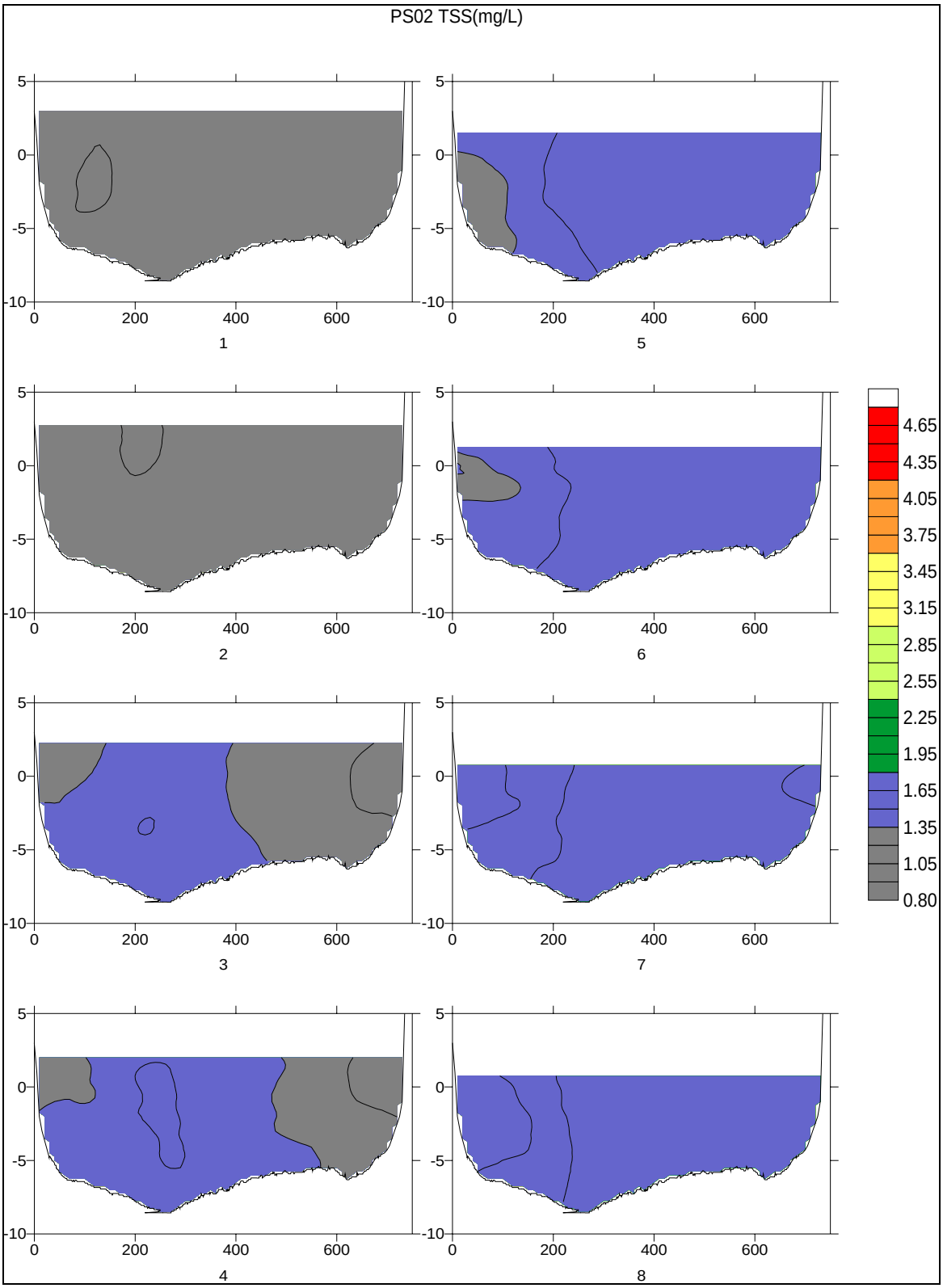

PS02 Density(sigma t)
25
29
26
30
27
31
28
32
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

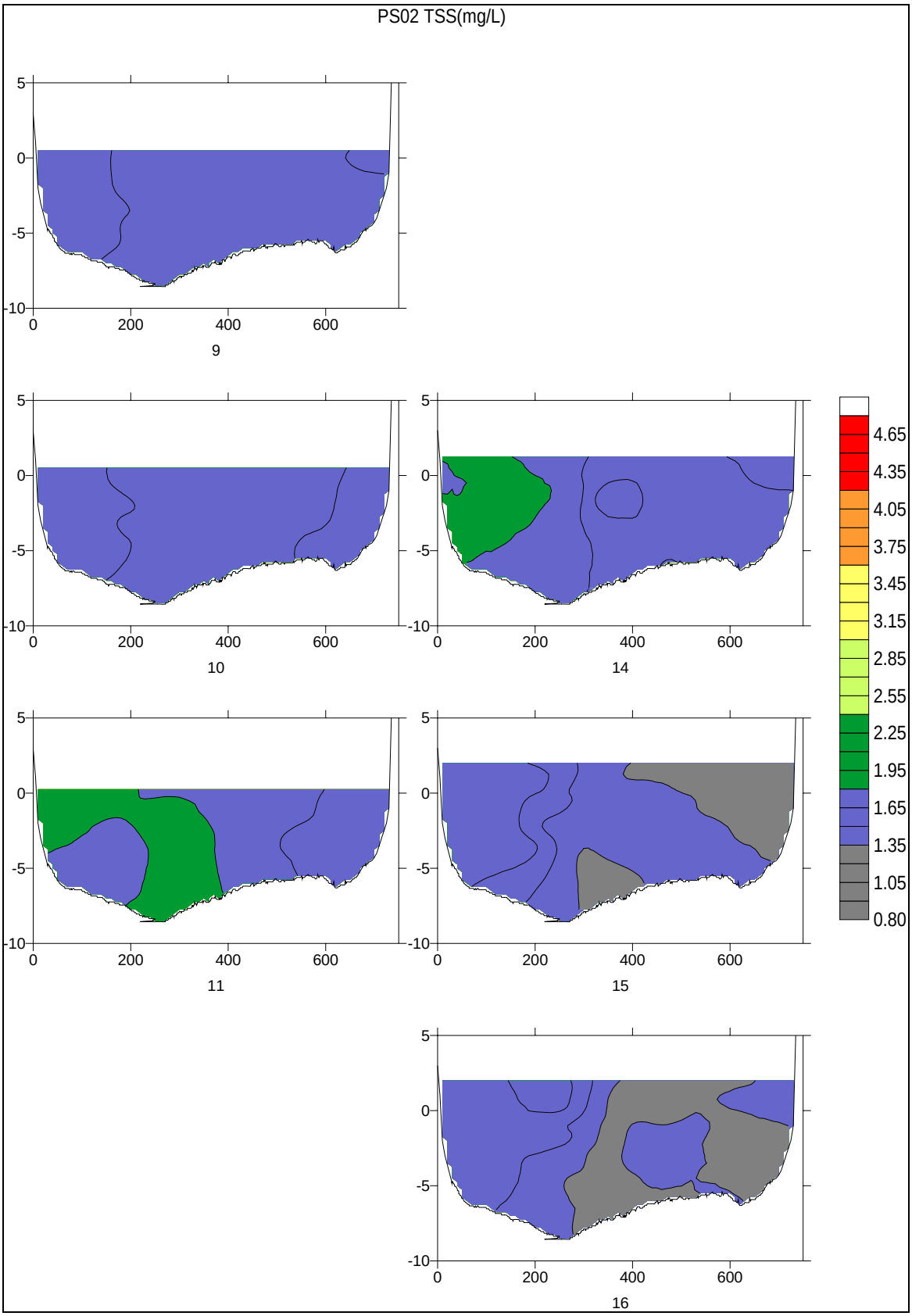

PS02 Density(sigma t)
5
0
-5
-10
0
200
400
600
33
37
34
38
35
39
36
40
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

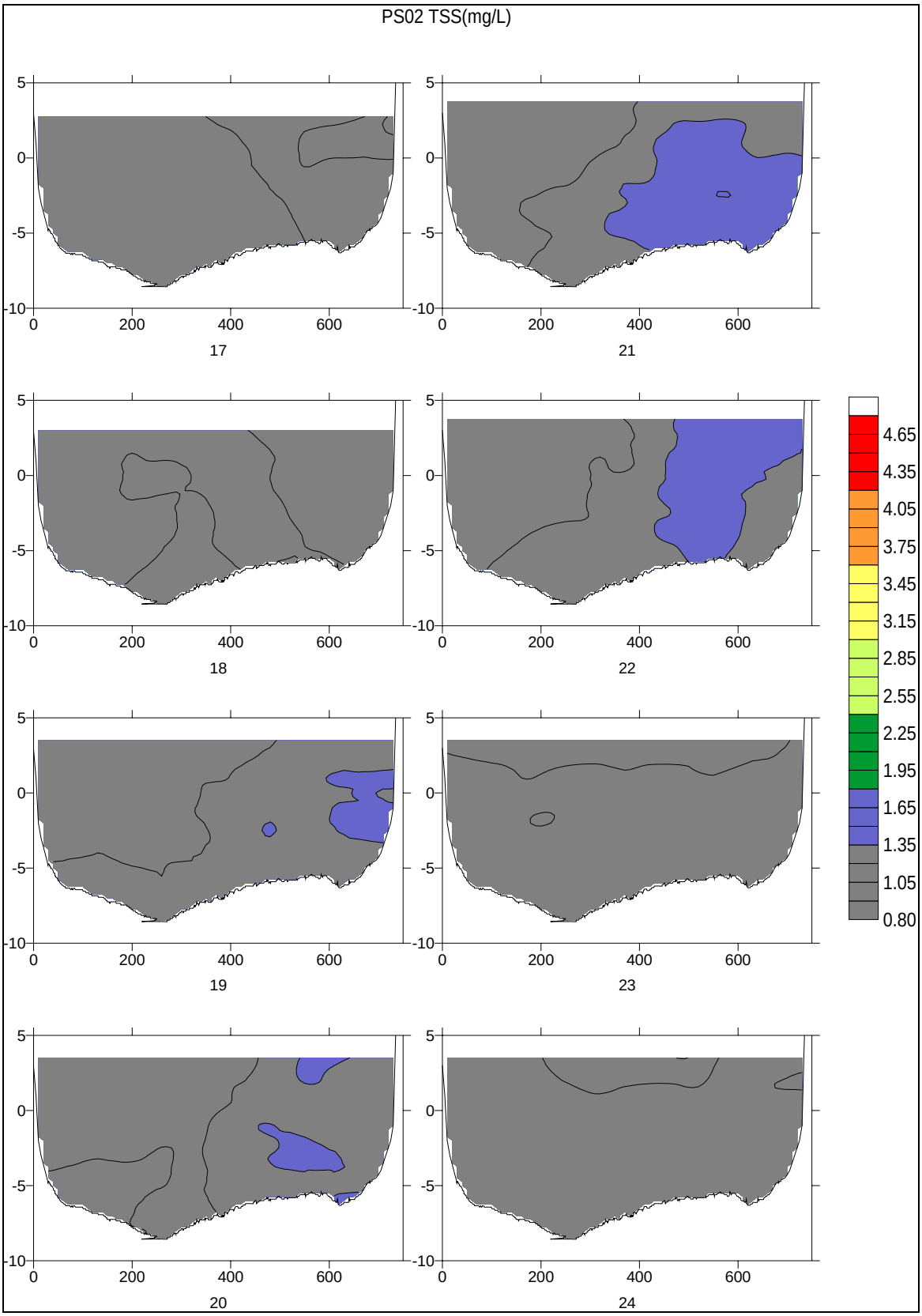

PS02 Density(sigma t)
41
45
42
46
43
47
44
48
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

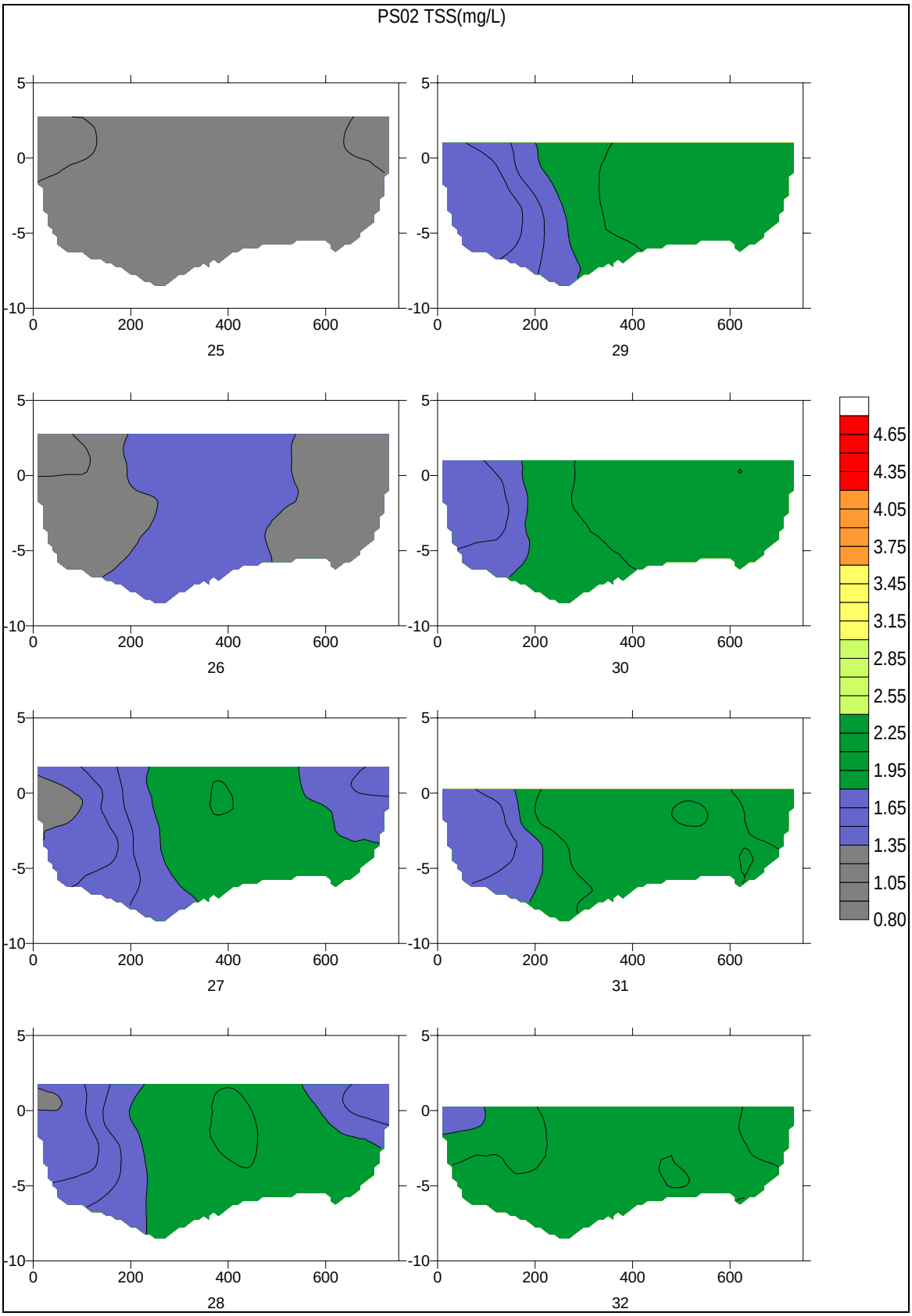

Dyes-PS02 Density(sigma t)
5
0
-5
-10
0
200
400
600
49
50
51
22.02
21.94
21.86
21.78
21.70
21.62
21.54
21.46
21.38
21.30
21.22
21.14

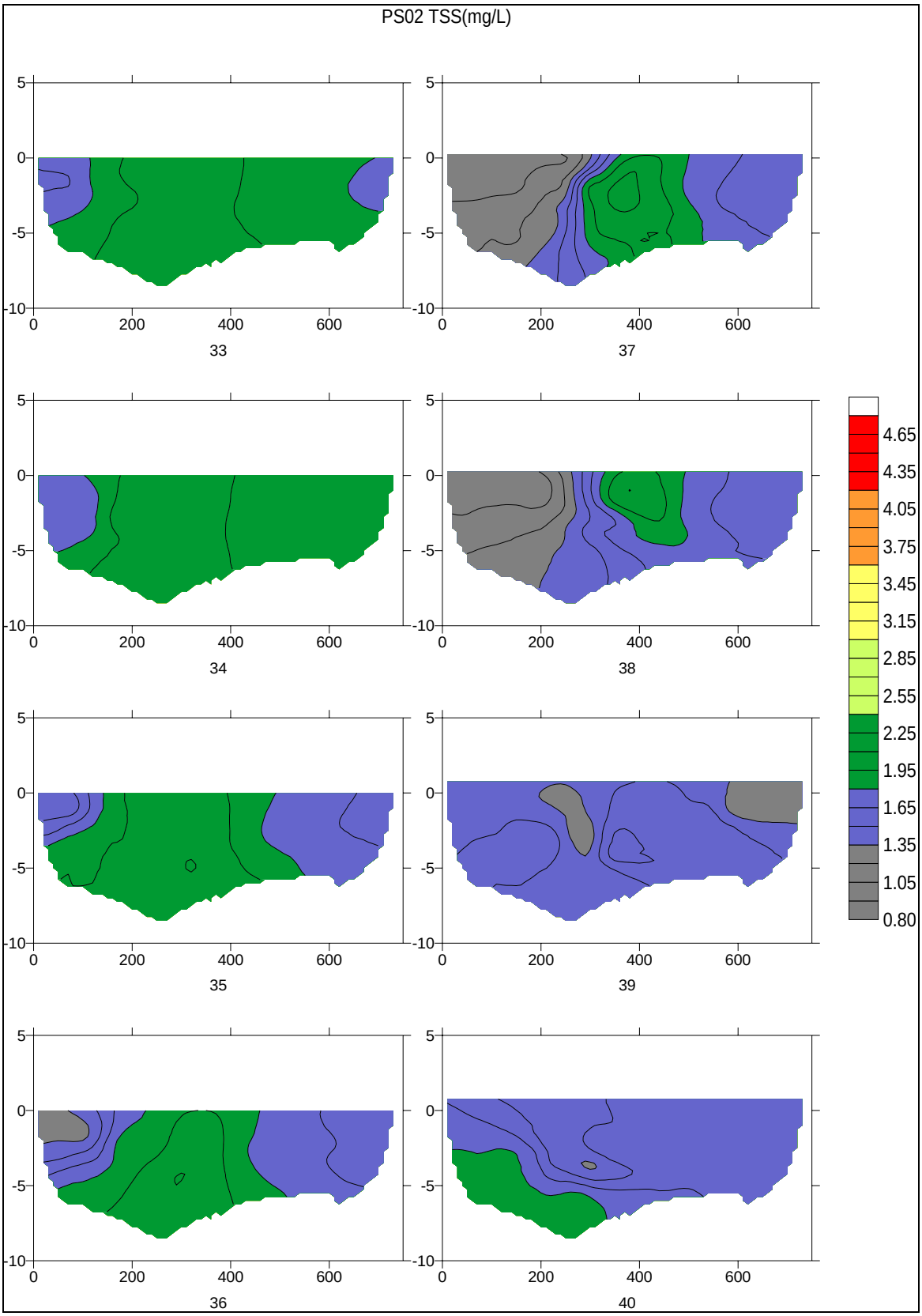
3.4.4 TSS

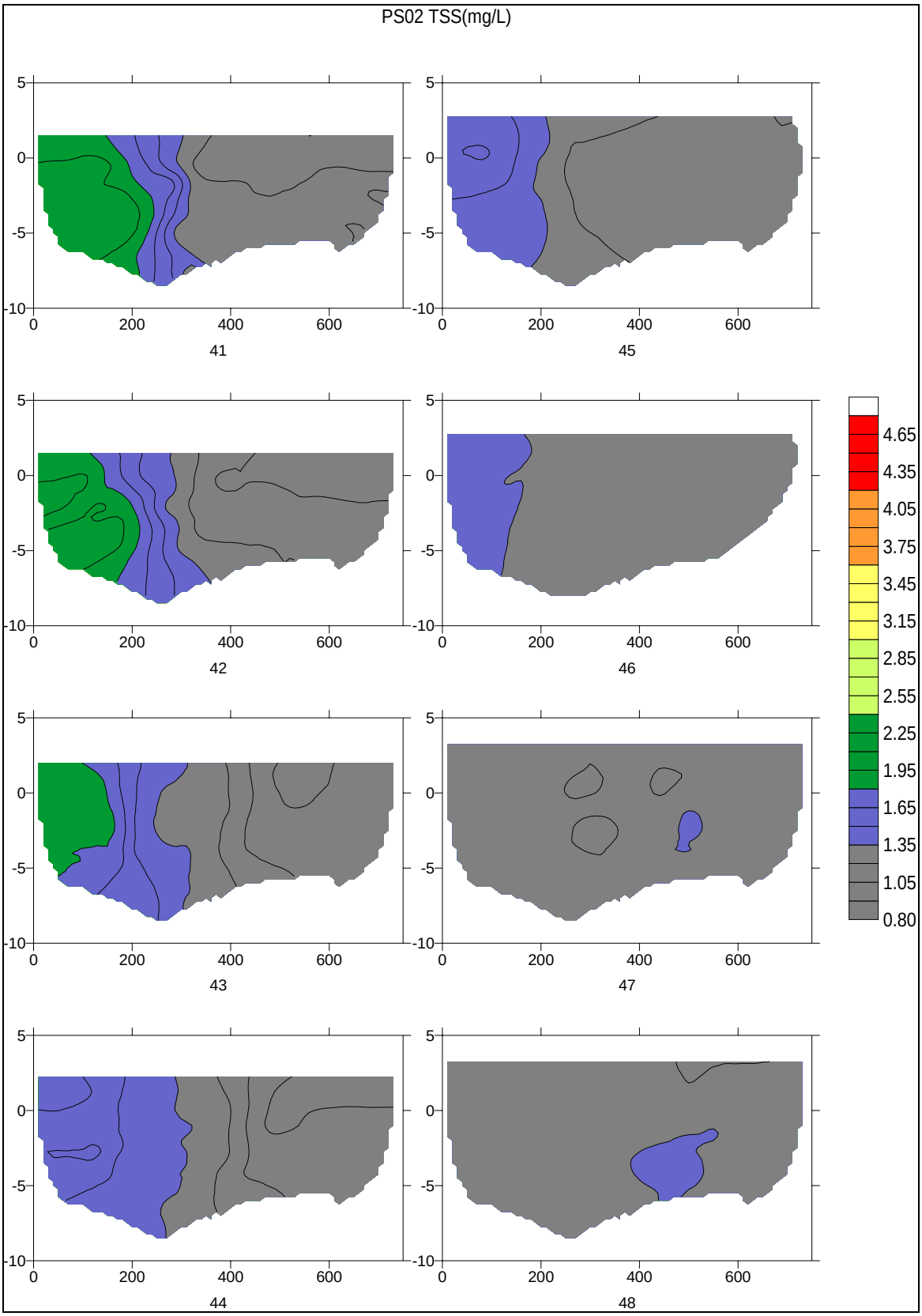

PS02 TSS(mg/L)
5
0
-5
-10
0
200
400
600
1
2
3
4
5
6
7
8
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

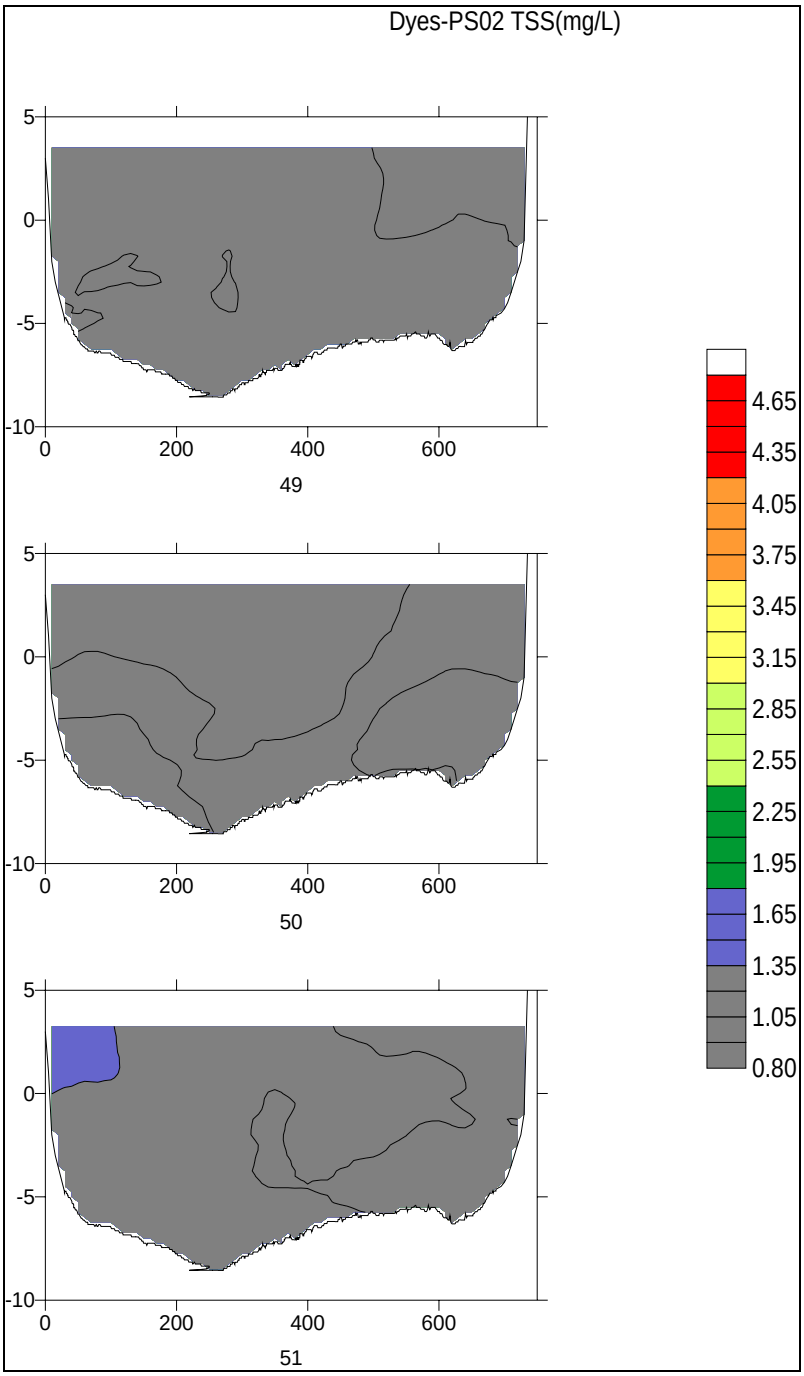

PS02 TSS(mg/L)
9
10
14
11
15
16
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80


PS02 TSS(mg/L)
17
18
19
20
21
22
23
24
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

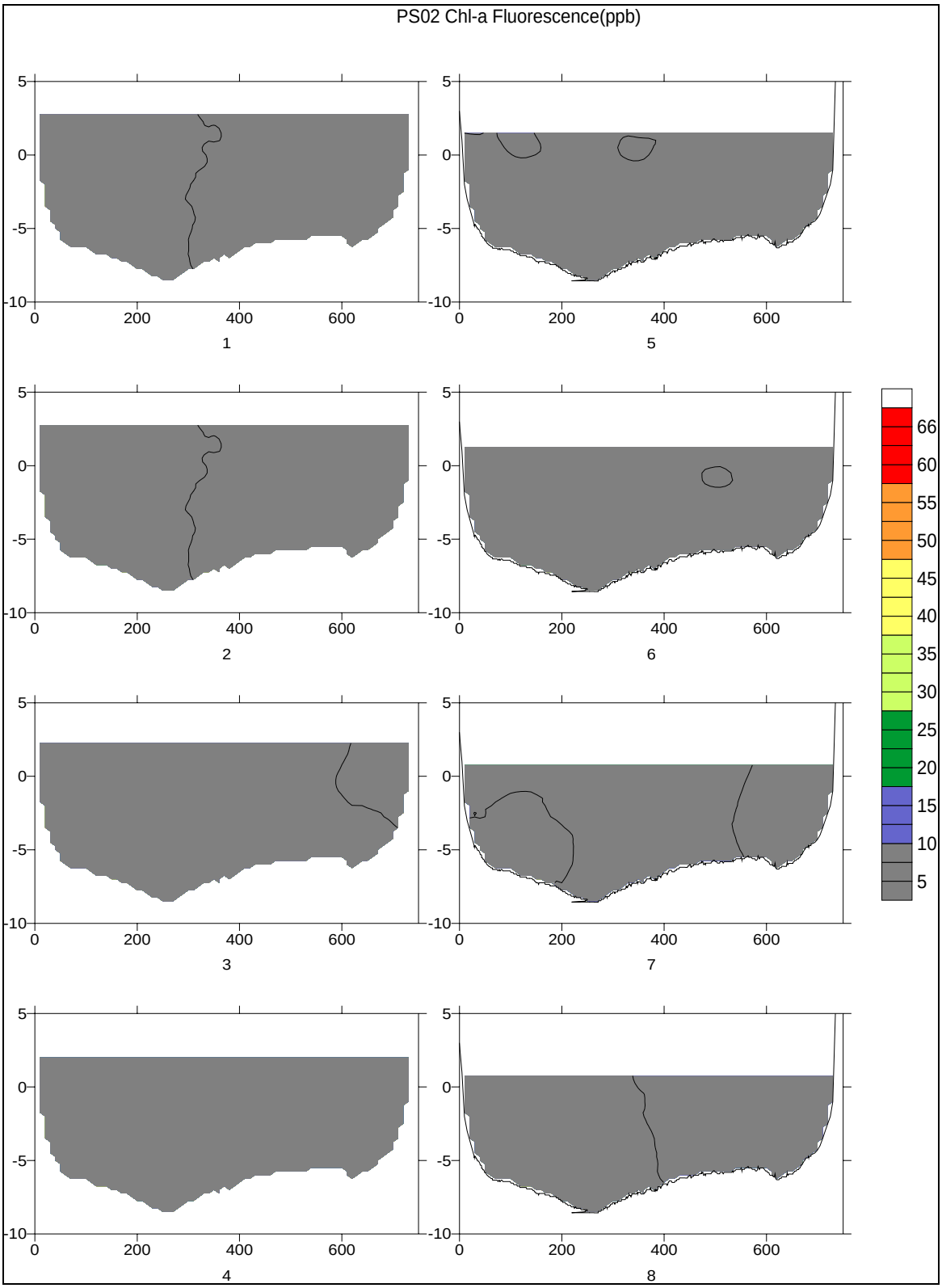

PS02 TSS(mg/L)
25
29
26
30
27
31
28
32
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

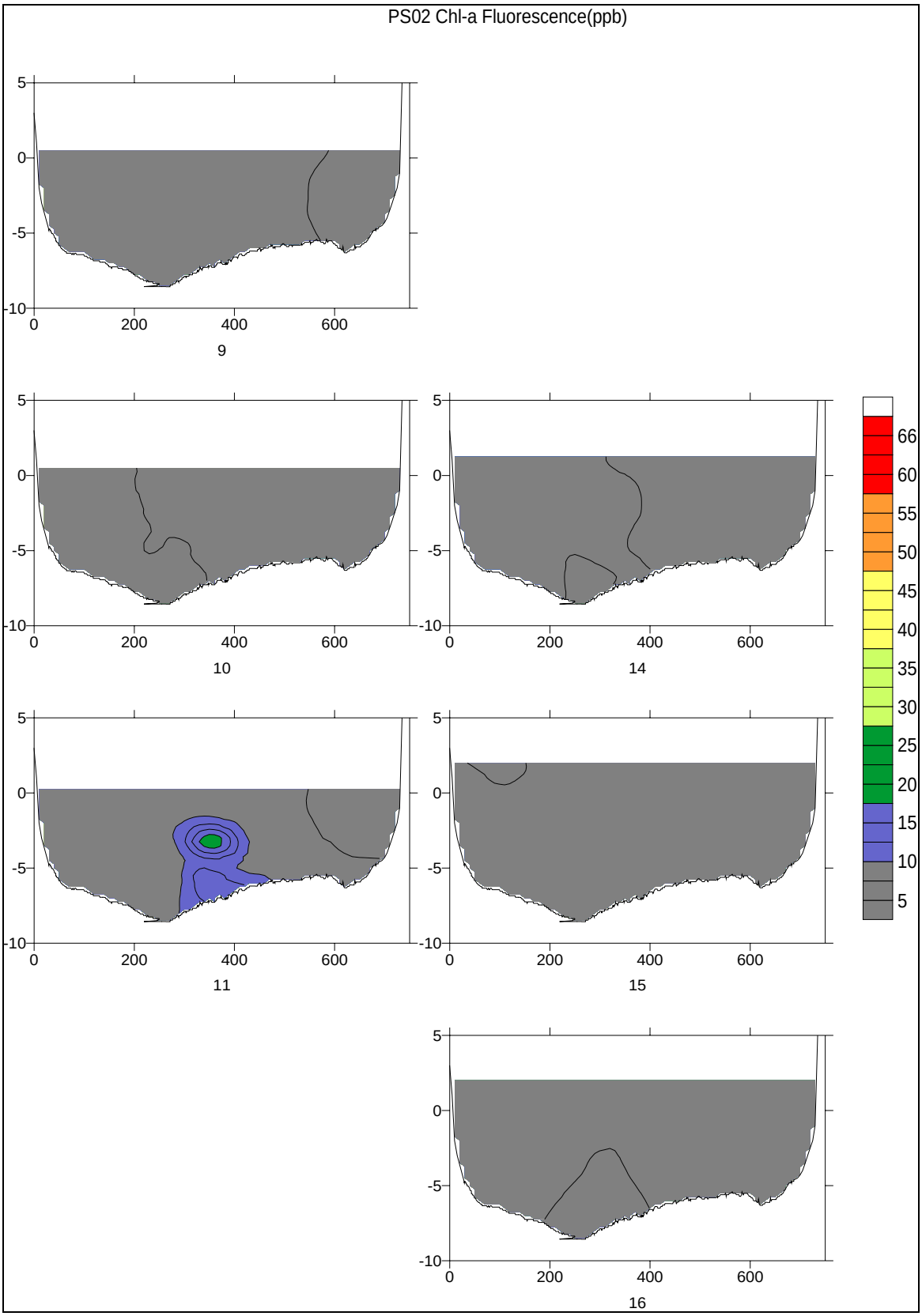

PS02 TSS(mg/L)
33
37
34
38
35
39
36
40
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

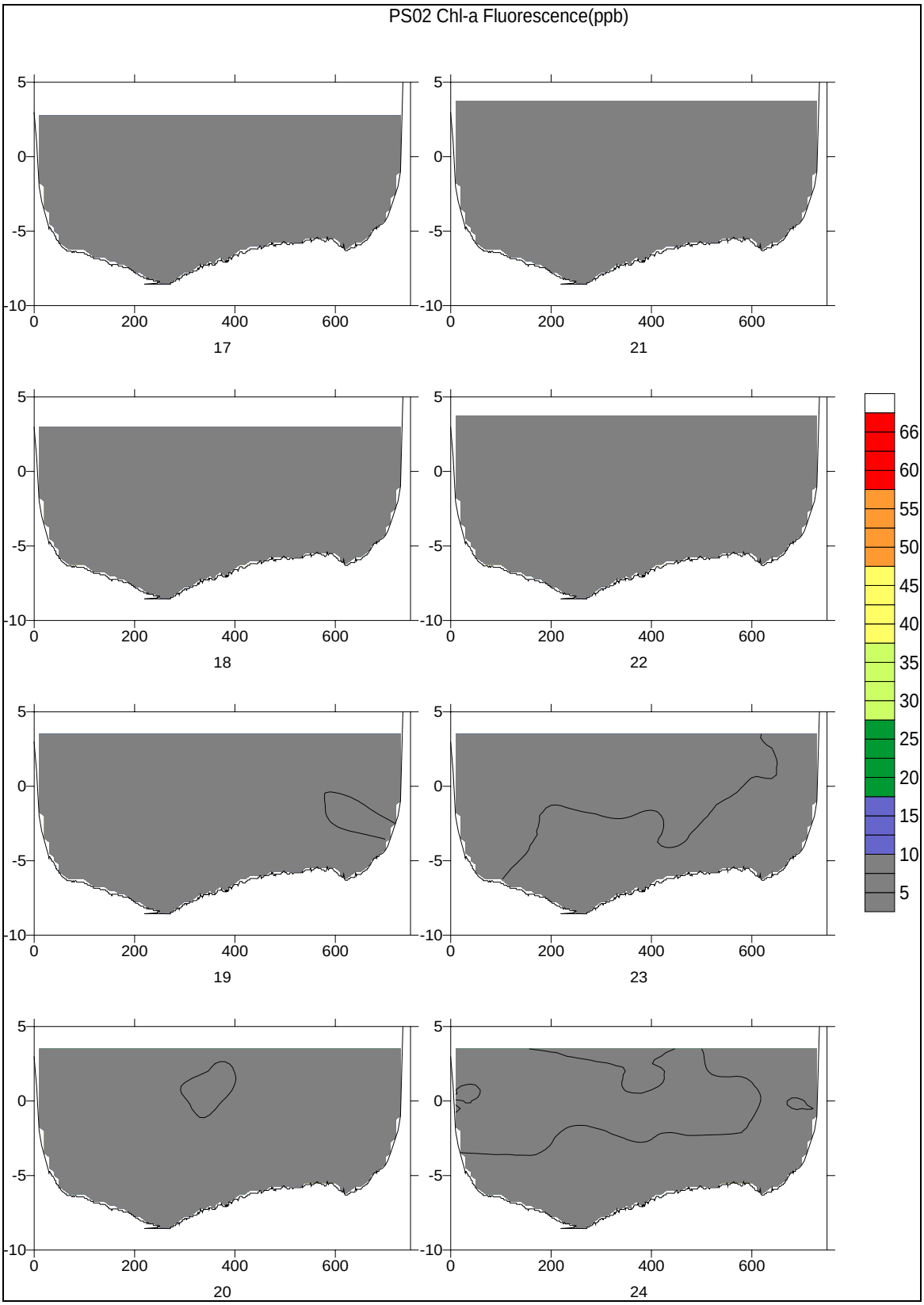

PS02 TSS(mg/L)
41
45
42
46
43
47
44
48
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

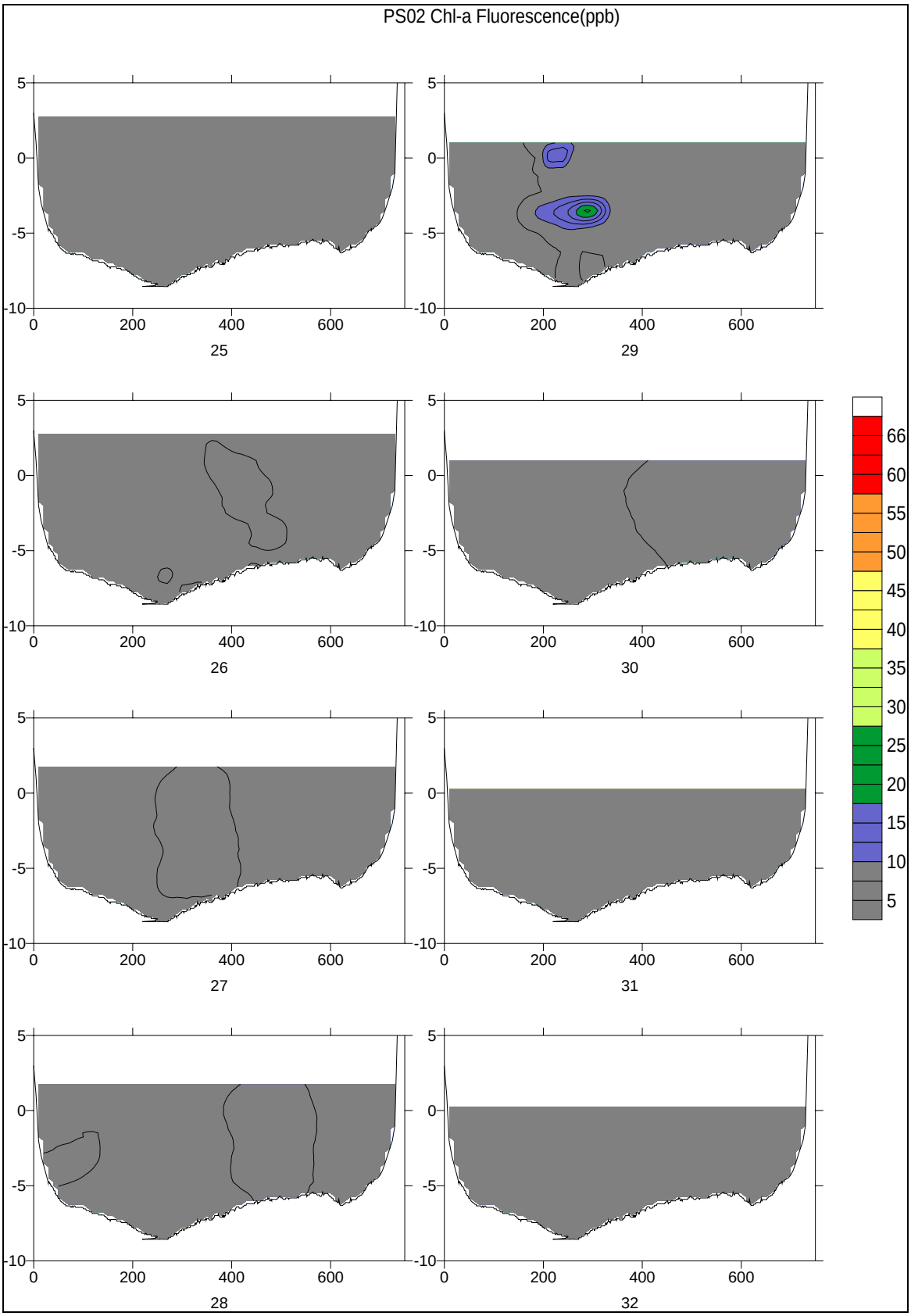

Dyes-PS02 TSS(mg/L)
5
0
-5
-10
0
200
400
600
49
50
51
4.65
4.35
4.05
3.75
3.45
3.15
2.85
2.55
2.25
1.95
1.65
1.35
1.05
0.80

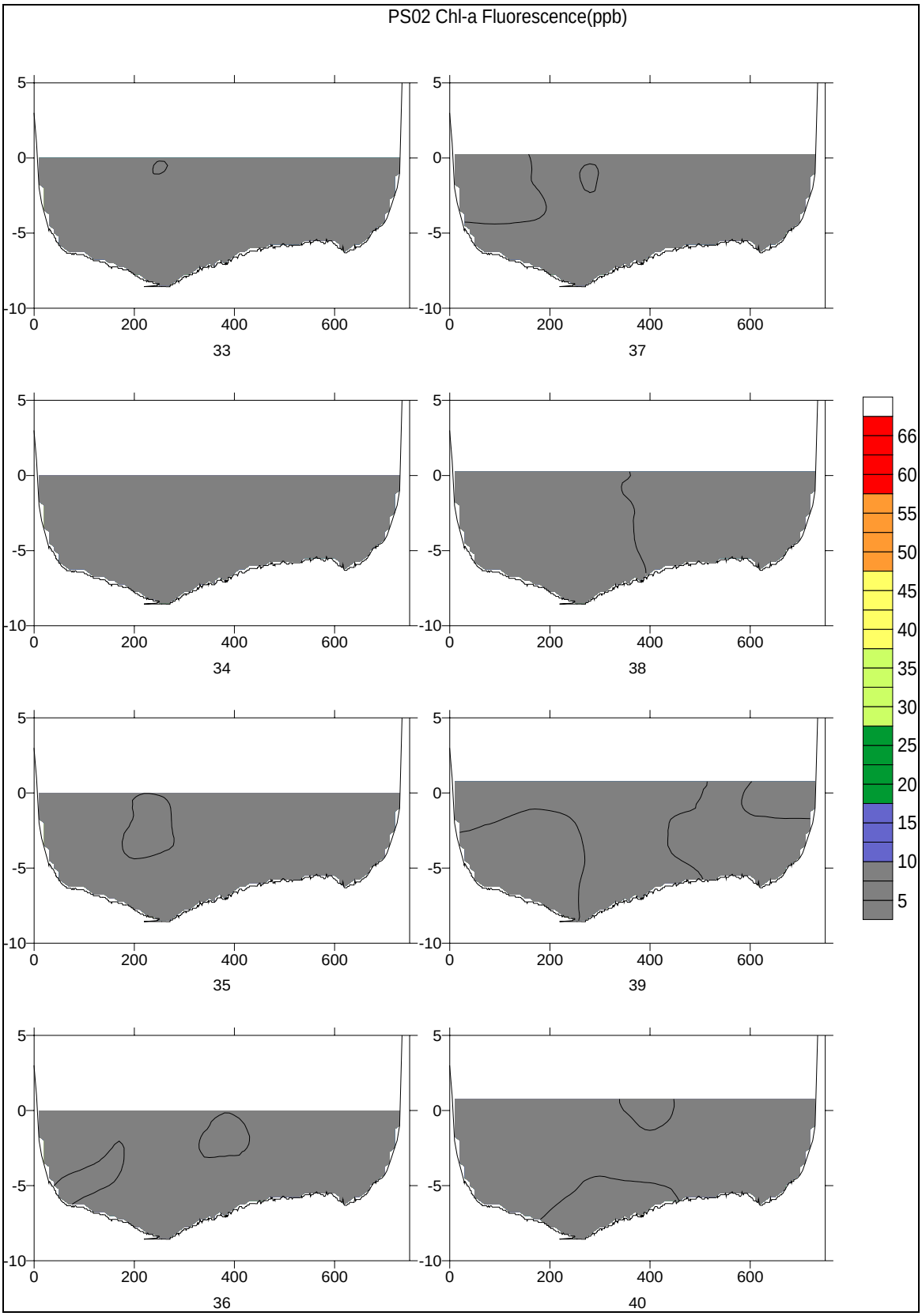
3.4.5 Chlorophyll *a*

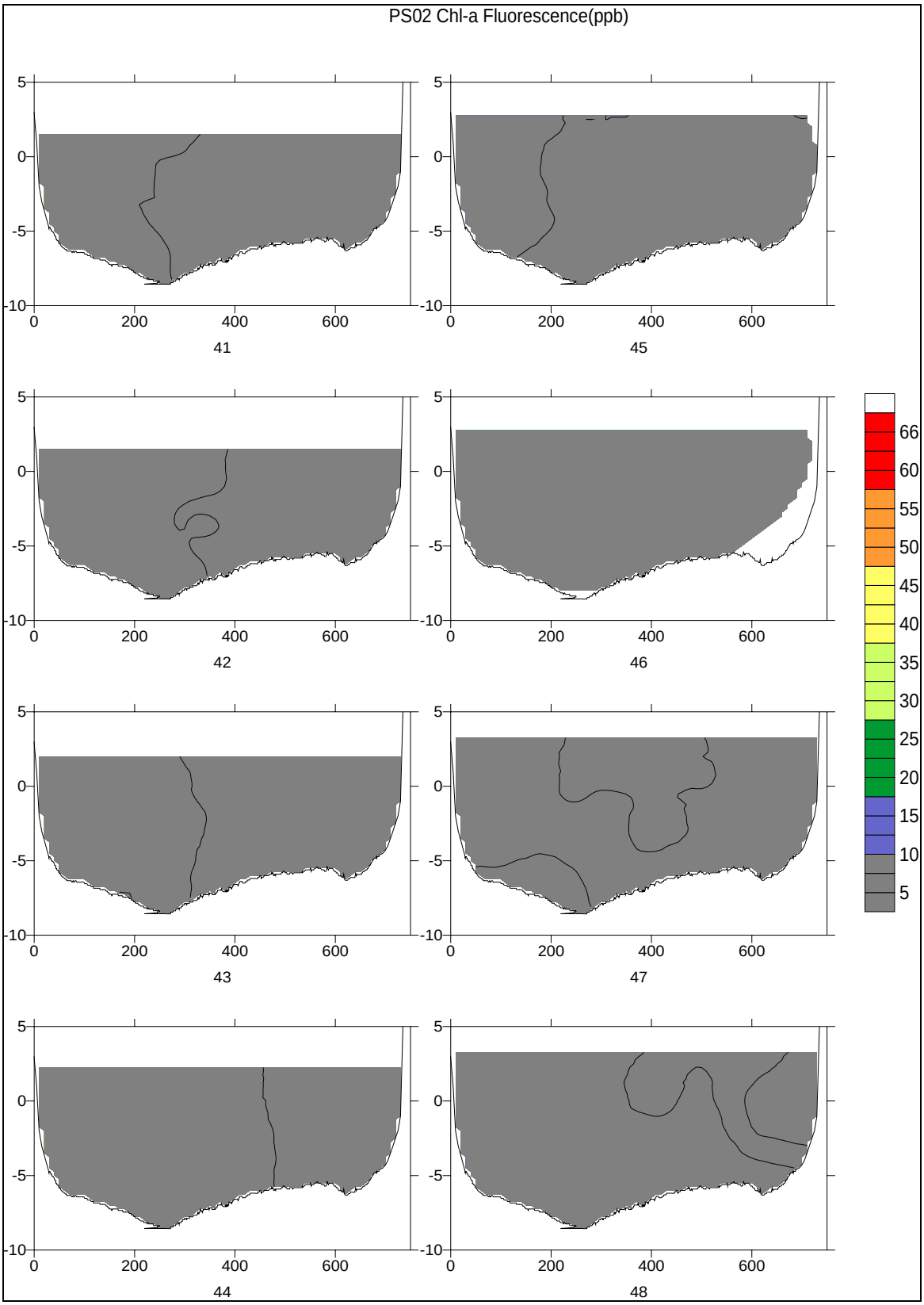


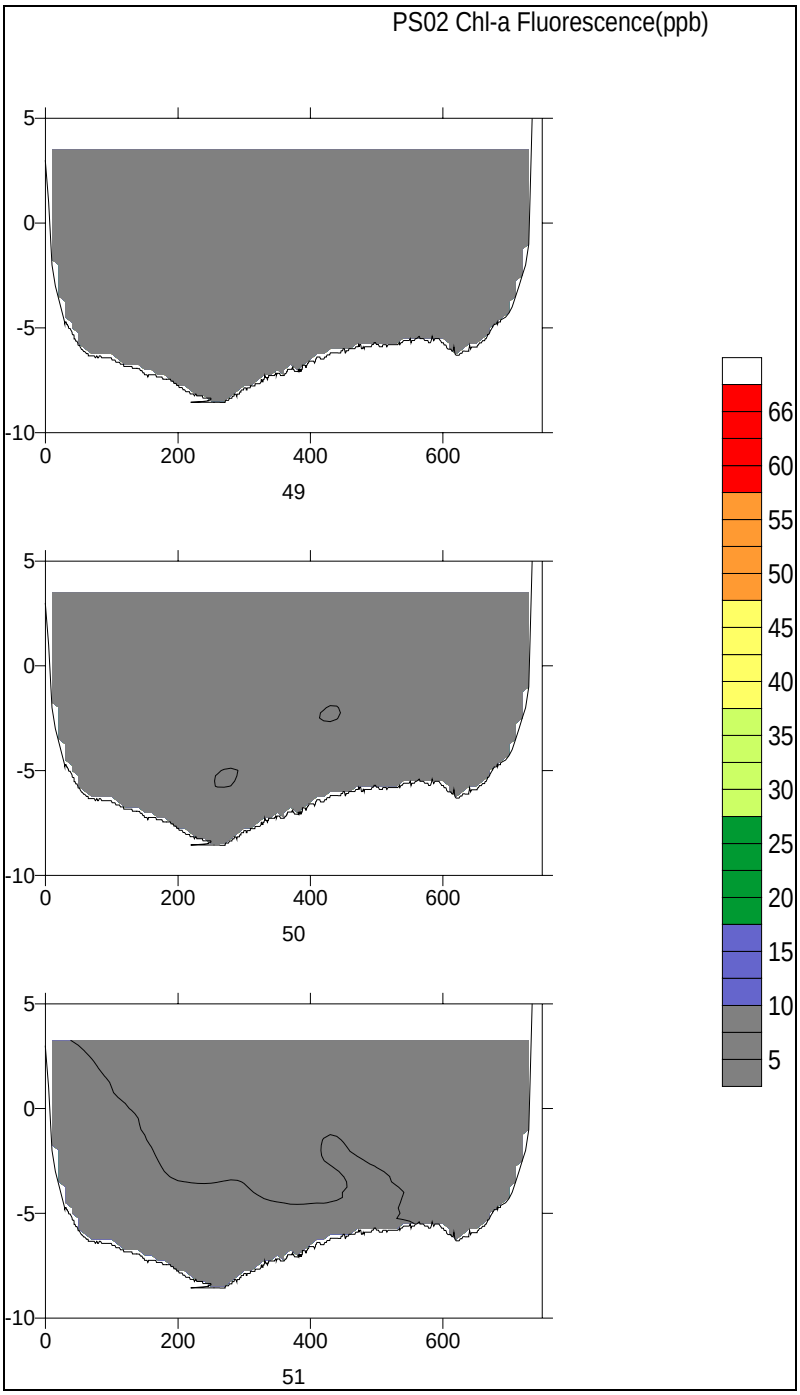

PS02 Chl-a Fluorescence(ppb)
9
10
14
11
15
16
66
60
55
50
45
40
35
30
25
20
15
10
5


PS02 Chl-a Fluorescence(ppb)
17
18
19
20
21
22
23
24
66
60
55
50
45
40
35
30
25
20
15
10
5

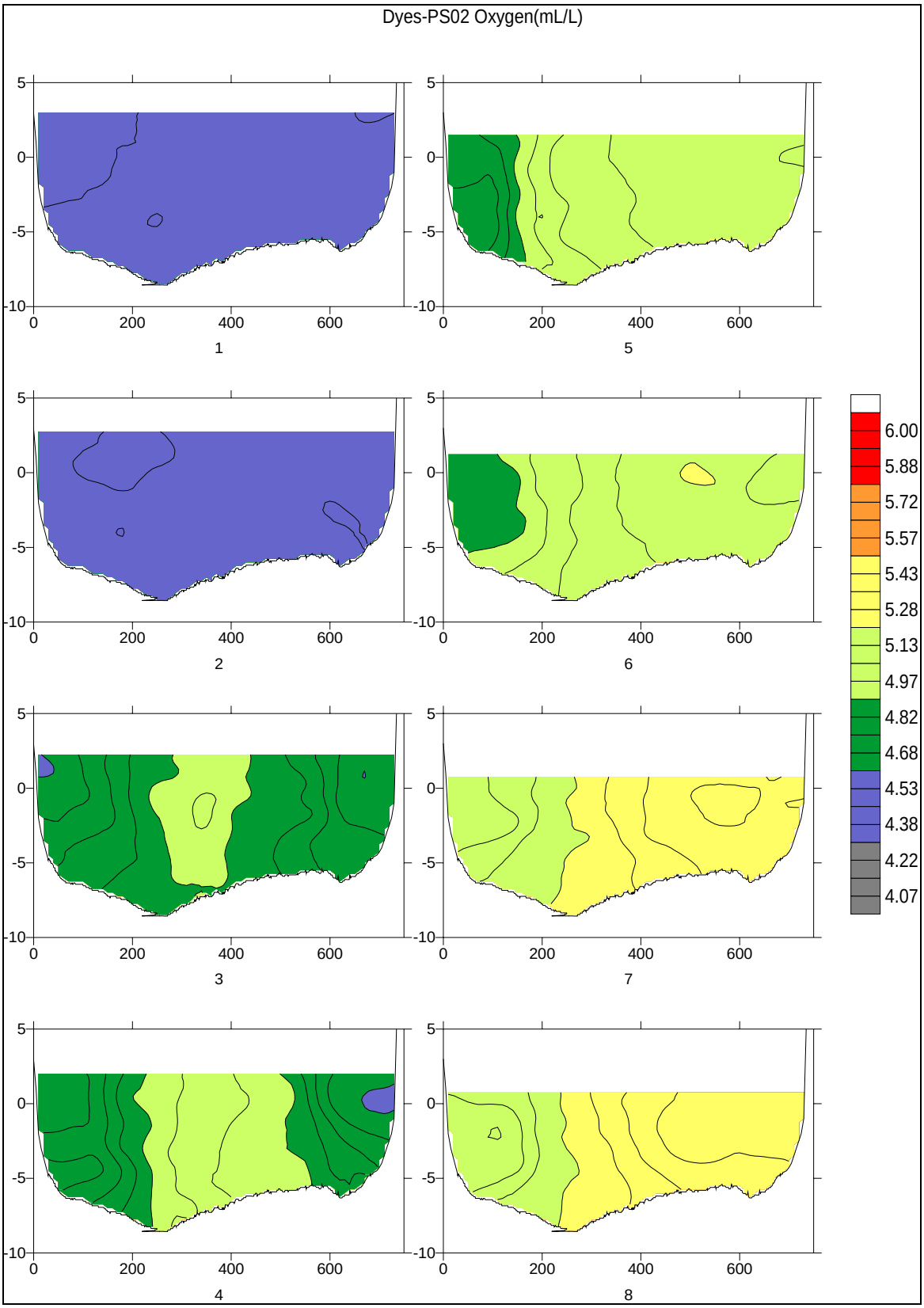

PS02 Chl-a Fluorescence(ppb)
25
29
26
30
27
31
28
32
66
60
55
50
45
40
35
30
25
20
15
10
5

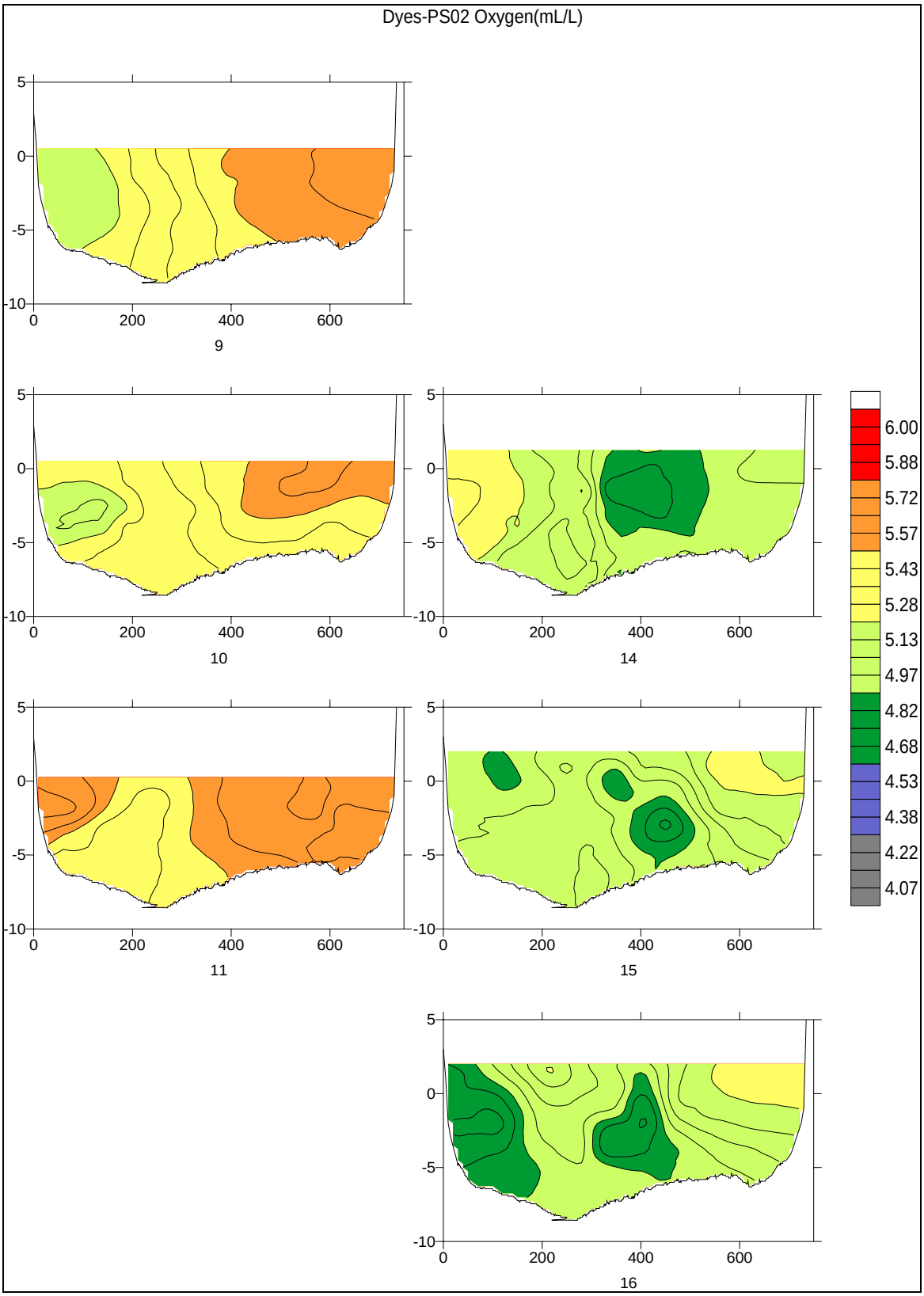

PS02 Chl-a Fluorescence(ppb)
33
37
34
38
35
39
36
40
66
60
55
50
45
40
35
30
25
20
15
10
5

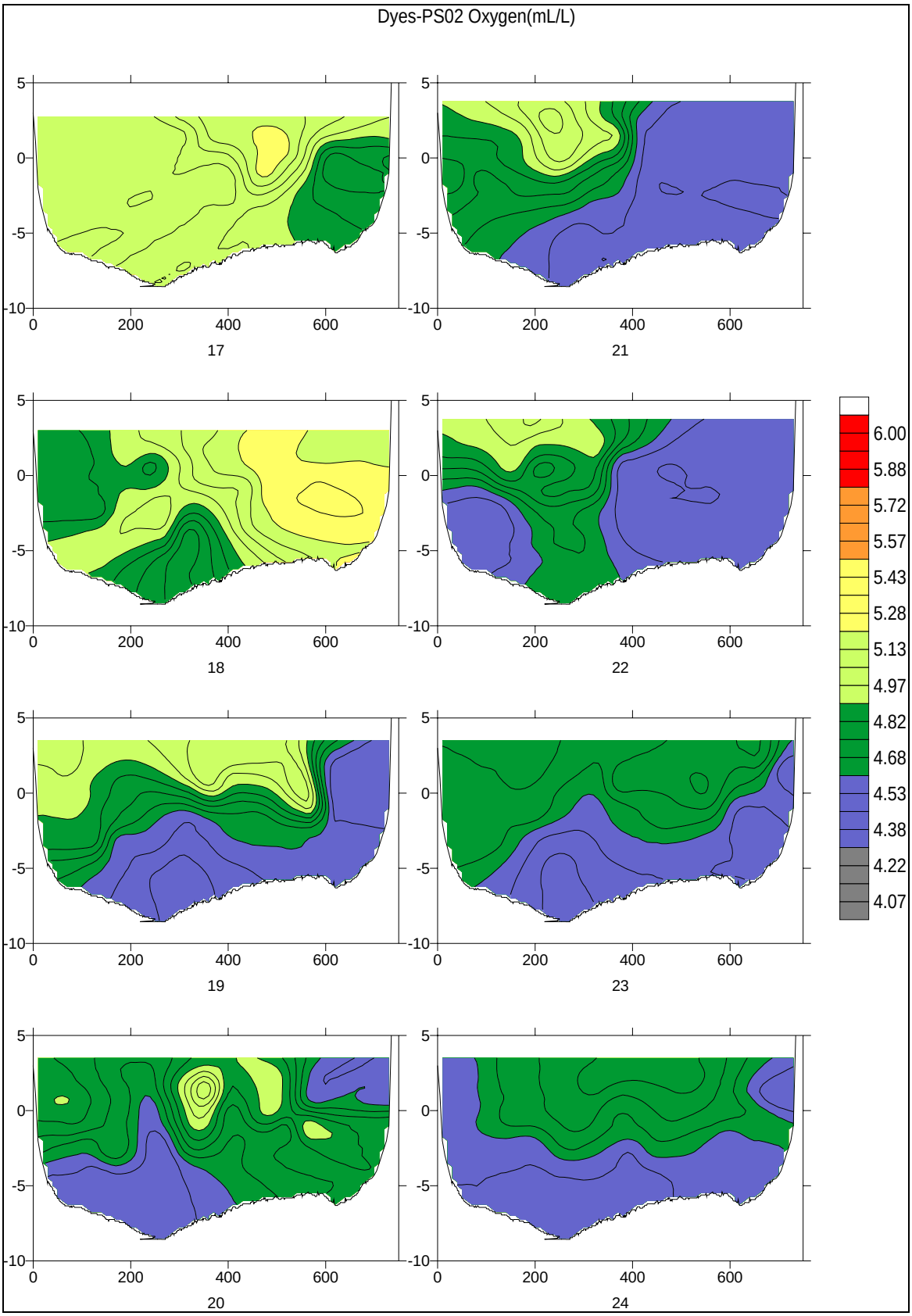

PS02 Chl-a Fluorescence(ppb)
41
45
42
46
43
47
44
48
66
60
55
50
45
40
35
30
25
20
15
10
5

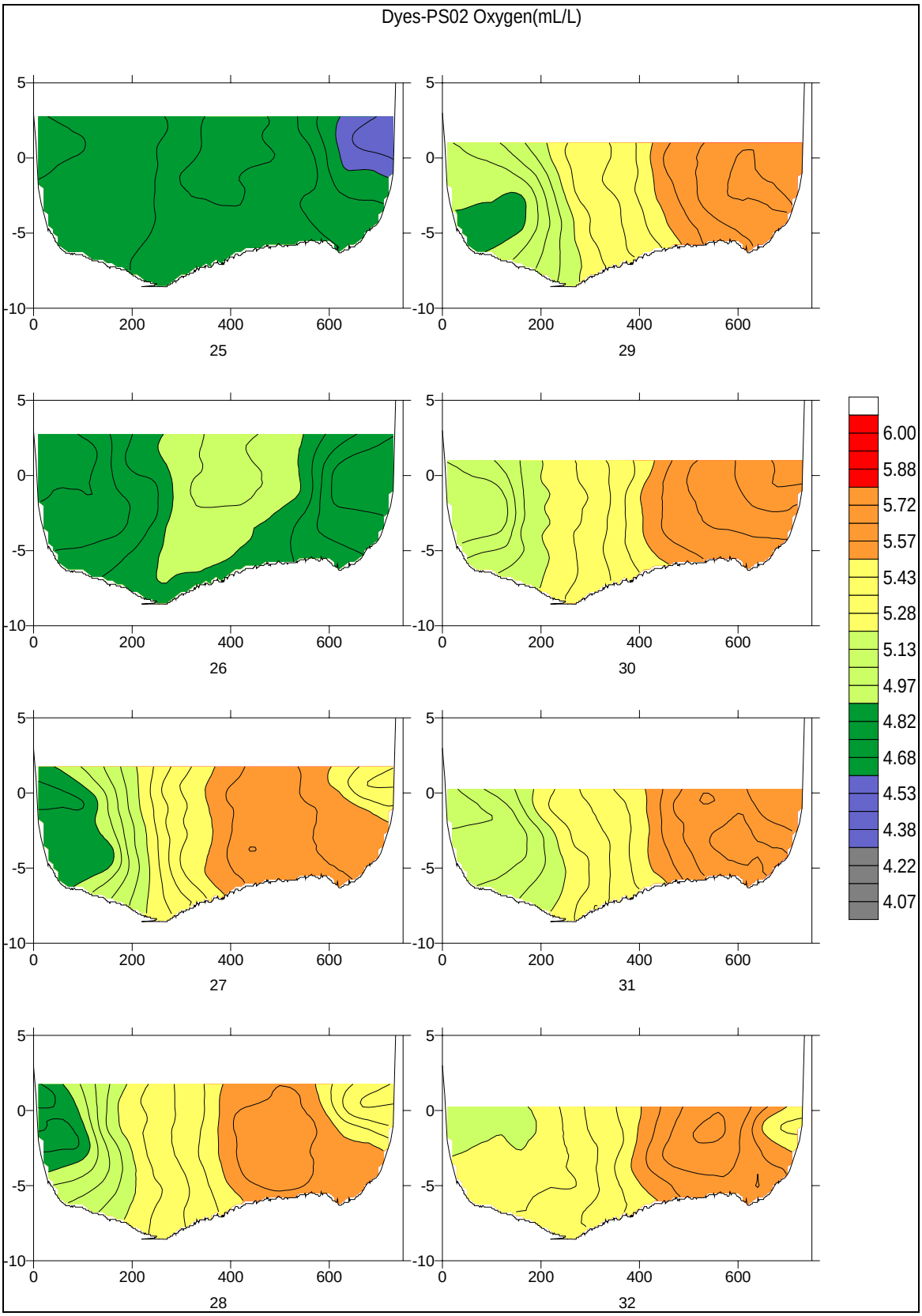

PS02 Chl-a Fluorescence(ppb)
5
0
-5
-10
0
200
400
600
49
50
51
66
60
55
50
45
40
35
30
25
20
15
10
5

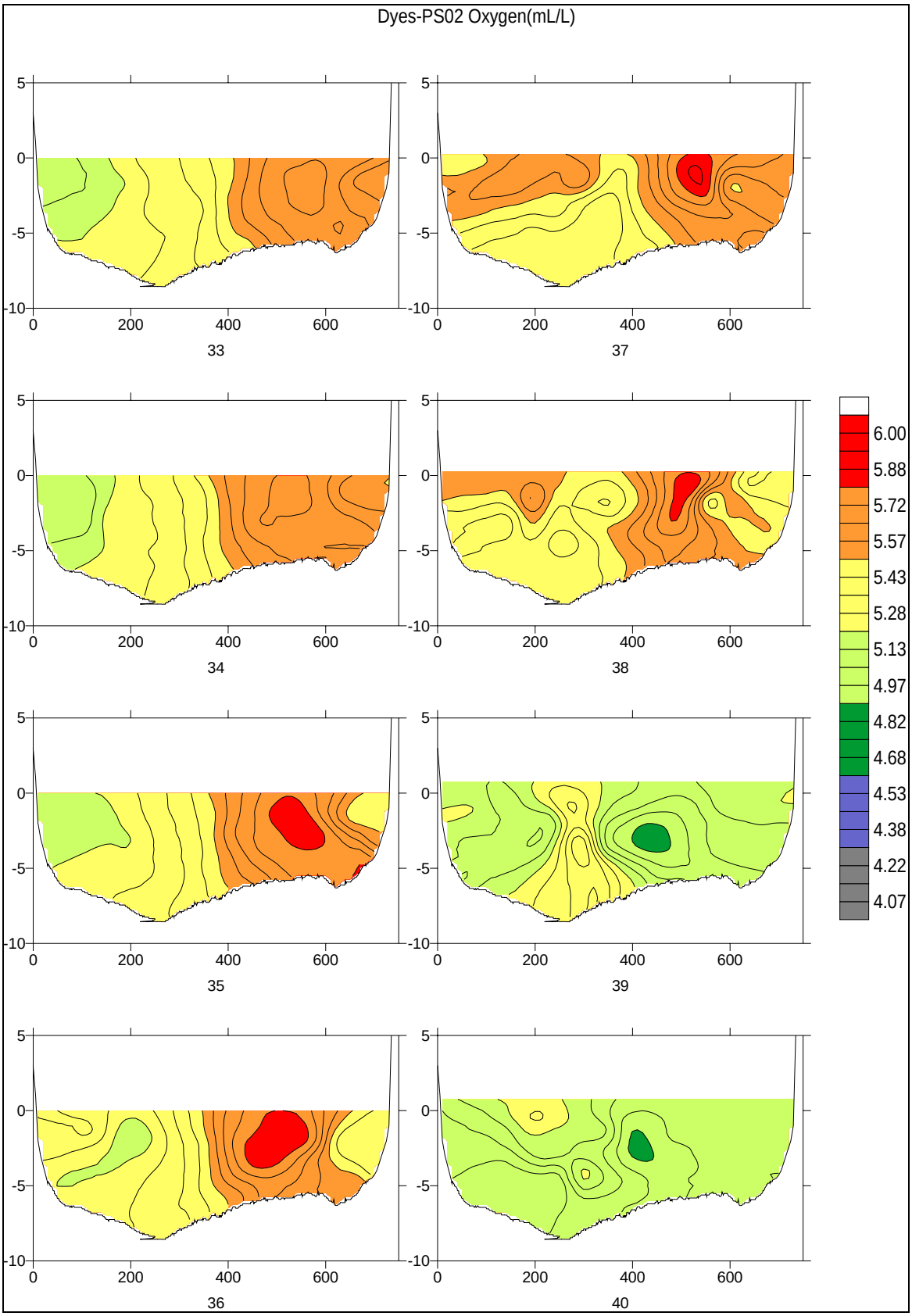
3.4.6 Oxygen

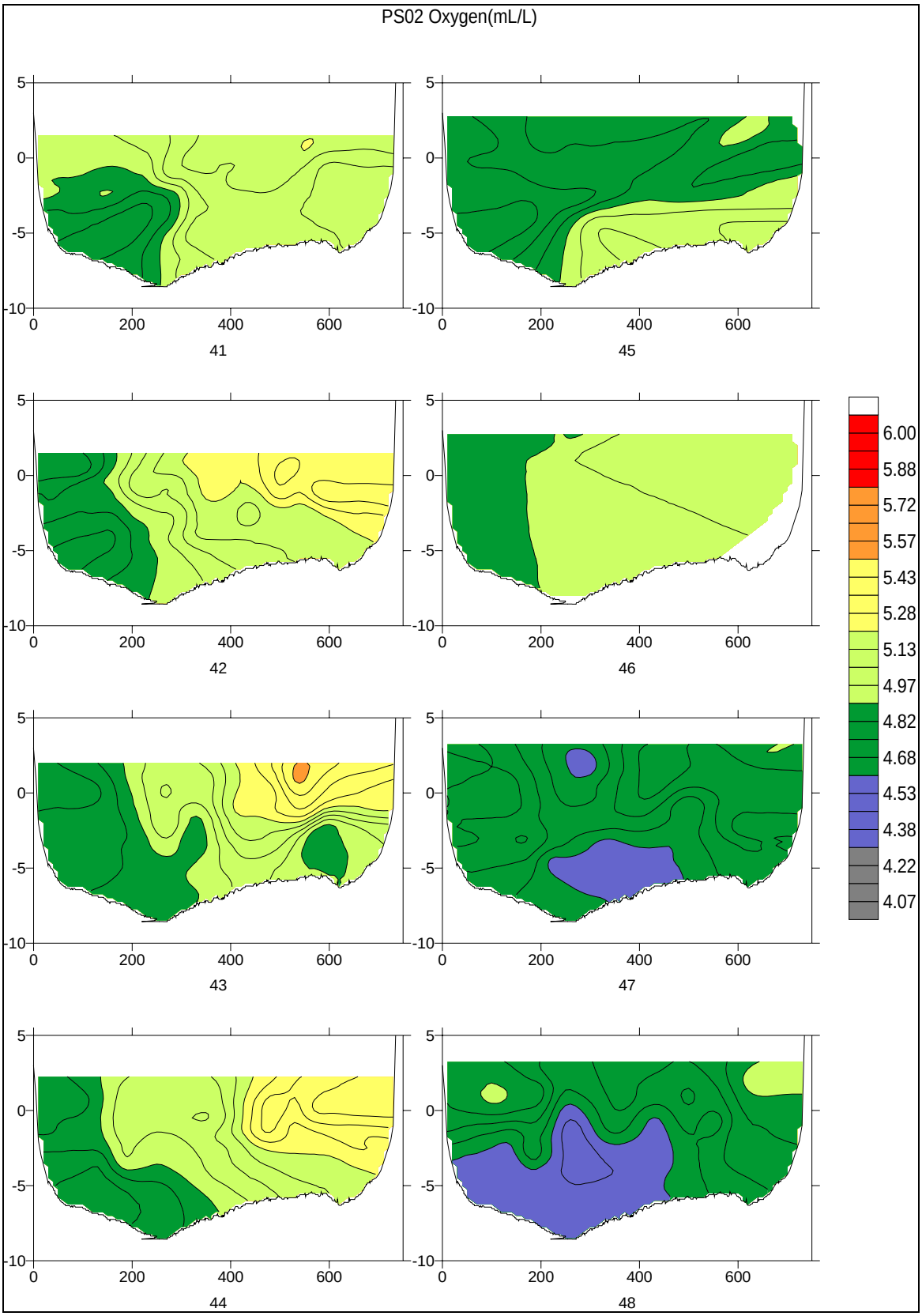

Dyes-PS02 Oxygen(mL/L)
1
2
3
4
5
6
7
8
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

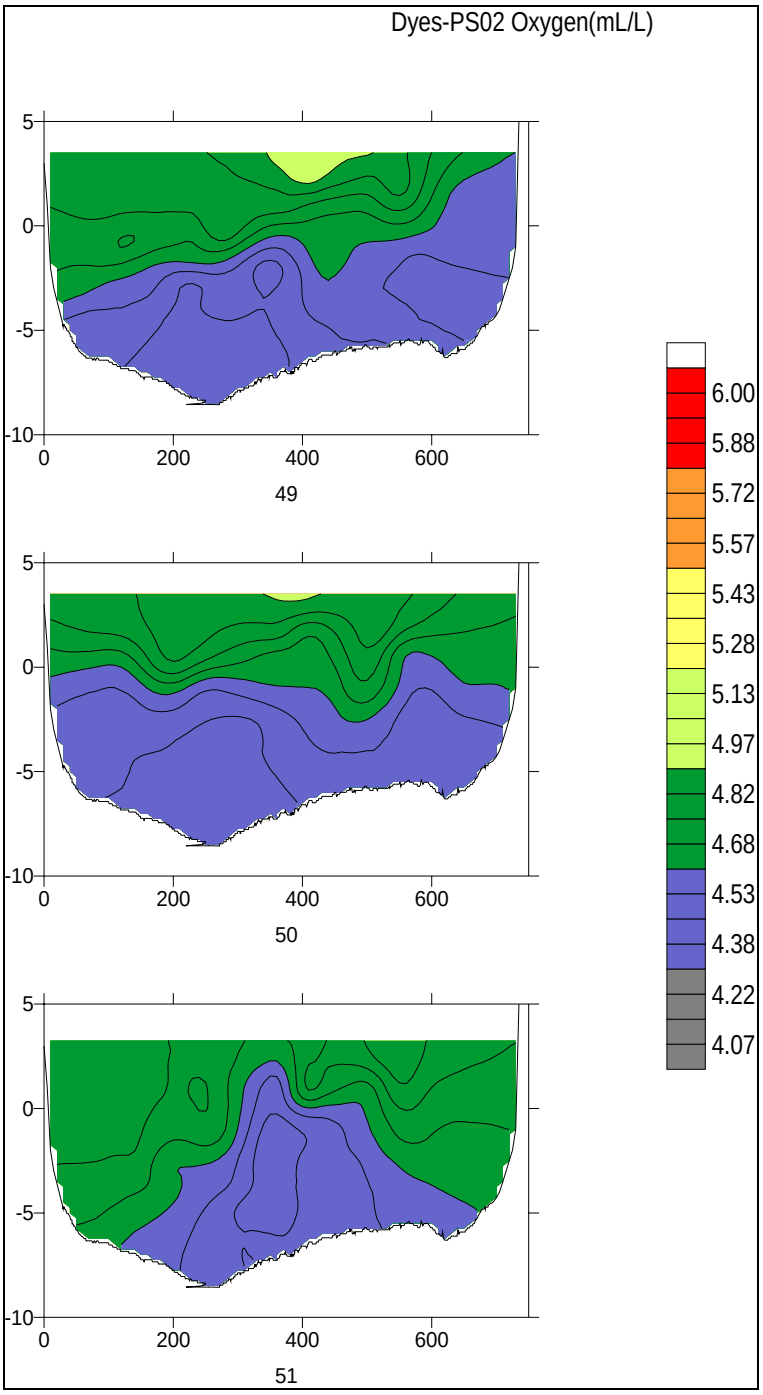

Dyes-PS02 Oxygen(mL/L)
9
10
14
11
15
16
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07


Dyes-PS02 Oxygen(mL/L)
17
21
18
22
19
23
20
24
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

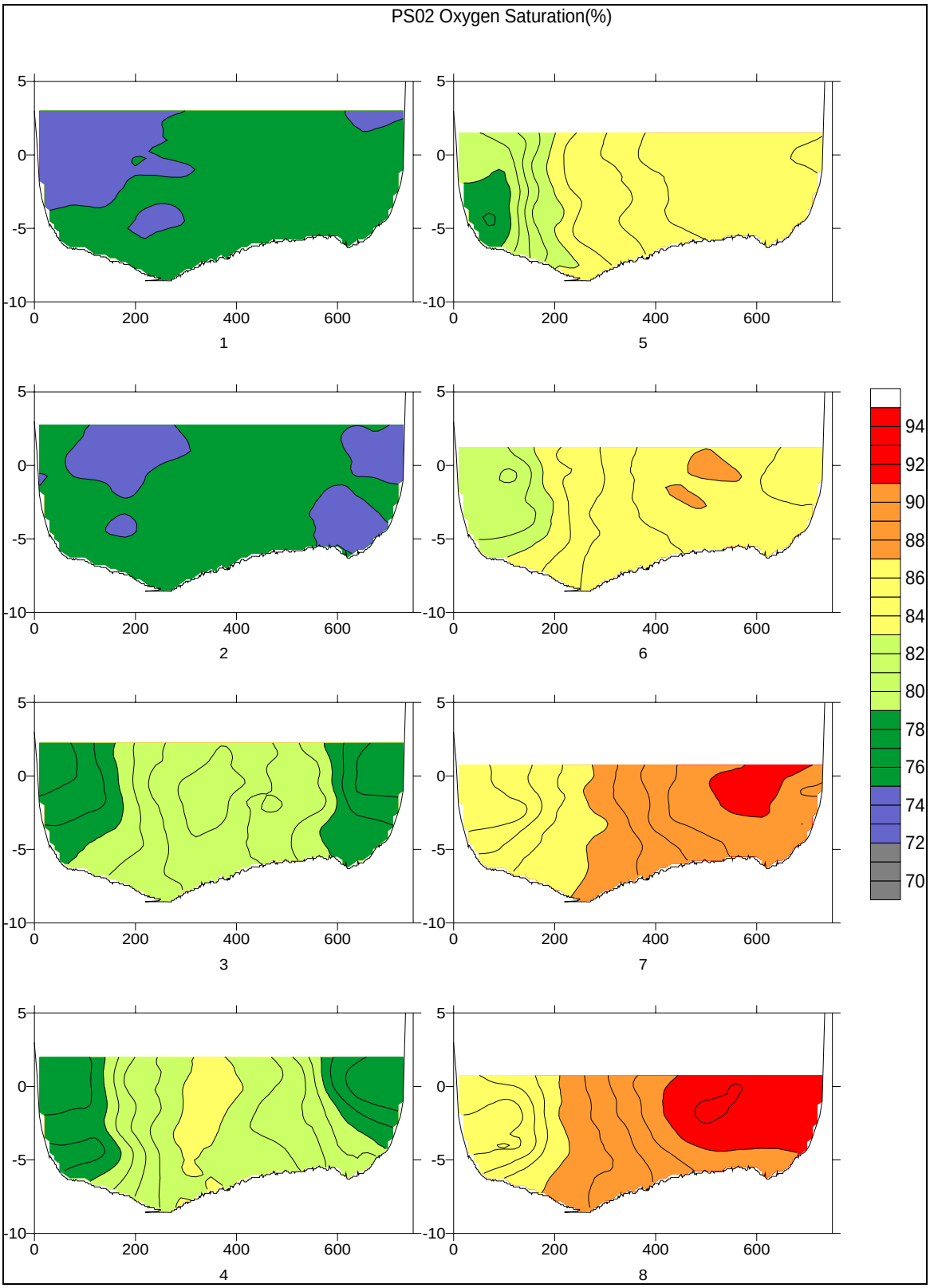

Dyes-PS02 Oxygen(mL/L)
25
29
26
30
27
31
28
32
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

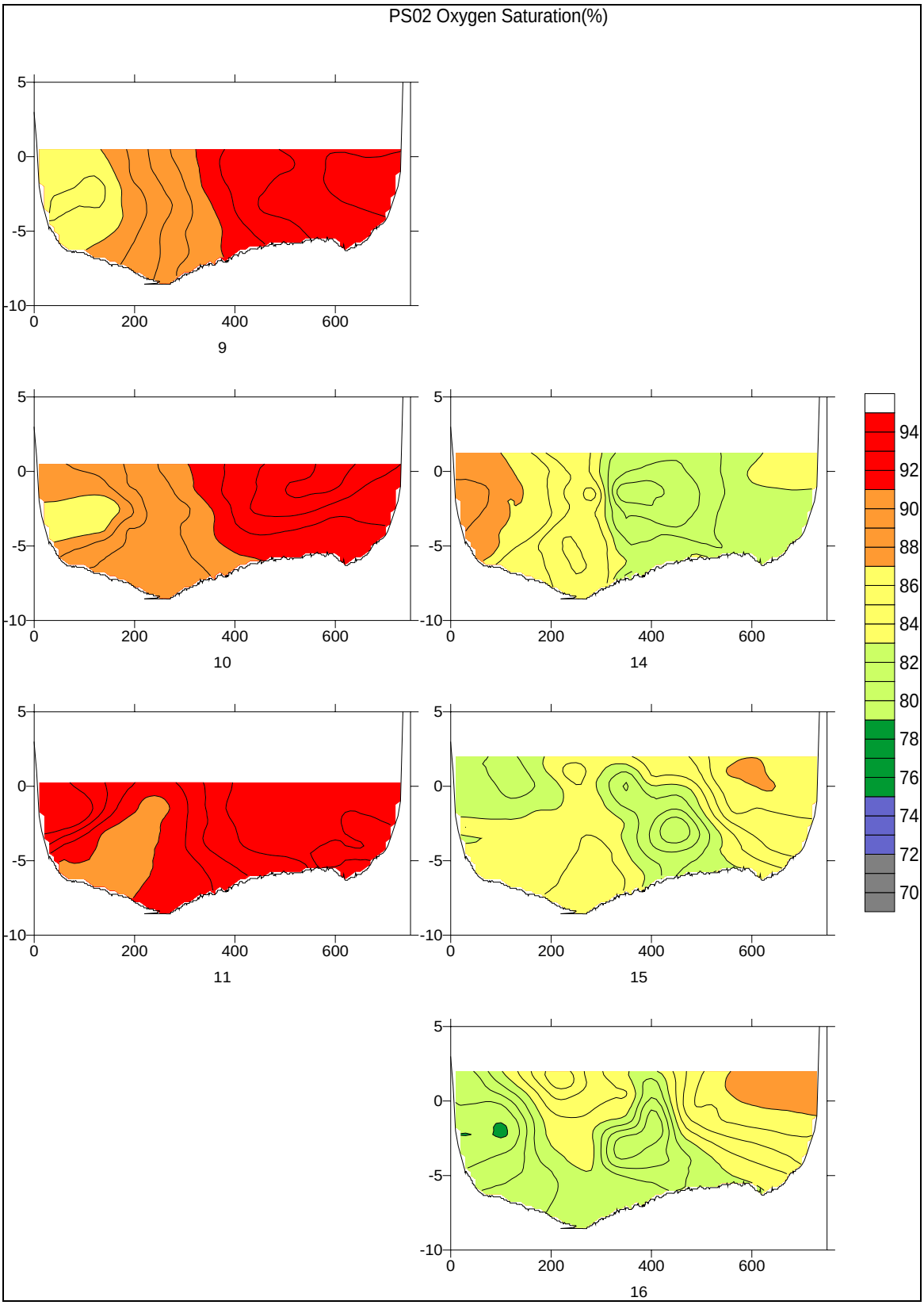

Dyes-PS02 Oxygen(mL/L)
33
37
34
38
35
39
36
40
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

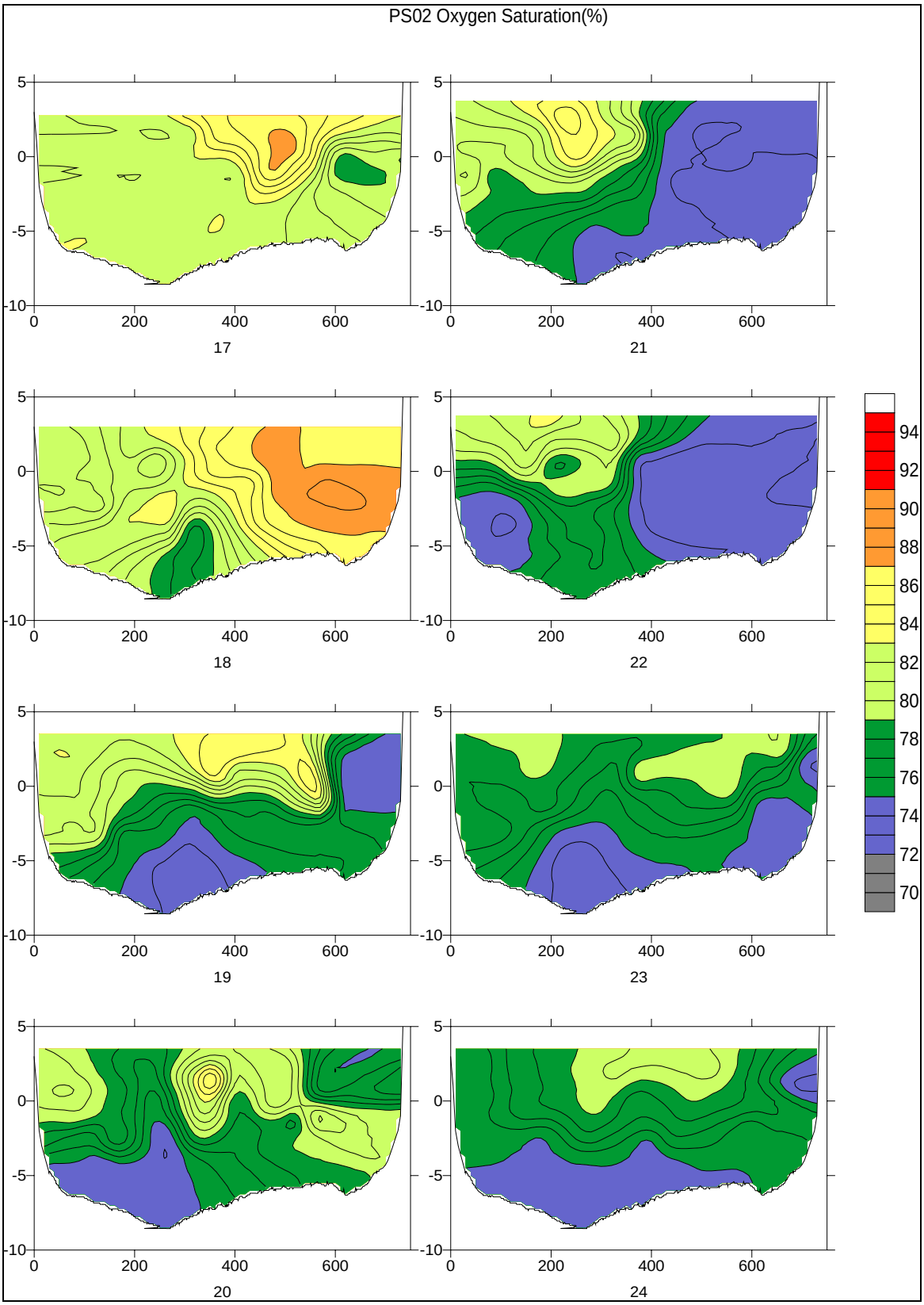

PS02 Oxygen(mL/L)
41
45
42
46
43
47
44
48
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

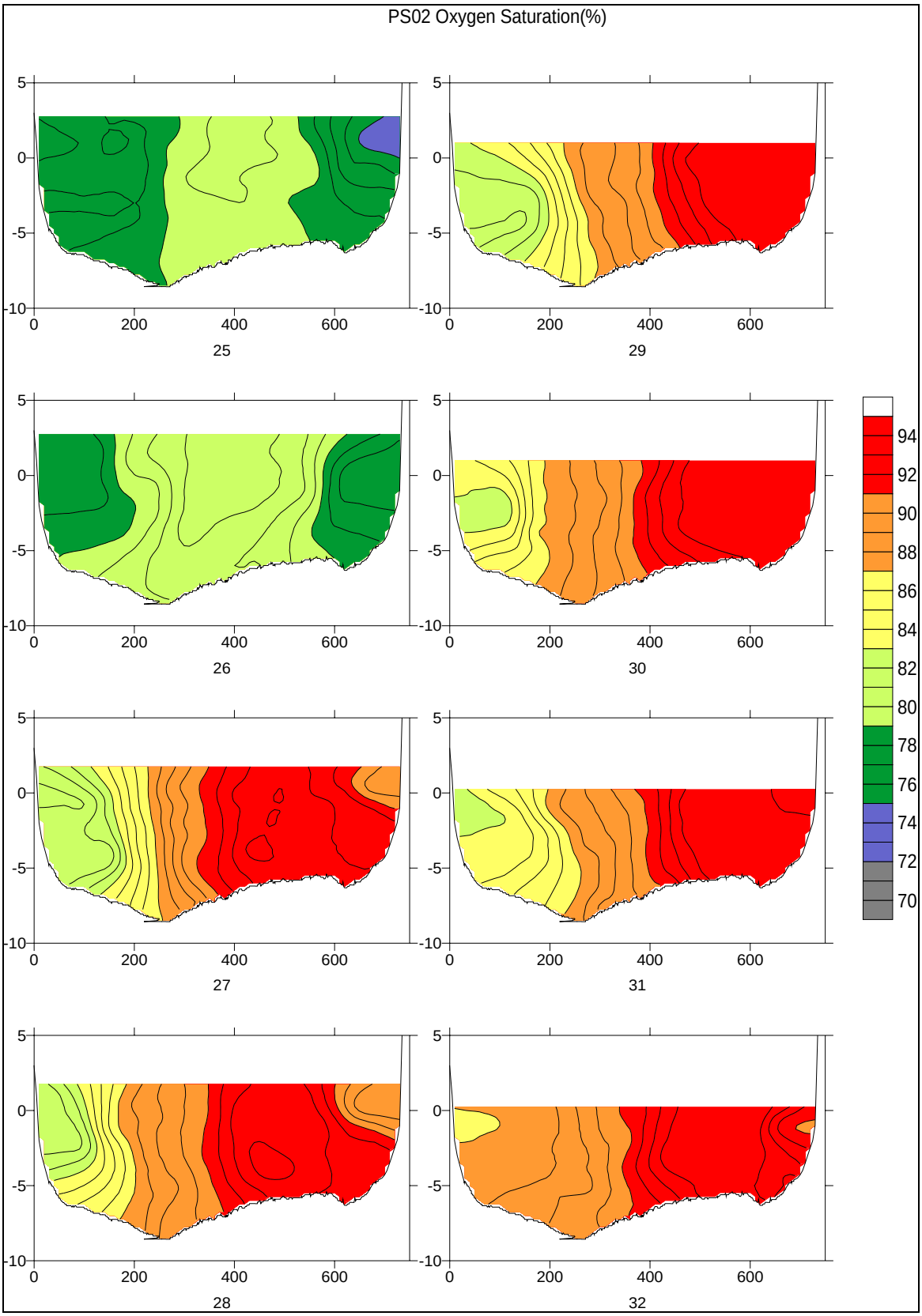

Dyes-PS02 Oxygen(mL/L)
5
0
-5
-10
0
200
400
600
49
50
51
6.00
5.88
5.72
5.57
5.43
5.28
5.13
4.97
4.82
4.68
4.53
4.38
4.22
4.07

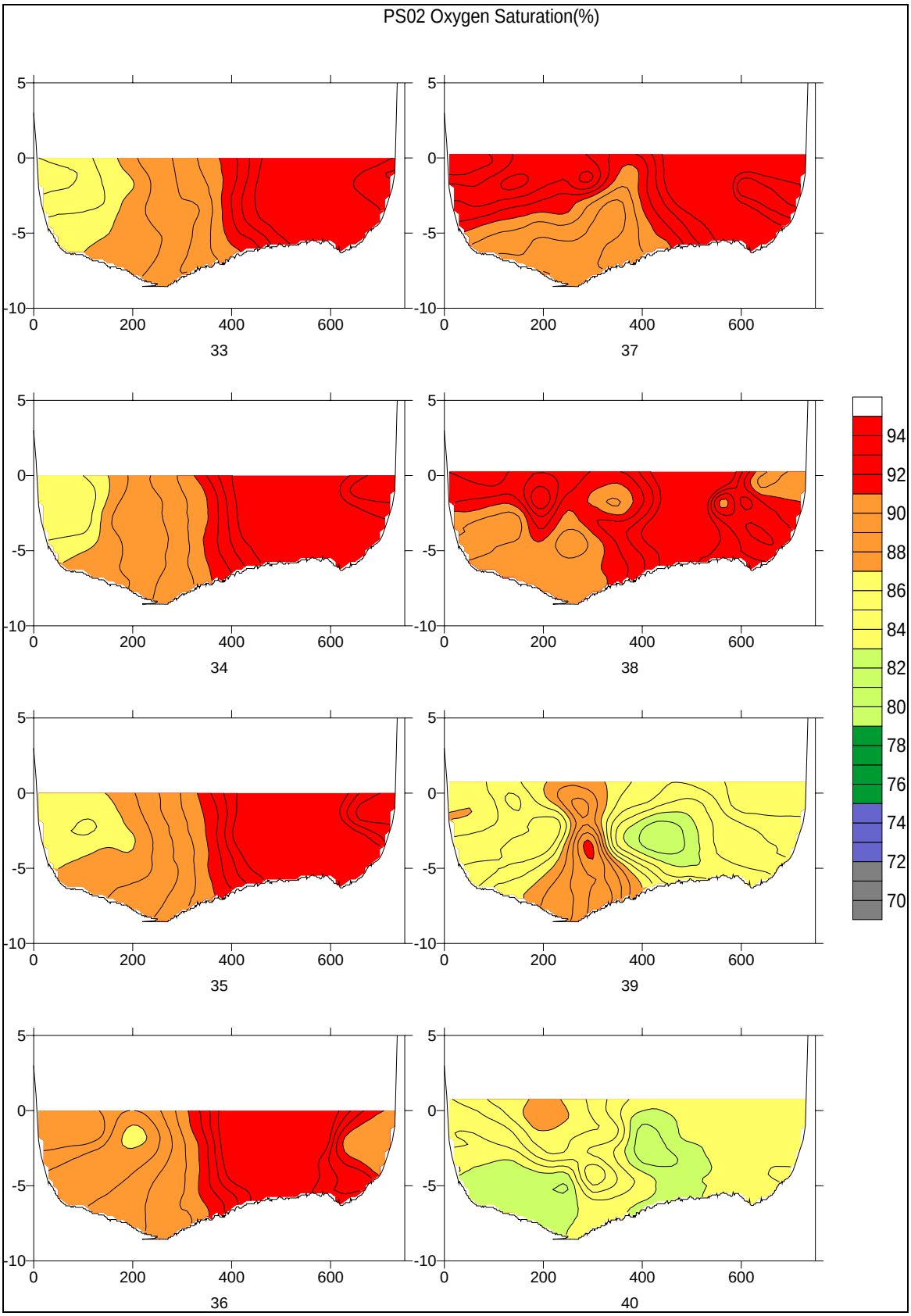
3.4.7 Oxygen Saturation

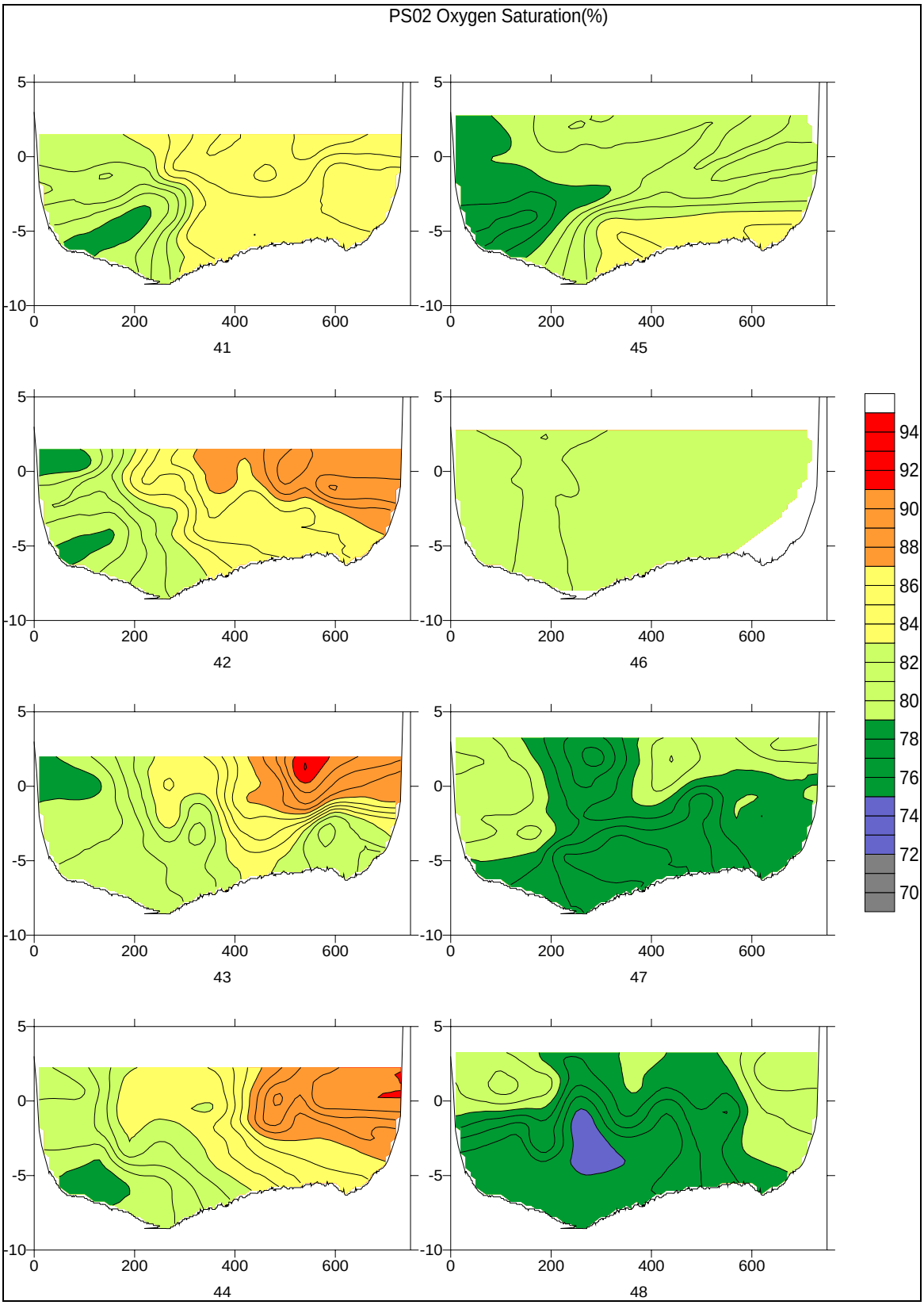


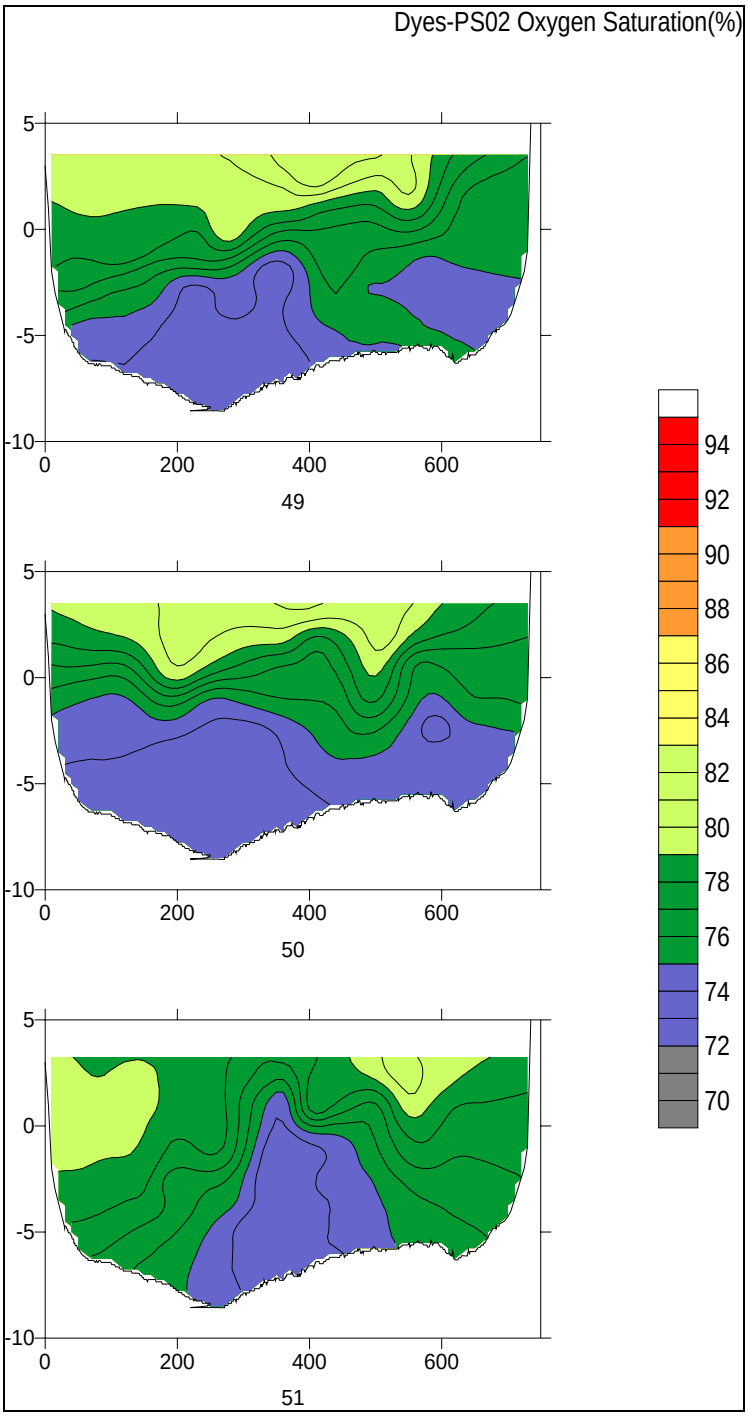

PS02 Oxygen Saturation(%)
9
10
11
14
15
16
94
92
90
88
86
84
82
80
78
76
74
72
70


PS02 Oxygen Saturation(%)
17
18
19
20
21
22
23
24
94
92
90
88
86
84
82
80
78
76
74
72
70

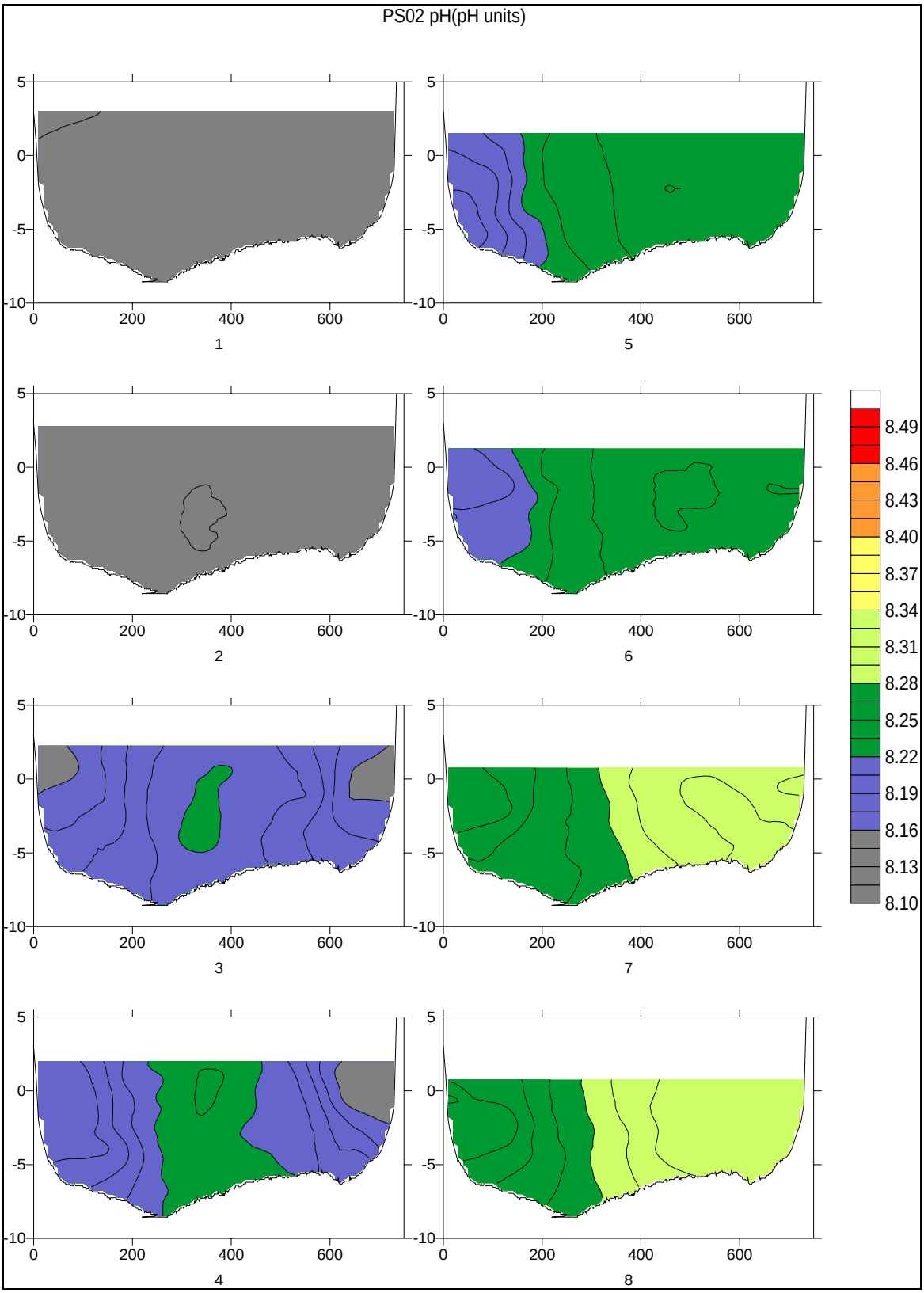

PS02 Oxygen Saturation(%)
25
29
26
30
27
31
28
32
94
92
90
88
86
84
82
80
78
76
74
72
70

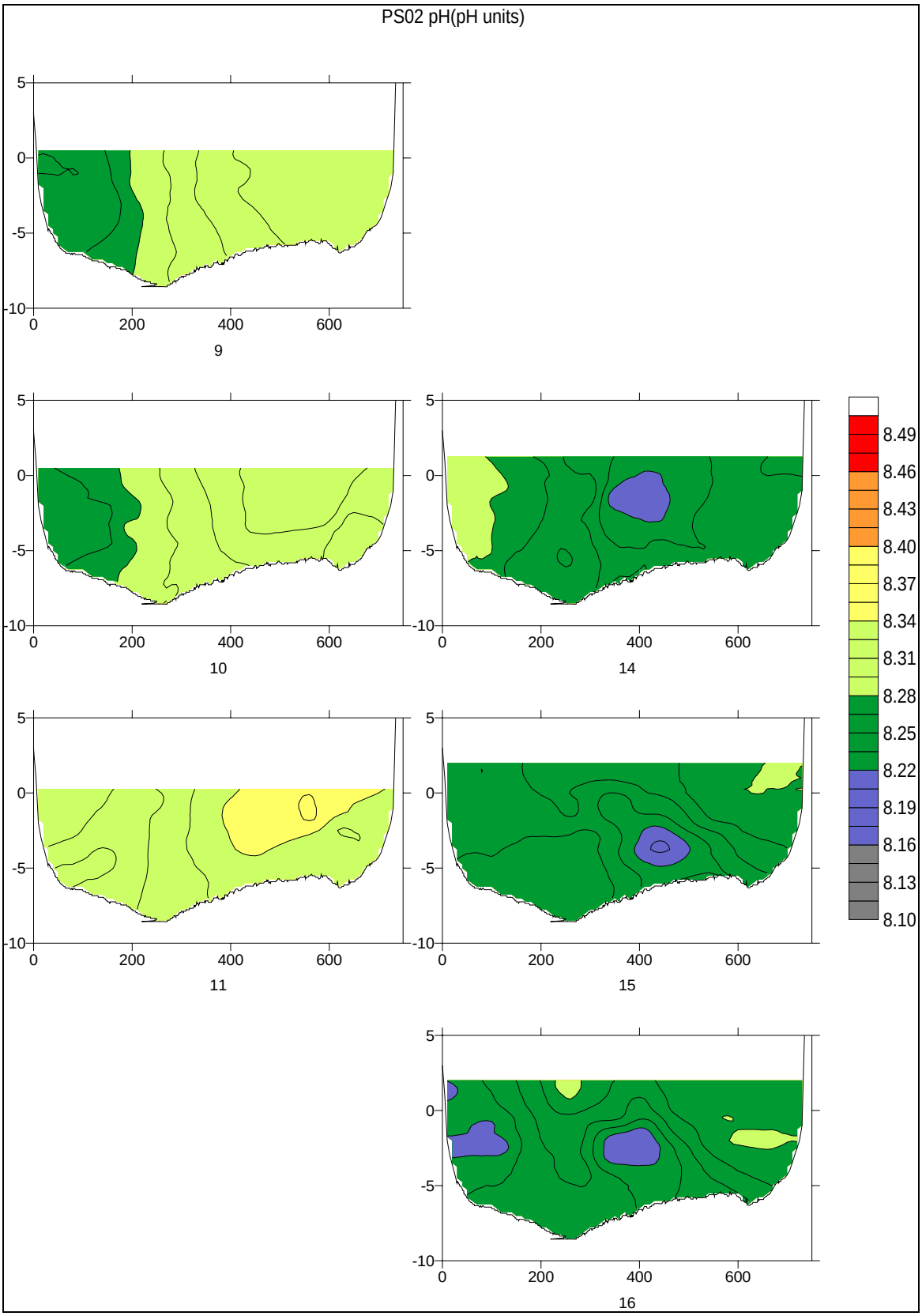

PS02 Oxygen Saturation(%)
33
37
34
38
35
39
36
40
94
92
90
88
86
84
82
80
78
76
74
72
70

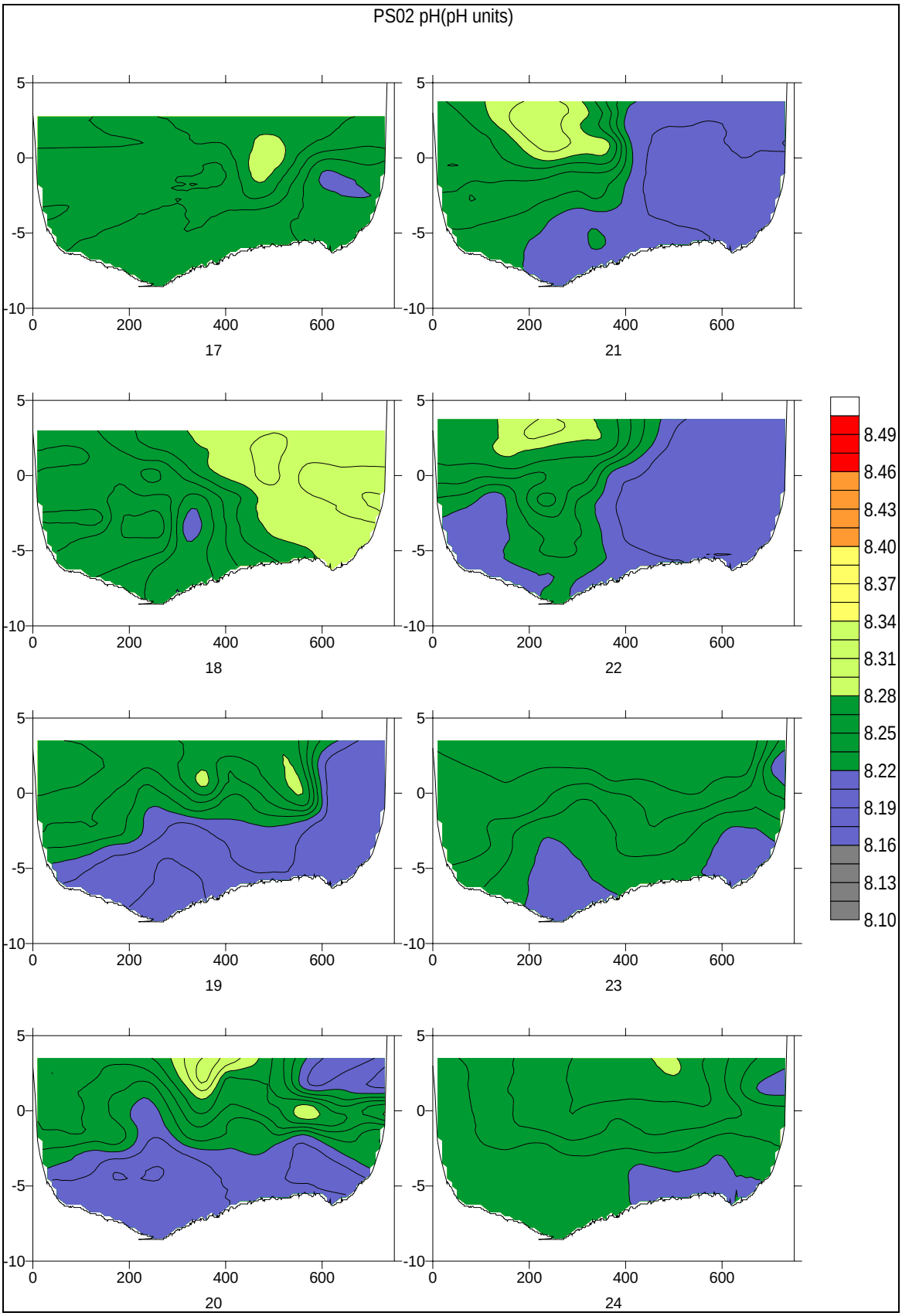

PS02 Oxygen Saturation(%)
41
45
42
46
43
47
44
48
94
92
90
88
86
84
82
80
78
76
74
72
70

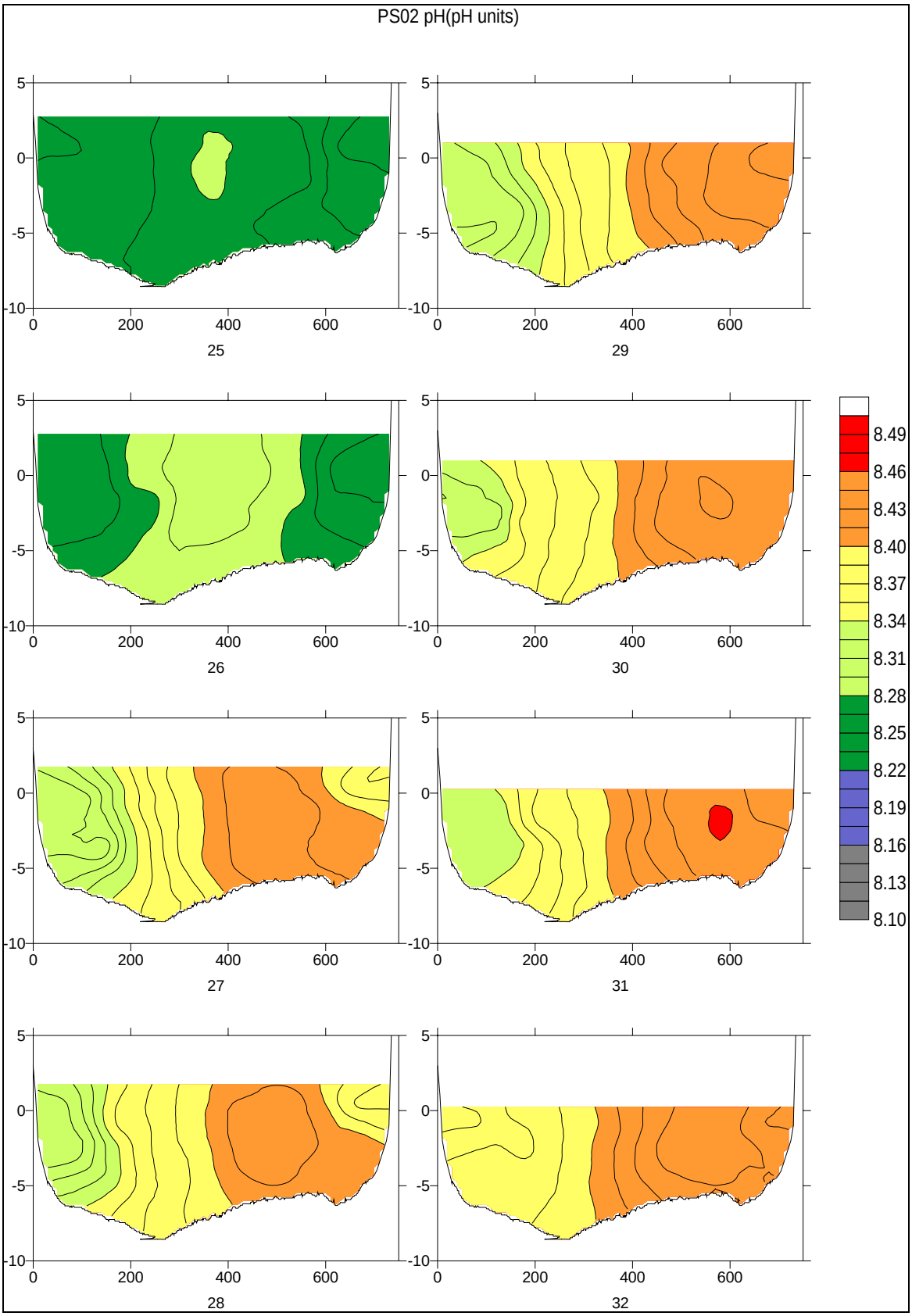

Dyes-PS02 Oxygen Saturation(%)
5
0
-5
-10
0
200
400
600
49
50
51
94
92
90
88
86
84
82
80
78
76
74
72
70

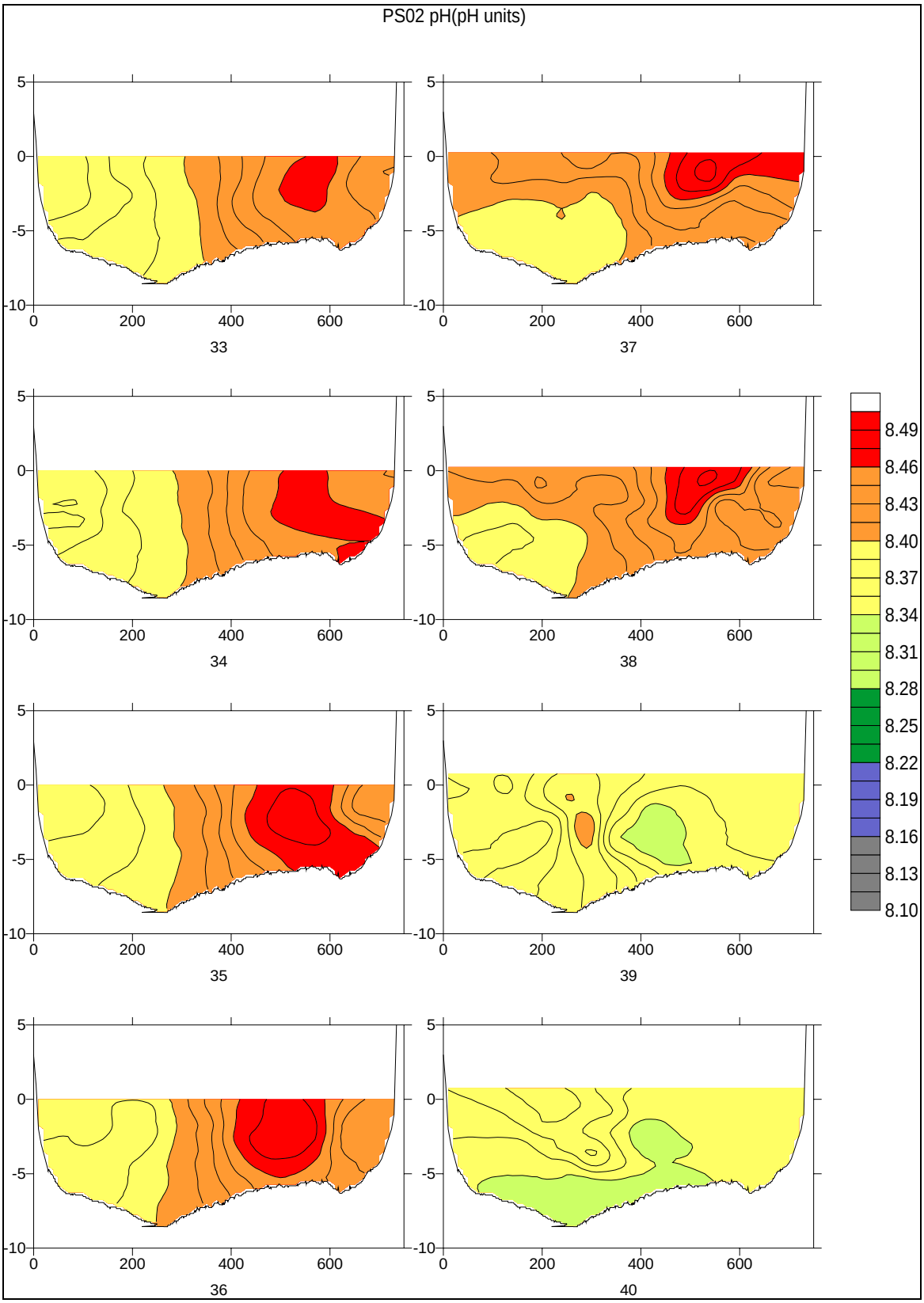
3.4.8 pH

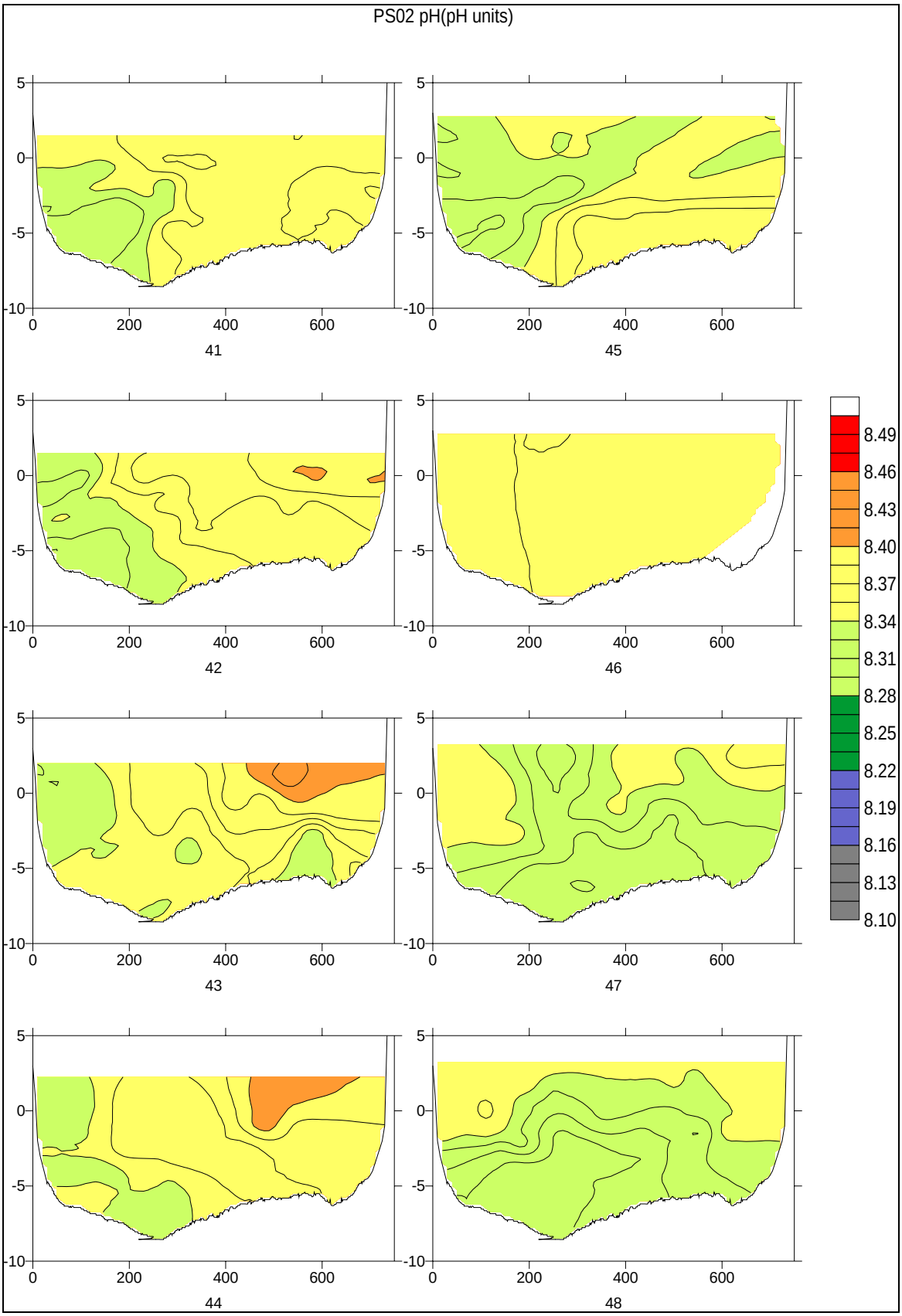

PS02 pH(pH units)
1
2
3
4
5
6
7
8
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

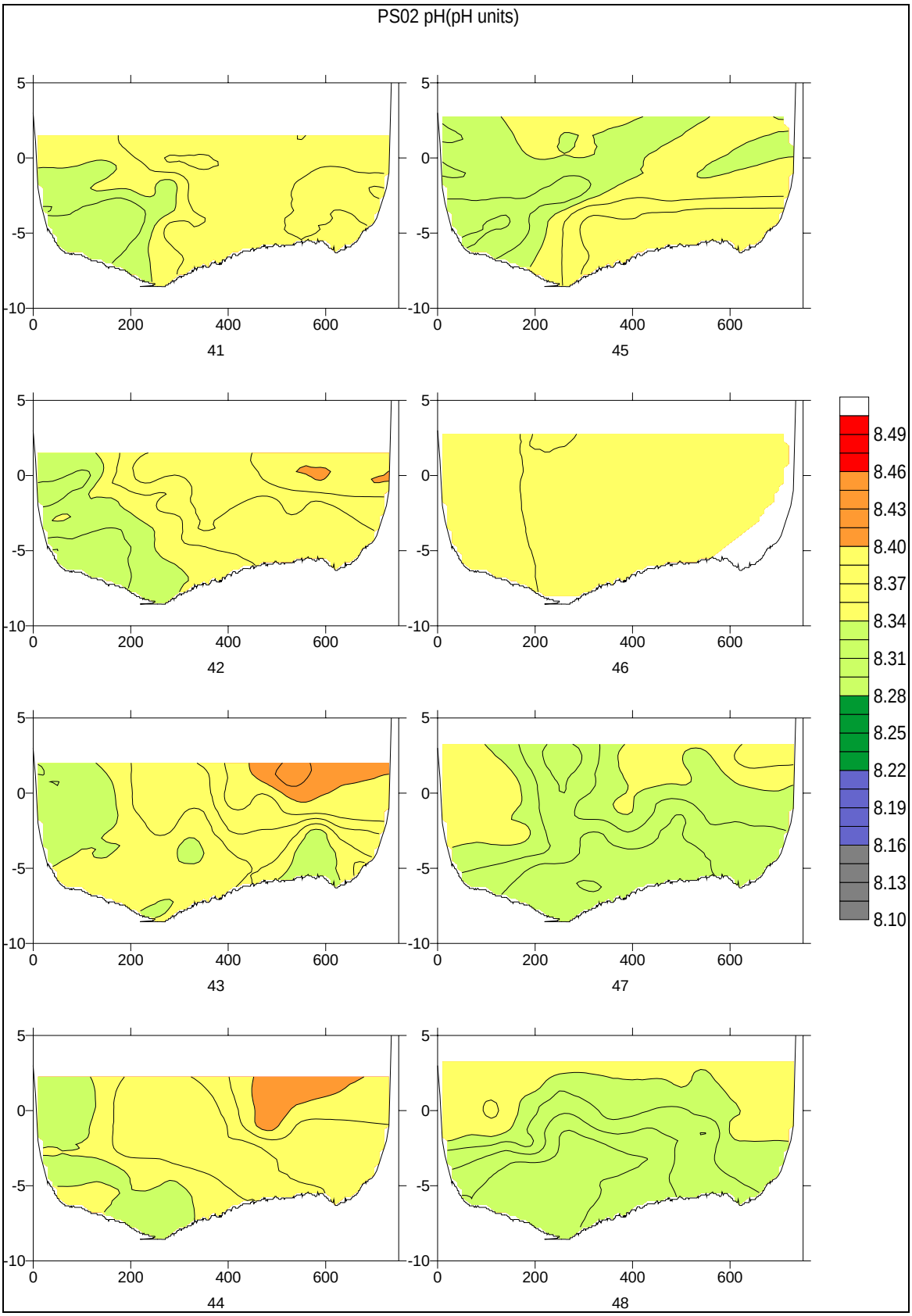

PS02 pH(pH units)
9
10
14
11
15
16
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

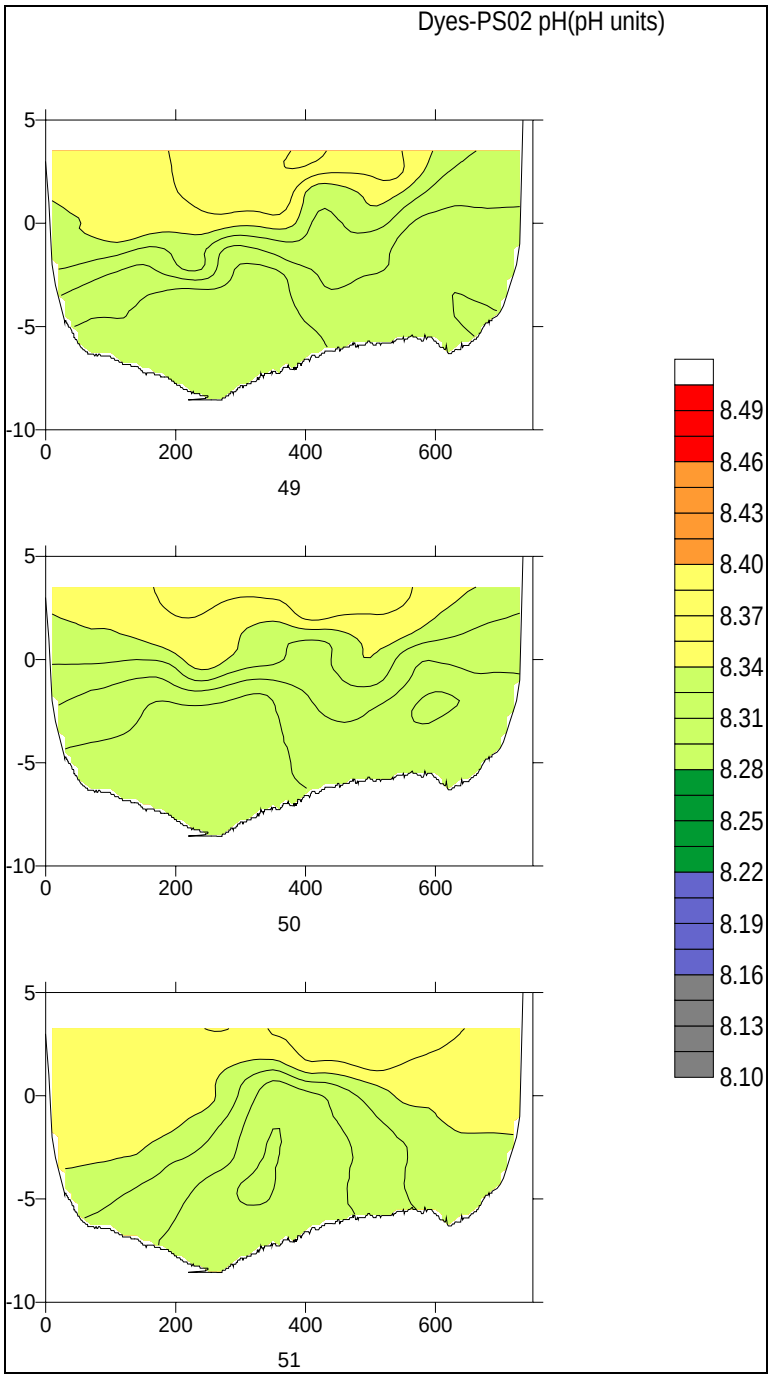

PS02 pH(pH units)
17
21
18
22
19
23
20
24
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10


PS02 pH(pH units)
25
29
26
30
27
31
28
32
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

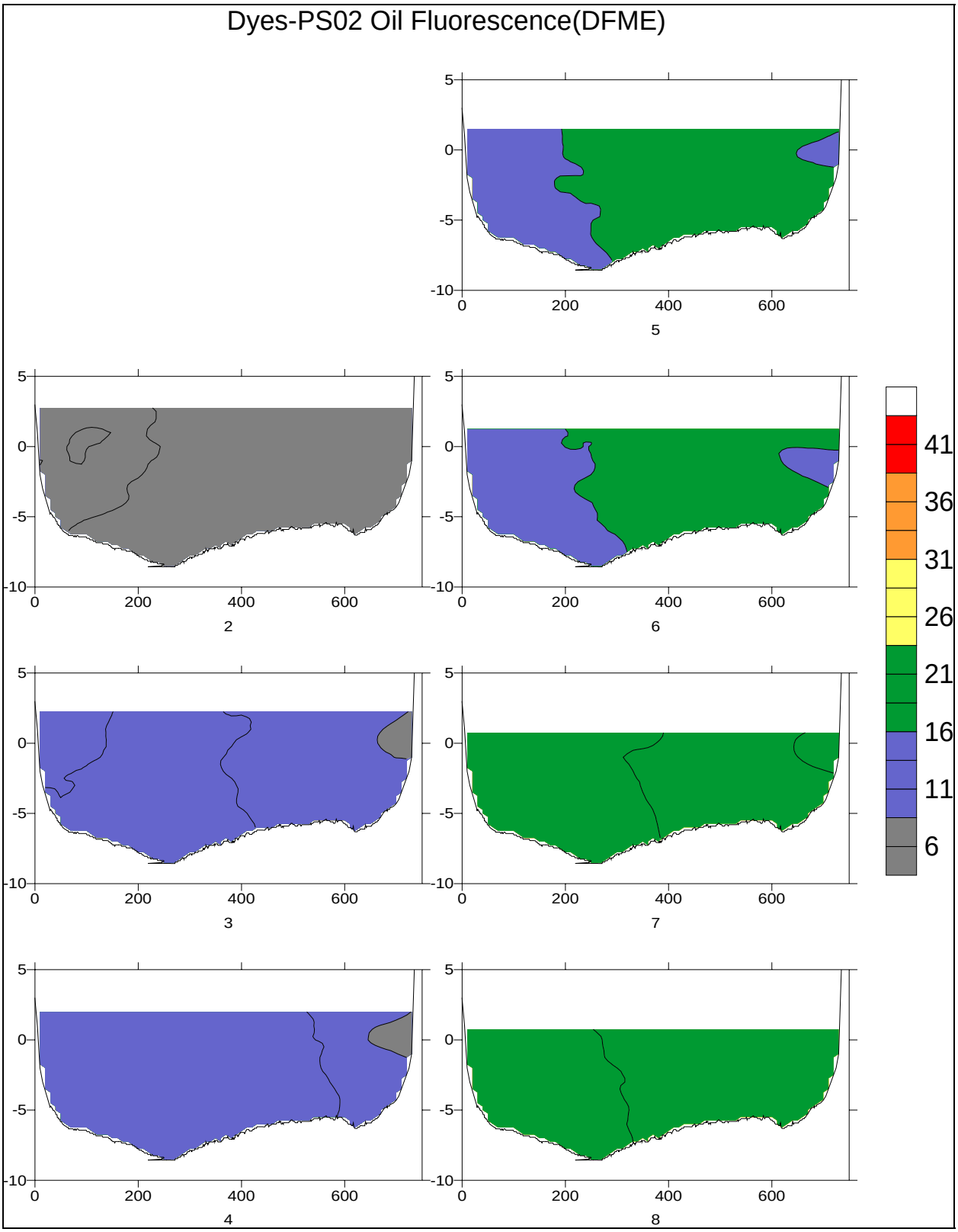

PS02 pH(pH units)
5
0
-5
-10
0
200
400
600
33
37
34
38
35
39
36
40
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

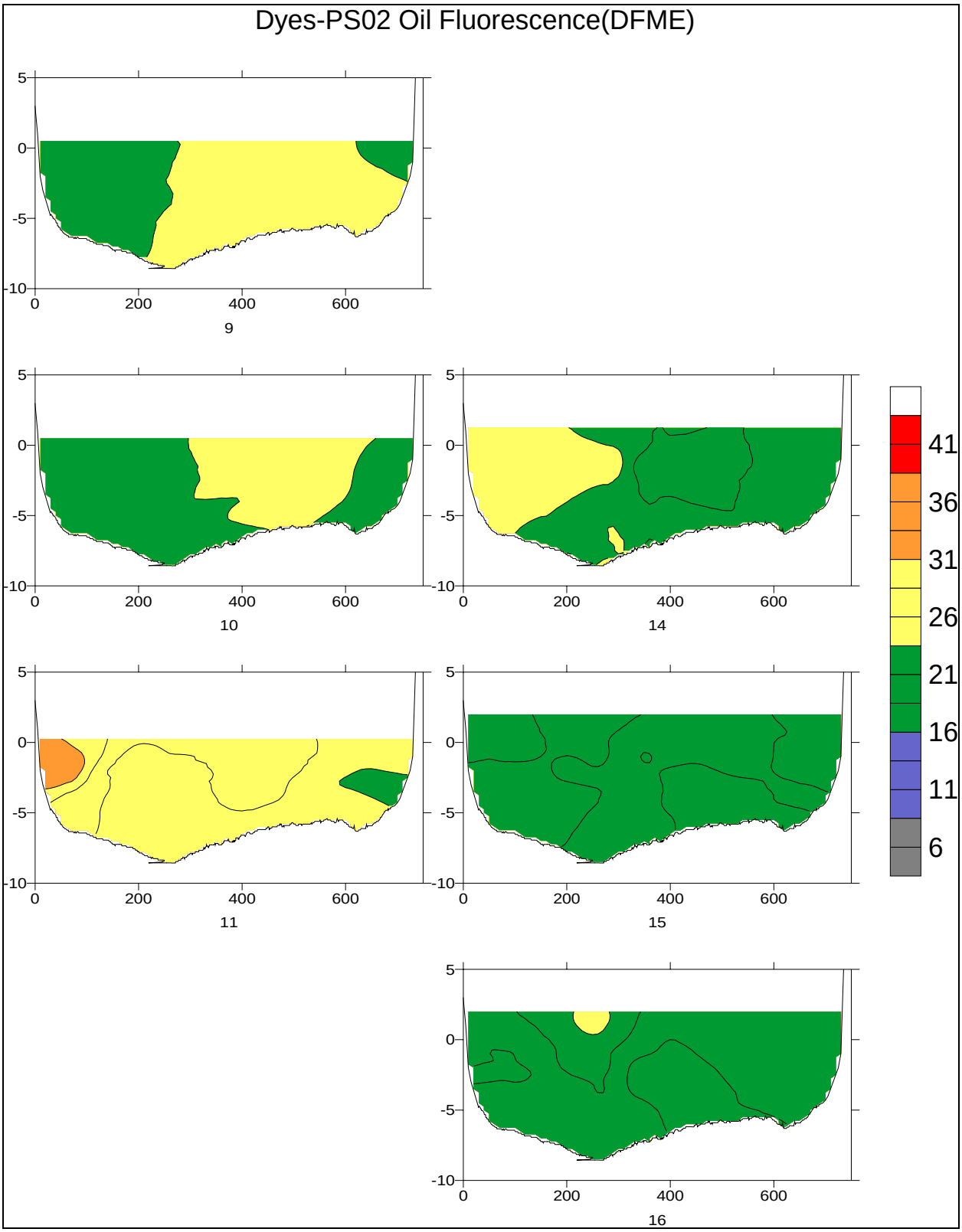

PS02 pH(pH units)
41
45
42
46
43
47
44
48
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

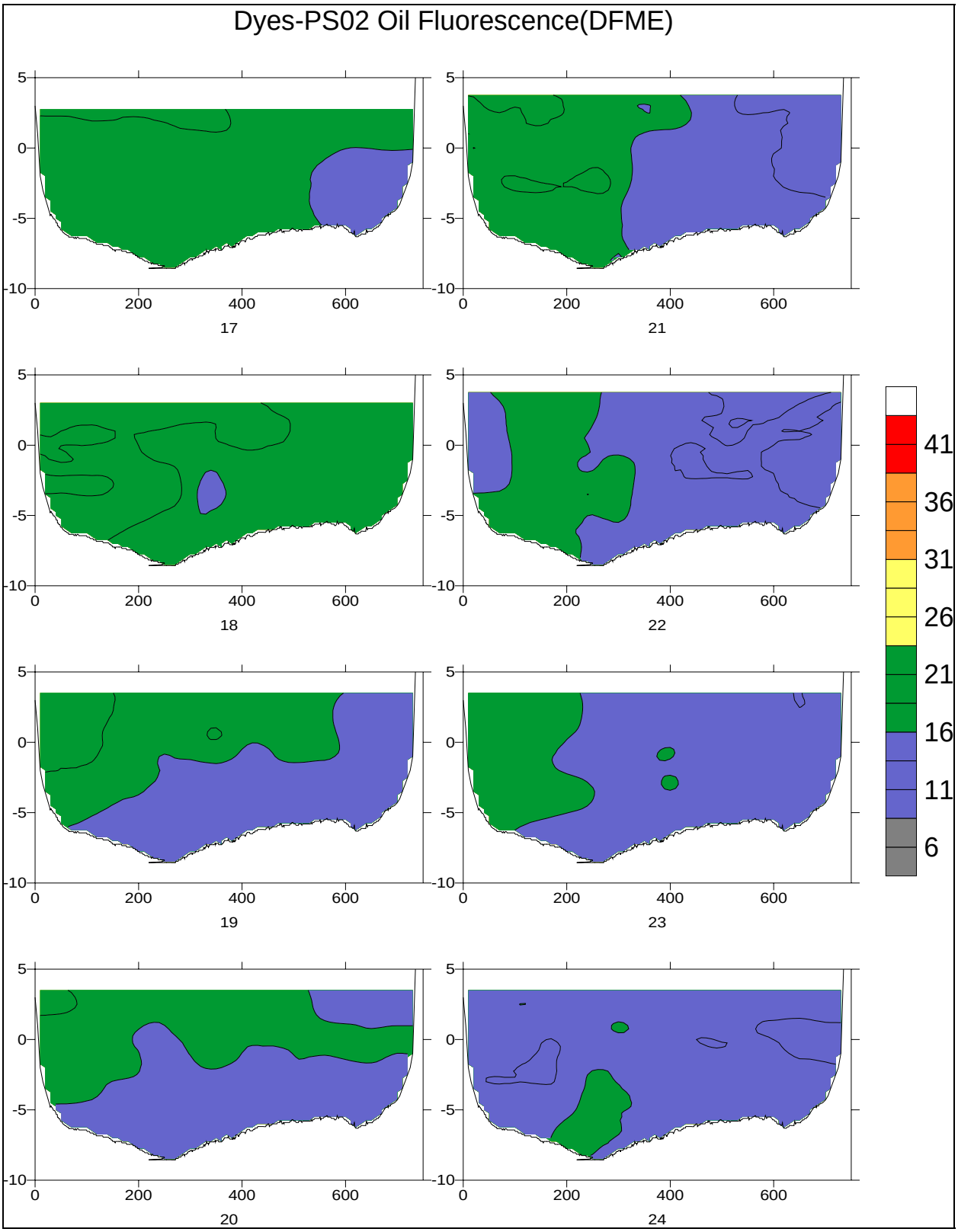

PS02 pH(pH units)
41
45
42
46
43
47
44
48
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

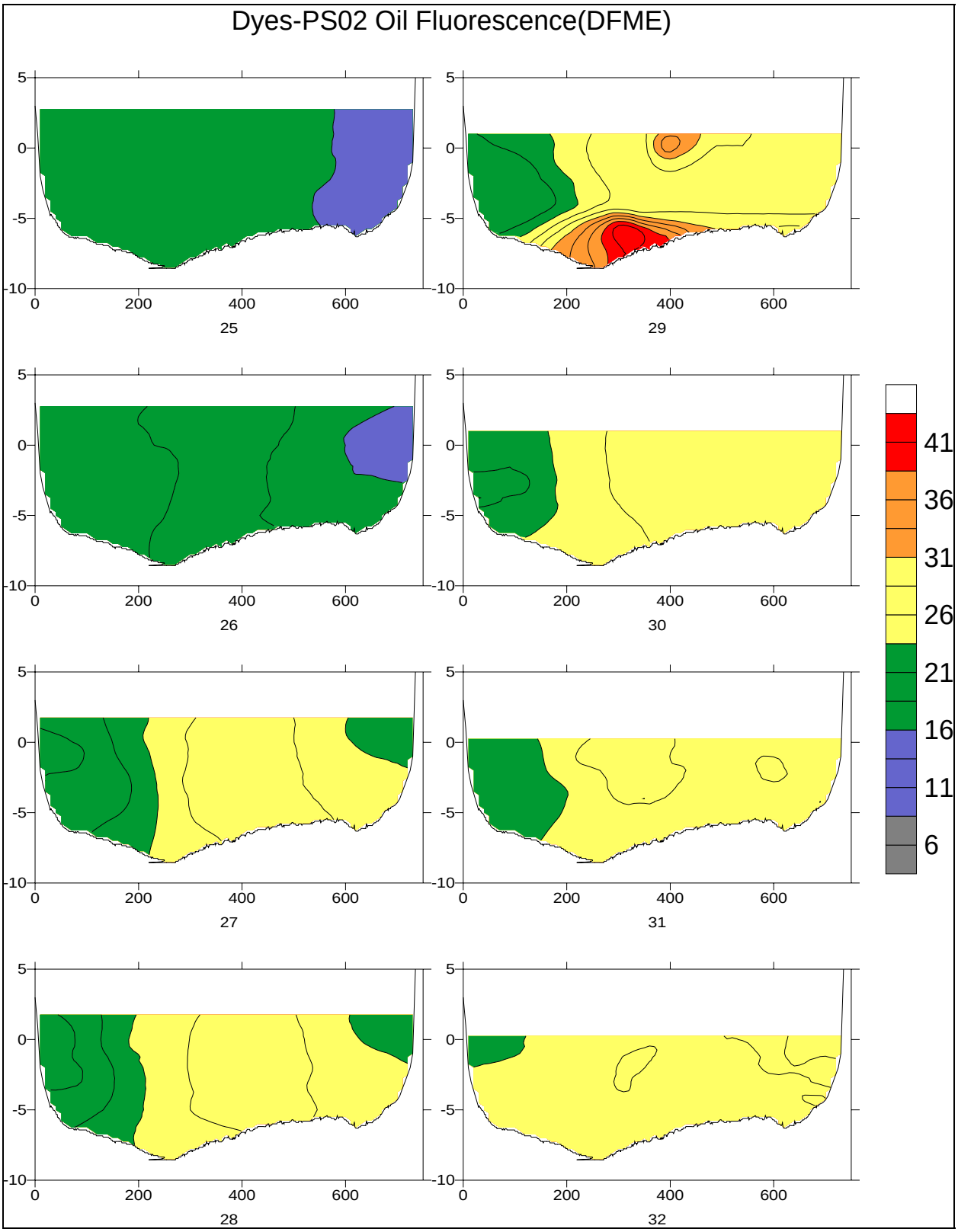

Dyes-PS02 pH(pH units)
5
0
-5
-10
0
200
400
600
49
50
51
8.49
8.46
8.43
8.40
8.37
8.34
8.31
8.28
8.25
8.22
8.19
8.16
8.13
8.10

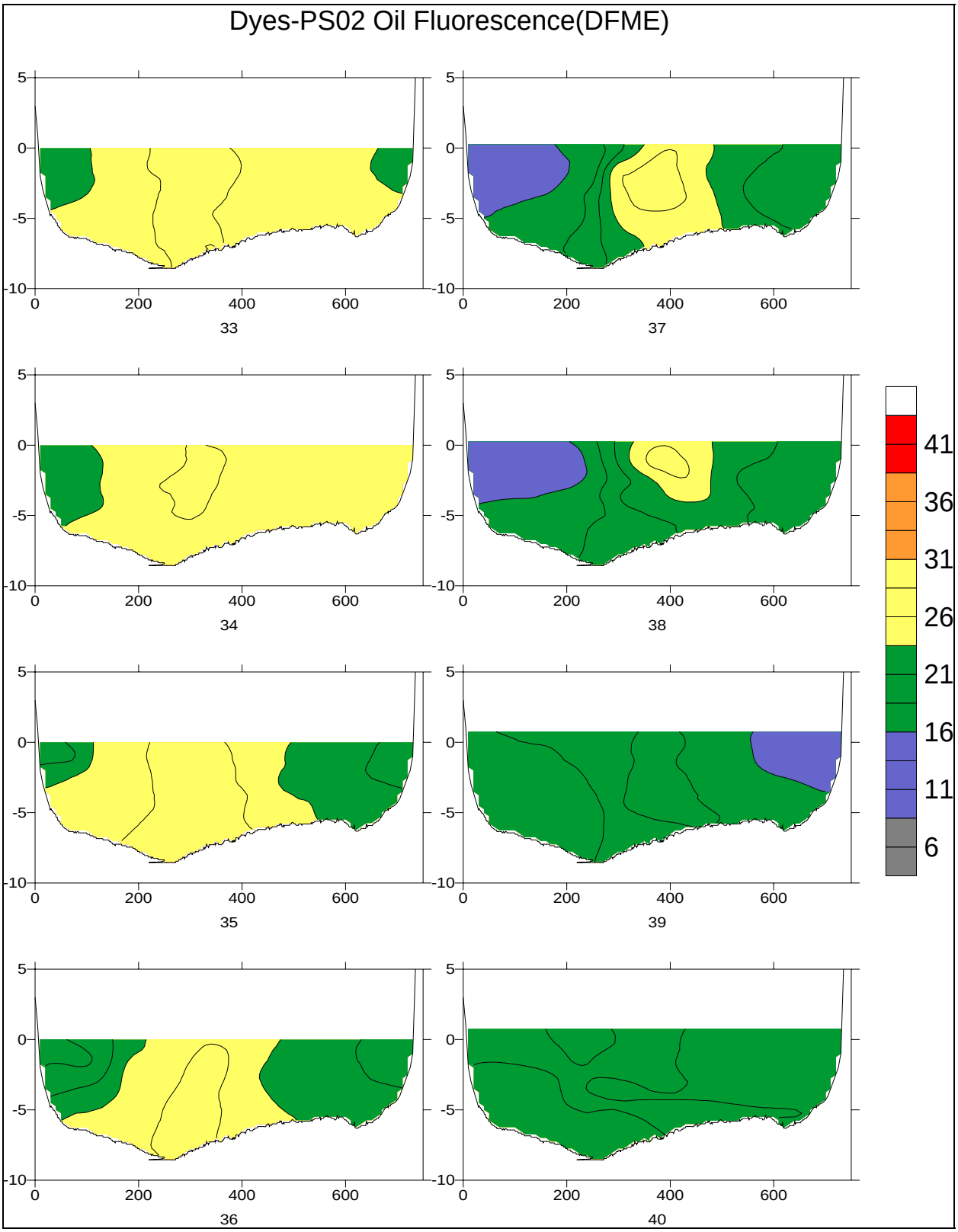
3.4.9 Oil Fluorescence

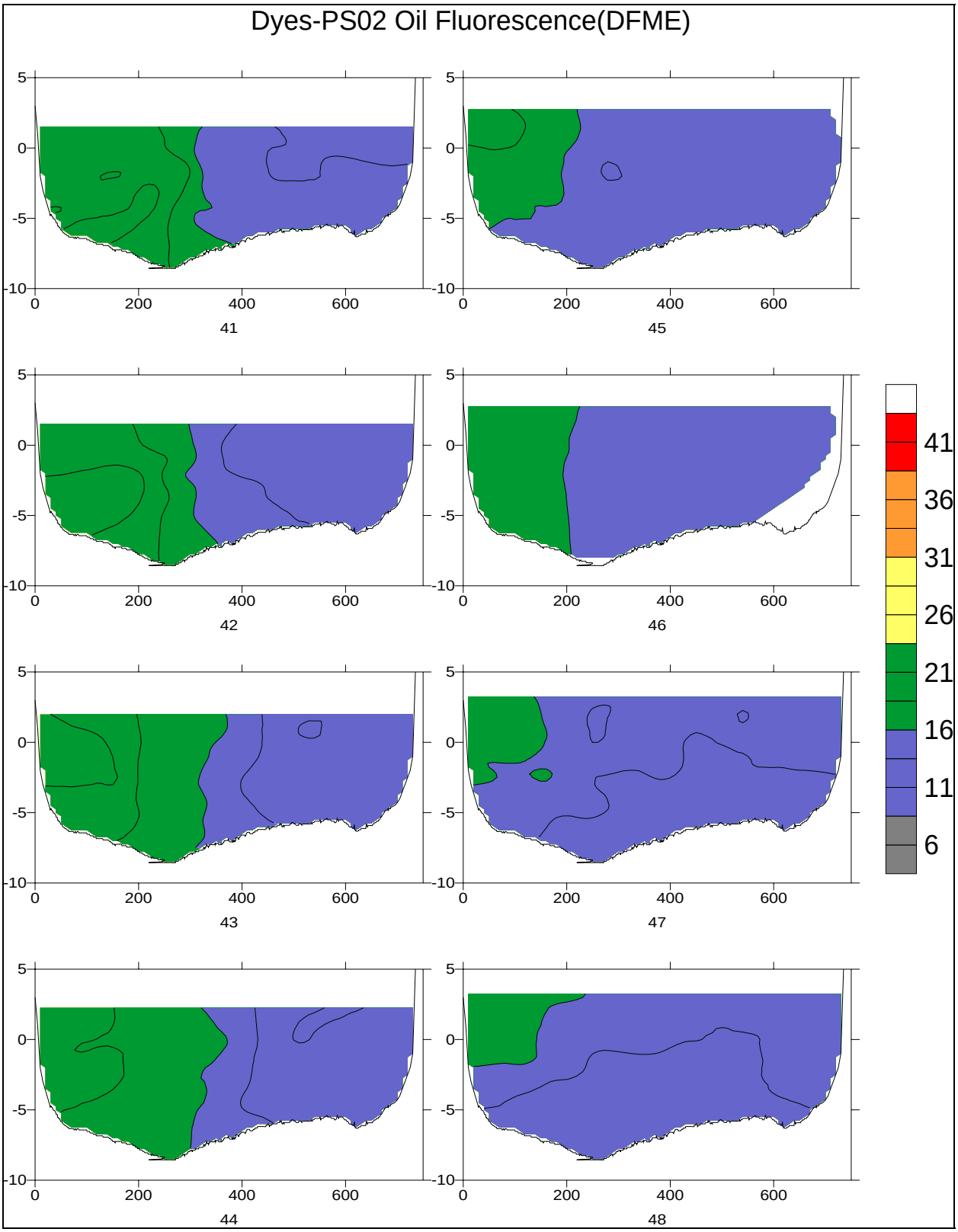


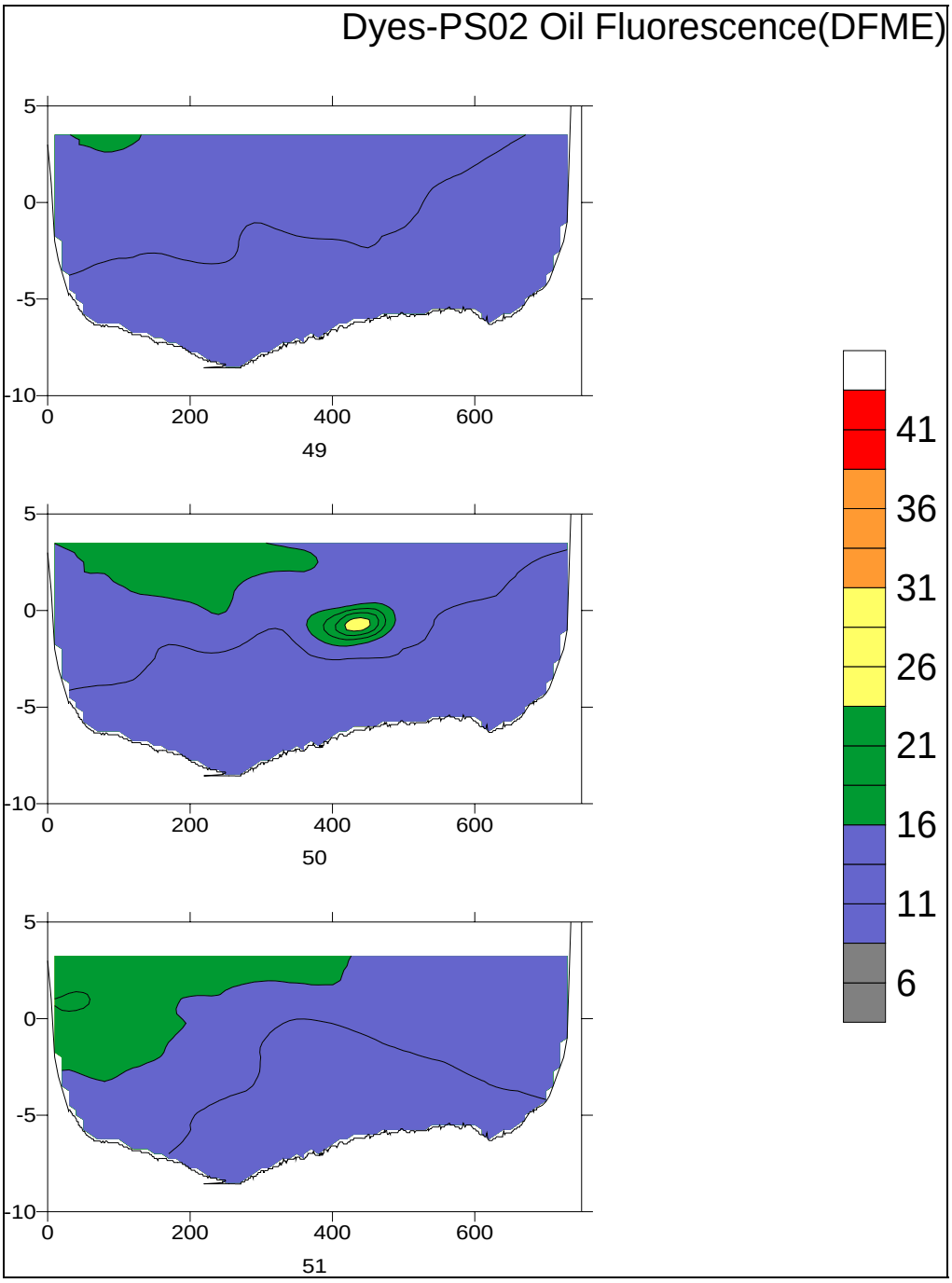

Dyes-PS02 Oil Fluorescence(DFME)
9
10
14
11
15
16
41
36
31
26
21
16
11
6


Dyes-PS02 Oil Fluorescence(DFME)
17
18
19
20
21
22
23
24
41
36
31
26
21
16
11
6

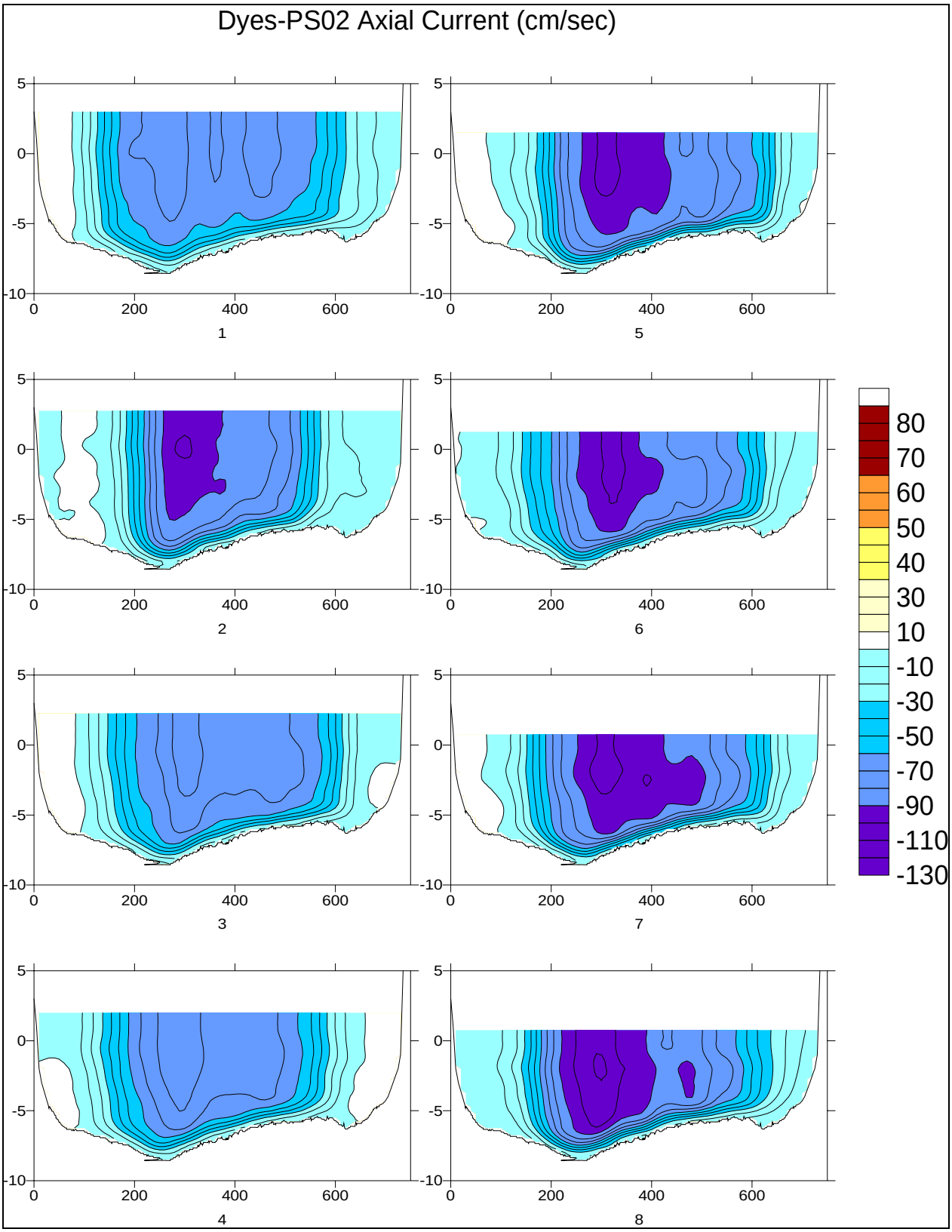

Dyes-PS02 Oil Fluorescence(DFME)
25
29
26
30
27
31
28
32
41
36
31
26
21
16
11
6

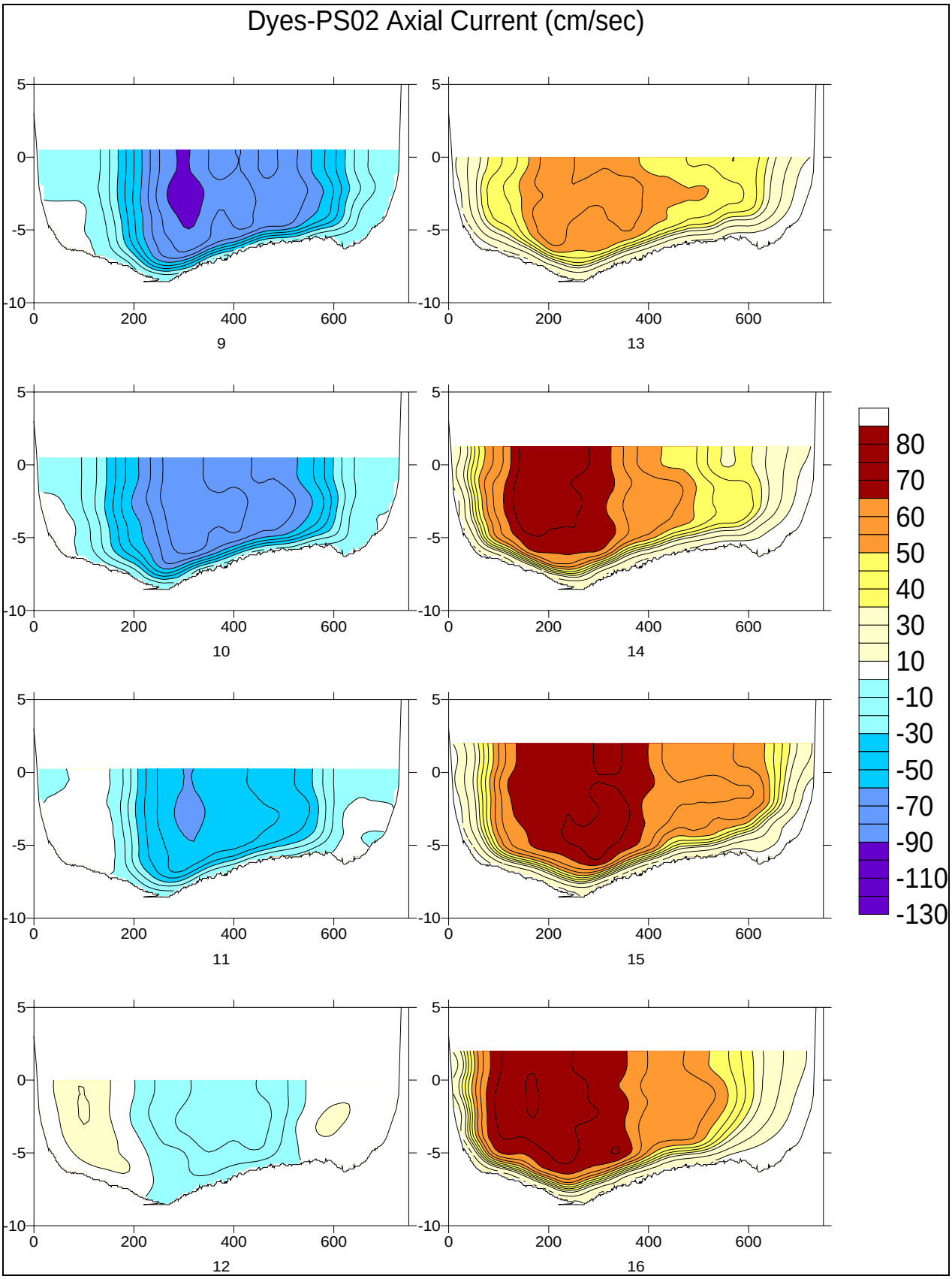

Dyes-PS02 Oil Fluorescence(DFME)
5
0
-5
-10
0
200
400
600
33
37
34
38
35
39
36
40
41
36
31
26
21
16
11
6

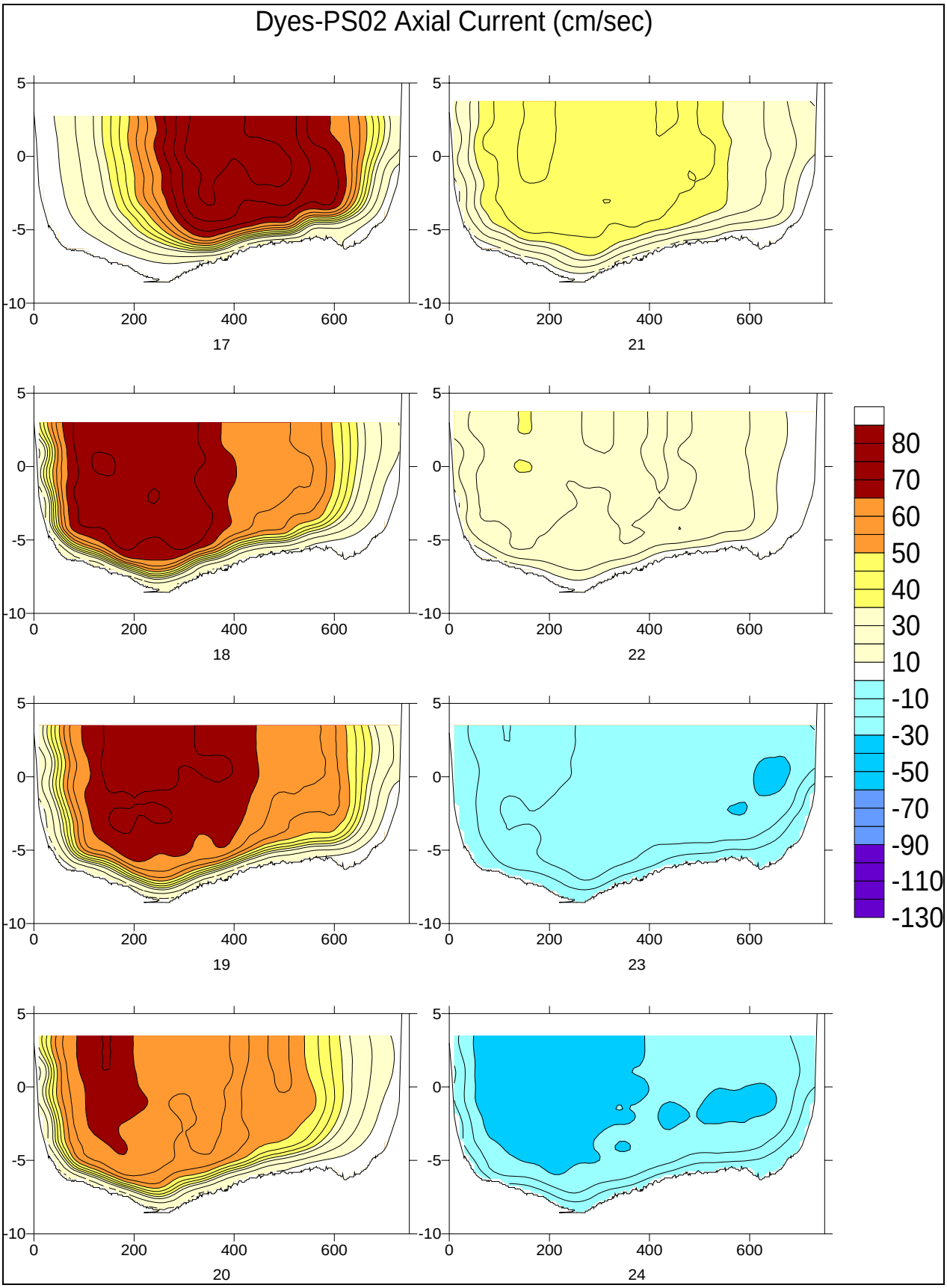

Dyes-PS02 Oil Fluorescence(DFME)
41
45
42
46
43
47
44
48
41
36
31
26
21
16
11
6

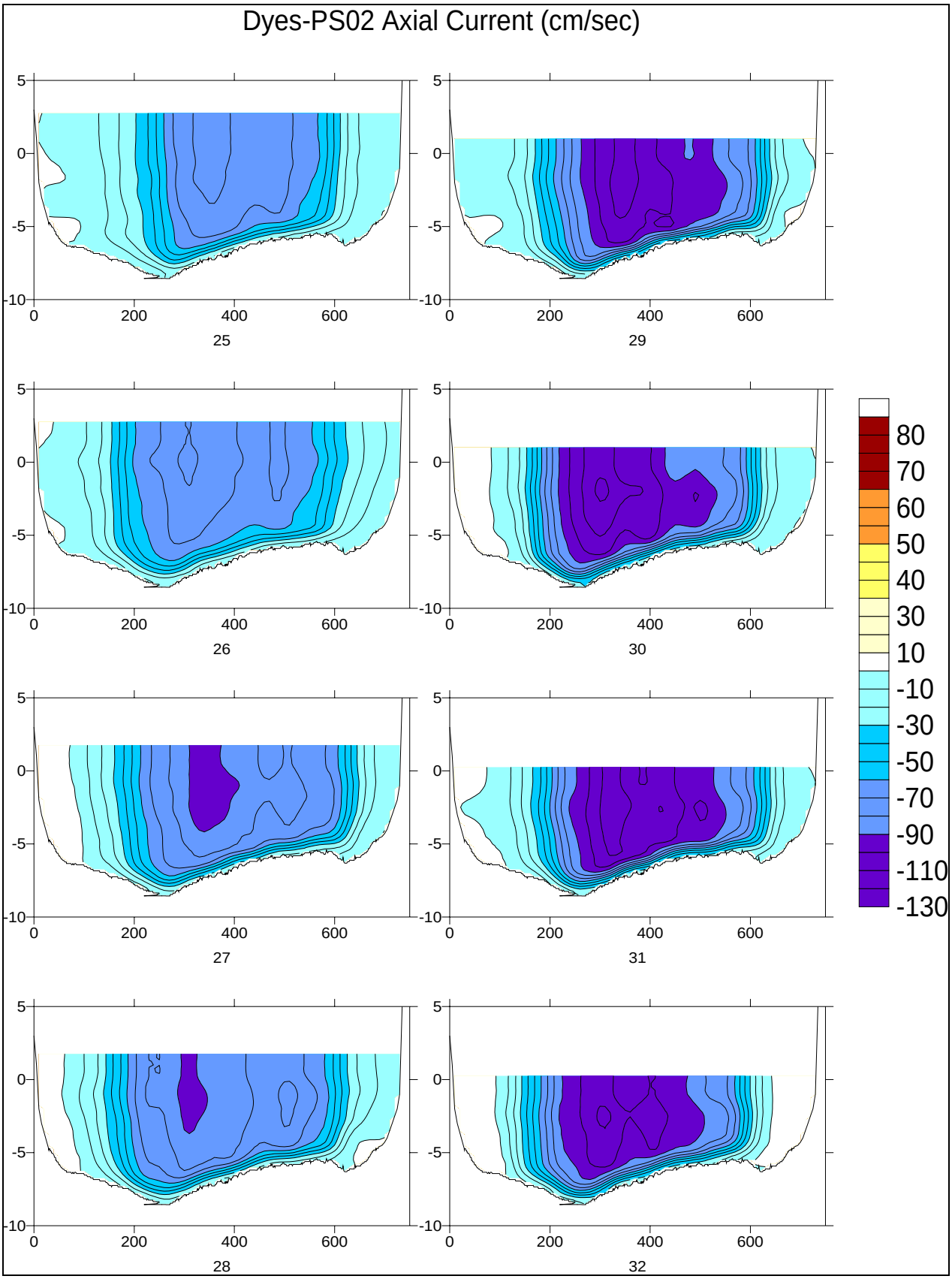

Dyes-PS02 Oil Fluorescence(DFME)
5
0
-5
-10
0
200
400
600
49
50
51
41
36
31
26
21
16
11
6

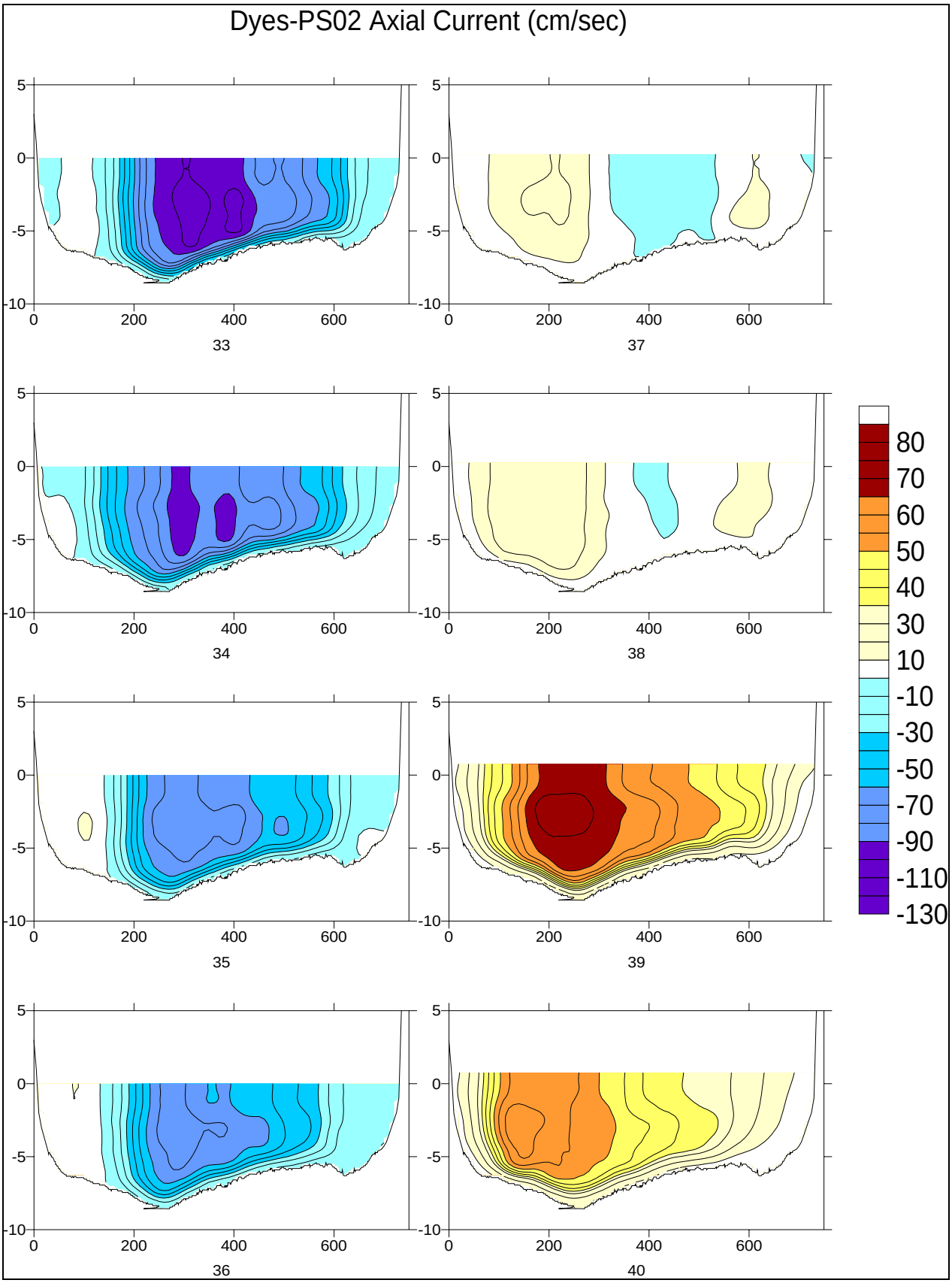
3.4.10 Axial Currents

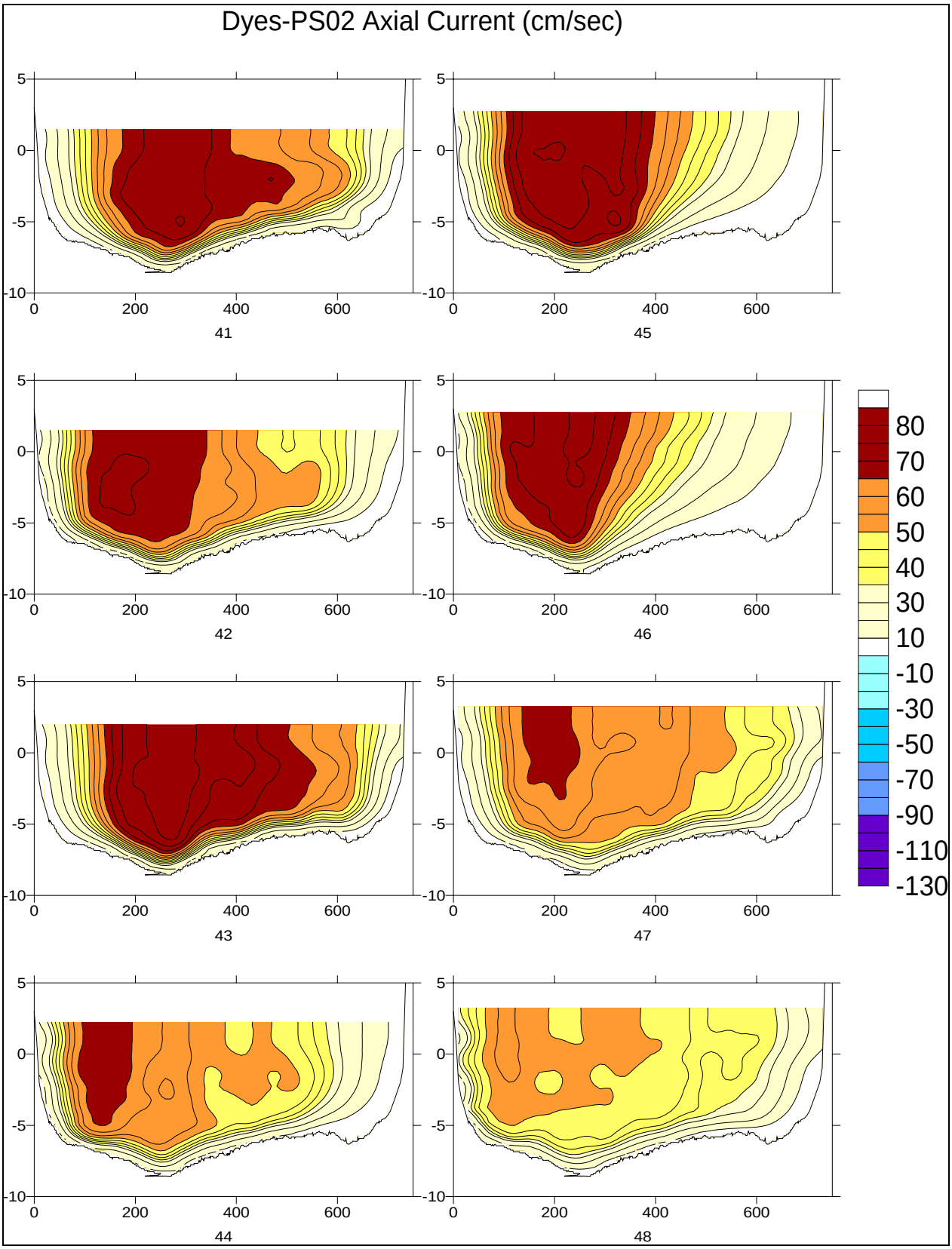


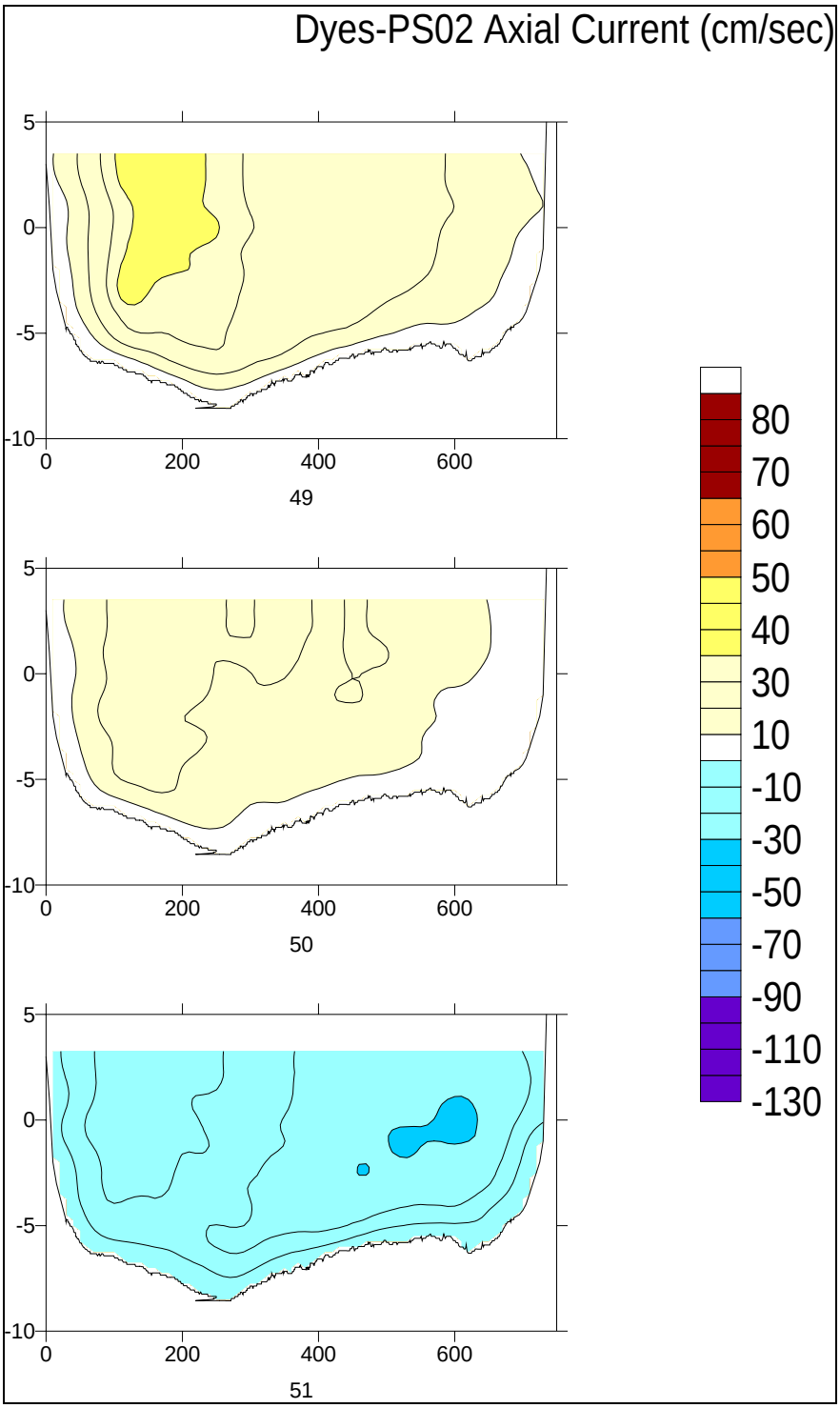

Dyes-PS02 Axial Current (cm/sec)
9
10
11
12
13
14
15
16
80
70
60
50
40
30
10
-10
-30
-50
-70
-90
-110
-130


Dyes-PS02 Axial Current (cm/sec)
17
18
19
20
21
22
23
24
80
70
60
50
40
30
10
-10
-30
-50
-70
-90
-110
-130

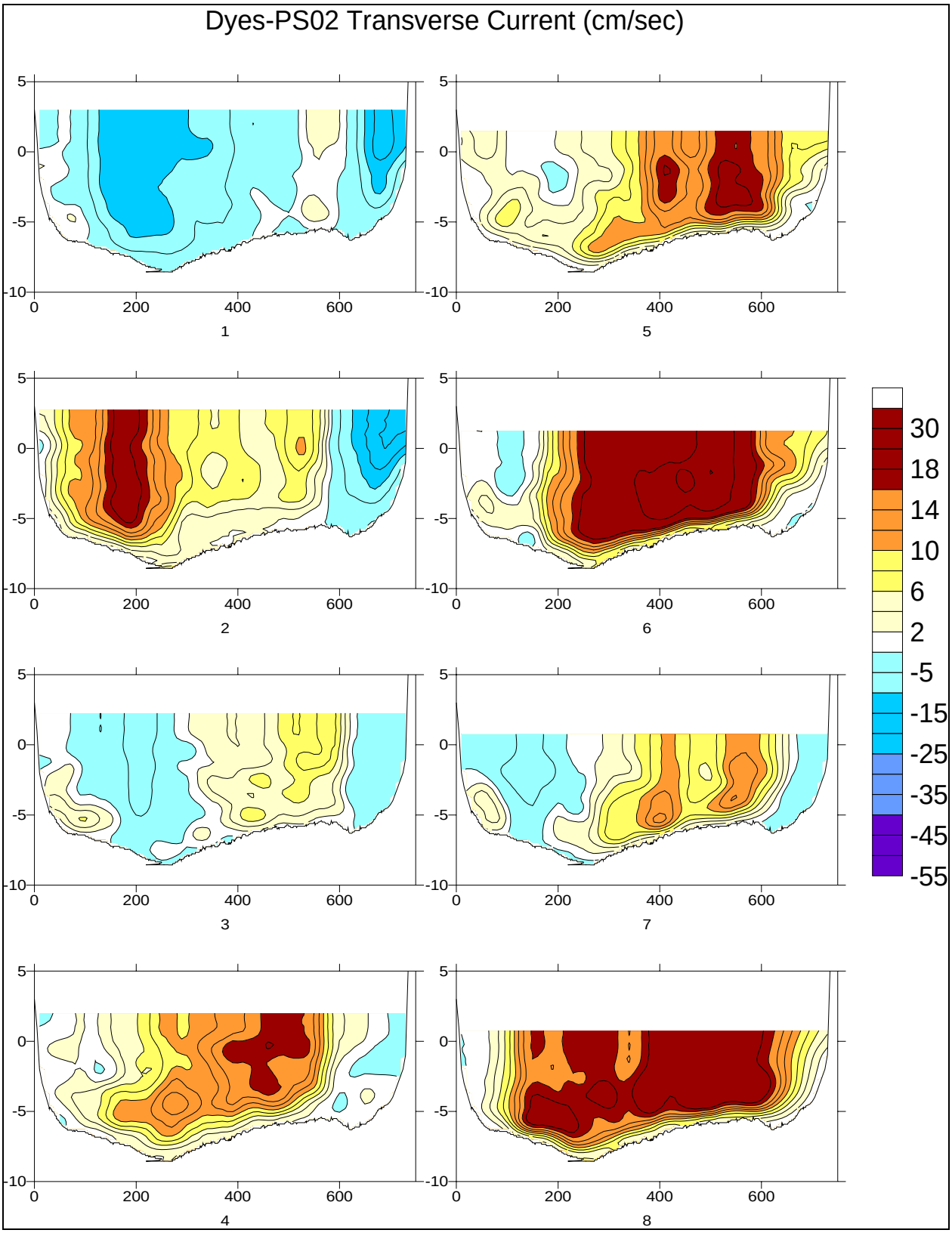

Dyes-PS02 Axial Current (cm/sec)
5
0
-5
-10
0
200
400
600
25
29
26
30
27
31
28
32
80
70
60
50
40
30
10
-10
-30
-50
-70
-90
-110
-130

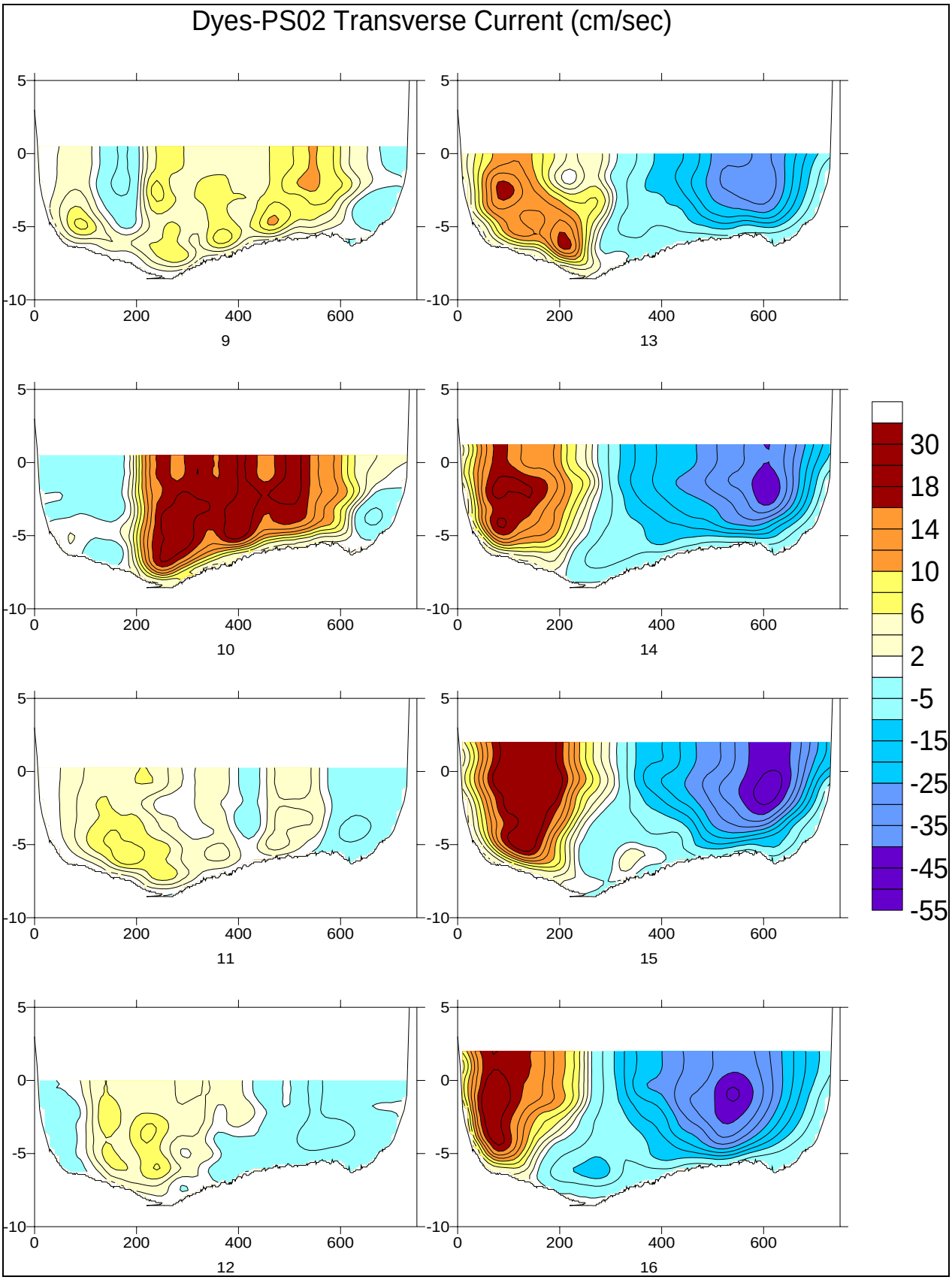

Dyes-PS02 Axial Current (cm/sec)
33
37
34
38
35
39
36
40
80
70
60
50
40
30
10
-10
-30
-50
-70
-90
-110
-130

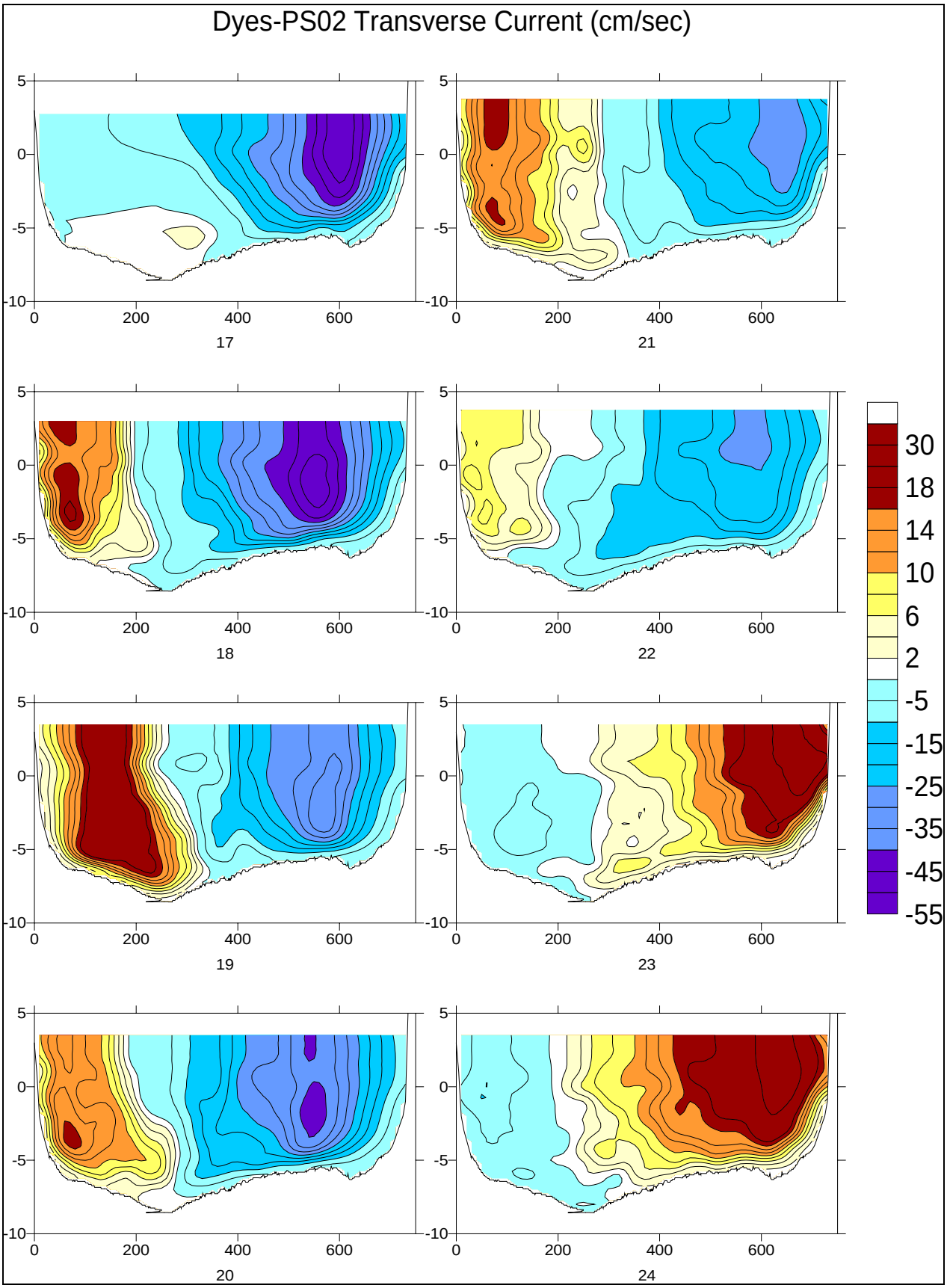

Dyes-PS02 Axial Current (cm/sec)
41
45
42
46
43
47
44
48
80
70
60
50
40
30
10
-10
-30
-50
-70
-90
-110
-130

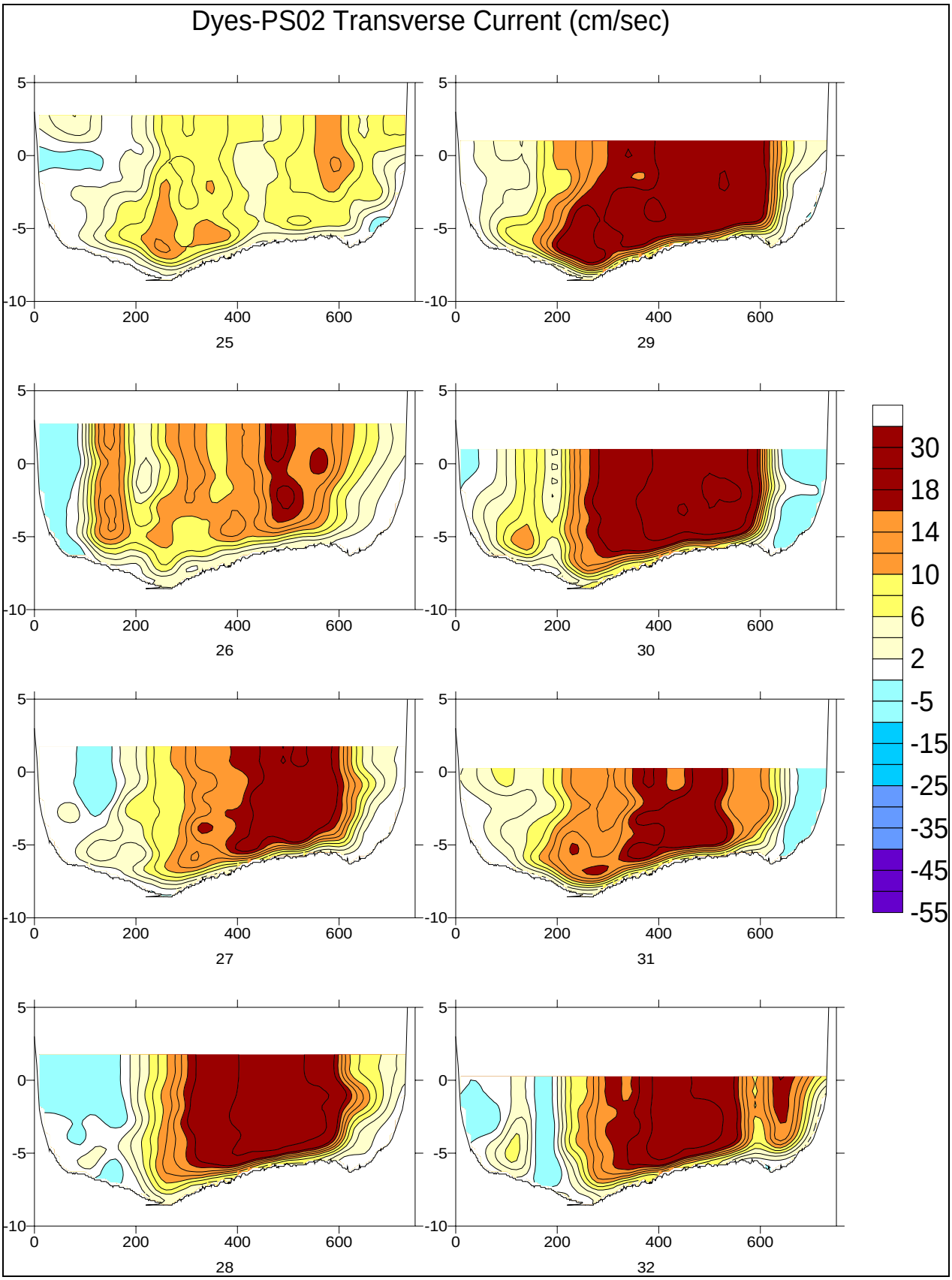

Dyes-PS02 Axial Current (cm/sec)
5
0
-5
-10
0
200
400
600
49
50
51
80
70
60
50
40
30
10
-10
-30
-50
-70
-90
-110
-130

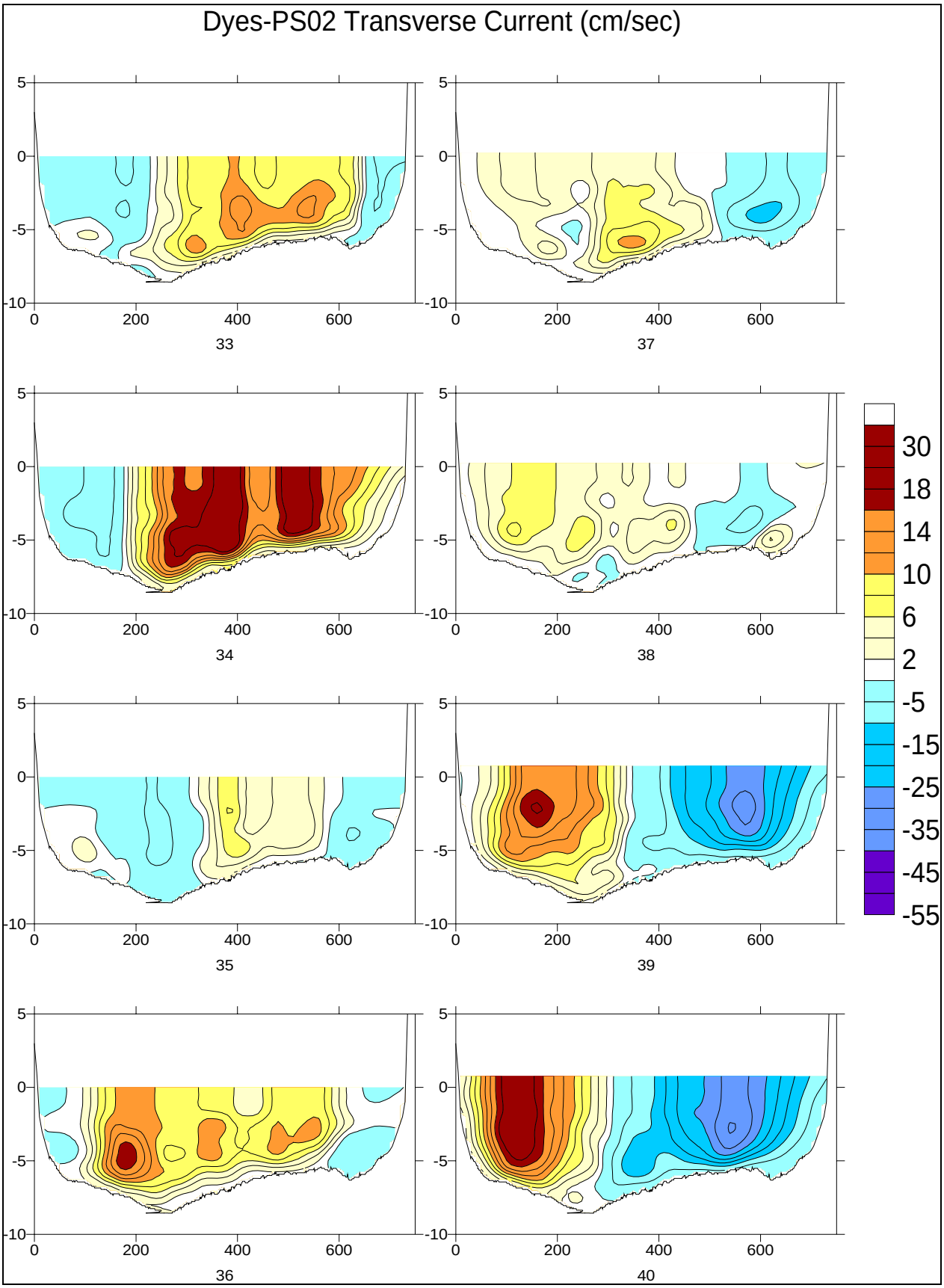
3.4.11 Transverse Currents

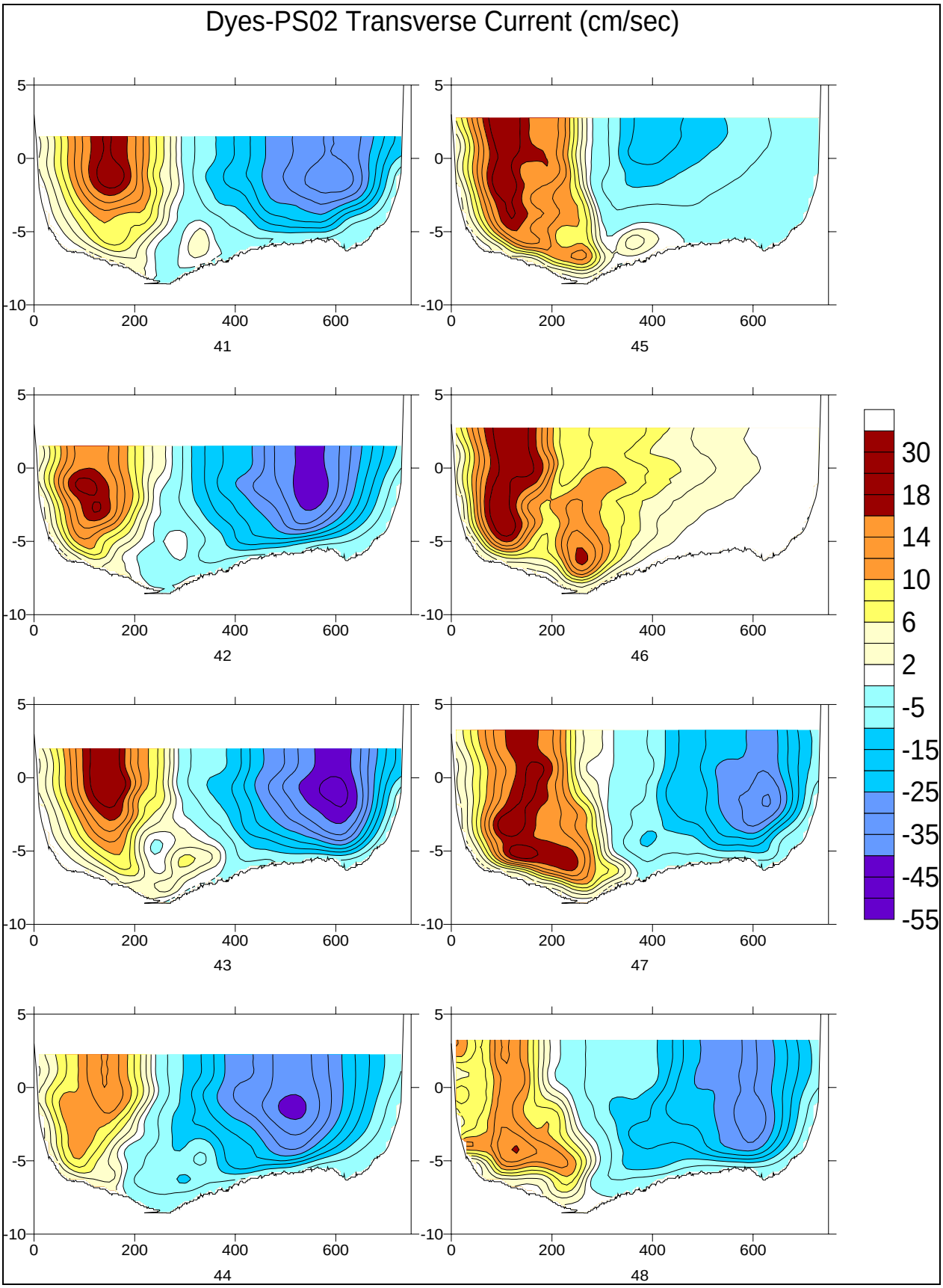


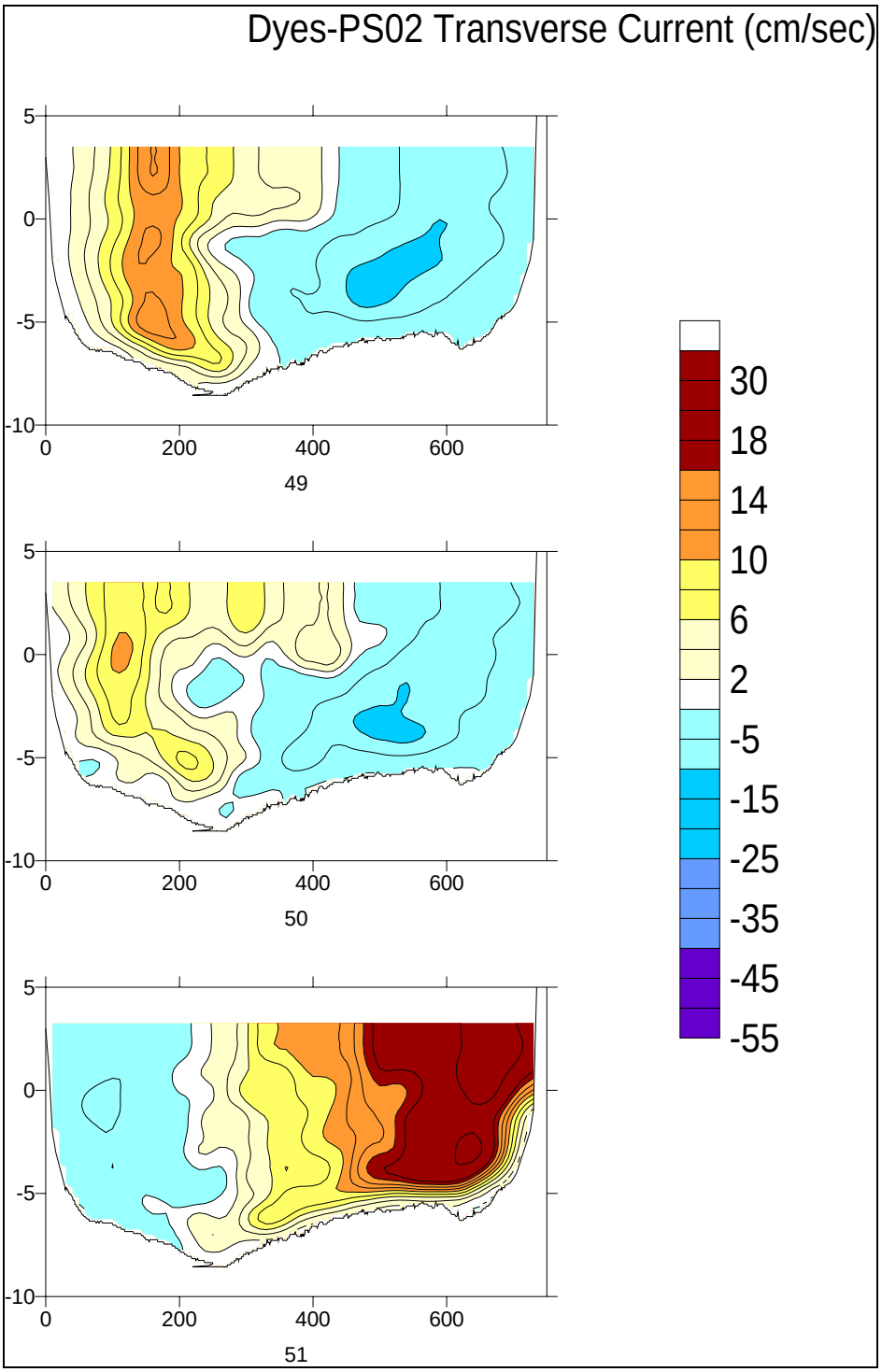

Dyes-PS02 Transverse Current (cm/sec)
5
0
-5
-10
0
200
400
600
9
10
11
12
13
14
15
16
30
18
14
10
6
2
-5
-15
-25
-35
-45
-55


Dyes-PS02 Transverse Current (cm/sec)
17
18
19
20
21
22
23
24
30
18
14
10
6
2
-5
-15
-25
-35
-45
-55


Dyes-PS02 Transverse Current (cm/sec)
25
29
26
30
27
31
28
32
30
18
14
10
6
2
-5
-15
-25
-35
-45
-55

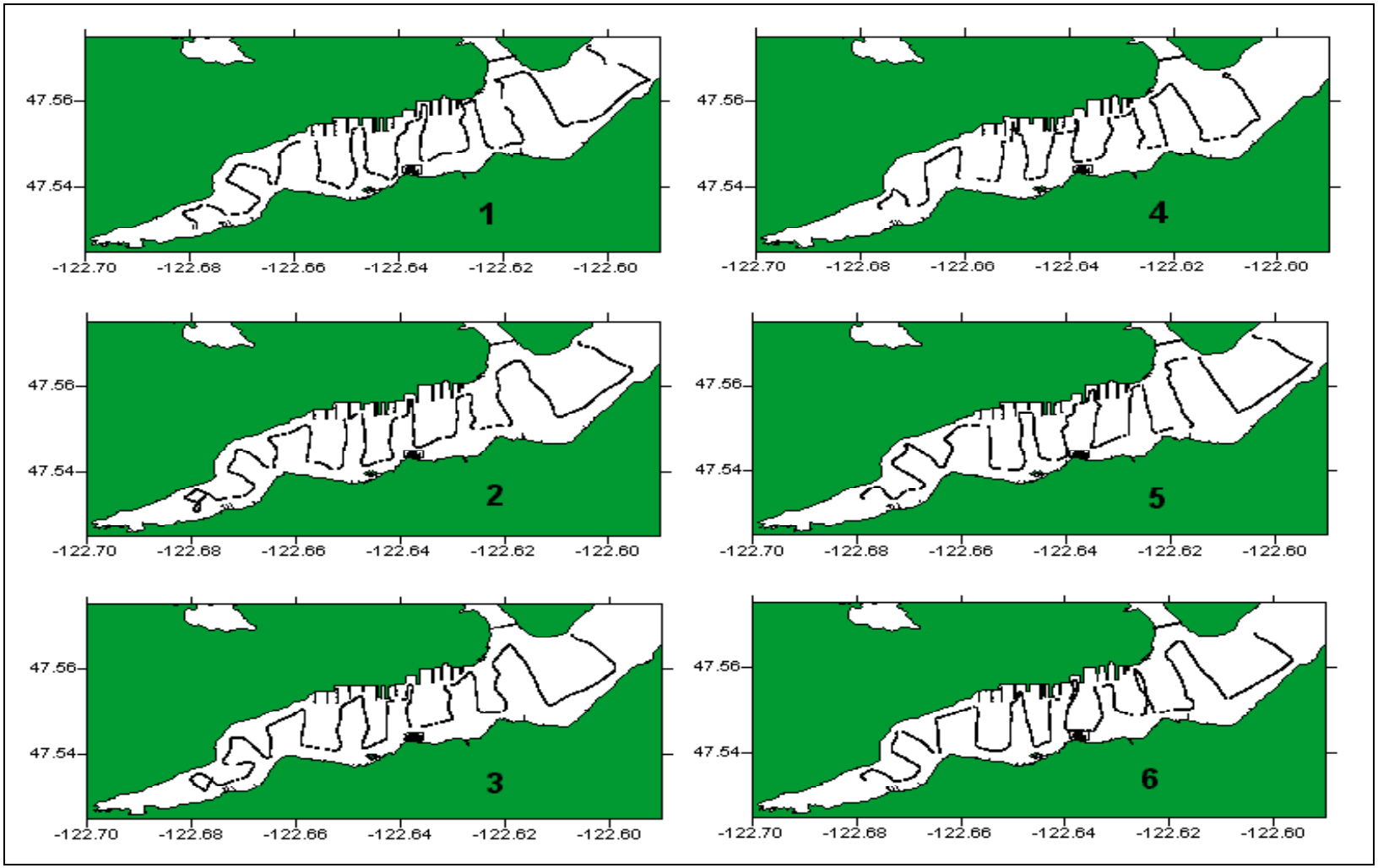

Dyes-PS02 Transverse Current (cm/sec)
33
37
34
38
35
39
36
40
30
18
14
10
6
2
-5
-15
-25
-35
-45
-55


Dyes-PS02 Transverse Current (cm/sec)
41
45
42
46
43
47
44
48
30
18
14
10
6
2
-5
-15
-25
-35
-45
-55

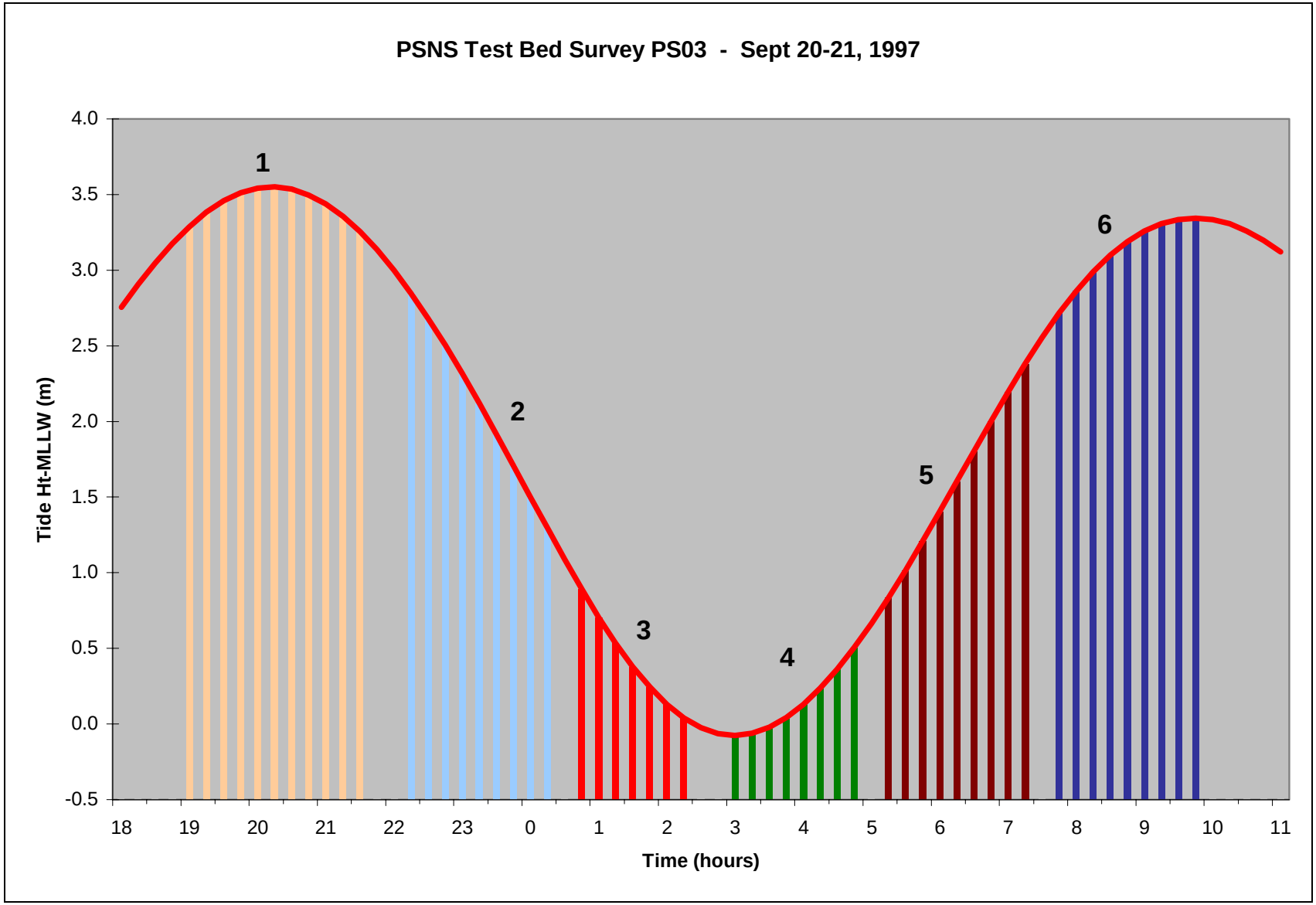

Dyes-PS02 Transverse Current (cm/sec)
5
0
-5
-10
0
200
400
600
49
50
51
30
18
14
10
6
2
-5
-15
-25
-35
-45
-55

4.1 September 20-21 1998 – PS03

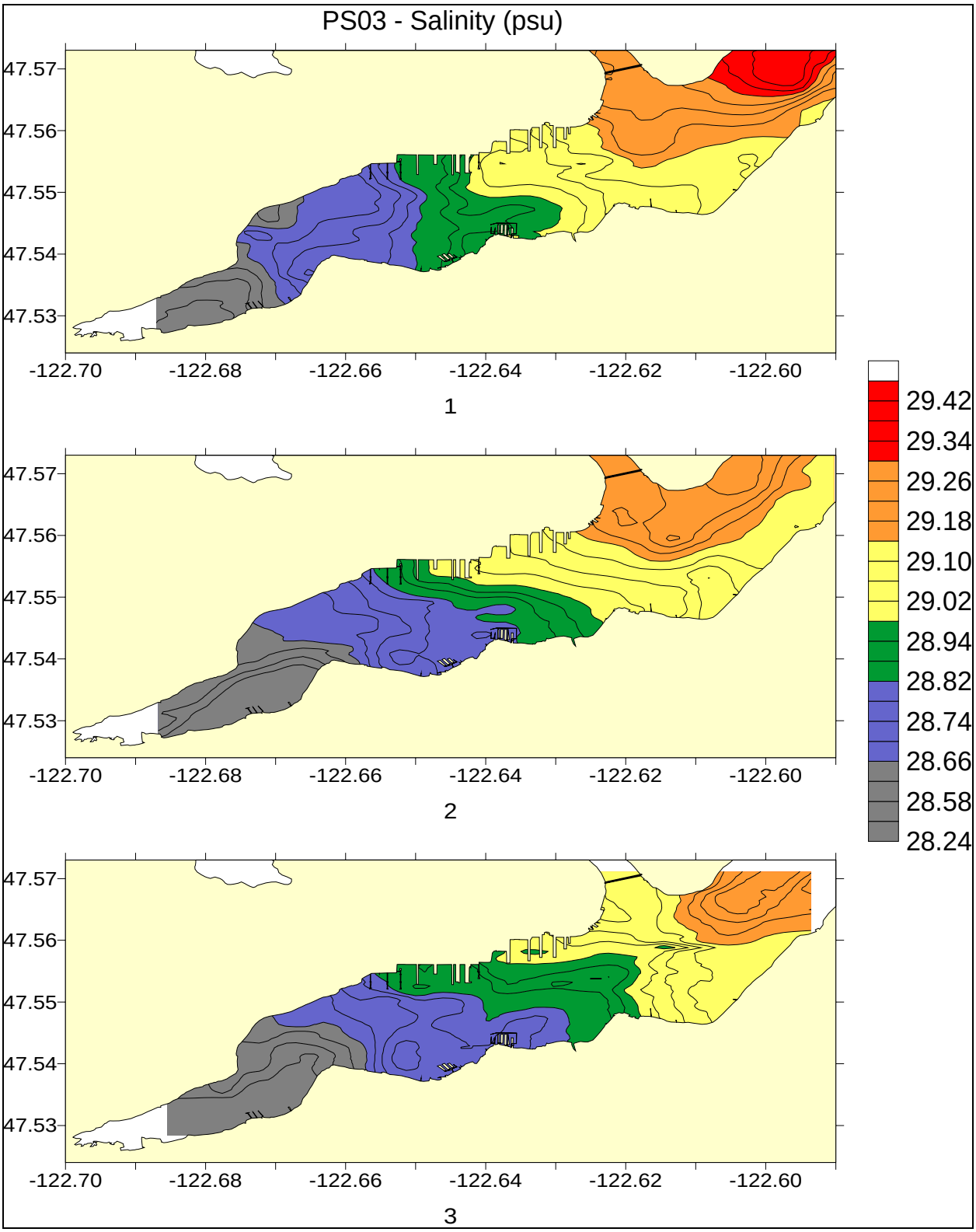
4.1.1 Track Map

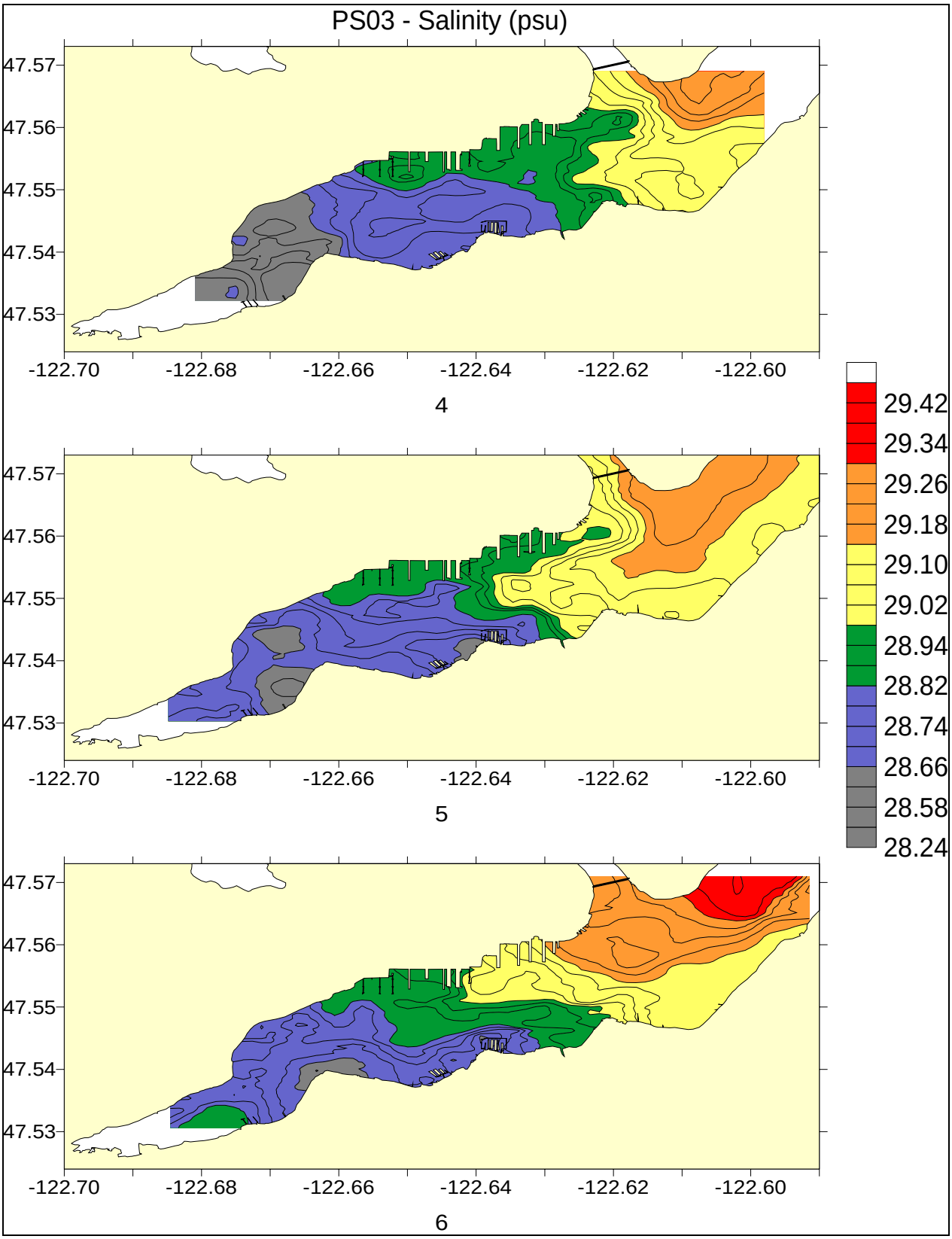


4.1.2 Tide Chart

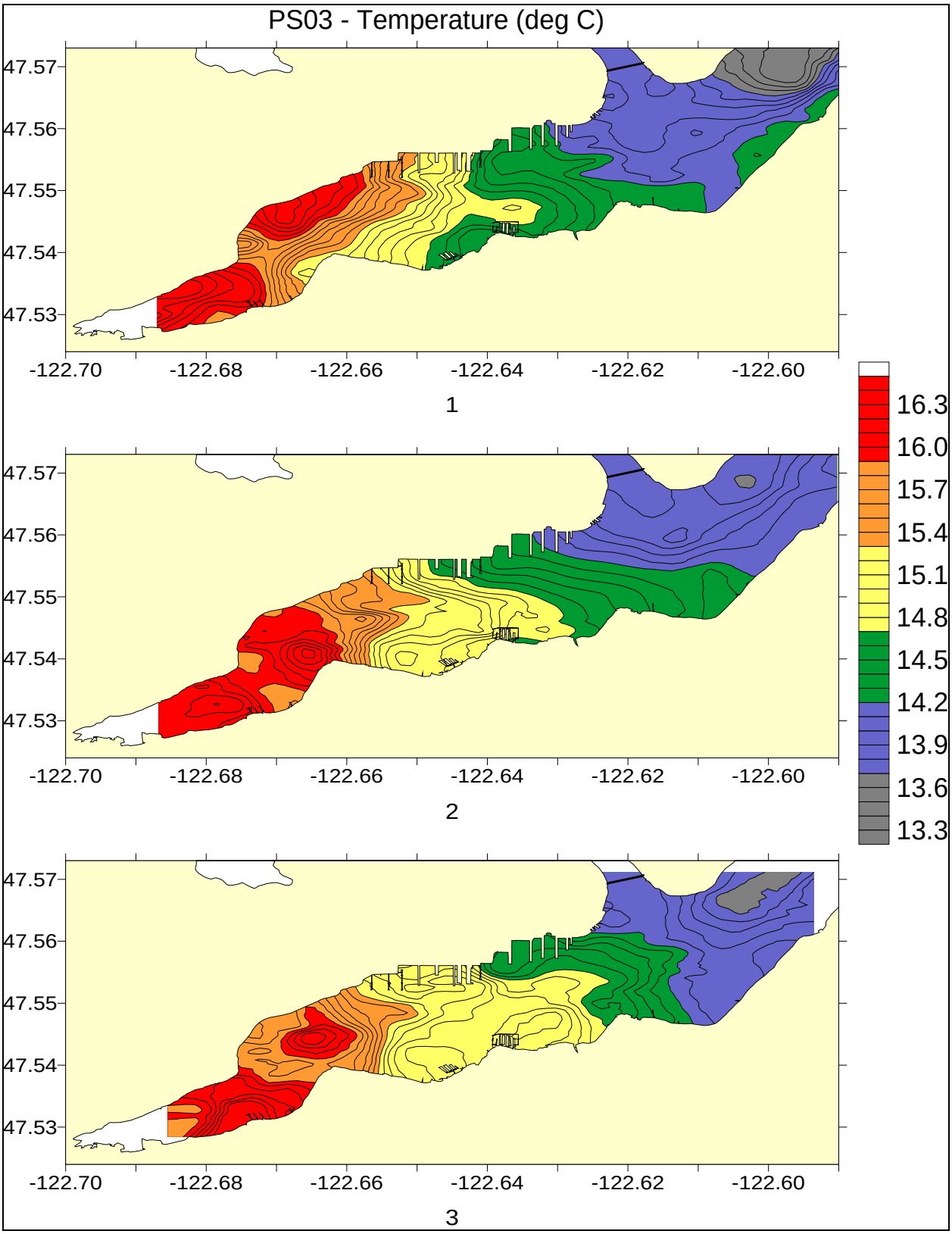


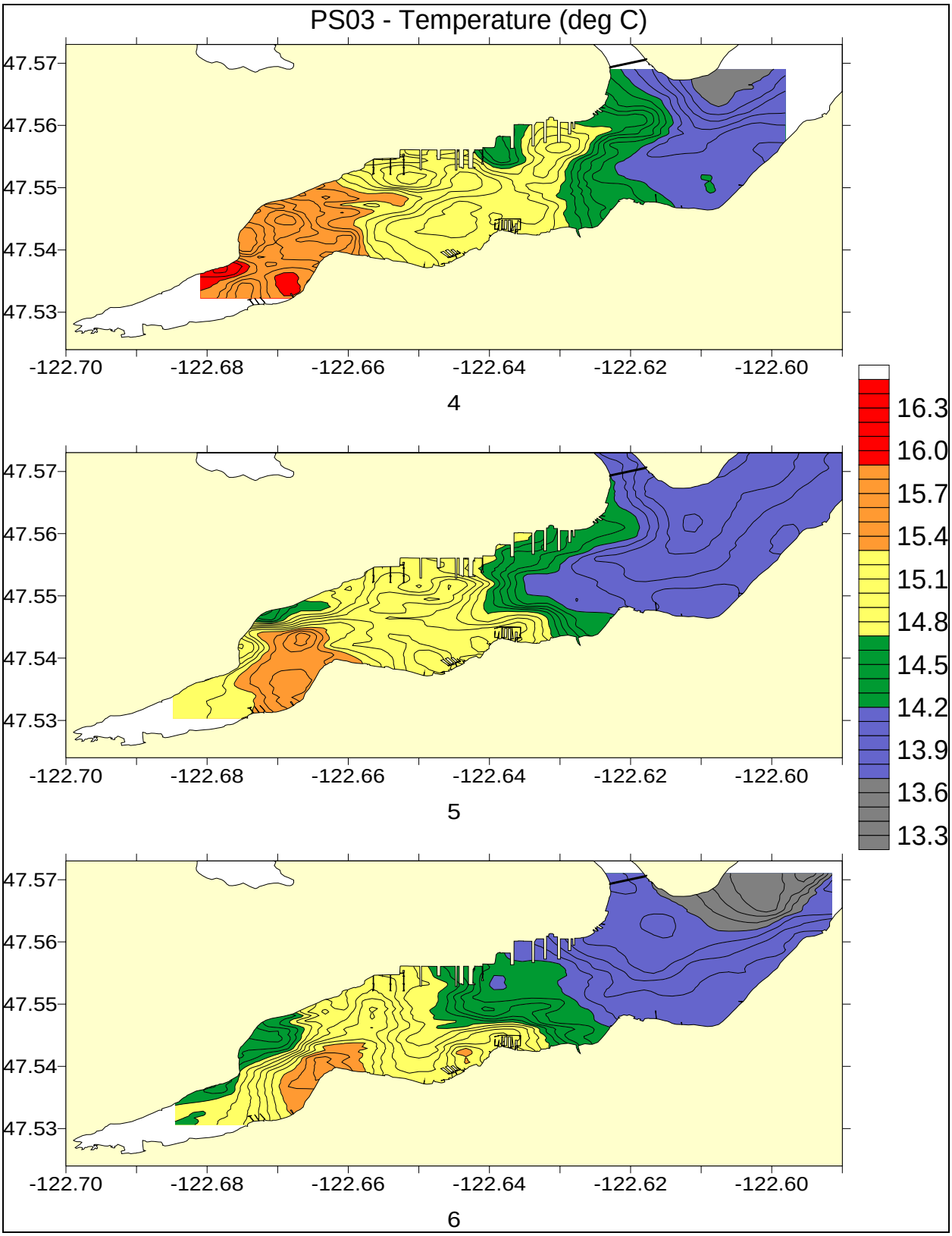
4.1.3 Salinity



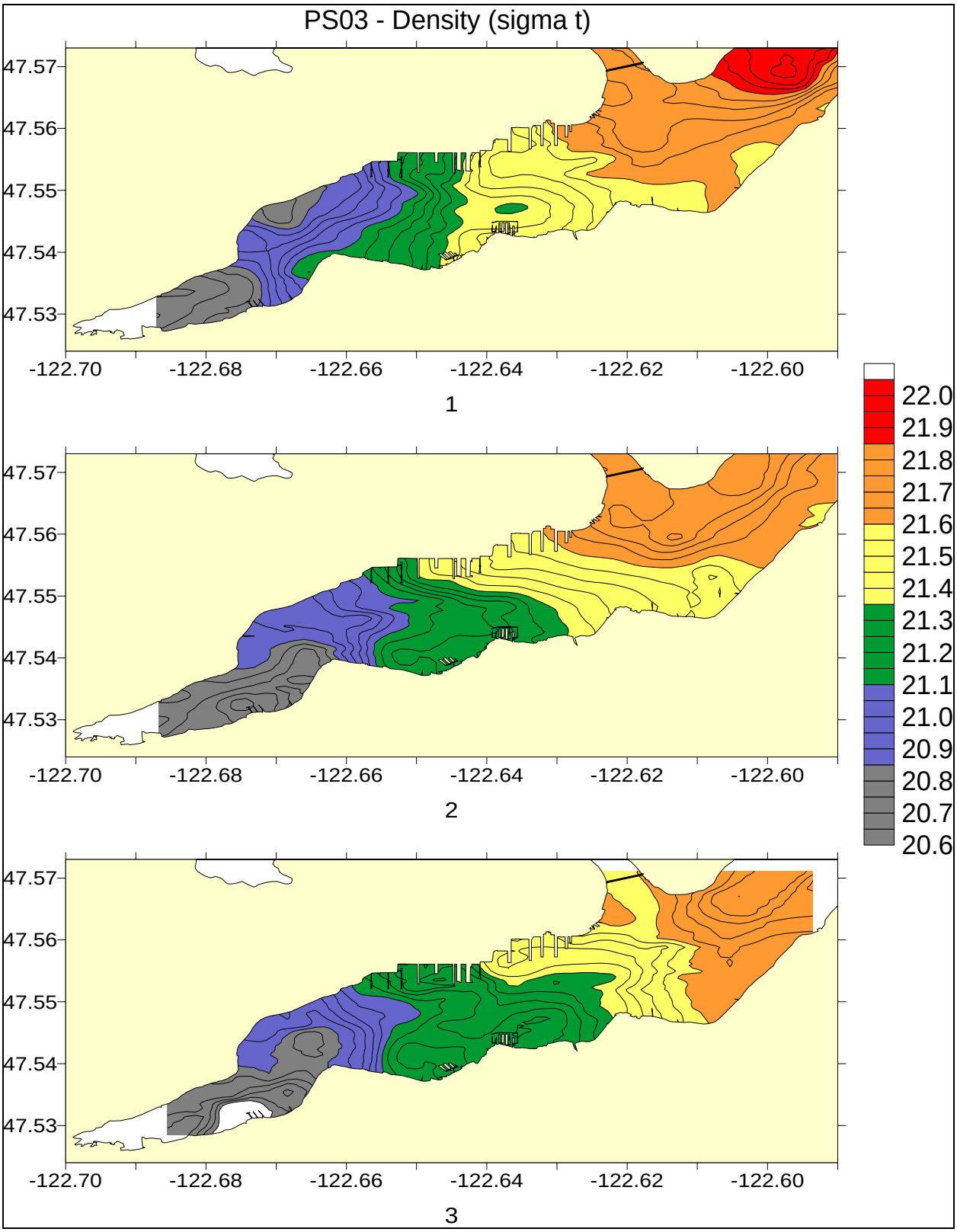

PS03 - Salinity (psu)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
29.42
29.34
29.26
29.18
29.10
29.02
28.94
28.82
28.74
28.66
28.58
28.24

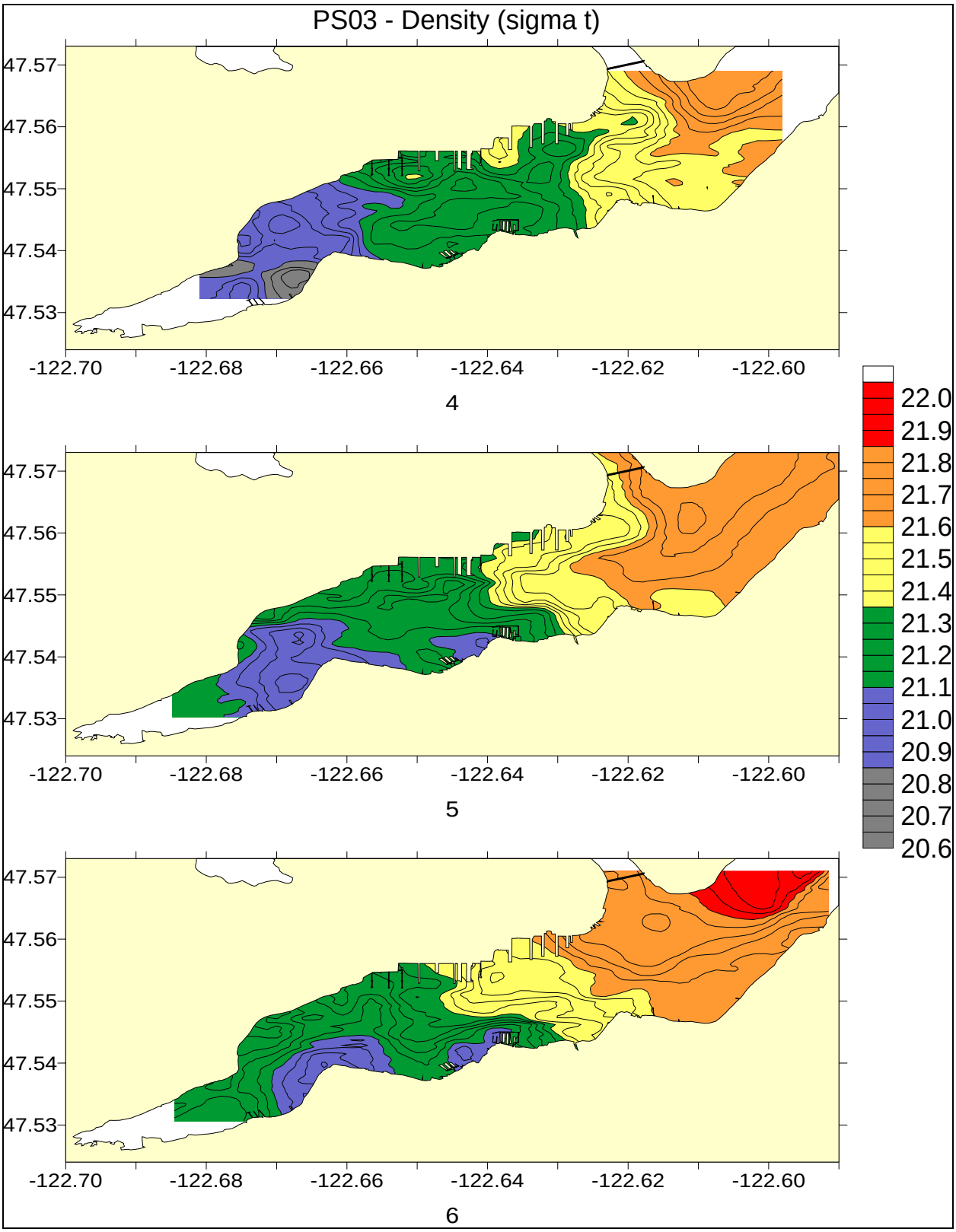
4.1.4 Temperature



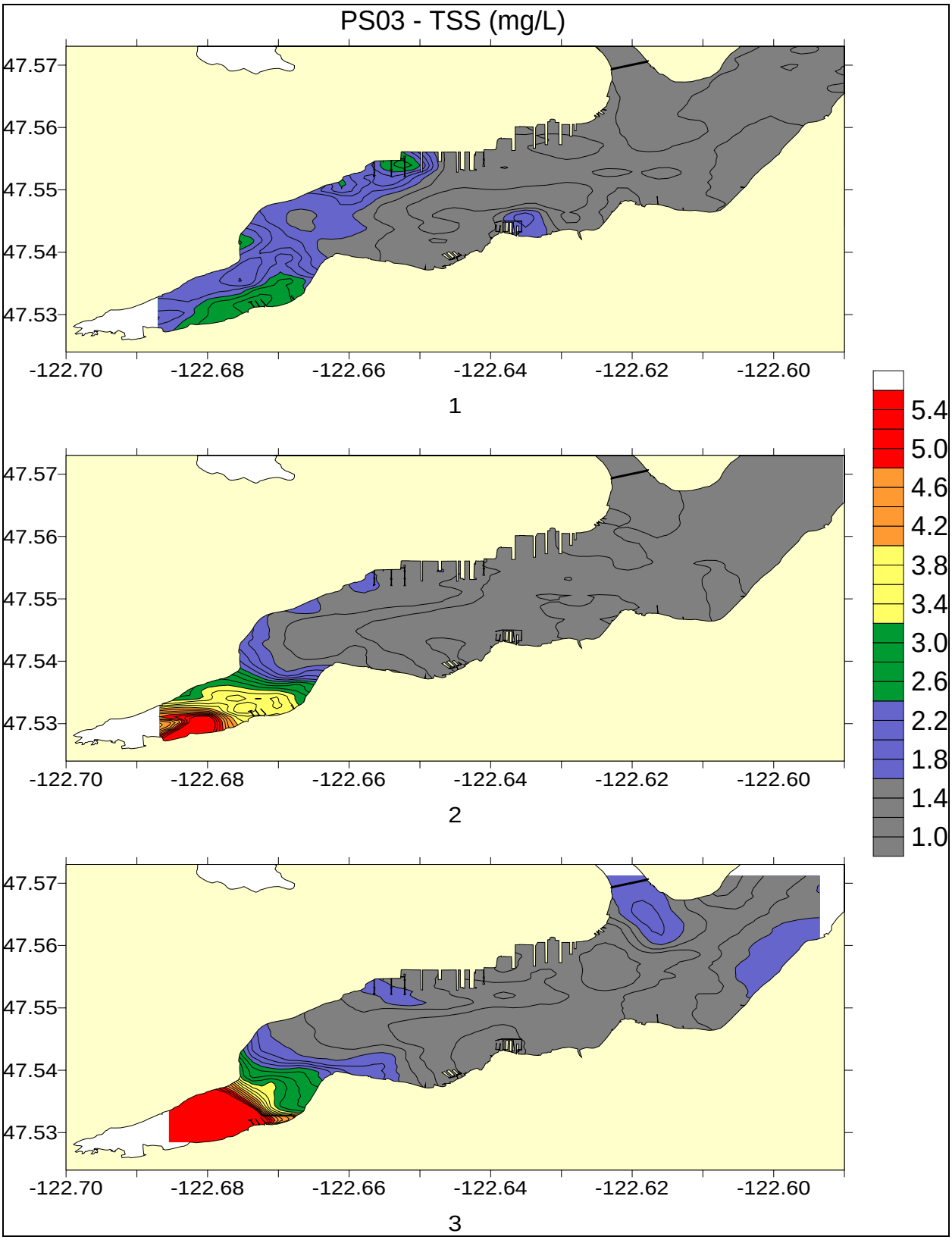

PS03 - Temperature (deg C)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
16.3
16.0
15.7
15.4
15.1
14.8
14.5
14.2
13.9
13.6
13.3

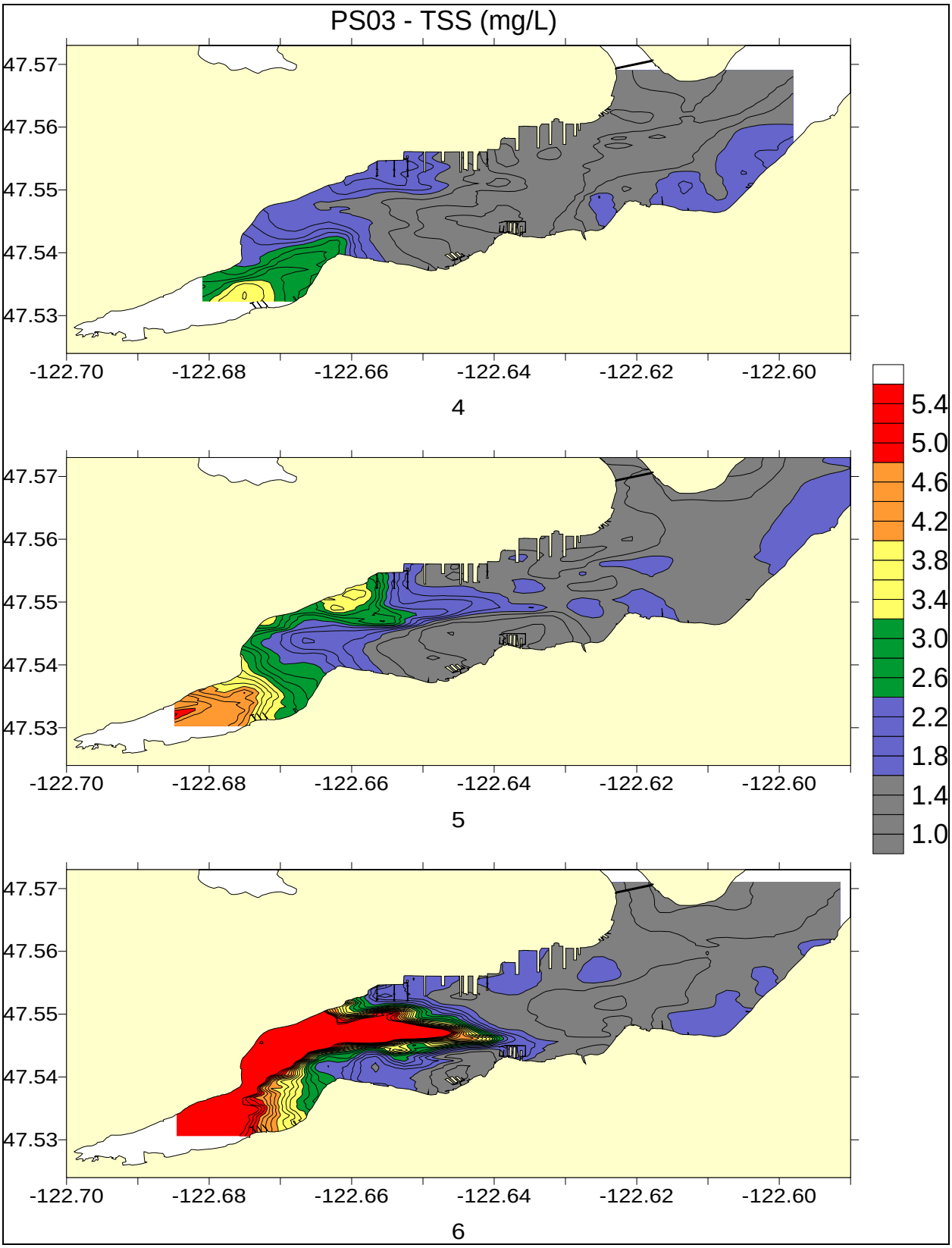
4.1.5 Density


PS03 - Density (sigma t)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
22.0
21.9
21.8
21.7
21.6
21.5
21.4
21.3
21.2
21.1
21.0
20.9
20.8
20.7
20.6

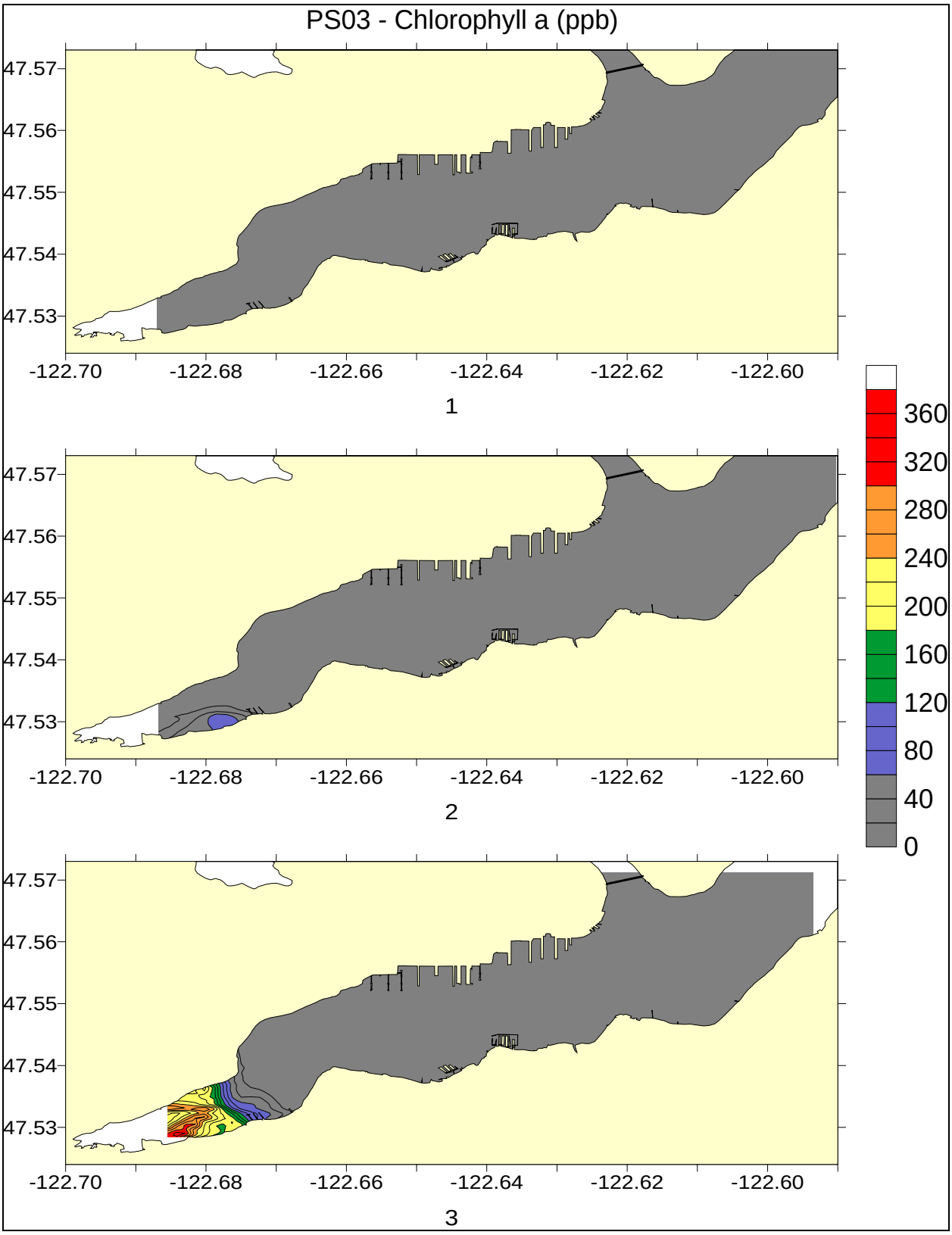

PS03 - Density (sigma t)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
22.0
21.9
21.8
21.7
21.6
21.5
21.4
21.3
21.2
21.1
21.0
20.9
20.8
20.7
20.6

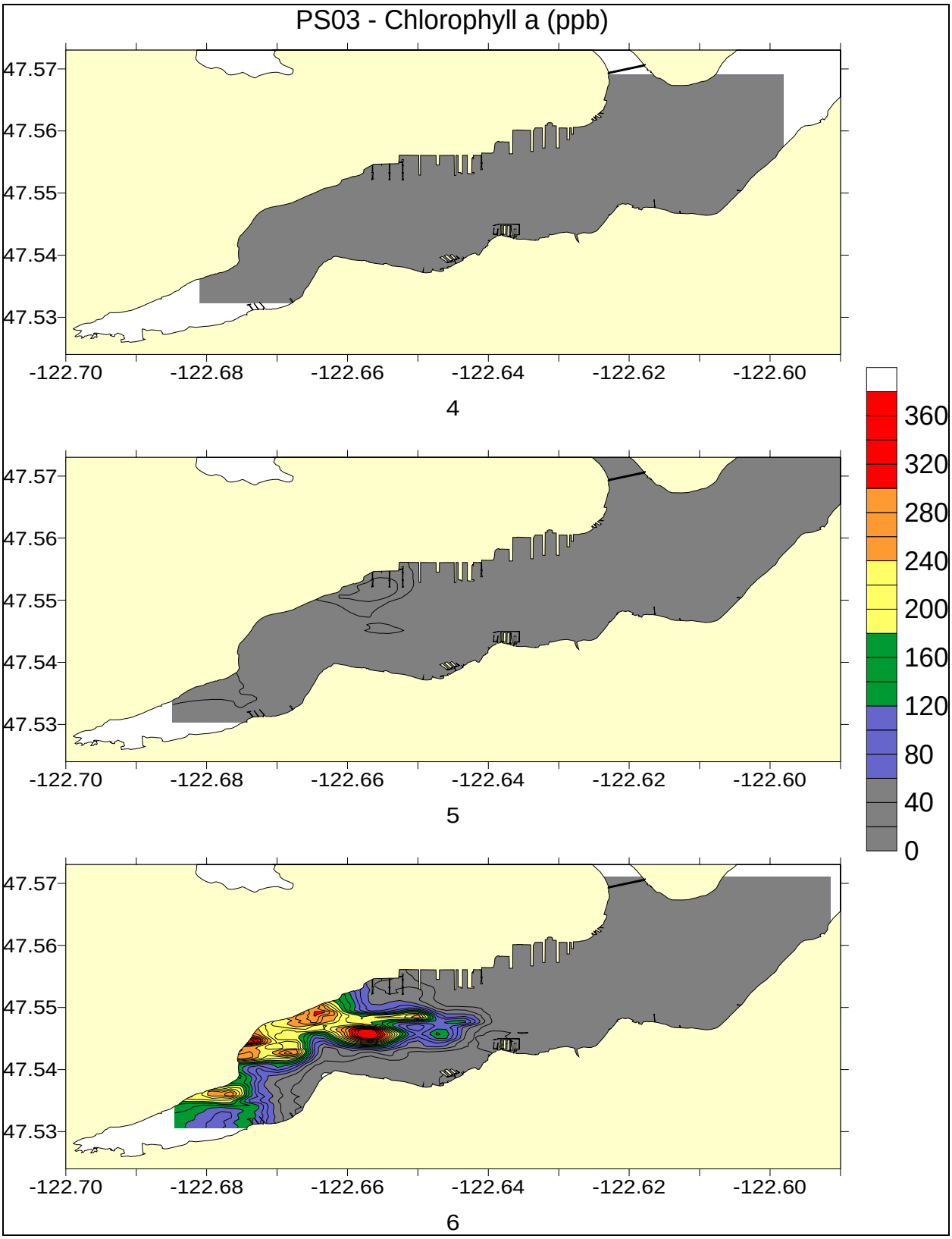
4.1.6 TSS


PS03 - TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
5.4
5.0
4.6
4.2
3.8
3.4
3.0
2.6
2.2
1.8
1.4
1.0

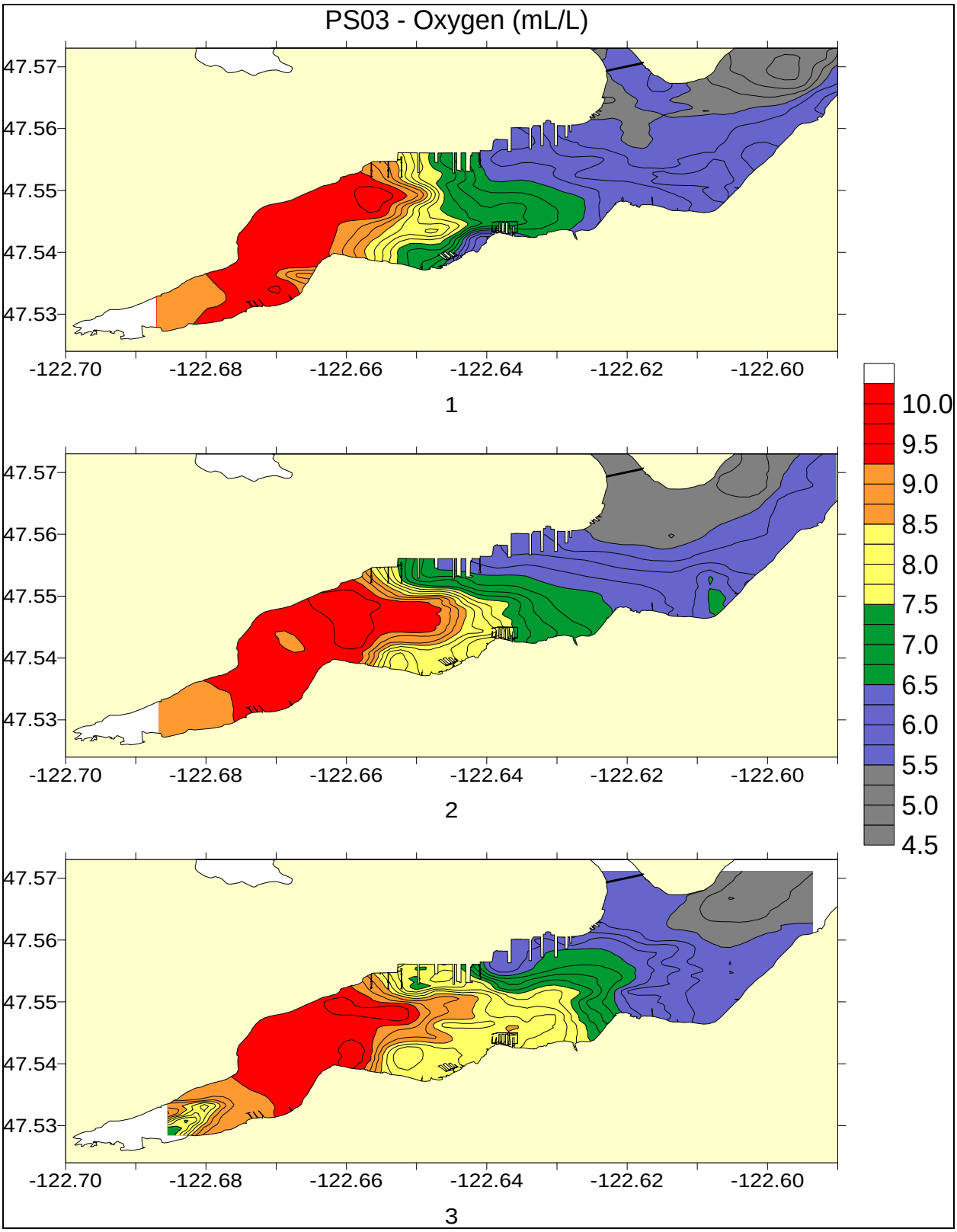

PS03 - TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
5.4
5.0
4.6
4.2
3.8
3.4
3.0
2.6
2.2
1.8
1.4
1.0

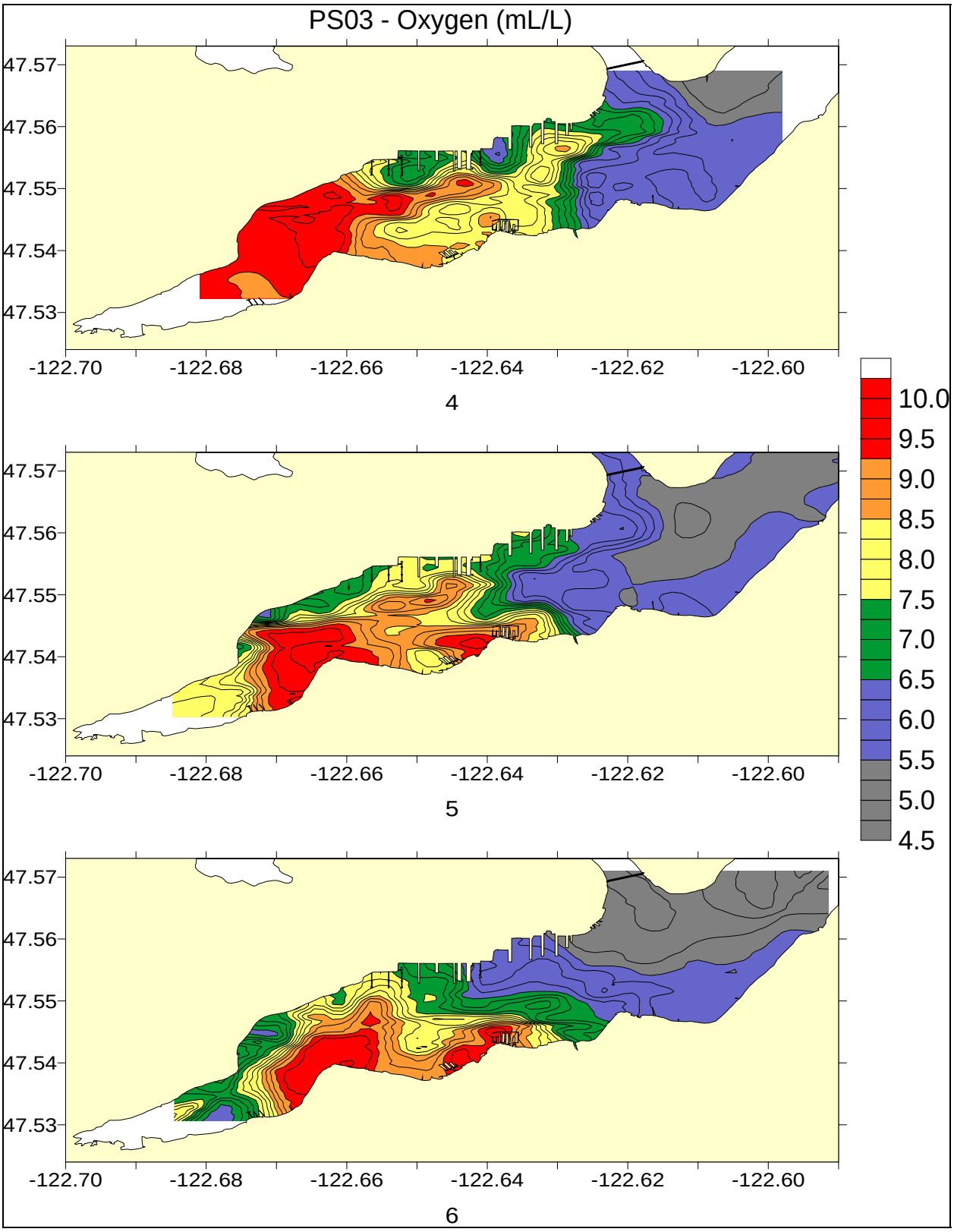
4.1.7 Chlorophyll *a*



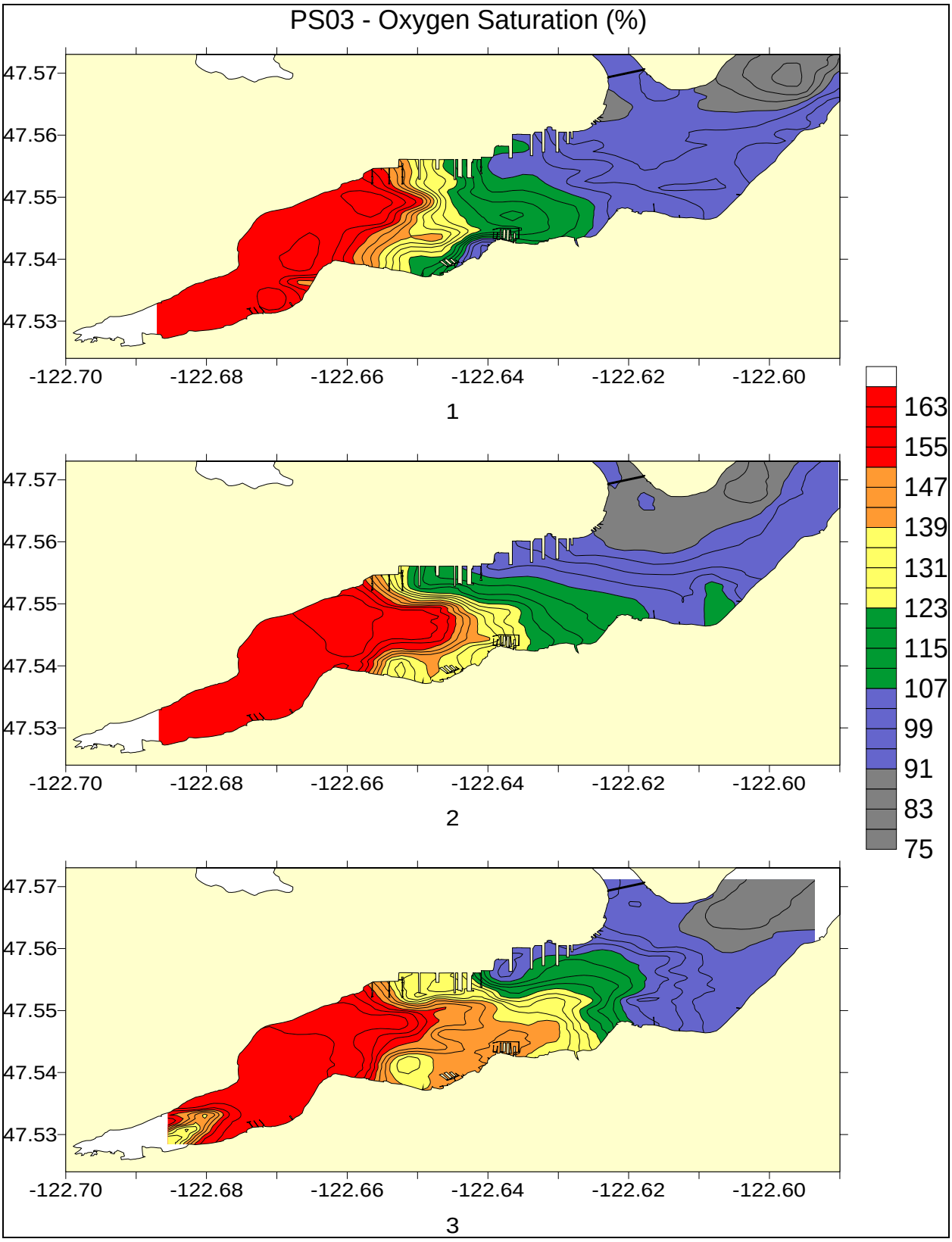

PS03 - Chlorophyll a (ppb)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
360
320
280
240
200
160
120
80
40
0

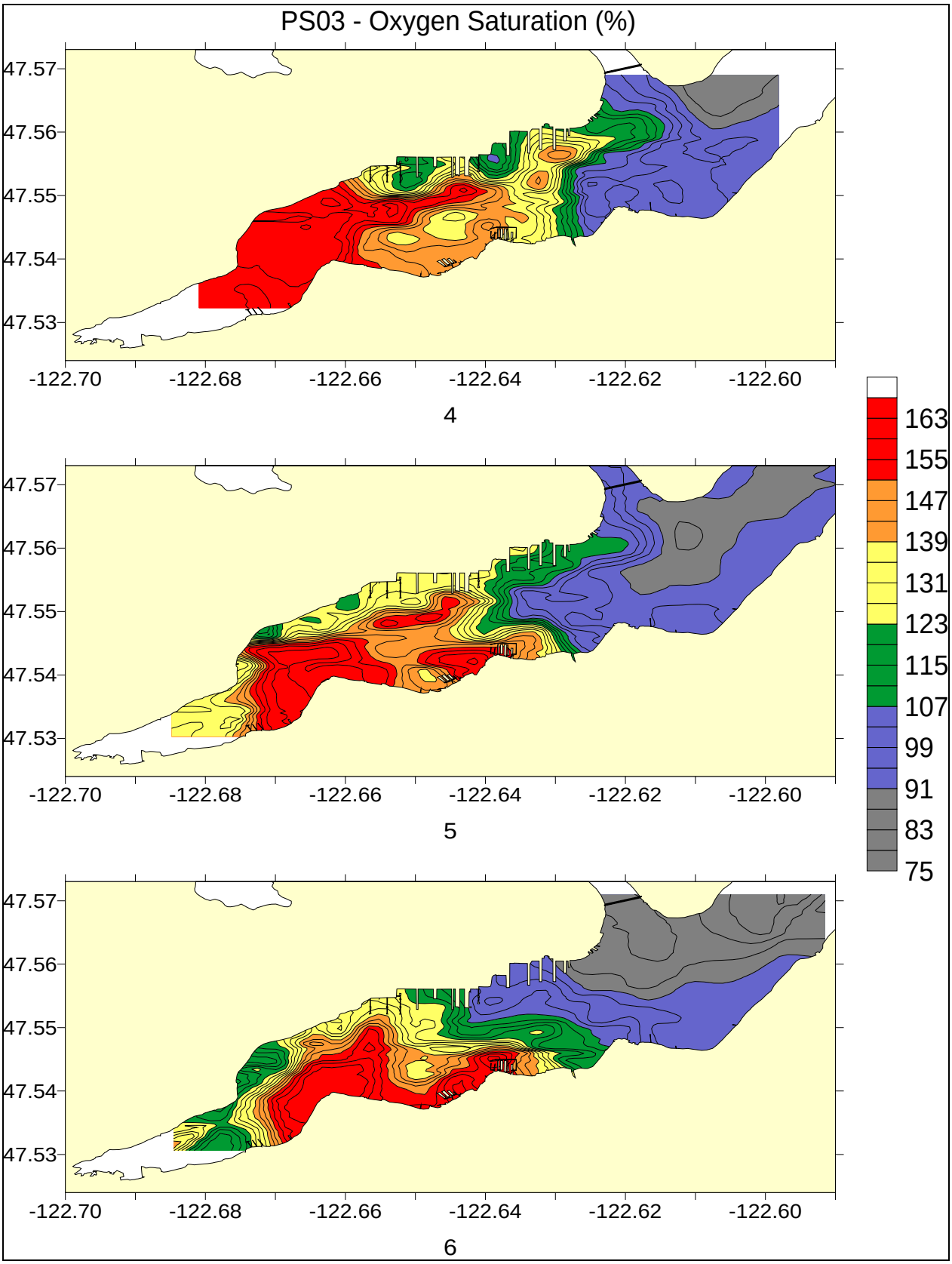
4.1.8 Oxygen


PS03 - Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5

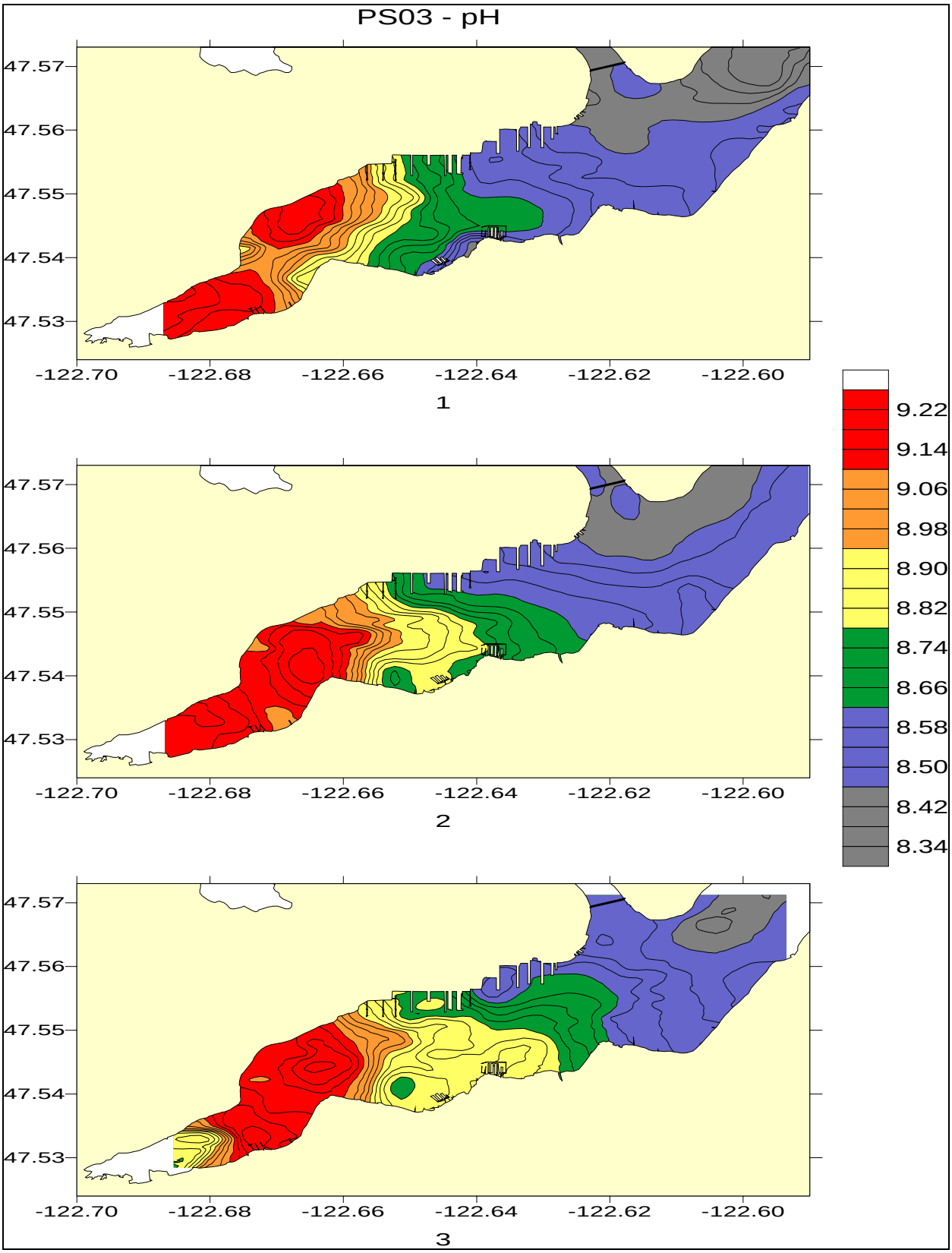

PS03 - Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5

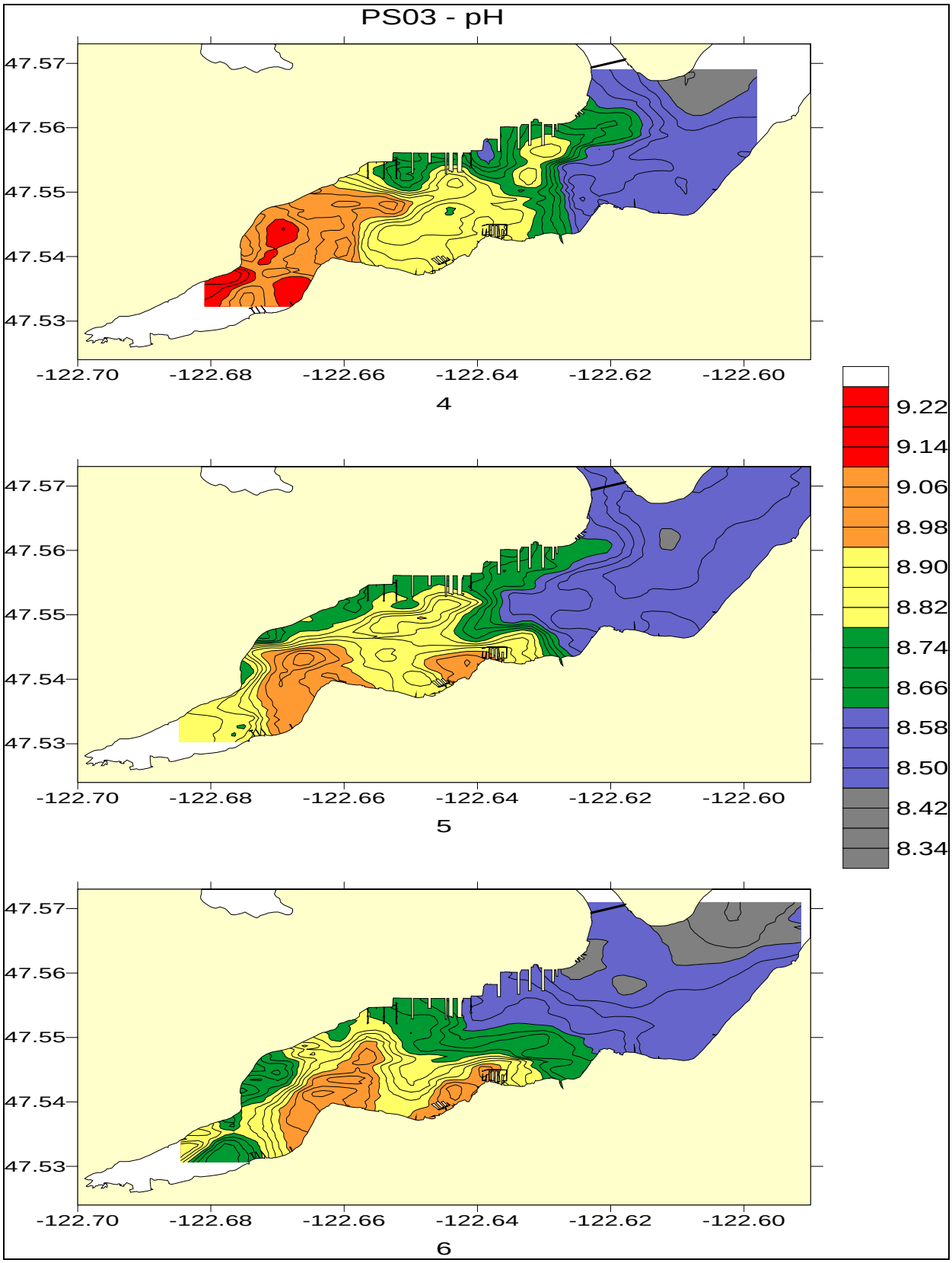
4.1.9 Oxygen Saturation



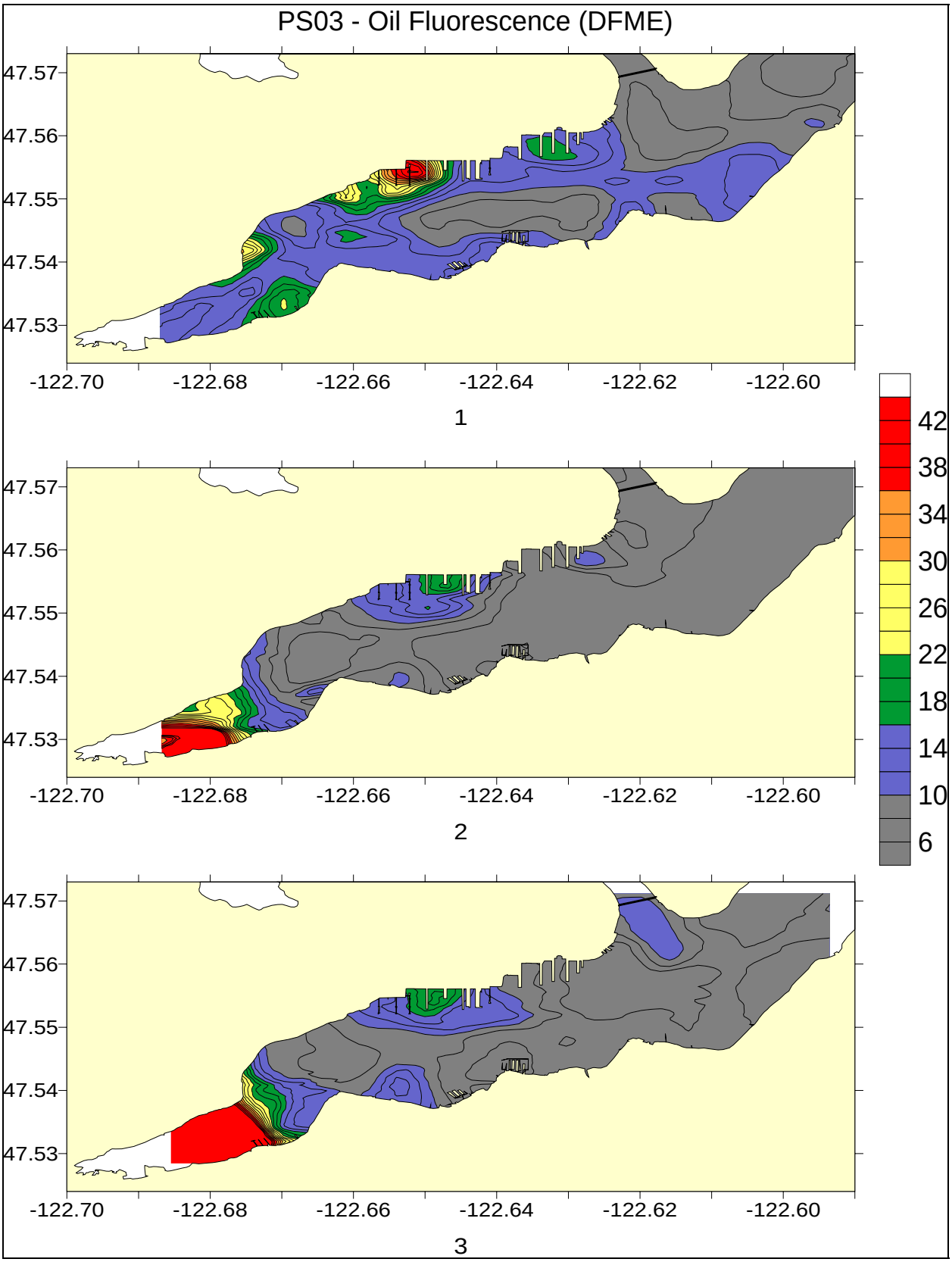

PS03 - Oxygen Saturation (%)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
163
155
147
139
131
123
115
107
99
91
83
75

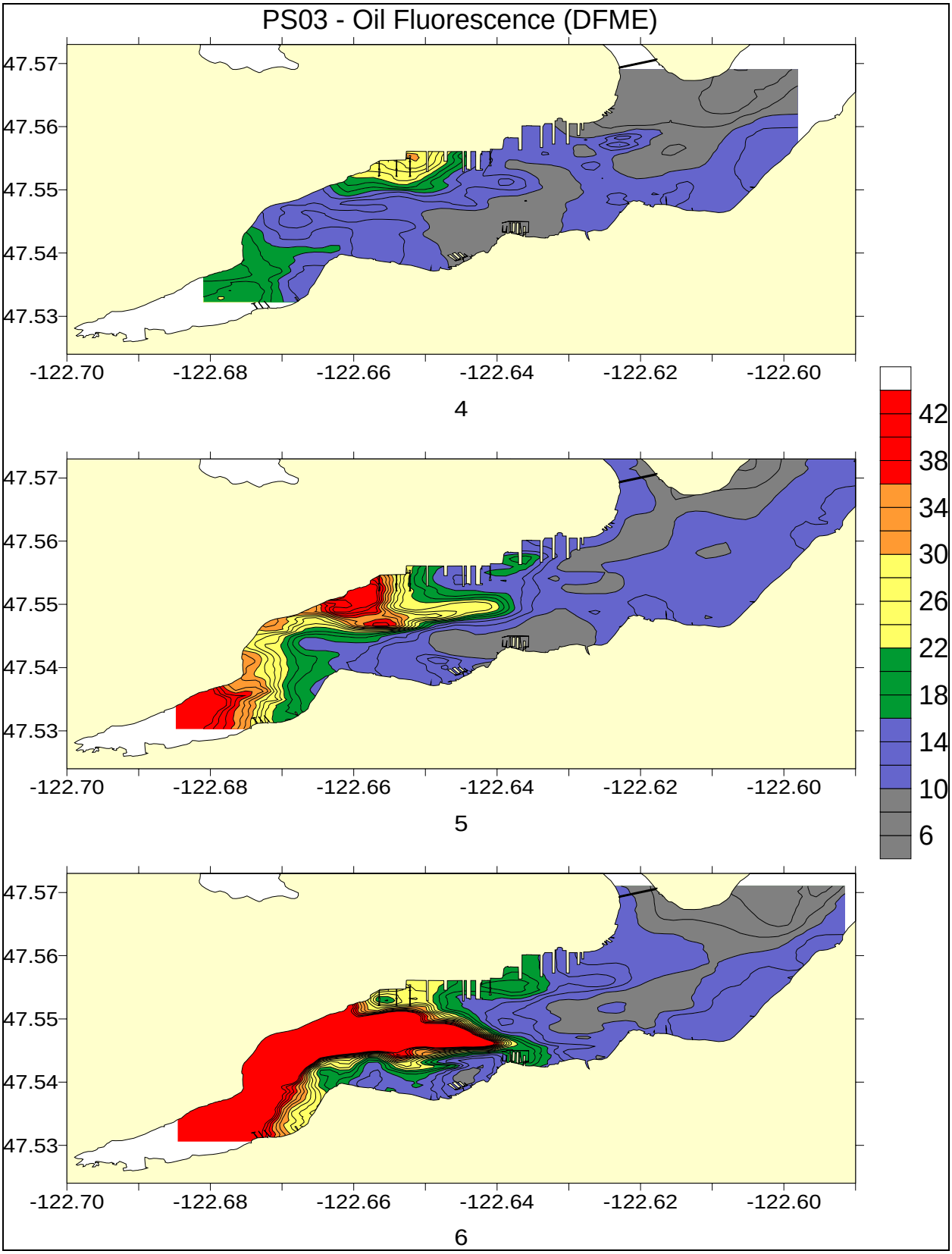
4.1.10 pH


PS03 - pH
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
9.22
9.14
9.06
8.98
8.90
8.82
8.74
8.66
8.58
8.50
8.42
8.34


PS03 - pH
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
9.22
9.14
9.06
8.98
8.90
8.82
8.74
8.66
8.58
8.50
8.42
8.34

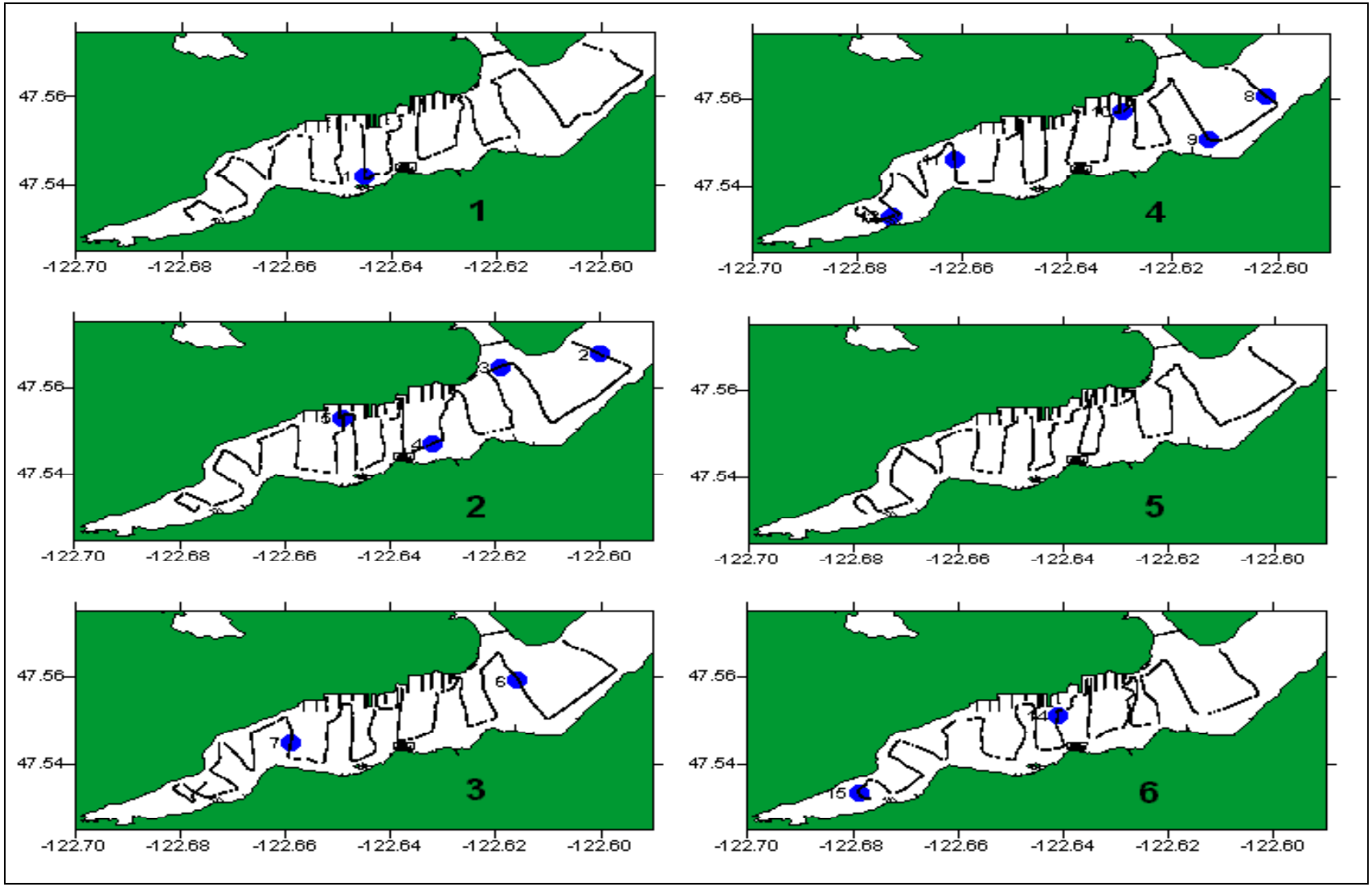
4.1.11 Oil Fluorescence



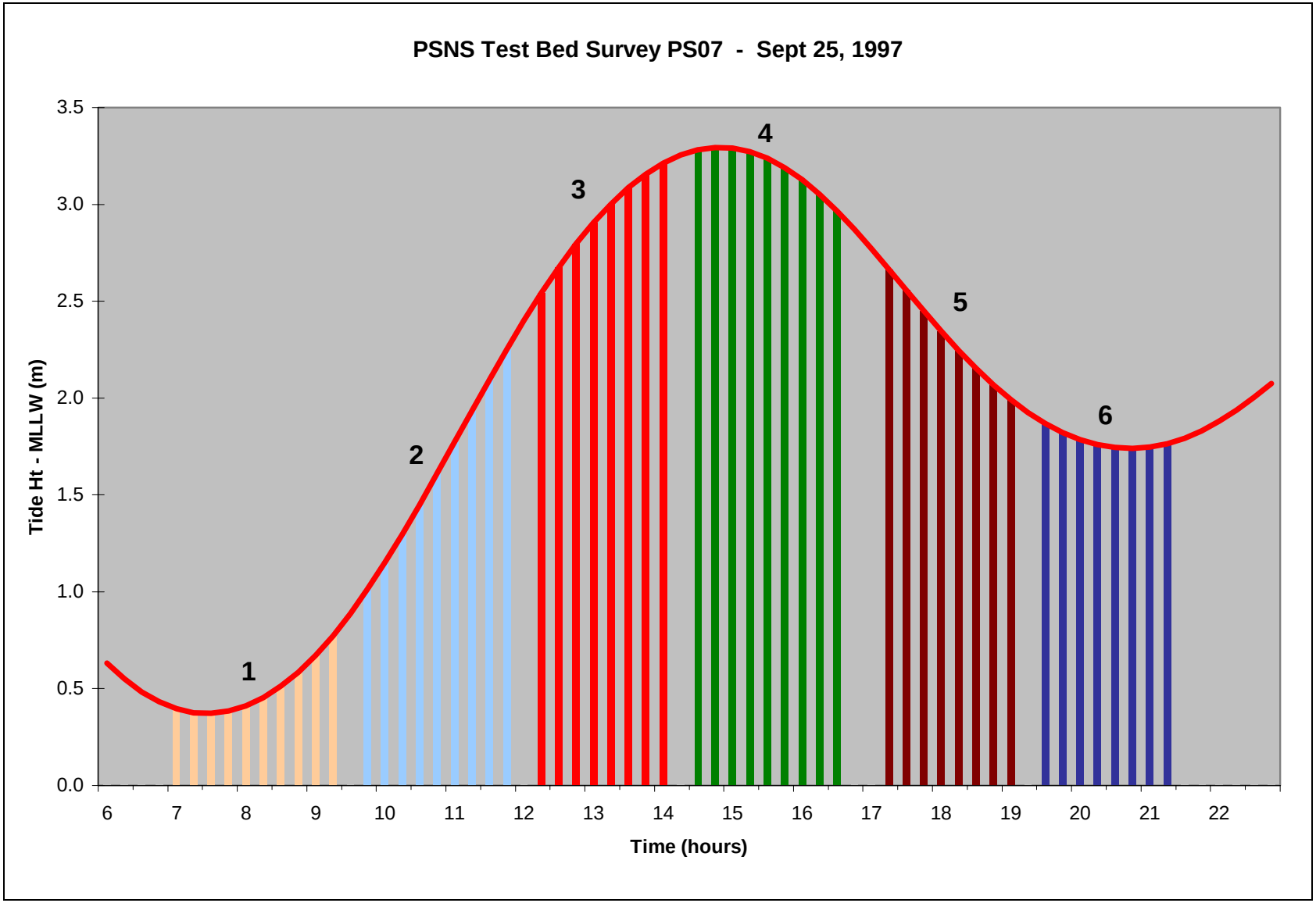

PS03 - Oil Fluorescence (DFME)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
42
38
34
30
26
22
18
14
10
6

4.2 September 25, 1997 – PS07

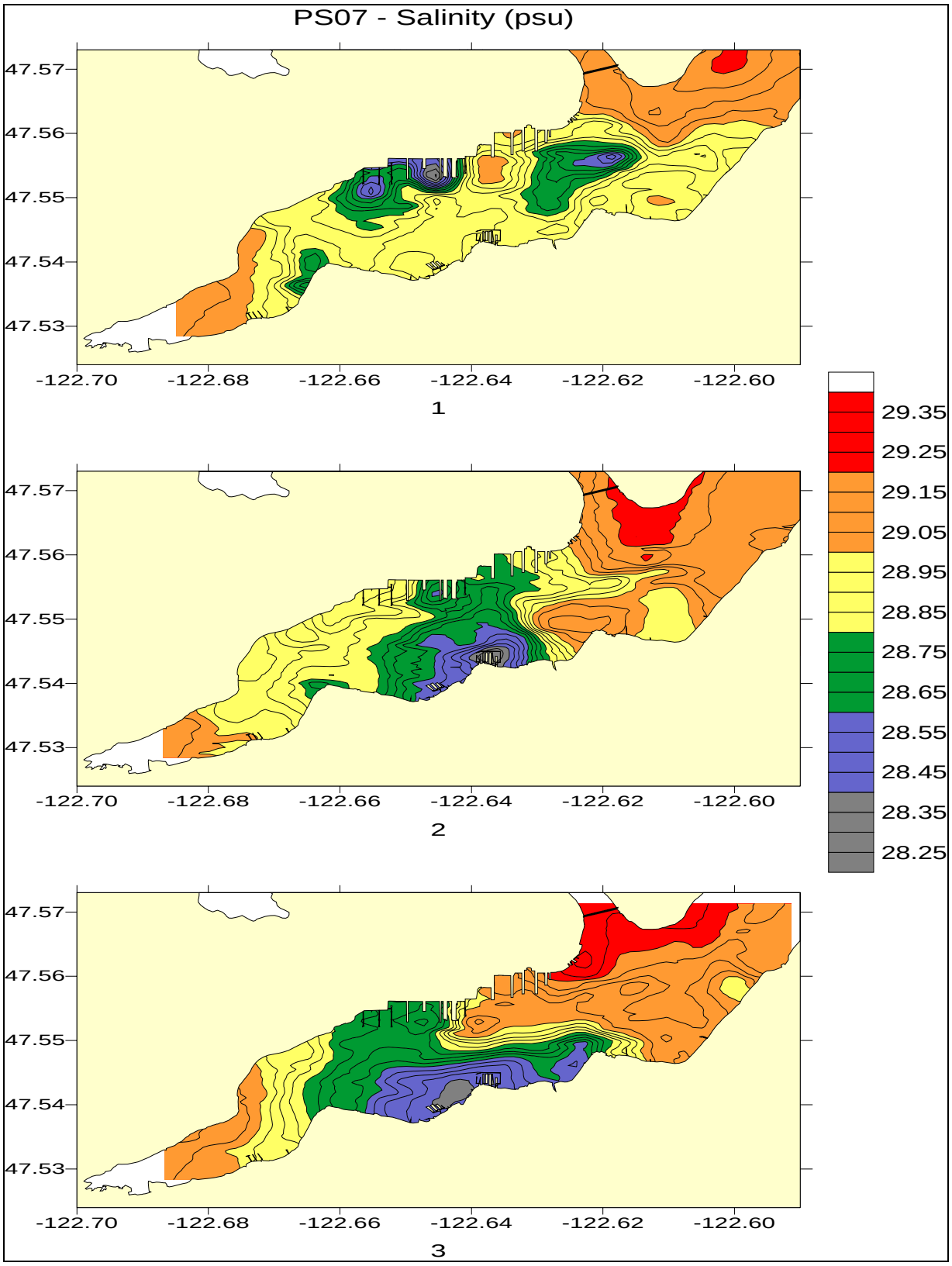
4.2.1 Track Map

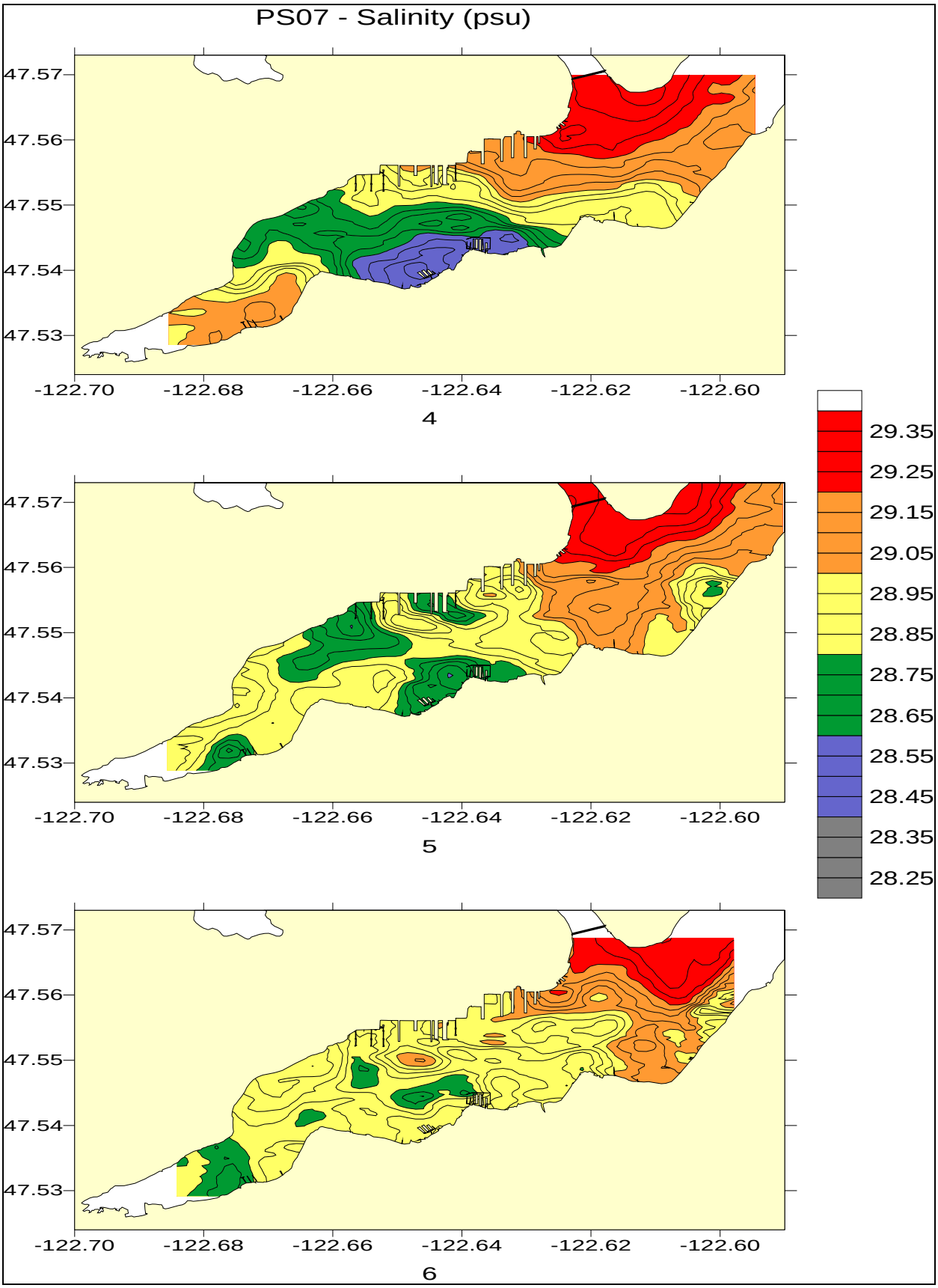


4.2.2 Tide Chart

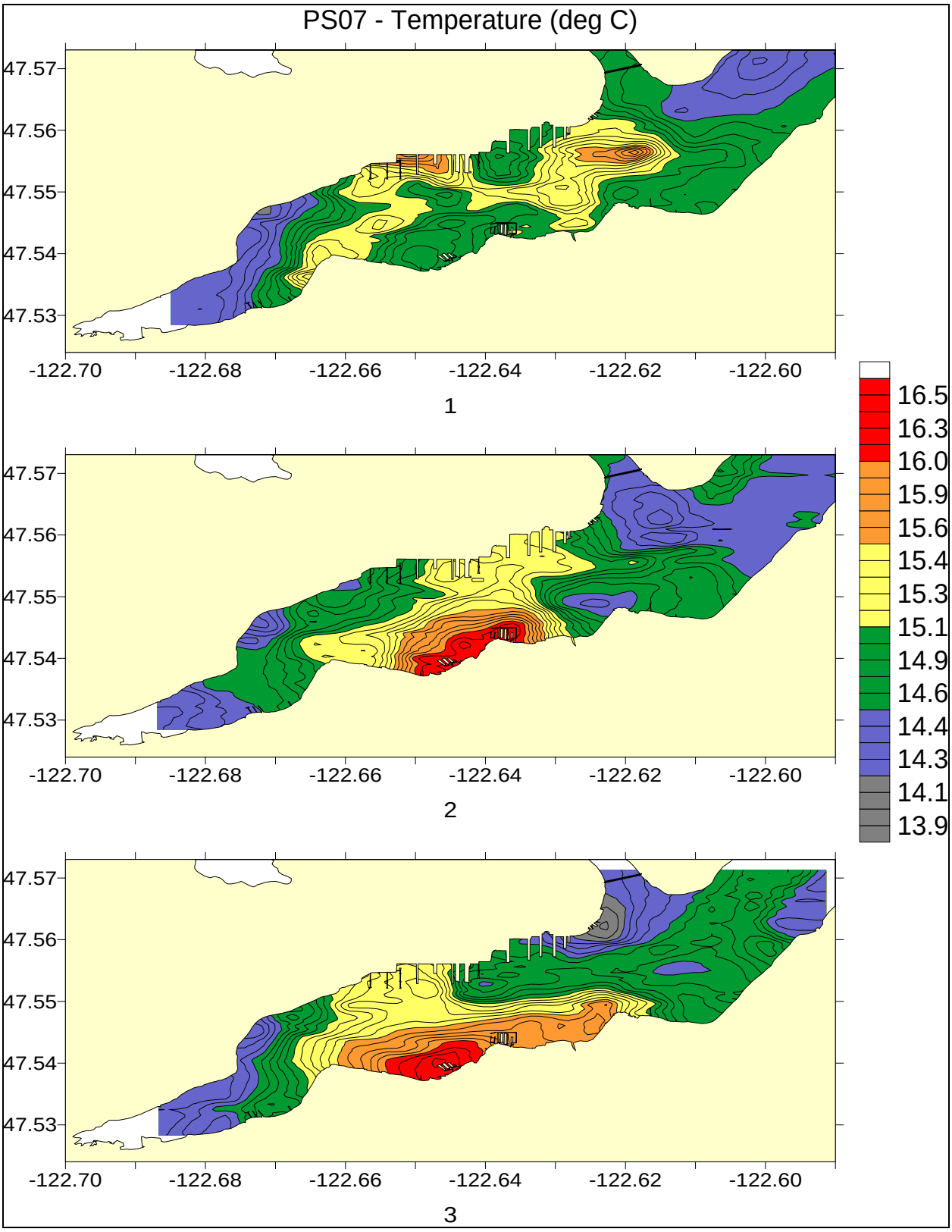


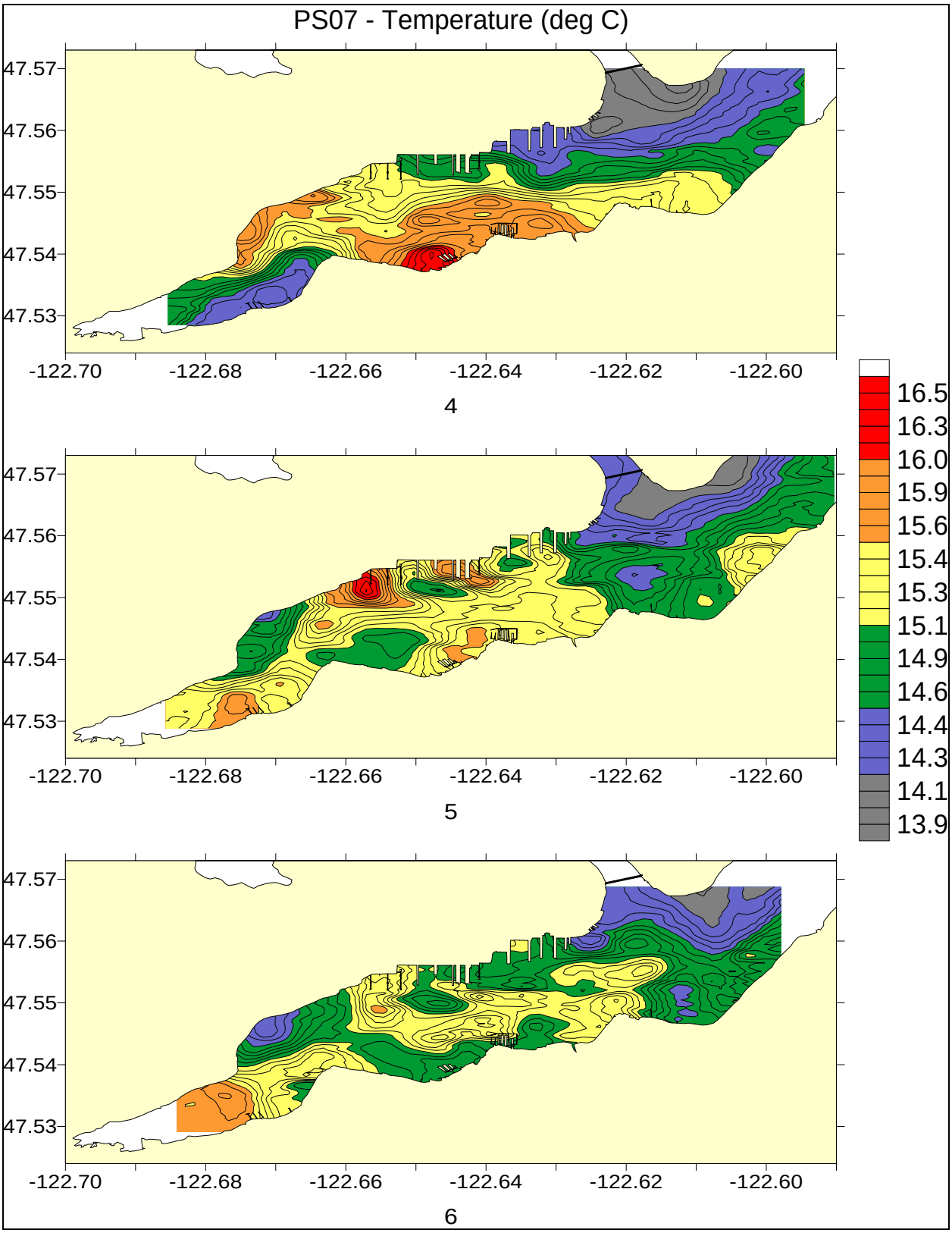
4.2.3 Salinity



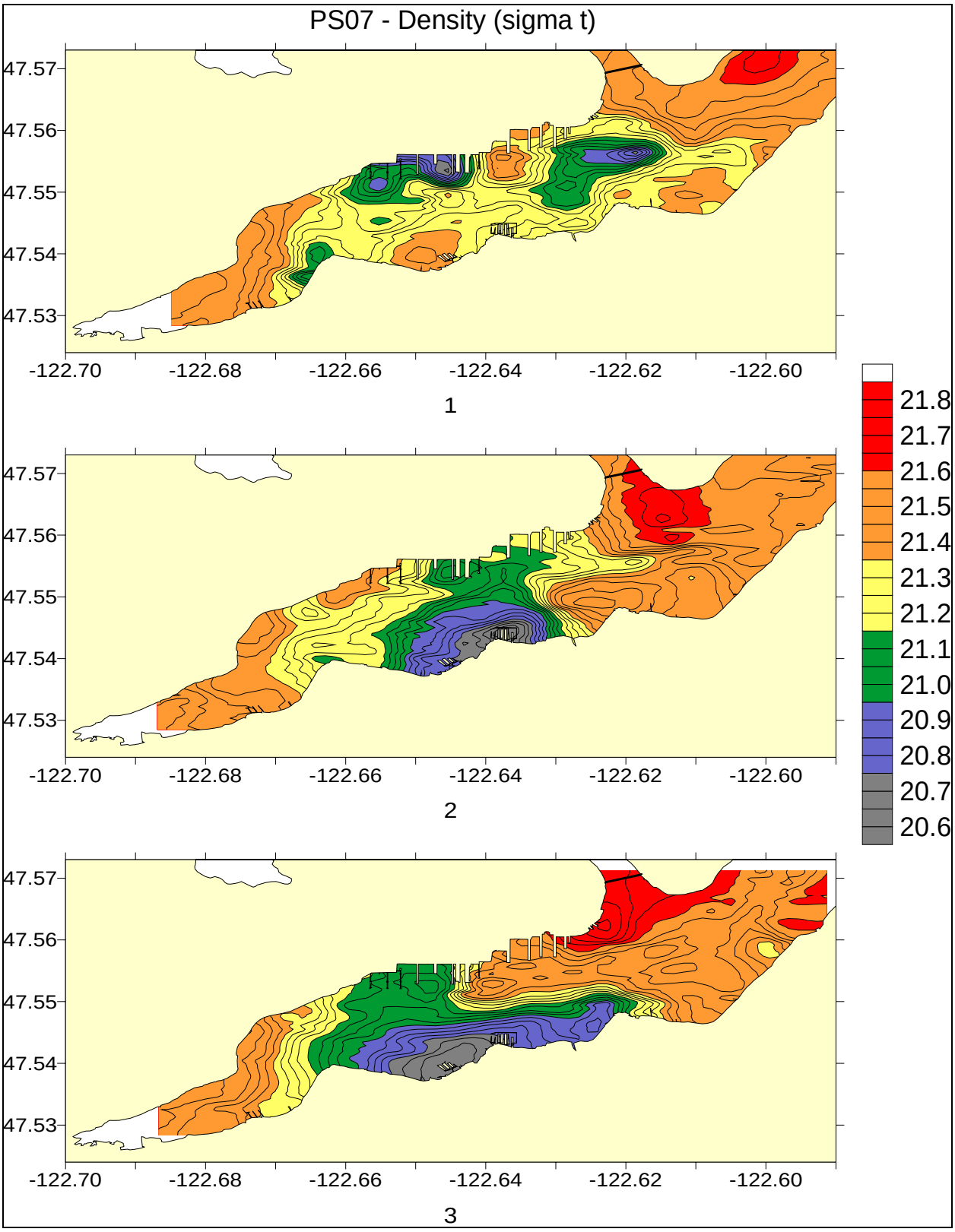

PS07 - Salinity (psu)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
29.35
29.25
29.15
29.05
28.95
28.85
28.75
28.65
28.55
28.45
28.35
28.25

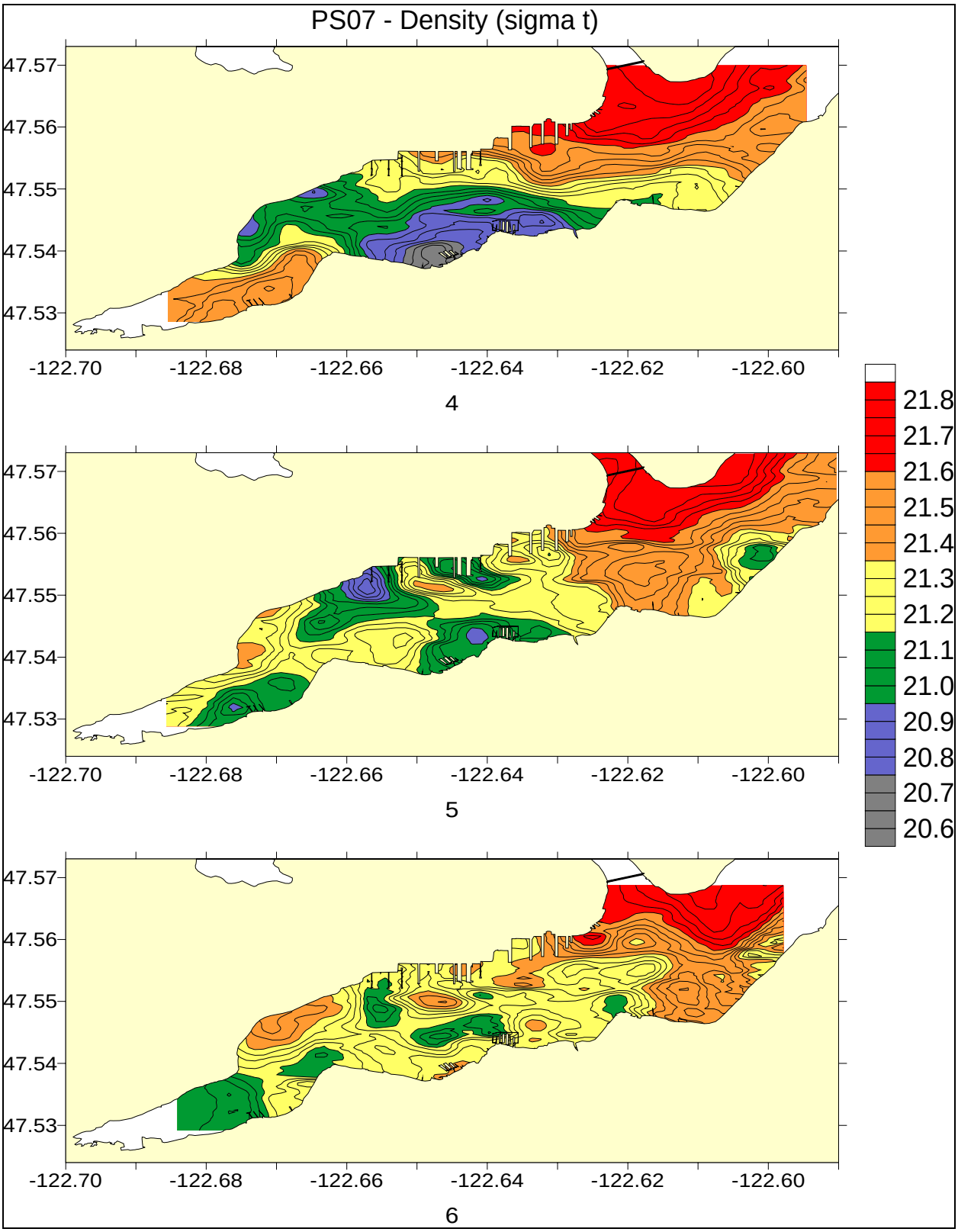
4.2.4 Temperature



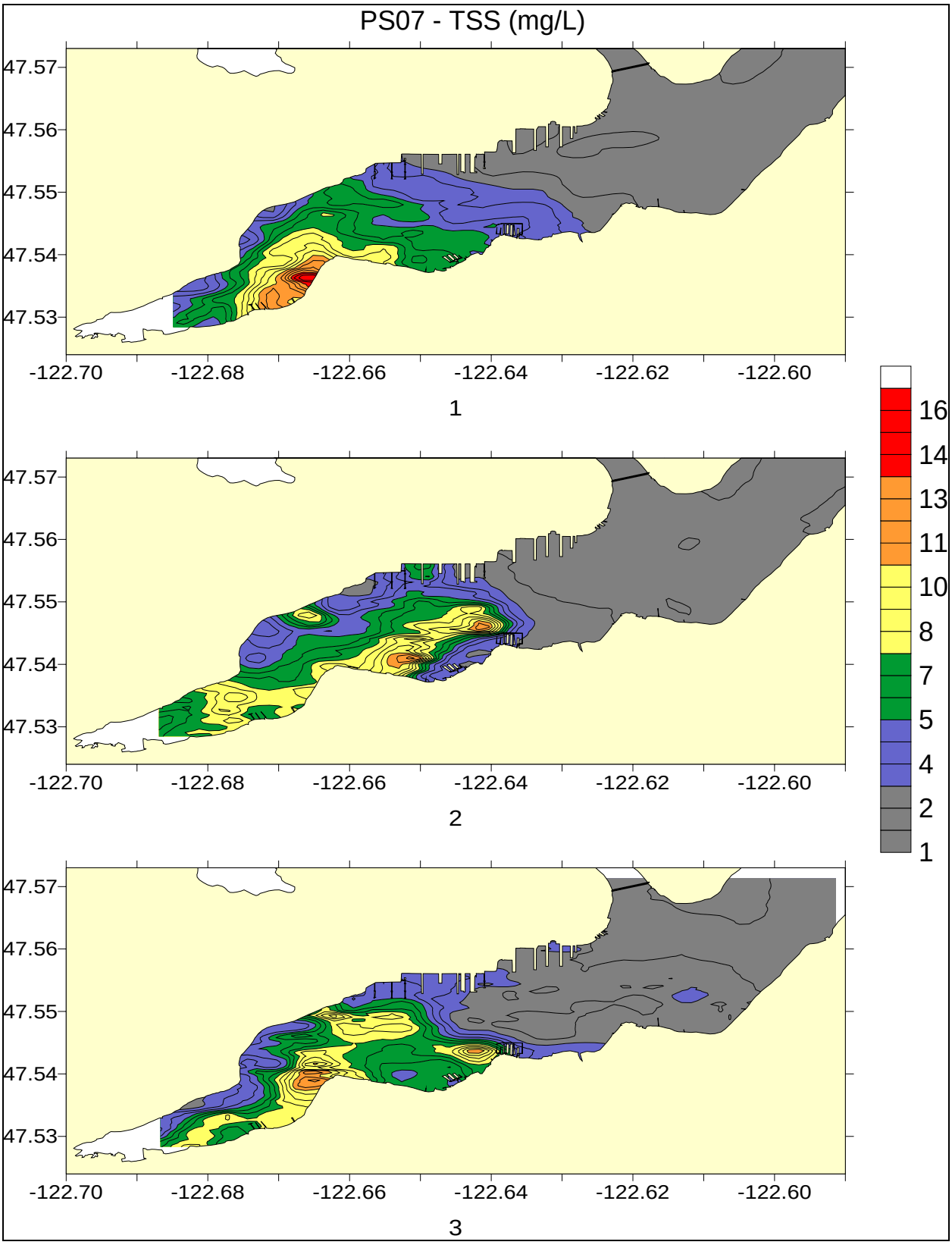

PS07 - Temperature (deg C)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
16.5
16.3
16.0
15.9
15.6
15.4
15.3
15.1
14.9
14.6
14.4
14.3
14.1
13.9

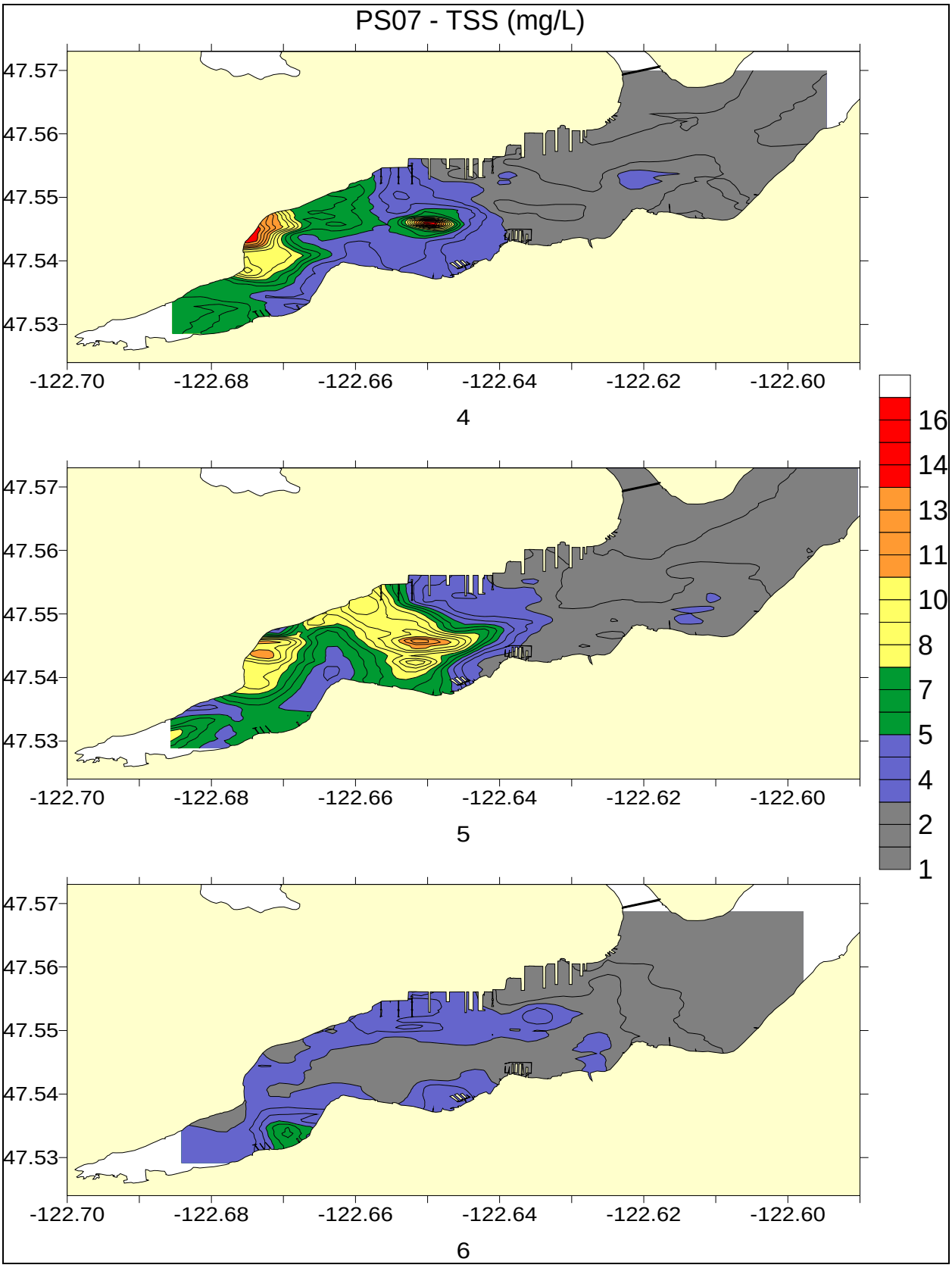
4.2.5 Density


PS07 - Density (sigma t)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
21.8
21.7
21.6
21.5
21.4
21.3
21.2
21.1
21.0
20.9
20.8
20.7
20.6

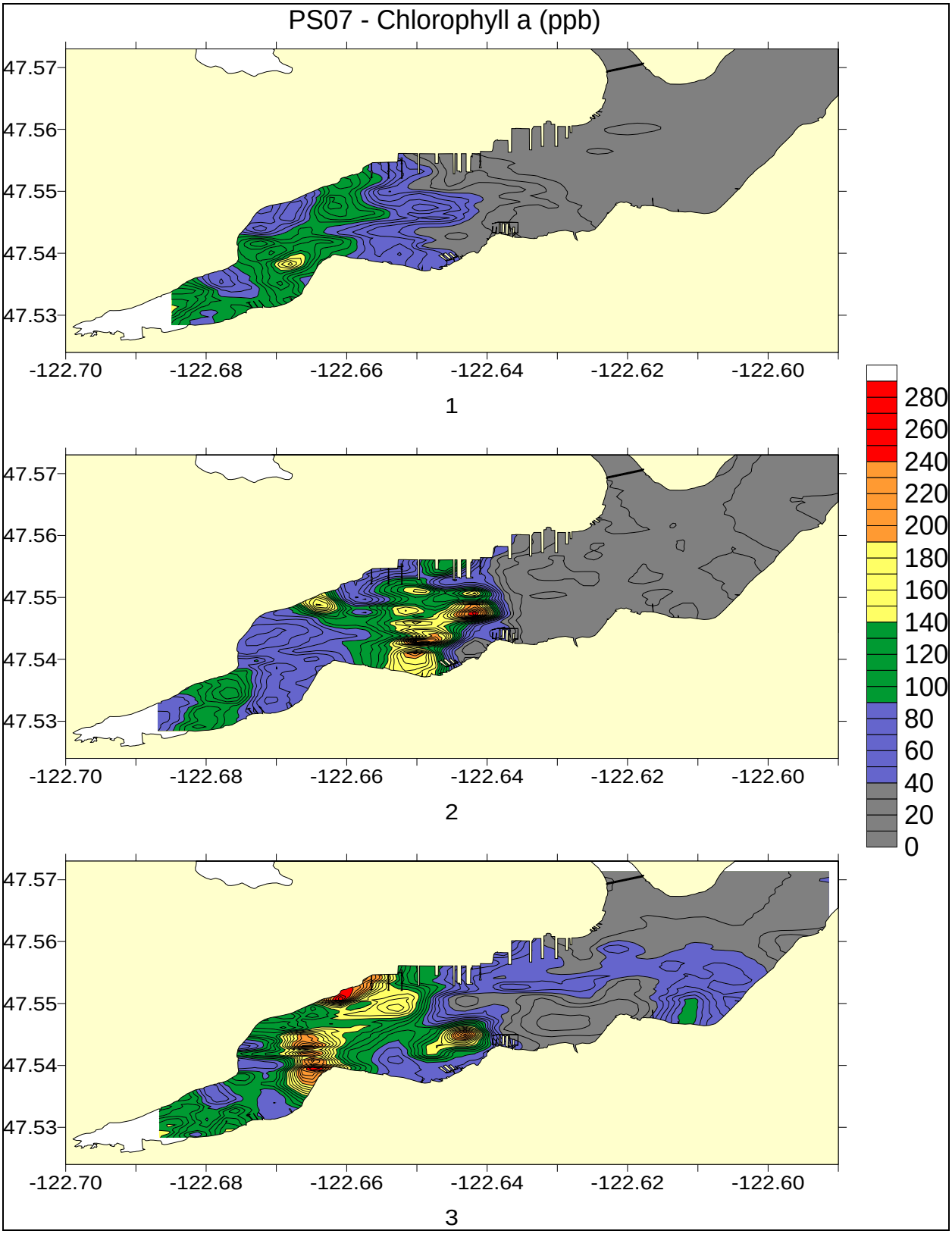

PS07 - Density (sigma t)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
21.8
21.7
21.6
21.5
21.4
21.3
21.2
21.1
21.0
20.9
20.8
20.7
20.6

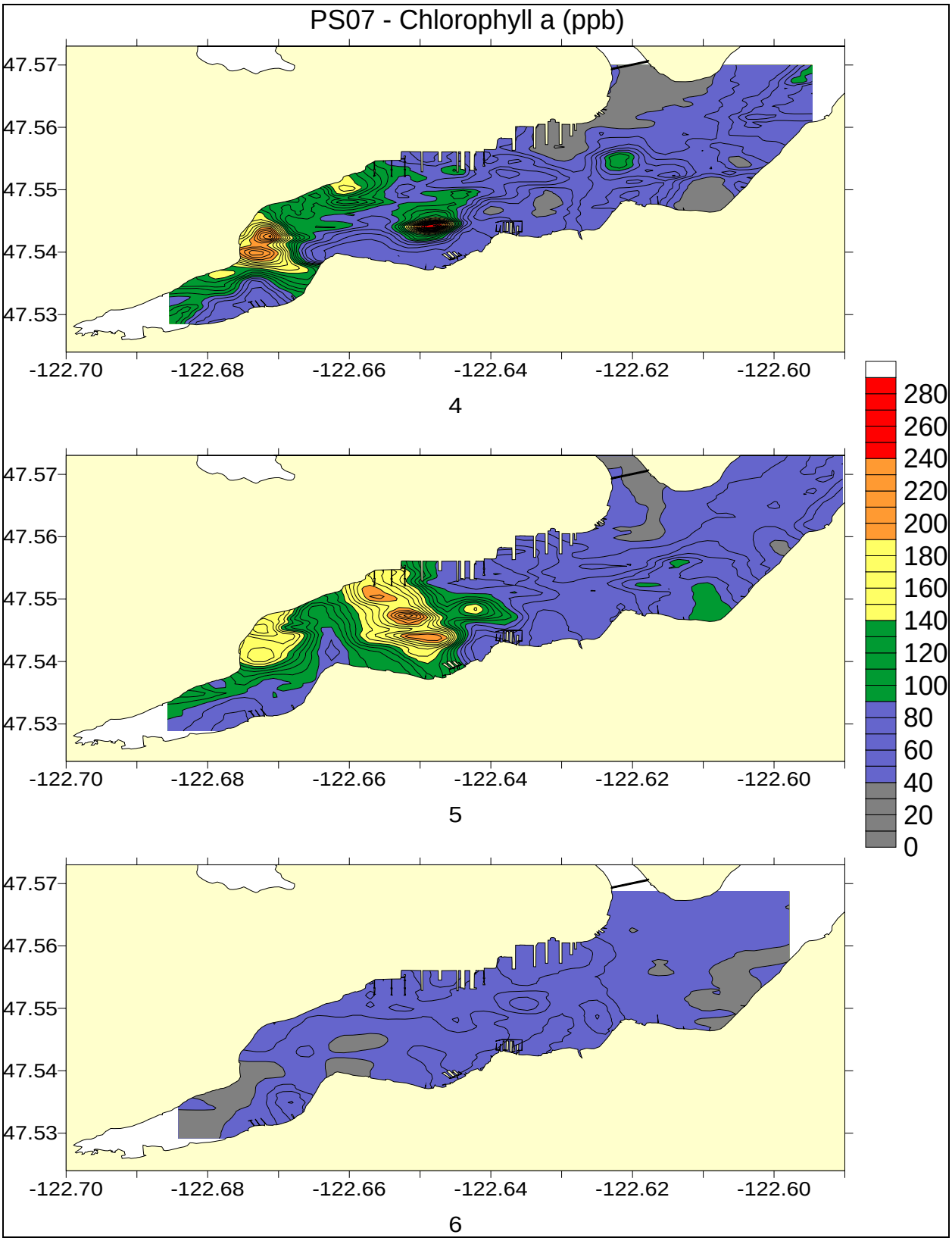
4.2.6 TSS


PS07 - TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
16
14
13
11
10
8
7
5
4
2
1

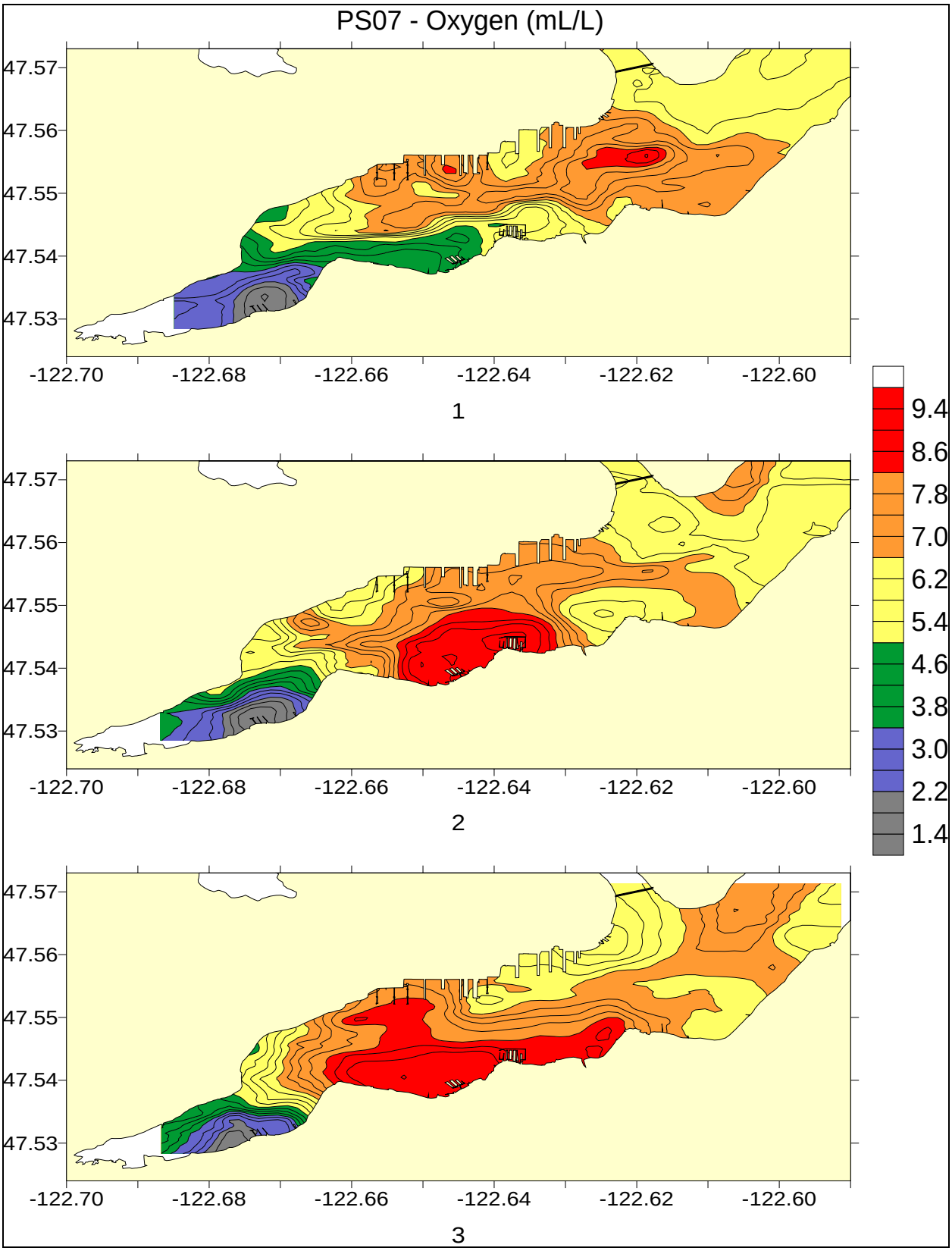

PS07 - TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
16
14
13
11
10
8
7
5
4
2
1

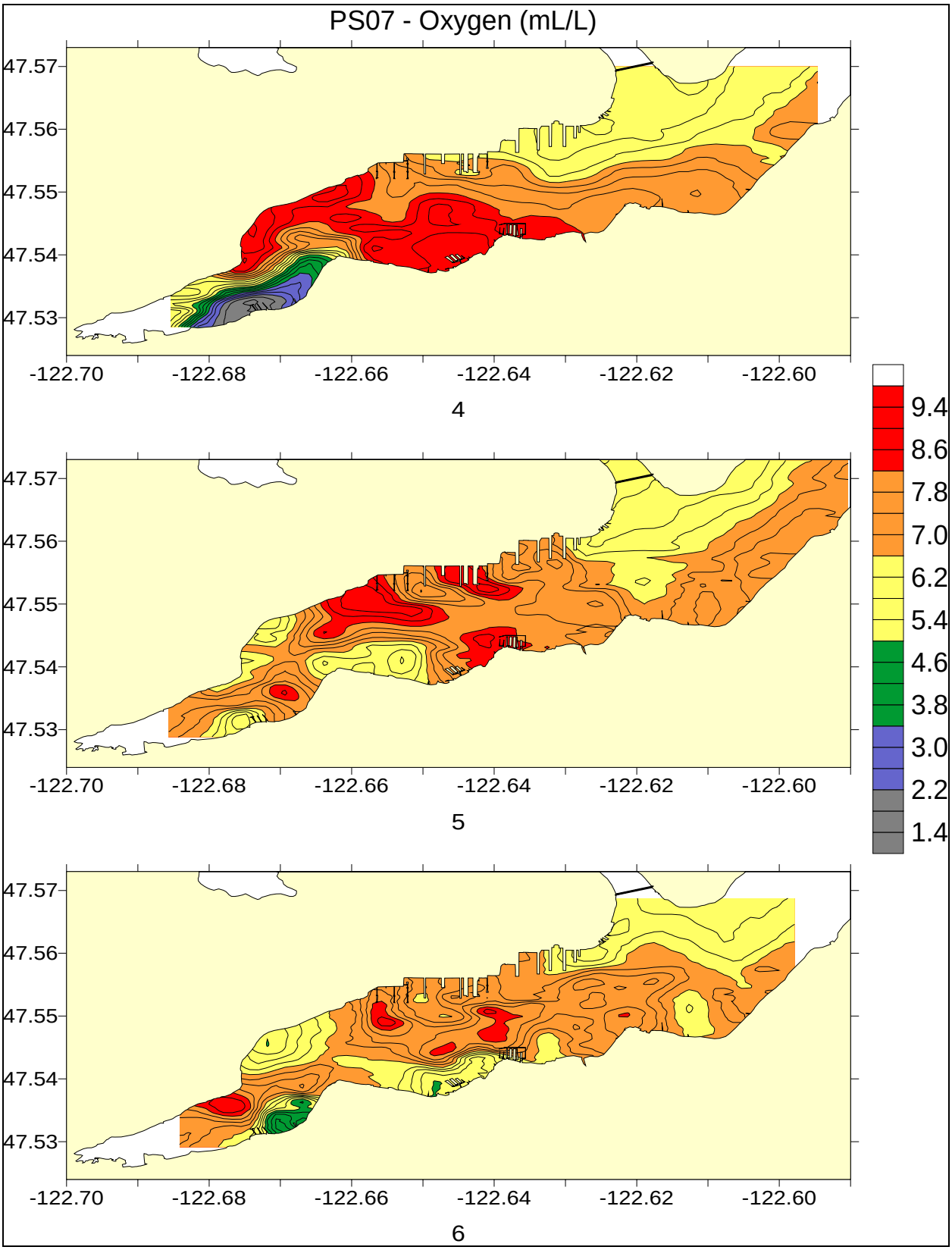
4.2.7 Chlorophyll *a*



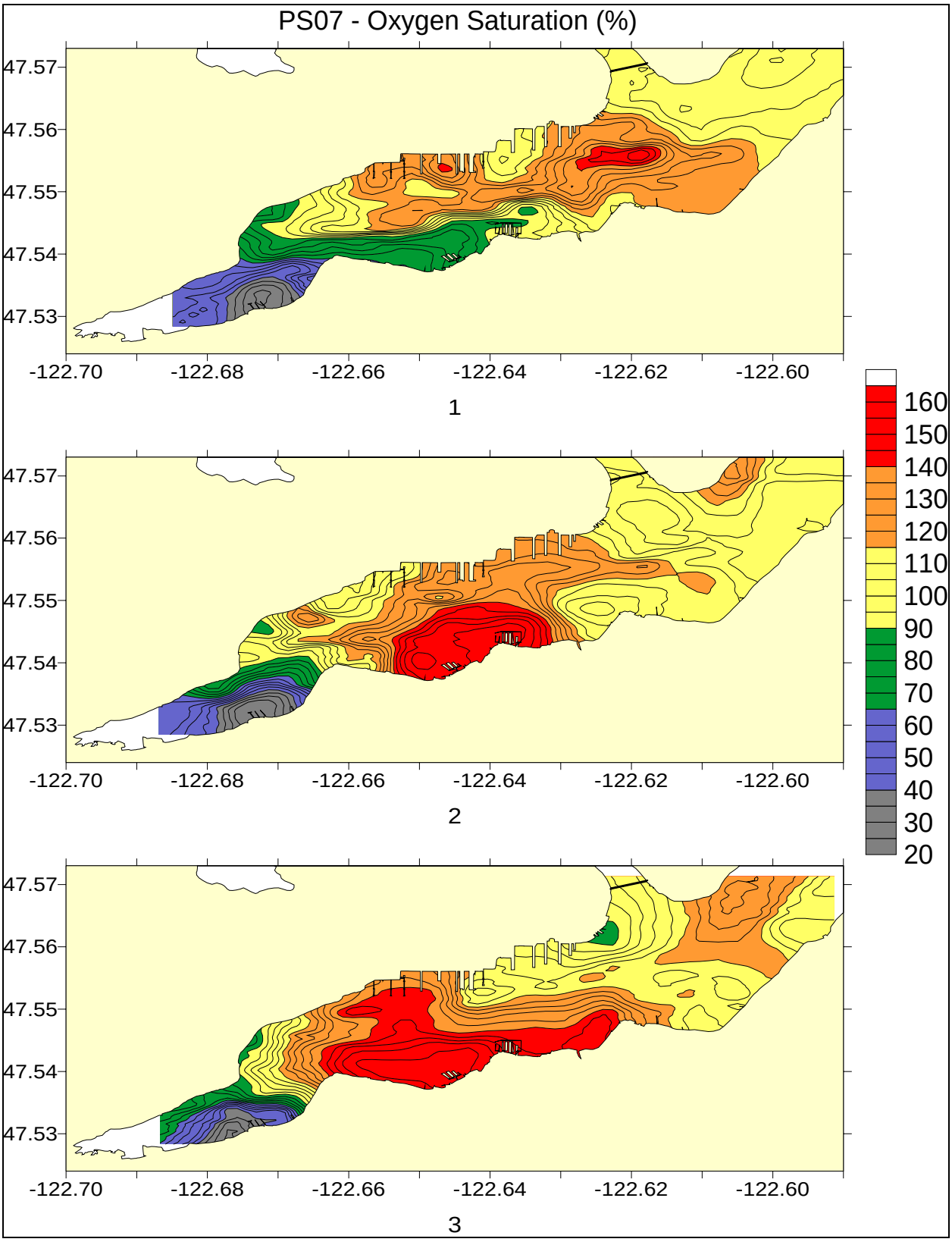

PS07 - Chlorophyll a (ppb)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0

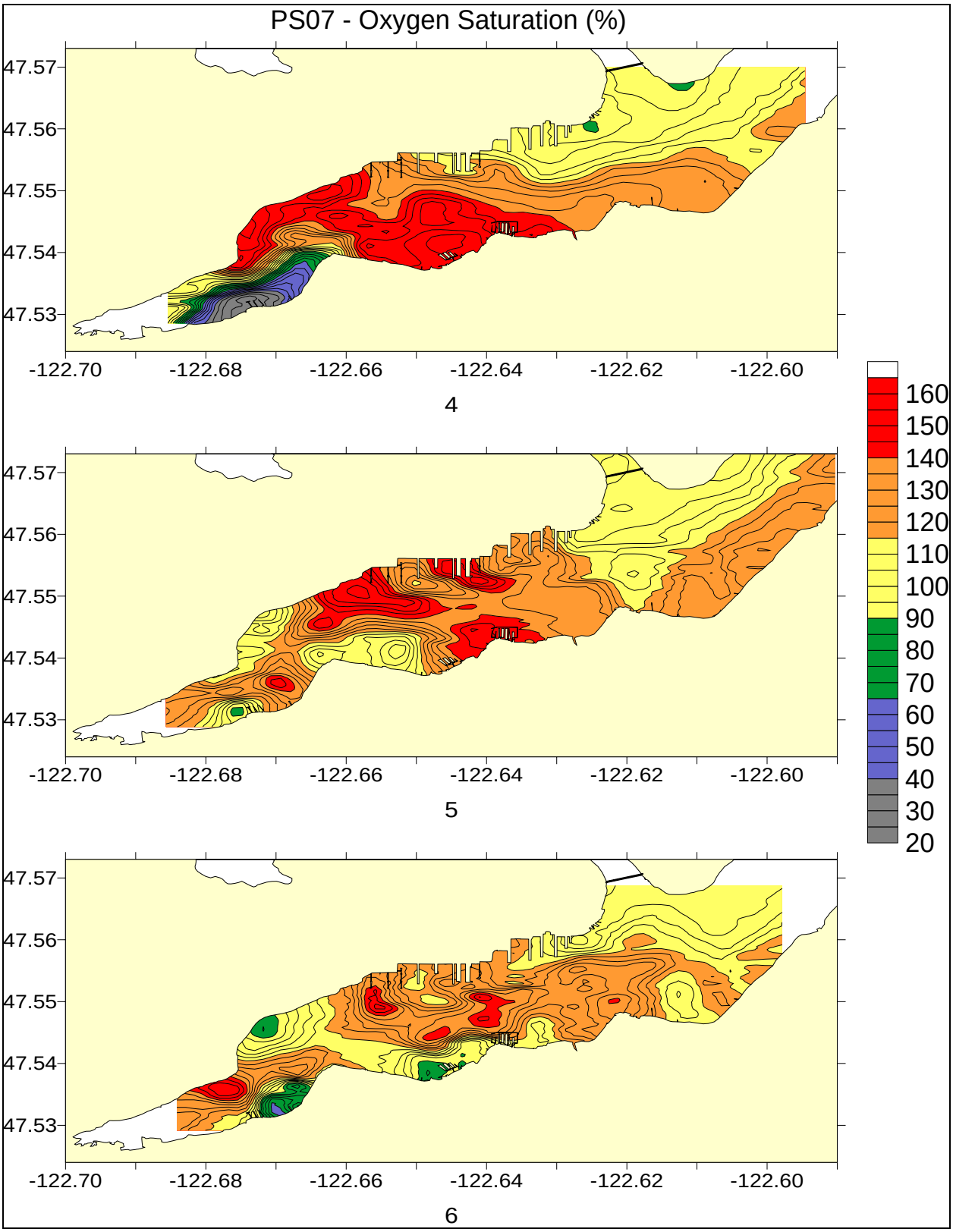
4.2.8 Oxygen


PS07 - Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
9.4
8.6
7.8
7.0
6.2
5.4
4.6
3.8
3.0
2.2
1.4

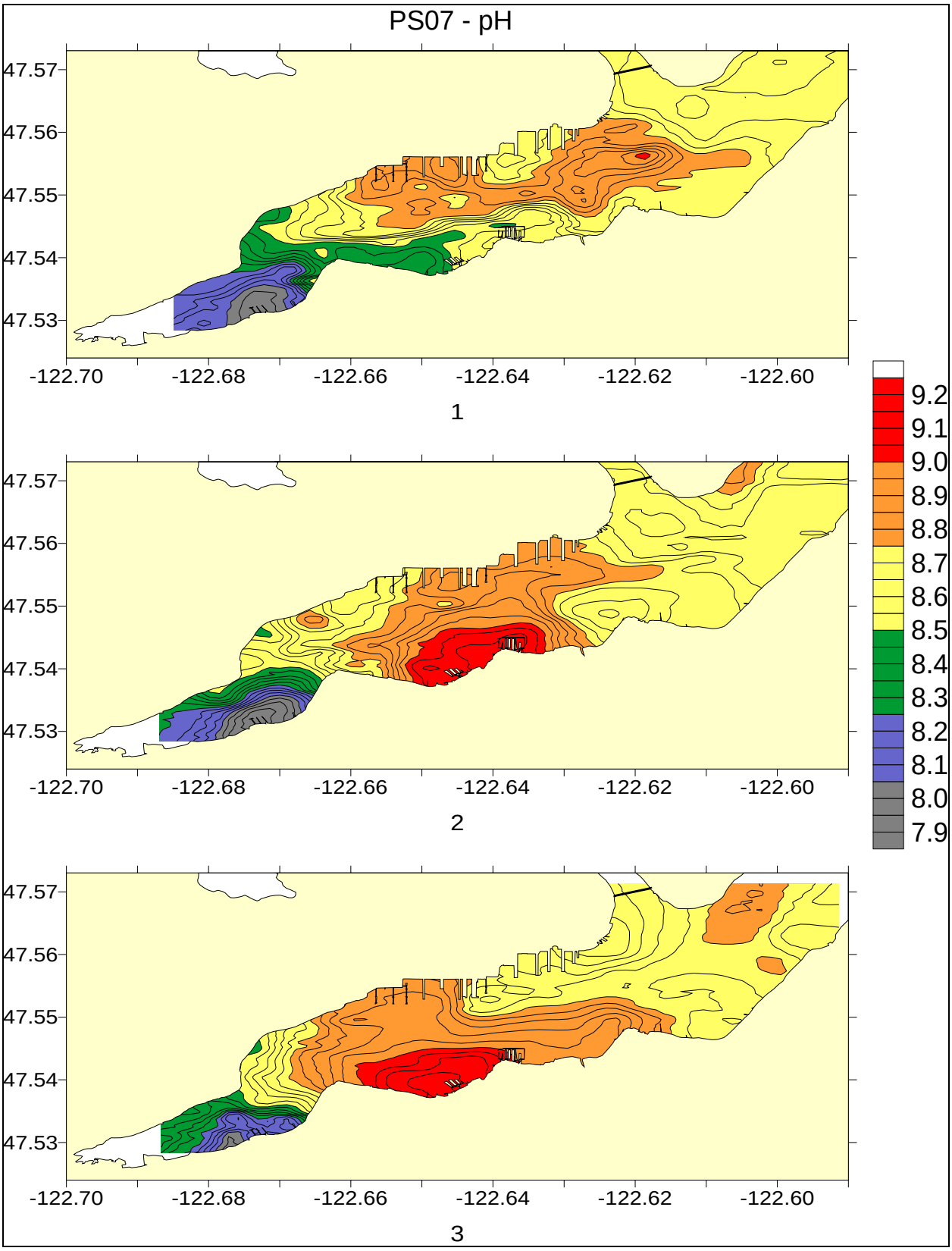

PS07 - Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
9.4
8.6
7.8
7.0
6.2
5.4
4.6
3.8
3.0
2.2
1.4

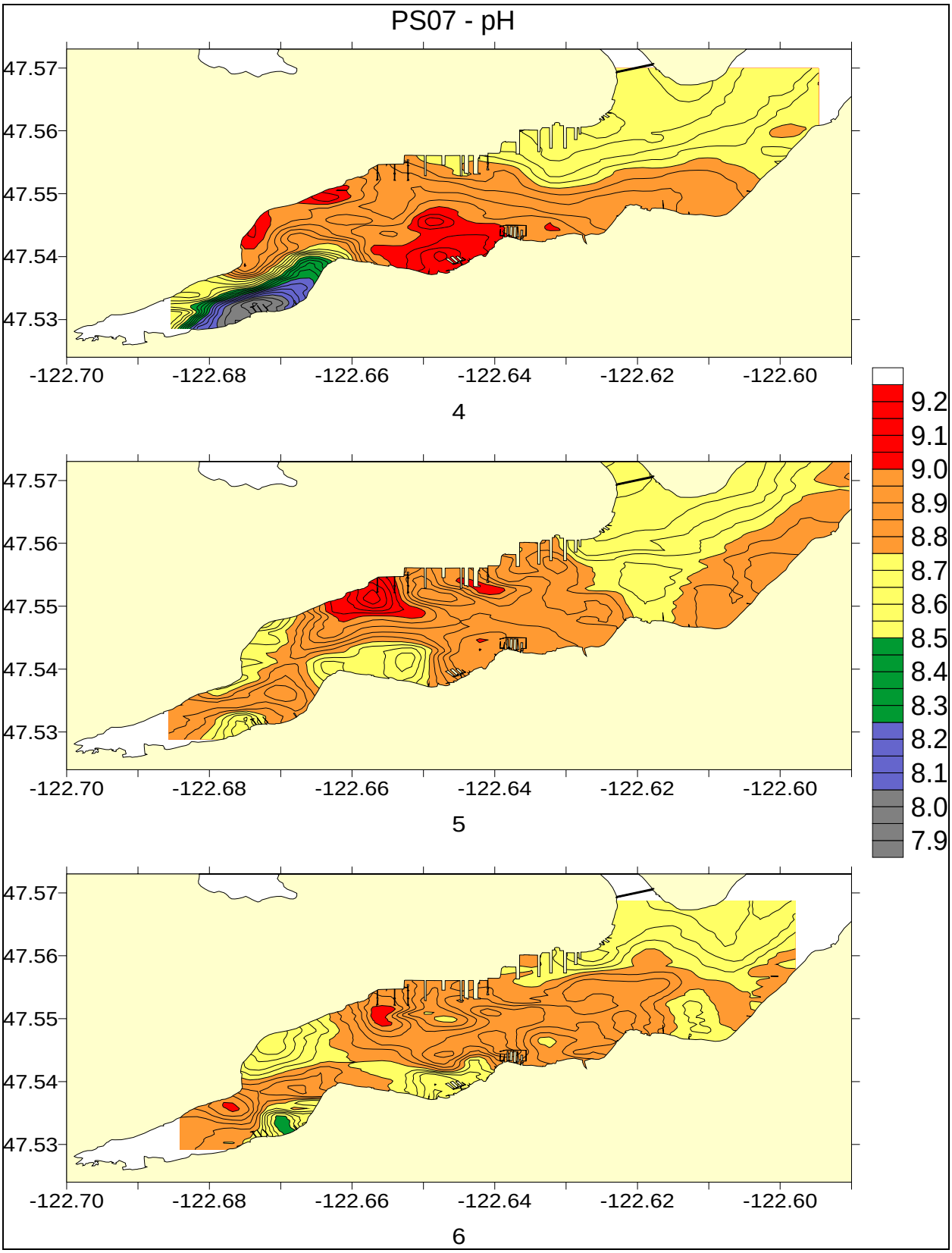
4.2.9 Oxygen Saturation



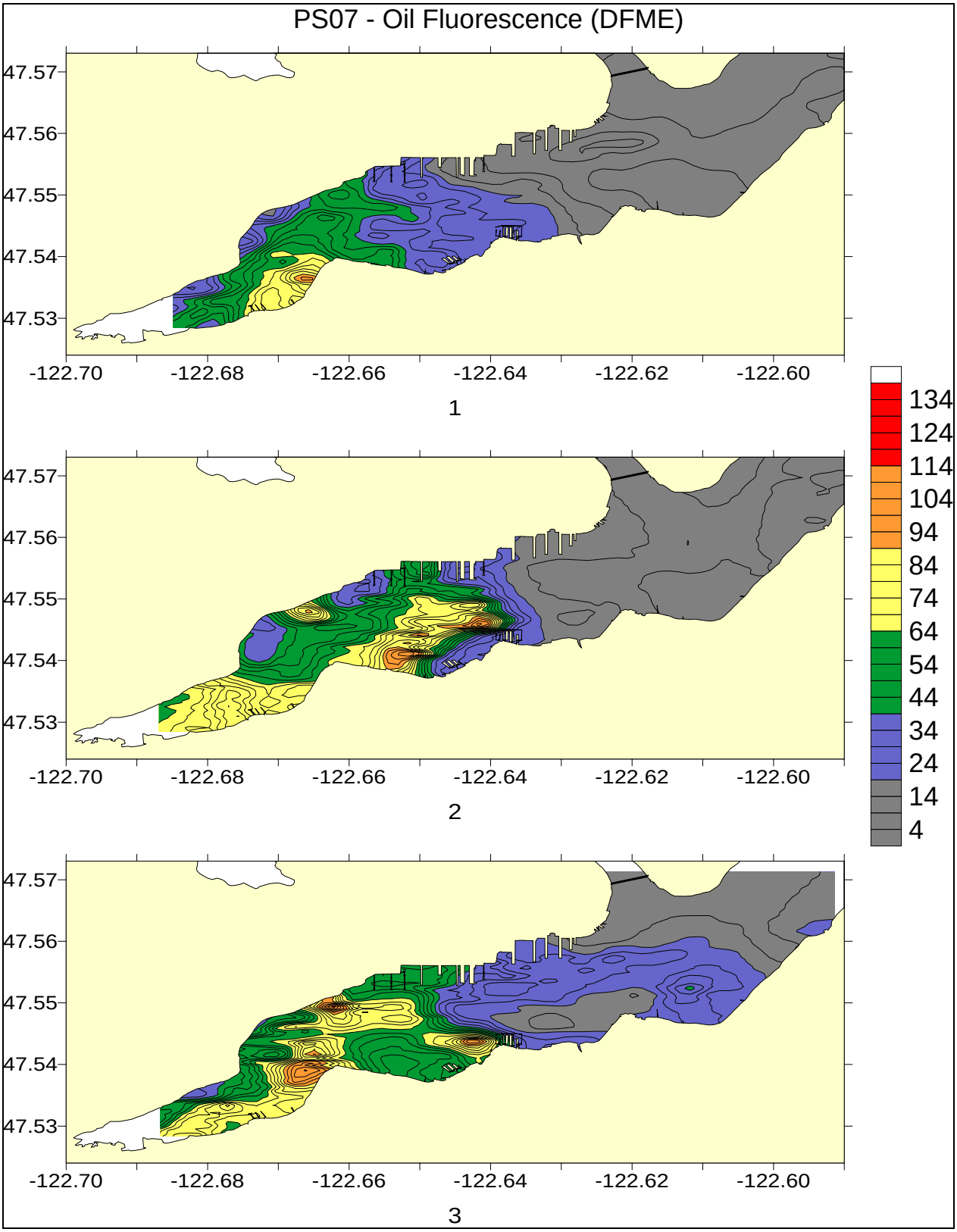

PS07 - Oxygen Saturation (%)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20

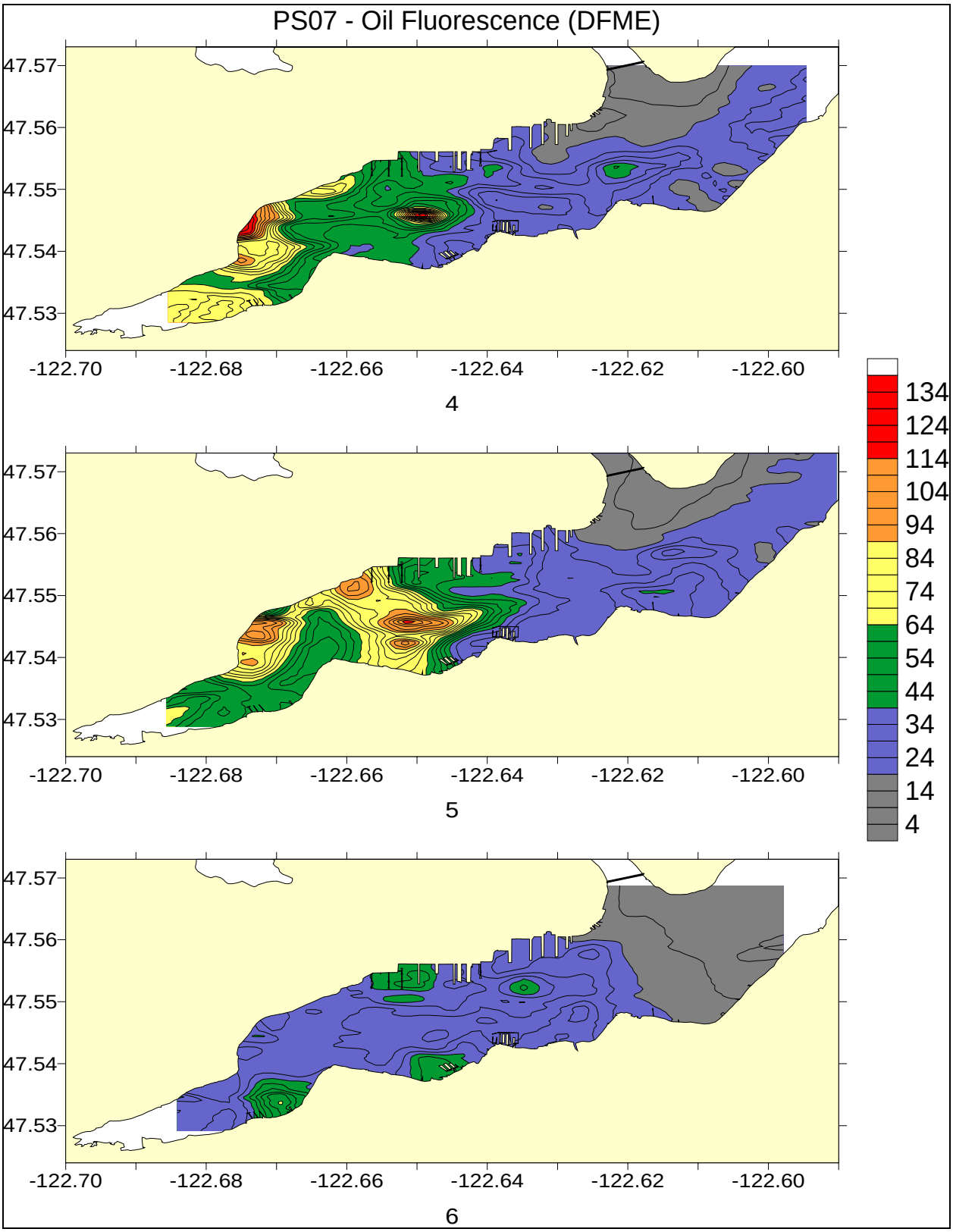
4.2.10 pH


PS07 - pH
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
9.2
9.1
9.0
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8.0
7.9


PS07 - pH
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
9.2
9.1
9.0
8.9
8.8
8.7
8.6
8.5
8.4
8.3
8.2
8.1
8.0
7.9

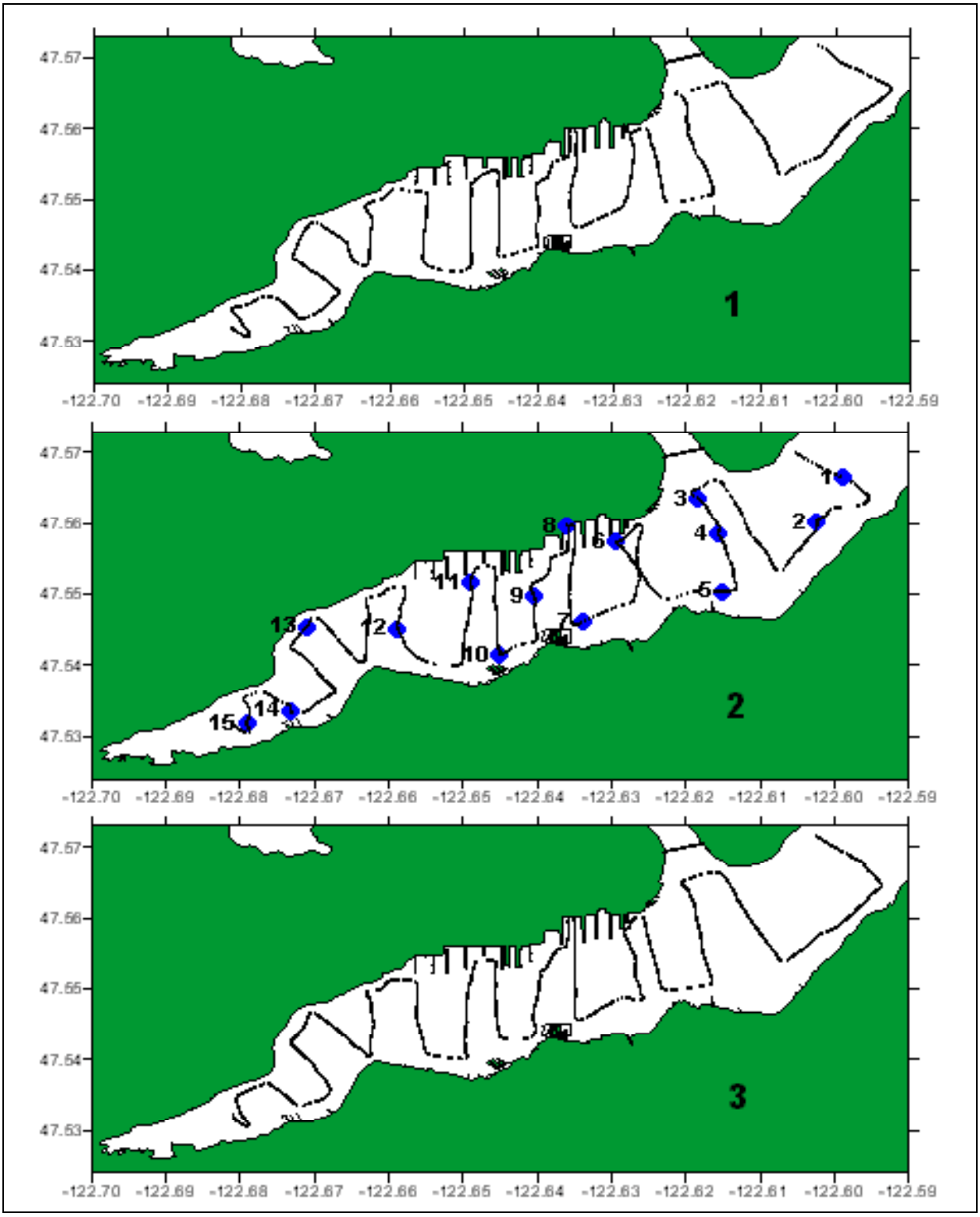
4.2.11 Oil Fluorescence



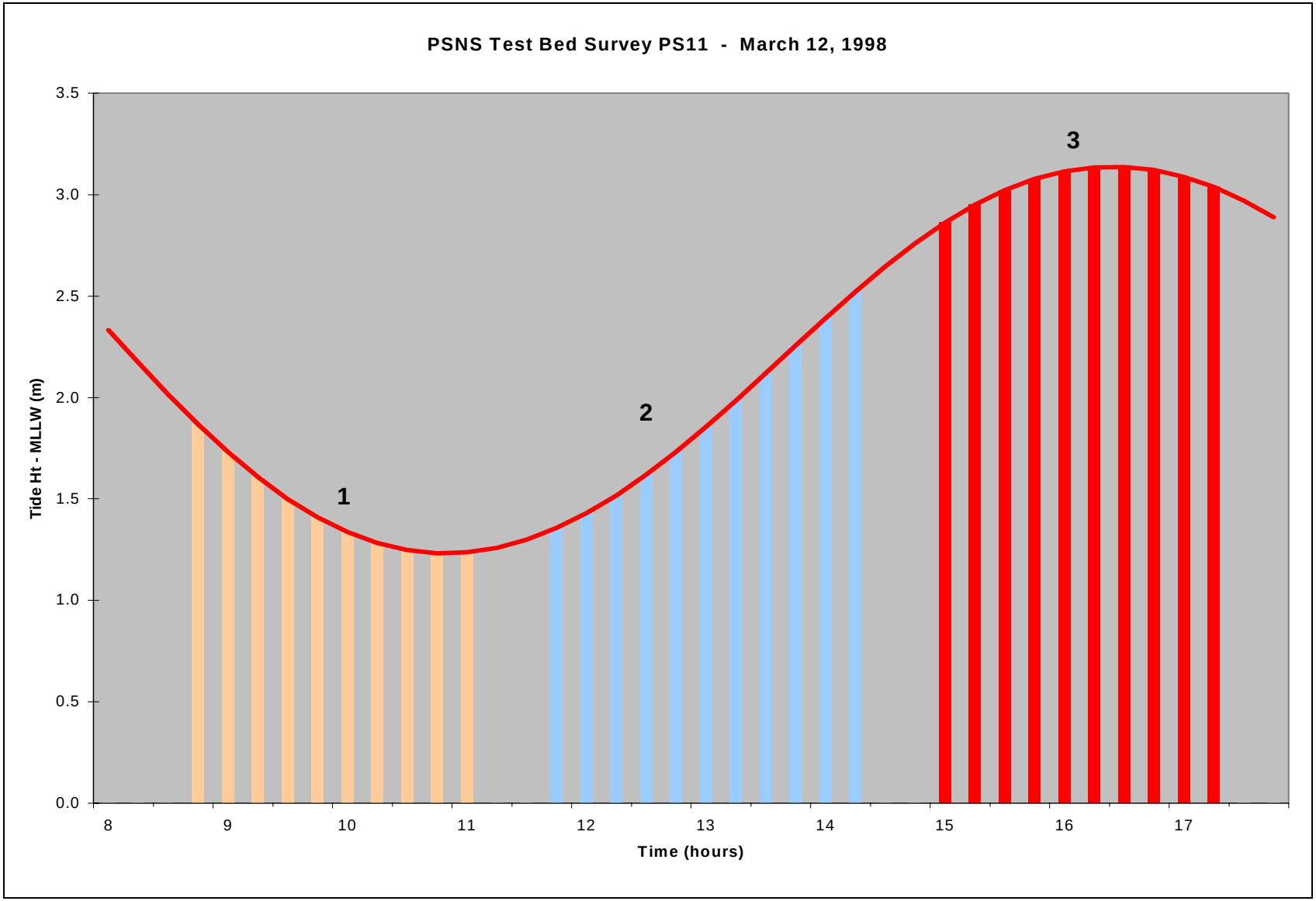

PS07 - Oil Fluorescence (DFME)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
4
5
6
134
124
114
104
94
84
74
64
54
44
34
24
14
4

4.3 March 1998 – PS11

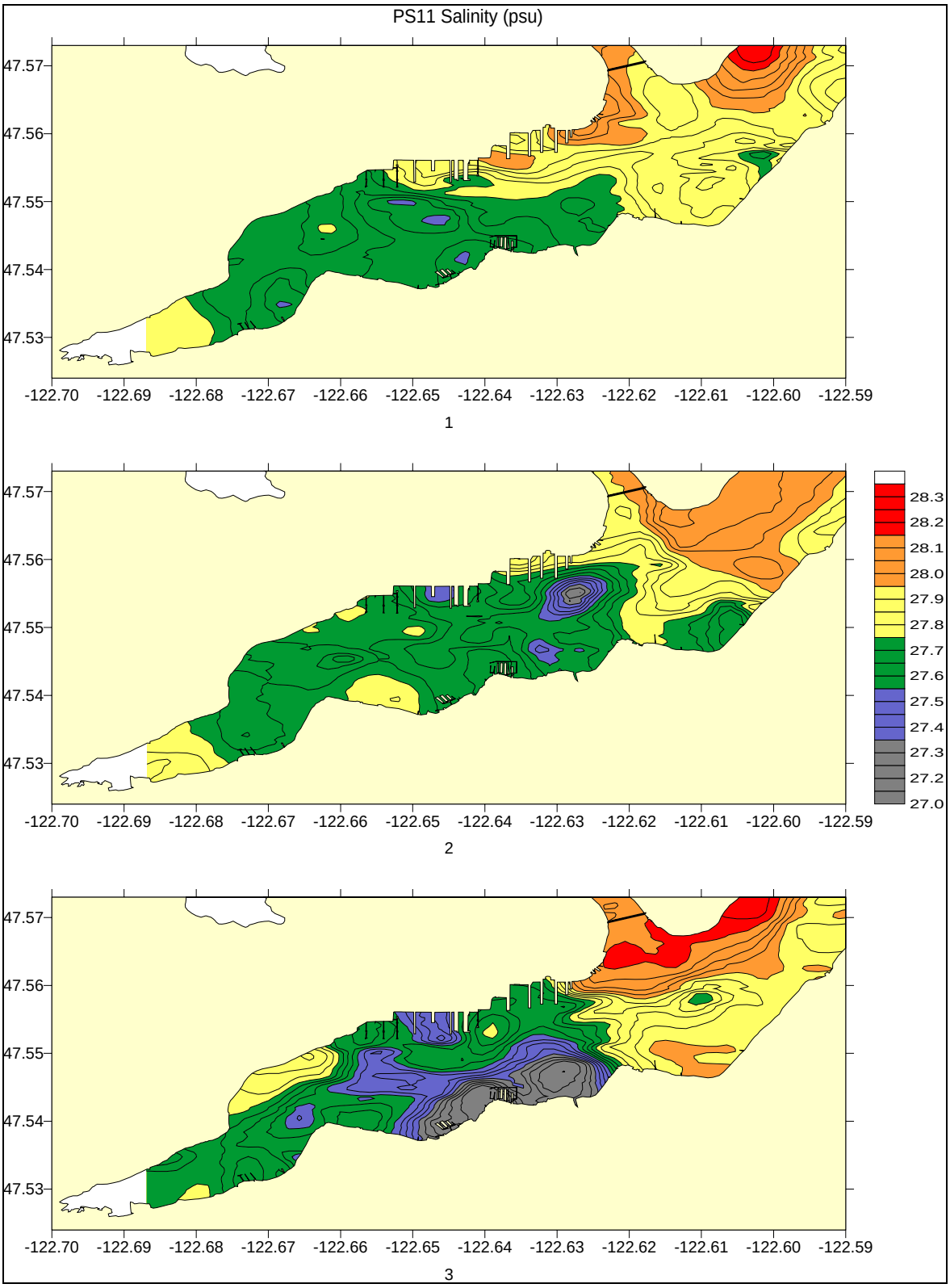
4.3.1 Track Map



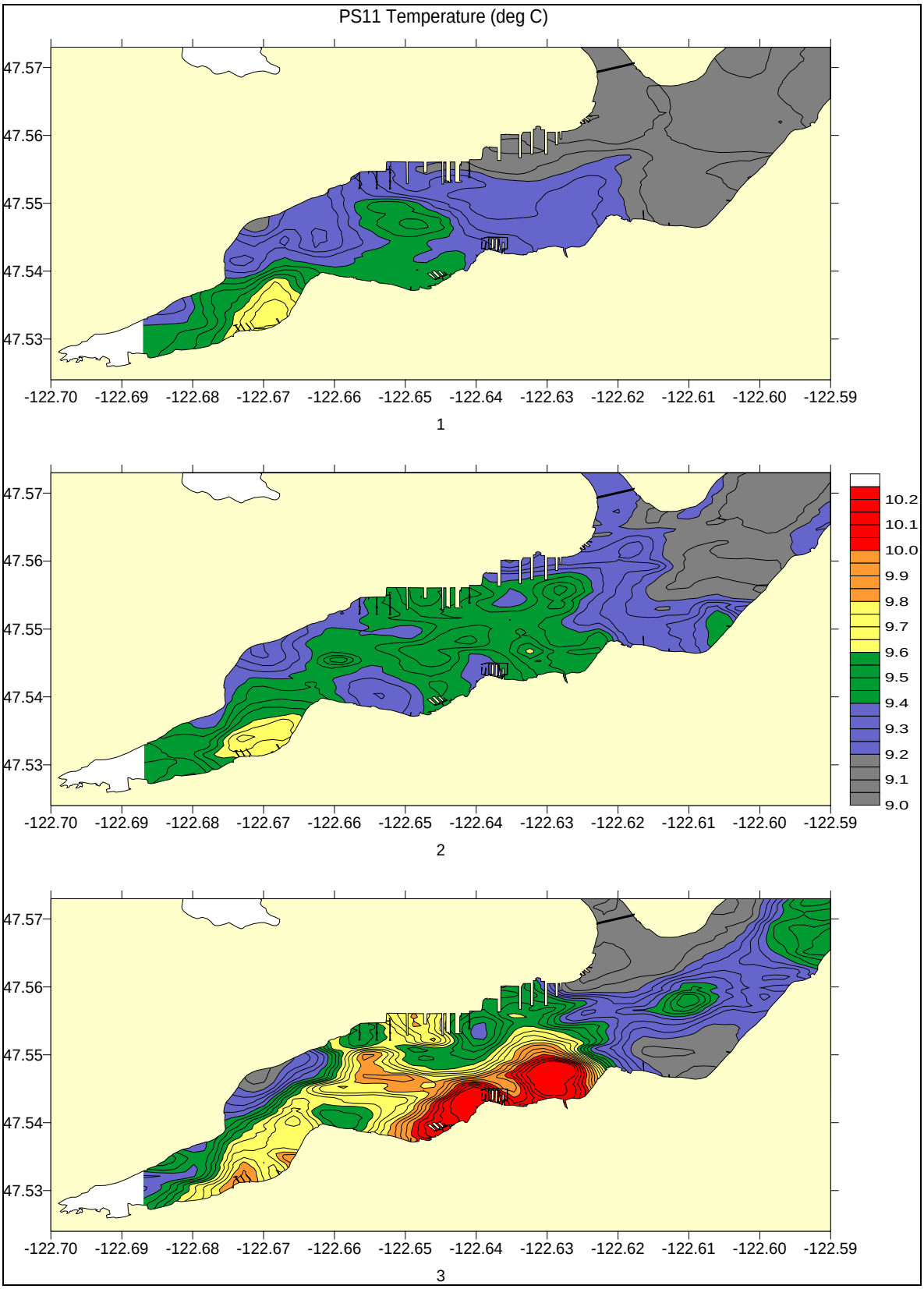
4.3.2 Tide Chart



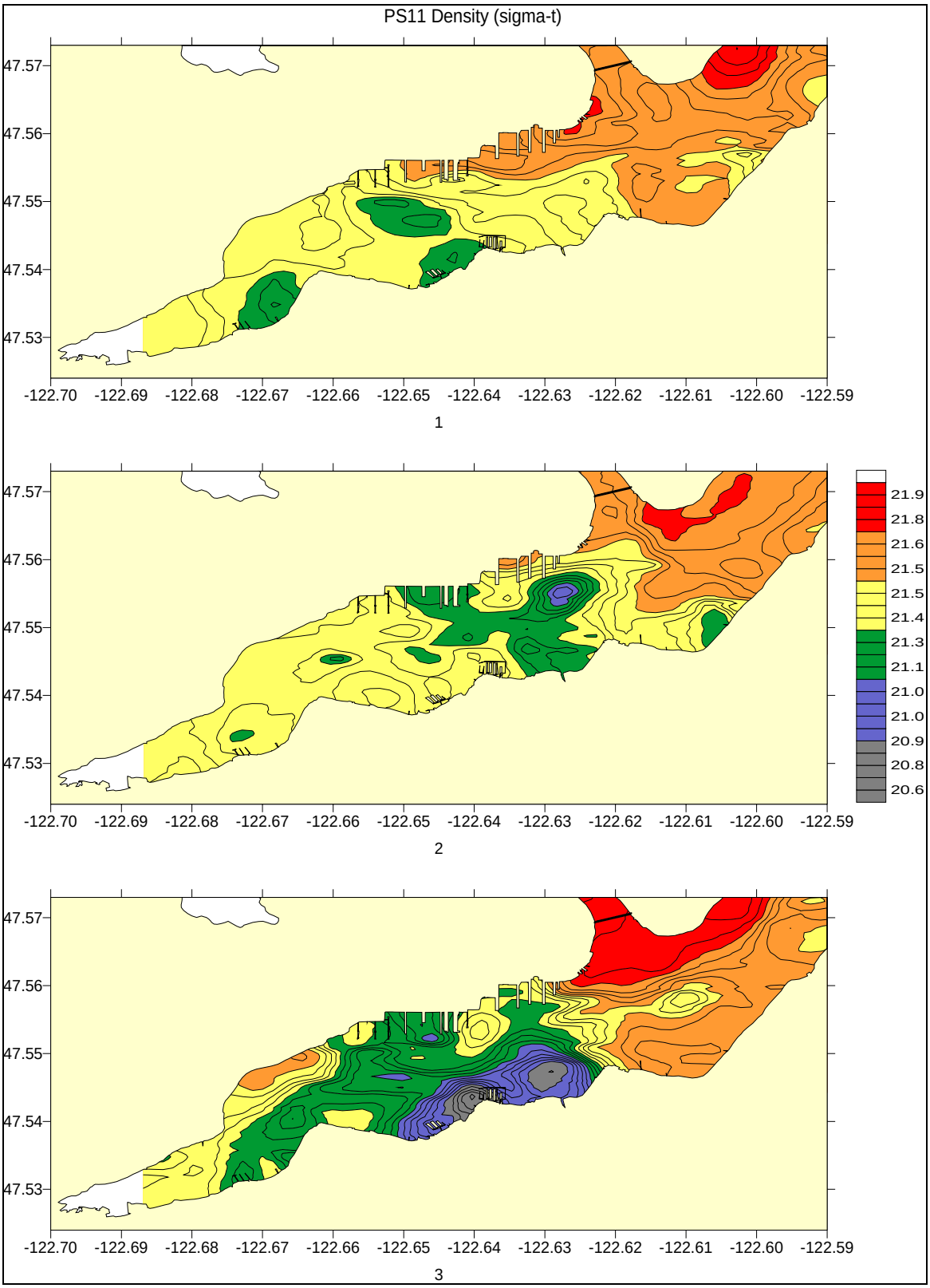
4.3.3 Salinity



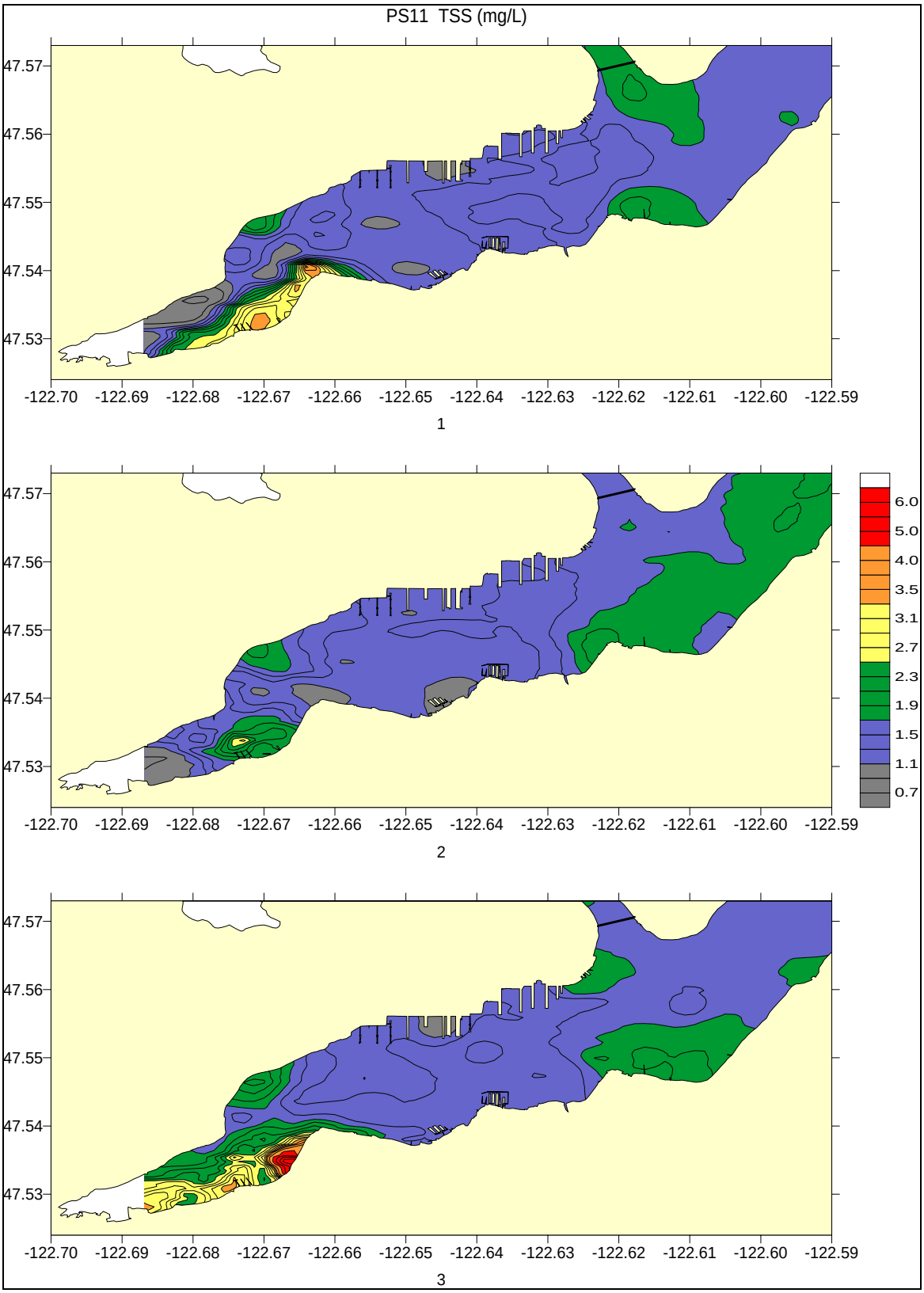
4.3.4 Temperature



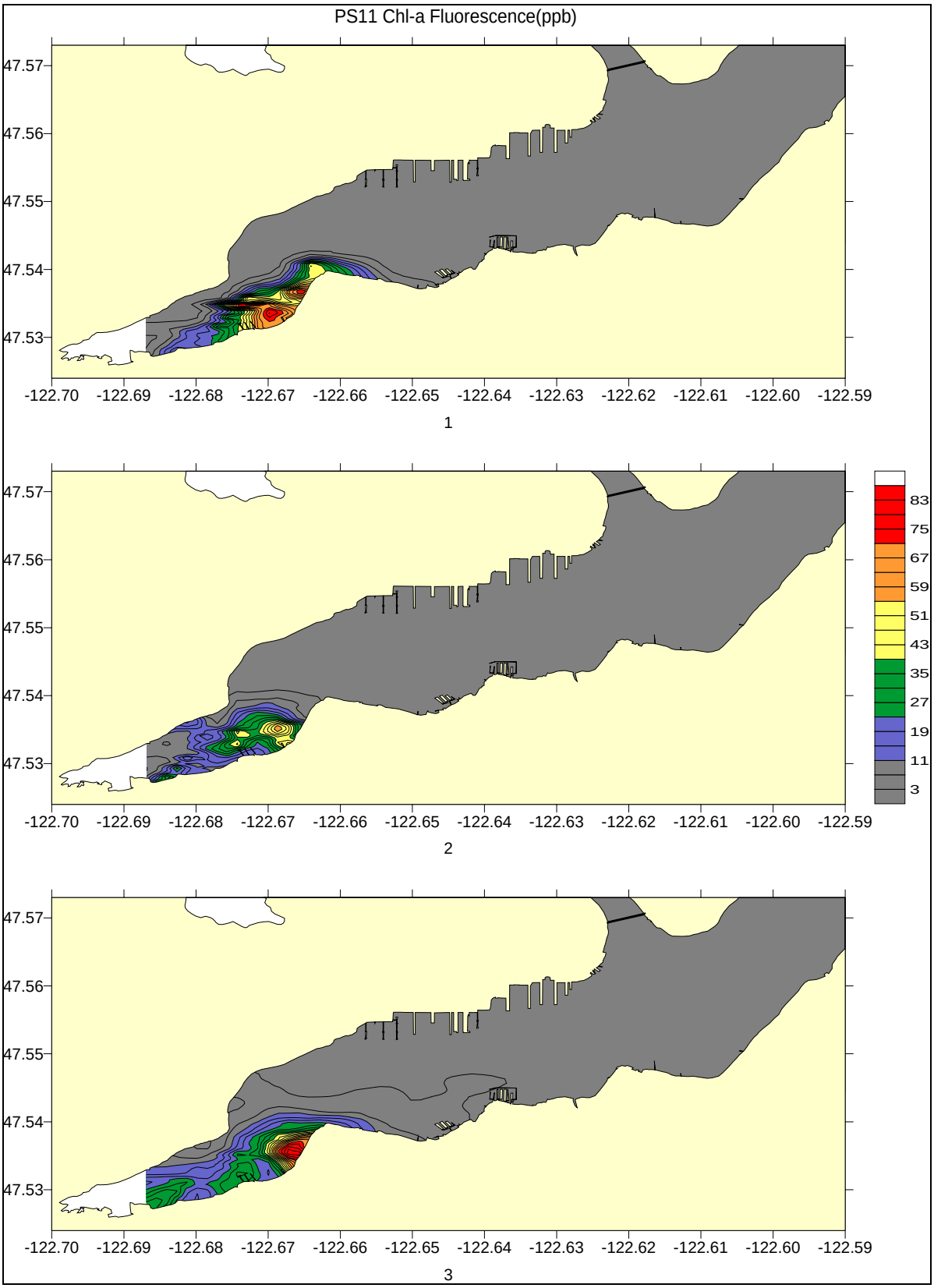
4.3.5 Density


PS11 Density (sigma-t)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
1
2
3
21.9
21.8
21.6
21.5
21.5
21.4
21.3
21.1
21.0
21.0
20.9
20.8
20.6

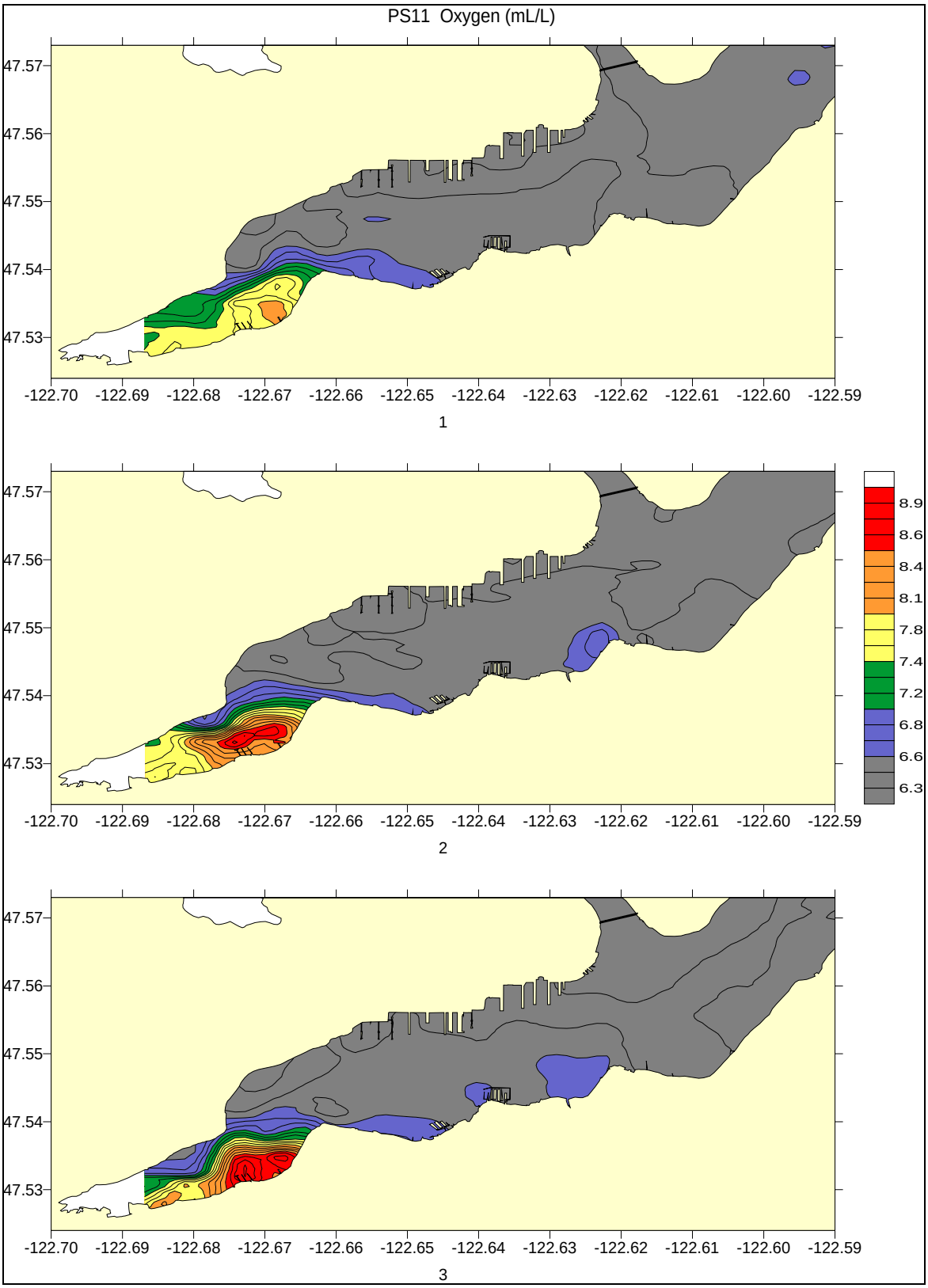
4.3.6 TSS


PS11 TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
1
2
3
6.0
5.0
4.0
3.5
3.1
2.7
2.3
1.9
1.5
1.1
0.7

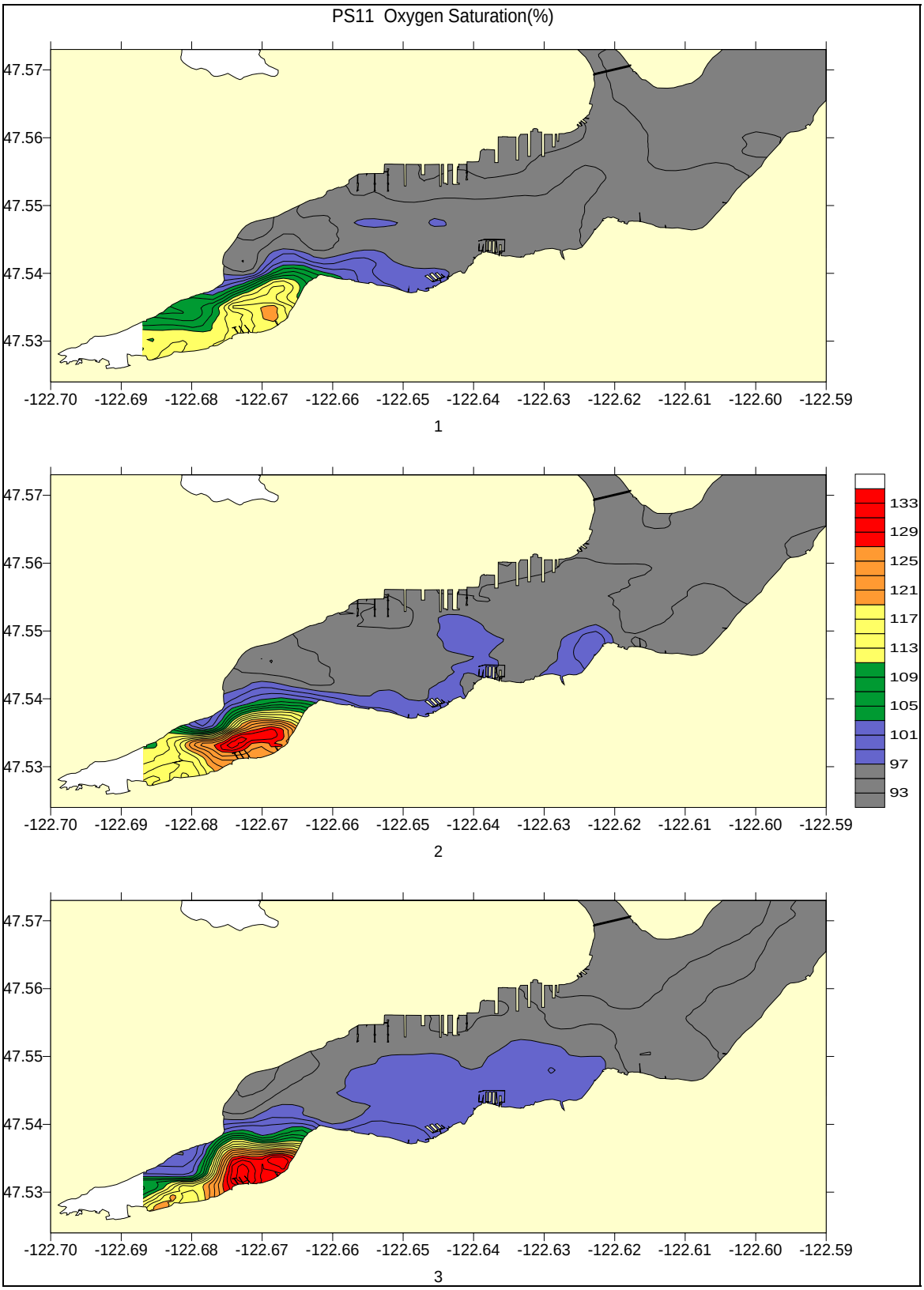
4.3.7 Chlorophyll *a*



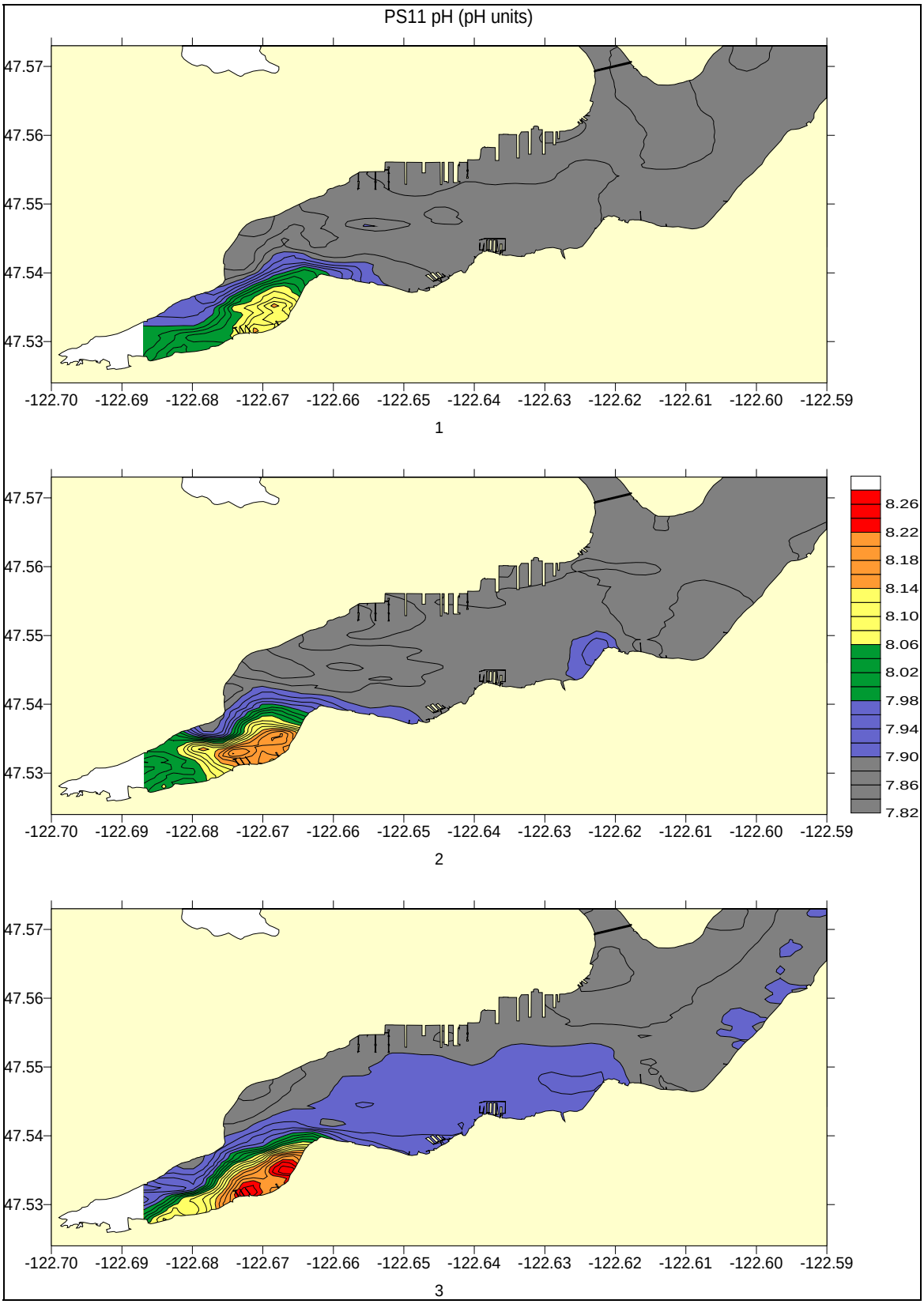
4.3.8 Oxygen


PS11 Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
1
2
3
8.9
8.6
8.4
8.1
7.8
7.4
7.2
6.8
6.6
6.3

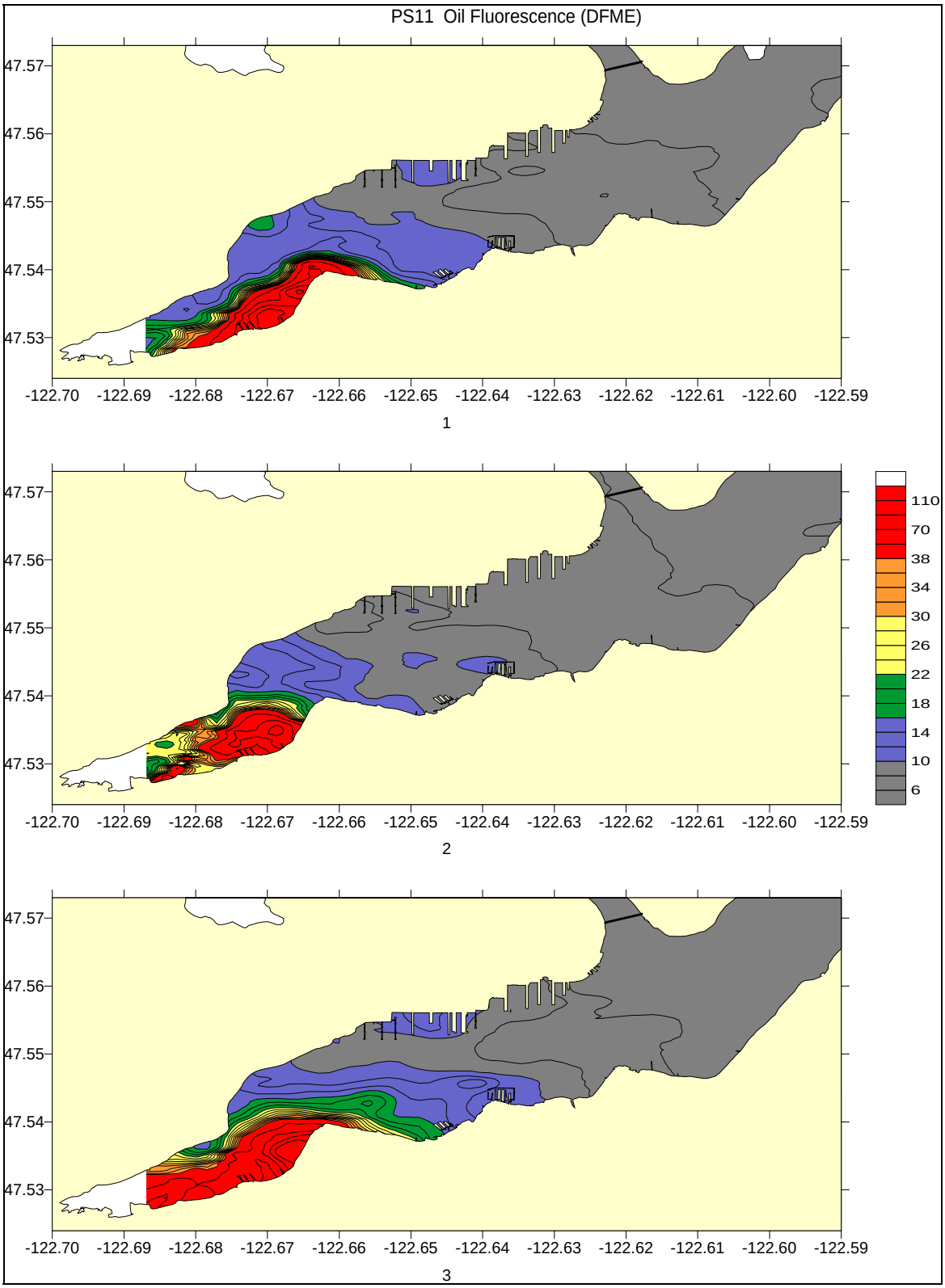
4.3.9 Oxygen Saturation



4.3.10 pH

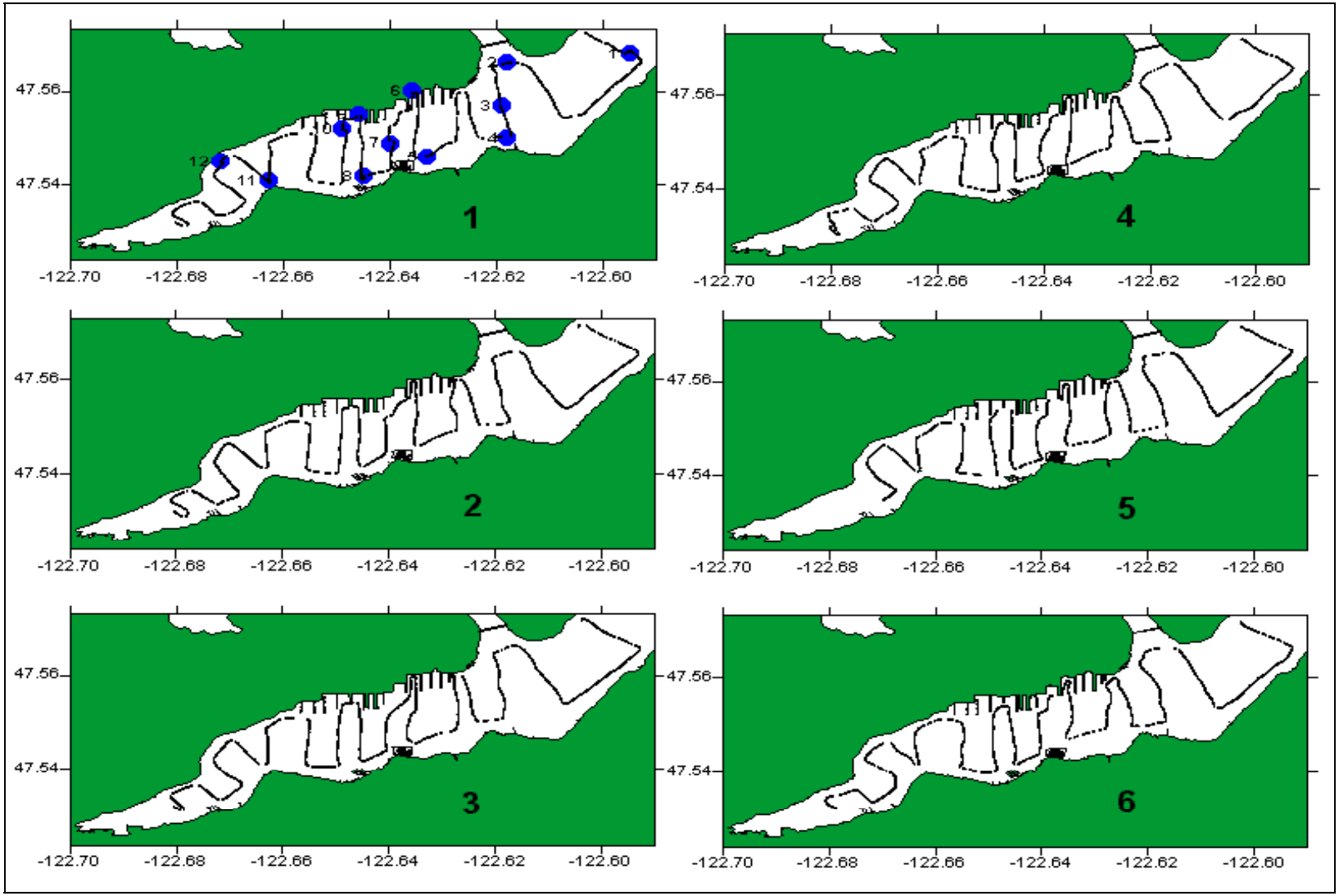

PS11 pH (pH units)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
1
2
3
8.26
8.22
8.18
8.14
8.10
8.06
8.02
7.98
7.94
7.90
7.86
7.82

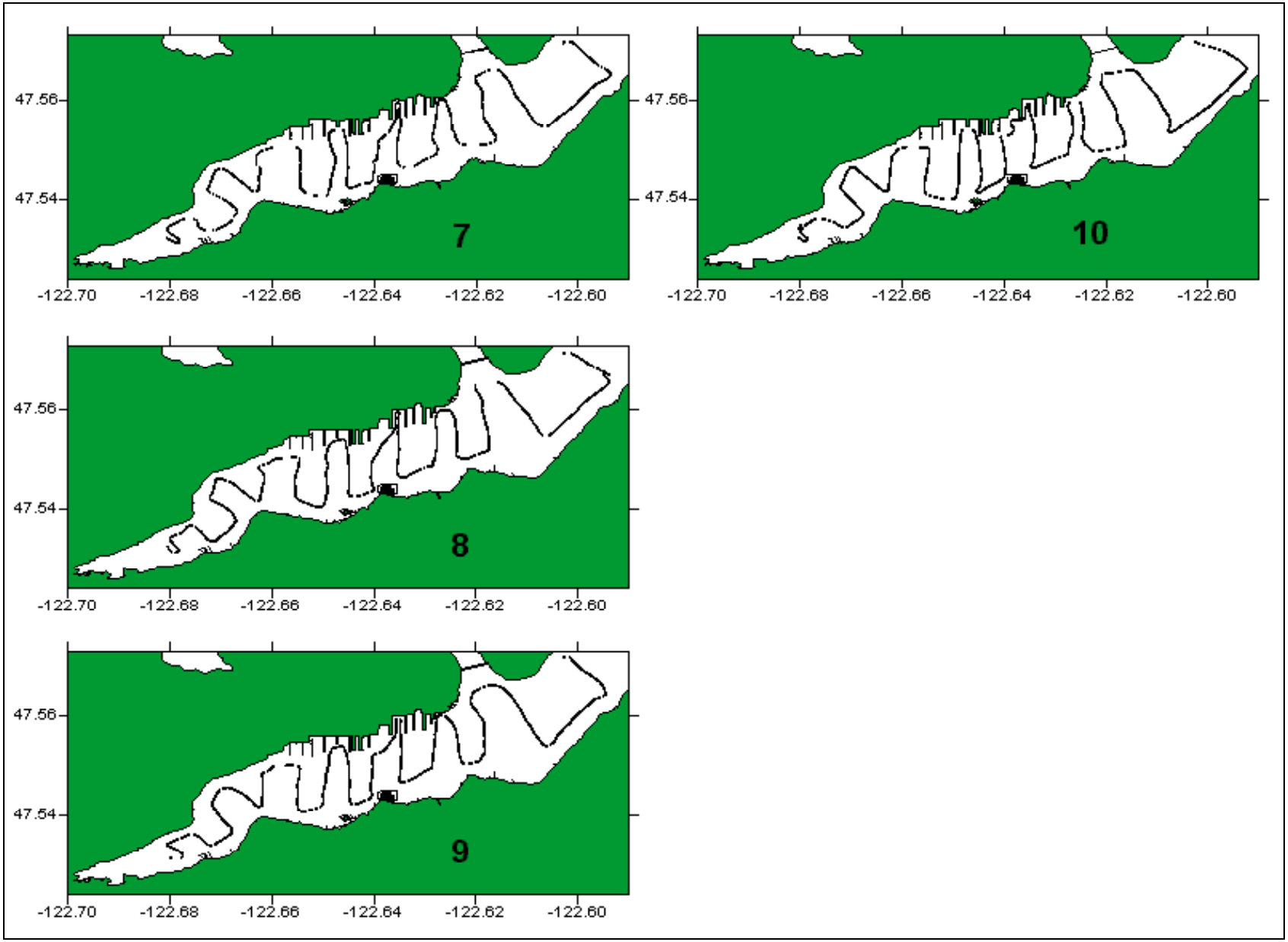
4.3.11 Oil Fluorescence



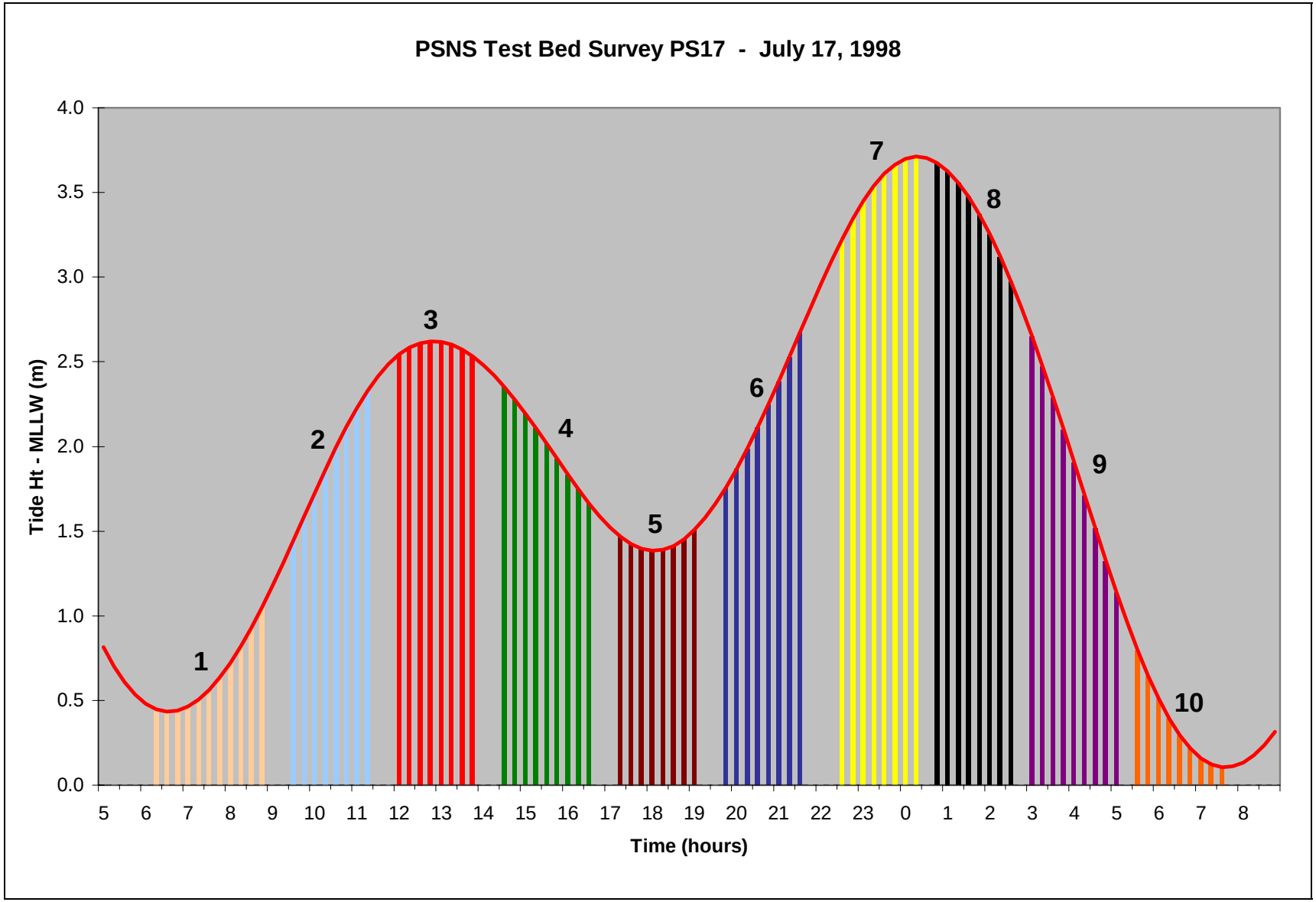
4.4 July 1998 – PS17

4.4.1 Track Maps

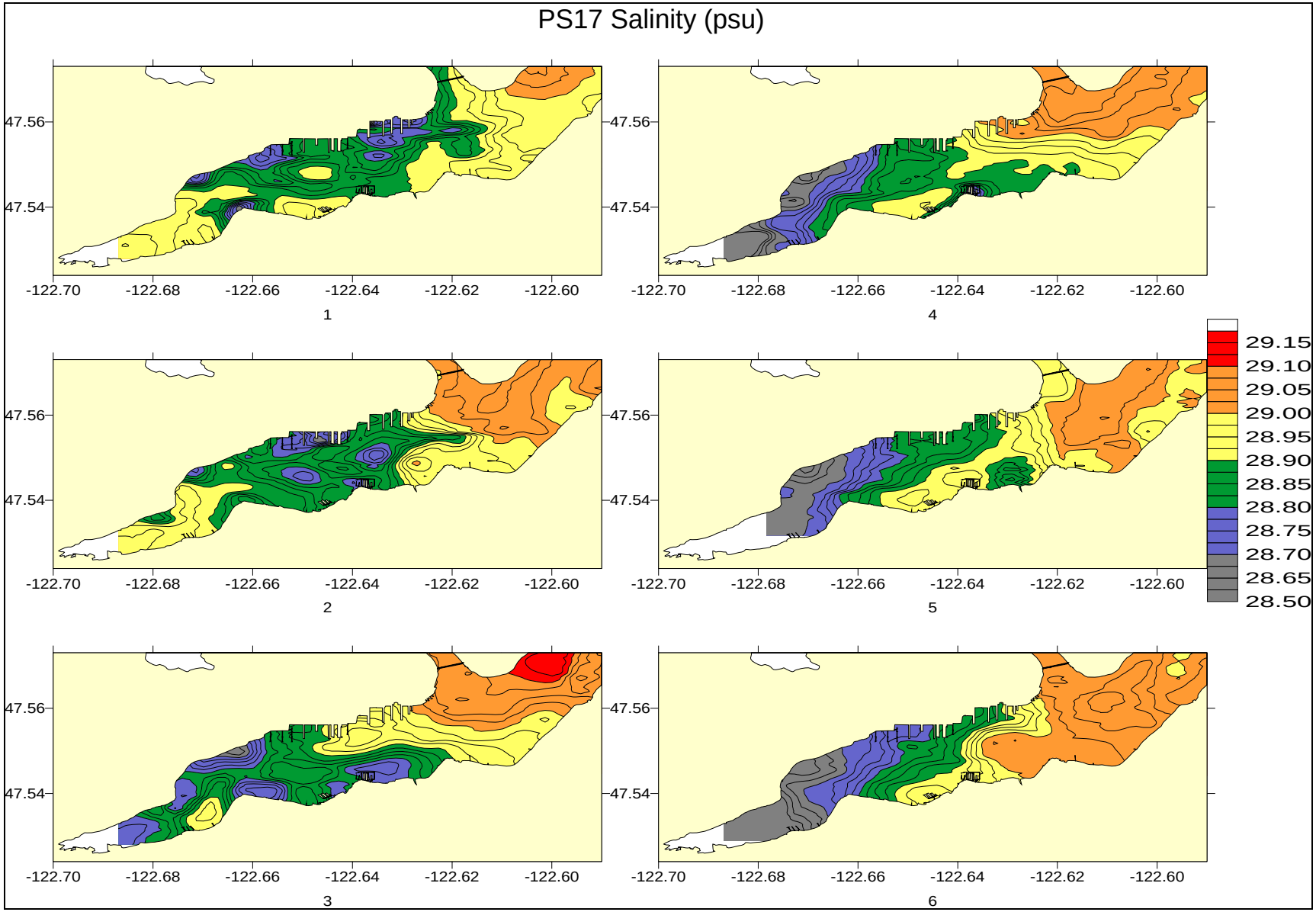


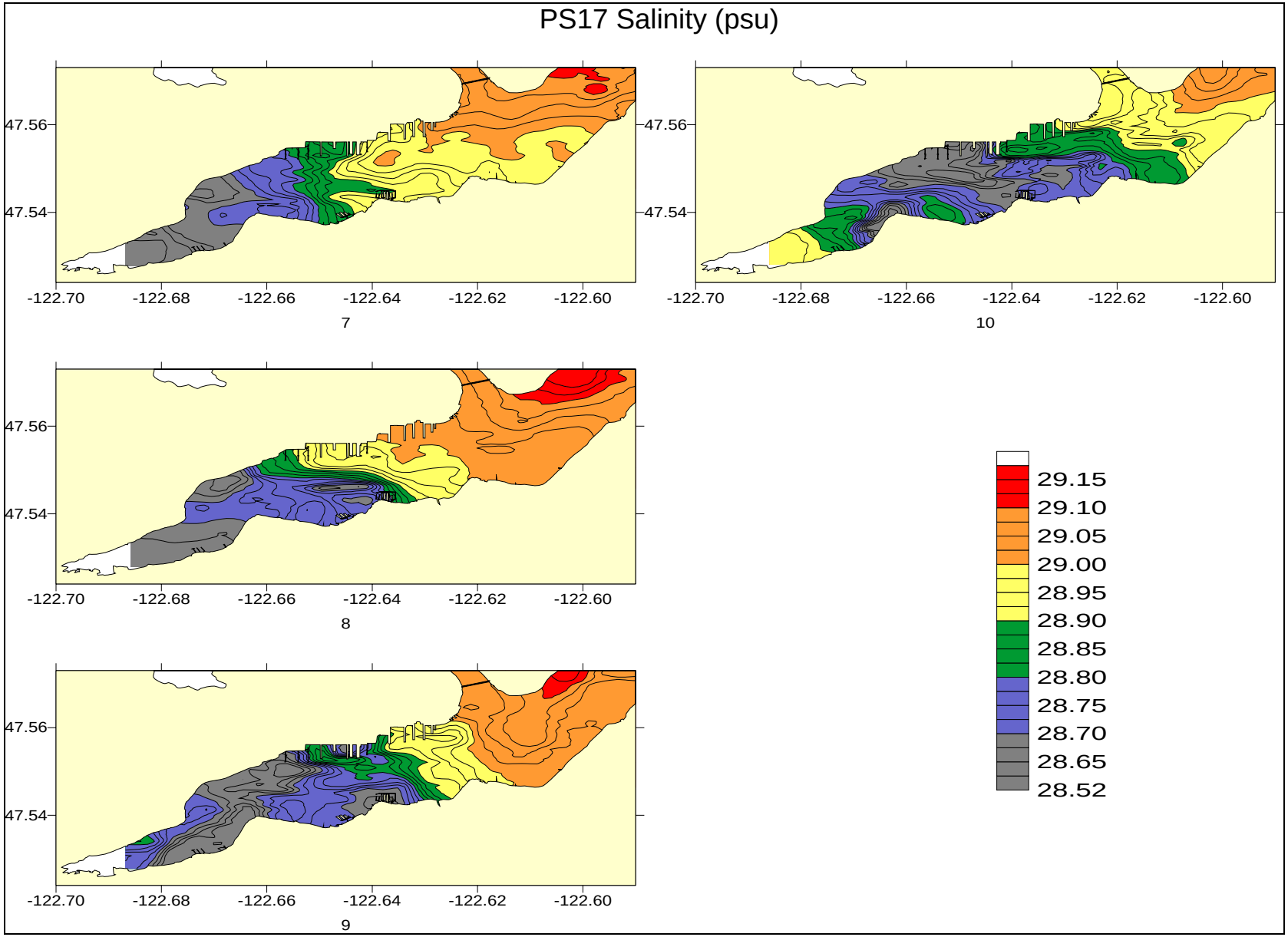

47.56
47.54
7
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
47.56
47.54
10
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
47.56
47.54
8
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
47.56
47.54
9
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60

4.4.2 Tide Chart

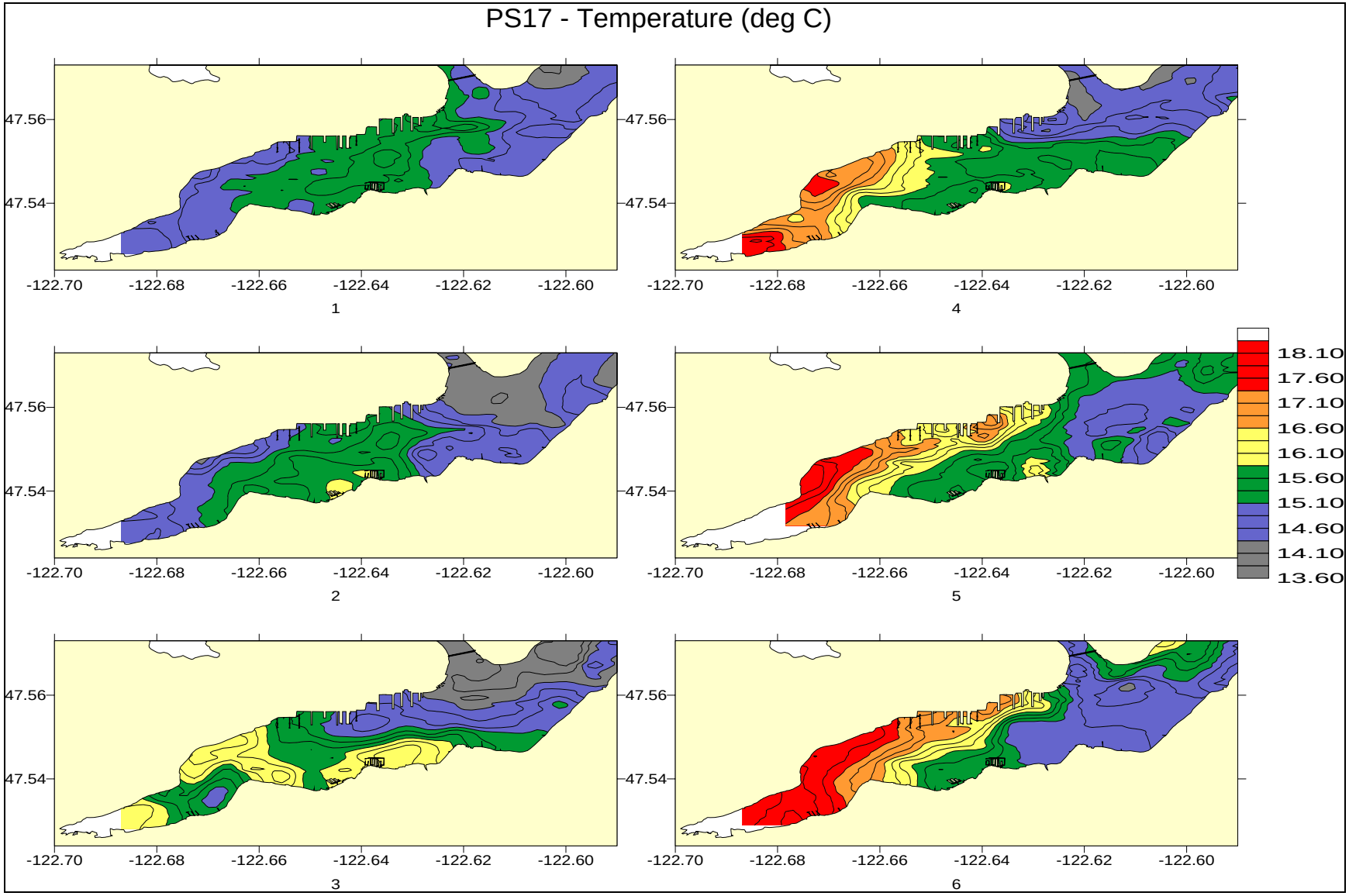


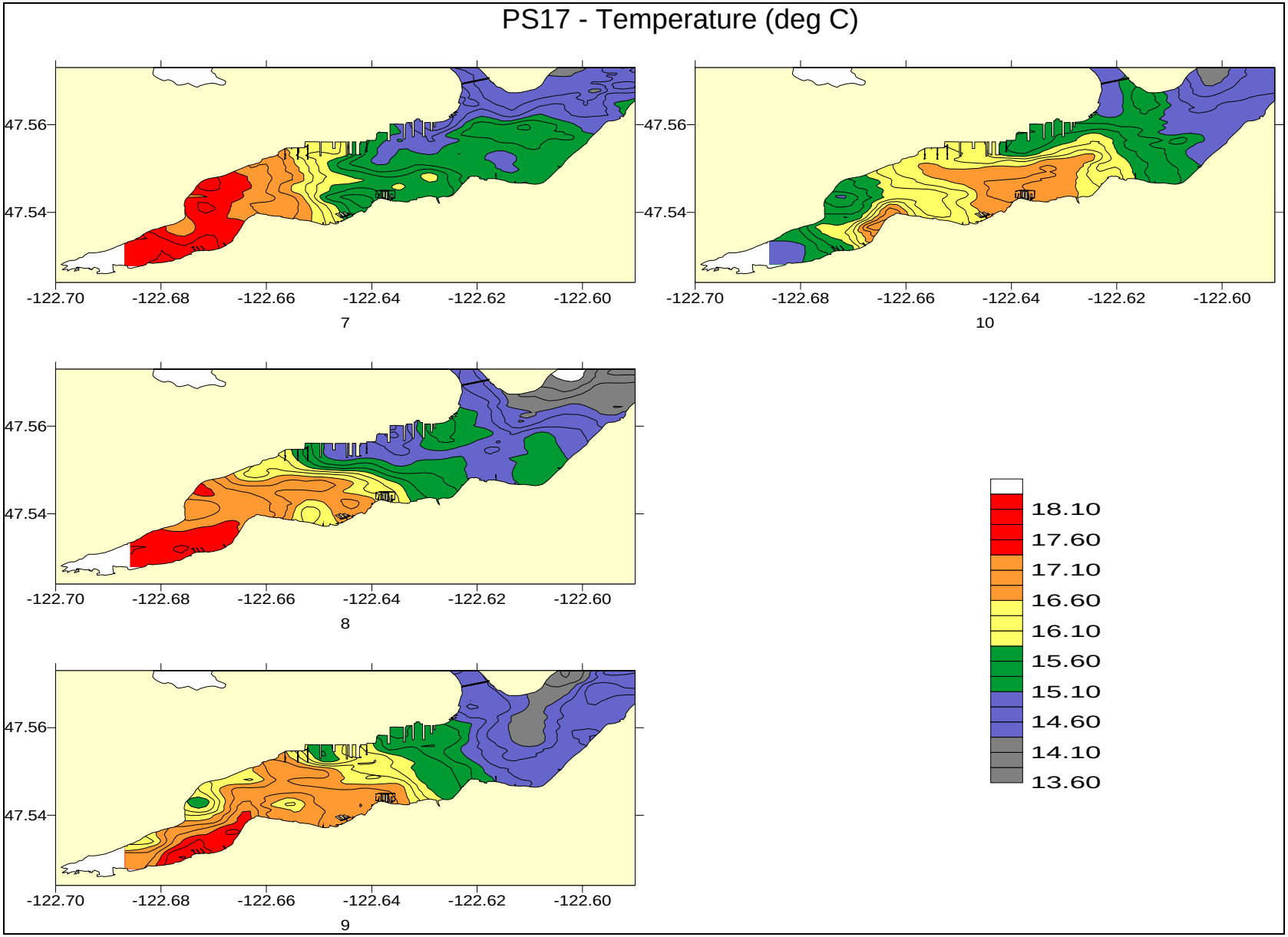
4.4.3 Salinity



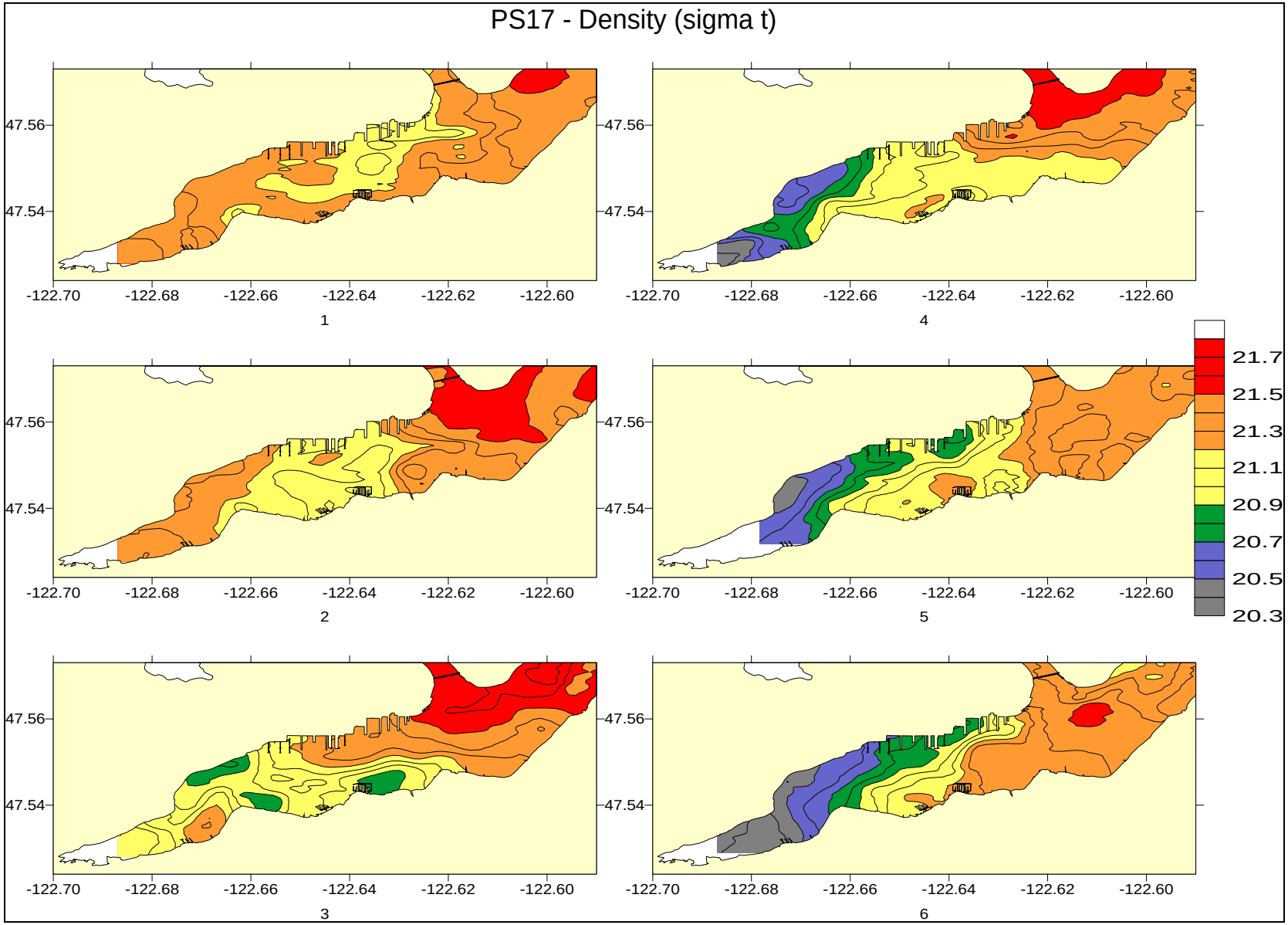

PS17 Salinity (psu)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
29.15
29.10
29.05
29.00
28.95
28.90
28.85
28.80
28.75
28.70
28.65
28.52

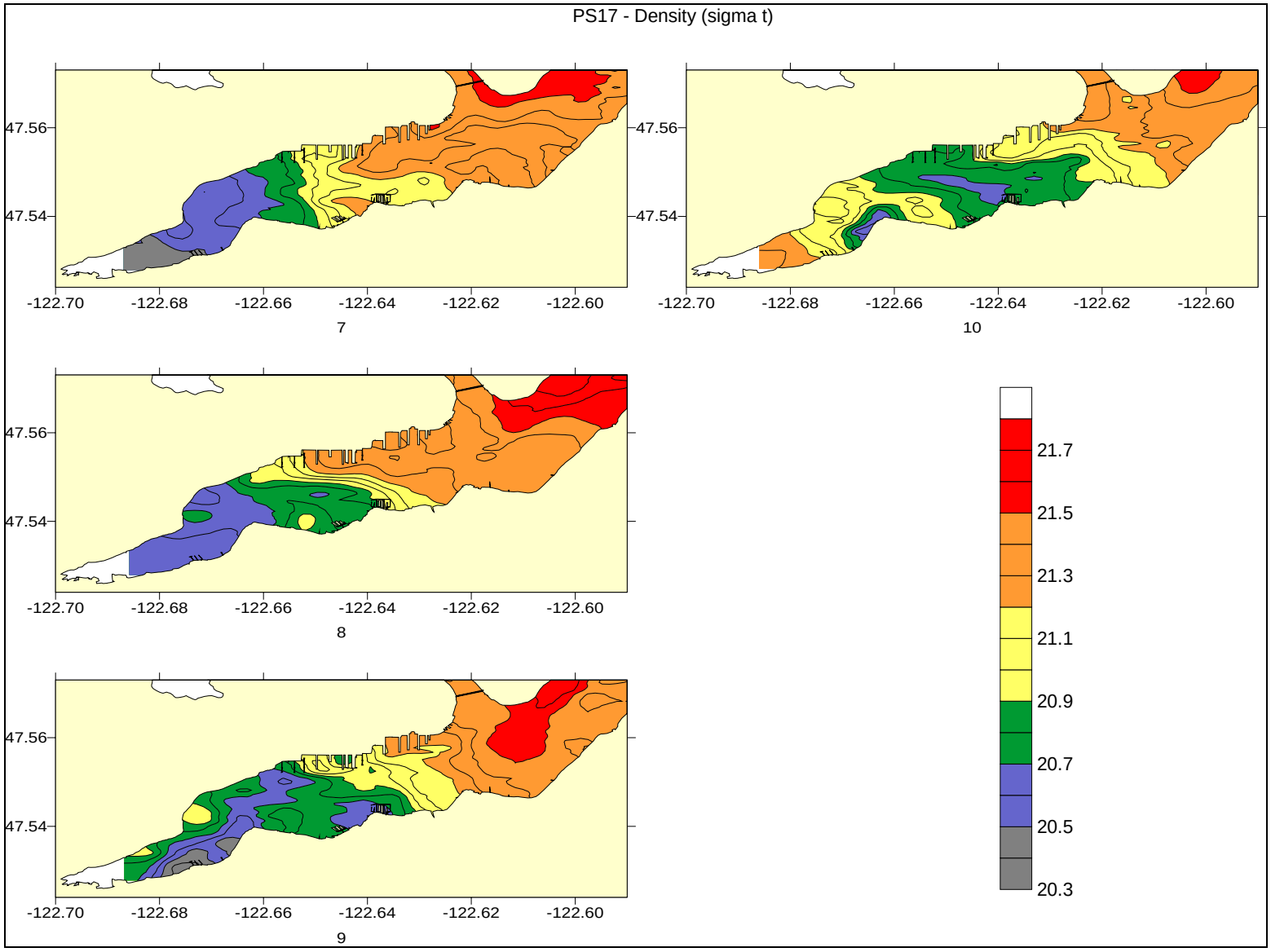
4.4.4 Temperature



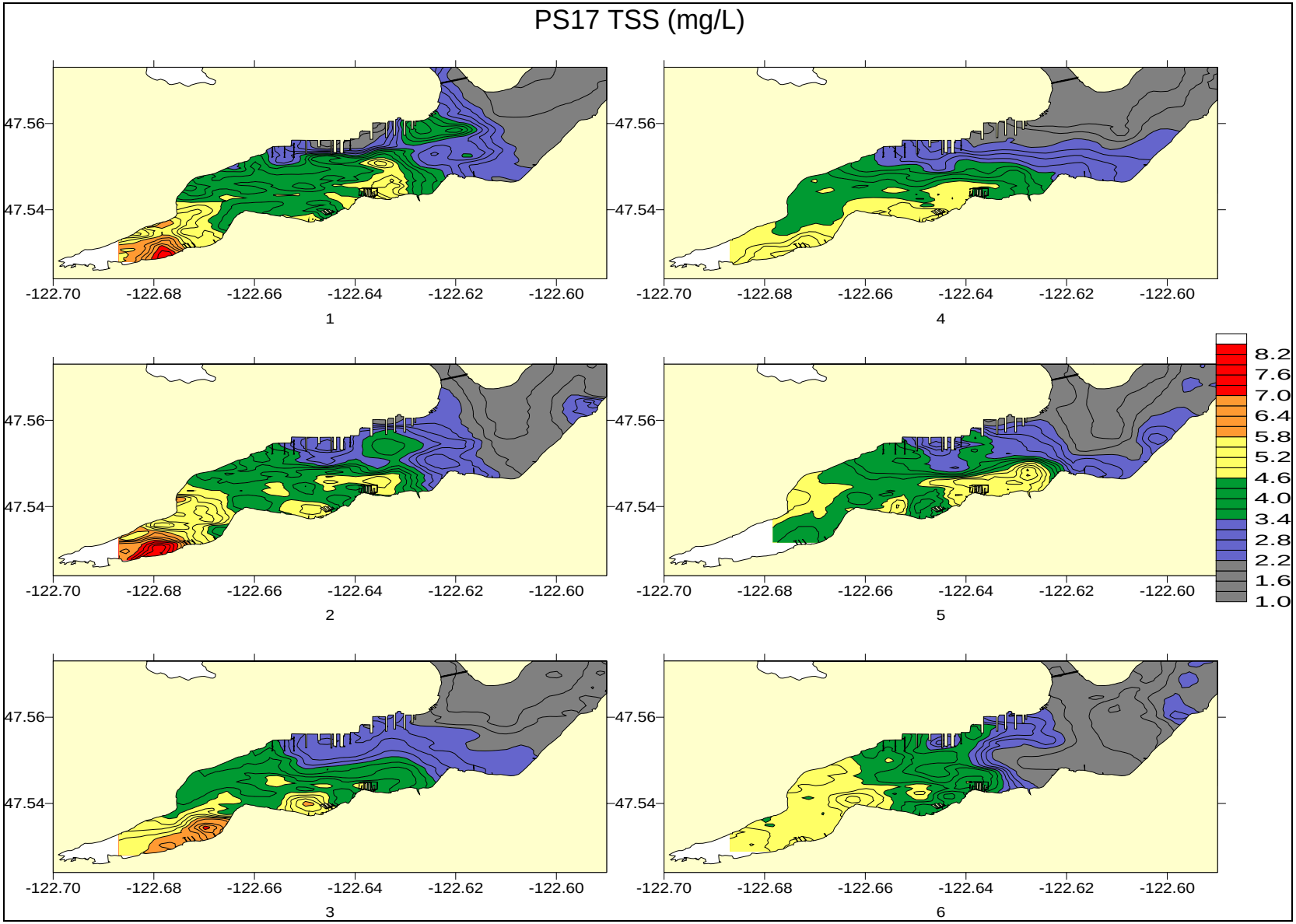

PS17 - Temperature (deg C)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
18.10
17.60
17.10
16.60
16.10
15.60
15.10
14.60
14.10
13.60

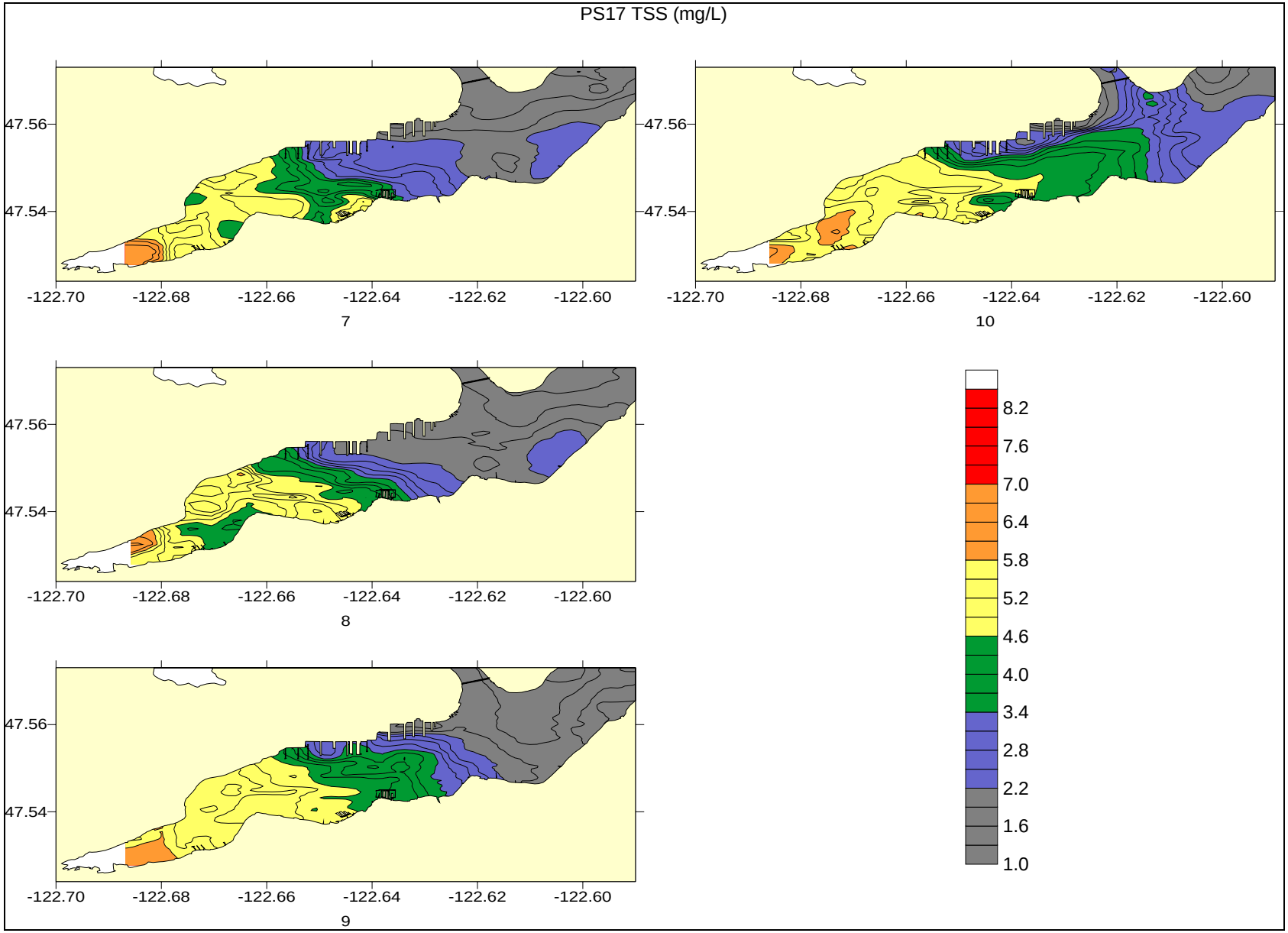
4.4.5 Density


PS17 - Density (sigma t)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
4
5
6
21.7
21.5
21.3
21.1
20.9
20.7
20.5
20.3

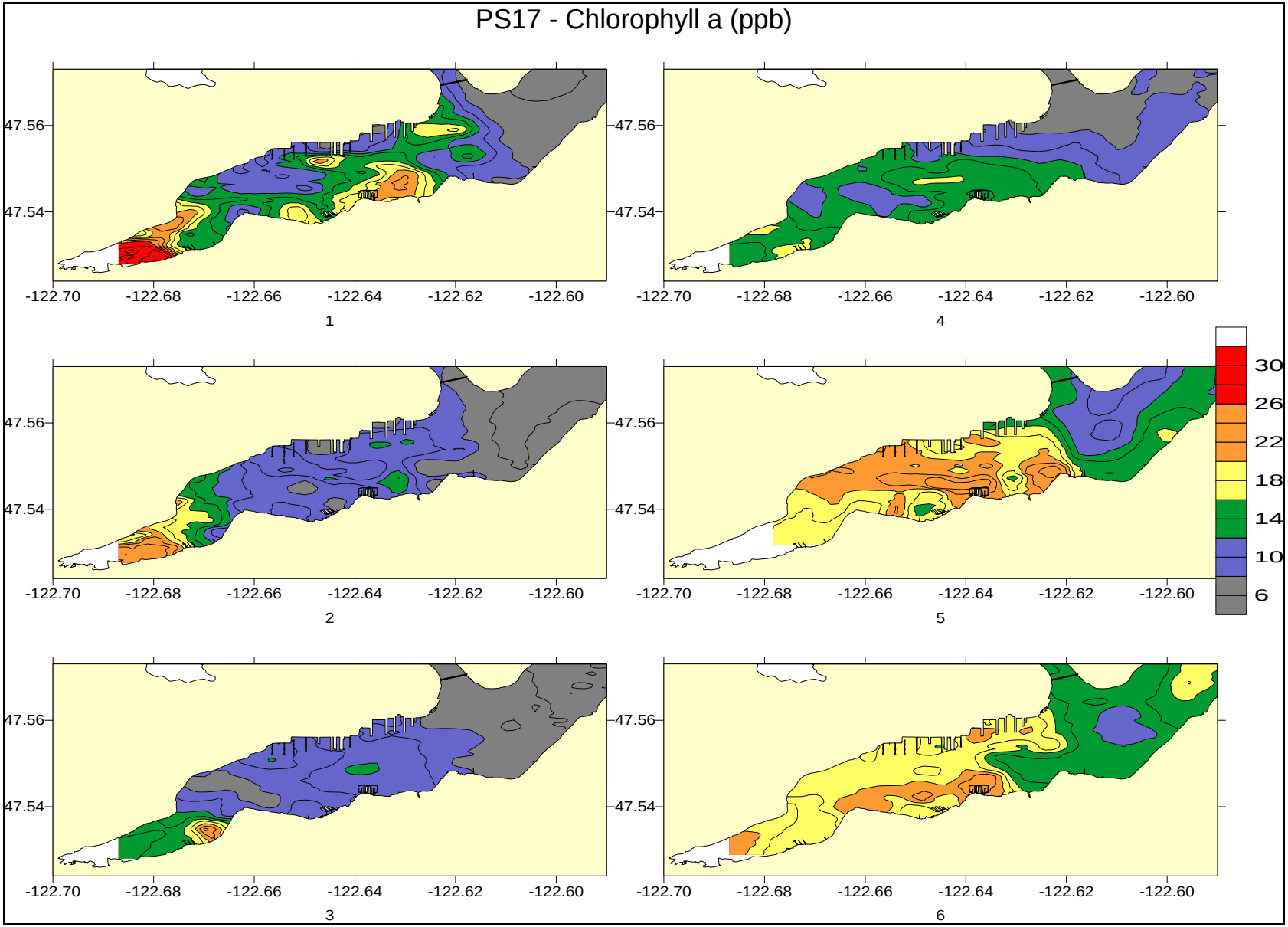

PS17 - Density (sigma t)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
21.7
21.5
21.3
21.1
20.9
20.7
20.5
20.3

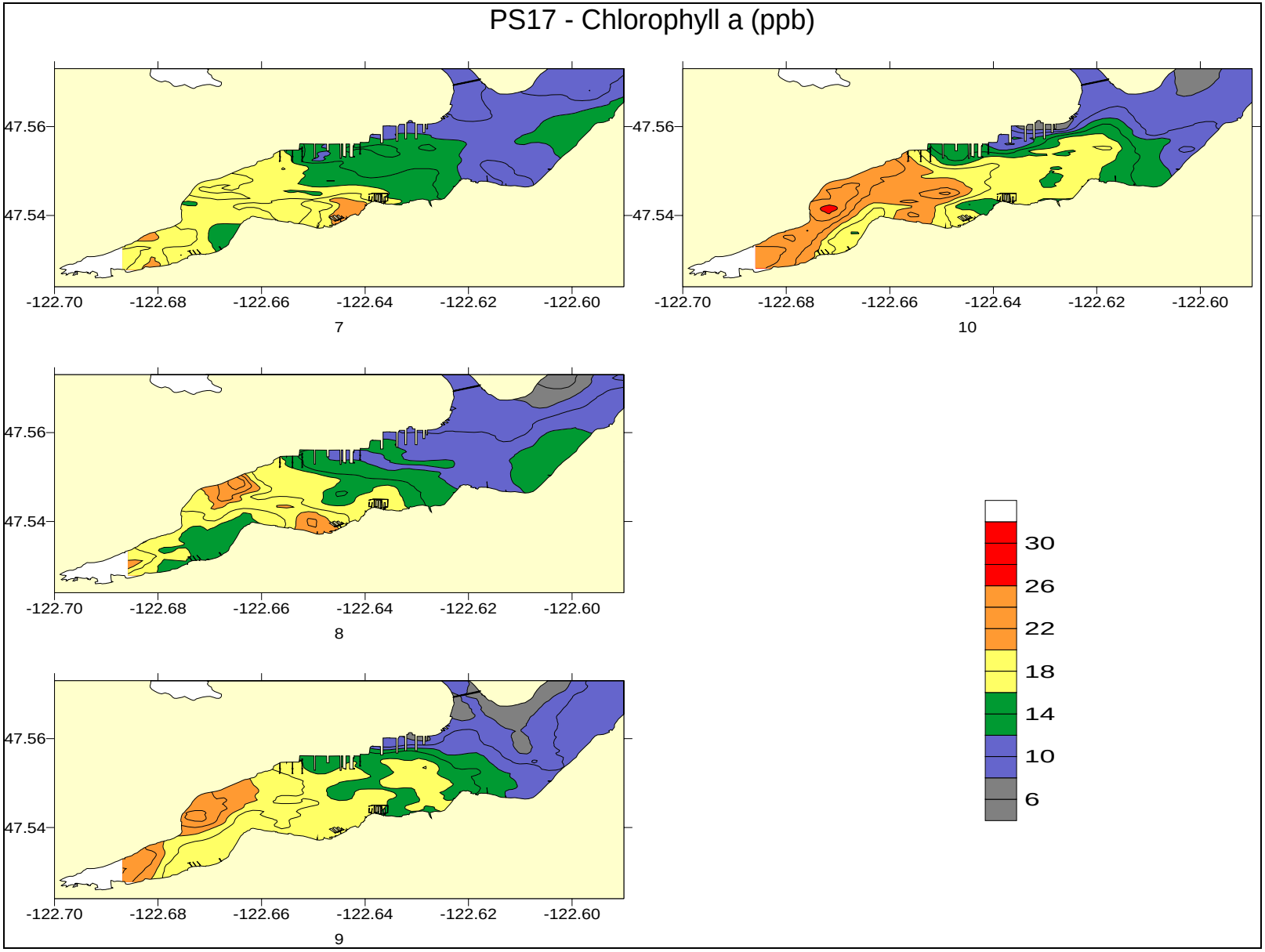
4.4.6 TSS


PS17 TSS (mg/L)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
4
5
6
8.2
7.6
7.0
6.4
5.8
5.2
4.6
4.0
3.4
2.8
2.2
1.6
1.0

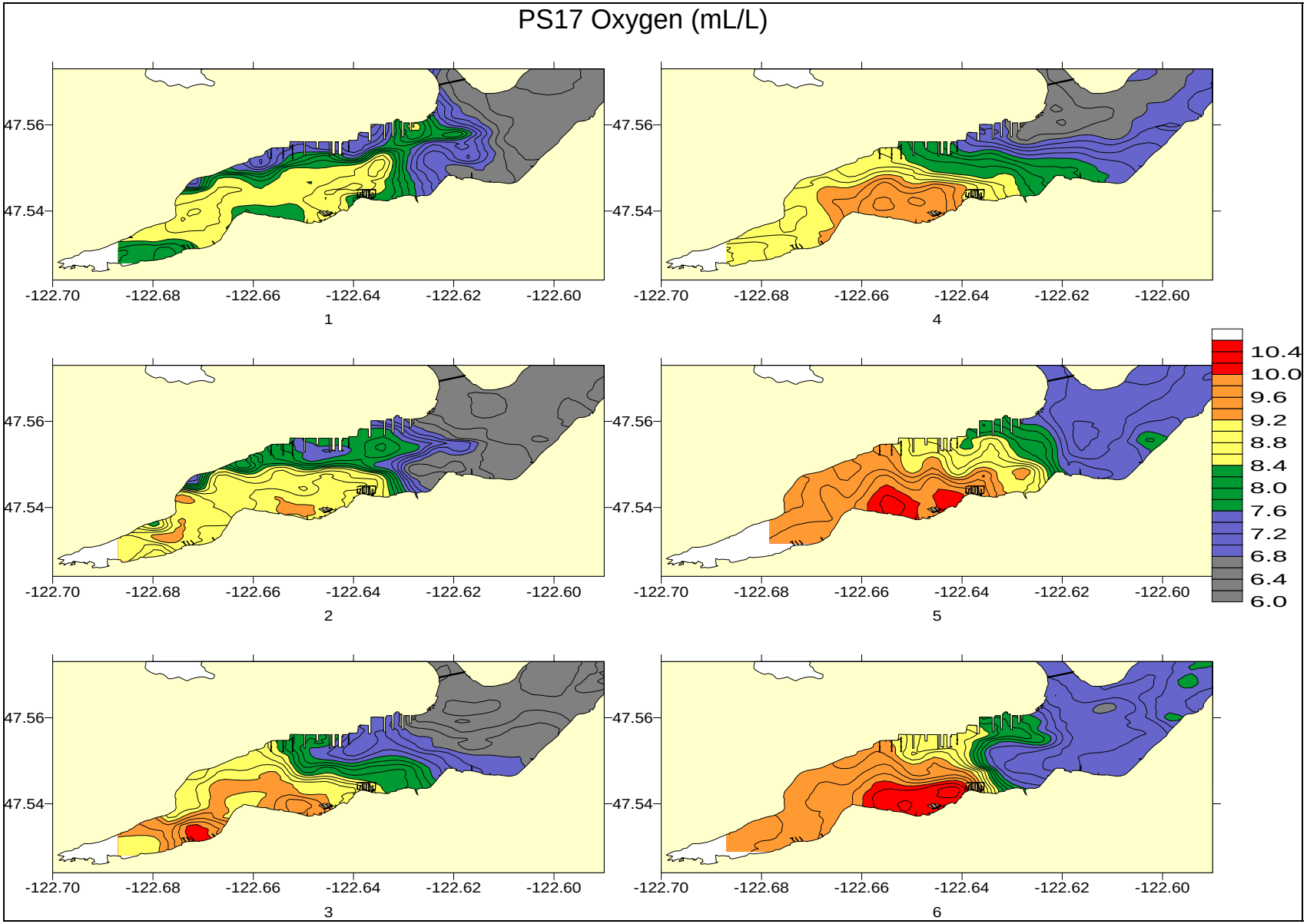

PS17 TSS (mg/L)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
8.2
7.6
7.0
6.4
5.8
5.2
4.6
4.0
3.4
2.8
2.2
1.6
1.0

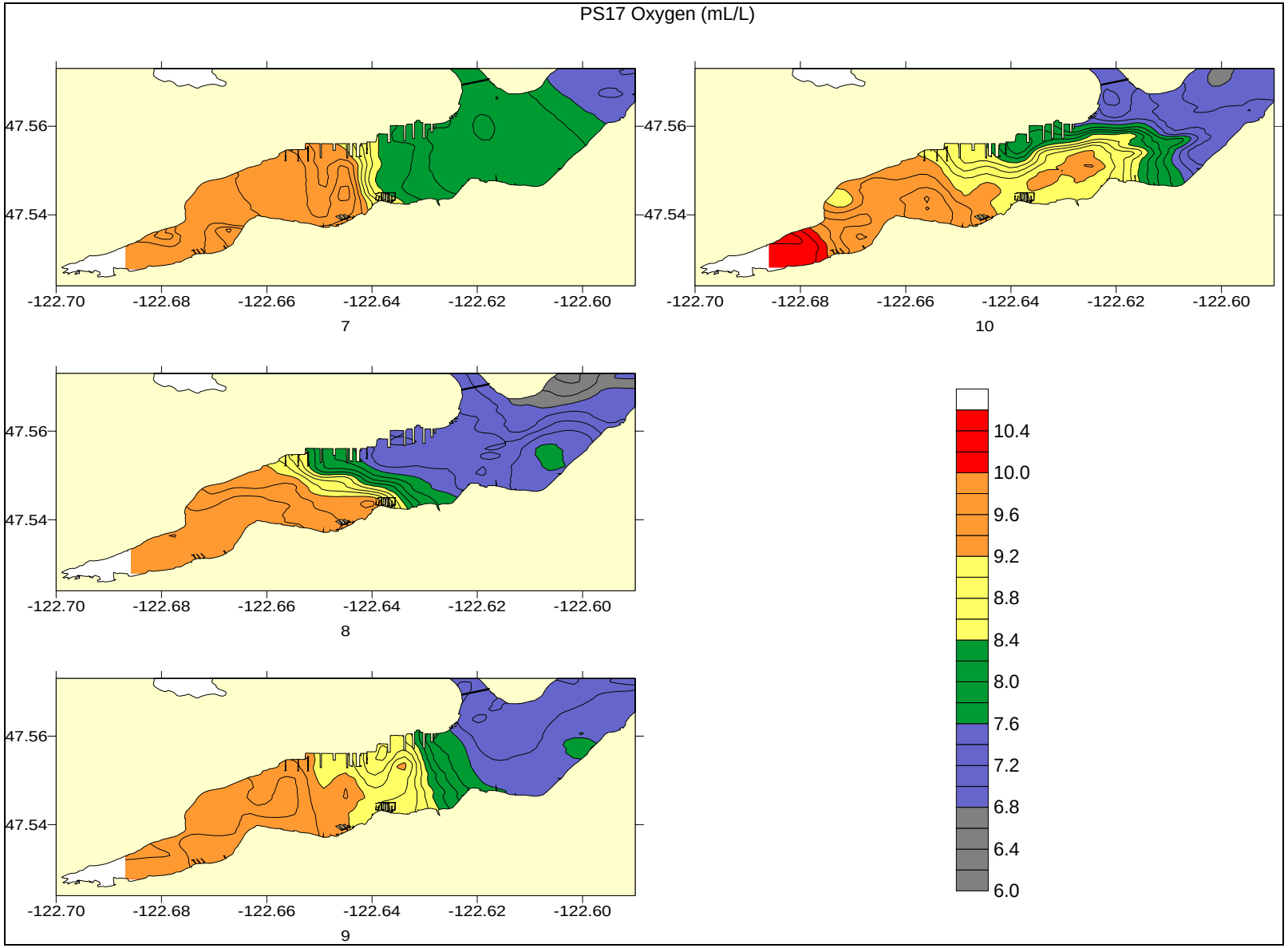
4.4.7 Chlorophyll *a*



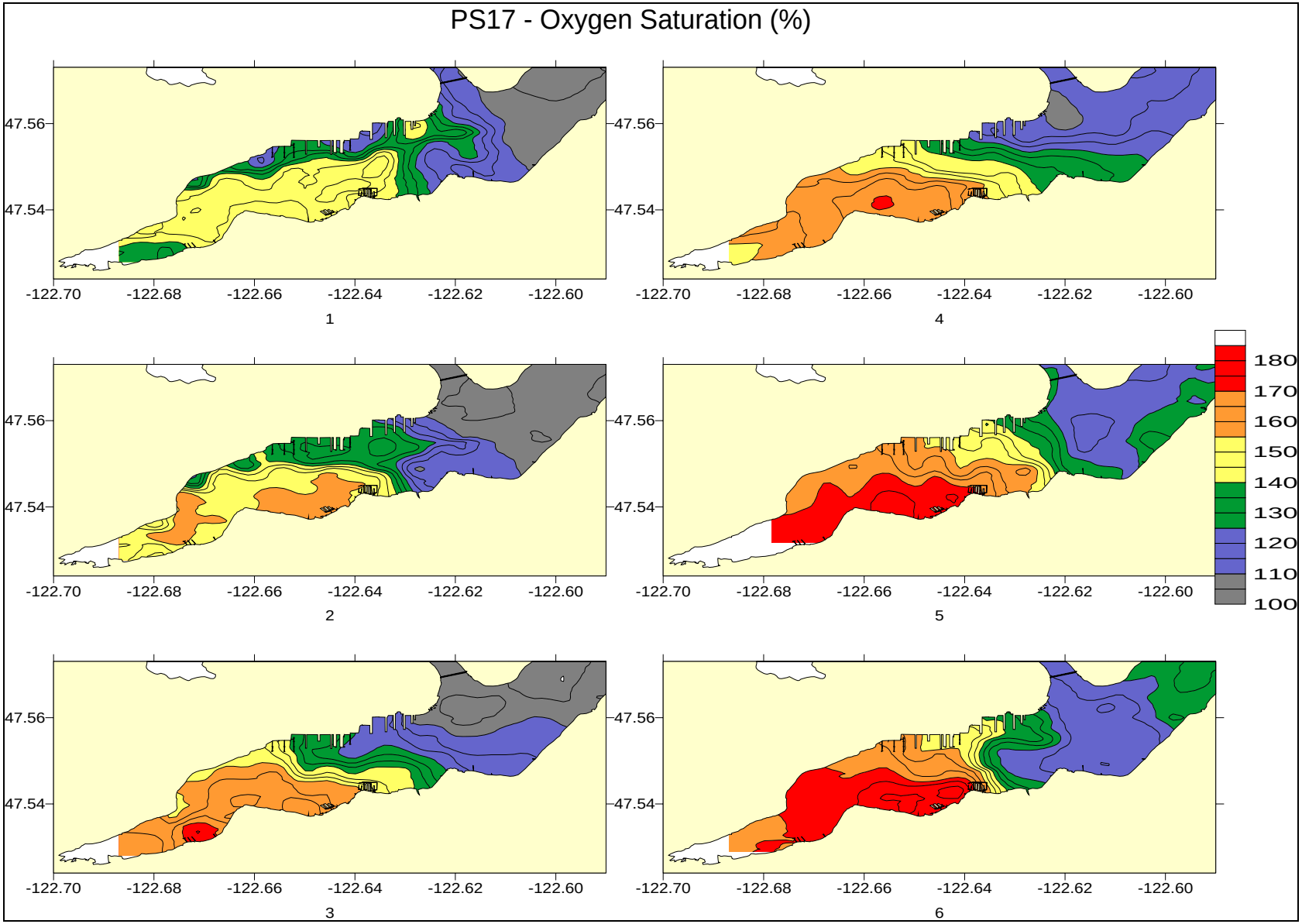

PS17 - Chlorophyll a (ppb)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
30
26
22
18
14
10
6

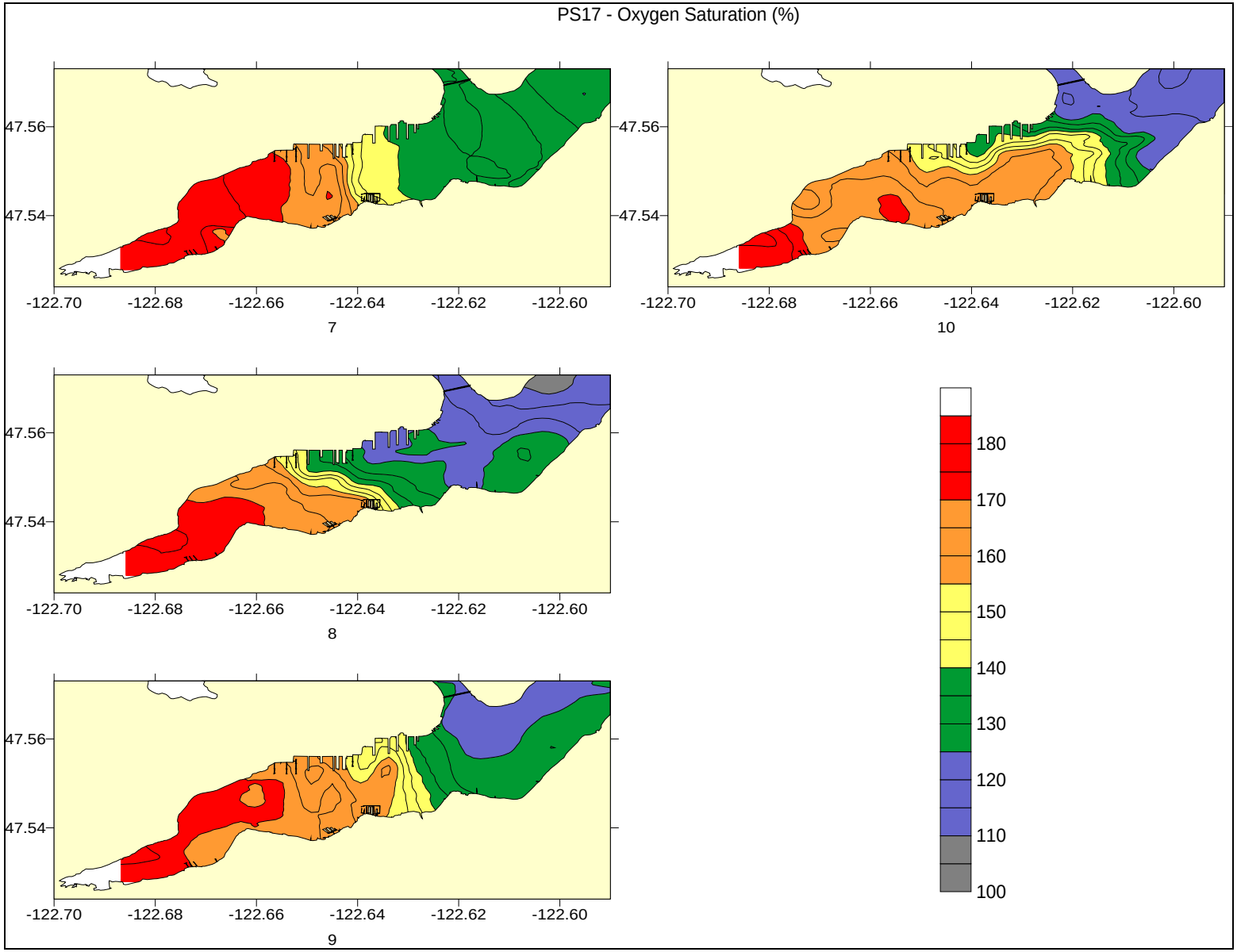
4.4.8 Oxygen


PS17 Oxygen (mL/L)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
4
5
6
10.4
10.0
9.6
9.2
8.8
8.4
8.0
7.6
7.2
6.8
6.4
6.0

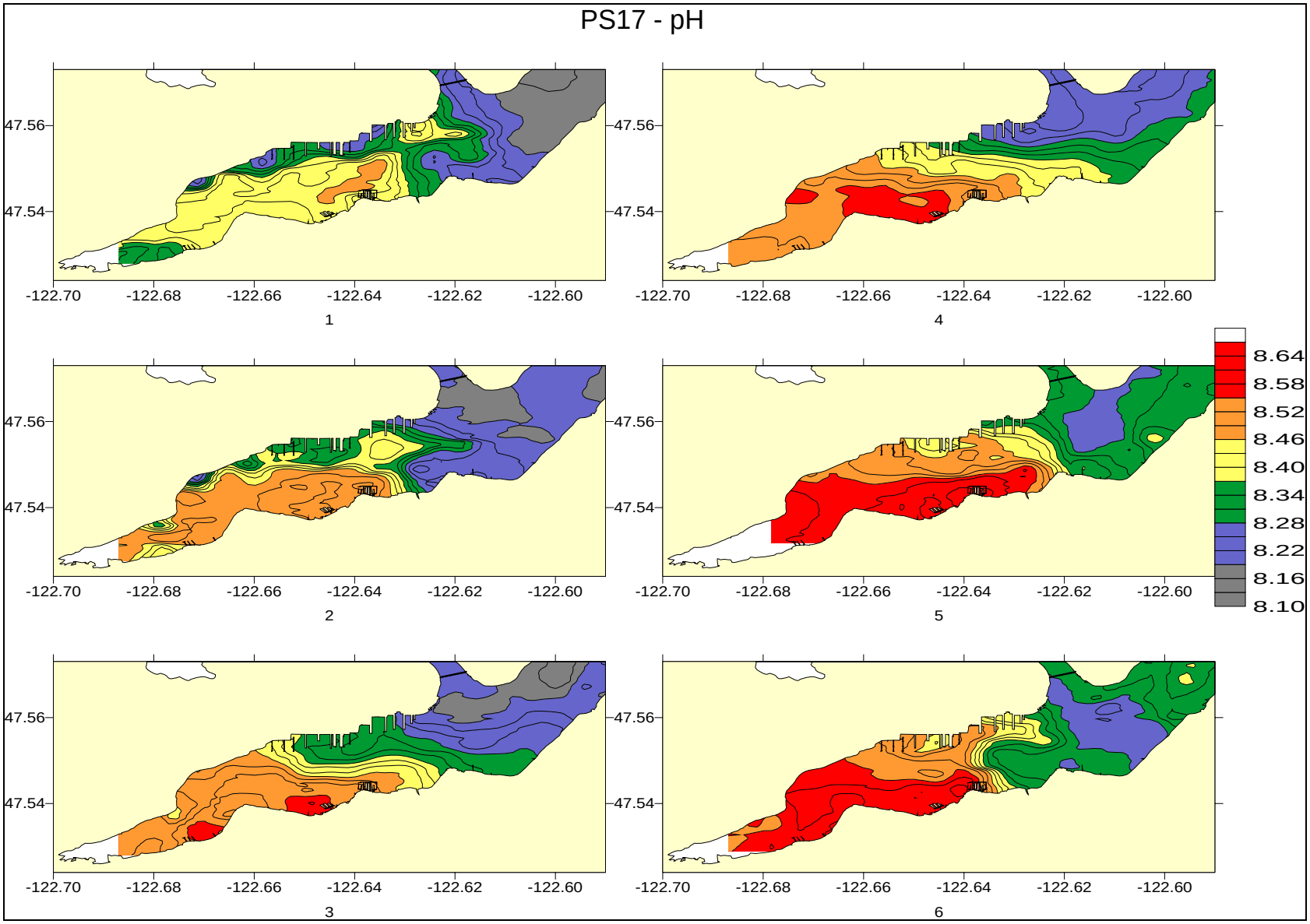

PS17 Oxygen (mL/L)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
10.4
10.0
9.6
9.2
8.8
8.4
8.0
7.6
7.2
6.8
6.4
6.0

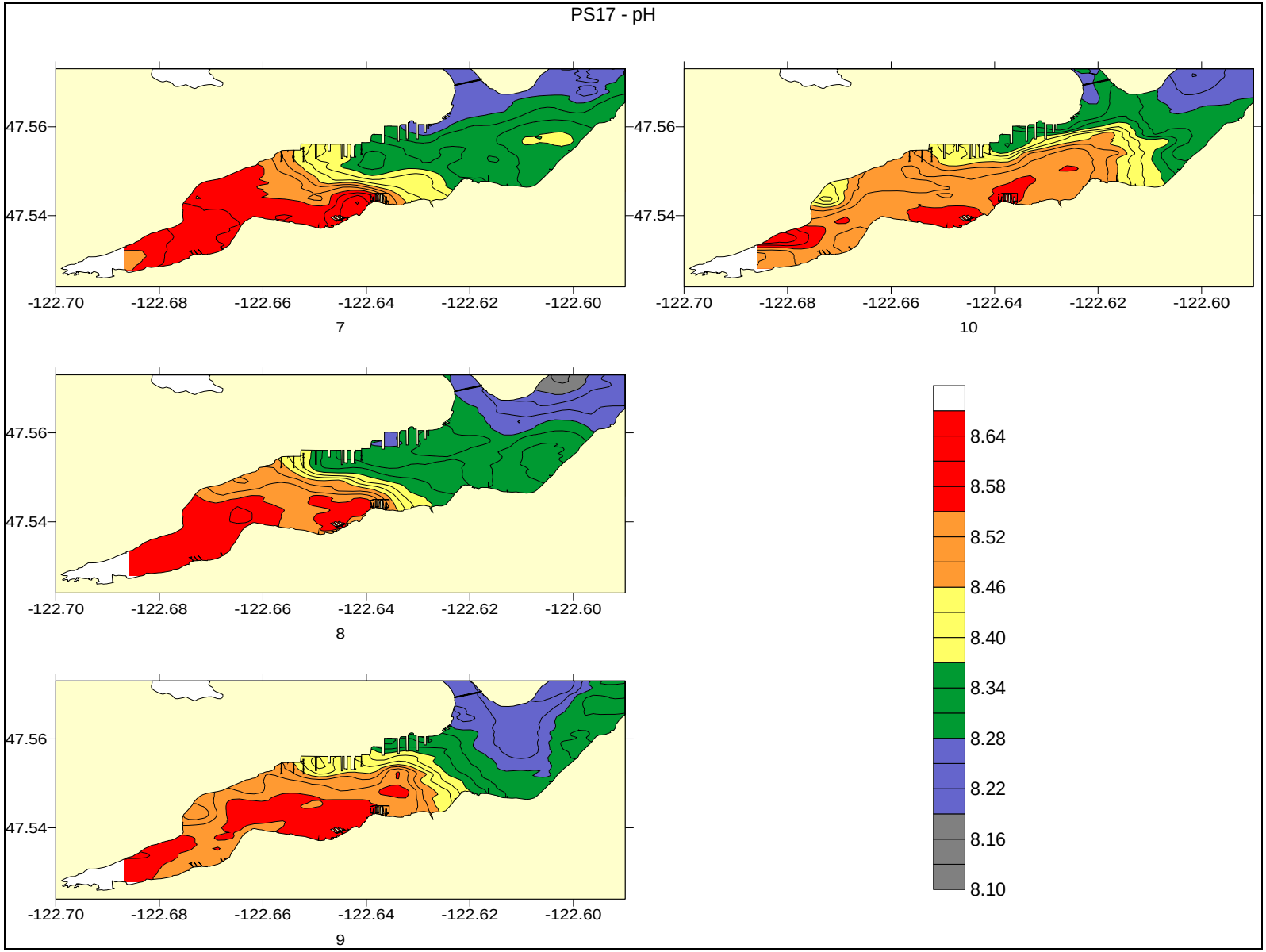
4.4.9 Oxygen Saturation



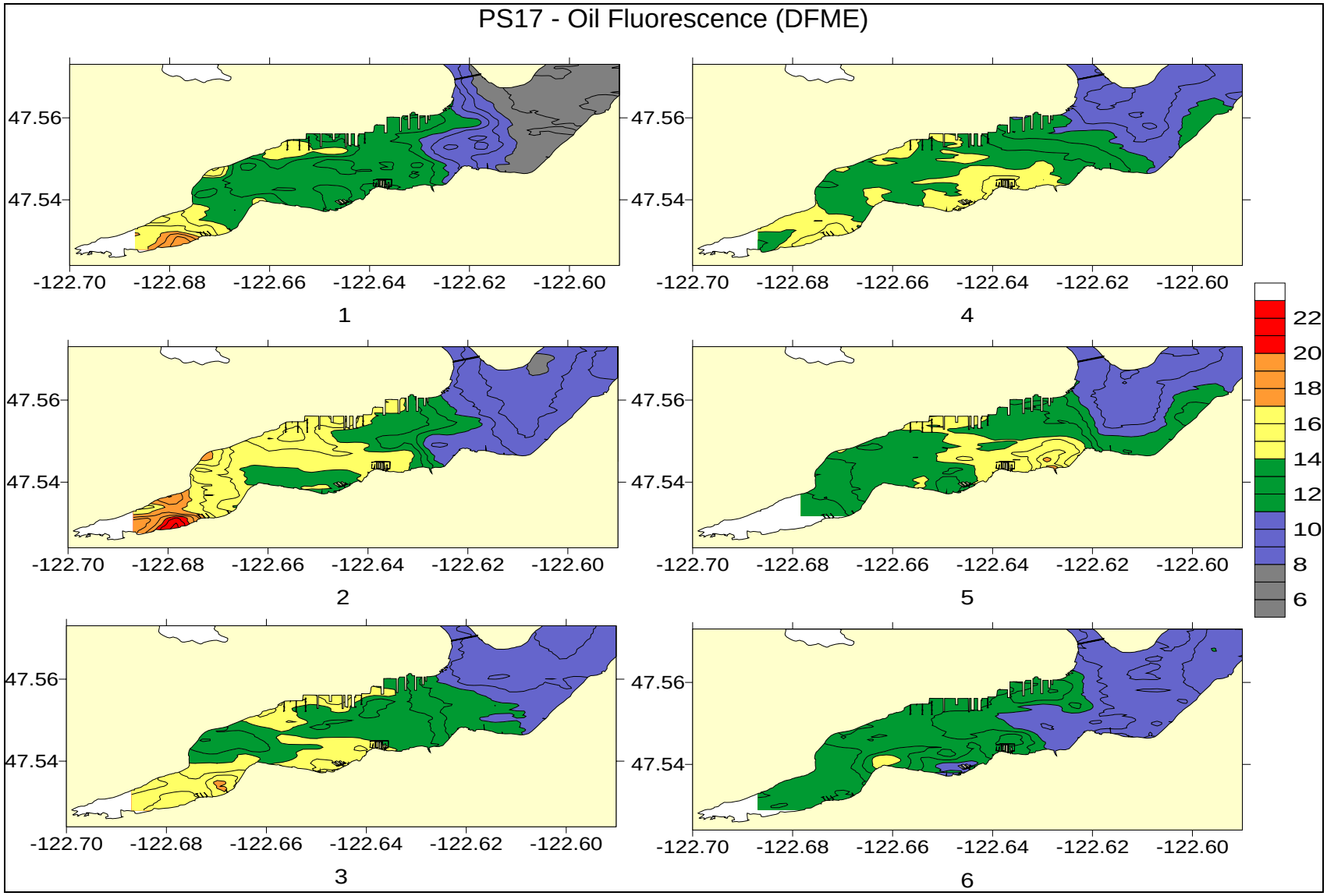

PS17 - Oxygen Saturation (%)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
180
170
160
150
140
130
120
110
100

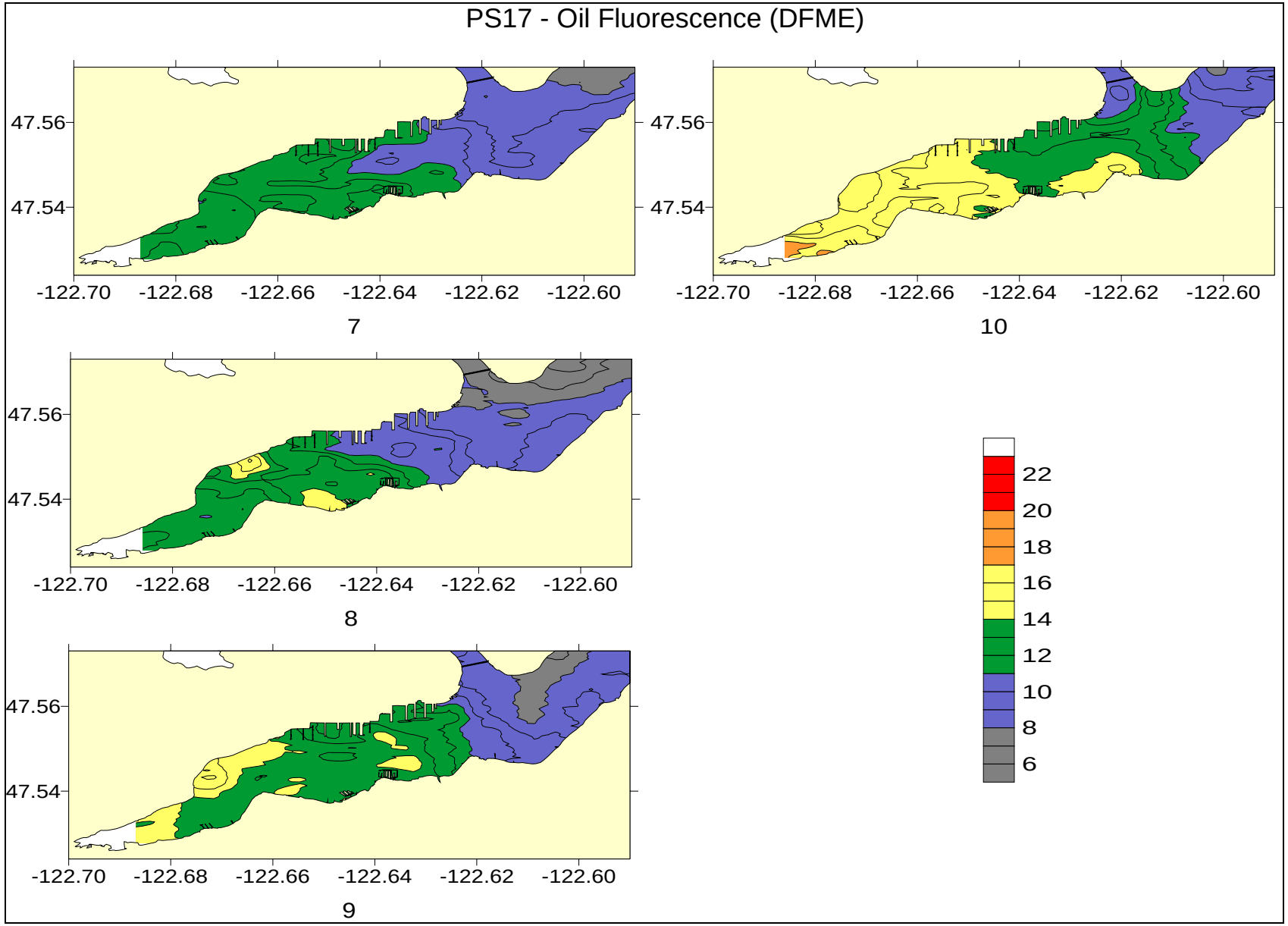
4.4.10 PH


PS17 - pH
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
4
5
6
8.64
8.58
8.52
8.46
8.40
8.34
8.28
8.22
8.16
8.10


PS17 - pH
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
8.64
8.58
8.52
8.46
8.40
8.34
8.28
8.22
8.16
8.10

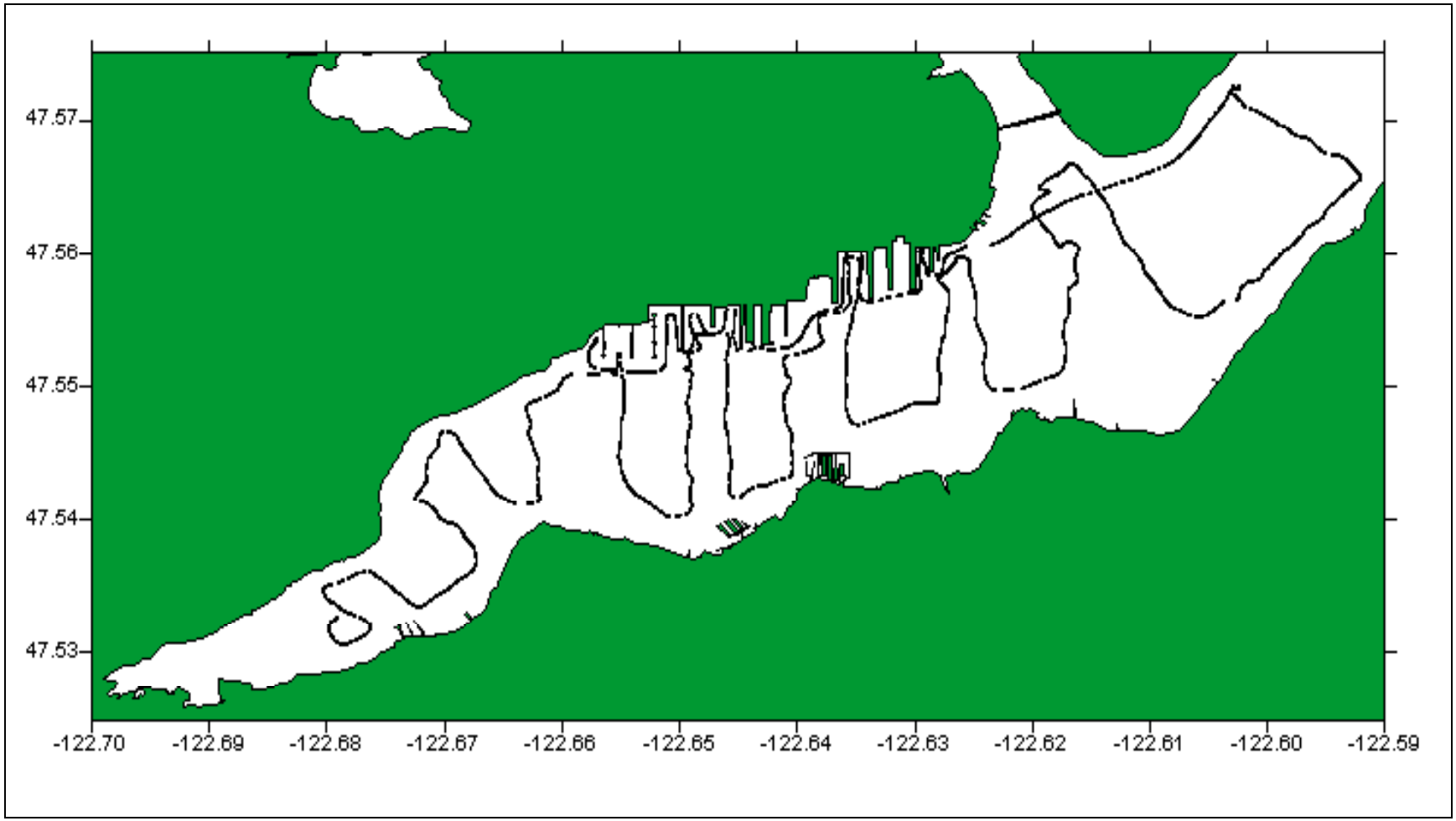
4.4.11 Oil Fluorescence



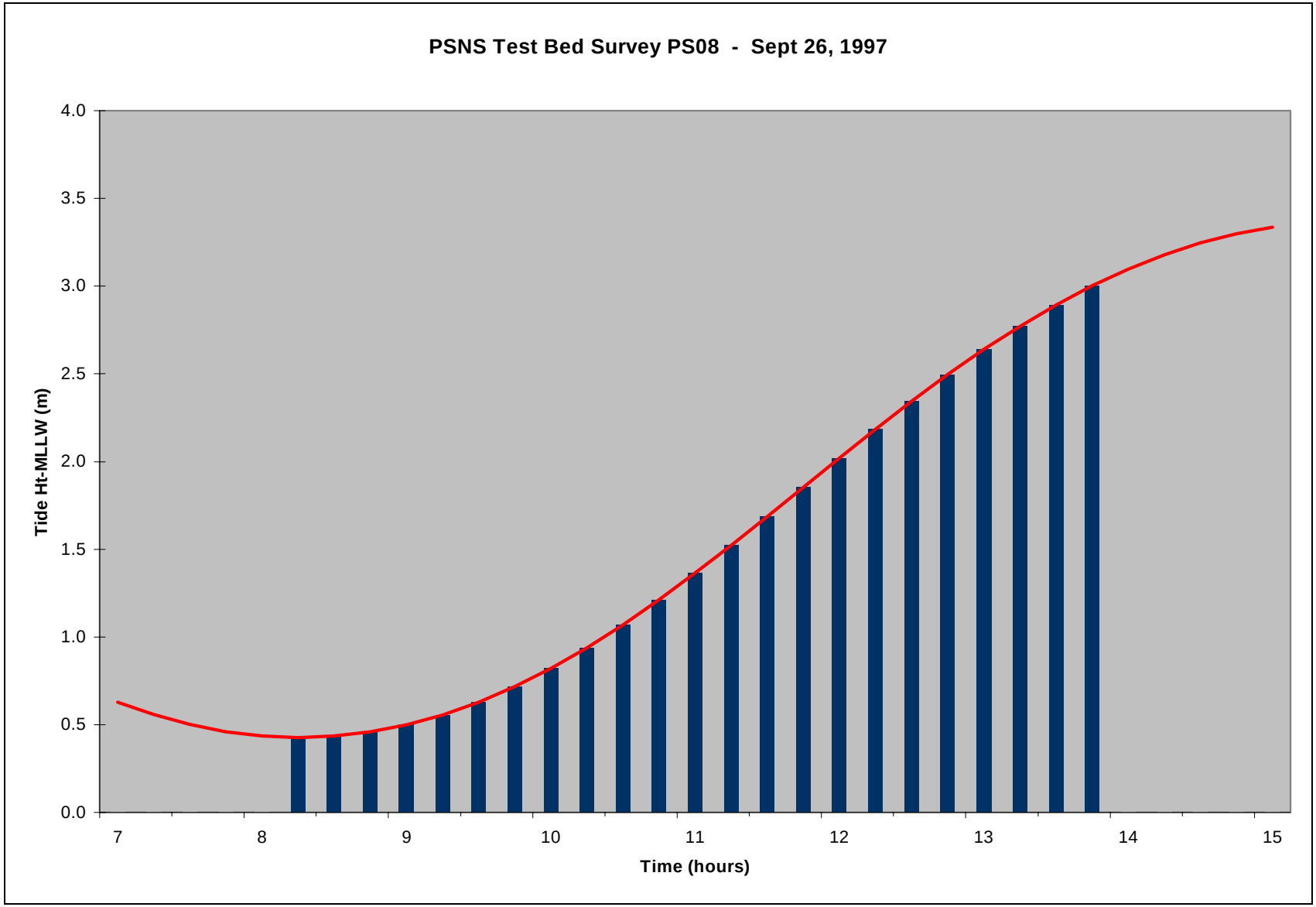

PS17 - Oil Fluorescence (DFME)
47.56
47.54
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
7
10
8
9
22
20
18
16
14
12
10
8
6

5.1 September 1997 – PS08

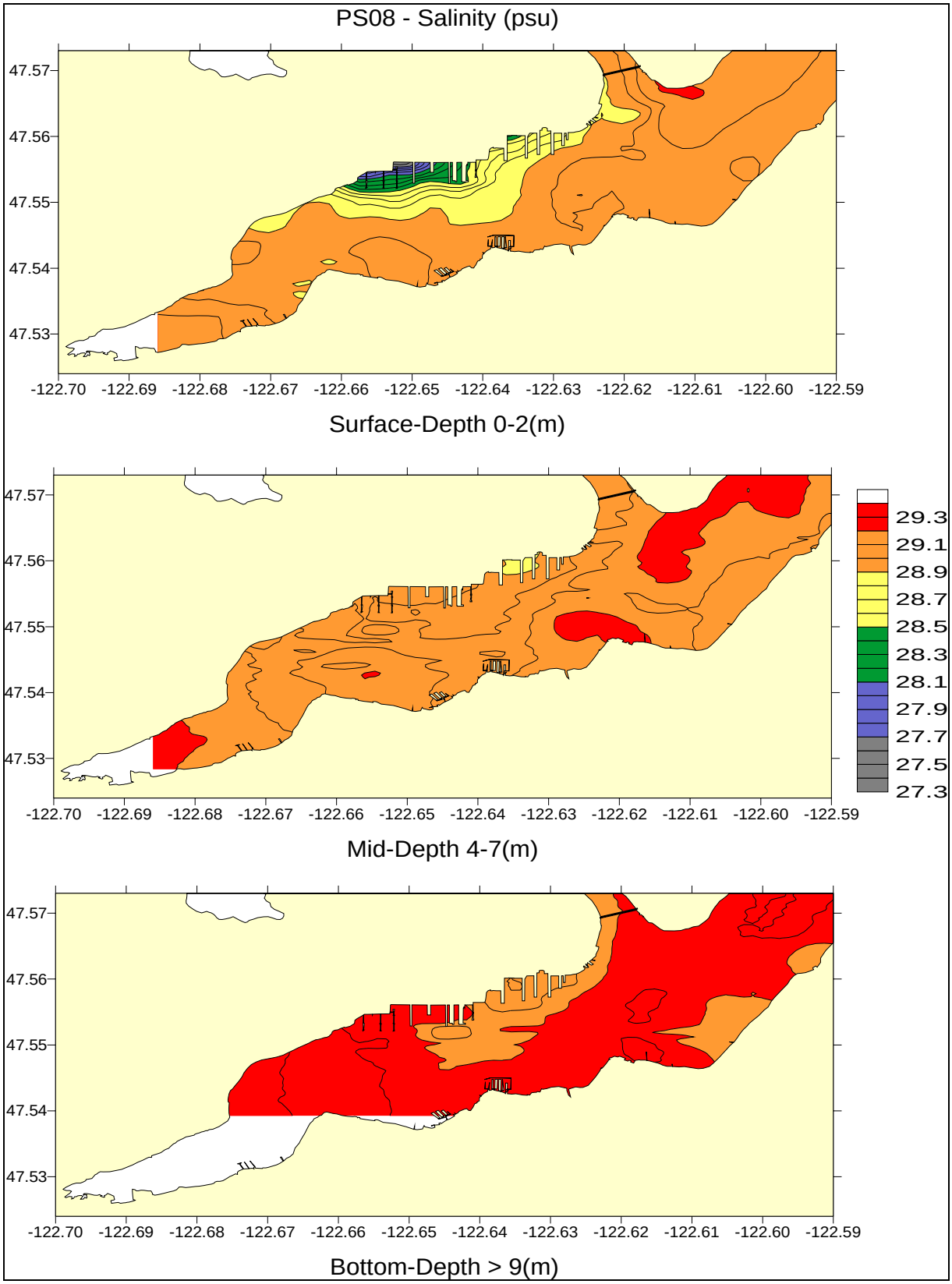
5.1.1 Track Map



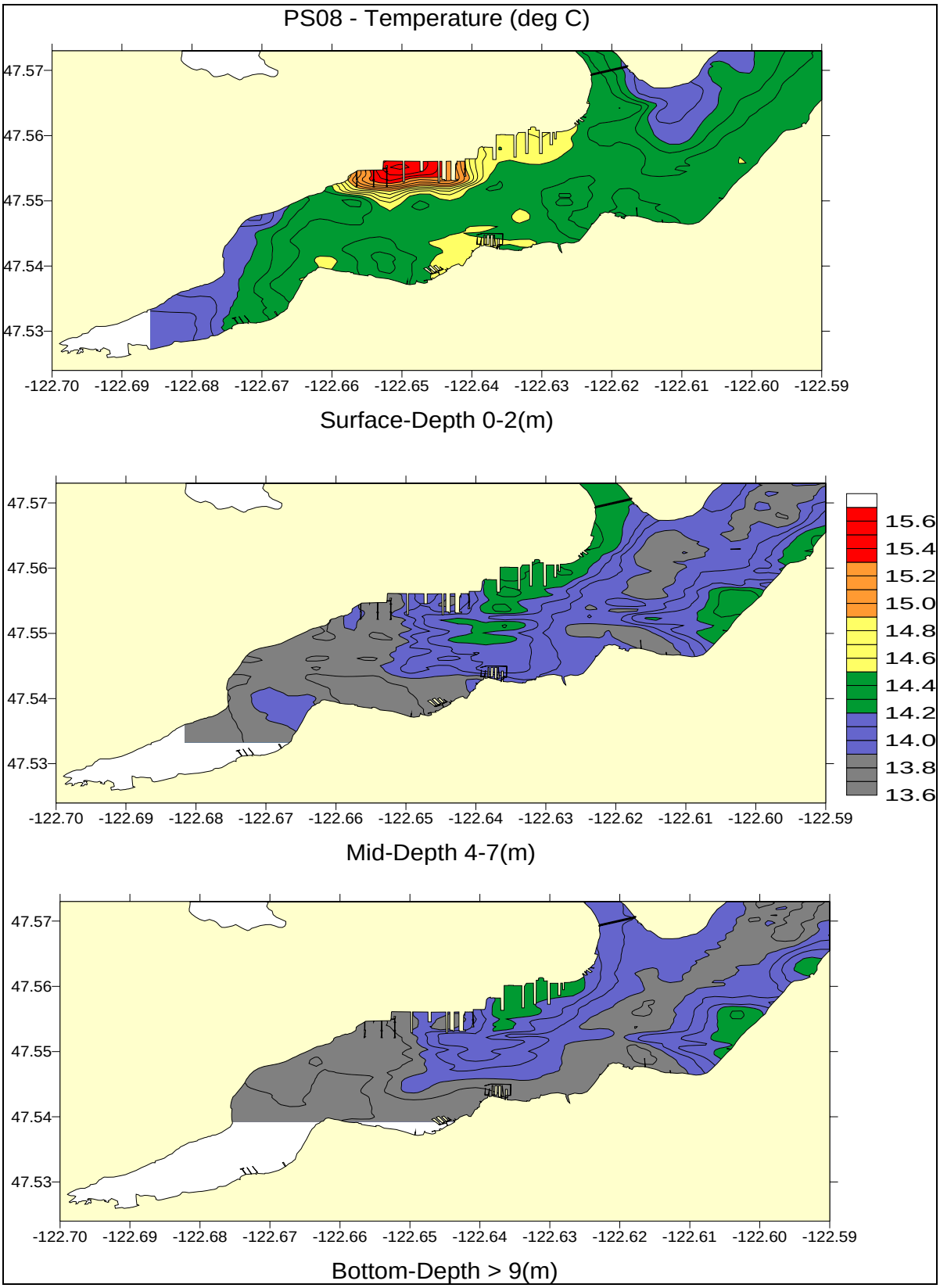
5.1.2 Tide Chart



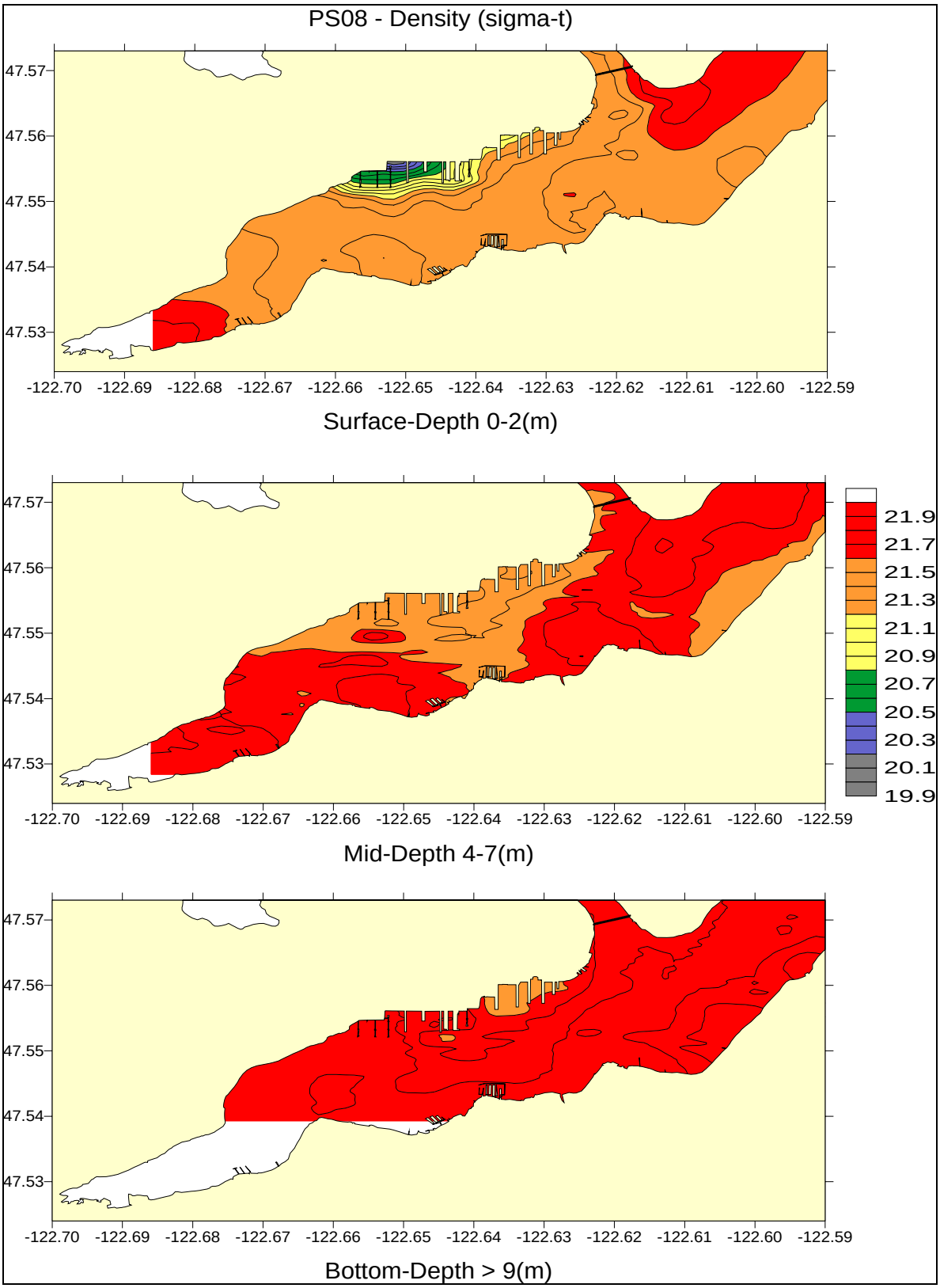
5.1.3 Salinity



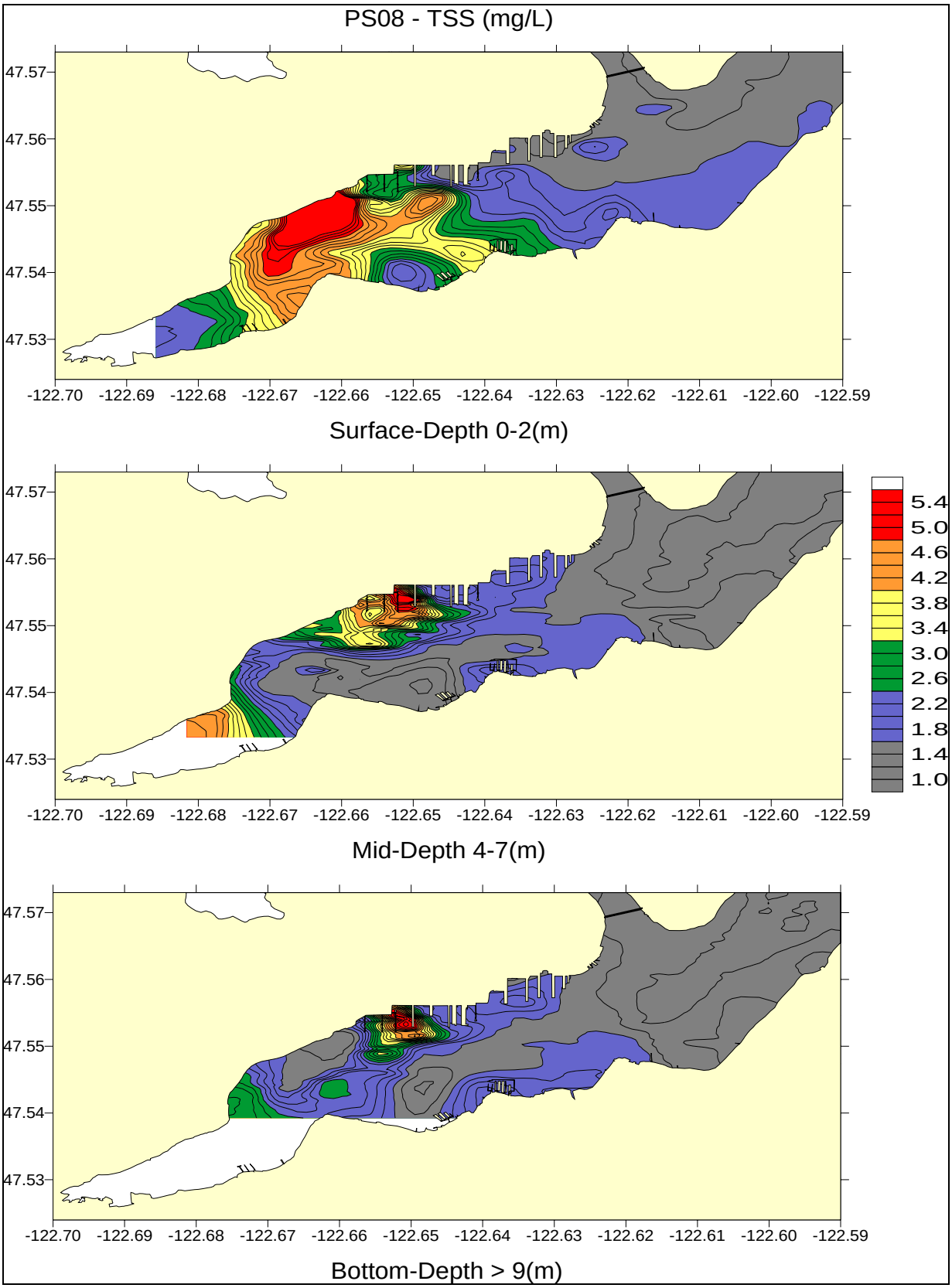
5.1.4 Temperature



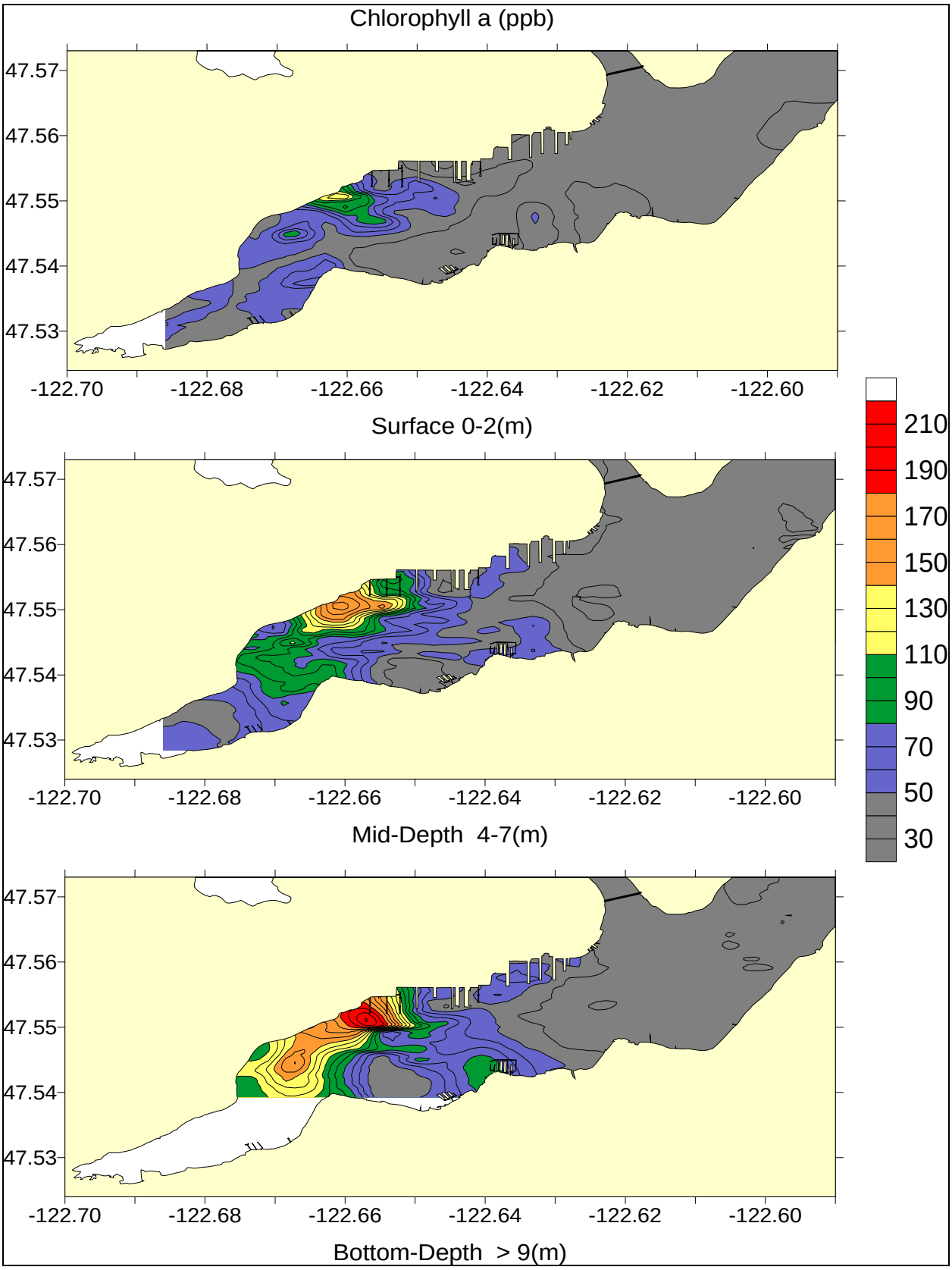
5.1.5 Density


PS08 - Density (sigma-t)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface-Depth 0-2(m)
21.9
21.7
21.5
21.3
21.1
20.9
20.7
20.5
20.3
20.1
19.9
Mid-Depth 4-7(m)
Bottom-Depth > 9(m)

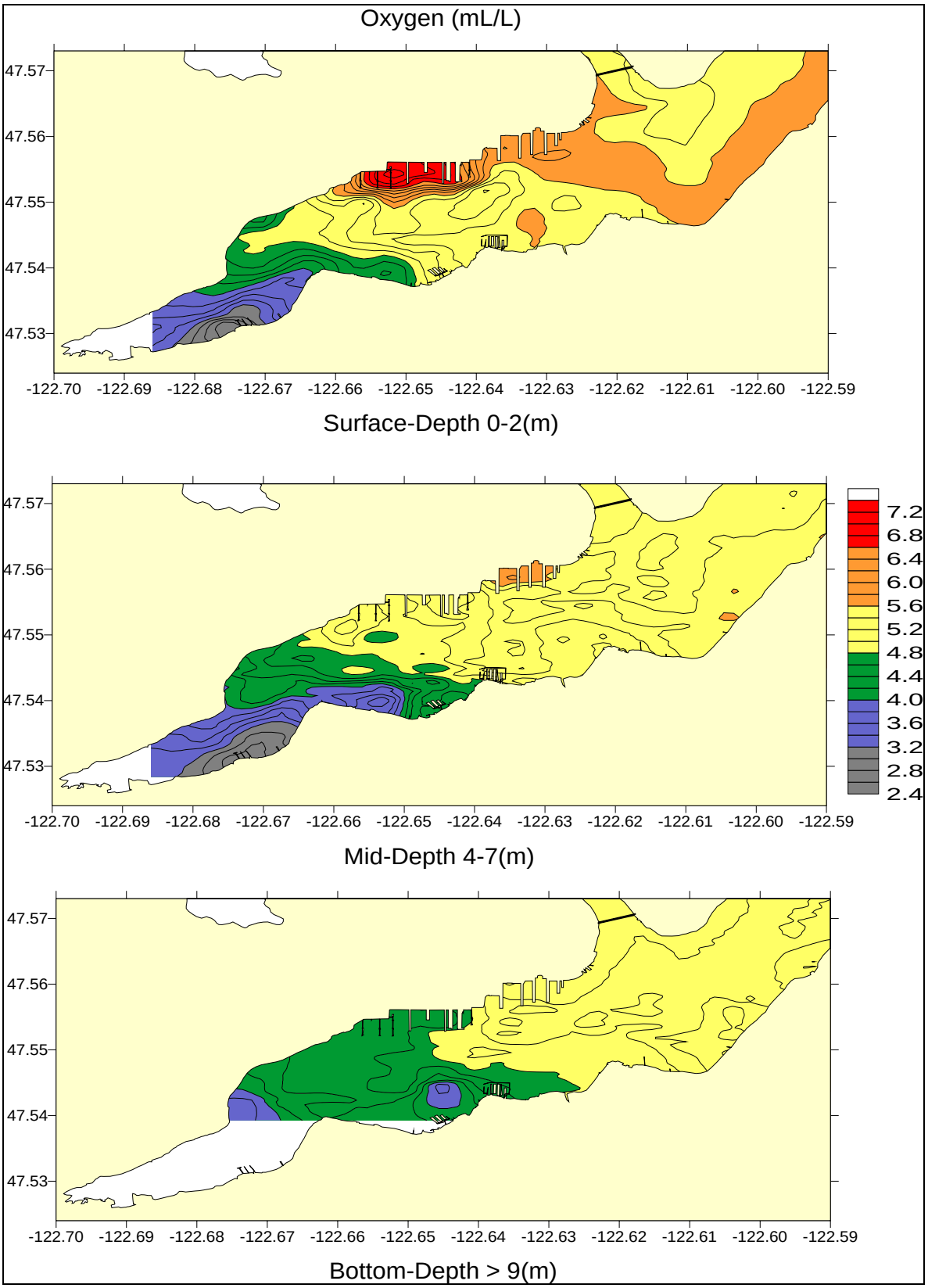
5.1.6 TSS


PS08 - TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface-Depth 0-2(m)
5.4
5.0
4.6
4.2
3.8
3.4
3.0
2.6
2.2
1.8
1.4
1.0
Mid-Depth 4-7(m)
Bottom-Depth > 9(m)

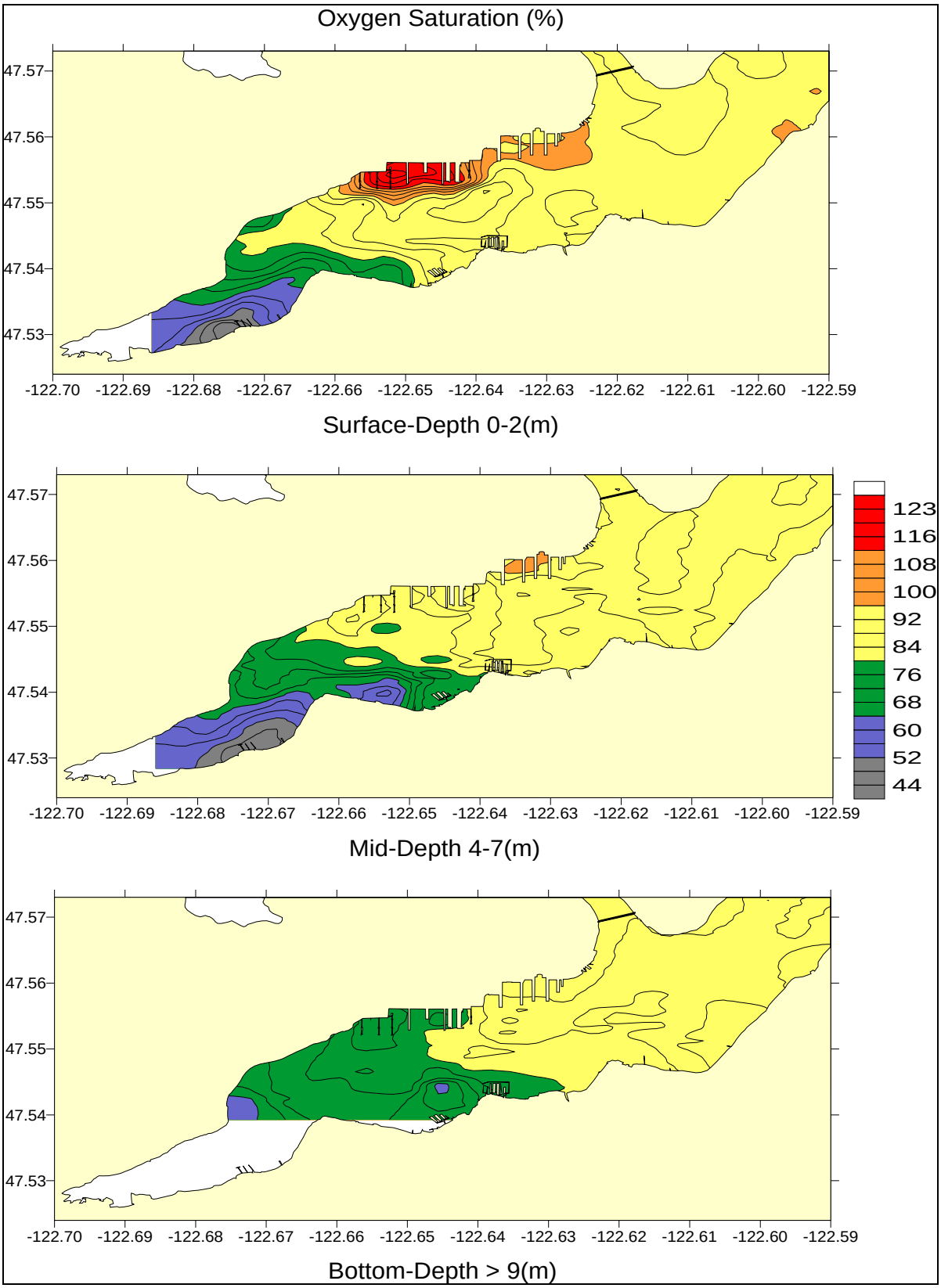
5.1.7 Chlorophyll *a*



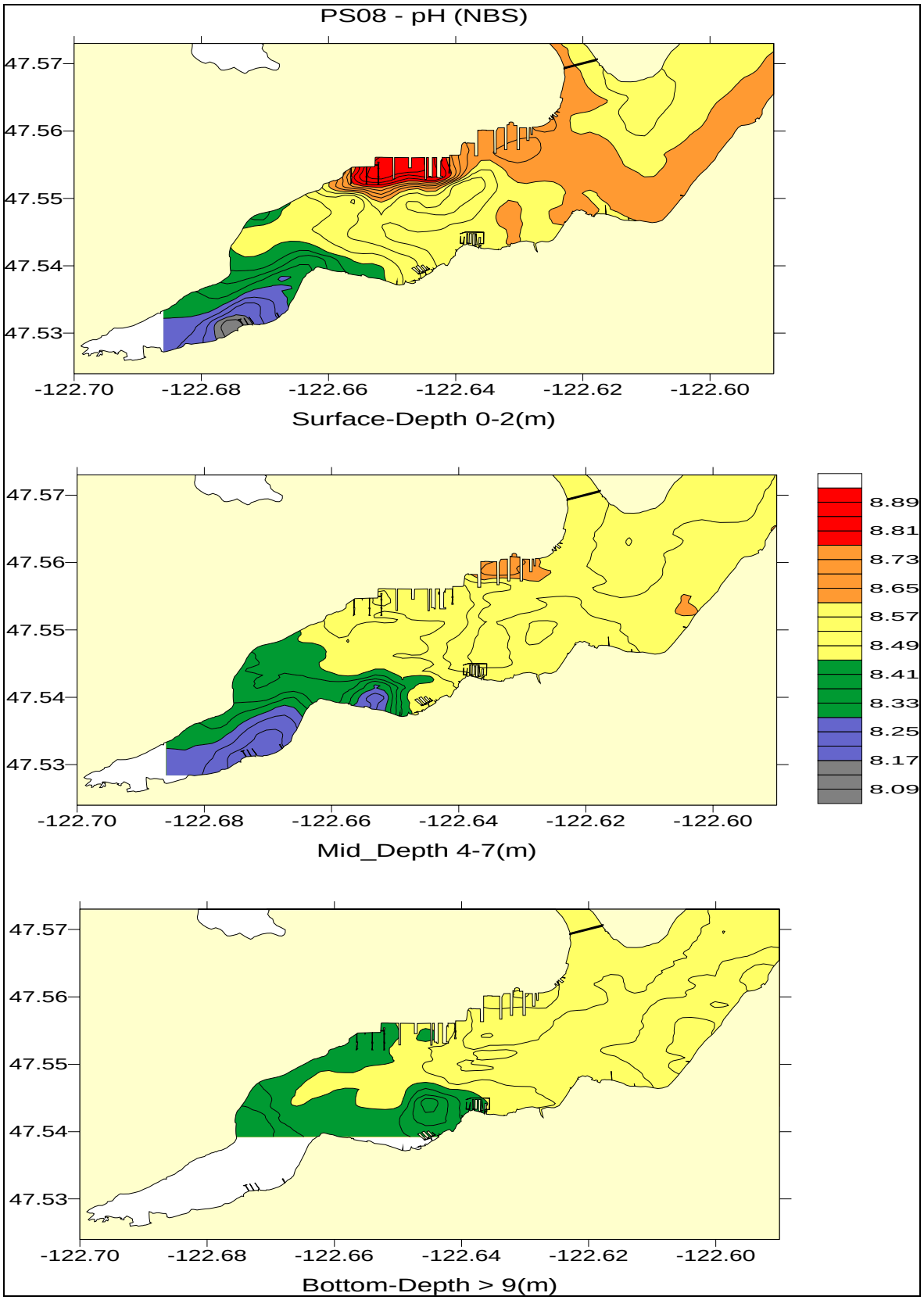
5.1.8 Oxygen


Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface-Depth 0-2(m)
7.2
6.8
6.4
6.0
5.6
5.2
4.8
4.4
4.0
3.6
3.2
2.8
2.4
Mid-Depth 4-7(m)
Bottom-Depth > 9(m)

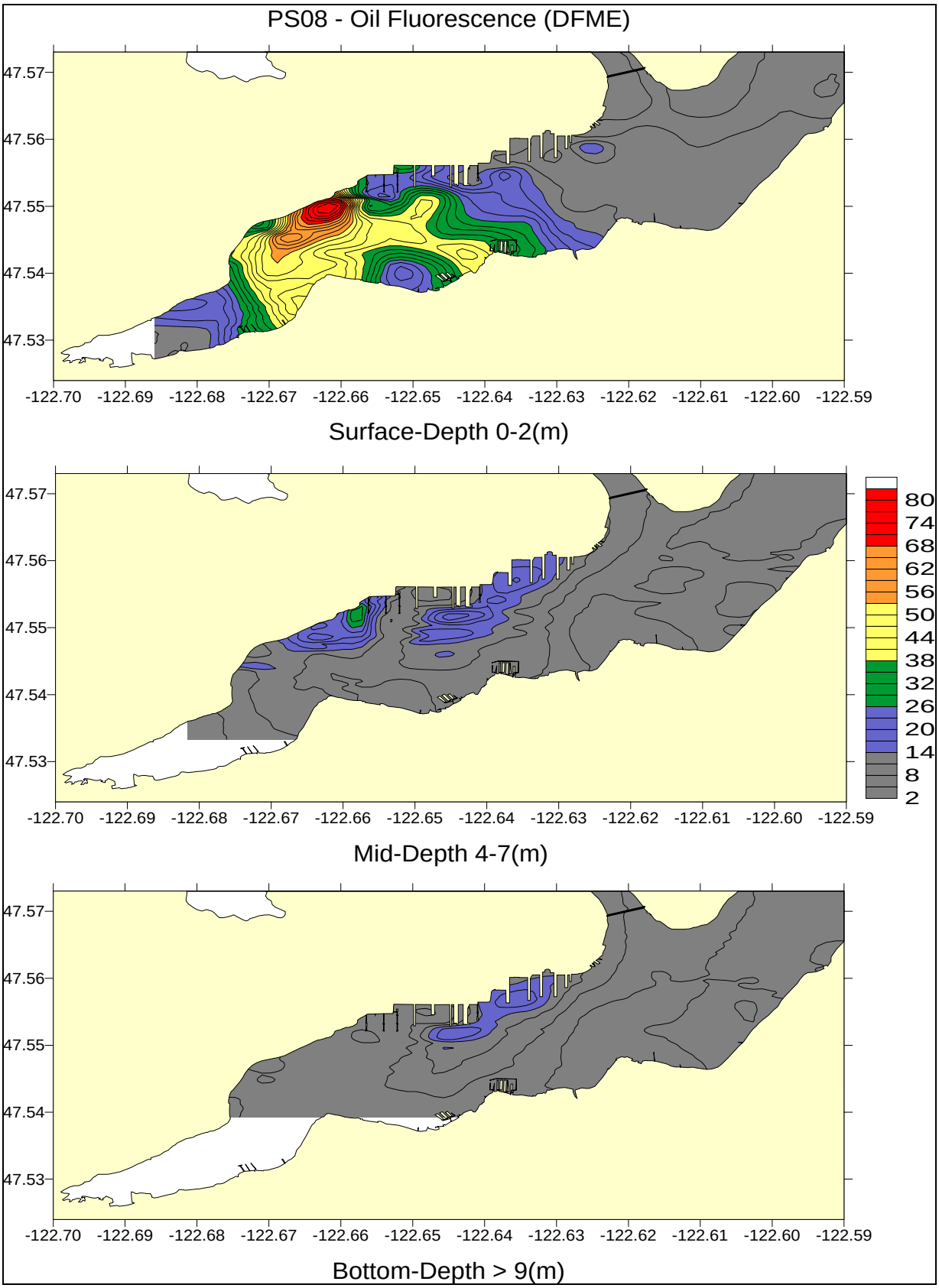
5.1.9 Oxygen Saturation



5.1.10 pH

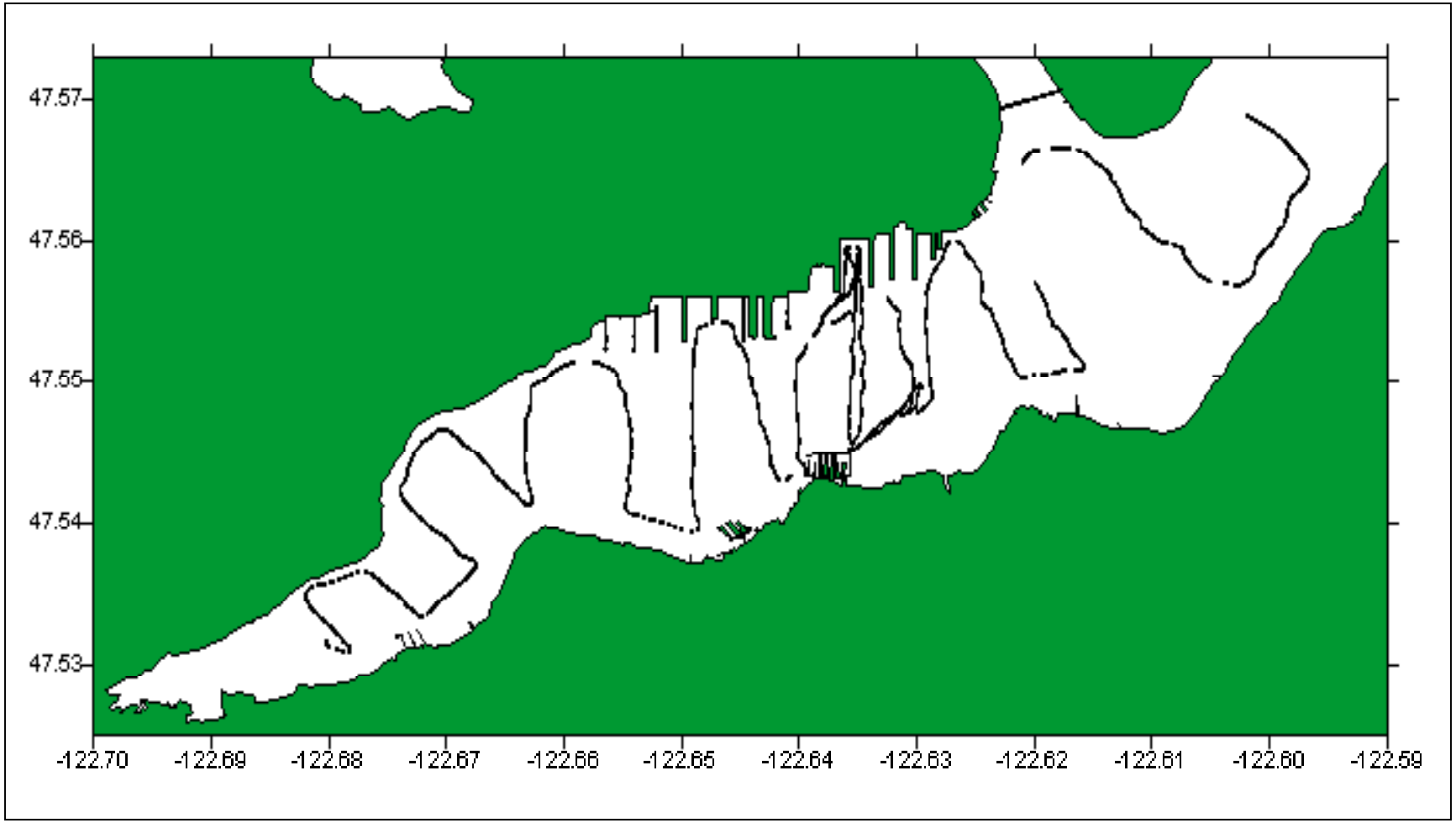

PS08 - pH (NBS)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Surface-Depth 0-2(m)
Mid_Depth 4-7(m)
Bottom-Depth > 9(m)
8.89
8.81
8.73
8.65
8.57
8.49
8.41
8.33
8.25
8.17
8.09

5.1.11 Oil Fluorescence

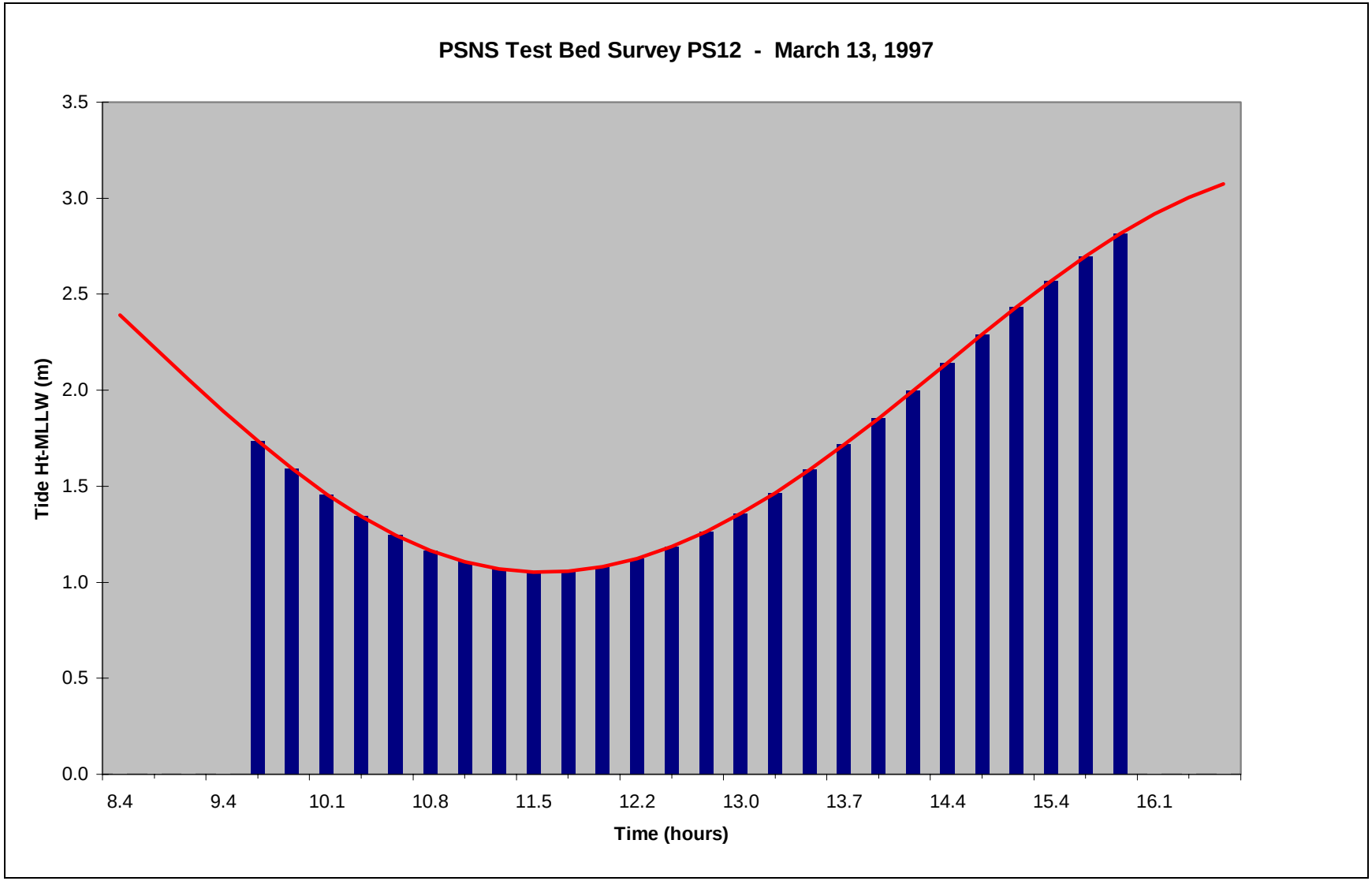


5.2 March 1998 – PS12

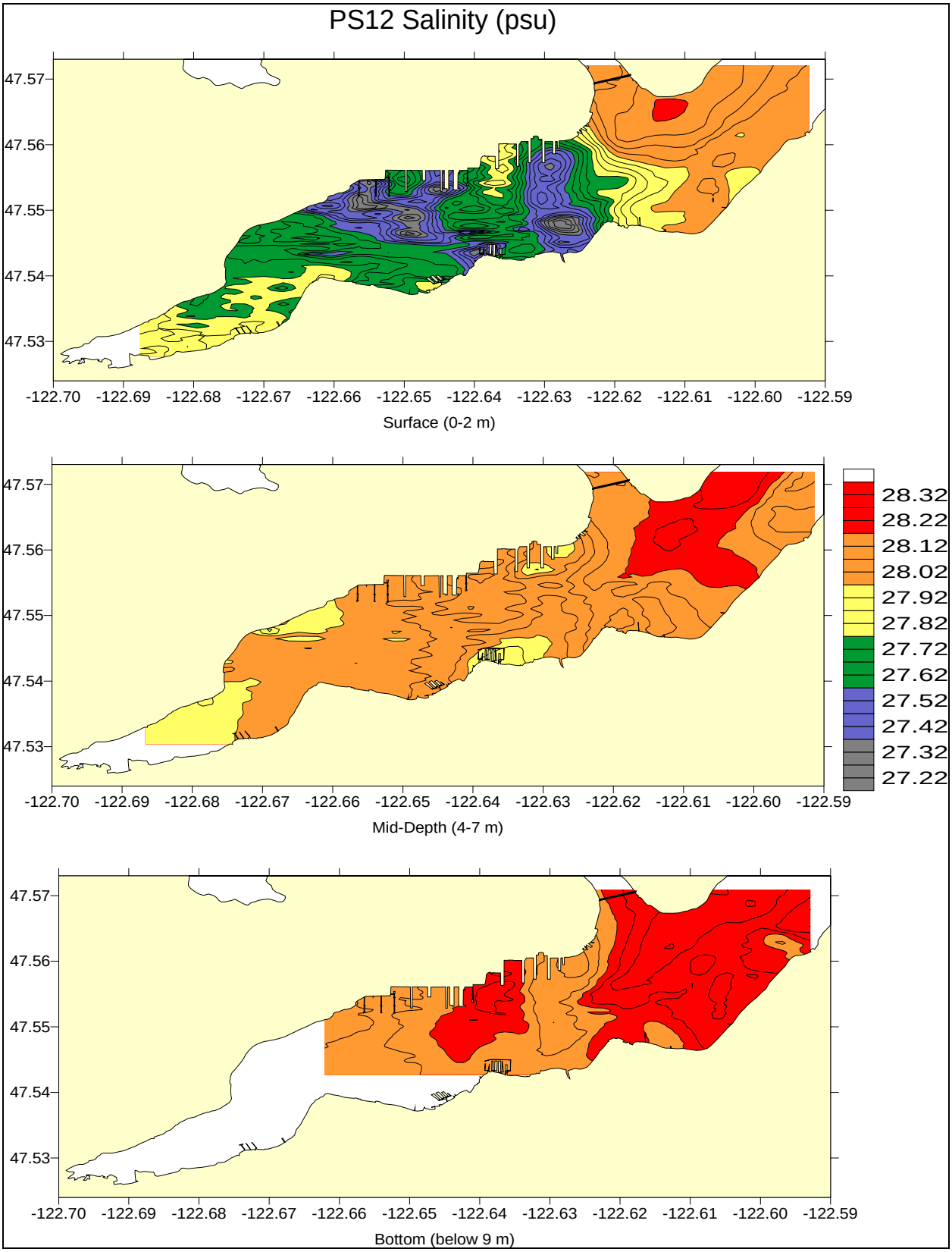
5.2.1 Track Map



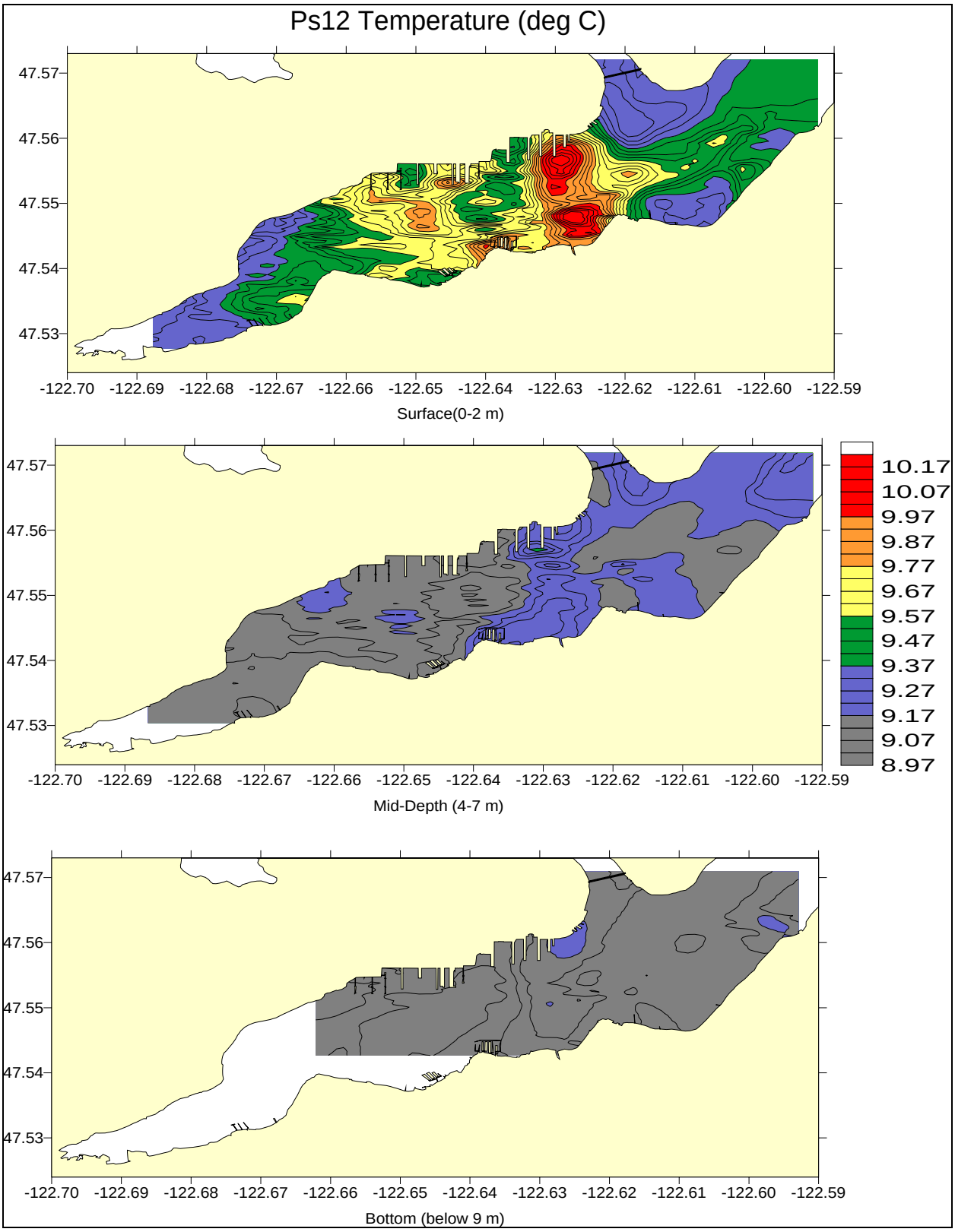
5.2.2 Tide Chart



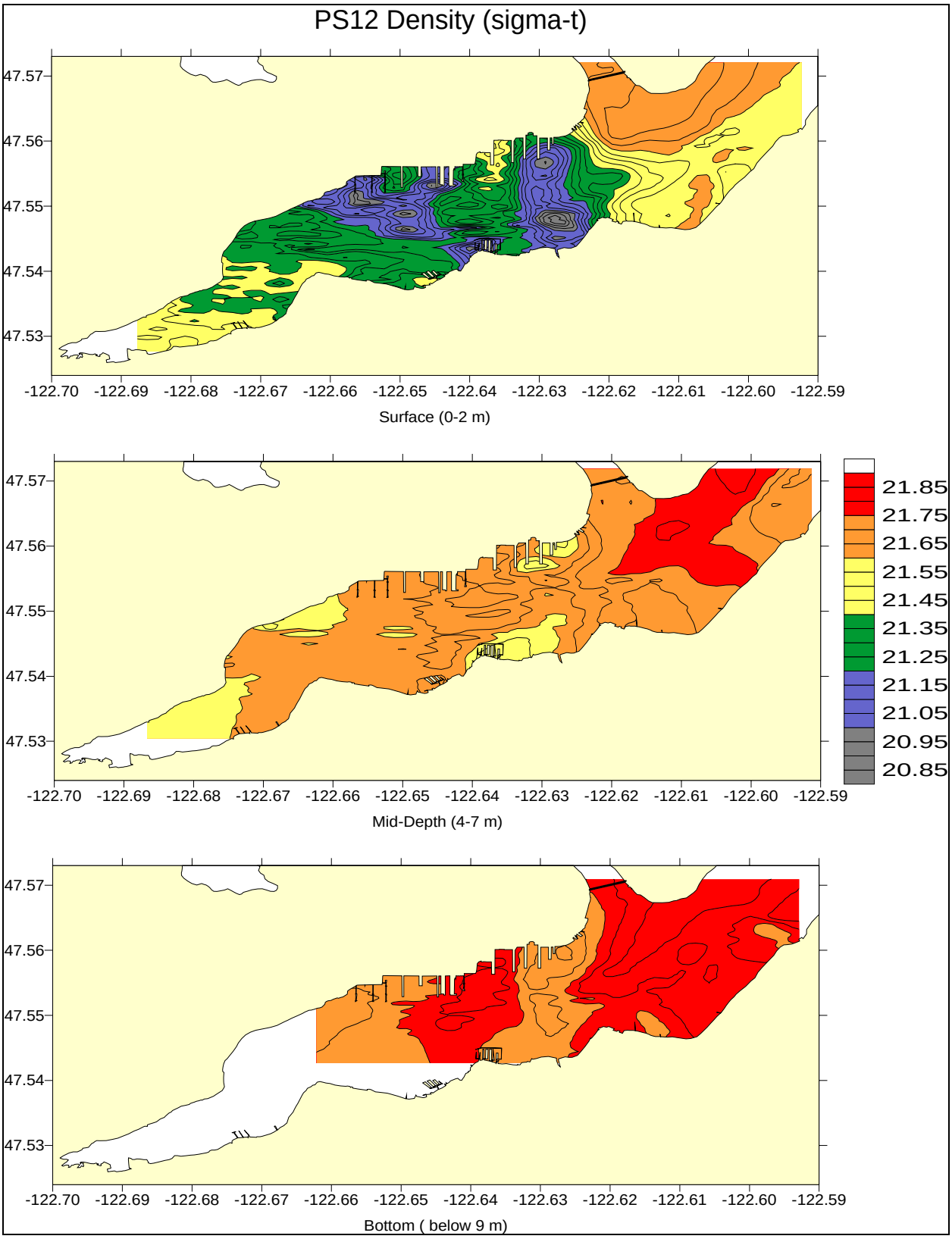
5.2.3 Salinity



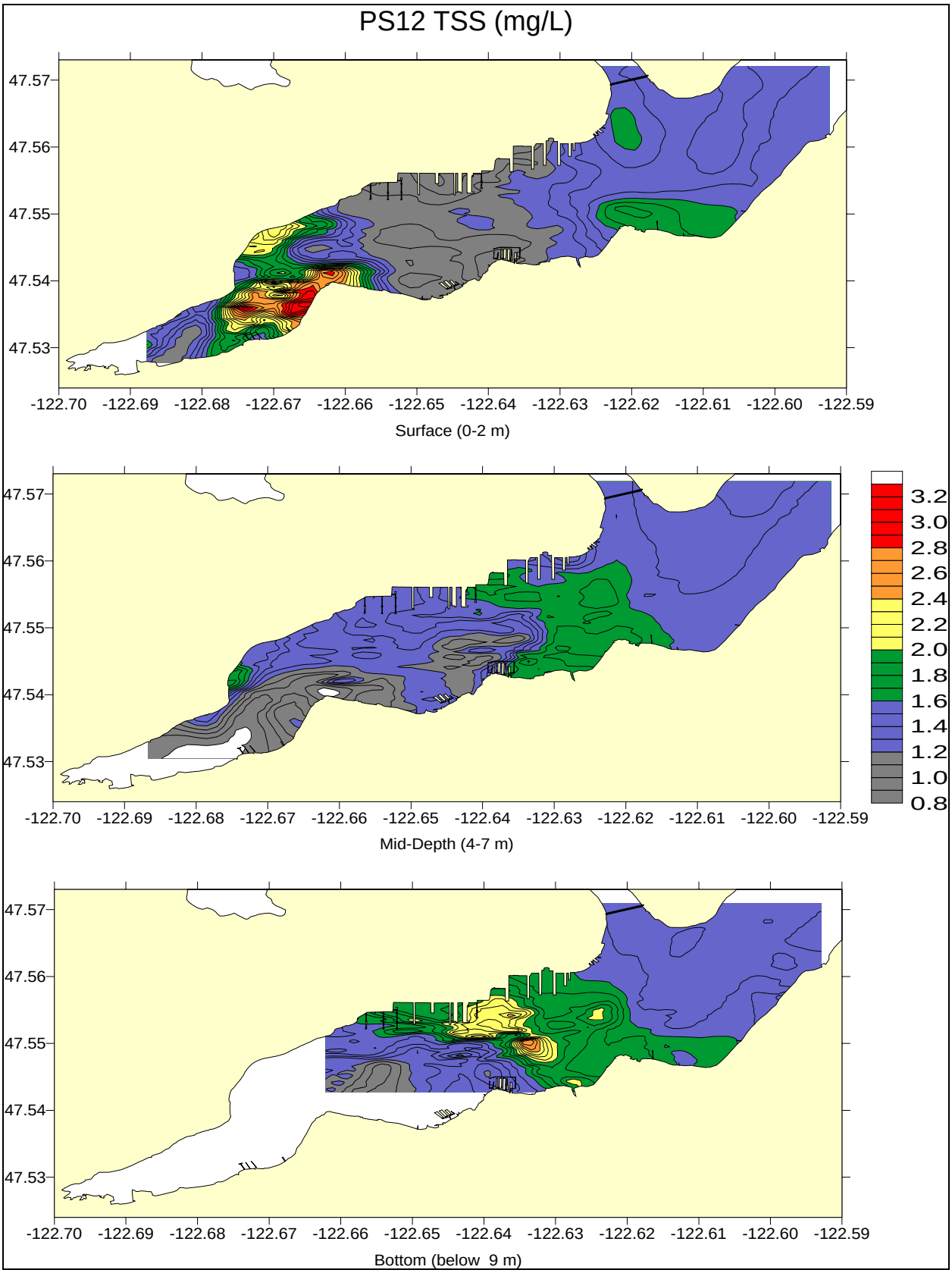
5.2.4 Temperature



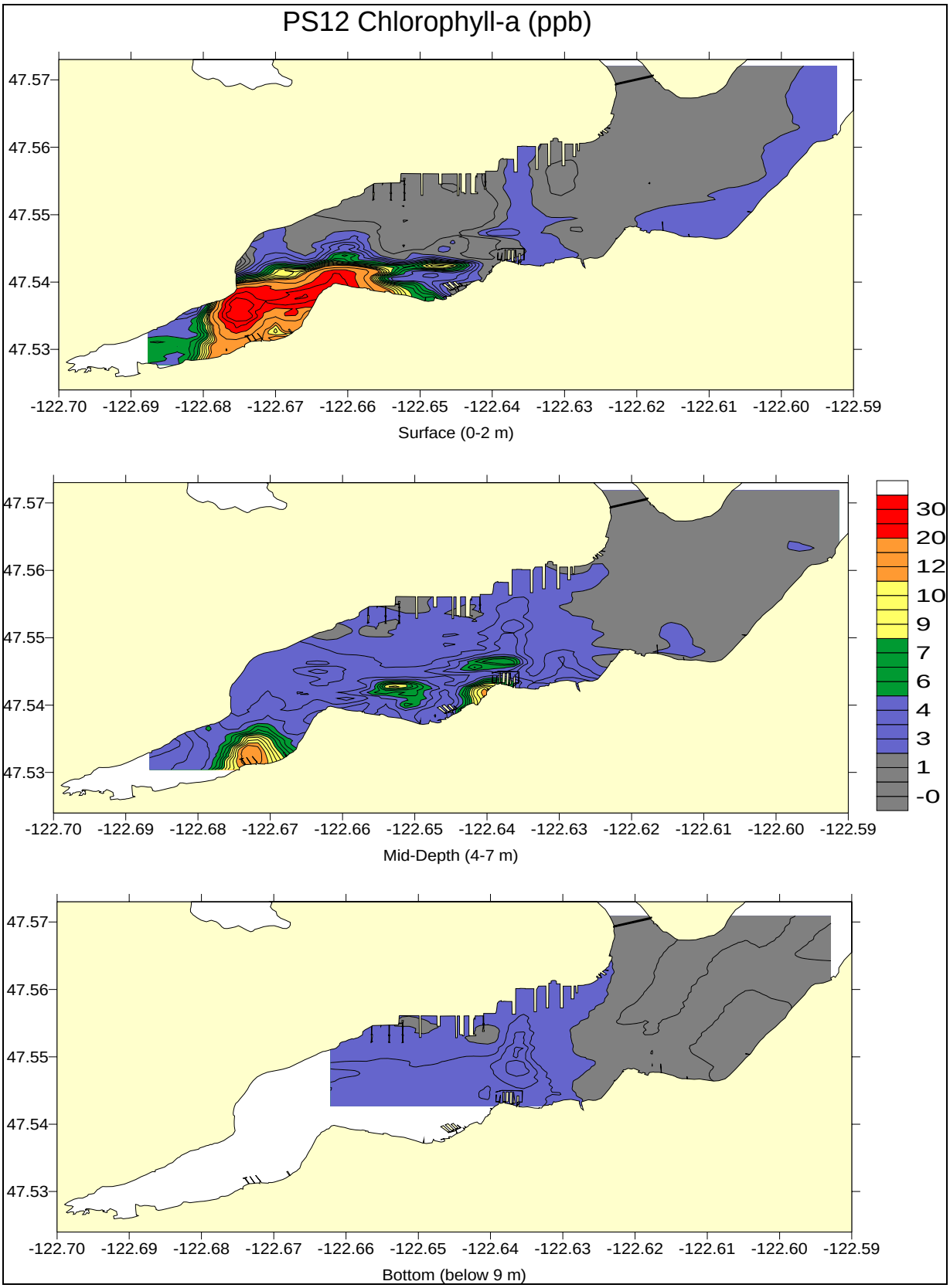
5.2.5 Density


PS12 Density (sigma-t)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface (0-2 m)
Mid-Depth (4-7 m)
Bottom (below 9 m)
21.85
21.75
21.65
21.55
21.45
21.35
21.25
21.15
21.05
20.95
20.85

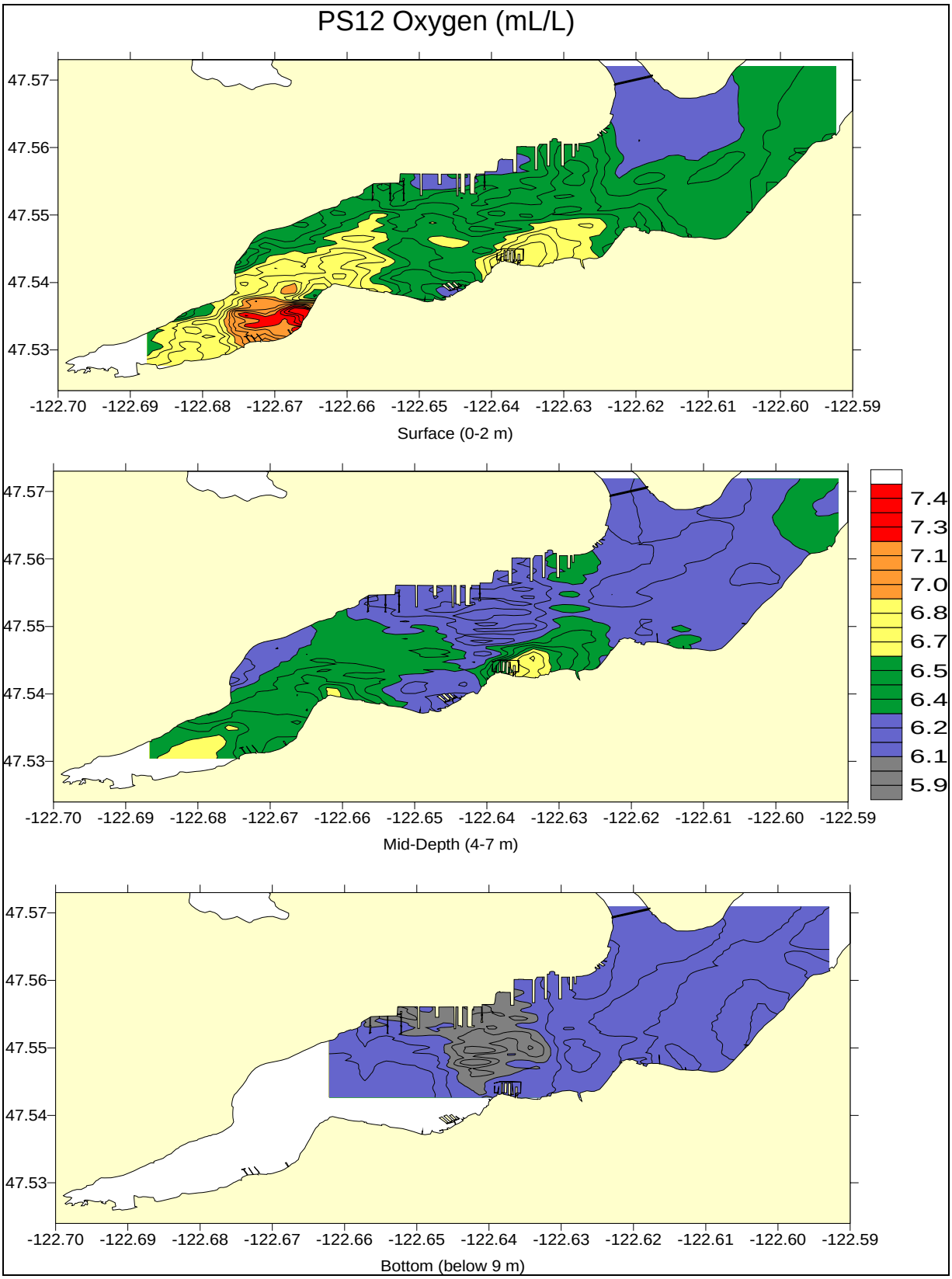
5.2.6 TSS


PS12 TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface (0-2 m)
Mid-Depth (4-7 m)
Bottom (below 9 m)
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8

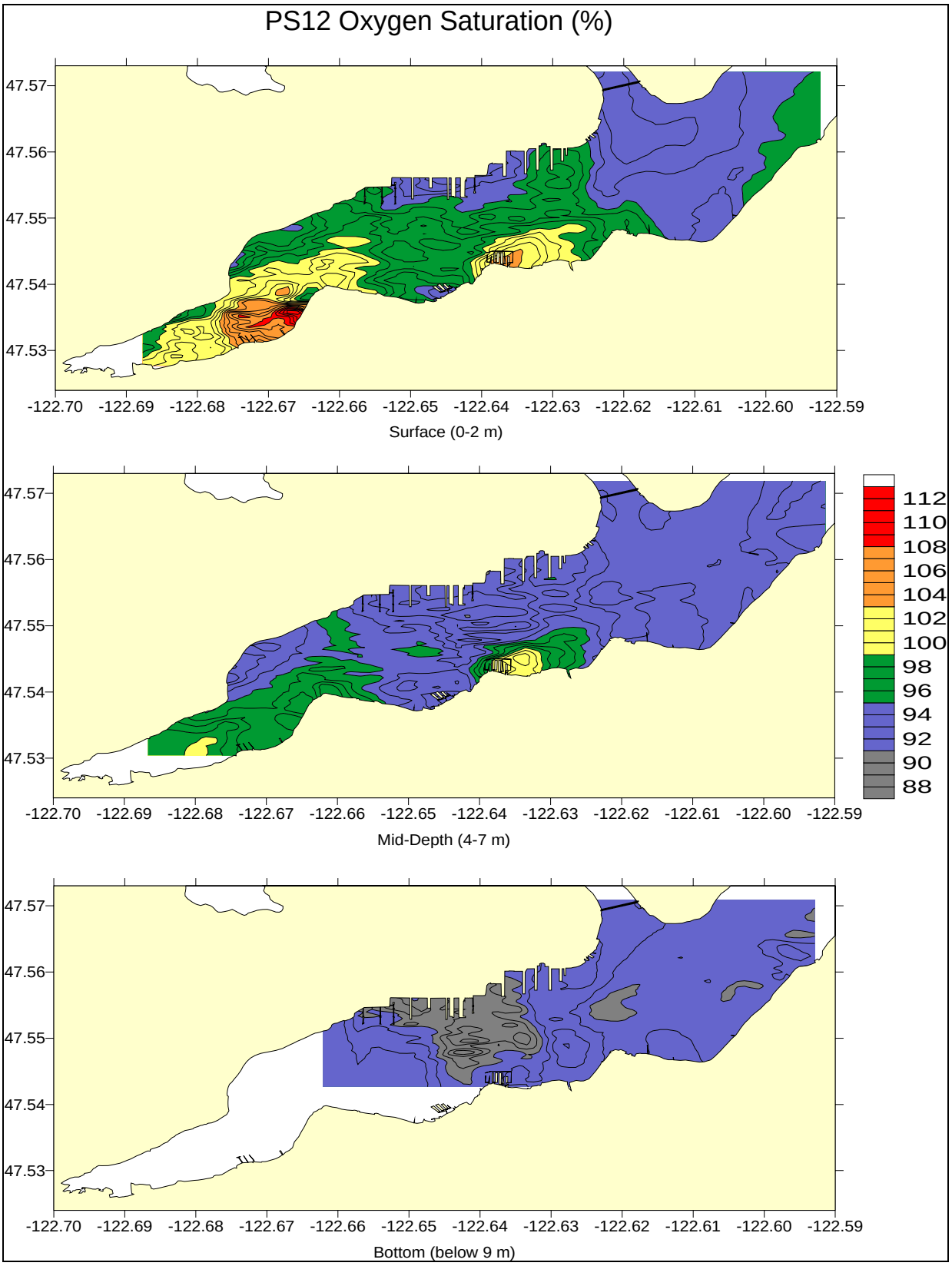
5.2.7 Chlorophyll *a*



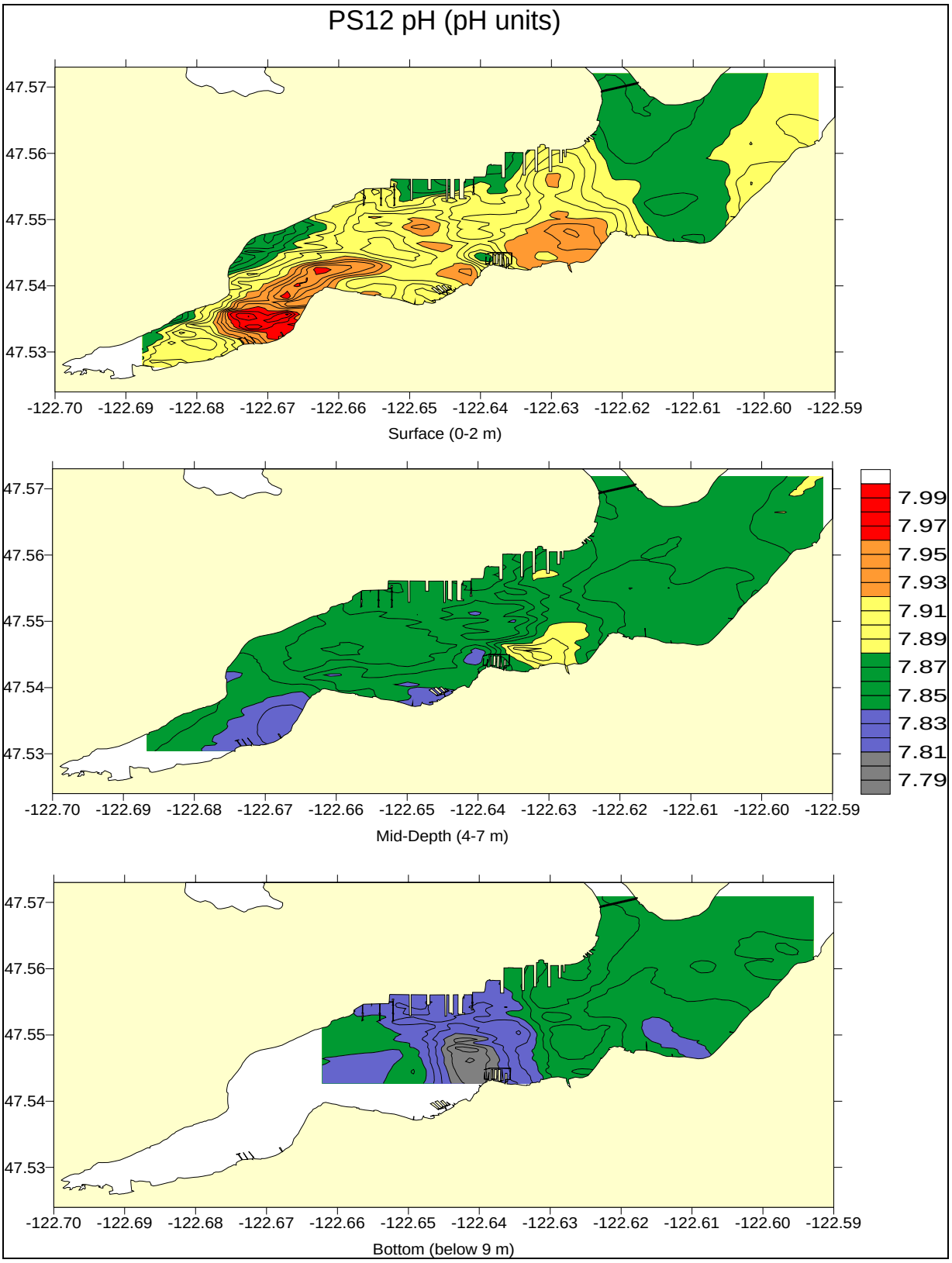
5.2.8 Oxygen


PS12 Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface (0-2 m)
Mid-Depth (4-7 m)
Bottom (below 9 m)
7.4
7.3
7.1
7.0
6.8
6.7
6.5
6.4
6.2
6.1
5.9

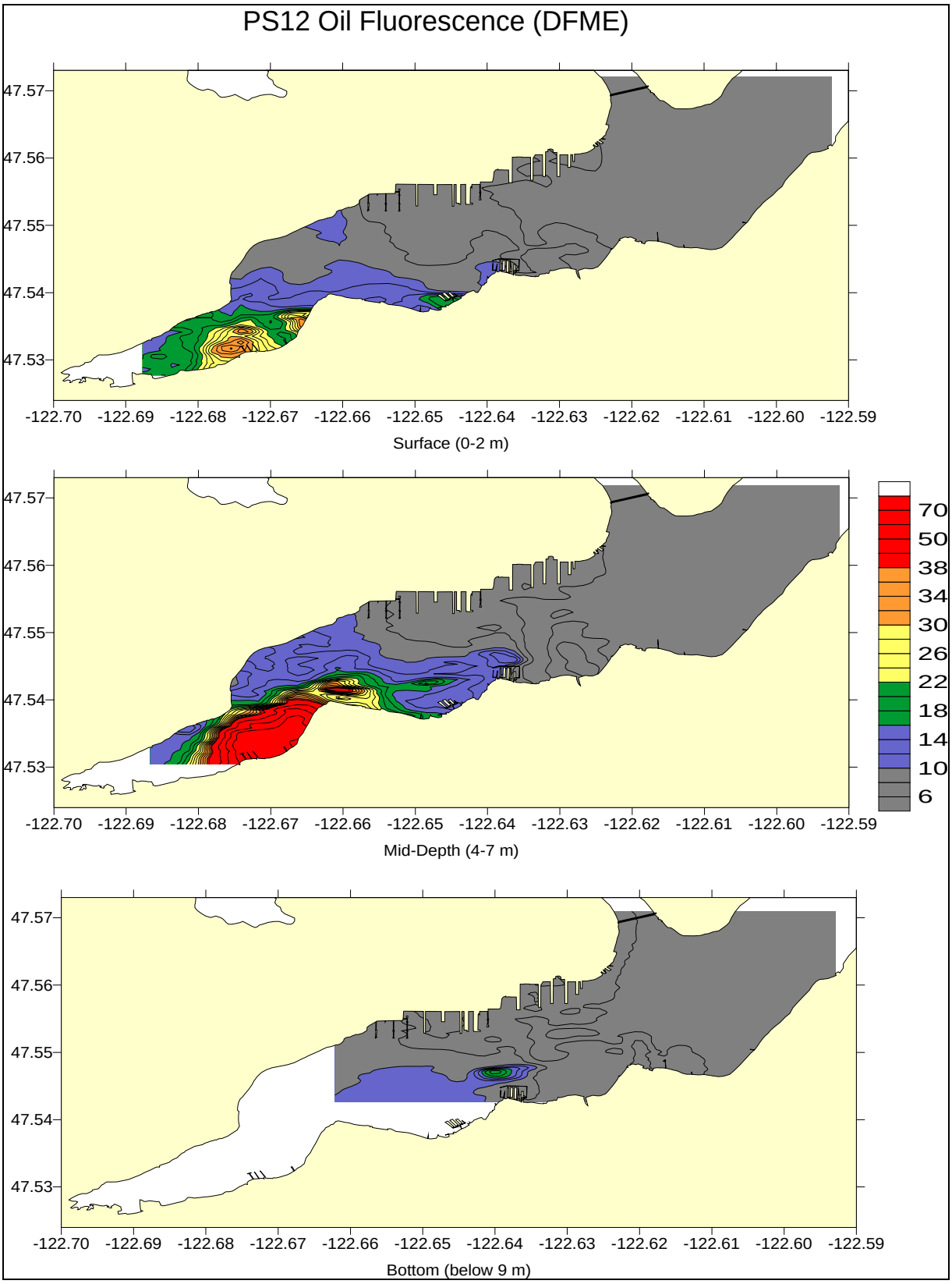
5.2.9 Oxygen Saturation



5.2.10 pH

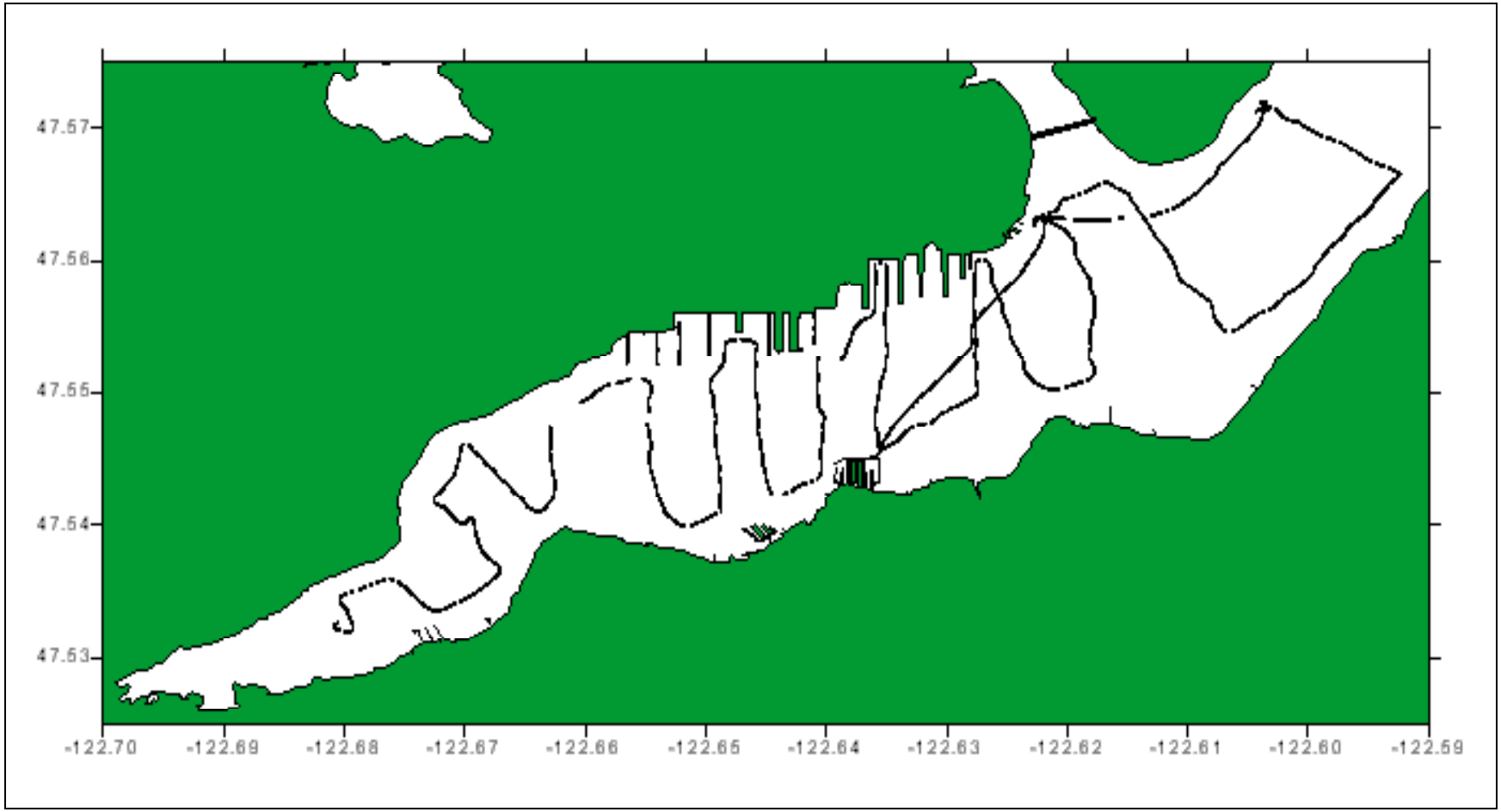

PS12 pH (pH units)
47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
Surface (0-2 m)
Mid-Depth (4-7 m)
Bottom (below 9 m)
7.99
7.97
7.95
7.93
7.91
7.89
7.87
7.85
7.83
7.81
7.79

5.2.11 Oil Fluorescence

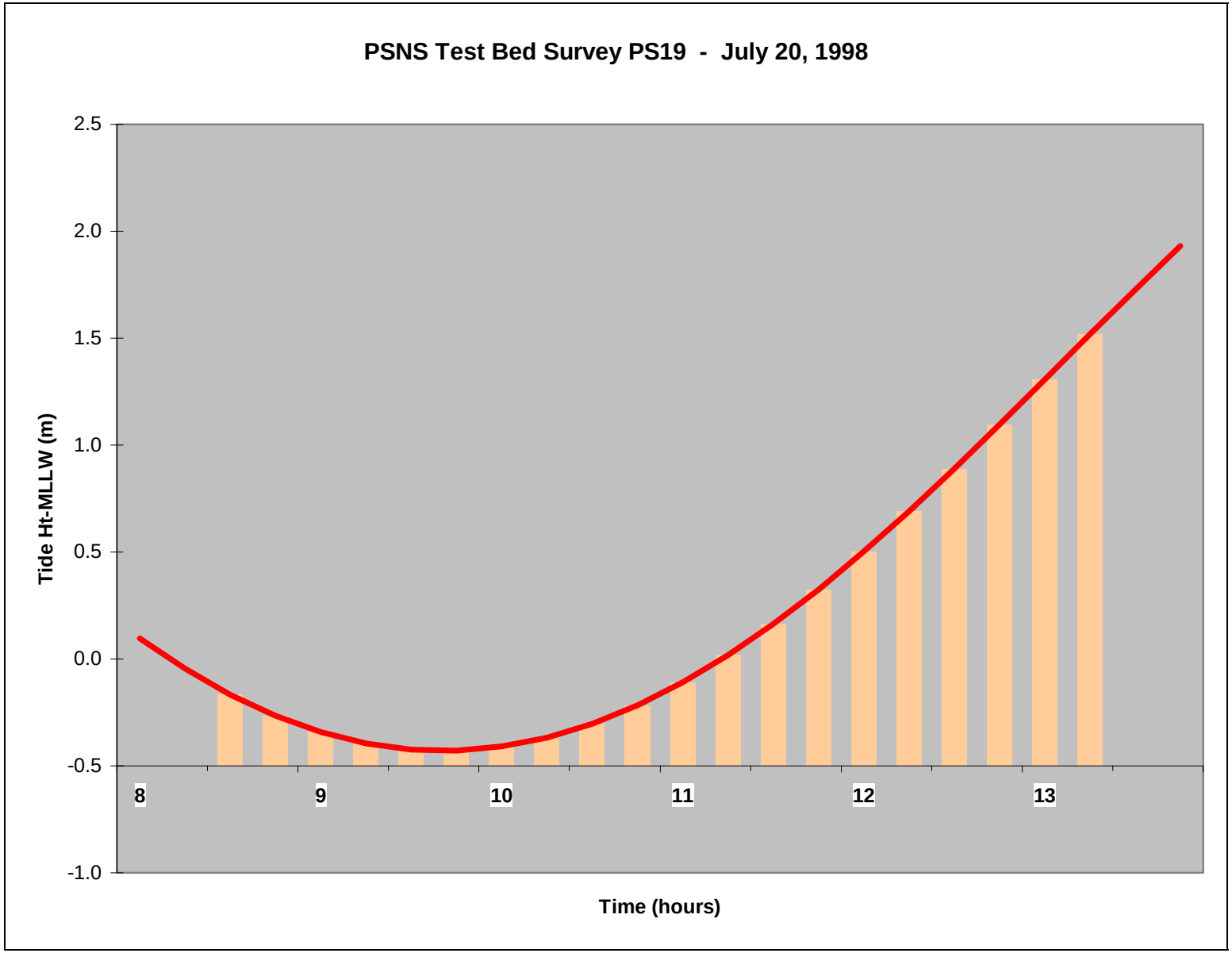


5.3 July 1998 – PS19

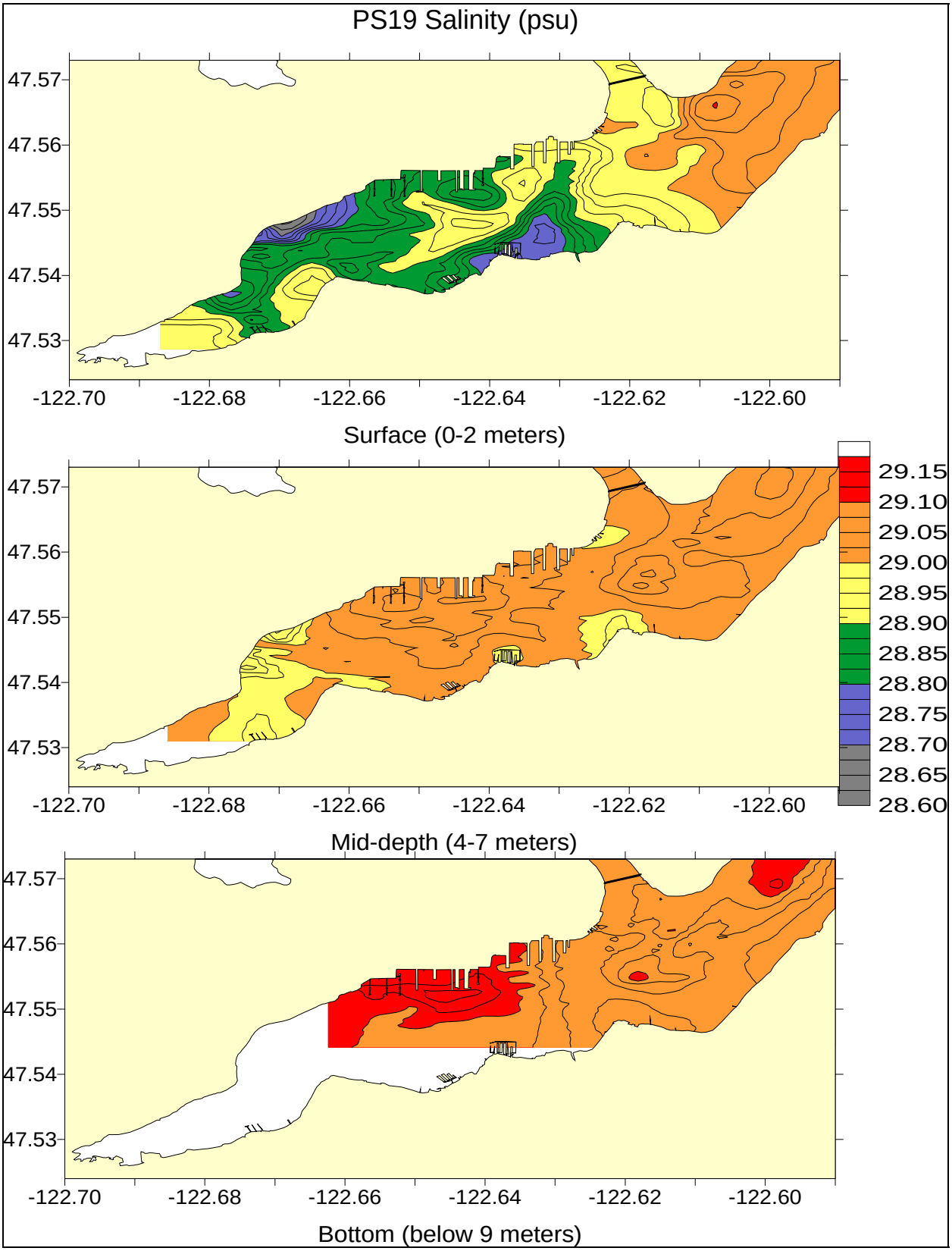
5.3.1 Track Map



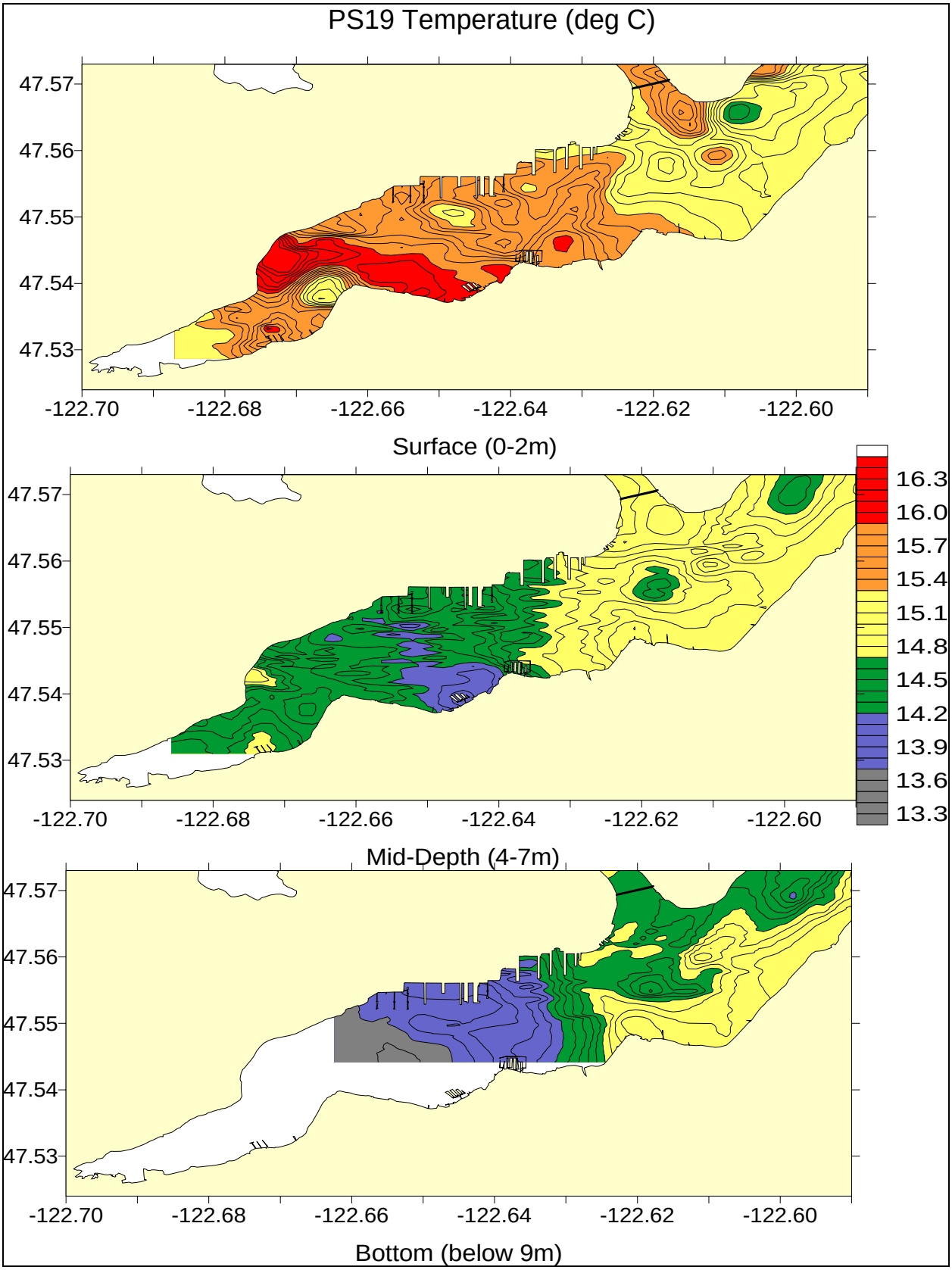
5.3.2 Tide Chart



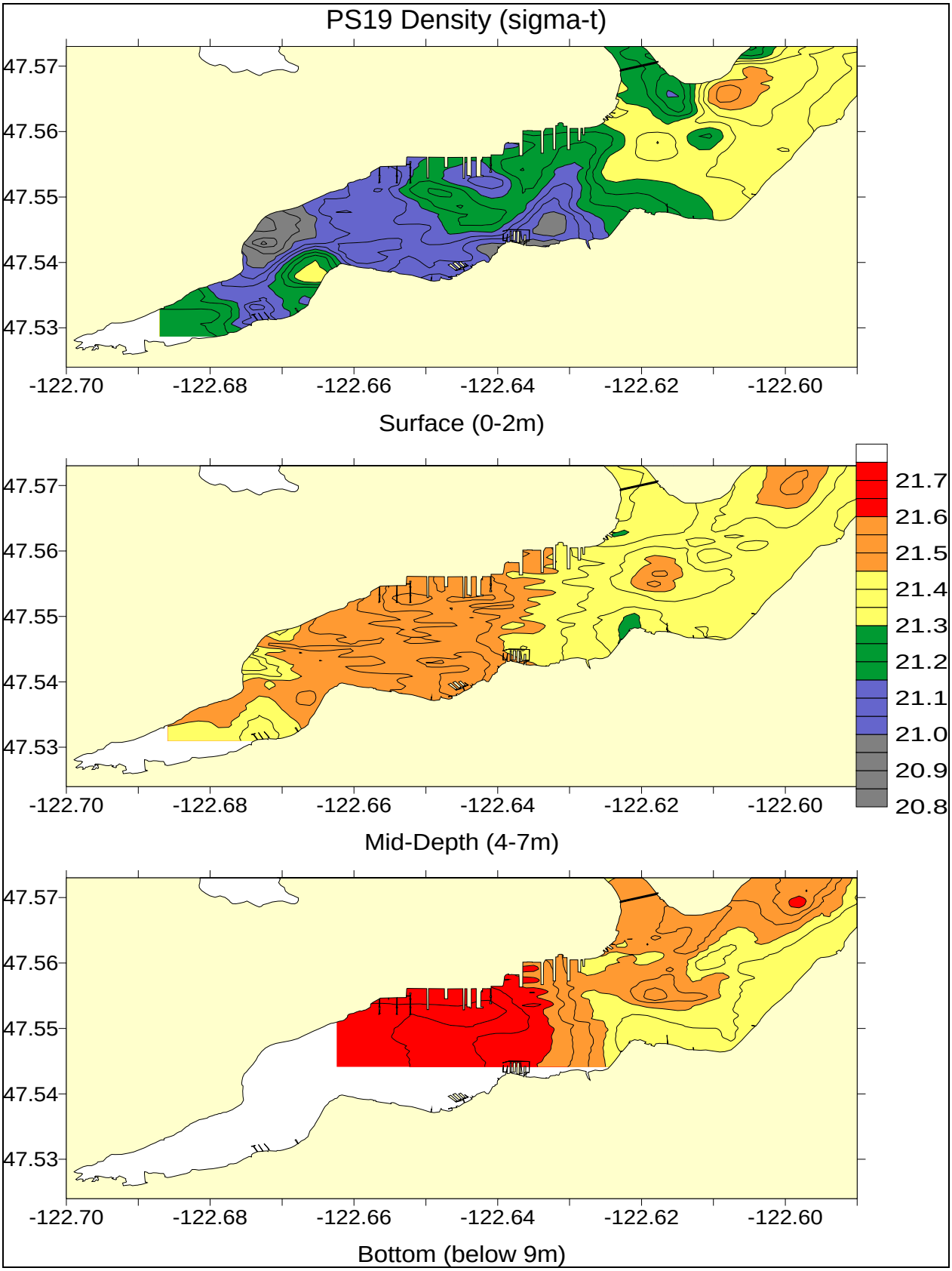
5.3.3 Salinity



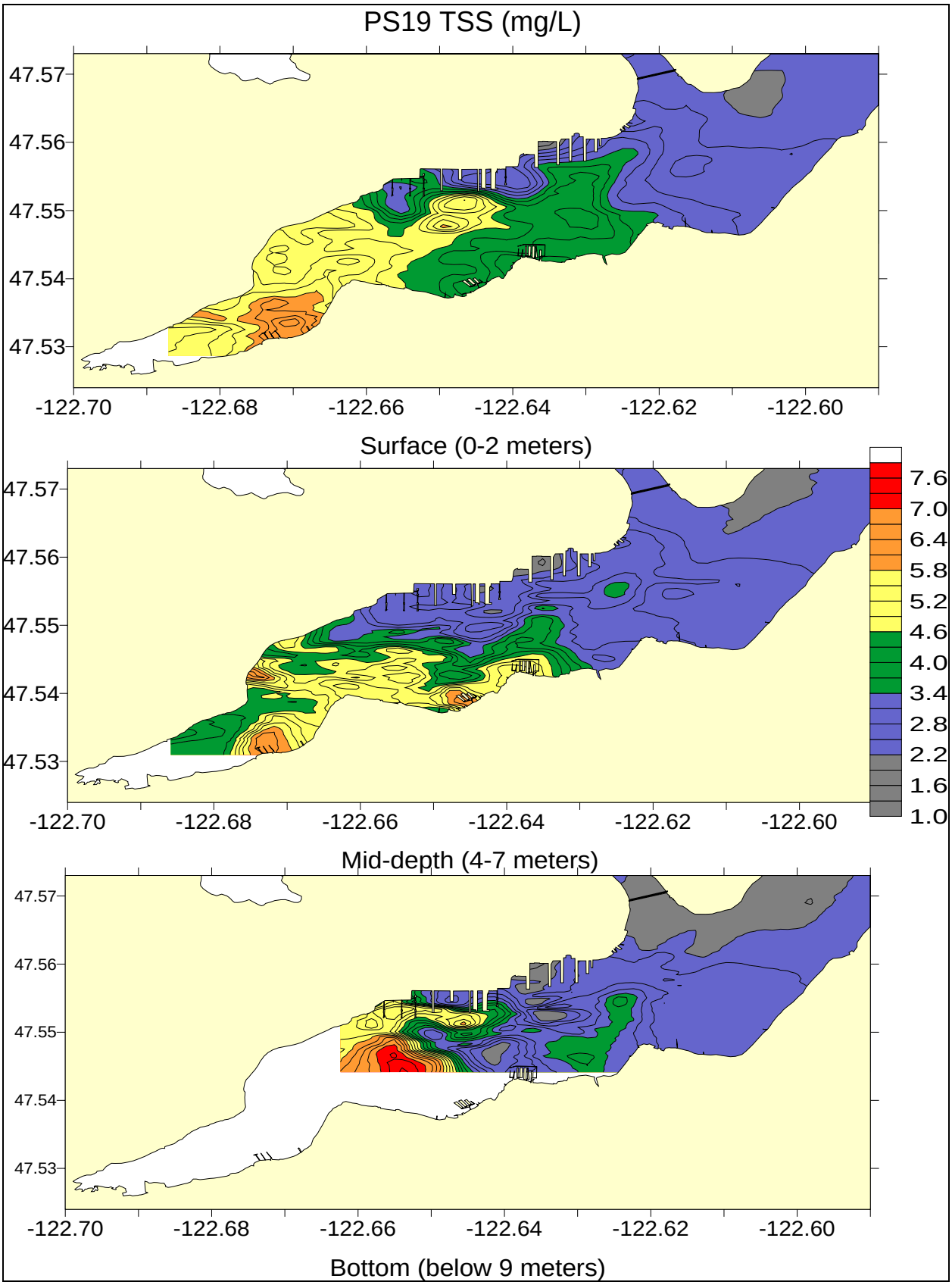
5.3.4 Temperature



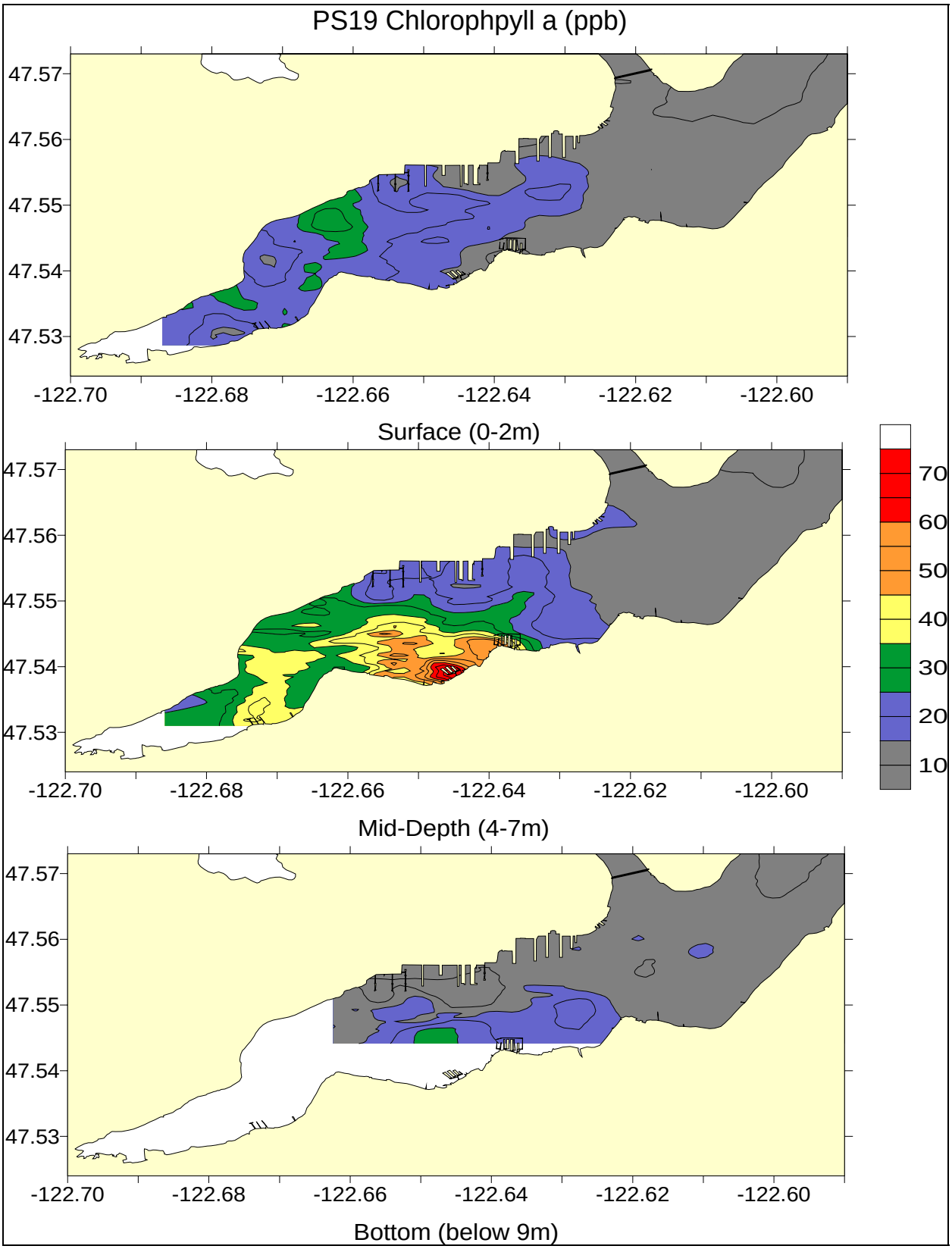
5.3.5 Density


PS19 Density (sigma-t)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Surface (0-2m)
21.7
21.6
21.5
21.4
21.3
21.2
21.1
21.0
20.9
20.8
Mid-Depth (4-7m)
Bottom (below 9m)

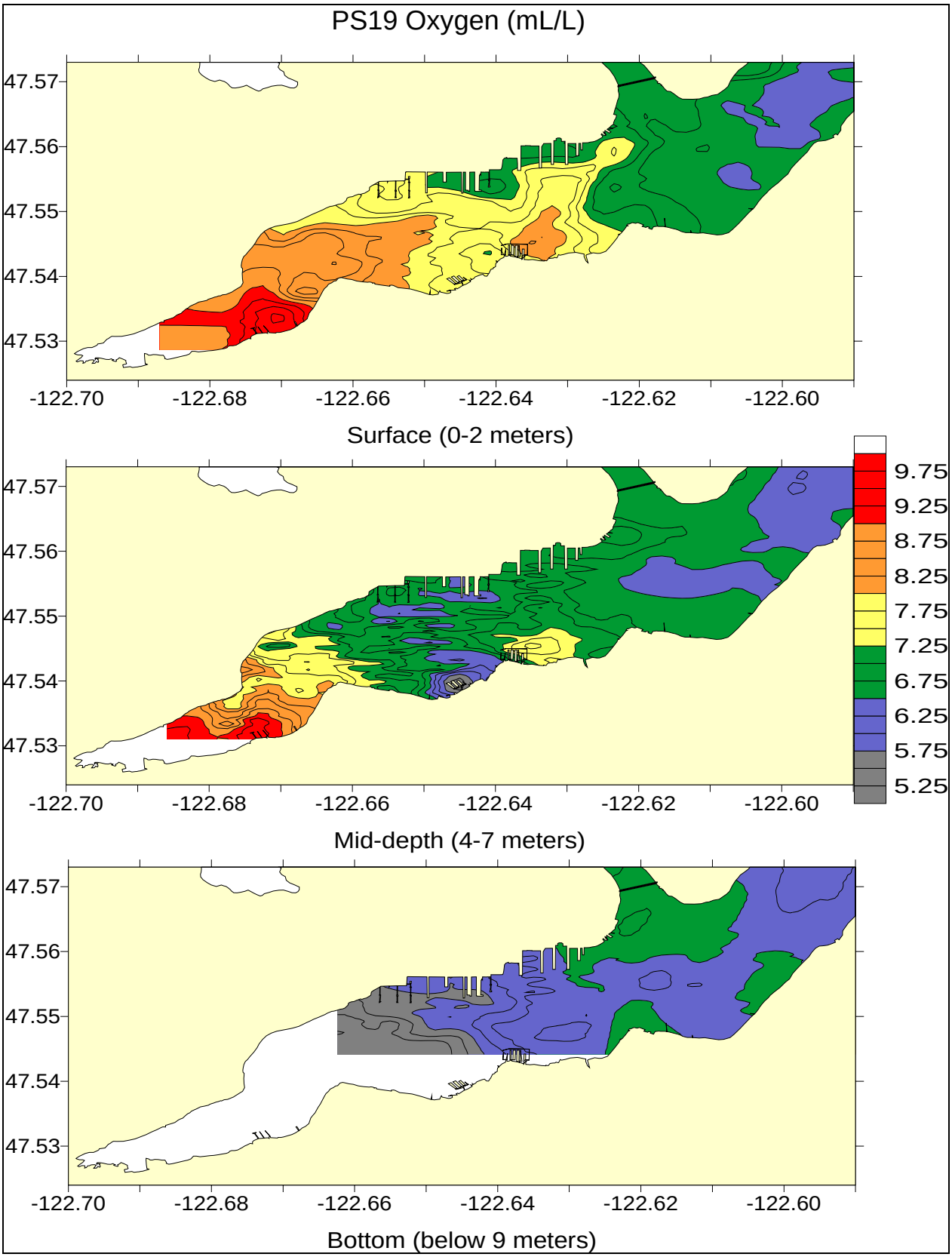
5.3.6 TSS


PS19 TSS (mg/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Surface (0-2 meters)
7.6
7.0
6.4
5.8
5.2
4.6
4.0
3.4
2.8
2.2
1.6
1.0
Mid-depth (4-7 meters)
Bottom (below 9 meters)

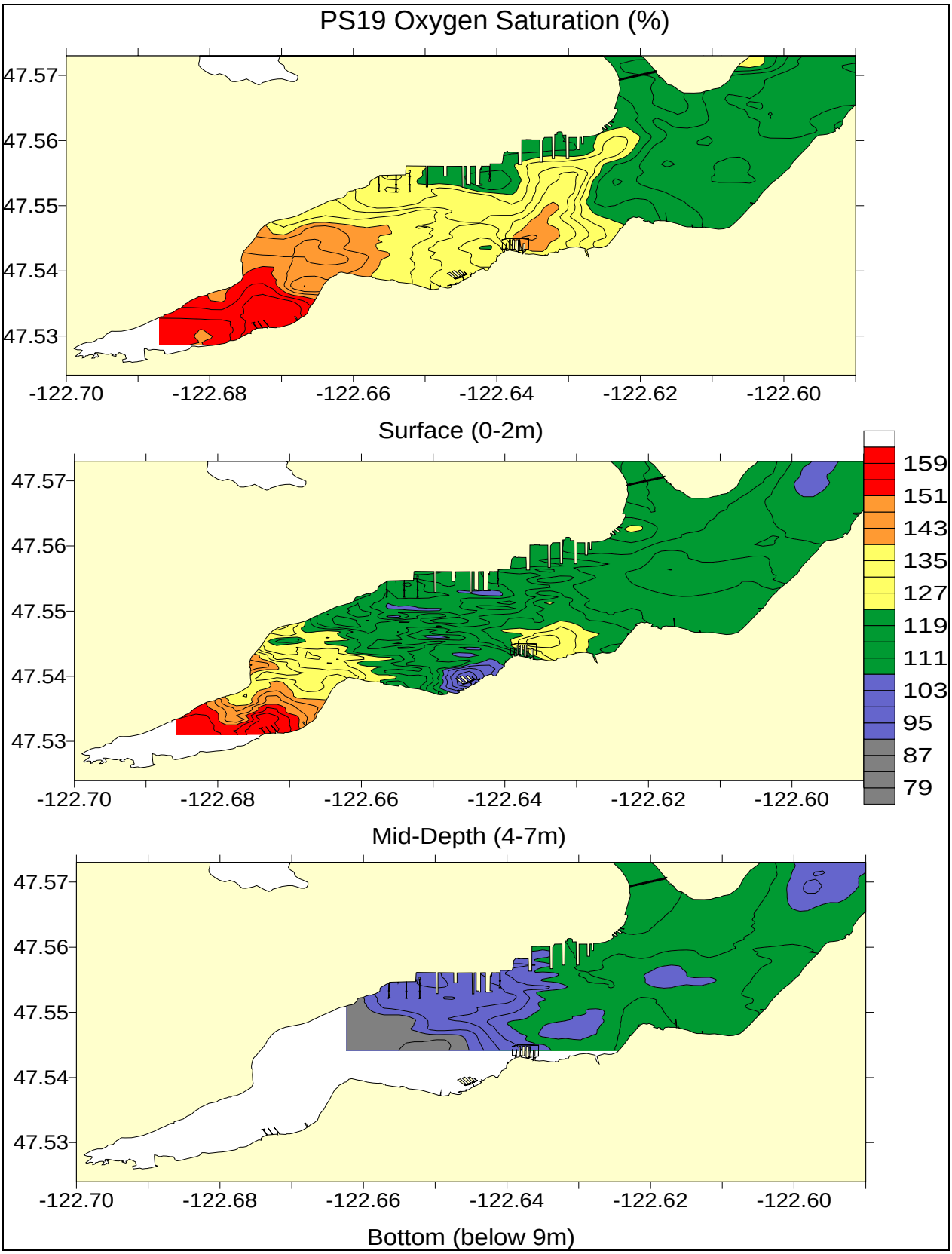
5.3.7 Chlorophyll *a*



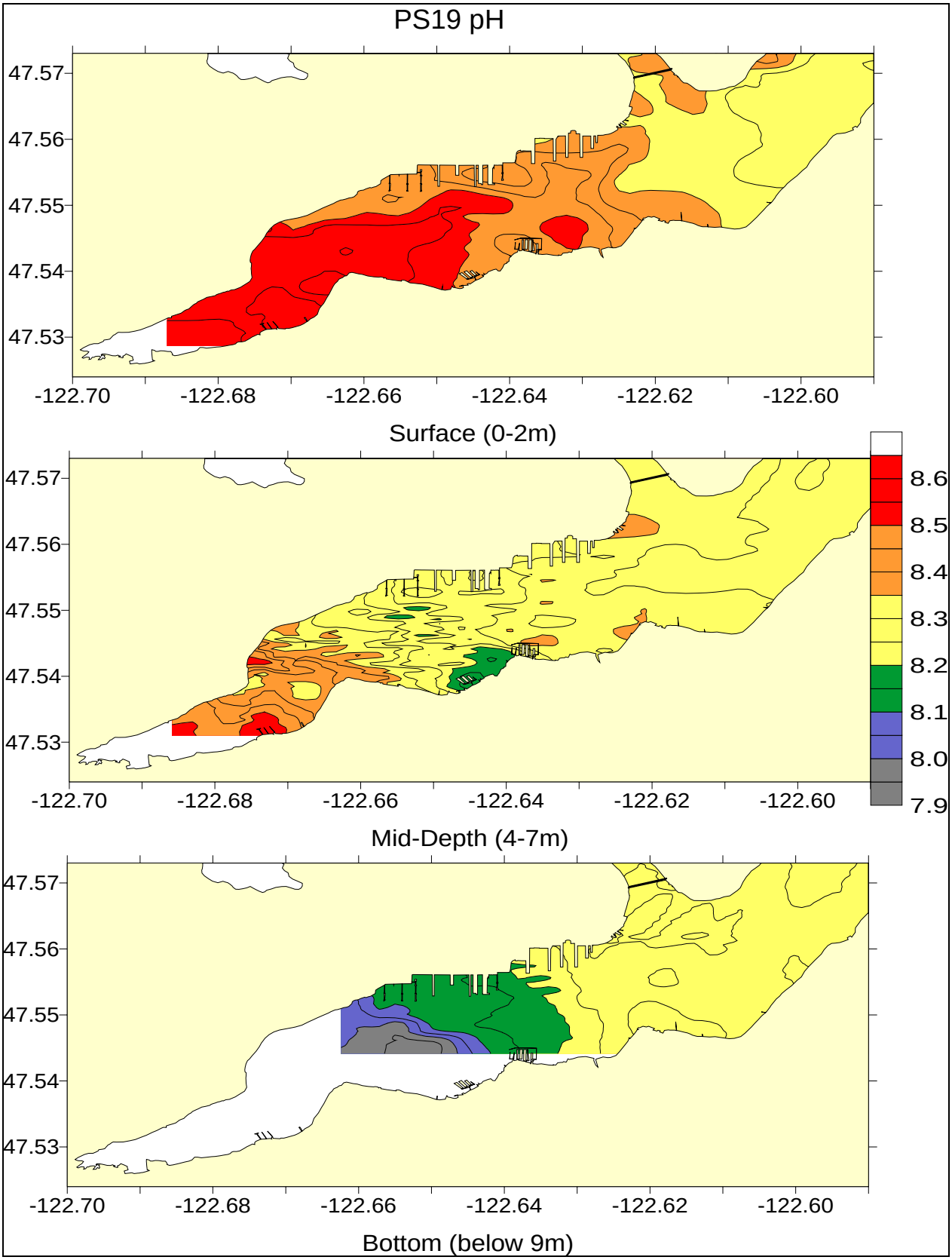
5.3.8 Oxygen


PS19 Oxygen (mL/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Surface (0-2 meters)
9.75
9.25
8.75
8.25
7.75
7.25
6.75
6.25
5.75
5.25
Mid-depth (4-7 meters)
Bottom (below 9 meters)

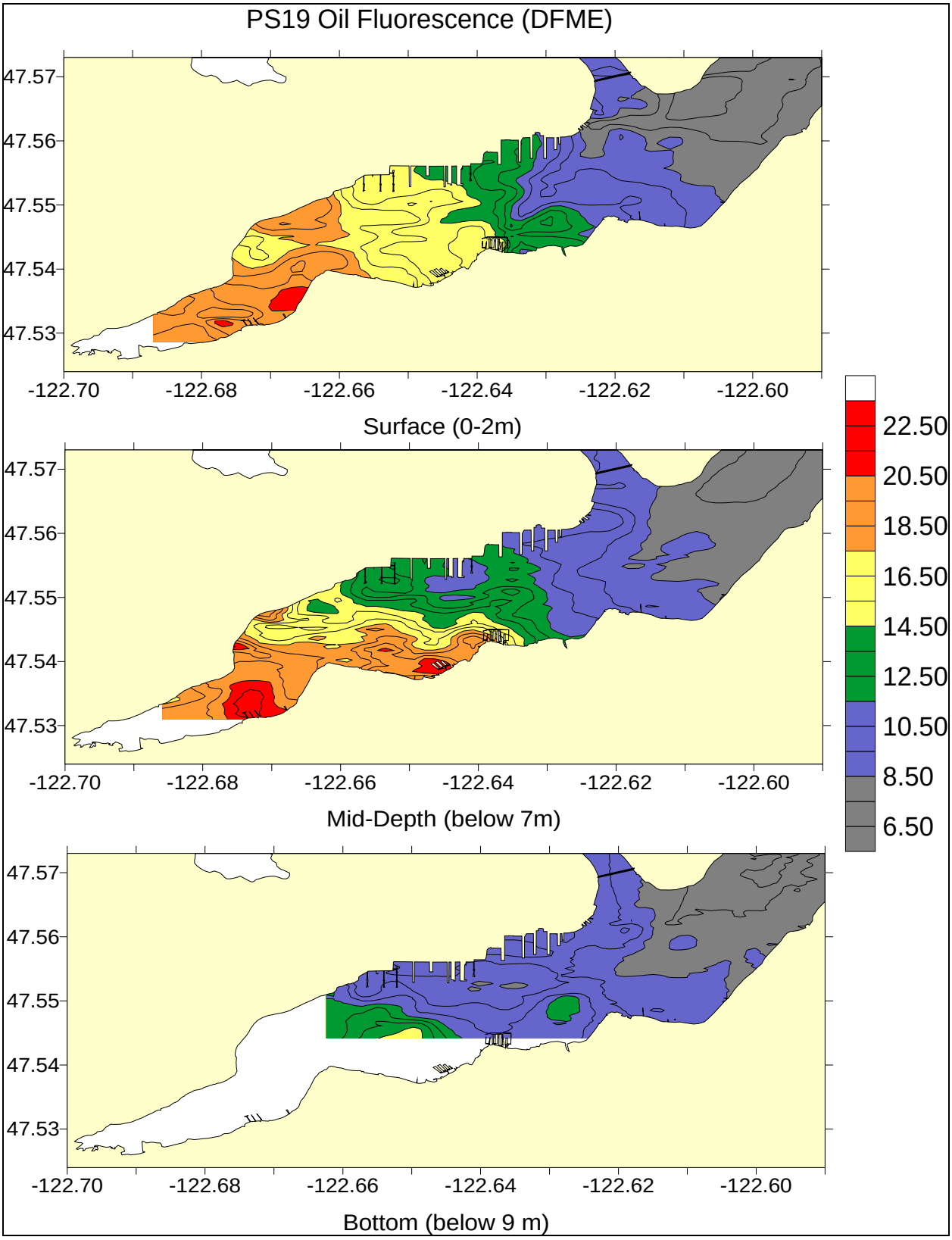
5.3.9 Oxygen Saturation



5.3.10 pH

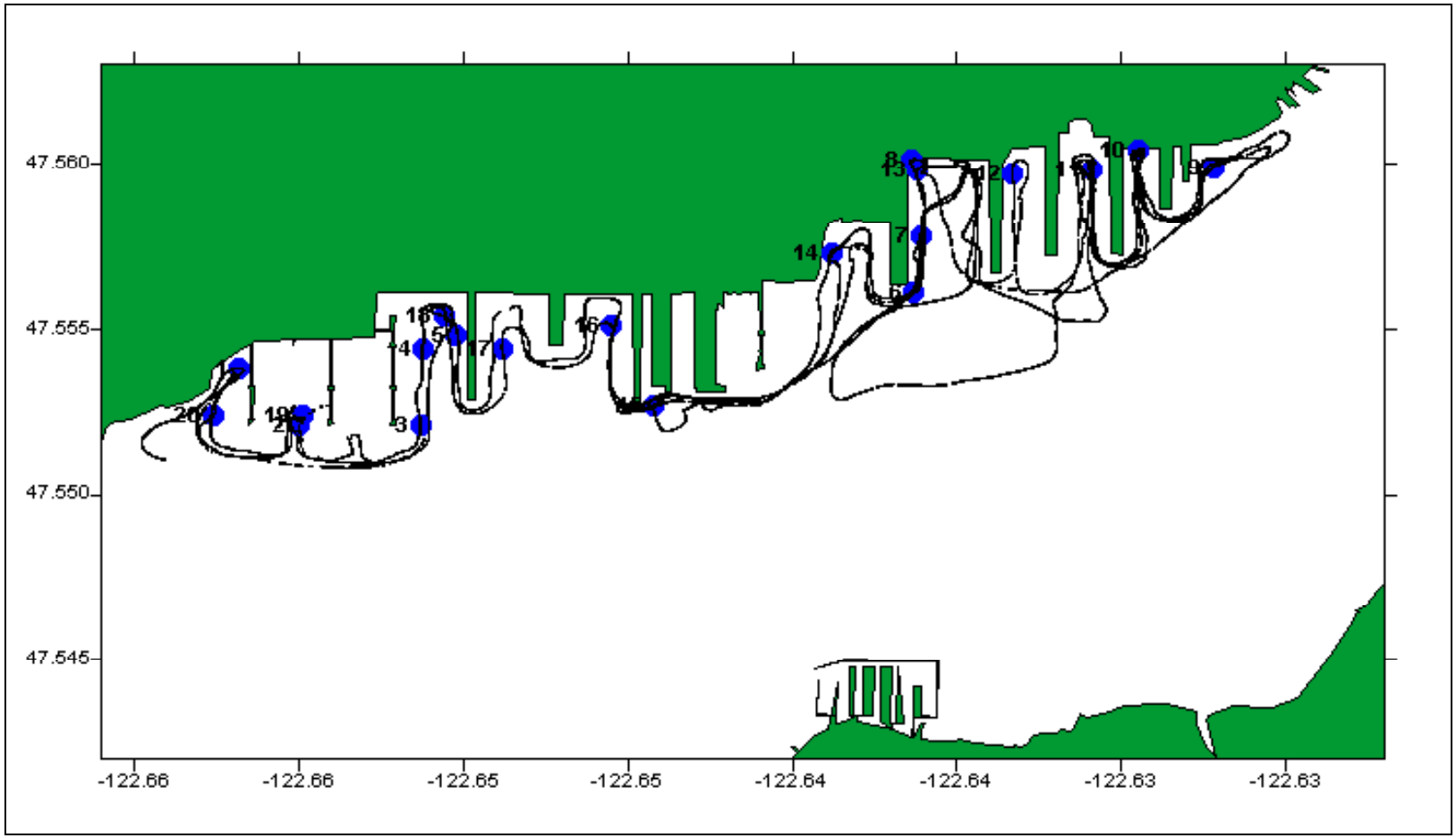

PS19 pH
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Surface (0-2m)
8.6
8.5
8.4
8.3
8.2
8.1
8.0
7.9
Mid-Depth (4-7m)
Bottom (below 9m)

5.3.11 Oil Fluorescence

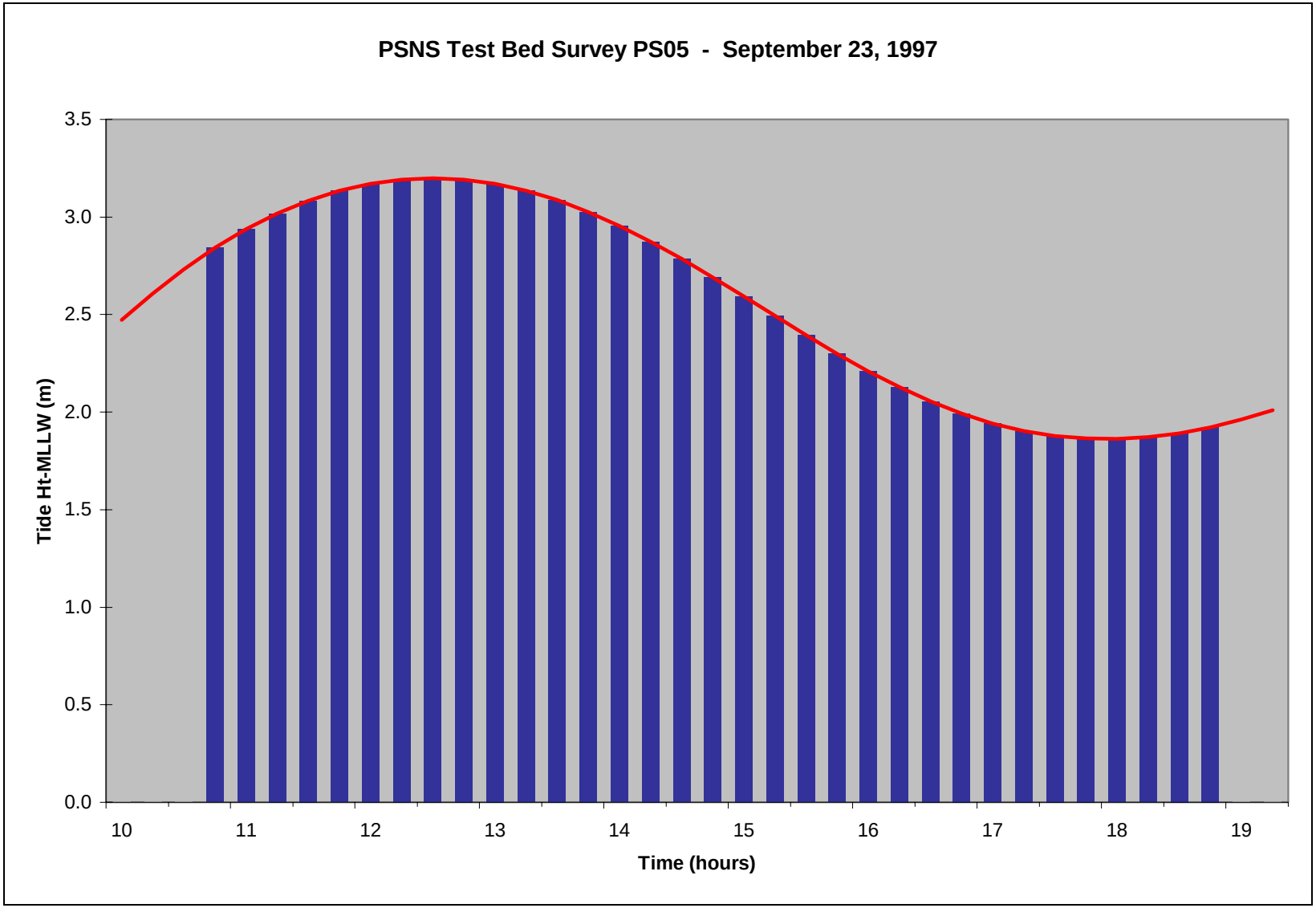


6.1 September 23, 1997 – PS05

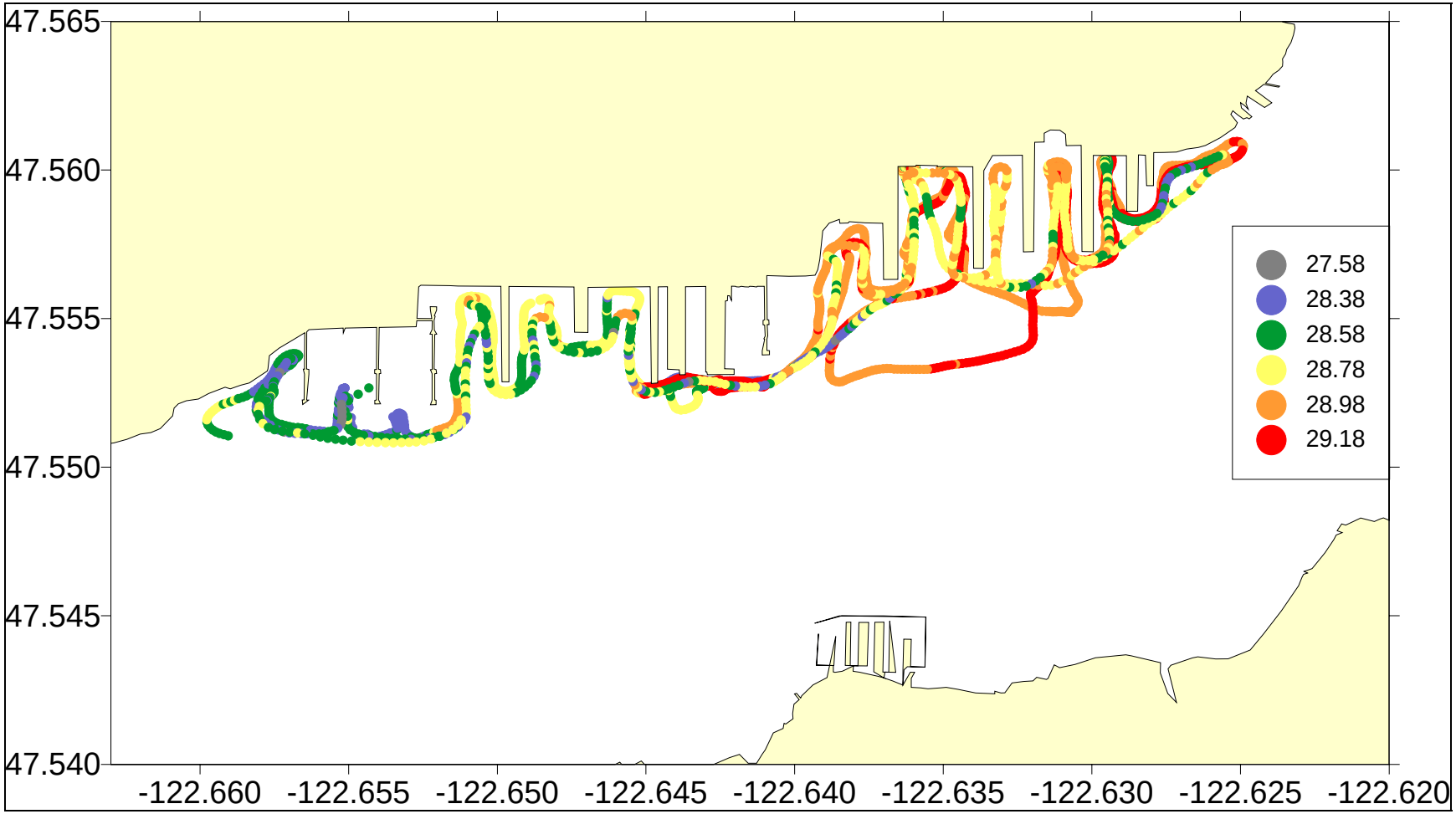
6.1.1 Track Map



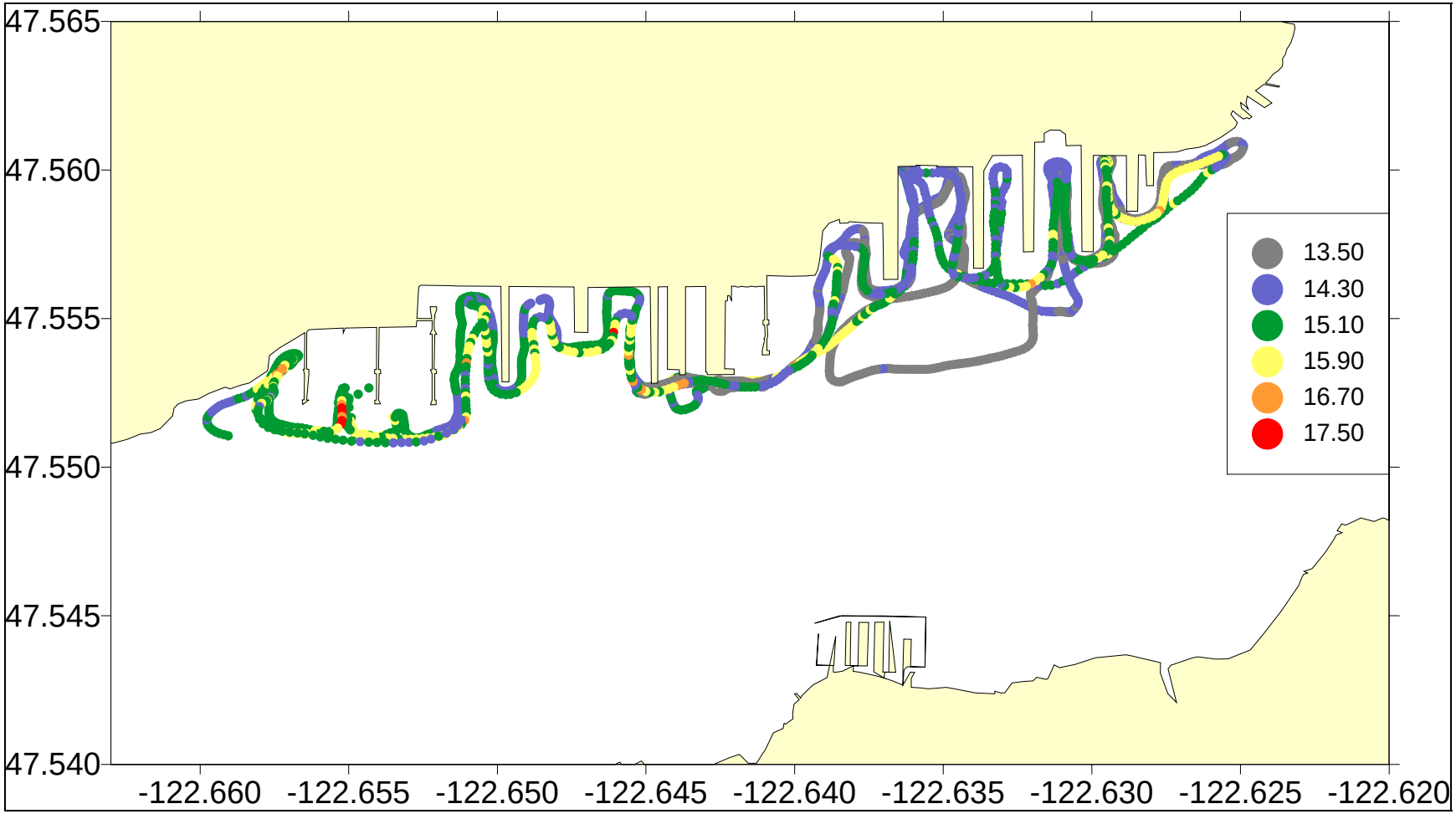
6.1.2 Tide Chart



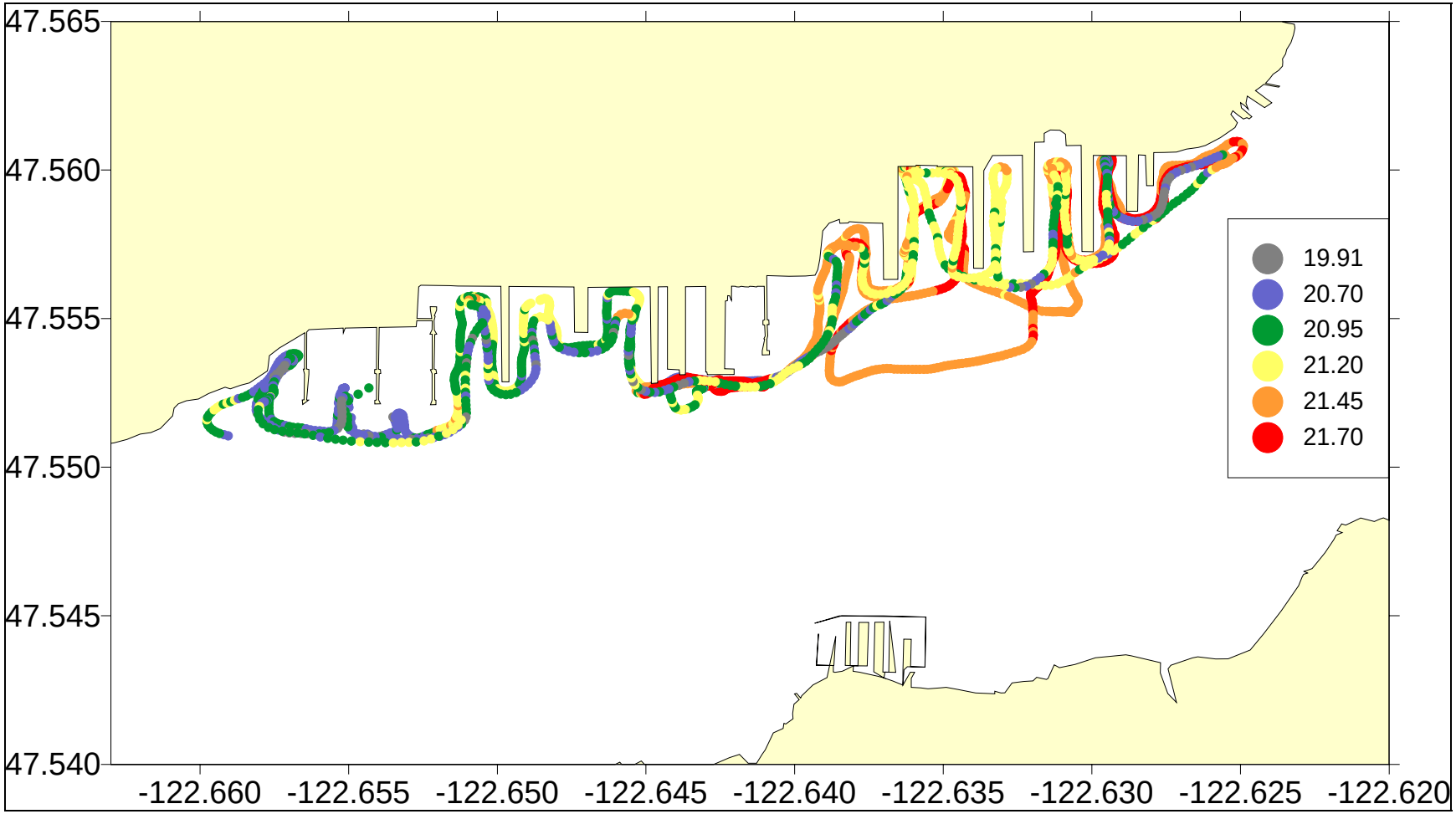
6.1.3 Salinity



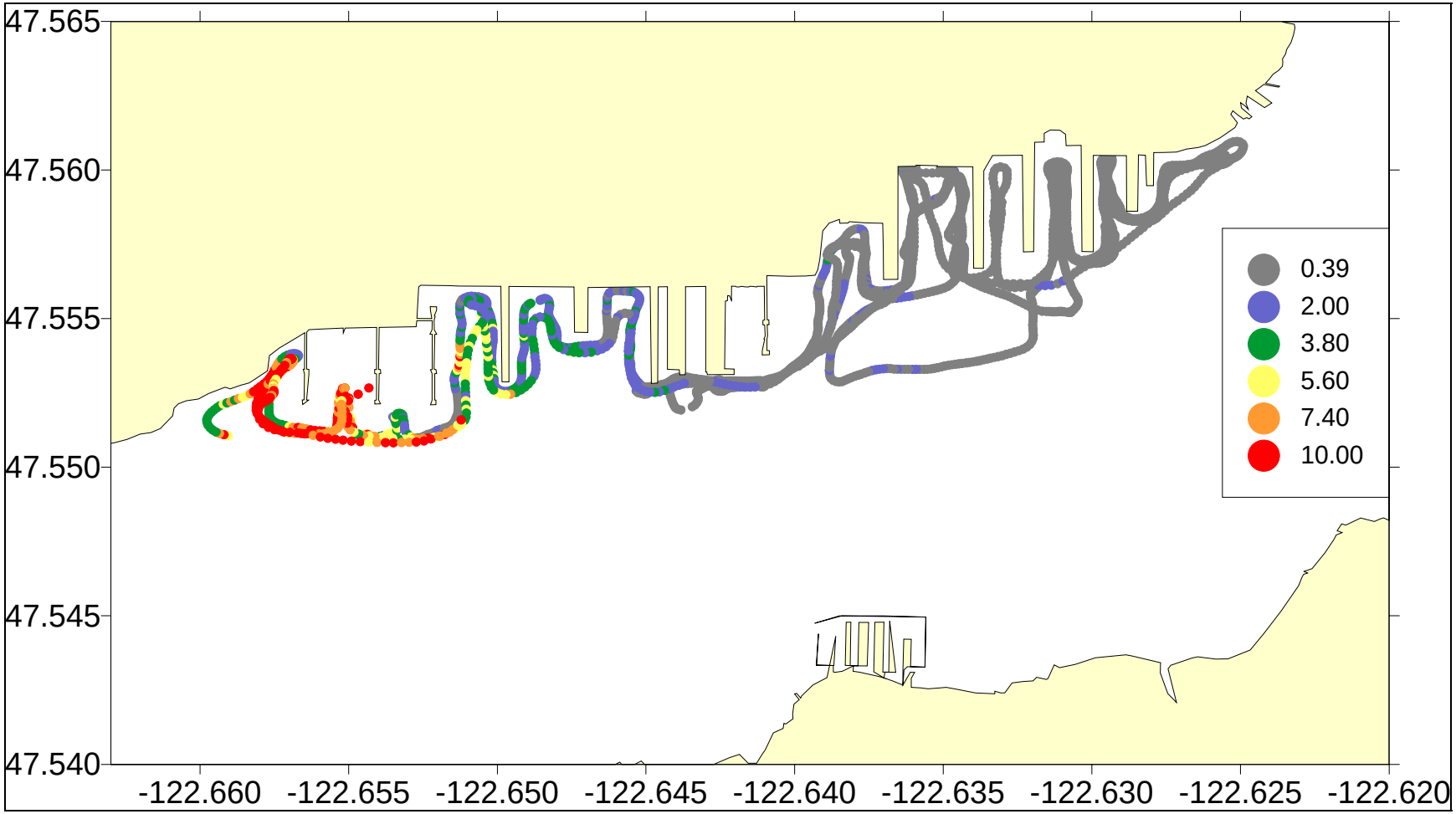
6.1.4 Temperature



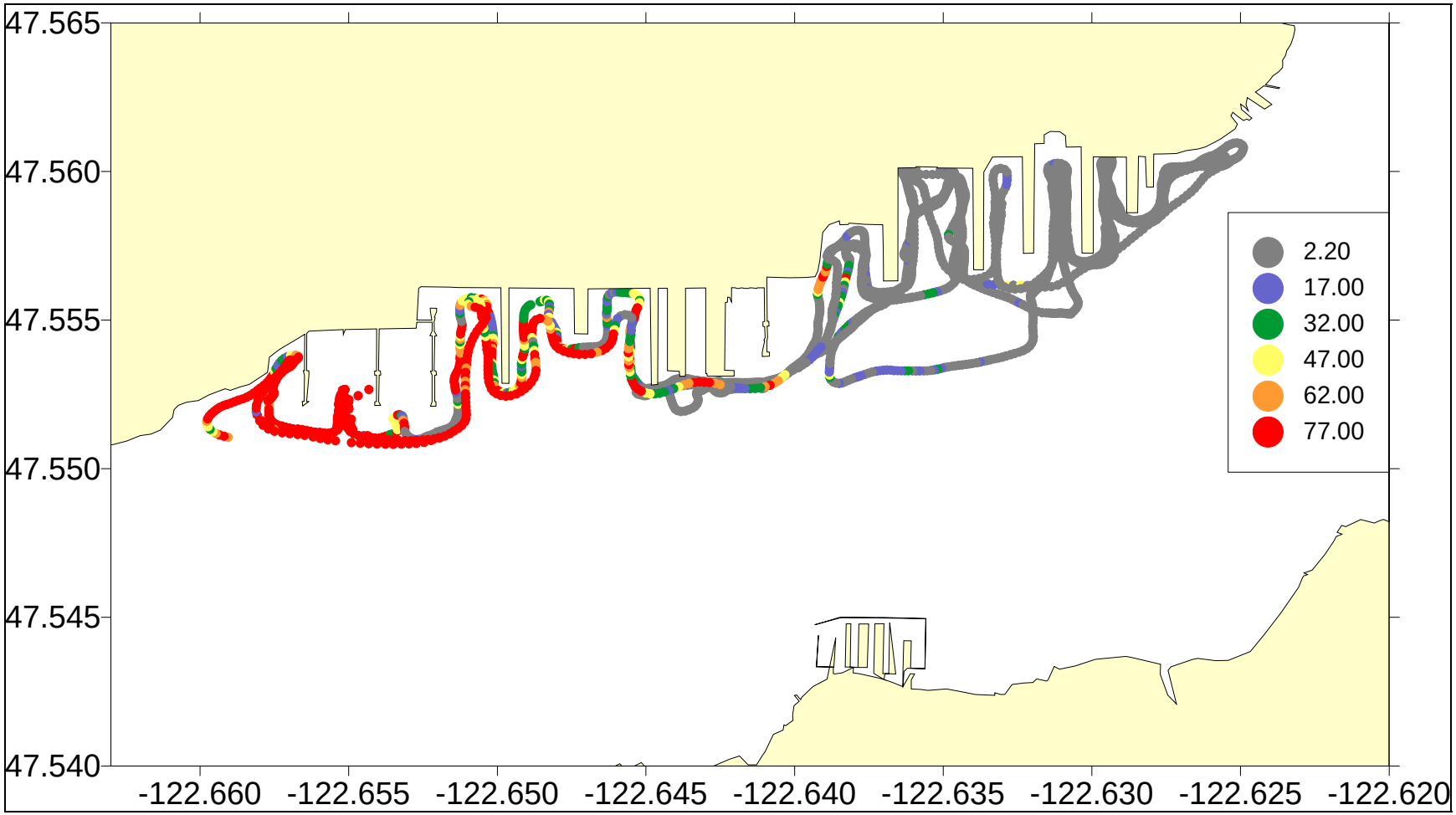
6.1.5 Density


47.565
47.560
47.555
47.550
47.545
47.540
-122.660
-122.655
-122.650
-122.645
-122.640
-122.635
-122.630
-122.625
-122.620
19.91
20.70
20.95
21.20
21.45
21.70

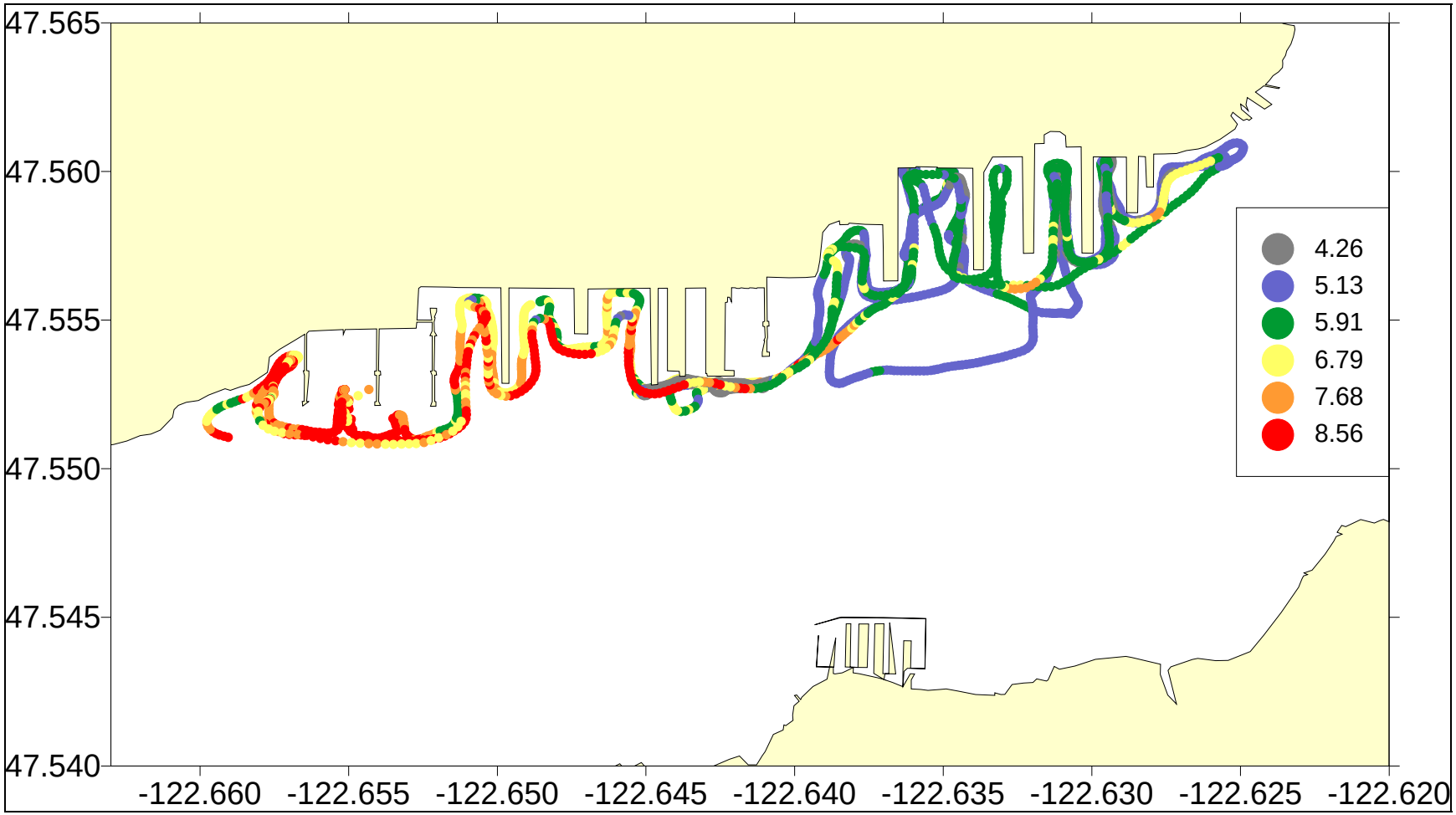
6.1.6 TSS


47.565
47.560
47.555
47.550
47.545
47.540
-122.660
-122.655
-122.650
-122.645
-122.640
-122.635
-122.630
-122.625
-122.620
0.39
2.00
3.80
5.60
7.40
10.00

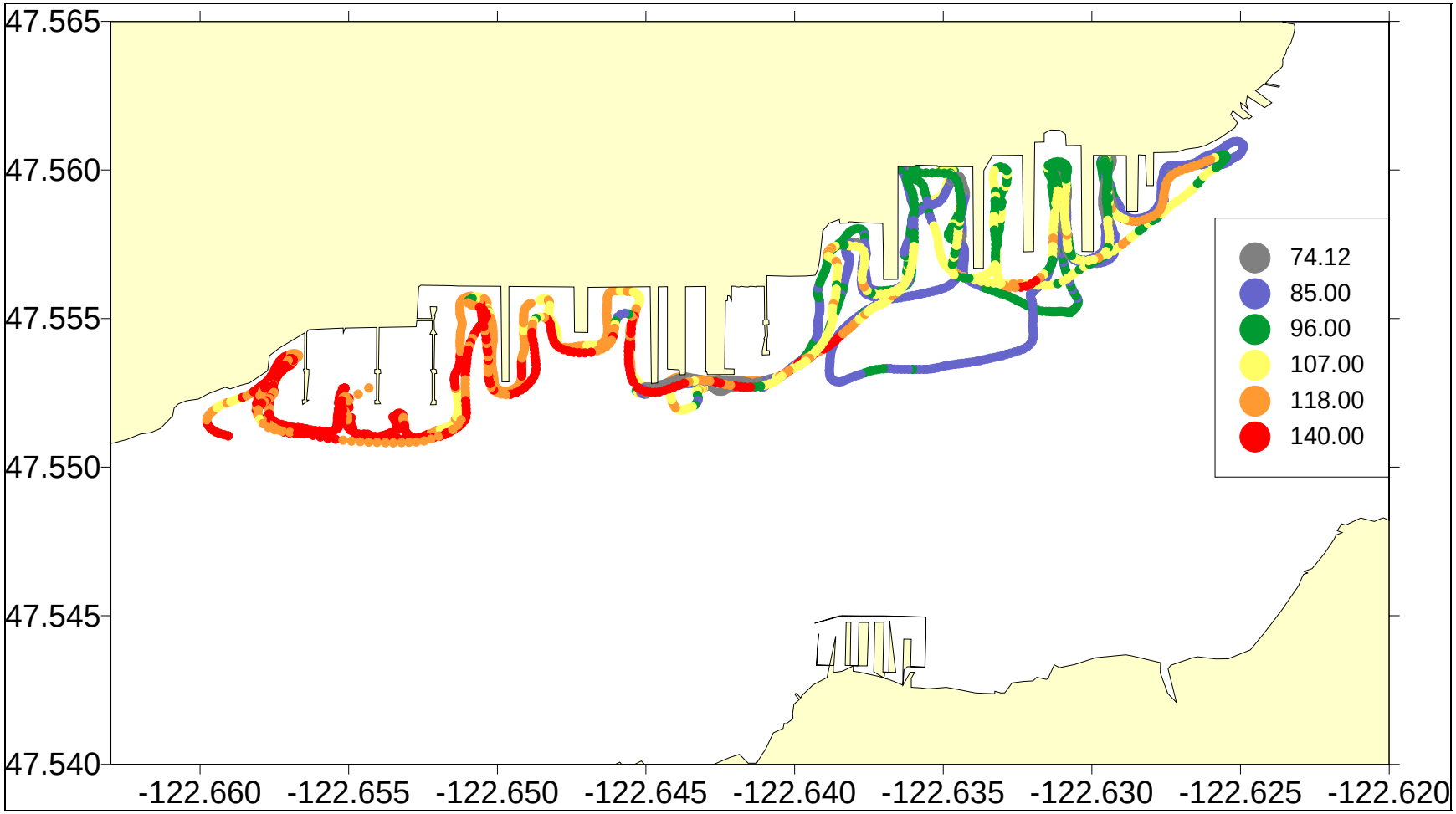
6.1.7 Chlorophyll *a*



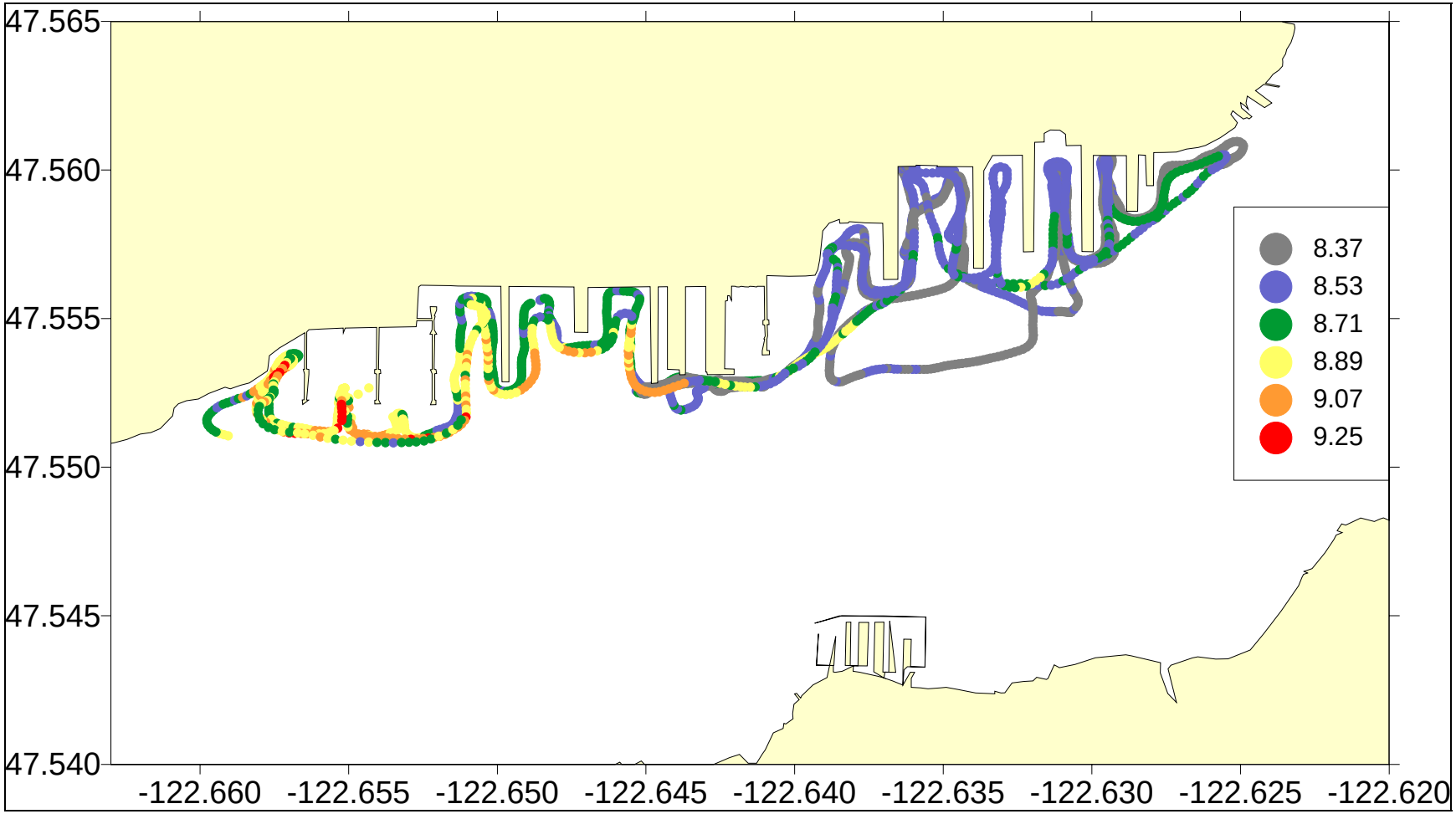
6.1.8 Oxygen


47.565
47.560
47.555
47.550
47.545
47.540
-122.660
-122.655
-122.650
-122.645
-122.640
-122.635
-122.630
-122.625
-122.620
4.26
5.13
5.91
6.79
7.68
8.56

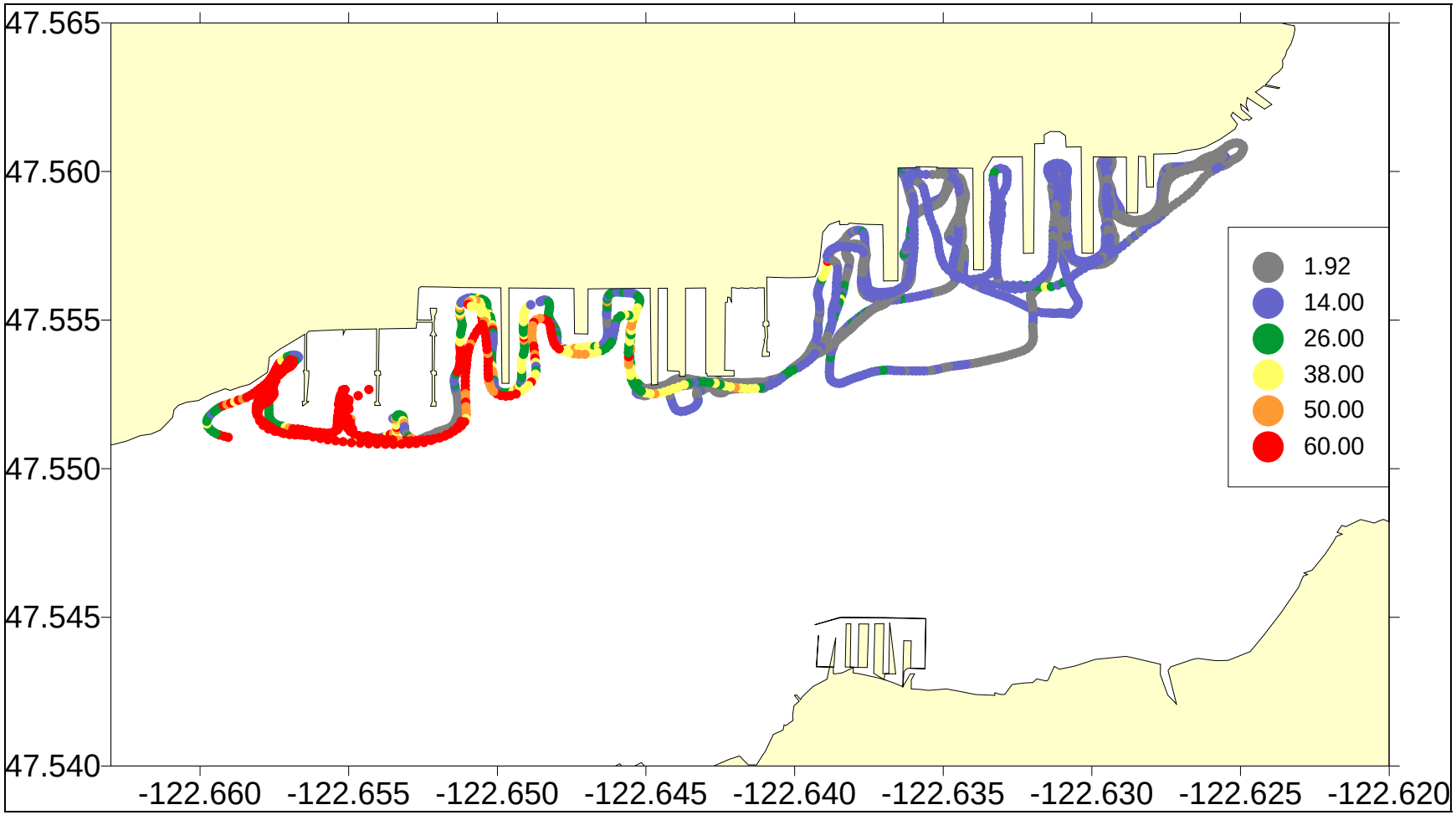
6.1.9 Oxygen Saturation



6.1.10 pH

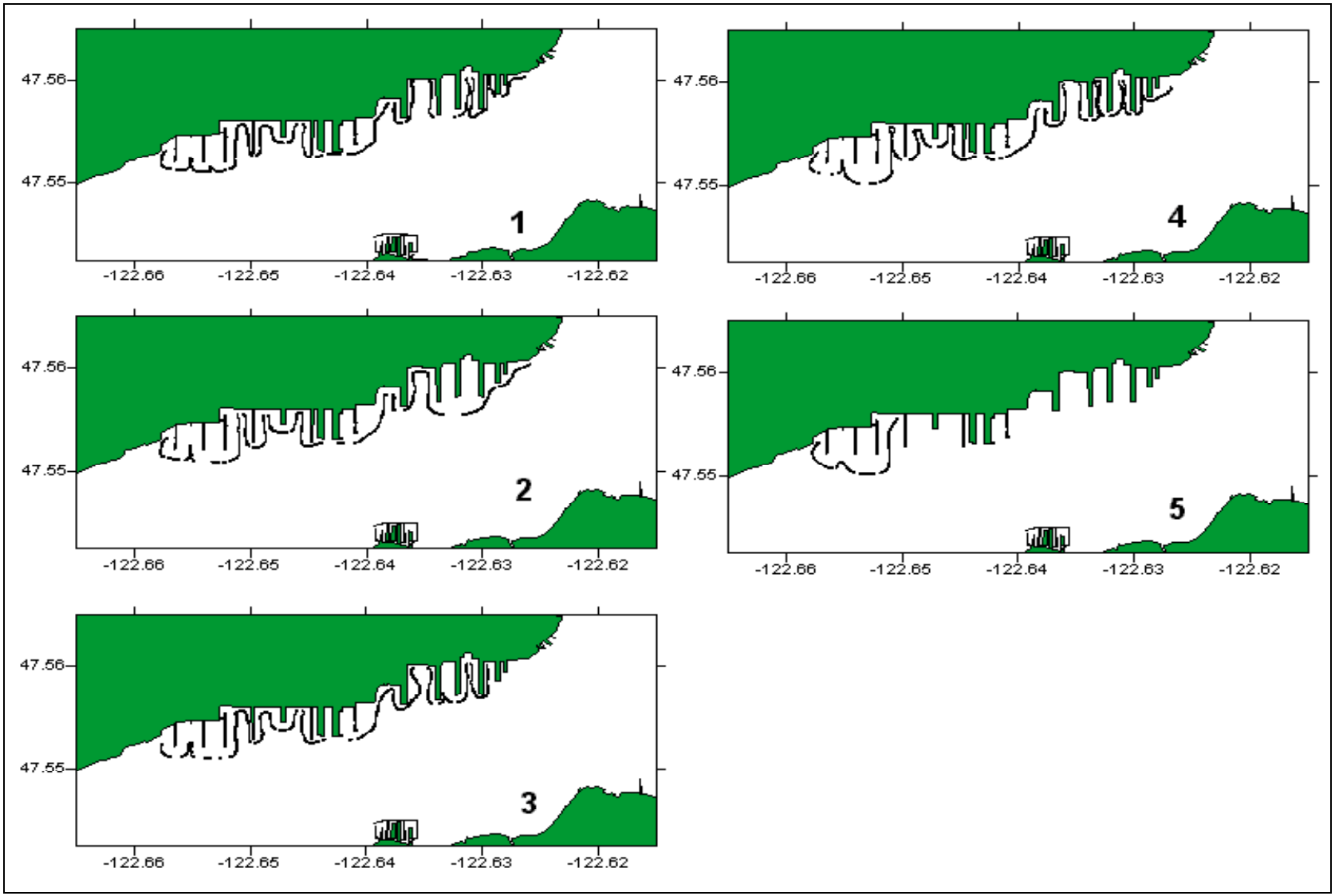

47.565
47.560
47.555
47.550
47.545
47.540
-122.660
-122.655
-122.650
-122.645
-122.640
-122.635
-122.630
-122.625
-122.620
8.37
8.53
8.71
8.89
9.07
9.25

6.1.11 Oil Fluorescence

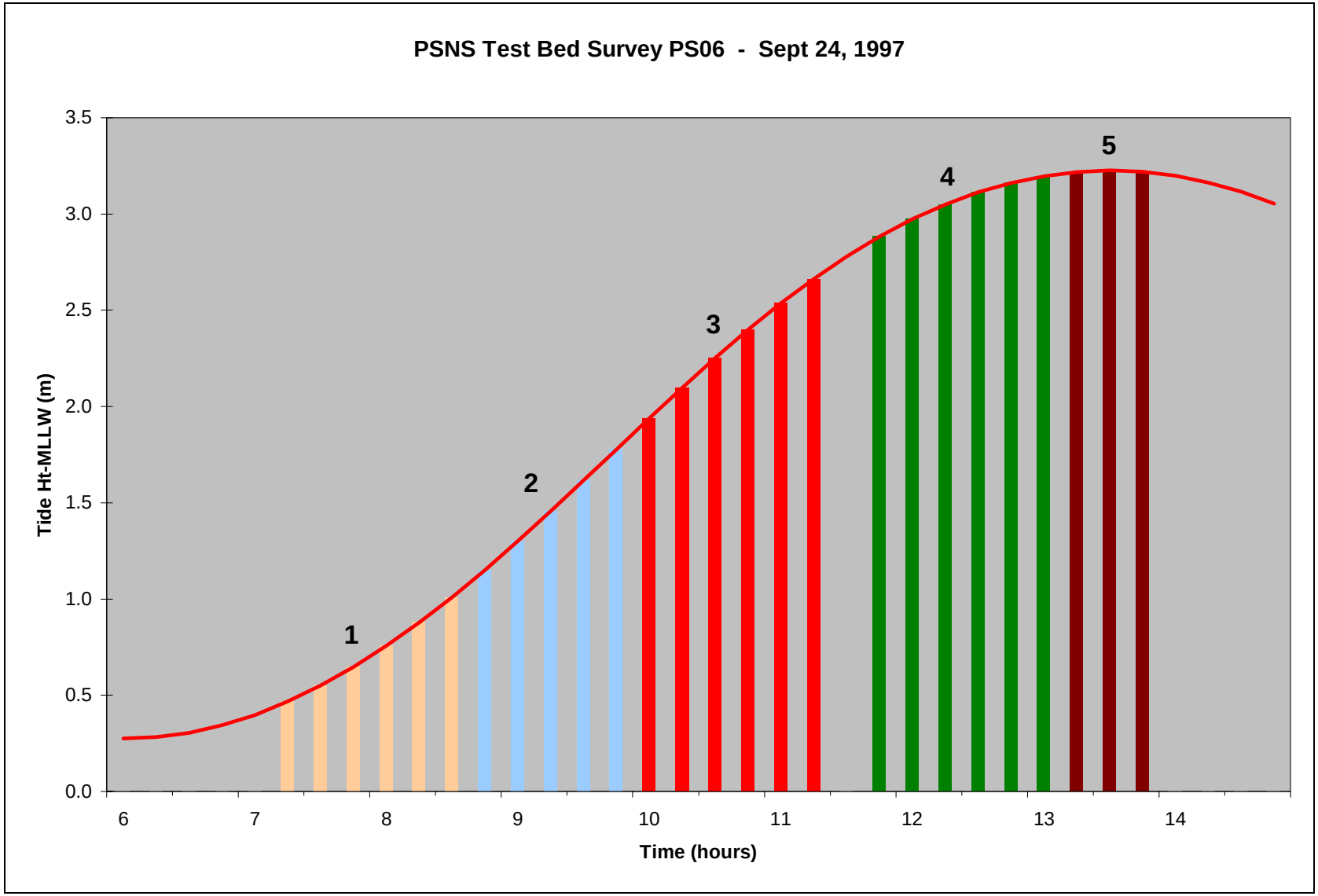


6.2 September 23, 1997 – PS06

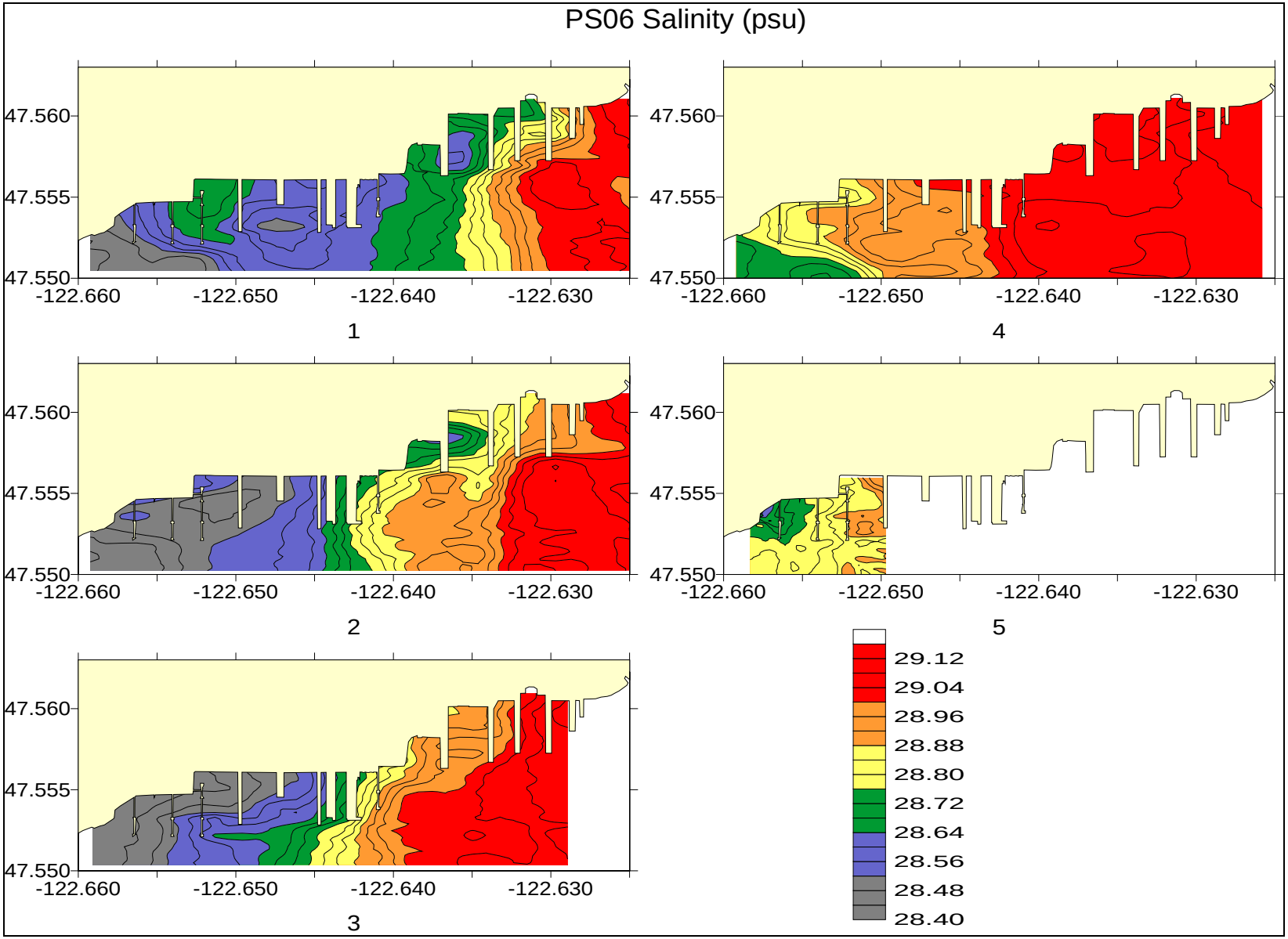
6.2.1 Track Map



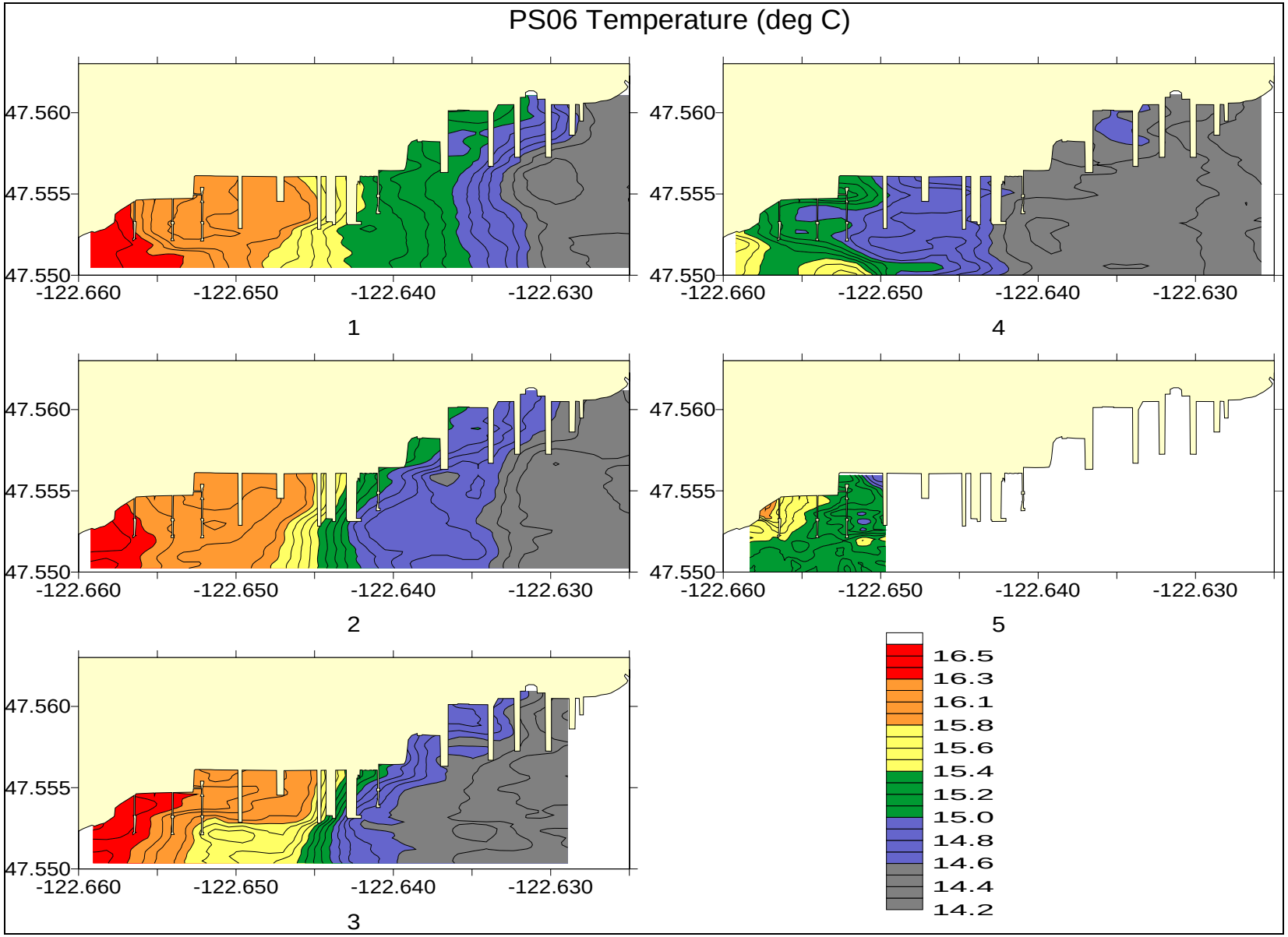
6.2.2 Tide Chart



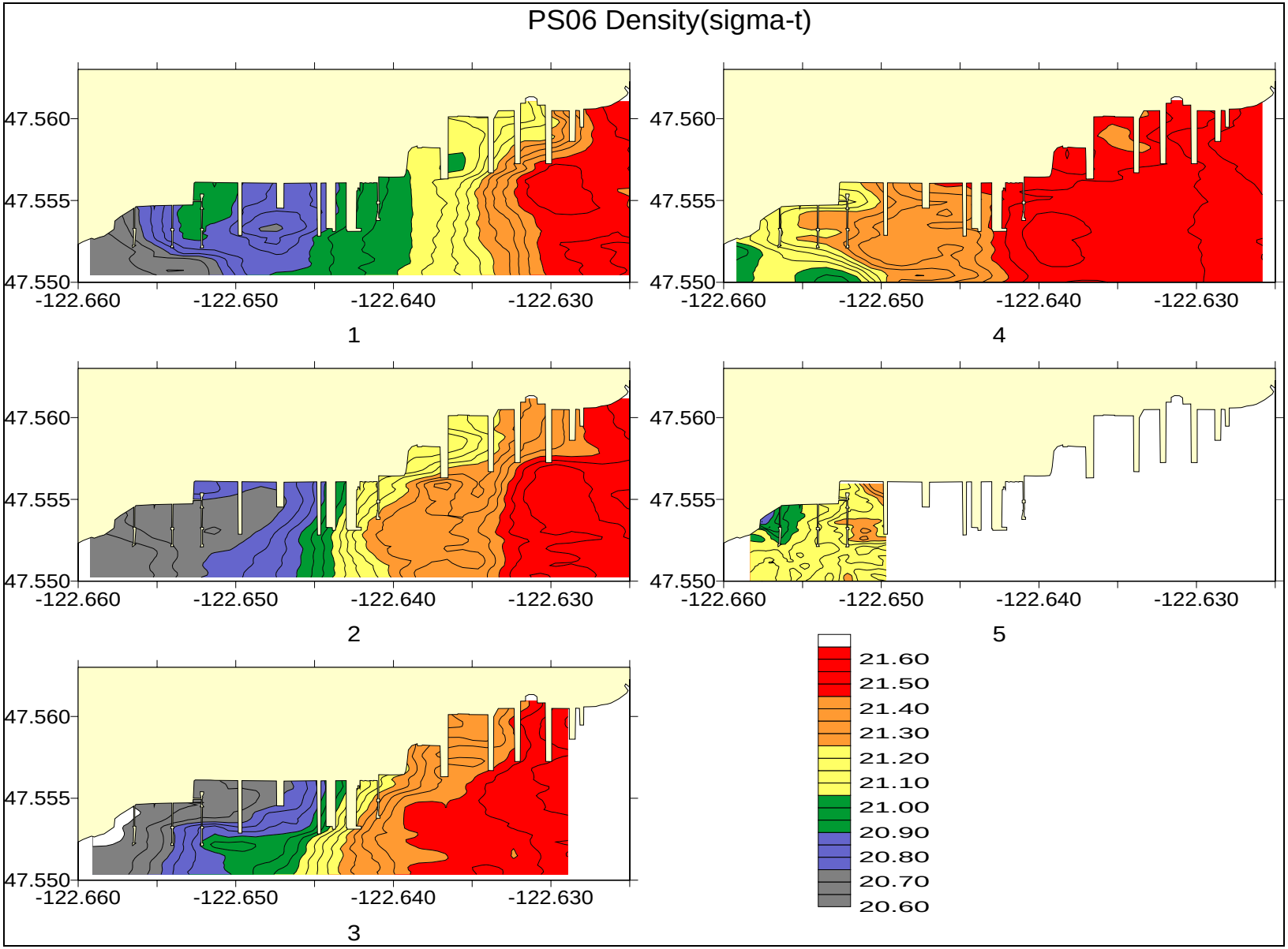
6.2.3 Salinity



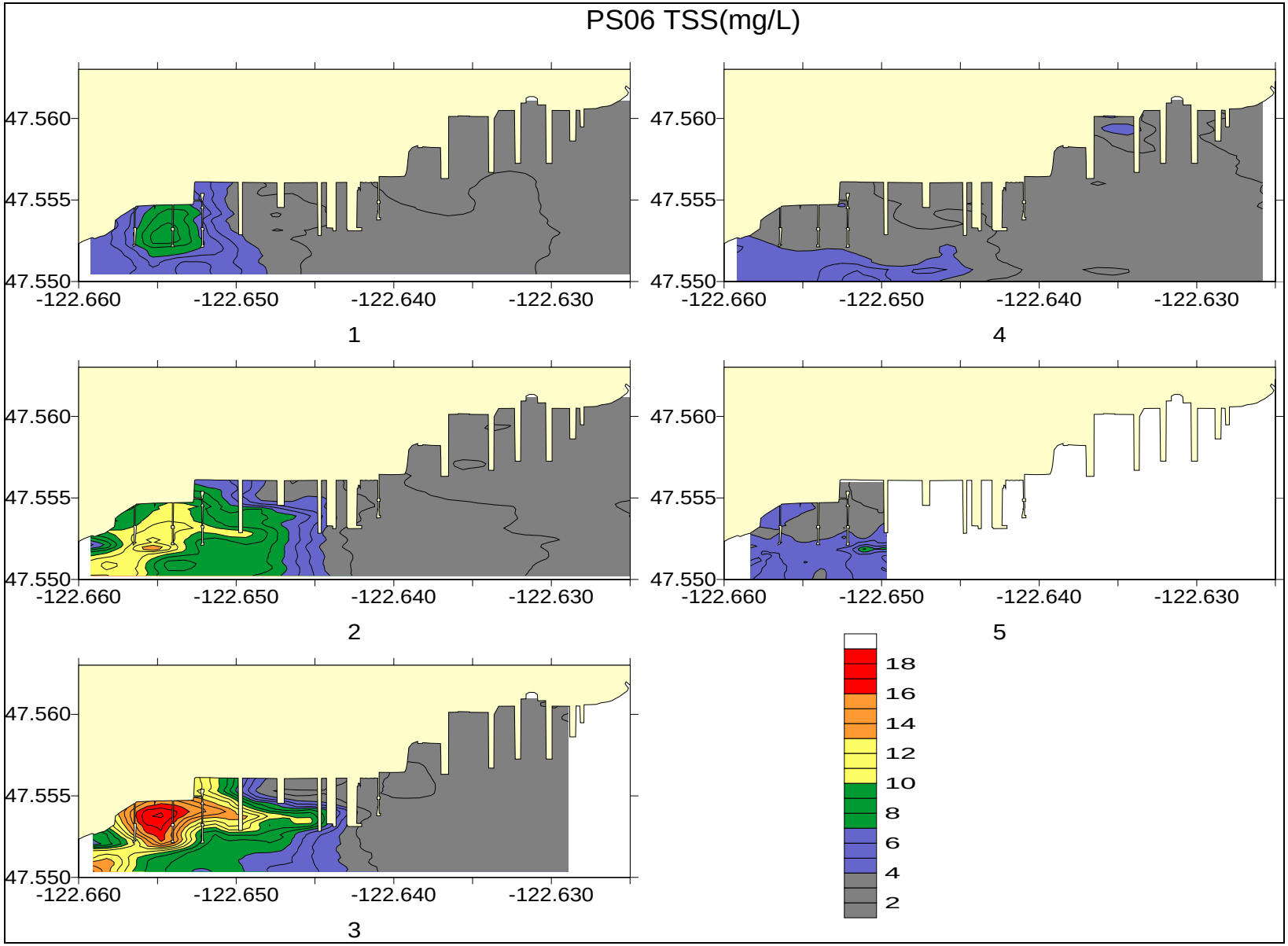
6.2.4 Temperature



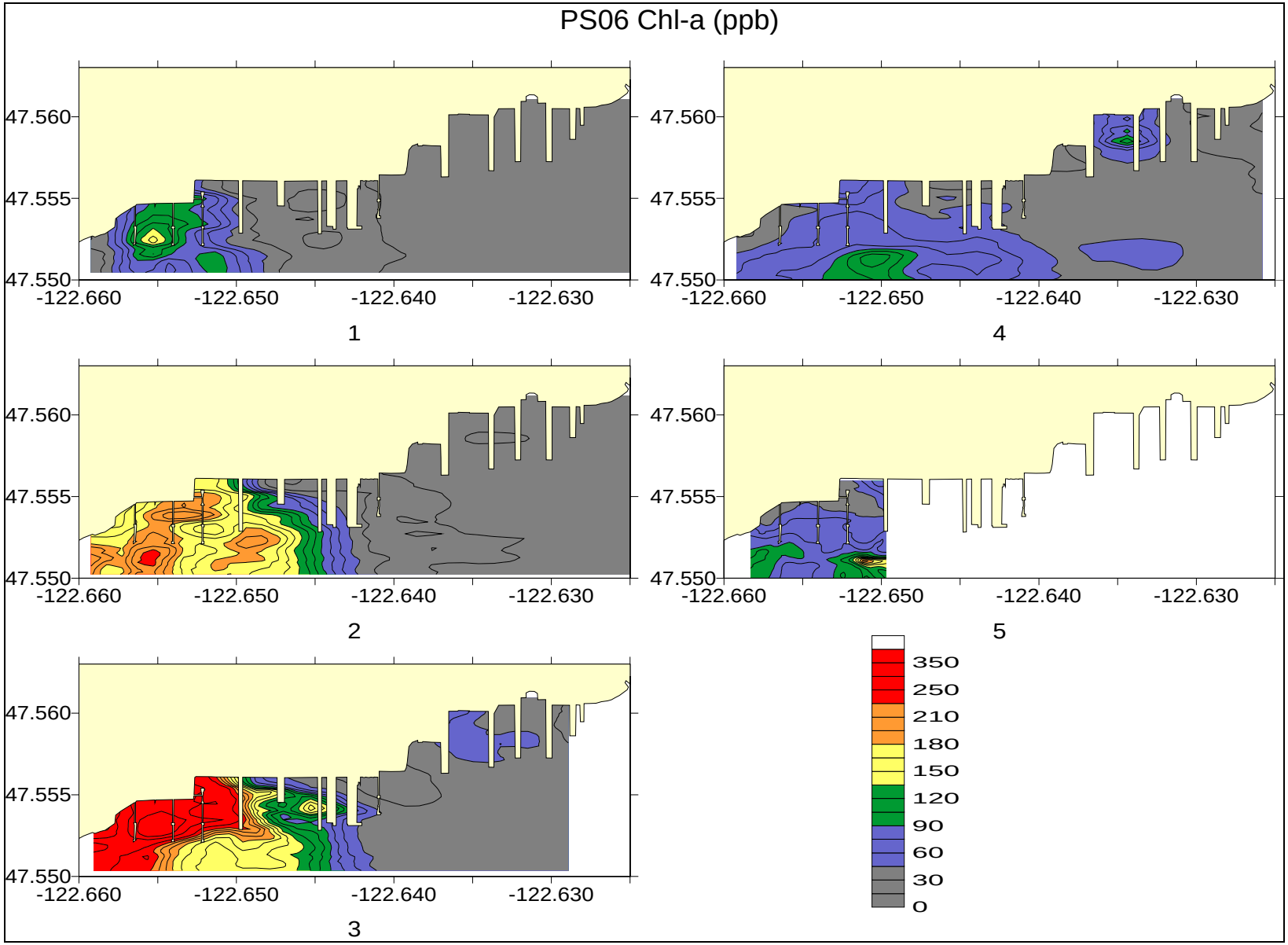
6.2.5 Density


PS06 Density(sigma-t)
47.560
47.555
47.550
-122.660
-122.650
-122.640
-122.630
1
2
3
4
5
21.60
21.50
21.40
21.30
21.20
21.10
21.00
20.90
20.80
20.70
20.60

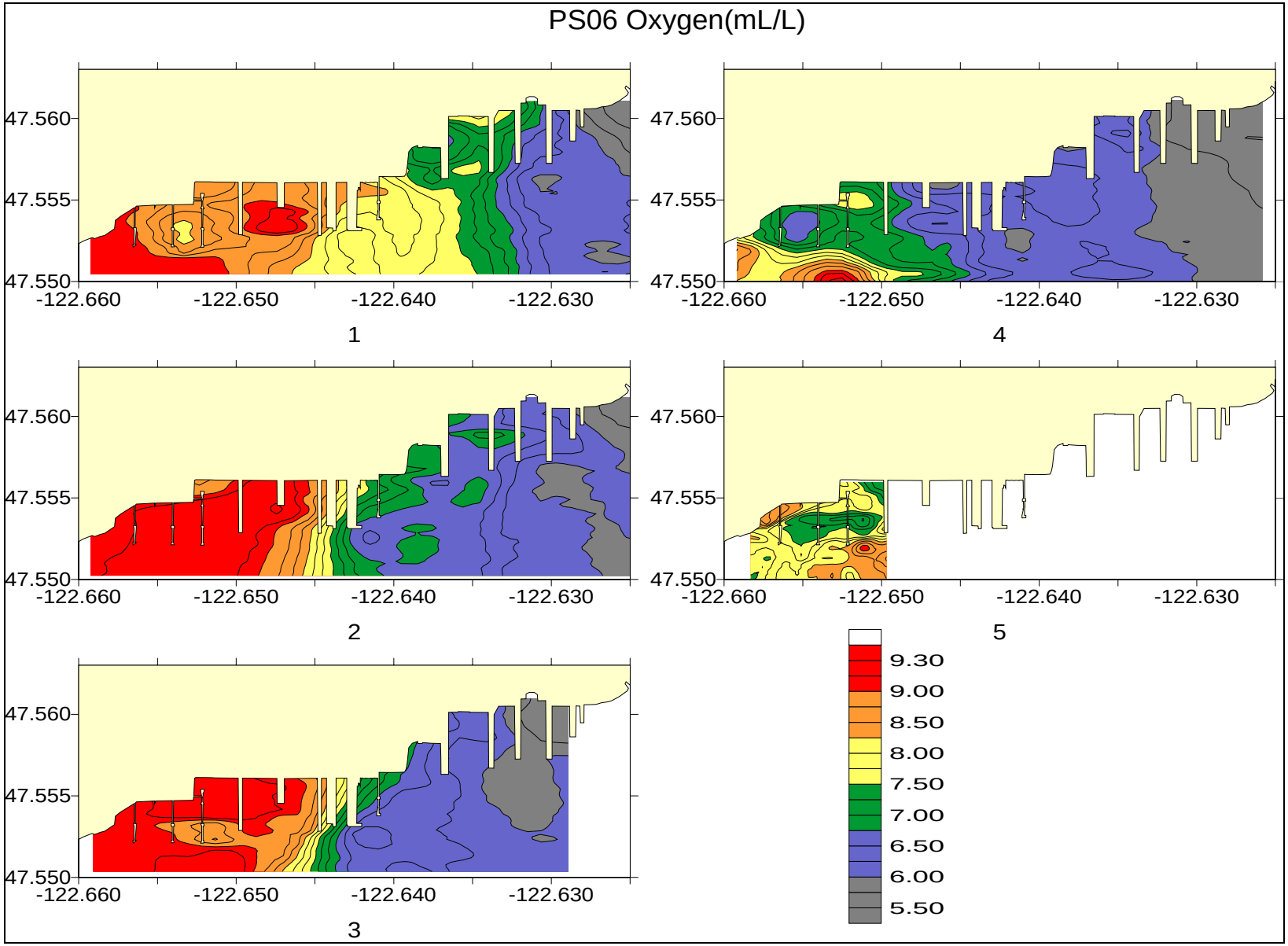
6.2.6 TSS


PS06 TSS(mg/L)
47.560
47.555
47.550
-122.660
-122.650
-122.640
-122.630
1
2
3
4
5
18
16
14
12
10
8
6
4
2

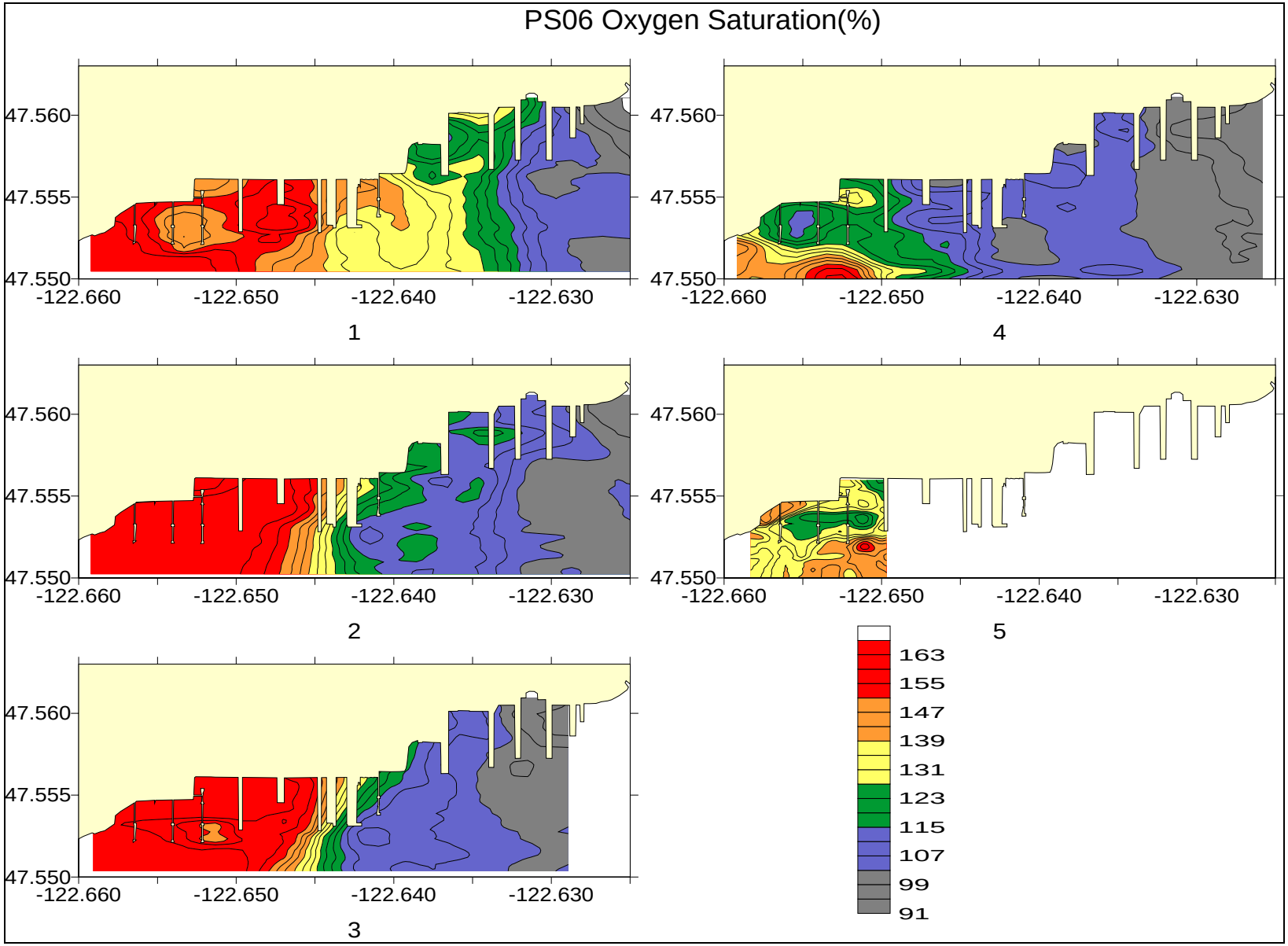
6.2.7 Chlorophyll *a*



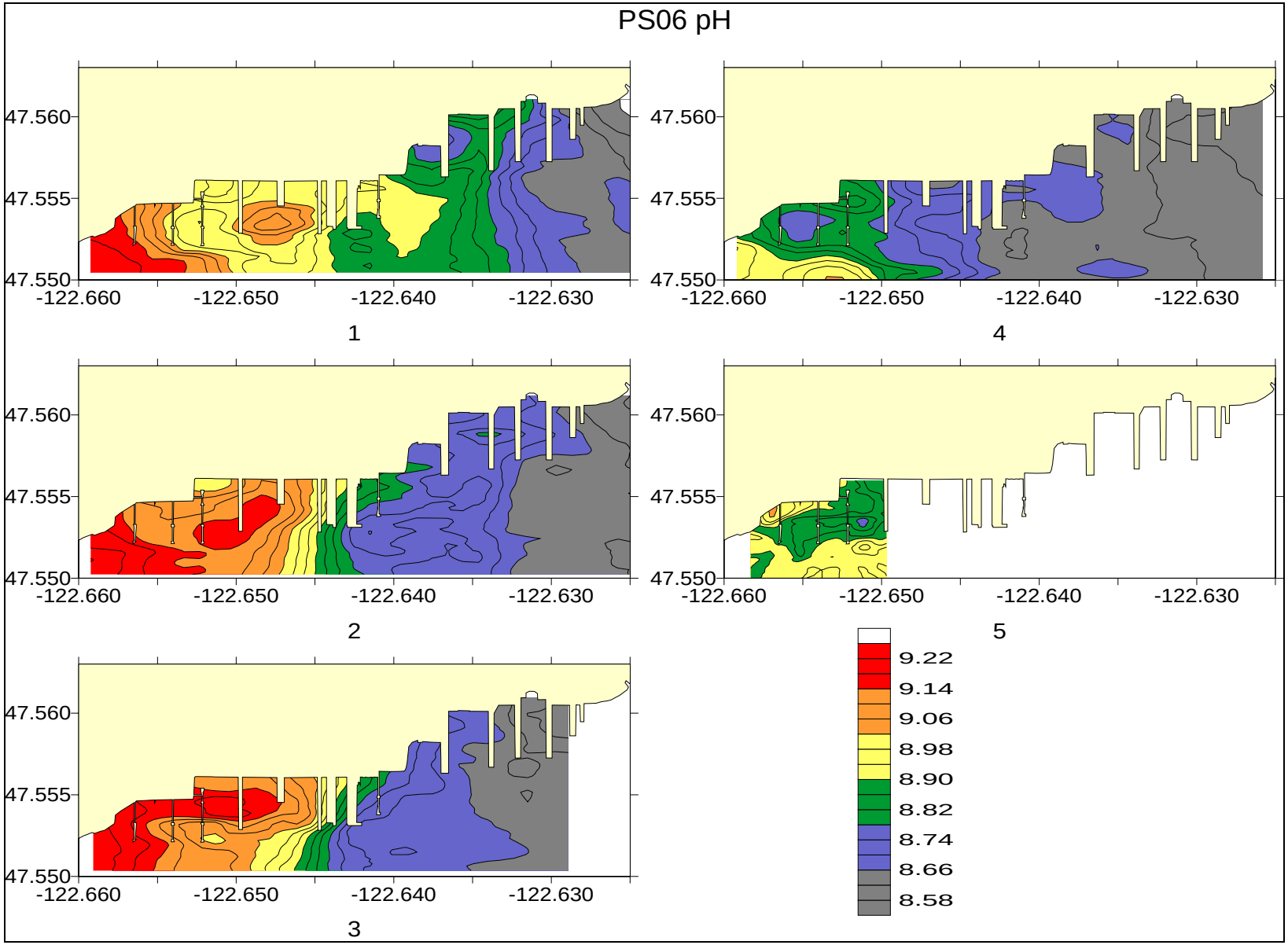
6.2.8 Oxygen


PS06 Oxygen(mL/L)
47.560
47.555
47.550
-122.660
-122.650
-122.640
-122.630
1
2
3
4
5
9.30
9.00
8.50
8.00
7.50
7.00
6.50
6.00
5.50

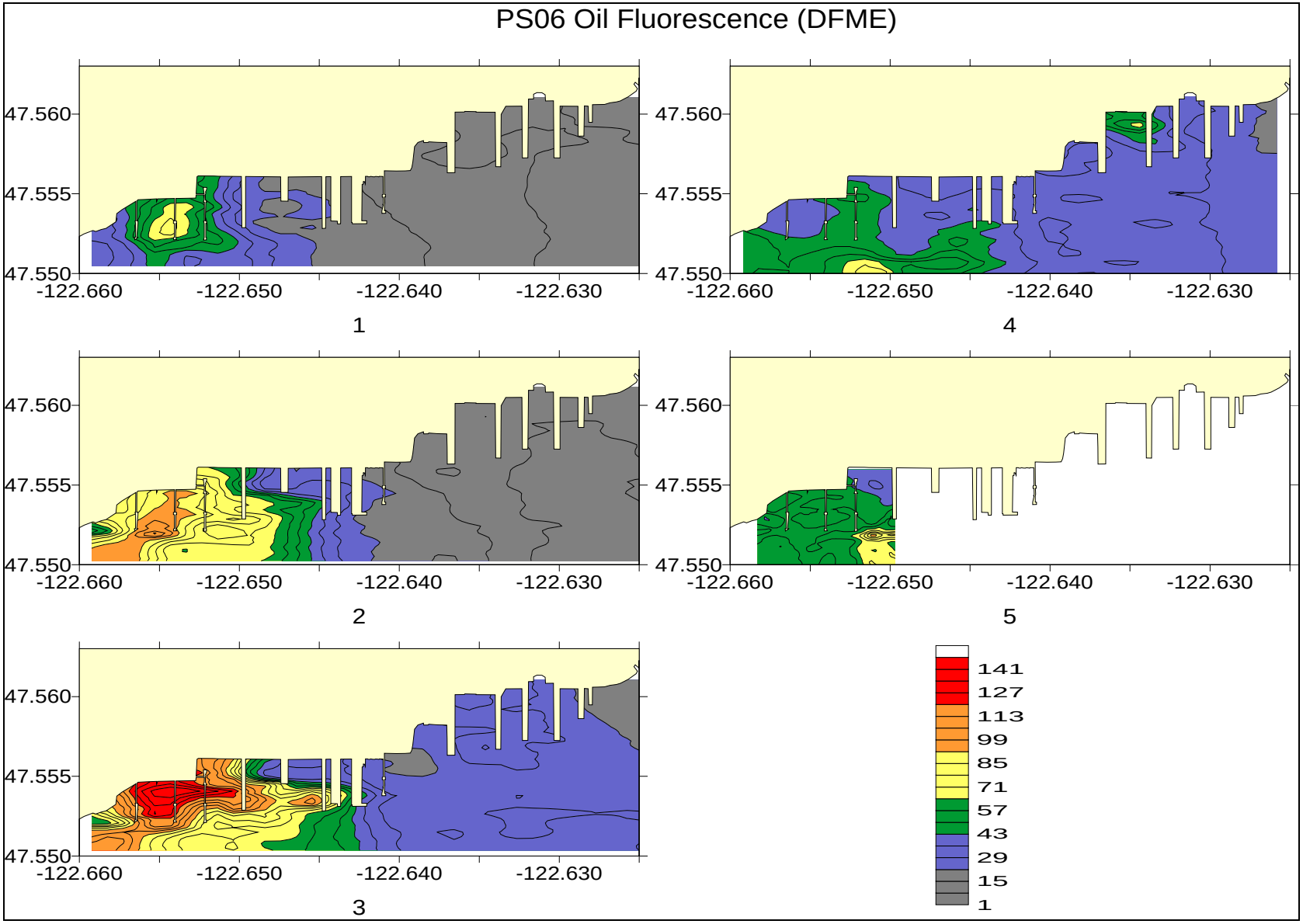
6.2.9 Oxygen Saturation



6.2.10 pH

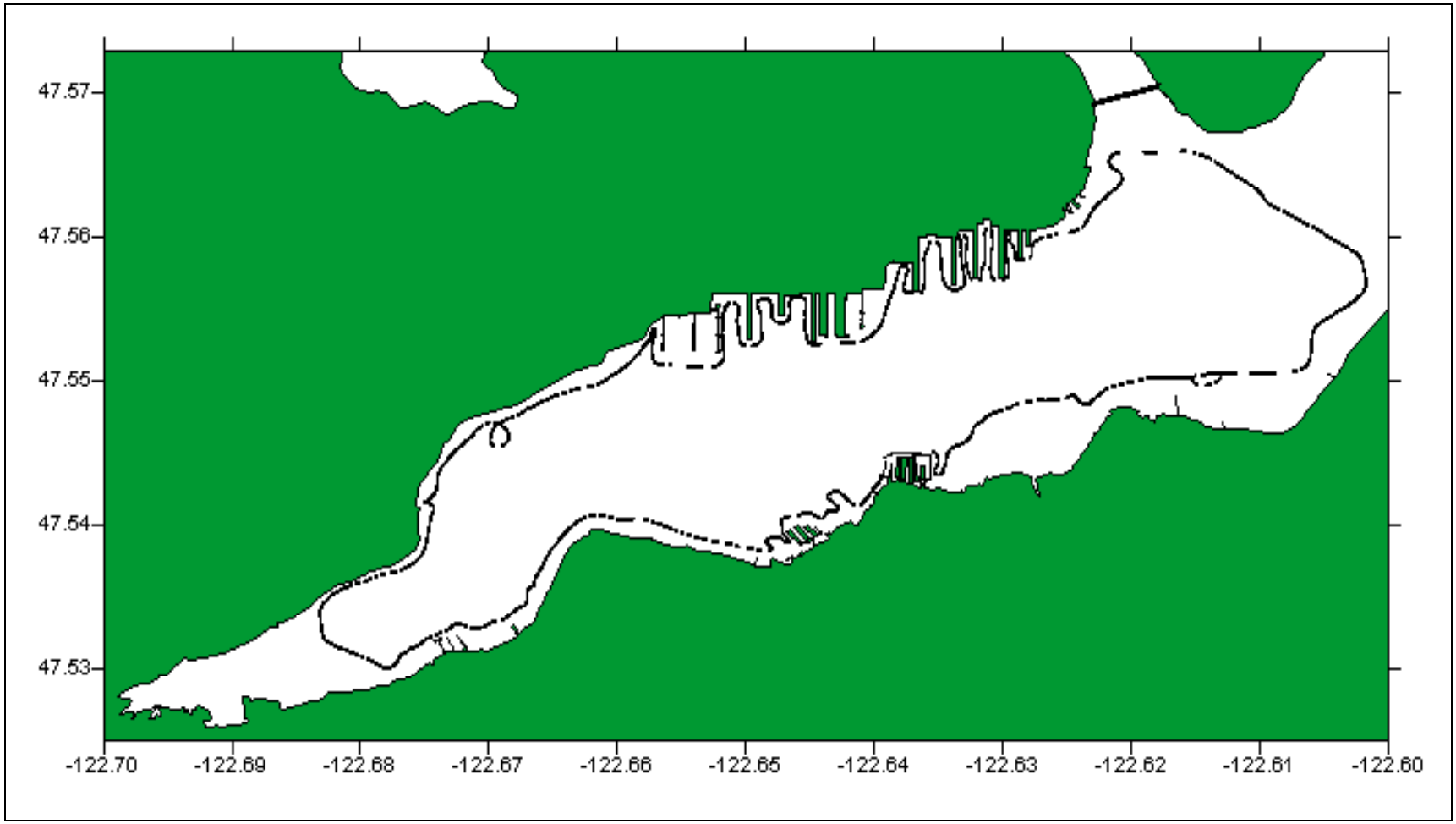

PS06 pH
47.560
47.555
47.550
-122.660
-122.650
-122.640
-122.630
1
2
3
4
5
9.22
9.14
9.06
8.98
8.90
8.82
8.74
8.66
8.58

6.2.11 Oil Fluorescence

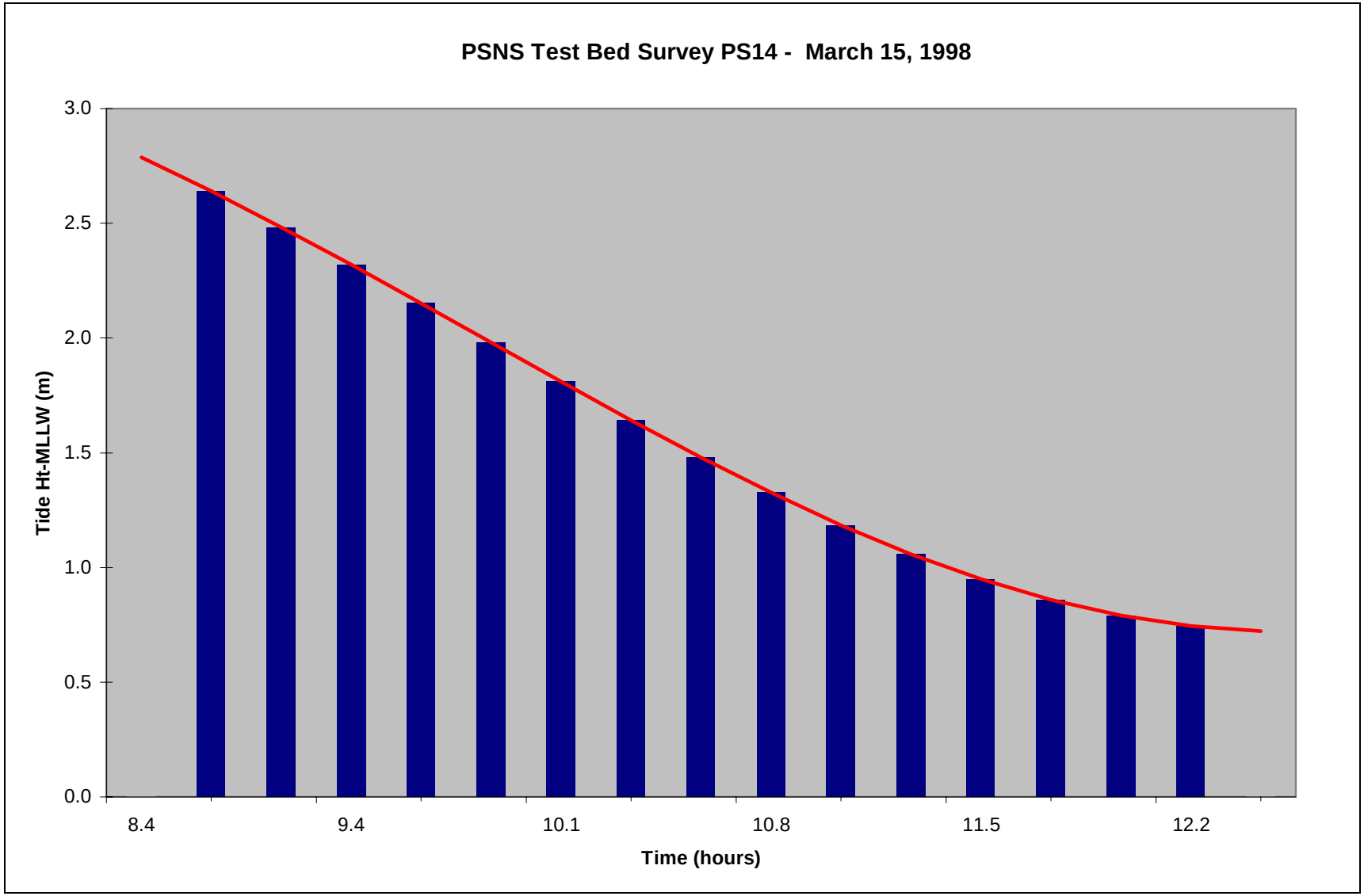


6.3 March 15, 1998 – PS14

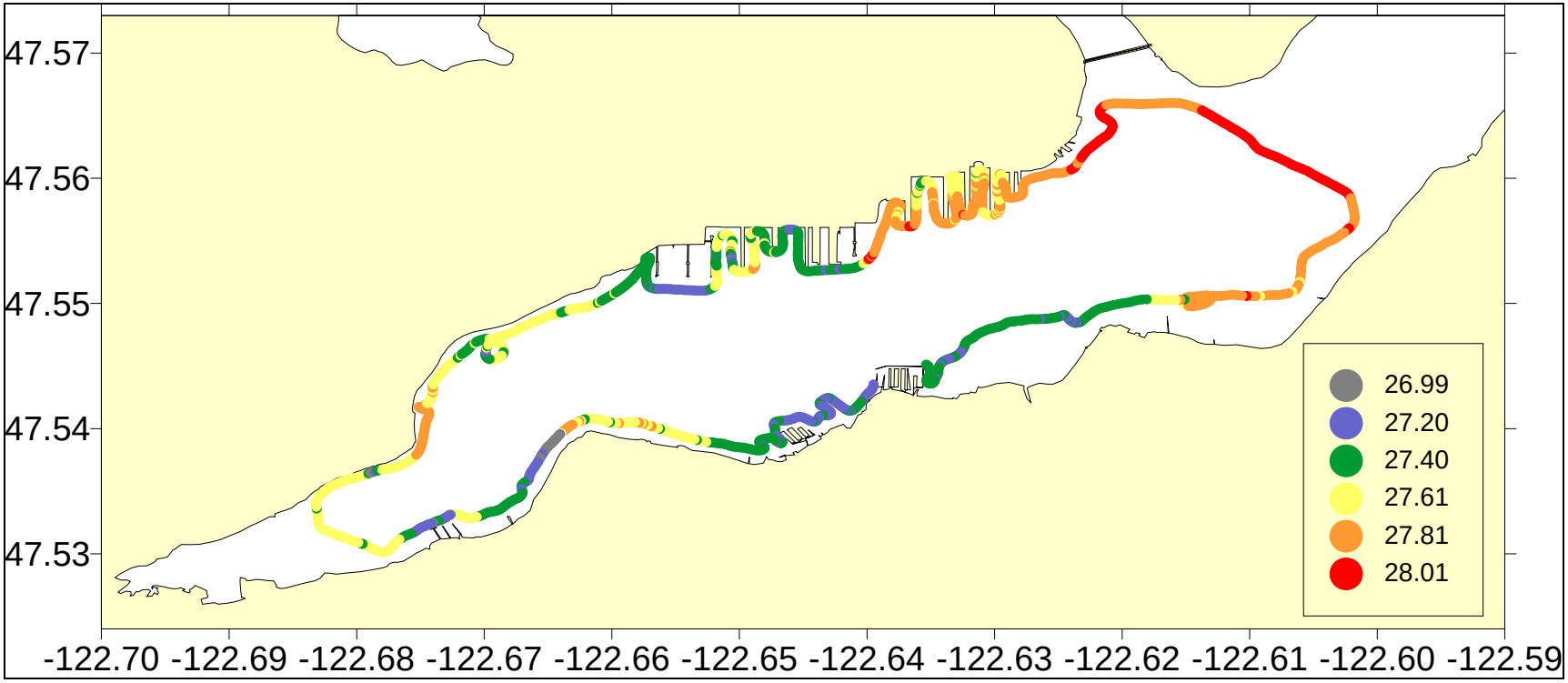
6.3.1 Track Map



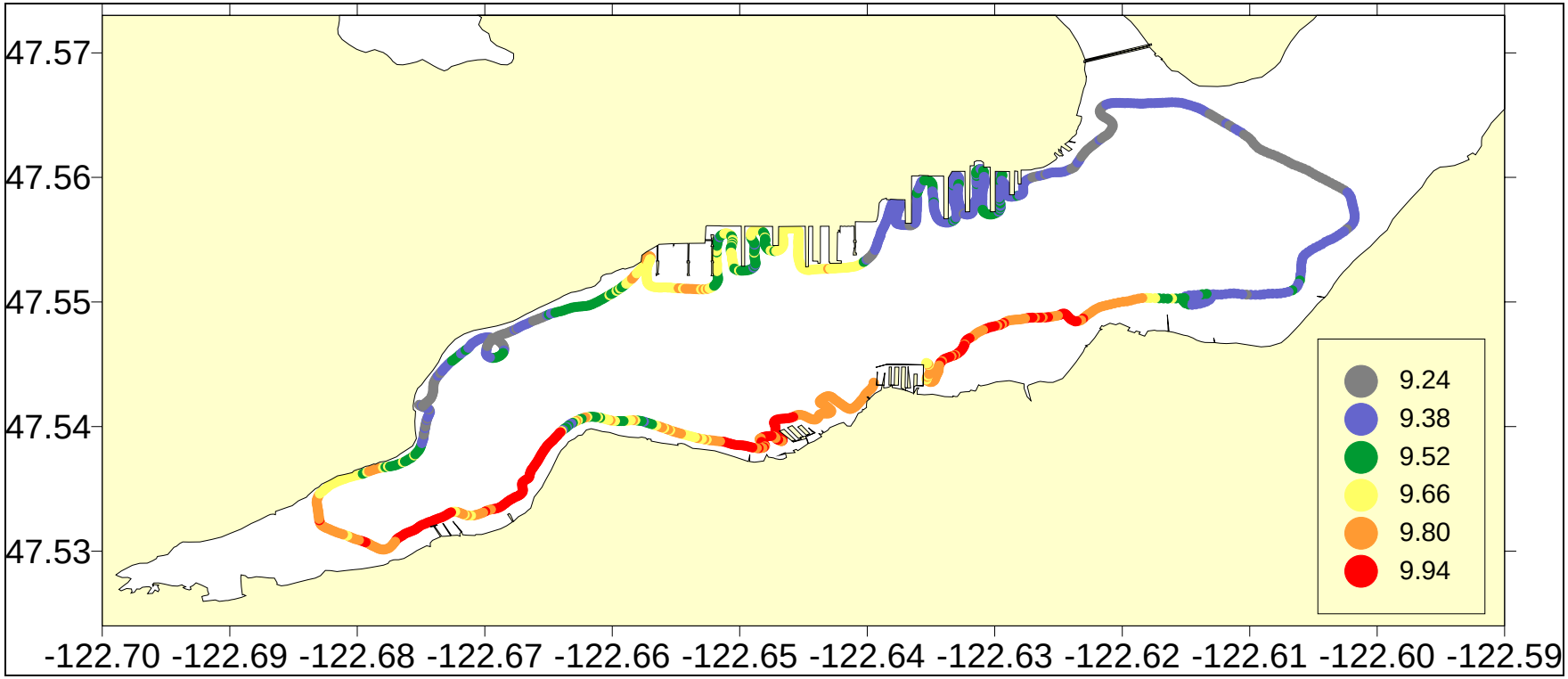
6.3.2 Tide Chart



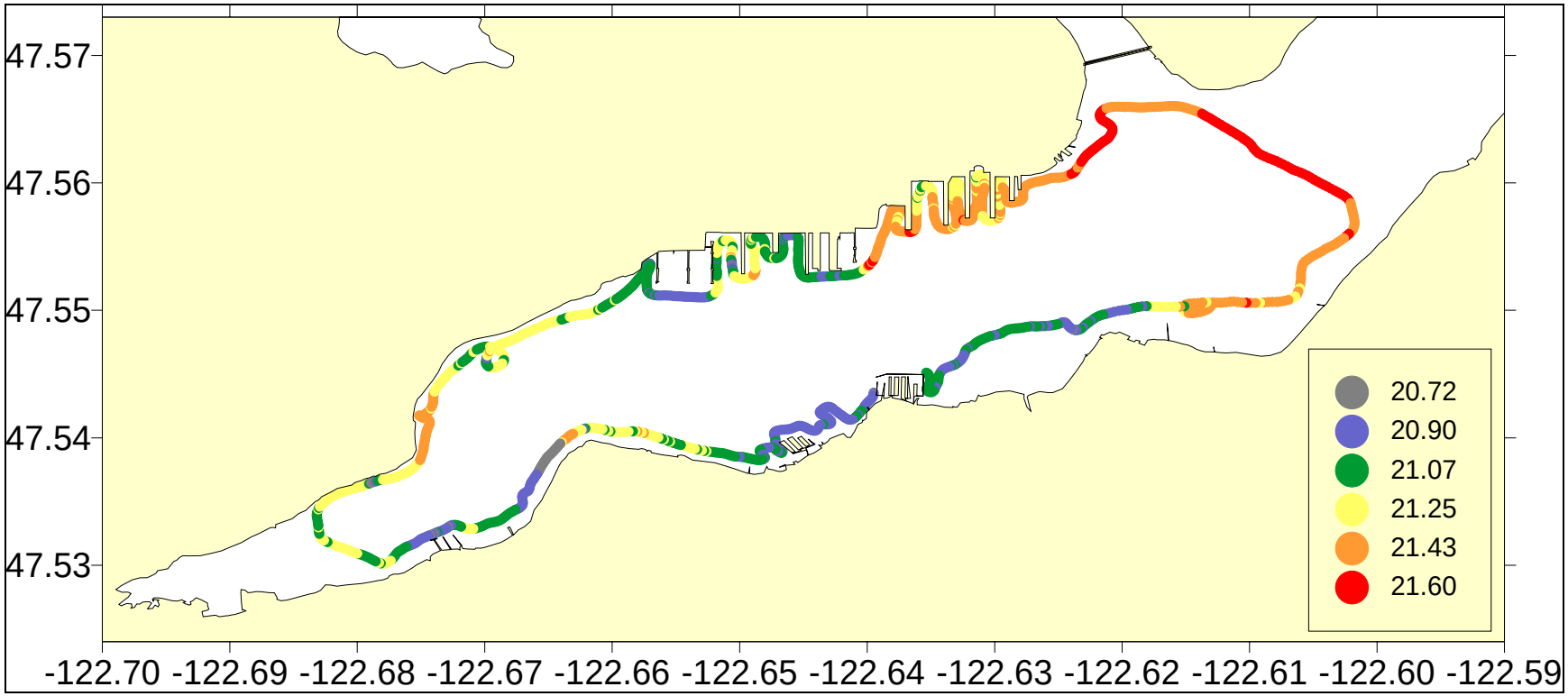
6.3.3 Salinity



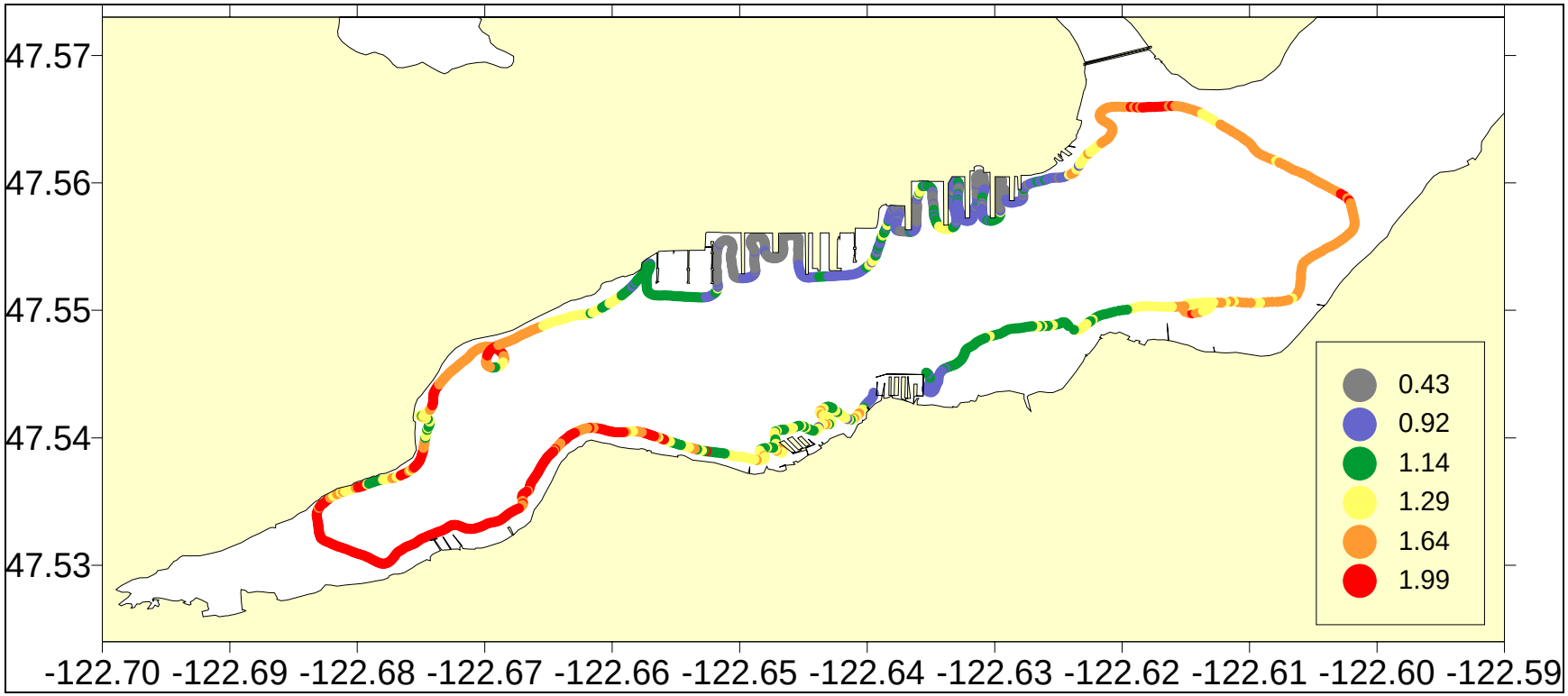
6.3.4 Temperature



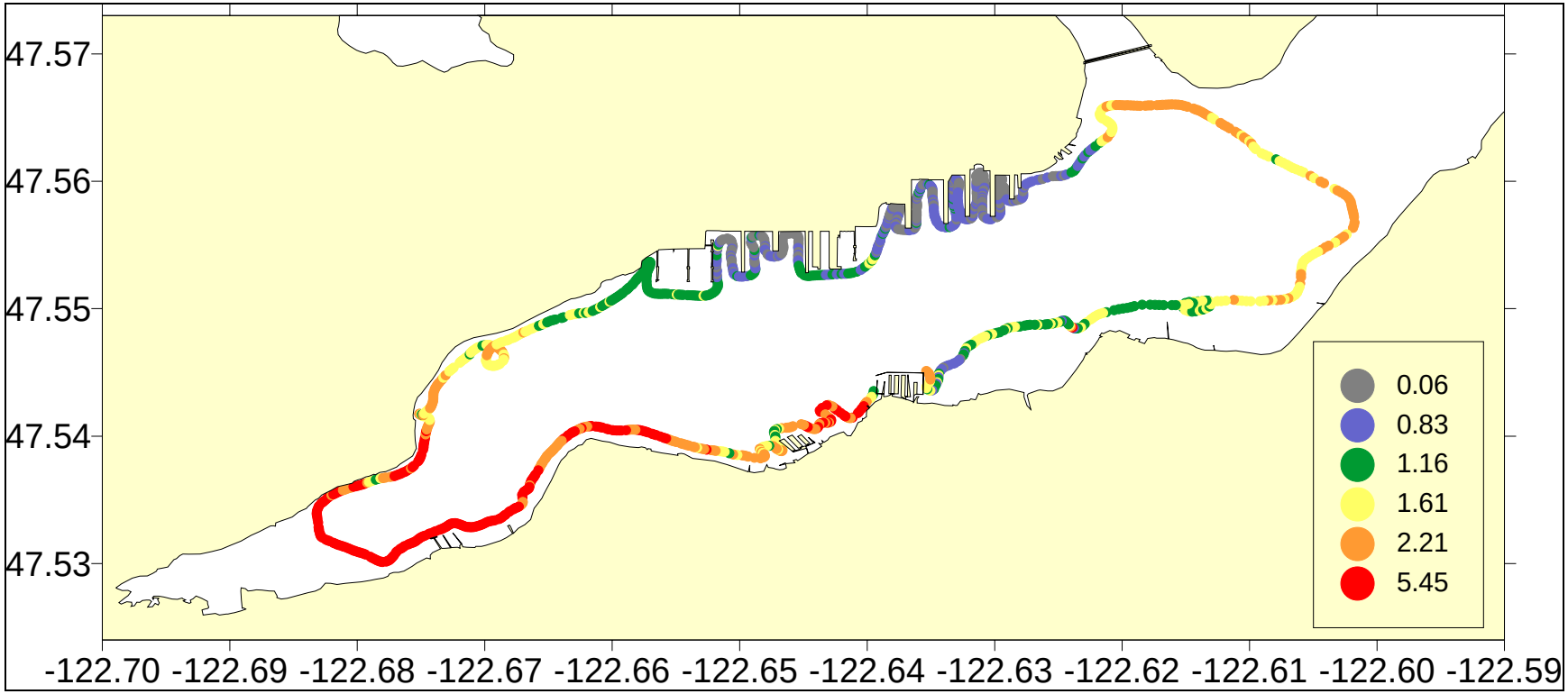
6.3.5 Density


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
20.72
20.90
21.07
21.25
21.43
21.60

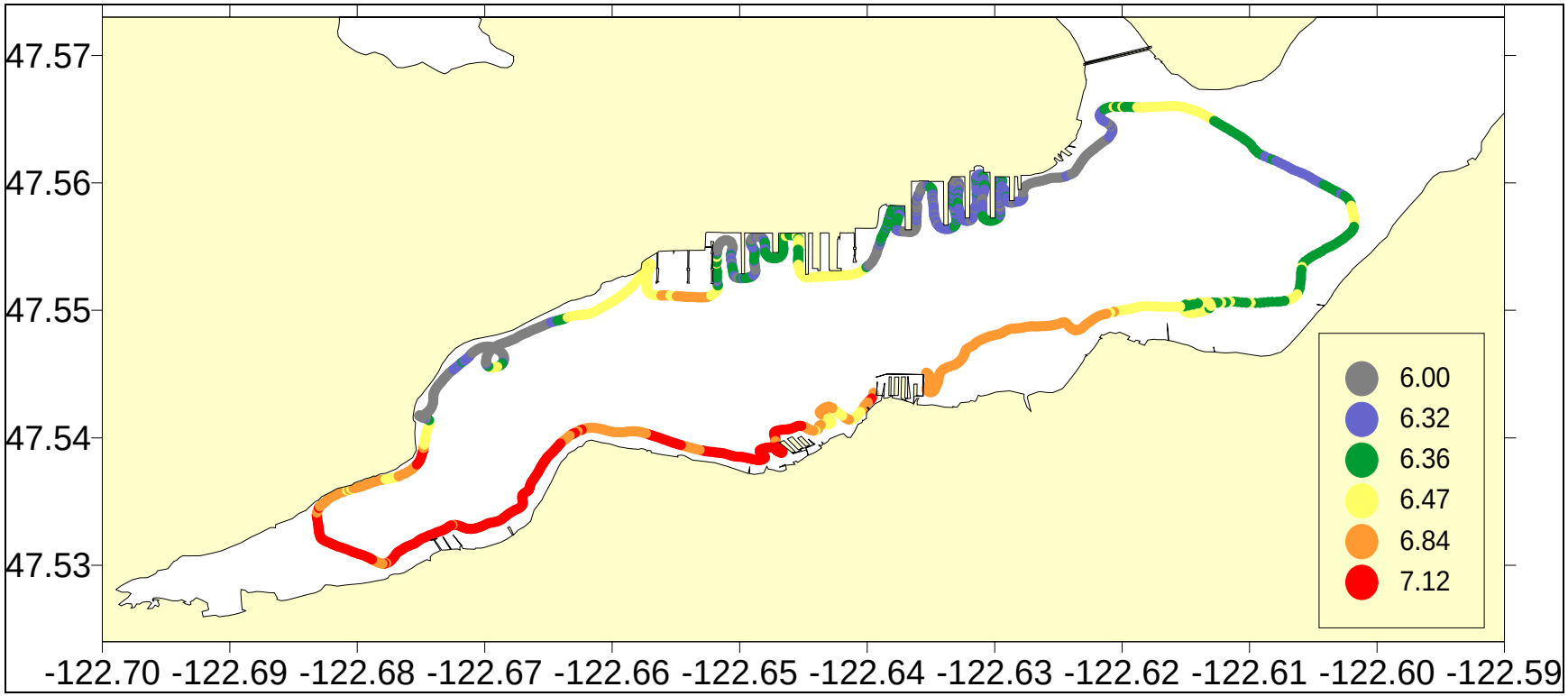
6.3.6 TSS


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
0.43
0.92
1.14
1.29
1.64
1.99

6.3.7 Chlorophyll *a*



6.3.8 Oxygen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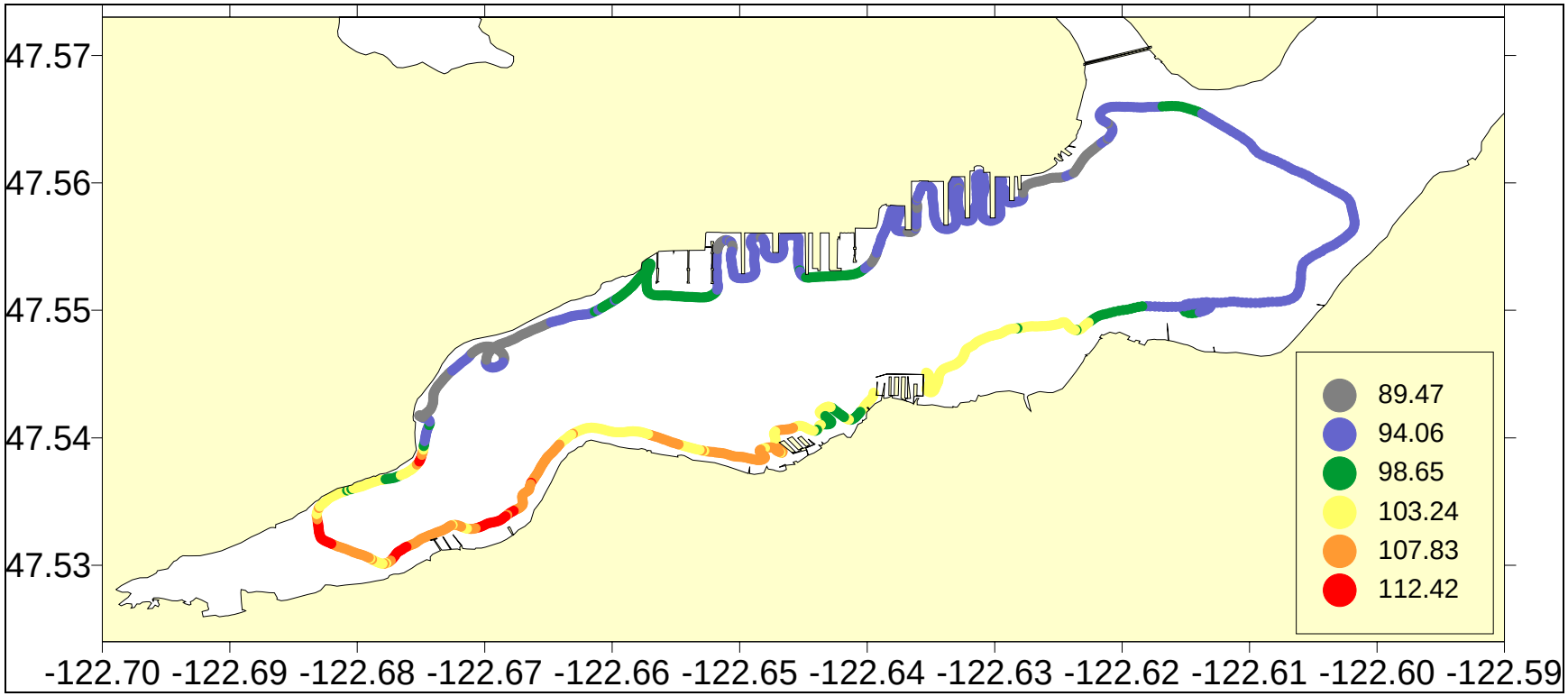
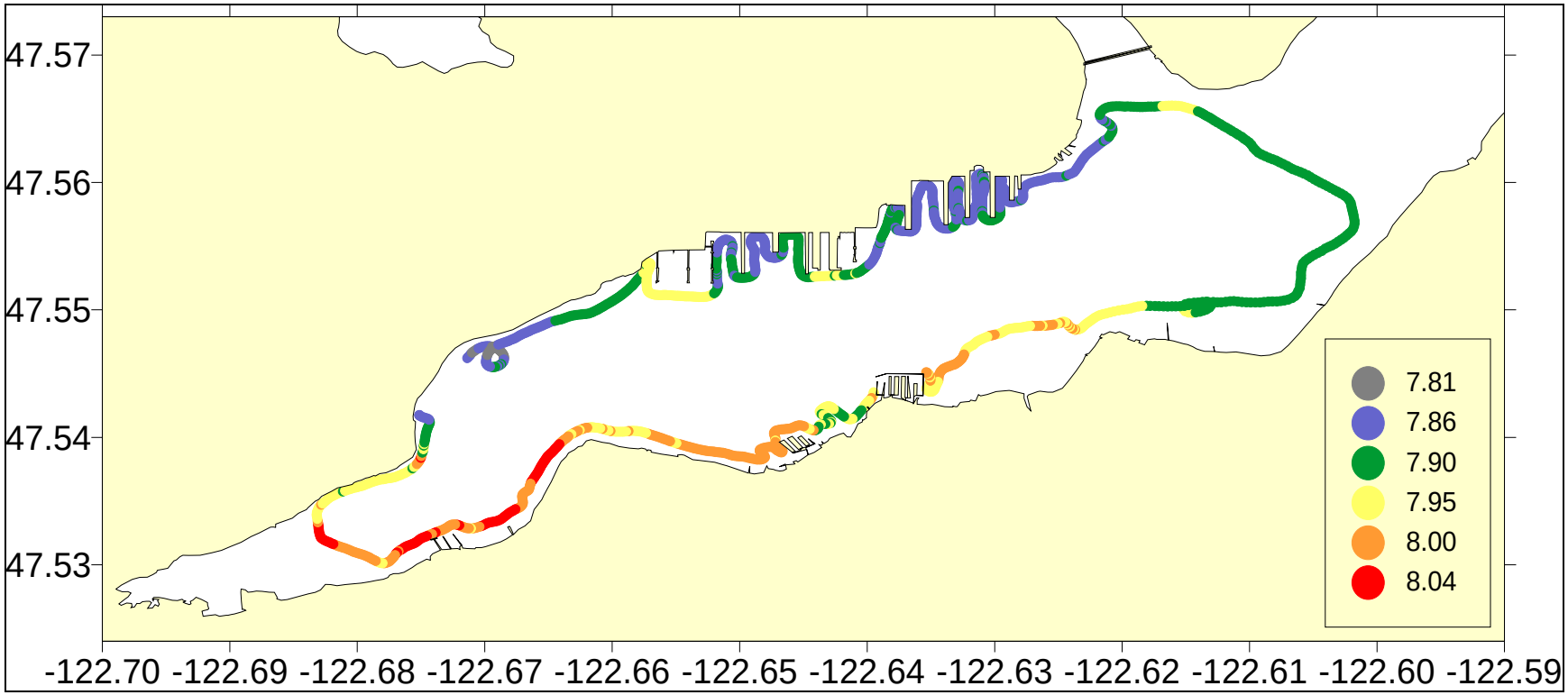
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
6.00
6.32
6.36
6.47
6.84
7.12

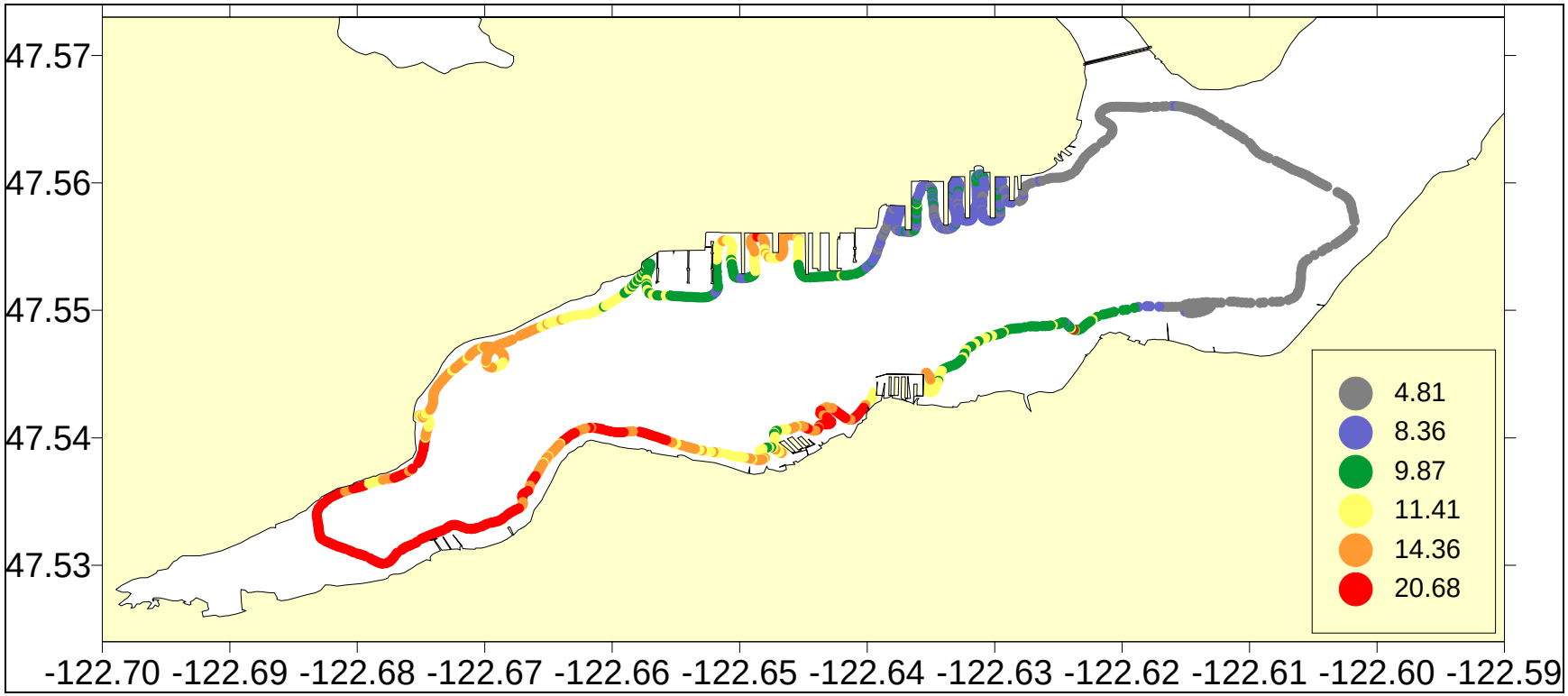
6.3.9 Oxygen Saturation



6.3.10 pH

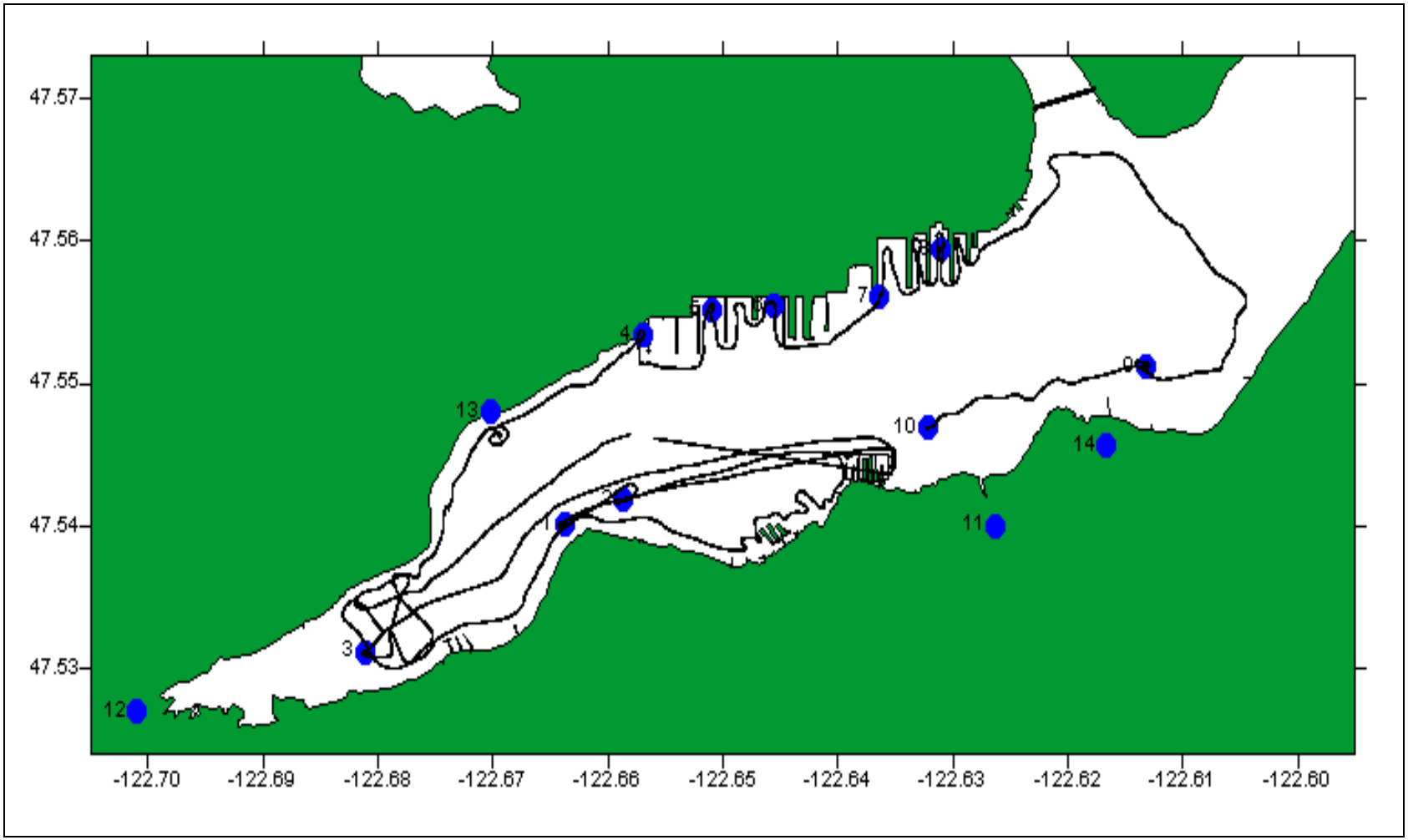

47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
7.81
7.86
7.90
7.95
8.00
8.04

6.3.11 Oil Fluorescence

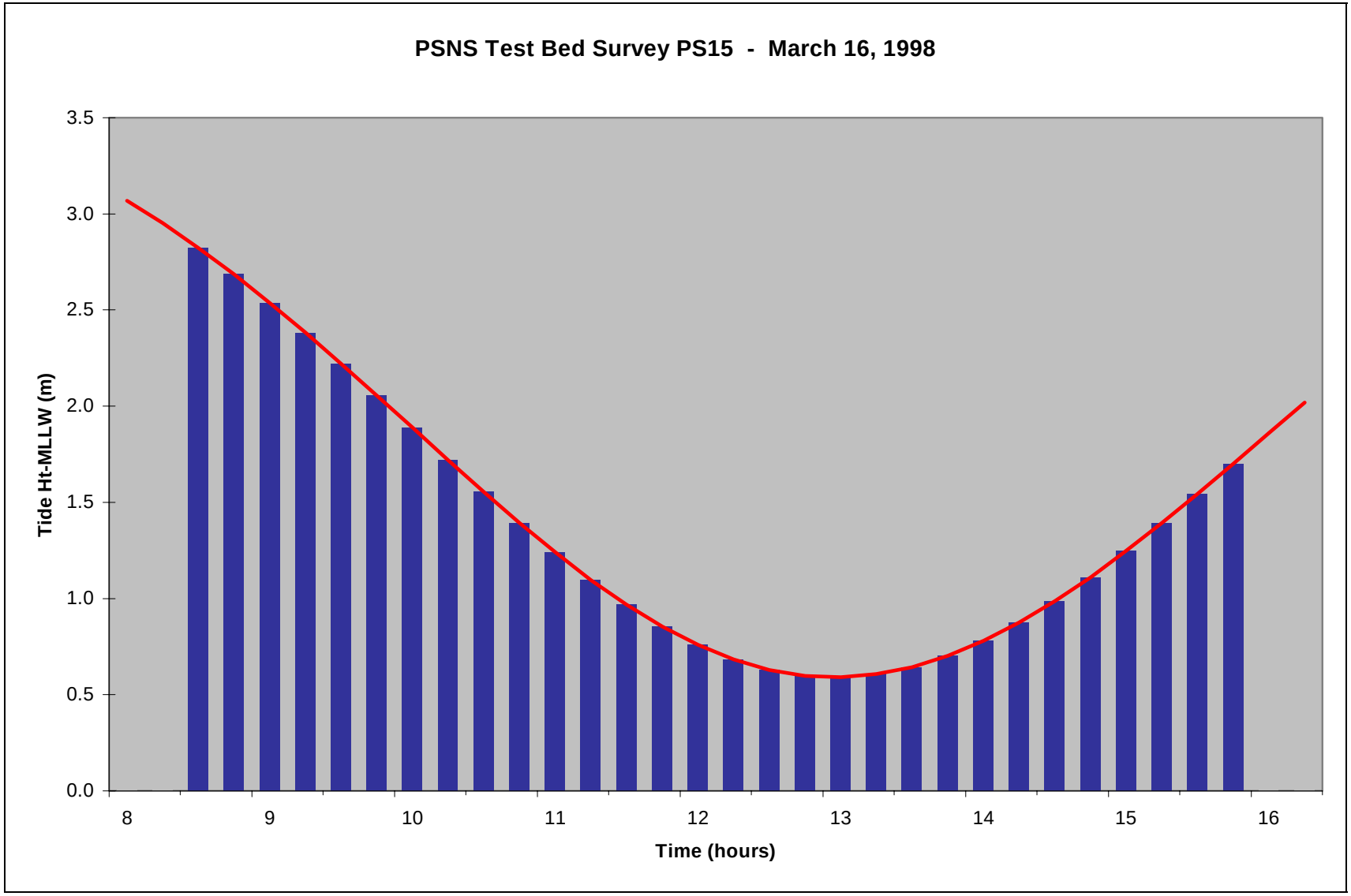


6.4 March 16, 1998 – PS15

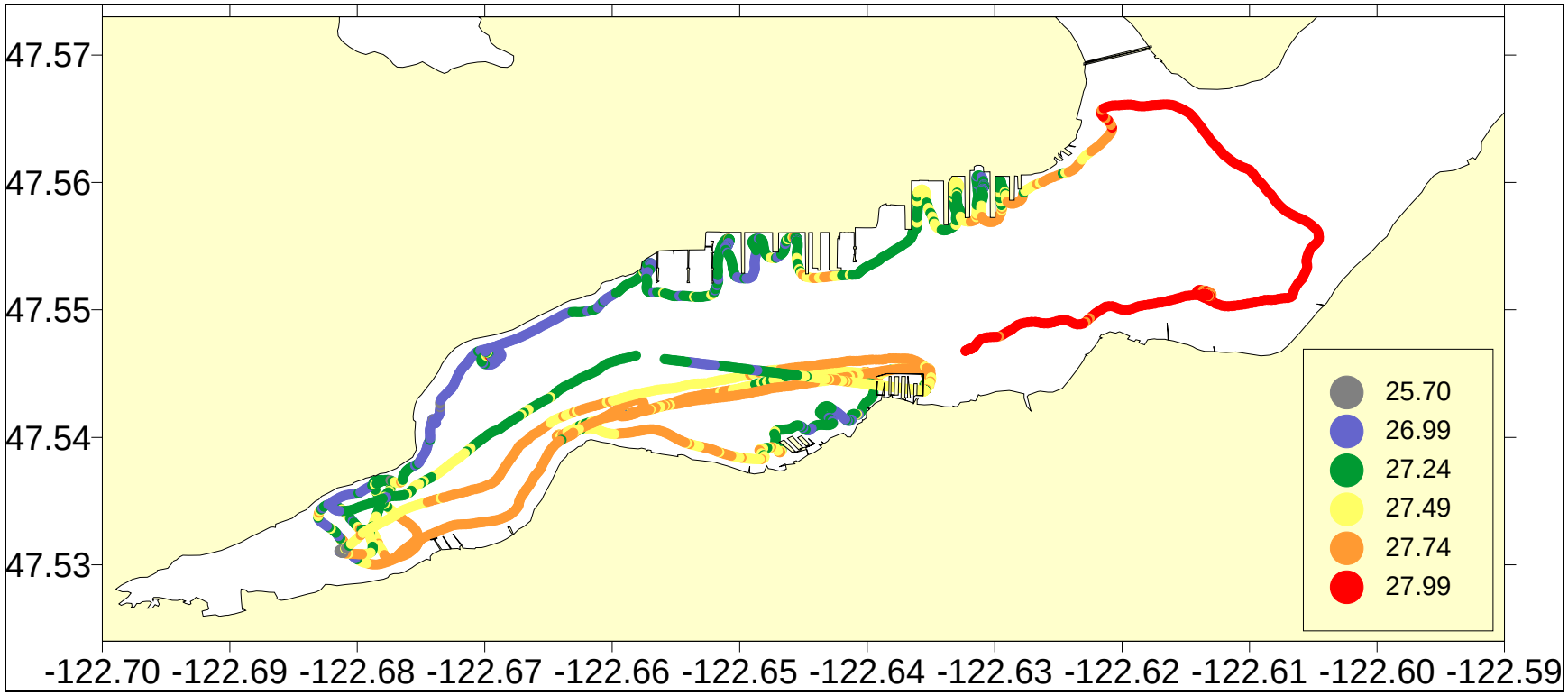
6.4.1 Track Map



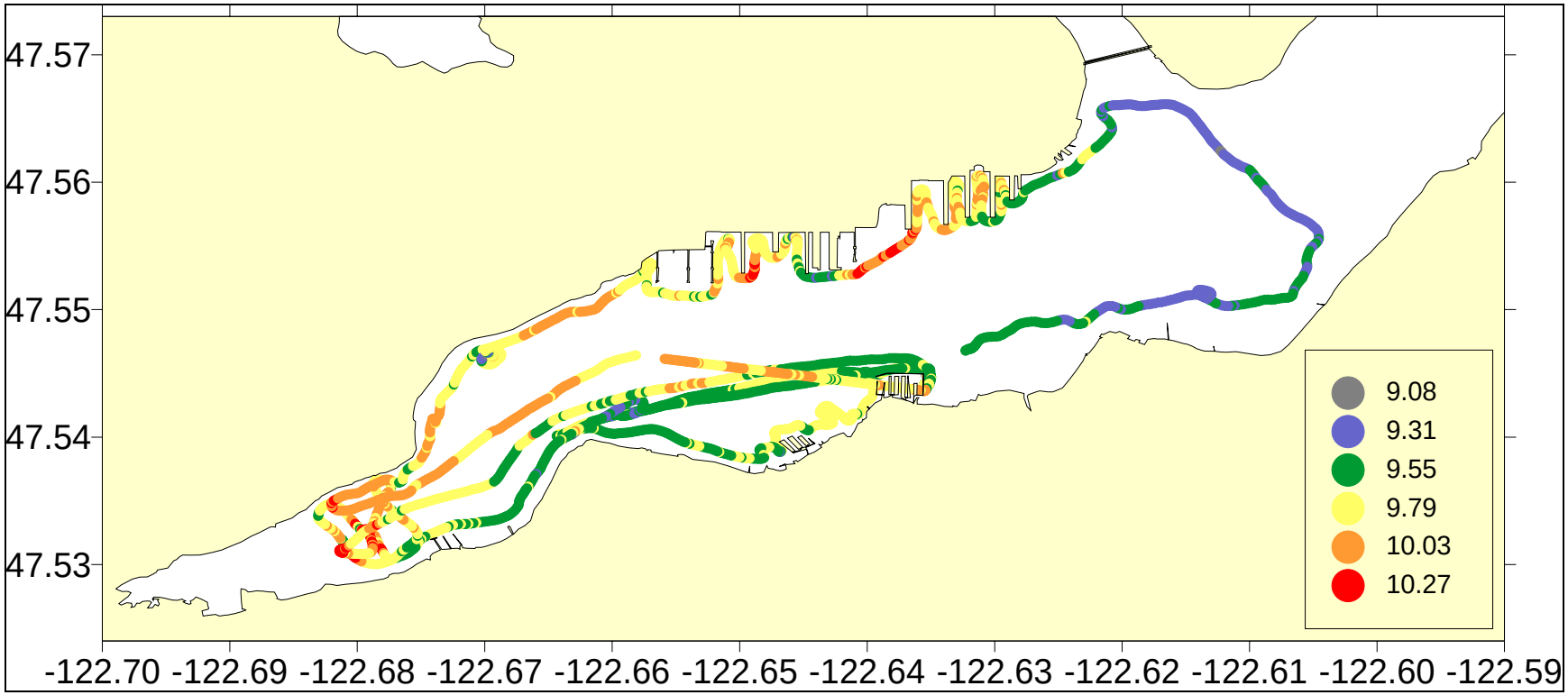
6.4.2 Tide Chart



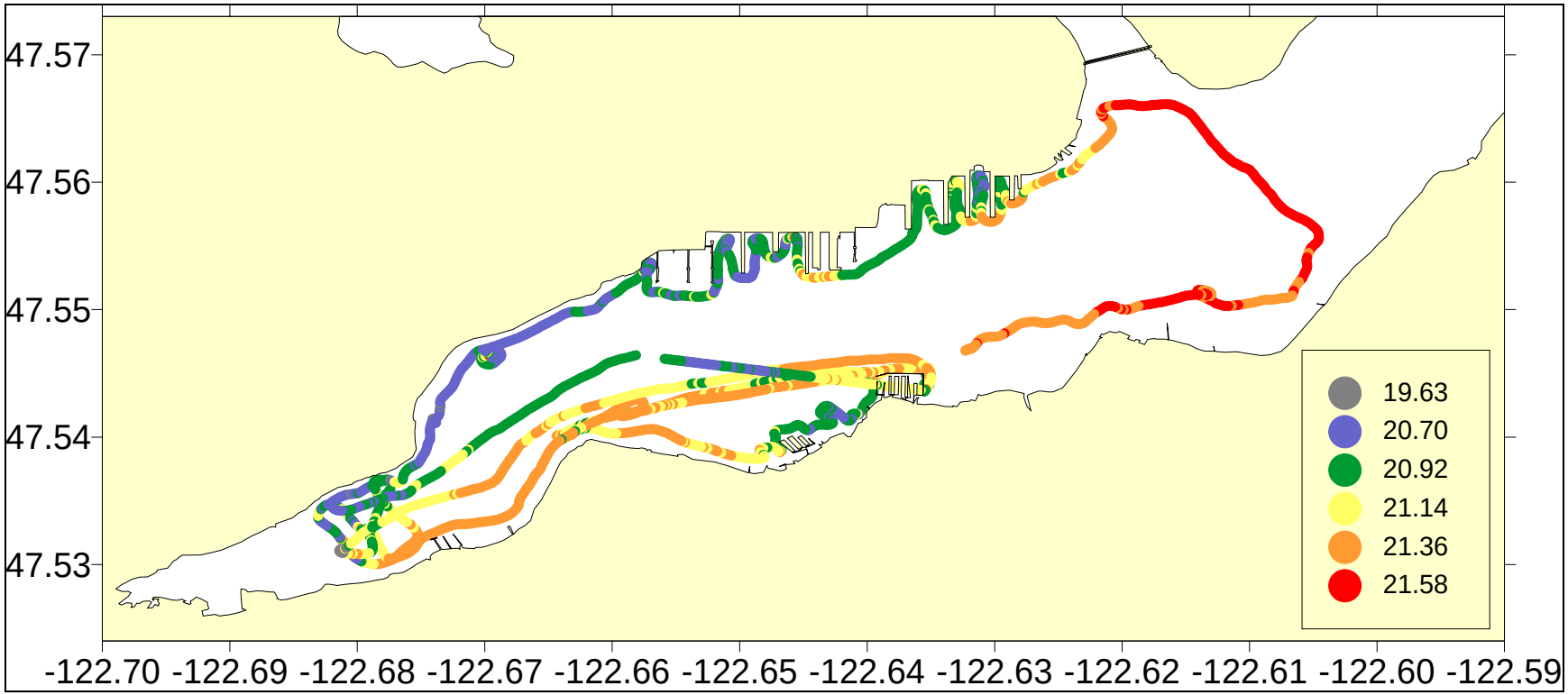
6.4.3 Salinity



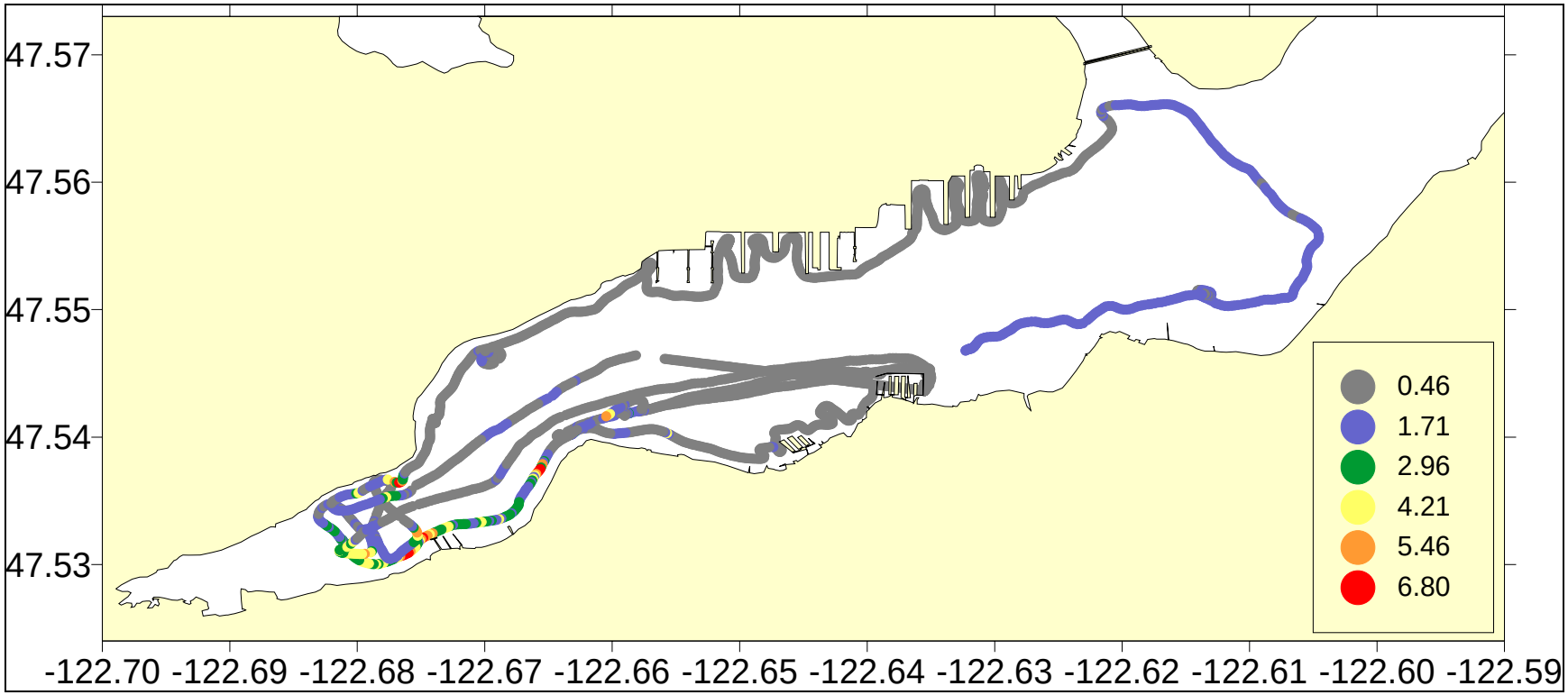
6.4.4 Temperature



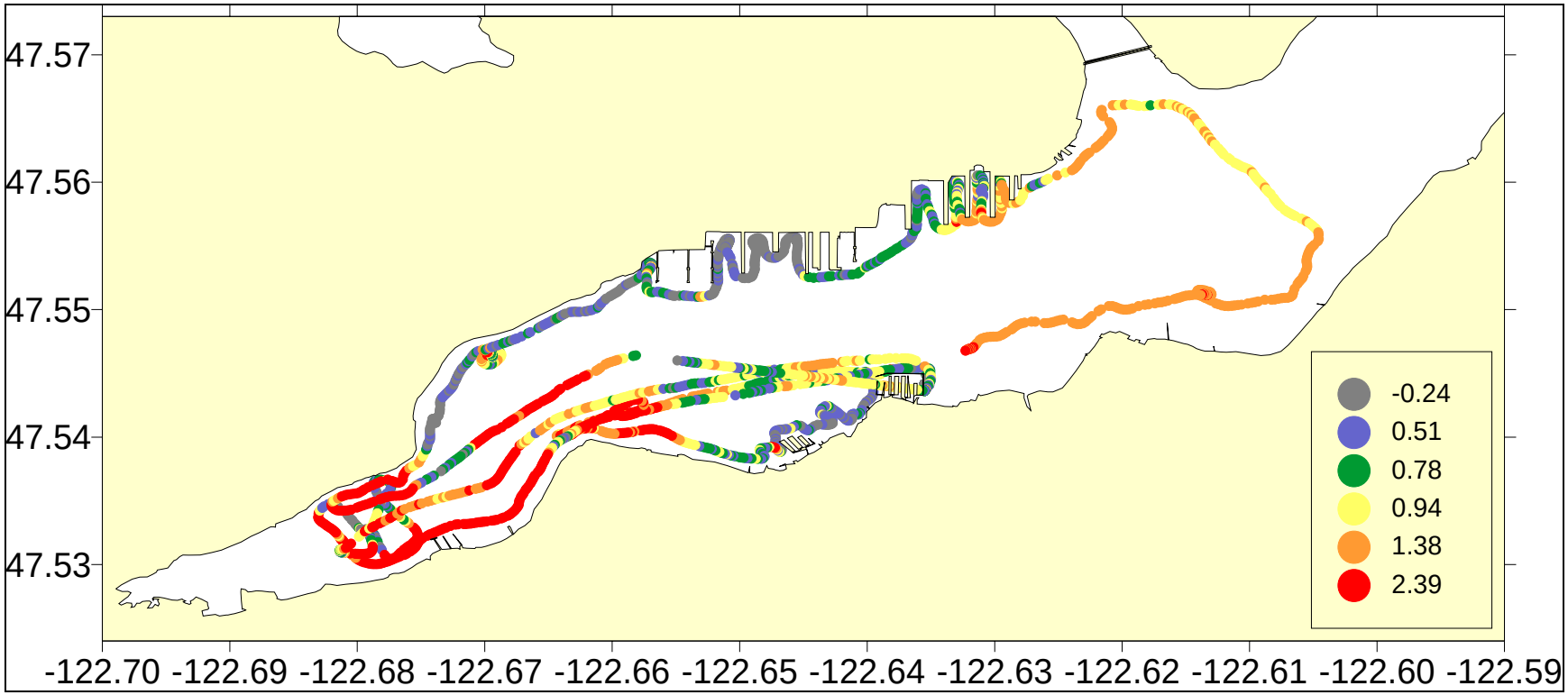
6.4.5 Density


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
19.63
20.70
20.92
21.14
21.36
21.58

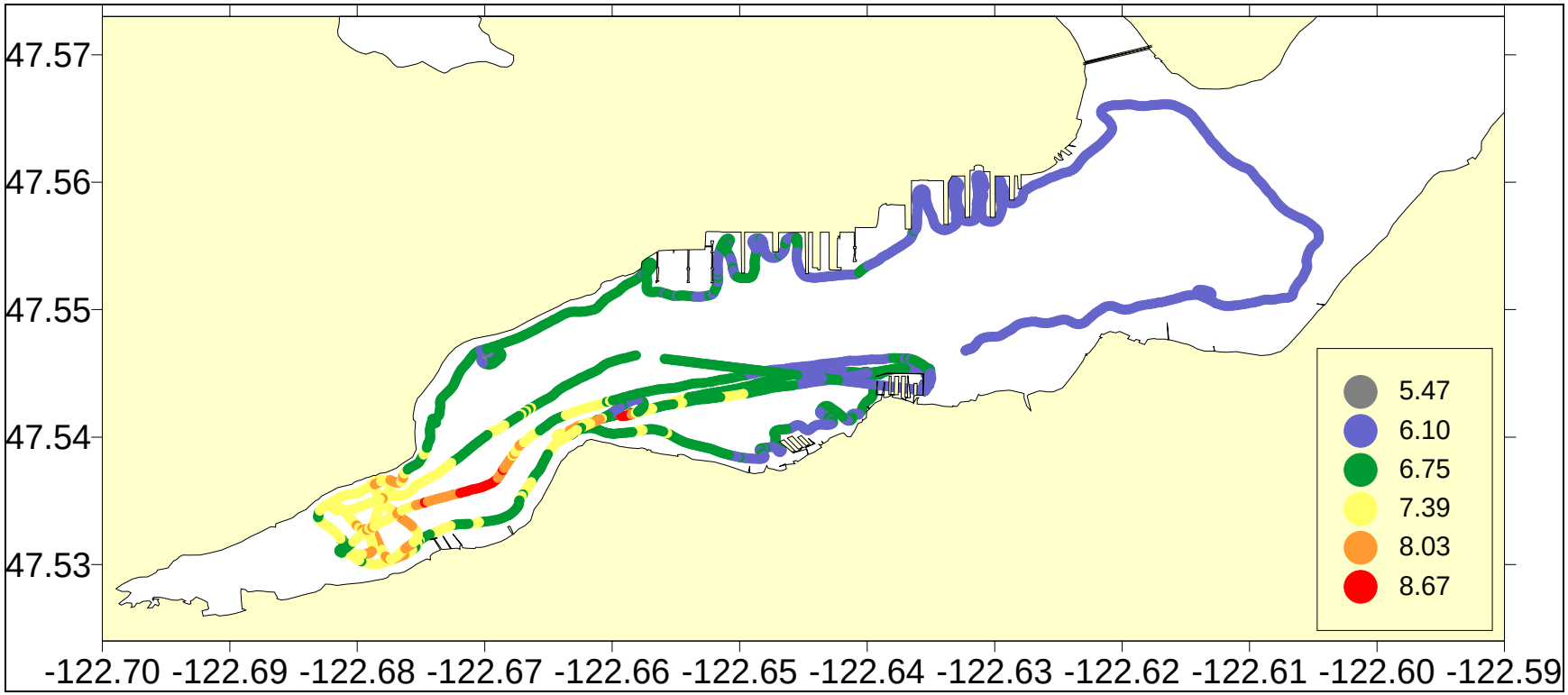
6.4.6 TSS


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
0.46
1.71
2.96
4.21
5.46
6.80

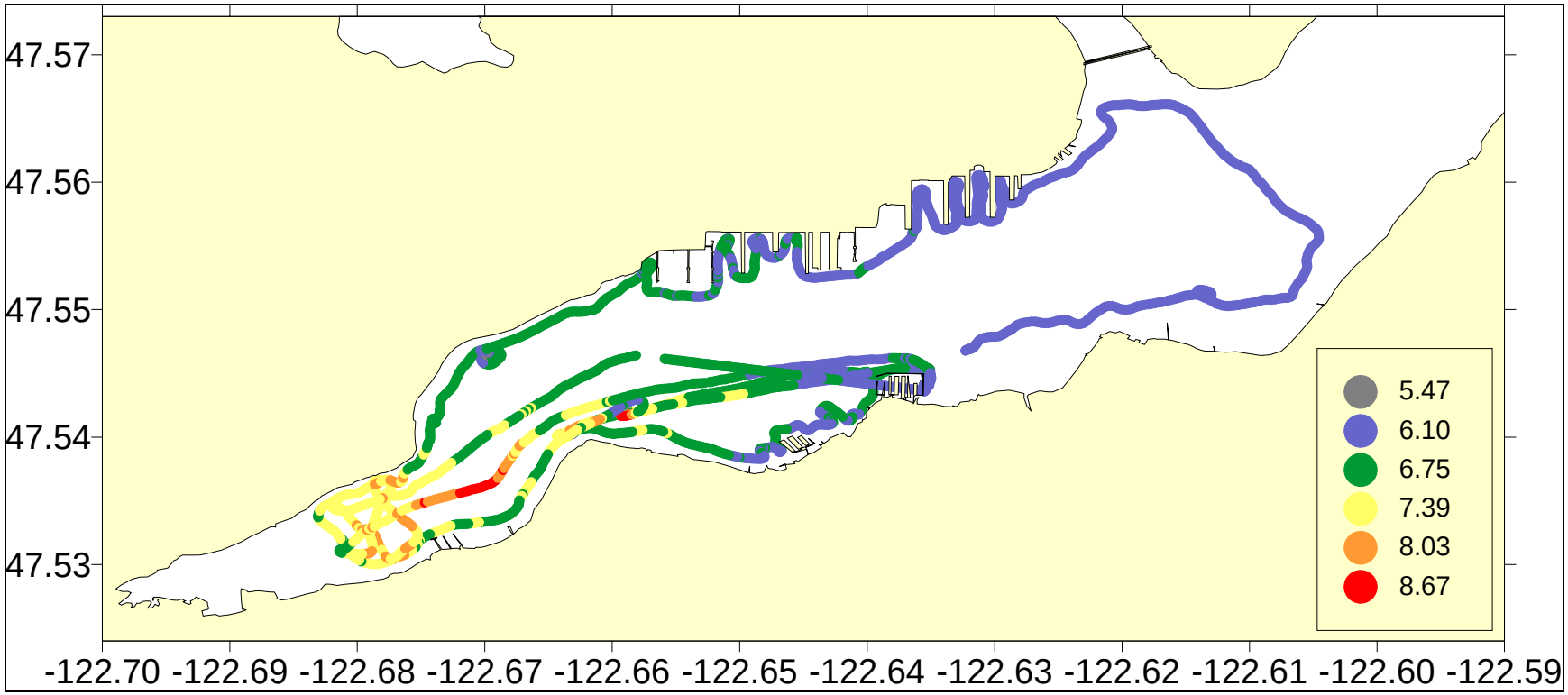
6.4.7 Chlorophyll *a*



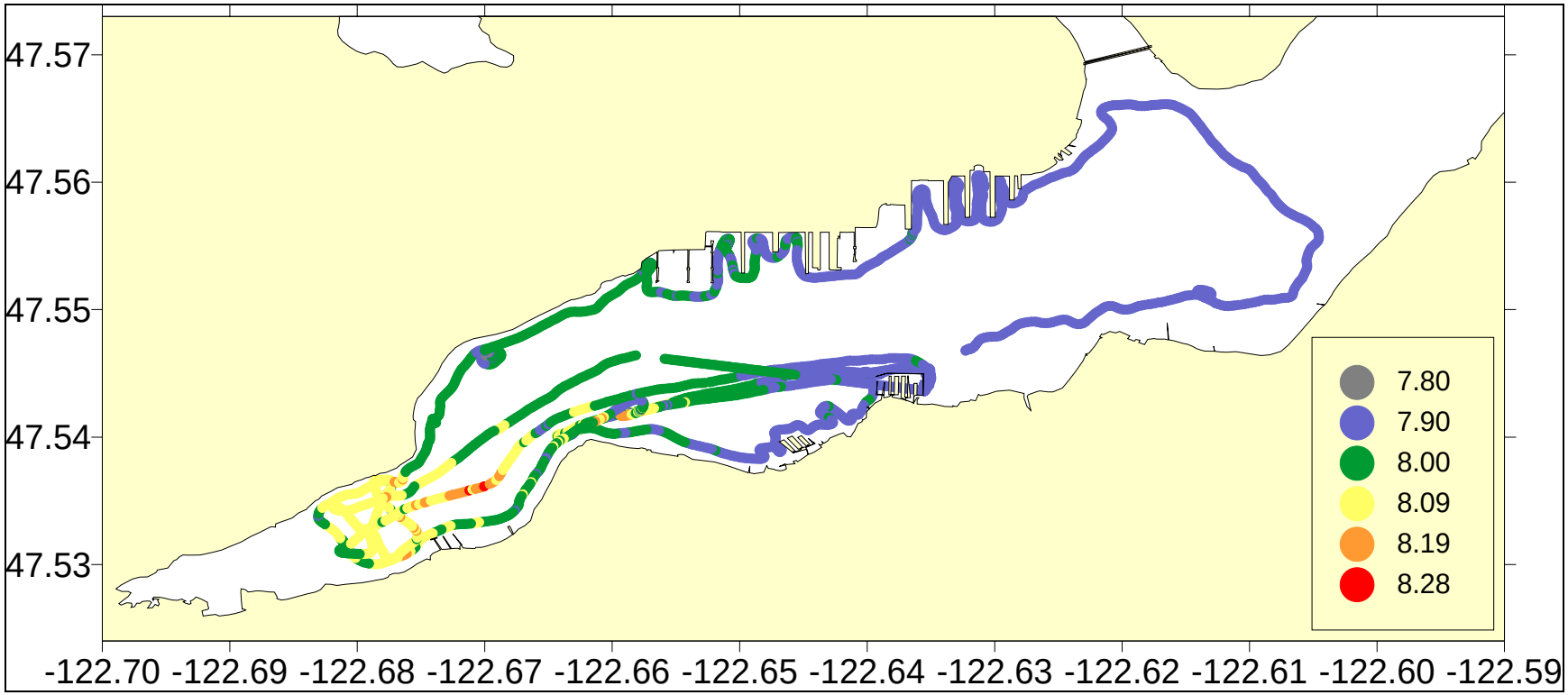
6.4.8 Oxygen


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
5.47
6.10
6.75
7.39
8.03
8.67

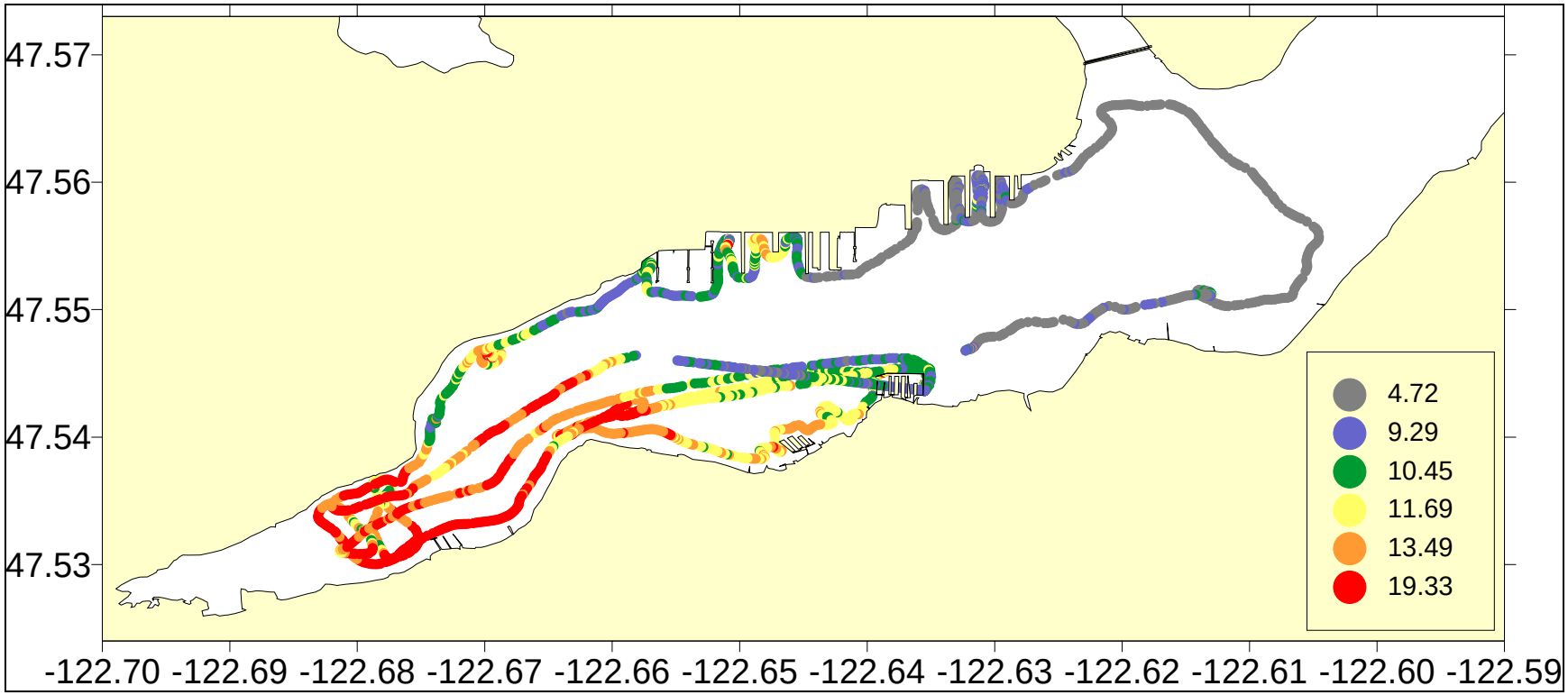
6.4.9 Oxygen Saturation



6.4.10 pH

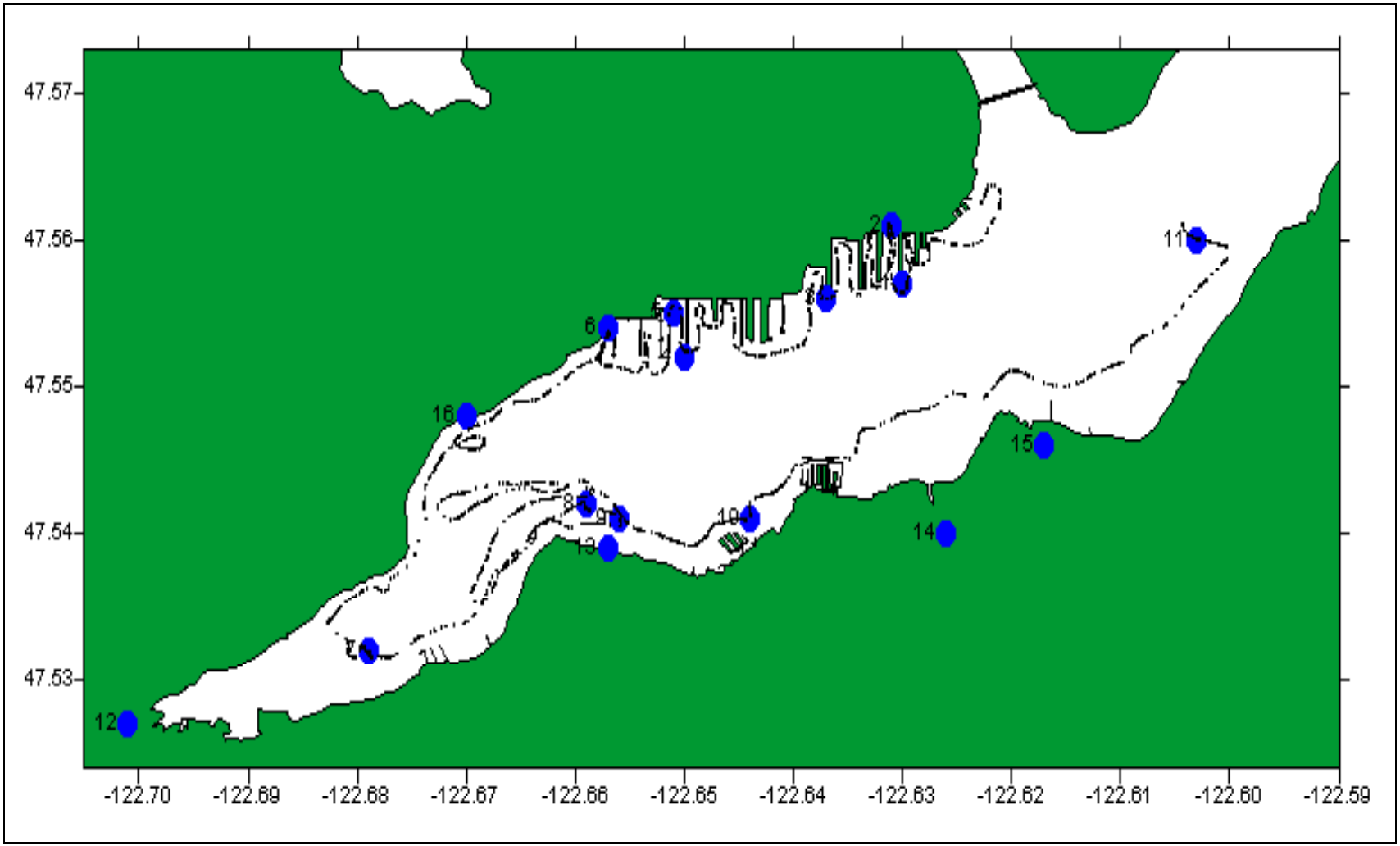

47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
7.80
7.90
8.00
8.09
8.19
8.28

6.4.11 Oil Fluorescence

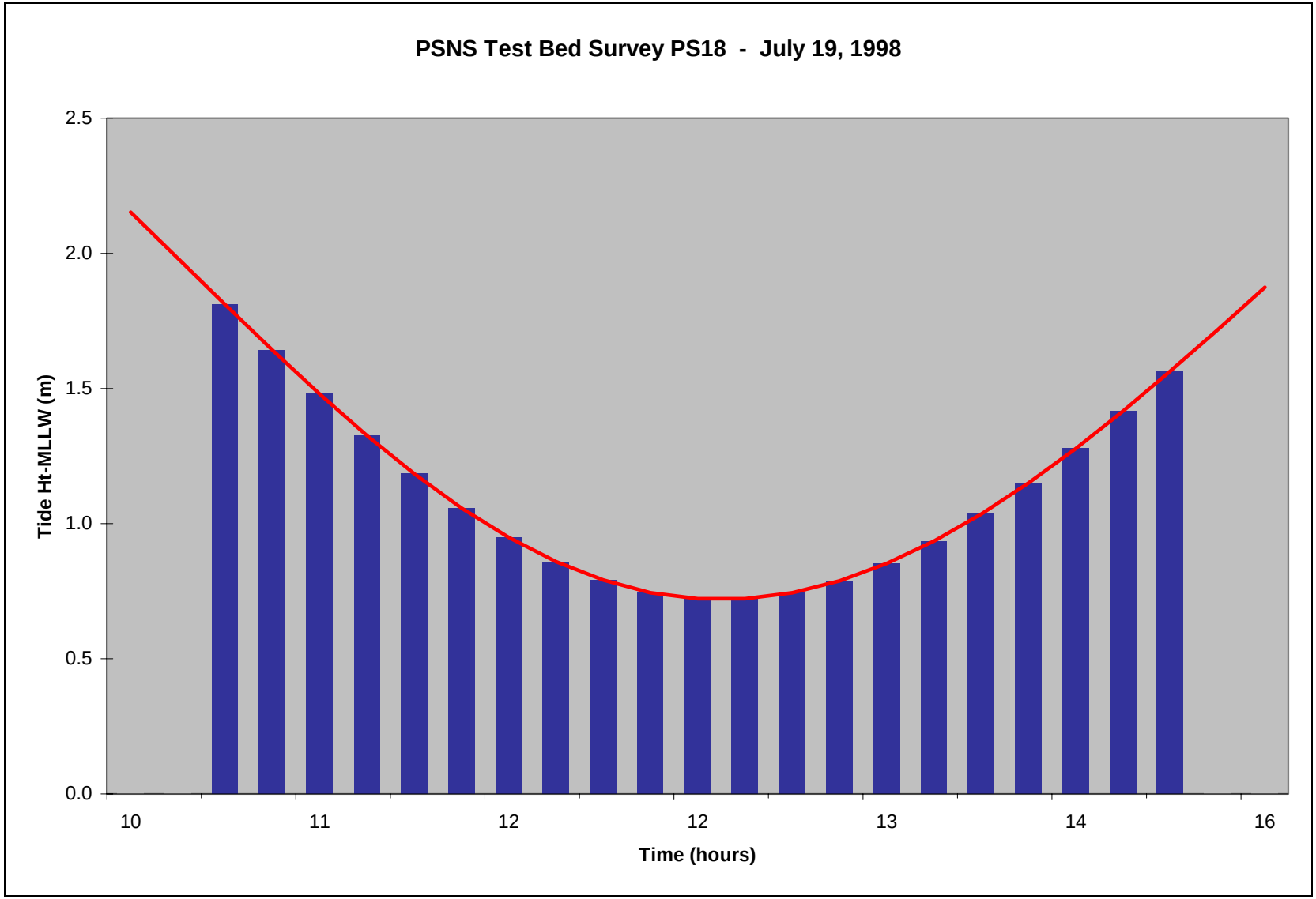


6.5 July 19, 1998 – PS18

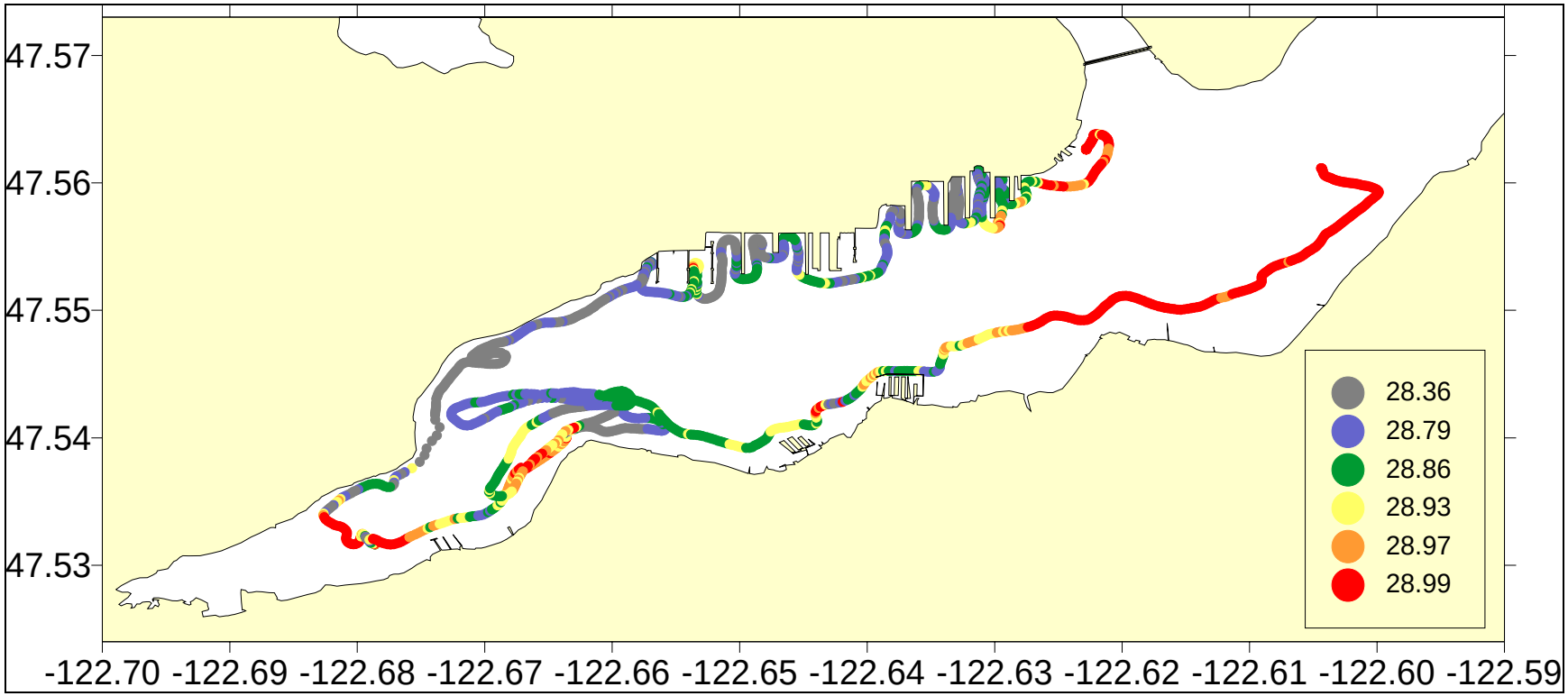
6.5.1 Track Map



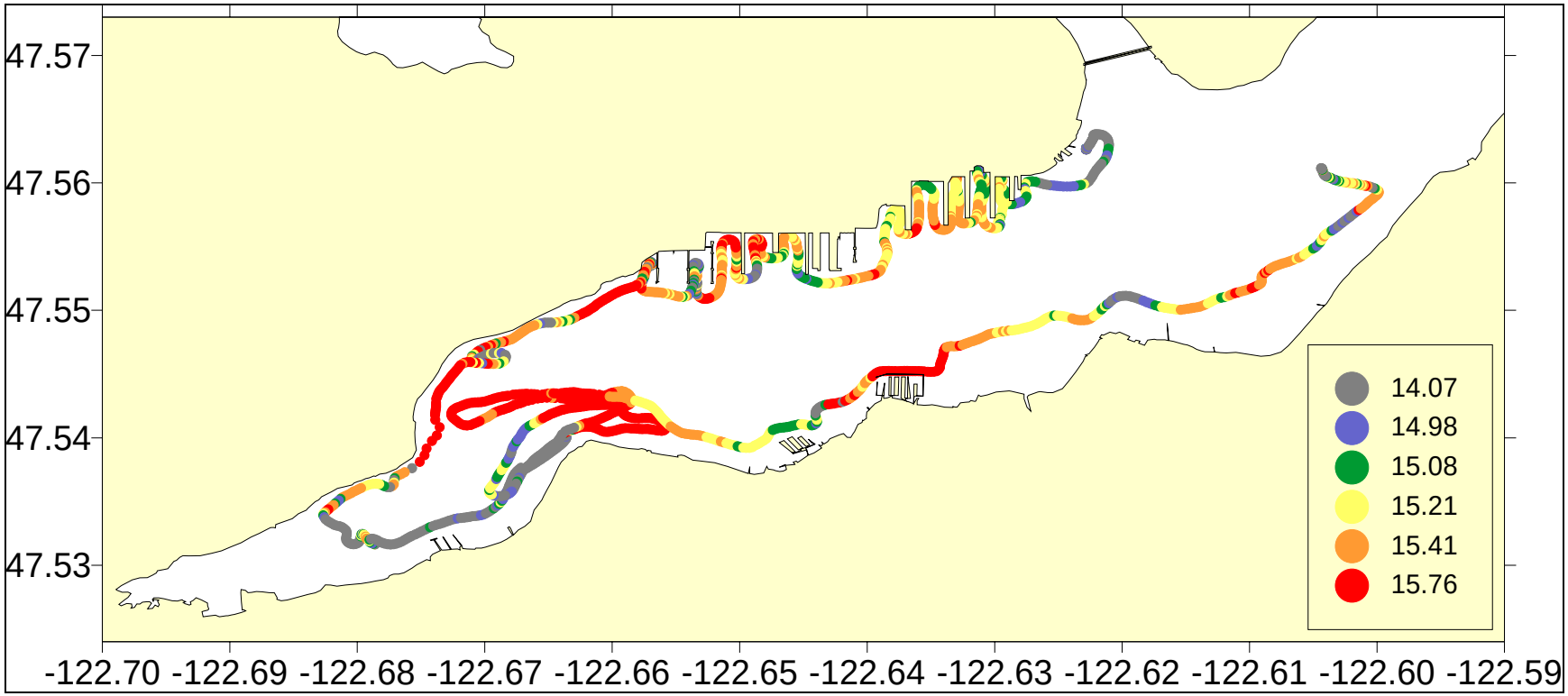
6.5.2 Tide Chart



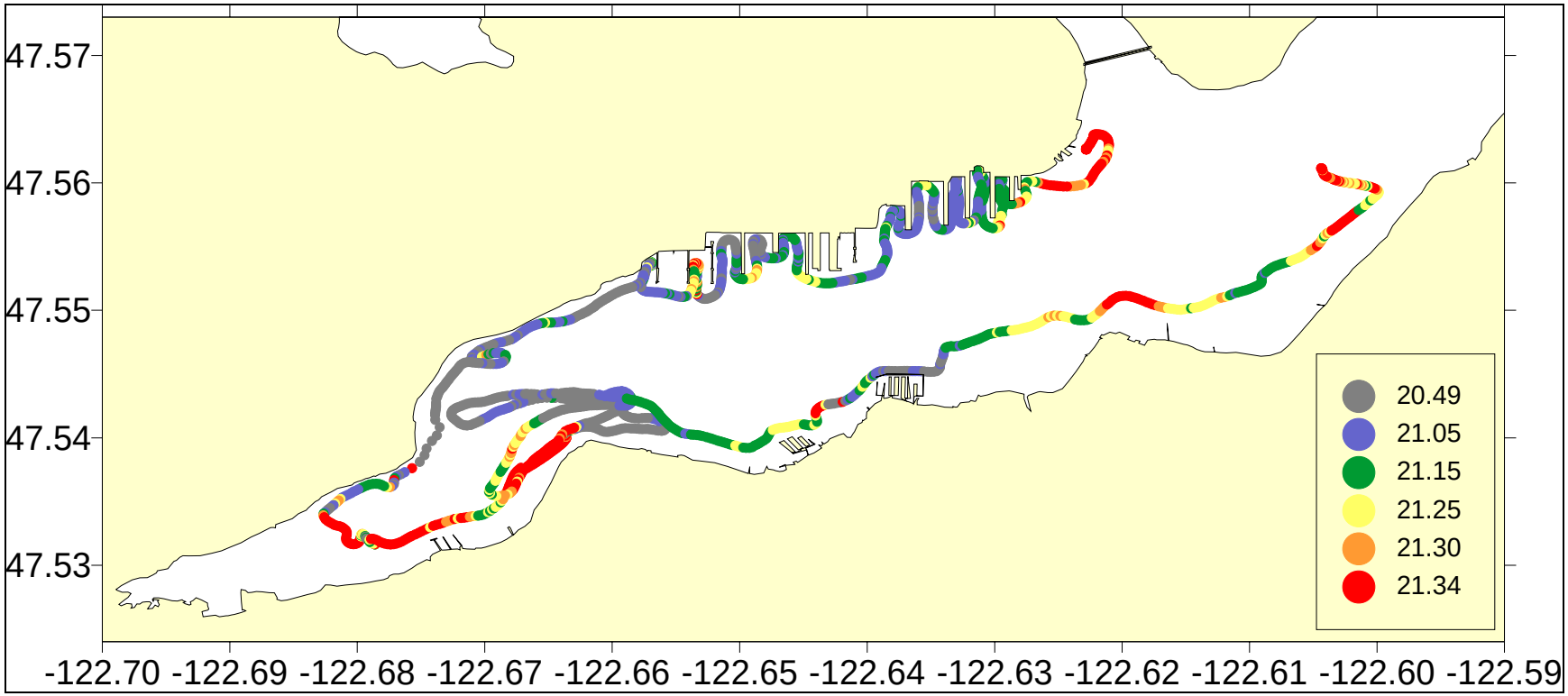
6.5.3 Salinity



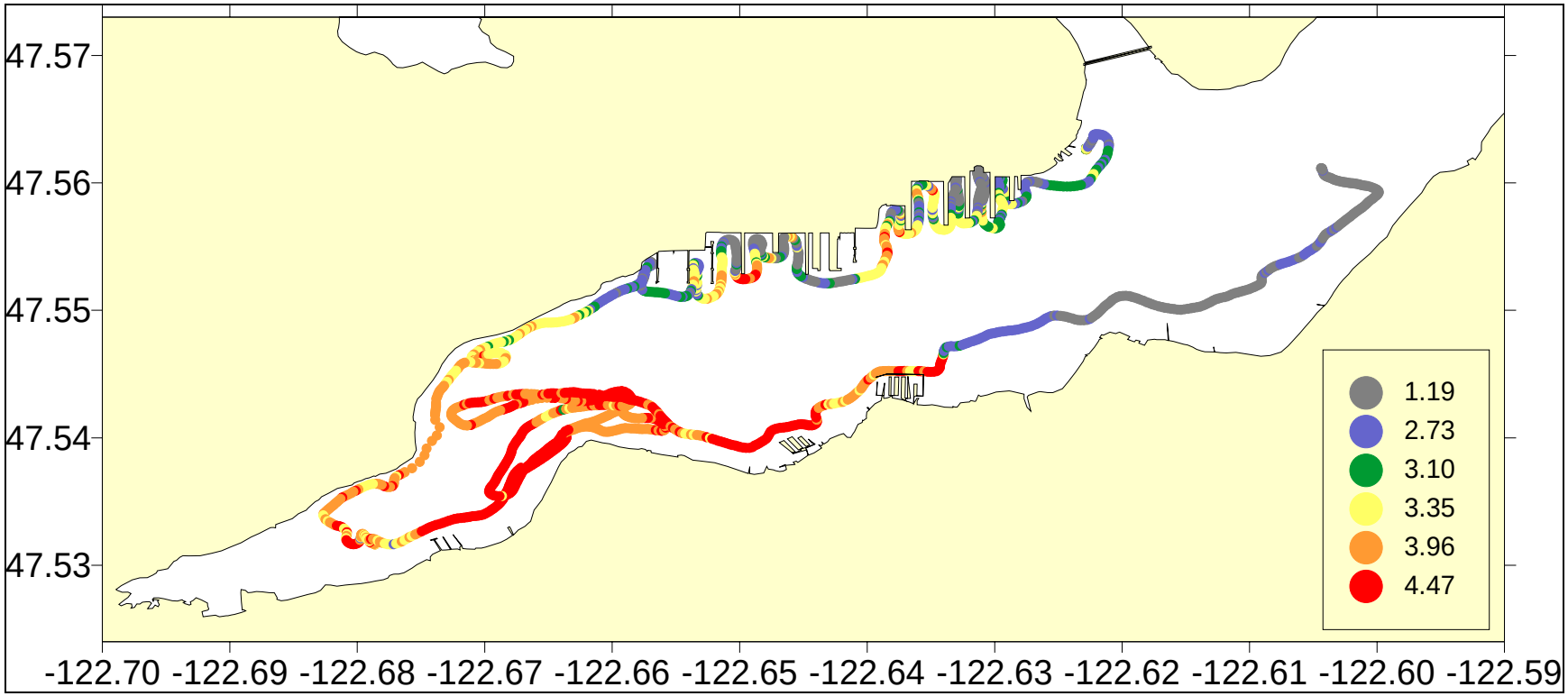
6.5.4 Temperature



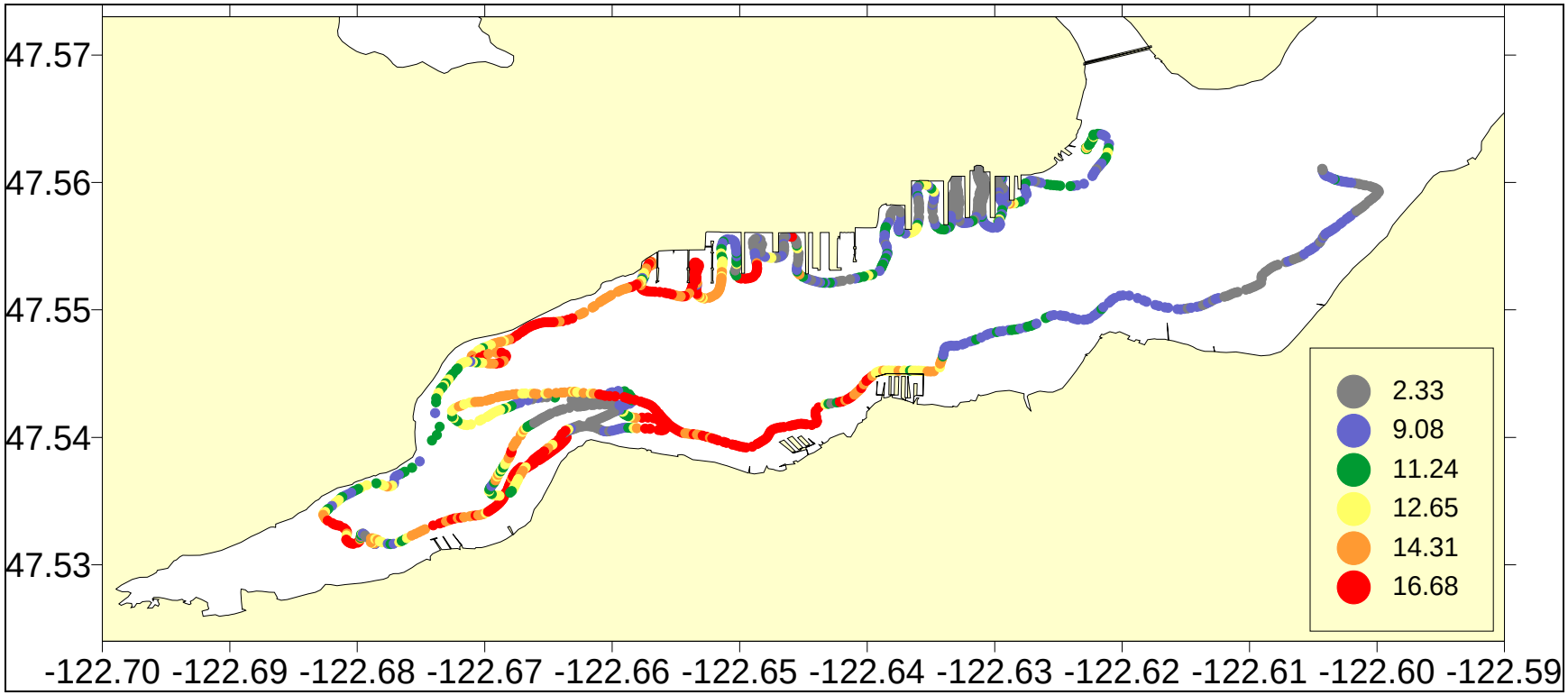
6.5.5 Density


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
20.49
21.05
21.15
21.25
21.30
21.34

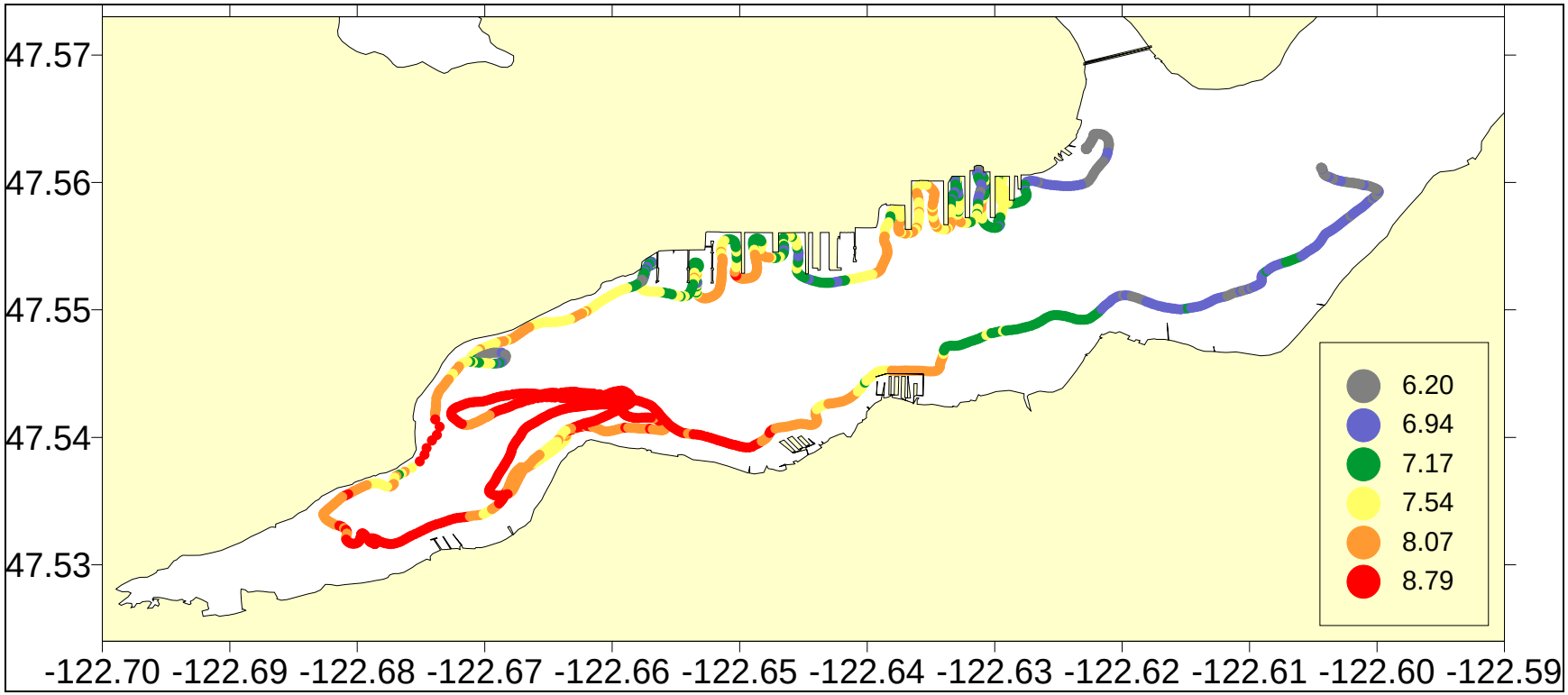
6.5.6 TSS


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
1.19
2.73
3.10
3.35
3.96
4.47

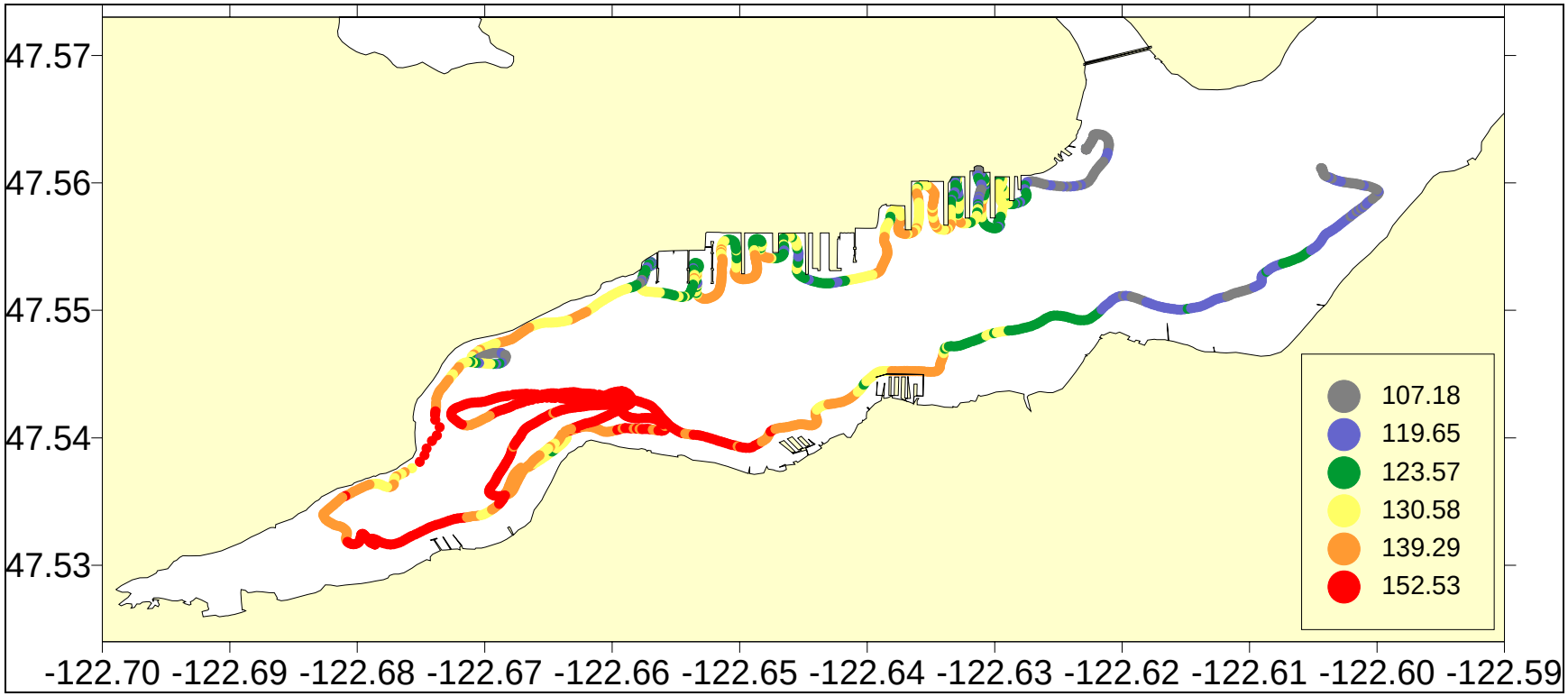
6.5.7 Chlorophyll *a*



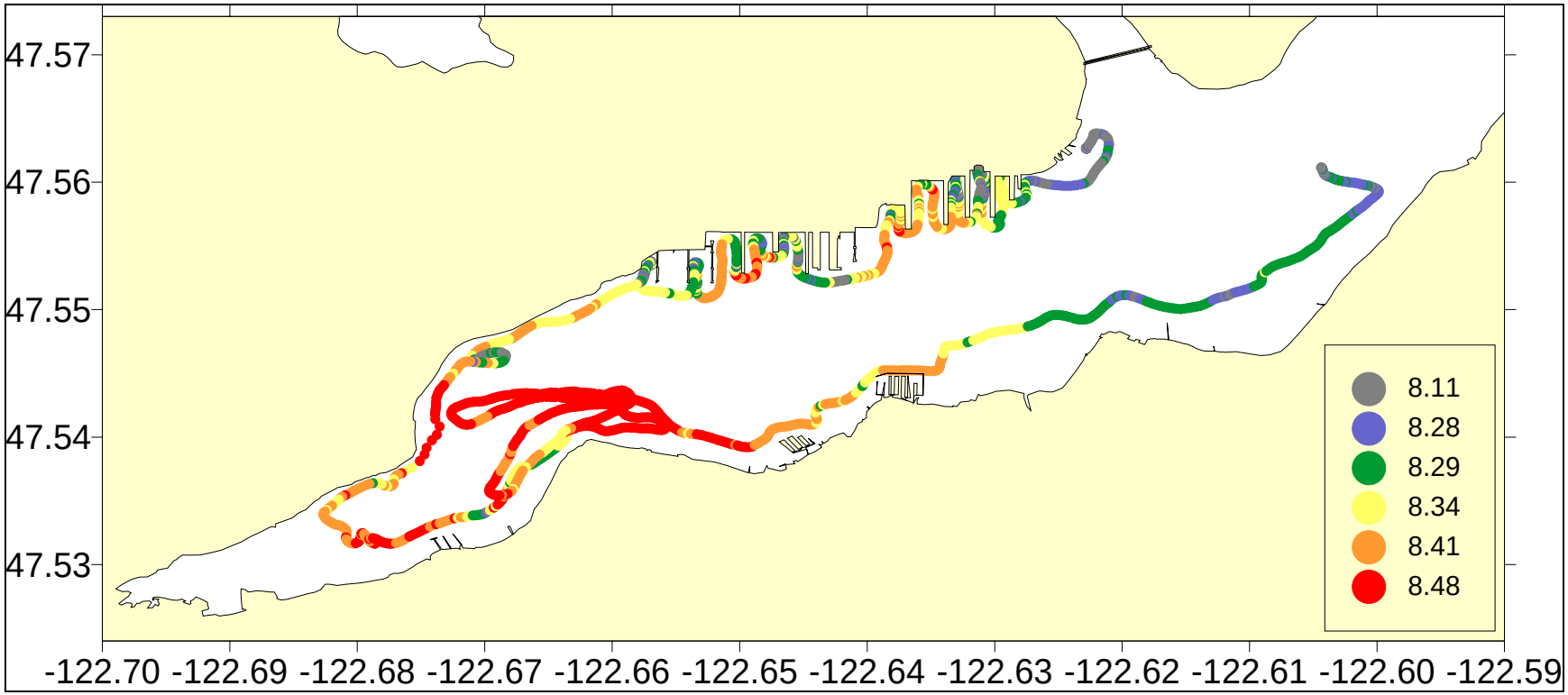
6.5.8 Oxygen


47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
6.20
6.94
7.17
7.54
8.07
8.79

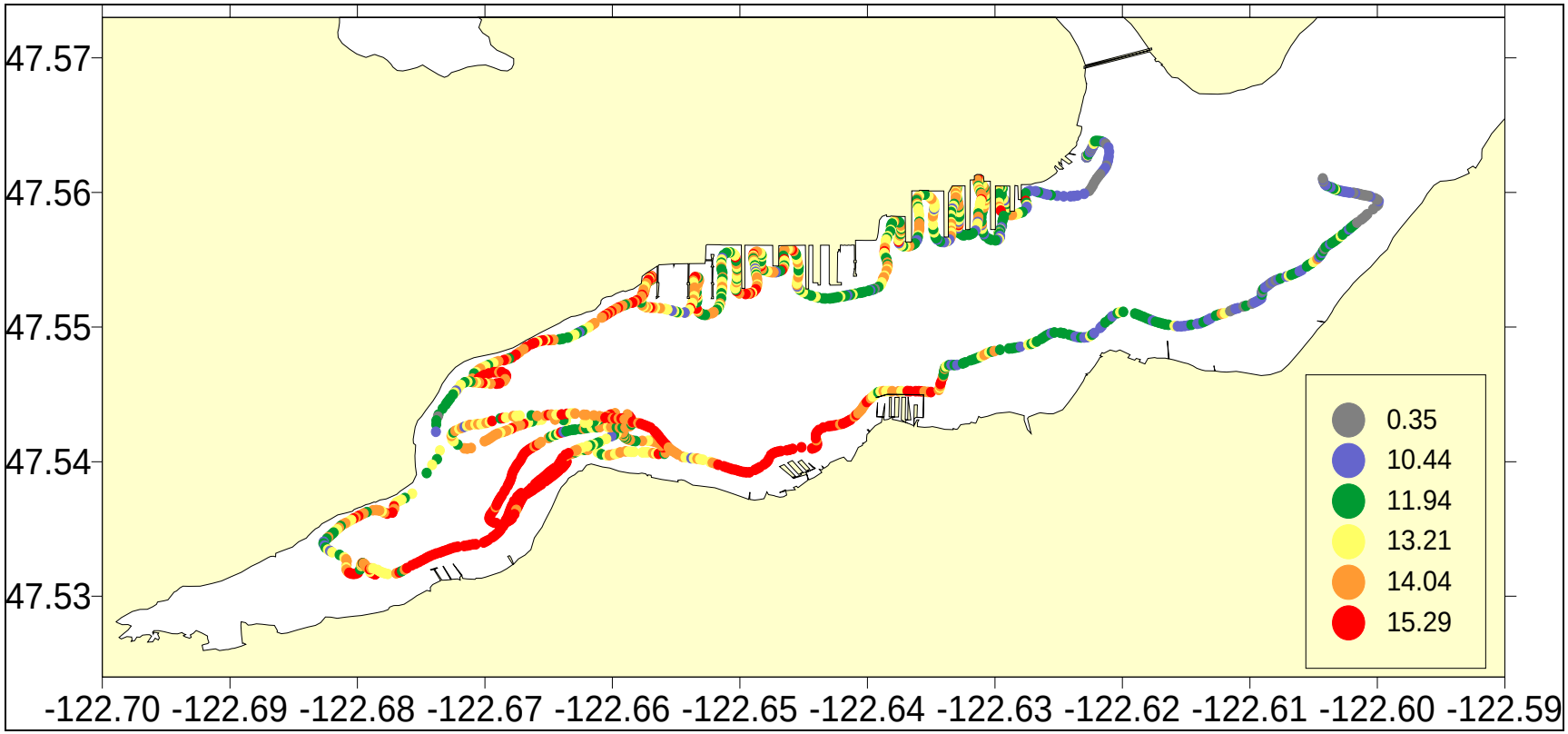
6.5.9 Oxygen Saturation



6.5.10 pH

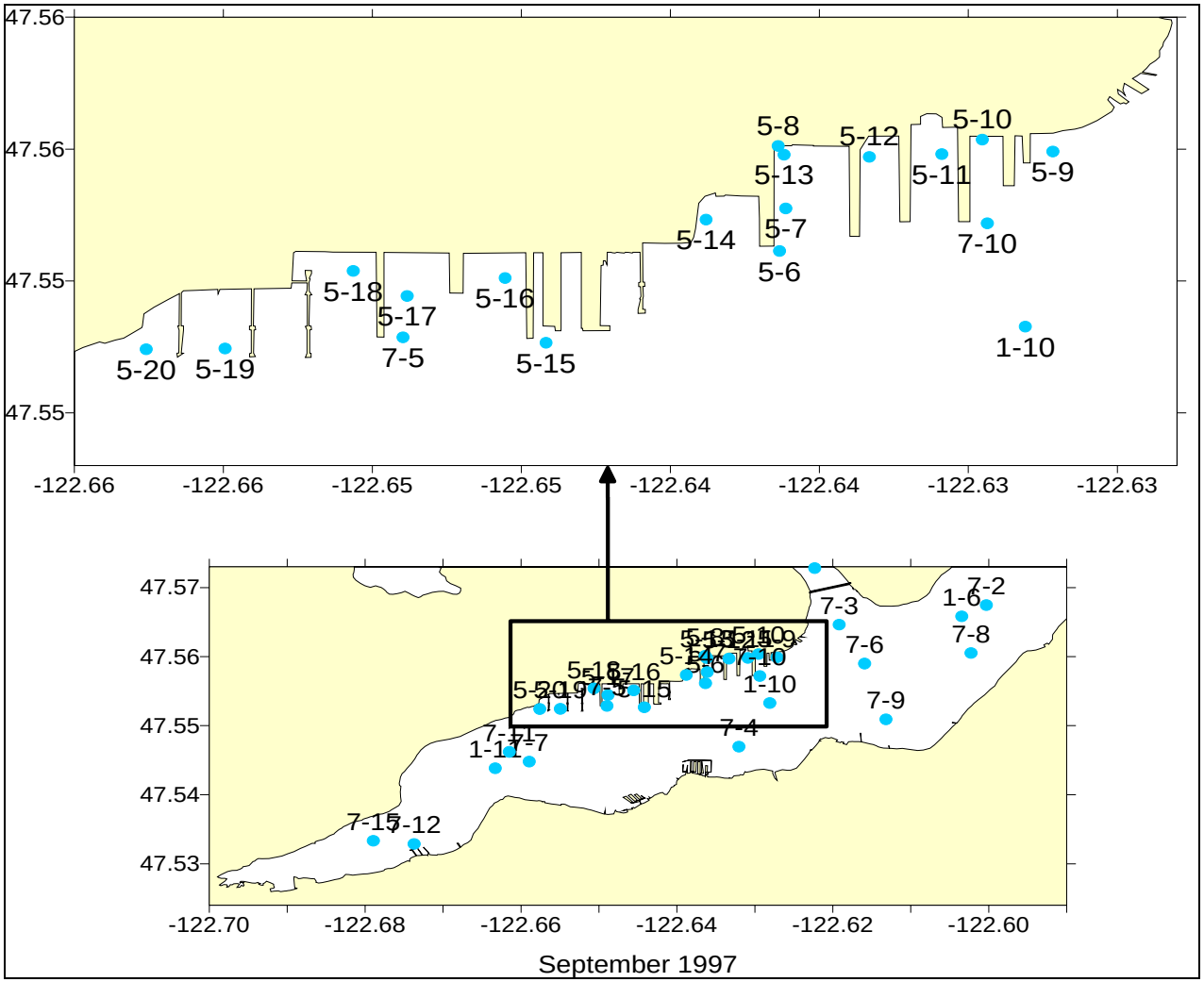

47.57
47.56
47.55
47.54
47.53
-122.70 -122.69 -122.68 -122.67 -122.66 -122.65 -122.64 -122.63 -122.62 -122.61 -122.60 -122.59
8.11
8.28
8.29
8.34
8.41
8.48

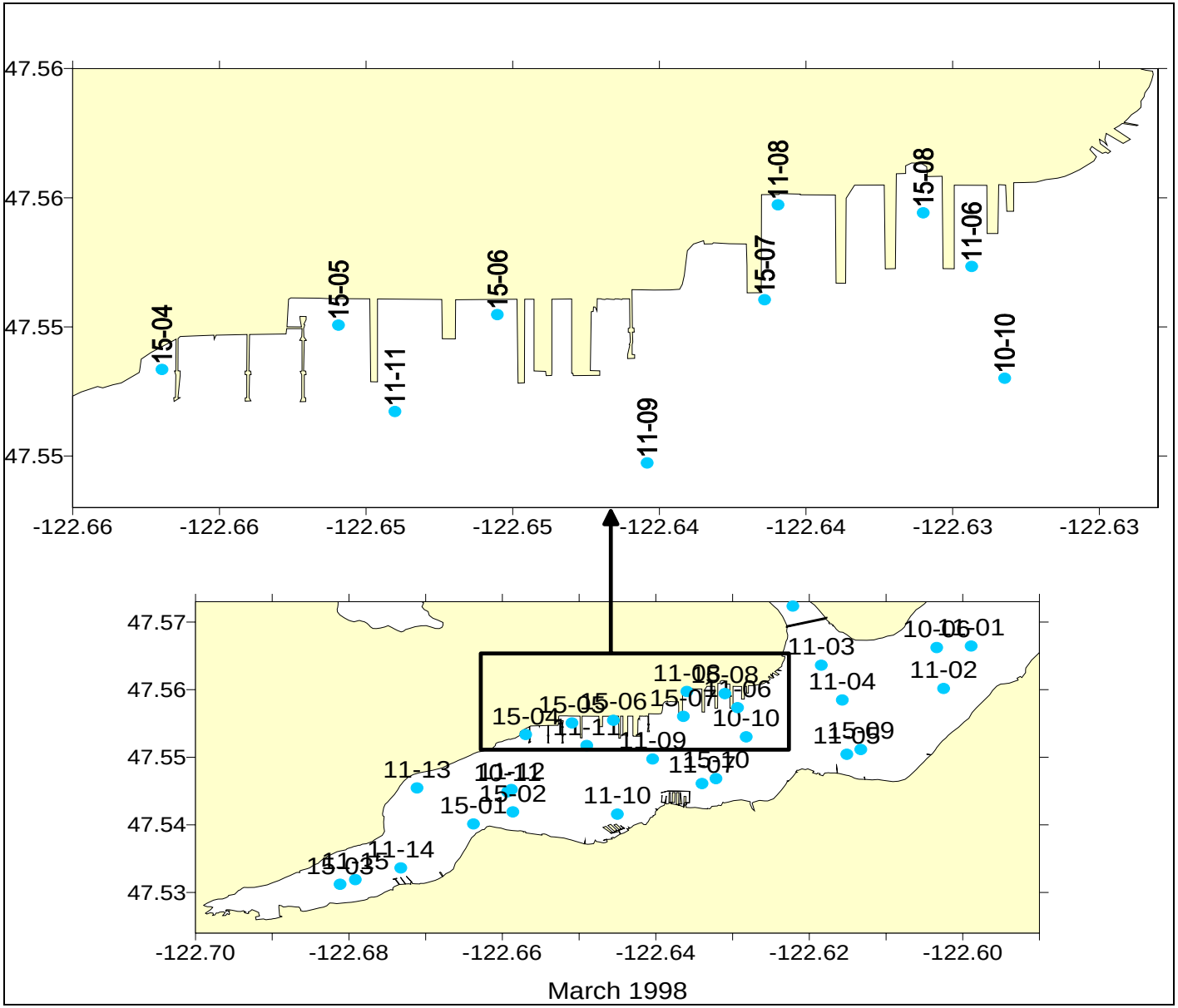
6.5.11 Oil Fluorescence

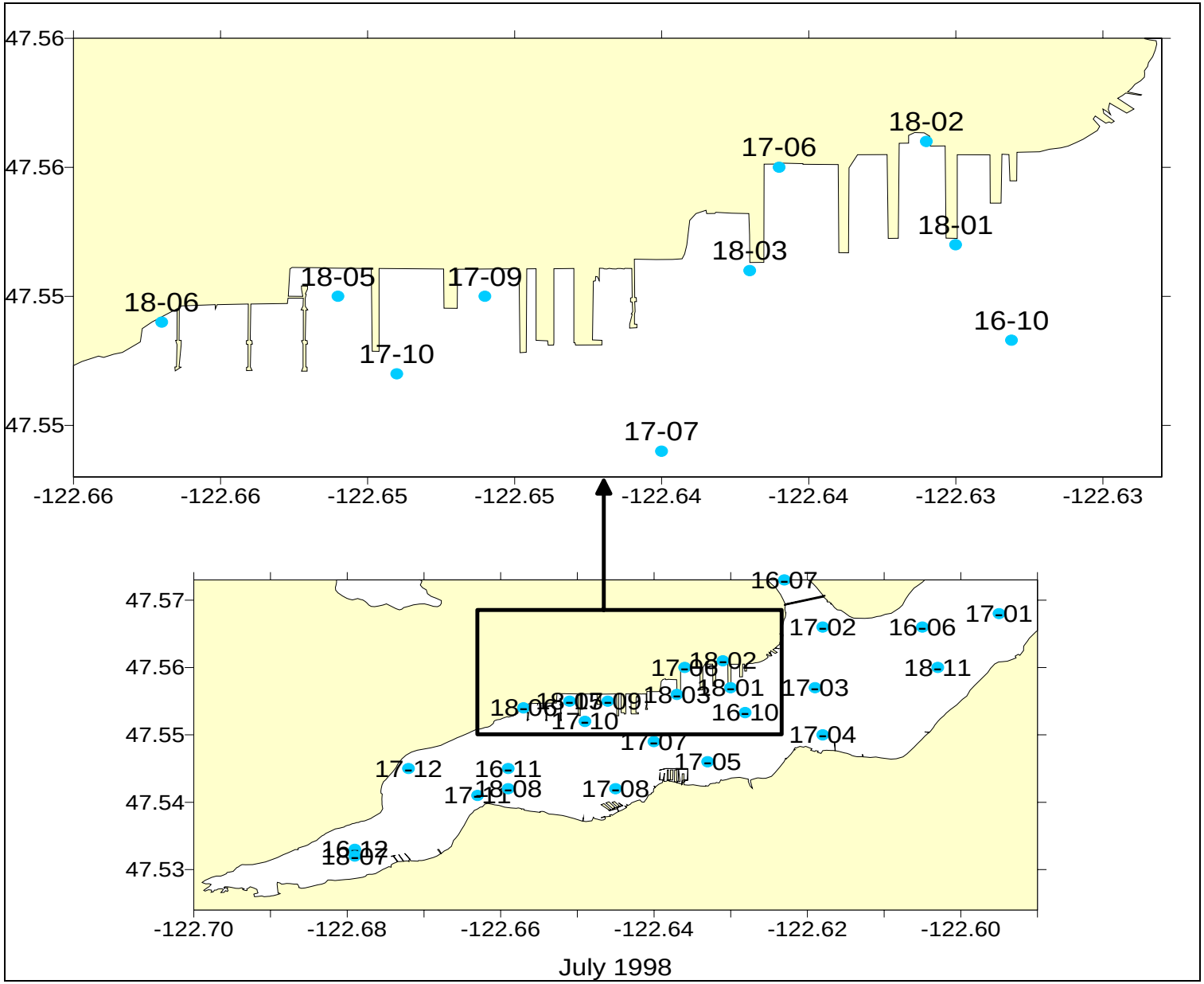


7.1 Receiving

7.1.1 Discrete Sample Sites




47.56
47.56
47.55
47.55
-122.66
-122.66
-122.65
-122.65
-122.64
-122.64
-122.63
-122.63
15-04
15-05
11-11
15-06
11-09
15-07
11-08
15-08
11-06
10-10
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
11-03
11-04
11-02
11-13
11-14
15-01
15-02
11-10
11-09
10-10
15-04
15-06
15-07
15-08
11-06
11-07
15-09
11-09
March 1998


47.56
47.56
47.55
47.55
-122.66
-122.66
-122.65
-122.65
-122.64
-122.64
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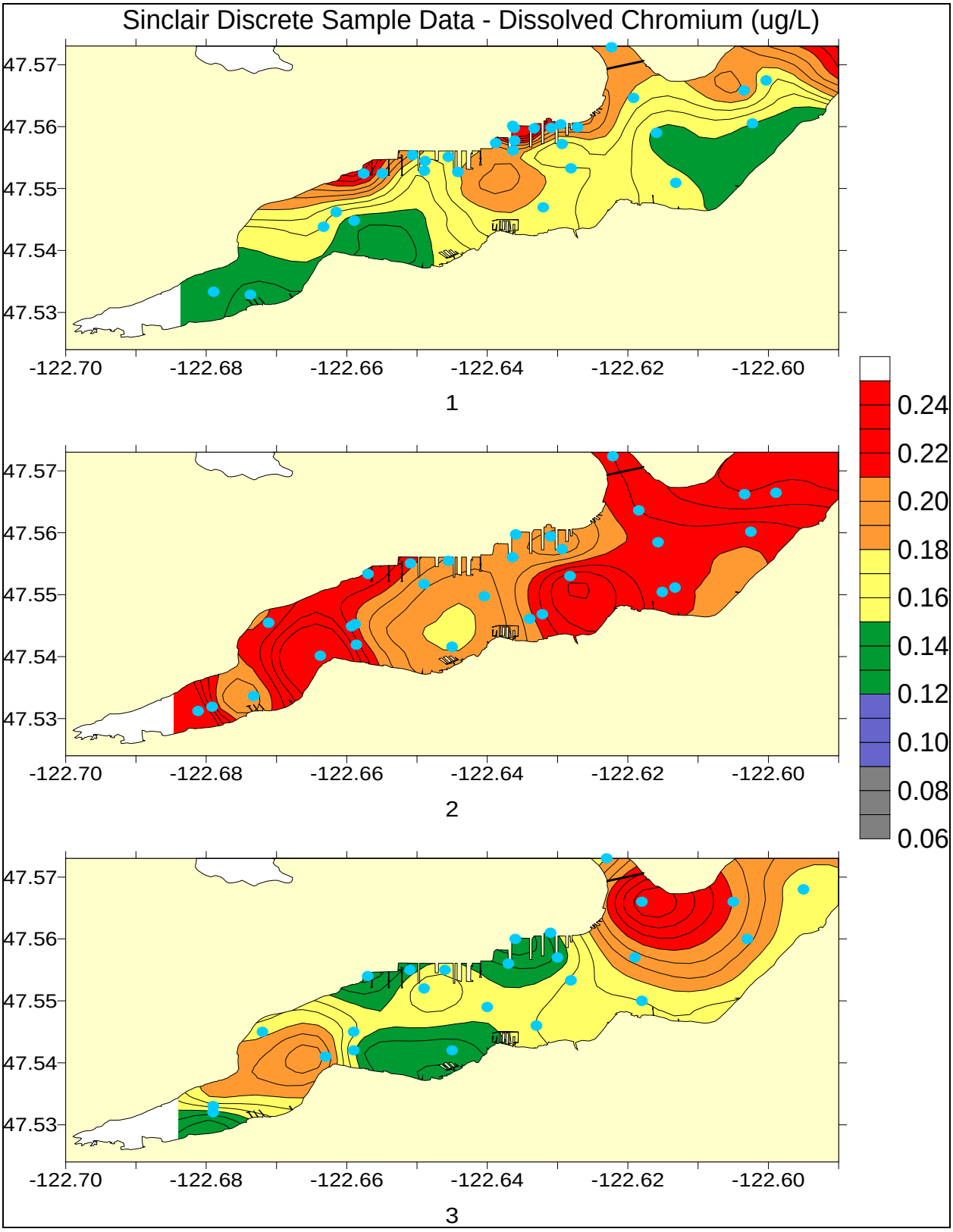
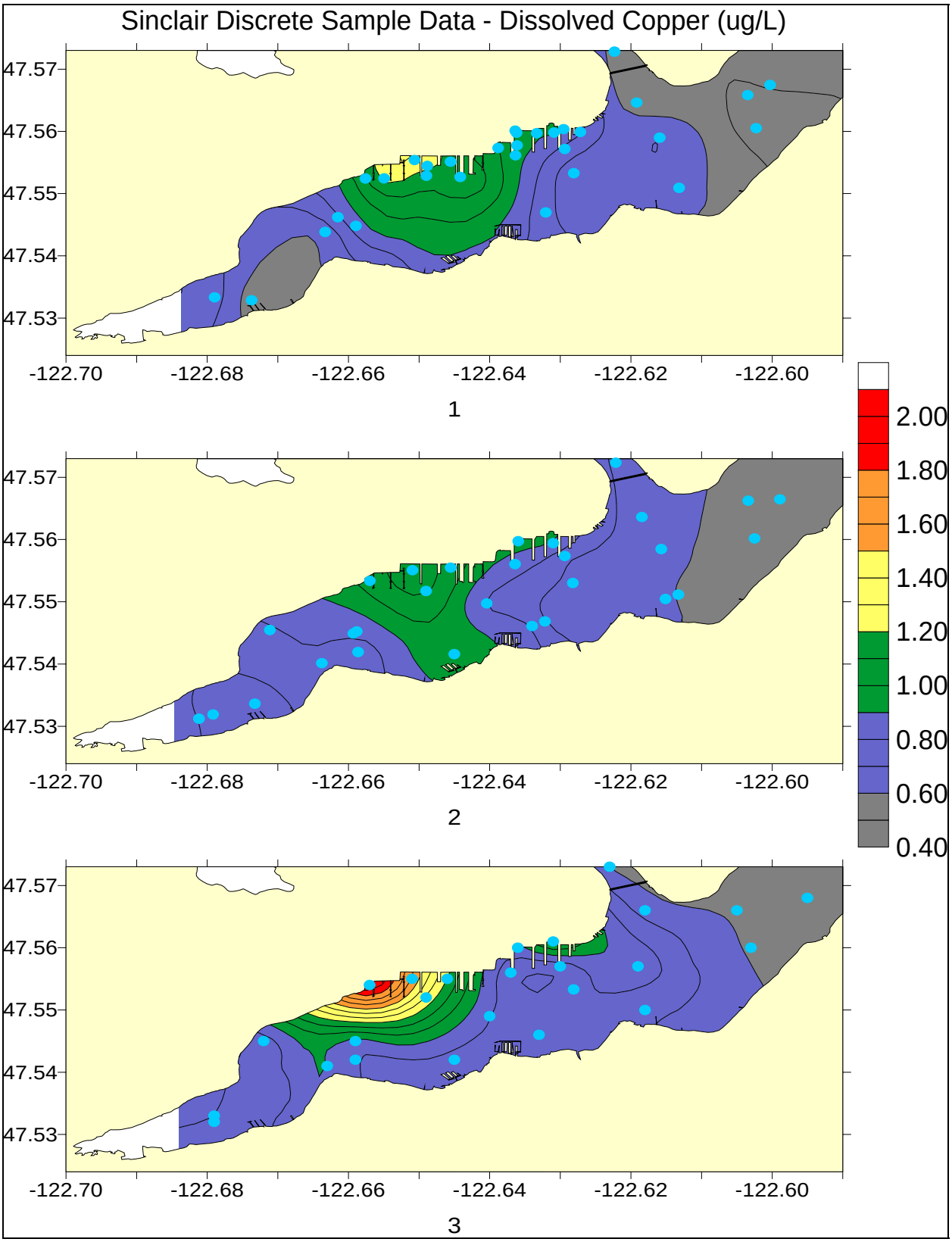
-122.63
18-02
17-06
18-01
18-03
18-05
17-09
18-06
16-10
17-10
17-07
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
16-07
17-01
17-02
16-06
18-11
17-03
17-04
17-05
17-12
16-11
17-08
16-12
July 1998

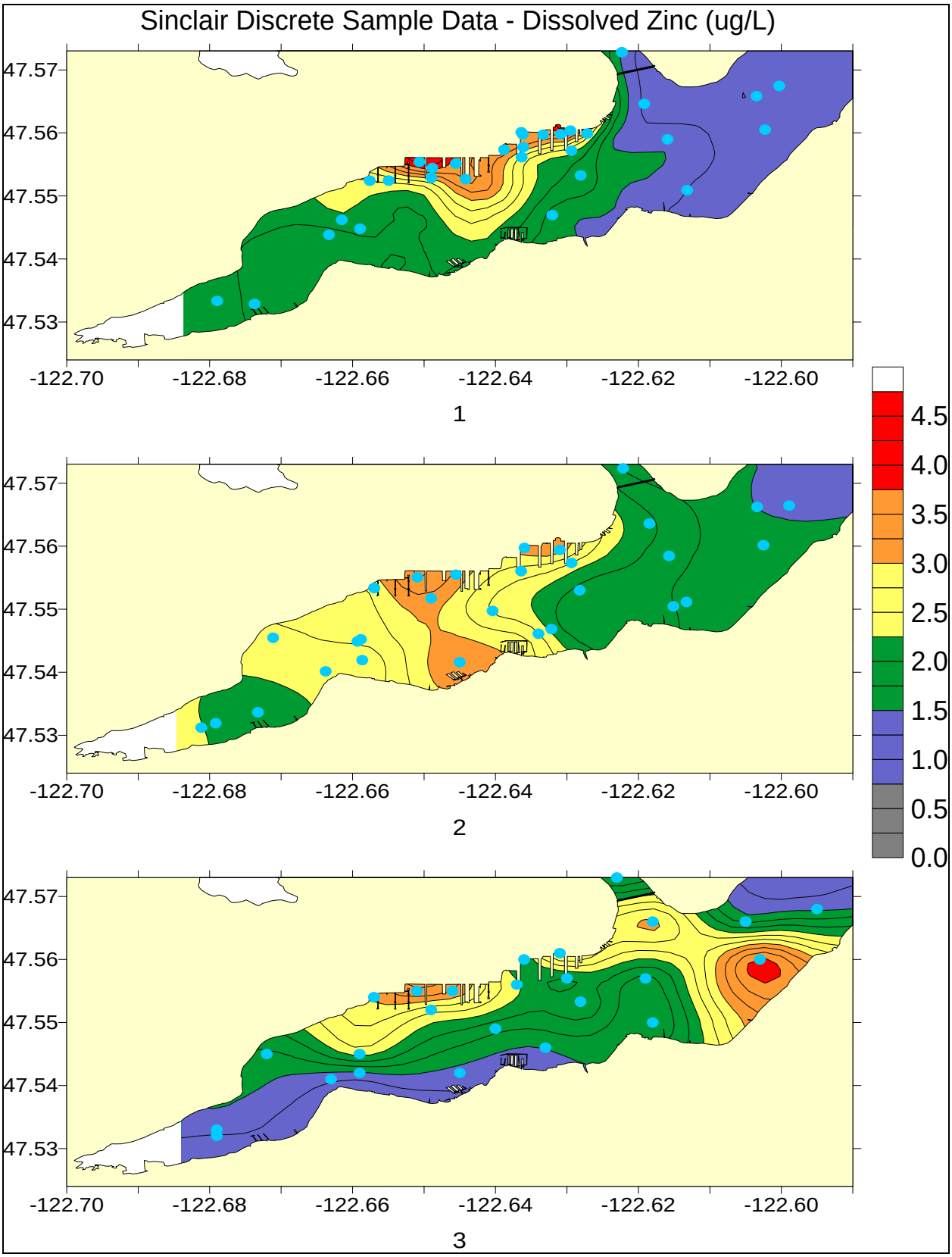
7.1.2 Chromium



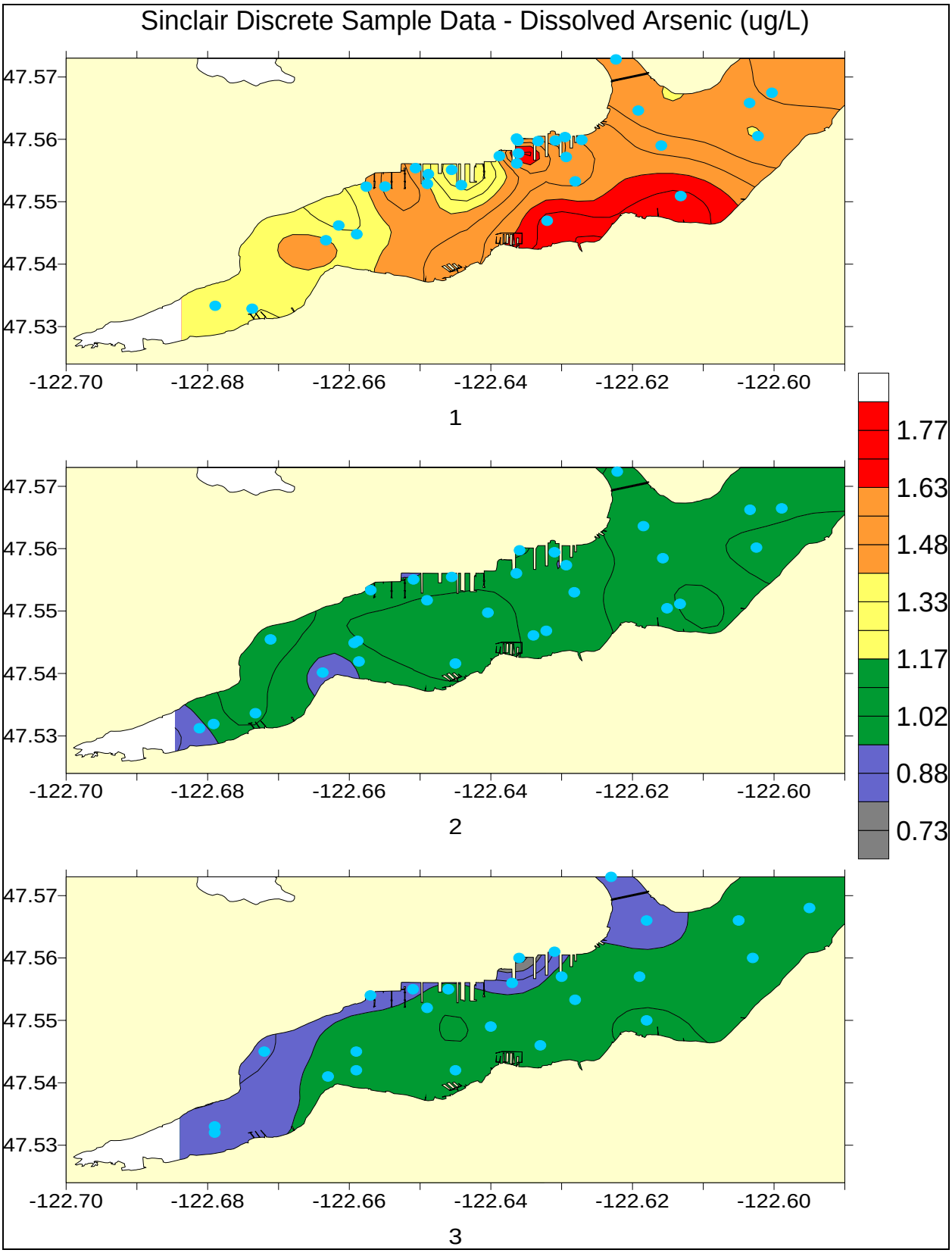
7.1.3 Copper


Sinclair Discrete Sample Data - Dissolved Copper (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40

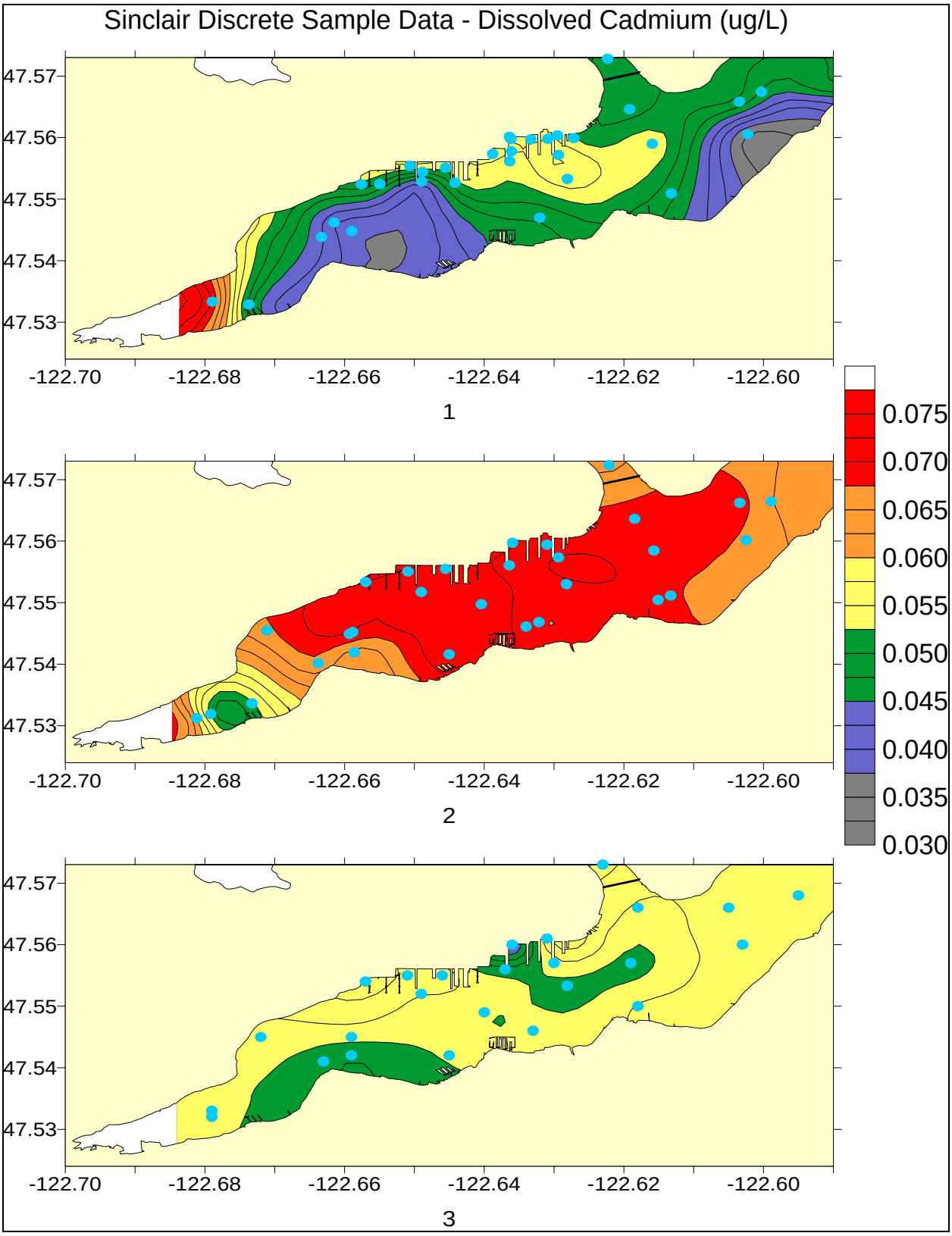
7.1.4 Zinc


Sinclair Discrete Sample Data - Dissolved Zinc (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0

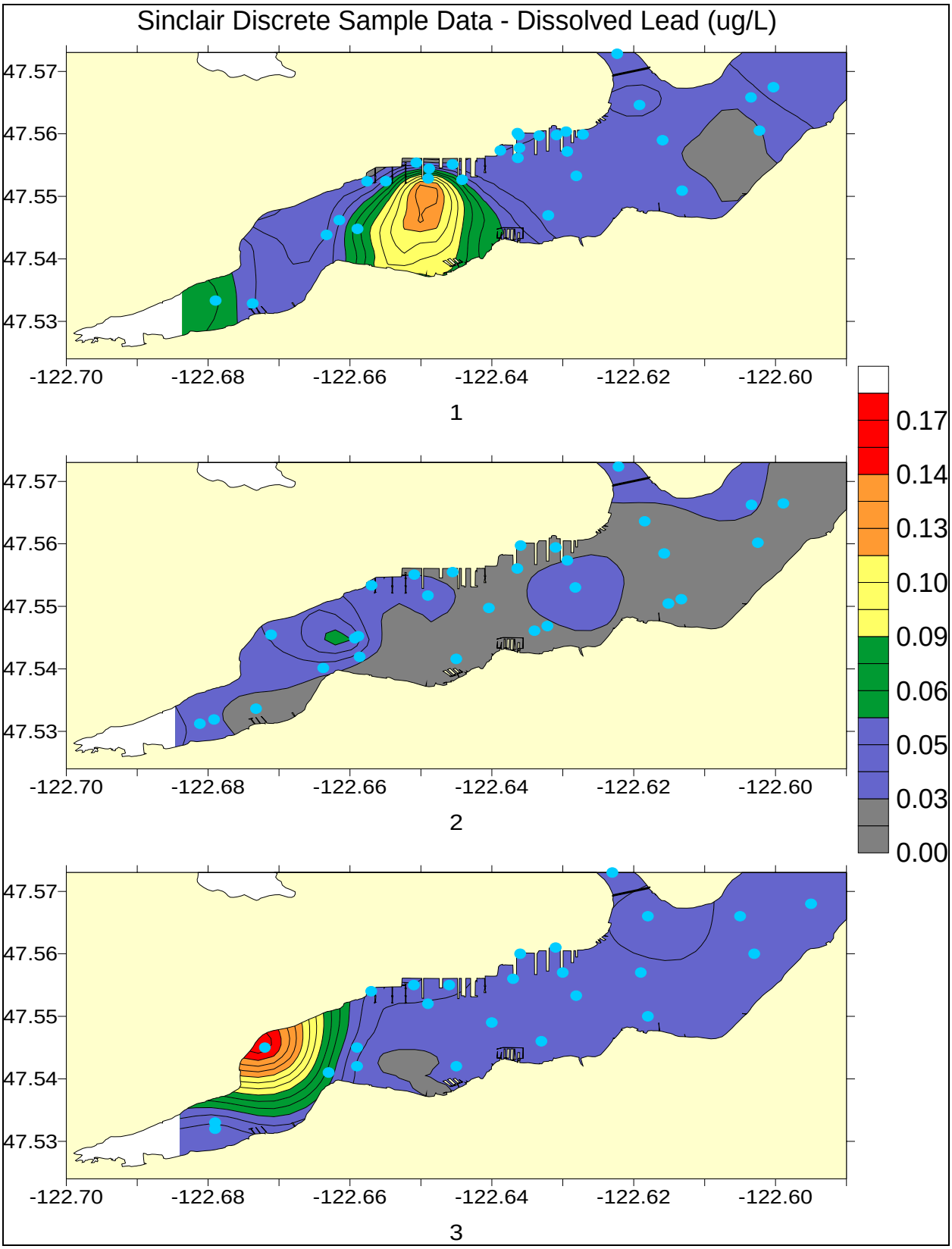
7.1.5 Arsenic


Sinclair Discrete Sample Data - Dissolved Arsenic (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
1.77
1.63
1.48
1.33
1.17
1.02
0.88
0.73

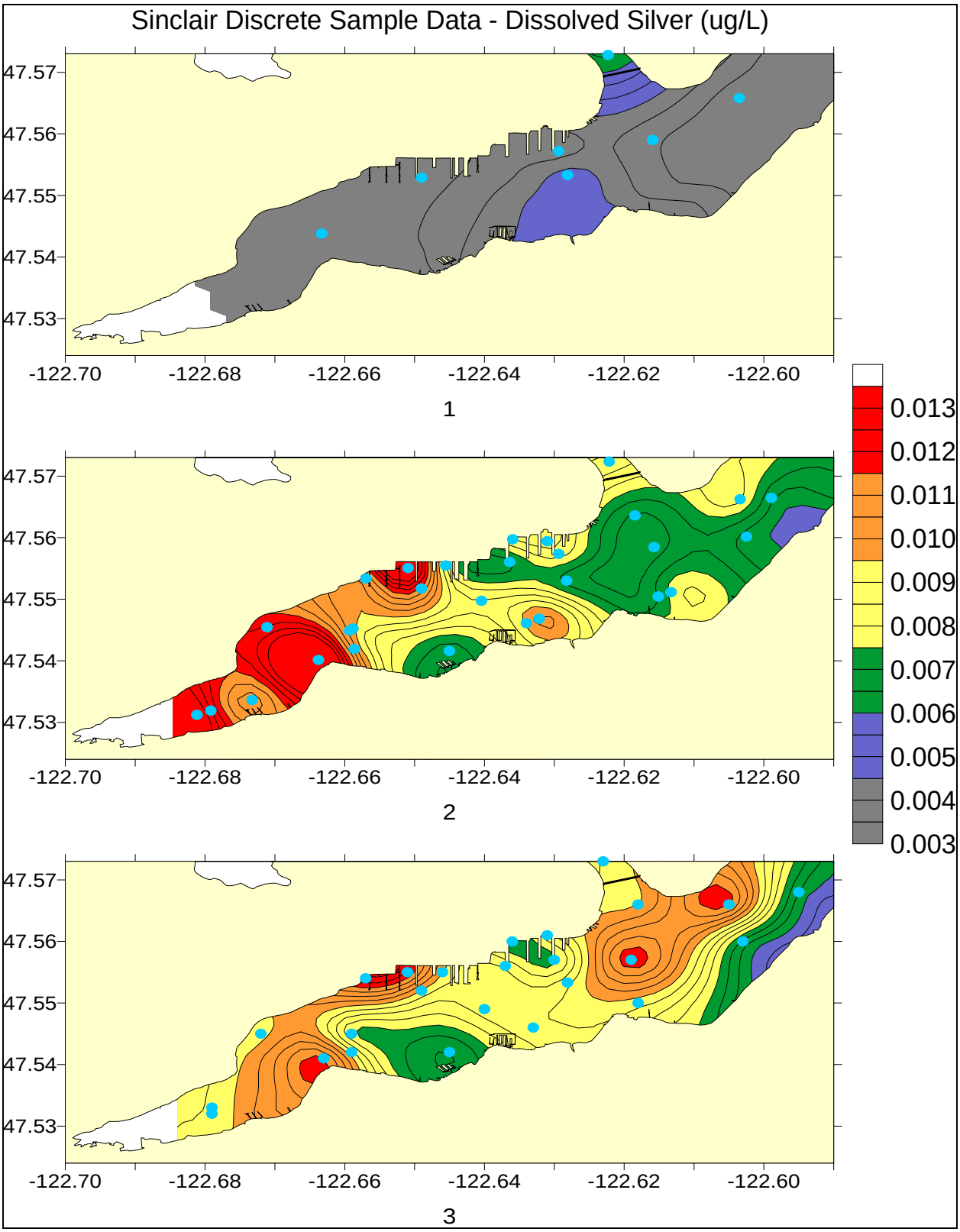
7.1.6 Cadmium


Sinclair Discrete Sample Data - Dissolved Cadmium (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
0.075
0.070
0.065
0.060
0.055
0.050
0.045
0.040
0.035
0.030

7.1.7 Lead

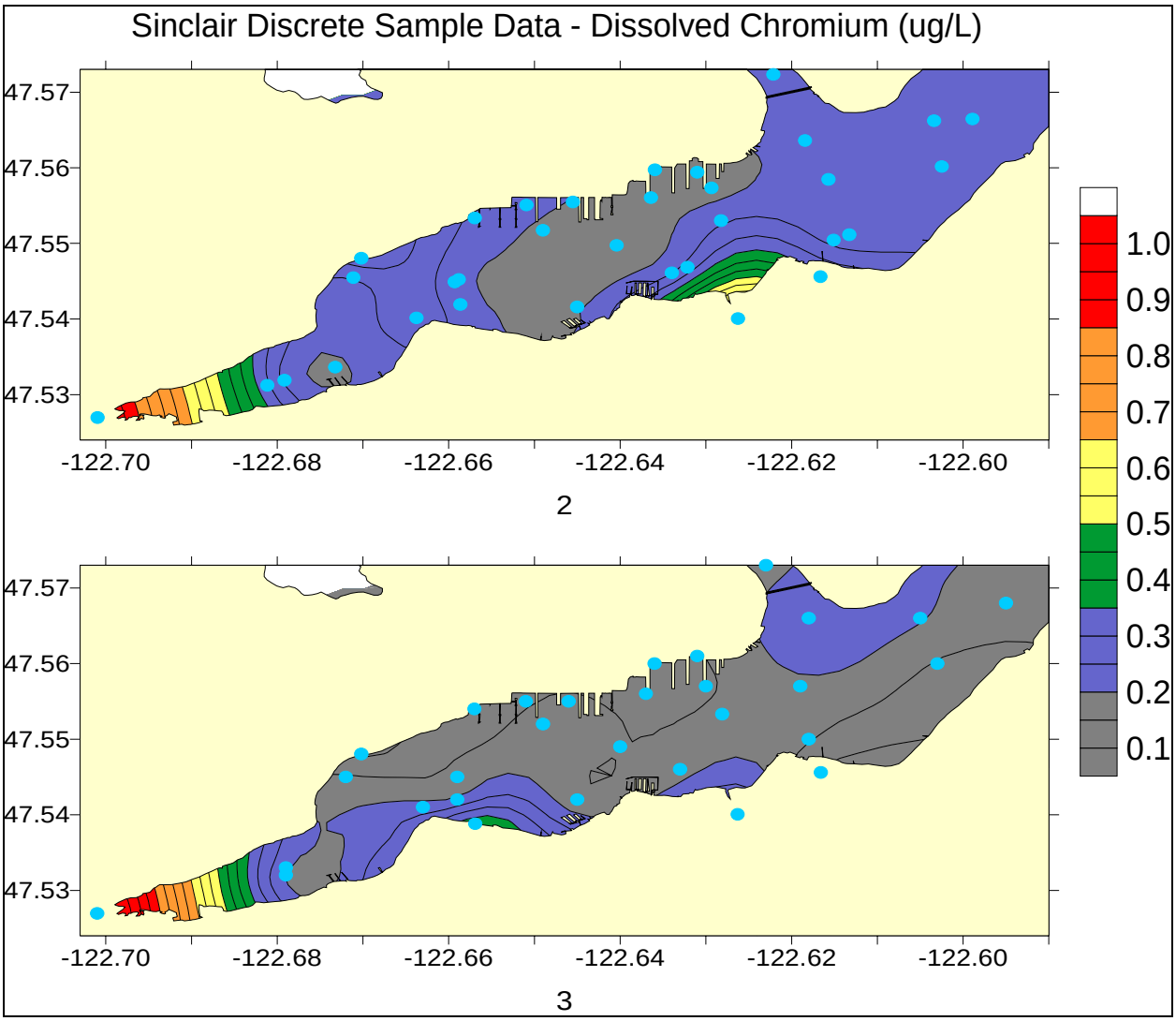

Sinclair Discrete Sample Data - Dissolved Lead (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
0.17
0.14
0.13
0.10
0.09
0.06
0.05
0.03
0.00

7.1.8 Silver

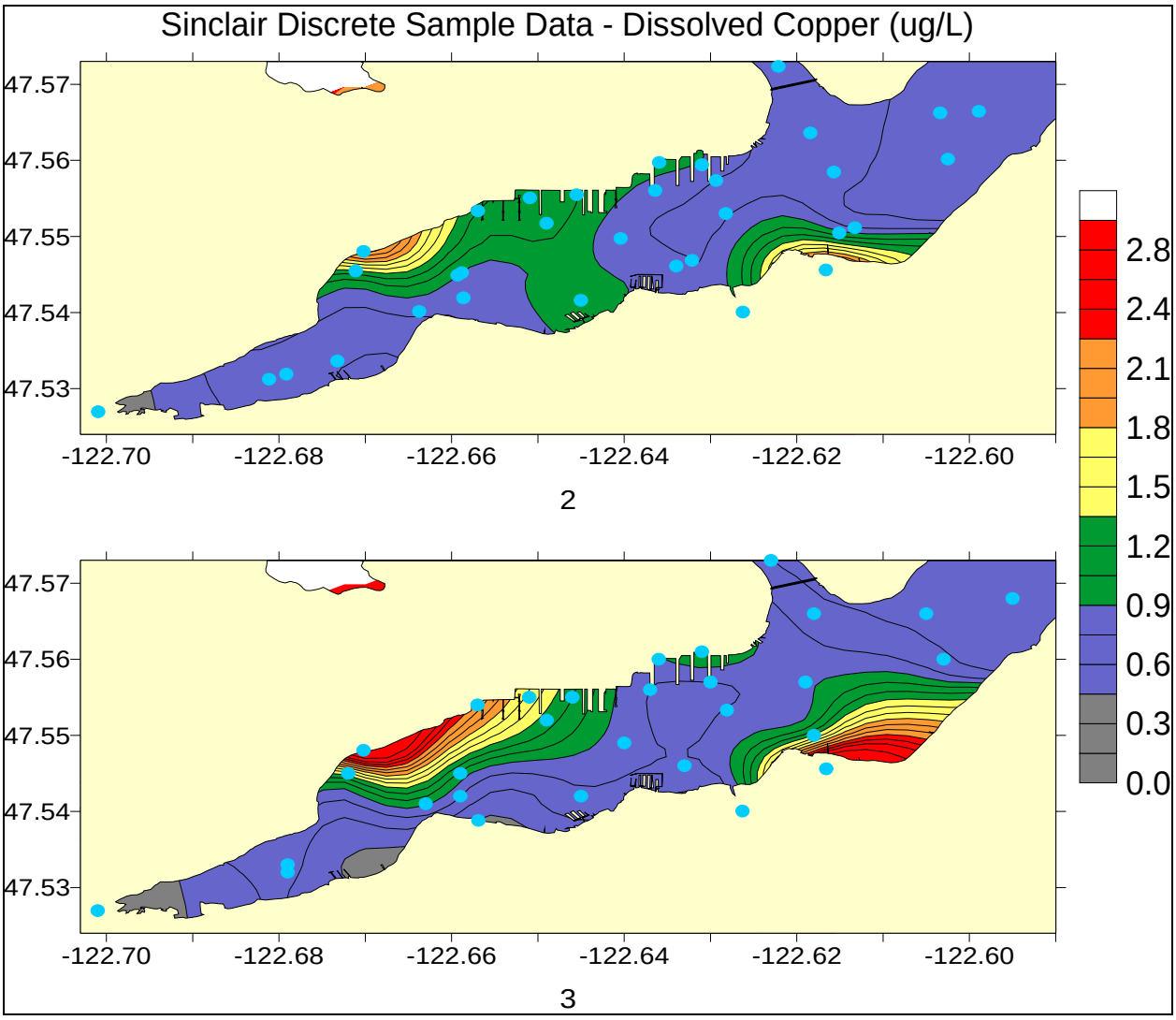

Sinclair Discrete Sample Data - Dissolved Silver (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
1
2
3
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003

7.2 Effluents

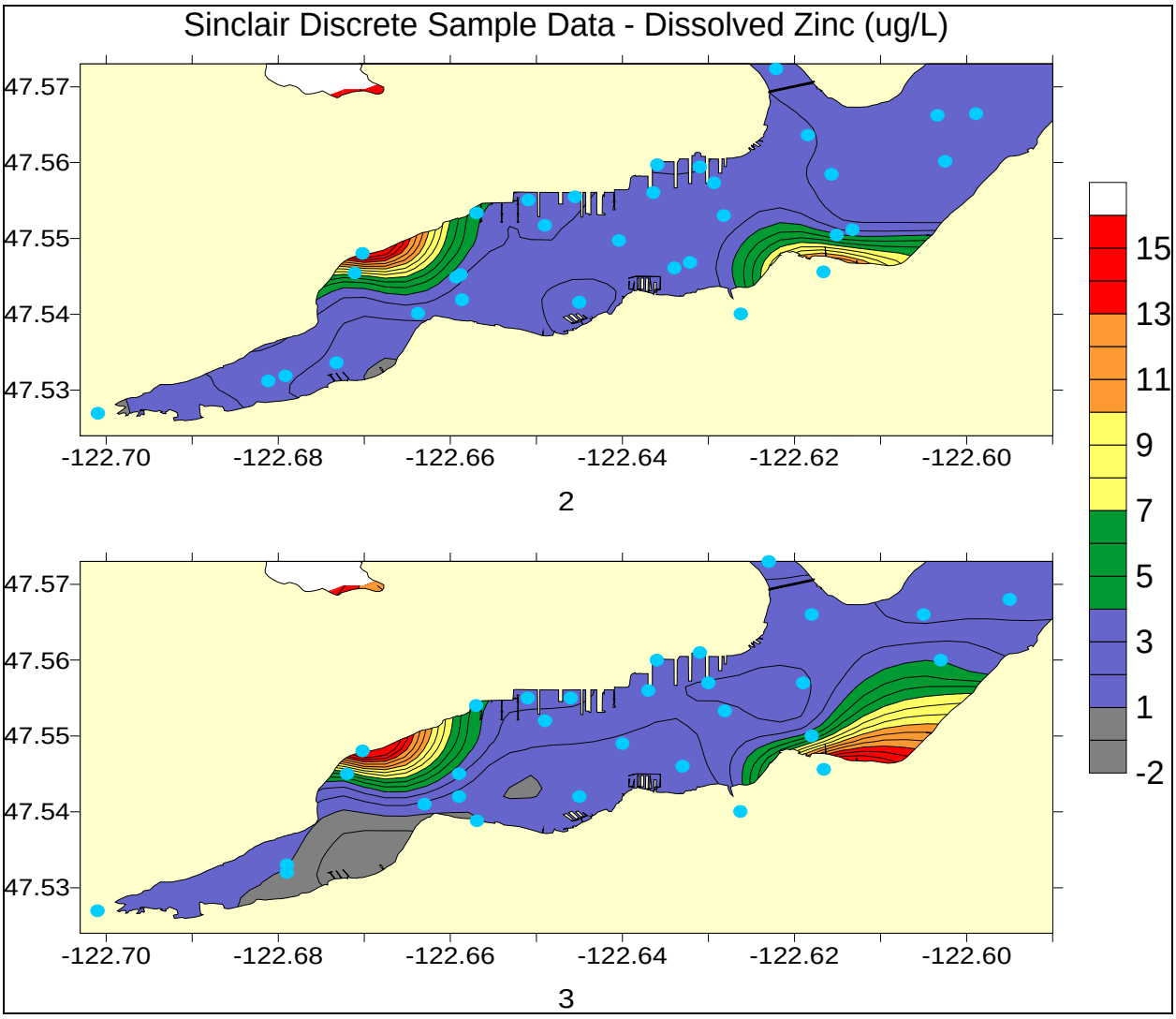
7.2.1 Chromium



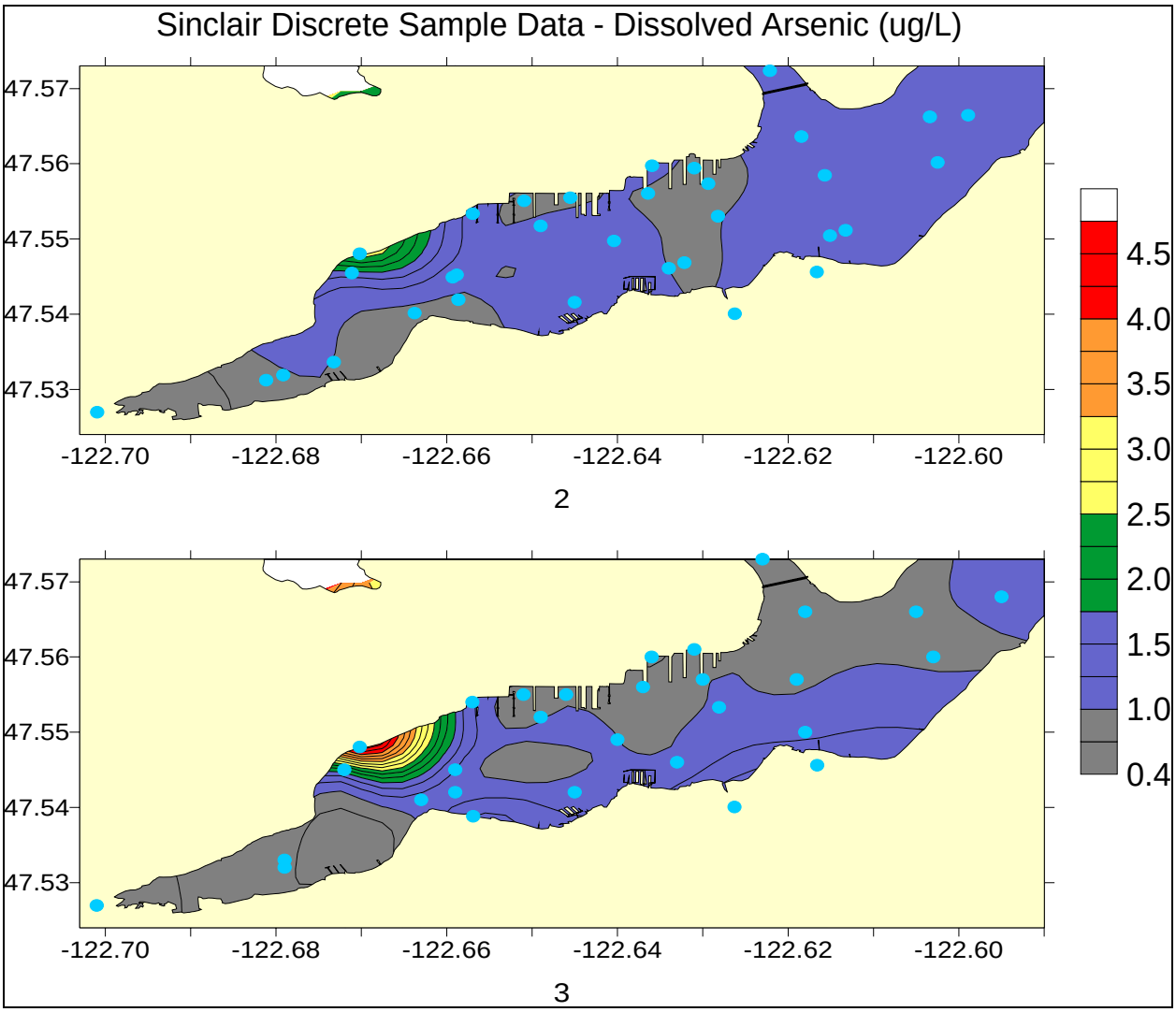
7.2.2 Copper


Sinclair Discrete Sample Data - Dissolved Copper (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
2.8
2.4
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0

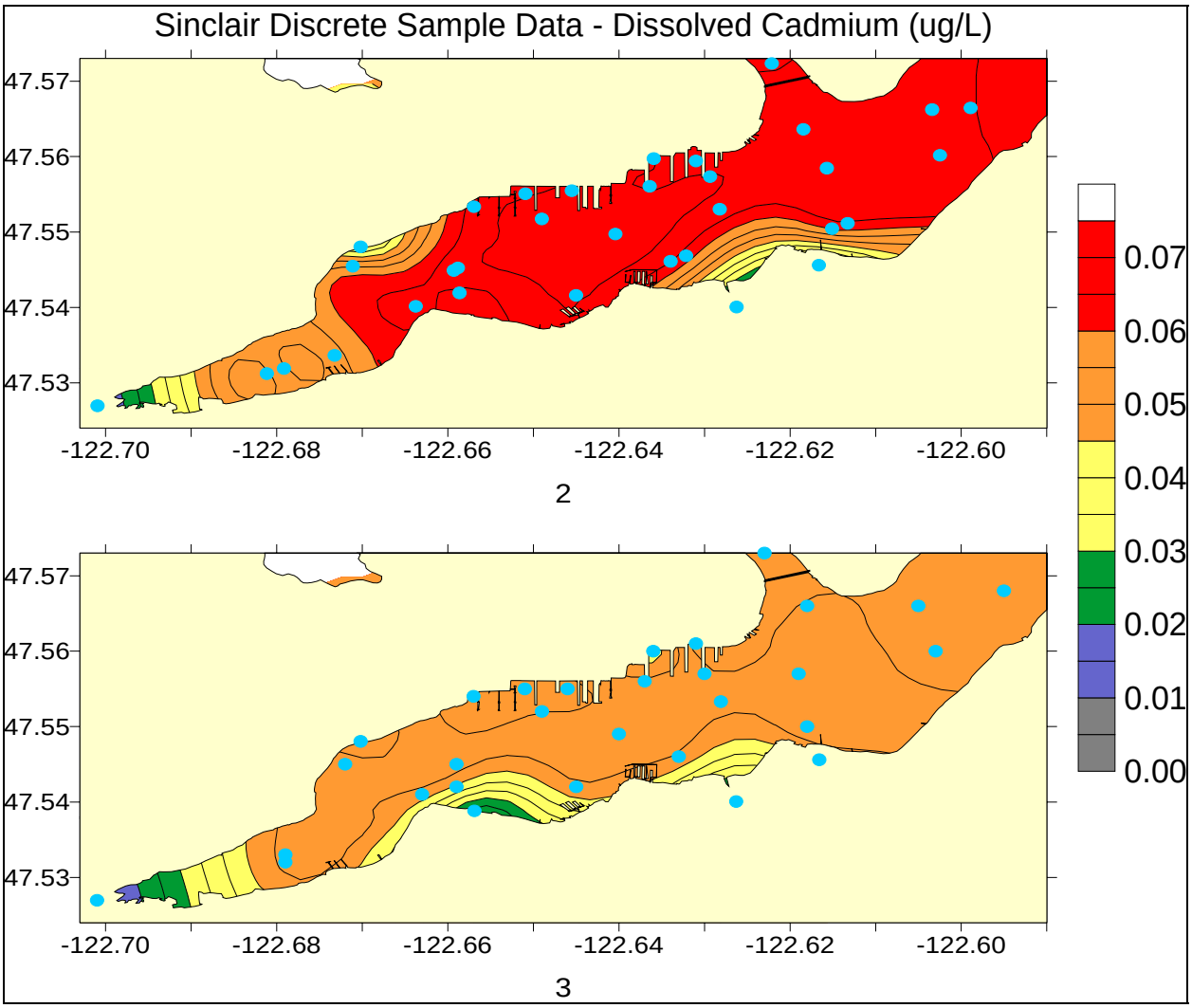
7.2.3 Zinc


Sinclair Discrete Sample Data - Dissolved Zinc (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
15
13
11
9
7
5
3
1
-2

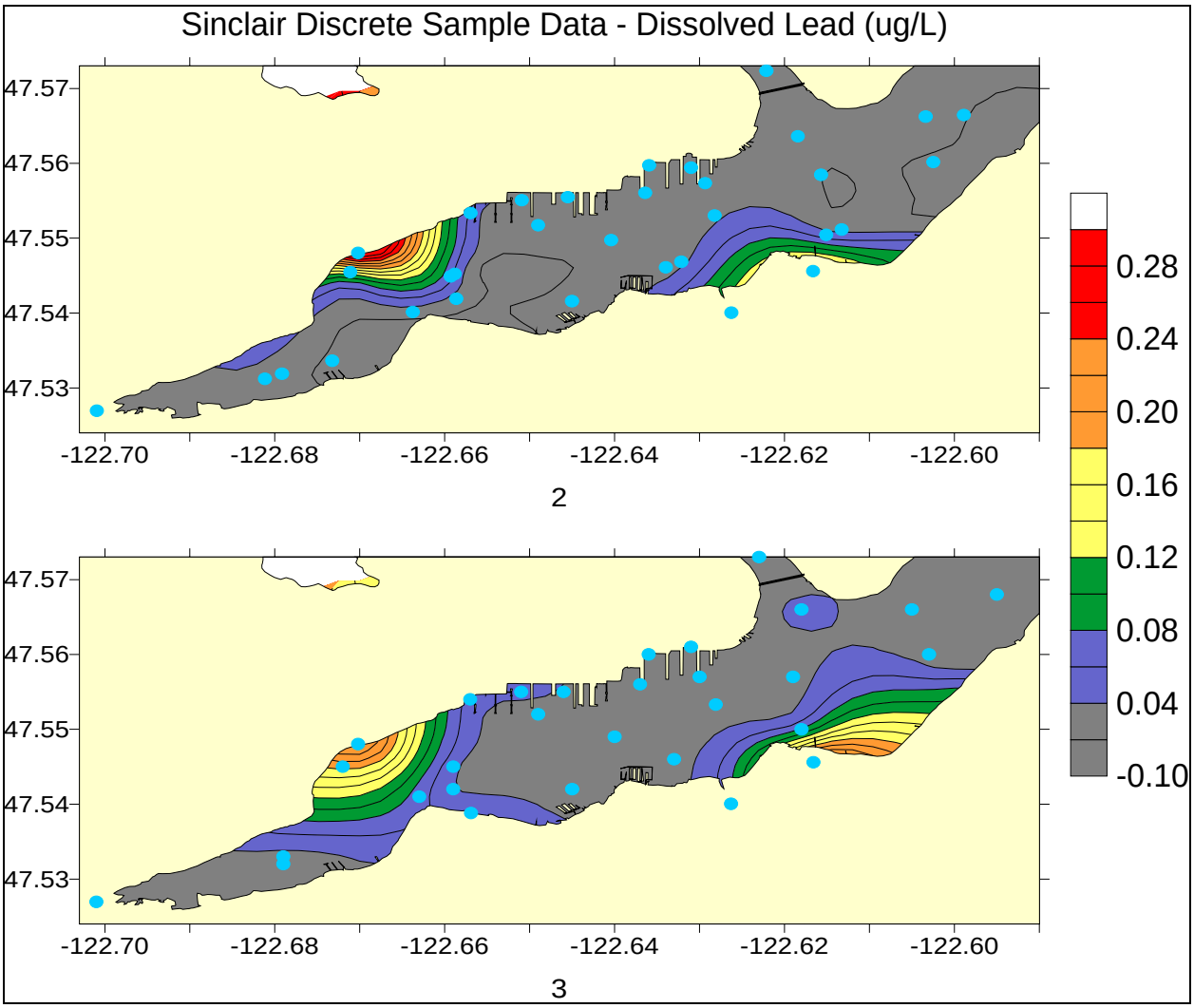
7.2.4 Arsenic


Sinclair Discrete Sample Data - Dissolved Arsenic (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.4

7.2.5 Cadmium


Sinclair Discrete Sample Data - Dissolved Cadmium (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00

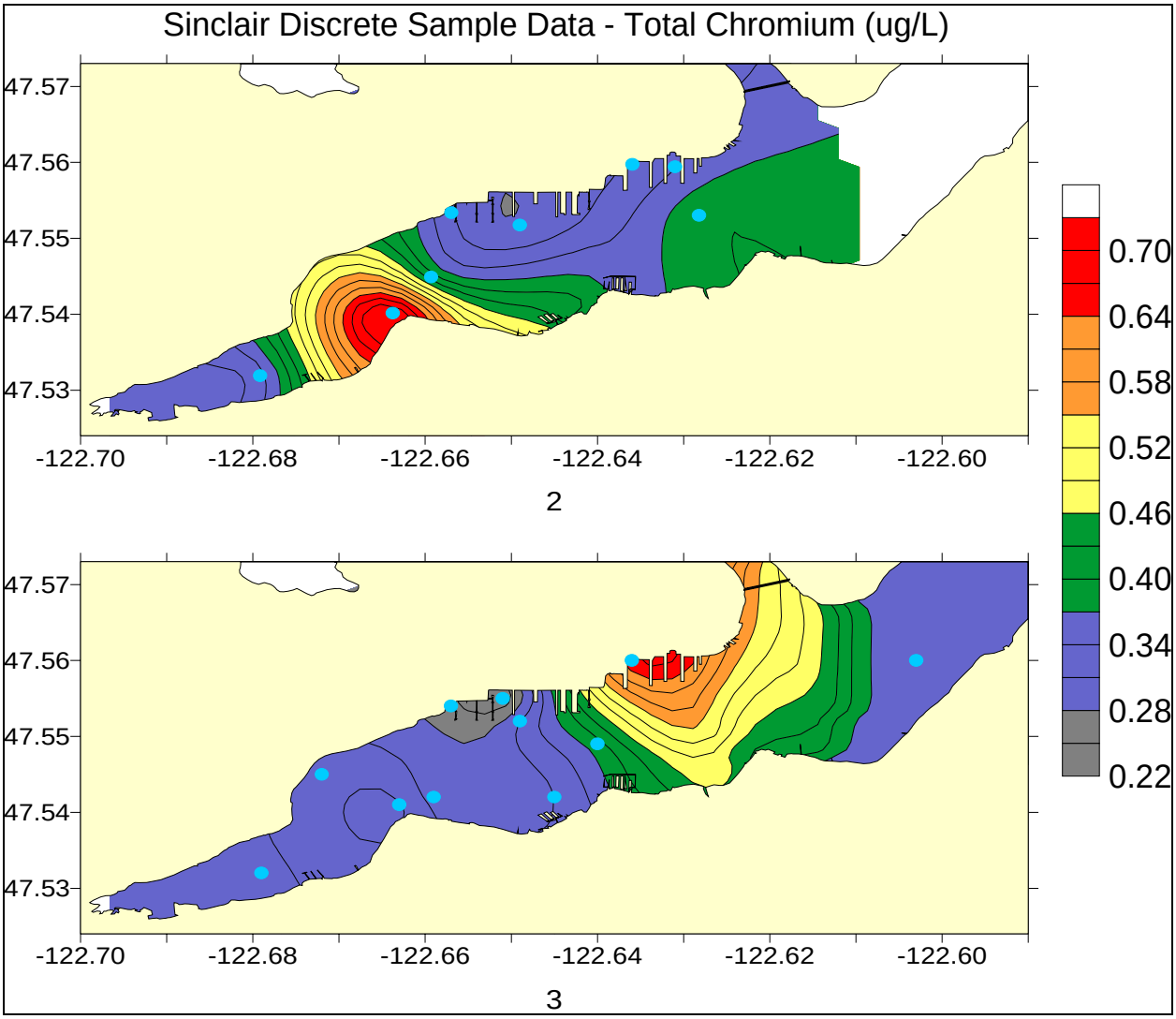
7.2.6 Lead


Sinclair Discrete Sample Data - Dissolved Lead (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
0.28
0.24
0.20
0.16
0.12
0.08
0.04
-0.10

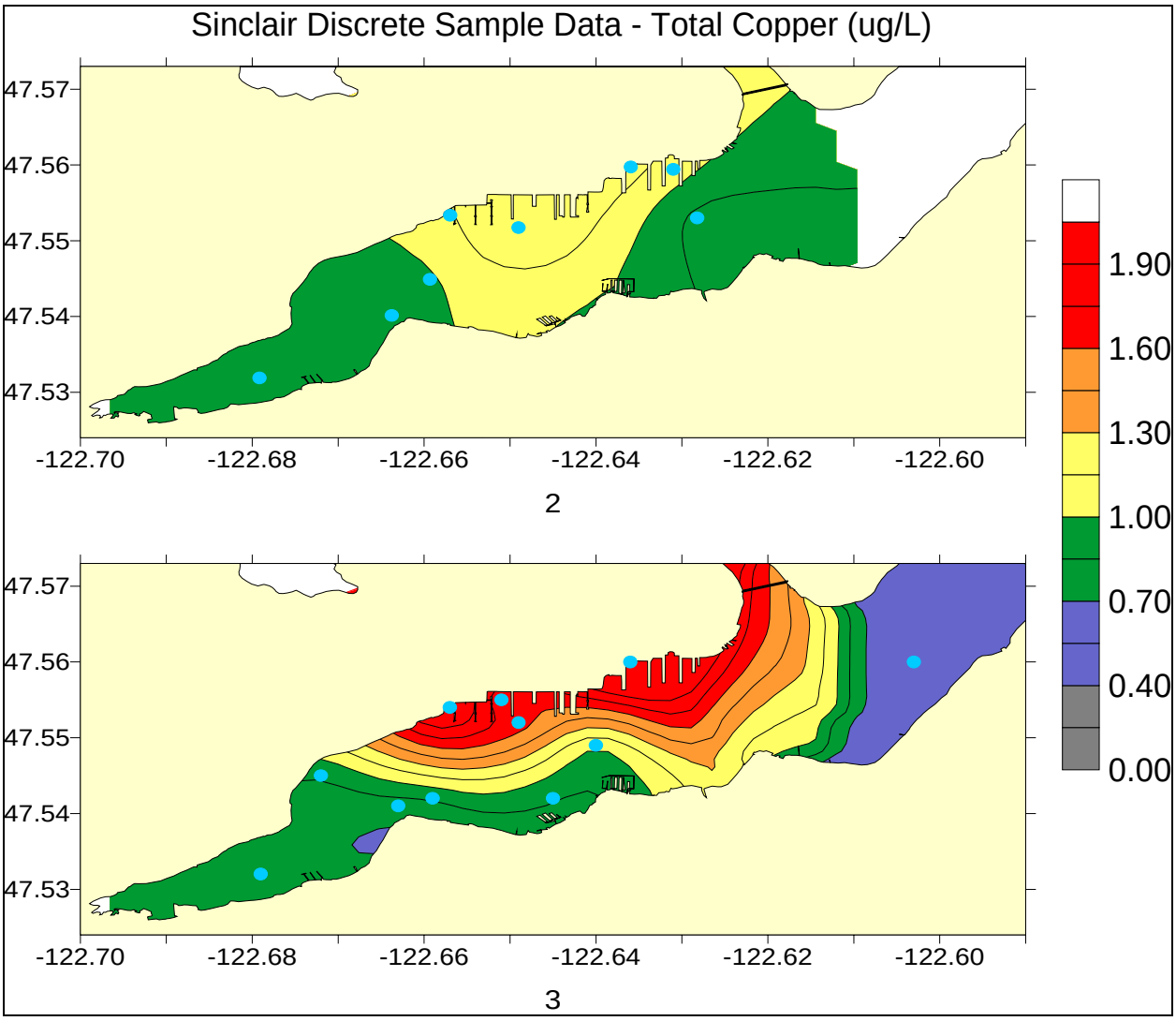
8 Heavy Metals – Totals

8.1 Effluents

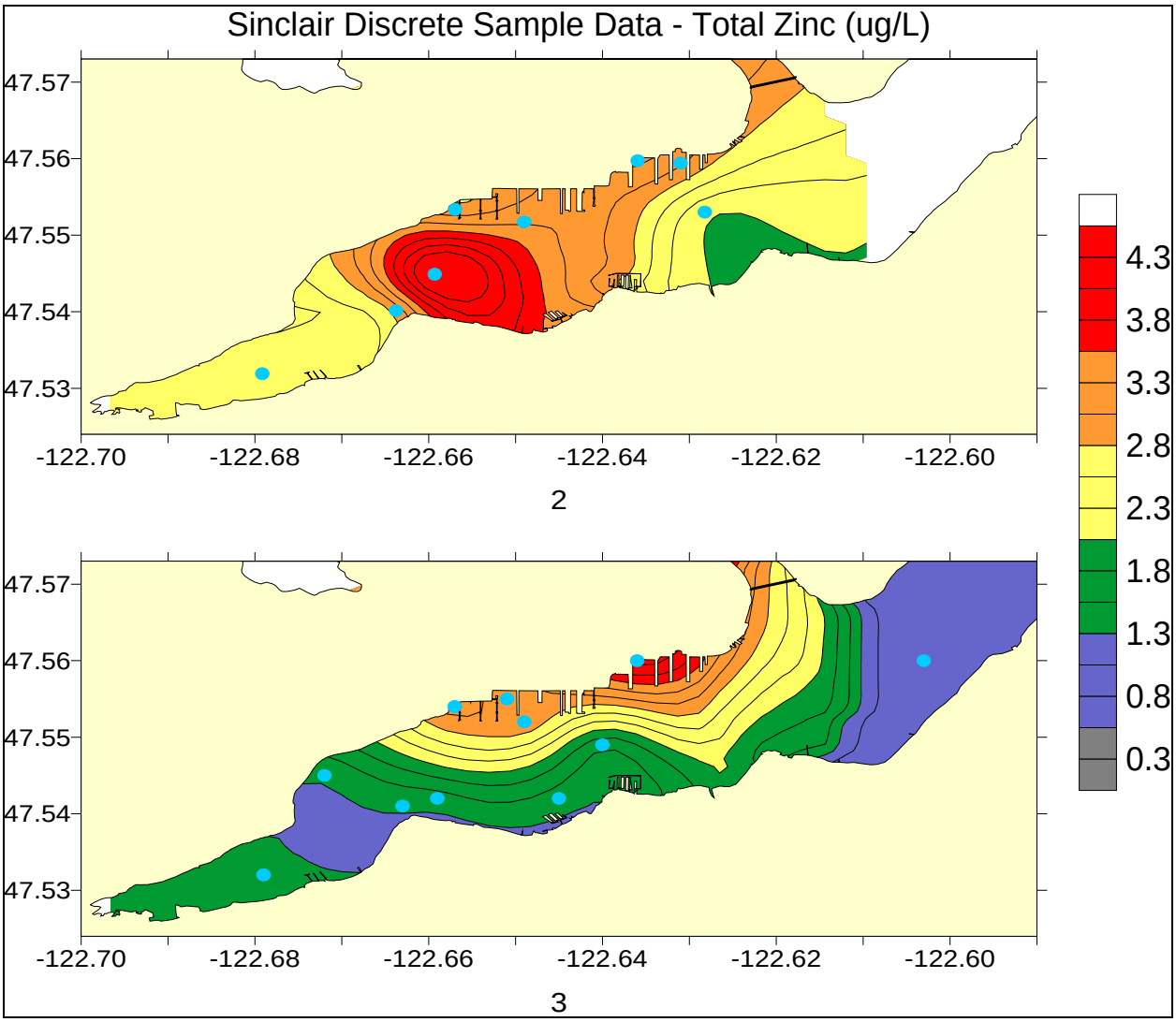
8.1.1 Chromium



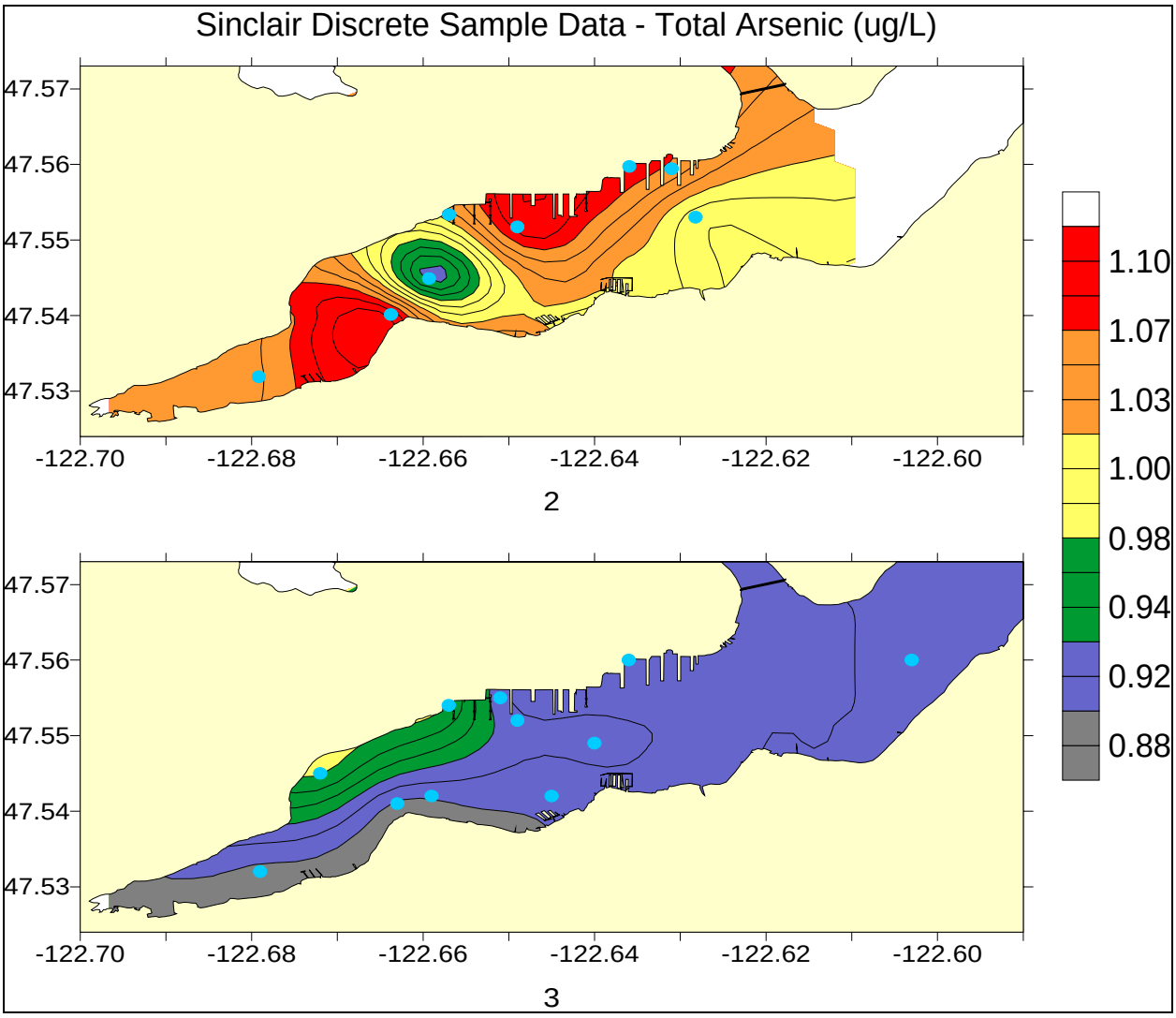
8.1.2 Copper


Sinclair Discrete Sample Data - Total Copper (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
1.90
1.60
1.30
1.00
0.70
0.40
0.00

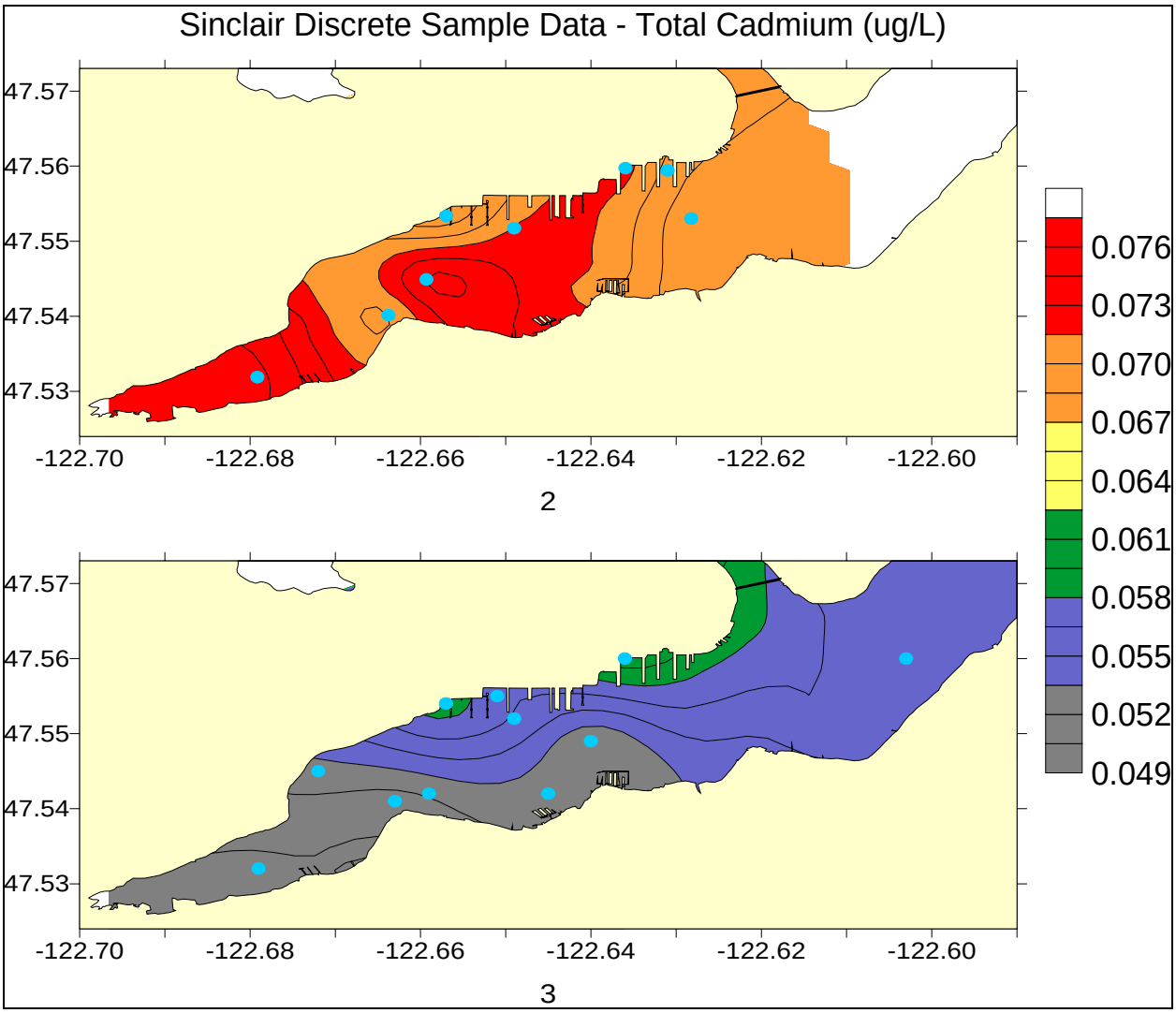
8.1.3 Zinc


Sinclair Discrete Sample Data - Total Zinc (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
4.3
3.8
3.3
2.8
2.3
1.8
1.3
0.8
0.3

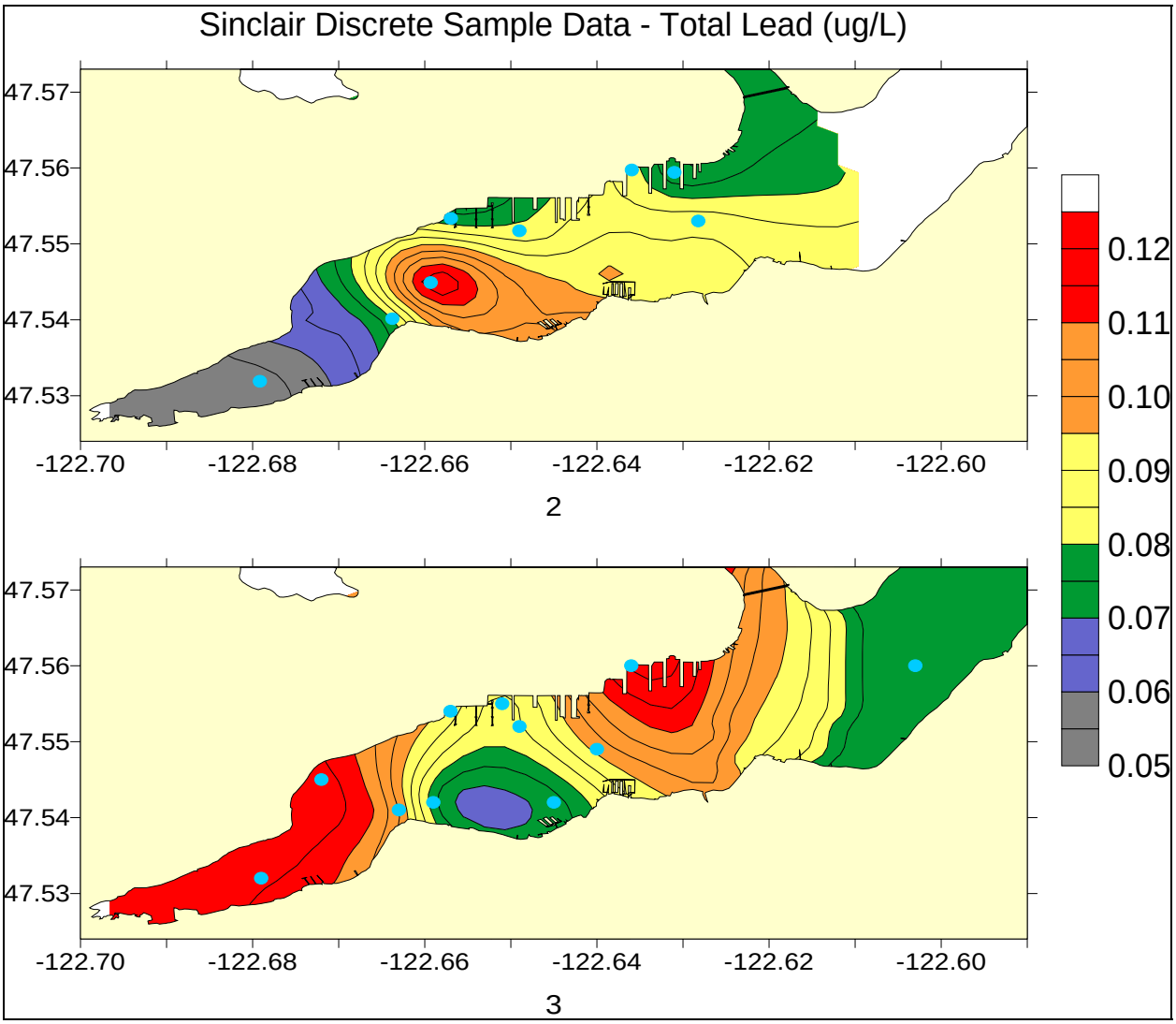
8.1.4 Arsenic


Sinclair Discrete Sample Data - Total Arsenic (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
1.10
1.07
1.03
1.00
0.98
0.94
0.92
0.88

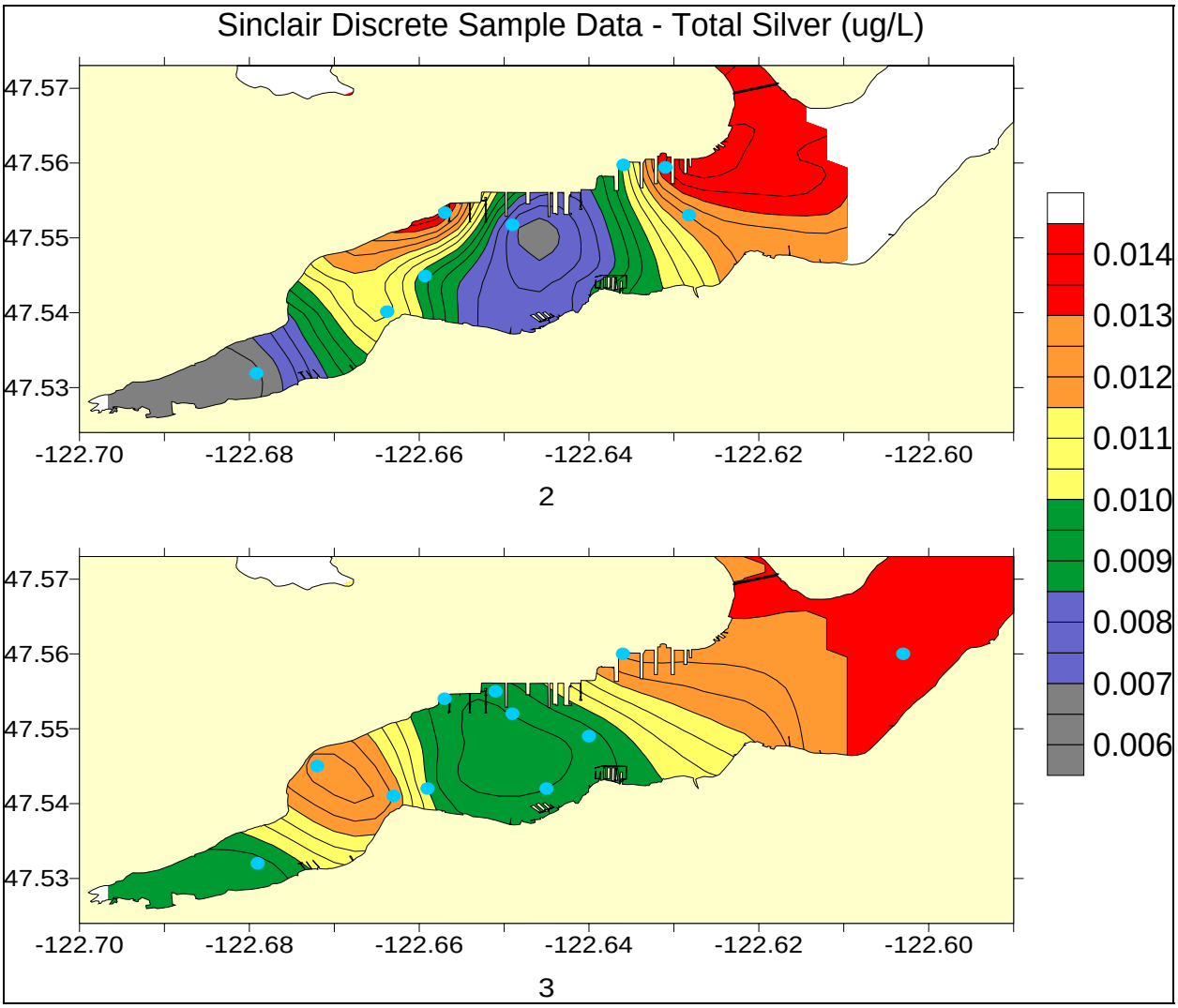
8.1.5 Cadmium


Sinclair Discrete Sample Data - Total Cadmium (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
0.076
0.073
0.070
0.067
0.064
0.061
0.058
0.055
0.052
0.049

8.1.6 Lead

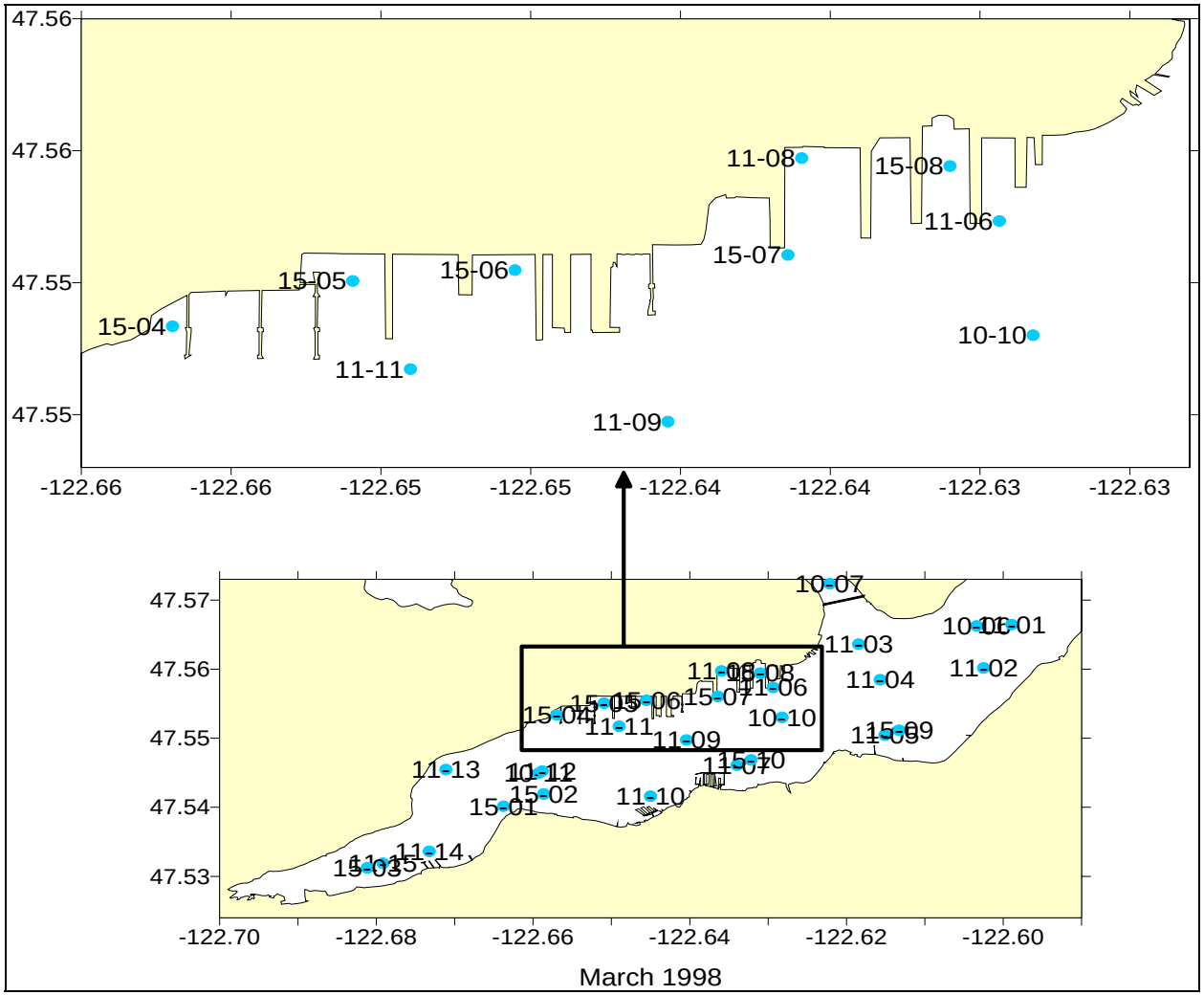

Sinclair Discrete Sample Data - Total Lead (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05

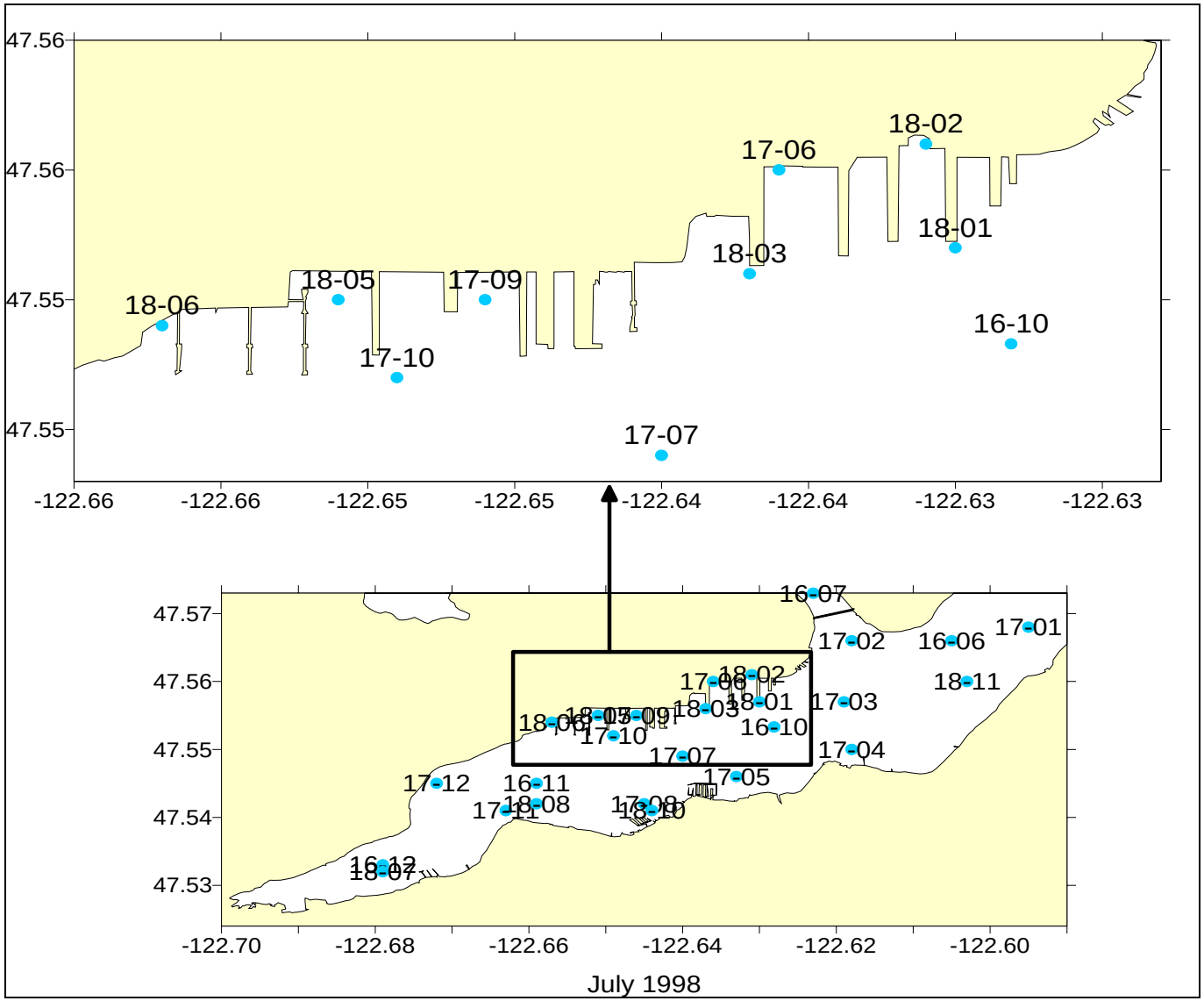
8.1.7 Silver


Sinclair Discrete Sample Data - Total Silver (ug/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
0.014
0.013
0.012
0.011
0.010
0.009
0.008
0.007
0.006

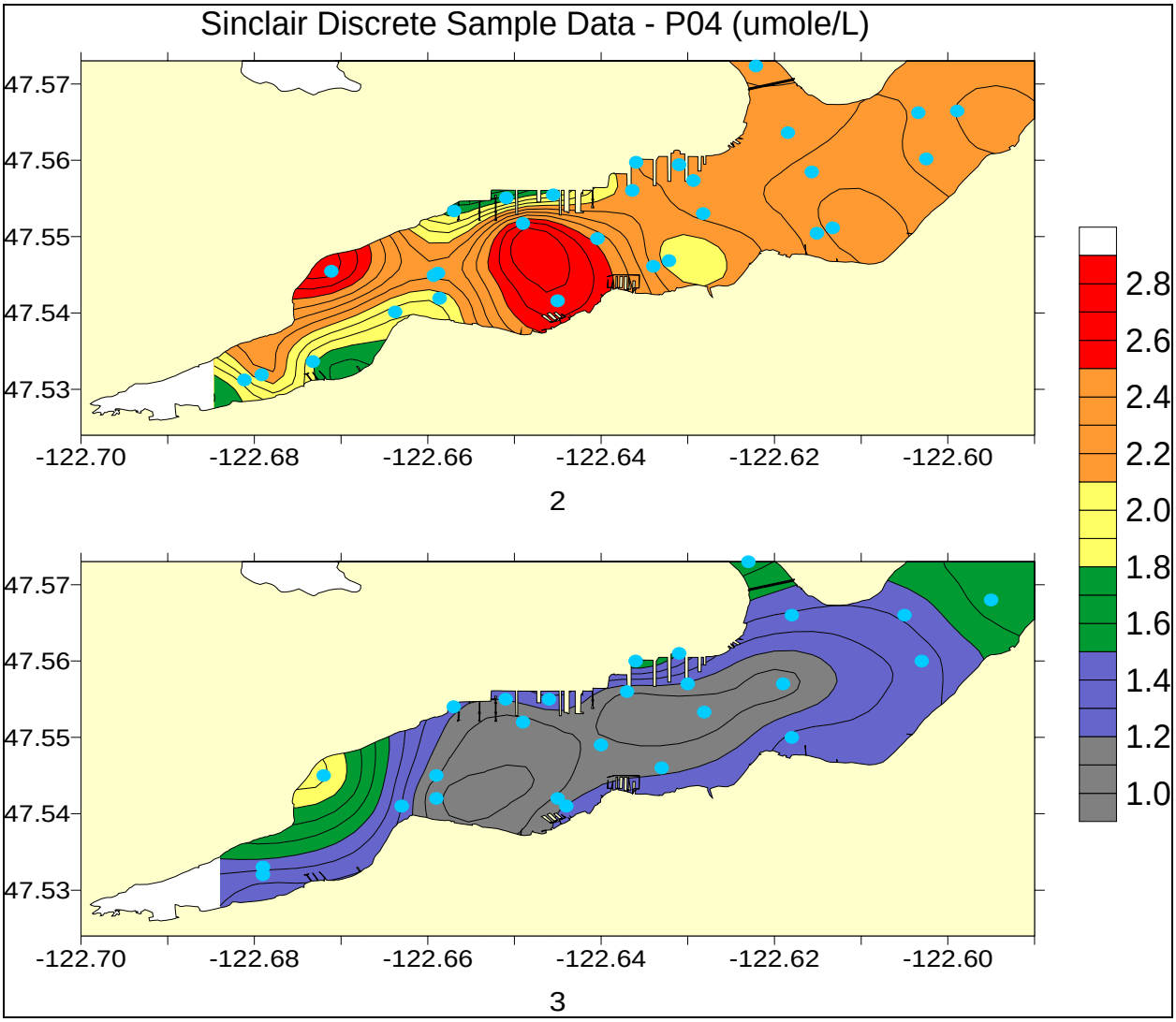
9.1 Receiving

9.1.1 Discrete Sample Sites

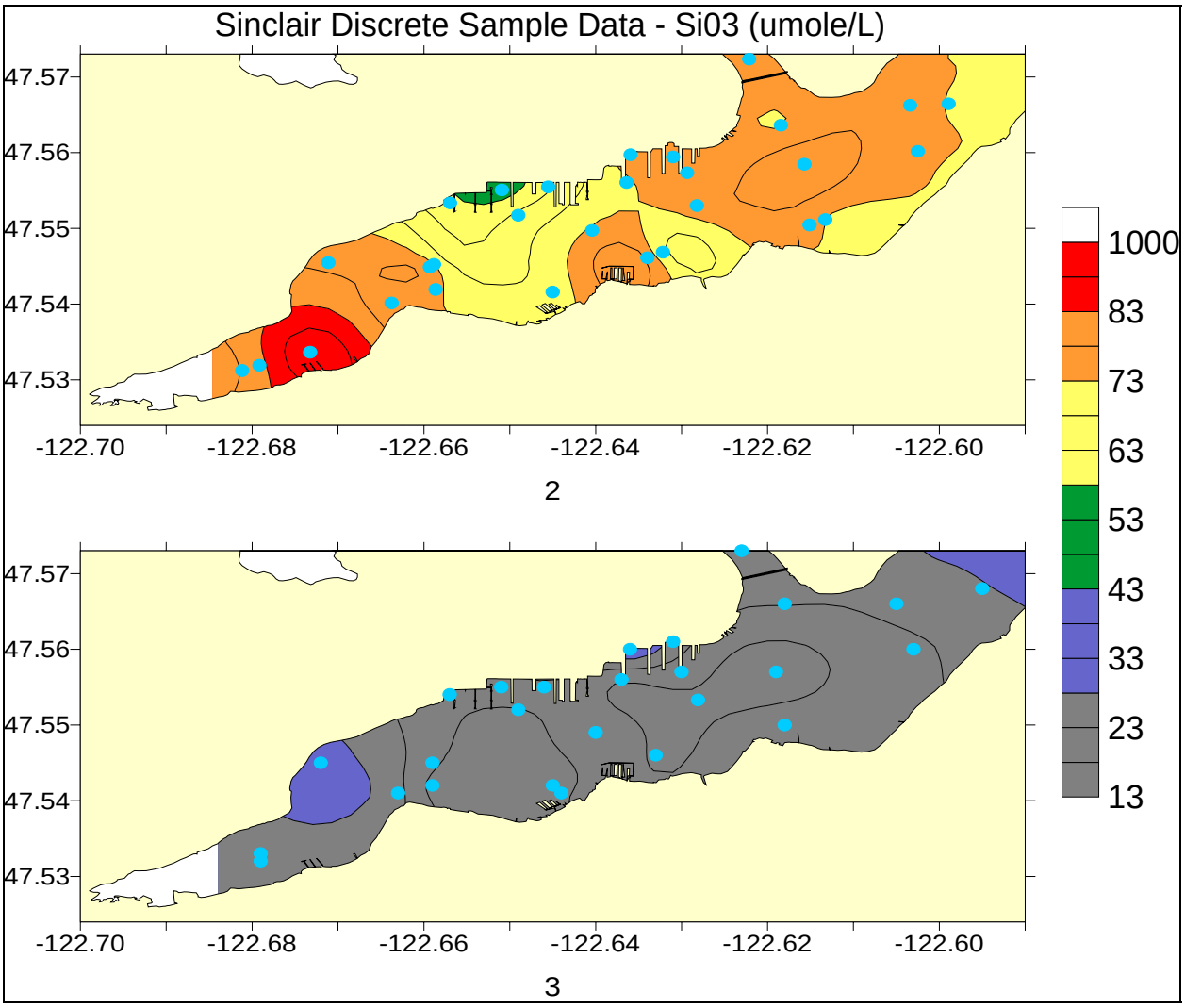



47.56
47.56
47.55
47.55
-122.66
-122.66
-122.65
-122.65
-122.64
-122.64
-122.63
-122.63
18-02
17-06
18-01
18-03
18-05
17-09
18-06
16-10
17-10
17-07
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
16-07
17-01
17-02
16-06
18-11
17-03
17-04
16-10
17-07
17-05
17-12
16-11
18-08
16-12
18-07
July 1998

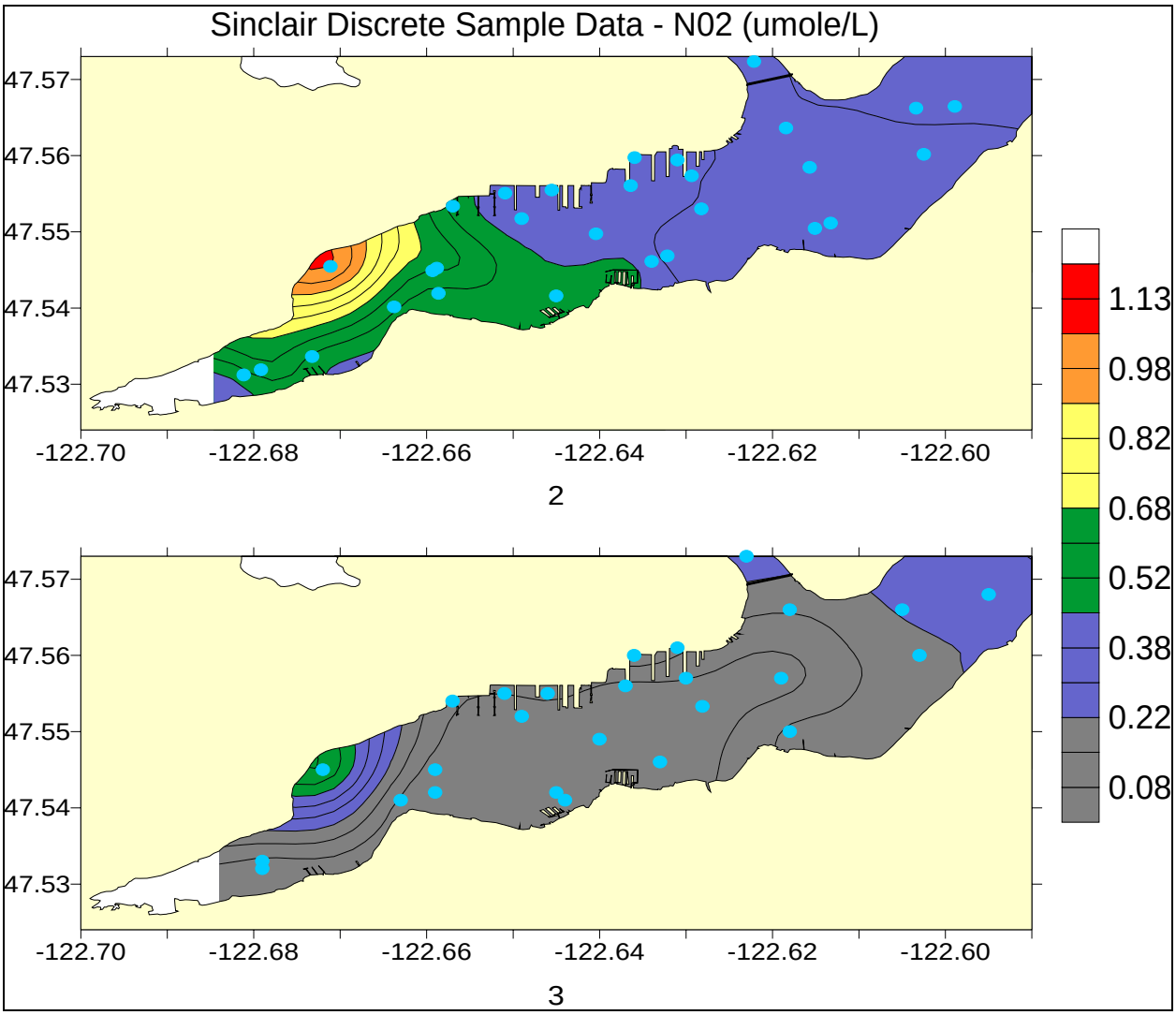
9.1.2 Phosphate



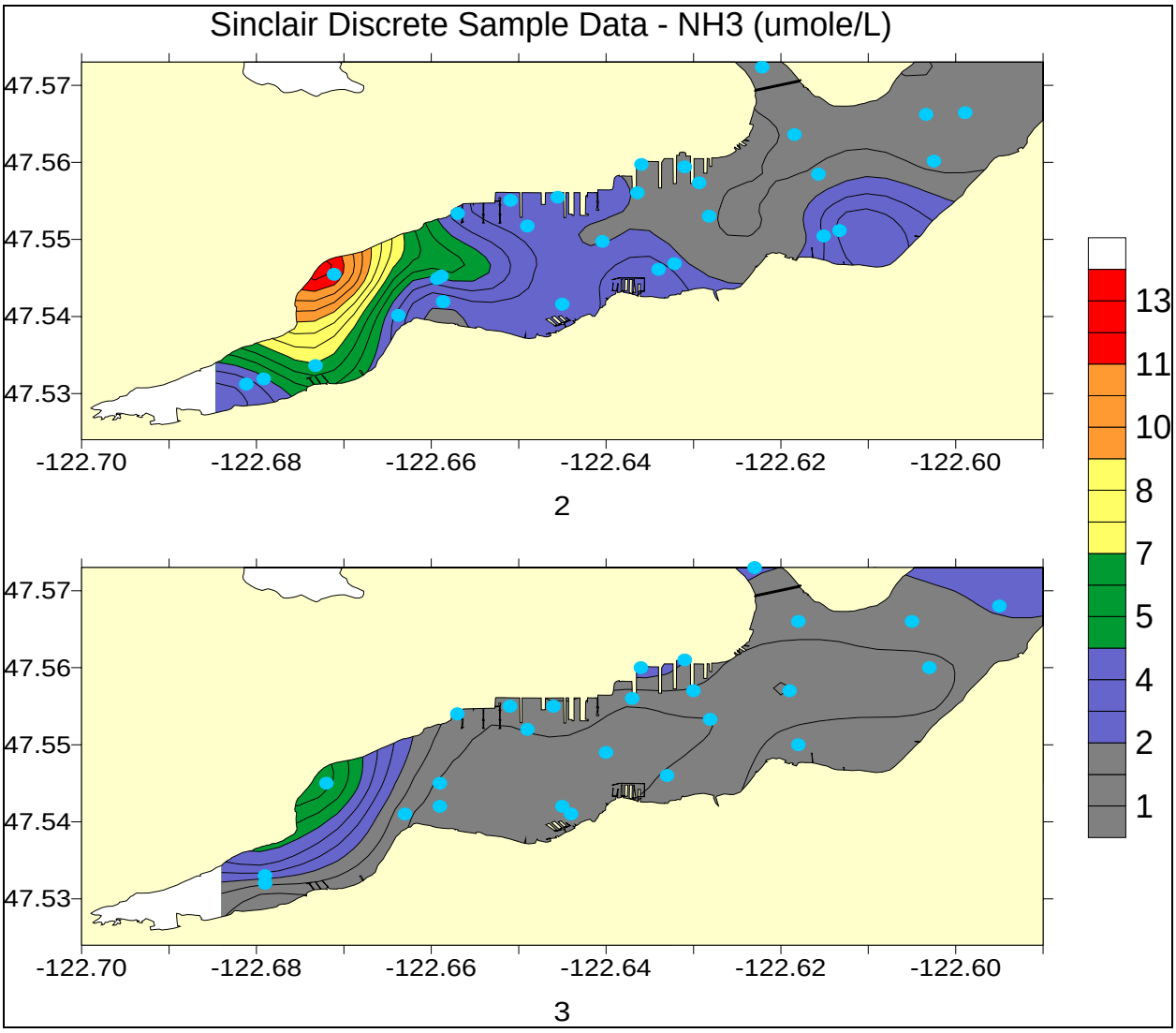
9.1.3 Silicate



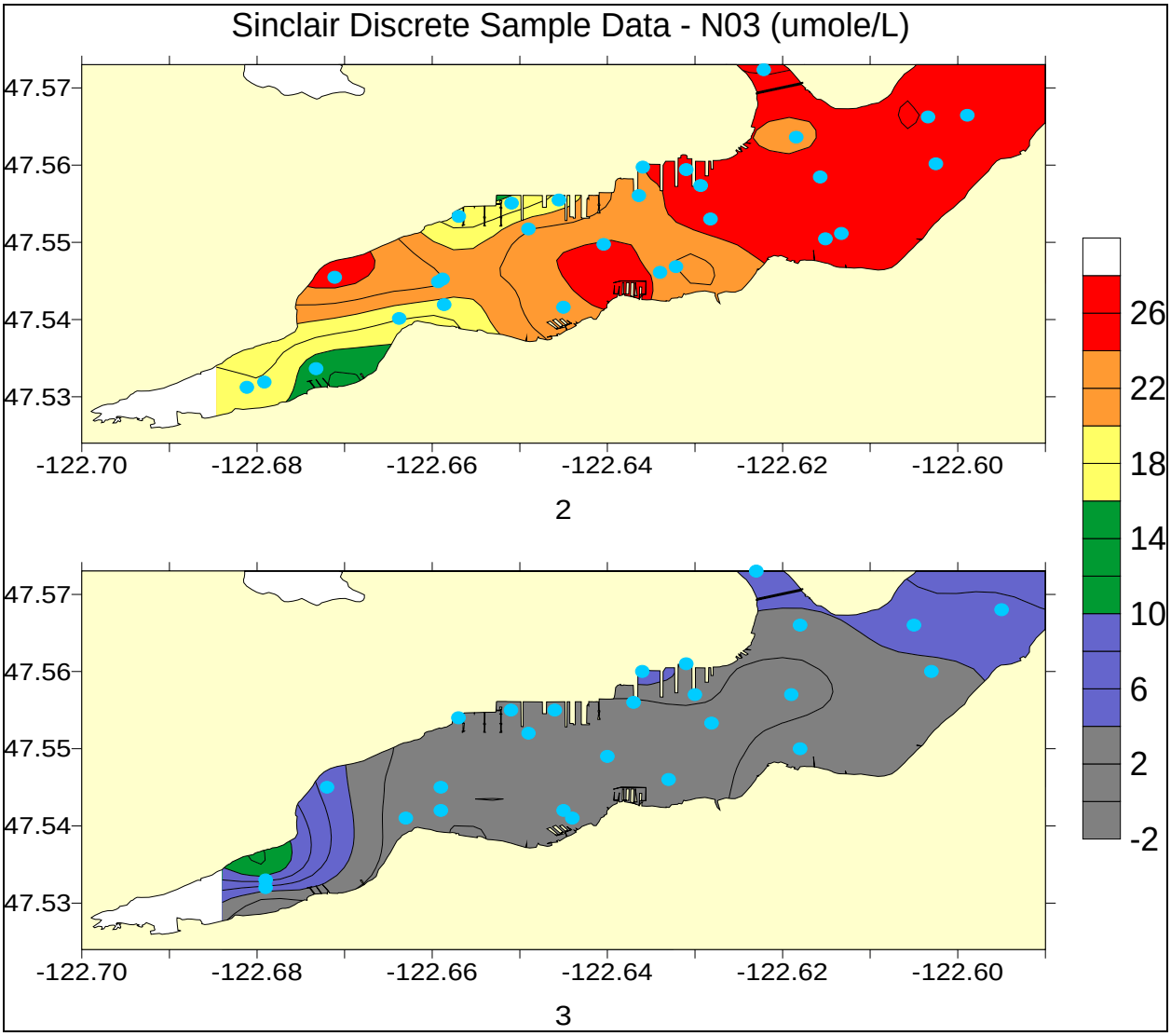
9.1.4 Nitrite


Sinclair Discrete Sample Data - N02 (umole/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
1.13
0.98
0.82
0.68
0.52
0.38
0.22
0.08

9.1.5 Ammonium

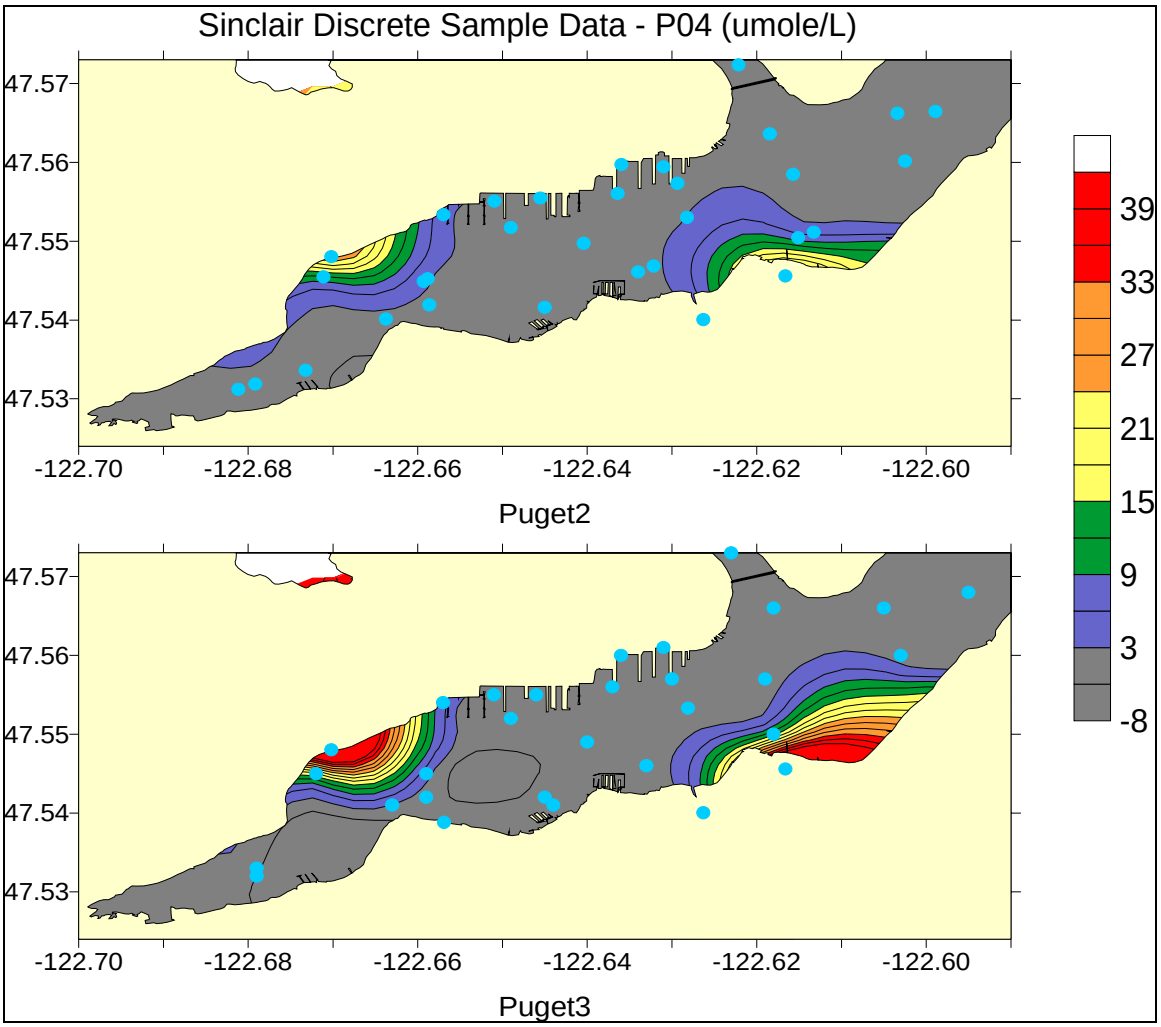


9.1.6 Nitrate

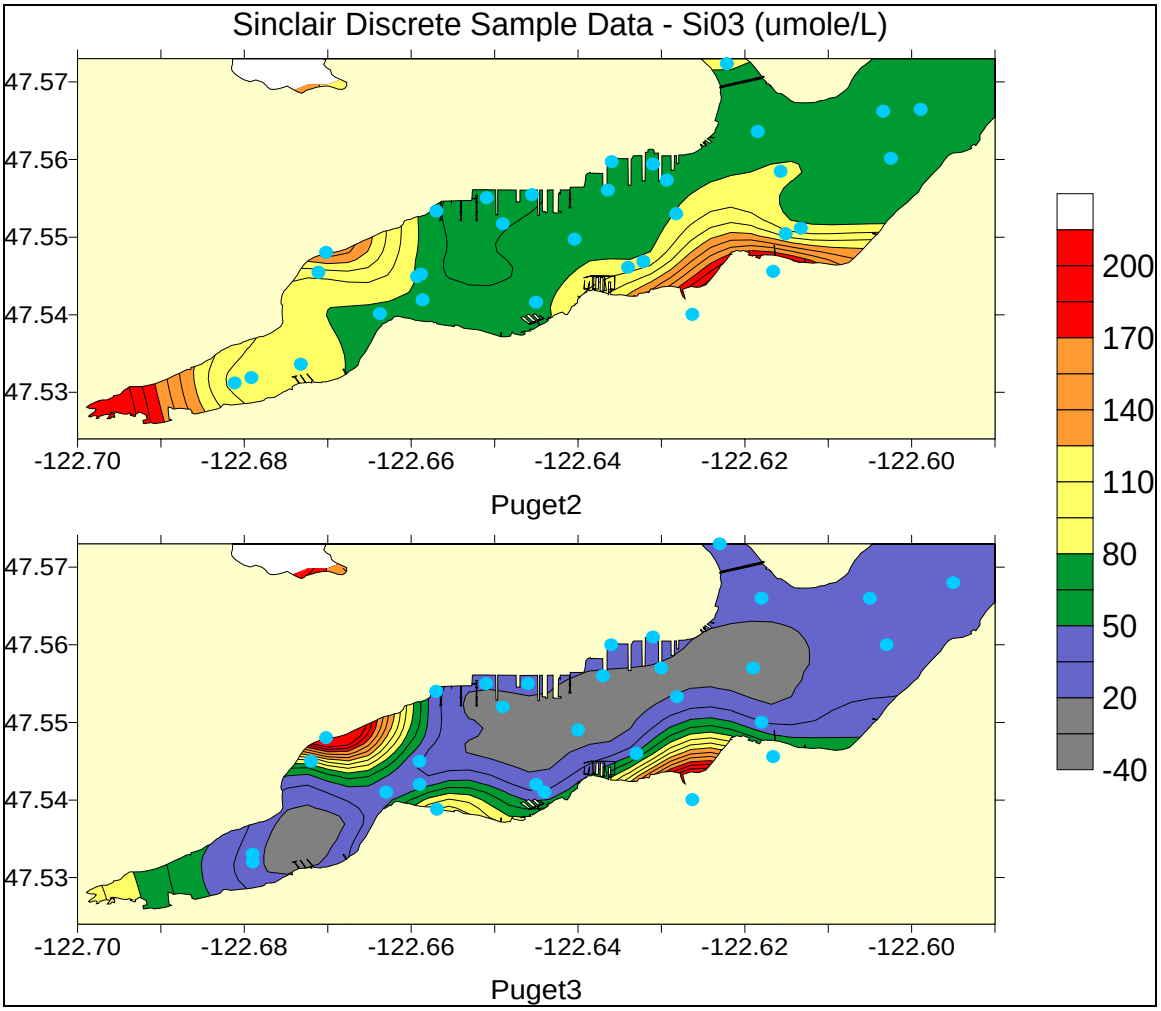

Sinclair Discrete Sample Data - N03 (umole/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
2
3
26
22
18
14
10
6
2
-2

9.2 Effluents

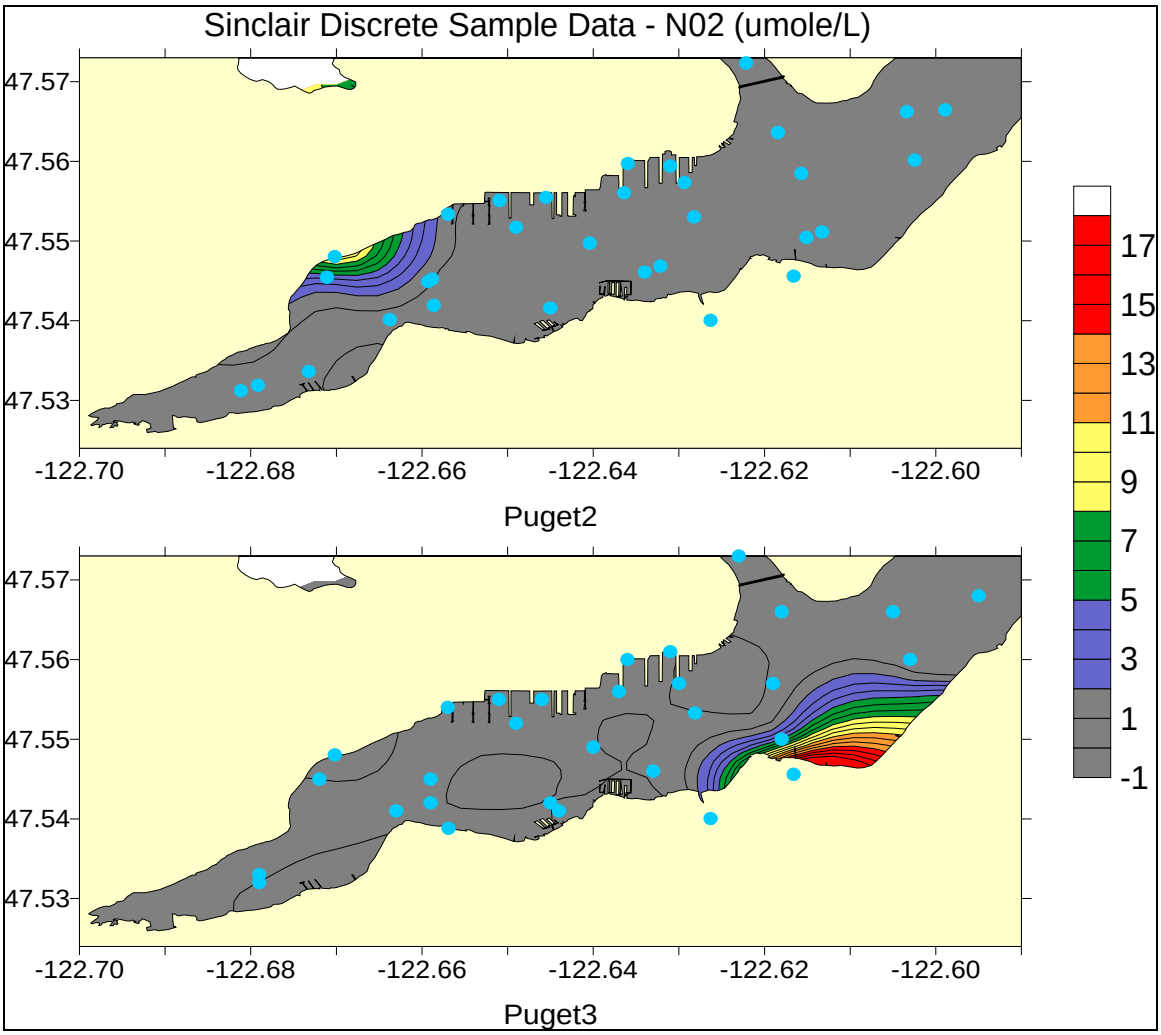
9.2.1 Phosphate



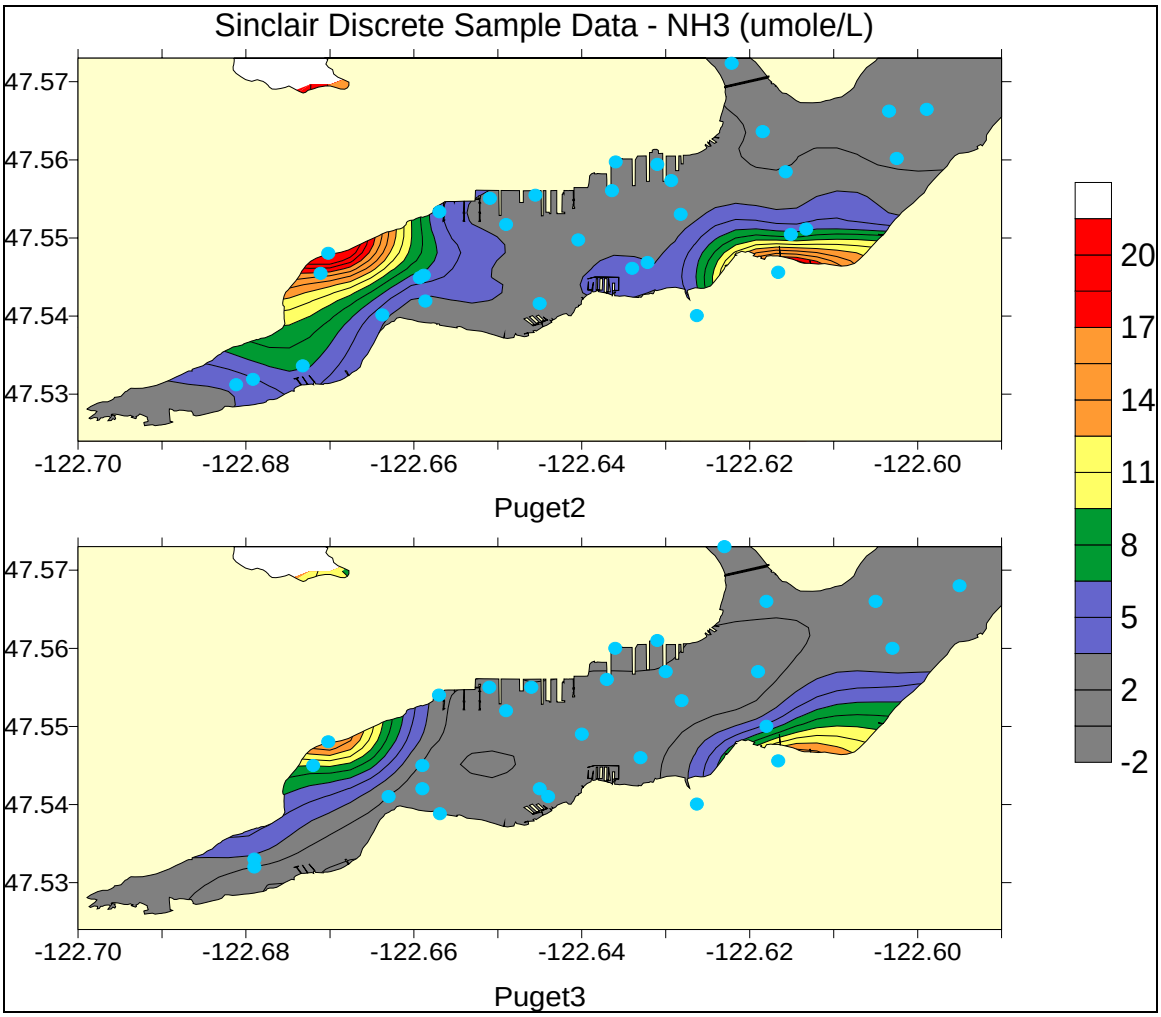
9.2.2 Silicate



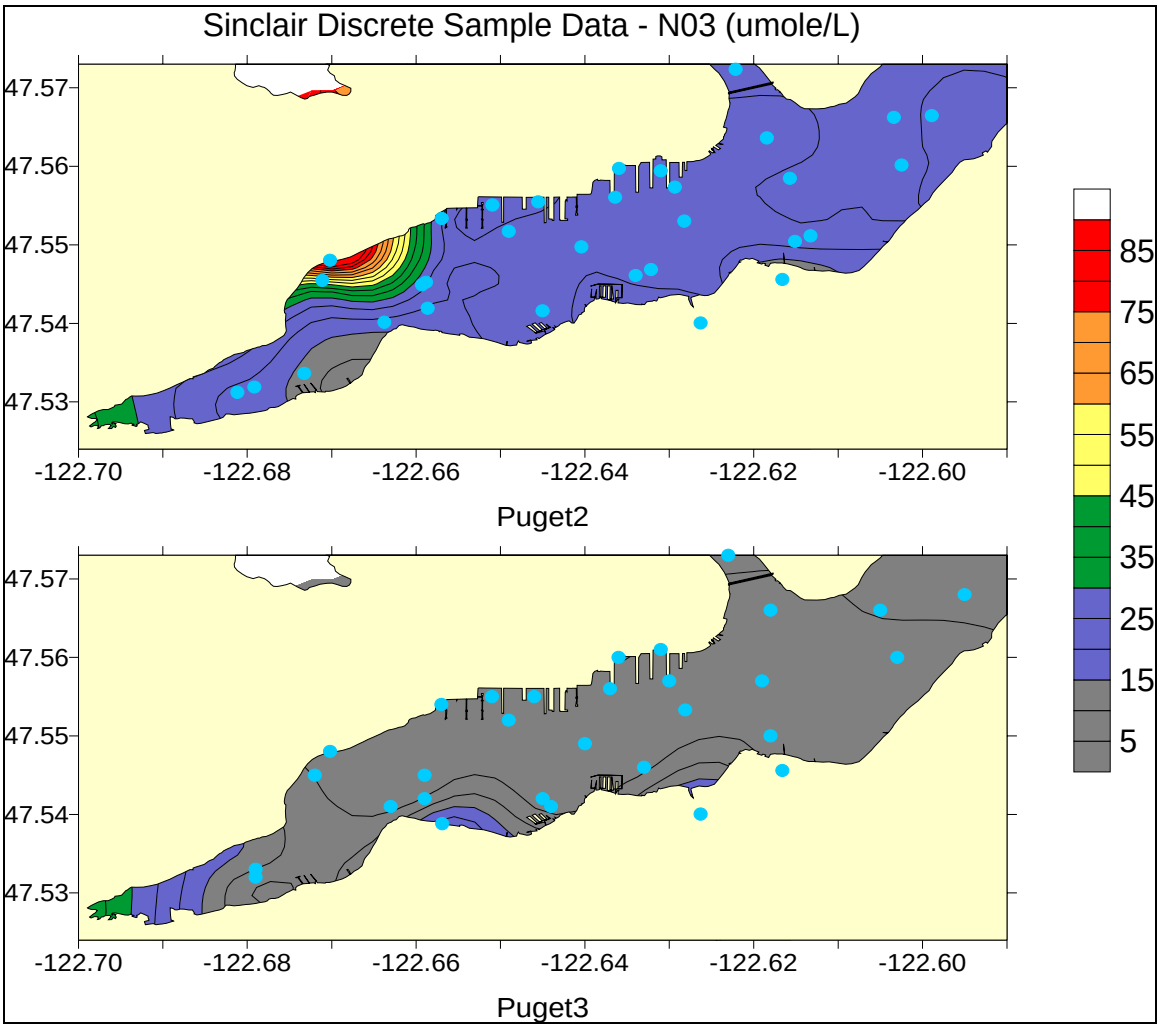
9.2.3 Nitrite


Sinclair Discrete Sample Data - N02 (umole/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Puget2
Puget3
17
15
13
11
9
7
5
3
1
-1

9.2.4 Ammonium

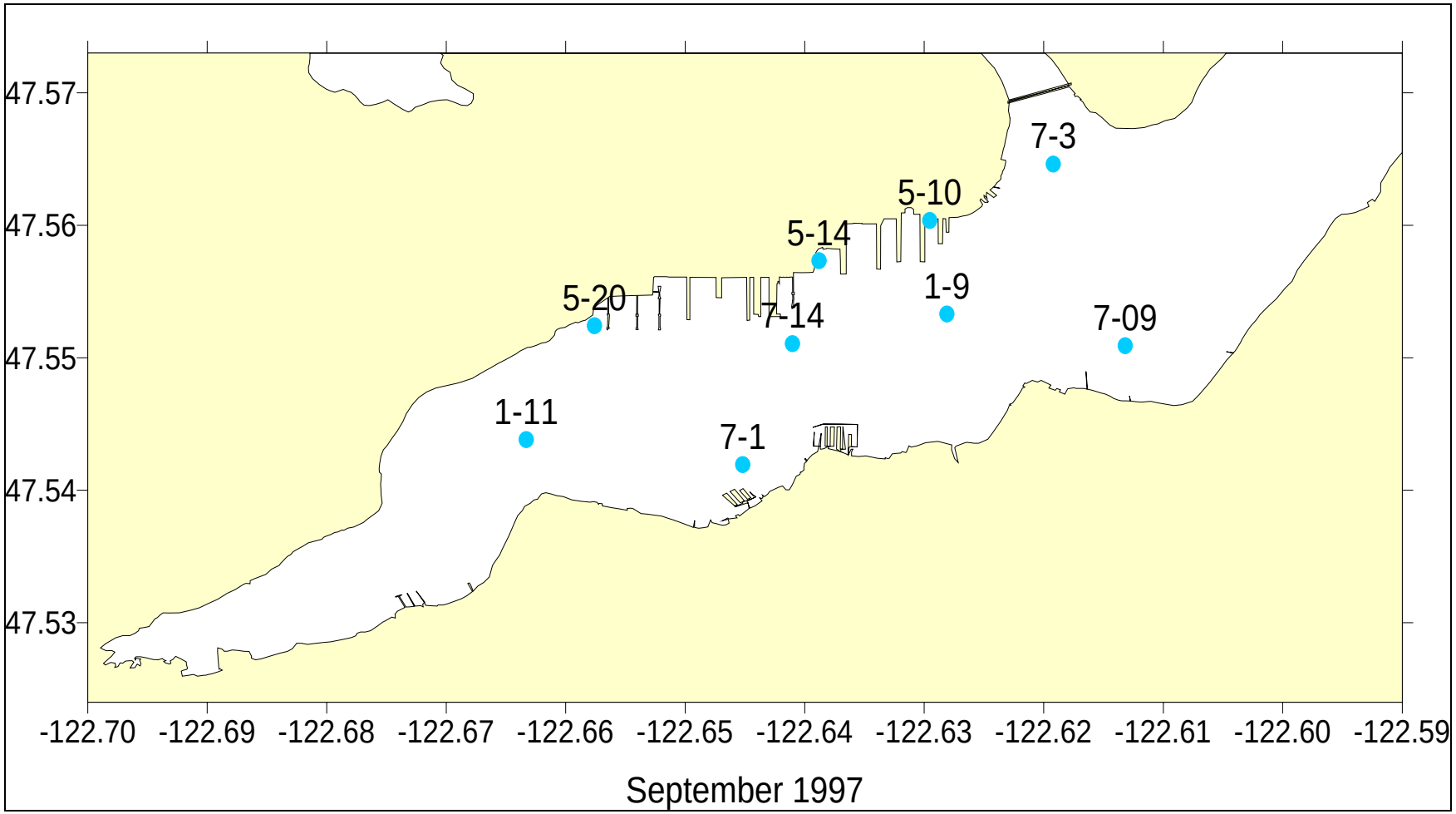


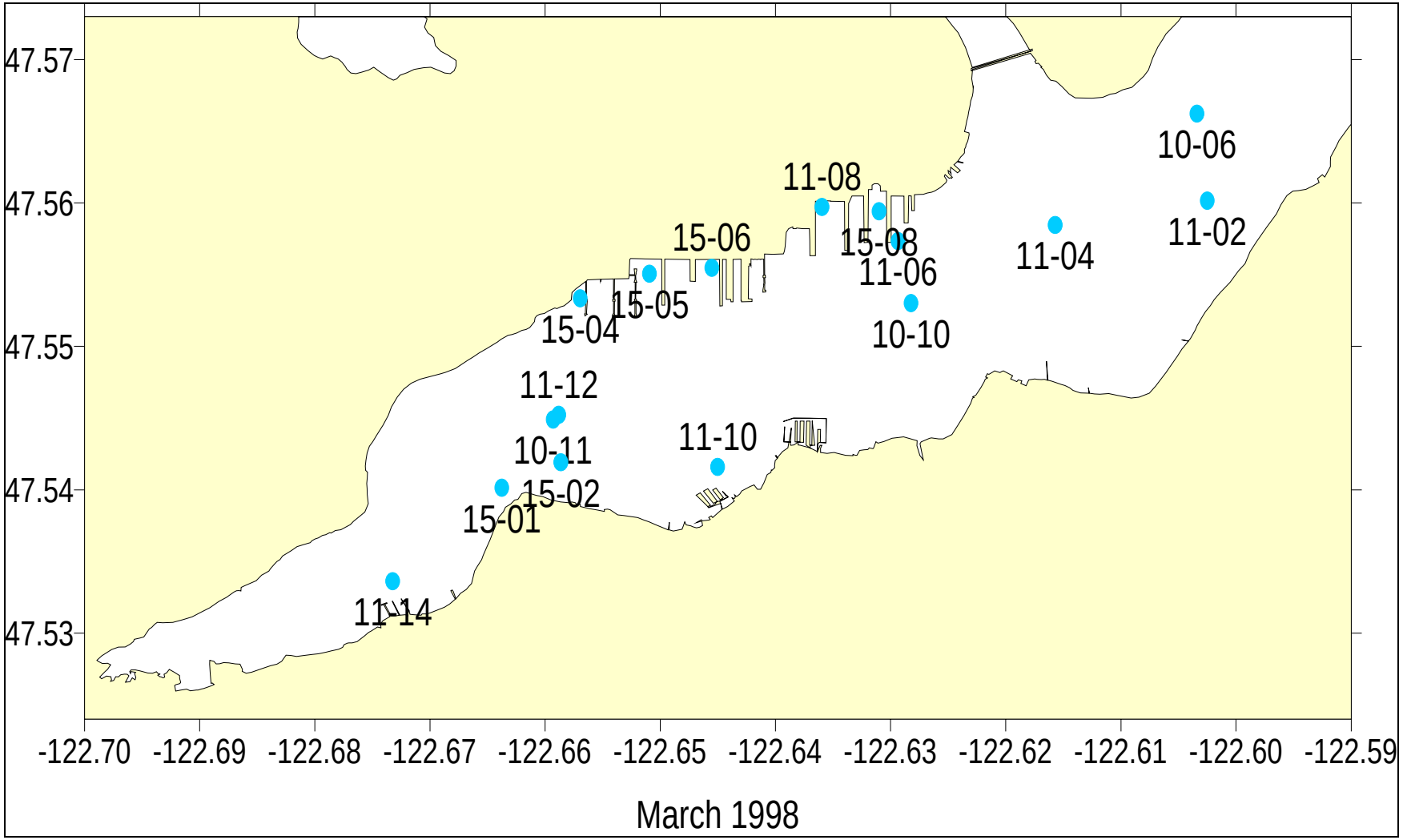
9.2.5 Nitrate

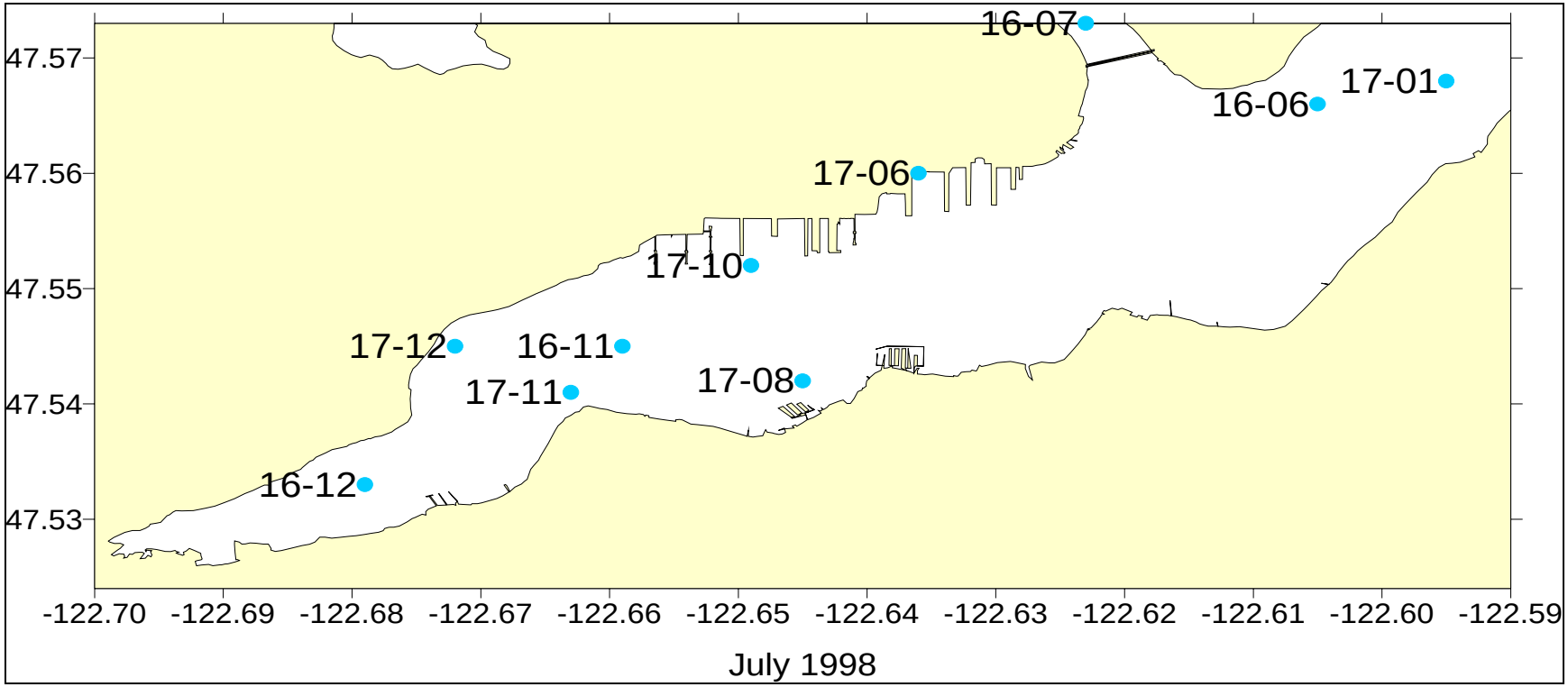

Sinclair Discrete Sample Data - N03 (umole/L)
47.57
47.56
47.55
47.54
47.53
-122.70
-122.68
-122.66
-122.64
-122.62
-122.60
Puget2
Puget3
85
75
65
55
45
35
25
15
5

10.1 Receiving

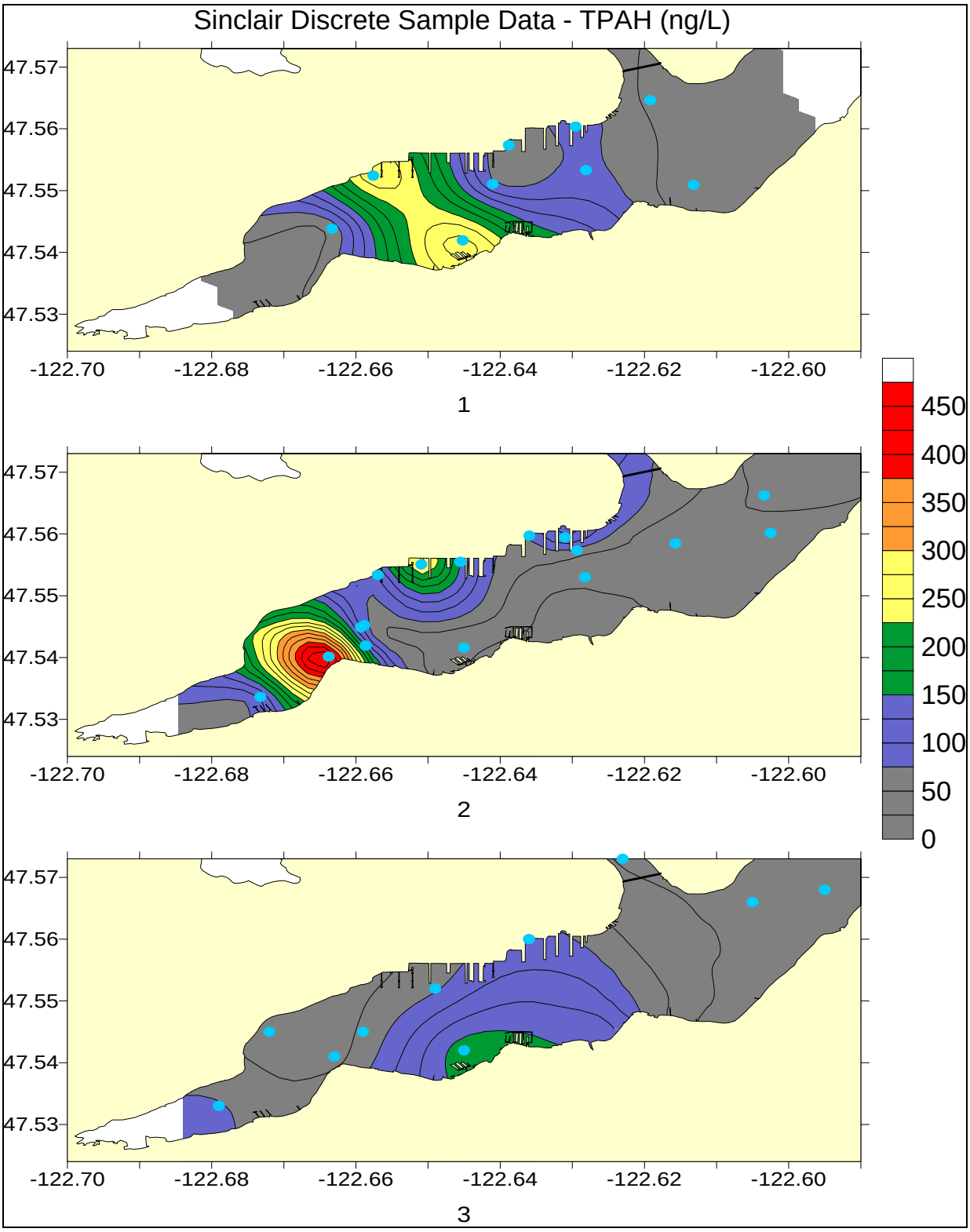
10.1.1 Discrete Sample Sites




47.57
47.56
47.55
47.54
47.53
-122.70
-122.69
-122.68
-122.67
-122.66
-122.65
-122.64
-122.63
-122.62
-122.61
-122.60
-122.59
10-06
11-08
11-02
15-06
15-08
11-04
11-06
15-05
15-04
10-10
11-12
11-10
10-11
15-02
15-01
11-14
March 1998

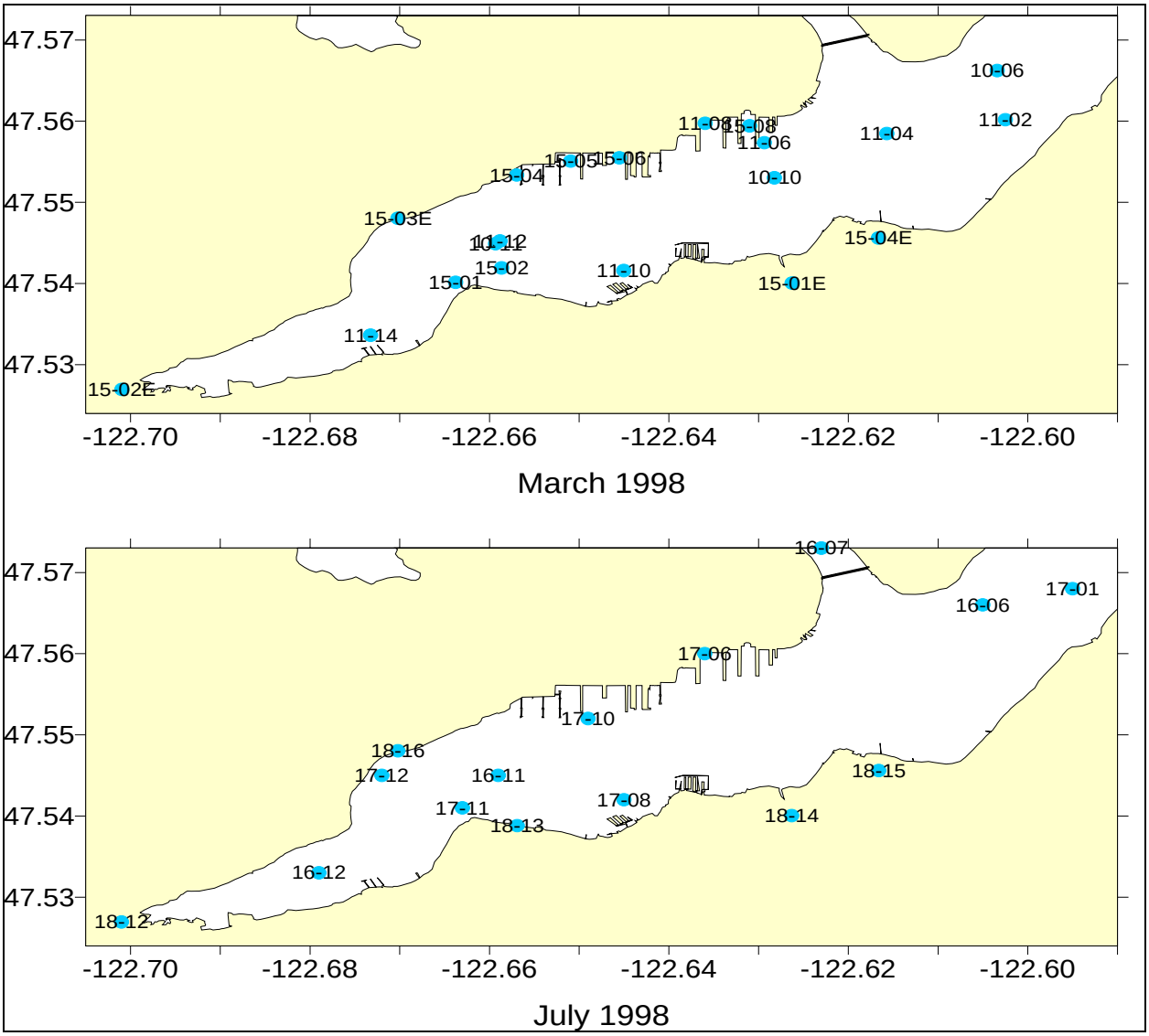

16-07
17-01
16-06
17-06
17-10
17-12
16-11
17-11
17-08
16-12
47.57
47.56
47.55
47.54
47.53
-122.70
-122.69
-122.68
-122.67
-122.66
-122.65
-122.64
-122.63
-122.62
-122.61
-122.60
-122.59
July 1998

10.1.2 TPAH Concentration

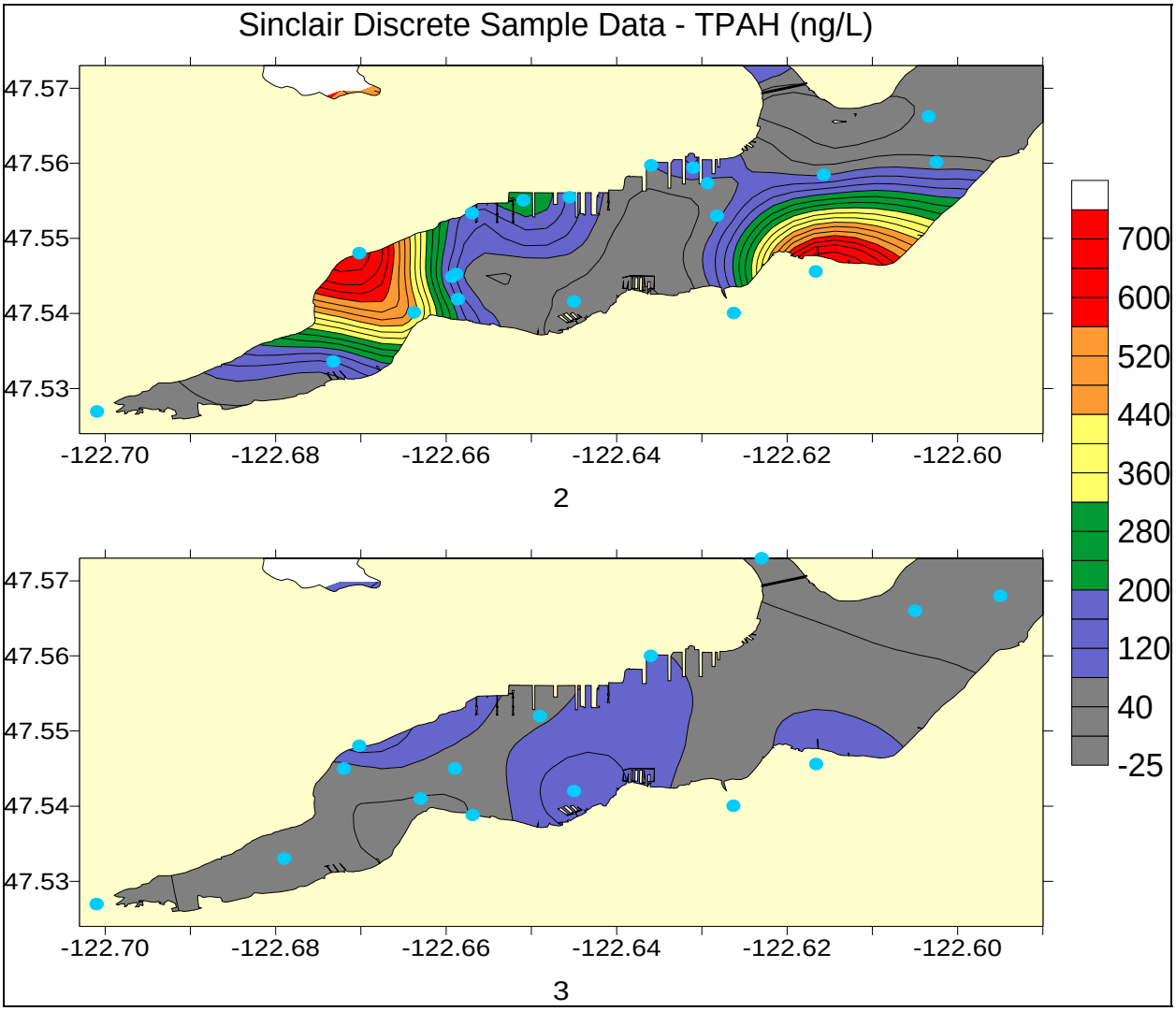


10.2 Effluents

10.2.1 Discrete Sample Sites

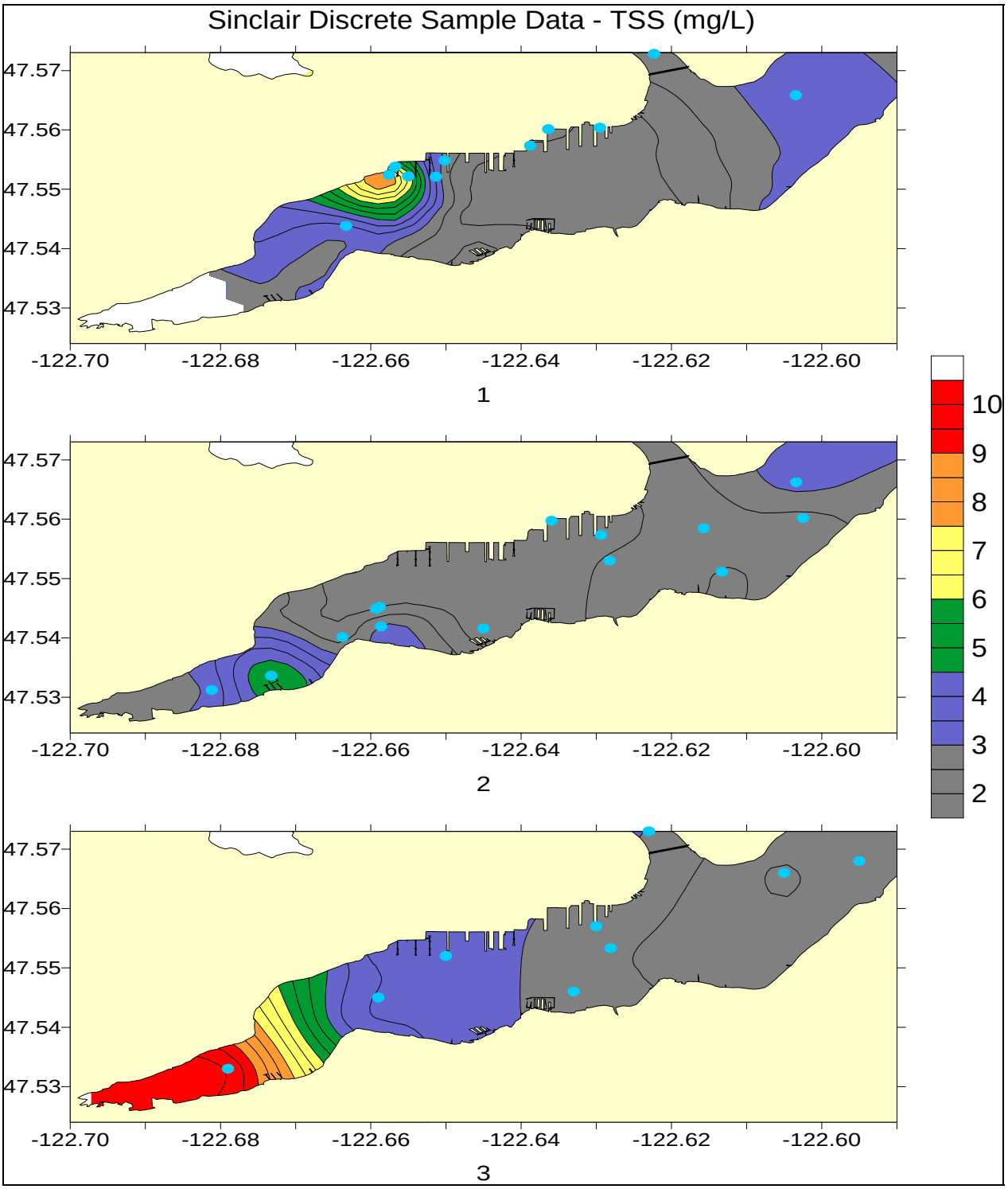


10.2.2 TPAH Concentration

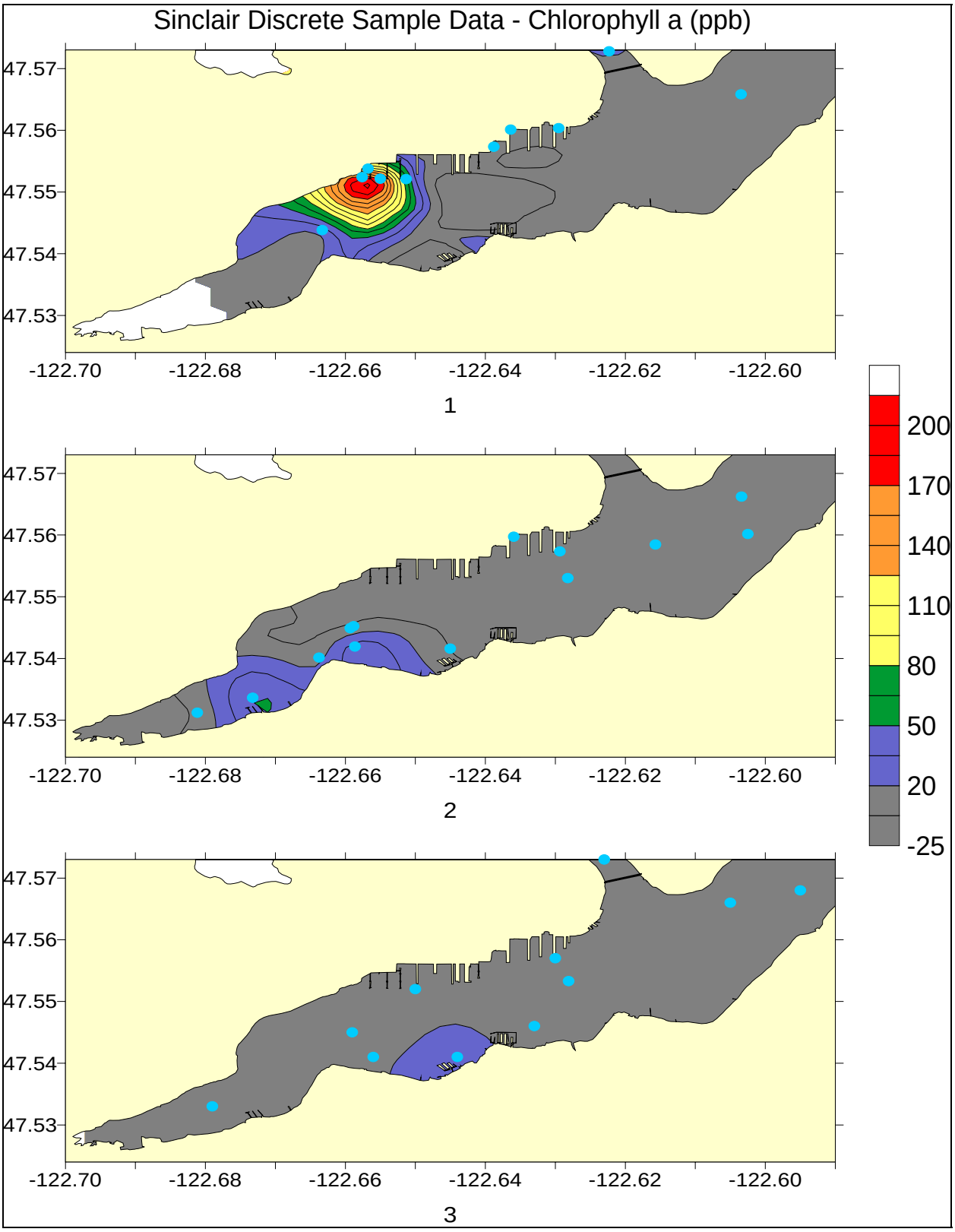


11.1 Receiving

11.1.1 TSS

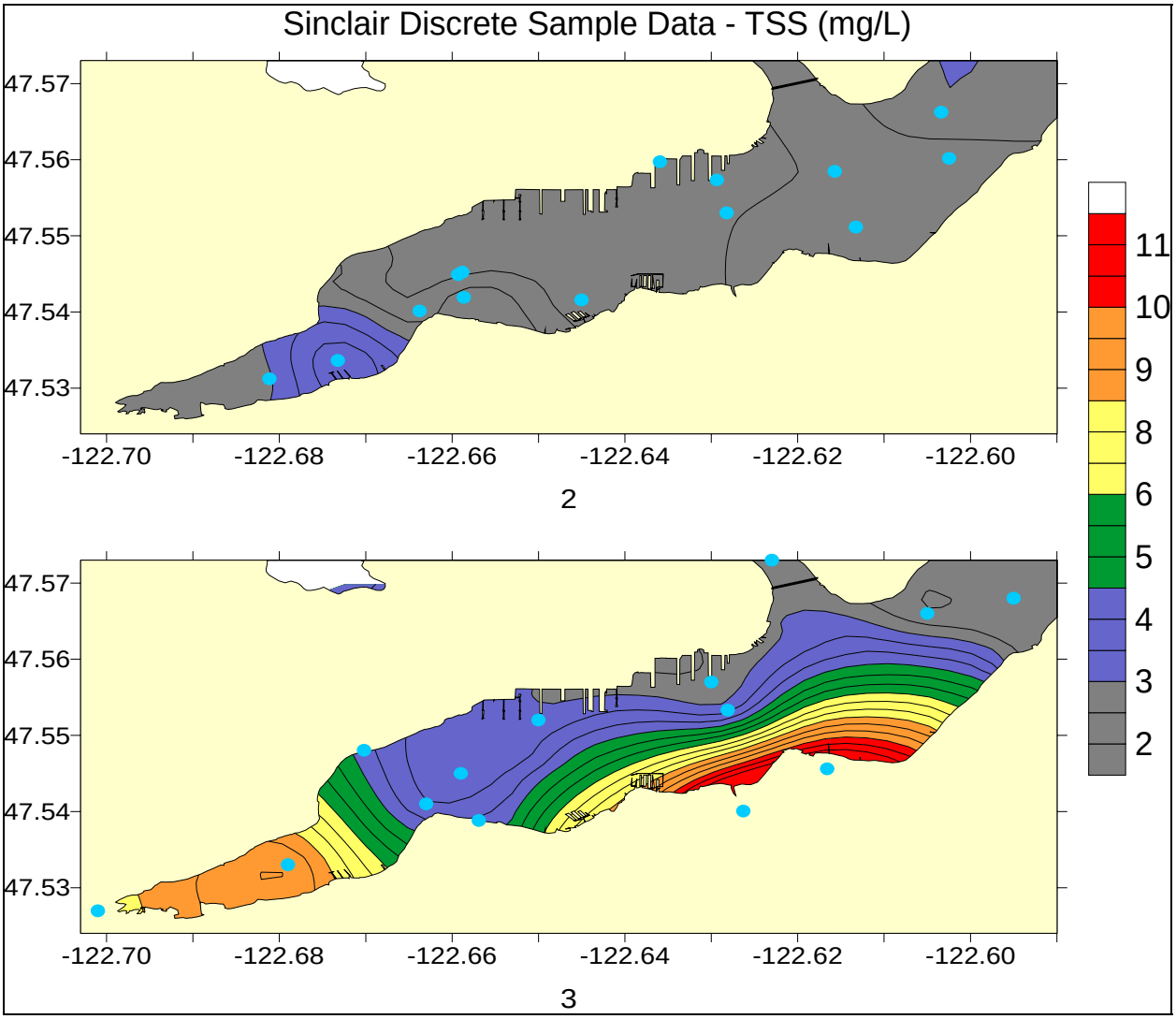


11.1.2 Chlorophyll a

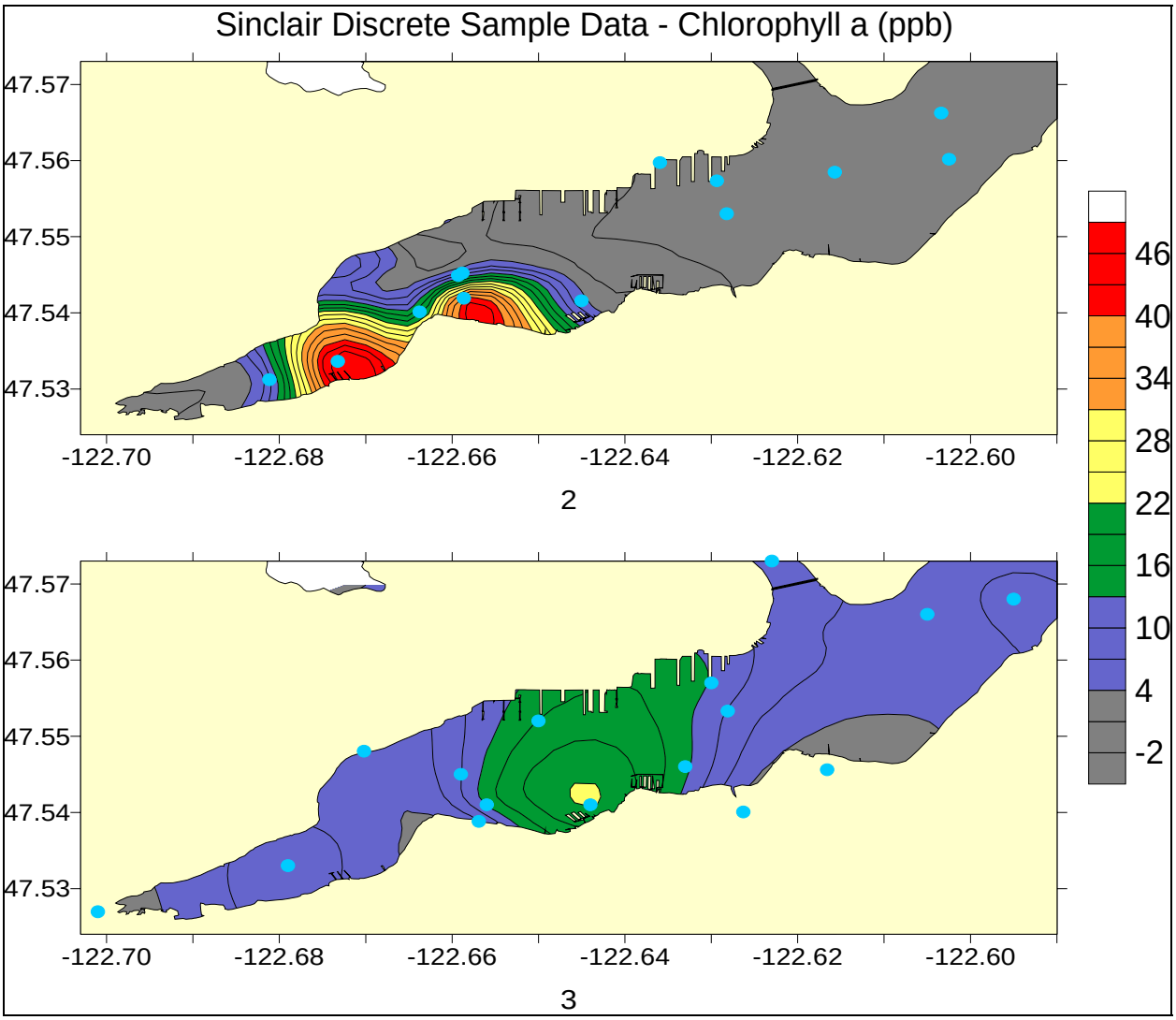


11.2 Effluents

11.2.1 TSS

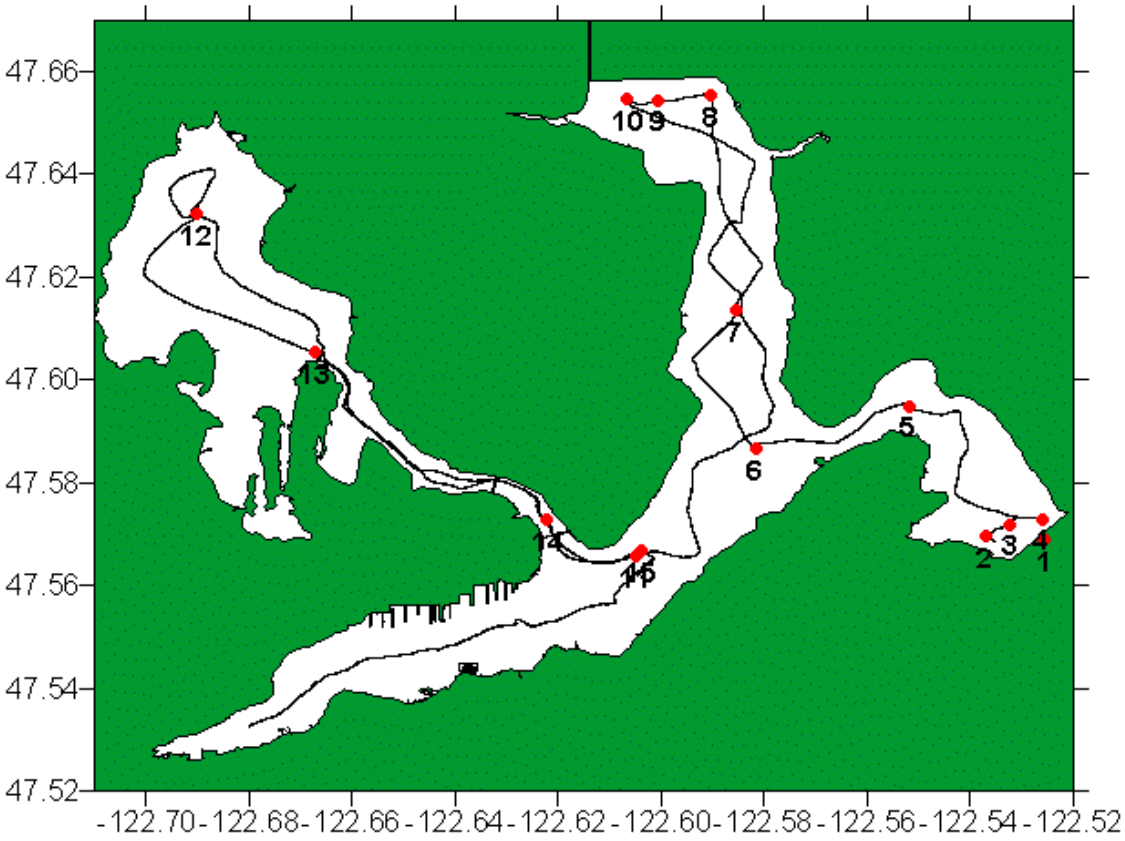


11.2.2 Chlorophyll a

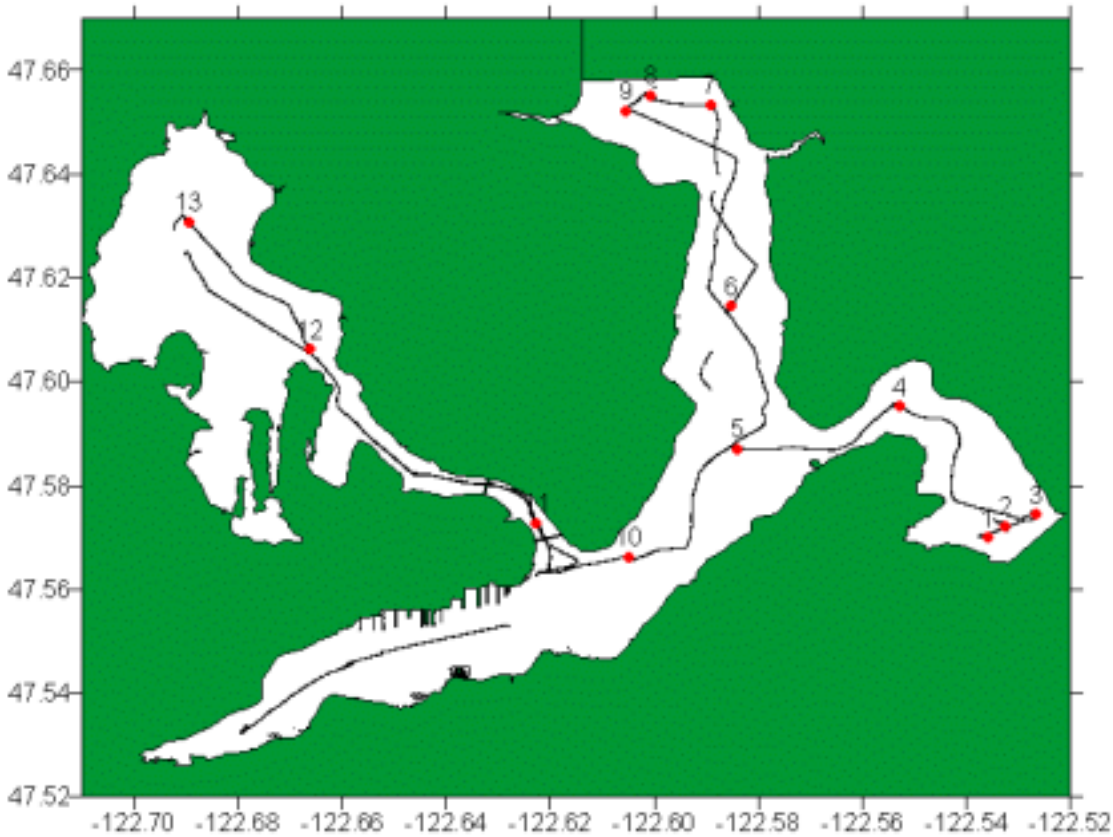


12 Vertical Profiles

Vertical Profile Stations collected on PS10 (11 March 98) and PS16 (16 July 1998). Data are plotted at full scale for each parameter. In many cases, when the data range is small, particularly noticeable for pH, the resultant plot shows the measurement resolution of the sensor.

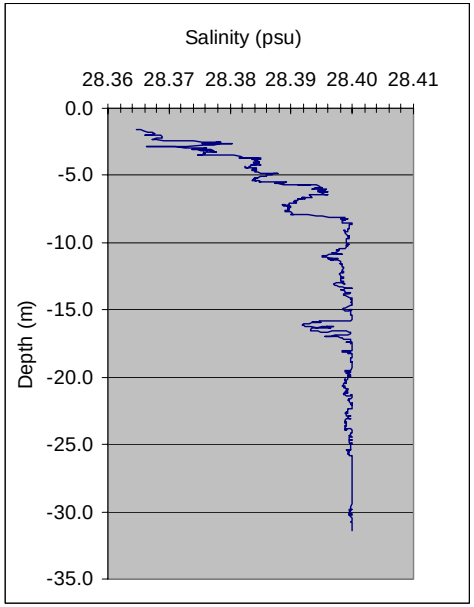


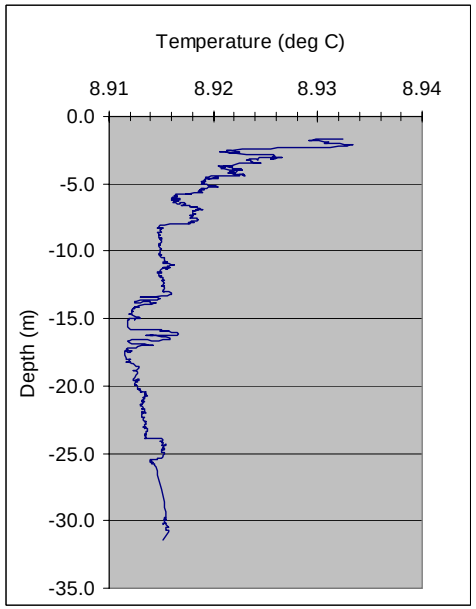
PS10-11 March 1998 Vertical Profile Stations

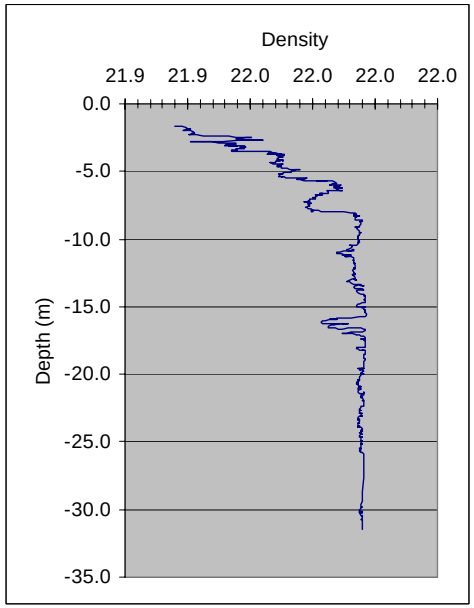


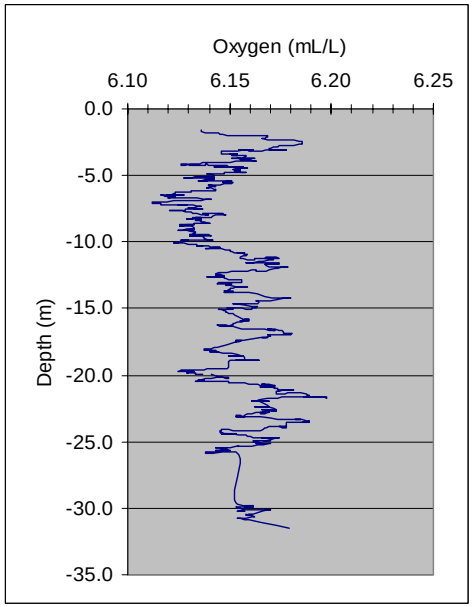
PS16-16 July 1998 Vertical Profile Stations

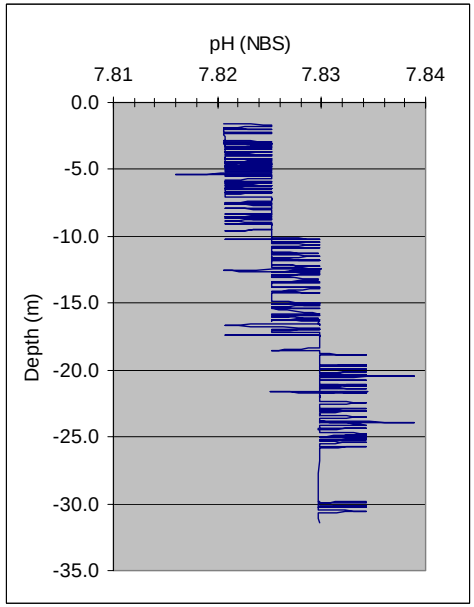
12.1 PS10 Station 1

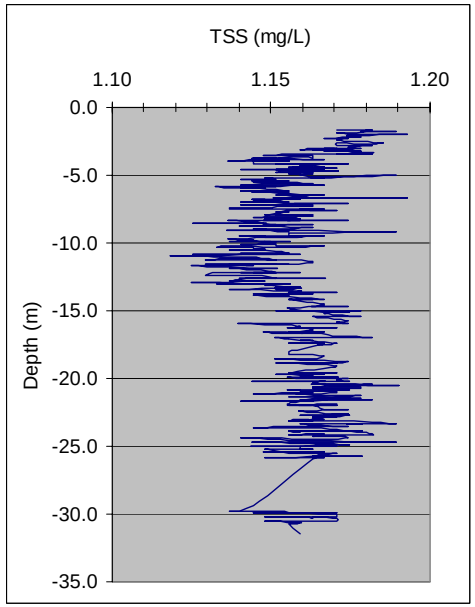




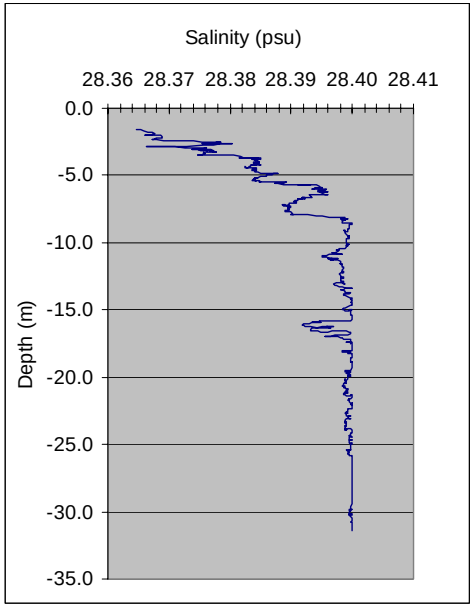


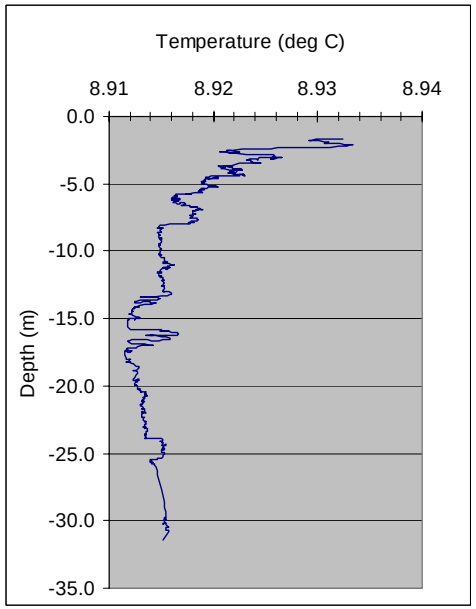


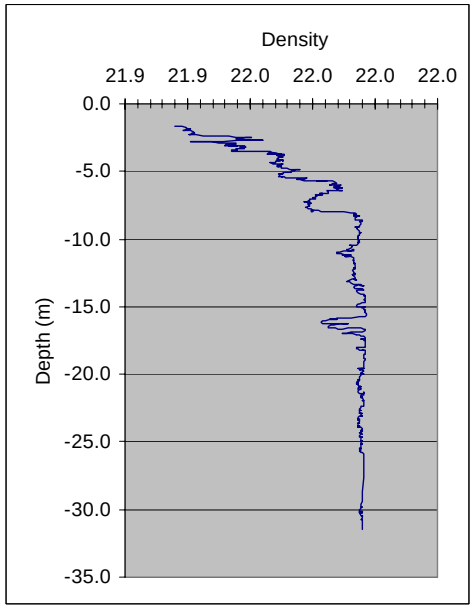


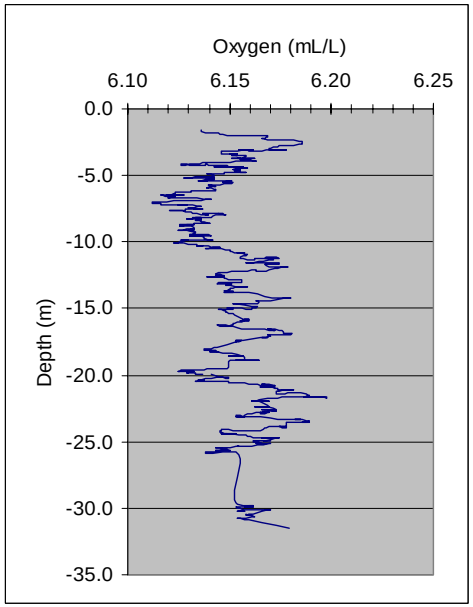


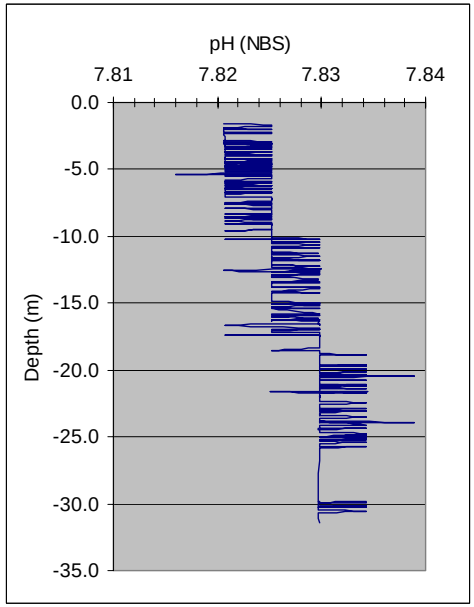
12.2 PS10 Station 1

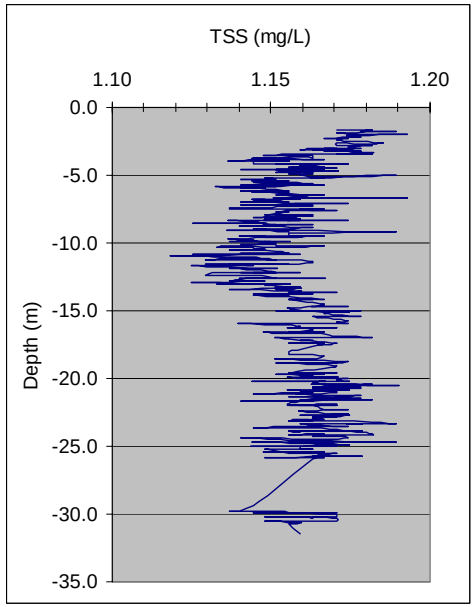




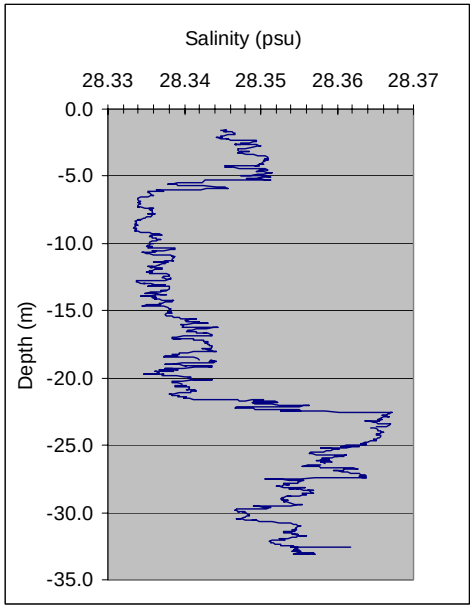


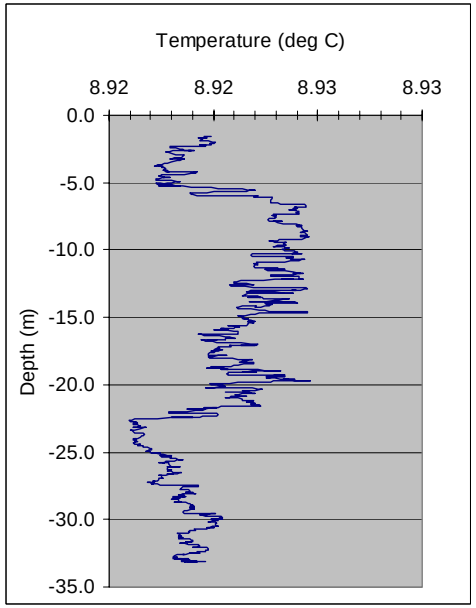


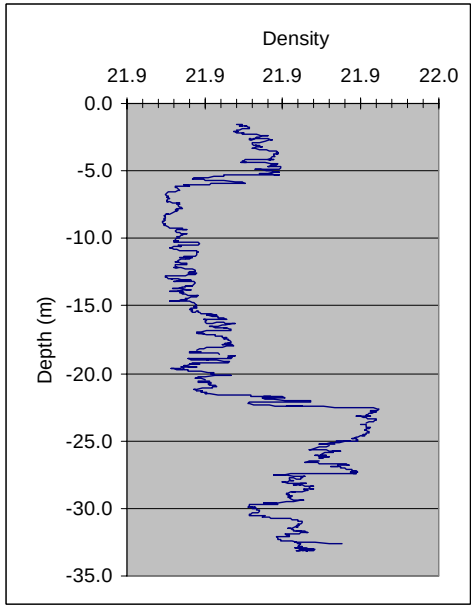


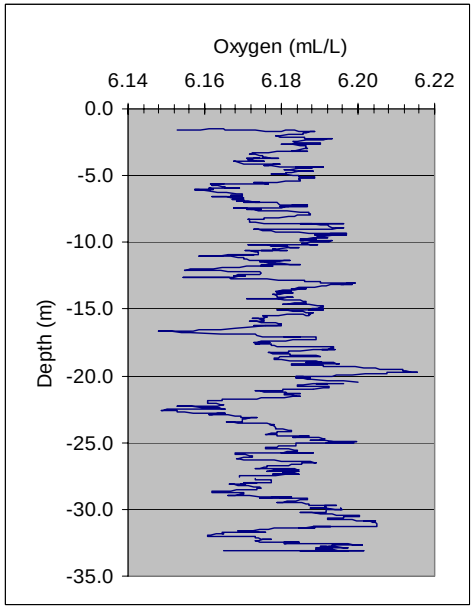


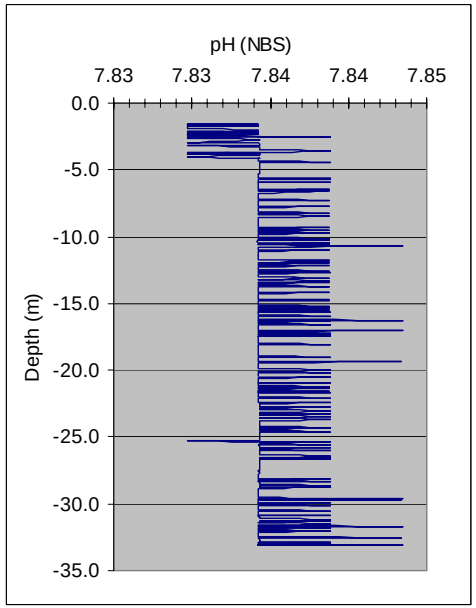
12.3 ***PS10 Station 2***

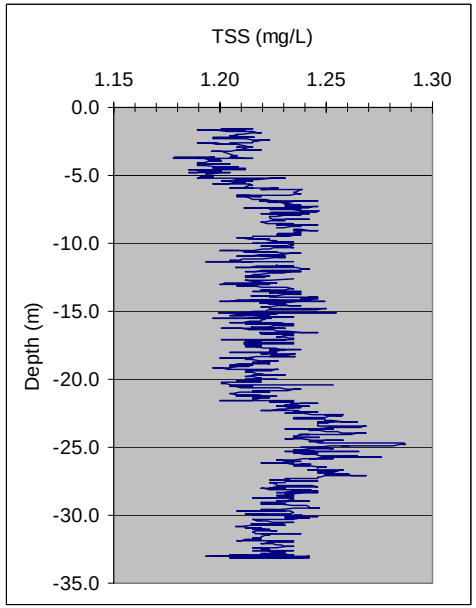




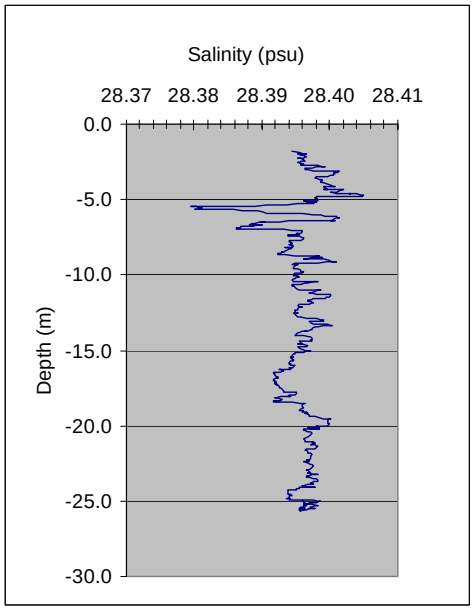


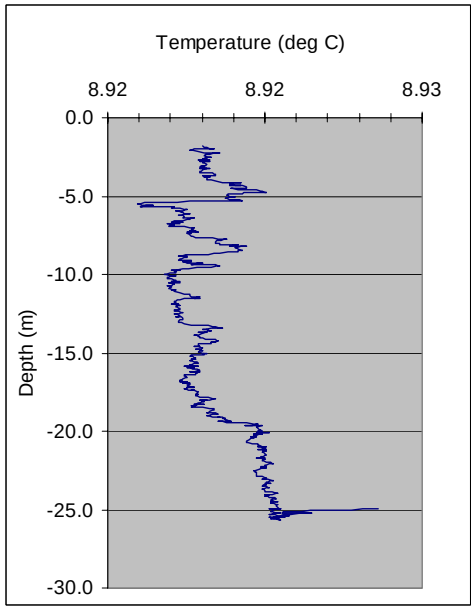


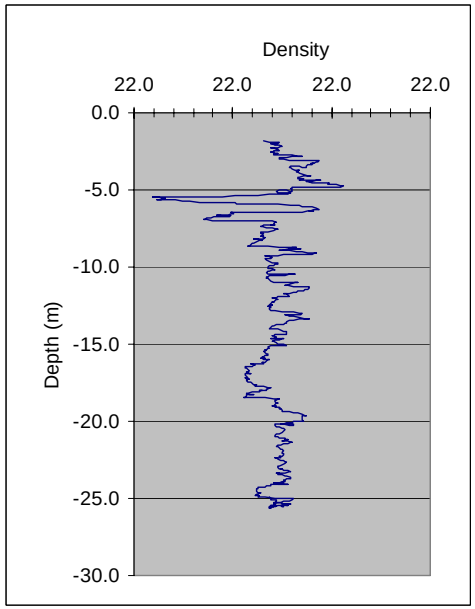


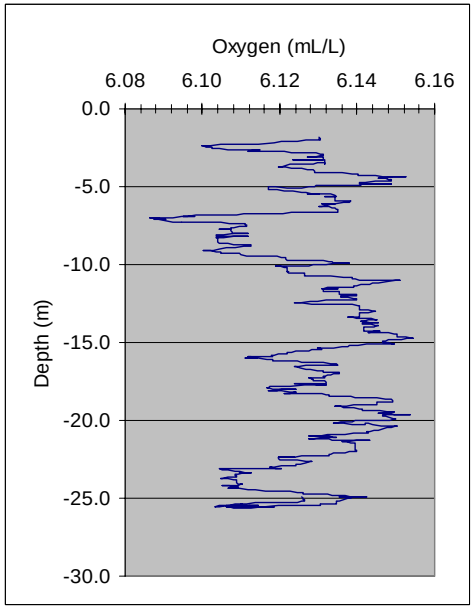


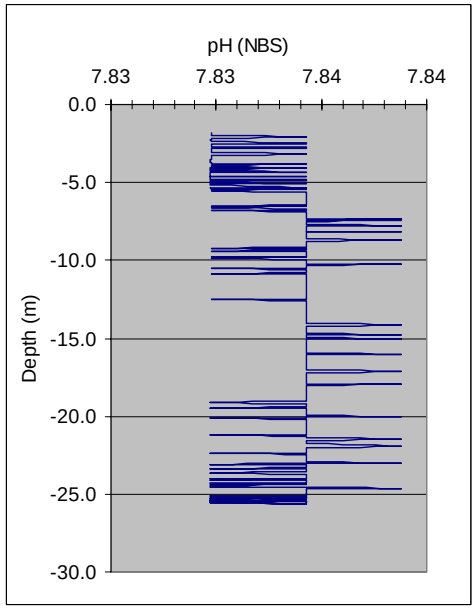
12.4 PS10 Station 3

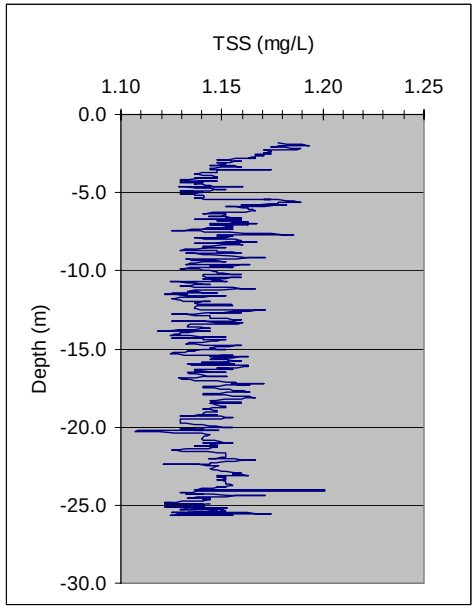




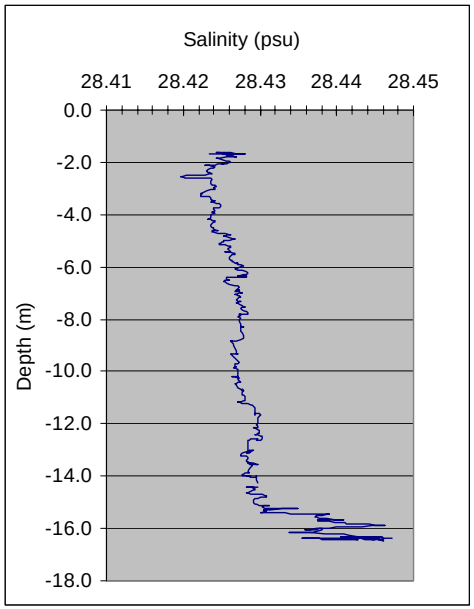


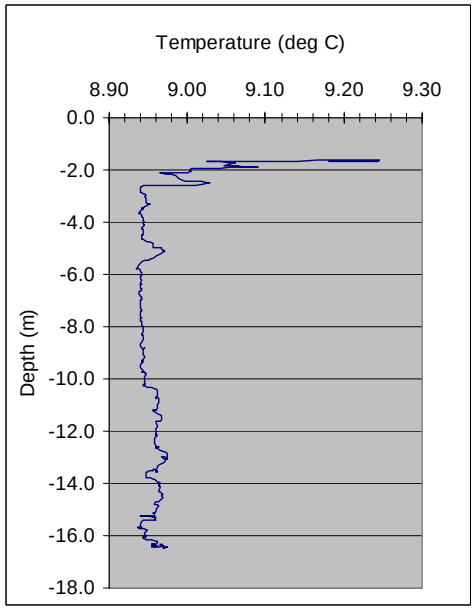


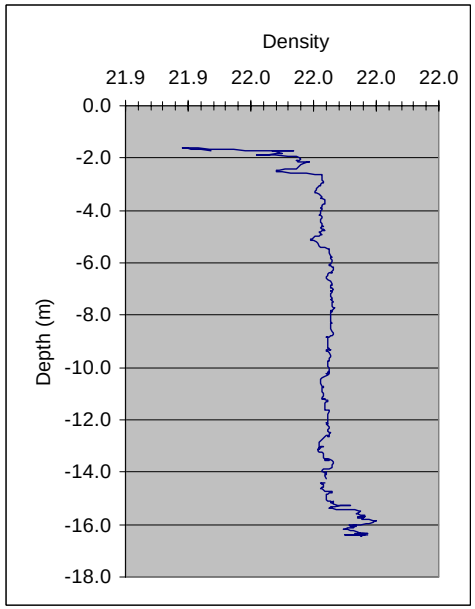


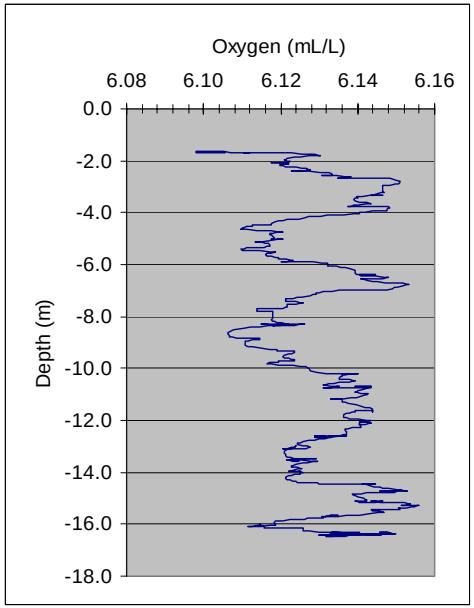


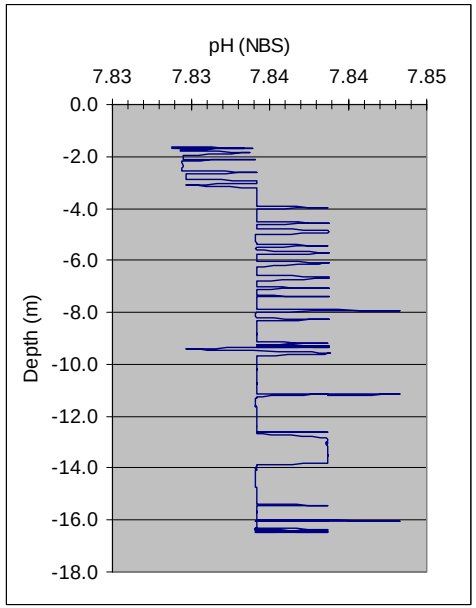
12.5 PS10 Station 4

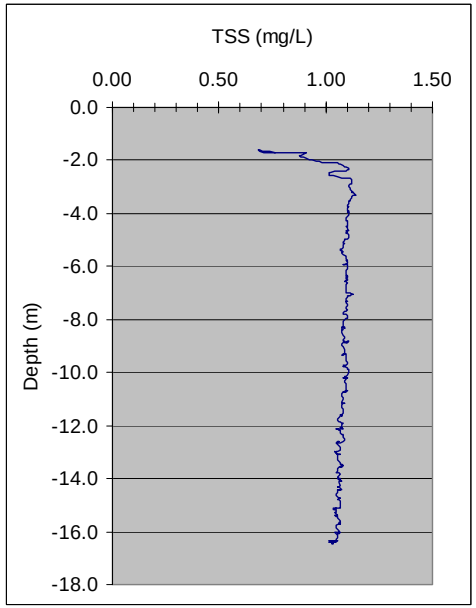




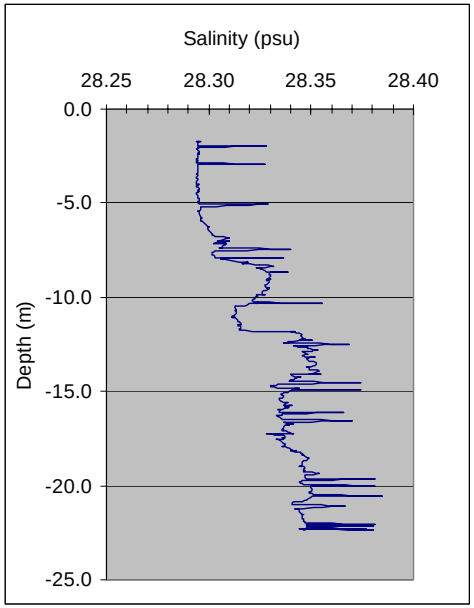


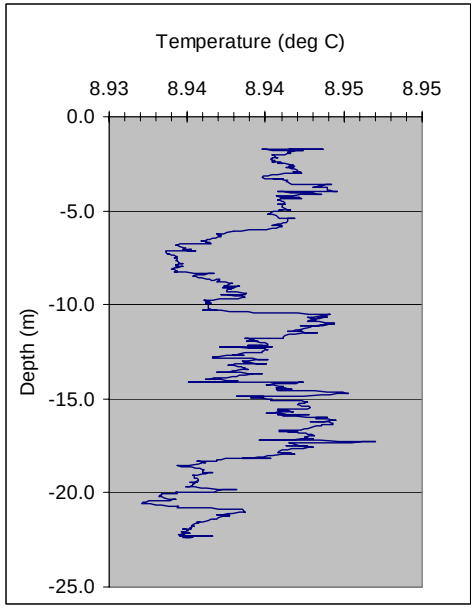


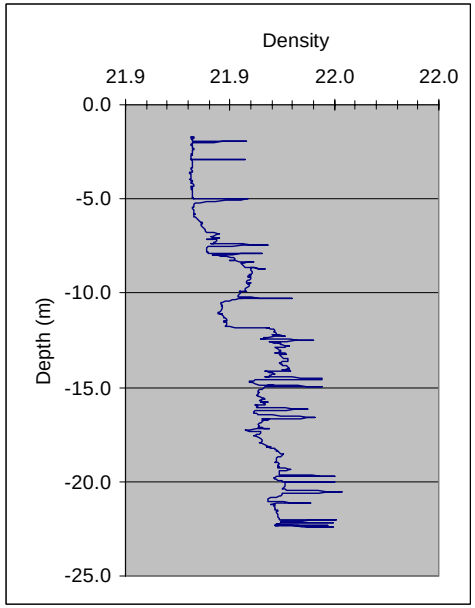


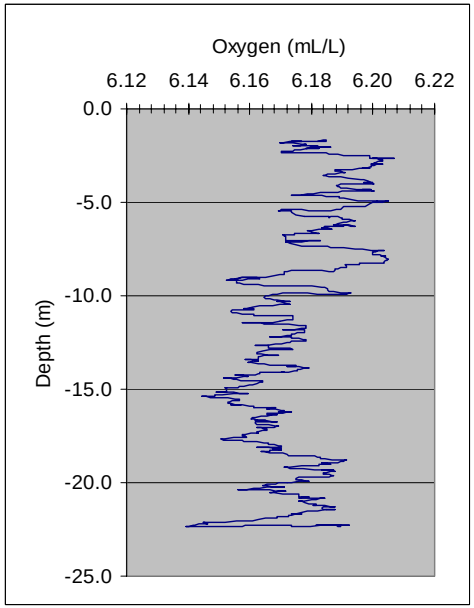


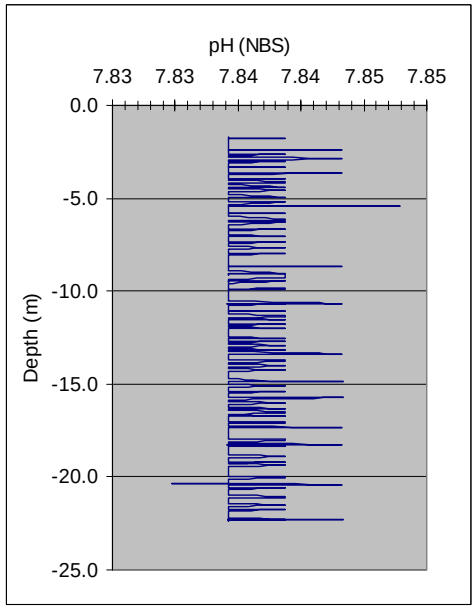
12.6 PS10 Station 5

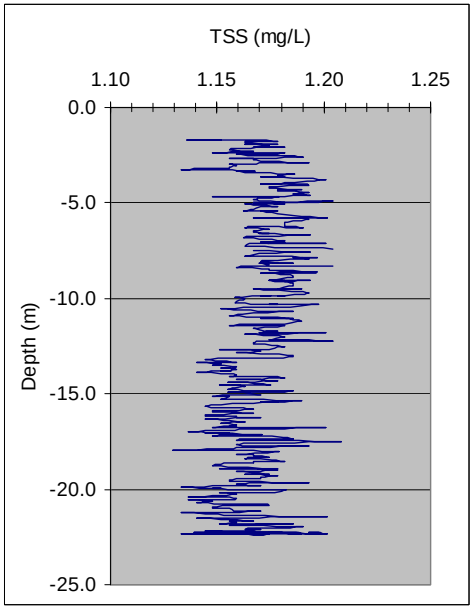




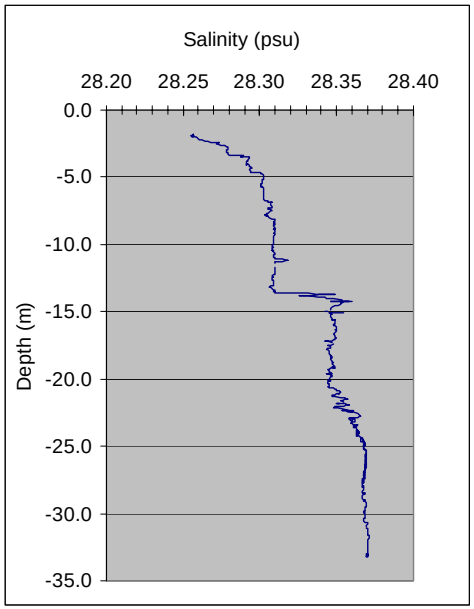


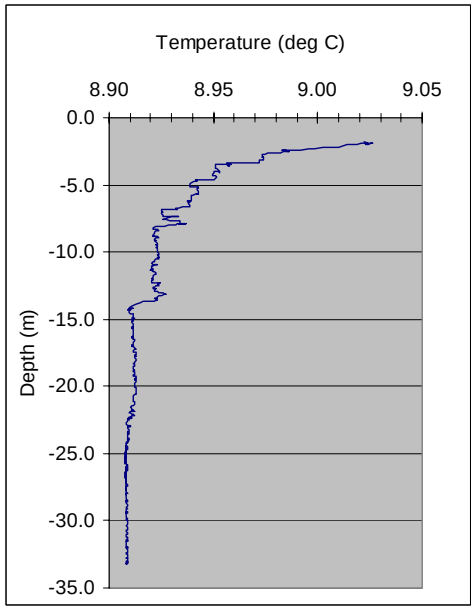


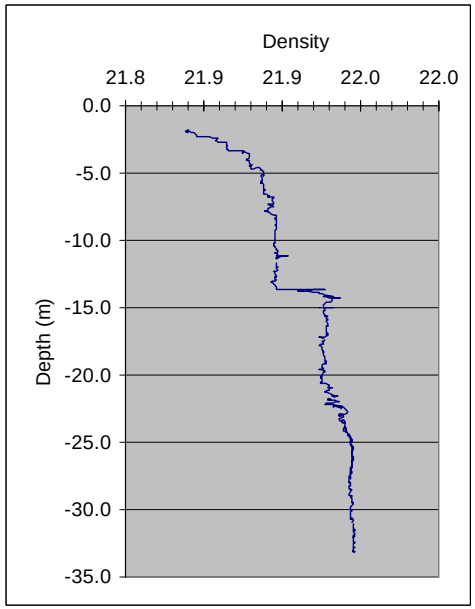


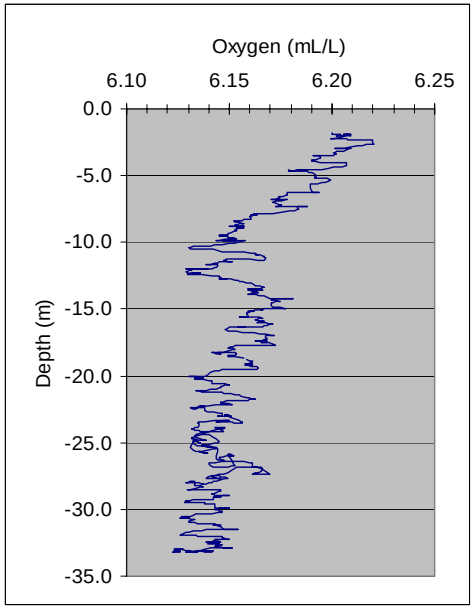


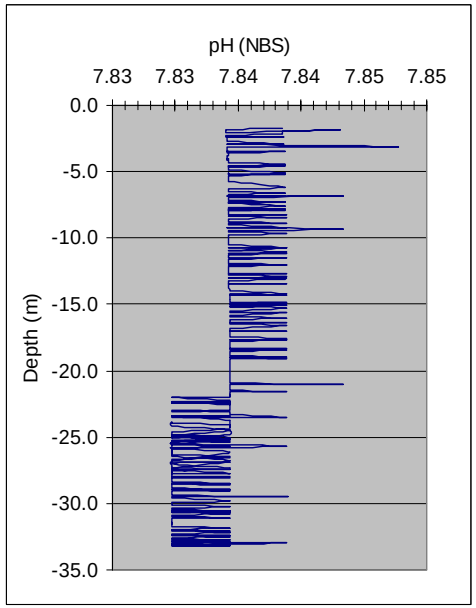
12.7 PS10 Station 6

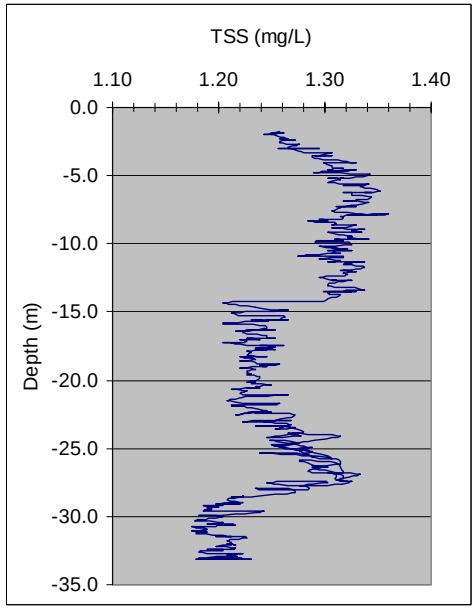




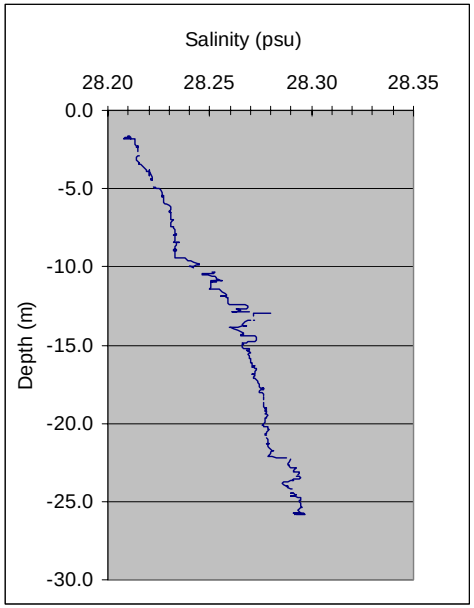


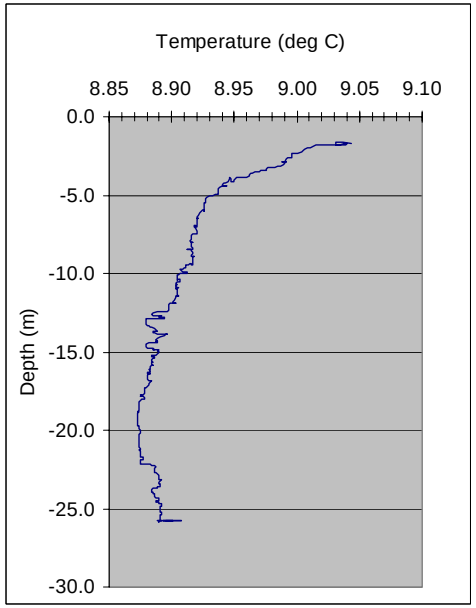


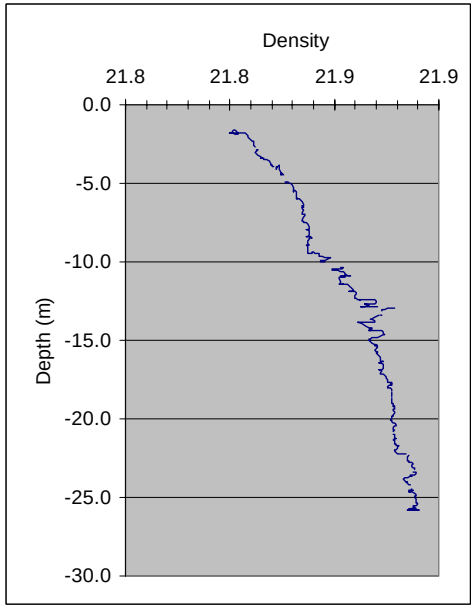


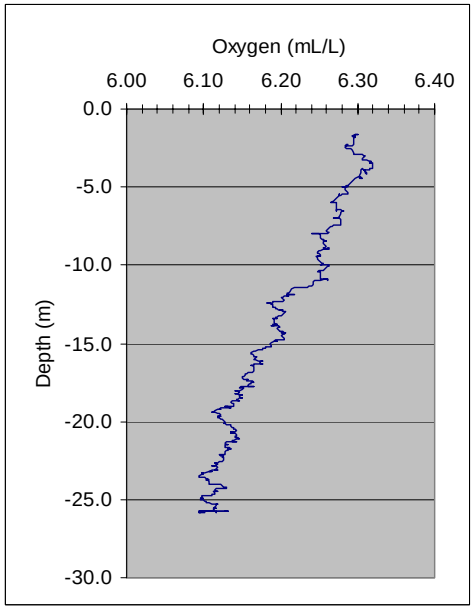


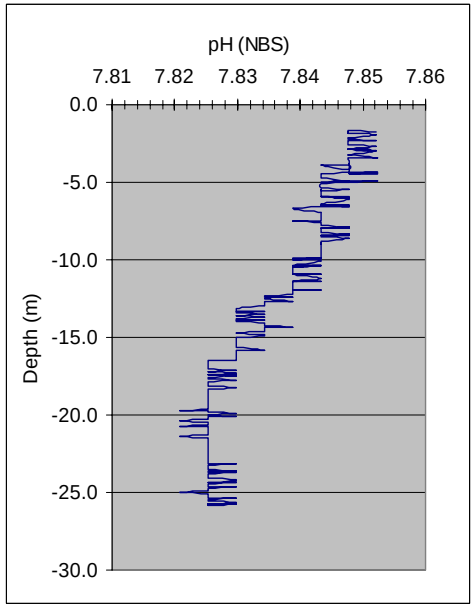
12.8 PS10 Station 7

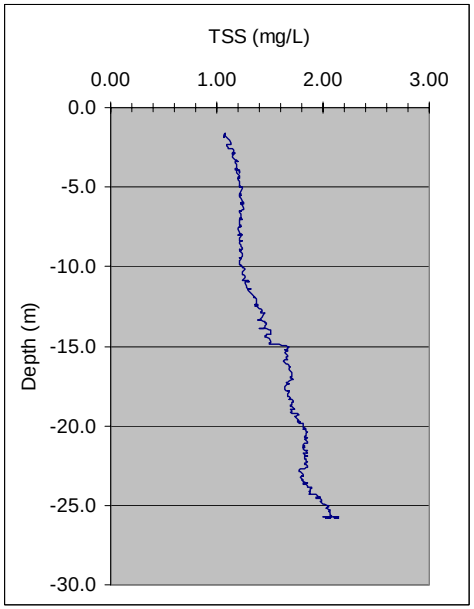




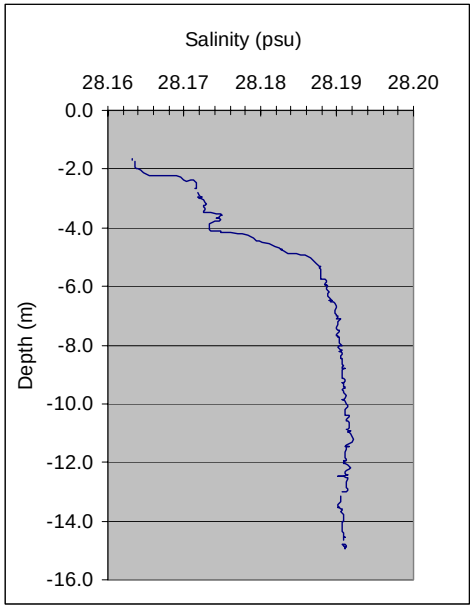


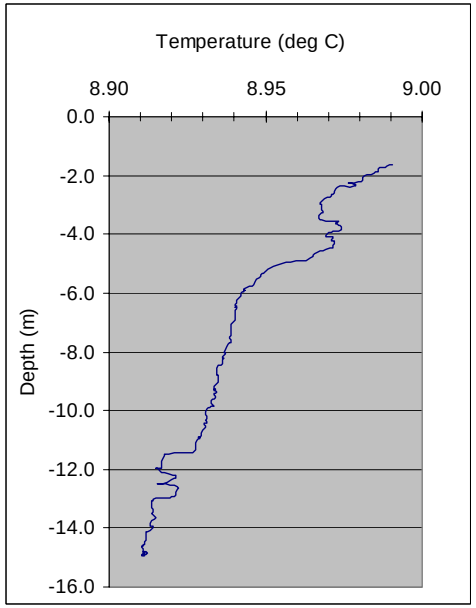


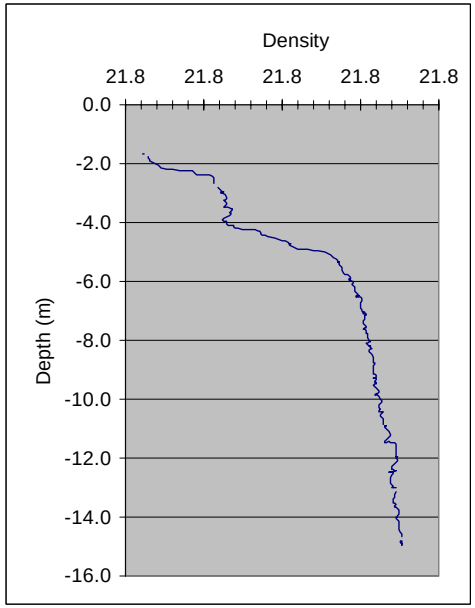


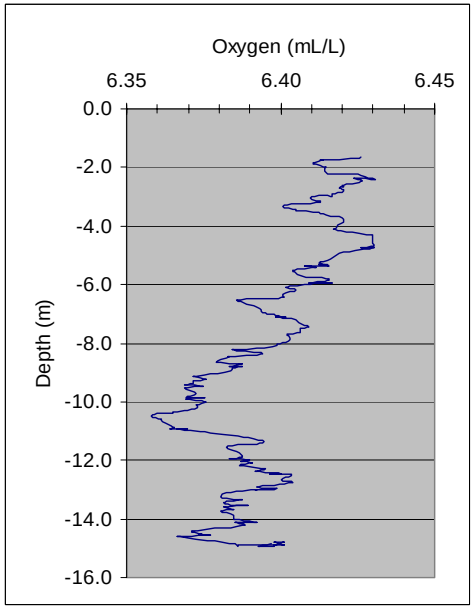


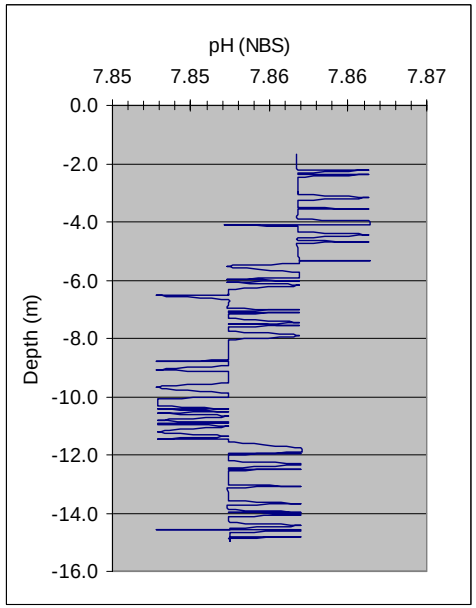
12.9 PS10 Station 8

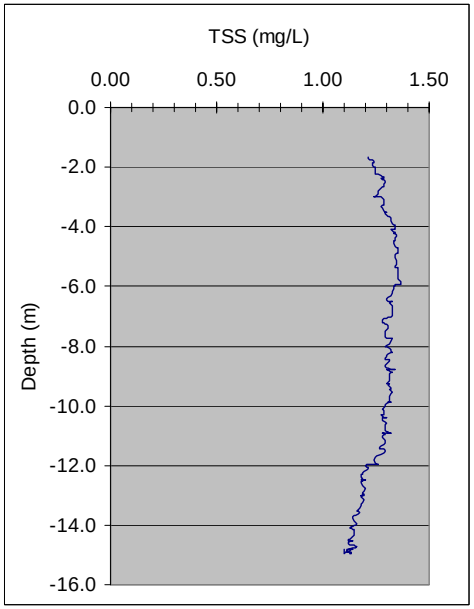




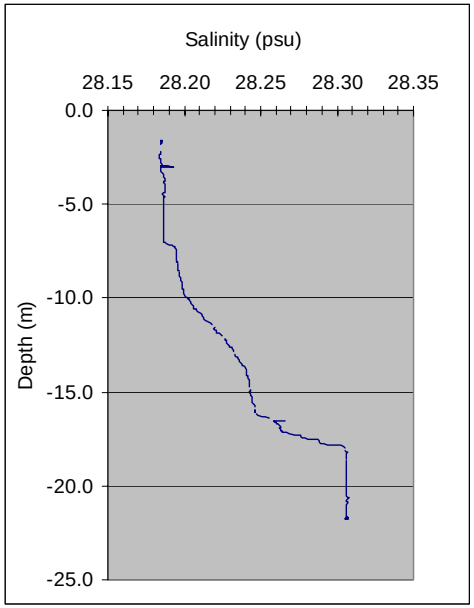


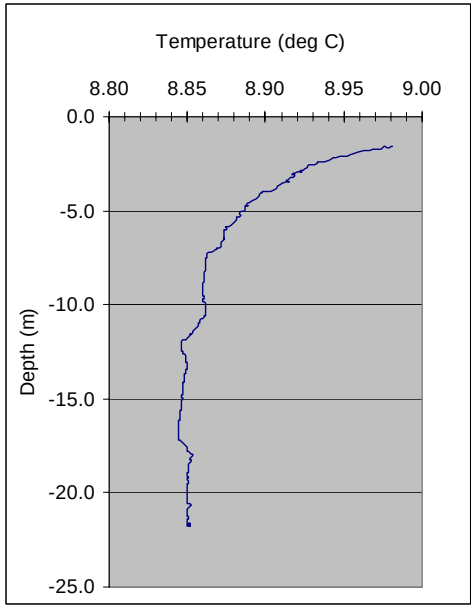


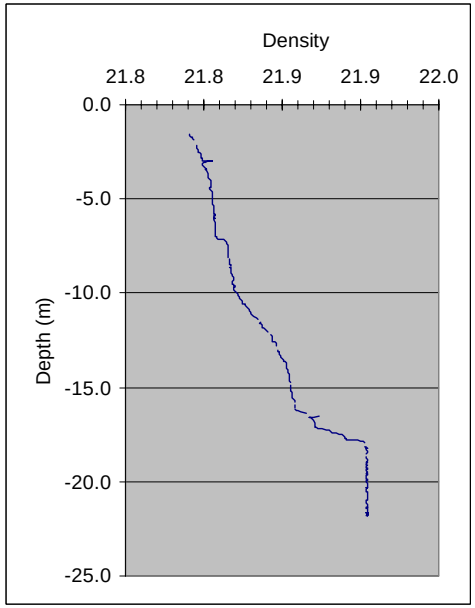


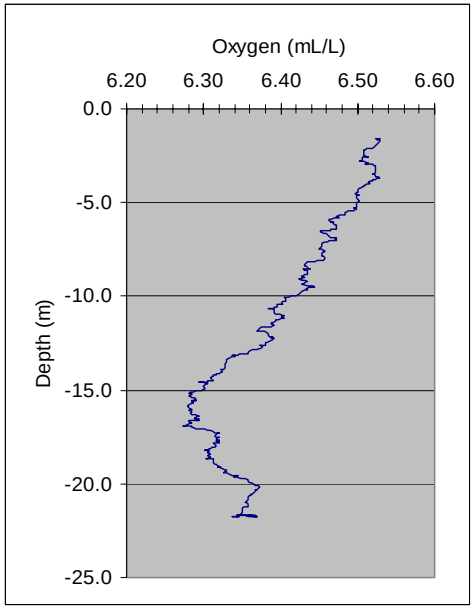


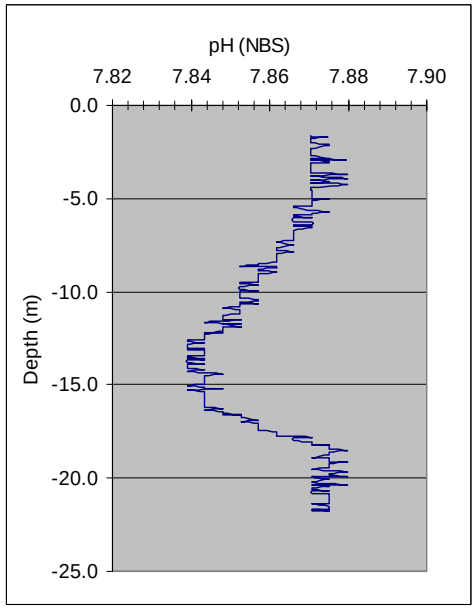
12.10 PS10 Station 9

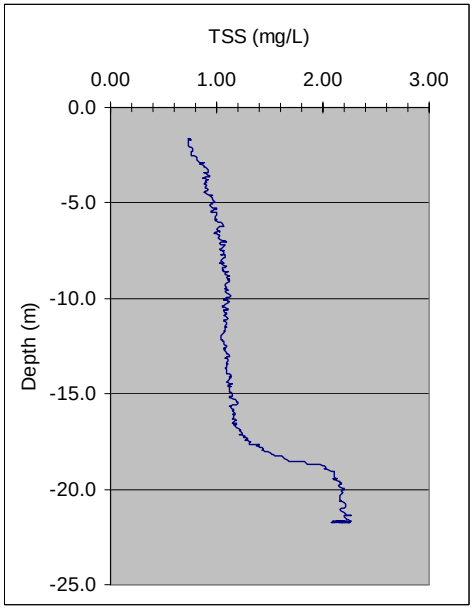




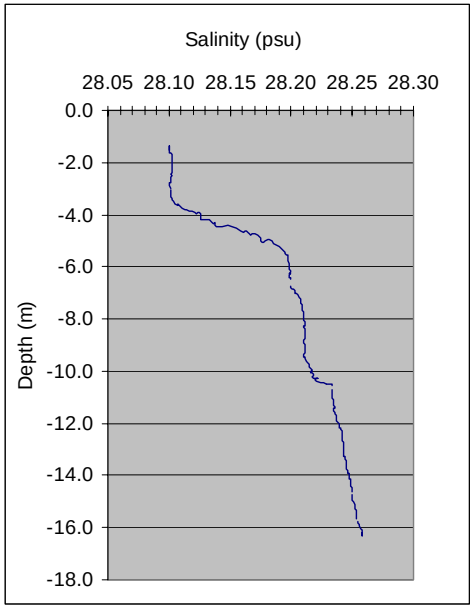


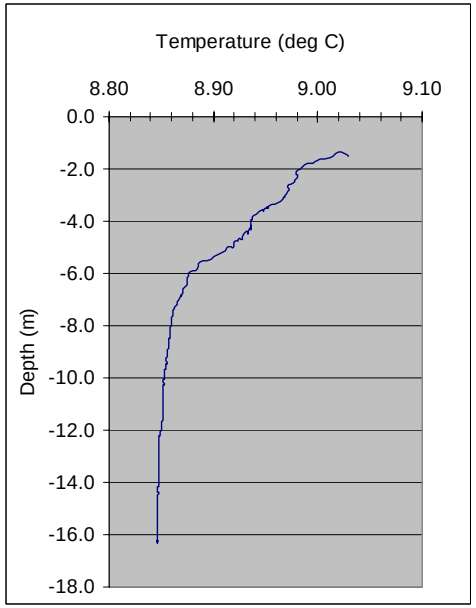


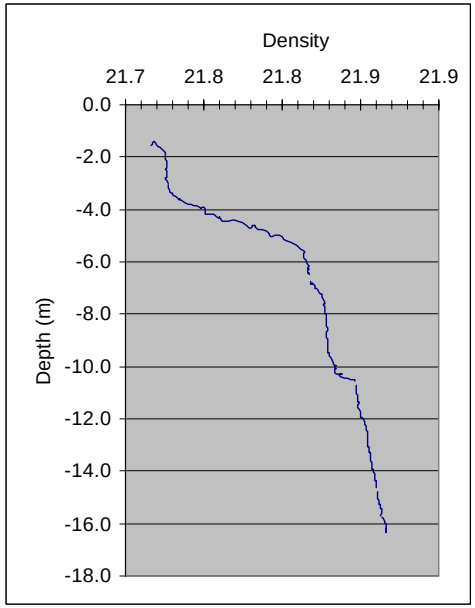


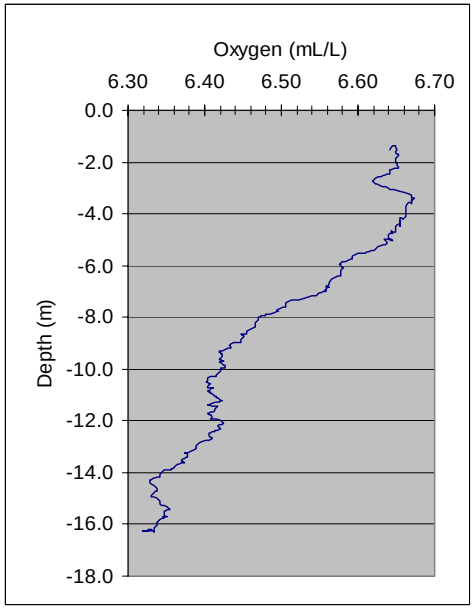


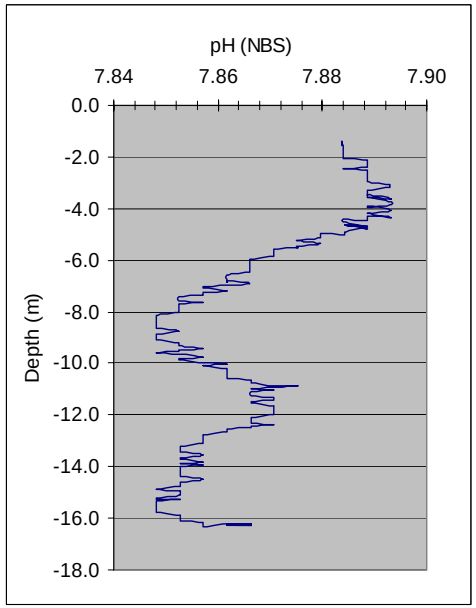
12.11 PS10 Station 10

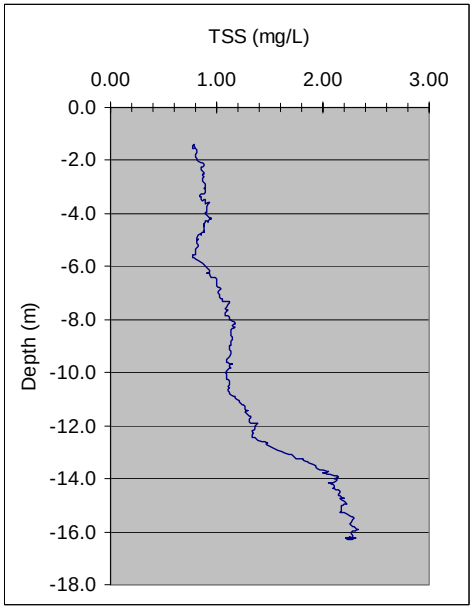




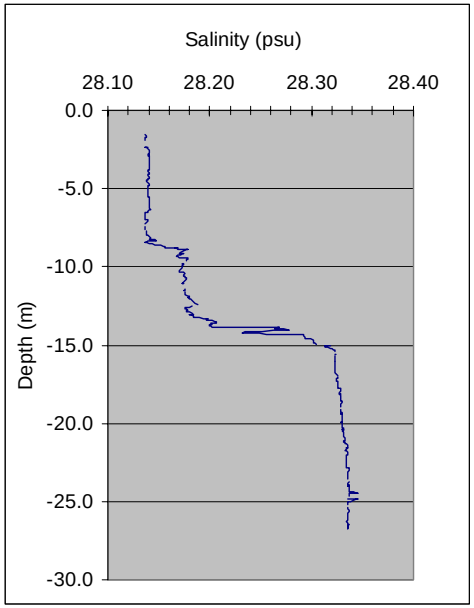


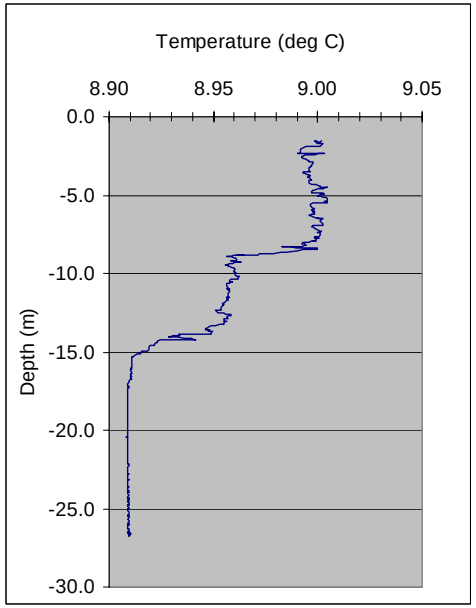


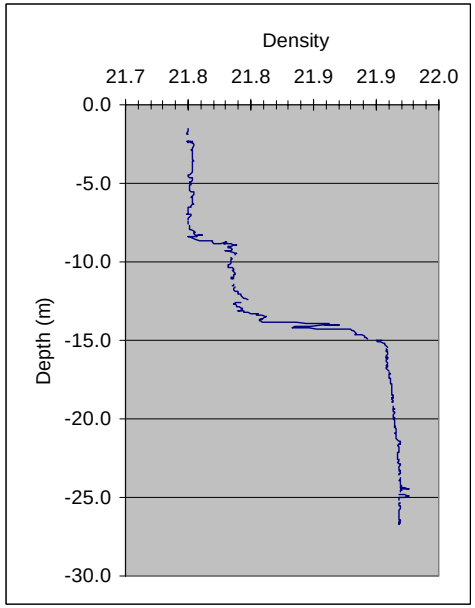


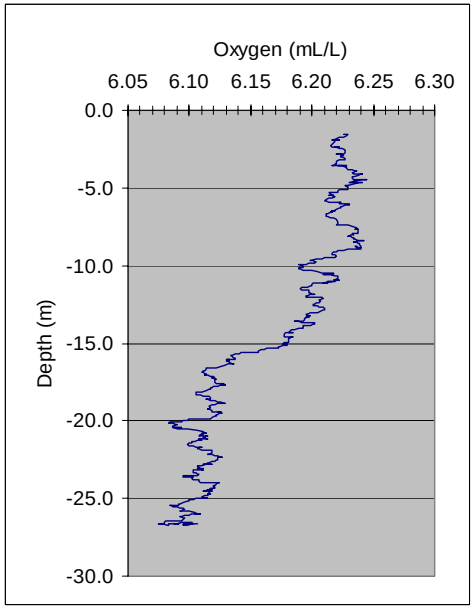


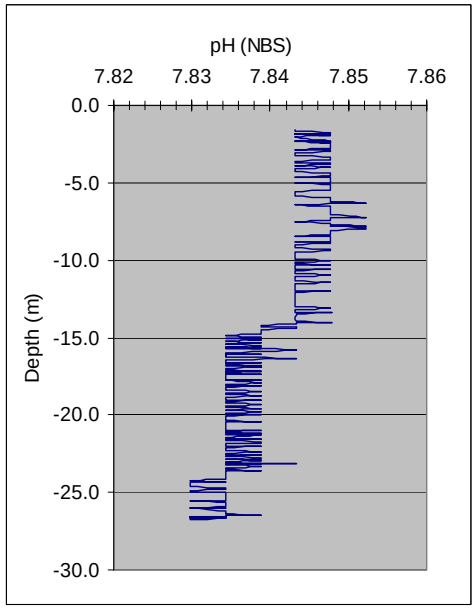
12.12 PS10 Station 11

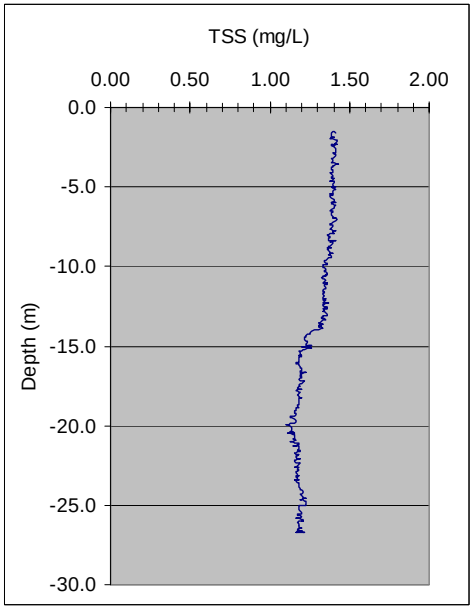




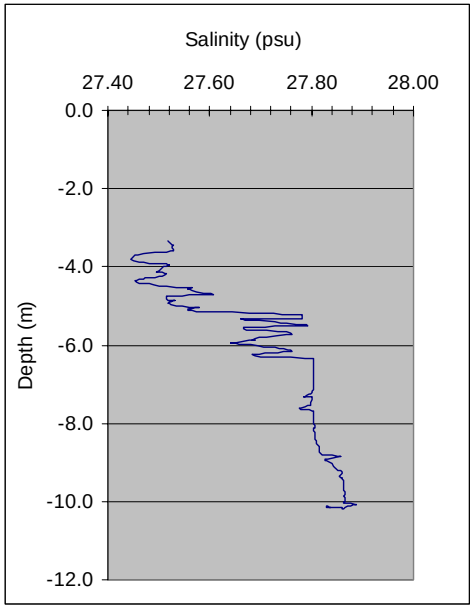


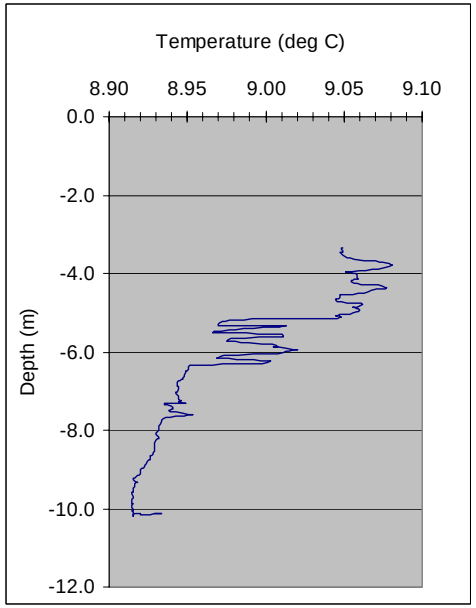


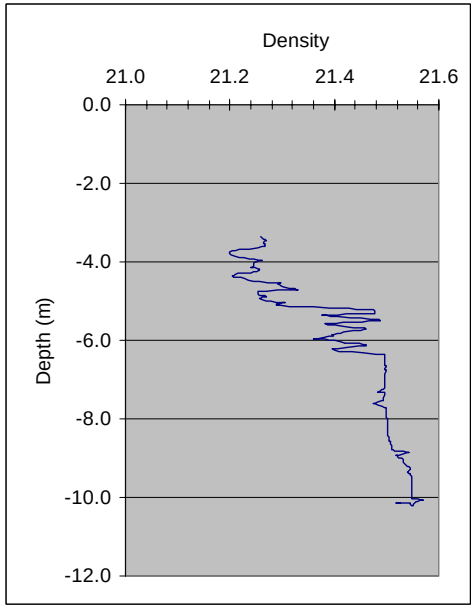


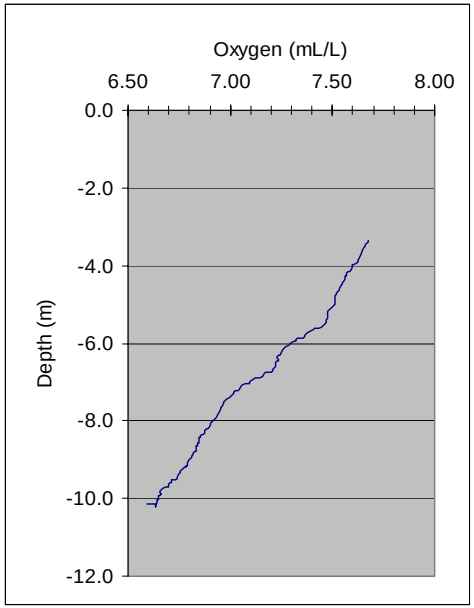


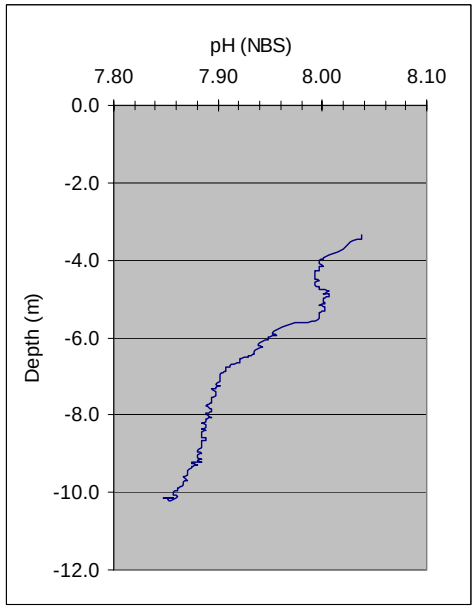
12.13 PS10 Station 12

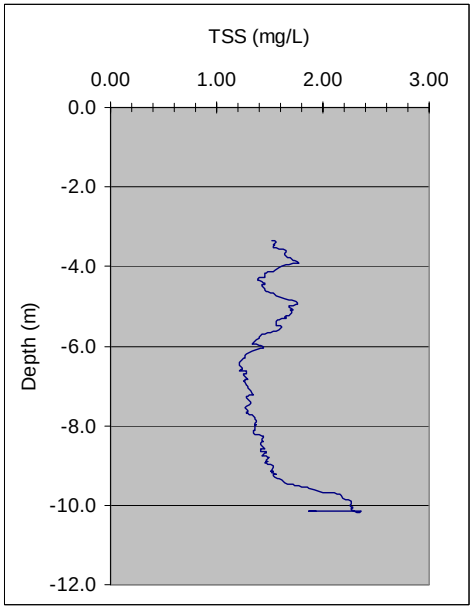




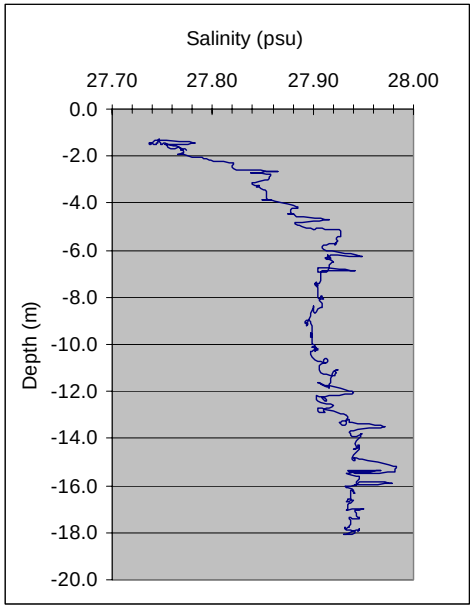


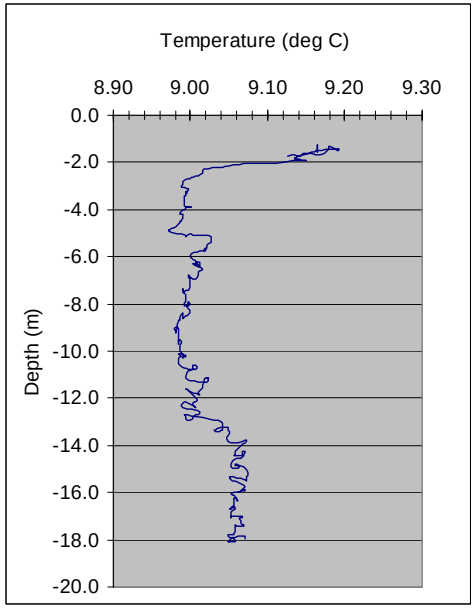


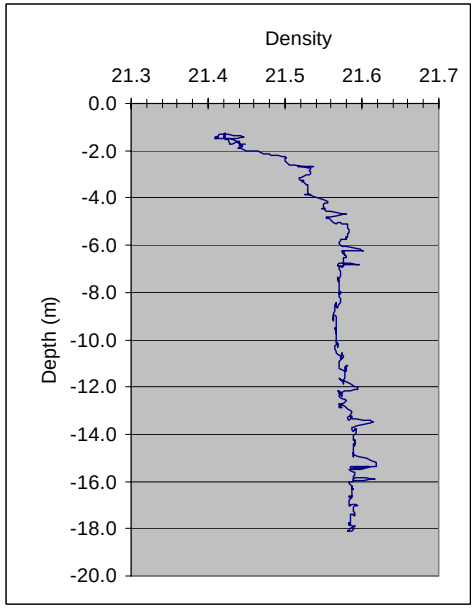


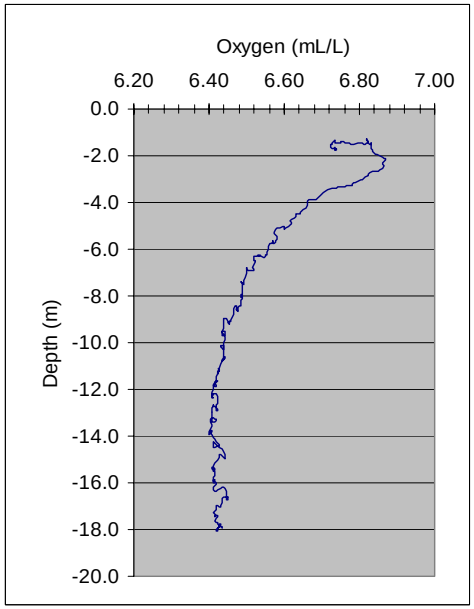


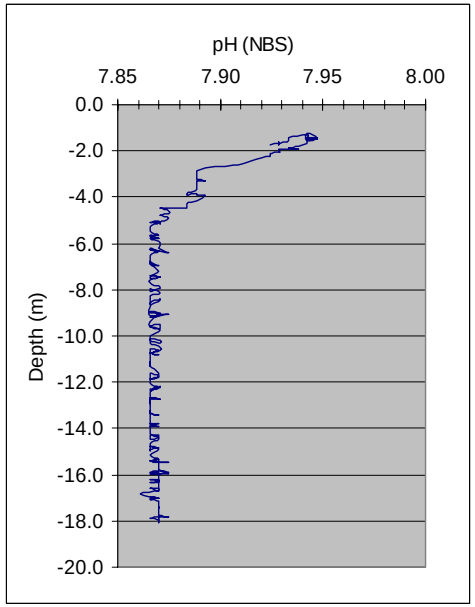
12.14 PS10 Station 13

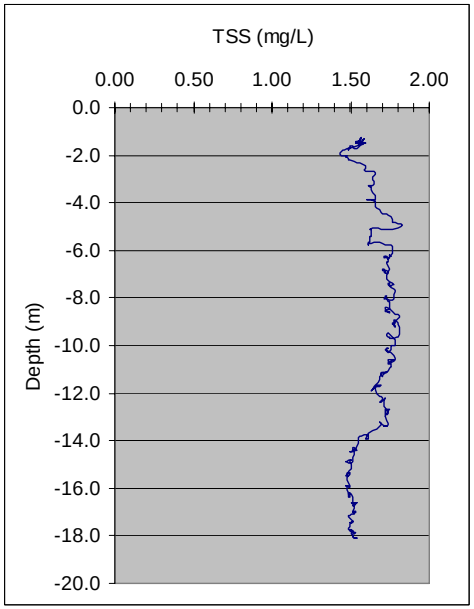




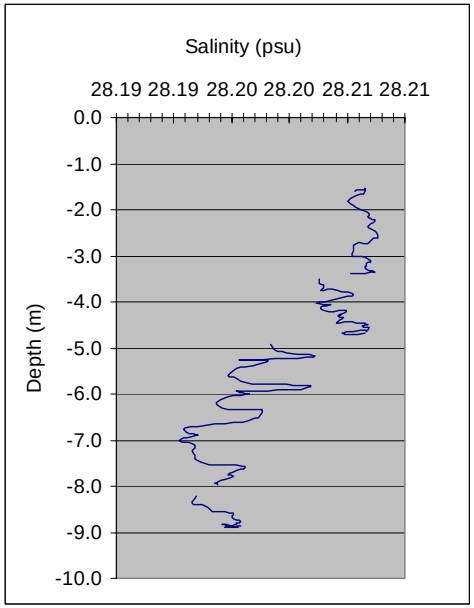


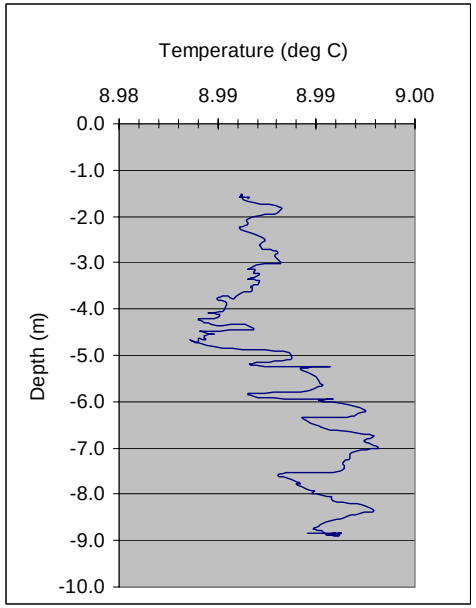


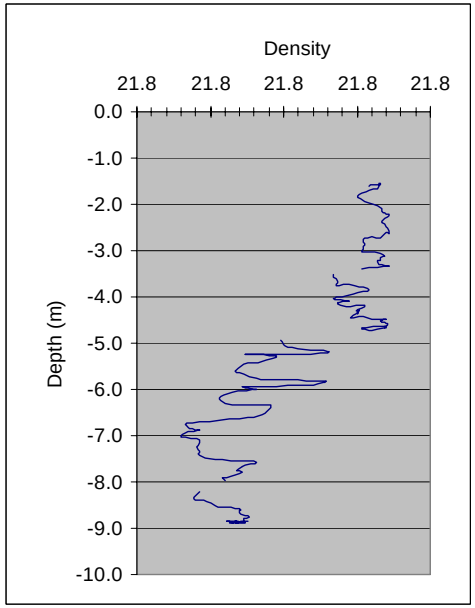


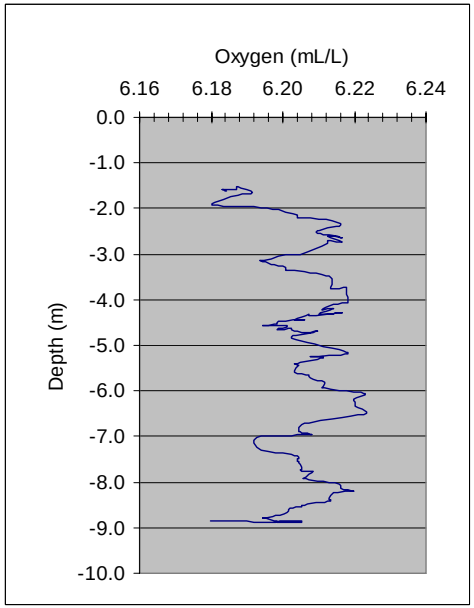


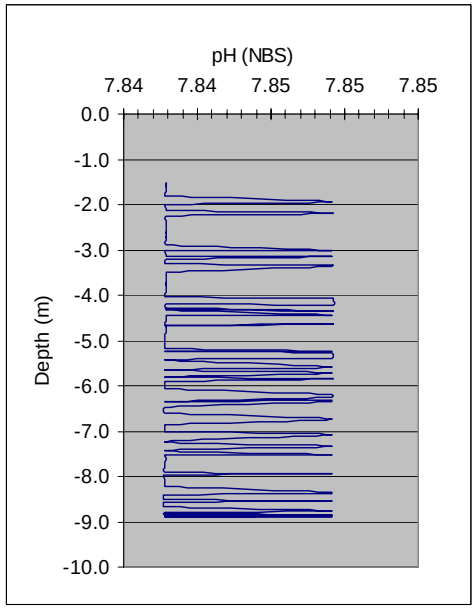
12.15 PS10 Station 14

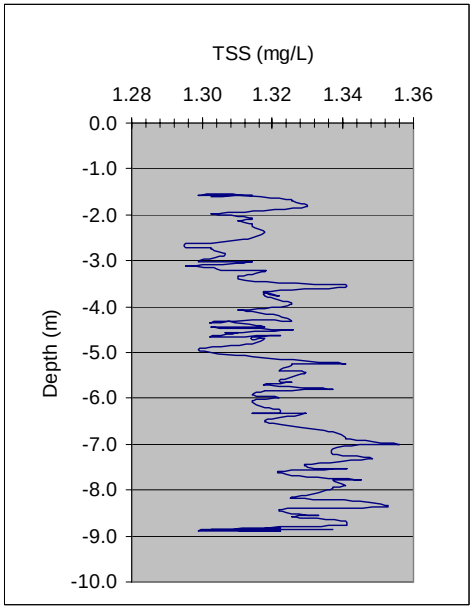




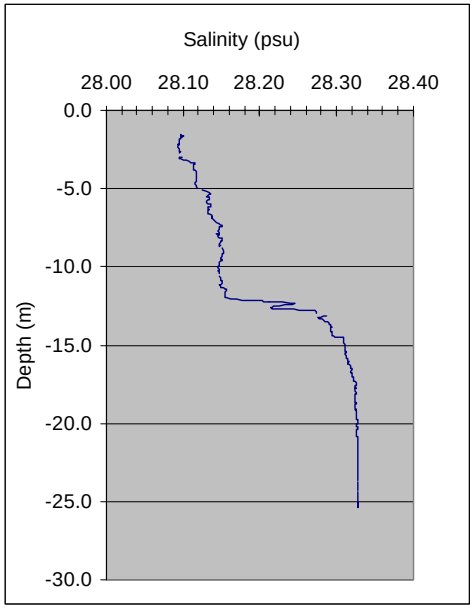


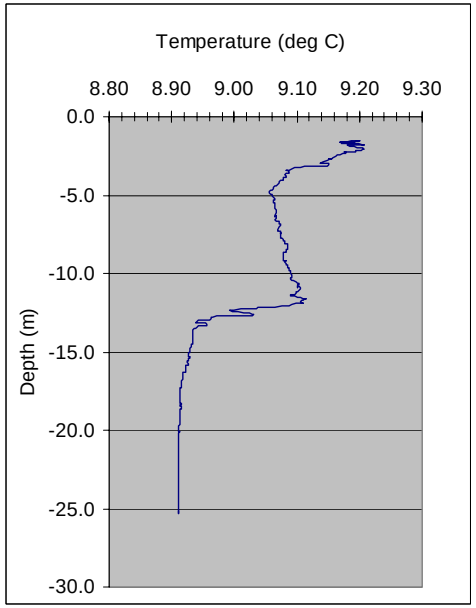


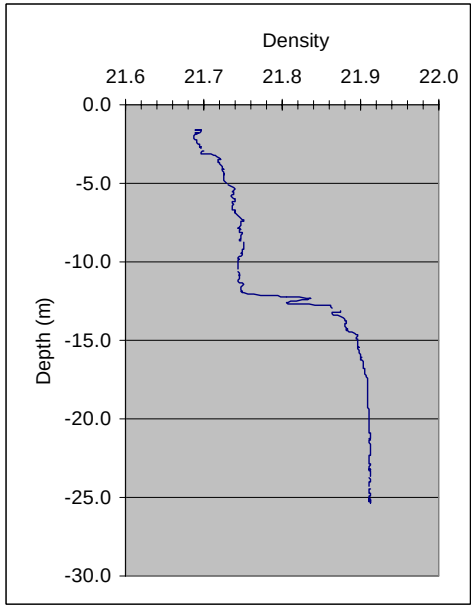


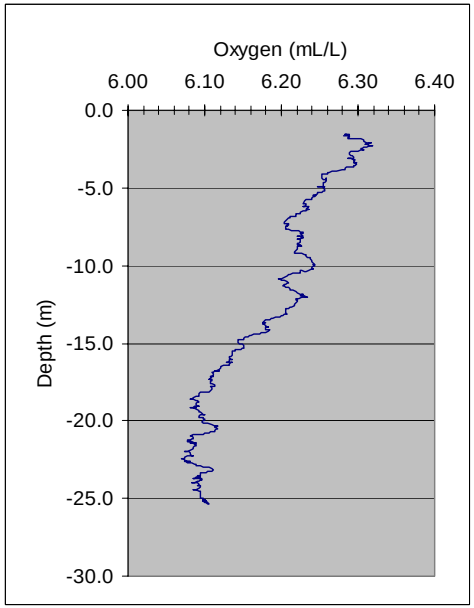


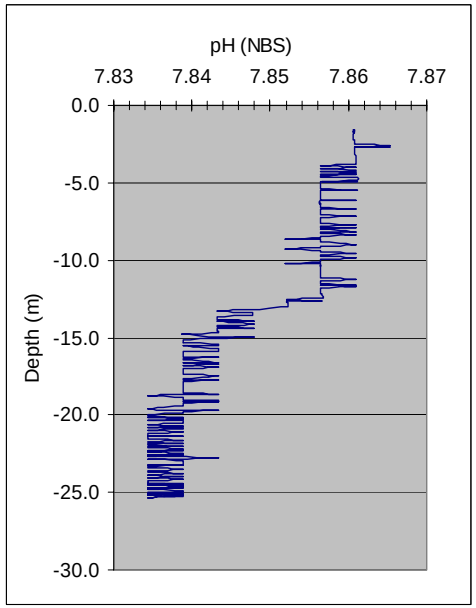
12.16 PS10 Station 15

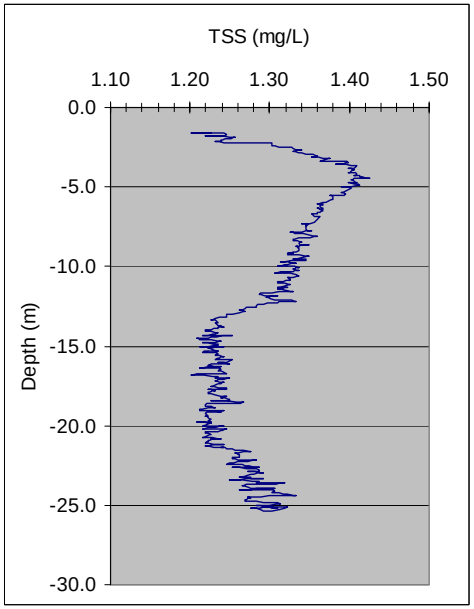




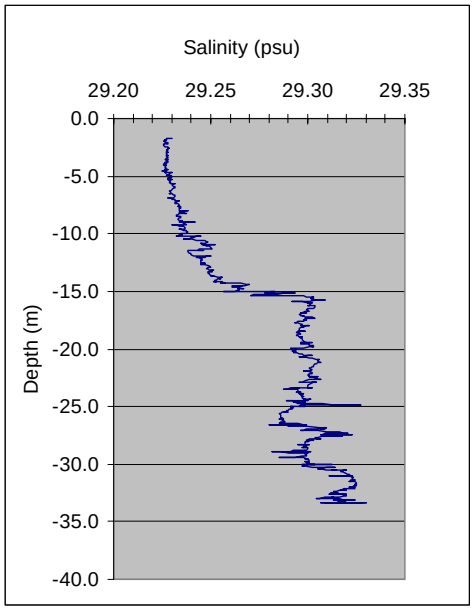


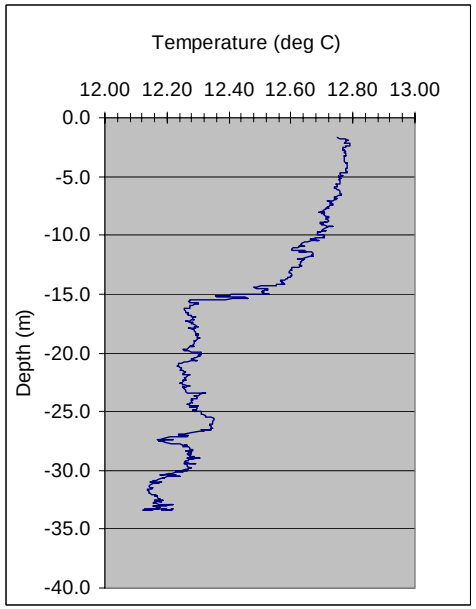


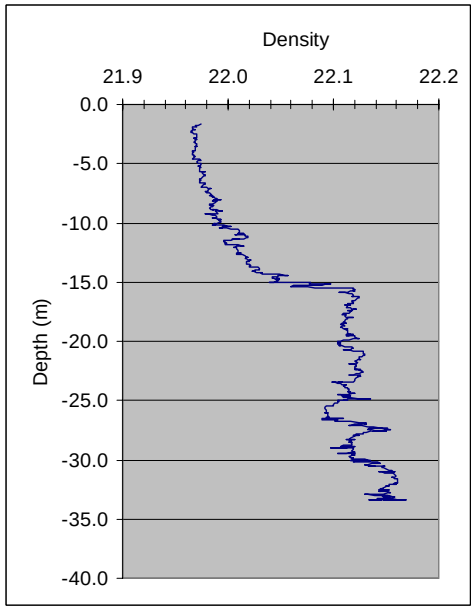


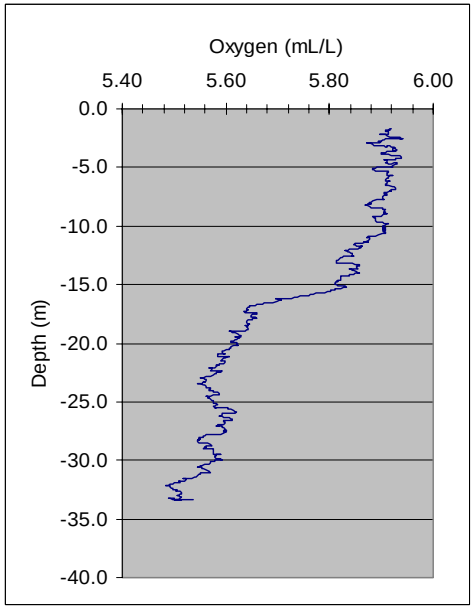


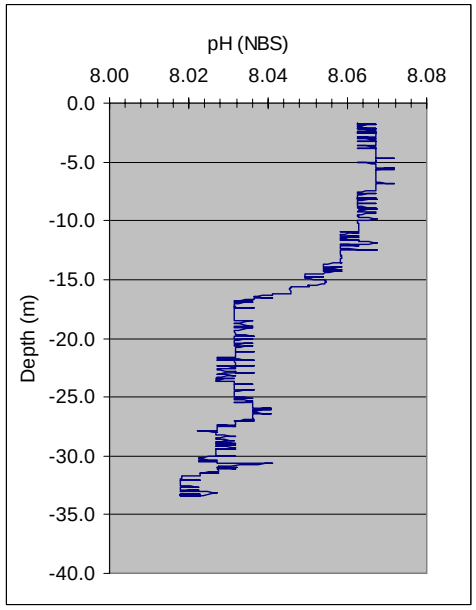
12.17 PS16 Station 1

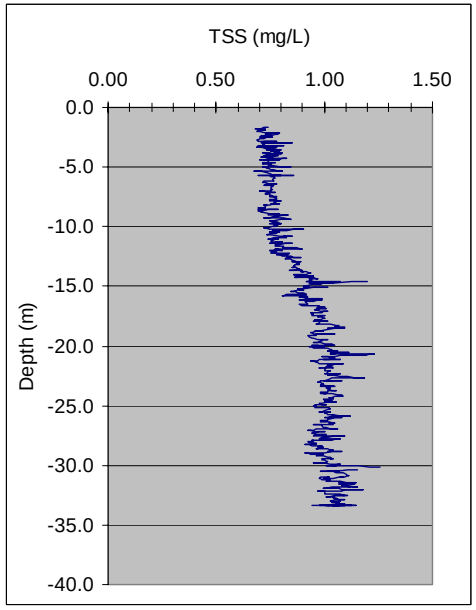




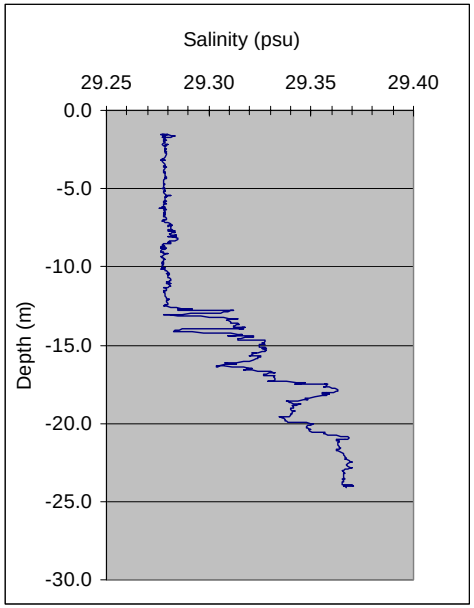


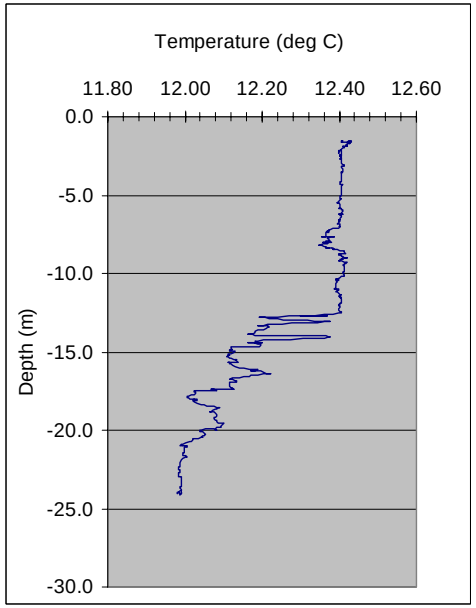


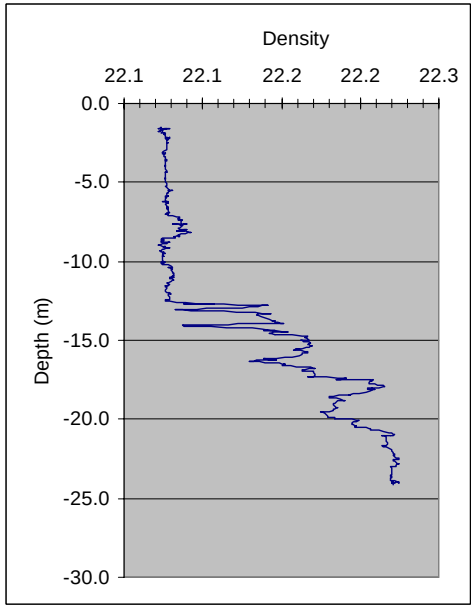


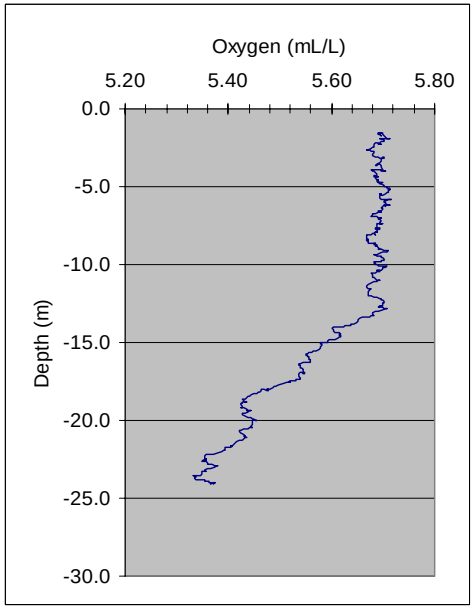


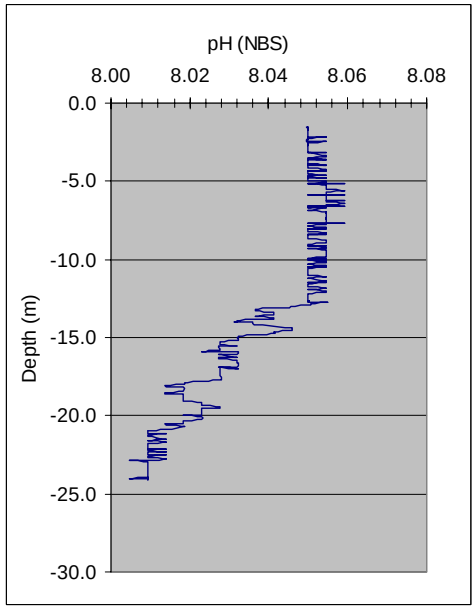
12.18 PS16 Station 2

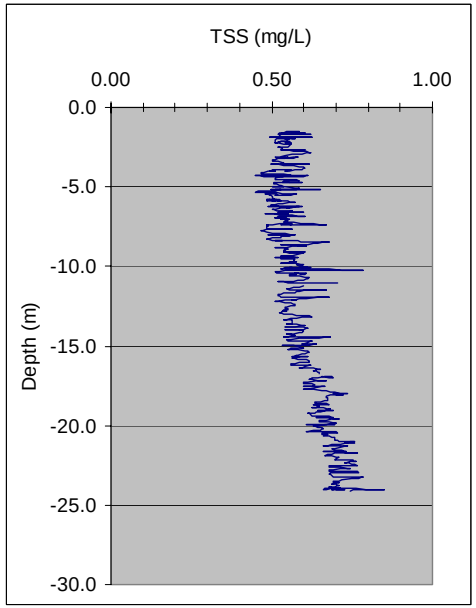




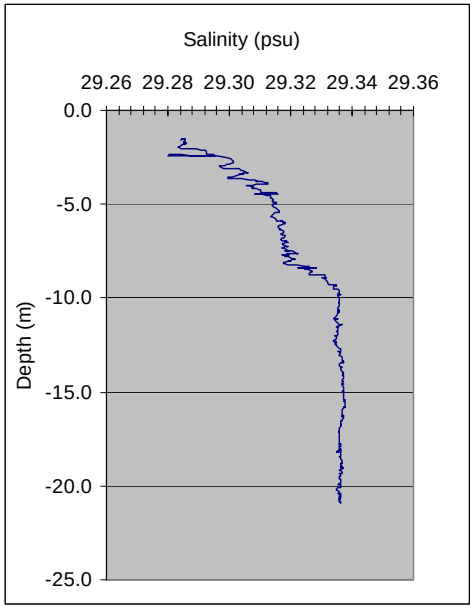


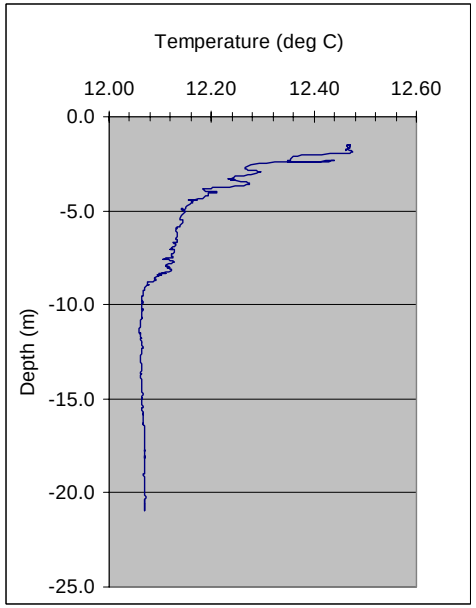


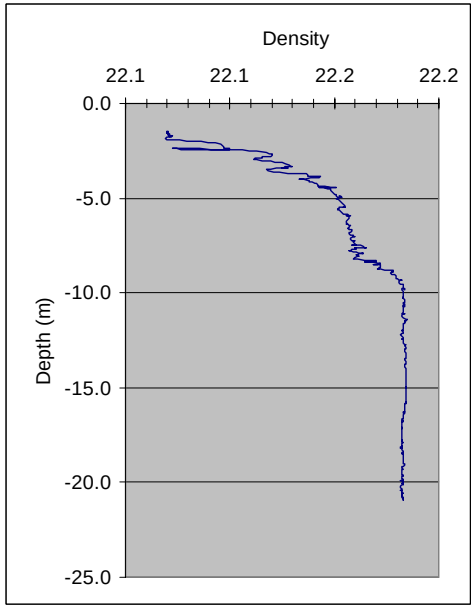


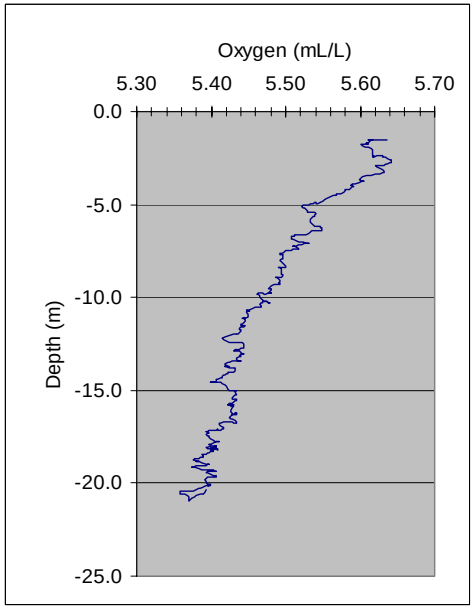


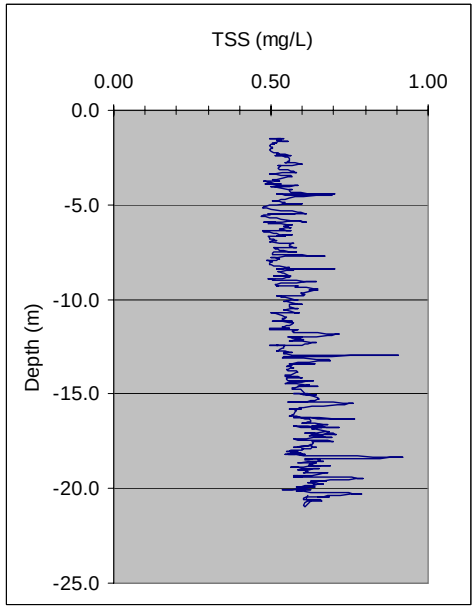
12.19 PS16 Station 3

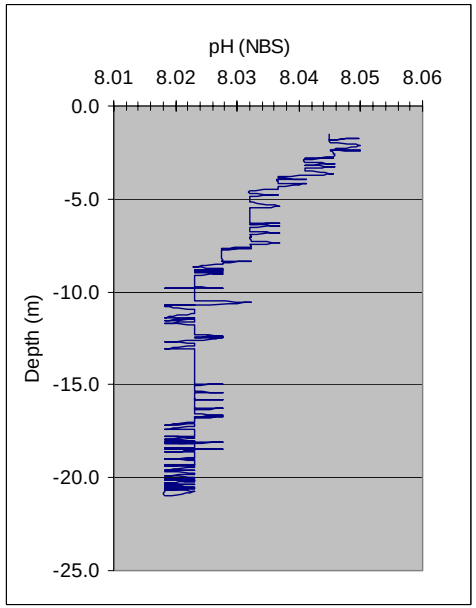




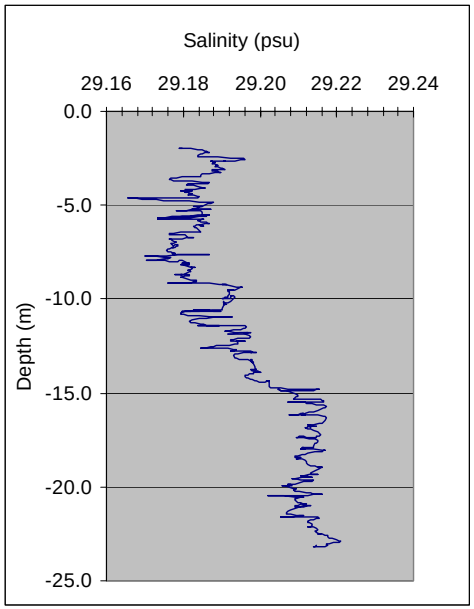


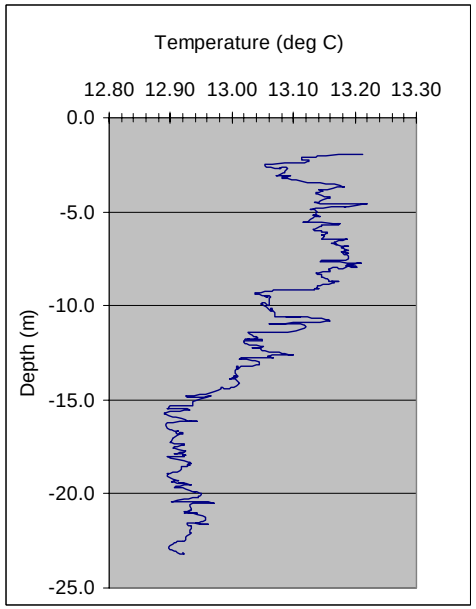


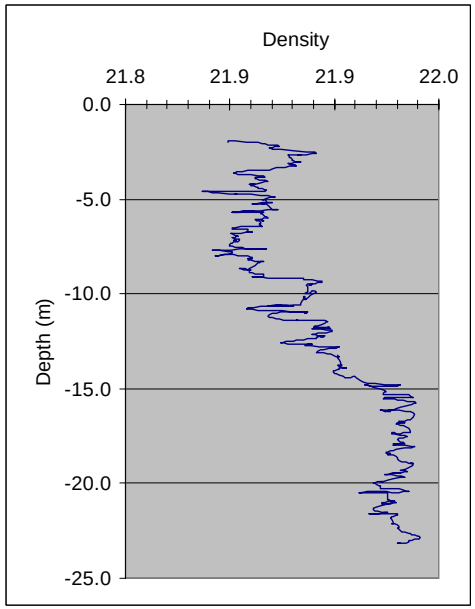


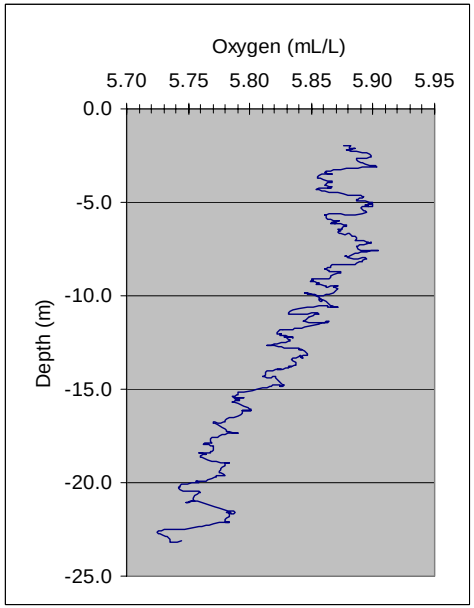


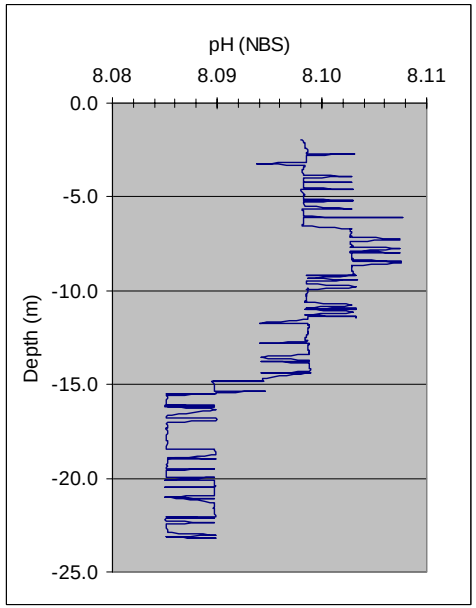
12.20 PS16 Station 4

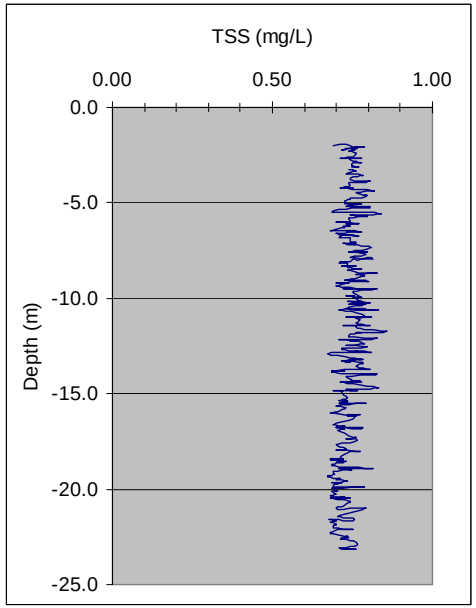




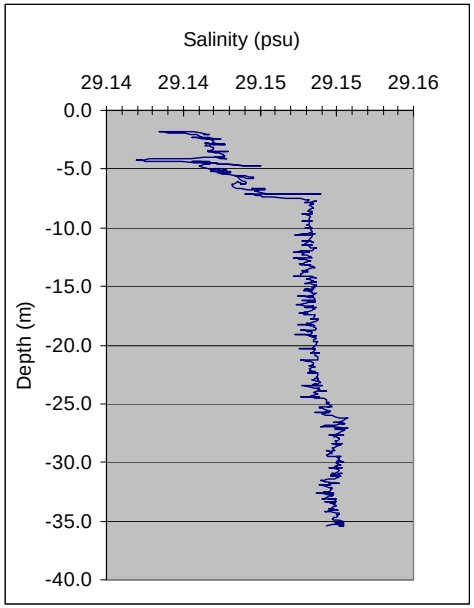


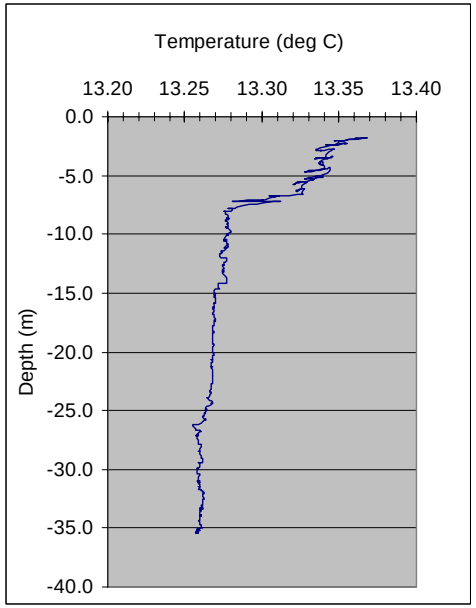


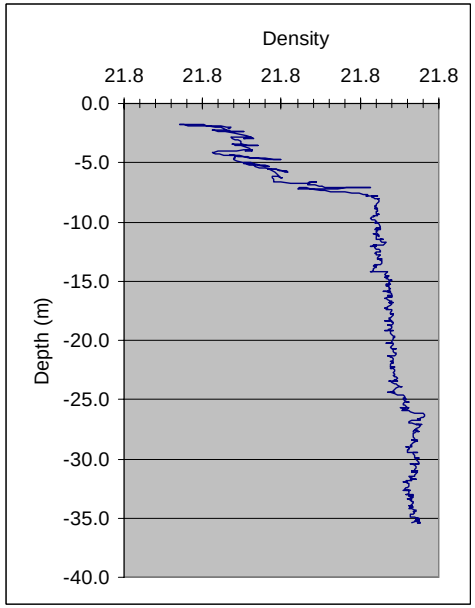


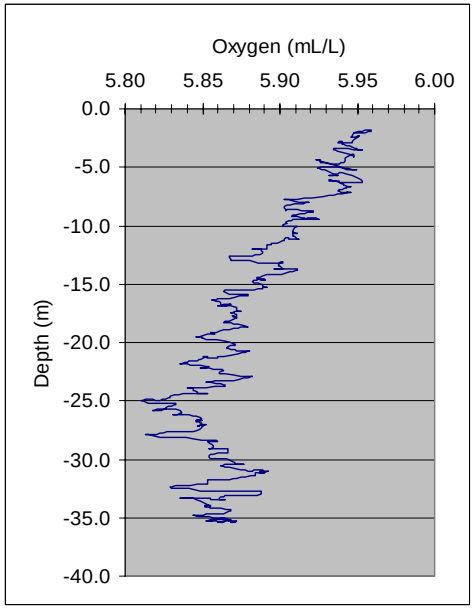


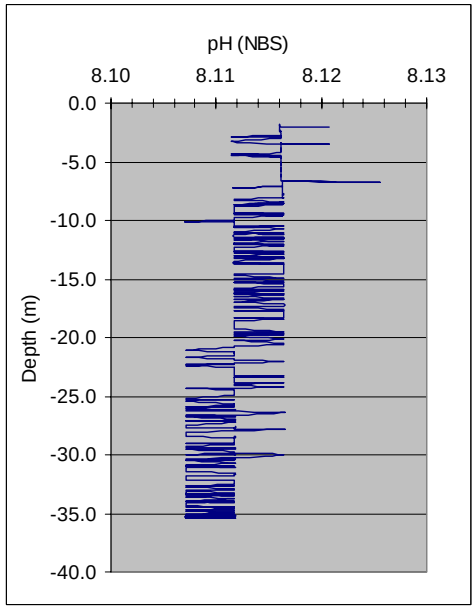
12.21 PS16 Station 5

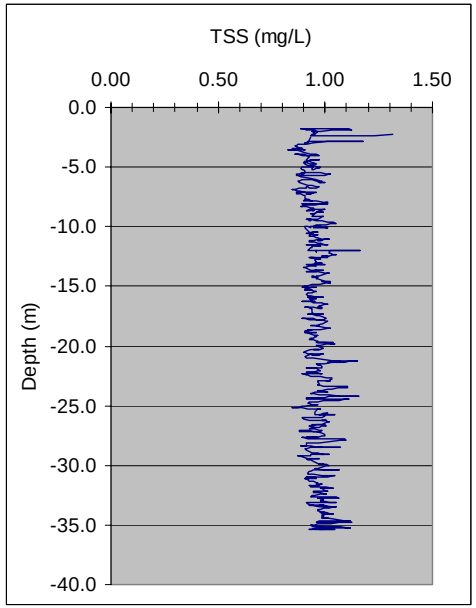




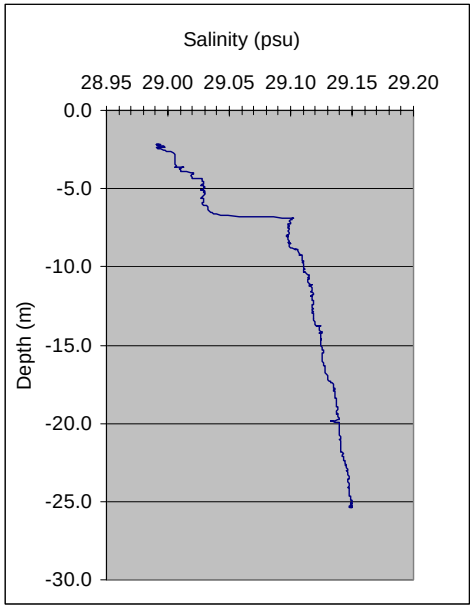


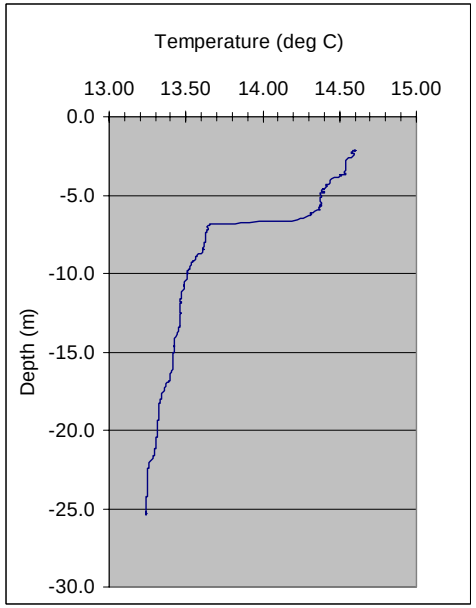


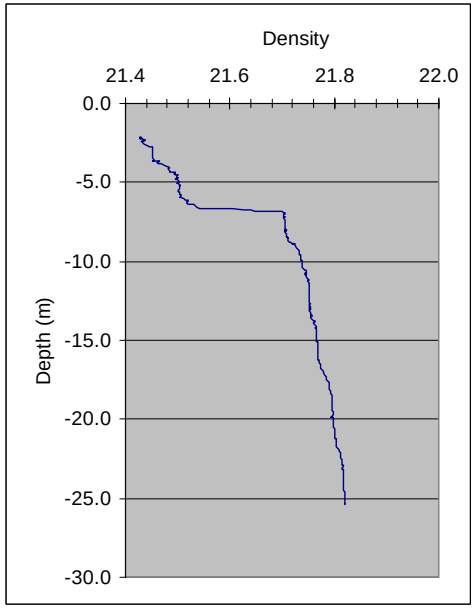


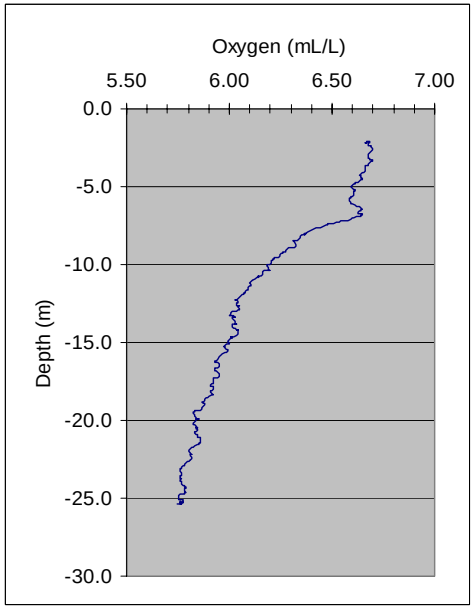


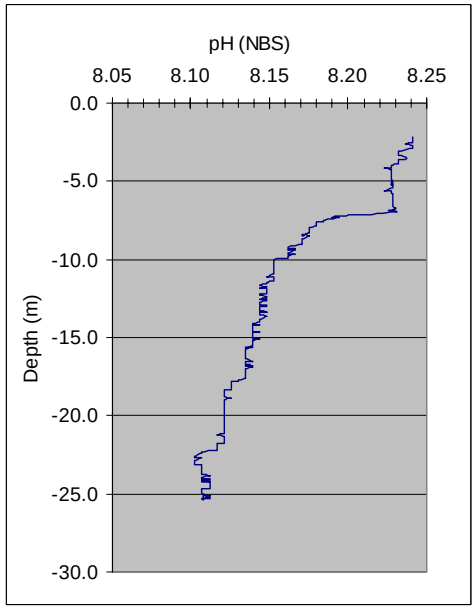
12.22 PS16 Station 6

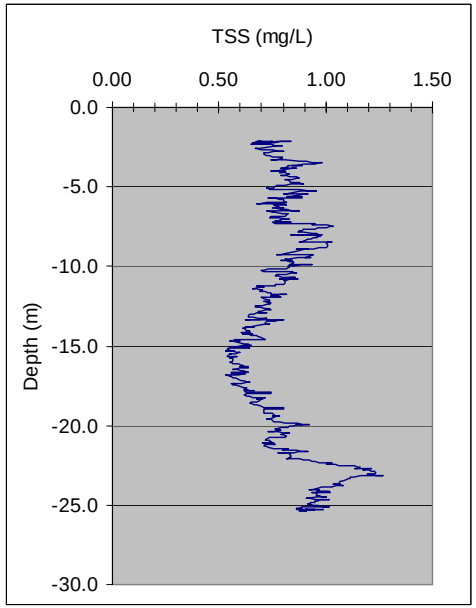




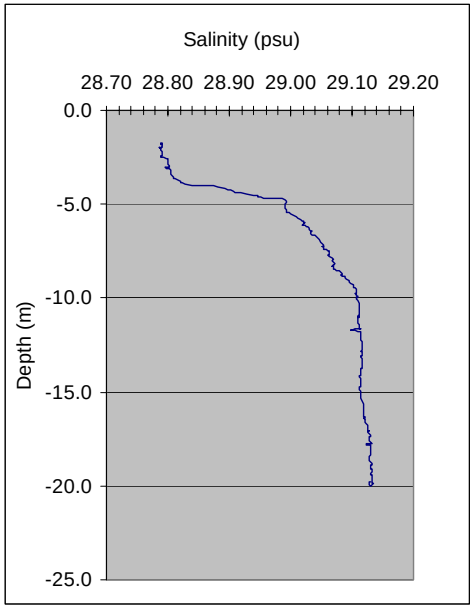


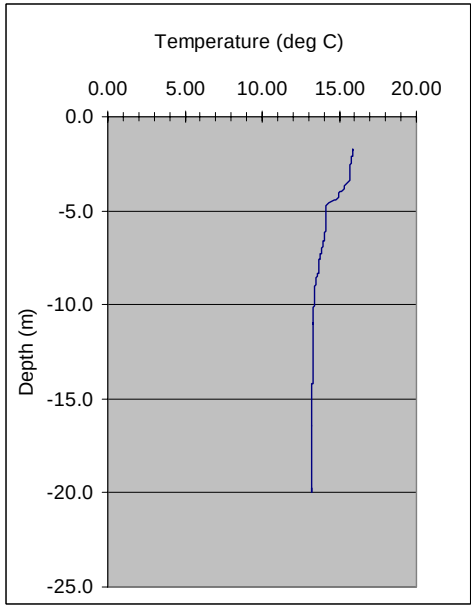


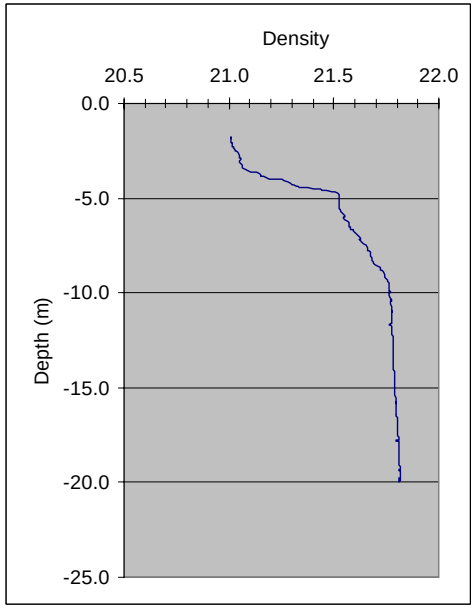


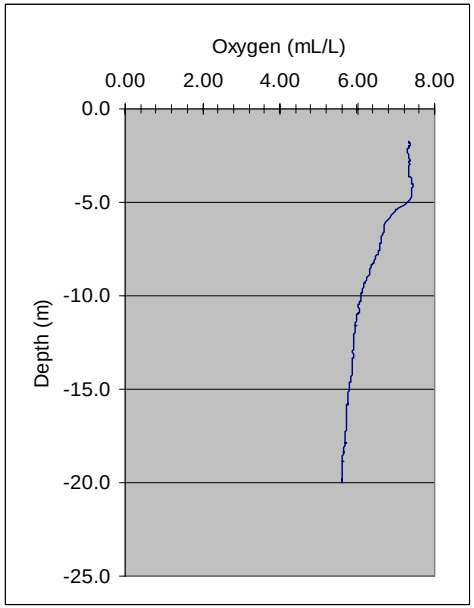


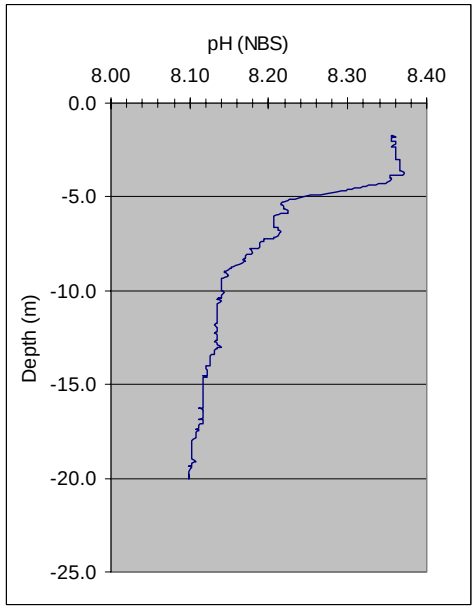
12.23 PS16 Station 7

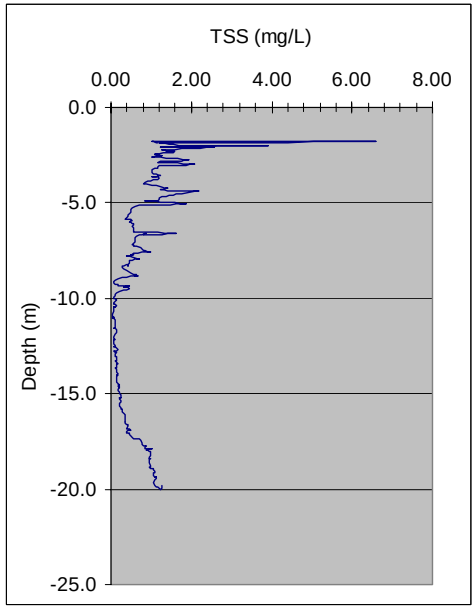




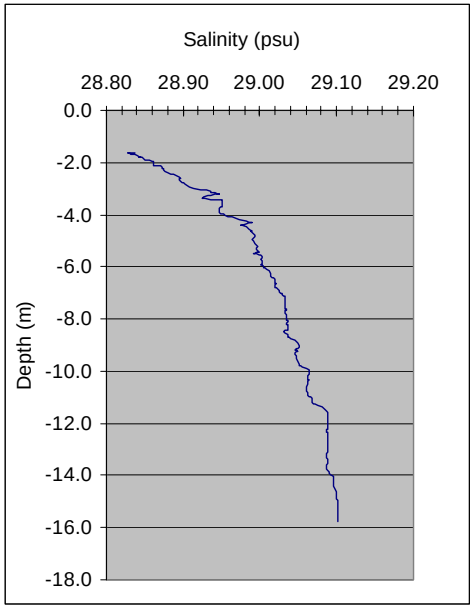


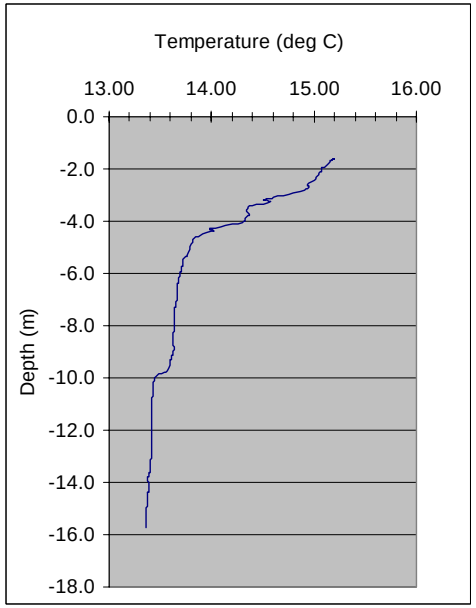


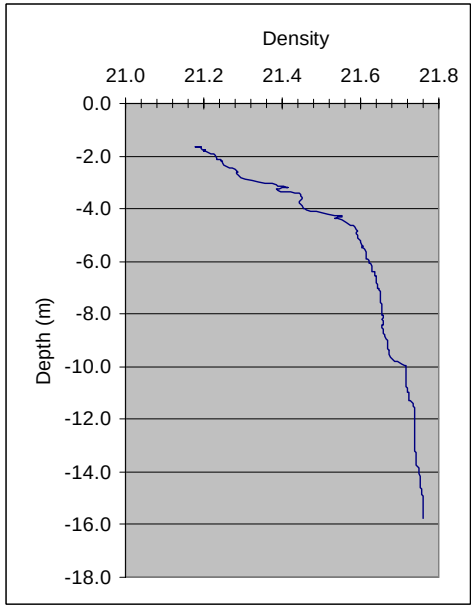


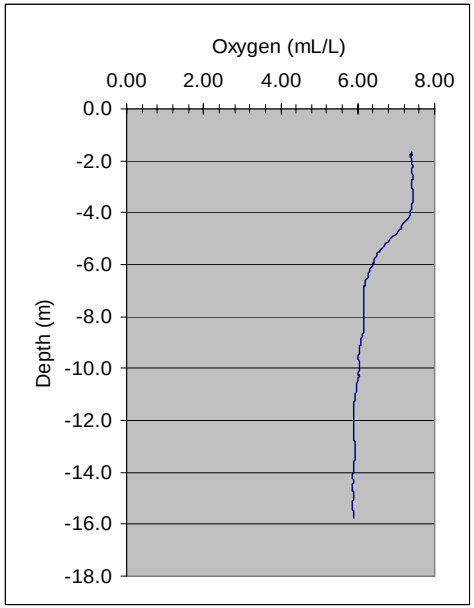


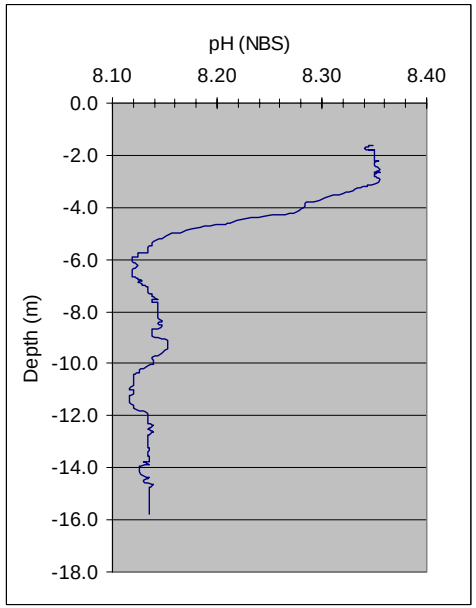
12.24 PS16 Station 8

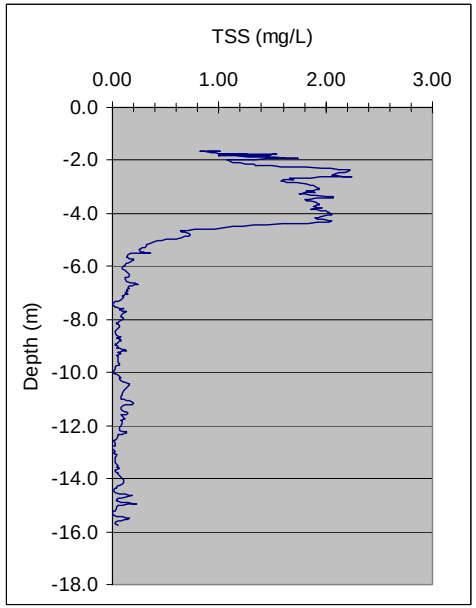




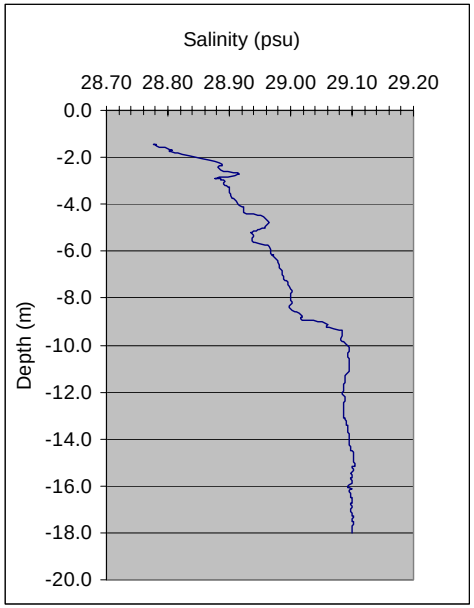


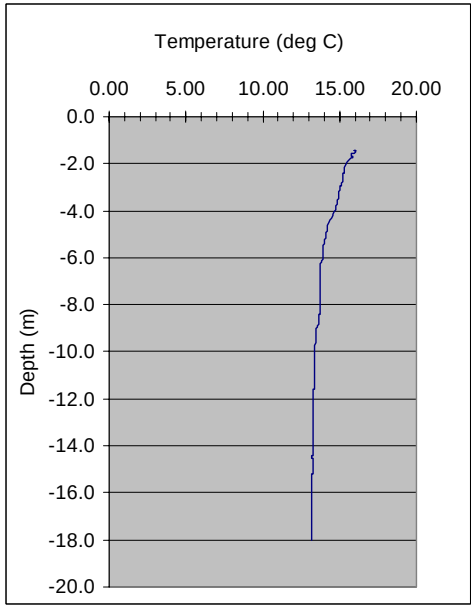


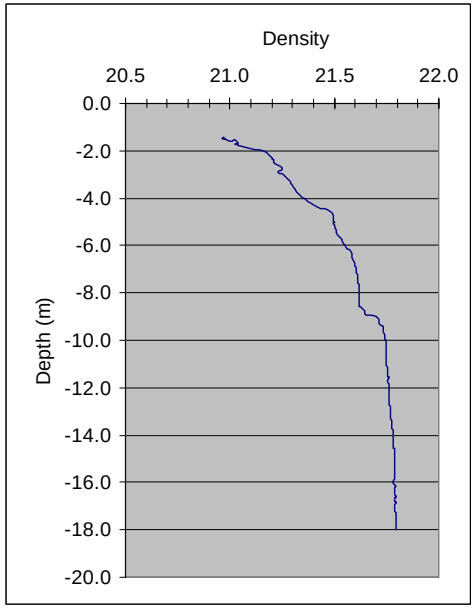


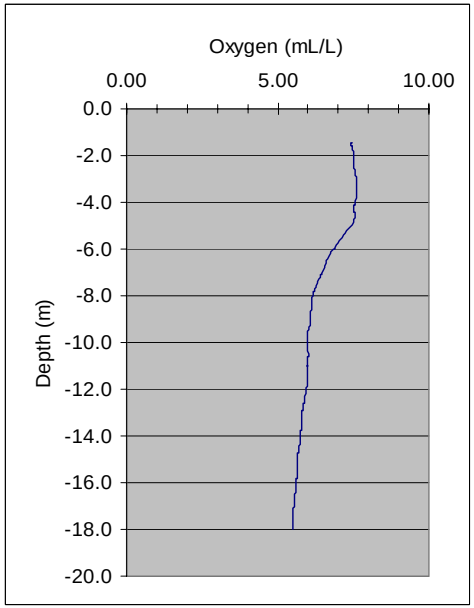


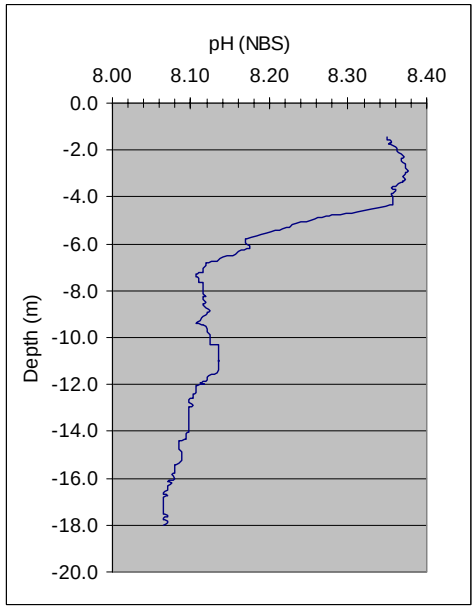
12.25 PS16 Station 9

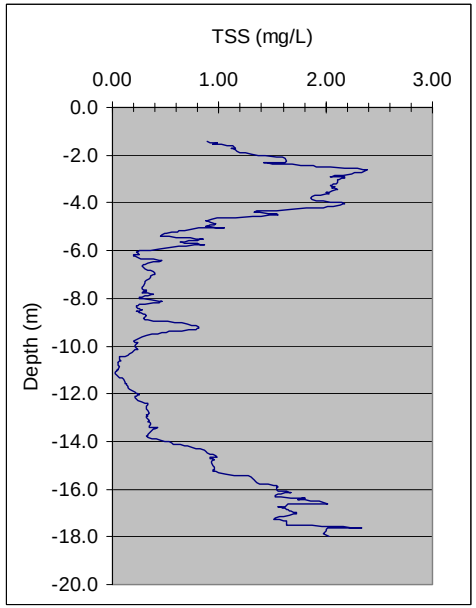




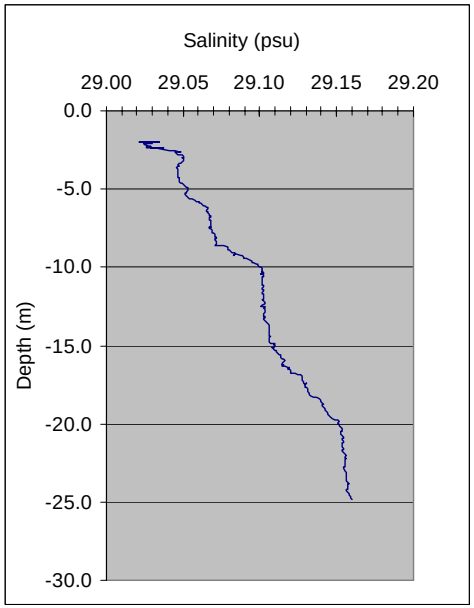


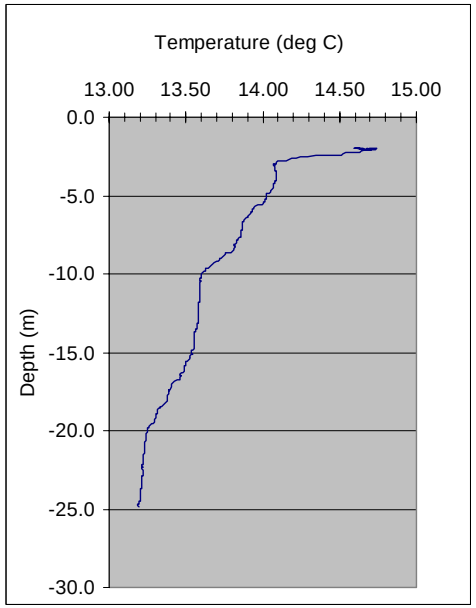


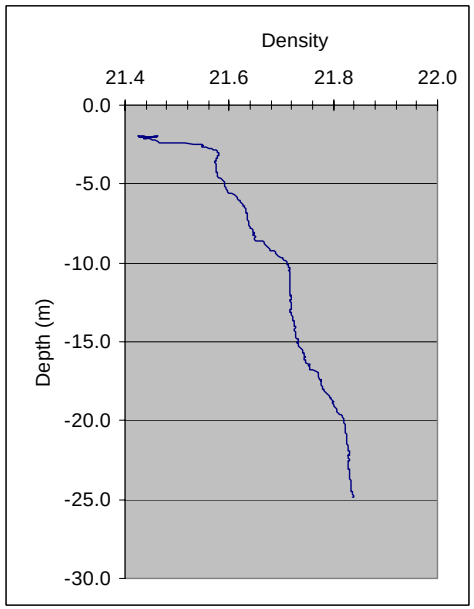


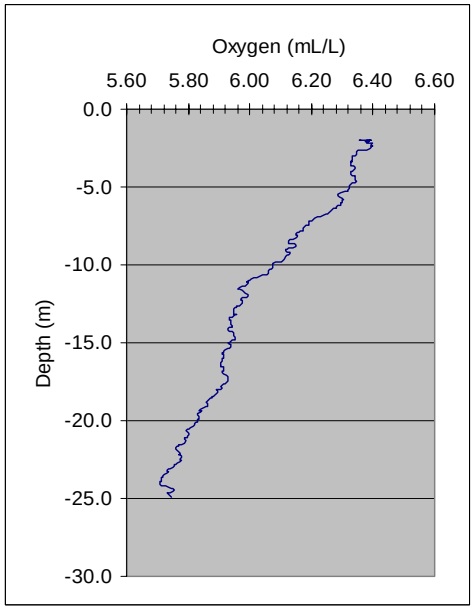


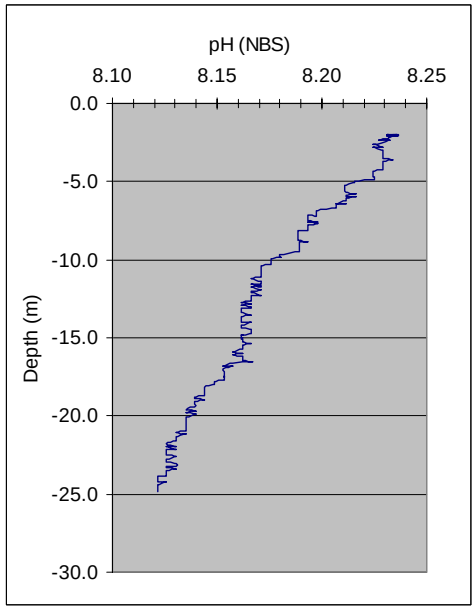
12.26 PS16 Station 10

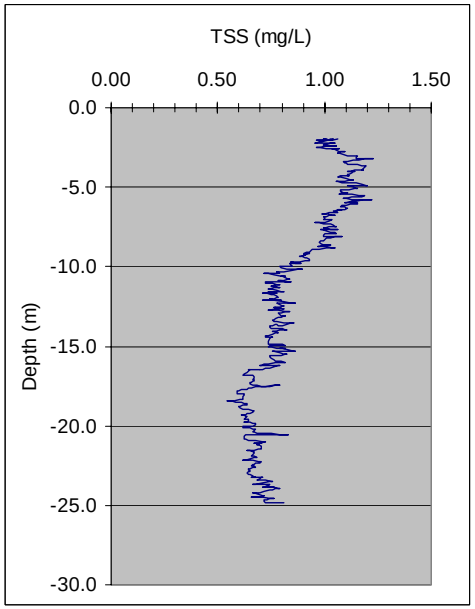




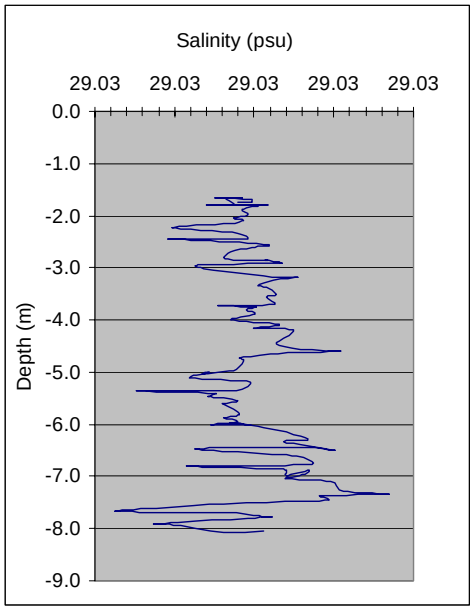


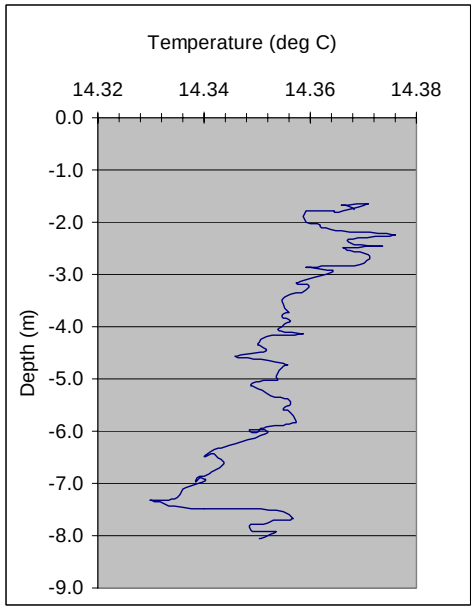


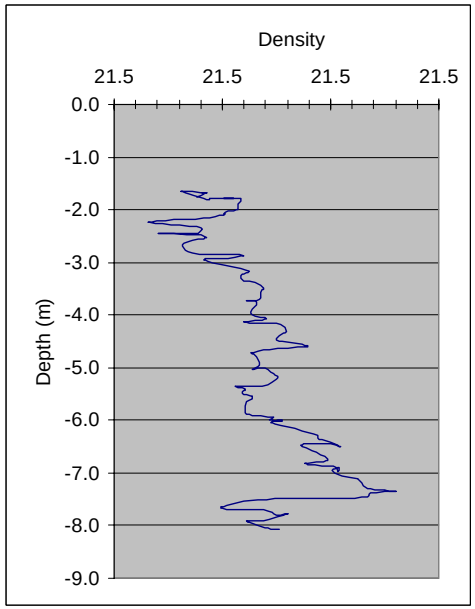


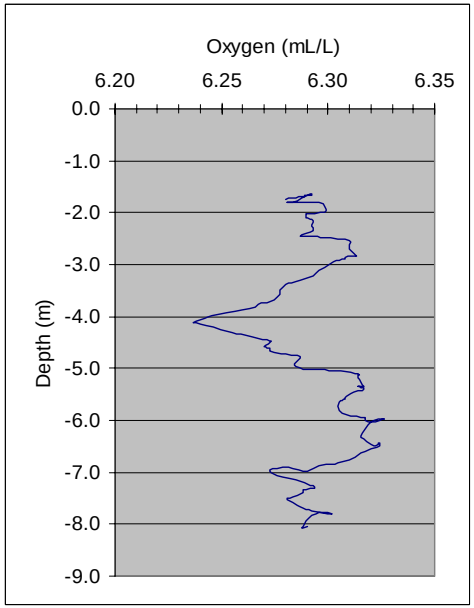


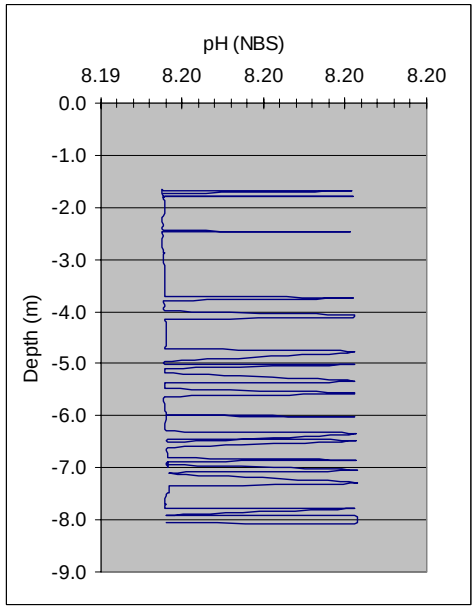
12.27 PS16 Station 11

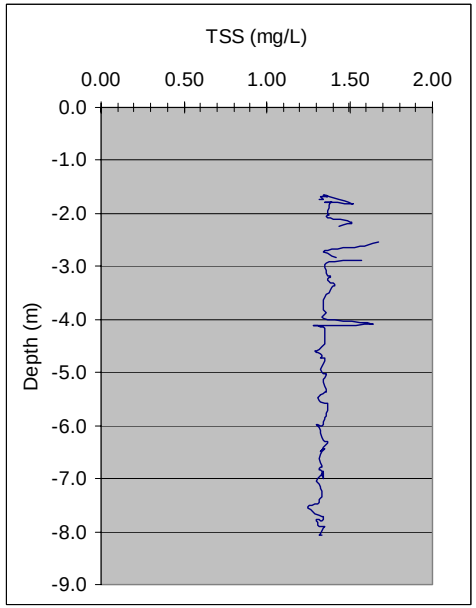




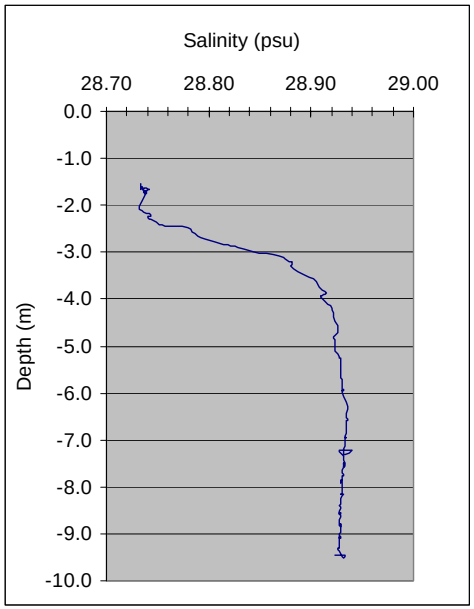


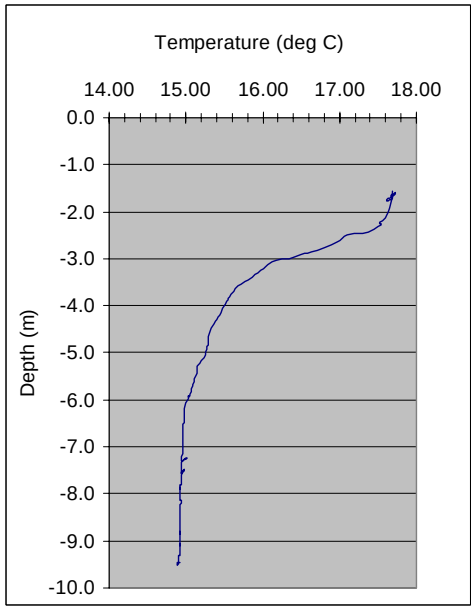


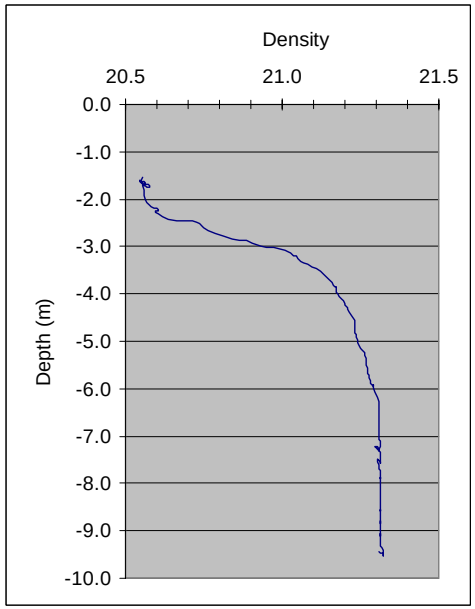


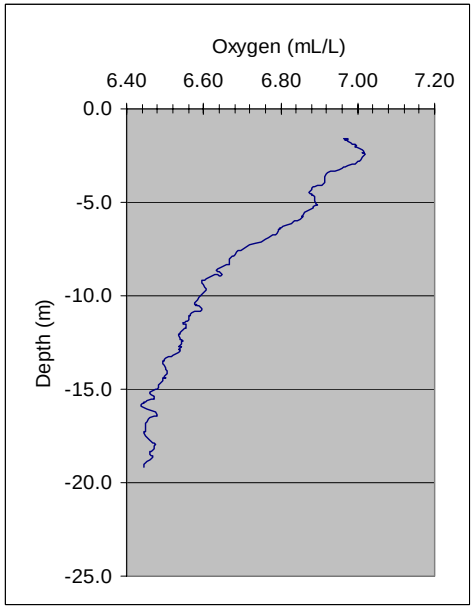


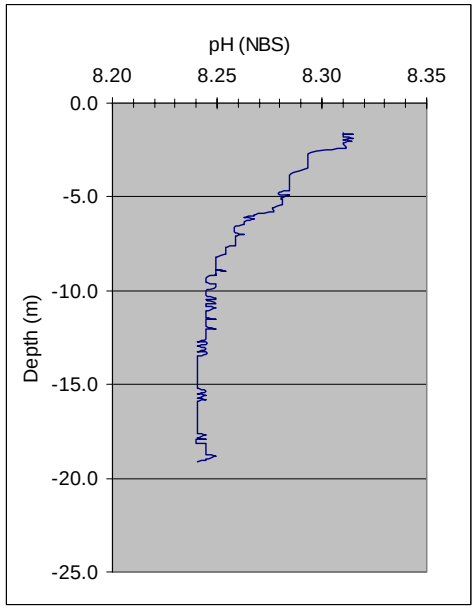
12.28 PS16 Station 12

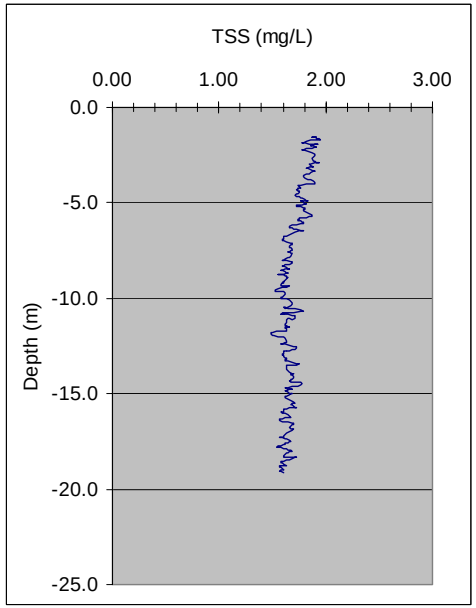
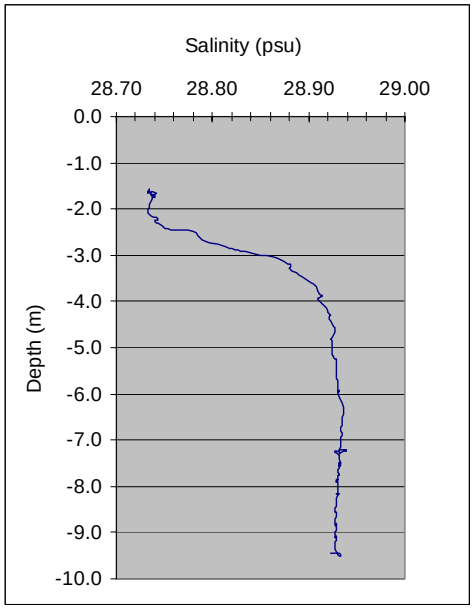
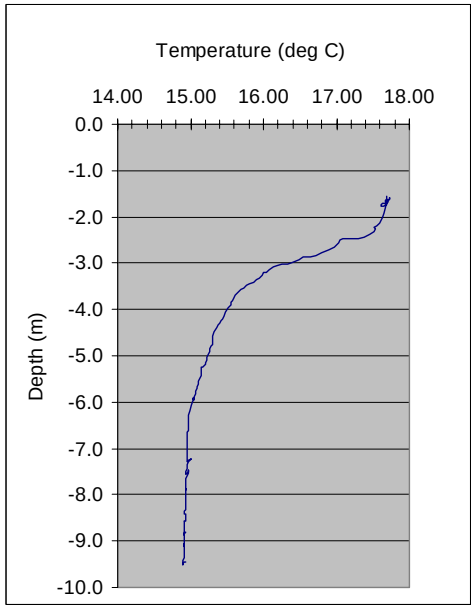
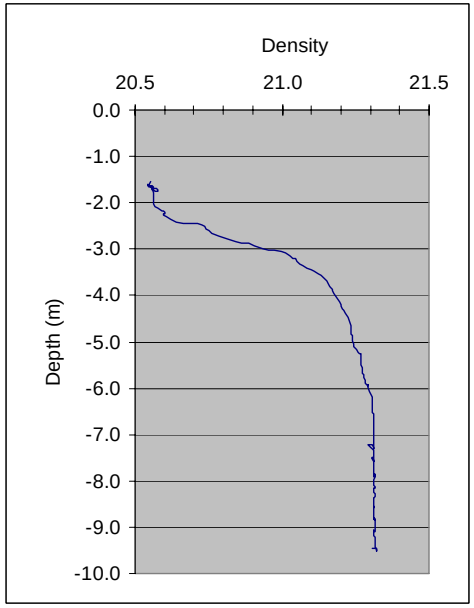
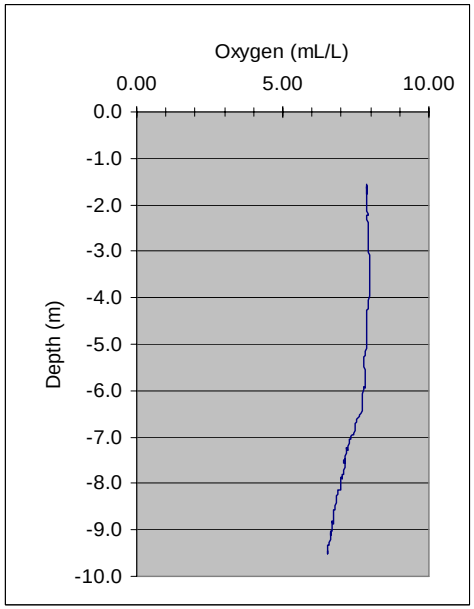
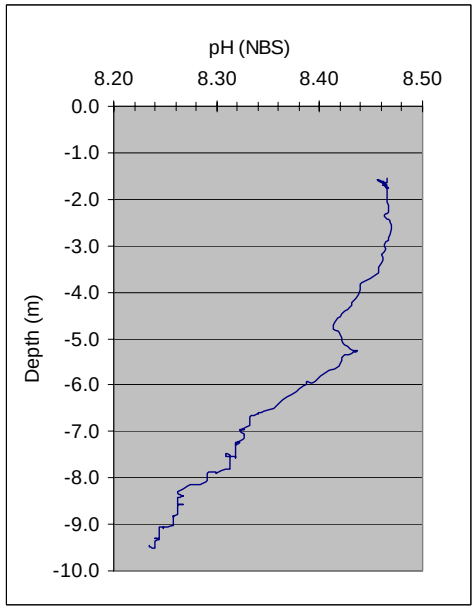
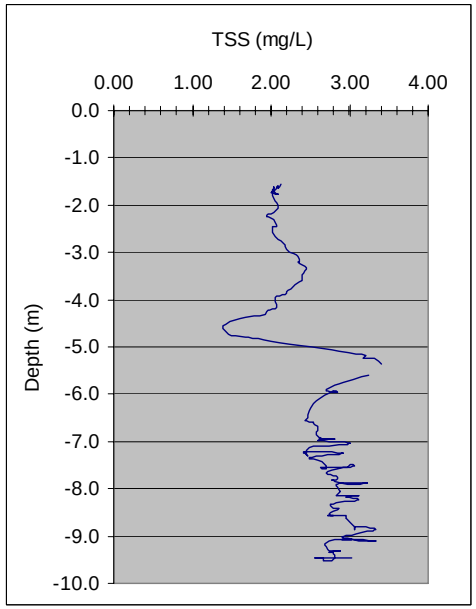












12.29 PS16 Station 13