

Physics and Physical Oceanography Data Report 2005-2

**Analysis of Physical Oceanographic Data from
Funk Island Bank, August 2005**

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Abstract

One mooring with three ADCPs and nineteen thermistors was deployed offshore Cape Freels in August 2005. The mooring, and a meteorological station at Lumsden, collected data from 7-25 August. We present a description of the mooring, plots of the raw data, and some preliminary analysis of the acoustic backscatter and light data.

Acknowledgements

We thank the crew and captain of the *Wilfred Templeman* for their help in this oceanographic study. Funding for this project was provided from the Natural Sciences and Engineering Research Council (NSERC).

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Introduction

In the August 2005 Funk Island Bank Cruise a single mooring (M1) was deployed northeast of Cape Freels, Newfoundland at 49°15.85 N, 52°58.26 W (figure 1). The mooring was deployed on August 7, 2005 at 15:40 GMT and recovered on August 25, 2005 at 9:20 GMT giving a total residence time of approximately 19 days. The mooring was equipped with three ADCPs and 19 thermistors.

An upward-facing ADCP (I1) at a frequency of 307.2 kHz was attached to M1 at a depth of 100 m. It collected ensemble averages at 5 minute intervals and had a bin depth of 2 m. Also attached to M1 at 100m was a downward-facing ADCP (I2), which malfunctioned during deployment and so did not collect any data. A second downward-facing ADCP (I3) at a frequency of 307.2 kHz was attached to M1 at a depth of 200 m. It also collected ensemble averages at 5 minute intervals and had a bin depth of 2 m. Data recorded by the upward-looking (downward-looking) ADCP within a few meters of the surface (seafloor) were omitted due to distortion from side lobe interference.

The mooring was also equipped with 19 thermistors positioned at depths: 10, 20, 30, 40, 50, 60, 70, 80, 90, 110, 130, 150, 170, 190, 210, 230, 250, 270 and 280 m that recorded temperatures at 5 minute intervals.

Data Processing

Raw temperature data were averaged for each thermistor over time and plotted, along with the standard deviation, in an averaged profile (figure 3) and then summarized in Table 2. Isotherms were plotted by interpolating the temperature data using the kriging method (figures 4 and 5).

Total solar radiation was obtained from the Aanderaa weather station deployed in Lumsden, Newfoundland (49°17.708'N, 053°35.493'W). The weather station recorded the total solar radiation in Watts/m² every 20 minutes from August 7 - 25, 2005. Total solar radiation (in Watts/m²) was also recorded by a mobile weather station onboard the *Wilfred Templeman* at 5 minute intervals from August 5 - 23, 2005. The instrument used to record this data was powered by solar panels. Unfortunately, the instrument did not have enough power to function during the night and so no data was recorded at this time. The instrument began recording again each morning, at varying times, once the batteries had been sufficiently recharged. The data collected at the Aanderaa weather station as well as onboard the *W. Templeman* are both shown in figure 6.

Mean values of the raw velocity data as well as the standard deviation are given for each bin depth in Tables 3-8. This data is also shown in plot form in figures 11-25. The velocity data has been decomposed into u (east), v (north) and w (vertical) components as well as treated to remove any sporadic unphysical data. Values greater than 1000 mm/s in the horizontal components of velocity, and 40 mm/s in the vertical component, were replaced with NaN (“Not a Number” in Matlab). The data was then linearly interpolated for the purpose of plotting. The mean horizontal direction of the velocity is also given in Tables 3-8 and is calculated as degrees clockwise of due north.

Backscatter intensity was corrected using standard techniques (Deines, 1999) where the backscatter coefficient is estimated by including factory-set instrument specifications as well as environmental factors in the sonar equation. These data, as well as the velocity data, show anomalies that are of a significant magnitude. The anomalies, which appear to occur at random times during the deployment period, can be clearly seen in the plots of corrected backscatter (figures 26-30) as well as in all components of the velocity (figures 11-25). The anomalies are present in the data as angled lines that are remarkably regular. They persist for several hours at a time (e.g., see figure 11) and the backscatter is present in all four beams. The dates and times of these occurrences are listed in Table 9. One possible explanation for these anomalies is that they are a result of a large towed net system that is deployed to the bottom. It is also possible that the backscatter is the result of interference between the instruments.

References

Deines, K. L., 1999. Backscatter estimation using broadband acoustic Doppler current profilers. *Proceeding of the IEEE 6th working conference on current measurement, San Diego, CA.*

Record, N., B. de Young and J. Foley, 2004. Analysis of Physical Oceanographic Data from Funk Island Bank, August 2004. *Physics and Physical Oceanography data report 2004.* Department of Physics & Physical Oceanography, Memorial University of Newfoundland.

Data Analysis

	Mooring 1 (M1)
Location	Latitude 49°15.85 N Longitude 52°58.26 W
Water Depth	293m
ADCP Depth	100m (upward-facing) 100m (downward-facing: <i>malfunctioned, no data</i>) 200m (downward-facing)
ADCP frequency	307.2 kHz
Bin Size	2m
Thermistor depths	10, 20, 30, 40, 50, 60, 70, 80, 90, 110, 130, 150, 170, 190, 210, 230, 250, 270 and 280 m
Deployed	7 Aug 2005 15:40 GMT (year day 219)
Recovered	25 Aug 2005 09:20 GMT (year day 237)

Table 1: Location and description of mooring for the 2005 Funk Island Bank cruise.

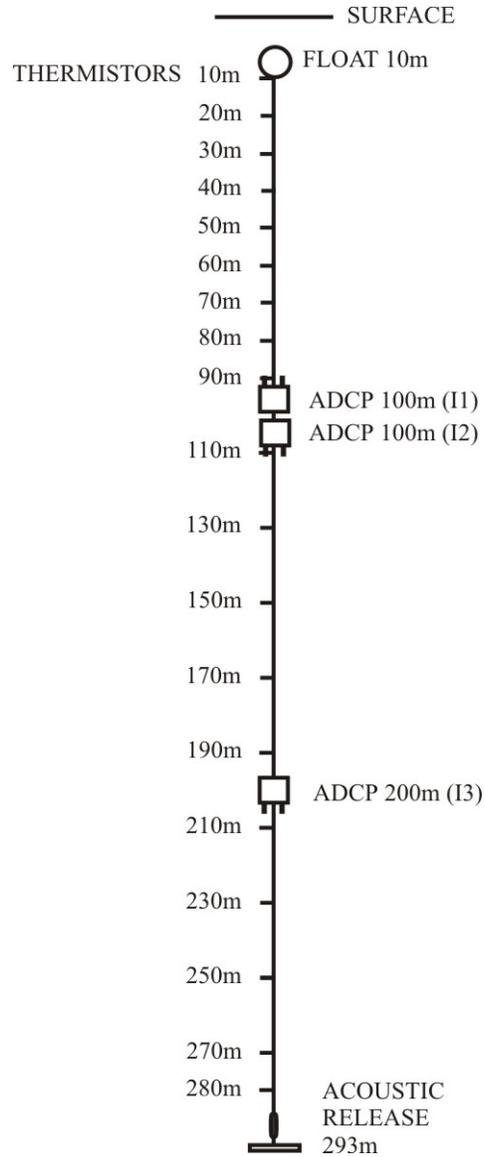


Figure 1: Mooring diagram for M1 showing ADCP and thermistor locations. (Note: The downward-facing ADCP at 100m (I2) malfunctioned and did not collect any data.)

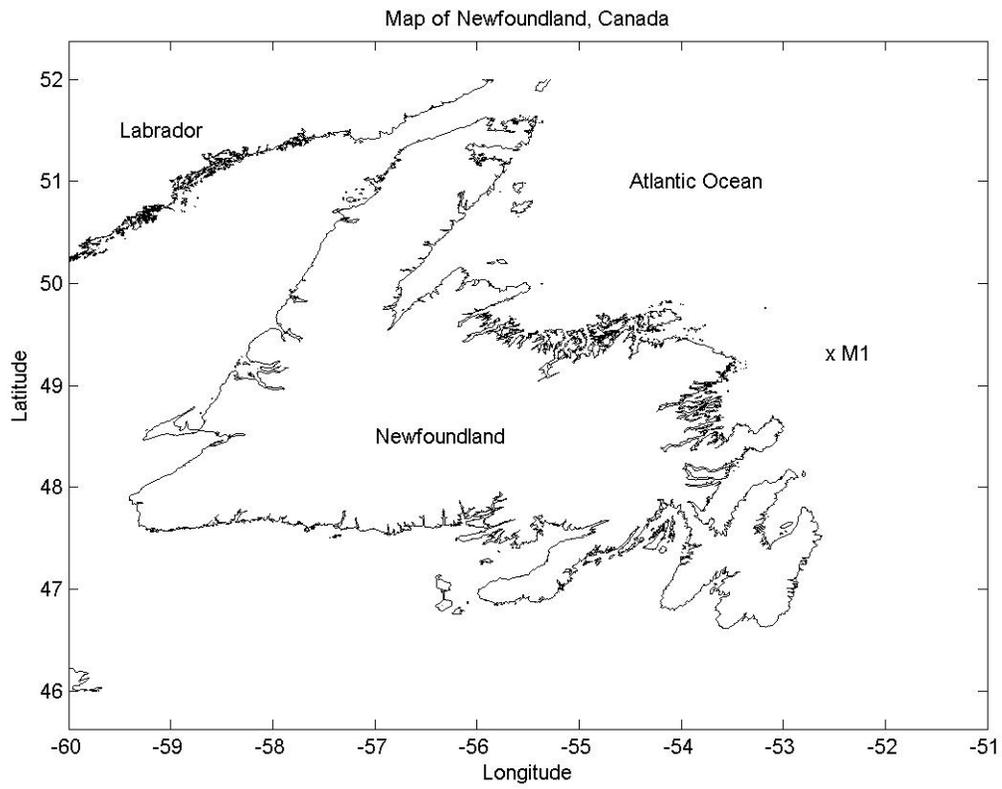


Figure 2: Mooring location for the 2005 Funk Island Bank Cruise.

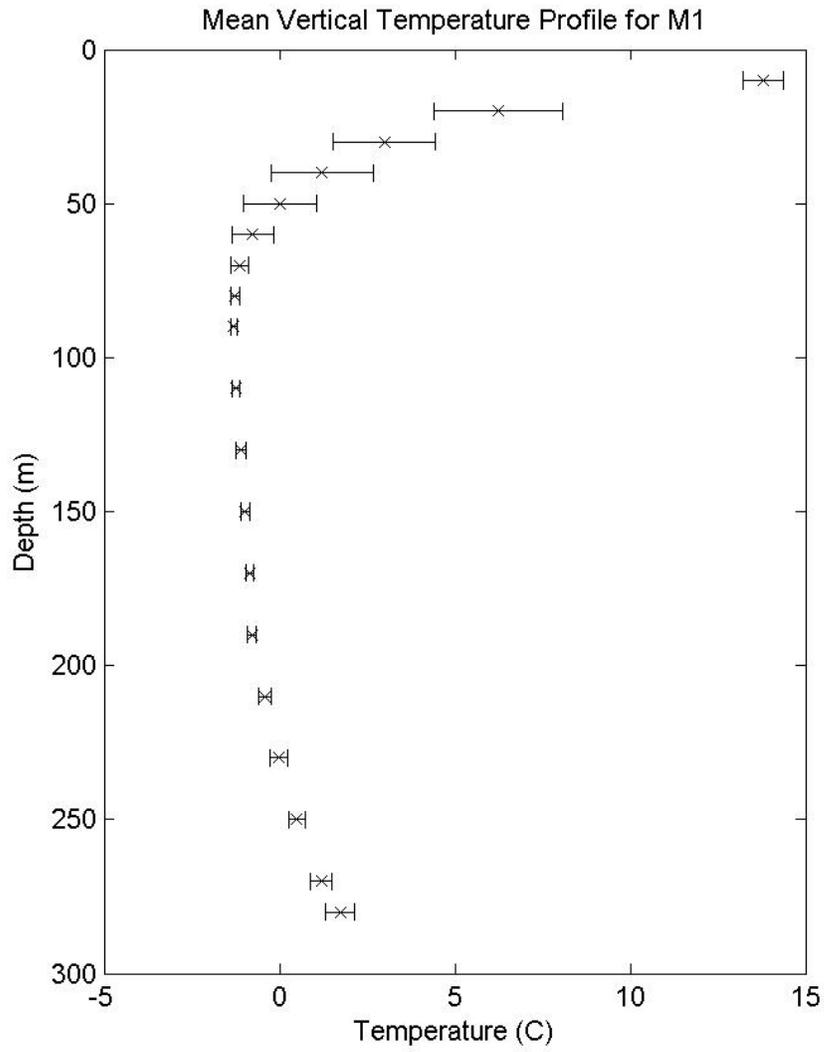


Figure 3: Mean temperature profile for M1. Profile is averaged over the entire deployment period (7 – 25 August, 2005).

<i>Mooring</i>	<i>Depth (m)</i>	<i>Mean Temperature (°C)</i>	<i>Maximum Temperature (°C)</i>	<i>Minimum Temperature (°C)</i>	<i>Standard Deviation (°C)</i>
M1	10	13.80	14.80	11.30	0.58
	20	6.25	13.30	2.10	1.84
	30	3.00	6.20	0.40	1.45
	40	1.21	4.30	-0.90	1.45
	50	0.01	3.40	-1.20	1.03
	60	-0.76	1.40	-1.40	0.59
	70	-1.14	0.30	-1.50	0.26
	80	-1.27	-0.80	-1.50	0.12
	90	-1.31	-0.60	-1.50	0.09
	110	-1.25	-0.30	-1.40	0.10
	130	-1.10	-0.40	-1.40	0.14
	150	-0.98	-0.40	-1.20	0.14
	170	-0.86	-0.10	-1.10	0.11
	190	-0.79	0.10	-1.10	0.11
	210	-0.43	0.80	-0.80	0.18
	230	-0.01	1.00	-0.60	0.25
	250	0.50	1.50	-0.10	0.24
	270	1.20	2.00	0.40	0.31
280	1.70	1.70	1.70	0	

Table 2: Summary of thermistor data for mooring M1 over the entire deployment period (7 – 25 August, 2005).

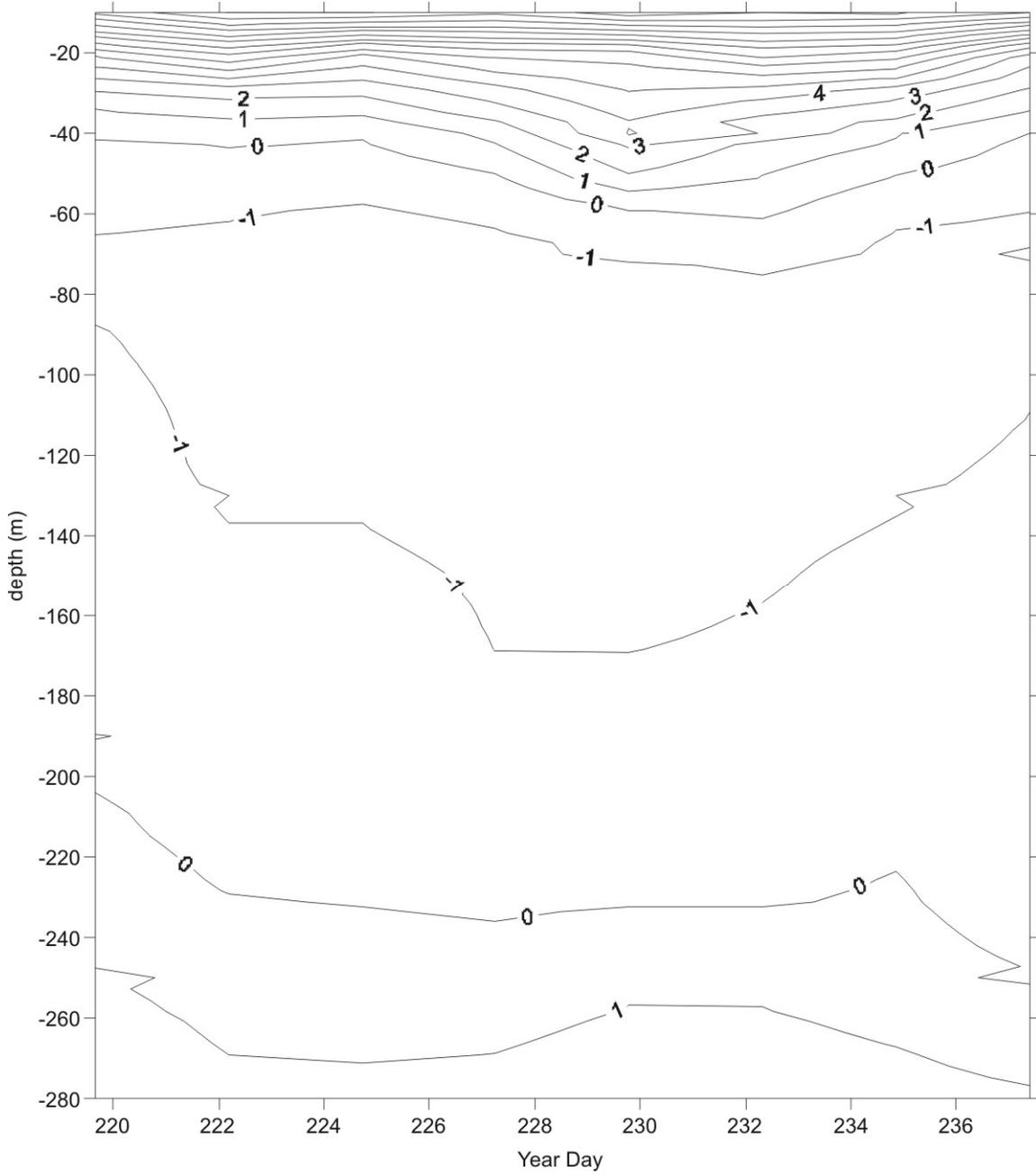


Figure 4: Isotherms at M1 for the entire deployment period (August 7-25, 2005) and entire water column. Isotherms are plotted using kriging-interpolated temperature data.

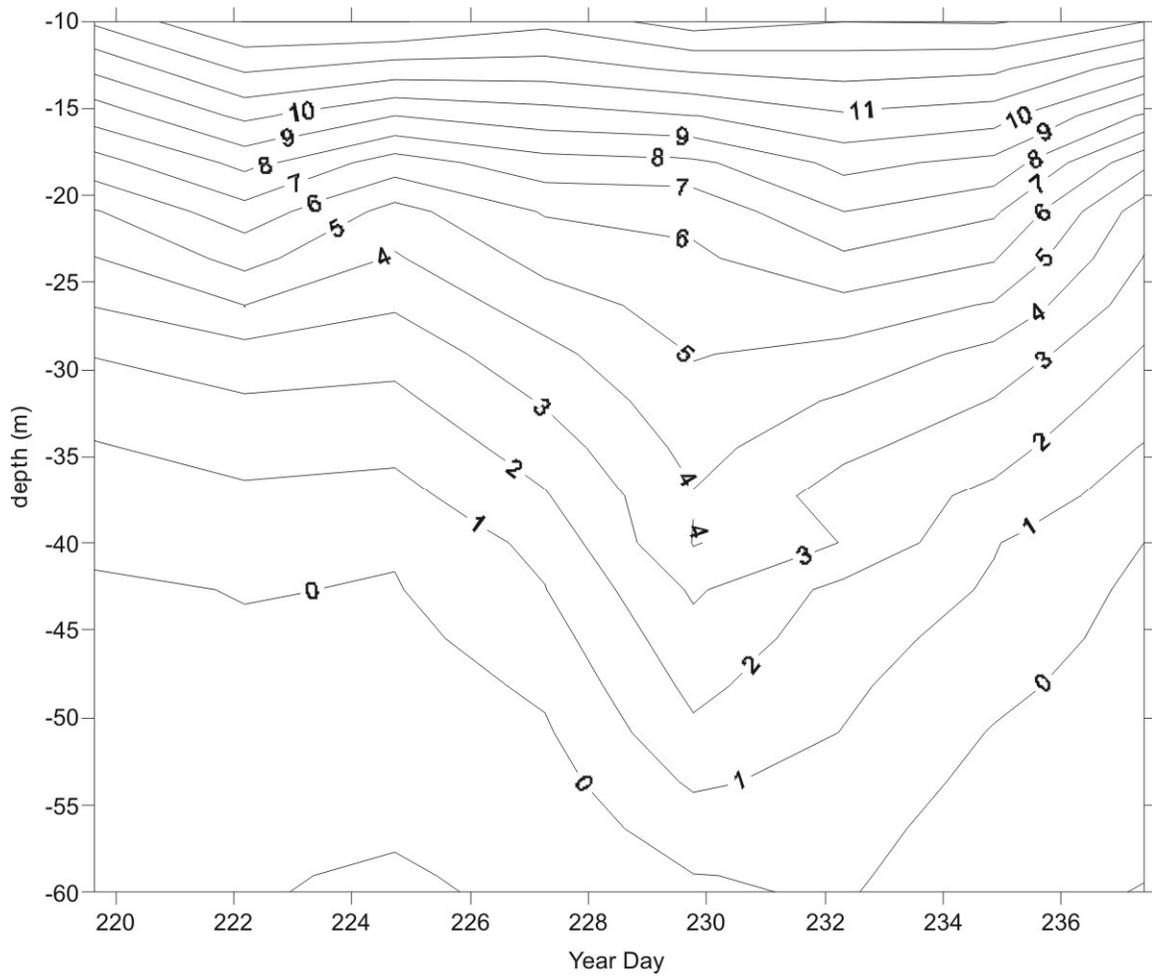


Figure 5: Isotherms at M1 for the entire deployment period (August 7-25, 2005) and the upper 60 m of the water column. Isotherms are plotted using kriging-interpolated temperature data.

Depth (m)	Mean Velocity U (mm/sec)	Standard Deviation U (mm/sec)	Mean Velocity V (mm/sec)	Standard Deviation V (mm/sec)	Mean Horizontal Direction
2	167.52	478.42	152.13	540.47	47.76
4	175.63	464.06	163.25	529.80	47.09
6	184.75	452.67	173.01	532.28	46.88
8	213.70	441.20	221.41	552.06	43.98
10	248.76	459.93	262.43	593.36	43.47
12	289.66	483.64	296.28	619.98	44.35
14	308.75	493.23	321.73	631.12	43.82
16	312.19	504.51	343.82	638.22	42.24
18	310.14	484.54	342.14	625.66	42.19
20	290.80	423.26	337.51	563.98	40.75
22	196.17	274.72	235.38	374.43	39.81
24	40.56	103.45	12.98	104.83	72.25
26	-0.23	164.39	-59.22	153.69	180.23
28	-11.47	164.28	-53.59	159.79	192.08
30	-19.75	151.60	-42.69	151.65	204.83
32	-26.05	139.49	-35.18	145.16	216.51
34	-28.39	128.24	-29.99	138.42	223.43
36	-26.37	120.16	-30.56	128.66	220.80
38	-25.08	111.81	-32.49	119.85	217.66
40	-23.09	104.06	-33.68	113.80	214.44
42	-19.82	98.81	-33.98	108.19	210.25
44	-18.44	97.85	-33.72	104.44	208.67
46	-16.88	94.48	-31.40	101.05	208.25
48	-17.10	87.82	-29.45	95.94	210.14
50	-16.06	83.63	-25.27	94.91	212.44
52	-15.31	80.14	-22.90	94.44	213.77
54	-13.84	76.65	-22.04	93.59	212.13
56	-12.59	73.99	-21.54	92.68	210.31
58	-11.12	71.96	-20.43	91.85	208.57
60	-10.66	70.25	-20.82	90.70	207.10

Table 3: Summary of horizontal current velocities from the upward-facing ADCP (I1) on M1 for each bin depth. Averages are taken over the entire deployment period after isolating and removing non-physical data. Mean horizontal direction is in degrees clockwise from North.

Depth (m)	Mean Velocity U (mm/sec)	Standard Deviation U (mm/sec)	Mean Velocity V (mm/sec)	Standard Deviation V (mm/sec)	Mean Horizontal Direction
62	-10.23	69.47	-22.16	91.15	204.79
64	-9.96	69.90	-22.32	90.15	204.05
66	-8.96	70.20	-21.05	88.81	203.05
68	-7.04	70.03	-19.44	86.33	199.91
70	-5.08	68.06	-18.64	83.97	195.26
72	-3.85	64.29	-17.82	82.98	192.20
74	-3.44	61.65	-17.47	82.22	191.15
76	-3.24	60.93	-17.17	81.14	190.68
78	-2.86	61.74	-17.49	79.53	189.29
80	-2.29	62.73	-18.65	77.89	187.01
82	-1.48	63.03	-20.55	76.27	184.12
84	-0.97	62.58	-21.37	75.79	182.60
86	-1.13	61.21	-21.13	75.45	183.06
88	-0.67	60.64	-21.00	74.95	181.82
90	-0.36	60.28	-20.80	74.44	180.98
92	0.36	59.65	-21.21	73.06	179.04
94	0.85	59.16	-21.92	70.75	177.77
96	1.36	59.01	-23.62	68.54	176.71
98	2.22	58.01	-25.30	66.96	174.99
100	3.48	57.44	-26.42	65.39	172.49
102	5.04	56.87	-26.78	64.24	169.35
104	6.14	56.49	-25.70	62.83	166.56
106	6.17	58.24	-25.42	64.66	166.36
108	5.25	59.85	-24.72	65.71	168.02

Table 4 (Continued): Summary of horizontal current velocities from the upward-facing ADCP (I1) on M1 for each bin depth. Averages are taken over the entire deployment period after isolating and removing non-physical data. Mean horizontal direction is in degrees clockwise from North.

Depth (m)	Mean Velocity W (mm/sec)	Standard Deviation W (mm/sec)	Depth (m)	Mean Velocity W (mm/sec)	Standard Deviation W (mm/sec)
2	2.19	22.23	62	-2.95	6.83
4	2.36	21.94	64	-3.00	7.02
6	2.64	21.71	66	-3.04	7.17
8	3.53	21.49	68	-3.06	7.21
10	2.08	20.65	70	-3.04	7.14
12	-3.24	19.65	72	-3.02	7.17
14	-8.10	18.76	74	-2.95	7.15
16	-12.46	17.14	76	-2.88	7.10
18	-5.25	16.21	78	-2.75	7.04
20	3.01	16.65	80	-2.53	7.21
22	-0.19	14.39	82	-2.26	7.25
24	1.03	13.66	84	-2.03	7.23
26	-2.06	9.30	86	-1.77	7.36
28	-1.07	7.72	88	-1.46	7.40
30	-0.77	7.76	90	-1.16	7.33
32	-0.71	7.97	92	-0.68	7.33
34	-0.98	8.45	94	0.05	7.33
36	-1.54	8.68	96	1.13	7.56
38	-1.78	8.45	98	2.29	7.97
40	-1.92	8.08	100	3.28	8.33
42	-1.62	7.68	102	3.65	8.47
44	-1.75	7.63	104	3.11	8.15
46	-1.93	7.45	106	2.23	7.27
48	-2.30	7.27	108	0.63	5.77
50	-2.42	6.93			
52	-2.55	6.70			
54	-2.80	6.52			
56	-2.89	6.52			
58	-2.93	6.50			
60	-2.83	6.57			

Table 5: Summary of vertical current velocities from the upward-facing ADCP (I1) on M1 for each bin depth. Averages are taken over the entire deployment period after isolating and removing non-physical data.

Depth (m)	Mean Velocity U (mm/sec)	Standard Deviation U (mm/sec)	Mean Velocity V (mm/sec)	Standard Deviation V (mm/sec)	Mean Horizontal Direction
2	0.04	58.29	-0.04	70.21	134.86
4	-0.15	36.93	-0.03	39.06	257.99
6	-1.65	15.35	-1.13	17.02	235.54
8	-2.44	11.60	1.36	13.29	299.06
10	2.33	9.35	-2.39	10.42	135.82
12	1.19	8.75	3.36	9.11	19.47
14	-2.05	10.14	0.21	9.23	275.80
16	-17.12	13.56	-2.25	17.68	262.52
18	24.28	11.21	-1.18	13.69	92.78
20	13.89	10.61	3.19	13.15	77.06
22	-12.78	12.78	-2.54	13.84	258.76
24	-0.43	9.20	-2.42	9.49	190.05
26	-0.57	36.43	-16.33	36.53	182.00
28	-0.75	59.65	-24.14	54.70	181.77
30	-2.15	60.03	-21.78	55.90	185.63
32	-3.44	59.49	-19.11	56.48	190.21
34	-4.01	57.57	-18.23	56.47	192.40
36	-4.45	55.69	-17.89	55.91	193.96
38	-4.57	54.10	-16.76	56.25	195.26
40	-4.63	53.14	-15.68	54.68	196.46
42	-5.06	51.61	-14.69	54.19	199.01
44	-4.64	52.13	-11.90	54.90	201.32
46	-3.79	53.39	-9.73	54.84	201.27
48	-3.12	52.58	-7.75	54.21	201.94
50	-2.78	51.70	-5.99	52.91	204.85
52	-3.02	50.25	-4.09	51.12	216.47
54	-3.39	50.19	-2.92	50.21	229.21
56	-2.51	50.11	-3.43	49.05	216.21
58	-0.76	50.34	-3.38	49.56	192.66
60	0.87	50.90	-3.22	49.60	164.90

Table 6: Summary of horizontal current velocities from the downward-facing ADCP (I3) on M1 for each bin depth. Averages are taken over the entire deployment period after isolating and removing non-physical data. Mean horizontal direction is in degrees clockwise from North.

Depth (m)	Mean Velocity U (mm/sec)	Standard Deviation U (mm/sec)	Mean Velocity V (mm/sec)	Standard Deviation V (mm/sec)	Mean Horizontal Direction
62	1.60	52.31	-2.35	50.00	145.75
64	2.37	52.57	-1.29	50.75	118.63
66	2.76	52.64	-0.91	52.47	108.23
68	3.47	51.83	-0.87	54.13	104.11
70	3.71	52.74	-0.75	55.97	101.47
72	3.62	53.00	-0.19	57.63	92.94
74	4.56	52.85	0.63	59.48	82.18
76	5.64	52.13	0.48	61.46	85.11
78	6.45	50.78	0.61	63.48	84.59
80	7.09	50.47	1.42	66.42	78.66
82	7.32	50.41	2.03	68.30	74.49
84	7.51	50.50	2.15	69.67	74.01
86	7.61	50.93	1.80	69.97	76.69
88	8.20	51.11	2.28	69.97	74.47
90	9.08	51.57	3.32	70.07	69.91
92	9.70	51.56	4.18	70.83	66.69
94	10.43	52.12	4.62	71.95	66.09
96	10.48	52.94	4.01	73.49	69.09
98	10.61	53.73	4.33	75.69	67.81
100	10.73	54.69	4.84	78.14	65.72
102	10.72	55.49	5.12	79.16	64.48
104	11.99	56.59	6.05	82.10	63.23
106	12.57	57.00	6.90	83.94	61.24
108	12.37	57.05	7.88	85.09	57.50

Table 7 (continued): Summary of horizontal current velocities from the downward-facing ADCP (I3) on M1 for each bin depth. Averages are taken over the entire deployment period after isolating and removing non-physical data. Mean horizontal direction is in degrees clockwise from North.

Depth (m)	Mean Velocity W (mm/sec)	Standard Deviation W (mm/sec)	Depth (m)	Mean Velocity W (mm/sec)	Standard Deviation W (mm/sec)
2	1.98	10.15	62	-2.79	6.49
4	2.08	8.88	64	-2.64	6.47
6	2.79	3.05	66	-2.57	6.42
8	4.23	2.40	68	-2.35	6.54
10	3.76	2.20	70	-2.12	6.69
12	2.54	2.12	72	-2.09	6.71
14	2.15	2.39	74	-2.08	6.79
16	12.25	3.82	76	-1.97	6.87
18	9.31	2.44	78	-1.90	6.85
20	-11.46	2.65	80	-1.81	6.90
22	-8.27	3.24	82	-1.64	7.02
24	-3.98	2.23	84	-1.51	7.03
26	-8.68	4.43	86	-1.35	6.97
28	-3.94	4.31	88	-1.36	6.97
30	-3.67	4.51	90	-1.23	6.97
32	-3.64	4.62	92	-1.12	6.85
34	-3.63	4.73	94	-1.03	6.81
36	-3.50	4.82	96	-0.93	6.60
38	-3.27	5.06	98	-0.87	6.46
40	-3.20	5.17	100	-0.73	6.25
42	-3.33	5.22	102	-0.59	5.96
44	-3.21	5.47	104	-0.65	5.71
46	-3.16	5.88	106	-0.73	5.40
48	-3.19	5.89	108	-0.70	4.95
50	-3.21	6.07			
52	-3.06	6.08			
54	-3.11	5.96			
56	-3.10	6.01			
58	-3.04	6.30			
60	-2.95	6.37			

Table 8: Summary of vertical current velocities from the downward-facing ADCP (I3) on M1 for each bin depth. Averages are taken over the entire deployment period after isolating and removing non-physical data.

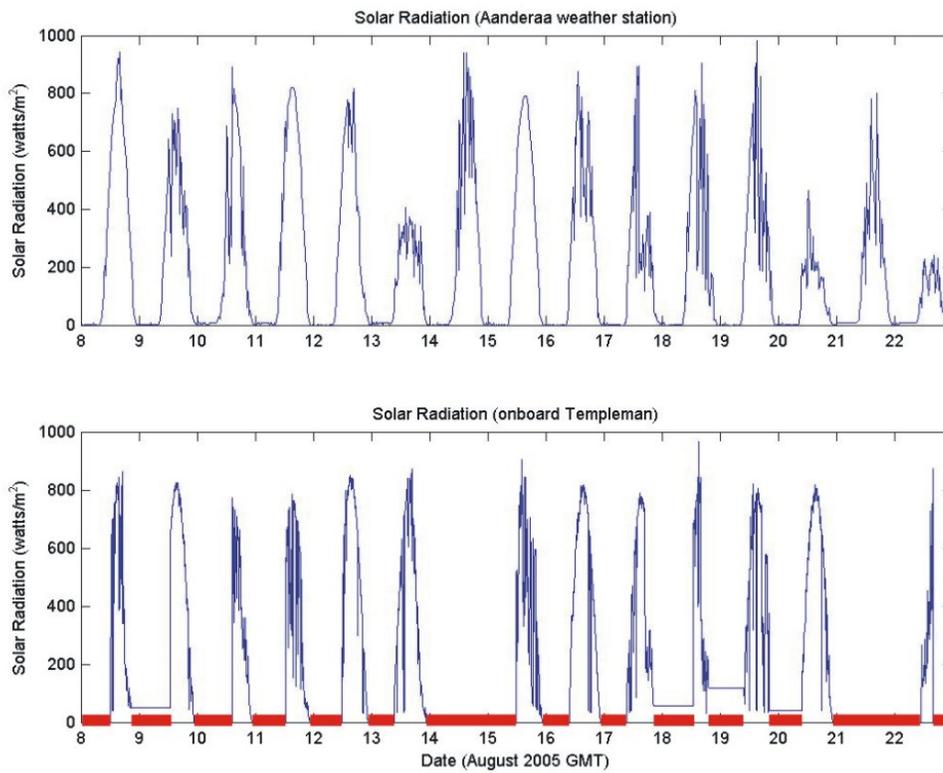


Figure 6: Solar Radiation (Watts/m²) collected at the Aanderaa weather station in Lumsden, NL (top) and onboard the *Wilfred Templeman* (bottom) for the period of August 8-22, 2005 GMT. Red lines on the axis represent the times during which the weather station onboard the *Wilfred Templeman* failed to collect data.

Date dd/mm/yr	Upward-looking ADCP	Downward-looking ADCP
07/08/05	-	-
08/08/05	-	-
09/08/05	10:00-12:00 (B,U,V)	18:00-20:30 (V) 21:00-23:30 (B,U,V,W)
10/08/05	-	-
11/08/05	-	-
12/08/05	03:30-06:00 (B,U,V) 06:00-08:30 (V)	12:00-14:00 (U) 15:00-17:30 (B,U,V,W)
13/08/05	10:00-12:00 (B)	-
14/08/05	21:00-23:30 (B,U,V)	-
15/08/05	00:00-02:00 (U) 22:00-23:30 (W)	09:00-11:30 (B,U,V,W)
16/08/05	-	-
17/08/05	14:30-17:00 (B,U,V,W) 18:00-20:00 (V)	-
18/08/05	-	02:30-05:00 (B,U,V)
19/08/05	-	-
20/08/05	08:30-11:00 (B,U,V) 11:30-02:00 (U)	20:00-22:30 (B,U,V,W)
21/08/05	-	-
22/08/05	-	-
23/08/05	04:00-06:00 (B,U)	16:00-18:00 (B,U,V,W)
24/08/05	-	-
25/08/05	-	-

Table 9: Dates and times of anomalous readings observed in both the corrected backscatter and velocity data (figures 11-30). All times are given in GMT. Since the anomalies are not always present at the same time in all of the components of velocity as well as in the backscatter, their presence within this data is specified in brackets behind the time at which the anomaly occurs. Here B represents backscatter, U represents the eastward component of velocity, V is the northward component of velocity, and W is the vertical component of velocity.

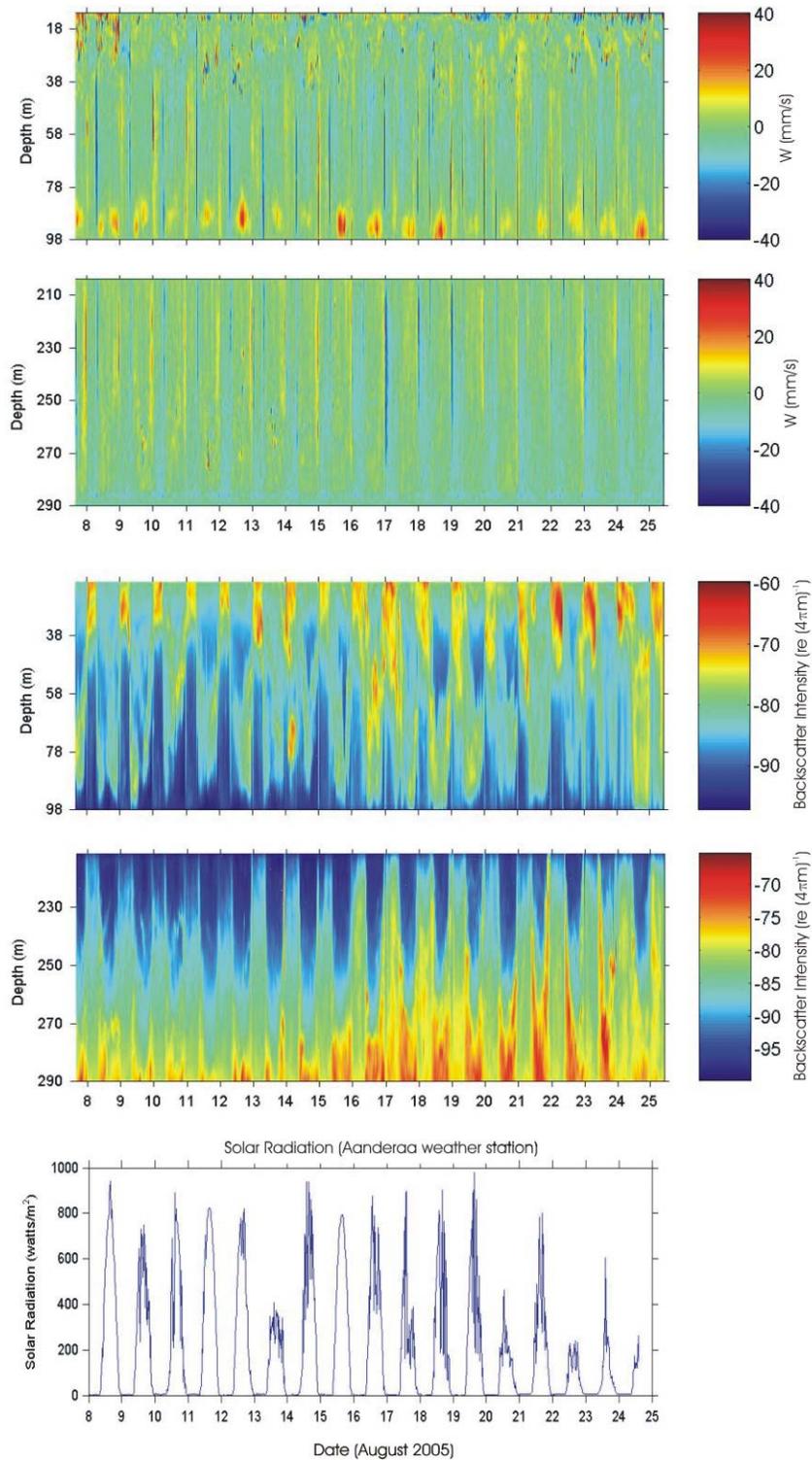


Figure 7: Vertical velocity (in mm/s) and corrected backscatter ($\text{re } (4\pi\text{m})^{-1}$) at M1 for the entire deployment period (August 7-25, 2005 GMT) as well as Solar radiation (in Watts/m^2) recorded at the Aanderaa weather station in Lumsden, NL from August 8-25, 2005 GMT.

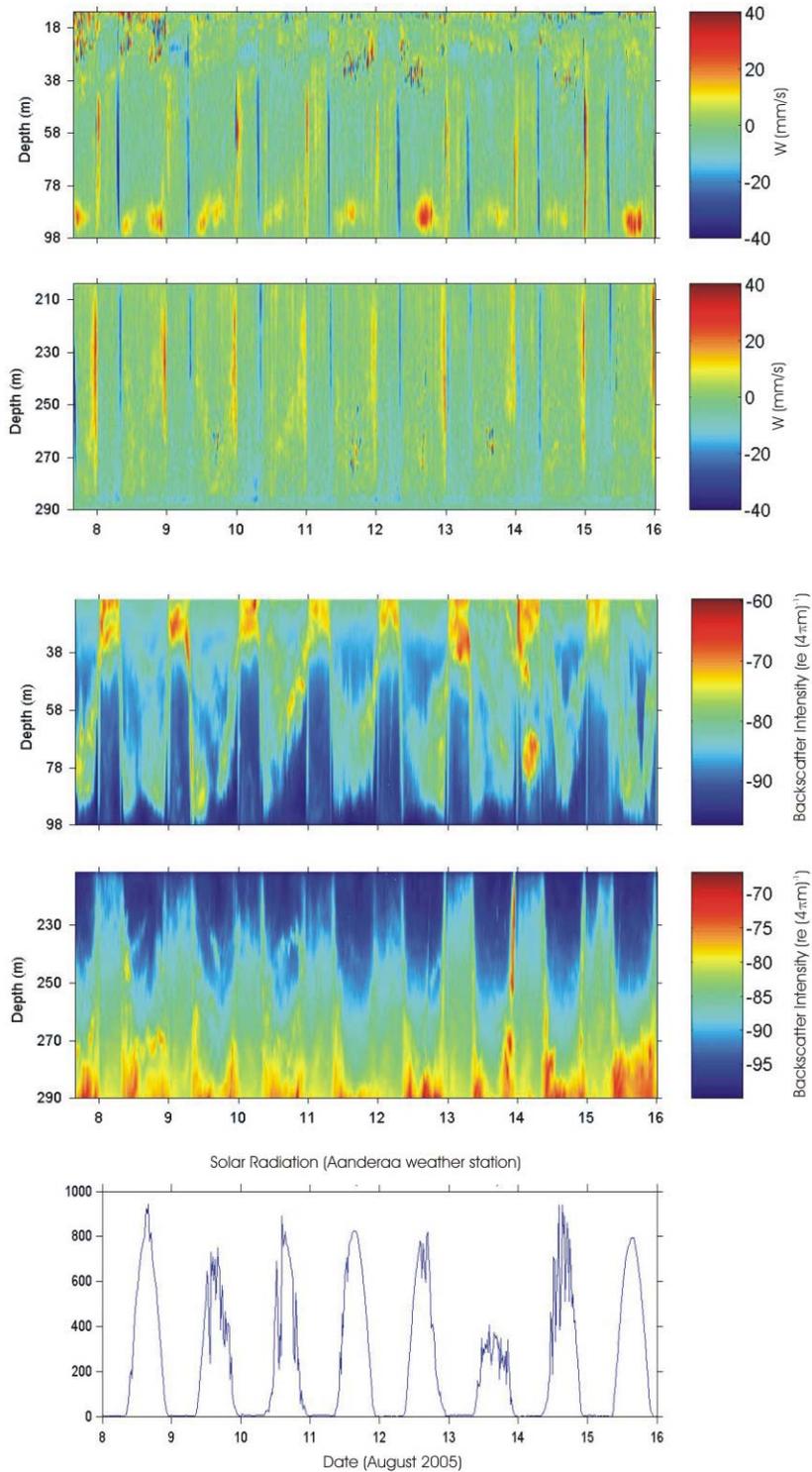


Figure 8: Vertical velocity (in mm/s) and corrected backscatter ($\text{re } (4\pi\text{m})^{-1}$) at M1 as well as Solar radiation (in Watts/m^2) collected at the Aanderaa weather station in Lumsden, NL for August 7-15, 2005 GMT.

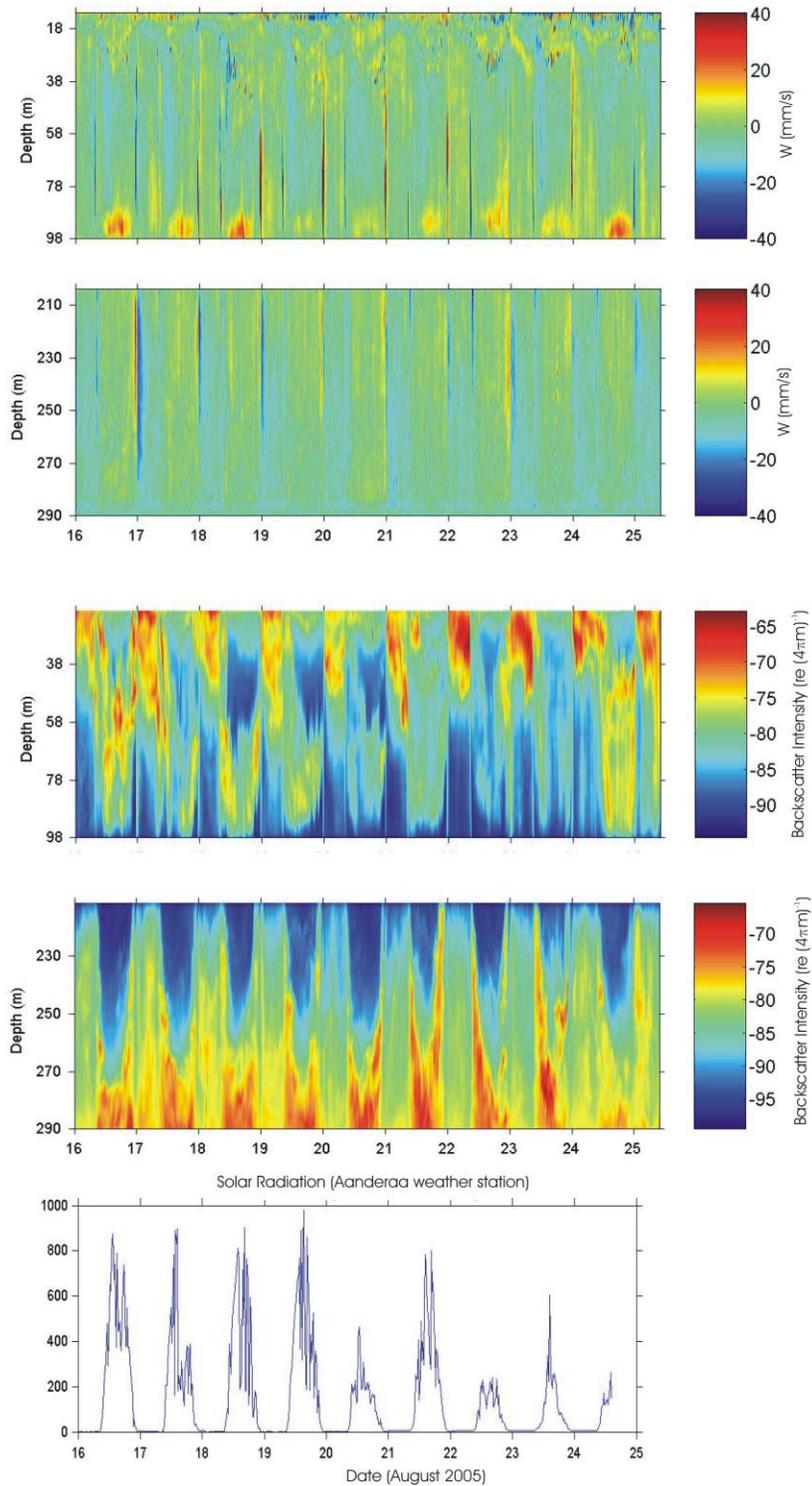


Figure 9: Vertical velocity (in mm/s) and corrected backscatter ($(4\pi\text{m})^{-1}$) at M1 as well as Solar radiation (in Watts/m^2) collected at the Aanderaa weather station in Lumsden, NL for August 16-25, 2005 GMT.

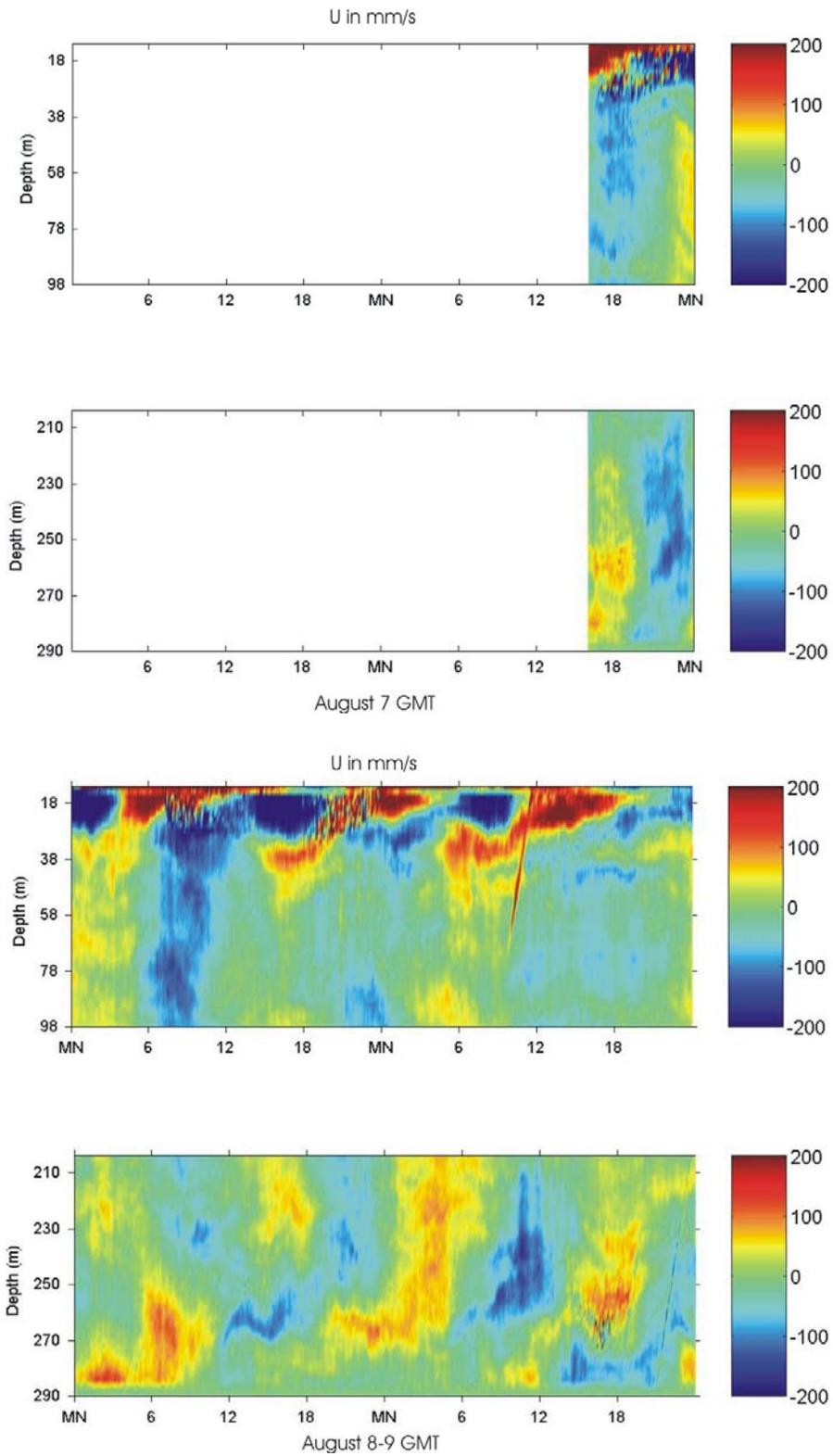


Figure 10: Raw data from M1, for both upward and downward facing ADCPs, for August 7-9, 2005. U (in mm/s) is positive to the east.

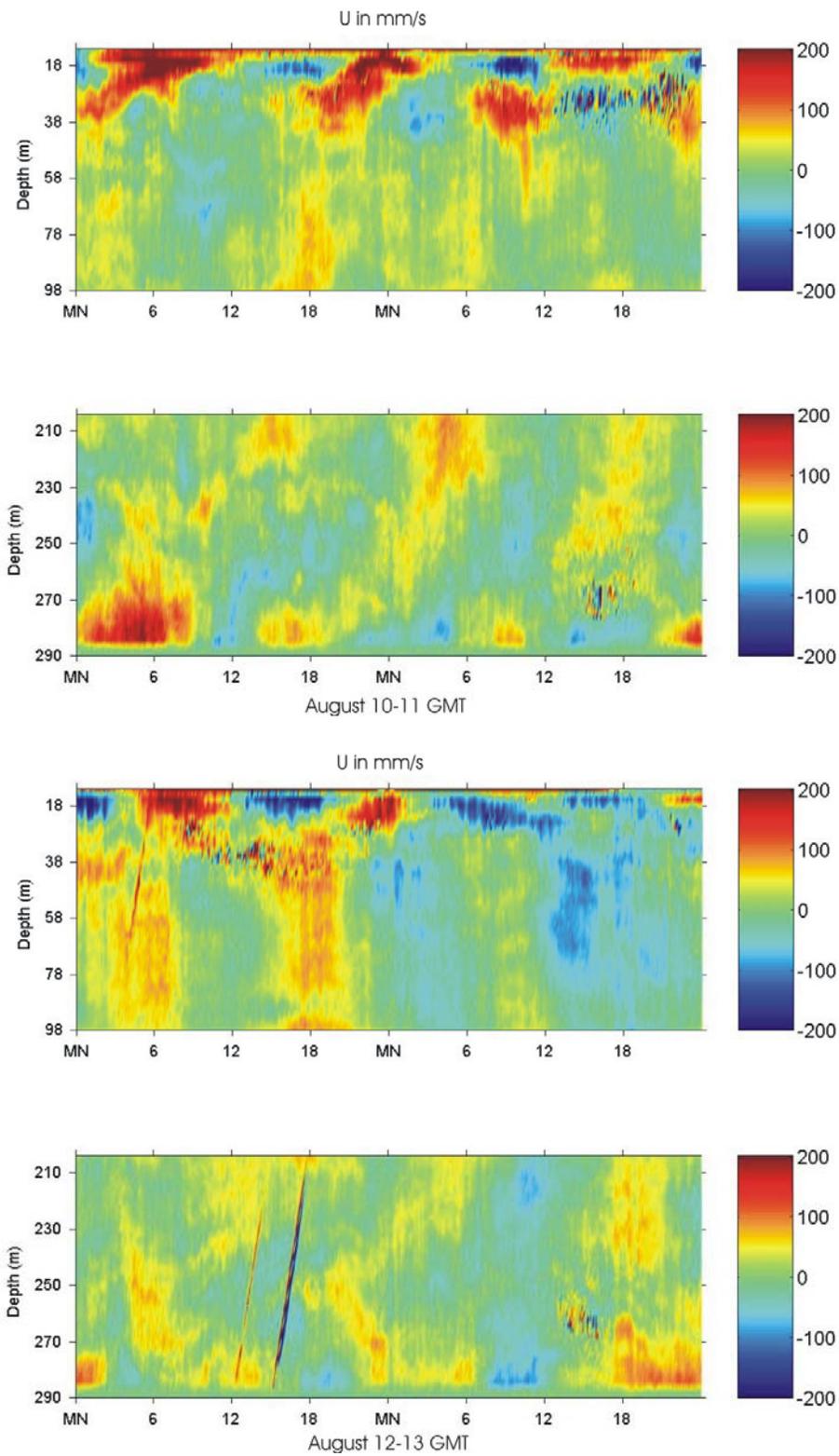


Figure 11: Raw data from M1, for both upward and downward facing ADCPs, for August 10-13, 2005. U (in mm/s) is positive to the east.

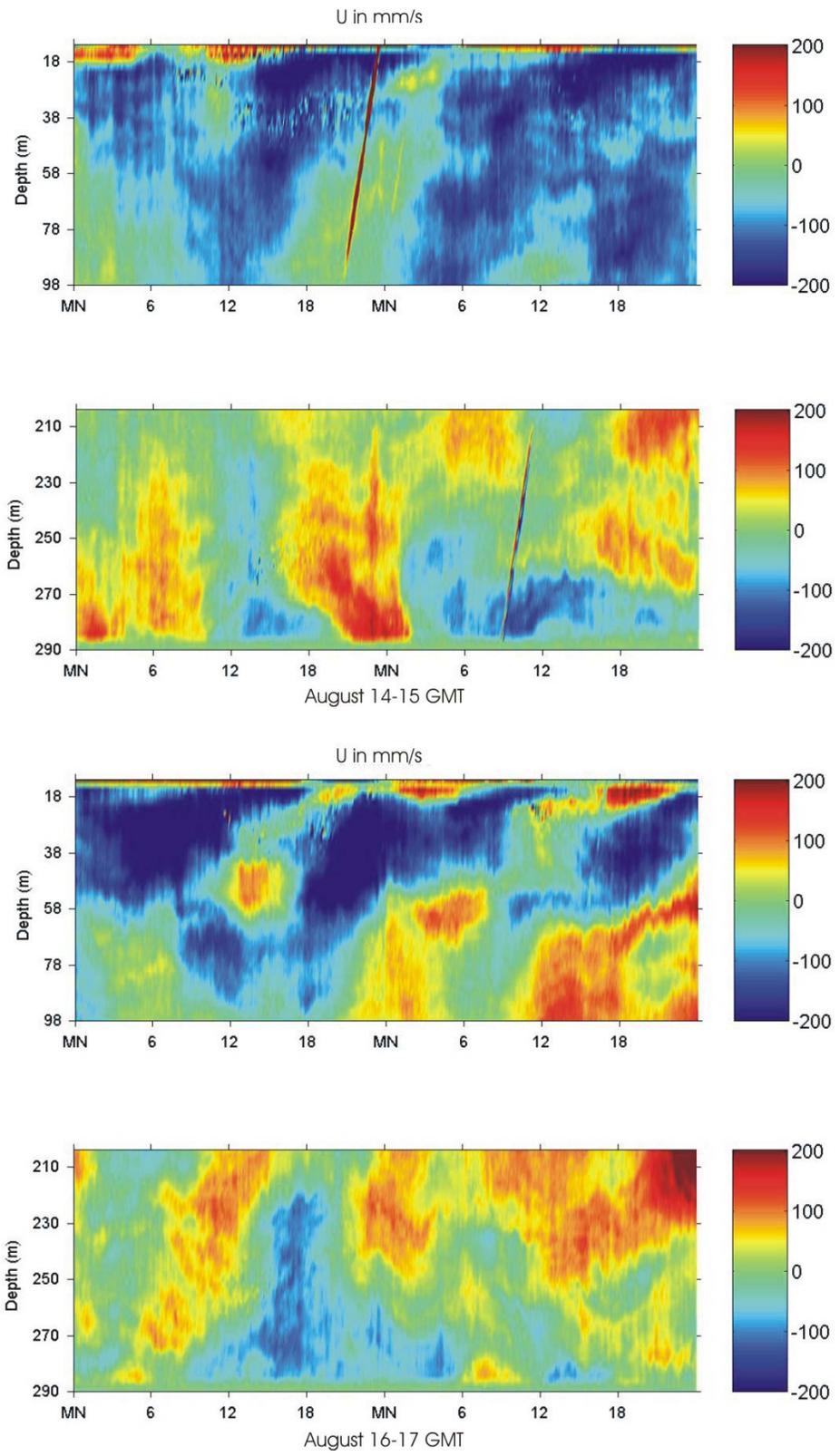


Figure 12: Raw data from M1, for both upward and downward facing ADCPs, for August 14-17, 2005. U (in mm/s) is positive to the east.

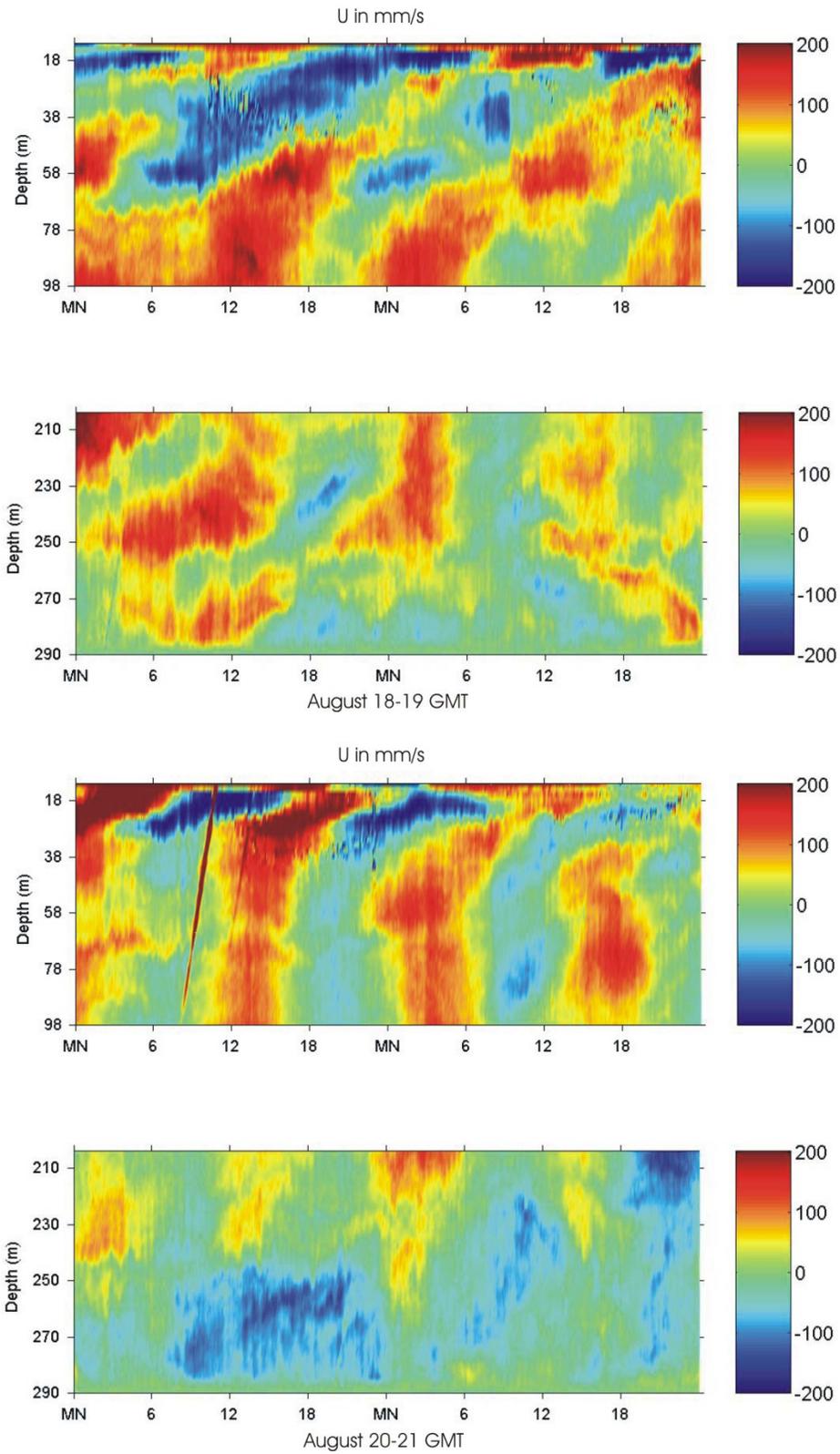


Figure 13: Raw data from M1, for both upward and downward facing ADCPs, for August 18-21, 2005. U (in mm/s) is positive to the east.

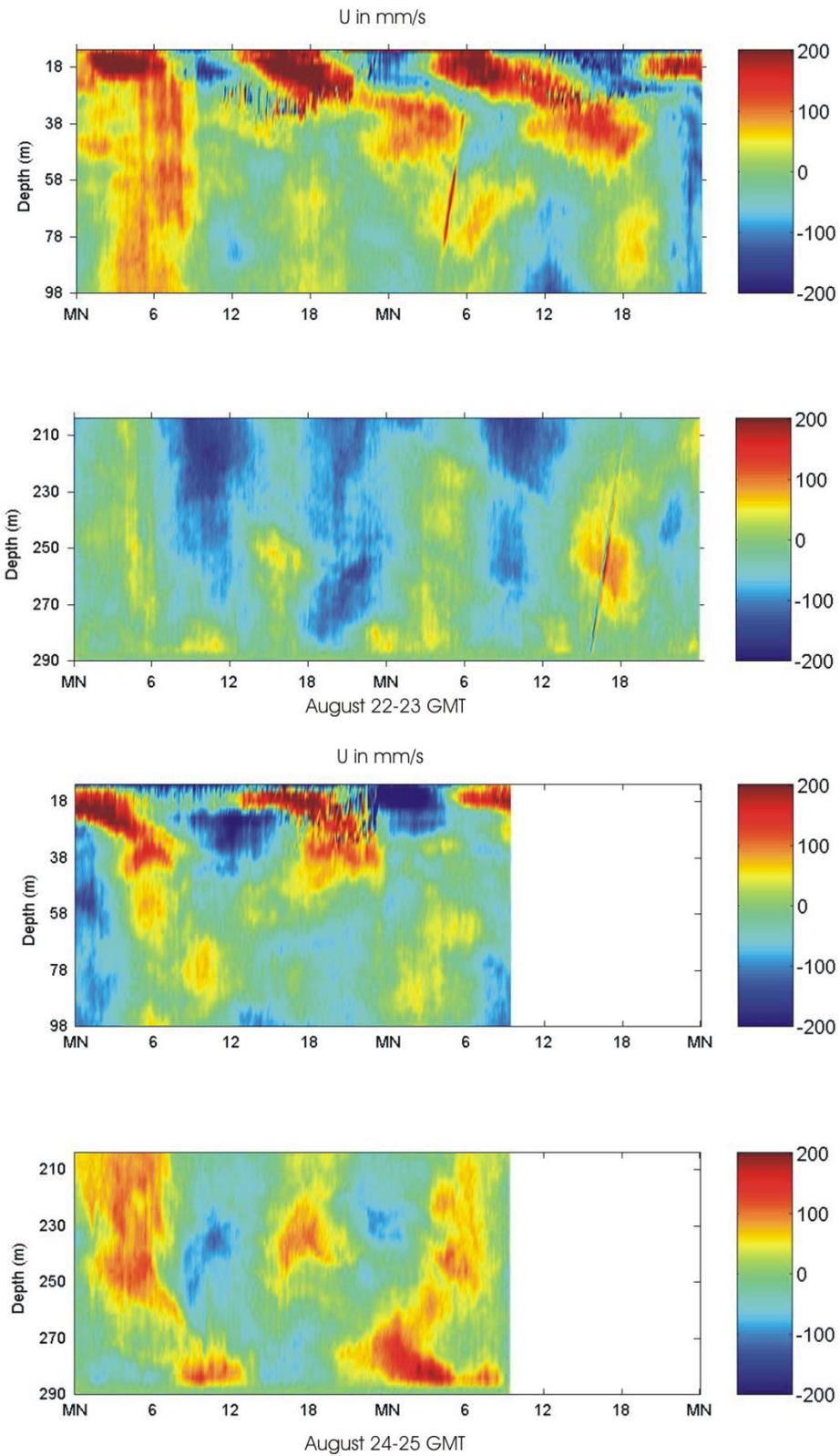


Figure 14: Raw data from M1, for both upward and downward facing ADCPs, for August 22-25, 2005. U (in mm/s) is positive to the east.

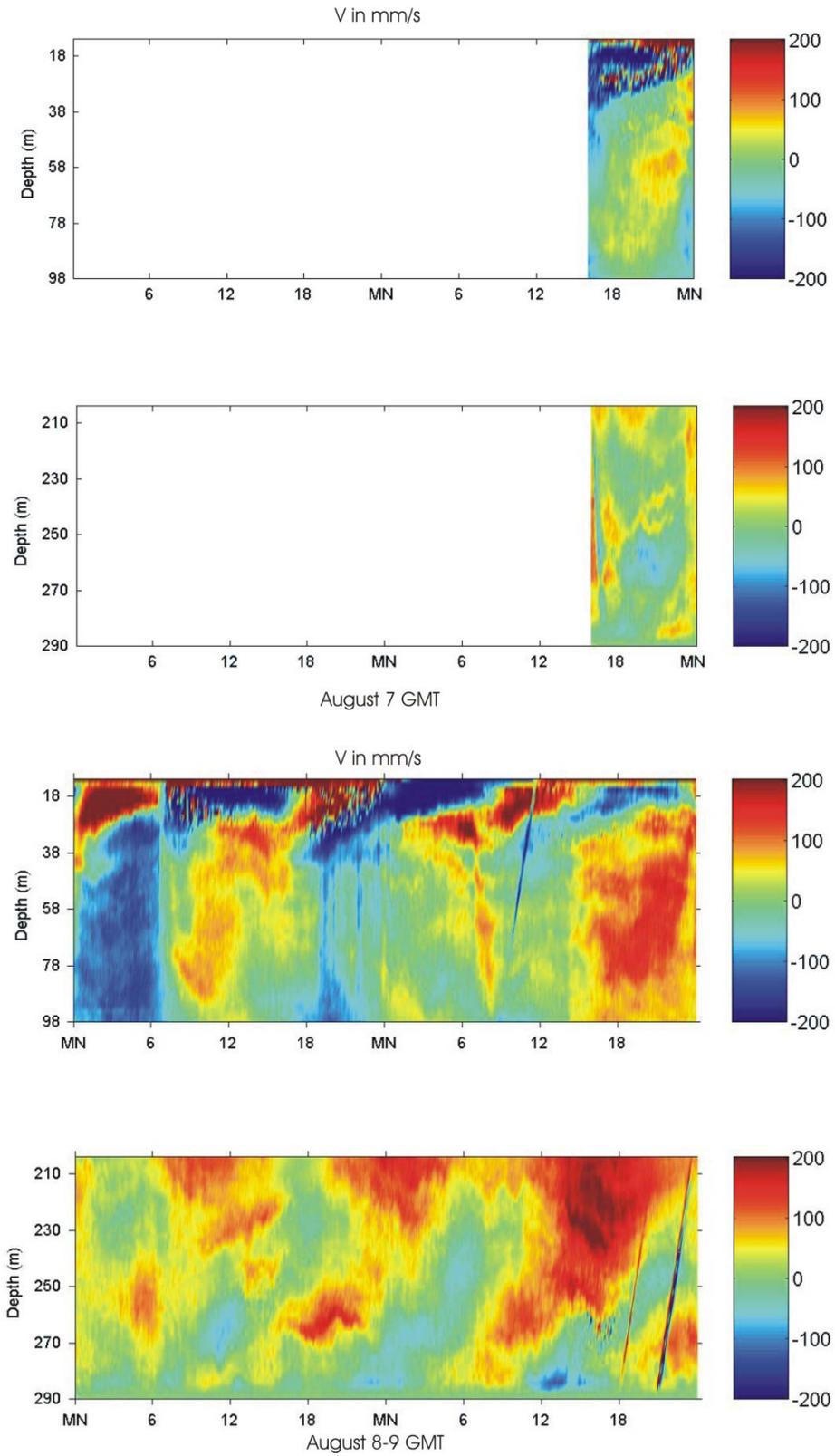


Figure 15: Raw data from M1, for both upward and downward facing ADCPs, for August 7-9, 2005. V (in mm/s) is positive to the north.

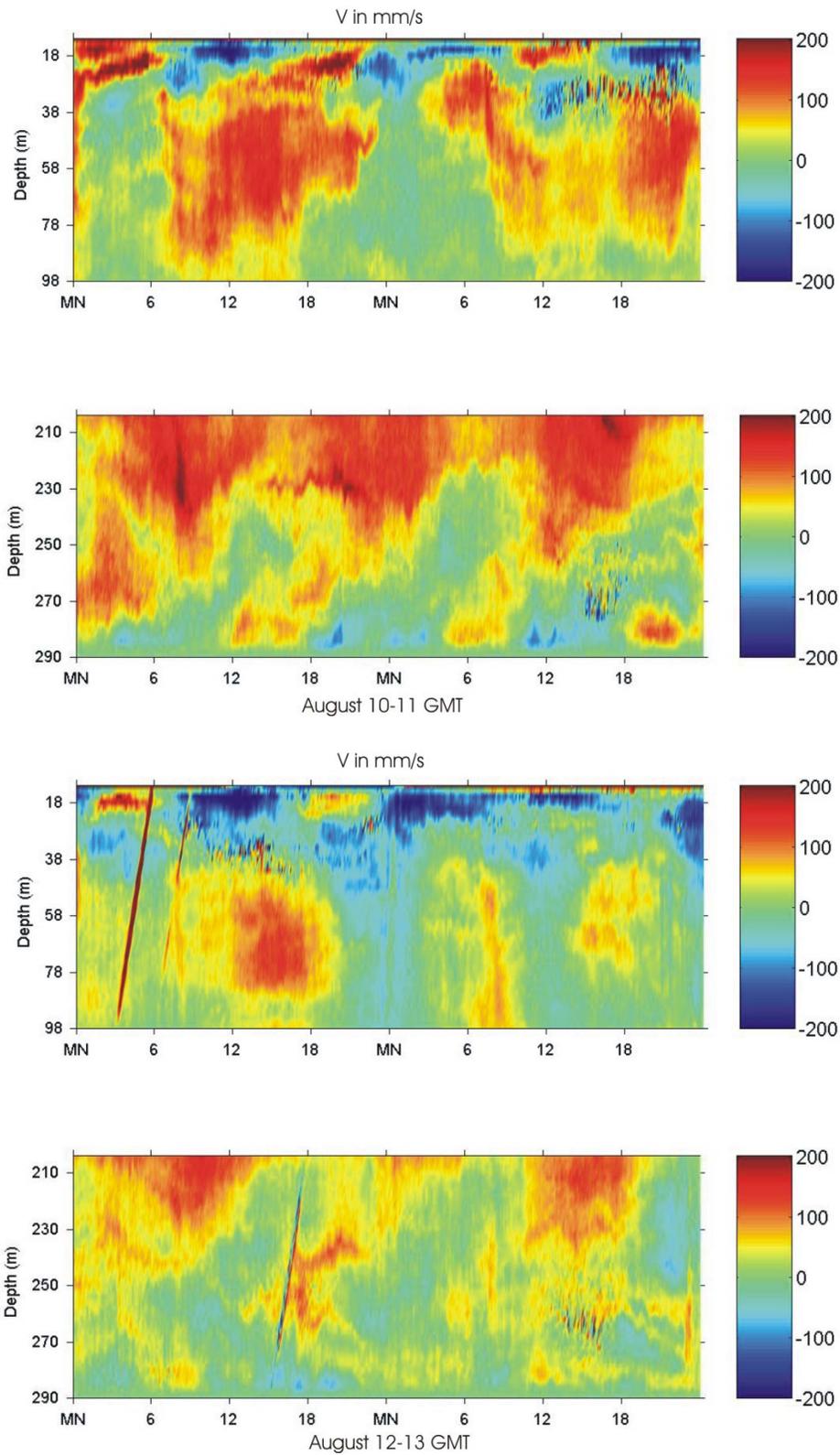


Figure 16: Raw data from M1, for both upward and downward facing ADCPs, for August 10-13, 2005. V (in mm/s) is positive to the north.

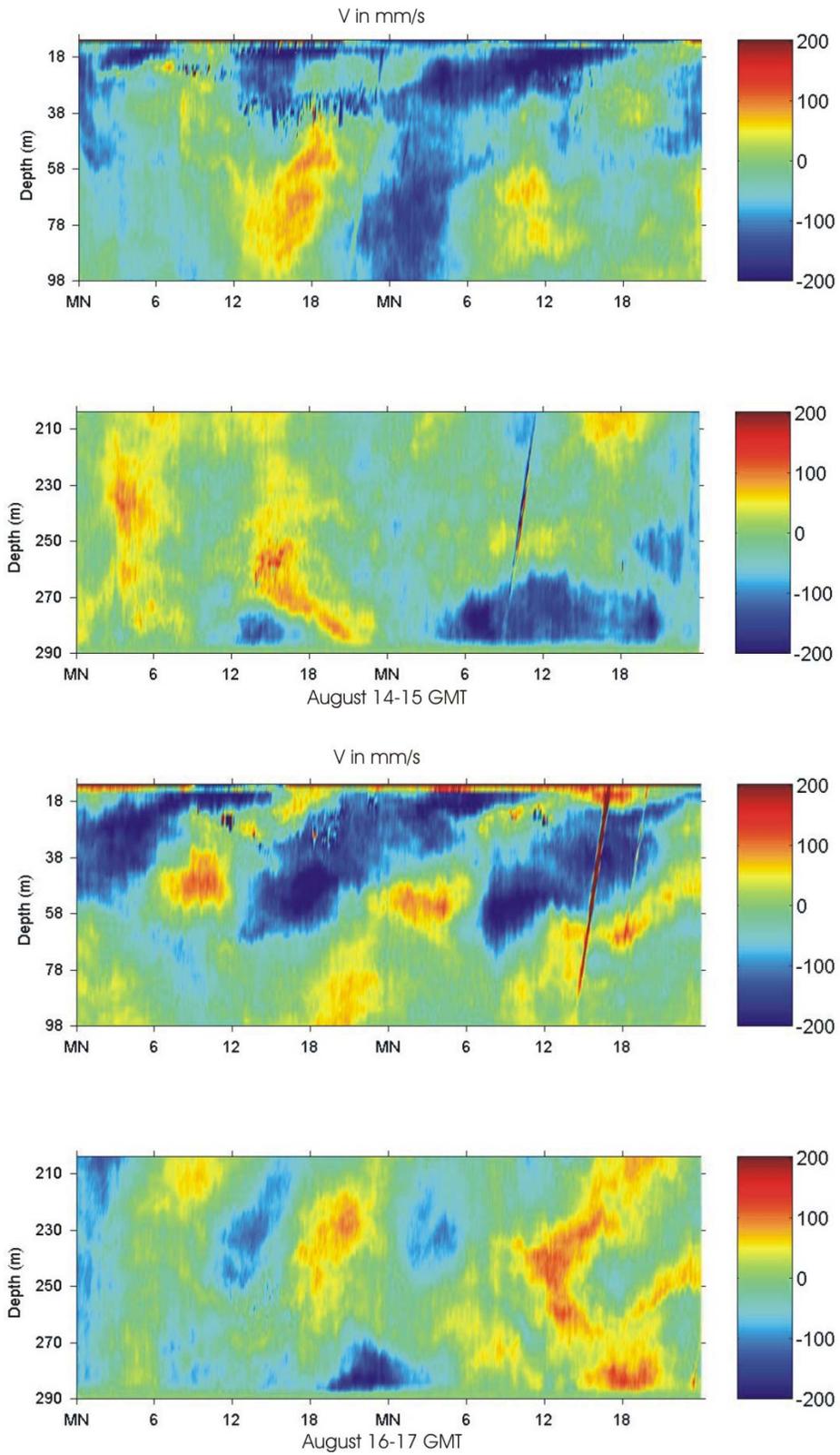


Figure 17: Raw data from M1, for both upward and downward facing ADCPs, for August 14-17, 2005. V (in mm/s) is positive to the north.

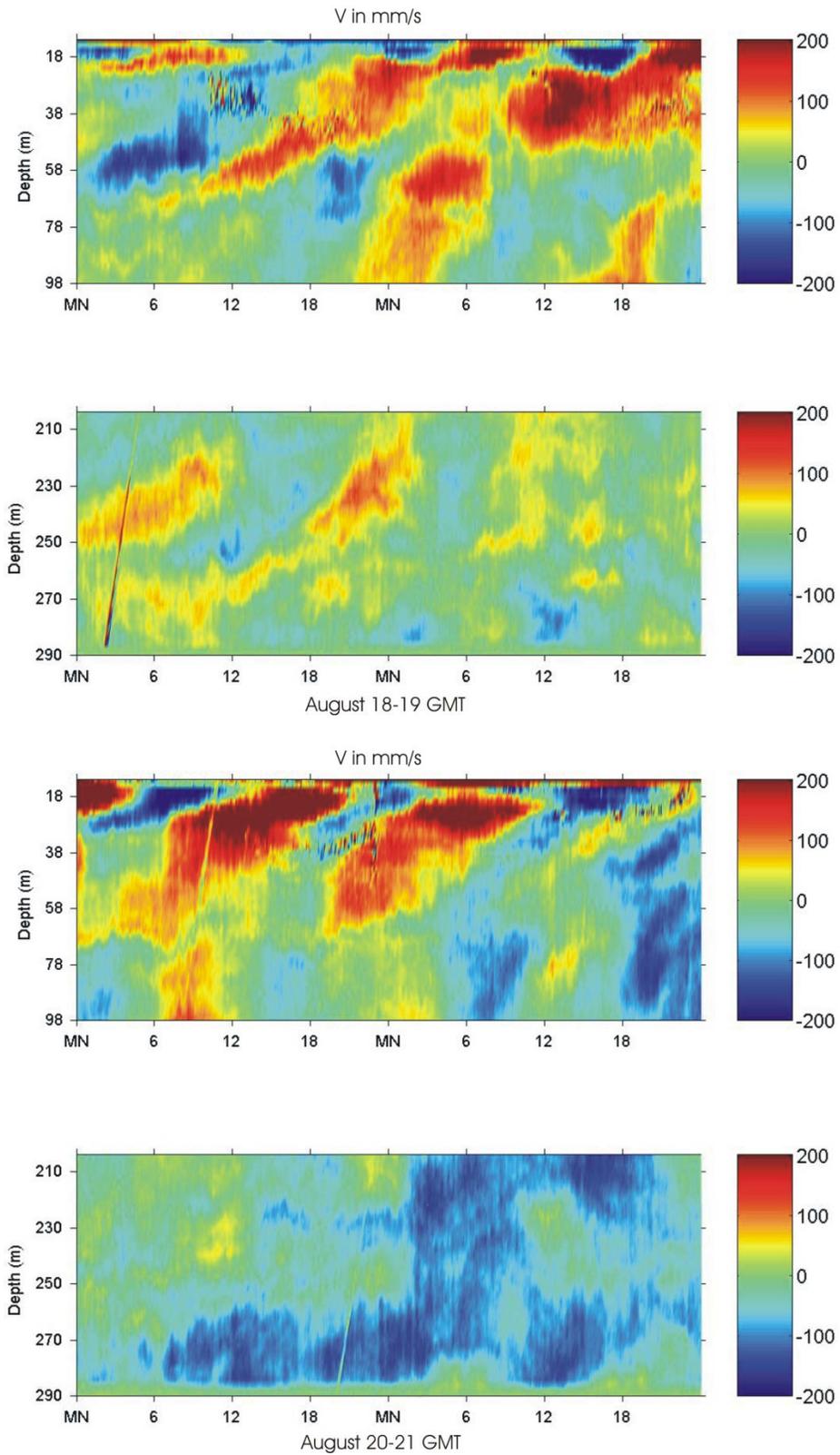


Figure 18: Raw data from M1, for both upward and downward facing ADCPs, for August 18-21, 2005. V (in mm/s) is positive to the north.

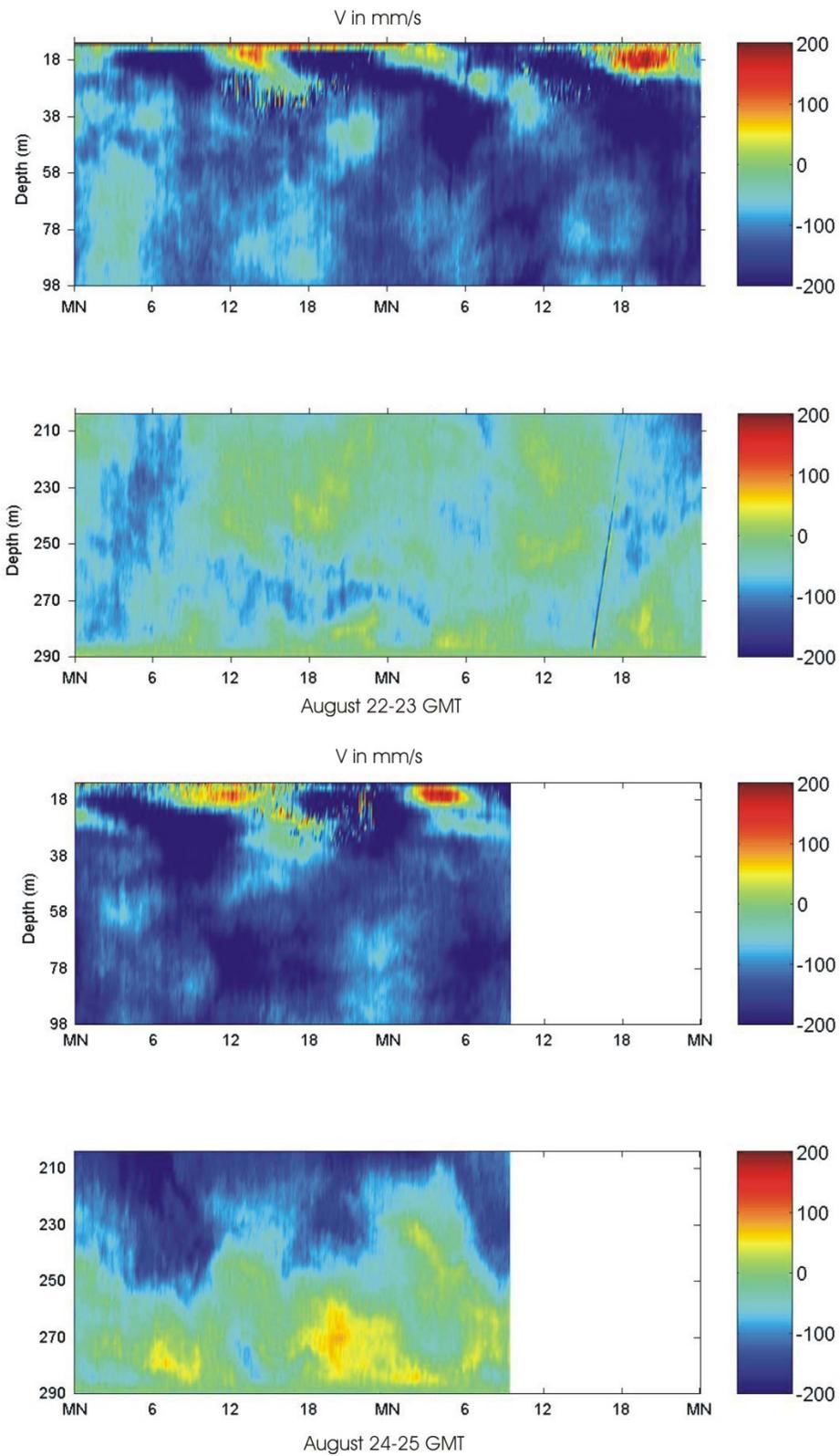


Figure 19: Raw data from M1, for both upward and downward facing ADCPs, for August 22-25, 2005. V (in mm/s) is positive to the north.

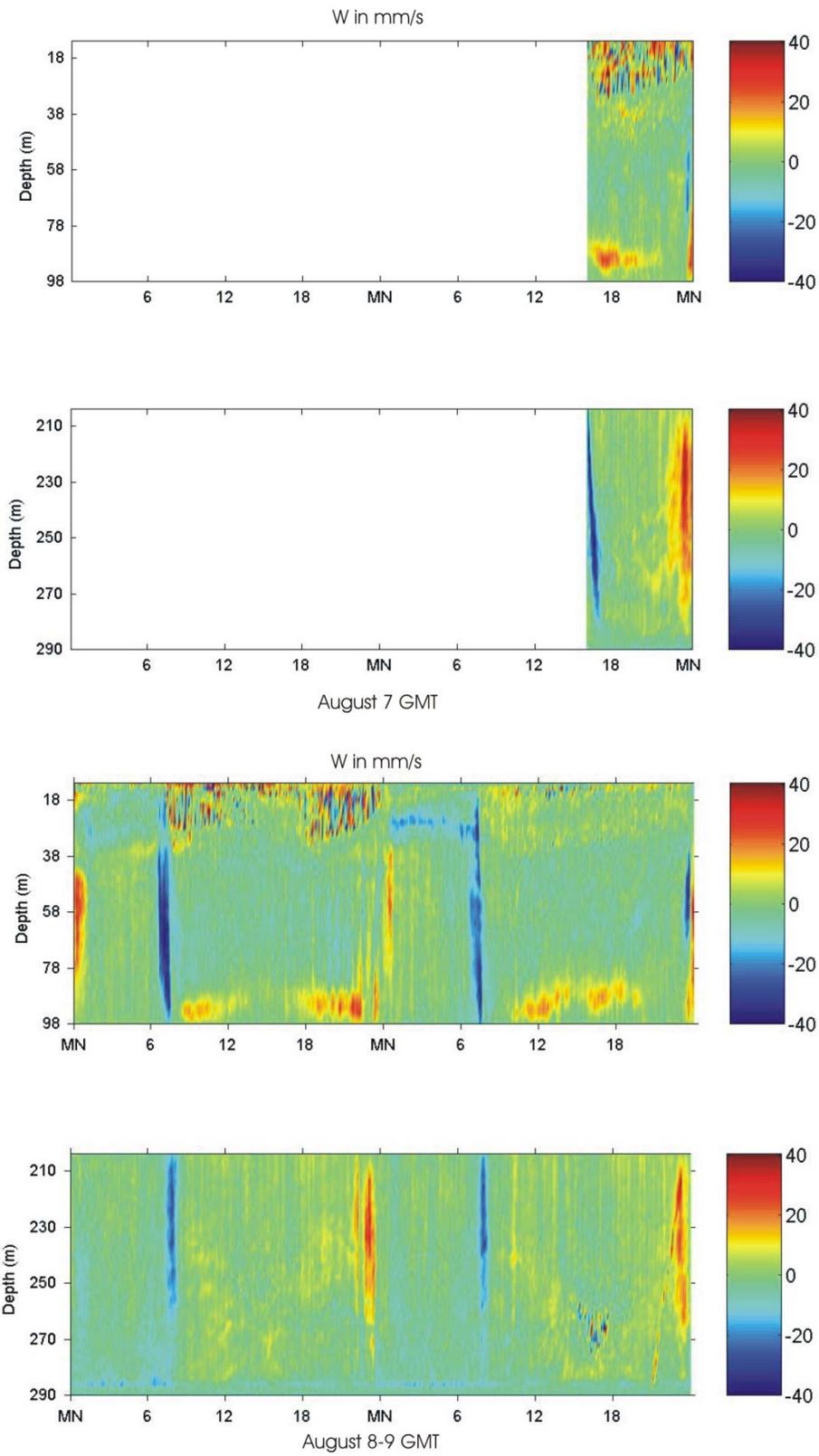


Figure 20: Raw data from M1, for both upward and downward facing ADCPs, for August 7-9, 2005. W (in mm/s) is positive upwards.

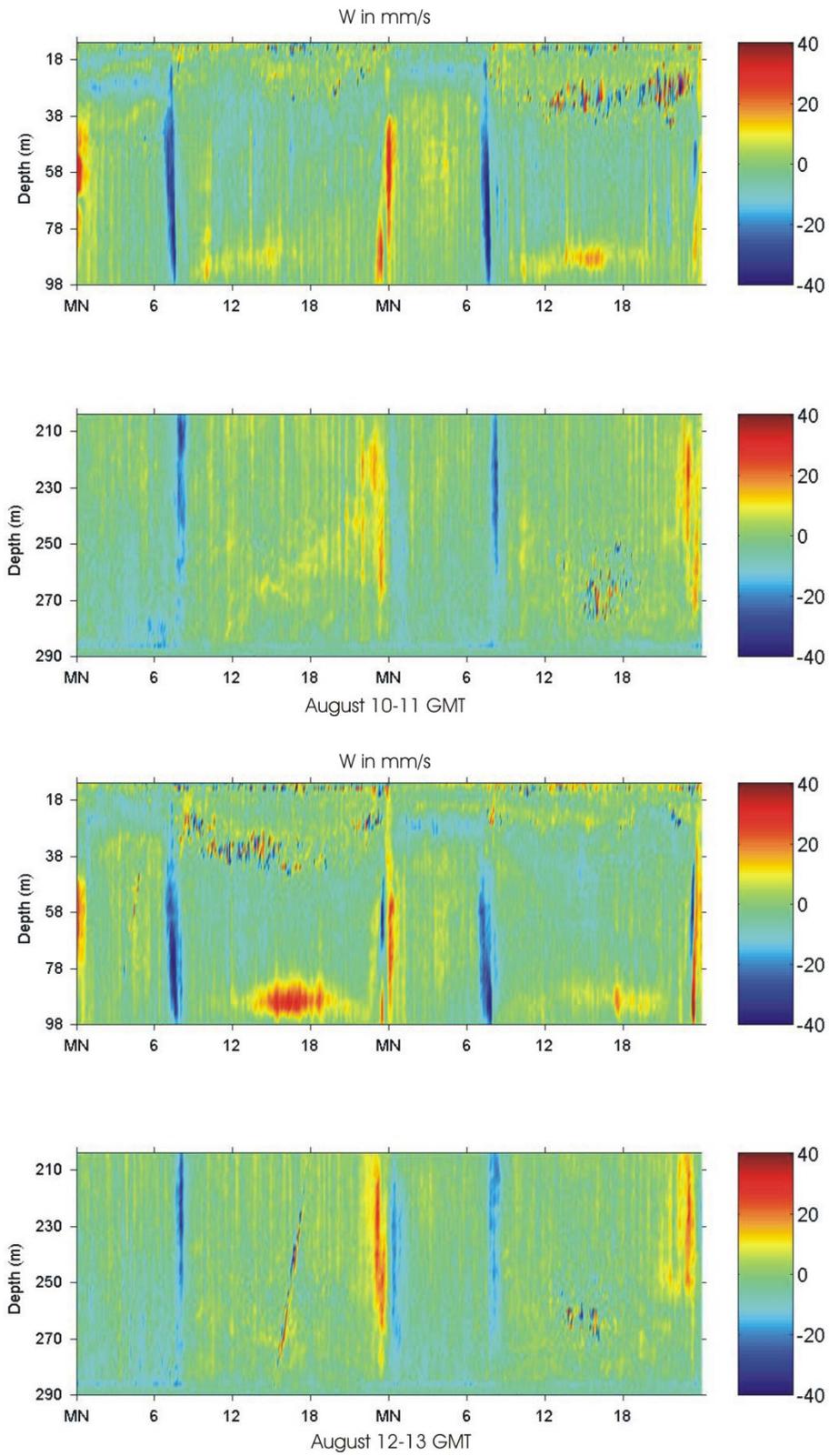


Figure 21: Raw data from M1, for both upward and downward facing ADCPs, for August 10-13, 2005. W (in mm/s) is positive upwards.

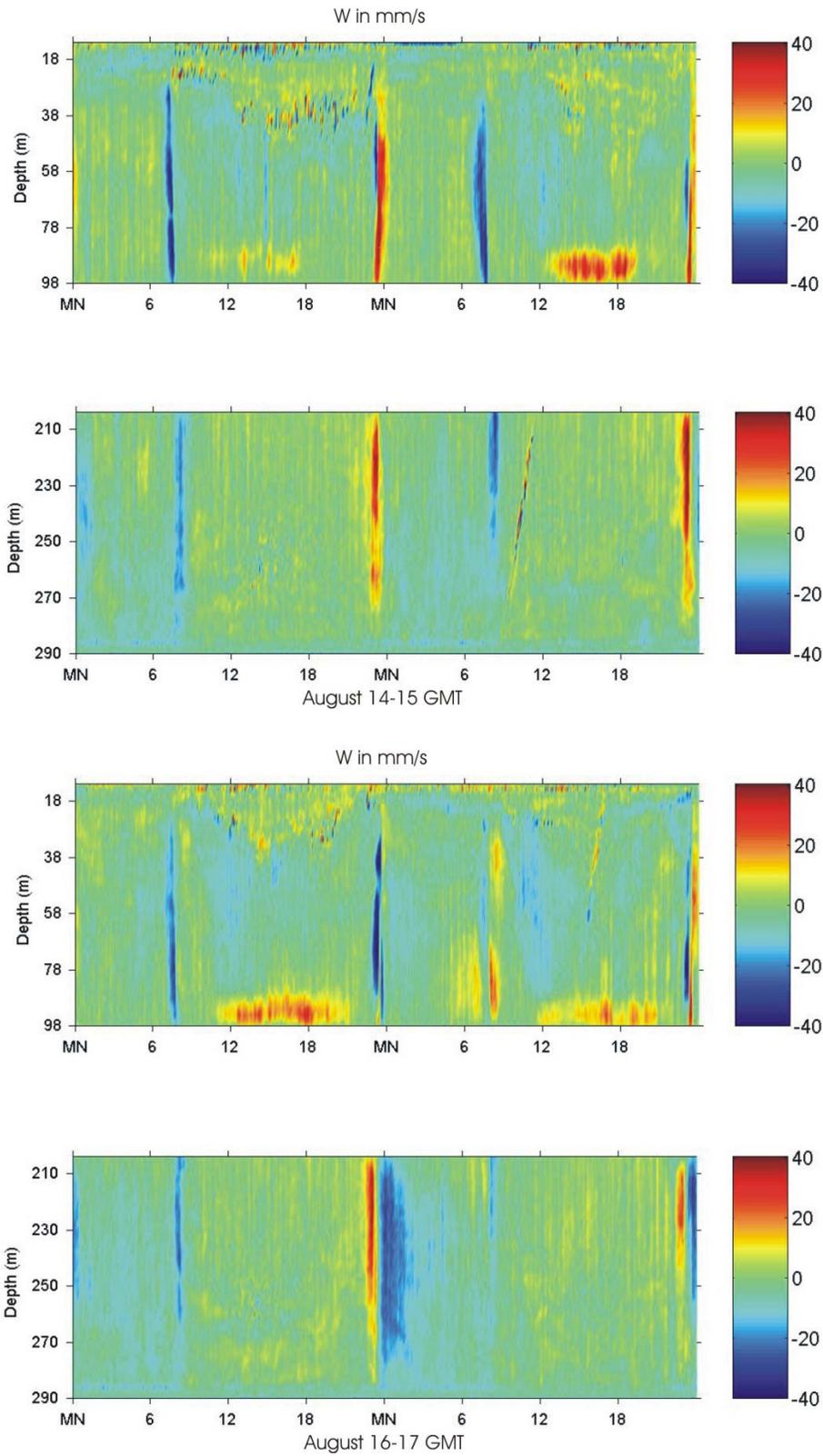


Figure 22: Raw data from M1, for both upward and downward facing ADCPs, for August 14-17, 2005. W (in mm/s) is positive upwards.

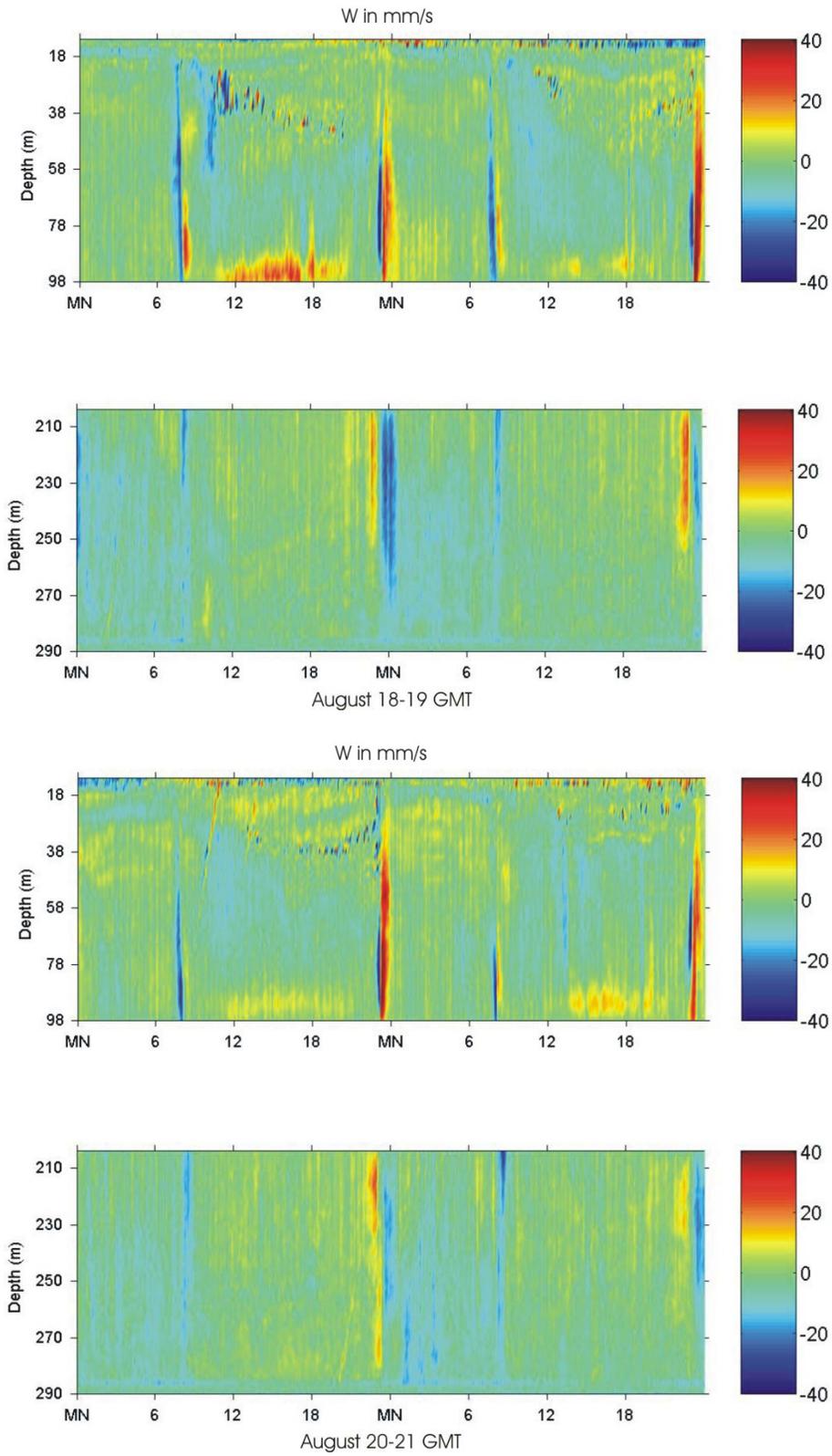


Figure 23: Raw data from M1, for both upward and downward facing ADCPs, for August 18-21, 2005. W (in mm/s) is positive upwards.

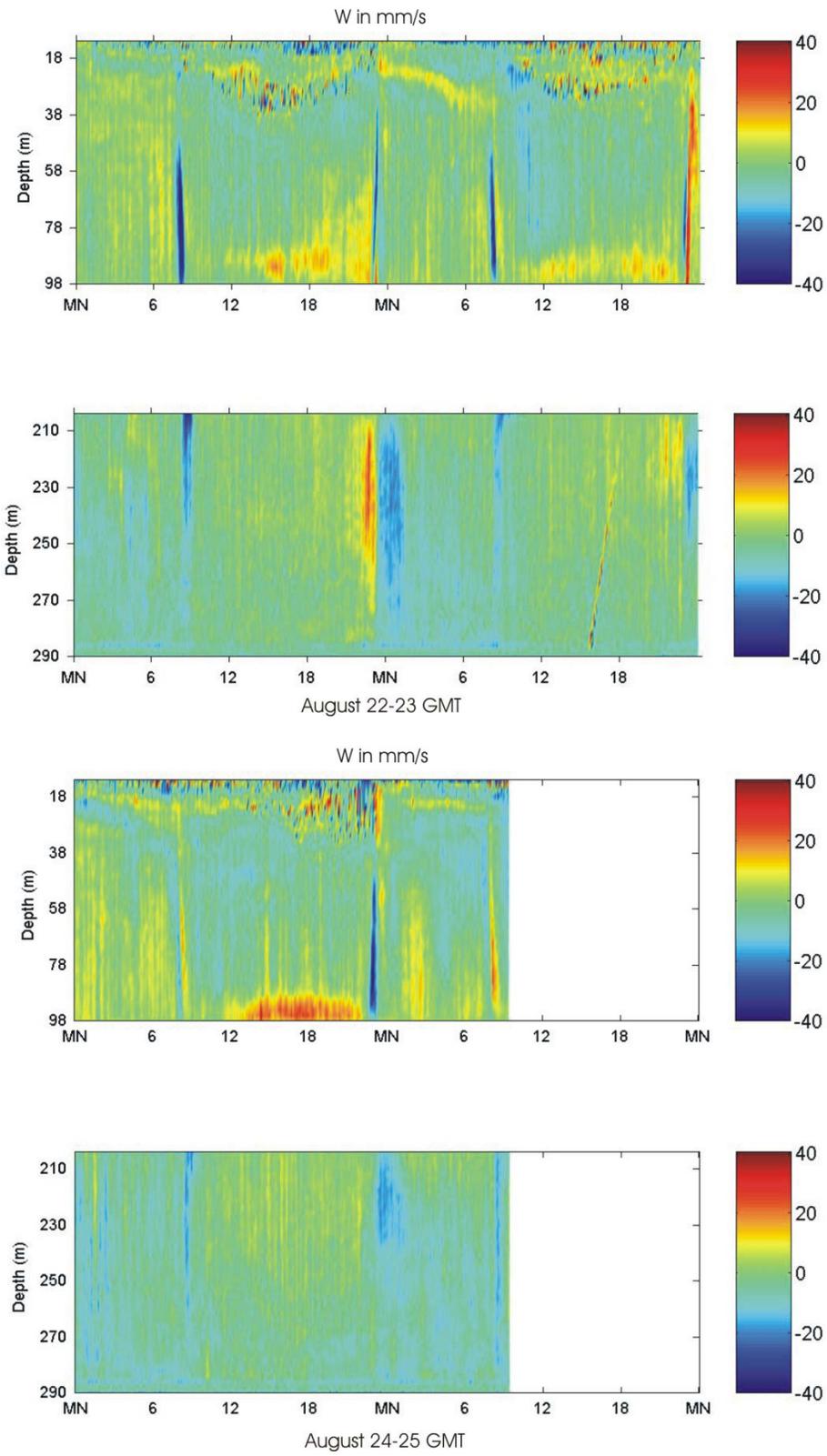


Figure 24: Raw data from M1, for both upward and downward facing ADCPs, for August 22-25, 2005. W (in mm/s) is positive upwards.

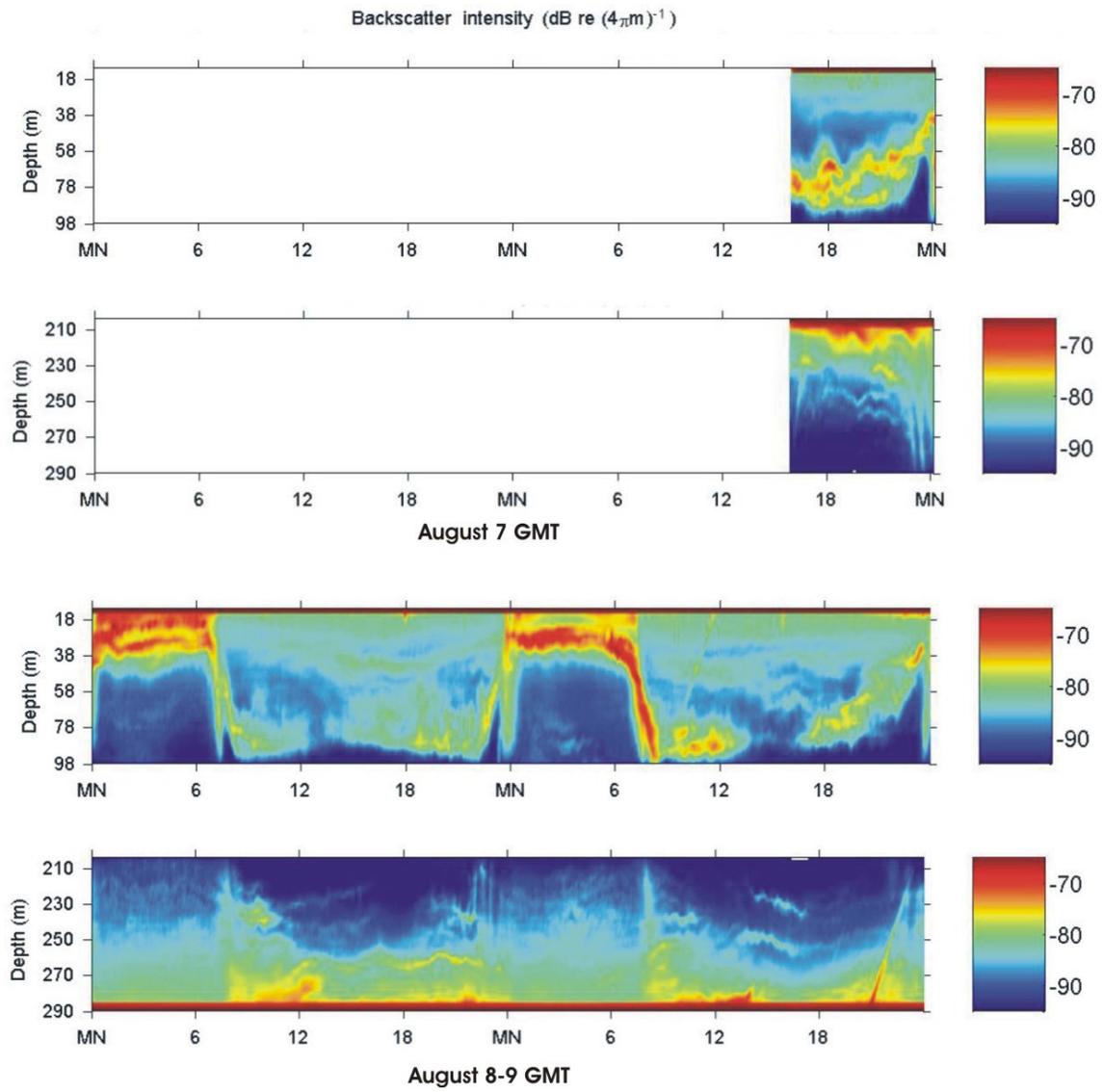


Figure 25: ADCP data from M1. Corrected backscatter, re $(4\pi m)^{-1}$, for August 7-9, 2005.

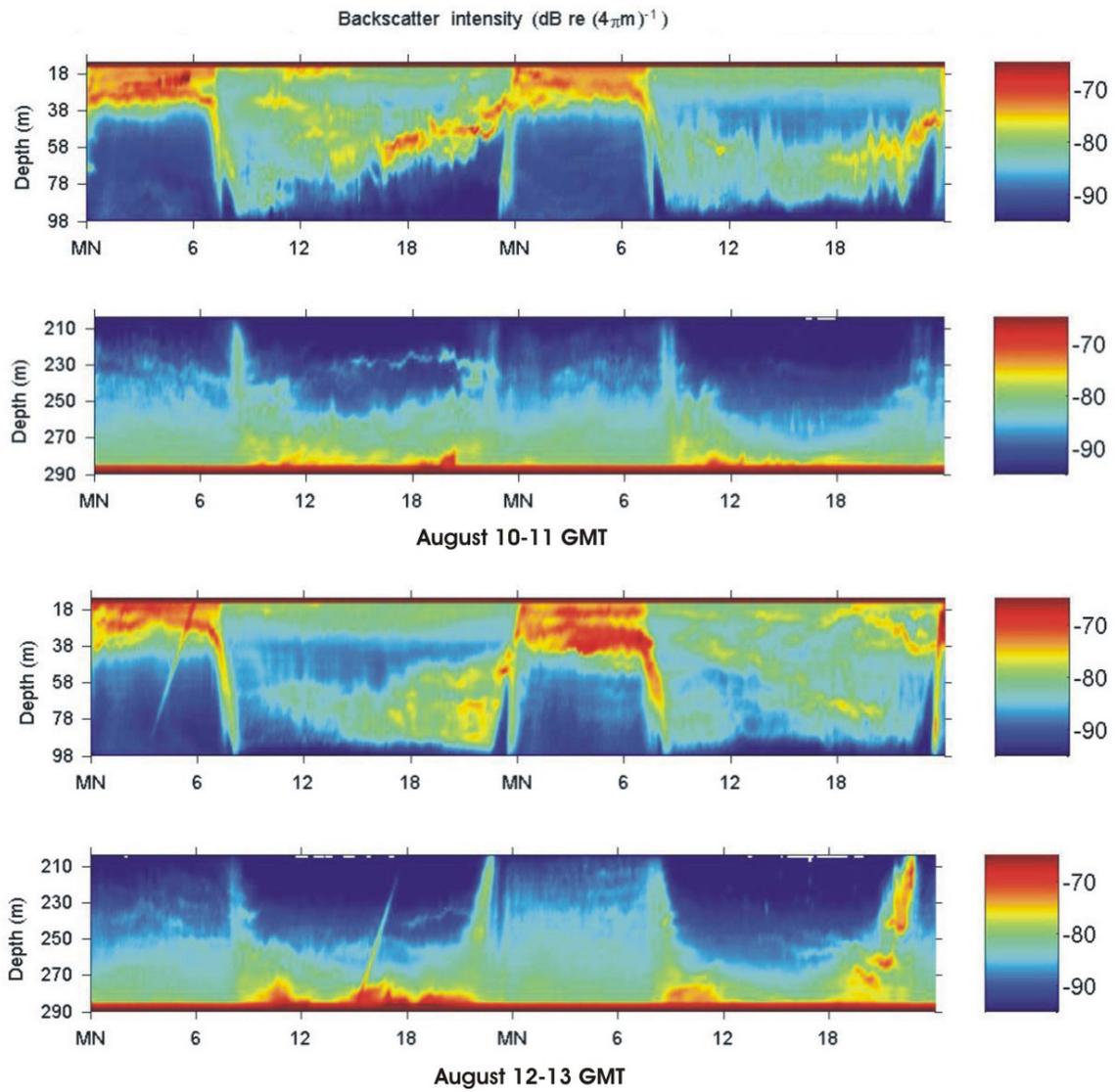


Figure 26: ADCP data from M1. Corrected backscatter, re $(4\pi\text{m})^{-1}$, for August 10-13, 2005.

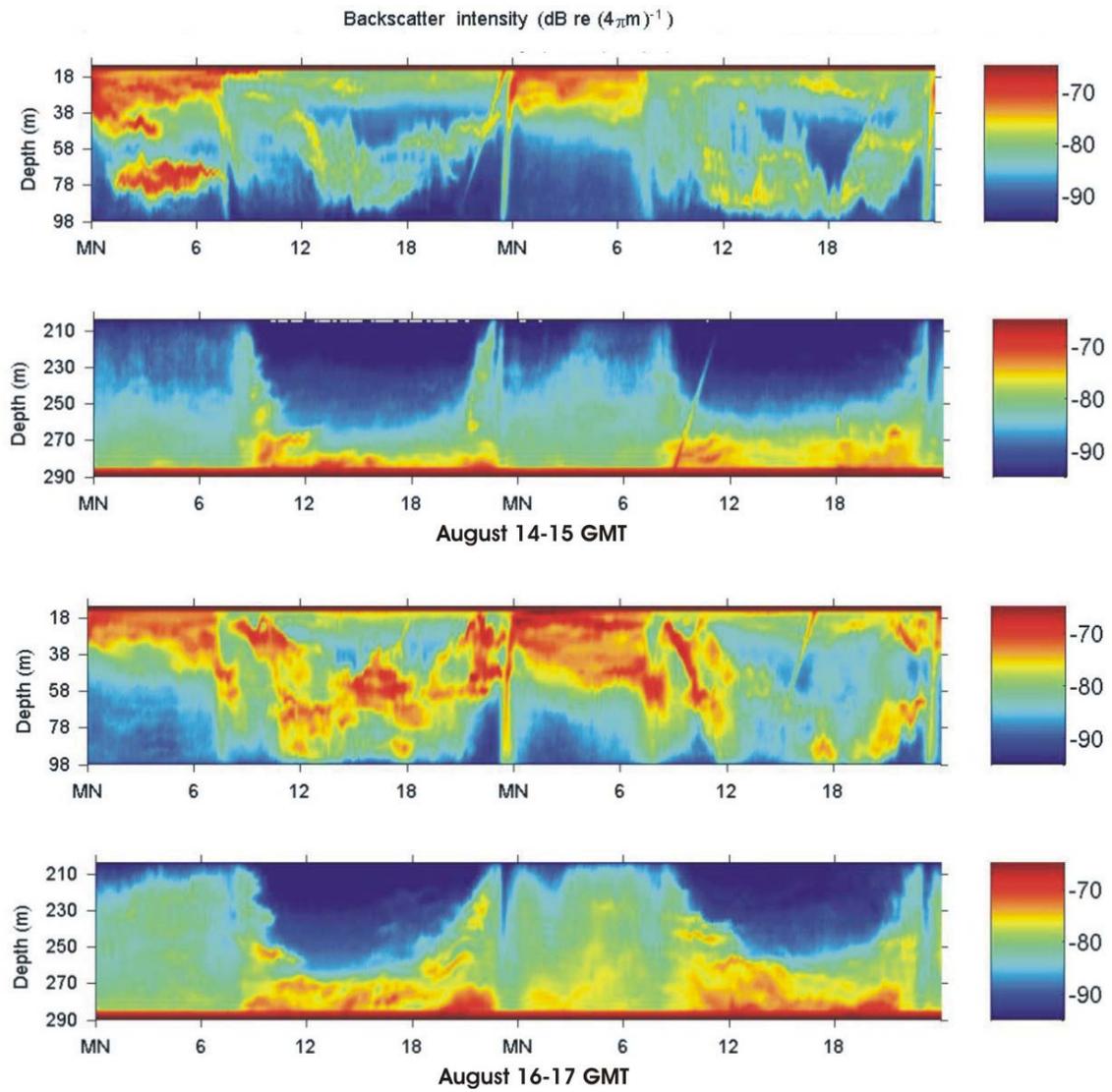


Figure 27: ADCP data from M1. Corrected backscatter, re $(4\pi m)^{-1}$, for August 15-17, 2005.

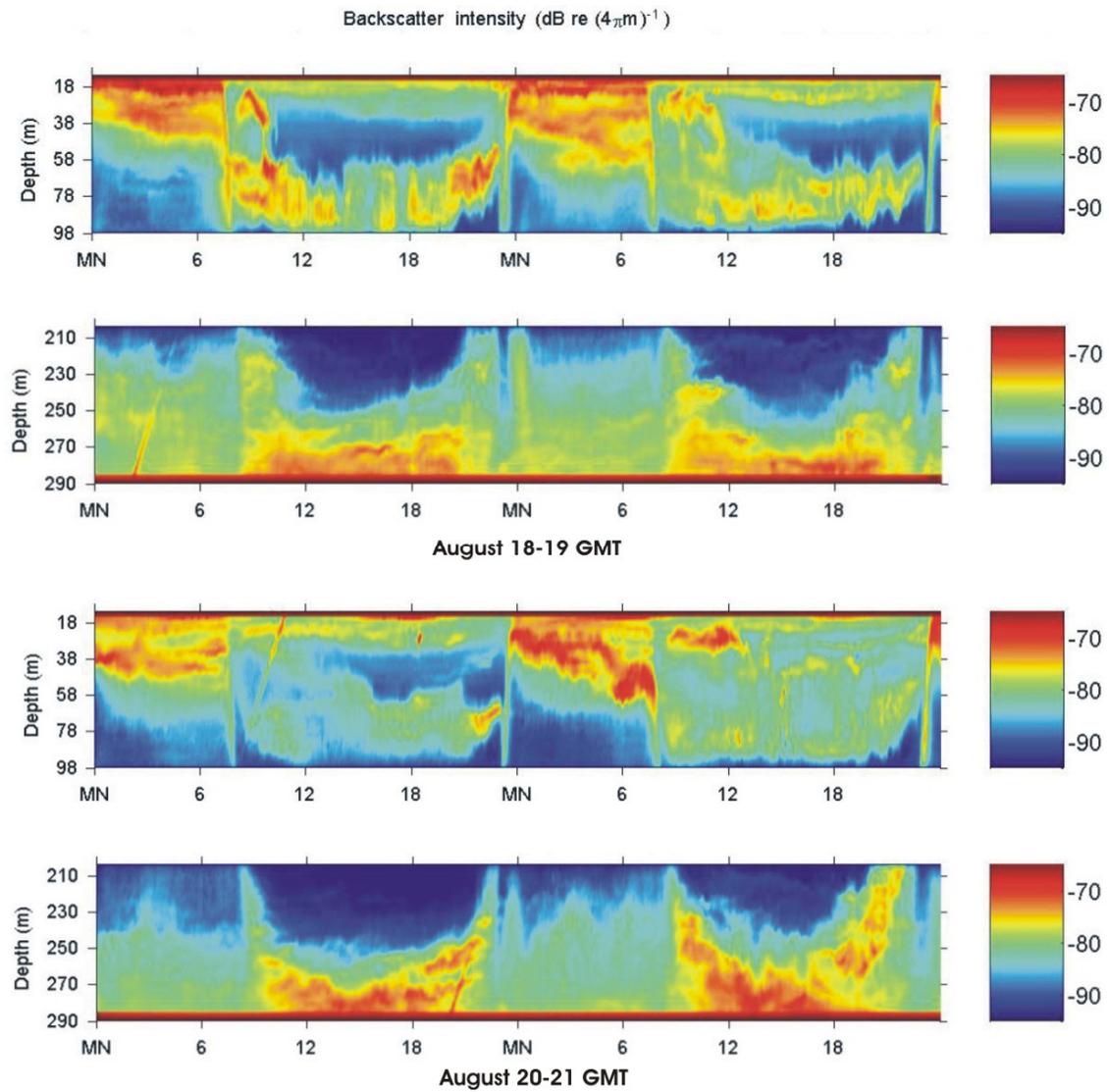


Figure 28: ADCP data from M1. Corrected backscatter, re $(4\pi m)^{-1}$, for August 18-21, 2005.

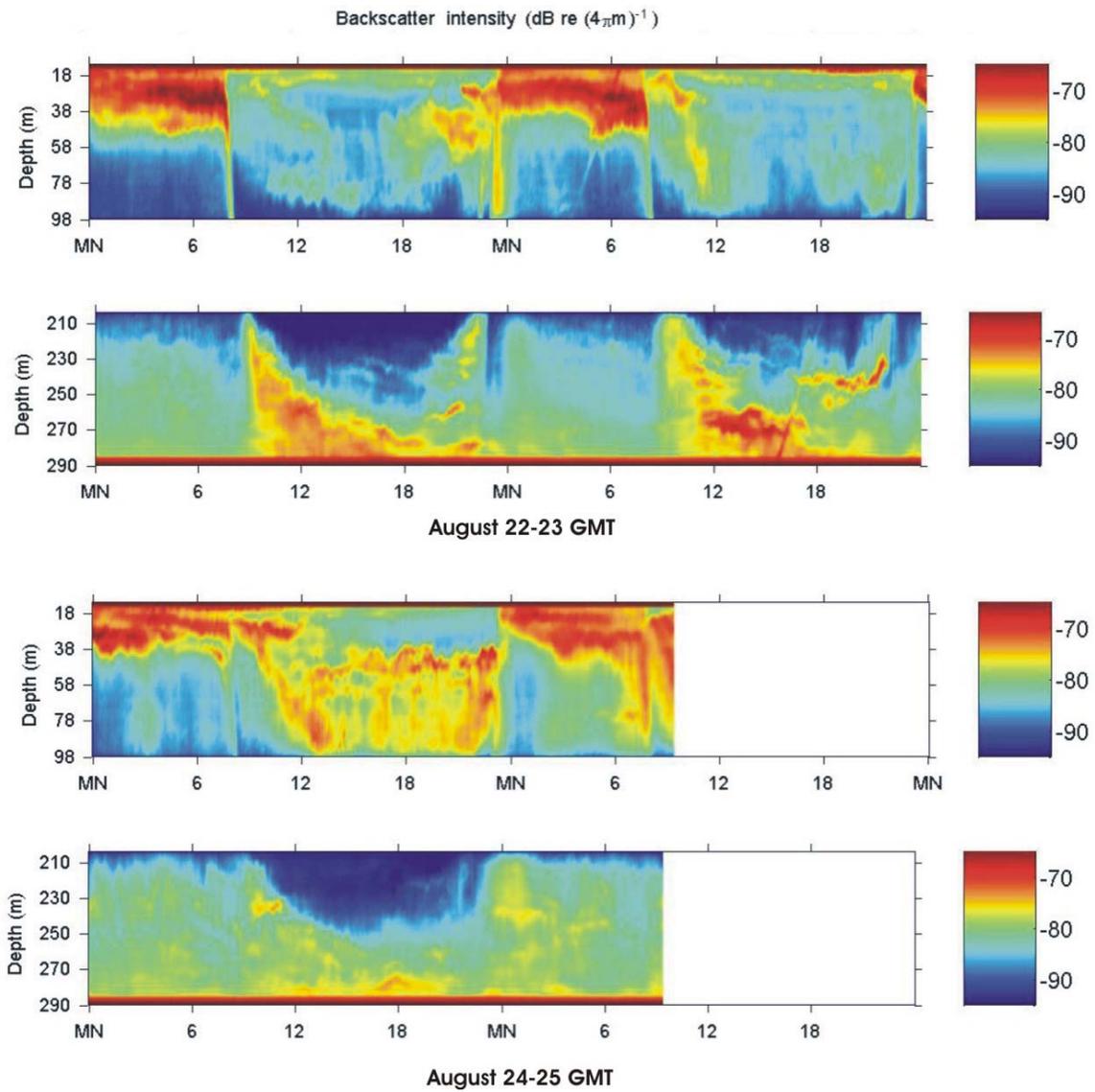


Figure 29: ADCP data from M1. Corrected backscatter, re $(4\pi m)^{-1}$, for August 22-25, 2005.