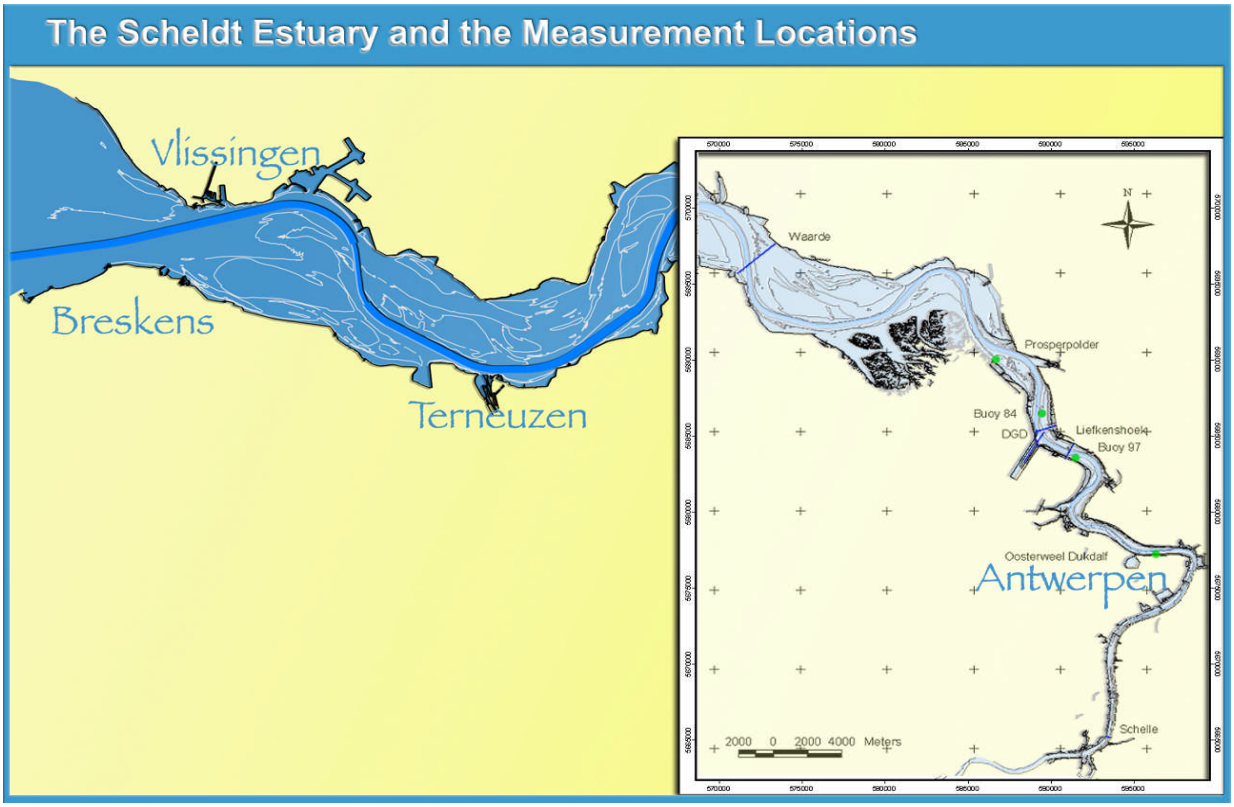
VLAAMSE OVERHEID
DEPARTEMENT MOBILITEIT EN OPENBARE WERKEN

WATERBOUWKUNDIG LABORATORIUM

Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing

Bestek 16EB/05/04



Deelrapport 3.11 : Omgevingscondities in de rivier de Schelde
juli – september 2007

Report 3.11 : Overview of boundary conditions in the river Scheldt
July – September 2007

4 April 2008
I/RA/11283/07.098/MSA

i.s.m. WL | delft hydraulics en GEMS International

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Document control sheet

Document Identification

Title:	Deelrapport 3.11: Omgevingscondities in de Schelde juli - september 2007 Report 3.11: Overview of ambient conditions in the river Scheldt Juy – September 2007
Project:	Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing
Client:	Waterbouwkundig Laboratorium
File reference:	I/RA/11283/07.098/MSA
File name:	K:\PROJECTS\11\11283 - Opvolging aanslibbing dgd\10-Rap\DGD2\3_11_RA07098_BounderyConditions_July_September07\3_11_Ra07.098_OmgevingsCond_july_sept_v2.0.doc

Revisions

Version	Date	Author	Description
2.0	04/04/08	JCA	Final version
1.0	18/01/08	JCA	Concept

Distribution list

Name	# ex.	Company/Authorities	Position in reference to the project
Joris Vanlede	7	Waterbouwkundig Laboratorium	client
Frederik Roose	3	Maritieme Toegang	client

Approval

Version	Date	Author	Project manager	Commissioner
2.0	04/04/08	JCA	MBO	MSA
1.0	18/01/08	JCA	MBO	MSA

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1. INTRODUCTION

1.1. The assignment

This report is part of the set of reports describing the results of the long-term measurements conducted in Deurganckdok aiming at the monitoring and analysis of silt accretion. This measurement campaign is an extension of the study "Extension of the study about density currents in the Beneden Zeeschelde" as part of the Long Term Vision for the Scheldt estuary. It is complementary to the study 'Field measurements high-concentration benthic suspensions (HCBS 2)'.

The terms of reference for this study were prepared by the 'Departement Mobiliteit en Openbare Werken van de Vlaamse Overheid, Afdeling Waterbouwkundig Laboratorium' (16EB/05/04). The repetition of this study was awarded to International Marine and Dredging Consultants NV in association with WL|Delft Hydraulics and Gems International on 10/01/2006. The project term was prolonged with an extra year from April 2007 till March 2008.

Waterbouwkundig Laboratorium– Cel Hydrometrie Schelde provided data on discharge, tide, salinity and turbidity along the river Scheldt and provided survey vessels for the long term and through tide measurements. Afdeling Maritieme Toegang provided maintenance dredging data. Agentschap voor Maritieme Dienstverlening en Kust – Afdeling Kust and Port of Antwerp provided depth sounding measurements.

The execution of the study involves a twofold assignment:

- Part 1: Setting up a sediment balance of Deurganckdok covering a period of one year, i.e. 04/2007 – 03/2008
- Part 2: An analysis of the parameters contributing to siltation in Deurganckdok

1.2. Purpose of the study

The Lower Sea Scheldt (Beneden Zeeschelde) is the stretch of the Scheldt estuary between the Belgium-Dutch border and Rupelmonde, where the entrance channels to the Antwerp sea locks are located. The navigation channel has a sandy bed, whereas the shallower areas (intertidal areas, mud flats, salt marshes) consist of sandy clay or even pure mud sometimes. This part of the Scheldt is characterized by large horizontal salinity gradients and the presence of a turbidity maximum with depth-averaged concentrations ranging from 50 to 500 mg/l at grain sizes of 60 - 100 μm. The salinity gradients generate significant density currents between the river and the entrance channels to the locks, causing large siltation rates. It is to be expected that in the near future also the Deurganckdok will suffer from such large siltation rates, which may double the amount of dredging material to be dumped in the Lower Sea Scheldt.

Results from the study may be interpreted by comparison with results from the HCBS and HCBS2 studies covering the whole Lower Sea Scheldt. These studies included through-tide measurement campaigns in the vicinity of Deurganckdok and long term measurements of turbidity and salinity in and near Deurganckdok.

The first part of the study focuses on obtaining a sediment balance of Deurganckdok. Aside from natural sedimentation, the sediment balance is influenced by the maintenance and capital dredging works. This involves sediment influx from capital dredging works in the Deurganckdok, and internal relocation and removal of sediment by maintenance dredging works. To compute a sediment balance an inventory of bathymetric data (depth soundings), density measurements of the

deposited material and detailed information of capital and maintenance dredging works will be made up.

The second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok, it is important to follow the evolution of the parameters involved, and this on a long and short term basis (long term & through-tide measurements). Previous research has shown the importance of water exchange at the entrance of Deurganckdok is essential for understanding sediment transport between the dock and the Scheldt river.

1.3. Overview of the study

1.3.1. Reports

Reports of the project 'Opvolging aanslibbing Deurganckdok' between April 2007 till March 2008 are summarized in Table 1-1.

This report, report 3.11, is one of set of reports for understanding the sediment transport between Deurganckdok and the river Scheldt, which belongs to the second part of this project.

The report is also a continuation of the set of ambient conditions reports of HCBS2 (IMDC, 2005k; IMDC, 2005l; IMDC, 2006l; IMDC, 2006p) and 'Opvolging aanslibbing Deurganckdok' (IMDC, 2007b, IMDC, 2007u). This new ambient conditions report gives an overview of the ambient conditions from July till September 2007 in the river Scheldt. An overview of the HCBS2 and 'Opvolging aanslibbing Deurganckdok' (between April 2006 till March 2007) reports are given in APPENDIX A.

Table 1-1: Overview of Deurganckdok Reports

Report	Description
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.10	Sediment Balance: Three monthly report 1/4/2007 - 30/06/2007 (I/RA/11283/07.081/MSA)
1.11	Sediment Balance: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.082/MSA)
1.12	Sediment Balance: Three monthly report 1/10/2007 – 31/12/2007 (I/RA/11283/07.083/MSA)
1.13	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/07.084/MSA)
1.14	Annual Sediment Balance (I/RA/11283/07.085/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP) & Calibrations	
2.09	Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)
2.10	Through tide measurement Siltprofiler winter (I/RA/11283/07.086/MSA)
2.11	Through tide measurement Salinity Profiling winter (I/RA/11283/07.087/MSA)
2.12	Through tide measurement Sediview winter (I/RA/11283/07.088/MSA)
2.13	Through tide measurement Sediview winter (I/RA/11283/07.089/MSA)
2.14	Through tide measurement Sediview winter (I/RA/11283/07.090/MSA)
2.15	Through tide measurement Siltprofiler (to be scheduled) (I/RA/11283/07.091/MSA)
2.16	Salt-Silt distribution Deurganckdok summer (21/6/2007 – 30/07/2007) (I/RA/11283/07.092/MSA)

Report	Description
2.17	Salt-Silt distribution & Frame Measurements Deurganckdok autumn (17/09/2007 - 10/12/2007) (I/RA/11283/07.093/MSA)
2.18	Salt-Silt distribution & Frame Measurements Deurganckdok winter (18/02/2008 - 31/3/2008) (I/RA/11283/07.094/MSA)
2.19	Calibration stationary & mobile equipment winter (I/RA/11283/07.096/MSA)
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.10	Boundary conditions: Three monthly report 1/4/2007 – 30/06/2007 (I/RA/11283/07.097/MSA)
3.11	Boundary conditions: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.098/MSA)
3.12	Boundary conditions: Three monthly report 1/10/2007 – 31/12/2007 (I/RA/11283/07.099/MSA)
3.13	Boundary conditions: Three monthly report 1/1/2008 – 31/03/2008 (I/RA/11283/07.100/MSA)
3.14	Boundary conditions: Annual report (I/RA/11283/07.101/MSA)
Analysis	
4.10	Analysis of Siltation Processes and Factors (I/RA/11283/07.102/MSA)

1.3.2. Measurement actions

Following measurements have been carried out during the course of this project:

1. Monitoring upstream discharge in the river Scheldt.
2. Monitoring Salt and sediment concentration in the Lower Sea Scheldt taken from on permanent data acquisition sites at Oosterweel, Prosperpolder and up- and downstream of the Deurganckdok.
3. Long term measurement of salt distribution in Deurganckdok.
4. Long term measurement of sediment concentration in Deurganckdok
5. Monitoring near-bed processes in the central trench in the dock, near the entrance as well as near the landward end: near-bed turbidity, near-bed current velocity and bed elevation variations are measured from a fixed frame placed on the dock's bed.
6. Measurement of current, salt and sediment transport at the entrance of Deurganckdok for which ADCP backscatter intensity over a full cross section are calibrated with the Sediview procedure and vertical sediment and salt profiles are recorded with the SiltProfiler equipment
7. Through tide measurements of vertical sediment concentration profiles -including near bed highly concentrated suspensions- with the SiltProfiler equipment. Executed over a grid of points near the entrance of Deurganckdok.
8. Monitoring dredging activities at entrance channels towards the Kallo, Zandvliet and Berendrecht locks
9. Monitoring dredging and dumping activities in the Lower Sea Scheldt

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors (IMDC, 2006a & IMDC, 2007a).

1.4. Structure of this report

This report is the factual data report for two measurement actions during the period between July and September 2007:

- Monitoring salinity and sediment concentration in the Lower Sea Scheldt taken from on permanent data acquisition sites at Oosterweel, Prosperpolder and up- (buoy 97) and downstream (buoy 84) of the Deurganckdok.
- Monitoring dredging and dumping activities in the Lower Sea Scheldt.

Beside these actions, navigation and meteorological conditions are also reported.

The first chapter comprises an introduction. The second chapter describes the project. Chapter 3 summarizes the measurement campaign, while the ambient conditions are discussed in Chapter 4.

2. SEDIMENTATION IN DEURGANCKDOK

2.1. Project Area: Deurganckdok

Deurganckdok is a tidal dock situated at the left bank in the Lower Sea Scheldt, between Liefkenshoek and Doel. Deurganckdok has the following characteristics:

1. the dock has a total length of 2750 m and is 450 m wide at the Scheldt end and 400 m wide at the inward end of the dock
2. The bottom of Deurganckdok is provided at a depth of –17m TAW in the transition zones between the quay walls and the central trench and of –19m TAW in the central trench.
3. the quay walls reach up to +9m TAW

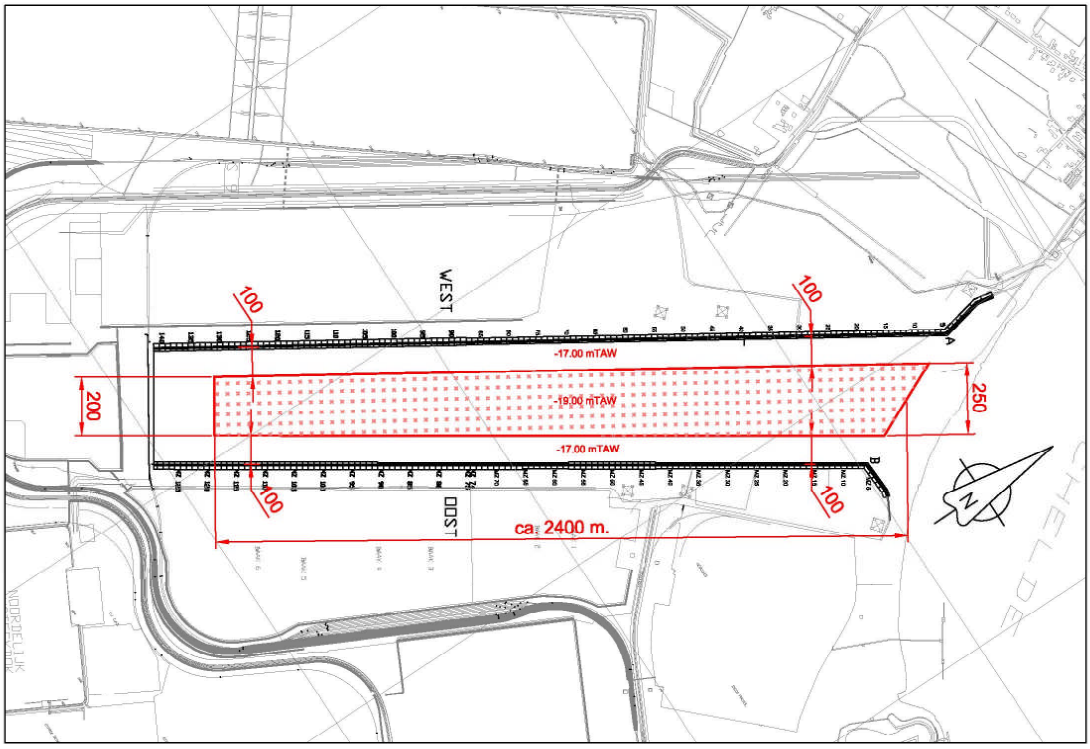

Figure 2-1: Overview of Deurganckdok

The dredging of the dock is performed in 3 phases. On 18 February 2005 the dike between the Scheldt and the Deurganckdok was breached. On 6 July 2005 Deurganckdok was officially opened. The second dredging phase was finalized a few weeks later. The first terminal operations have started since.

2.2. Overview of the studied parameters

The first part of the study aims at determining a sediment balance of Deurganckdok and the net influx of sediment. The sediment balance comprises a number of sediment transport modes: deposition, influx from capital dredging works, internal replacement and removal of sediments due to maintenance dredging (Figure 2-2).

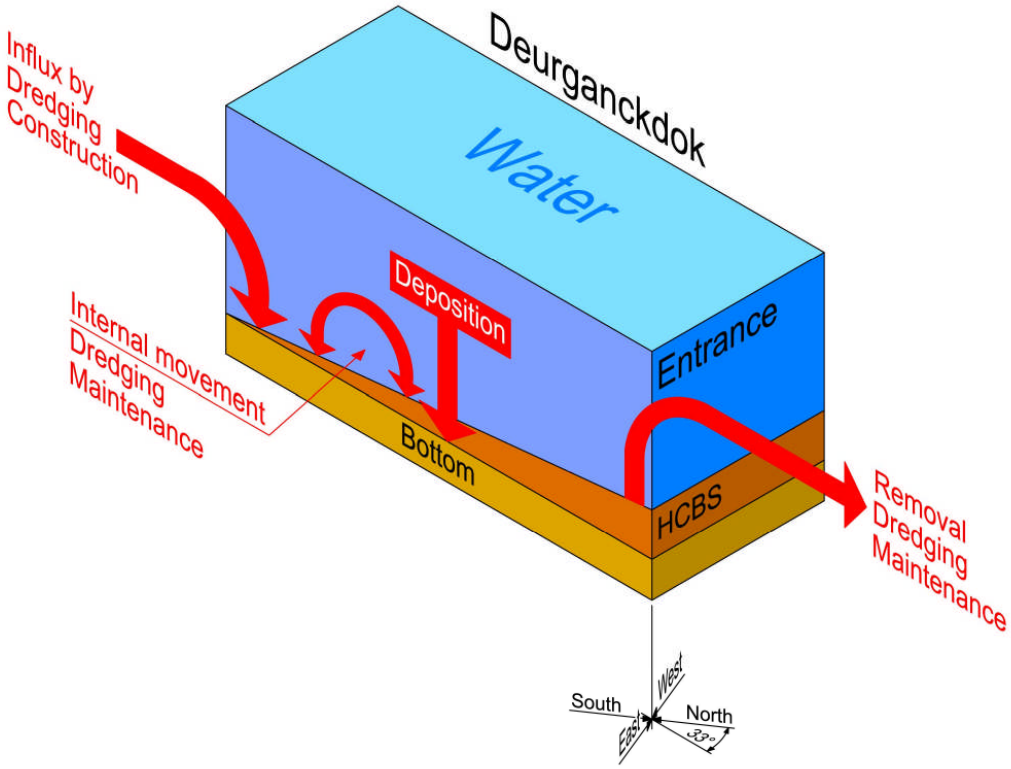

Figure 2-2: Elements of the sediment balance

A net deposition can be calculated from a comparison with a chosen initial condition t_0 (Figure 2-3). The mass of deposited sediment is determined from the integration of bed density profiles recorded at grid points covering the dock. Subtracting bed sediment mass at t_0 leads to the change in mass of sediments present in the dock (mass growth). Adding cumulated dry matter mass of dredged material removed since t_0 and subtracting any sediment influx due to capital dredging works leads to the total cumulated mass entered from the river Scheldt since t_0.

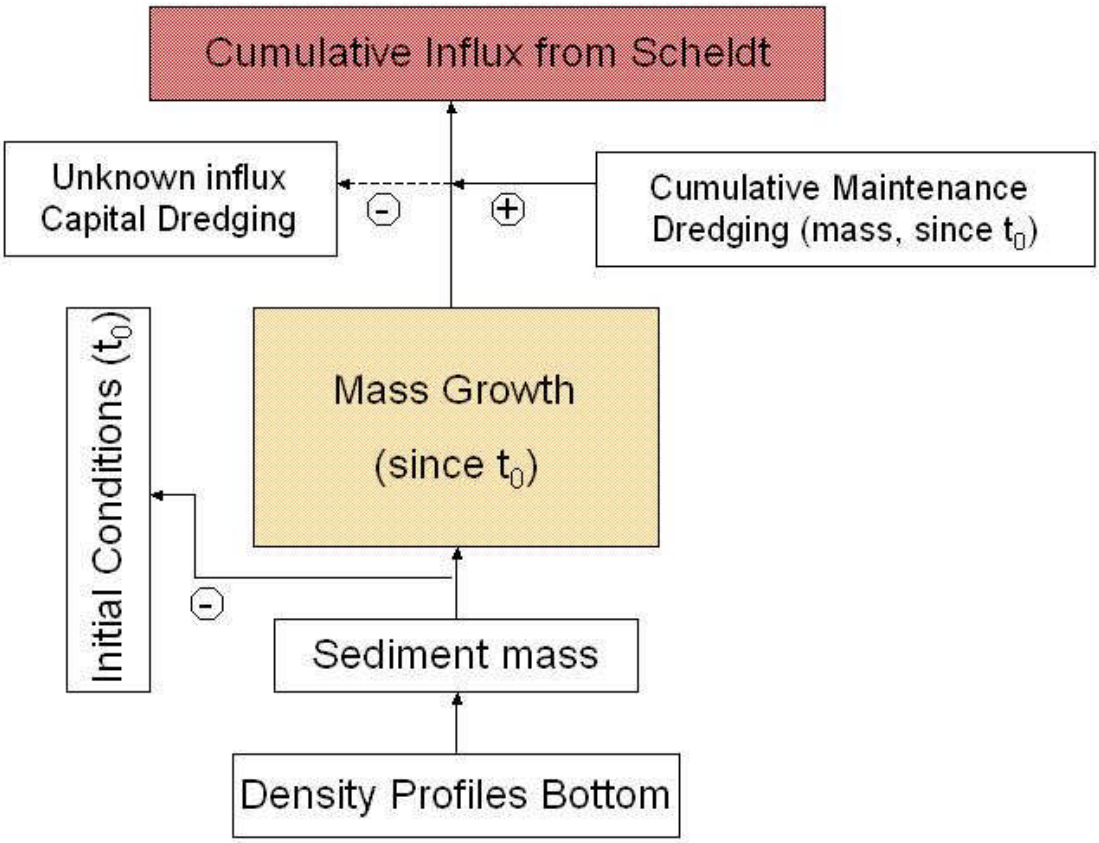

Figure 2-3: Determining a sediment balance

The main purpose of the second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok. The following mechanisms will be aimed at in this part of the study:

- Tidal prism, i.e. the extra volume in a water body due to high tide
- Vortex patterns due to passing tidal current
- Density currents due to salt gradient between the Scheldt river and the dock
- Density currents due to highly concentrated benthic suspensions

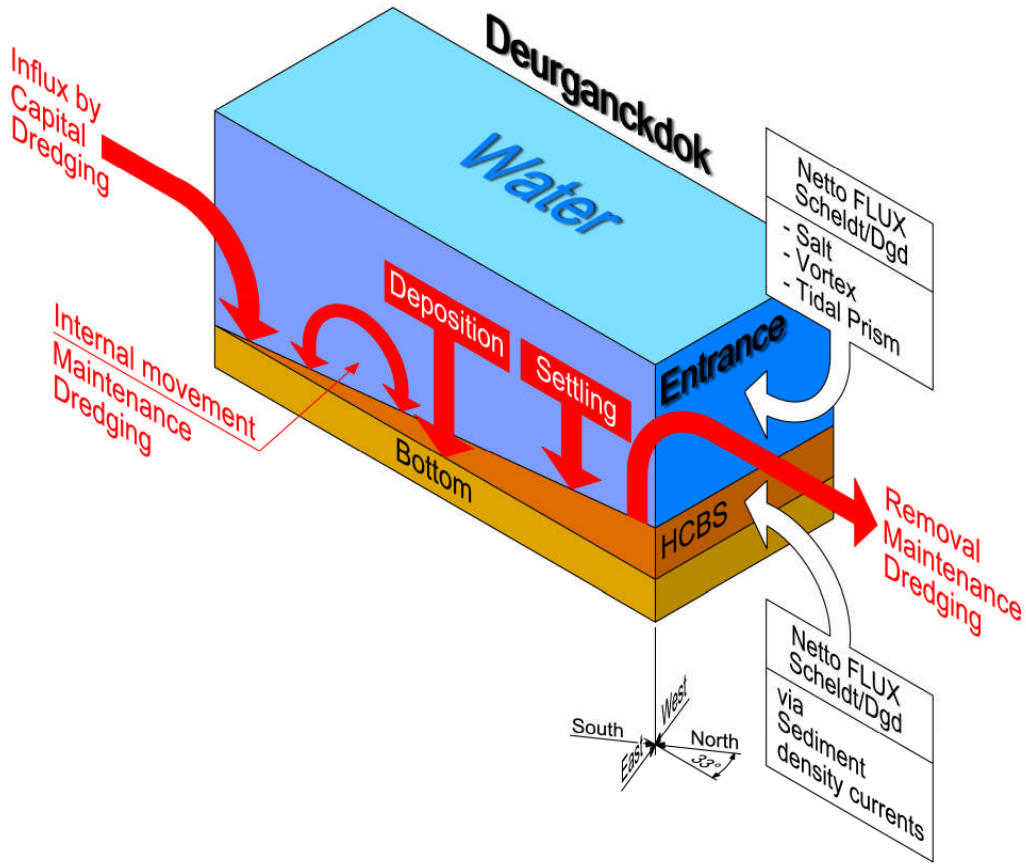

Figure 2-4: Transport mechanisms

These aspects of hydrodynamics and sediment transport have been landmark in determining the parameters to be measured during the project. Measurements will be focused on three types of timescales: one tidal cycle, one neap-spring cycle and seasonal variation within one year.

Following data are being collected to understand these mechanisms:

- Monitoring upstream discharge in the river Scheldt.
- Monitoring Salt and sediment concentration in the Lower Sea Scheldt at permanent measurement locations at Oosterweel, up- and downstream of the Deurganckdok.
- Long term measurement of salt and suspended sediment distribution in Deurganckdok.
- Monitoring near-bed processes (current velocity, turbidity, and bed elevation variations) in the central trench in the dock, near the entrance as well as near the current deflecting wall location.
- Dynamic measurements of current, salt and sediment transport at the entrance of Deurganckdok.
- Through tide measurements of vertical sediment concentration profiles -including near bed high concentrated benthic suspensions.
- Monitoring dredging activities at entrance channels towards the Kallo, Zandvliet and Berendrecht locks as well as dredging and dumping activities in the Lower Sea Scheldt.
- In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors.

2.3. Specific objectives of this report

The natural ambient conditions in the Scheldt estuary change from the mouth near Vlissingen to the upstream boundaries near Gent and the tributaries. Furthermore navigation and dredging activities are important human activities in the Lower Sea Scheldt.

These natural and human conditions can help to gain insight in the mechanisms causing siltation in Deurganckdok. For this reason this report summarises the following data for the period between July and September 2007:

- Ambient characteristics in the Lower Sea Scheldt:
    - Tide
    - Current
    - Salinity
    - Temperature
    - Turbidity/Suspended sediment concentration
    - Salinity downstream
- Fresh water inflow from the tributaries
- Meteorological conditions
- Human activities
    - Dredging/dumping
    - Navigation

3. THE MEASUREMENT CAMPAIGN

3.1. Overview of the measurement campaigns

Several measurement campaigns took place between the 1st of July and the 30th of September 2007. Near bed continuous monitoring took place at the entrance of Deurganckdok and finally further long term measurements were executed near buoy 84 and buoy 97. Through tide and long term salinity measurements were not executed during this reporting period.

The long term measurements at buoys 84 and 97 started the 21st, respectively the 20th of September 2005 and will be continued at least until the 31st of March 2008. In this period there were two short interruptions to calibrate the instruments: 13/04/2006 – 18/04/2006 and 05/09/2007 – 13/09/2007. Table 3-1 gives an overview of the coordinates of the measurement locations and the periods when data was gathered. Considering the through tide measurements coordinates are given for the sailed transects (i.e. left bank and right bank position). Figure 3-1 shows the Lower Sea Scheldt with the measurement locations. A sketch of each measurement campaign can be found from Figure 3-2 to Figure 3-14.

A detailed description of the near bed continuous monitoring during this reporting period can be found in IMDC (2008a). The factual data of the long term measurements near buoy 84 and buoy 97 from July till September 2007 are given in this report.

Table 3-1:Measurement locations and periods for the HCBS2 and Deurganckdok measurements (01/01/2006 – 30/09/2007)

Through tide measurements: Transects					
Location	***Easting (UTM ED 50)***		***Northing (UTM ED 50)***		***Period***
Deurganckdok (in dock) (transect Y)	Left Bank	Right Bank	Left Bank	Right Bank	21/03/2006 & 26/09/2006
	589059	591298	5684948	5683077	
Liefkenshoek (transect I)	Left Bank	Right Bank	Left Bank	Right Bank	22/03/2006 & 27/09/2006
	590318	590771	5684257	5683302	
Deurganckdok (downstream) (transect K)	Left Bank	Right Bank	Left Bank	Right Bank	22 & 23/03/2006 & 27 & 28/09/2006
	588484	589775	5684924	5685384	
Deurganckdok (in dock) (transect DGD)	Left Bank	Right Bank	Left Bank	Right Bank	22/03/2006 & 27/09/2006
	588765	588541	5684056	5684527	
Schelle (transect S)	Left Bank	Right Bank	Left Bank	Right Bank	23/03/2006 & 28/09/2006
	592645	592953	5665794	5665682	
Waarde (transect W)	Left Bank	Right Bank	Left Bank	Right Bank	23/03/2006 & 28/09/2006
	573541	571318	5696848	5694933	

Through tide measurements: Siltprofiler gauging points			
Location	***Easting (UTM ED 50)***	***Northing (UTM ED 50)***	***Period***
Location 1: Xa	588549	5684335	21/03/2006 & 26/09/2006
Location 2: Xb	588596	5684411	
Location 3: Xc	588643	5684486	
Location 4: Xd	588690	5684562	
Location 5: Xe	588737	5684638	
Location 6: Ya	588606	5684217	
Location 7: Yb	588653	5684293	
Location 8: Yc	588700	5684368	
Location 9: Yd	588747	5684444	
Location 10: Ye	588793	5684520	
Location 11: Za	588662	5684099	
Location 12: Zb	588709	5684174	
Location 13: Zc	588756	5684250	
Location 14: Zd	588803	5684326	
Location 15: Ze	588850	5684402	
Near bed continuous monitoring			
Location	***Easting (UTM ED 50)***	***Northing (UTM ED 50)***	***Period***
Deurganckdok CDW	588653	5684906	14/03/2006 – 05/04/2006
Deurganckdok CDW	588685	5684880	19/04/2006 – 23/05/2006
Deurganckdok Sill	588805	5684170	19/04/2006 – 23/05/2006
Deurganckdok CDW	588685	5684880	18/07/2006 – 11/10/2006
Deurganckdok Sill	588805	5684170	19/07/2006 – 11/10/2006
Deurganckdok CDW	588685	5684880	15/03/2007 – 12/04/2007
Deurganckdok Sill	588805	5684170	09/02/2007 – 18/04/2007
Deurganckdok CDW	588685	5684880	26/09/2007 – 05/12/2007
Deurganckdok Sill	588805	5684170	10/10/2007 – 28/11/2007
Salt Silt measurements Deurganckdok			
Location	***Easting (UTM ED 50)***	***Northing (UTM ED 50)***	***Period***
P&O 1	588074	5682942	17/03/2006 – 28/04/2006
P&O 2	588767	5684045	17/03/2006 – 28/04/2006
PSA	588536	5684523	17/03/2006 – 28/04/2006
P&O 1	588074	5682942	20/07/2006 – 12/10/2006
P&O 2	588767	5684045	20/07/2006 – 12/10/2006
PSA	588536	5684523	20/07/2006 – 12/10/2006
P&O 1	588074	5682942	12/02/2007 – 27/03/2007
P&O 2	588767	5684045	12/02/2007 – 27/03/2007
PSA	588536	5684523	12/02/2007 – 27/03/2007
P&O 1	588074	5682942	20/06/2007 – 31/07/2007
P&O 2	588767	5684045	20/06/2007 – 31/07/2007
PSA	588536	5684523	20/06/2007 – 31/07/2007
Settling velocity – INSSEV			
Location	***Easting (UTM ED 50)***	***Northing (UTM ED 50)***	***Period***
Deurganckdok CDW	588717	5684898	05/09/2006
Deurganckdok SILL	588800	5684250	06/09/2006
Deurganckdok Western quay wall	588452	5684355	07/09/2006

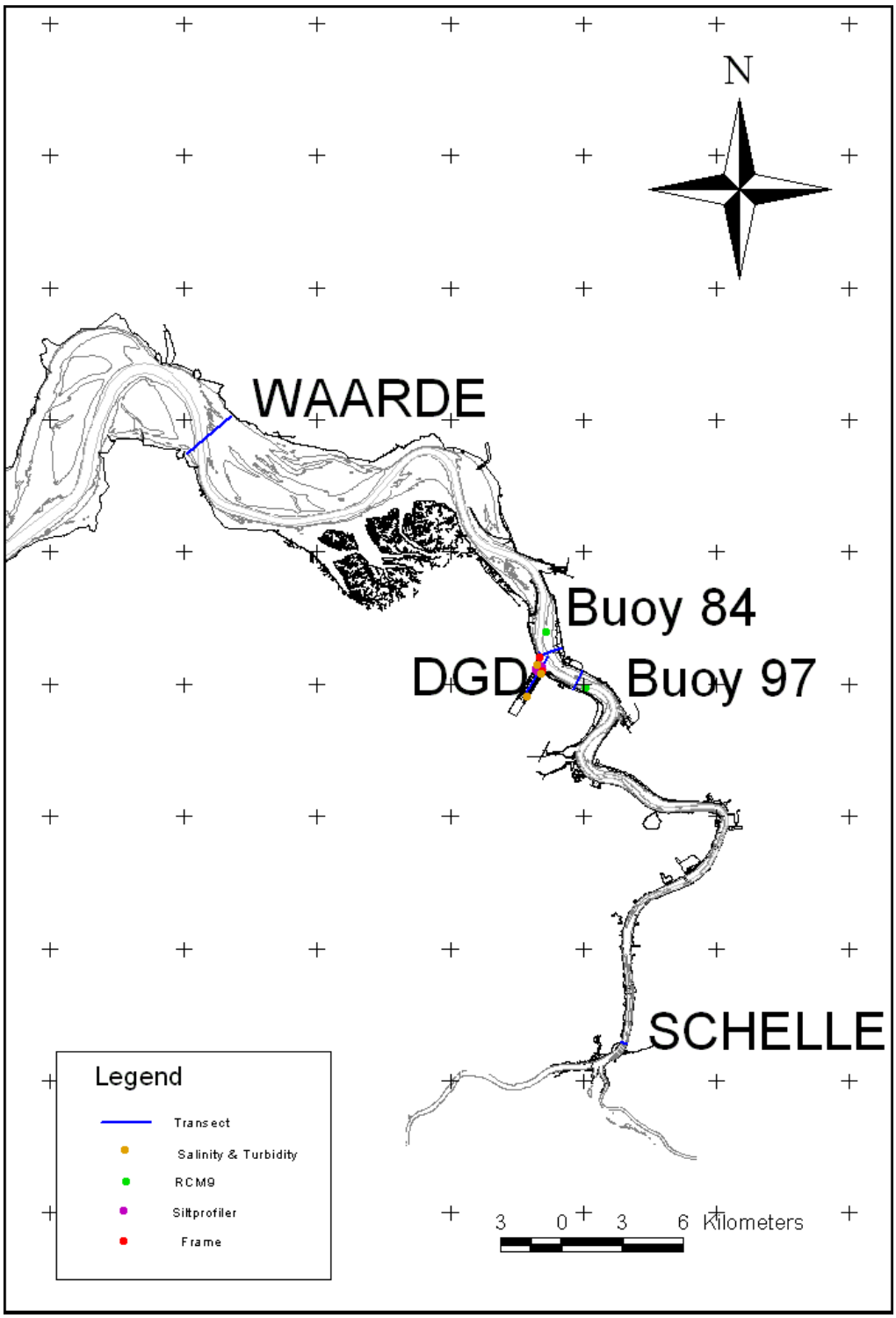

Figure 3-1: The measurement locations in the Lower Sea Scheldt and Deurganckdok (01/01/2006 – 30/09/2007)

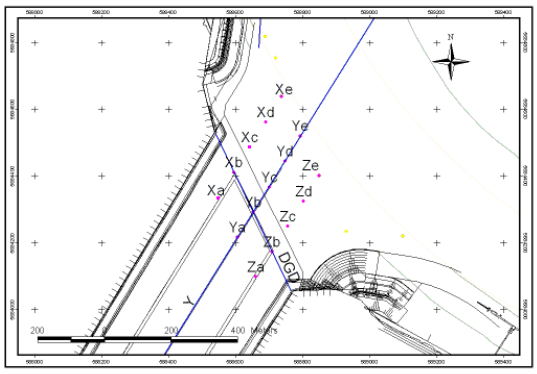

Figure 3-2: Through tide measurements - Deurganckdok 21/03/2006 & 26/09/2006 (Siltprofiler)

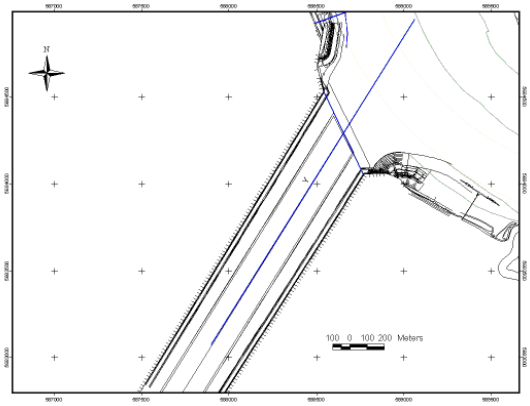

Figure 3-3: Through tide measurements – Deurganckdok 21/03/2006 & 26/09/2006 (salinity)

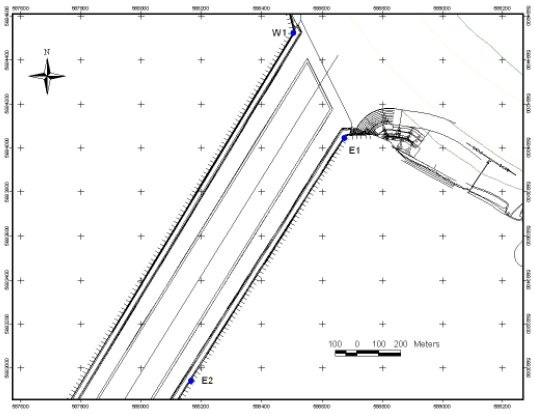

Figure 3-4: Long term salinity measurements Deurganckdok 17/03/2006 – 28/04/2006, 20/07/2006 – 12/10/2006 & 12/02/2007 – 27/03/2007

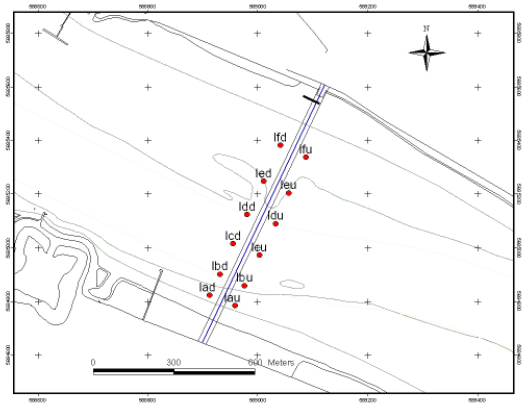

Figure 3-5:Through tide measurements - Liefkenshoek 22/03/2006 & 27/09/2006 (ADCP+SiltProfiler)

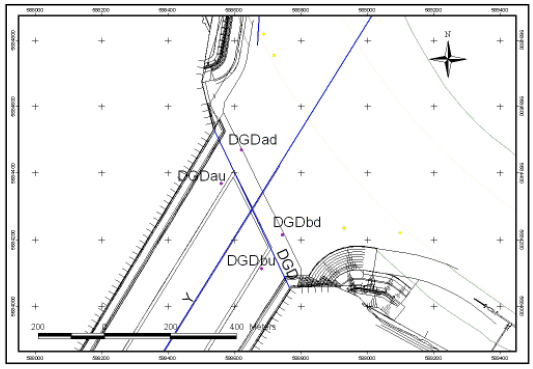

Figure 3-6: Through tide measurements - Deurganckdok 22/03/2006 & 27/09/2006 (ADCP)

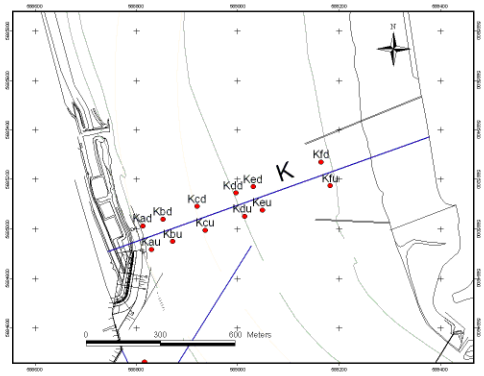

Figure 3-7: Through tide measurements - Deurganckdok 22/03/2006 & 27/09/2006 (ADCP); 23/03/2006 & 28/09/2006 (ADCP+SiltProfiler)

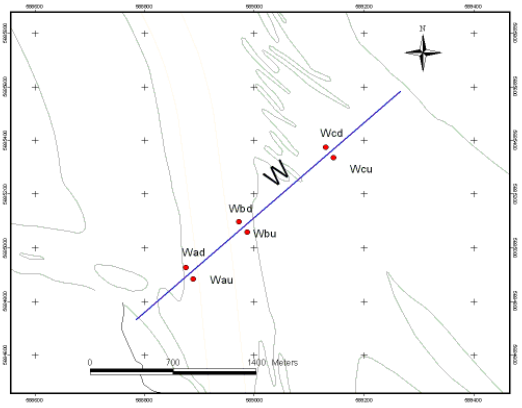

Figure 3-8: Through tide measurements - Waarde 23/03/2006 & 28/09/2006 (ADCP)

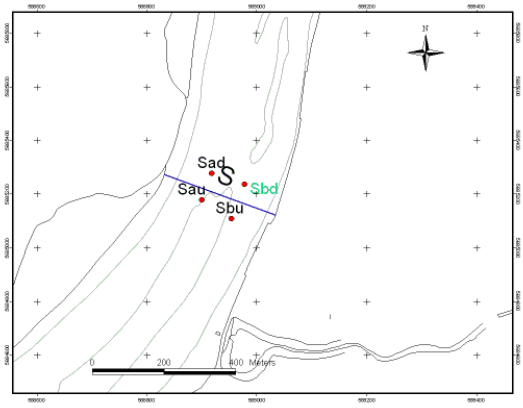

Figure 3-9: Through tide measurements - Schelle 23/03/2006 & 28/09/2006 (ADCP)

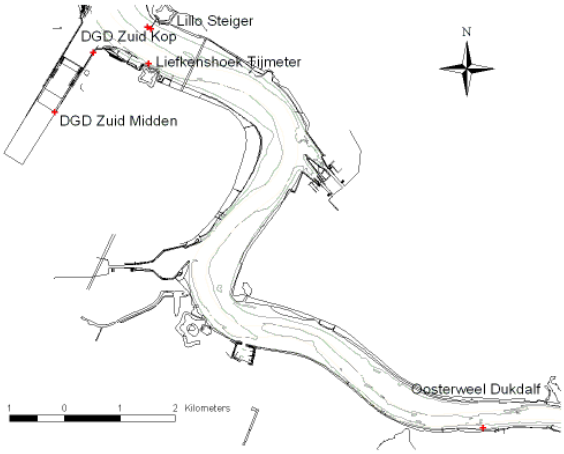

Figure 3-10: Calibration measurements - 15/03/2006 & 14/04/2006

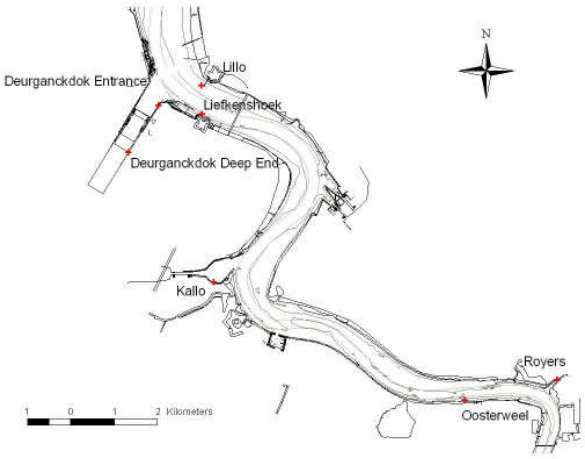

Figure 3-11: Calibration measurements – 23/06/2006 & 18/09/2006

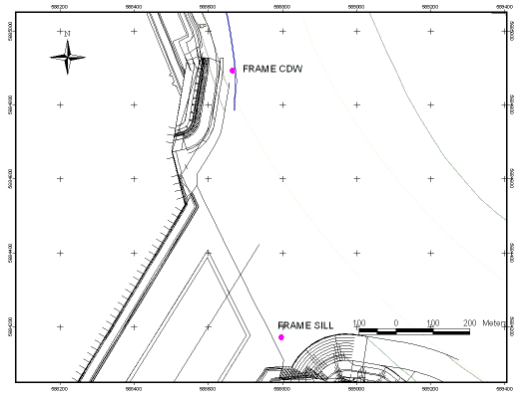

Figure 3-12:Near bed continuous monitoring
14/03/2006 – 23/05/2006
18/07/2006 – 11/10/2006
09/02/2007 – 18/04/2007
26/09/2007 – 05/12/2007

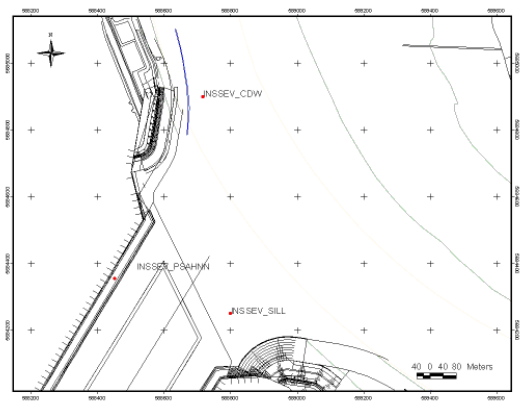

Figure 3-13: Settling velocity (INSSEV) 05/09/2006 – 07/09/2006

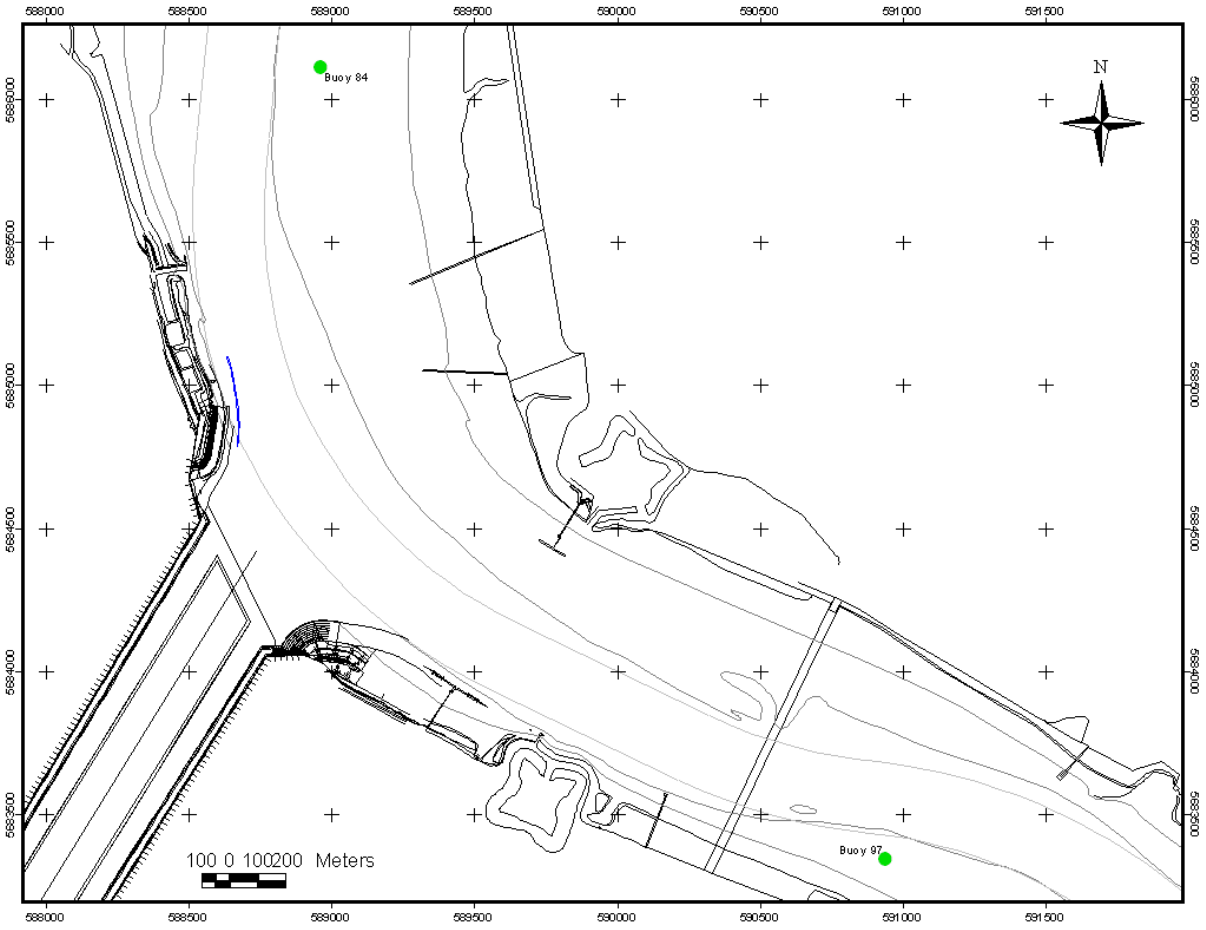

Figure 3-14: Long term measurements in the Lower Sea Scheldt

3.2. Description of the data

3.2.1. Parameters and equipment

The data gathered during the measurement campaign is current velocity, current direction, temperature, pressure and turbidity. For the through tide measurements also data about depth and position of the hard and soft bottom is collected. To report the results in most cases current velocity, current direction, temperature, salinity and suspended sediment concentration is used.

A detailed description of the data acquisition can be found in IMDC (2006b – 2006l; 2007a-2007q).

During the long term stationary at buoy 97 and buoy 84 measurements current, temperature, salinity and turbidity where measured using Aanderaa RCM-9's. A fixed set up was used in which a steel frame was placed on the bottom, with two RCM-9s suspended and held upright by subsurface buoys (Figure 3-15). The lower RCM-9 was placed at 0.80 m above the bottom, while the upper one was placed at a distance of 2.5 m above the lower one. To collect data, check and clean the instruments the instruments were surfaced on regular bases.
The owner of the instruments differs per location, the measurement instruments on buoy 84 belong to WL – Cel Hydrometrie Schelde and the instruments on buoy 97 to IMDC.

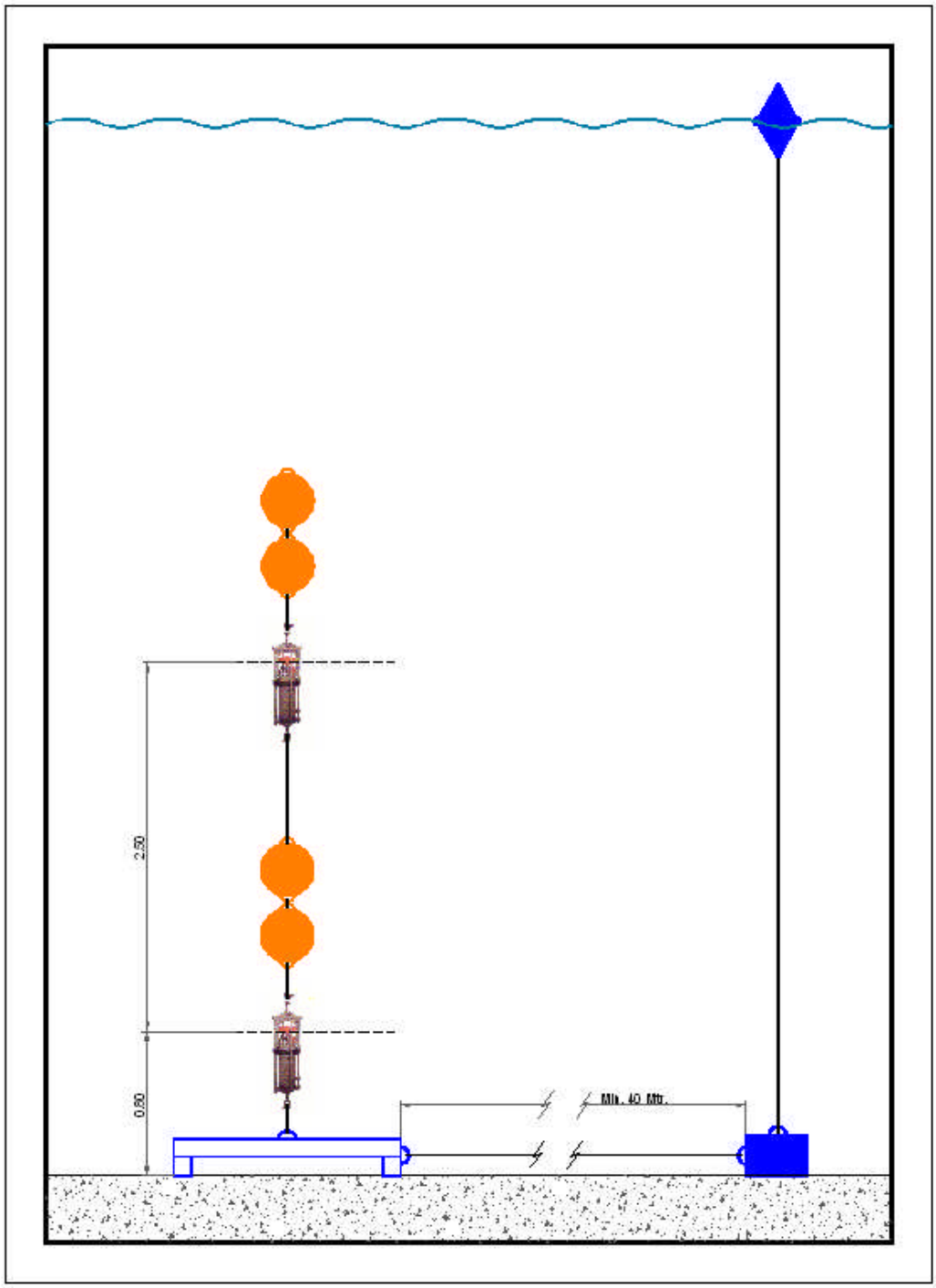

Figure 3-15: Fixed set-up for two RCM9 units with subsurface buoys (orange)

The instruments were set up to measure every 10 minutes. All sensors (temperature, pressure, conductivity, turbidity, tilting) except the Doppler Current Sensor were set to record once every 10 minutes. The Doppler Current Sensor sent 600 pings during every 10 minute-interval and calculated the average value for current speed and direction over this interval. Data storage units

in the instruments logged all the measured values. A picture of the set-up is shown in Figure 3-16. More information about the Aanderaa RCM-9 can be found in IMDC (2005l).

Figure 3-16: Set-up of two RCM-9 units

Table 3-2 gives an overview of the measured parameters during the long term measurements and the depth at which these were registered.

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Table 3-2: The equipment and measured parameters per location (01/01/2006 – 30/09/2007)

Through tide measurements									
Location	***Period***	***Instrument***	***Velocity***	***Direction***	***Temperature***	***Pressure***	***Conductivity***	***Turbidity***	***Depth***
Deurganckdok (in dock, transect Y	21/03/06 & 26/09/06	SiltProfiler			X	X	X	X	
		Echosounder							X
		Aanderaa RCM 9			X	X	X		
		CTD			X	X	X		
Liefkenshoek (transect I)	22/03/06 & 27/09/06	ADCP	X	X					
		OBS			X	X	X	X	
		CTD			X	X	X		
		Pump Sampler							
		SiltProfiler			X	X	X	X	
		Echosounder							X
Deurganckdok (transect K & in dock transect DGD)	22/03/06 & 27/09/06	ADCP	X	X					
		OBS			X	X	X	X	
		CTD			X	X	X		
		Pump Sampler							
Deurganckdok (transect K)	23/03/06 & 28/09/06	SiltProfiler			X	X	X	X	
		Echosounder							X
Schelle (transect S)	23/03/06 & 28/09/06	ADCP	X	X					
		OBS			X	X	X	X	
		CTD			X	X	X		
		Pump Sampler							
Waarde (Transect W)	23/03/06 & 28/09/06	Same as Schelle (transect S)							

Near bed continuous monitoring									
Location	***Period***	***Instrument***	***Velocity***	***Direction***	***Temperature***	***Pressure***	***Conductivity***	***Turbidity***	***Depth***
Deurganckdok CDW	14/03/2006 – 05/04/2006	Valeport MIDAS OBS3+	X	X	X	X	X	X	
		Aanderaa RCM9	X	X	X	X	X	X	
		ALTUS							X
		ARGUS			X	X	X	X	
Deurganckdok CDW	19/04/2006 – 23/05/2006	Idem	Idem						
Deurganckdok Sill	19/04/2006 – 23/05/2006	Idem	Idem						
Deurganckdok CDW	18/07/2006 – 11/10/2006	Idem	Idem						
Deurganckdok Sill	19/07/2006 – 11/10/2006	Idem	Idem						
Deurganckdok CDW	15/03/2007 – 12/04/2007	Idem	Idem						
Deurganckdok Sill	09/02/2007 – 18/04/2007	Idem	Idem						
Deurganckdok CDW	26/09/2007 – 05/12/2007	Idem	Idem						
Deurganckdok Sill	10/10/2007 – 28/11/2007	Idem	Idem						

Long-term salinity measurements								
Location	***Period***	***Instrument***	***Velocity***	***Direction***	***Temperature***	***Pressure***	***Conductivity***	***Turbidity***
Deurganckdok (Quay wall)	17/03/2006 – 28/04/2006	Aanderaa RCM9	X	X	X	X	X	X
		OBS 3A			X	X	X	X
Deurganckdok (Quay wall)	20/07/2006 – 12/10/2006	OBS 3A			X	X	X	X
Deurganckdok (Quay wall)	12/02/2007 – 27/03/2007	OBS 3A			X	X	X	X
Deurganckdok (Quay wall)	20/06/2007 – 31/07/2007	OBS 3A			X	X	X	X

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Long-term measurements			
Location	***Period***	***Instrument***	***Depth sensor***
Buoy 84	01/01/2006 – 30/06/2006	Aanderaa RCM 9	-5.6m TAW
		Aanderaa RCM 9	-8.1m TAW
Buoy 97	01/01/2006 – 30/06/2006	Aanderaa RCM 9	-5.3m TAW
		Aanderaa RCM 9	-7.8m TAW
Buoy 84	01/07/2006 – 31/12/2006	Aanderaa RCM 9	-5.6m TAW
		Aanderaa RCM 9	-8.1m TAW
Buoy 97	01/07/2006 – 31/12/2006	Aanderaa RCM 9	-5.3m TAW
		Aanderaa RCM 9	-7.8m TAW
Buoy 84	01/01/2007 – 31/03/2007	Aanderaa RCM 9	-5.6m TAW
		Aanderaa RCM 9	-8.1m TAW
Buoy 97	01/01/2007 – 31/03/2007	Aanderaa RCM 9	-5.3m TAW
		Aanderaa RCM 9	-7.8m TAW
Buoy 84	01/04/2007 – 30/06/2007	Aanderaa RCM 9	-5.6m TAW
		Aanderaa RCM 9	-8.1m TAW
Buoy 97	01/04/2007 – 30/06/2007	Aanderaa RCM 9	-5.3m TAW
		Aanderaa RCM 9	-7.8m TAW
Buoy 84	01/07/2007 – 30/09/2007	Aanderaa RCM 9	-5.6m TAW
		Aanderaa RCM 9	-8.1m TAW
Buoy 97	01/07/2007 – 30/09/2007	Aanderaa RCM 9	-5.3m TAW
		Aanderaa RCM 9	-7.8m TAW

3.2.2. Overview of the data acquisition (measurements buoy 84 & buoy 97)

A chronological overview of the measurements, per location and per instrument, is given in Table 3-3 as well as an explanation for missing and faulty data.

Table 3-3: Chronological overview of the RCM-9 measurements

Buoy 84 top – 3.3 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
20/09/2005				Start measurement period
01/07/2007	0579			Start reporting period
14/07/2007 – 16/07/2007	0579		X	Faulty tide data
26/07/2007 – 08/08/2007	0579	X		Technical problem
05/09/2007 – 13/08/2007	0579	X		Autumn calibration
30/09/2007	0579			End reporting period
Buoy 84 bottom – 0.8 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
20/09/2005				Start measurement period
01/07/2007	1153			Start reporting period
14/07/2007 – 16/07/2007	1153		X	Faulty tide data
05/09/2007 – 13/09/2007	1153	X		Autumn calibration
16/09/07 – 30/09/2007	1153	X		Technical problem
30/09/2007	1153			End reporting period
Buoy 97 top – 3.3 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
21/09/2005				Start measurement period
01/07/2007	1225			Start reporting period
14/07/2007 – 16/07/2007	1225		X	Faulty tide data
05/09/2007 – 13/09/2007	1225	X		Autumn calibration
30/06/2007	1225			End reporting period

Buoy 97 bottom – 0.8 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
21/09/2005				Start measurement period
01/07/2007	1229			Start reporting period
14/07/2007 – 16/07/2007	1229		X	Faulty tide data
20/07/2007 – 25/07/2007	1229	X		Technical problem
31/07/2007	1229	X		Problem with the battery
01/07/2007	1229	X		Problem with the battery
05/09/2007 – 13/09/2007	1229	X		Autumn calibration
30/06/2007	1229	X		End reporting period

3.3. Processing of datasets

3.3.1. Methodology of Processing

The collected data was validated and outliers were removed. Erroneous measurements because of malfunction of sensors, growth on sensors, instrument failure were also removed from the dataset and are documented in 3.2.2.

Salinity was calculated using the temperature, conductivity and pressure in the pps-78 formula (Unesco, 1991 & IMDC, 2002).

Turbidity values were converted to suspended sediment concentration using the equation of the calibration curve. By submerging each turbidity sensor in clean water at almost every redeployment, the bias of the turbidity sensors was tested.

The calibration procedure and calibration graphs can be found in IMDC (2006a and 2007a).

3.3.2. Results (weekly)

Measurements are visualized per instrument, location and per week in APPENDIX B.

- The title shows the week number followed by the year
- The first graph shows the current velocity and the current direction. The direction is scaled from 0 to 360
- The second graph depicts the salinity and temperature
- The third and last graph shows the waterlevel at the nearest tidal gauge and the suspended sediment concentration

All times are given in MET.

3.3.3. Results (monthly)

Monthly results are reported in APPENDIX B. The minimum, maximum and average value for velocity magnitude, temperature and suspended sediment concentration is given for every month. For salinity the minimum, maximum and mean are calculated for both high water slack and low water slack.

3.3.4. Results (deployment period)

An overview of the evolution of the monthly minimum, maximum and average values for velocity magnitude, temperature and suspended sediment concentration is given in APPENDIX B. For salinity the minimum, maximum and mean are given for both high water slack and low water slack. The graphs are given for the whole deployment period (September 2005 – September 2007).

3.3.5. Total results (July 2007 – September 2007)

The results for the whole deployment period are also given in APPENDIX B. The minimum, maximum and average value for velocity magnitude, temperature and suspended sediment concentration is given for the period from July 2007 till September 2007. For salinity the minimum, maximum and mean are calculated for both high water slack and low water slack is given.

4. AMBIENT CONDITIONS

4.1. Environmental characteristics in the Lower Sea Scheldt

4.1.1. Other measurement campaigns

Beside the RCM-9 measurements at buoy 97 and 84 also other long-term measurements were executed in the Lower Sea Scheldt. At Oosterweel left bank (or Dukdalf), current, temperature, salinity and turbidity measurements were conducted using 2 Aanderaa RCM-9 units. Another RCM-9 unit was also used at Prosperpolder, where only temperature and salinity measurements were conducted. These instruments were suspended from a mooring post at fixed distances from the bottom. These measurements were set up and maintained by WL – Cel Hydrometrie Schelde. Figure 4-1 shows an overview of all the measurement locations (including locations of HCBS2 measurements).

The data of these measurements was processed by IMDC and is presented in APPENDIX C. Calibration of the turbidity sensors was executed by IMDC during the summer calibration of 2006. Further details of this calibration can be found in IMDC (2007a).

Table 4-1: Measurement locations and periods at Oosterweel (left bank) & Prosperpolder .

Location	***Depth sensor***	***Easting (UTM ED 50)***	***Northing (UTM ED 50)***	***Period***
Oosterweel (left bank)	4.5m above bottom (-2.3m TAW)	595574	5677278	01/07/2007 – 30/09/2007
Oosterweel (left bank)	1m above bottom (-5.8m TAW)	595574	5677278	01/07/2007– 30/09/2007
Prosperpolder	2.5m above bottom (-1.5m TAW)	586307	5689501	01/07/2007– 30/09/2007

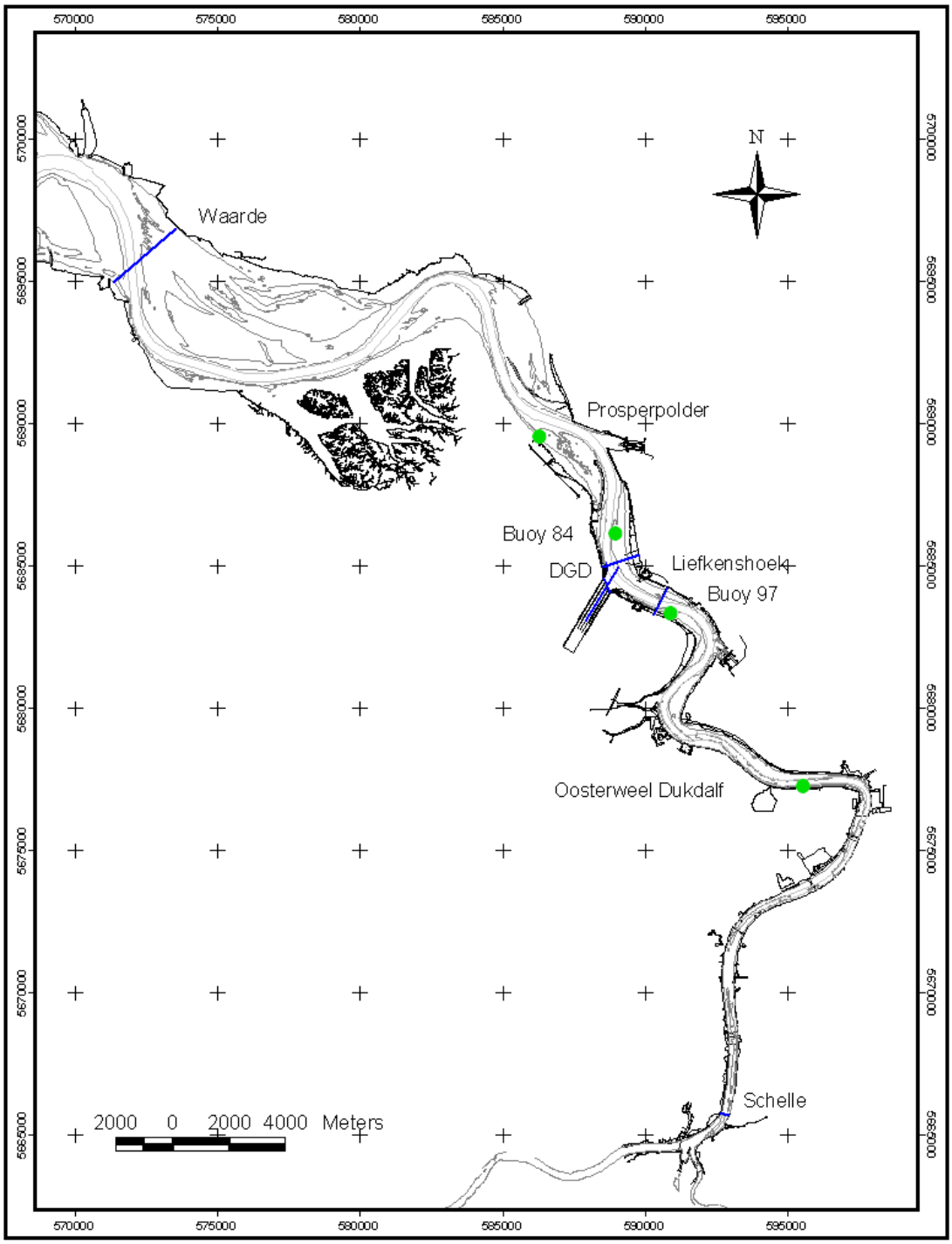


Figure 4-1: All measurement locations 01/2007 – 09/2007

The data gathered during these long-term measurements is current velocity, current direction, temperature, pressure and turbidity. In APPENDIX C the processed data is visualized per instrument, location and per week for July until September 2007.

- The title shows the week number followed by the year
- The first graph shows the current velocity and the current direction. The direction is scaled from 0 to 360.
- The second graph depicts the salinity and temperature
- The third and last graph shows the water level at the nearest tidal gauge and the suspended sediment concentration

All times are given in MET.

To convert the turbidity values to suspended sediment concentration the equation of the calibration curve was used. The calibration procedure and calibration graphs can be found in IMDC (2007a).

An overview of the measurements and an explanation of missing and faulty data for the whole period is given in Table 4-2.

Table 4-2: Chronological overview of the long term measurements at Oosterweel& Prosperpolder (01/07/2007 - 30/09/2007)

Oosterweel left bank – 4.5 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
01/07/2004				Start measurement period
01/07/2007	0152			Start reporting period
01/07/2007 – 05/07/2007	0152		X	Faulty turbidity data
14/07/2007 – 16/07/2007	0152		X	Faulty tide data
19/07/2007 – 09/08/2007	0152	X		Data not delivered
23/08/2007 – 30/08/2007	0152	X		Data not delivered
19/09/2007 – 20/09/2007	0152		X	Faulty tide data
30/09/2007	0152			End reporting period
Oosterweel left bank – 1 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
01/07/2004				Start measurement period
01/072007	0149			Start reporting period
01/072007 – 12/07/2007	0149	X		Data not delivered
14/07/2007 – 16/07/2007	0149		X	Faulty tide data
19/09/2007 – 20/09/2007	0149		X	Faulty tide data
30/09/2007	0149			End reporting period

Prosperpolder – 2.5 m above bottom				
Period	***Sensor***	***No data***	***Faulty data***	***Comment***
15/06/2006	0117			Start measurement period
01/07/2007	0117			Start reporting period
14/07/2007 – 16/07/2007		X		Faulty tide data
30/09/2007	0117			End reporting period

Monthly results (minimum, maximum and average) are shown in APPENDIX C. The minimum, maximum and average value for velocity magnitude, temperature and suspended sediment concentration is given for every month. For salinity the minimum, maximum and mean are calculated for both high water slack and low water slack. Also an overview of the evolution of the monthly minimum, maximum and average values of these parameters is given in APPENDIX C for the whole reporting period (July 2007 – September 2007). Notice that for the suspended sediment concentration the graphs are only given since 2006. In the previous reports turbidity was presented because there was no calibration available for the turbidity sensors.

The results for the whole measurement period are also given in APPENDIX C. The minimum, maximum and average value for velocity magnitude, temperature and suspended sediment concentration is given for the period from July 2007 till September 2007. For salinity the minimum, maximum and mean are calculated for both high water slack and low water slack is given.

4.1.2. Vertical tide

Tidal data was delivered for the period from 01/07/2007 till 30/09/2007 by Waterbouwkundig Laboratorium – Cel Hydrometrie Schelde. It is reported together with the processed data of the long term measurement campaigns and those at Oosterweel and Prosperpolder in APPENDIX B respectively APPENDIX C.

4.1.3. Salinity downstream

Salinity data of Baalhoek and Hoofdplaat was collected from the Hydro Meteo Centrum Zeeland (HMCZ, 2007) and processed by IMDC. Outliers were screened and removed. Monthly results (minimum, maximum and average values for salinity) are reported in APPENDIX D.

4.2. Fresh water inflow from the tributaries

The fresh water discharge of the Kleine Nete (Grobbendonk), the Grote Nete (Hulshout), the Dijle (Wijgmaal), The Demer (Wilsele), the Dender (Dendermonde), the Zenne (Eppegem) and the Bovenschelde (Melle) are provided by the Hydrologische Informatie Centrum of the Ministerie van de Vlaamse Gemeenschap – Departement Leefmilieu en Infrastructuur Afdeling Waterbouwkundig Laboratorium. The gauging stations are not influenced by the tide. The calculated discharges at the gauging stations are converted to discharges at the mouth of the tributaries and then to a total fresh water discharge at Schelle. This procedure is described in AZ (1974) and is based on the use of correction coefficients that take in account the surface of the hydrological basins.

In APPENDIX E a graph of the evolution of the fresh water discharge is given just as a table with the decade averages of the fresh water discharge. Also the monthly averages are compared to the expected discharges in a graph. Notice that the given values are only temporary since no influence

of possible growth is taken in to account yet. This will be done at the end of the year by the Hydrologische Informatie Centrum of the Ministerie van Mobiliteit en Openbare Werken - Departement Mobiliteit en Openbare Werken - Afdeling Waterbouwkundig Laboratorium.

4.3. Meteorological data

The meteorological conditions for the measurement station Deurne for the period 01/07/2007-30/09/2007 cannot be reported. This data should have been obtained from the KMI (Royal Meteorological Institute of Belgium) but due to problems at the institute the requested data is not published yet.

4.4. Human Activities

4.4.1. Dredging activities

Afdeling Maritieme Toegang provided information about the dates, times, volumes and locations of dredging activities. In APPENDIX F an overview is given of all the dredging activities from 01/07/2007 till 30/09/2007. Weekly volumes are given per location.

4.4.2. Navigation

Weekly data of navigation was delivered by Afdeling Scheepvaartbegeleiding – Schelde Rader Keten for the period of 01/07/2007 till 31/09/2007. To order the data a splitting up of the Beneden Zeeschelde was done in 4 areas. The first area is from de Belgian border up to locks of Zandvliet – Berendrecht (sluizencomplex Zandvliet – Berendrecht), the second goes from this point forward up to Deurganckdok. The third area is from Deurganckdok up to the lock of Kallo (Kallosluis) and finally the fourth goes up to the lock of Royers (Royerssluis). A more detailed description of the areas can be found in APPENDIX G. Also a distinction is made between the draughts. In APPENDIX G a total number is given which refers to the total of passing ships registered by Afdeling Scheepvaartbegeleiding - Schelde Radar Keten. In addition a difference was made between inland navigation and seagoing ships, just as between arrival and departure. Notice that for a certain area and certain draught, the total may deviate from the sum of inland navigation and seagoing. This can be explained by the presence of ships like dredgers, which were only counted in the column ‘total’. Also a difference may occur between the total number and the sum of the arrival and departure number. This is due to vessels that have the same entry and exit point.

Finally it should be mentioned that not all inland shipping is observed by the system, which means that the actual number of inland shipping will be higher.

5. REFERENCES

AZ (1974). Debieten van het Scheldebekken periode 1959 – 1972. *Ministerie van Openbare werken, Antwerpse Zeehavendienst.*

HMCZ (2007). Hydro Meteo Centrum Zeeland. Tijdsreeksen uit de WTZ – database. Consulted on 10 July 2007, at http://www.hmcz.nl/cgi-bin/uncgi/ok.cgi?Akkoord=Ja&/cgi-bin/uncgi/ok.cgi=Verstuur.

IMDC (2002). Studie Densiteitsstroming in het kader van LTV Schelde, Stroom- en saliniteitsmeting t.h.v. Deurganckdok uitgevoerd op 12/06/202, I/RA/11216/02.042/CMA.

IMDC (2005a). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 1: Test survey 17/02/2005, I/RA/11265/05.008/MSA.

IMDC (2005b). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.1: Deurganckdok 17/02/2005, I/RA/11265/05.009/MSA.

IMDC (2005c). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.2: Zandvliet 17/02/2005, I/RA/11265/05.010/MSA.

IMDC (2005d). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.3: Liefkenshoek 17/02/2005, I/RA/11265/05.0011/MSA.

IMDC (2005e). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.4: Schelle 17/02/2005, I/RA/11265/05.0012/MSA.

IMDC (2005f). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.5: Deurganckdok 16/02/2005, I/RA/11265/05.013/MSA.

IMDC (2005g). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.6: Kallosluis 18/02/2005, I/RA/11265/05.014/MSA.

IMDC (2005h). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.7: Near bed continious monitoring: february 2005, I/RA/11265/05.015/MSA.

IMDC (2005i). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 3: Settling velocity INSSEV february 2005, I/RA/11265/05.016/MSA.

IMDC (2005j). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 4: Cohesive sediment properties february 2005, I/RA/11265/05.017/MSA

IMDC (2005k). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.1: Overview of ambient conditions in the river Scheldt January-June 2005, I/RA/11265/05.018/MSA.

IMDC (2005l). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.2: Overview of ambient conditions in the river Scheldt July-December 2005, I/RA/11265/05.019/MSA.

IMDC (2006a) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 6.1 Calibration Winter 15 March & 14 April 2006? I/RA/11291/06.092/MSA.

IMDC (2006b) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.1 21 March 2006 Scheldewacht – Deurganckdok, I/RA/11291/06.094/MSA.

IMDC (2006c) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.2 22 March 2006 Parel 2 – Deurganckdok (downstream), I/RA/11291/06.095/MSA.

IMDC (2006d) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.3 22 March 2006 Laure Marie – Liefkenshoek, I/RA/11291/06.096/MSA.

IMDC (2006e) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.4 23 March 2006 Parel 2 – Schelle, I/RA/11291/06.097/MSA.

IMDC (2006f) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.5 23 March 2006 Laure Marie – Deurganckdok (downstream), I/RA/11291/06.098/MSA.

IMDC (2006g) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.6 23 March 2006 Veremans – Waarde, I/RA/11291/06.099/MSA.

IMDC(2006h) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.1 Opmeting stroming en zout- en sedimentbeweging aan de ingang van het Deurganckdok (SiltProfiler), I/RA/11283/06.087/WGO.

IMDC(2006i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.3. Opmeting stroming en zout-en sedimentbeweging aan de ingang van het Deurganckdok (ADCP), I/RA/11283/06.110/BDC

IMDC (2006j). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 8.1: Vaste meetopstelling in zake bodemgedrag, I/RA/11291/06.100/MSA.

IMDC (2006k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.6 Zout en slibverdeling Deurganckdok 17/03/2006 – 23/05/2006, I/RA/11283/06.121/MSA.

IMDC (2006l) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.3 Overview of ambient conditions in the river Scheldt – Januari-June 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC(2006m): Studie van de stromingsvelden en sedimentuitwisseling aan de ingang van Deurganckdok. Current and Sediment flux measurements November 17th 2005 (I/RA/15030/06.021/BDC).

IMDC (2006n). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 9: Valsnelheid slib – INSSEV, I/RA/11291/06.102/MSA, in opdracht van AWZ.

IMDC (2006o). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.7: Silt distribution and frame measurements 15/07/2006 – 31/10/2006. (I/RA/11291/06.122/MSA).

IMDC (2006p) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.3 Overview of ambient conditions in the river Scheldt – Januari-June 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2007a) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 6.2 Summer calibration and Final report, I/RA/11291/06.093/MSA.

IMDC (2007b). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 5.4 Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA), in opdracht van AWZ.

IMDC (2007c). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.1 Through tide Measurement Sediview & Siltprofiler 27/9 Stream - Liefkenshoek (I/RA/11291/06.104/MSA), in opdracht van AWZ.

IMDC (2007d). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.2 Through tide Measurement Sediview 27/9 Veremans - Raai K (I/RA/11291/06.105/MSA), in opdracht van AWZ.

IMDC (2007e). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.3 Through tide Measurement Sediview & Siltprofiler 28/9 Stream - Raai K (I/RA/11291/06.106/MSA), in opdracht van AWZ.

IMDC (2007f). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.4 Through tide Measurement Sediview 28/9 Veremans - Waarde(I/RA/11291/06.107/MSA), in opdracht van AWZ.

IMDC (2007g). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.5 Through tide Measurement Sediview 28/9 Parel 2 - Schelle (I/RA/11291/06.108/MSA), in opdracht van AWZ.

IMDC (2007h). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 11.6 Through tide Measurement Salinity Distribution 26/9 Scheldewacht – Deurganckdok in opdracht van AWZ.

IMDC (2007i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.1 Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)

IMDC (2007j) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.2 Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)

IMDC (2007k) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.3 Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)

IMDC (2007l) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.4 Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)

IMDC (2007m) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 1.5 Annual Sediment Balance (I/RA/11283/06.117/MSA)

IMDC (2007n) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.2 Through tide measurement SiltProfiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)

IMDC (2007o) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.7 Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006 (I/RA/11283/06.122/MSA)

IMDC (2007p) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.8 Salt-Silt distribution & Frame Measurements Deurganckdok 15/01/2007 – 15/03/2007 (I/RA/11283/06.123/MSA)

IMDC (2007q) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 3.1 Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA)

IMDC (2007r) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing 2. Deelrapport 1.10: Sediment Balance: Three monthly report 1/4/2007 – 30/06/2007 (I/RA/11283/07.081/MSA)

IMDC (2007s) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing 2. Deelrapport 1.11: Sediment Balance: Three monthly report 1/7/2007 – 30/09/2007 (I/RA/11283/07.082/MSA)

IMDC (2007t) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing 2. Deelrapport 2.16: Salt-Silt distribution Deurganckdok summer (21/6/2007 – 30/07/2007) (I/RA/11283/07.092/MSA)

IMDC (2007v) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing 2. Deelrapport 3.10: Boundary conditions: Three monthly report 1/04/2007 – 30/06/2007 (I/RA/11283/07.097/MSA)

IMDC (2007w) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing 2. Deelrapport 3.11: Boundary conditions: Three monthly report 1/07/2007 – 30/09/2007 (I/RA/11283/07.098/MSA)

IMDC (2008a) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing 2. Deelrapport 2.17: Salt-Silt distribution & Frame Measurements Deurganckdok autumn (17/9/2007-10/12/2007) (I/RA/11283/07.093/MSA)

TV SAM (2006a) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 01/2005-06/2005. 42SR S032PIB 2A.

TV SAM (2006b) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 07/2005-12/2005. 42SR S033PIB 2A.

TV SAM (2006c) Langdurige stationaire ADCP stroommetingen te Oosterweel dukdalf 01/2006-06/2006. 42SR S032PIB 2A.

Unesco (1983). Algorithms for computation of fundamental properties of seawater, UNESCO Technical Papers in Marine Science, 44. UNESCO, France.

APPENDIX A.

OVERVIEW OF HCBS2 AND OPVOLGING AANSLIBBING DEURGANCKDOK REPORTS

Report	Description of HCBS2
Ambient Conditions Lower Sea Scheldt	
5.3	Overview of ambient conditions in the river Scheldt – January-June 2006 (I/RA/11291/06.088/MSA)
5.4	Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA)
~~5.5~~	~~Overview of ambient conditions in the river Scheldt : RCM-9 buoy 84 & 97 (1/1/2007 -31/3/2007) (I/RA/11291/06.090/MSA)~~[1]
5.6	Analysis of ambient conditions 21/09/05 - 31/3/2007 (I/RA/11291/06.091/MSA)
Calibration	
6.1	Winter Calibration (I/RA/11291/06.092/MSA)
6.2	Summer Calibration and Final Report (I/RA/11291/06.093/MSA)
Through tide Measurements Winter 2006	
7.1	21/3 Scheldewacht – Deurganckdok – Salinity Distribution (I/RA/11291/06.094/MSA)
7.2	22/3 Parel 2 – Deurganckdok (I/RA/11291/06.095/MSA)
7.3	22/3 Laure Marie – Liefkenshoek (I/RA/11291/06.096/MSA)
7.4	23/3 Parel 2 – Schelle (I/RA/11291/06.097/MSA)
7.5	23/3 Laure Marie – Deurganckdok (I/RA/11291/06.098/MSA)
7.6	23/3 Veremans Waarde (I/RA/11291/06.099/MSA)
HCBS Near bed continuous monitoring (Frames)	
8.1	Near bed continuous monitoring winter 2006 (I/RA/11291/06.100/MSA)
INSSEV	
9	Settling Velocity - INSSEV summer 2006 (I/RA/11291/06.102/MSA)
Cohesive Sediment	
10	Cohesive sediment properties summer 2006 (I/RA/11291/06.103/MSA)
Through tide Measurements Summer 2006	
11.1	Through Tide Measurement Sediview and Siltprofiler 27/9 Stream - Liefkenshoek (I/RA/11291/06.104/MSA)
11.2	Through Tide Measurement Sediview 27/9 Veremans - Raai K (I/RA/11291/06.105/MSA)
11.3	Through Tide Measurement Sediview and Siltprofiler 28/9 Stream - Raai K (I/RA/11291/06.106/MSA)
11.4	Through Tide Measurement Sediview 28/9 Veremans – Waarde (I/RA/11291/06.107/MSA)

[1] The data, foreseen for Report 5.5 is reported in report 3.1. Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA) including HCBS 2 report 5.5 (Deurganckdok).

Report	Description of HCBS2
Ambient Conditions Lower Sea Scheldt	
11.5	Through Tide Measurements Sediview 28/9 Parel 2 - Schelle (I/RA/11291/06.108/MSA)
11.6	Through Tide measurement Longitudinal Salinity Distribution 26/9 Scheldewacht – Deurganckdok (I/RA/11291/06.161/MSA)
Analysis	
12	Report concerning the presence of HCBS layers in the Scheldt river (I/RA/11291/06.109/MSA)

Report	Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2007
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.1	Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)
1.2	Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)
1.3	Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)
1.4	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)
1.5	Annual Sediment Balance (I/RA/11283/06.117/MSA)
1.6	Sediment balance Bathymetry: 2005 – 3/2006 (I/RA/11283/06.118/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP)	
2.1	Through tide measurement Siltprofiler 21/03/2006 Laure Marie (I/RA/11283/06.087/WGO)
2.2	Through tide measurement Siltprofiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)
2.3	Through tide measurement Sediview spring tide 22/03/2006 Veremans (I/RA/11283/06.110/BDC)
2.4	Through tide measurement Sediview spring tide 27/09/2006 Parel 2 (I/RA/11283/06.119/MSA)
2.5	Through tide measurement Sediview average tide 24/10/2007 Parel 2 (I/RA/11283/06.120/MSA)
2.6	Salt-Silt distribution & Frame Measurements Deurganckdok 13/3/2006 – 31/05/2006 (I/RA/11283/06.121/MSA)
2.7	Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006

Report	Description of Opvolging aanslibbing Deurganckdok between April 2006 till March 2007
	(I/RA/11283/06.122/MSA)
2.8	Salt-Silt distribution & Frame Measurements Deurganckdok 12/02/2007 – 18/04/2007 (I/RA/11283/06.123/MSA)
2.9	Calibration stationary equipment autumn (I/RA/11283/07.095/MSA)
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.1	Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA) including HCBS 2 report 5.5
~~3.2~~	~~Boundary condtions: Annual report (I/RA/11283/06.128/MSA)~~[2]
Analysis	
4.1	Analysis of Siltation Processes and Factors (I/RA/11283/06.129/MSA)

[2] considered in report 5.6 'Analysis of ambient conditions during 2006' (I/RA/11291/06.091/MSA) in the framework of the study 'Extension of the study about density currents in the Beneden Zeeschelde'

APPENDIX B.

LONG TERM MEASUREMENTS

DGD MEASUREMENT CAMPAIGN

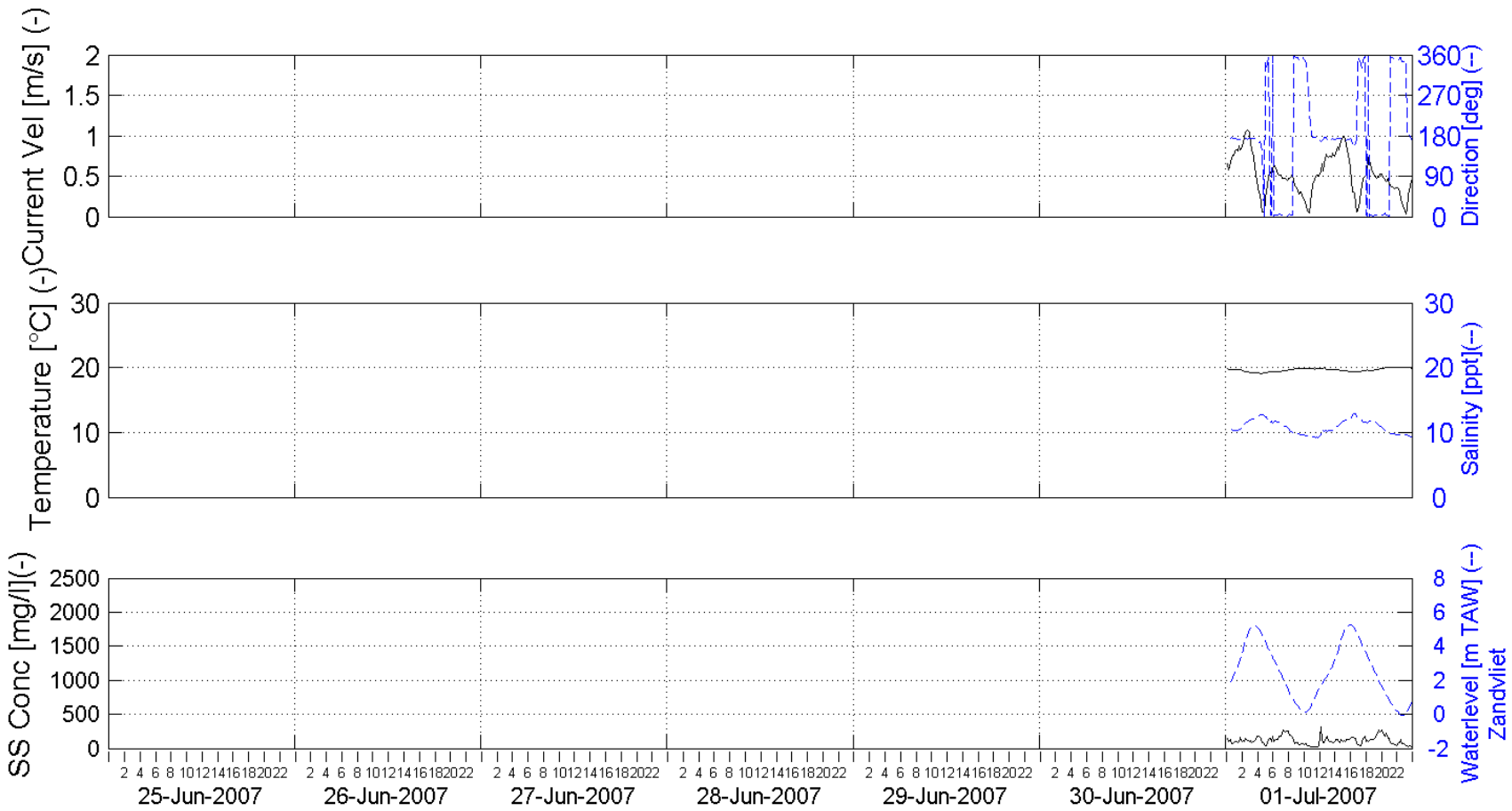
B.1 Datasheets weekseries

Datasheet order

Nr	*Location*	*Depth of Instrument*		*Sensor*	*Period*
		[m] above bottom	*[m TAW]*		
1	Buoy 84	3.3	-5.6	Aanderaa 0579	01/07/2007 – 30/09/2007
2	Buoy 84	0.8	-8.1	Aanderaa 1153	01/07/2007 – 30/09/2007
3	Buoy 97	3.3	-5.3	Aanderaa 1225	01/07/2007 – 30/09/2007
4	Buoy 97	0.8	-7.8	Aanderaa 1229	01/07/2007 – 30/09/2007

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 26 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

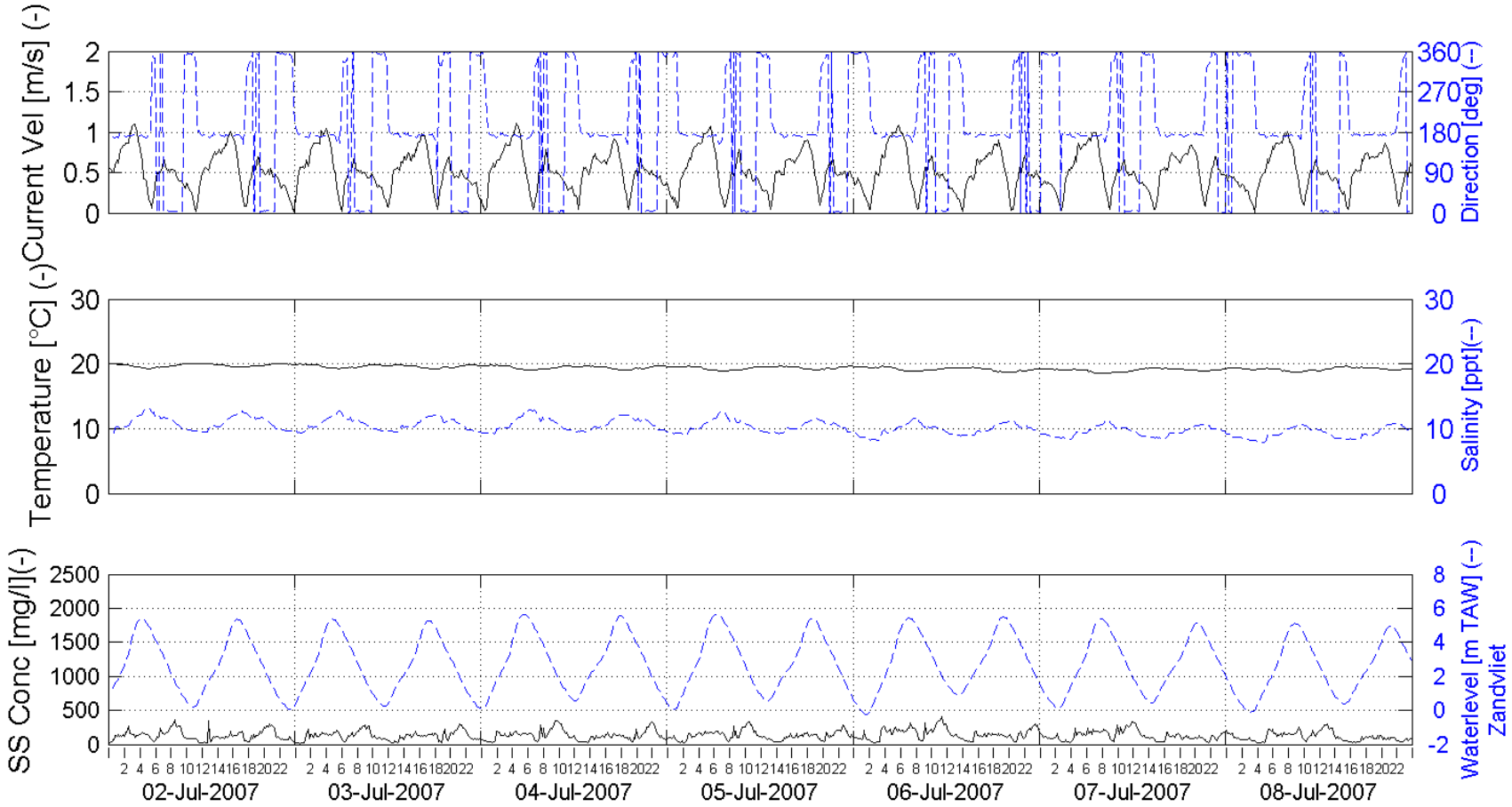
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 27 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

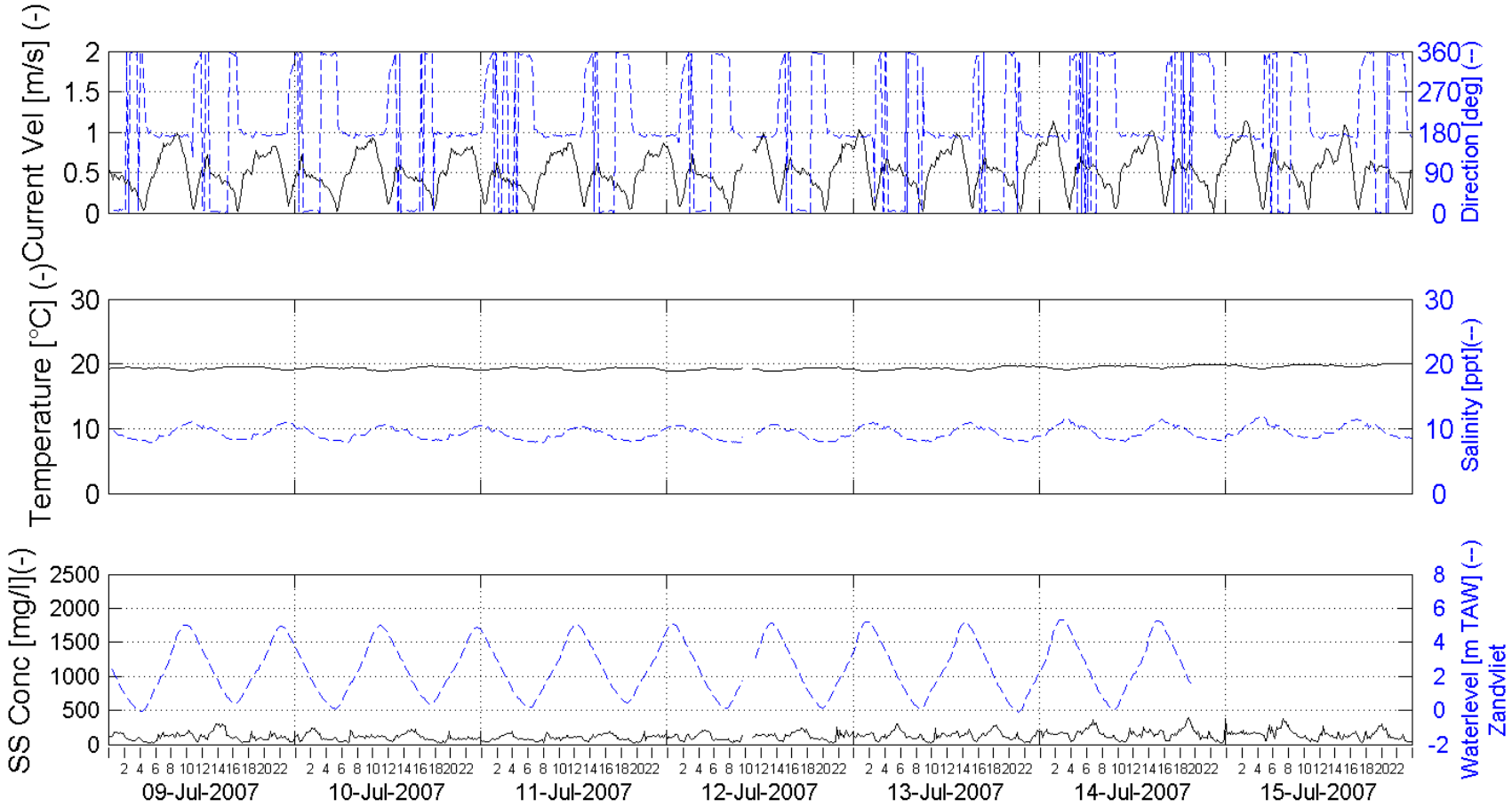
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 28 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

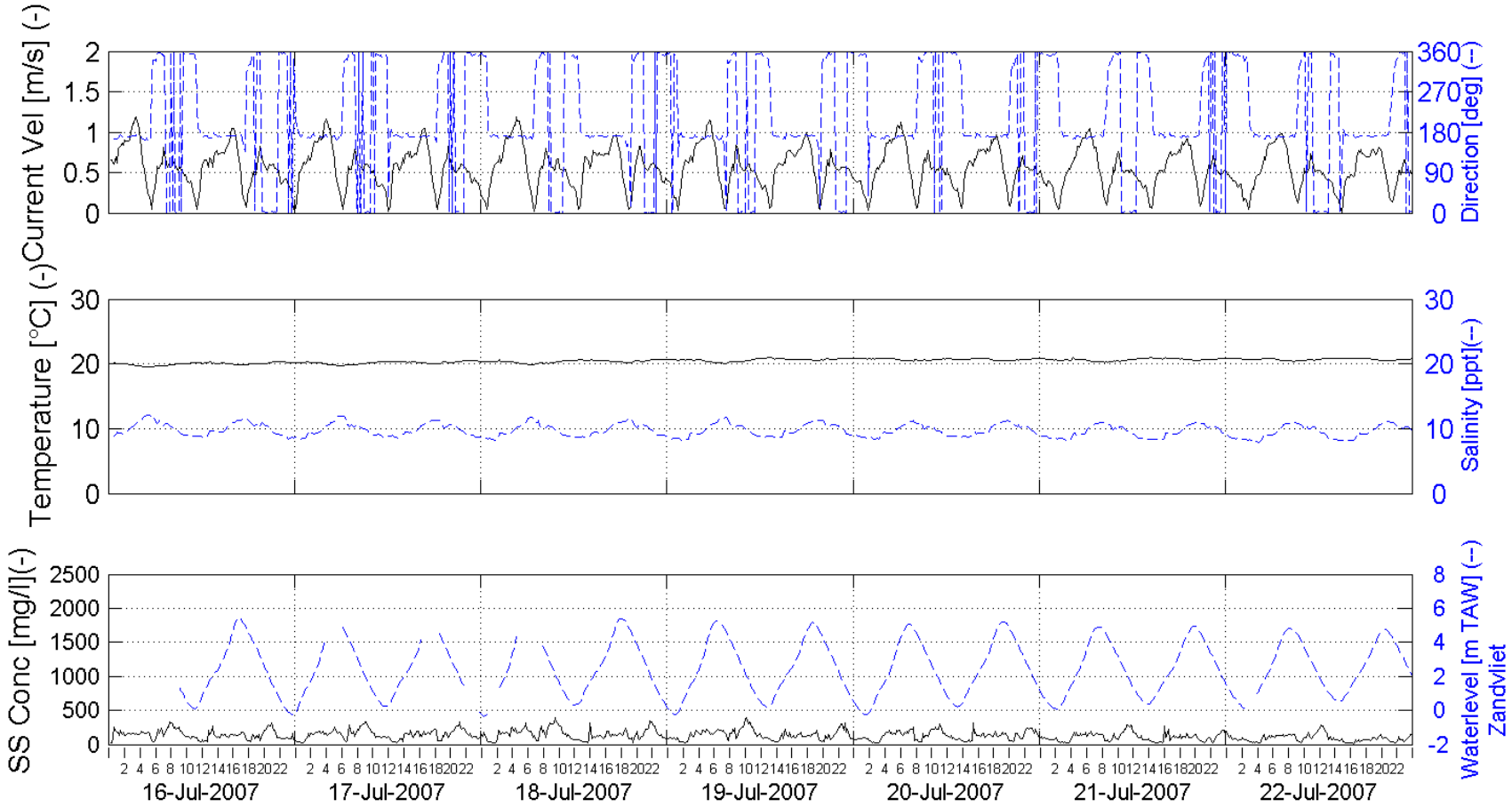
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 29 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

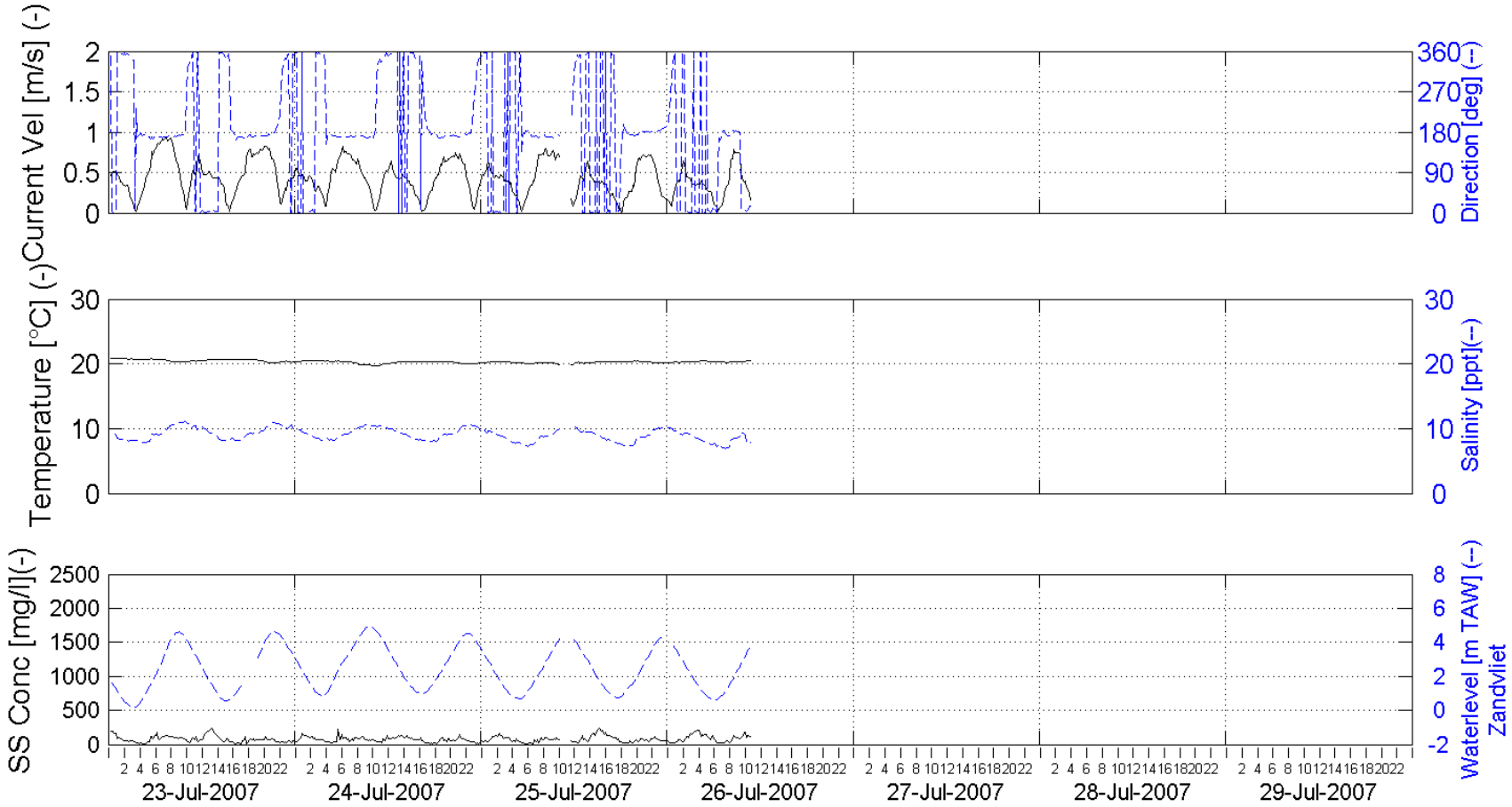
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 30 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

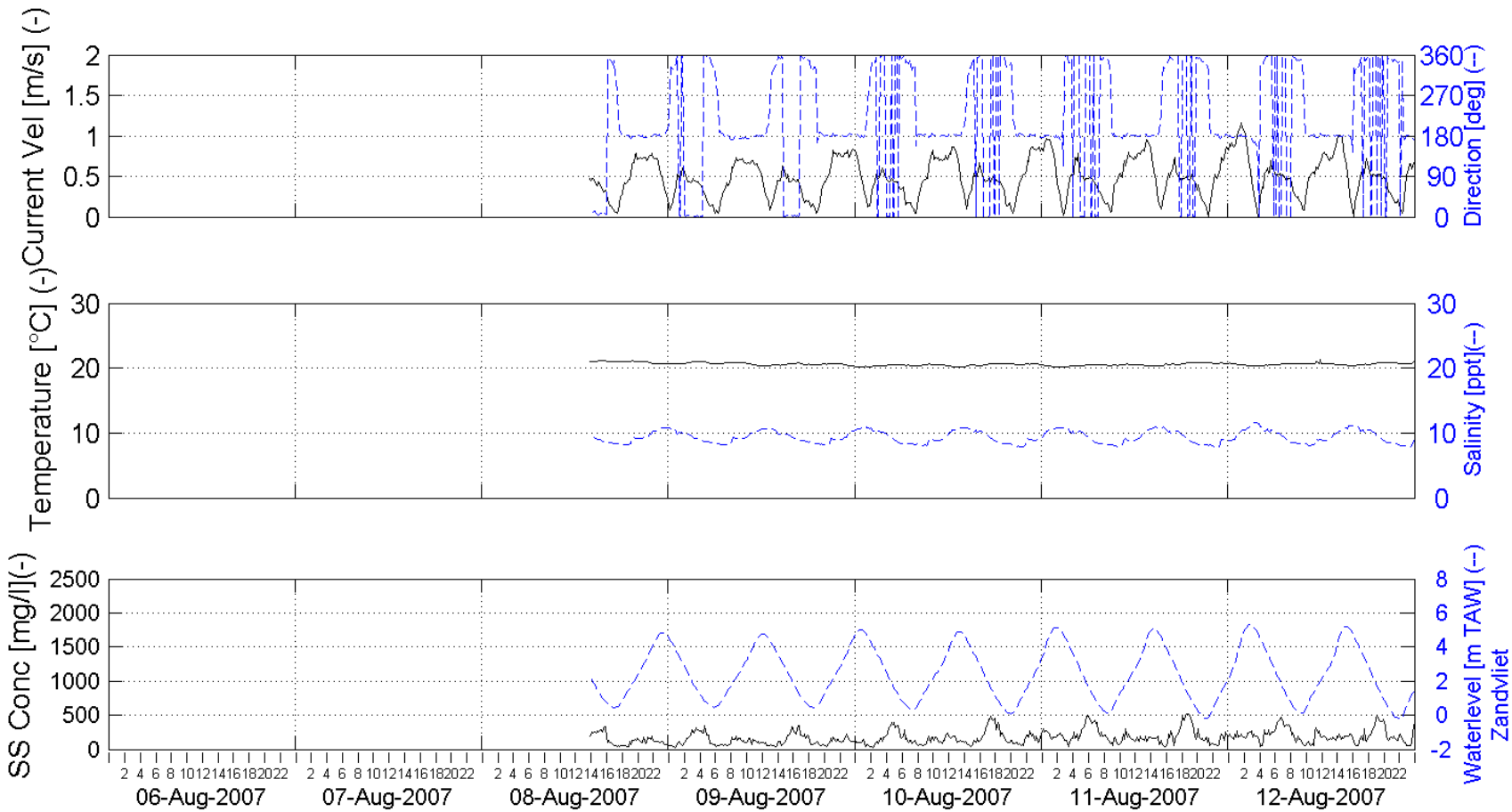
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 32 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

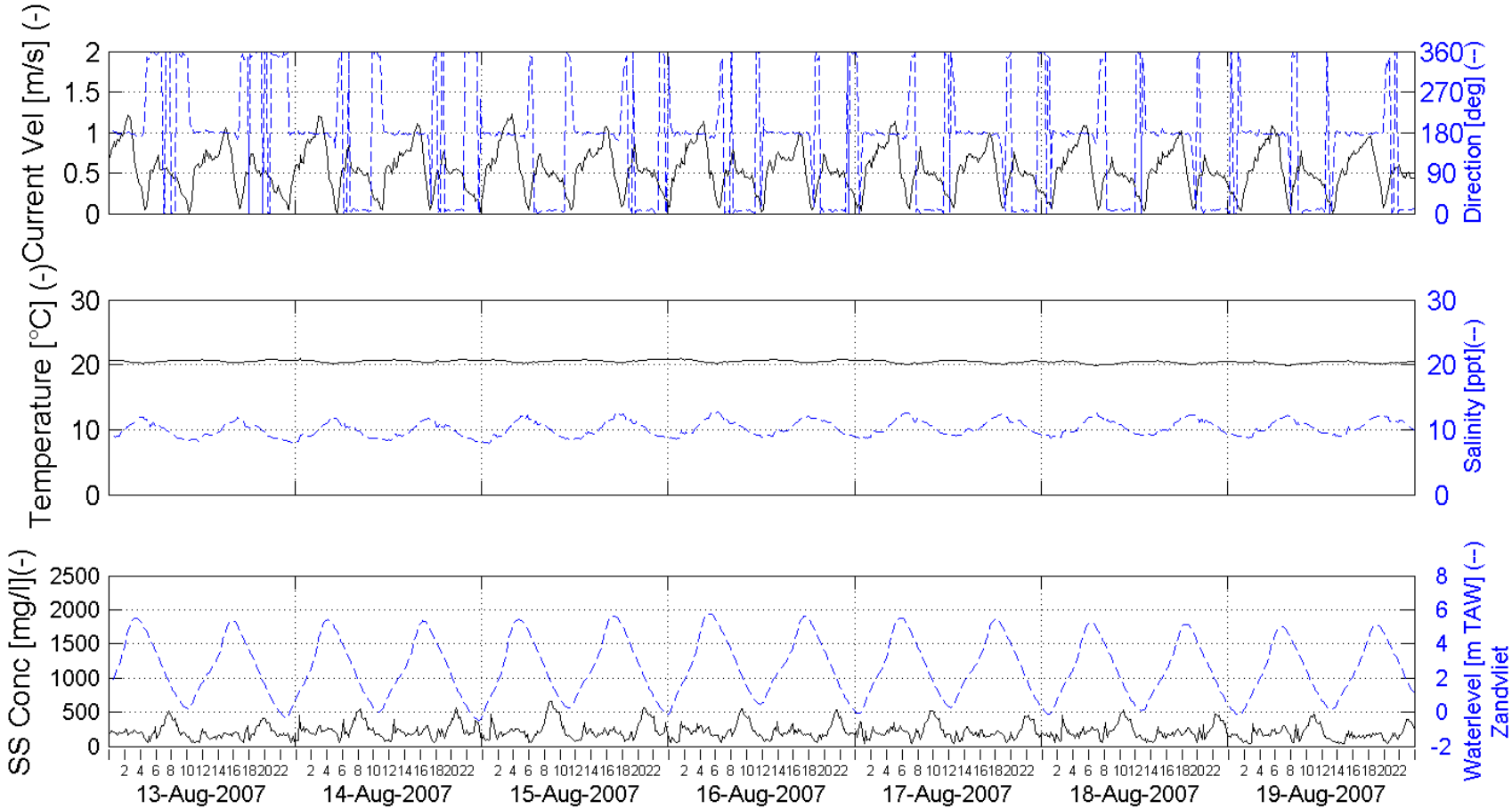
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 33 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

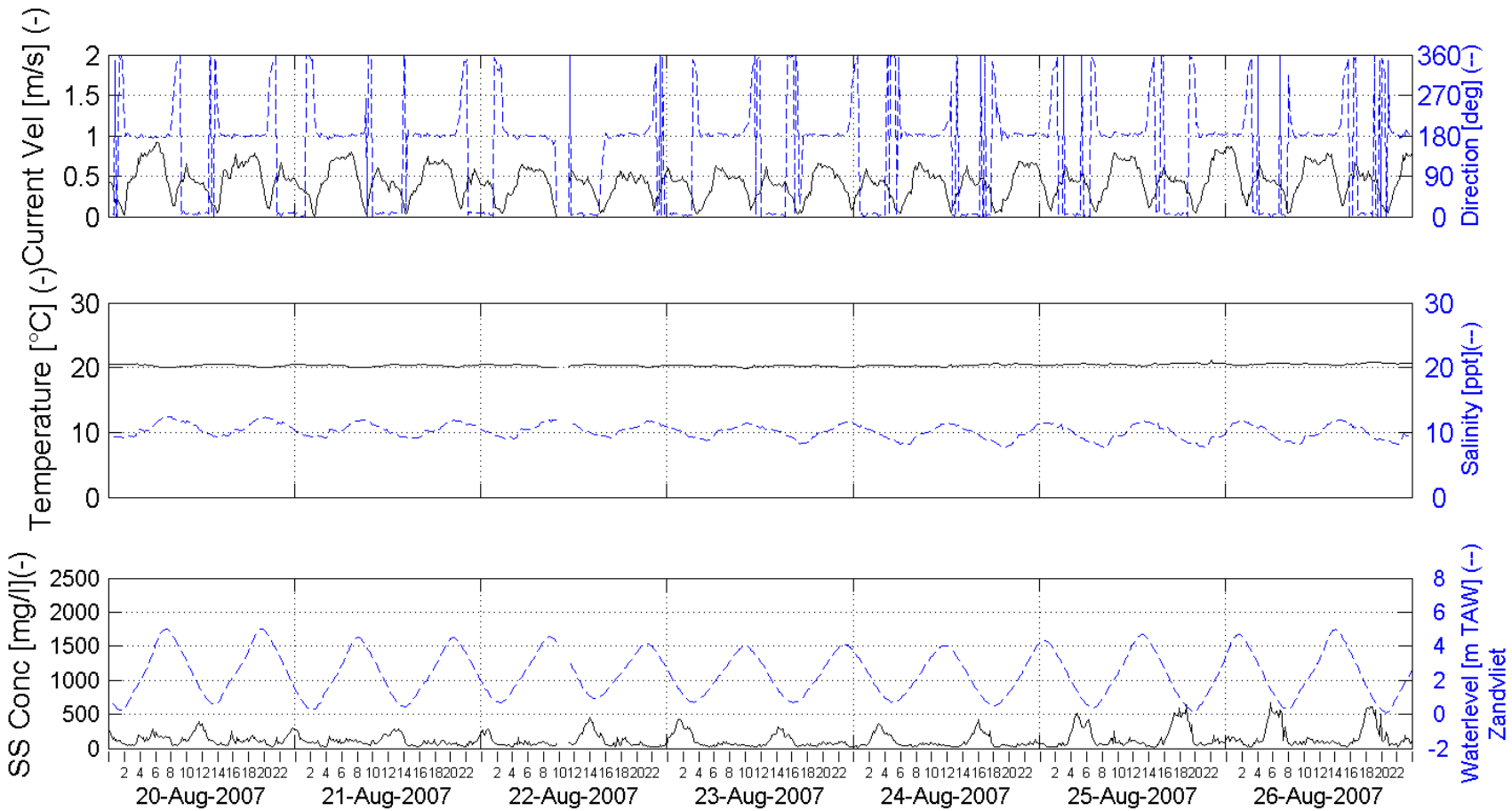
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 34 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

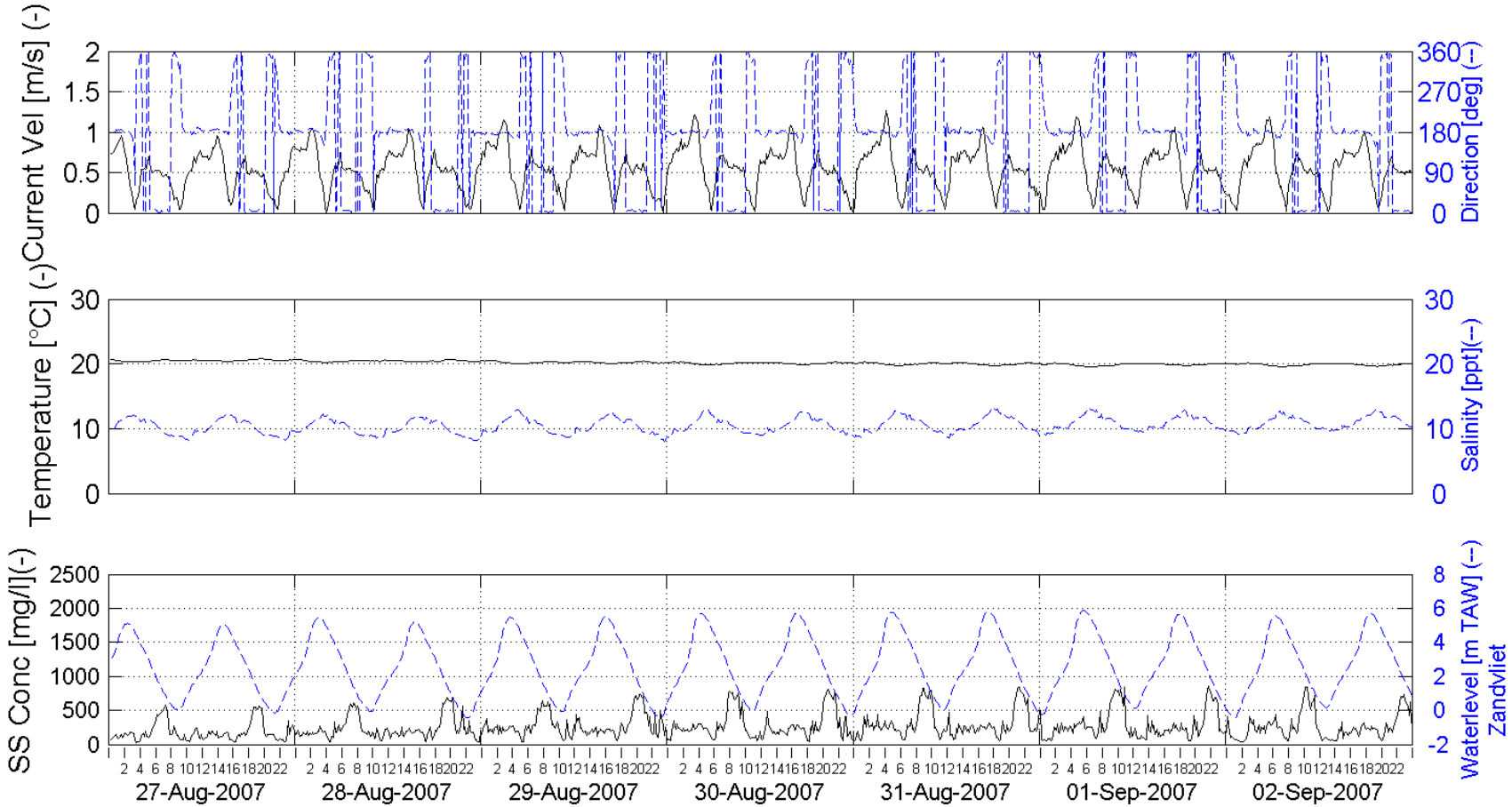
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 35 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

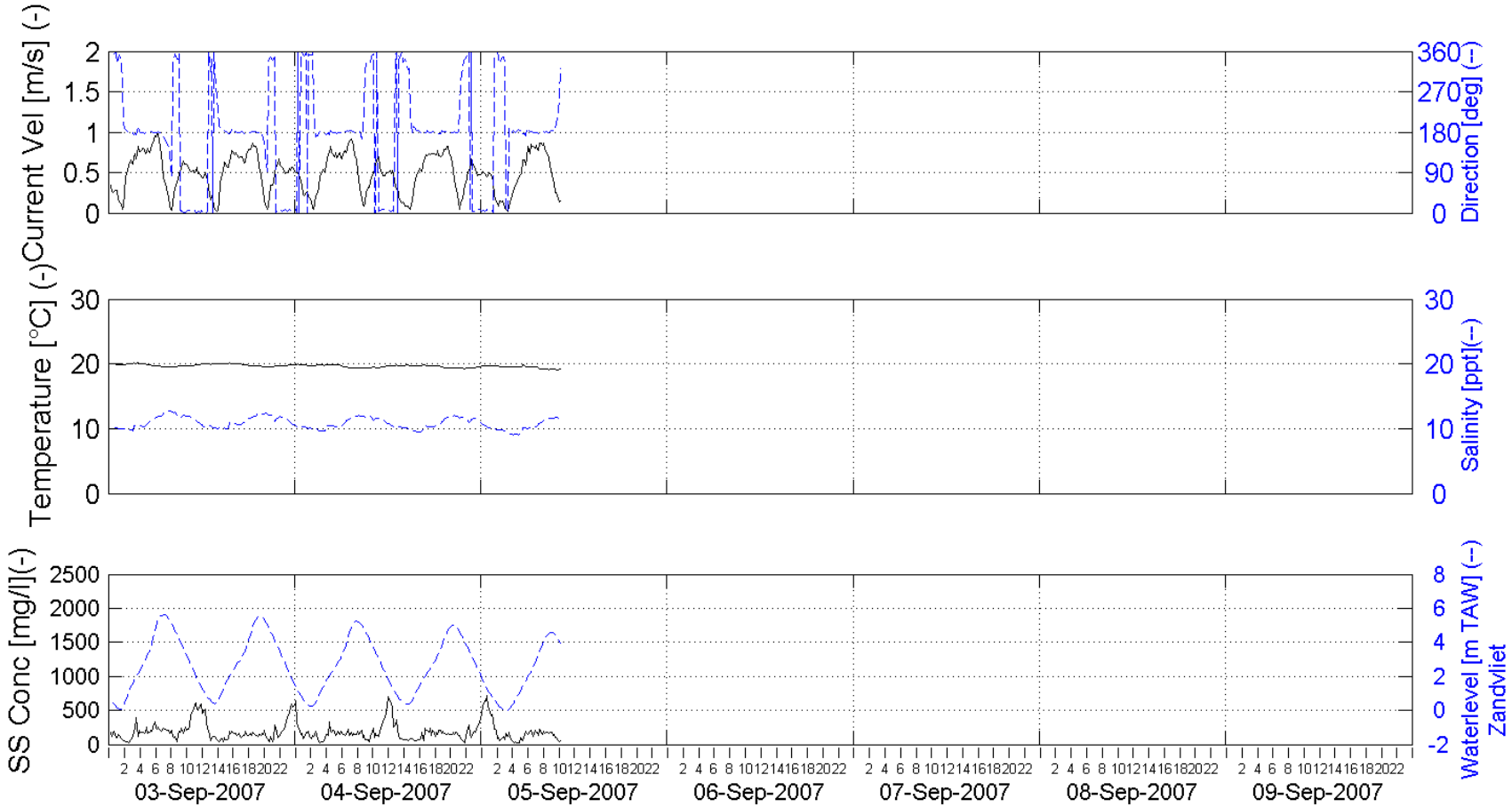
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 36 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

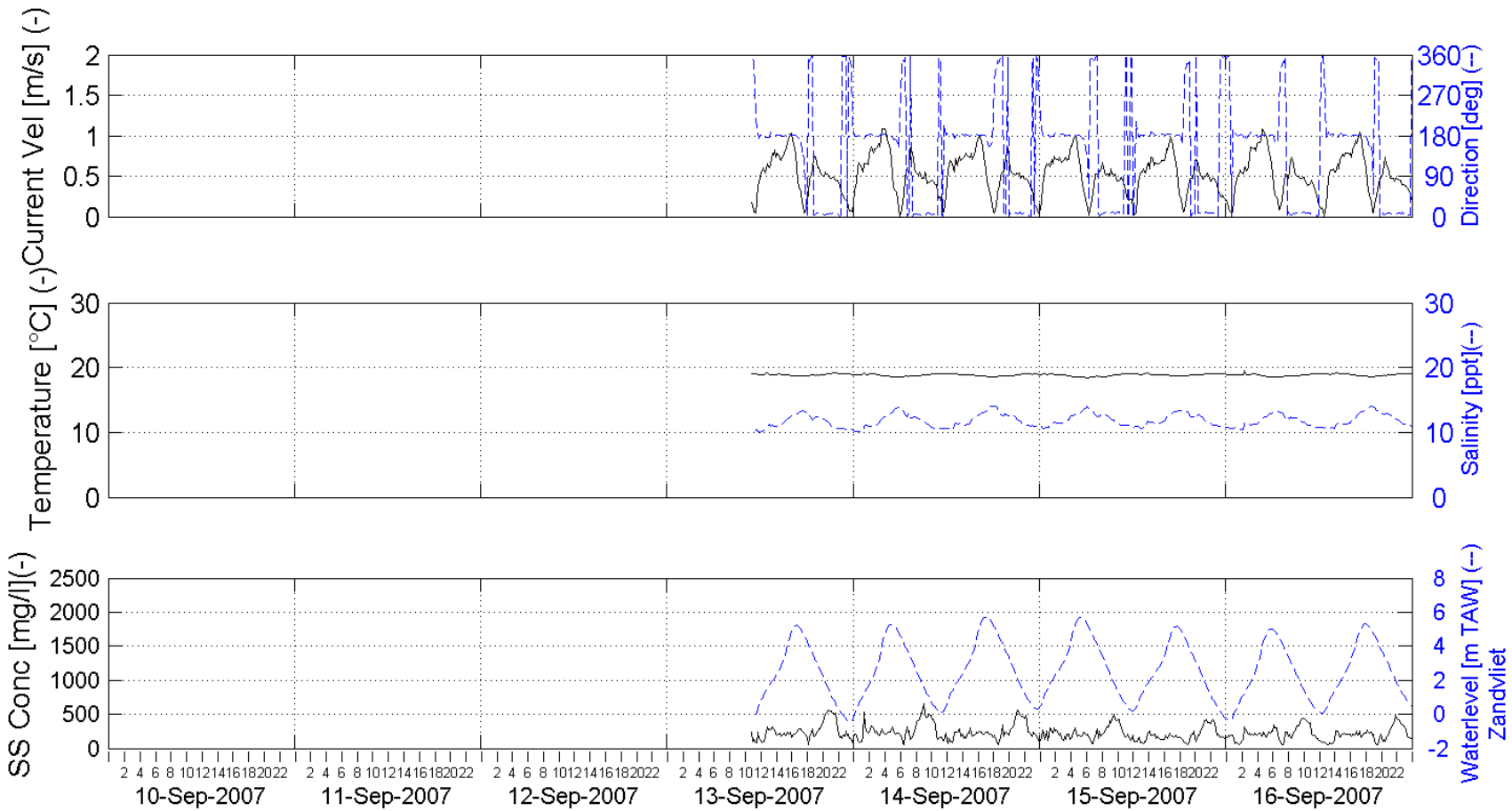
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 37 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

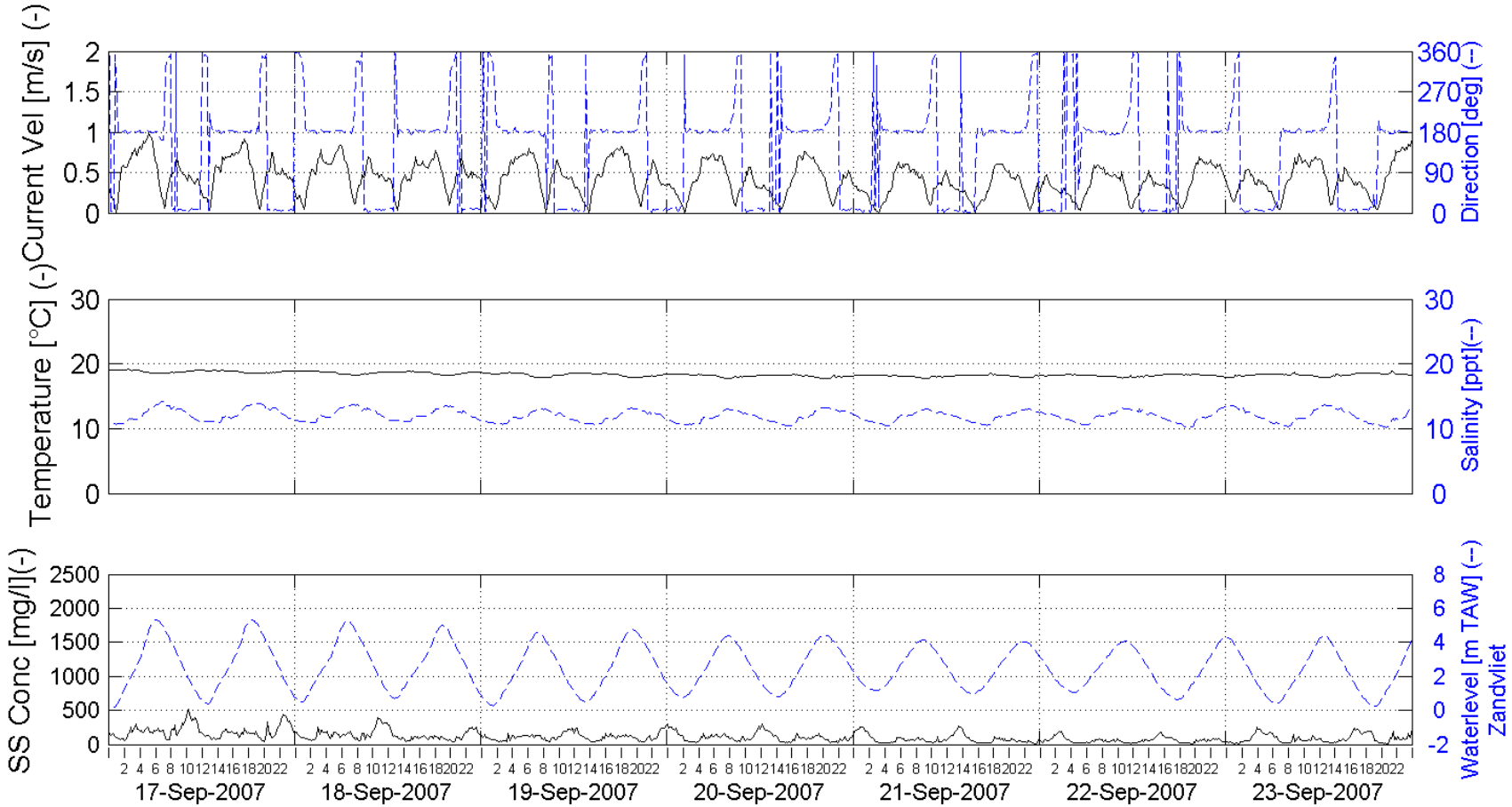
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 38 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

IMDC

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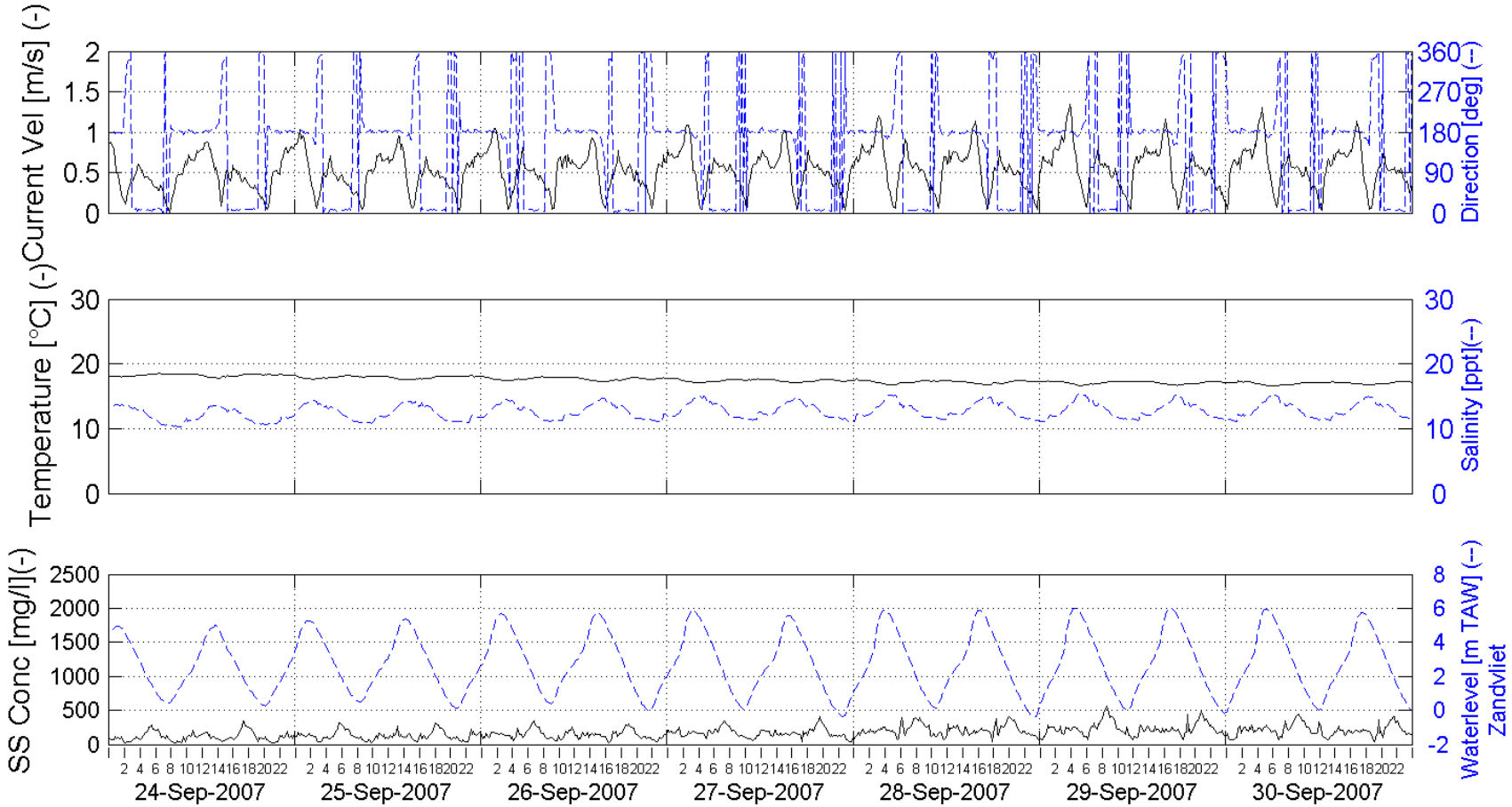
I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 39 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 top - 3.3m above bottom (-5.6m TAW)

Processed by:

IMDC

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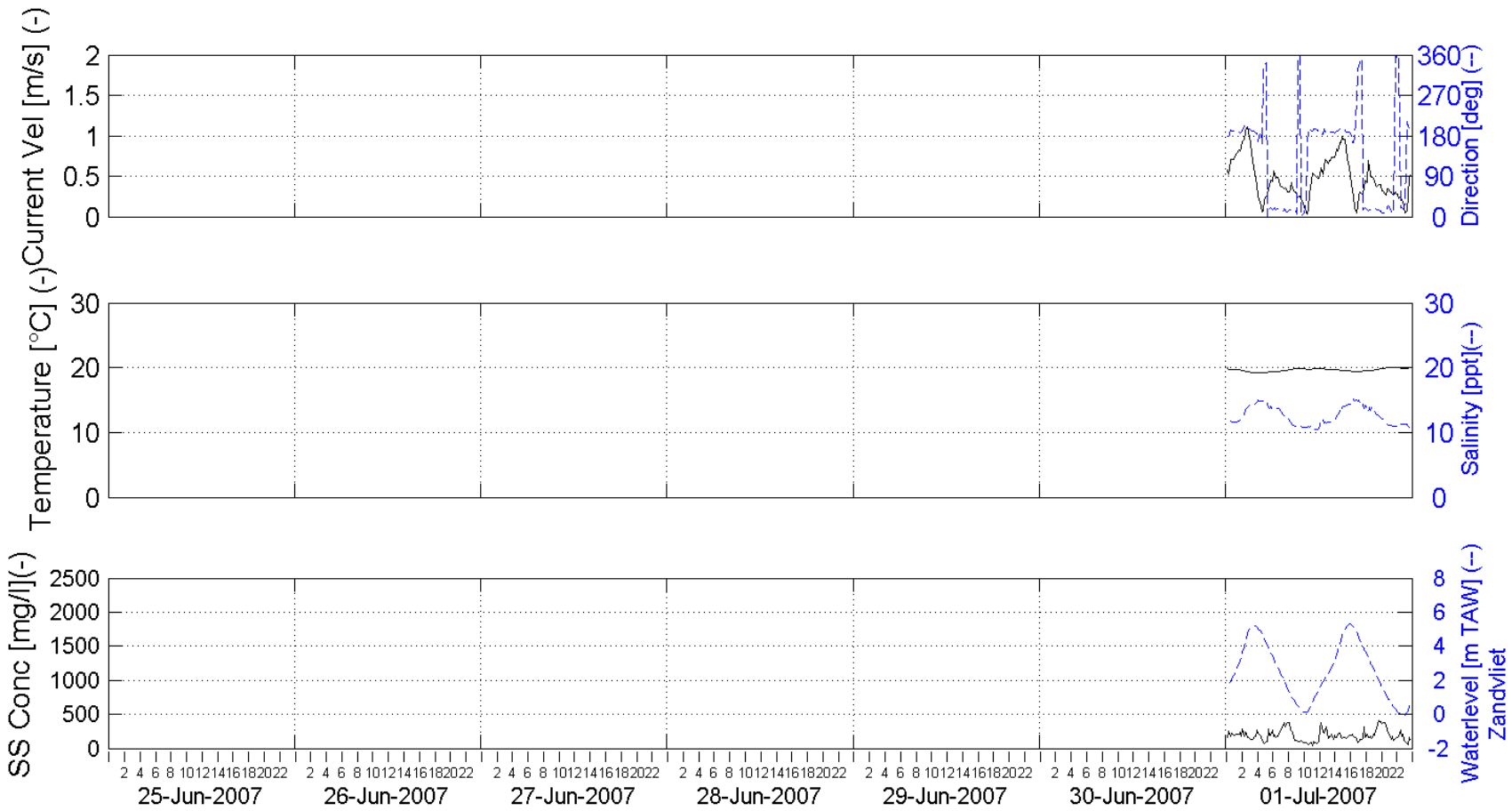
I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 26 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

IMDC

In Association with:

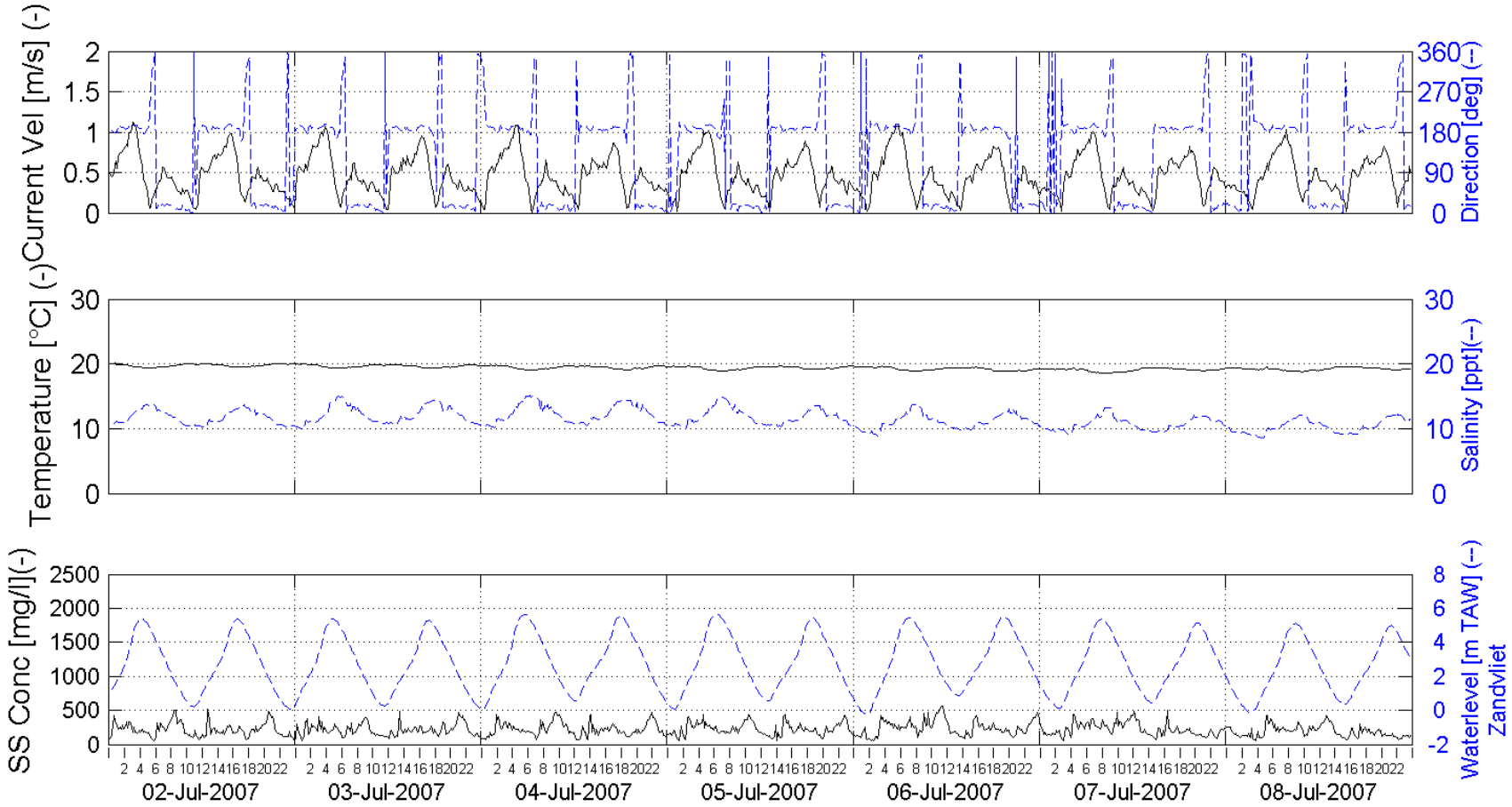
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 27 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

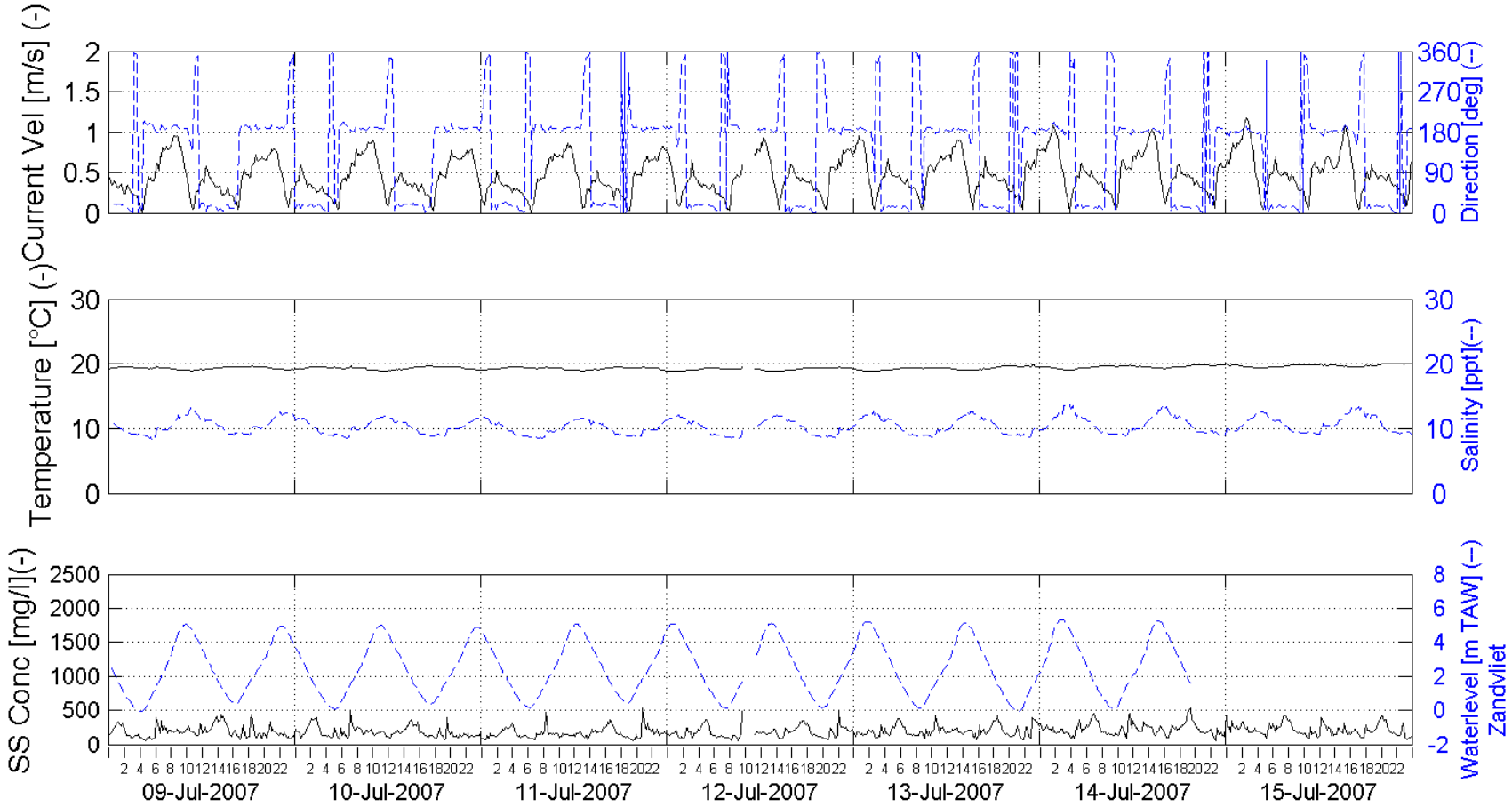
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 28 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

IMDC

In Association with:

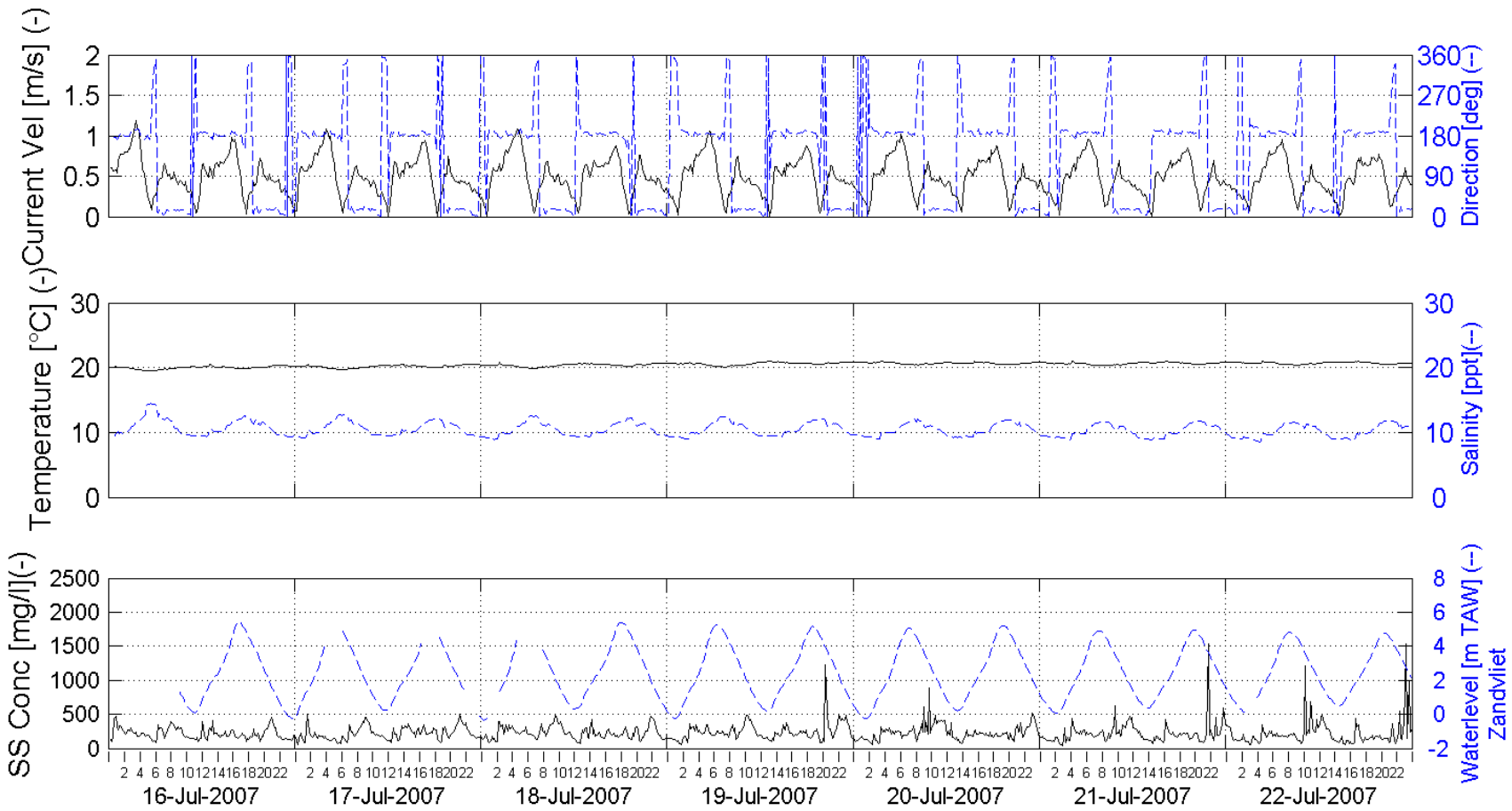
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 29 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

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Processed by:

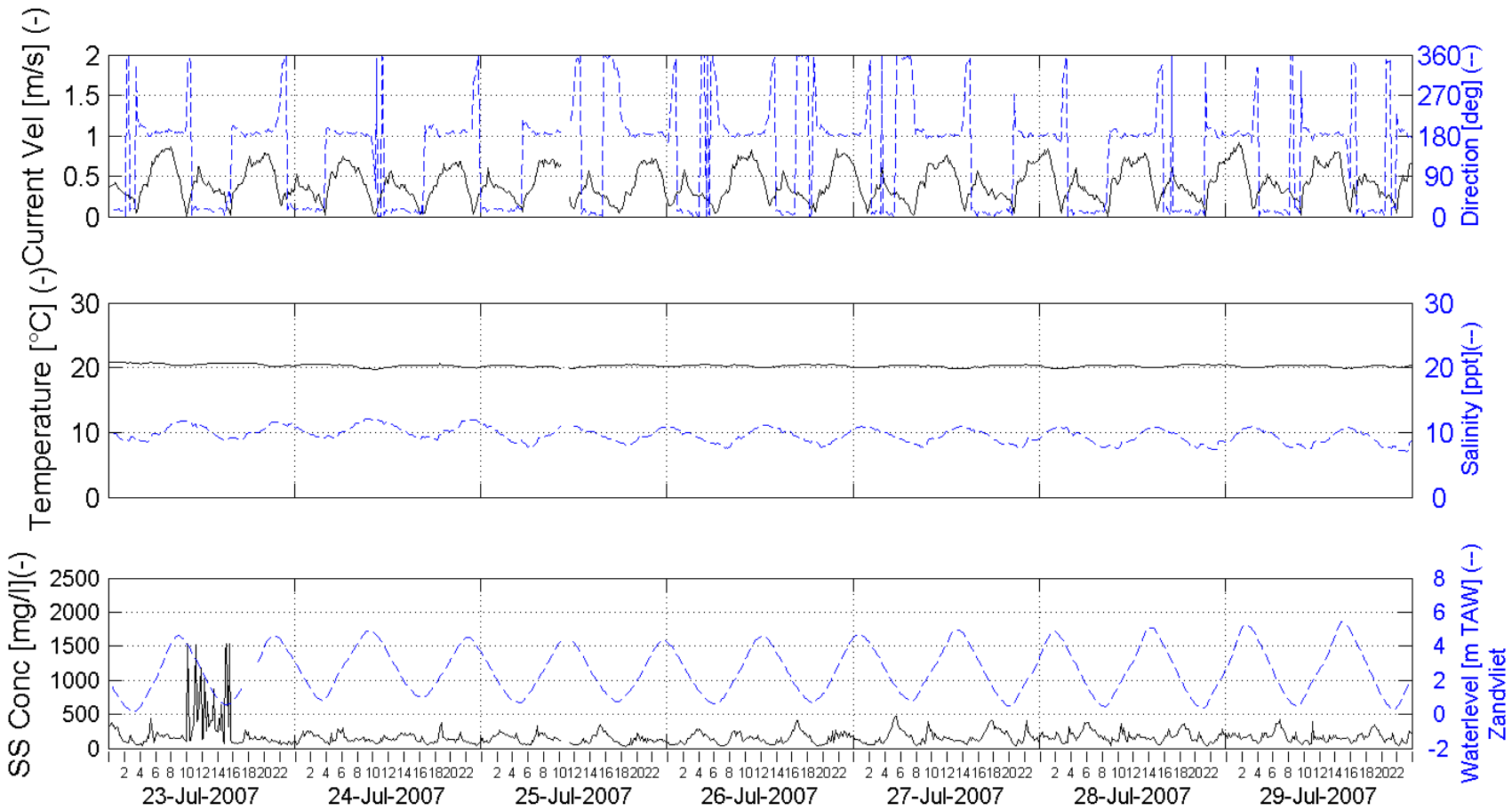
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 30 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

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IMDC

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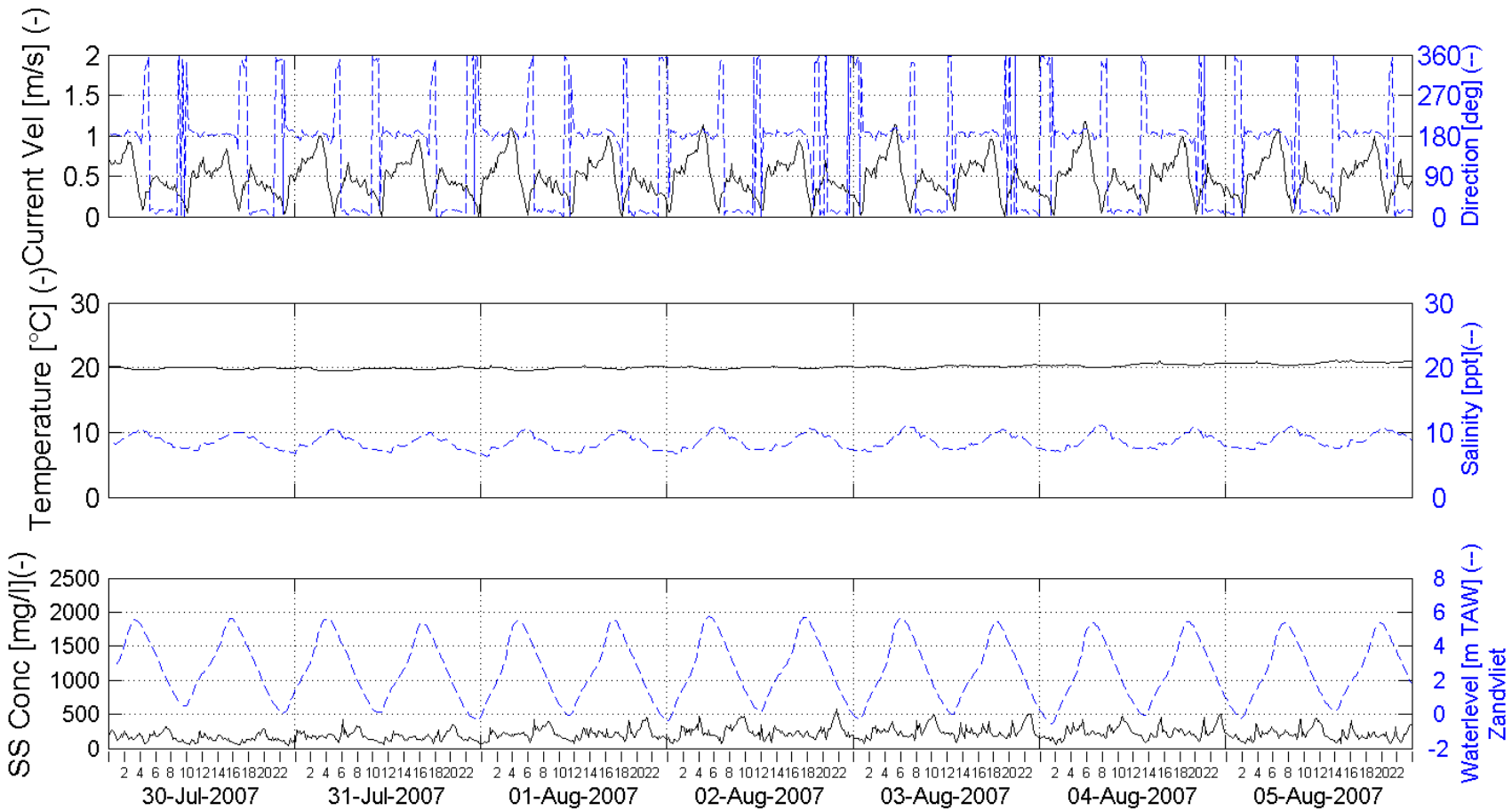
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 31 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

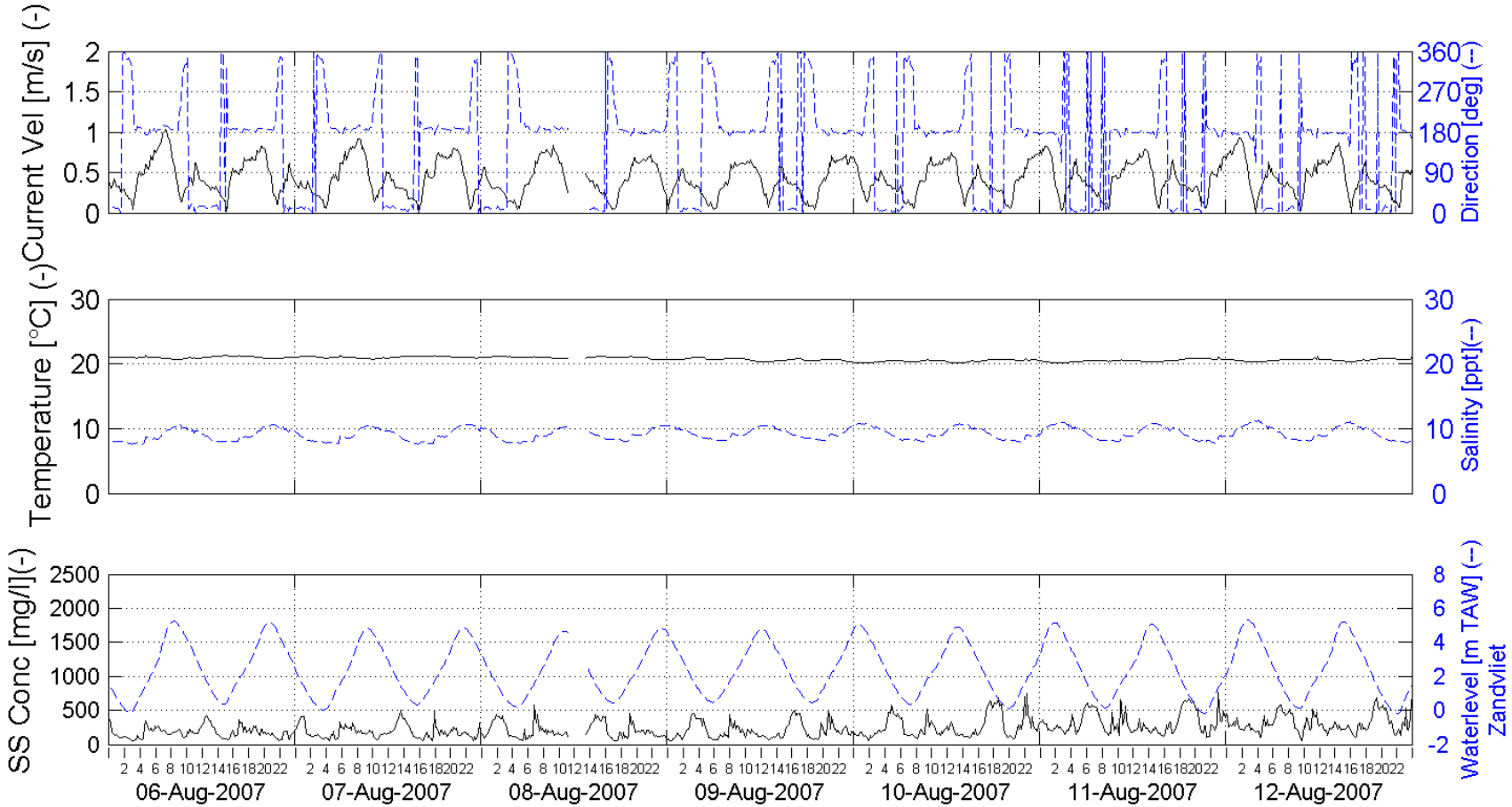
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 32 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

IMDC

In Association with:

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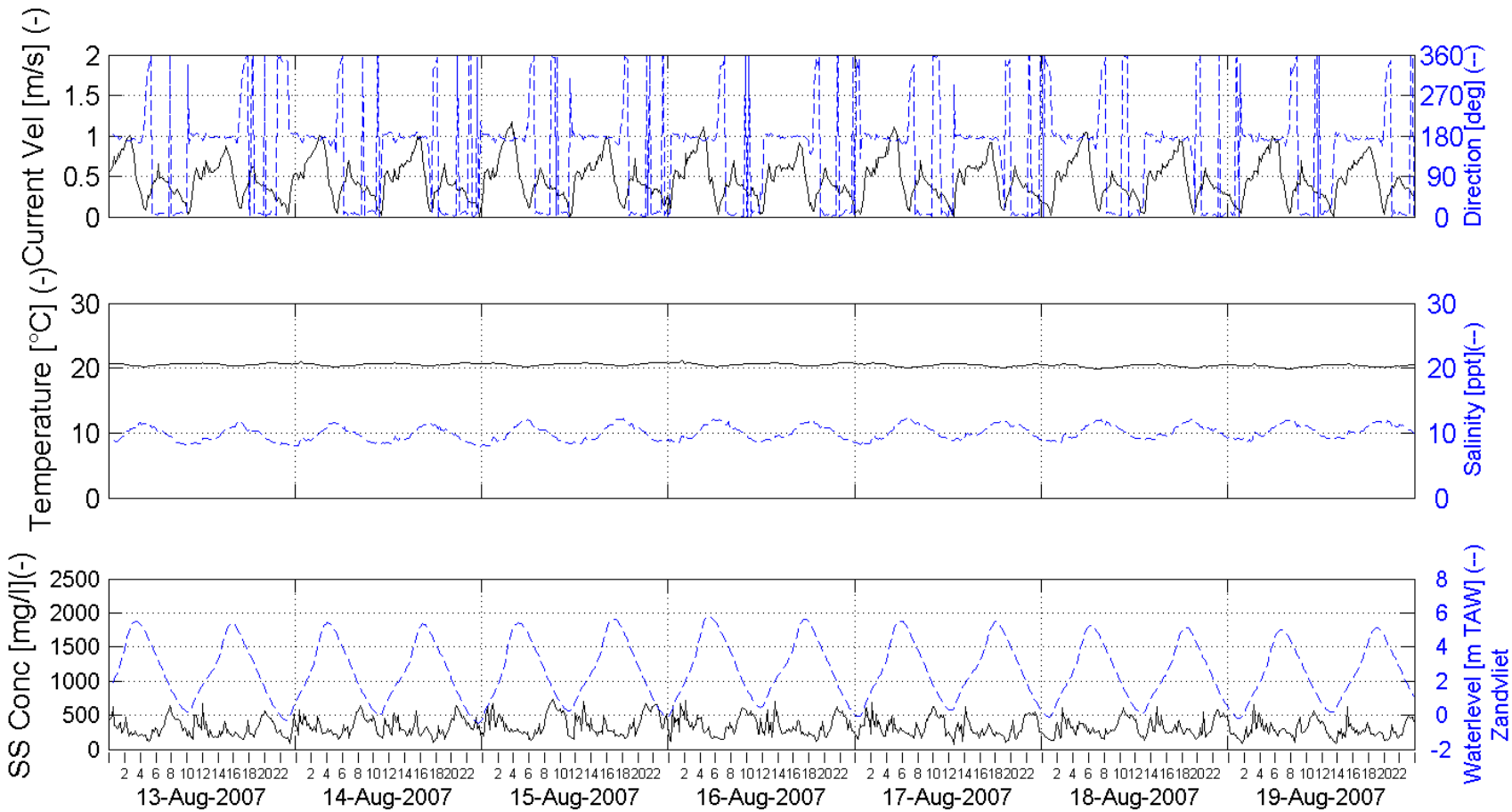
GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 33 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

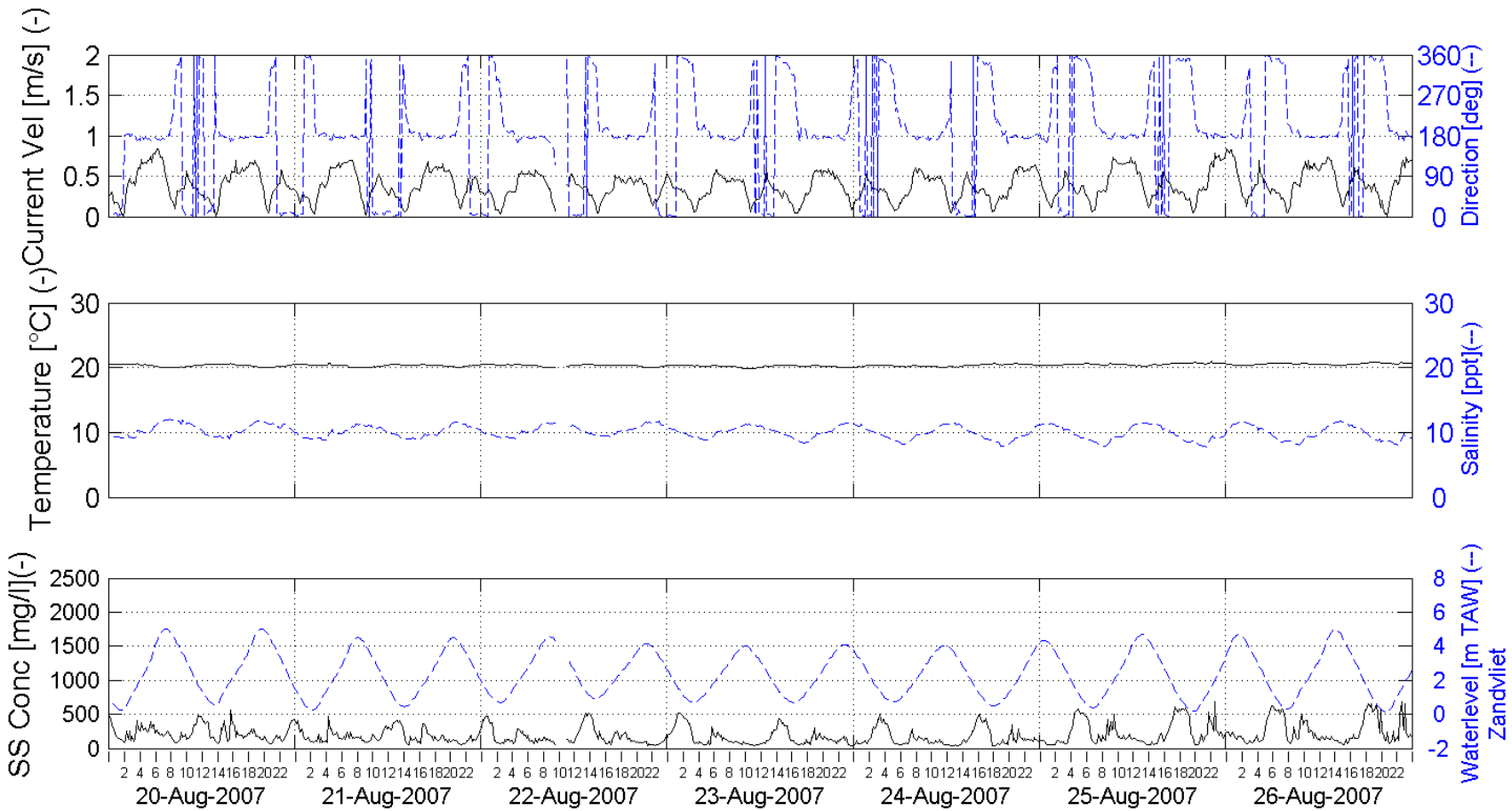
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 34 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

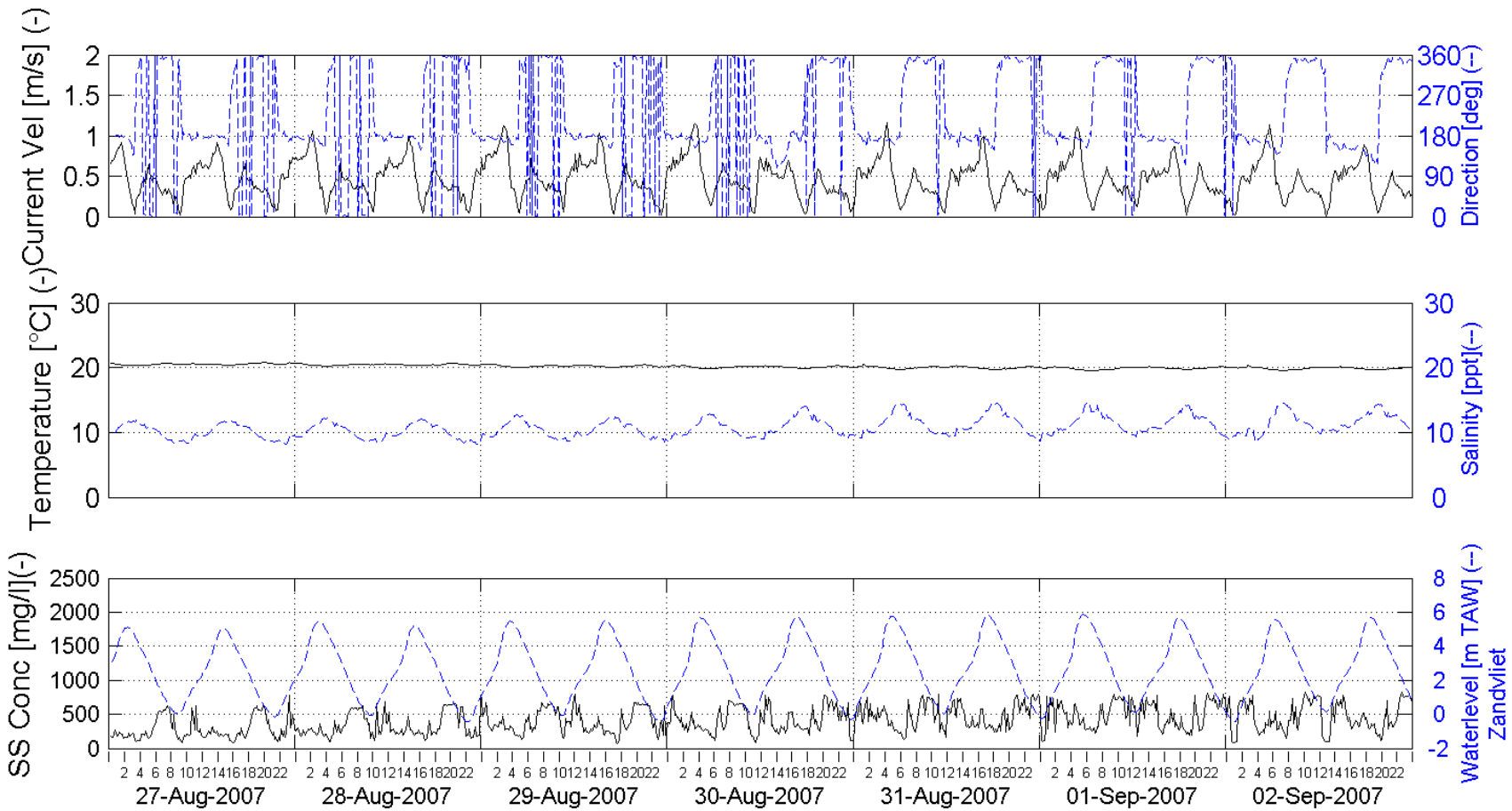
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 35 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

IMDC

In Association with:

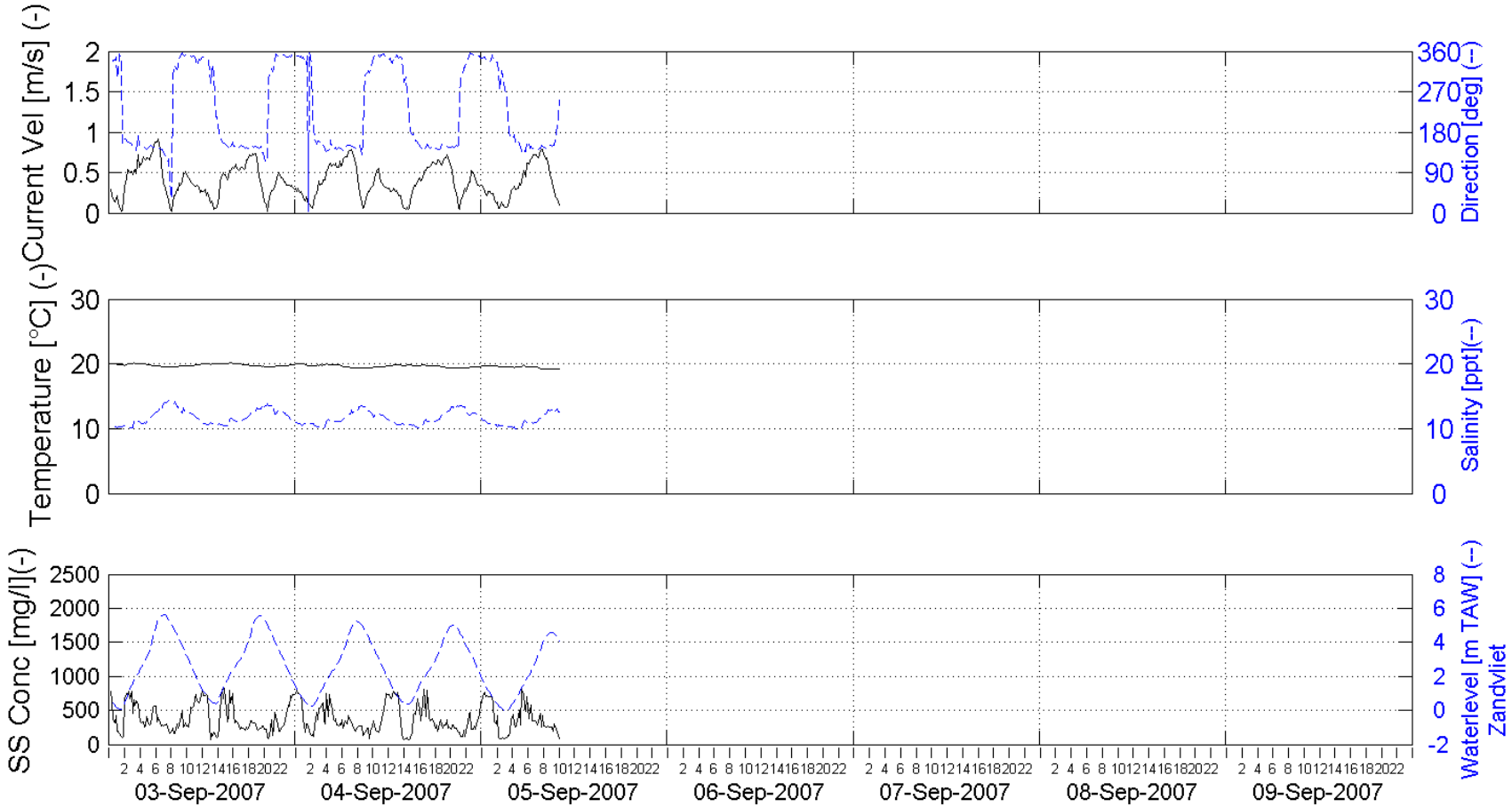
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 36 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

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IMDC

In Association with:

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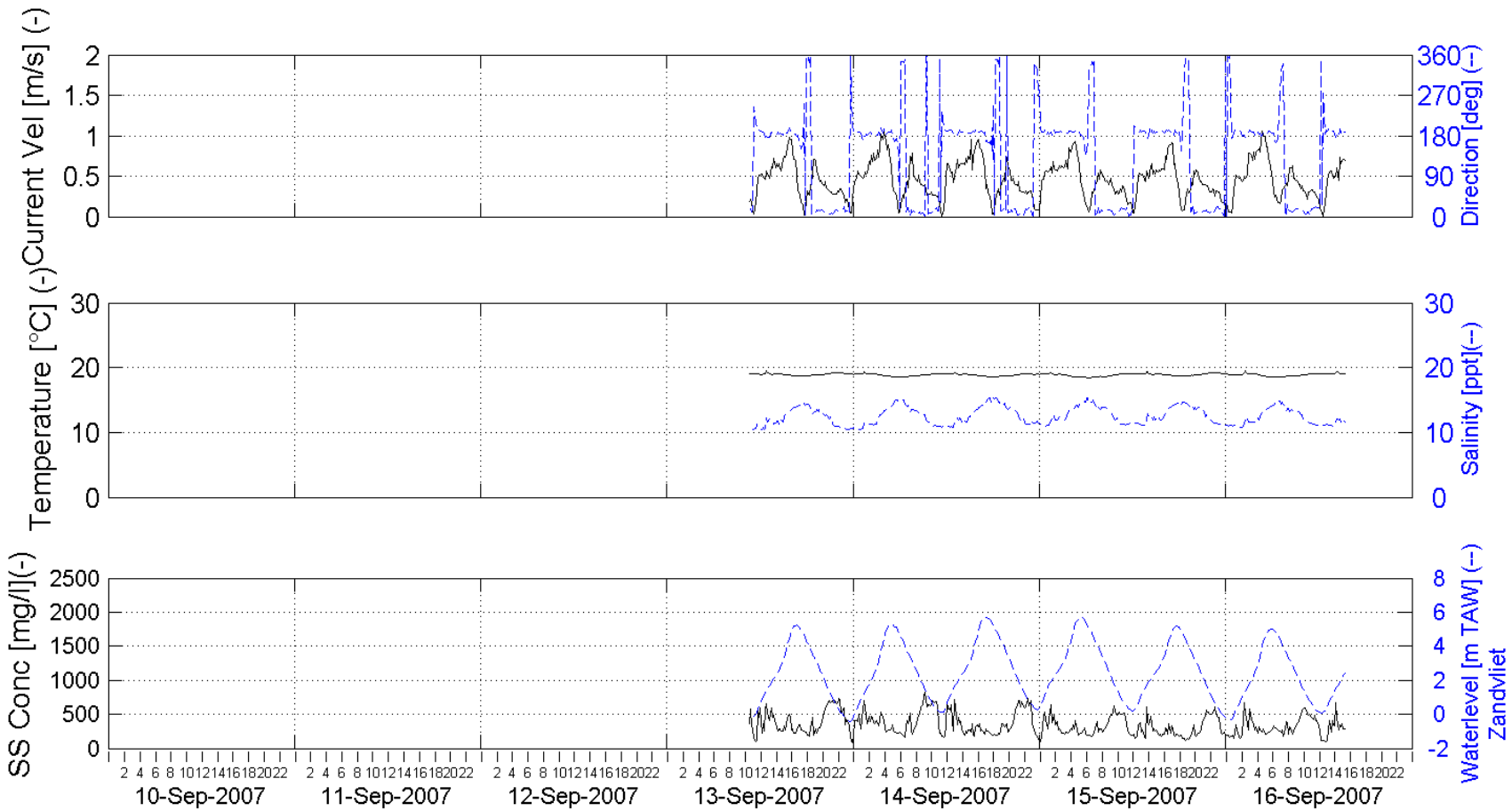
GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 37 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 84 bottom - 0.8m above bottom (-8.1m TAW)

Processed by:

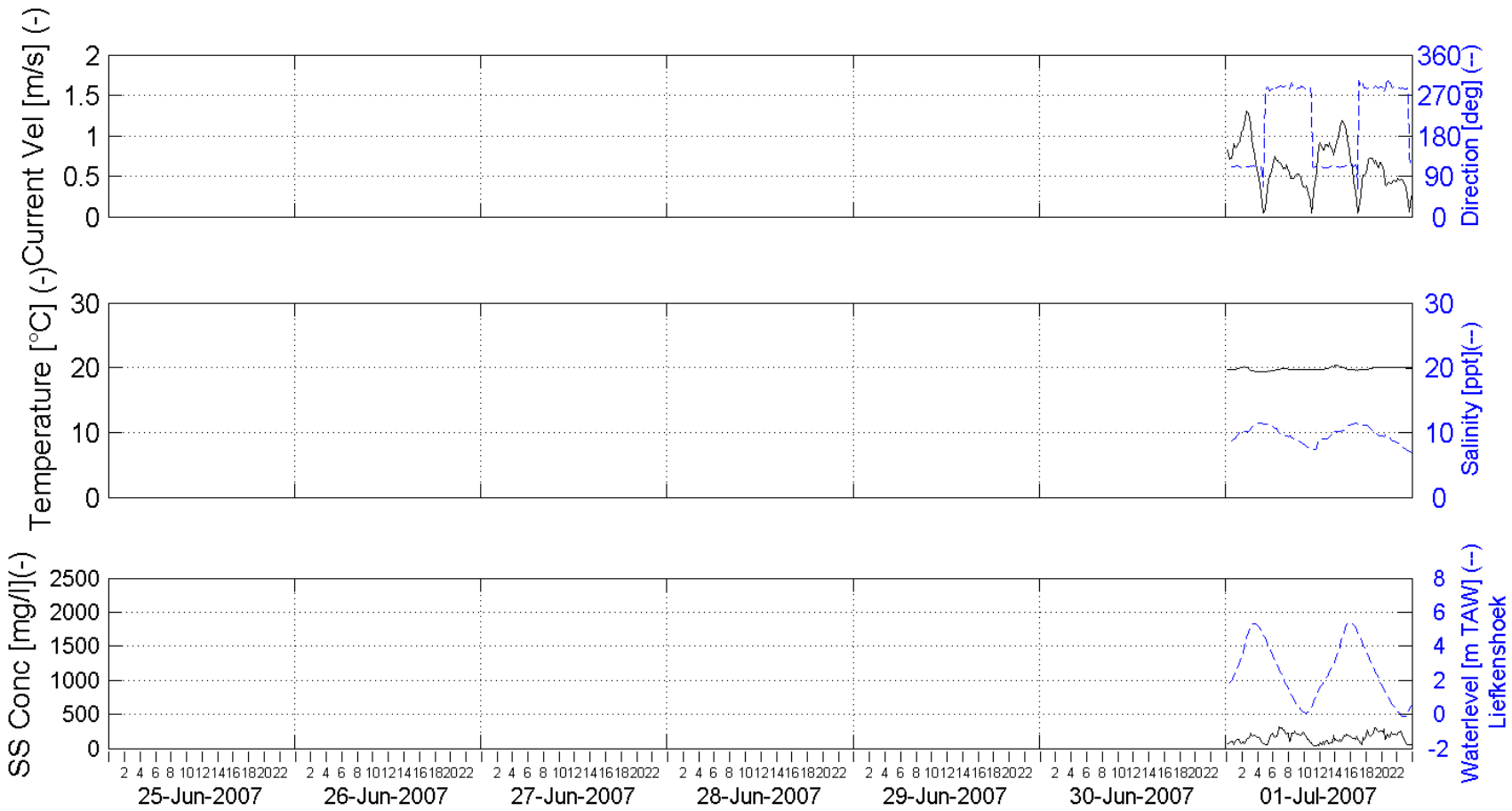
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 26 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 top - 3.3m above bottom (-5.3m TAW)

Processed by:

IMDC

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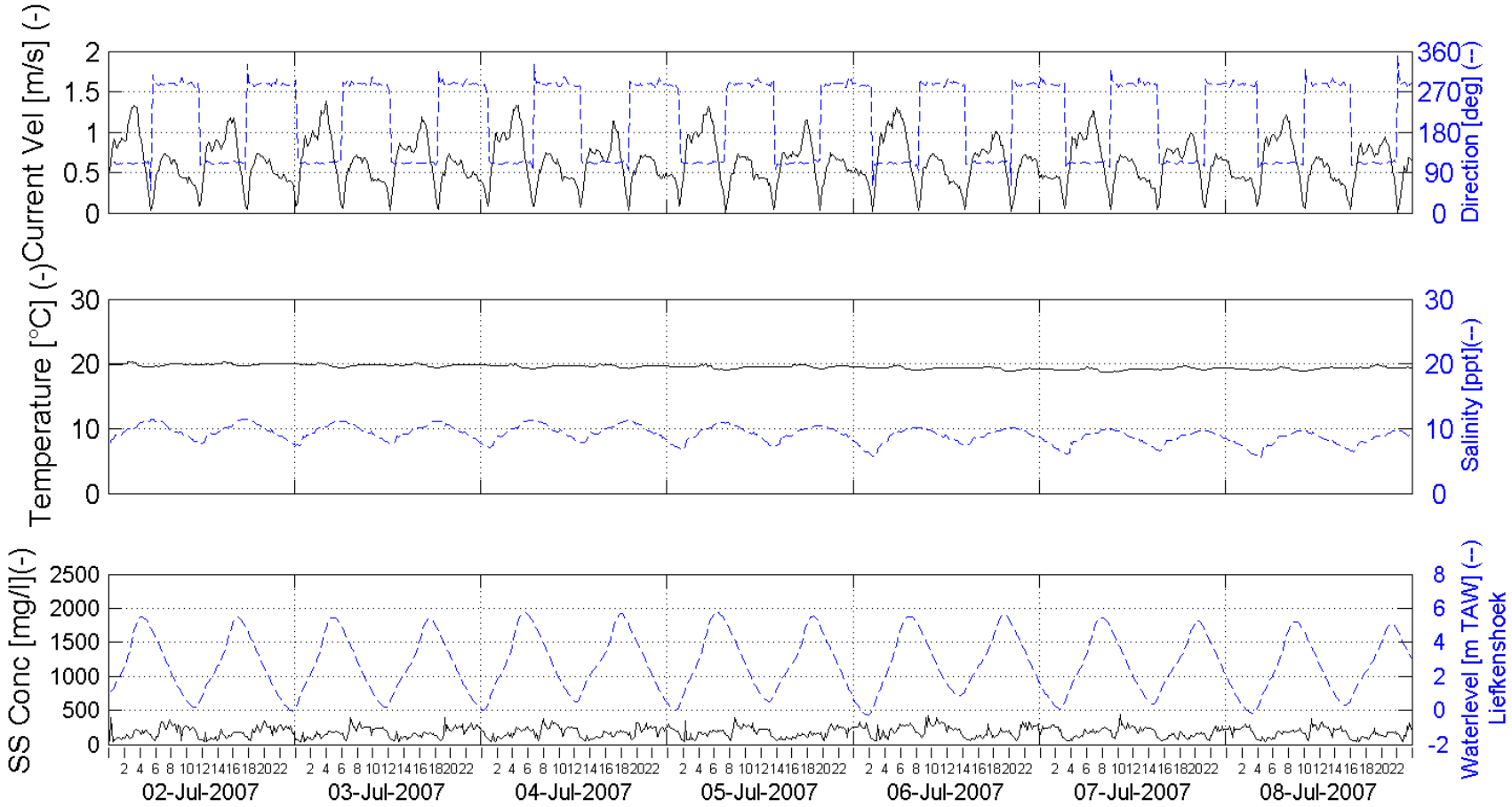
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 27 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 top - 3.3m above bottom (-5.3m TAW)

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IMDC

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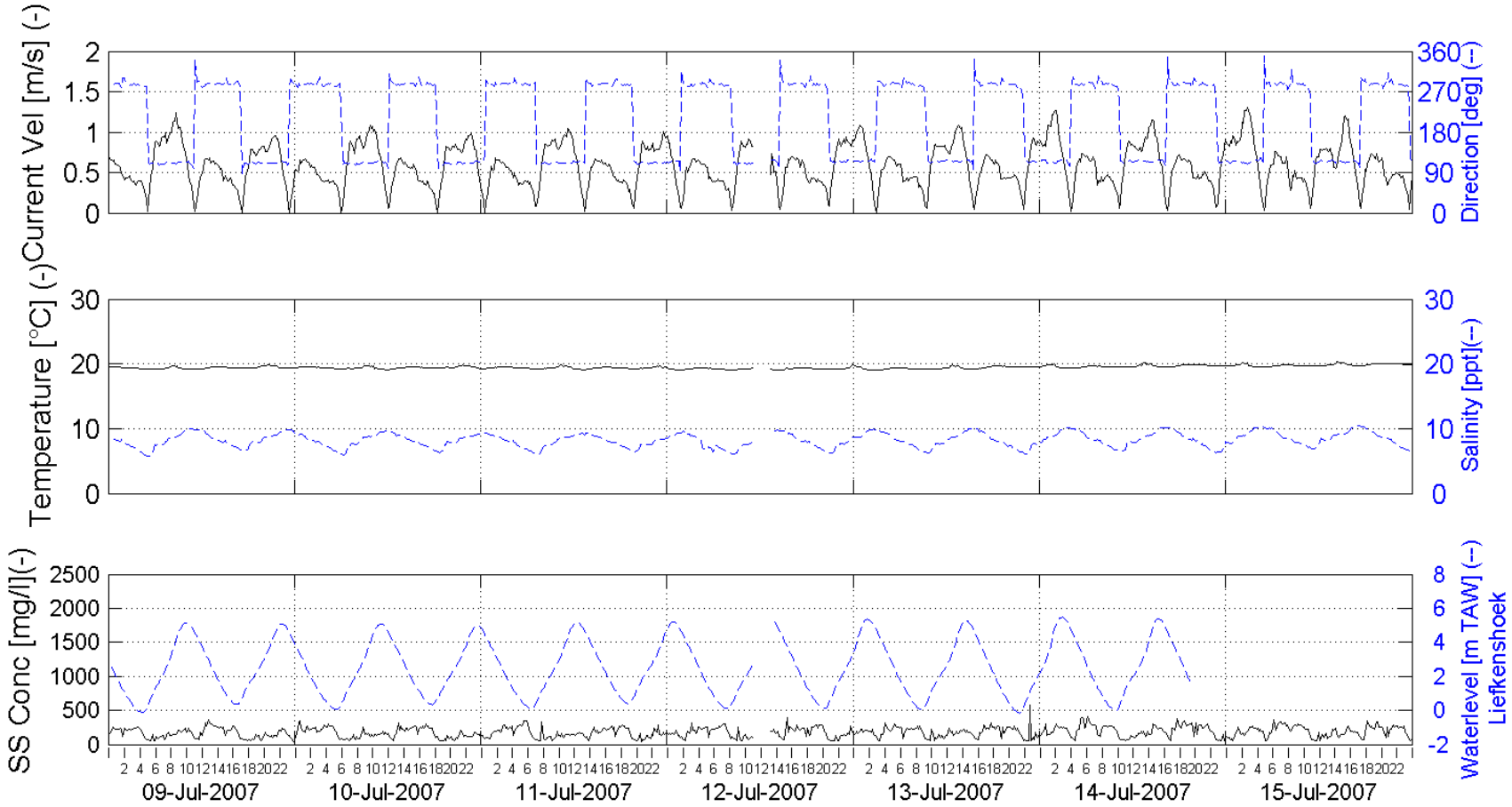
GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 28 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Buoy 97 top - 3.3m above bottom (-5.3m TAW)

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IMDC

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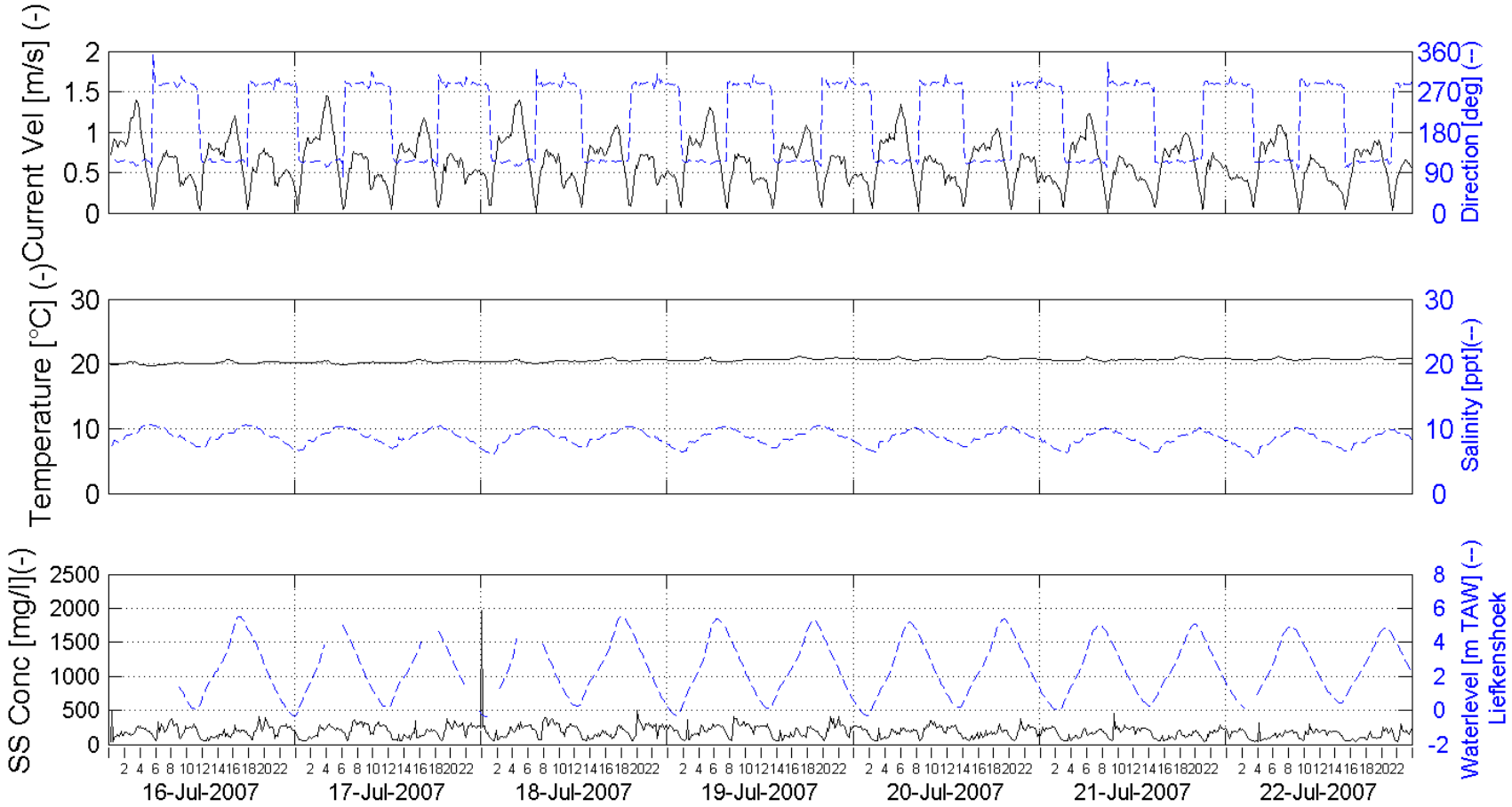
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 29 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Buoy 97 top - 3.3m above bottom (-5.3m TAW)

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In Association with:

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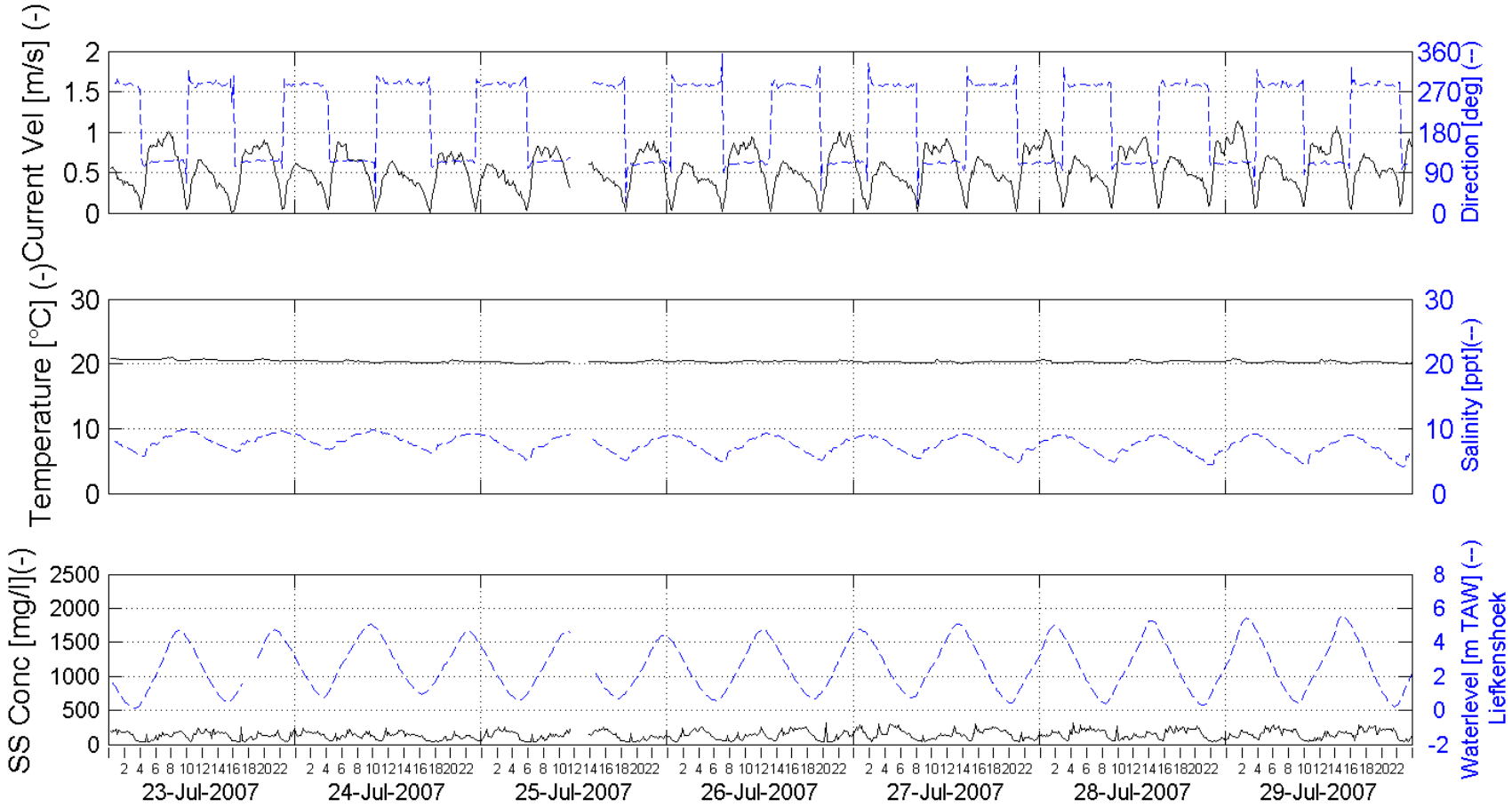
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 30 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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IMDC

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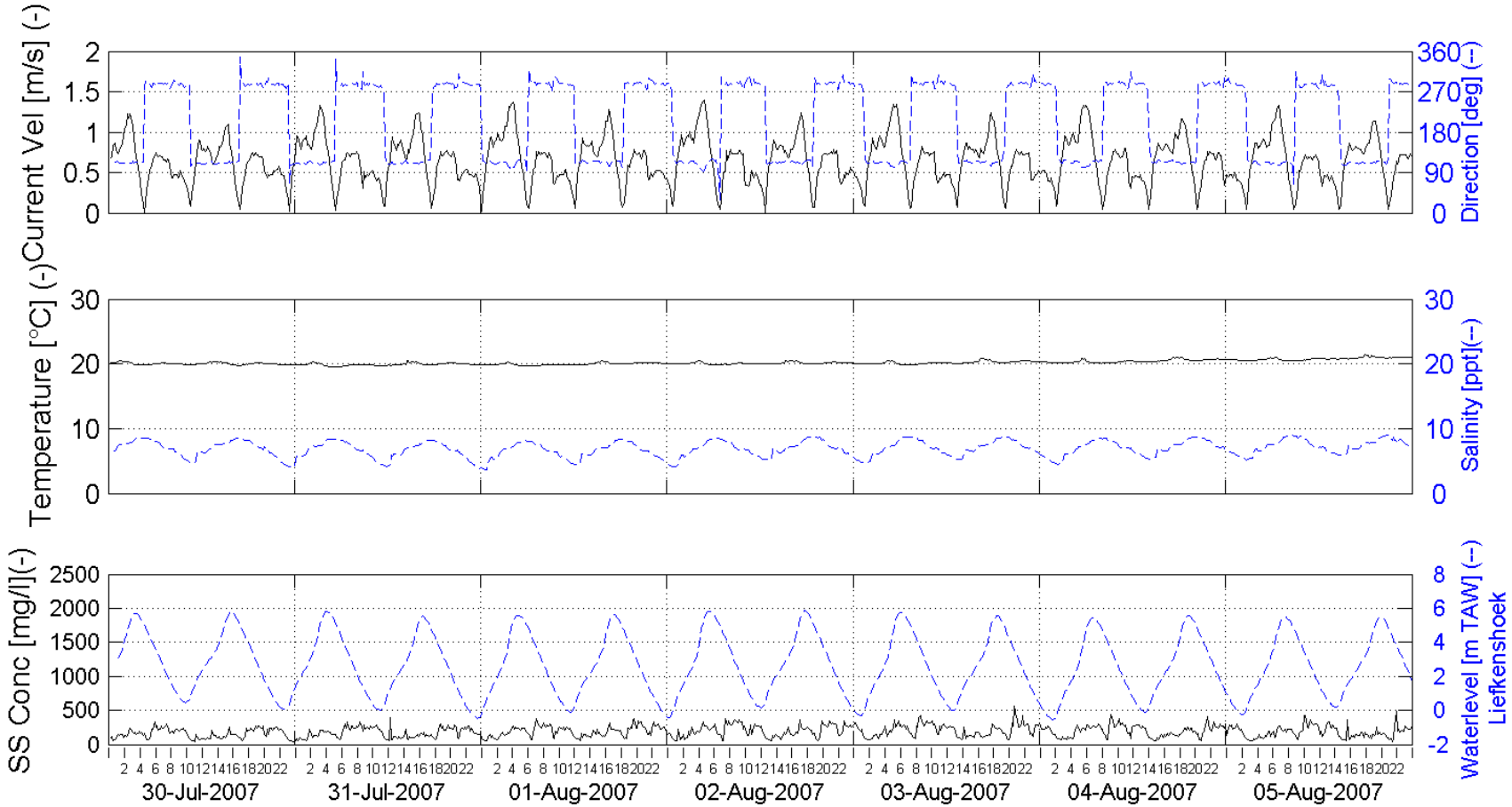
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 31 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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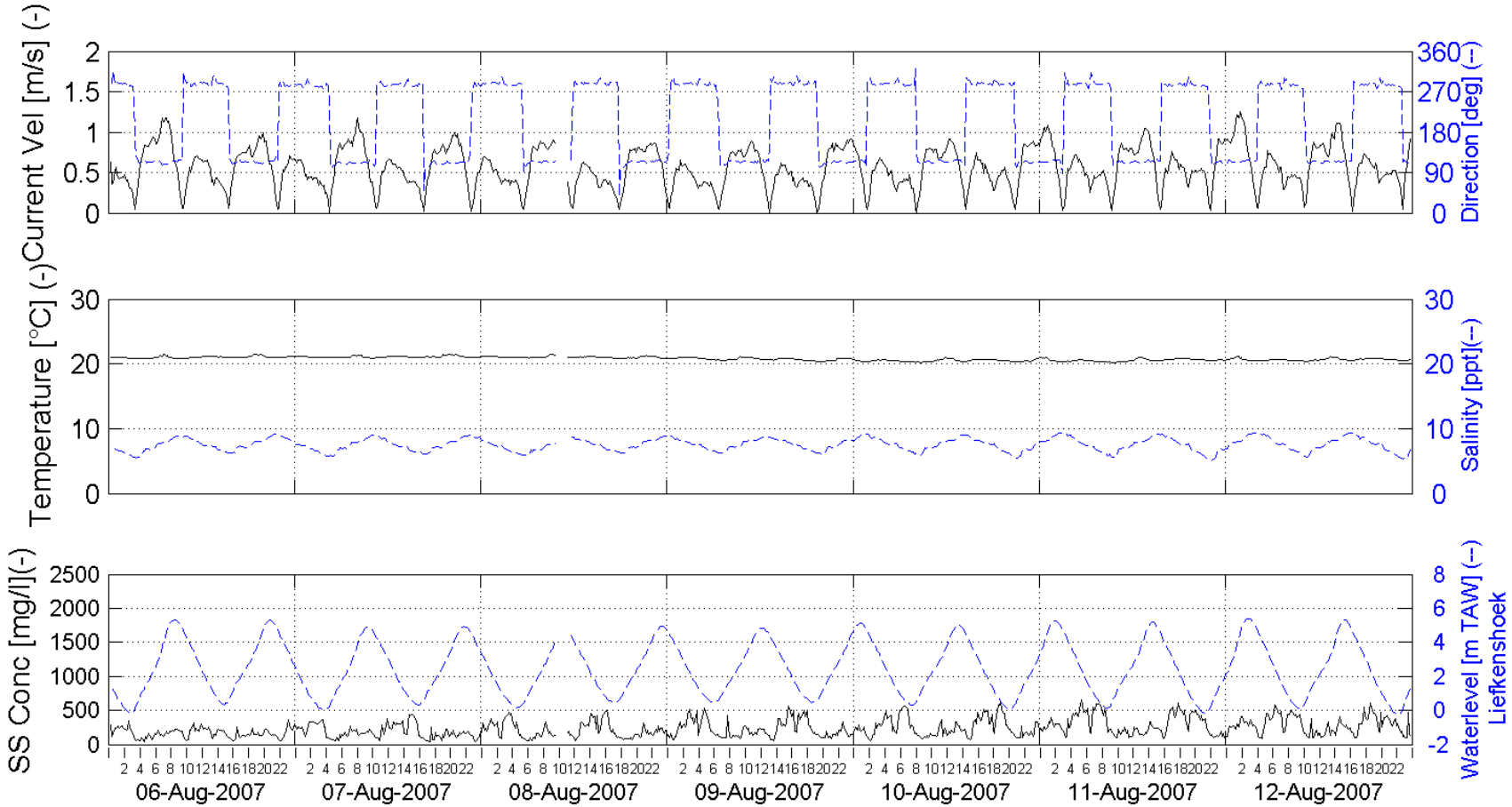
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 32 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Buoy 97 top - 3.3m above bottom (-5.3m TAW)

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IMDC

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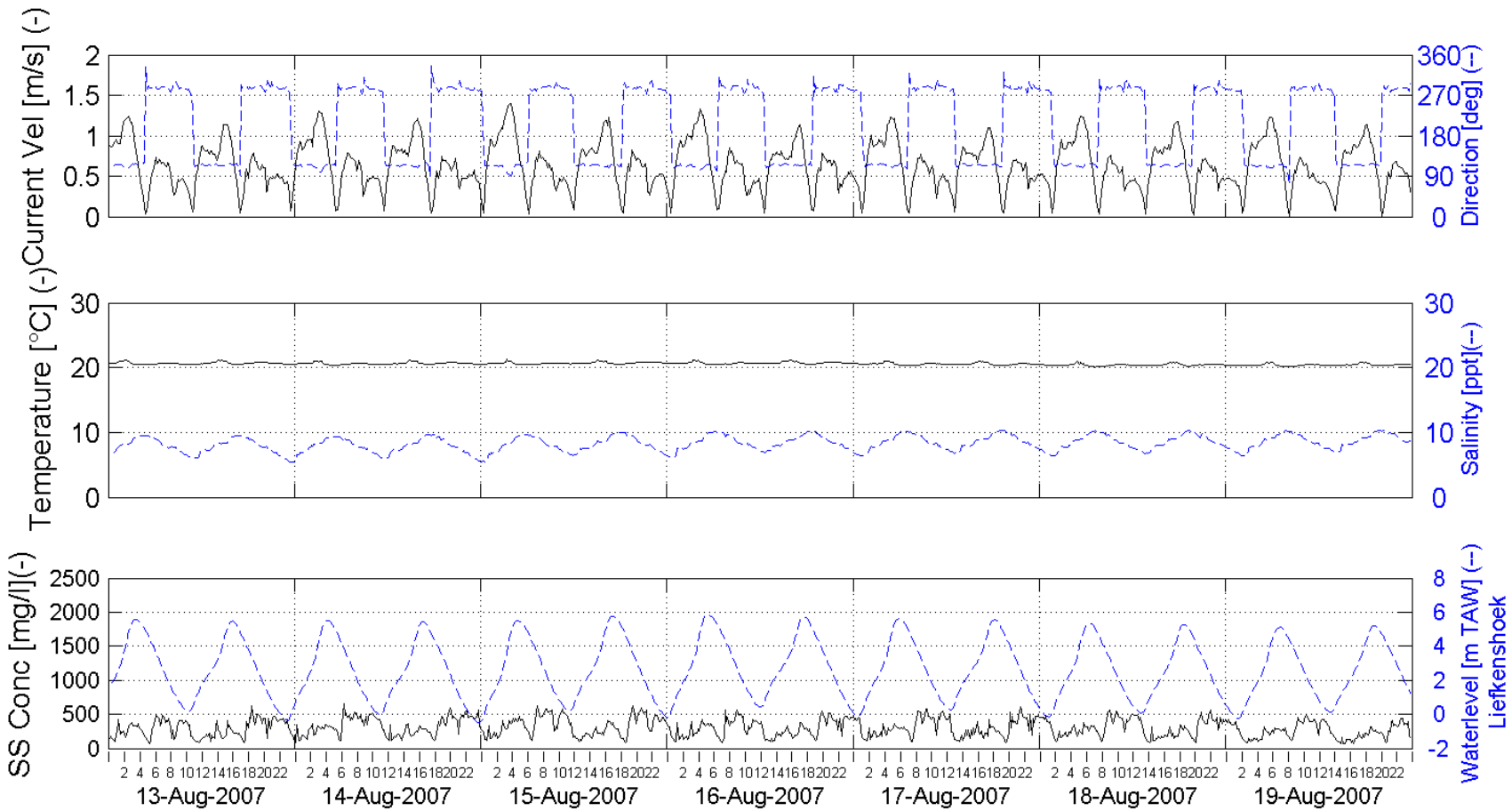
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 33 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Processed by:

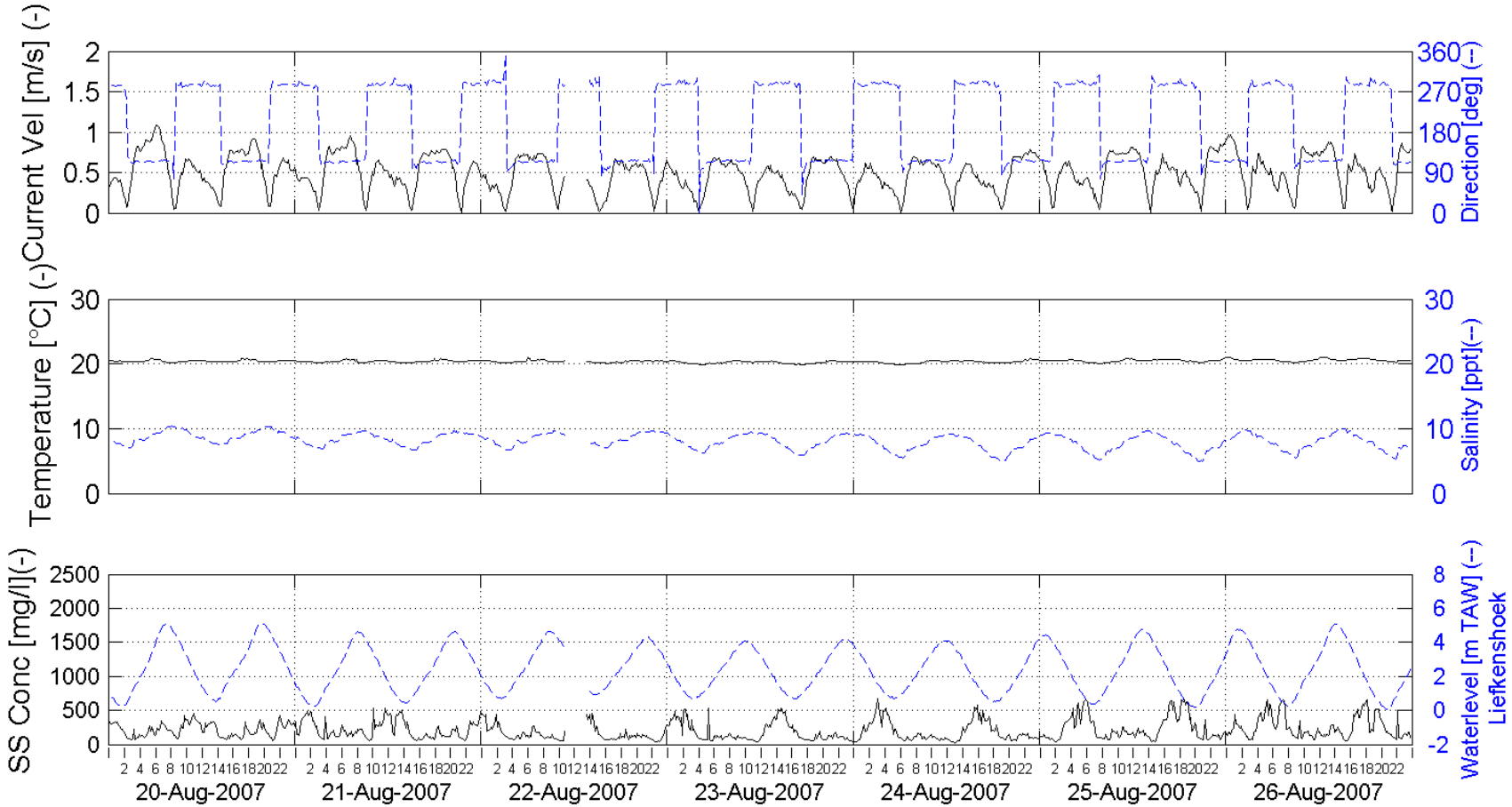
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 34 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Processed by:

IMDC

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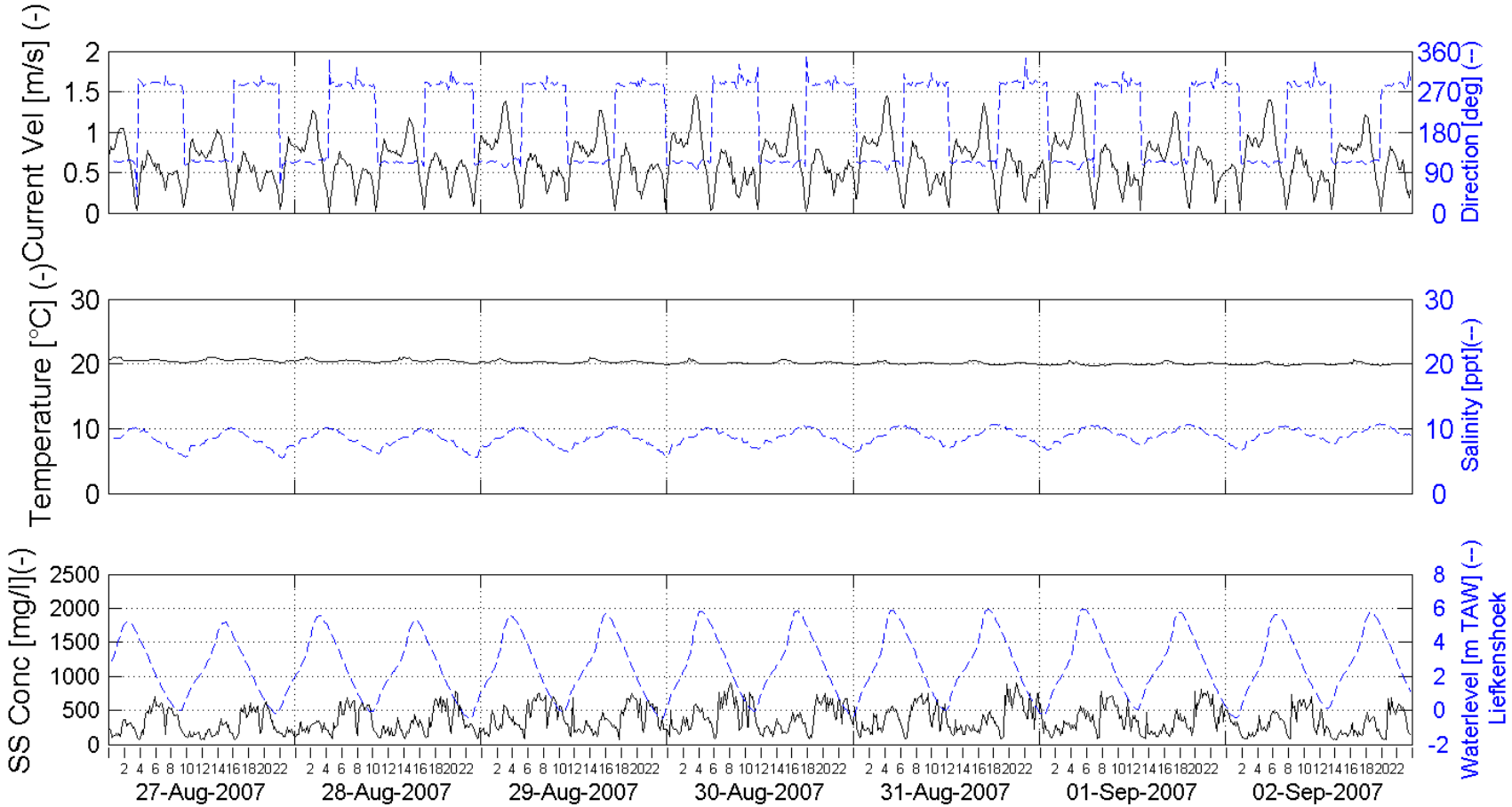
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 35 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

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Processed by:

IMDC

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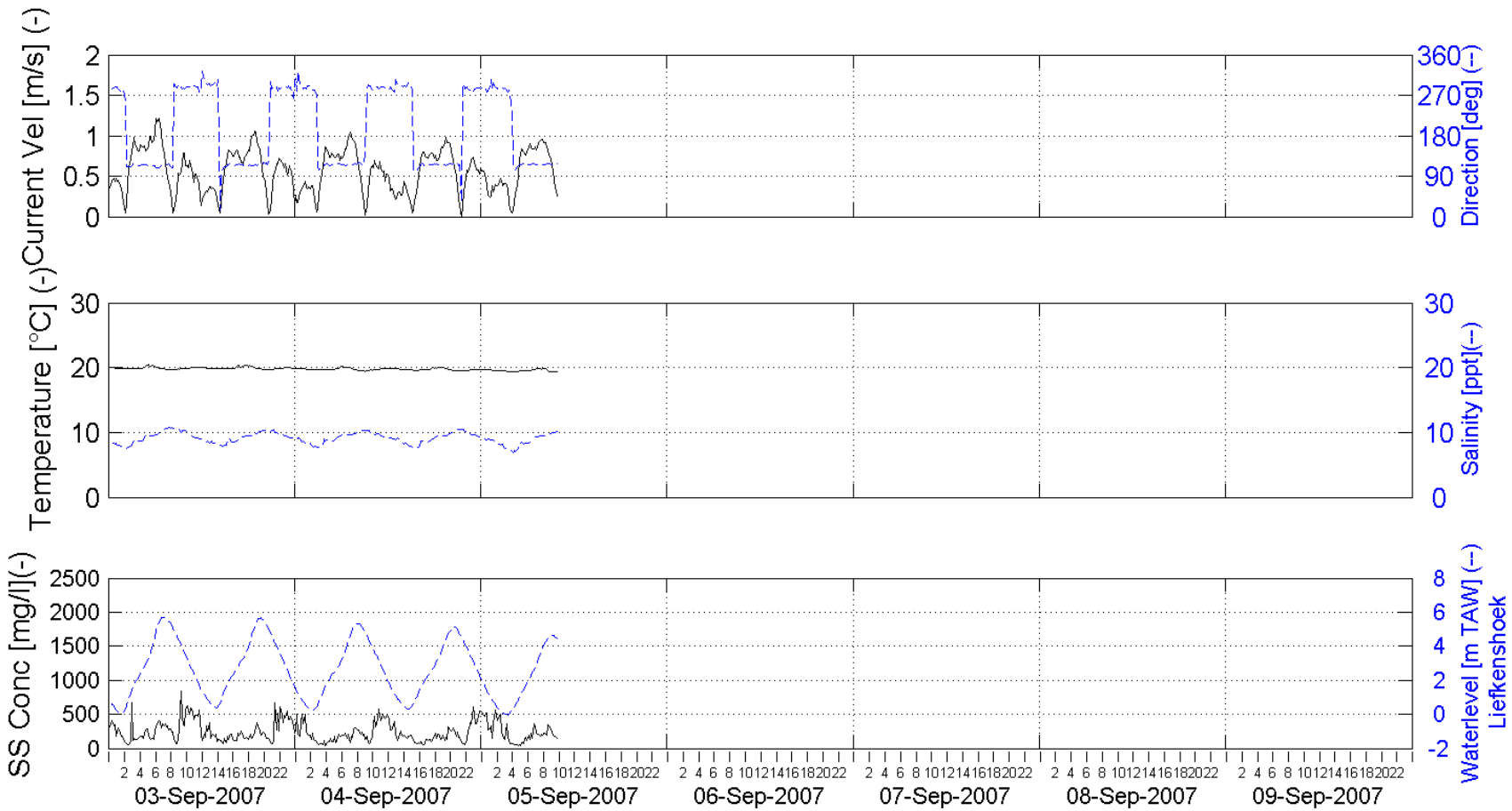
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 36 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 top - 3.3m above bottom (-5.3m TAW)

Processed by:

IMDC

In Association with:

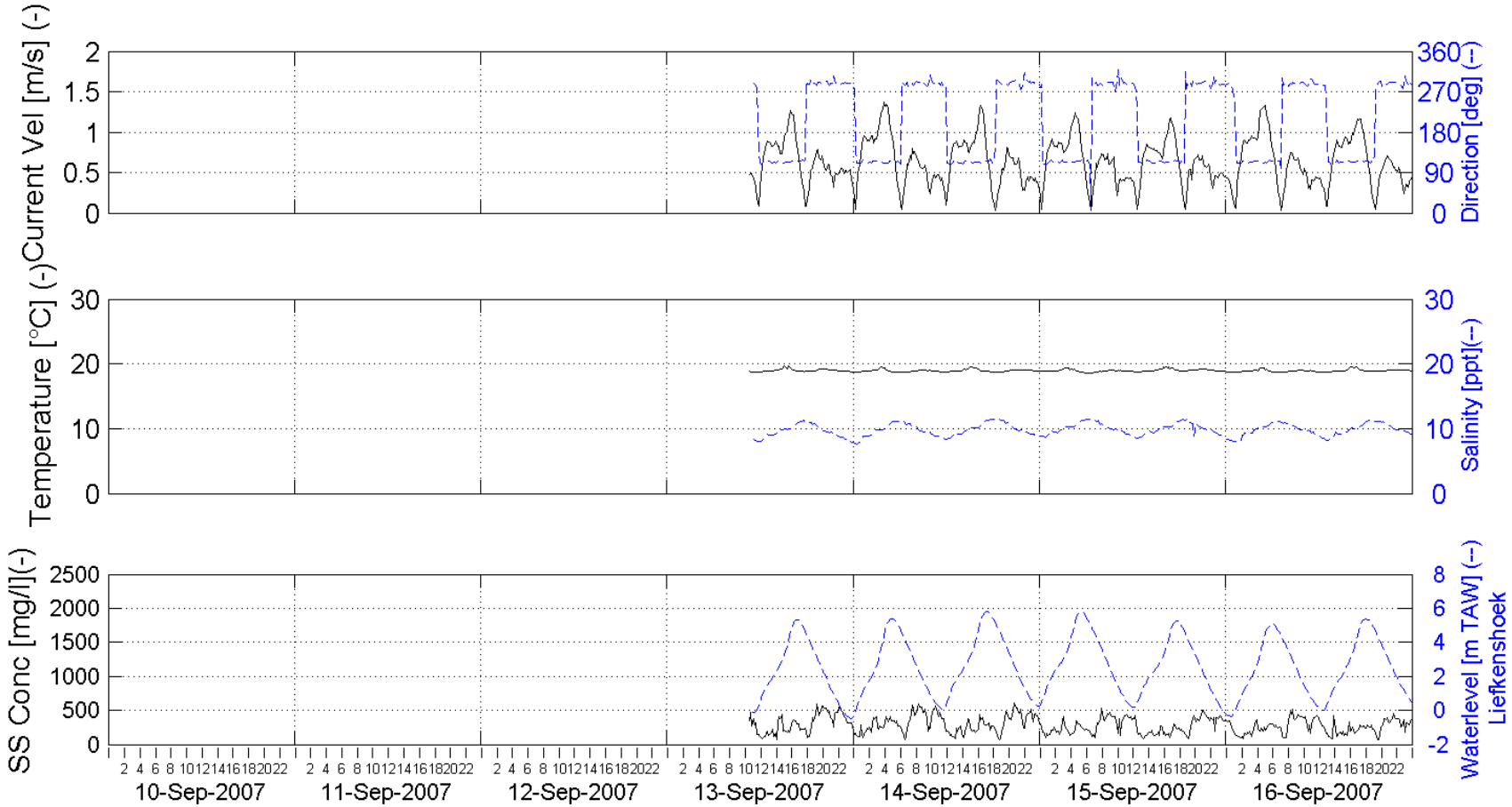
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 37 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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Processed by:

In Association with:

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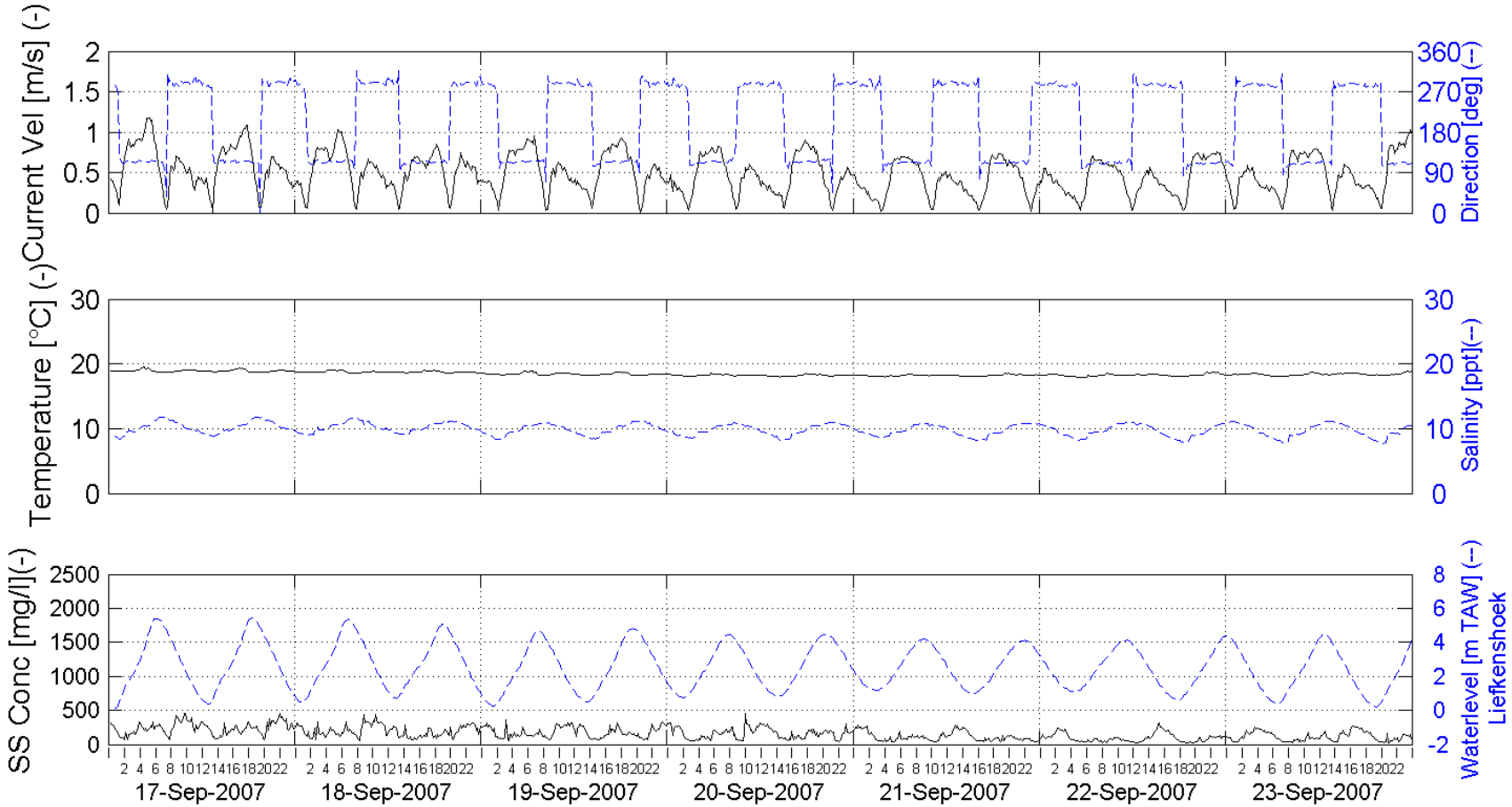
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 38 - 2007



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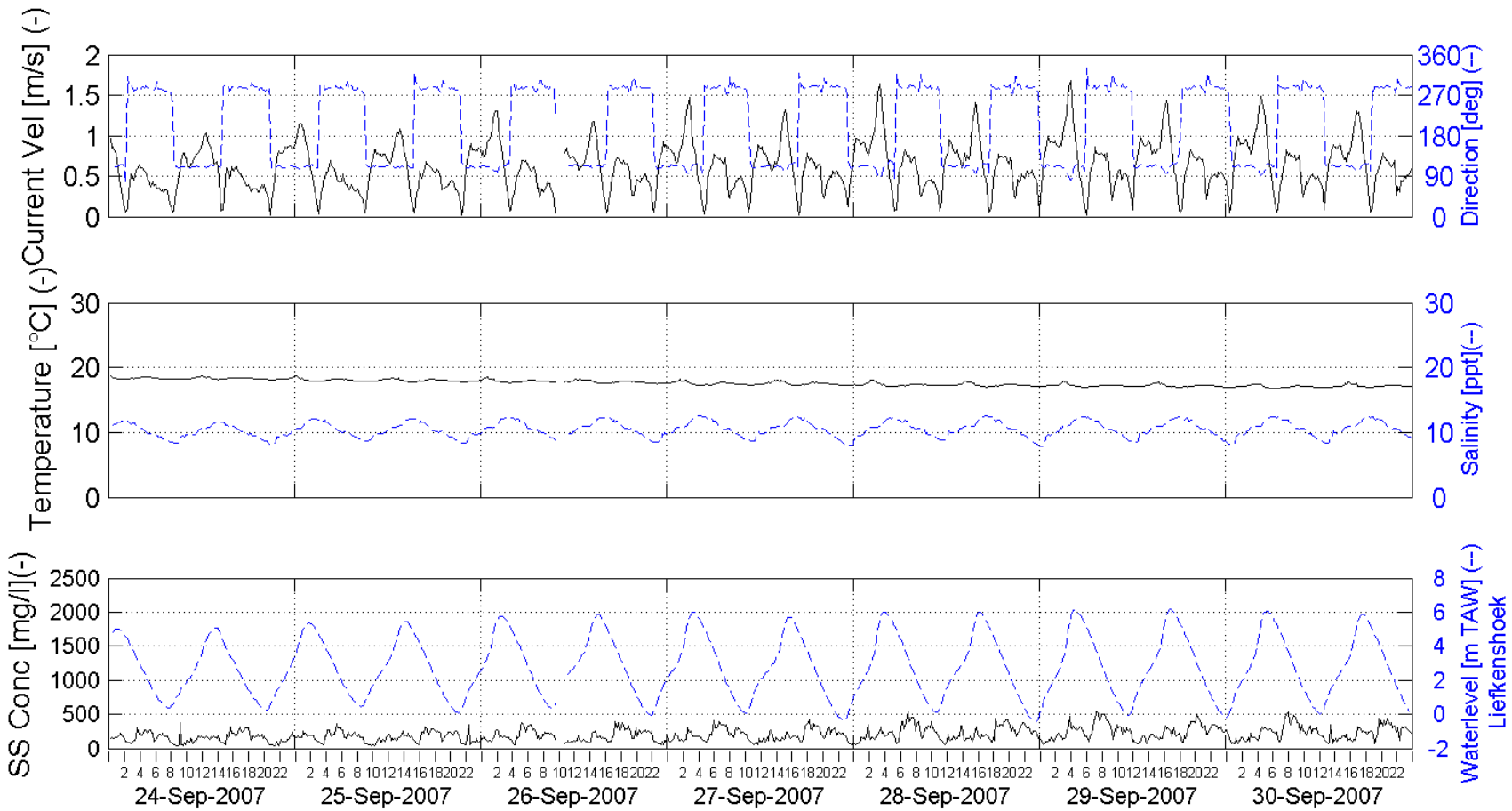
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 39 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 top - 3.3m above bottom (-5.3m TAW)

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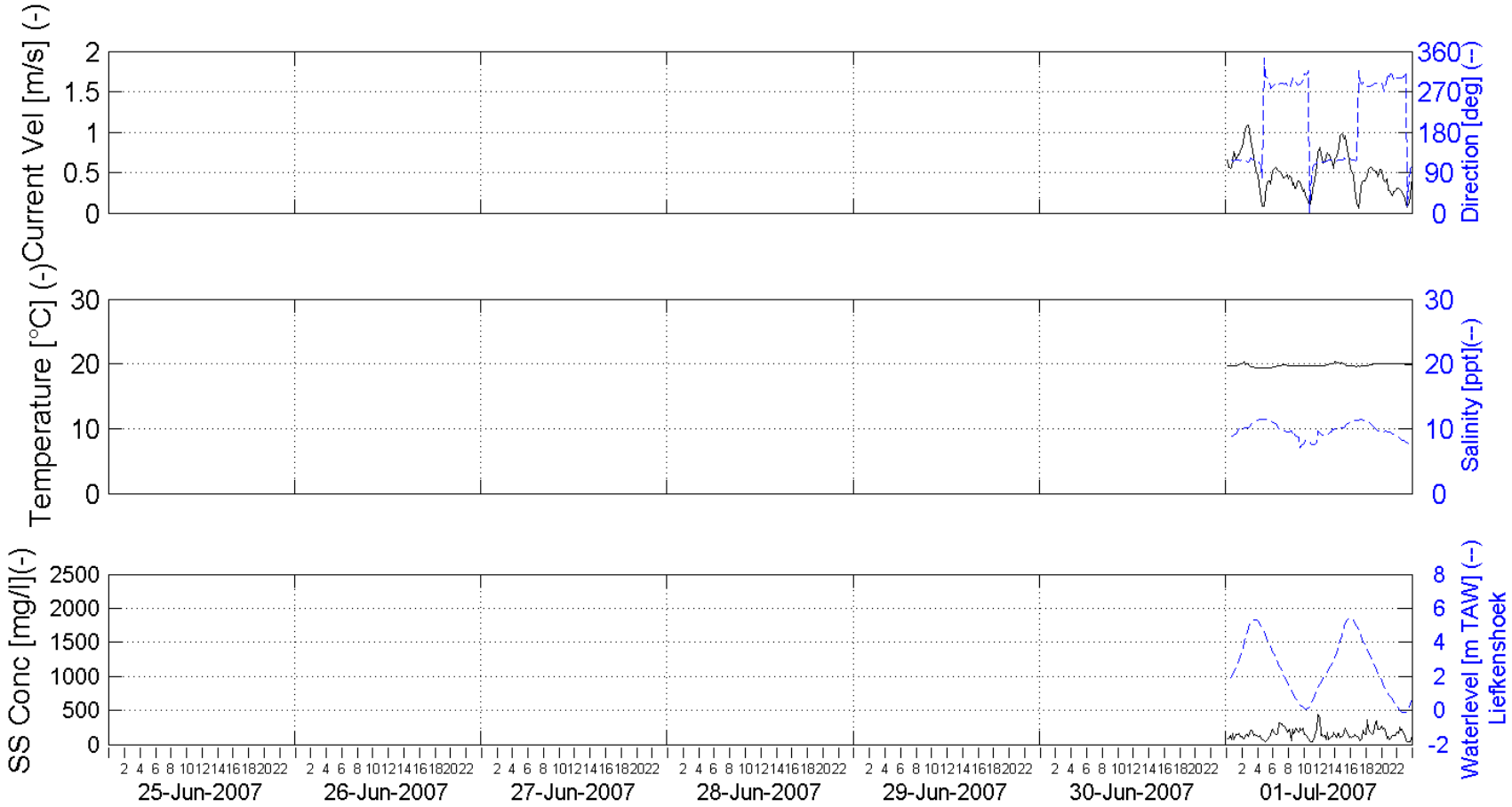
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 26 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

IMDC

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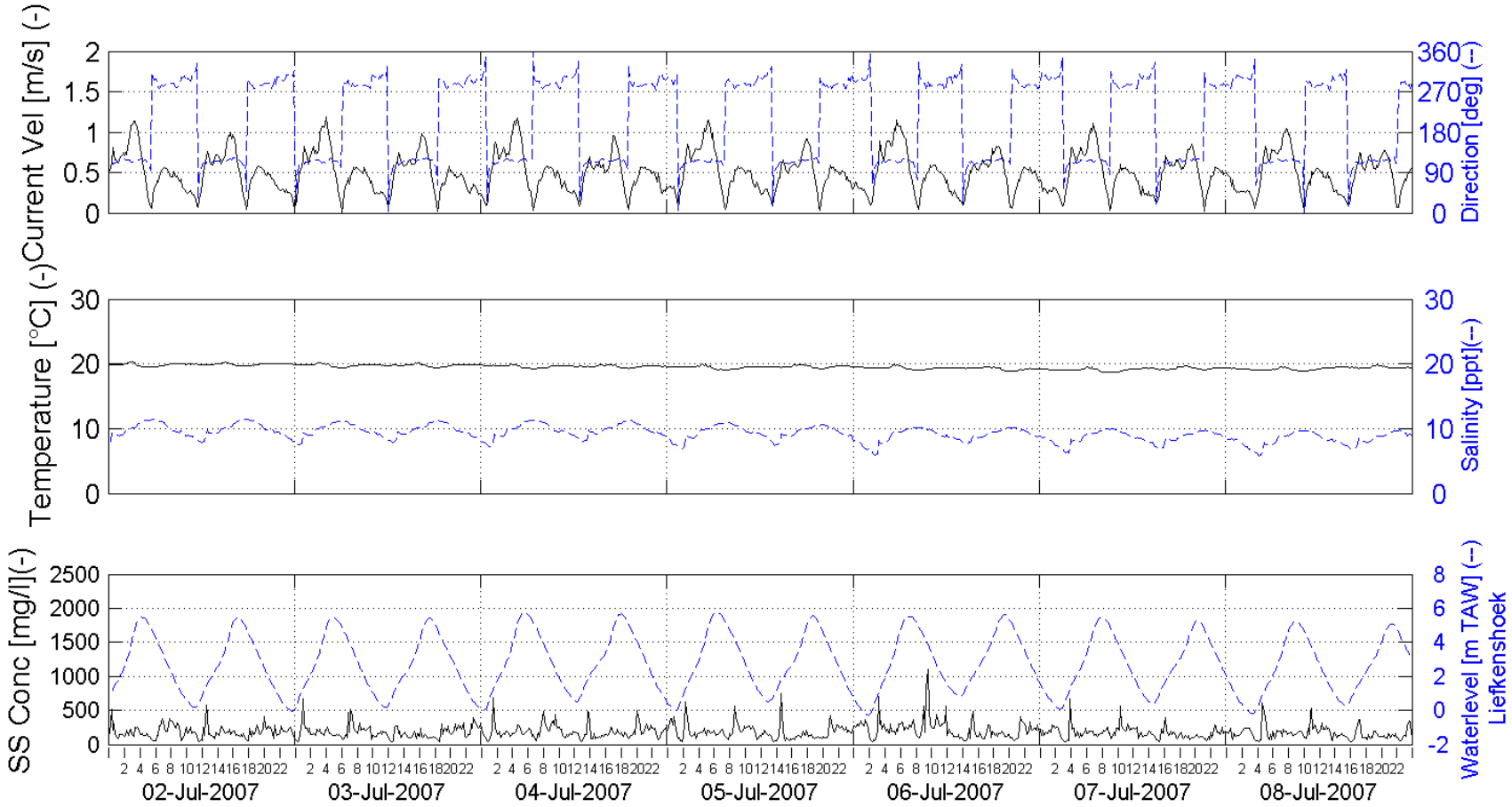
GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 27 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

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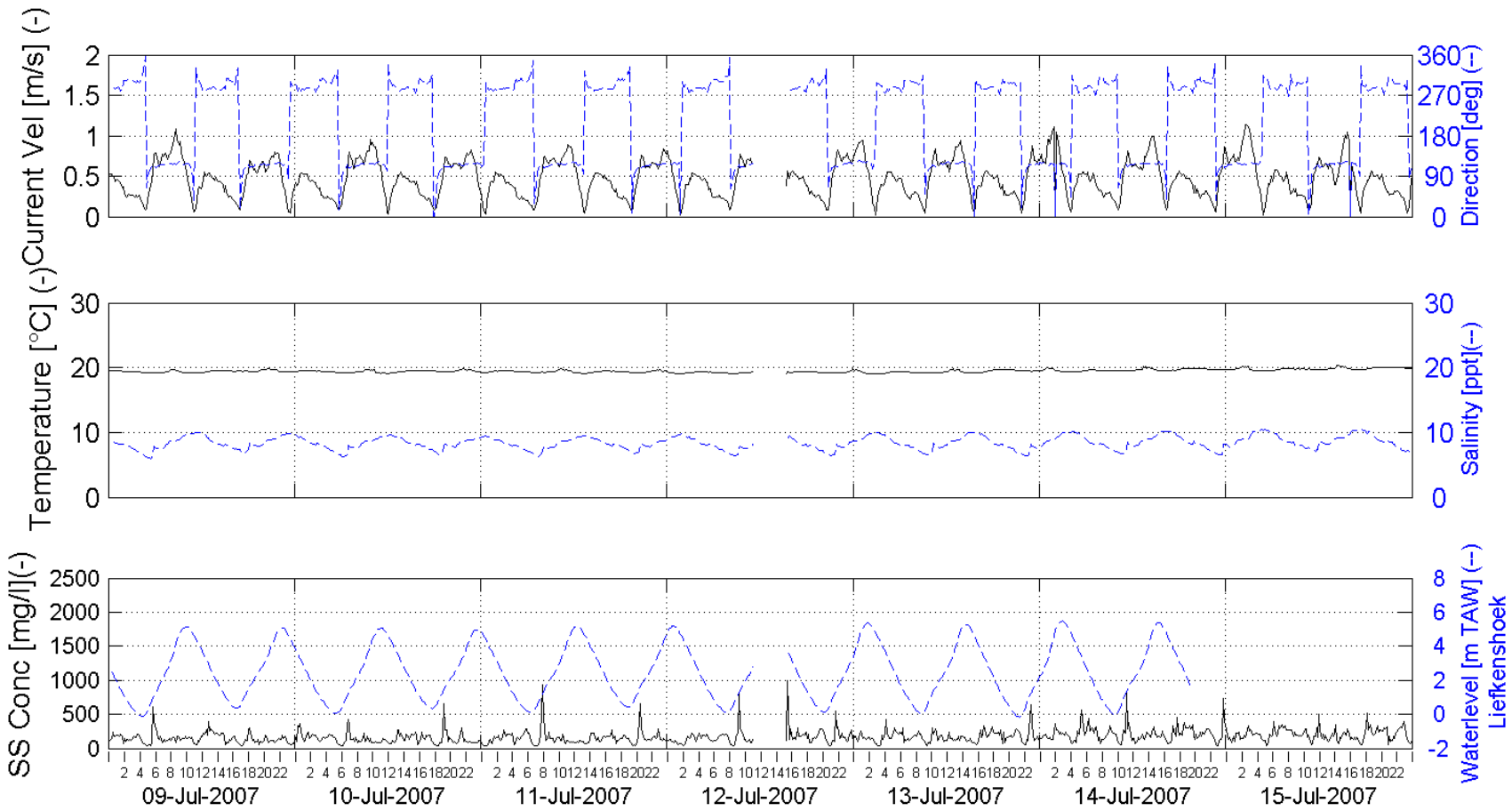
In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 28 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

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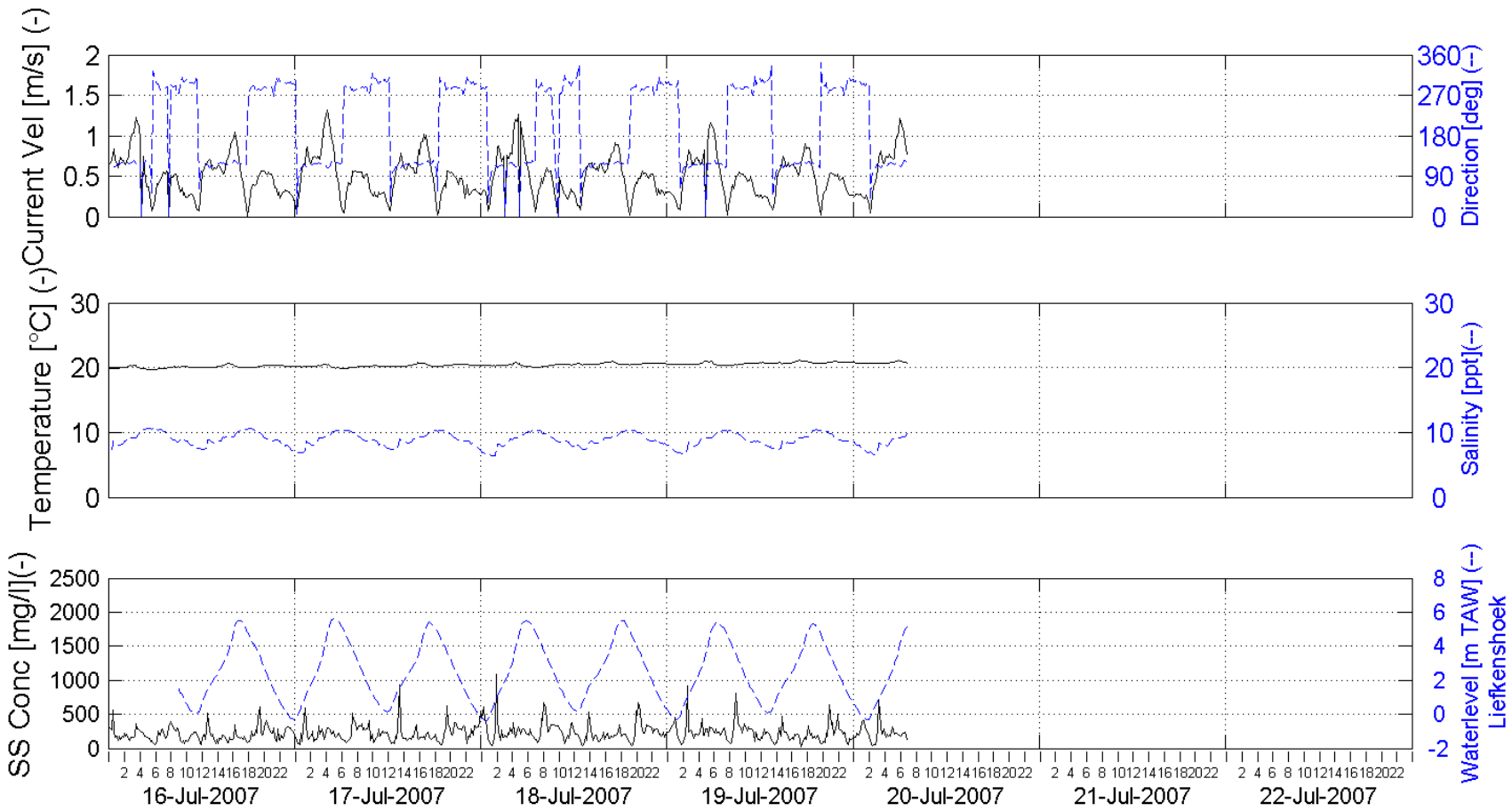
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 29 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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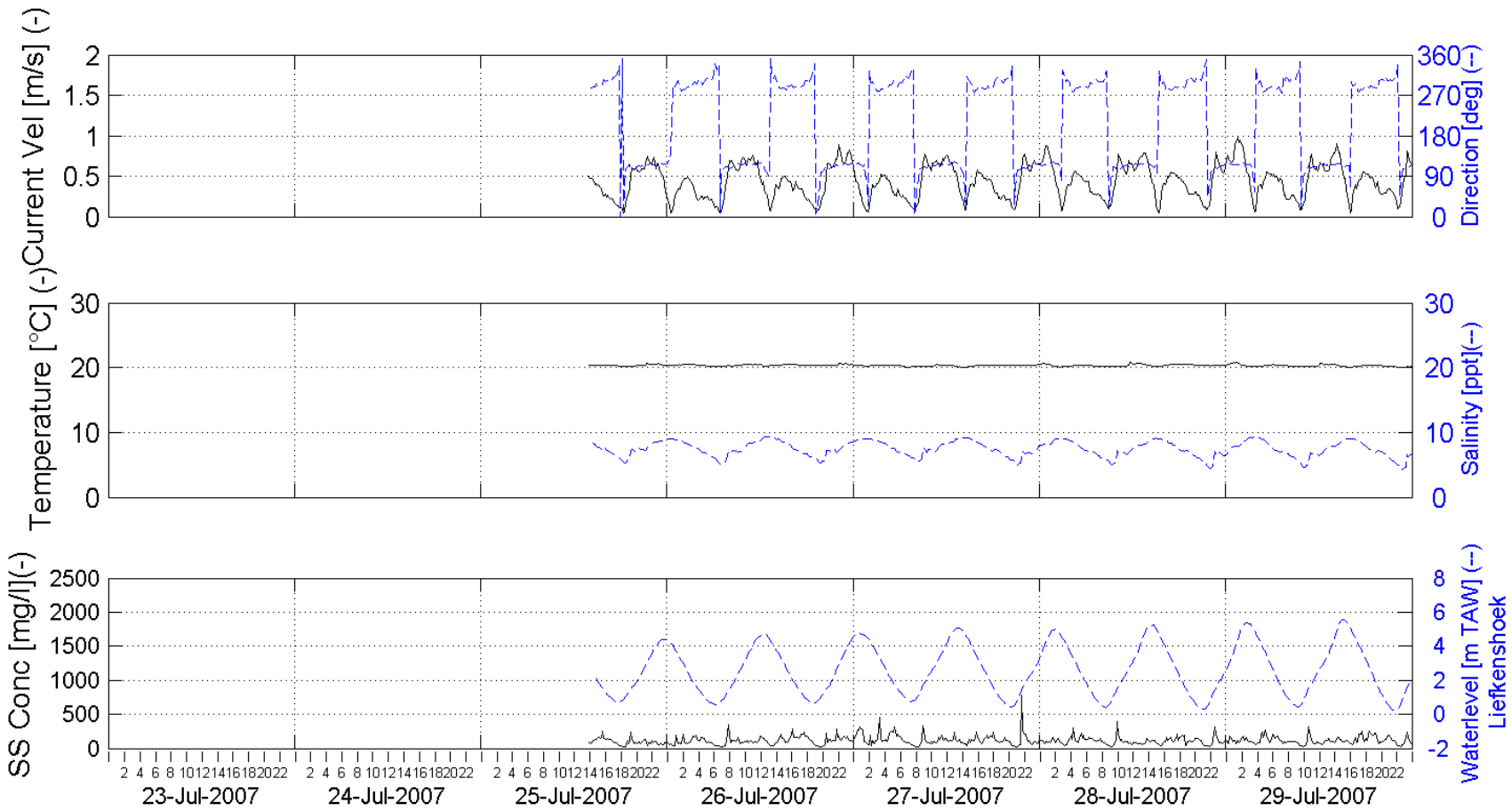
Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 30 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

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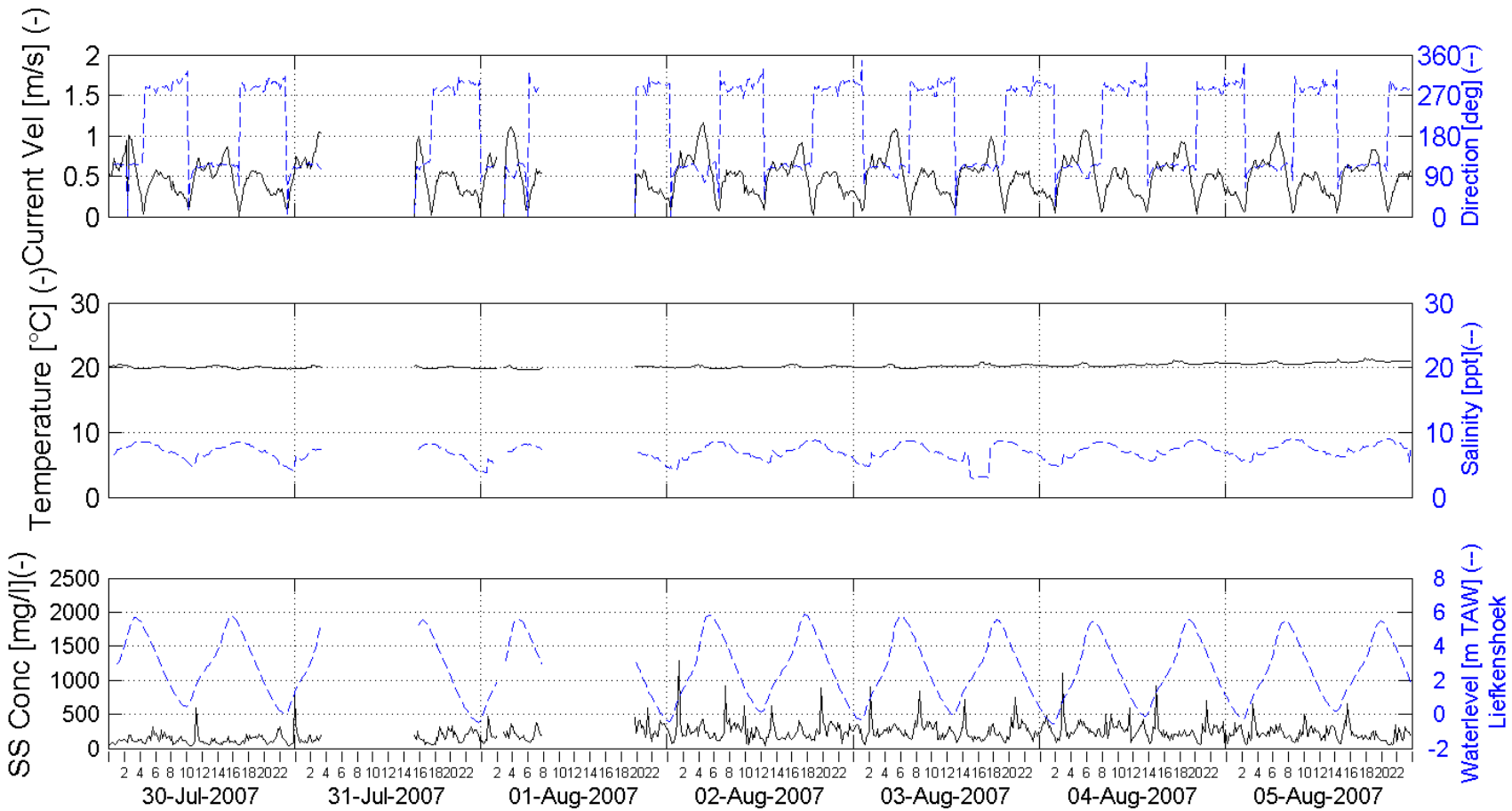
In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 31 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

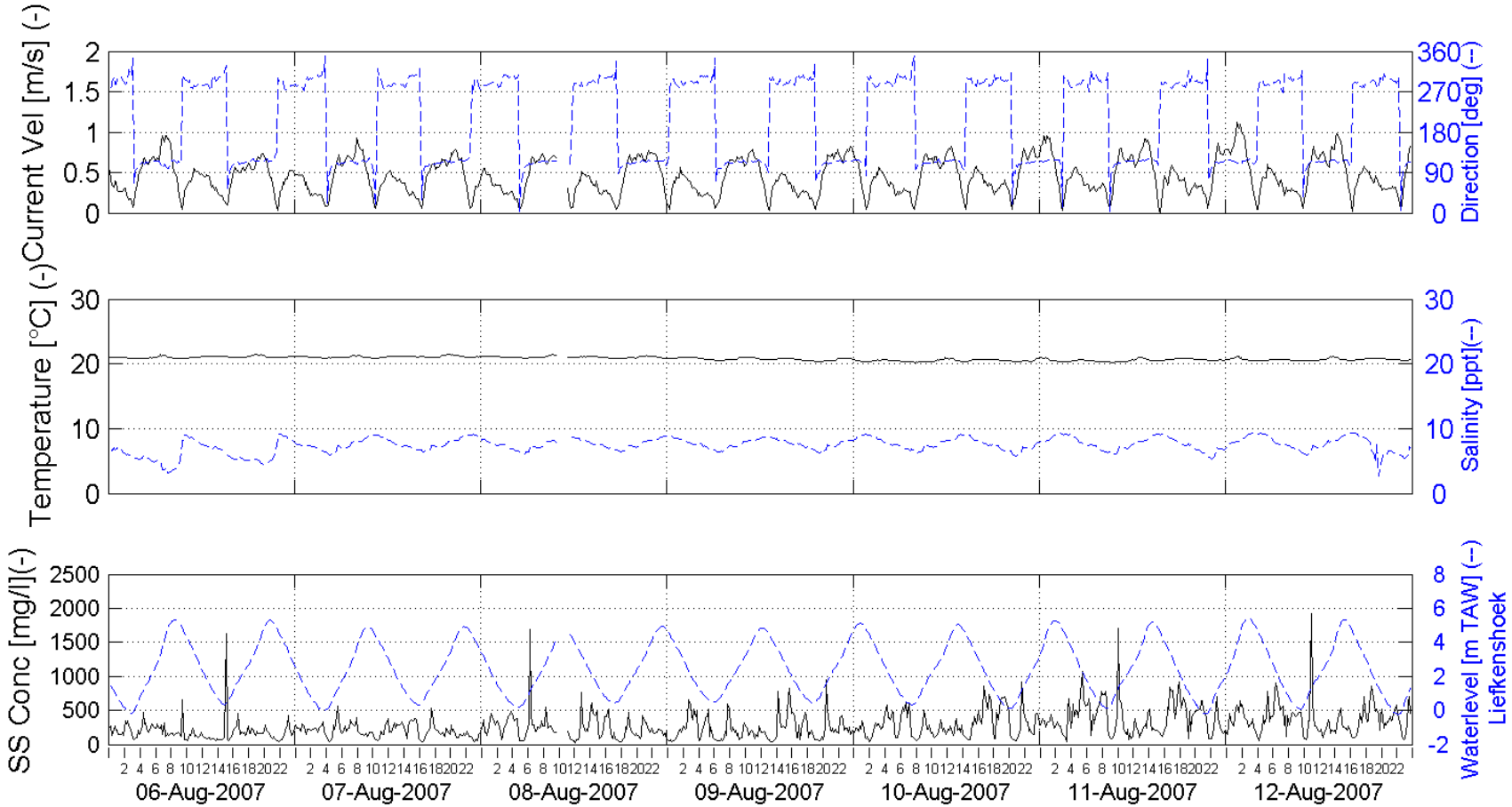
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 32 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

IMDC

In Association with:

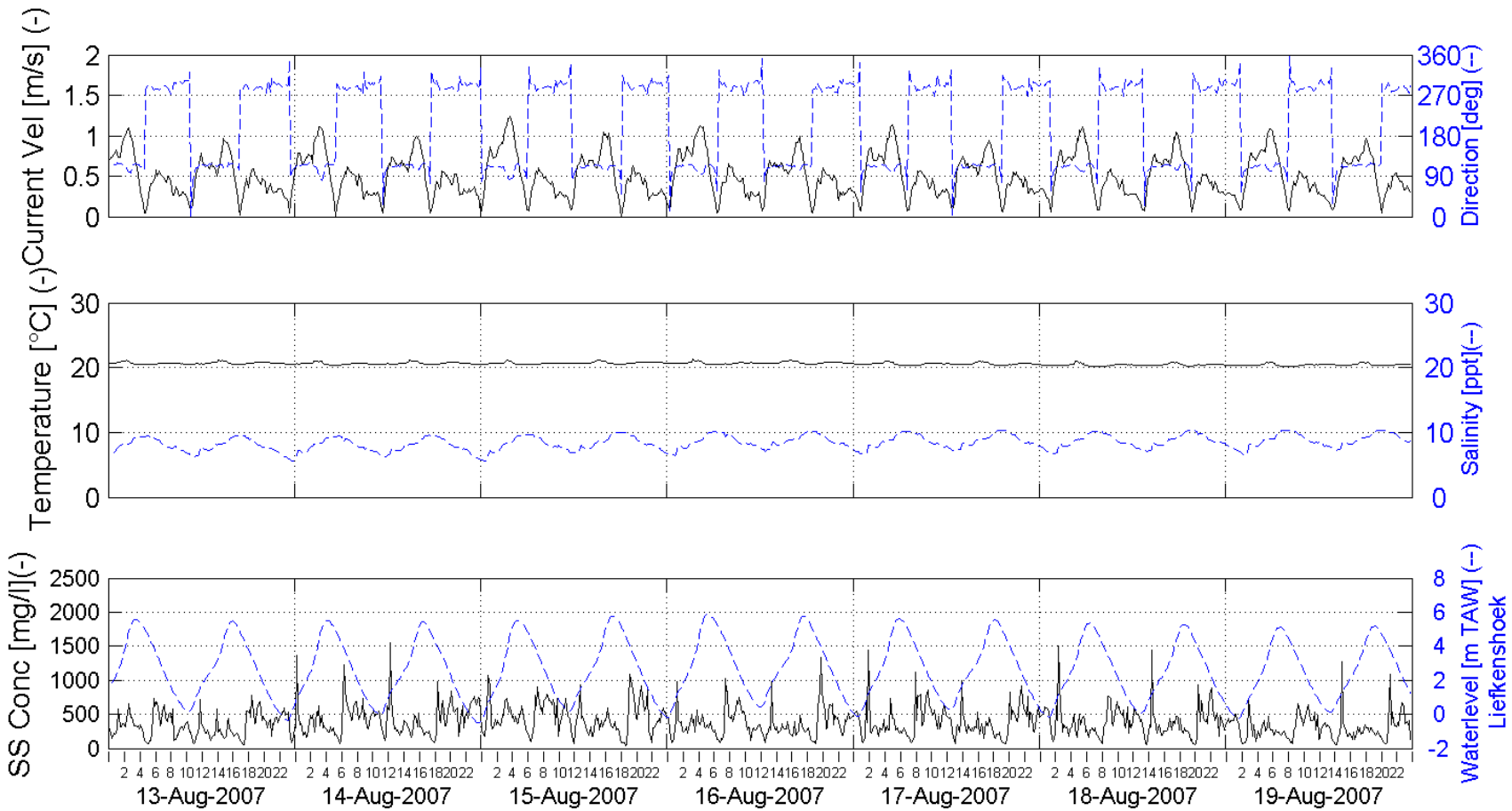
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 33 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

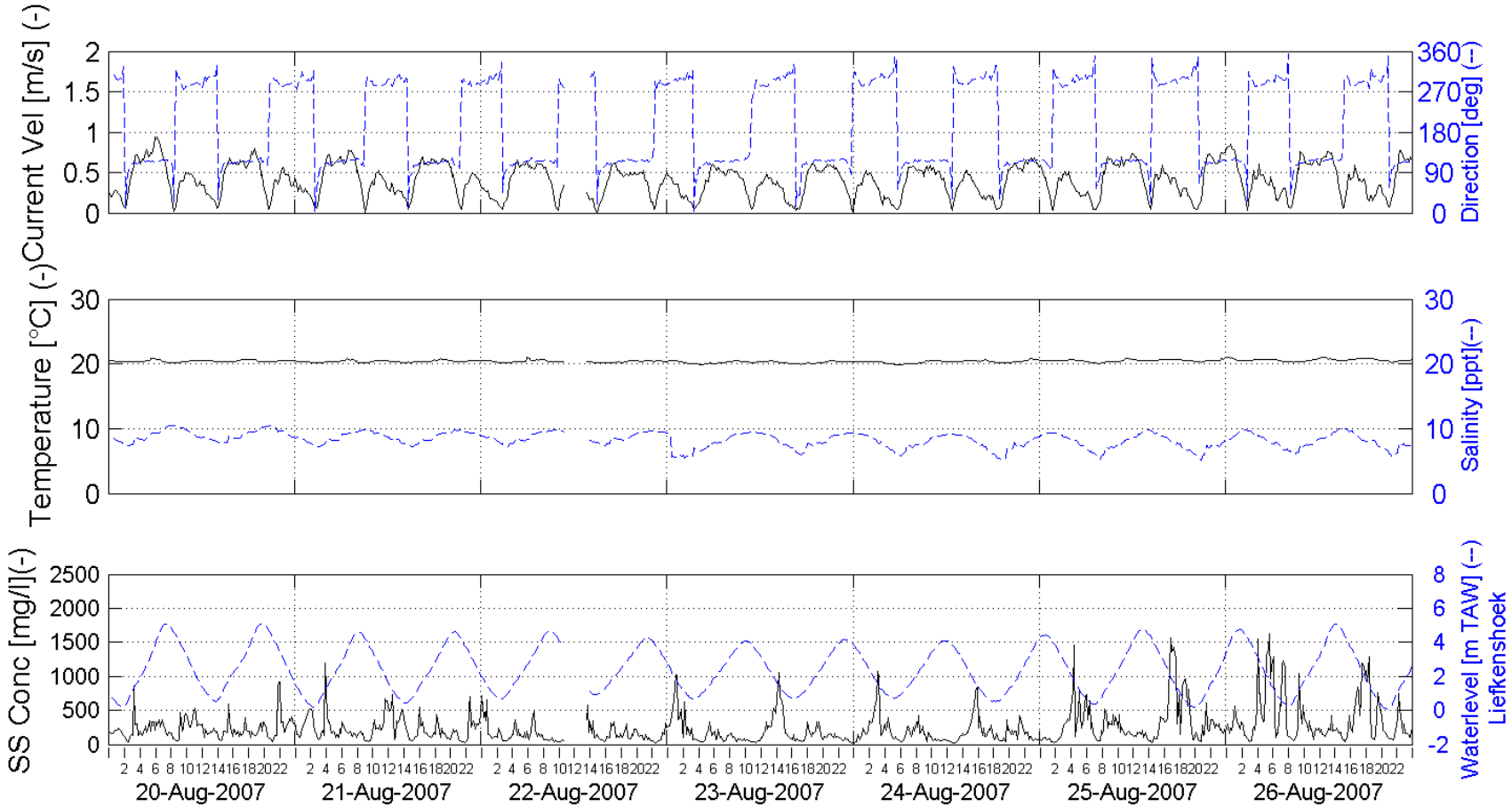
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 34 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

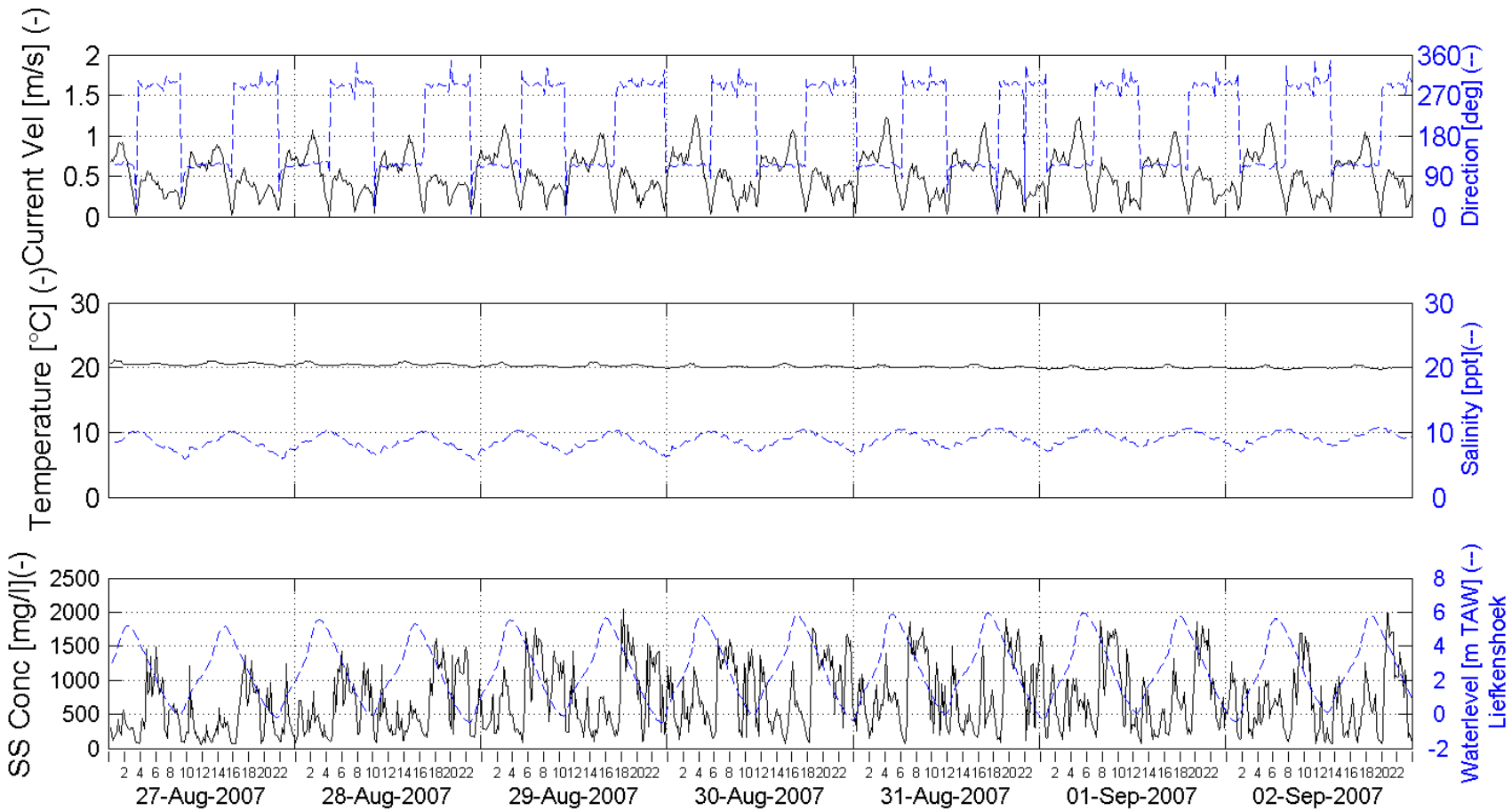
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 35 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

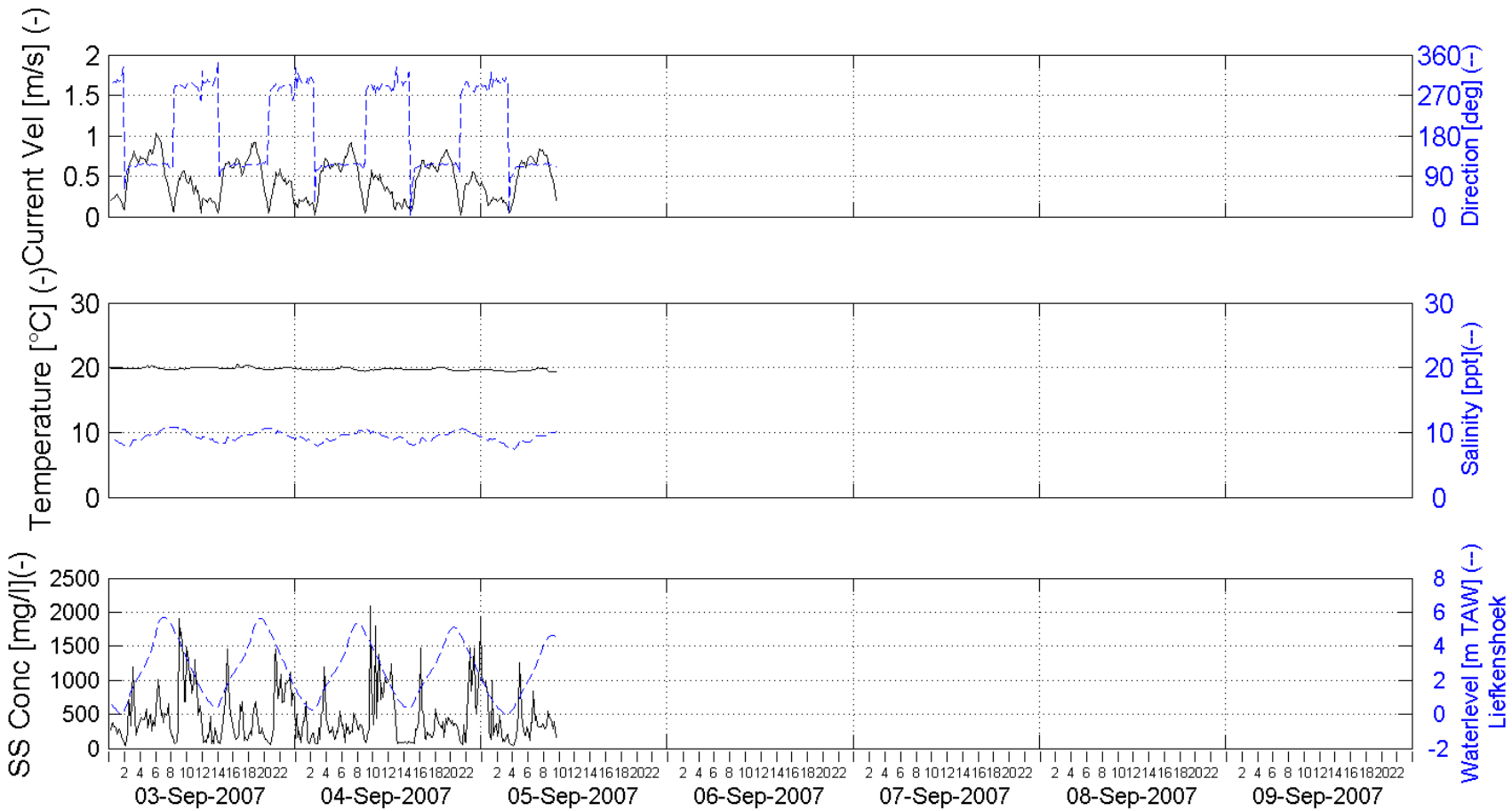
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 36 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

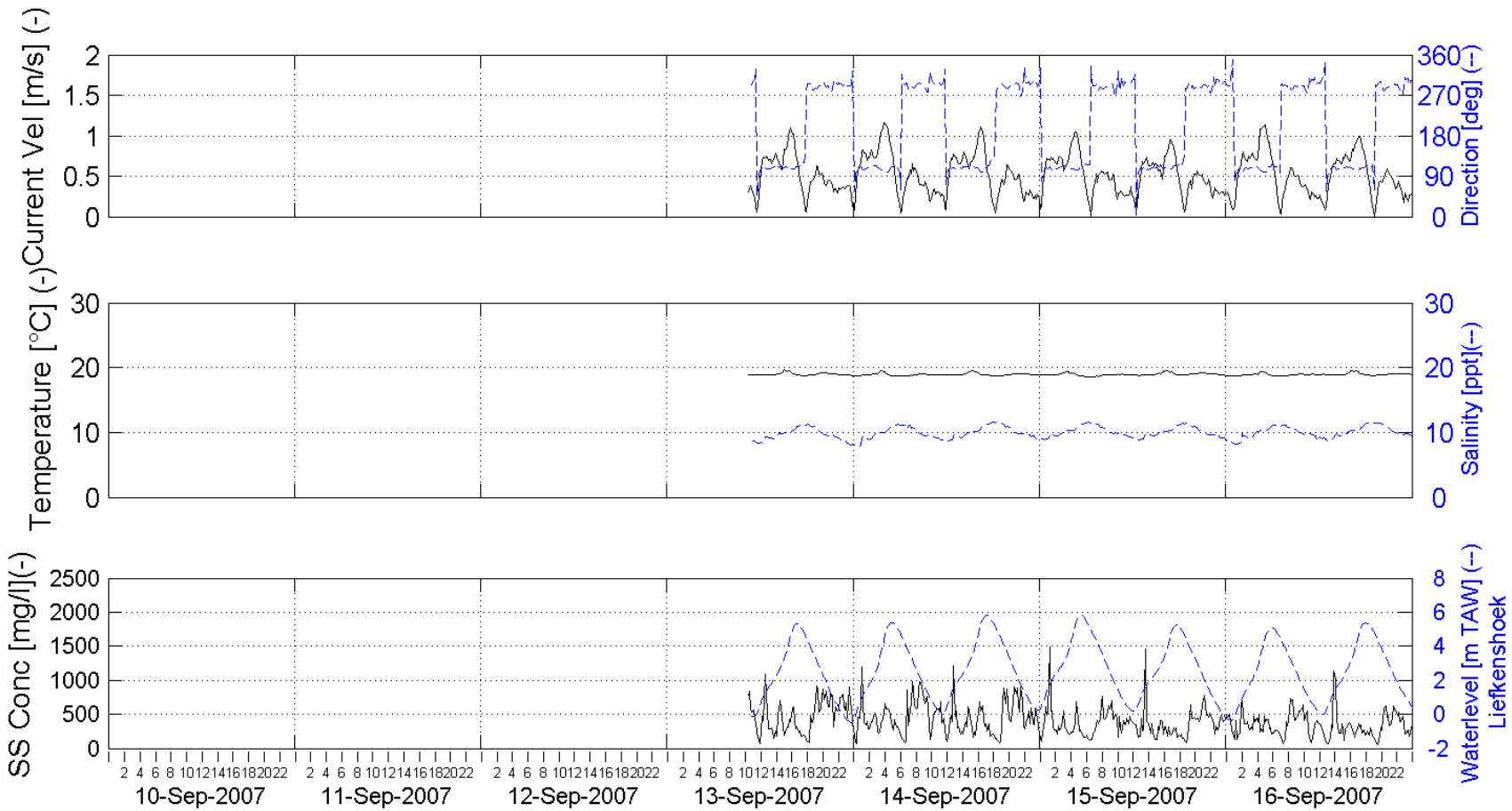
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 37 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

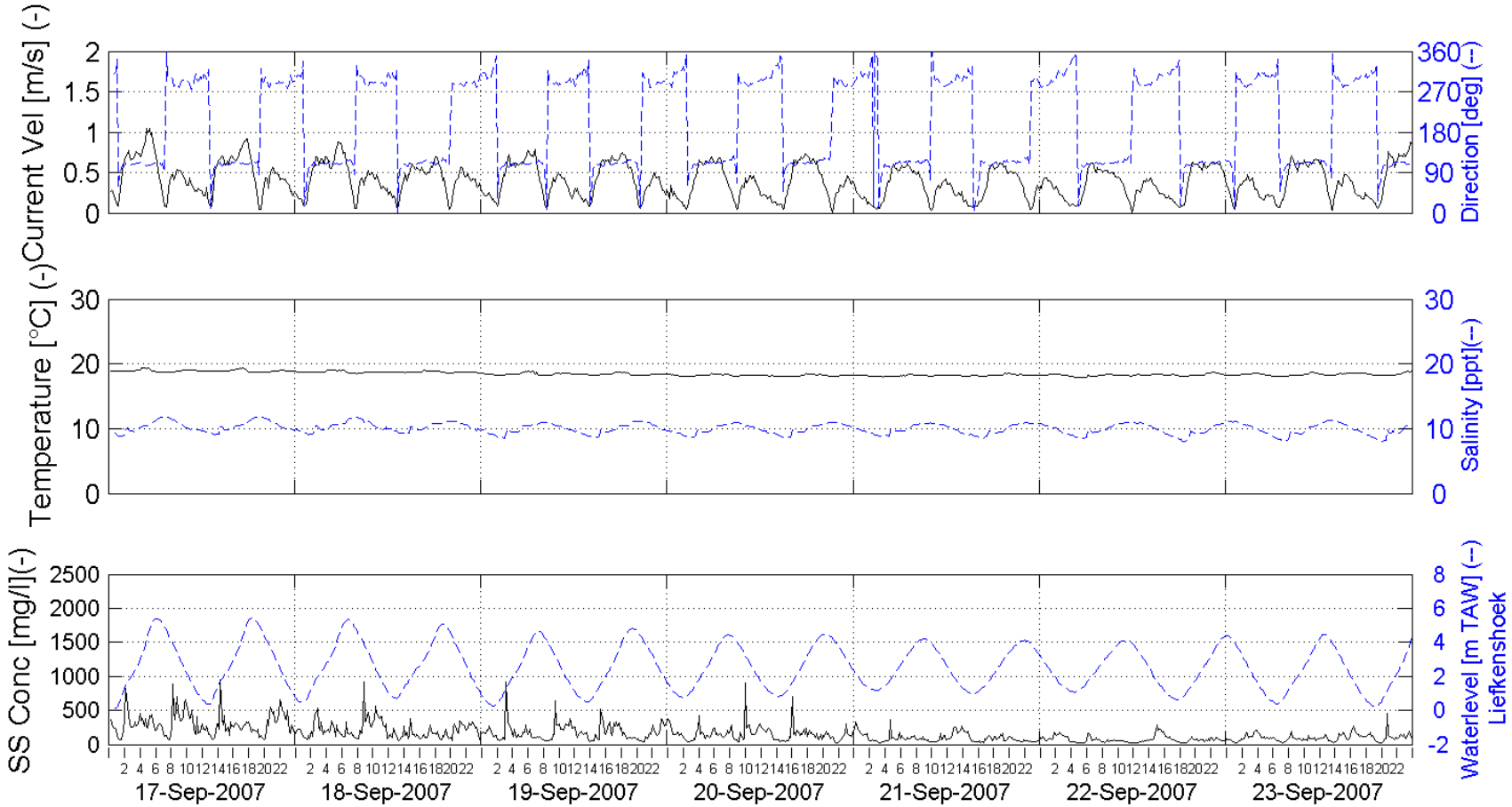
Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 38 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

IMDC

In Association with:

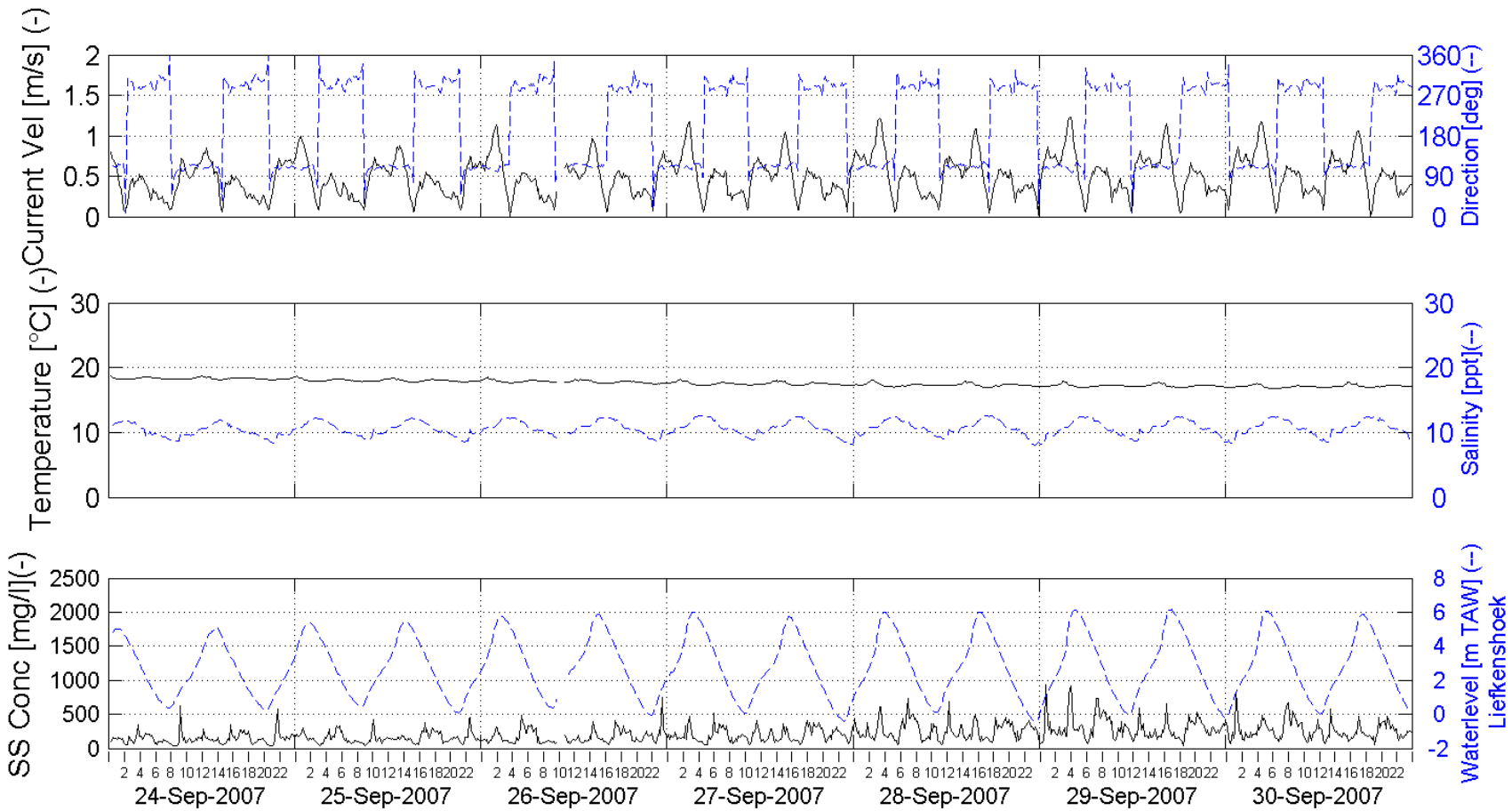
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 39 - 2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Buoy 97 bottom - 0.8m above bottom (-7.8m TAW)

Processed by:

IMDC

In Association with:

WL | delft hydraulics

GEMS International

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B.2 Monthly results minimum, maximum and average of velocity magnitude, temperature, salinity and suspended sediment concentration

Location: Buoy 84
3.3 meter above bottom [-5.6 m TAW]

Velocity magnitude [m/s]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	0.01	1.42	0.51
February 2007	0.00	1.45	0.52
March 2007	0.01	1.47	0.54
April 2007	0.01*	1.28*	0.56*
May 2007	0.00	1.26	0.53
June 2007	0.00	1.27	0.52
July 2007	0.01	1.19	0.52
August 2007	0.00	1.27	0.50
September 2007	0.00	1.34	0.49
Temperature [°C]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	7.4	9.9	8.4
February 2007	7.1	9.2	8.0
March 2007	8.5	10.6	9.6
April 2007	10.1*	12.8*	11.1*
May 2007	16.0	18.6	17.2
June 2007	17.5	21.6	20.1
July 2007	18.5	21.0	19.8
August 2007	19.5	21.4	20.4
September 2007	16.6	20.3	18.5

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	4.6	2.6	9.3	6.4	6.3	4.1
February 2007	4.8	3.0	7.2	4.8	6.1	4.0
March 2007	2.3	1.4	6.0	3.7	3.9	2.2
April 2007	6.0*	3.7*	7.6*	5.6*	7.1*	4.8*
May 2007	11.4	8.8	12.7	9.8	12.1	9.3
June 2007	11.1	8.5	13.7	10.5	12.5	9.6
July 2007	9.8	6.8	12.8	9.7	11.2	8.5
August 2007	6.3	8.1	12.9	9.4	11.6	8.7
September 2007	11.5	9.2	15.1	11.7	13.5	10.7

Suspended sediment concentration [mg/l]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	22	2941	173
February 2007	23	3008	334
March 2007	25	1435	205
April 2007	28*	1055*	243*
May 2007	12	494	122
June 2007	2	377	101
July 2007	9	408	122
August 2007	15	846	190
September 2007	12	850	174

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Location: Buoy 84
0.8 meter above bottom [-8.1 m TAW]

Velocity magnitude [m/s]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	0.01	1.07	0.41
February 2007	0.01	1.31	0.46
March 2007	0.01	1.37	0.45
April 2007	0.01*	1.00*	0.46*
May 2007	0.01	1.20	0.46
June 2007	0.00	1.08	0.45
July 2007	0.01	1.19	0.46
August 2007	0.01	1.18	0.44
September 2007	-	-	-
Temperature [°C]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	7.5	9.4	8.3
February 2007	7.1	9.8	7.9
March 2007	8.5	10.7	9.6
April 2007	10.0*	12.8*	11.1*
May 2007	16.0	18.6	17.2
June 2007	17.6	21.7	20.1
July 2007	18.6	21.1	19.9
August 2007	19.5	21.4	20.4
September 2007	-	-	-

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	4.8	3.0	9.6	6.9	6.8	4.5
February 2007	4.6	2.6	7.4	5.0	6.0	3.9
March 2007	2.5	1.4	6.0	4.0	4.0	2.3
April 2007	5.9*	3.9*	8.0*	5.6*	7.3*	4.9*
May 2007	11.7*	9.2*	14.2*	10.0*	12.8*	9.7*
June 2007	11.3	8.3	15.4	11.2	13.1	10.1
July 2007	9.9	6.8	15.0	11.2	12.3	9.1
August 2007	10.2	6.9	14.4	9.9	11.4	8.5
September 2007	-	-	-	-	-	-

Suspended sediment concentration [mg/l]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	25	1643	259
February 2007	29	2311	615
March 2007	29	2311	448
April 2007	31*	1889*	463*
May 2007	14	852	209
June 2007	1	808	170
July 2007	30	1540	200
August 2007	33	802	272
September 2007	-	-	-

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Location: Buoy 97
3.3 meter above bottom [-5.3 m TAW]

Velocity magnitude [m/s]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	0.01	1.38	0.53
February 2007	0.01*	1.37*	0.56*
March 2007	0.01*	1.73*	0.56*
April 2007	0.01	1.45	0.61
May 2007	0.01	1.35	0.60
June 2007	0.01	1.32	0.59
July 2007	0.00	1.45	0.59
August 2007	0.00	1.46	0.59
September 2007	0.00	1.68	0.58
Temperature [°C]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	7.1	10.1	8.5
February 2007	6.7*	8.9*	7.8*
March 2007	9.0*	11.0*	9.7*
April 2007	10.0	17.7	14.3
May 2007	16.3	18.7	17.3
June 2007	17.7	21.9	20.2
July 2007	18.7	21.2	20.0
August 2007	19.6	21.5	20.5
September 2007	16.9	20.7	18.6

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	4.2	1.4	7.4	5.2	5.5	2.9
February 2007	4.7*	1.5*	6.4*	4.3*	5.7*	3.1*
March 2007	4.0*	1.4*	5.2*	3.0*	4.4*	2.2*
April 2007	5.3	2.4	10.0	7.0	8.2	5.3
May 2007	10.2	6.5	11.3	8.6	10.8	7.4
June 2007	10.5	5.3	12.3	8.7	11.4	7.5
July 2007	8.2	4.2	11.4	7.8	9.9	6.3
August 2007	8.1	4.1	10.5	7.4	9.4	6.0
September 2007	10.2	6.7	12.4	9.2	11.3	8.2

Suspended sediment concentration [mg/l]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	24	1449	238
February 2007	30*	1354*	356*
March 2007	34*	1252*	305*
April 2007	24	1616	243
May 2007	23	980	154
June 2007	22	540	98
July 2007	33	1970	170
August 2007	25	900	260
September 2007	18	848	219

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Location: Buoy 97
0.8 meter above bottom [-7.8 m TAW]

Velocity magnitude [m/s]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	-	-	-
February 2007	0.01	1.22	0.46
March 2007	0.00	1.61	0.46
April 2007	0.01	1.29	0.50
May 2007	0.00	1.23	0.49
June 2007	0.01	1.18	0.47
July 2007	0.00	1.32	0.48
August 2007	0.00	1.25	0.47
September 2007	0.01	1.23	0.47
Temperature [°C]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	-	-	-
February 2007	6.8	9.3	7.9
March 2007	8.6	11.2	9.6
April 2007	10.0	17.7	14.3
May 2007	16.3	18.7	17.3
June 2007	17.7	21.9	20.2
July 2007	18.7	21.1	19.8
August 2007	19.6	21.5	20.5
September 2007	16.8	20.5	18.6

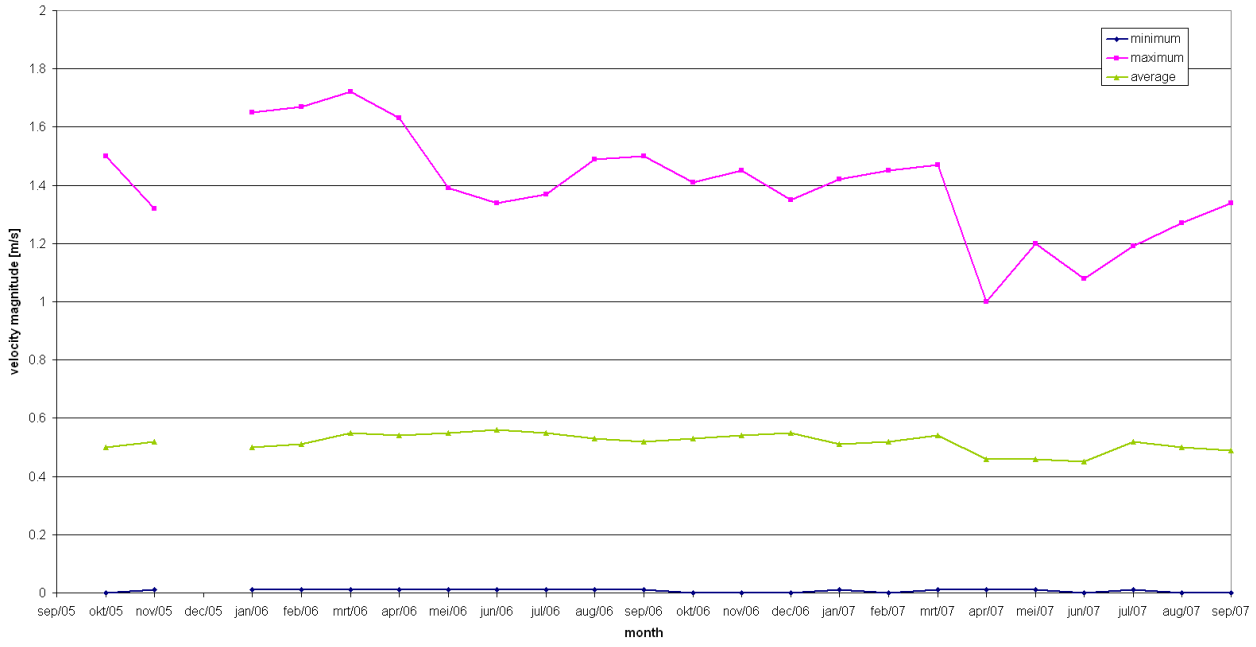
Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	-	-	-	-	-	-
February 2007	3.8	1.2	5.5	4.1	4.8	2.7
March 2007	1.9	0.7	5.2	3.1	3.3	1.7
April 2007	5.2	2.8	10.2	7.5	8.3	5.7
May 2007	10.3	7.0	11.4	9.1	10.9	8.0
June 2007	10.4	6.8	12.4	9.3	11.5	8.2
July 2007	7.3	4.6	11.5	8.2	9.9	6.9
August 2007	7.6	5.0	10.5	8.1	9.5	6.5
September 2007	10.2	7.2	12.5	9.5	11.4	8.7

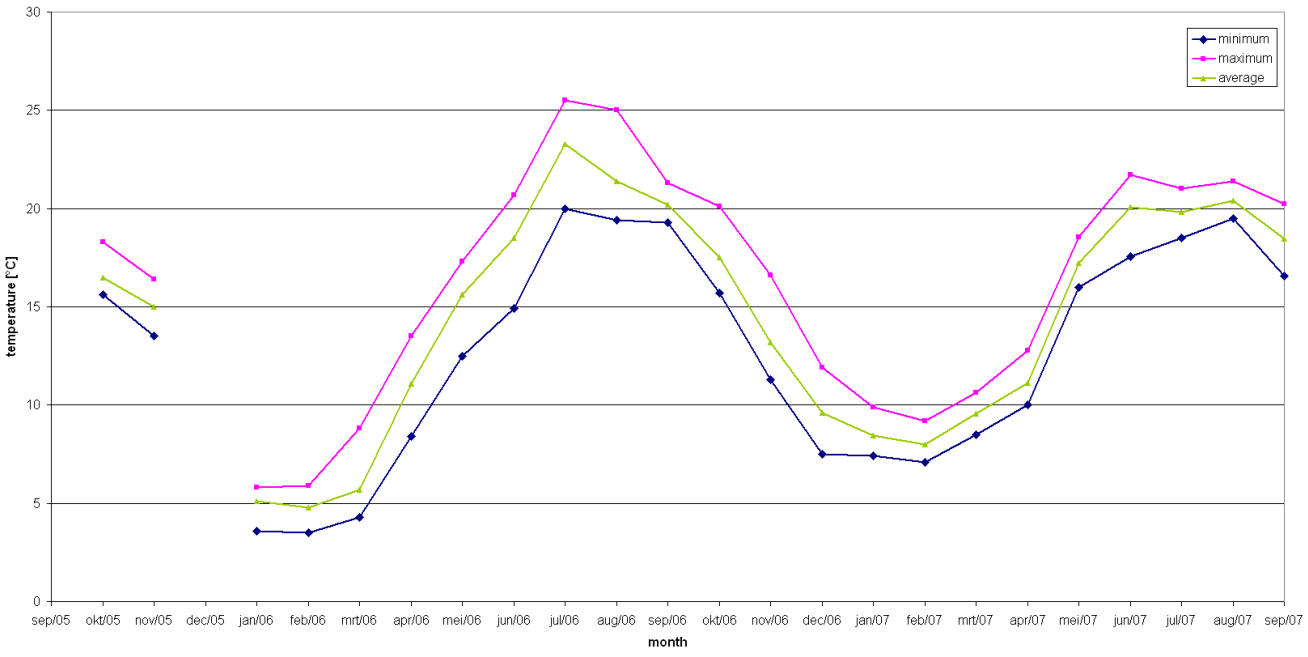
Suspended sediment concentration [mg/l]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	-	-	-
February 2007	29	2076	565
March 2007	31	1843	398
April 2007	31	1852	444
May 2007	22	1880	368
June 2007	22	2502	211
July 2007	25	1108	173
August 2007	25	2042	360
September 2007	22	2091	300

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

B.3 Graphs monthly results for the whole deployment period

Velocity magnitude & temperature





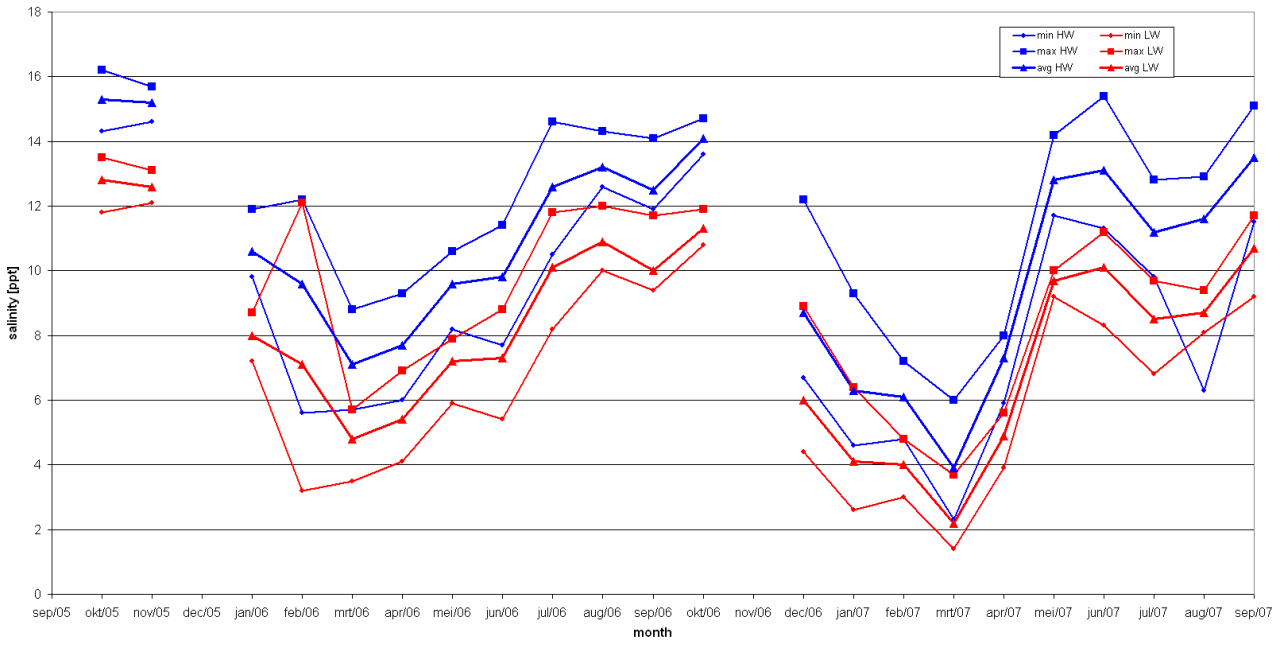
Buoy 84
3.3 m above bottom (-5.6 m TAW)

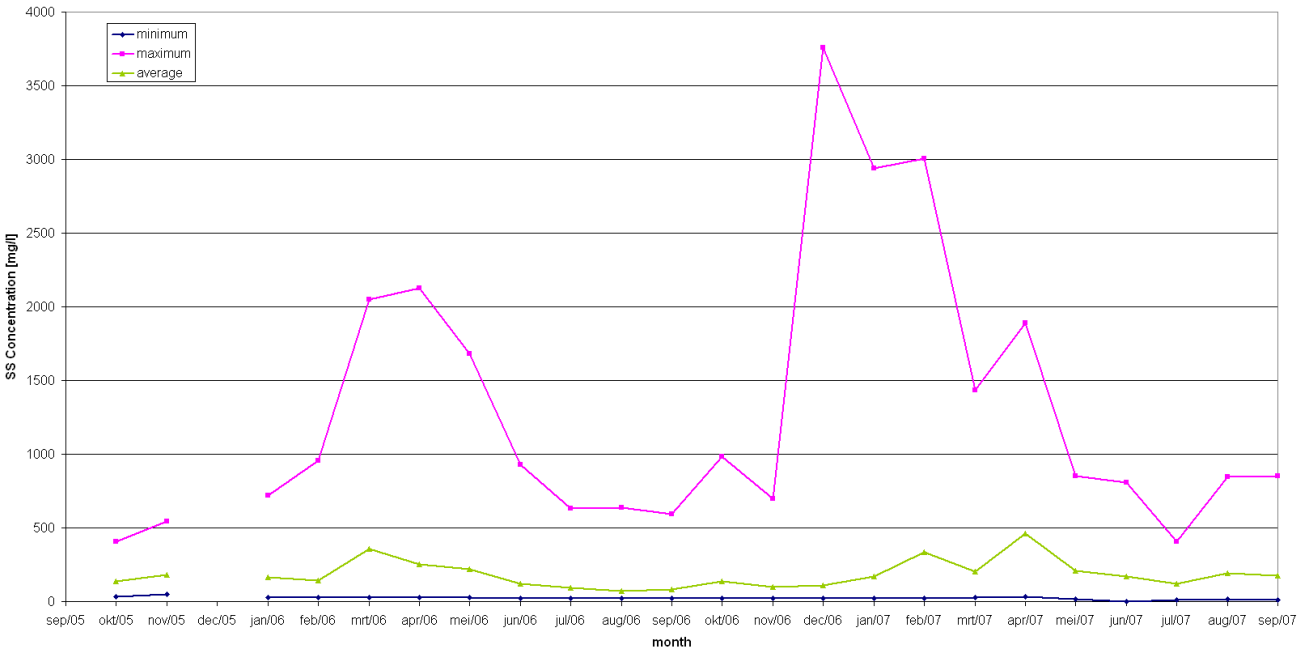
Data processed by:

In association with:

I/RA/11283/07.098/MSA

Salinity & SS Concentration





Buoy 84
3.3m above bottom (-5.6m TAW)

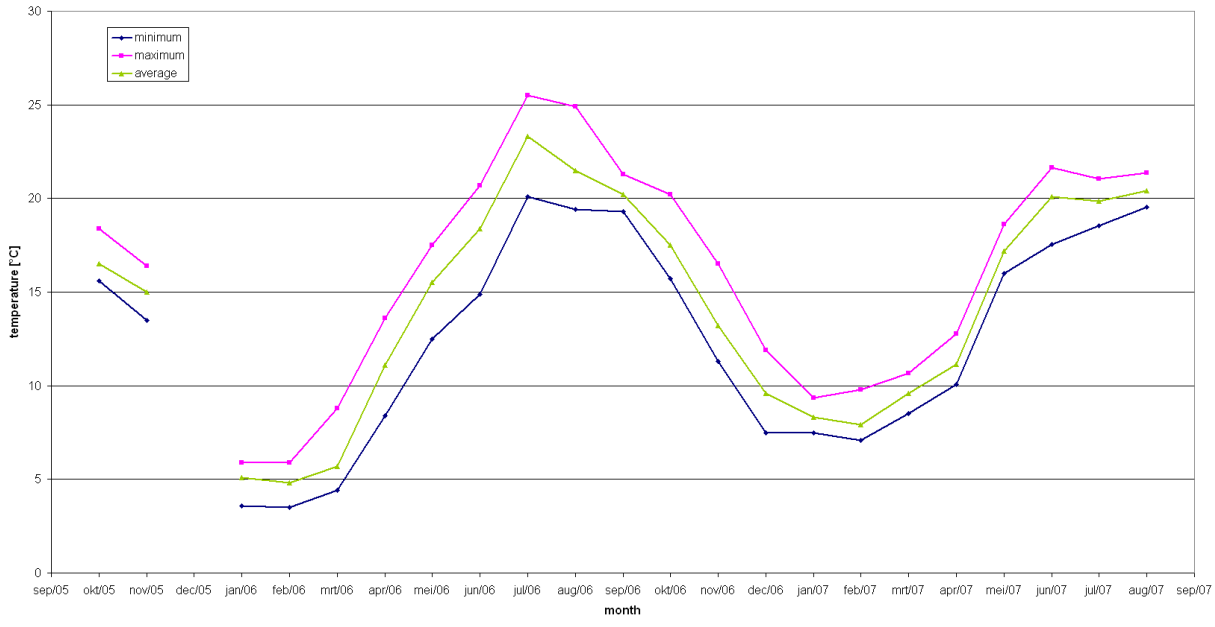
Data processed by:

In association with:

IMDC
WL | delft hydraulics
GEMS International

I/RA/11283/07.098/MSA

Velocity magnitude & temperature



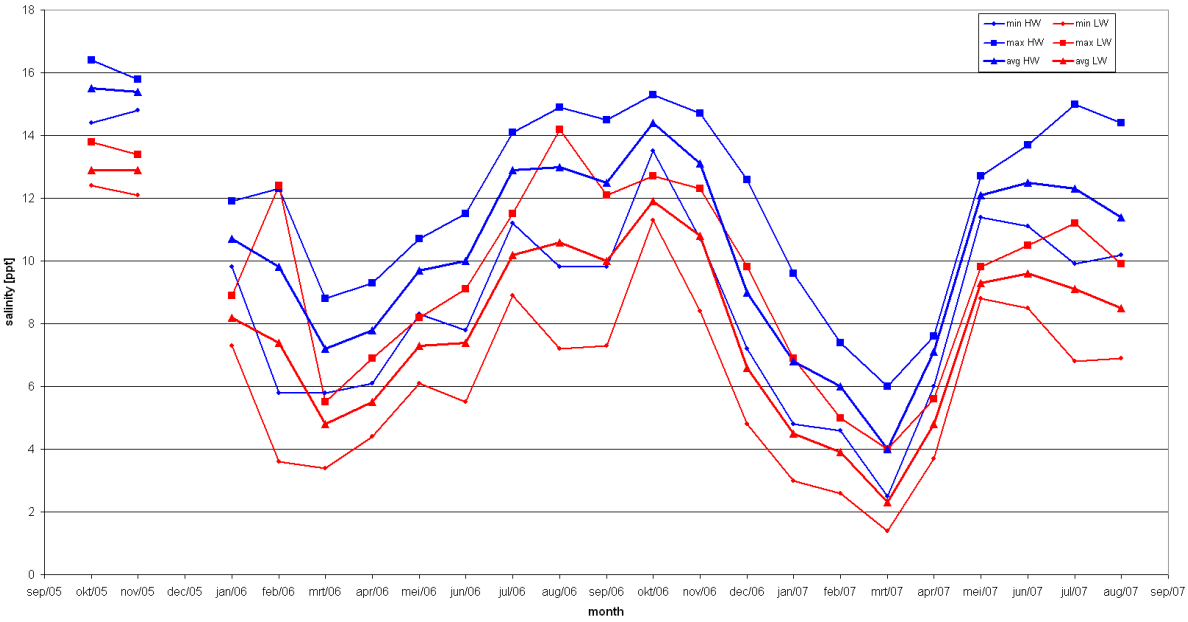
Buoy 84
0.8m above bottom (-8.1m TAW)

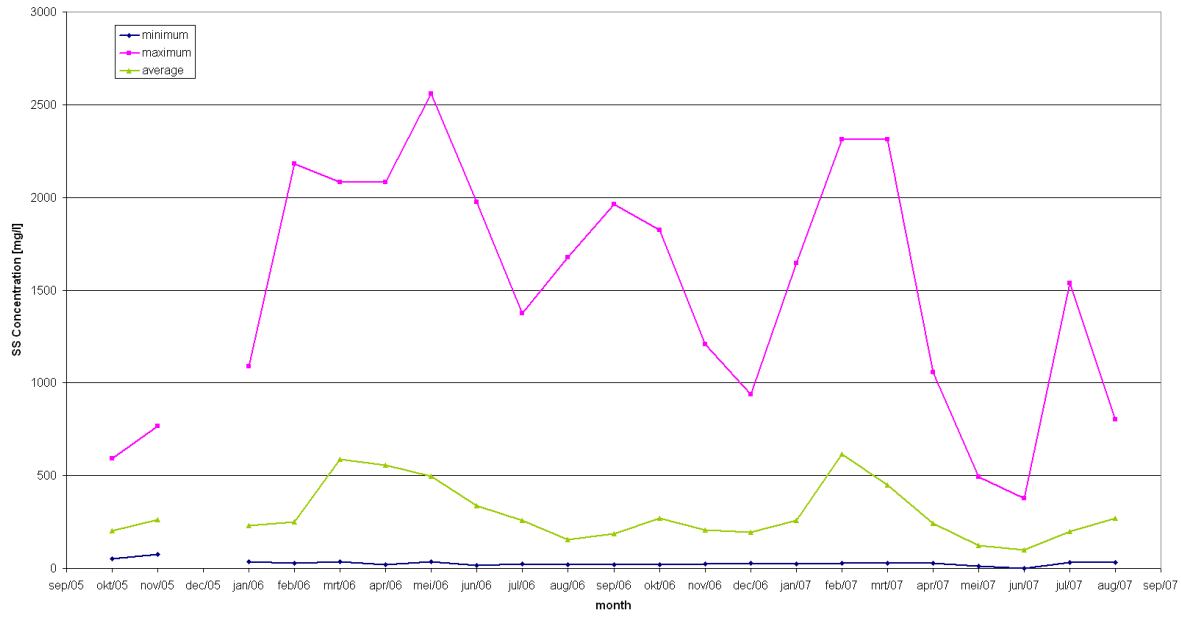
Data processed by:

In association with:

I/RA/11283/07.0987/MSA

Salinity & SS Concentration





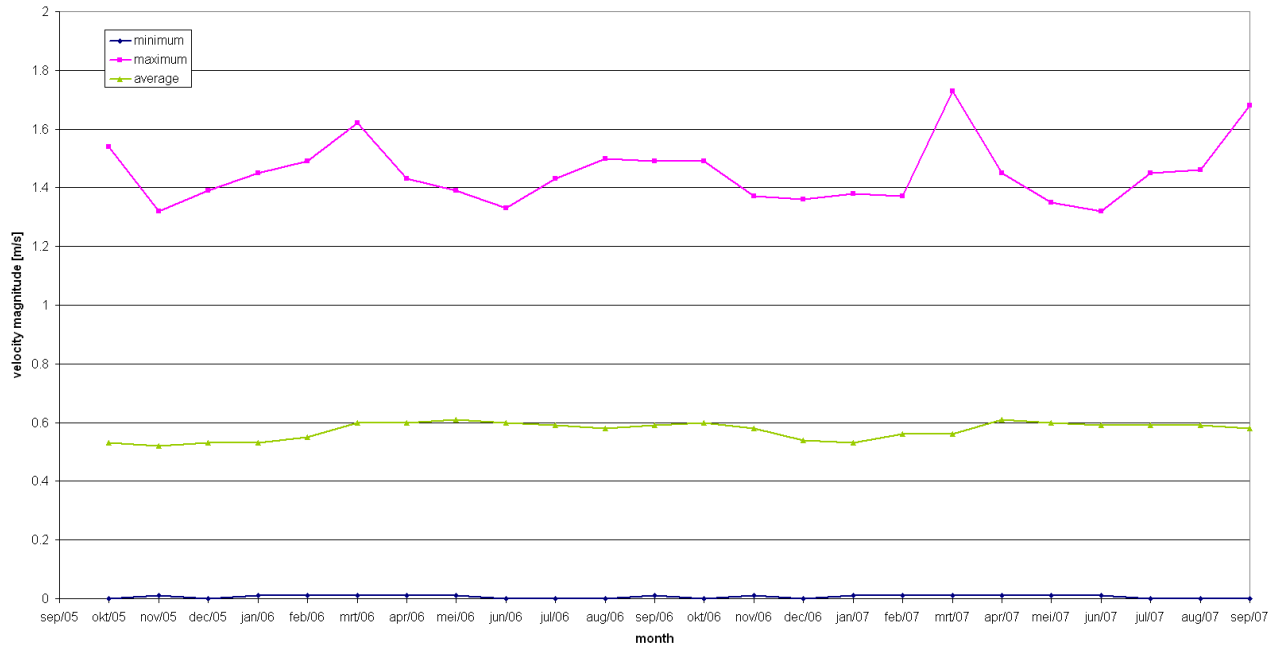
Buoy 84
0.8m above bottom (-8.1m TAW)

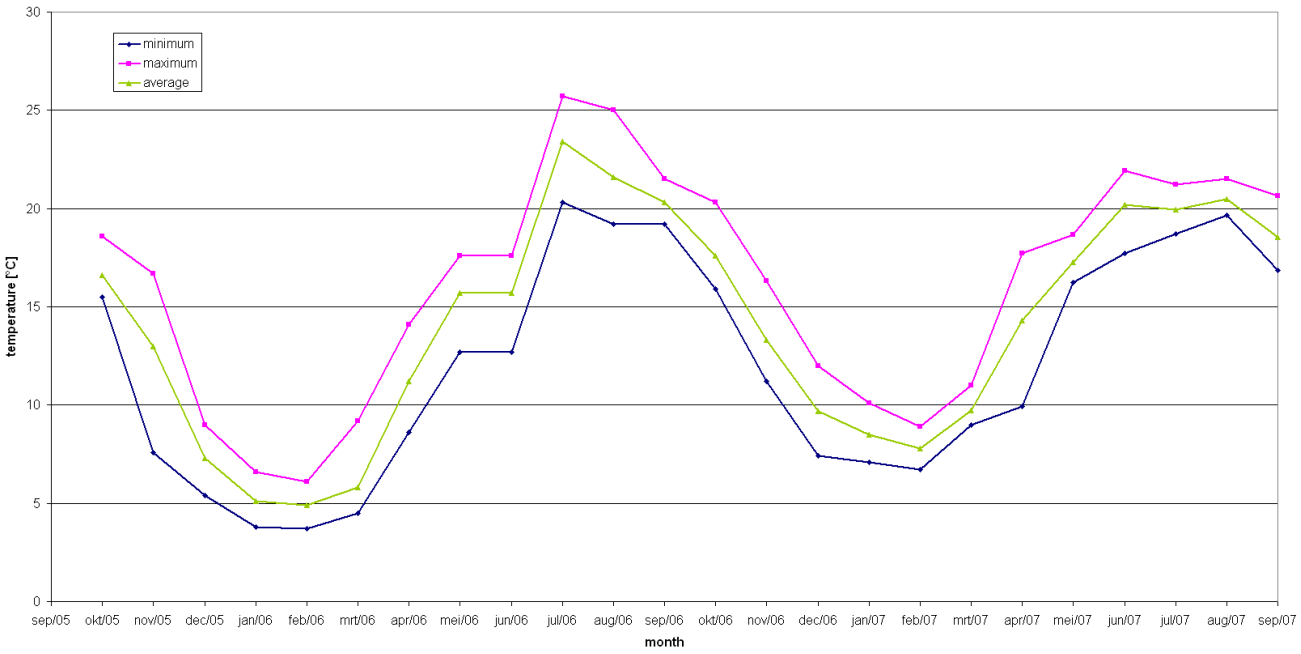
Data processed by:

In association with:

I/RA/11283/07.098/MSA

Velocity magnitude & temperature





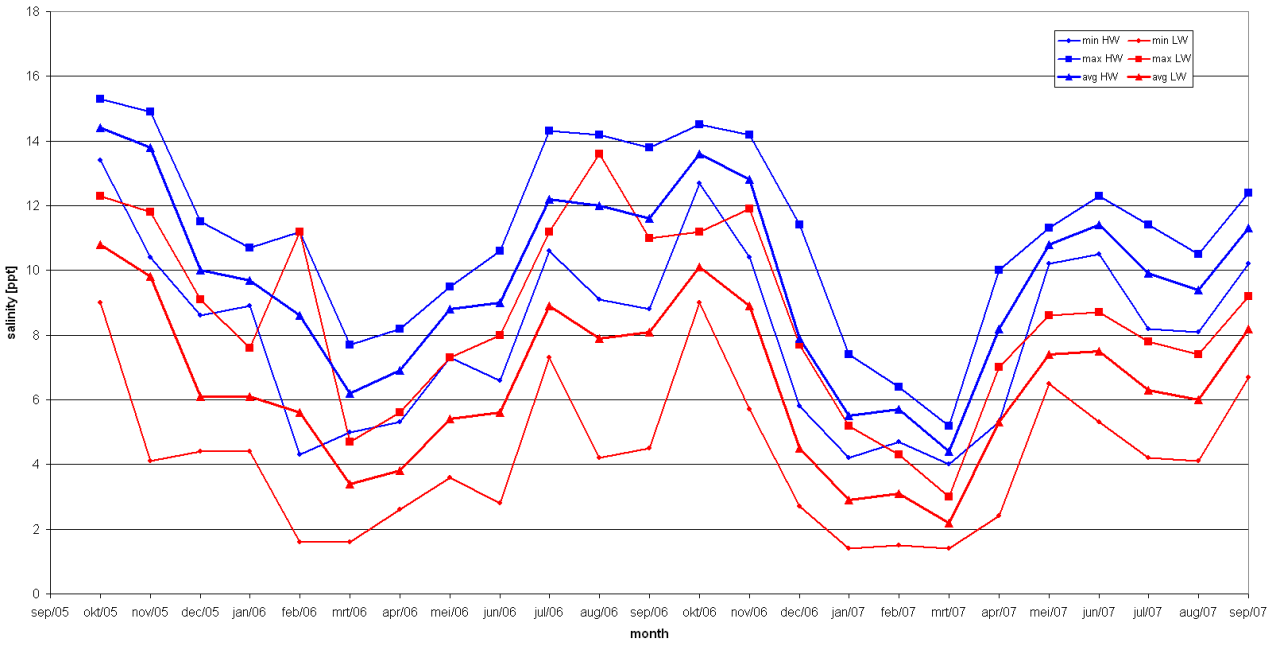
Buoy 97
3.3m above bottom (-5.3m TAW)

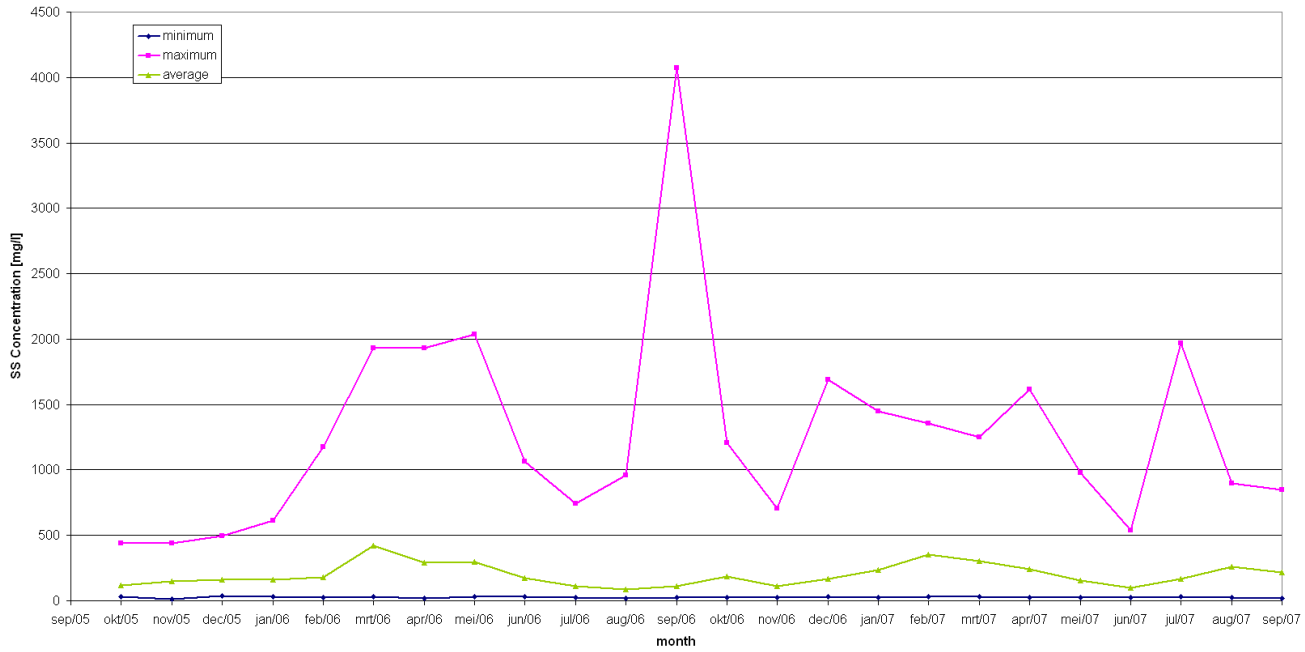
Data processed by:

In association with:

I/RA/11283/07.098/MSA

Salinity & SS Concentration





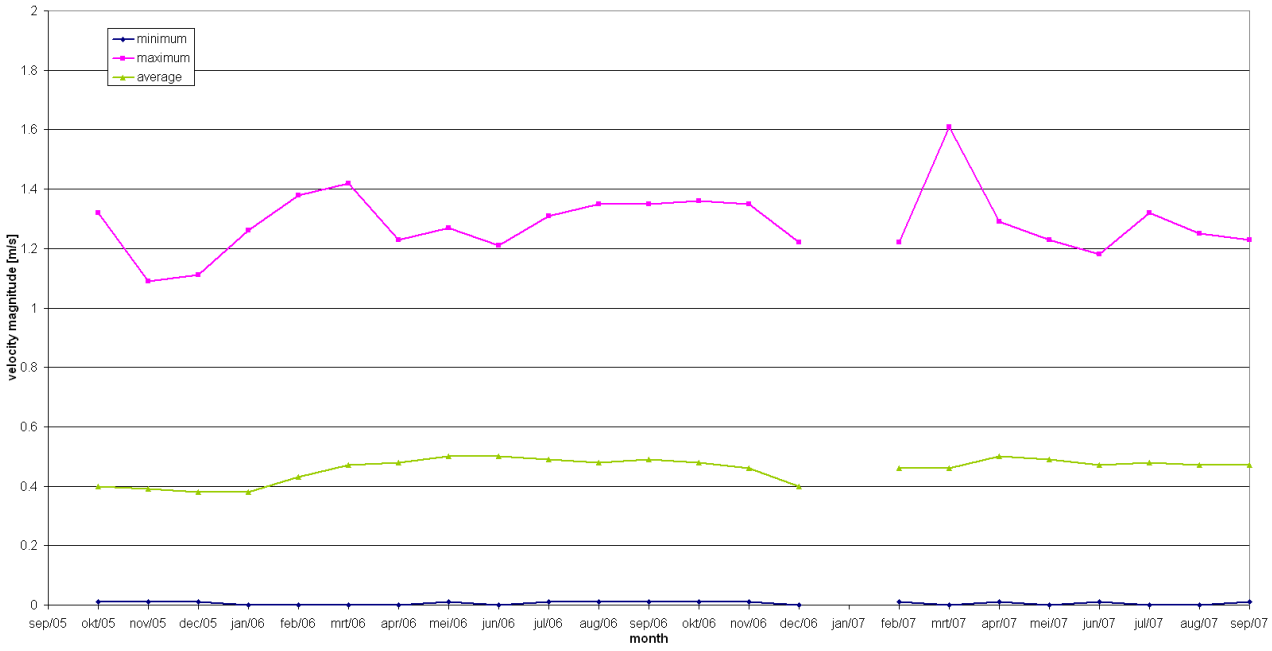
Buoy 97
3.3m above bottom (-5.3m TAW)

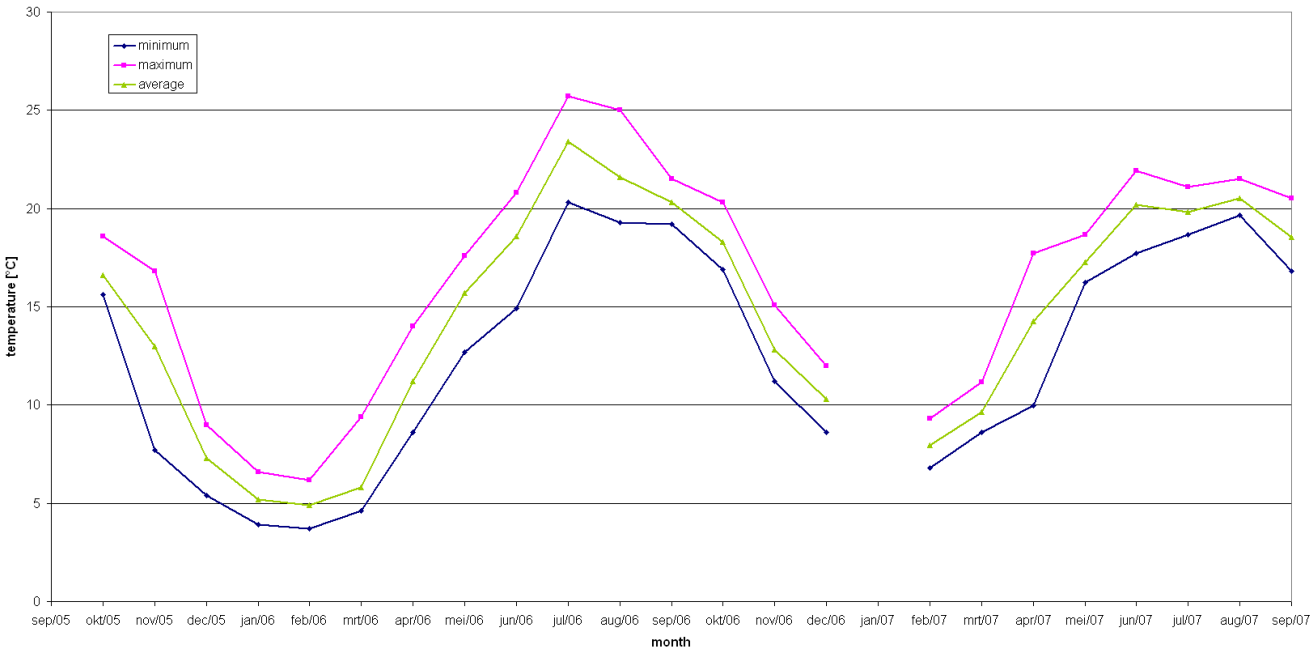
Data processed by:

In association with:

I/RA/11283/07.098/MSA

Velocity magnitude & temperature





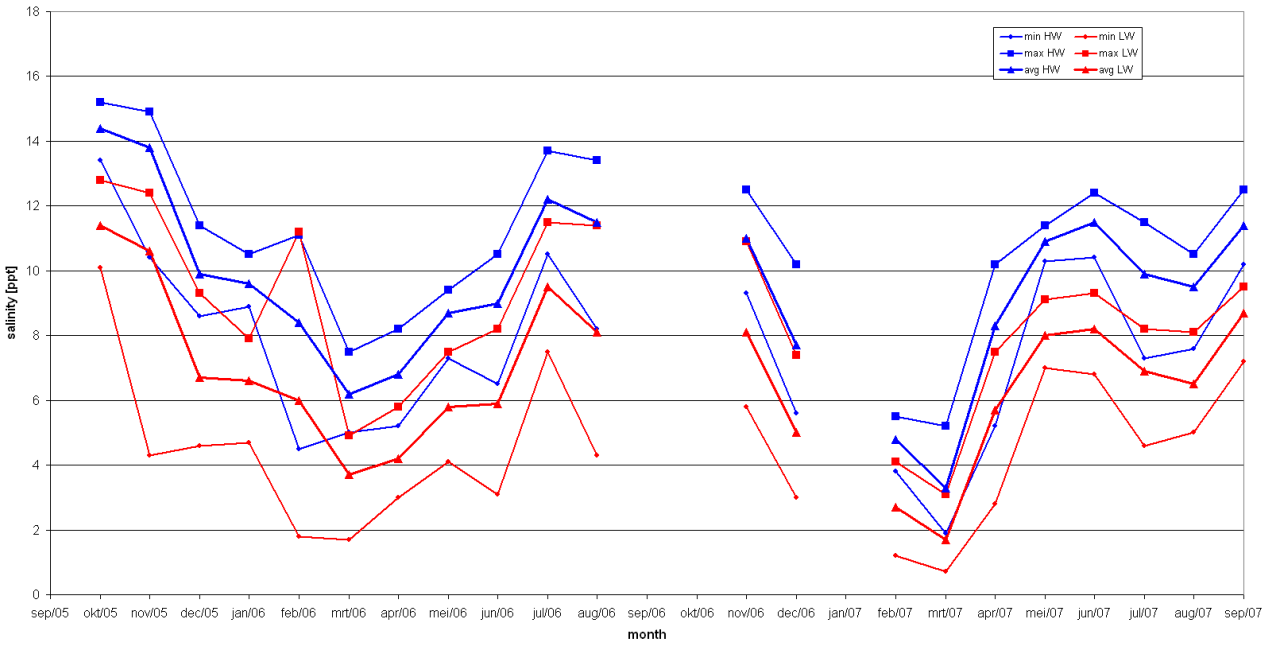
Buoy 97
0.8m above bottom (-7.8m TAW)

Data processed by:

In association with:

I/RA/11283/07.098/MSA

Salinity & SS Concentration



Buoy 97
0.8m above bottom (-7.8m TAW)

Data processed by:

In association with:

I/RA/11283/07.098/MSA

B.4 Total result from July 2007 till September 2007 of velocity magnitude, temperature, salinity and suspended sediment concentration

Averages for the whole deployment period of each instrument [July 2007 – September 2007]

Location	*Depth [m TAW]*	*Velocity [m/s]*			*Temperature [°C]*			*SS concentration [mg/l]*		
		Min	*Max*	*Avg*	*Min*	*Max*	*Avg*	*Min*	*Max*	*Avg*
Buoy 84	-5.6	0.00	1.34	0.50	16.6	21.4	19.6	9	850	160
Buoy 84	-8.1	0.00	1.19	0.45	18.4	21.4	20.1	30	1540	254
Buoy 97	-5.3	0.00	1.68	0.59	16.9	21.5	19.8	18	1970	216
Buoy 97	-7.8	0.00	1.32	0.47	16.8	21.5	19.7	22	2091	283

Salinity [ppt]

Location	*Depth [m TAW]*	*Minimum*		*Maximum*		*Average*	
		Slack HW	*Slack LW*	*Slack HW*	*Slack LW*	*Slack HW*	*Slack LW*
Buoy 84	-5.6	6.3	6.8	15.1	11.7	12.0	9.3
Buoy 84	-8.1	9.9	6.8	15.0	11.7	12.1	9.0
Buoy 97	-5.3	8.1	3.9	12.4	9.2	10.1	6.7
Buoy 97	-7.8	7.3	4.0	12.5	9.5	10.2	7.3

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

APPENDIX C.

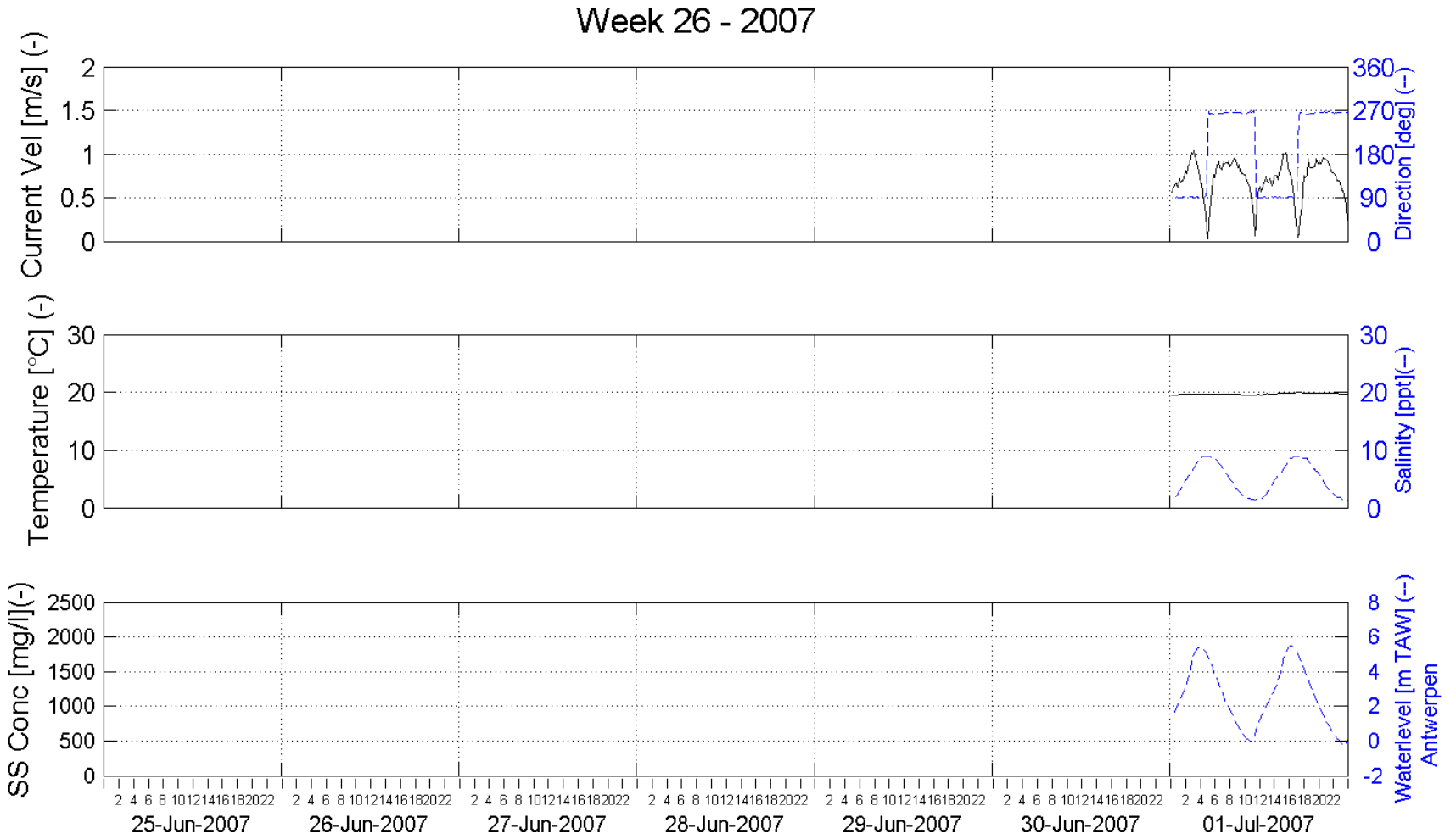
LONG TERM MEASUREMENTS AT OOSTERWEEL AND PROSPERPOLDER (WL – CEL HYDROMETRIE)

C.1 Datasheets week series

Datasheet order

Nr	*Location*	*Depth of Instrument*		*Sensor*	*Period*
		[m] above bottom	*[m TAW]*		
1	Oosterweel left bank	4.5	-2.3	Aanderaa 0152	01/07/2007 – 30/09/2007
2	Oosterweel left bank	1.0	-5.8	Aanderaa 0149	01/07/2007 – 30/09/2007
3	Prosperpolder	2.5	-1.5	Aanderaa 0117	01/07/2007 – 30/09/2007

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

IMDC

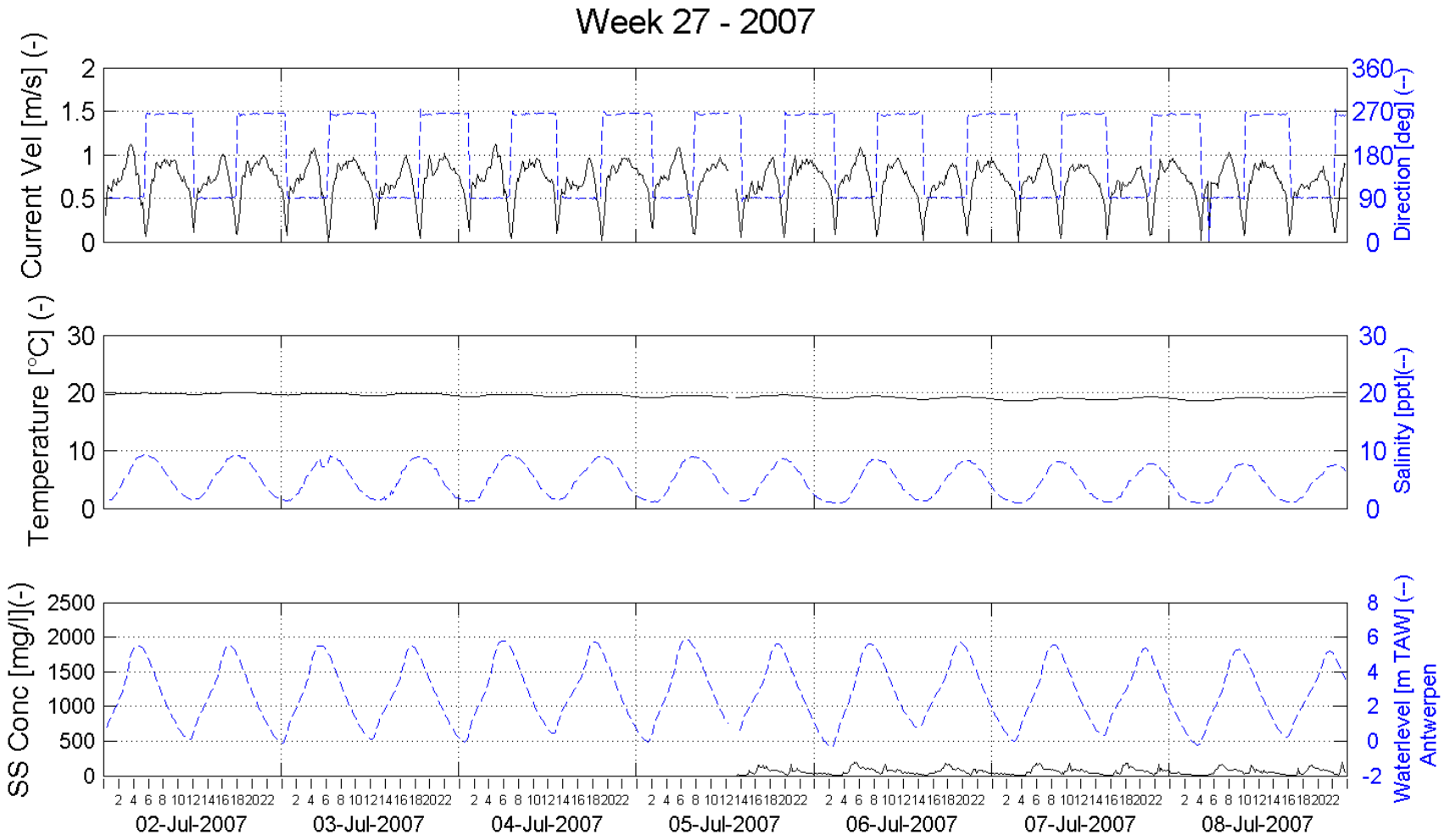
In Association with:

WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction,
Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

IMDC

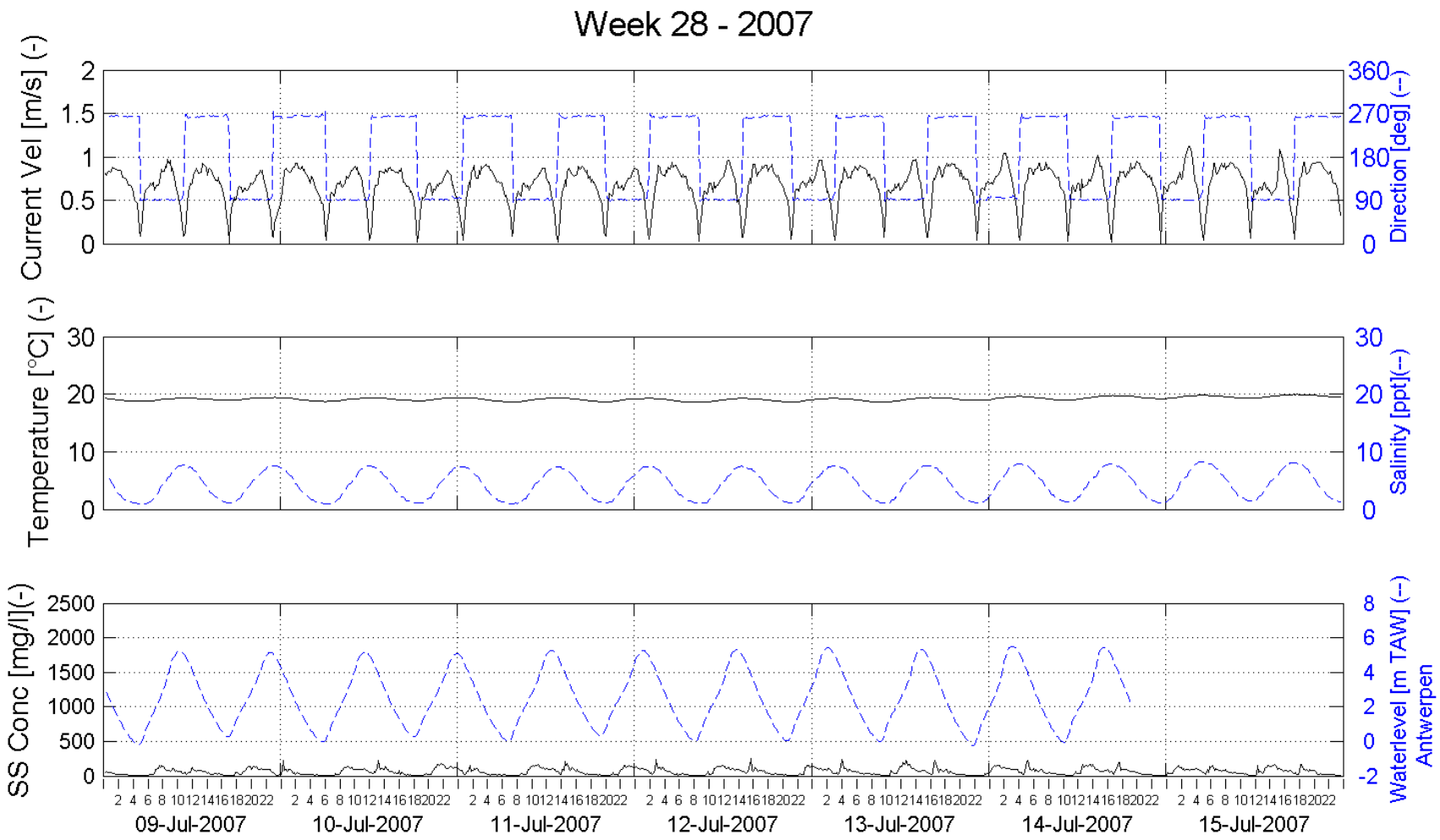
In Association with:

GEMS International

WL | delft hydraulics

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

IMDC

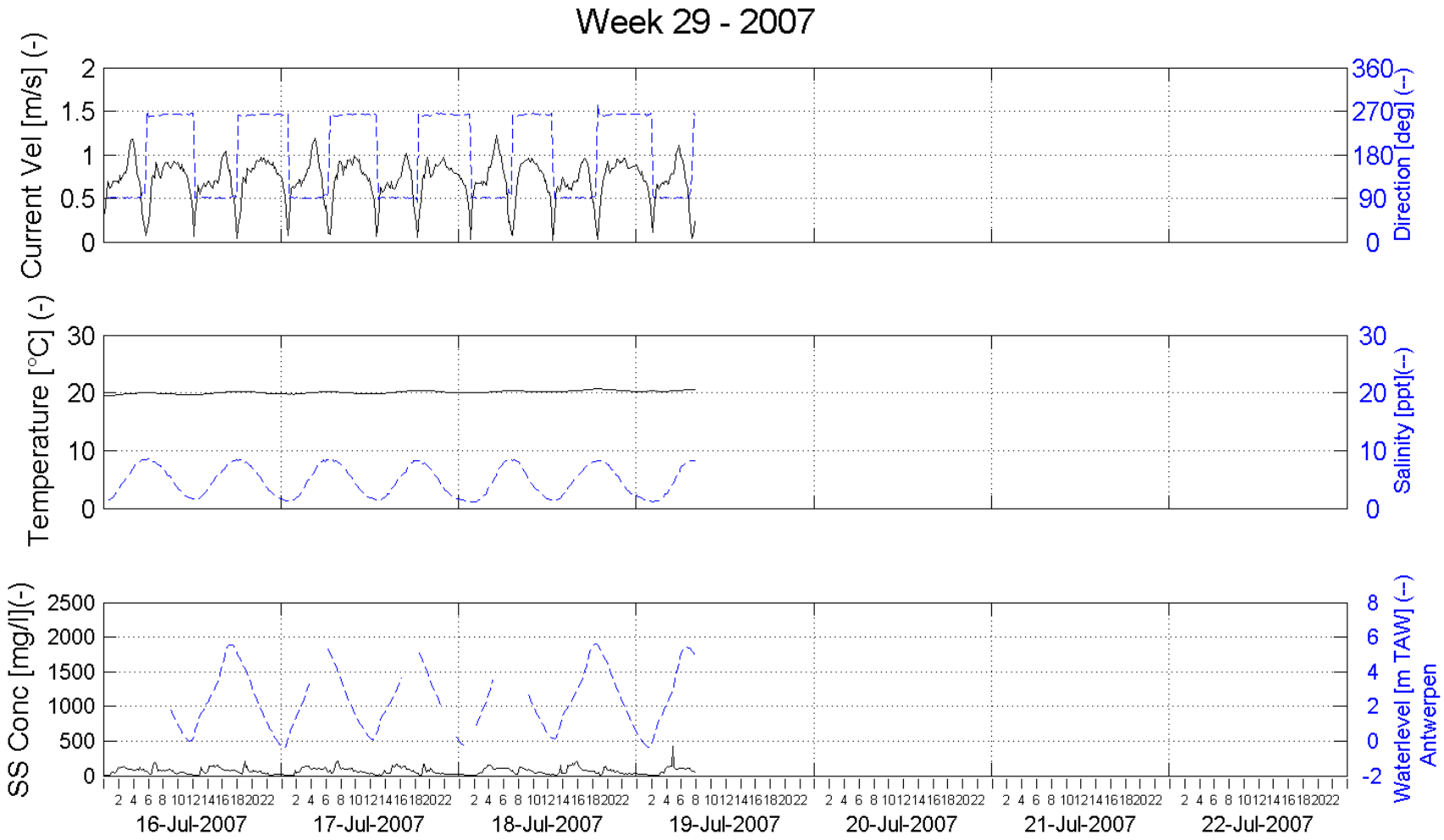
In Association with:

WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

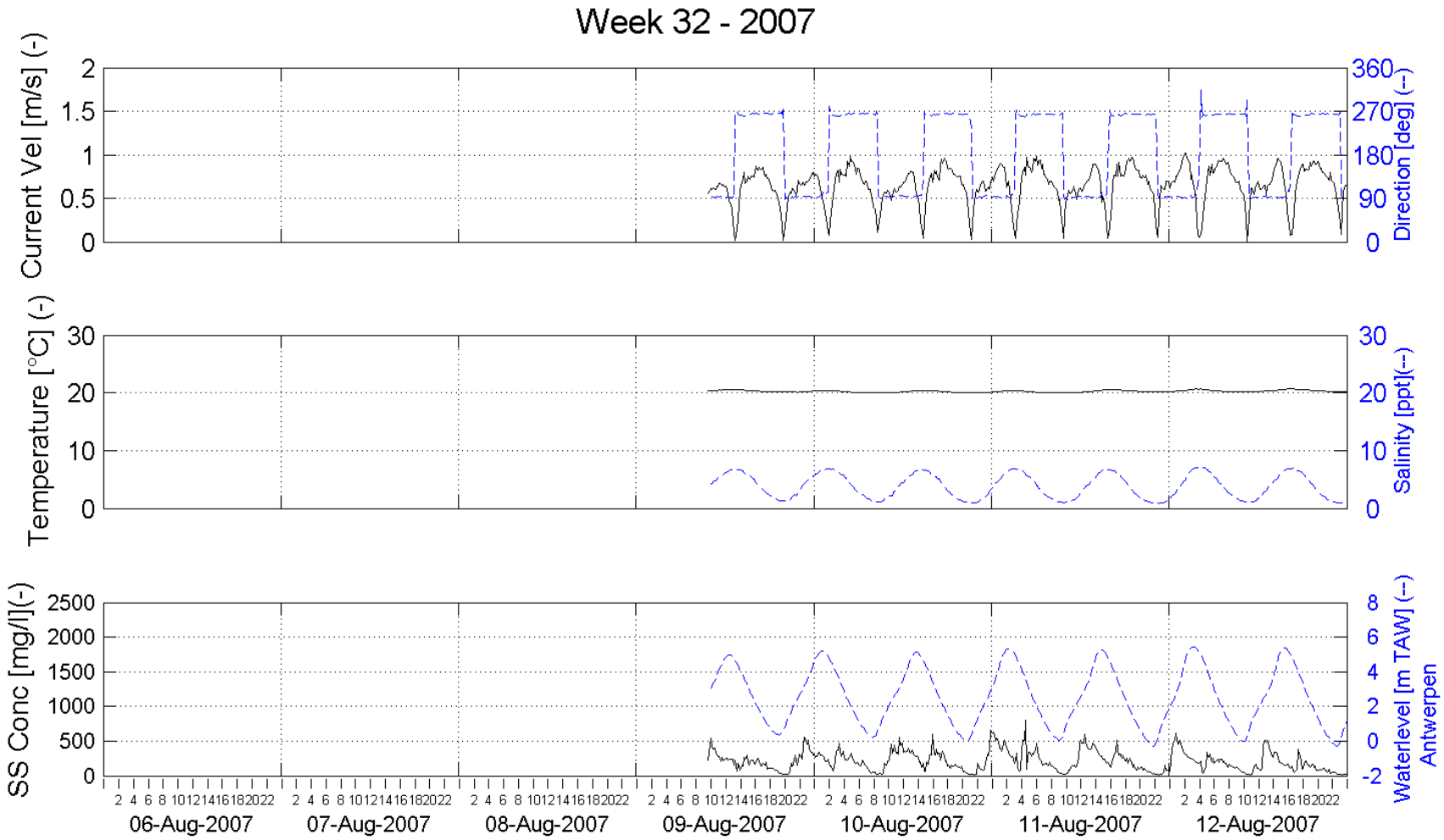
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

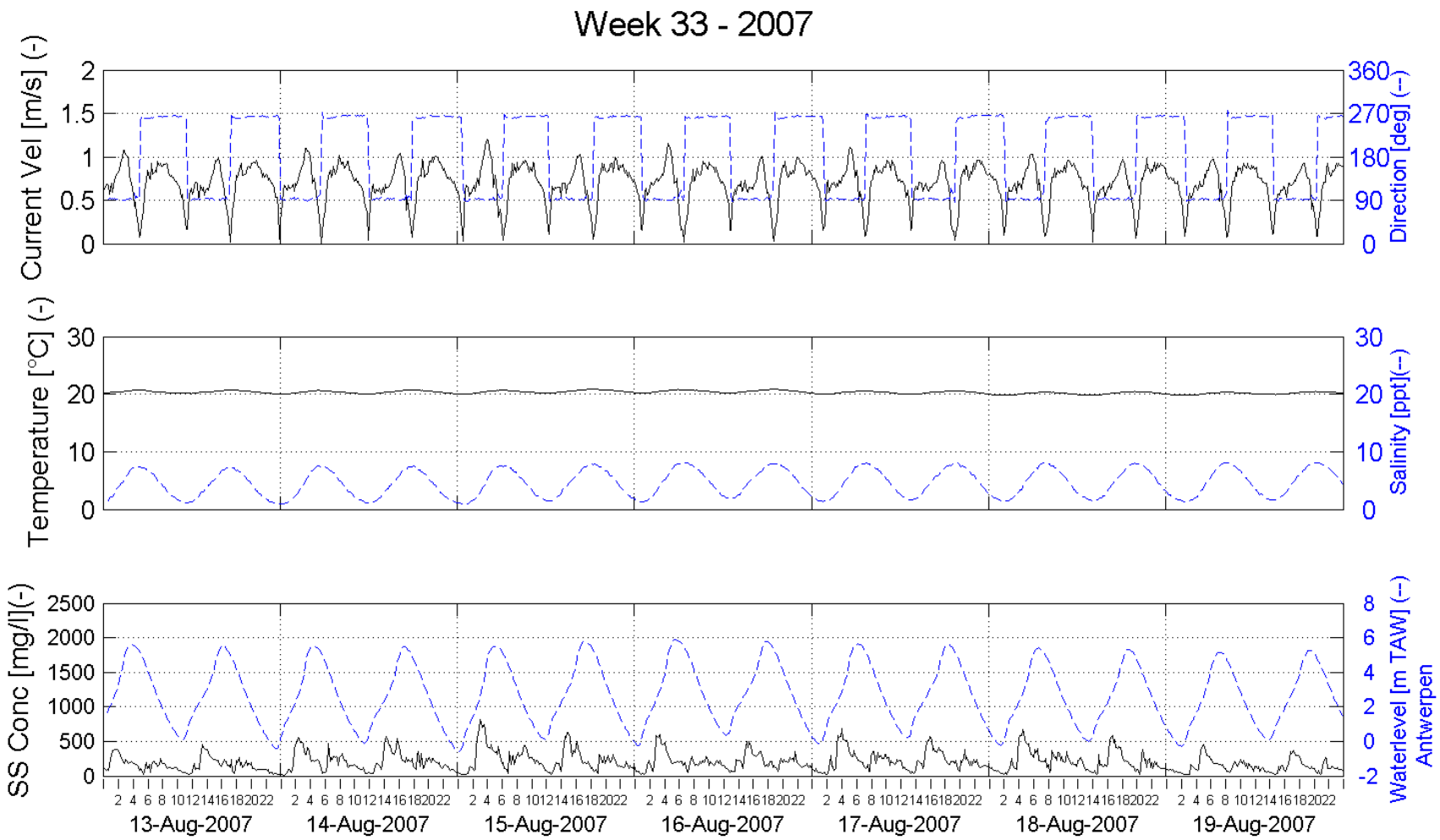
Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

IMDC

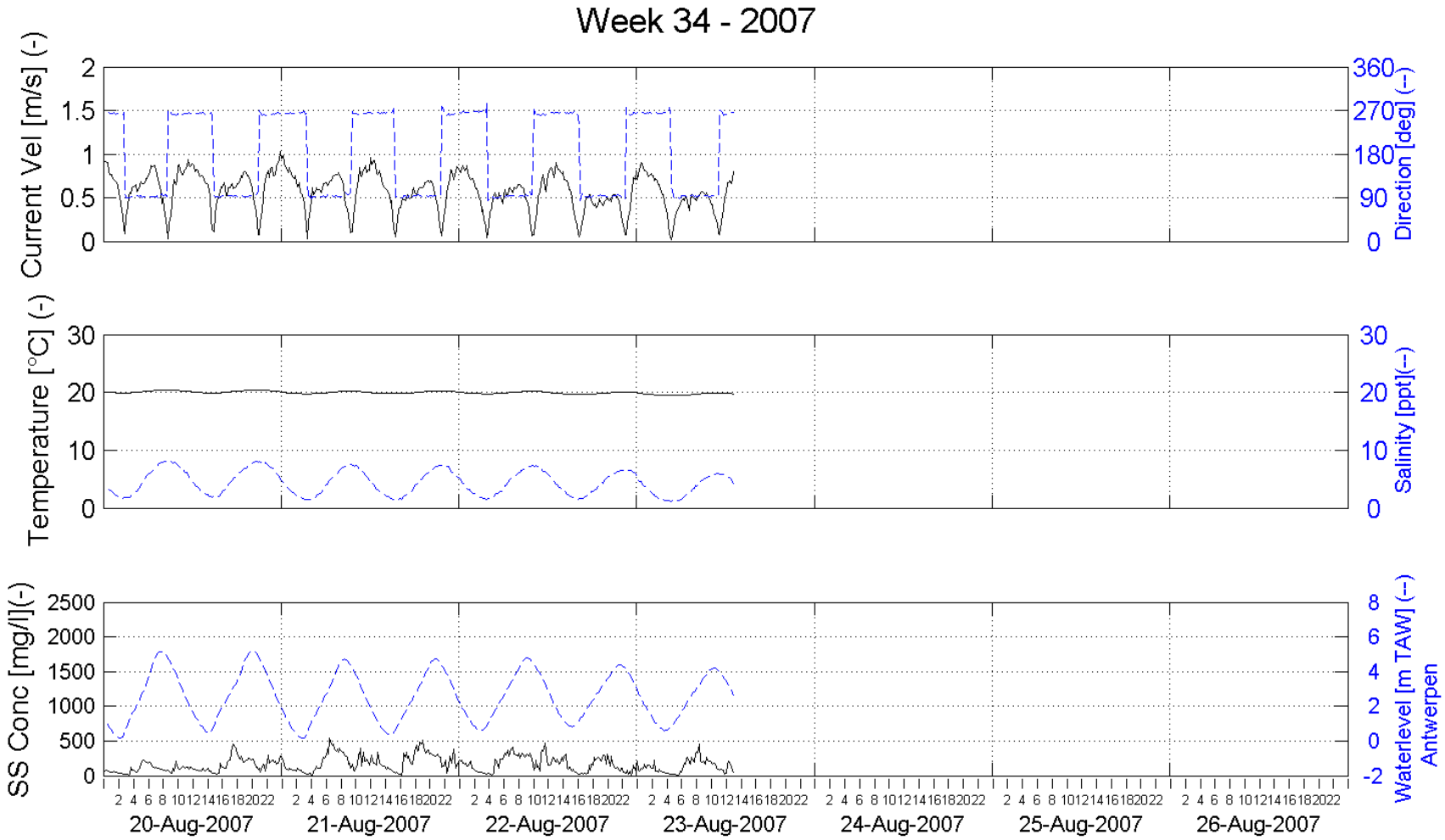
In Association with:

WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction,
Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

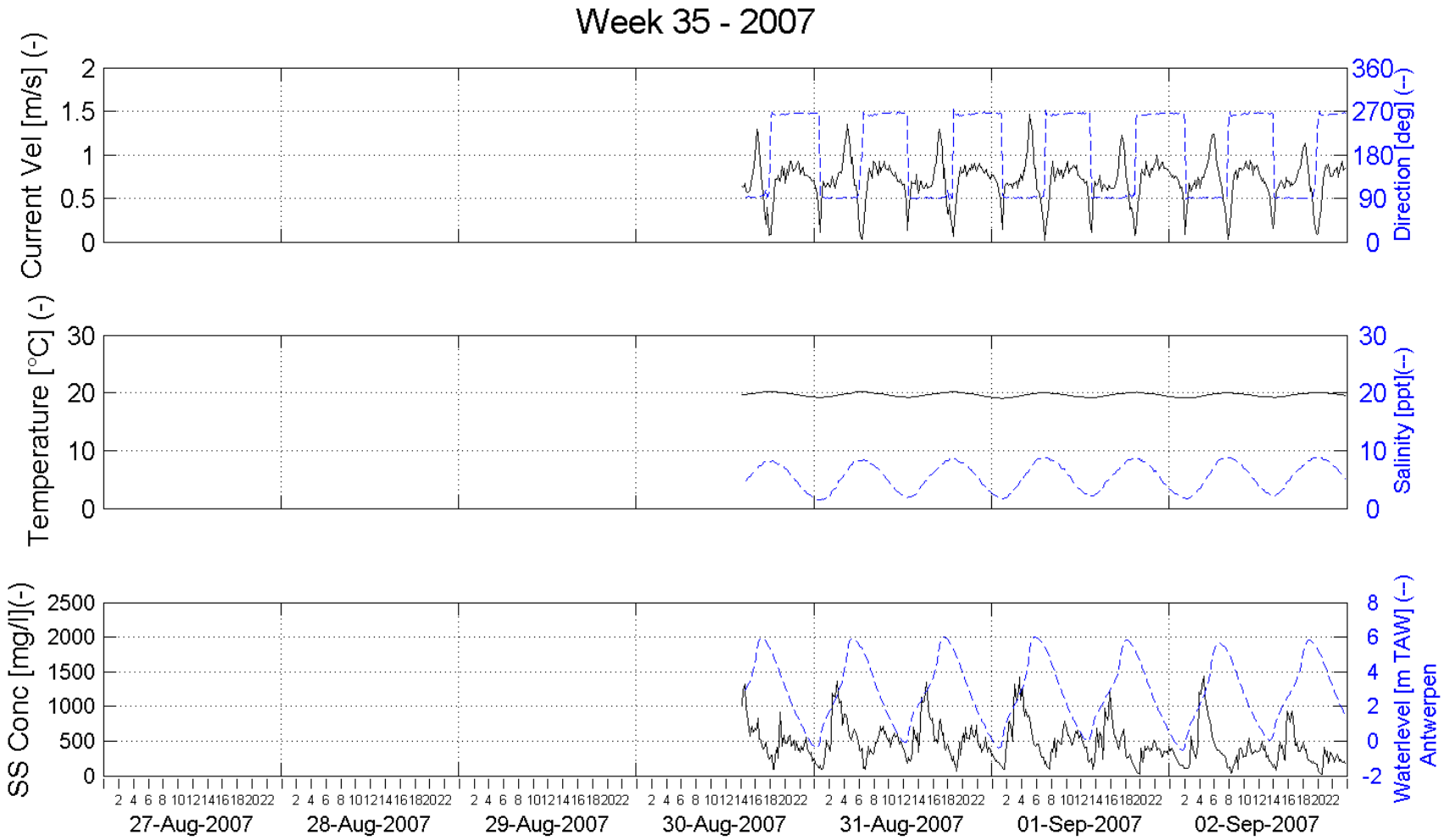
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction,
Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

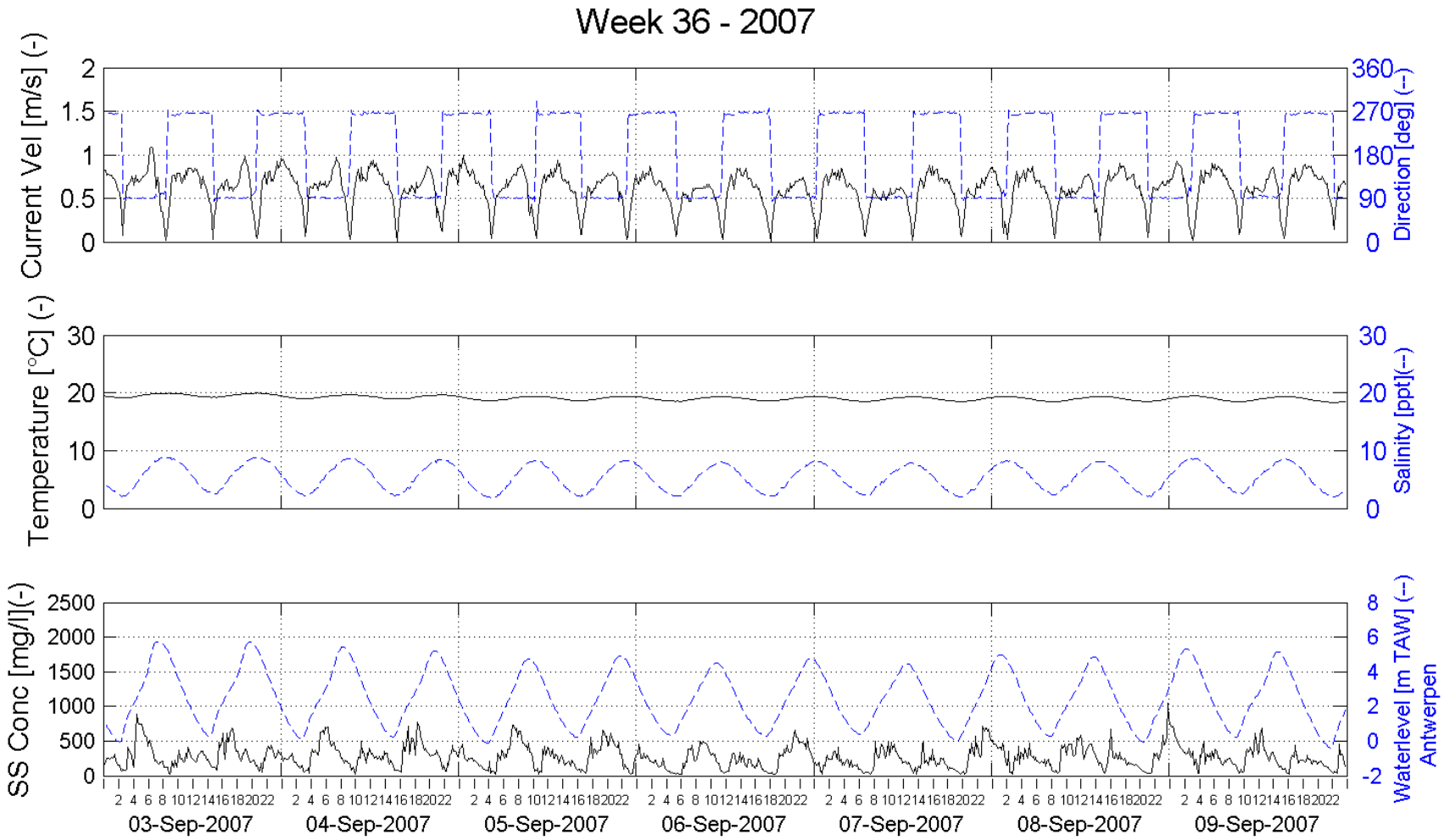
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

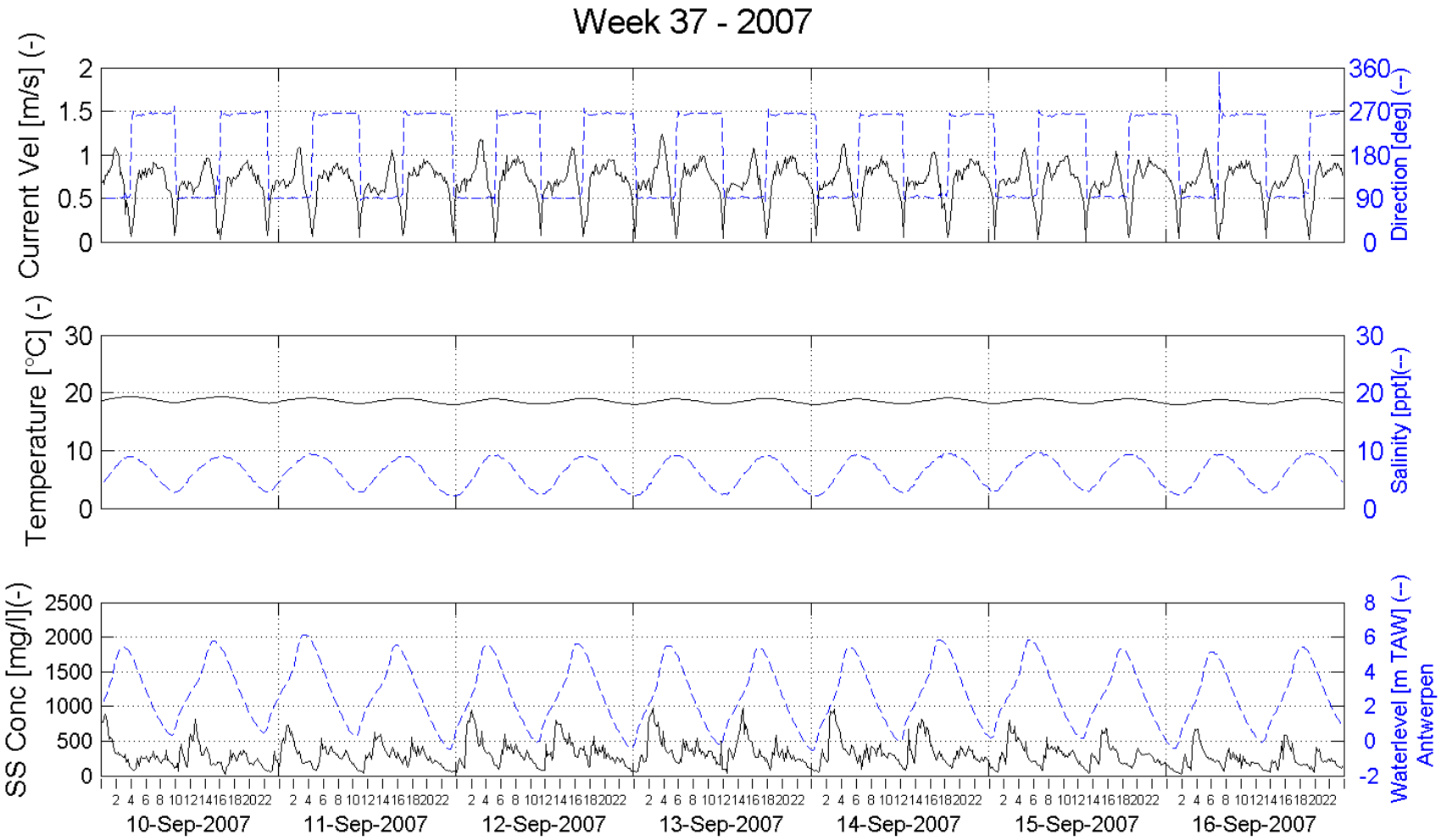
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

IMDC

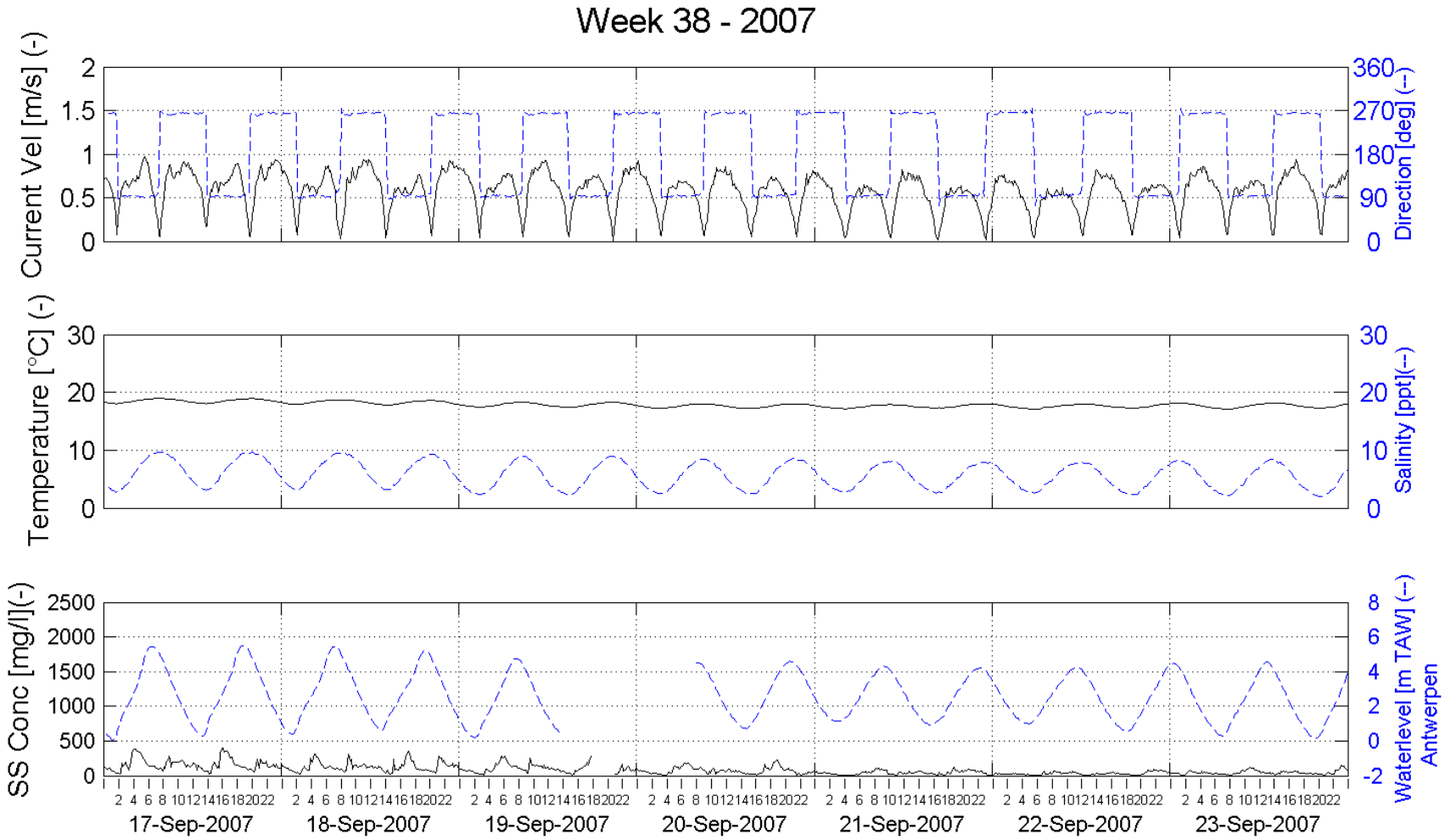
In Association with:

WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

Processed by:

IMDC

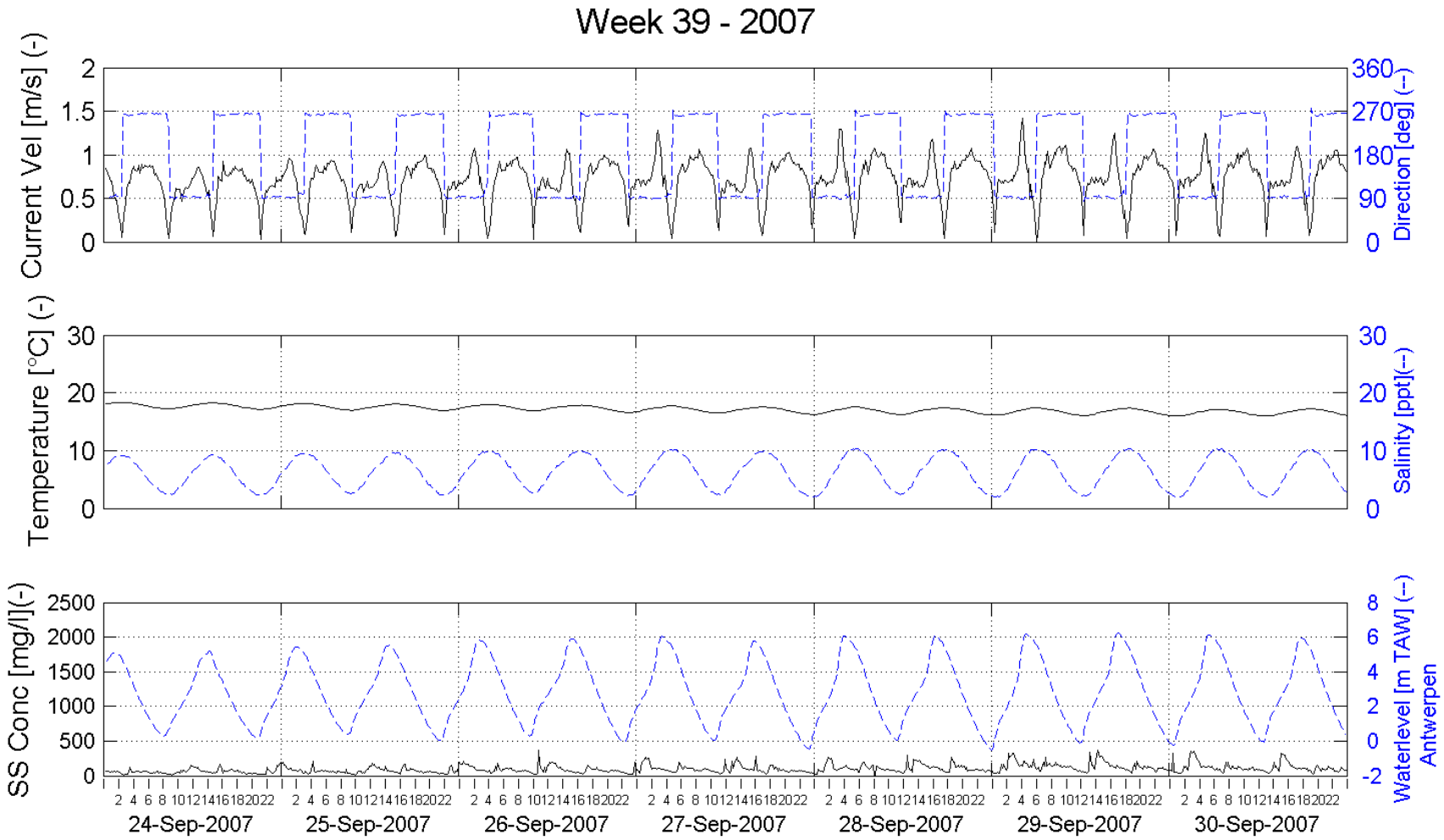
In Association with:

WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 4.5m above bottom (-2.3m TAW)

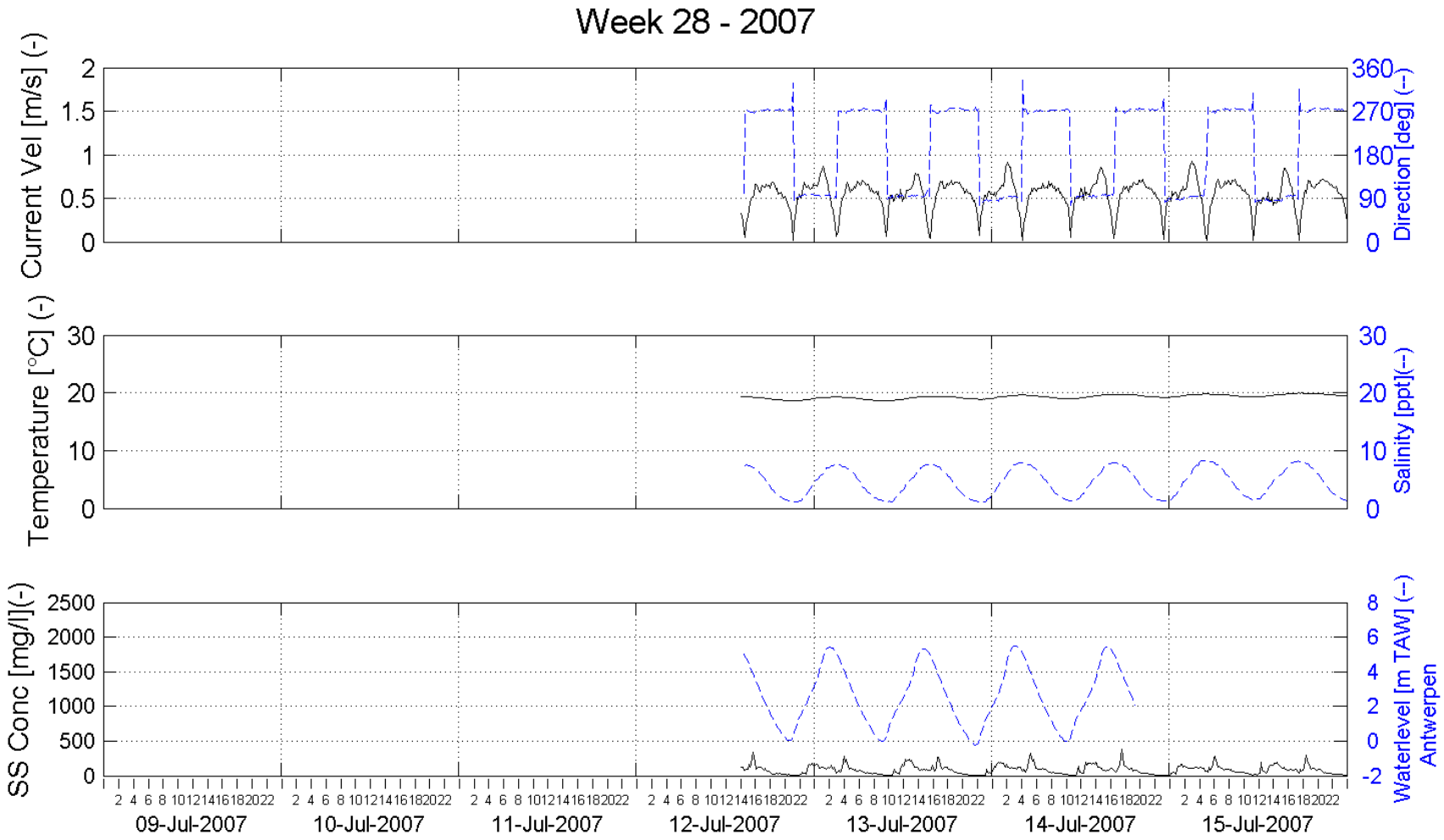
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

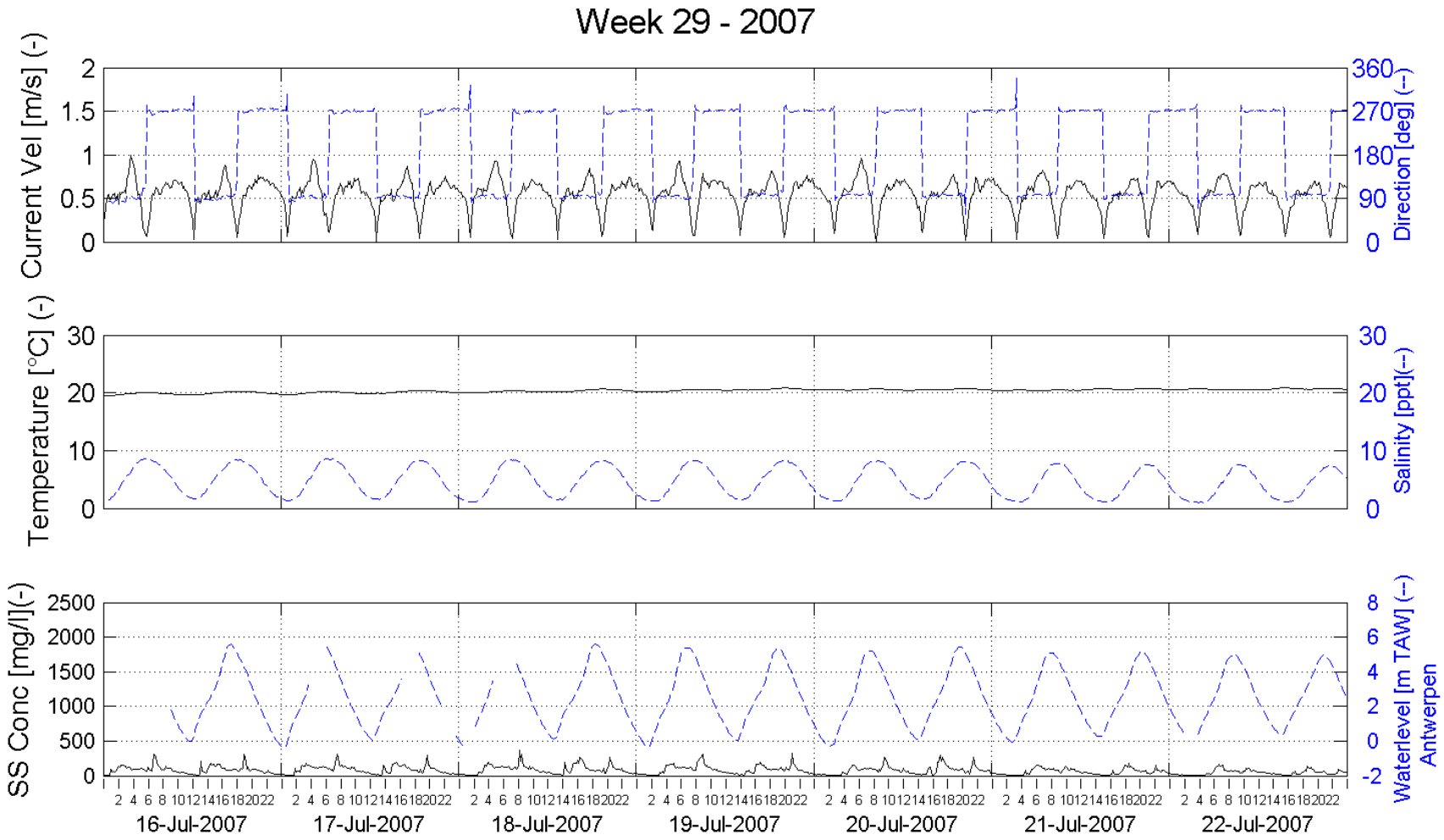
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

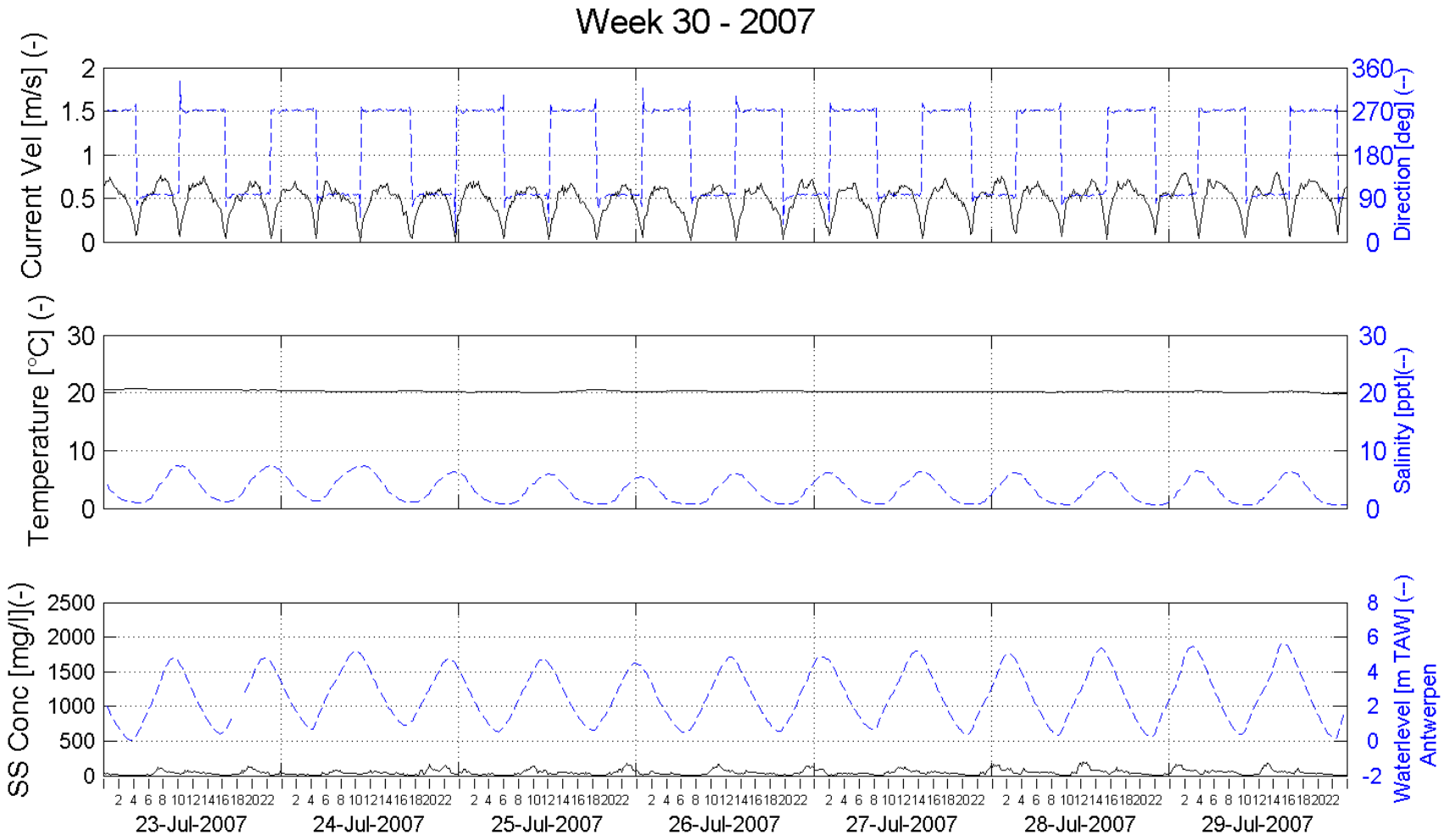
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

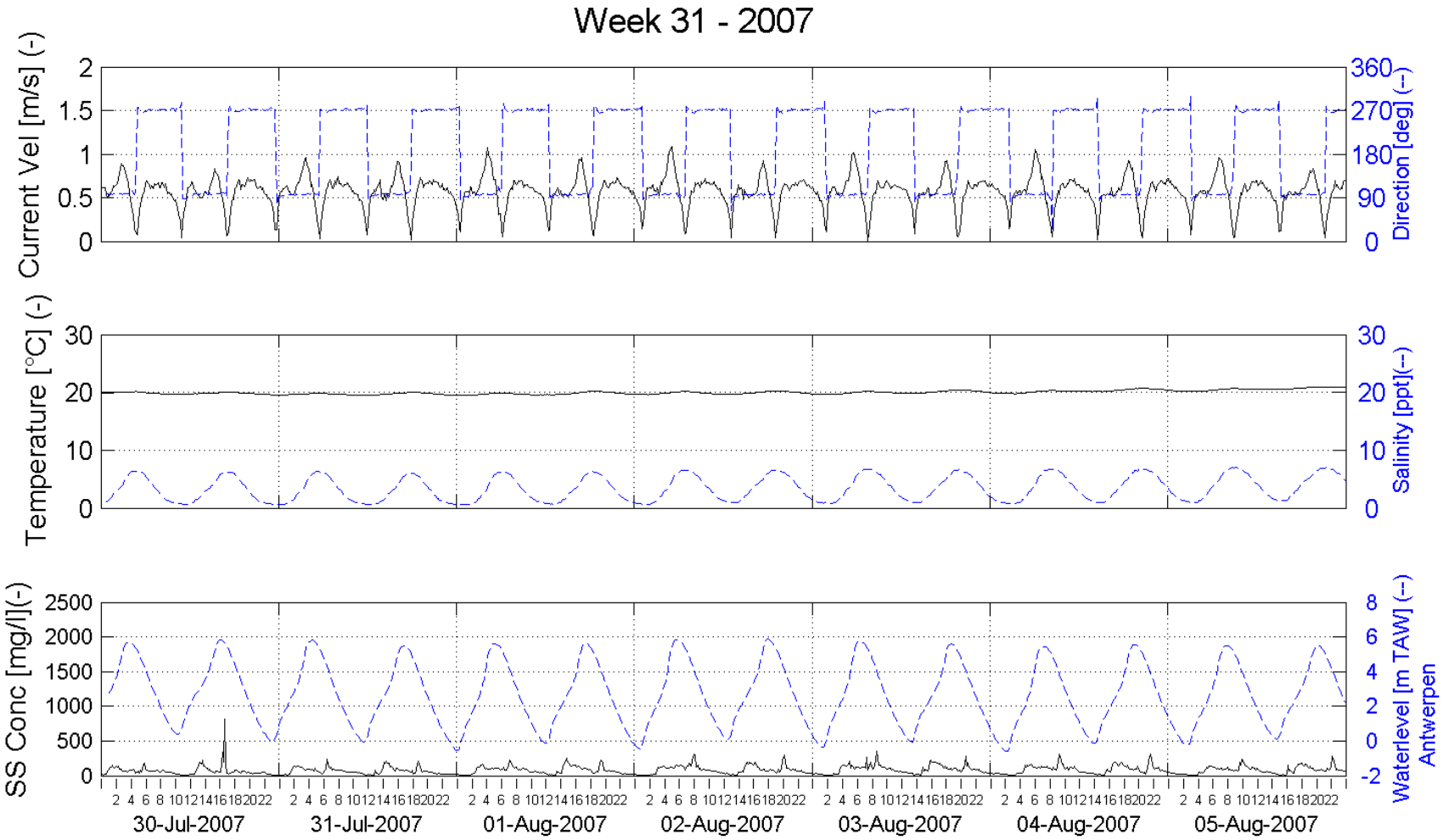
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

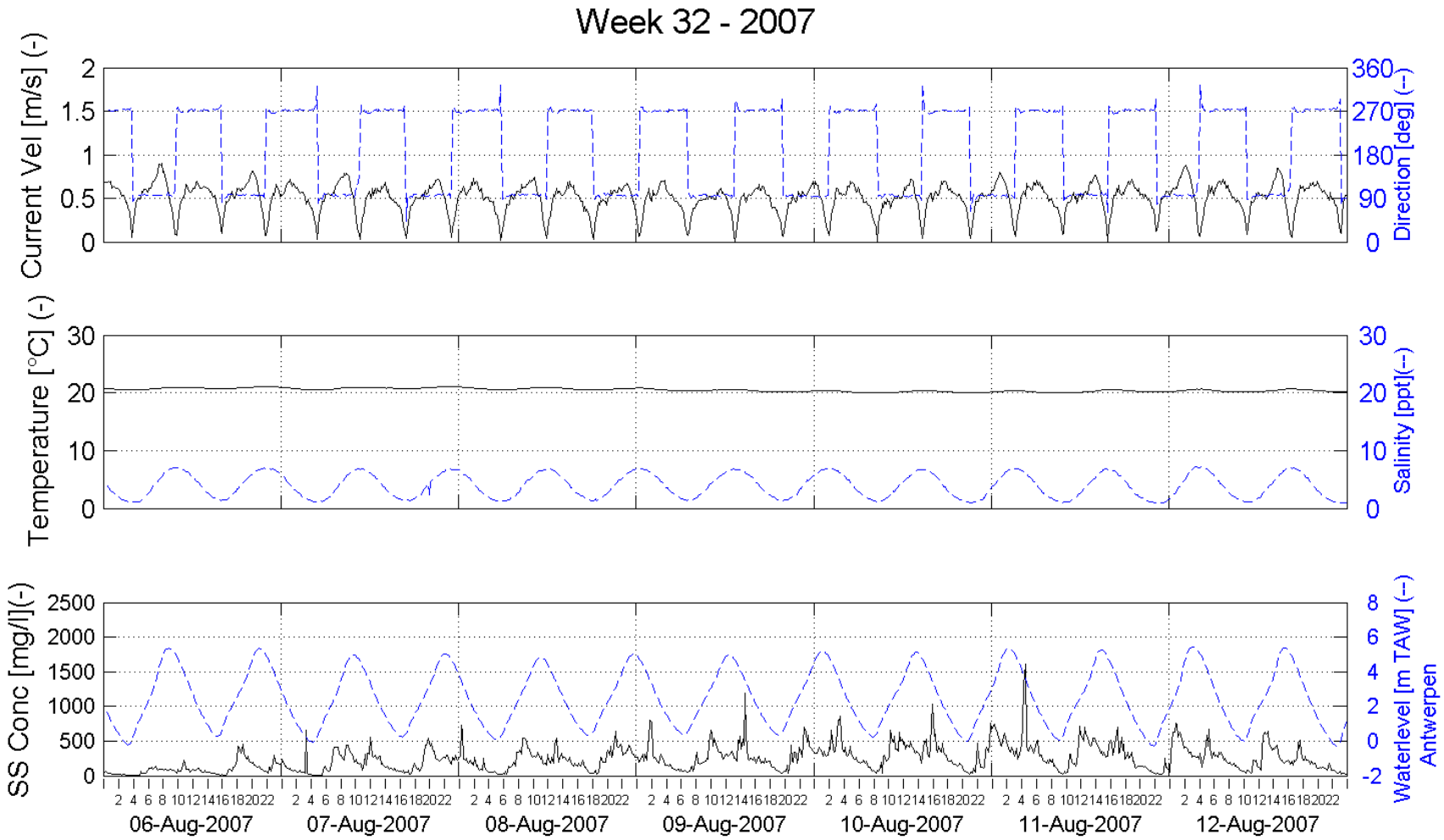
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

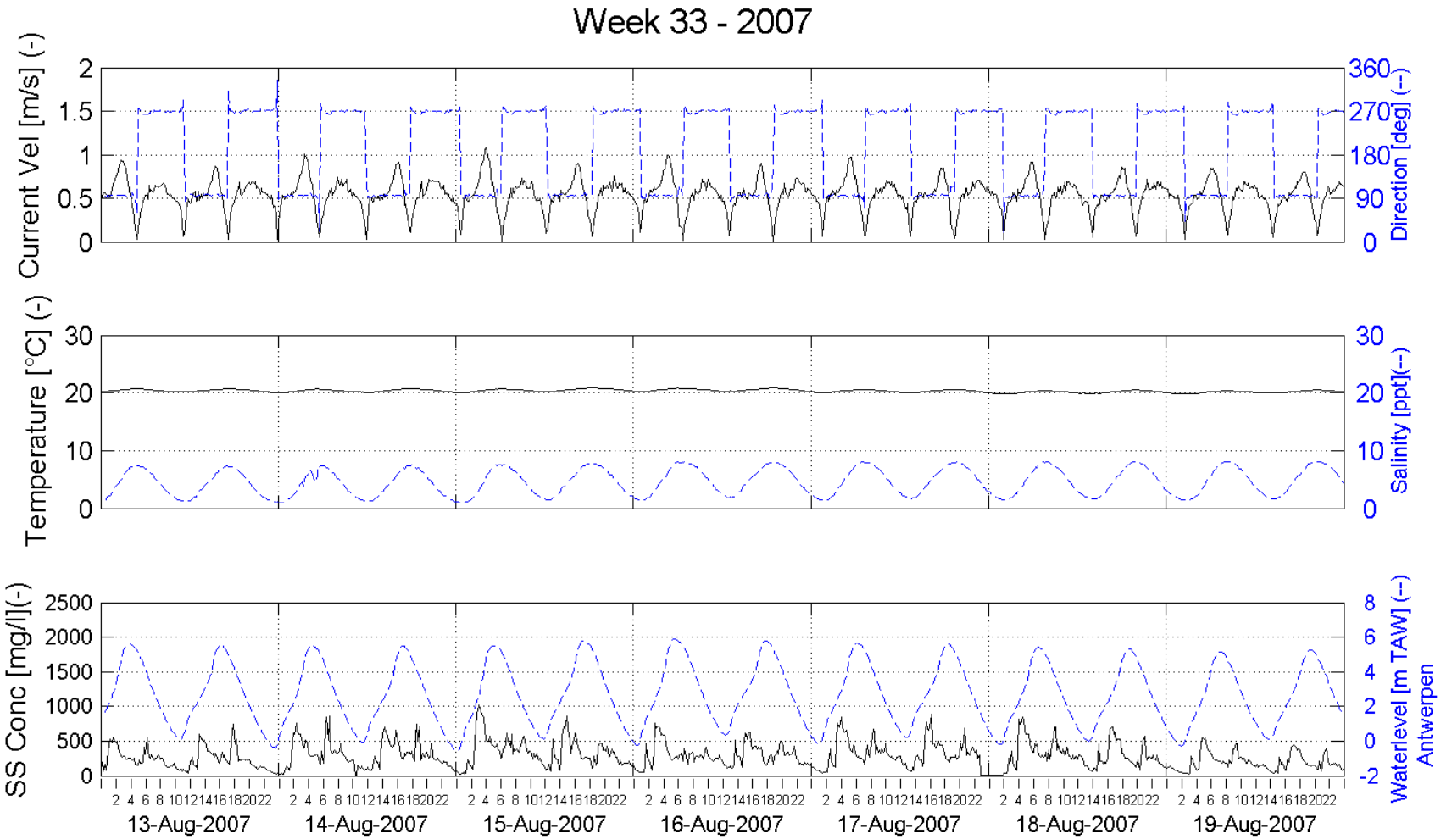
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

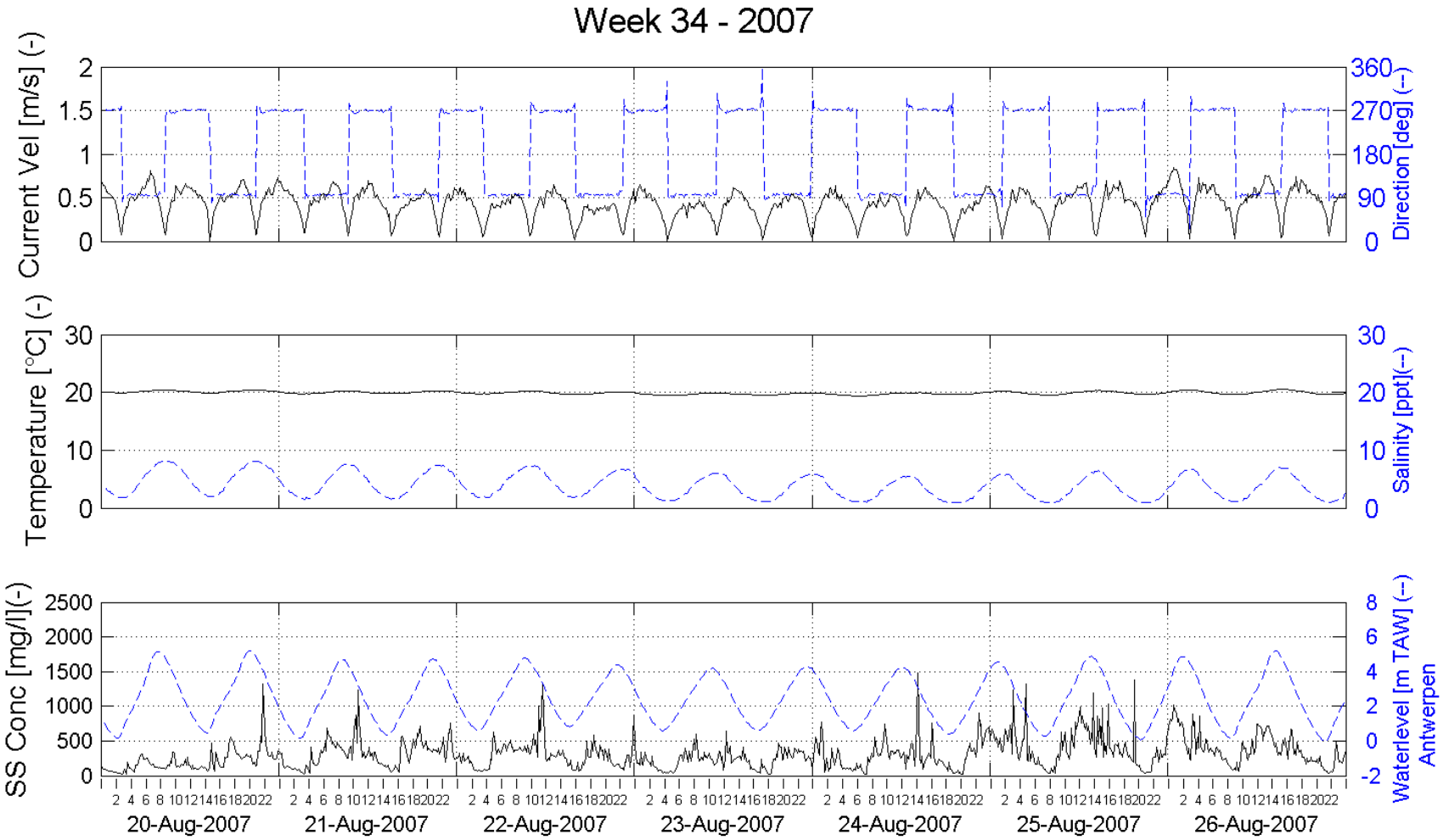
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

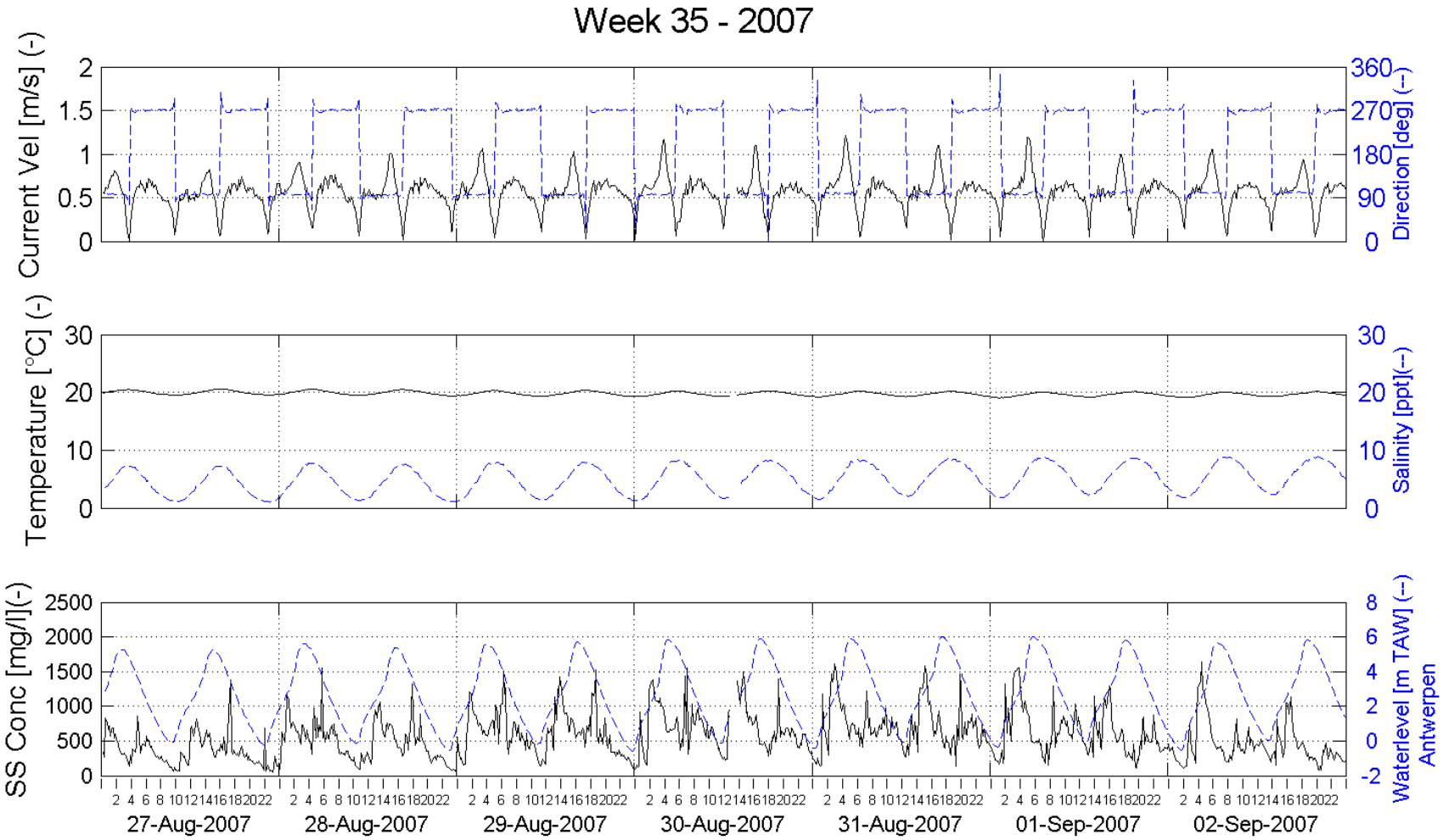
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction,
Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

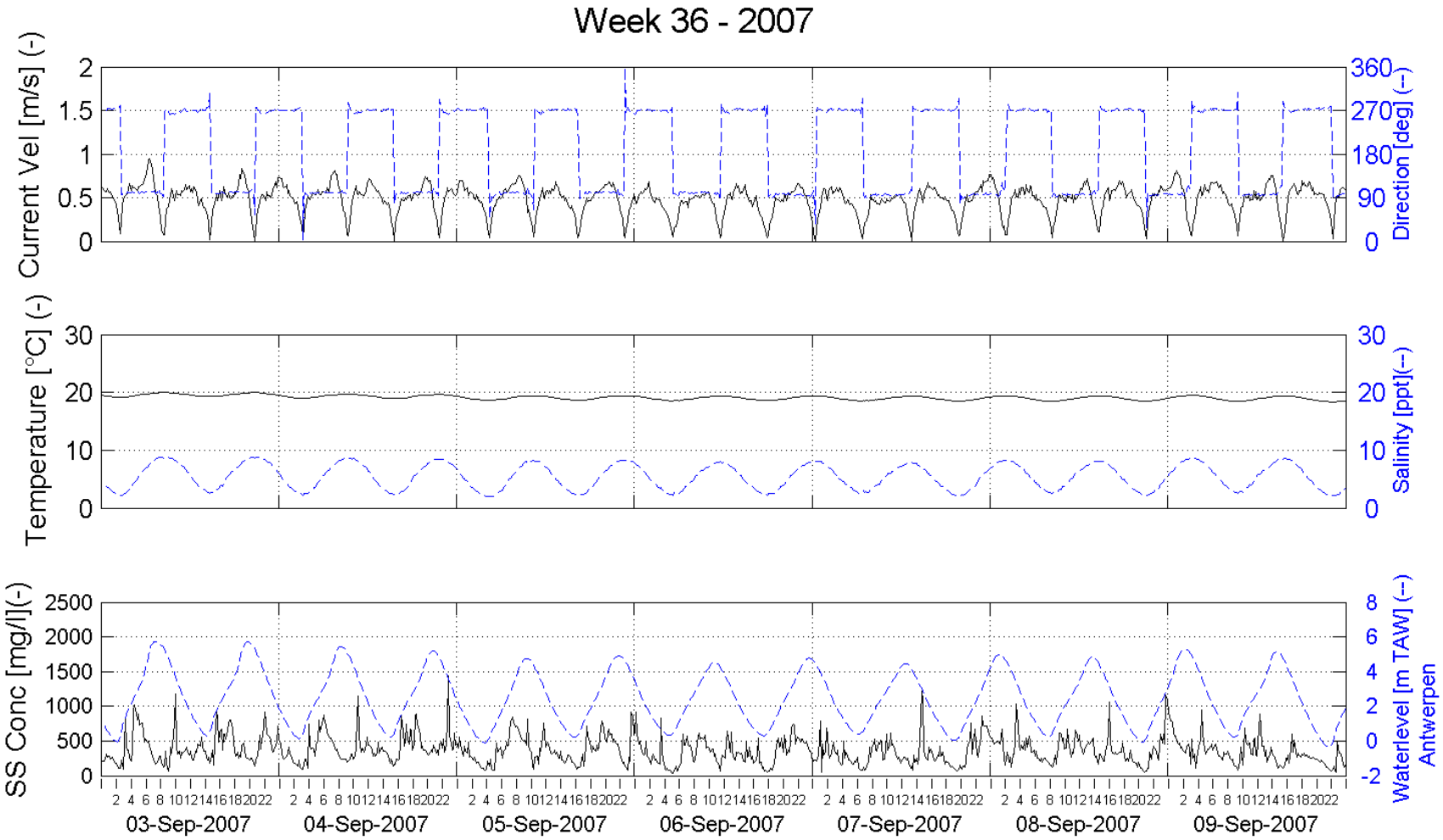
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

Processed by:

IMDC

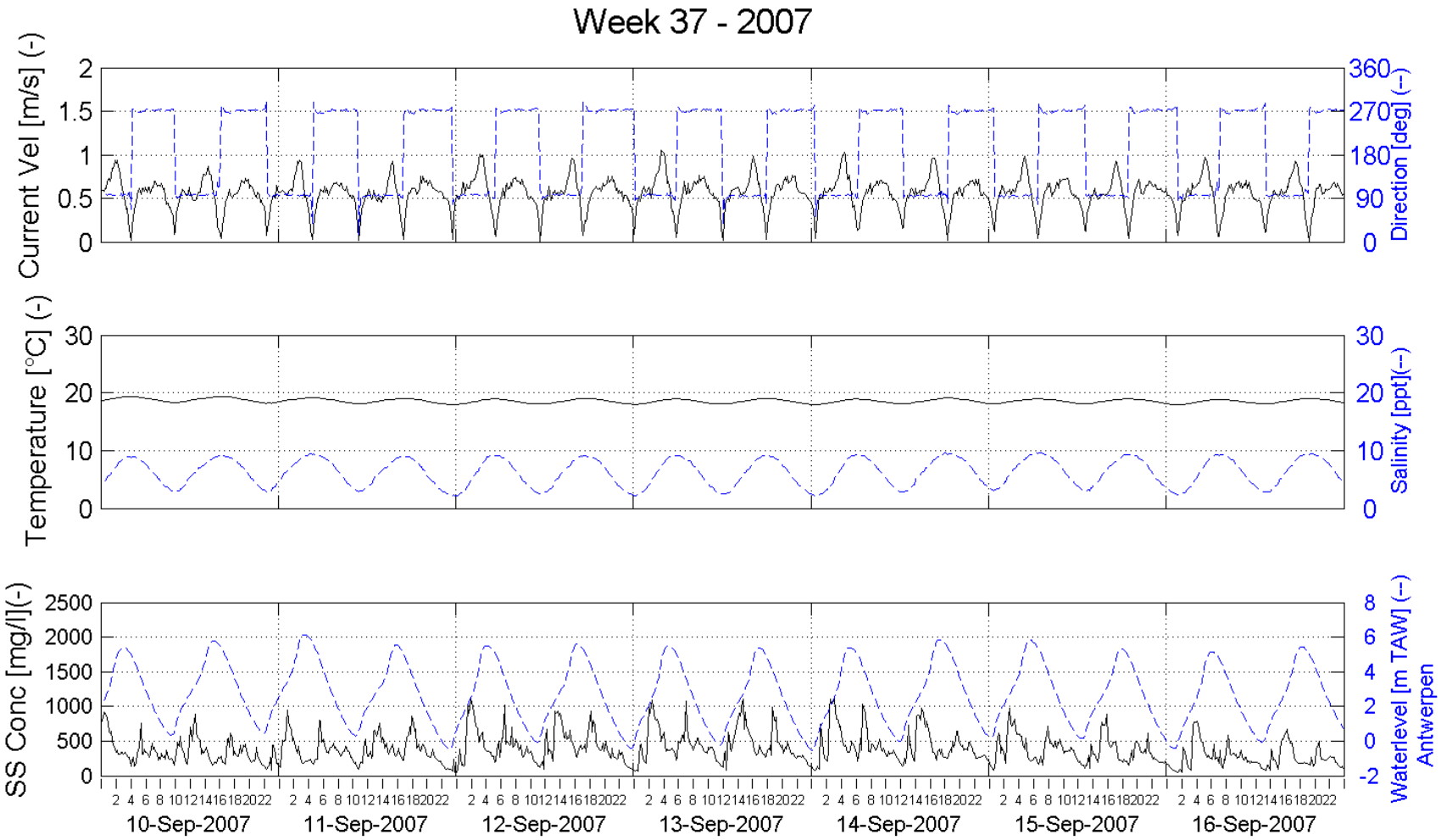
In Association with:

WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction,
Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

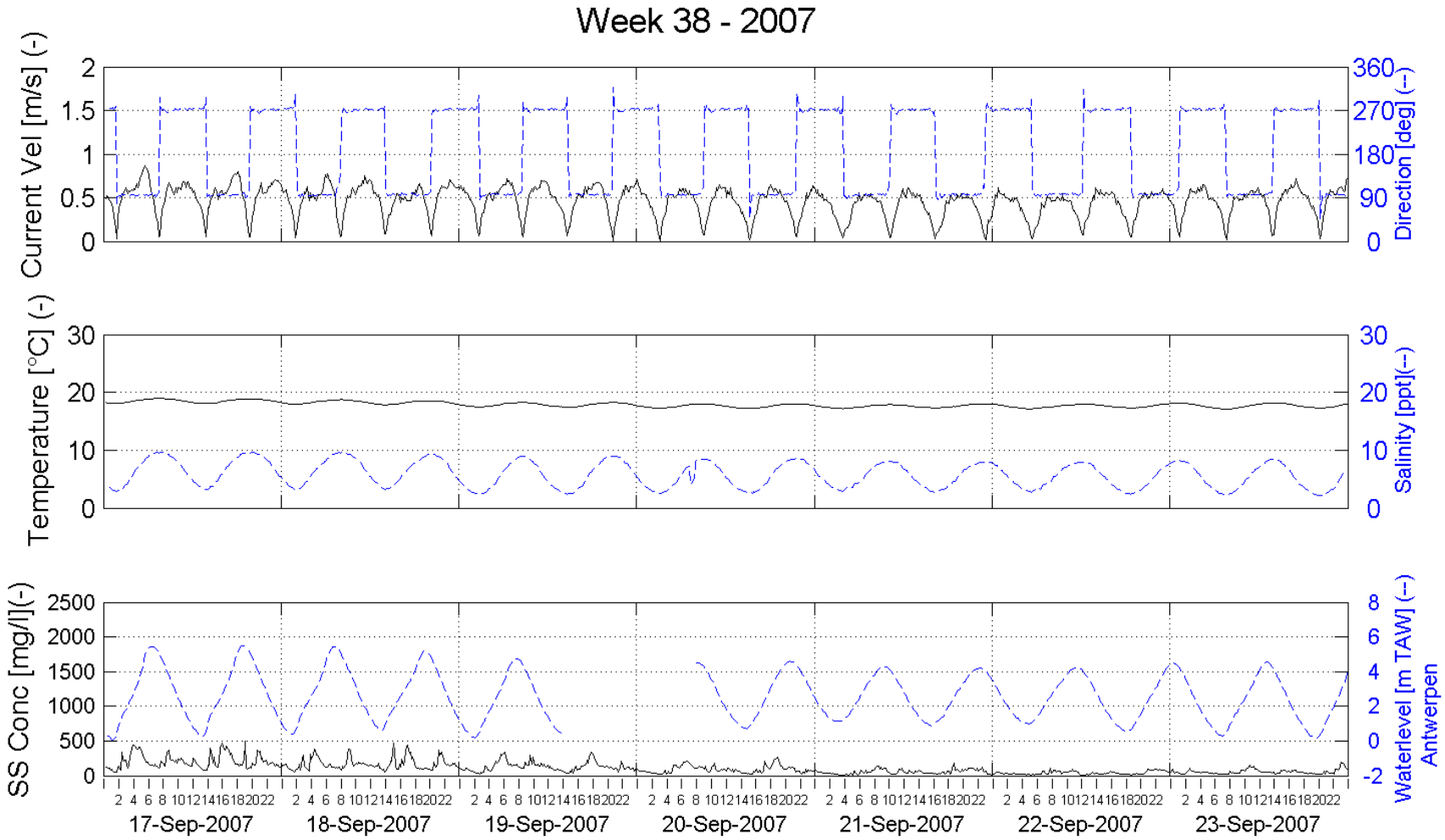
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

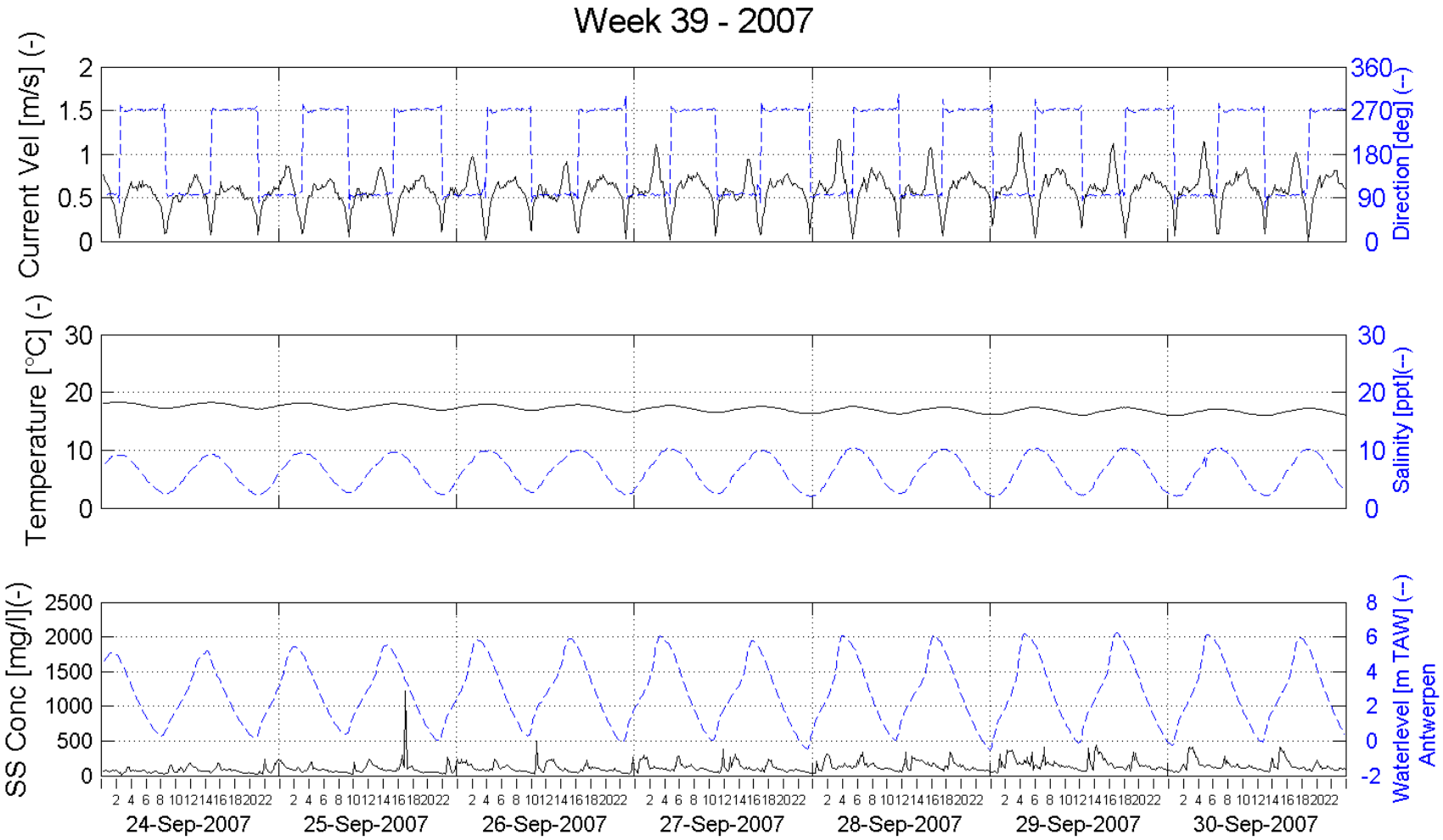
Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007



Week series Current Velocity, Current Direction, Temperature, Salinity, SS Concentration and Tide

Location:

Oosterweel (left bank) - 1m above bottom (-5.8m TAW)

Processed by:

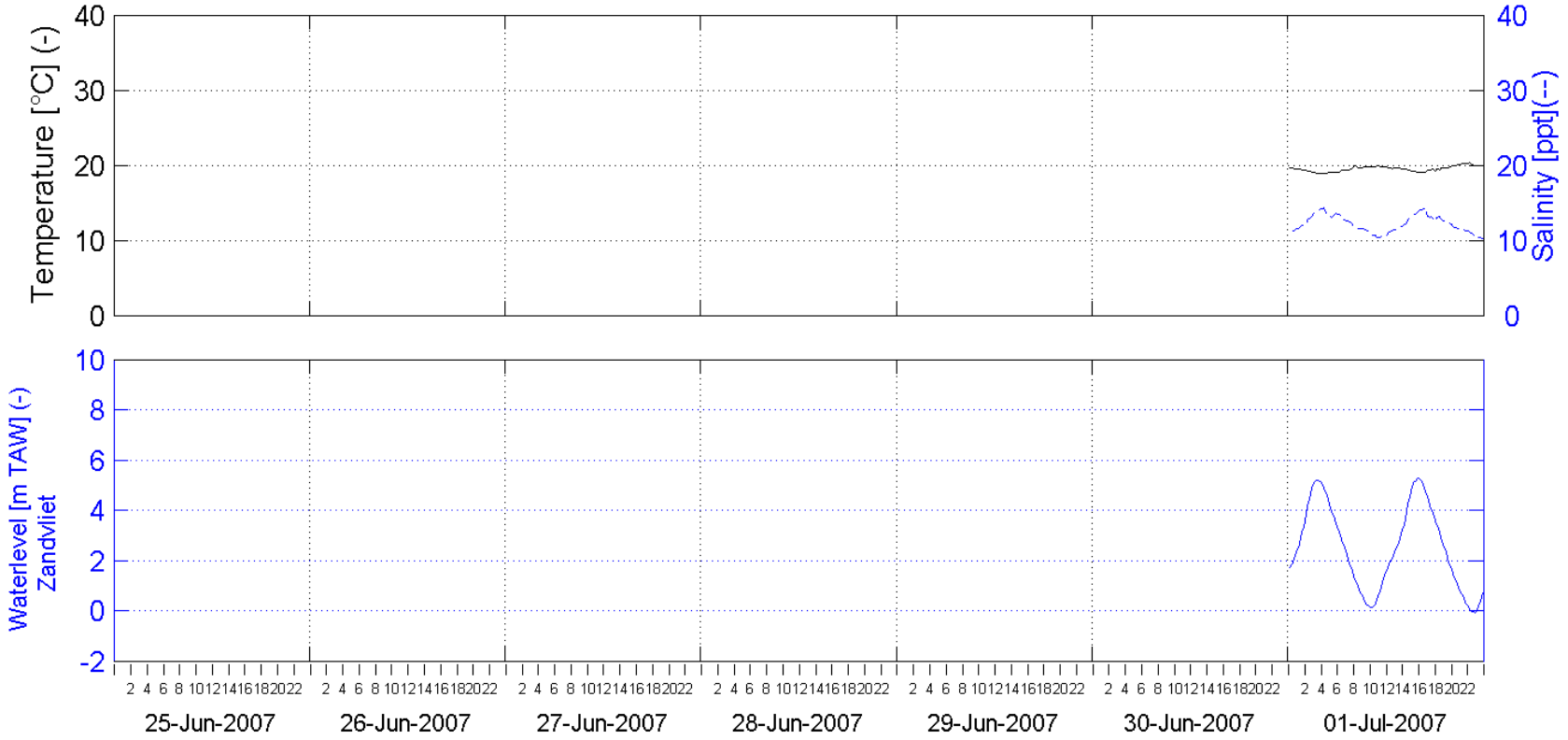
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 26 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

IMDC

In Association with:

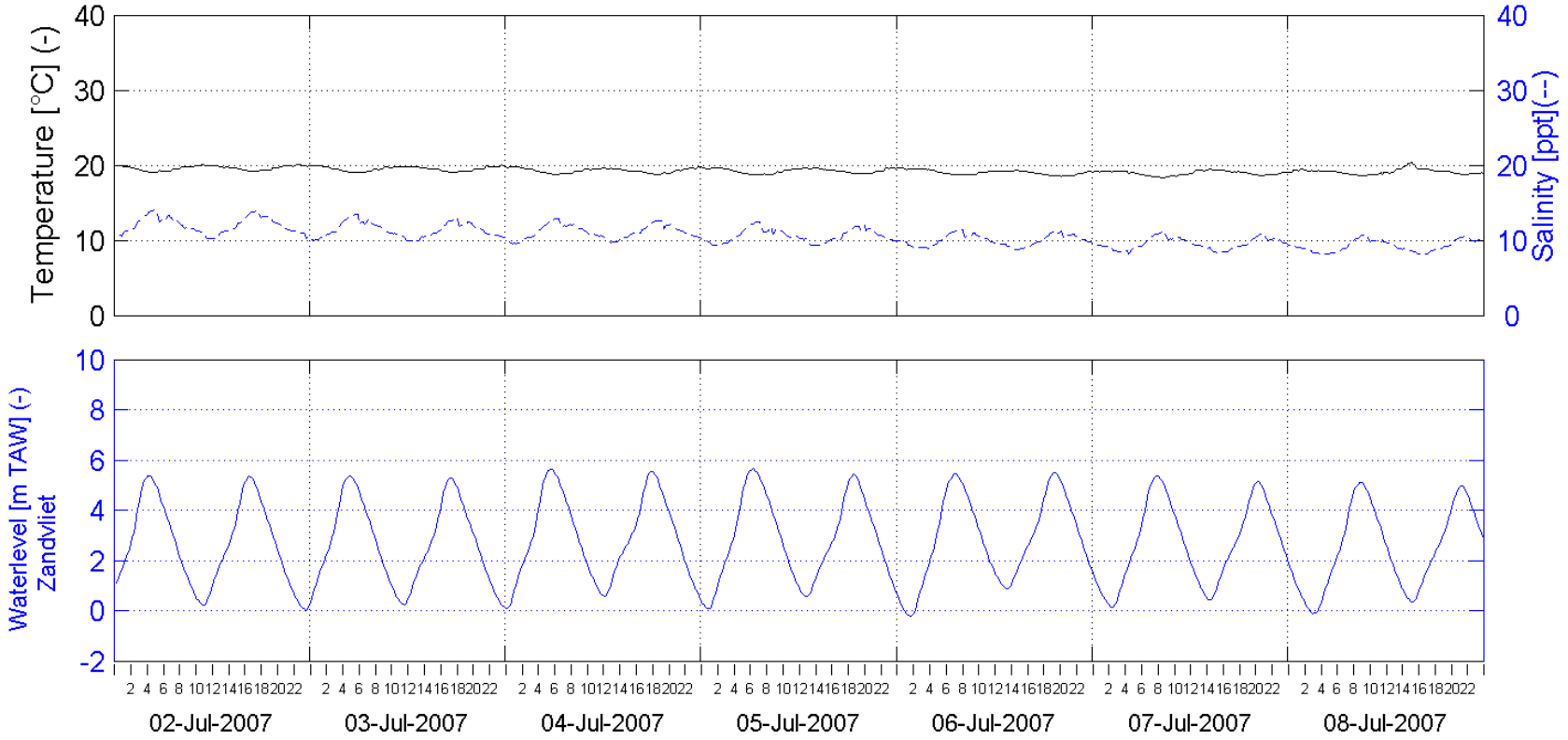
GEMS International

w.l | delft hydraulics

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 27 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

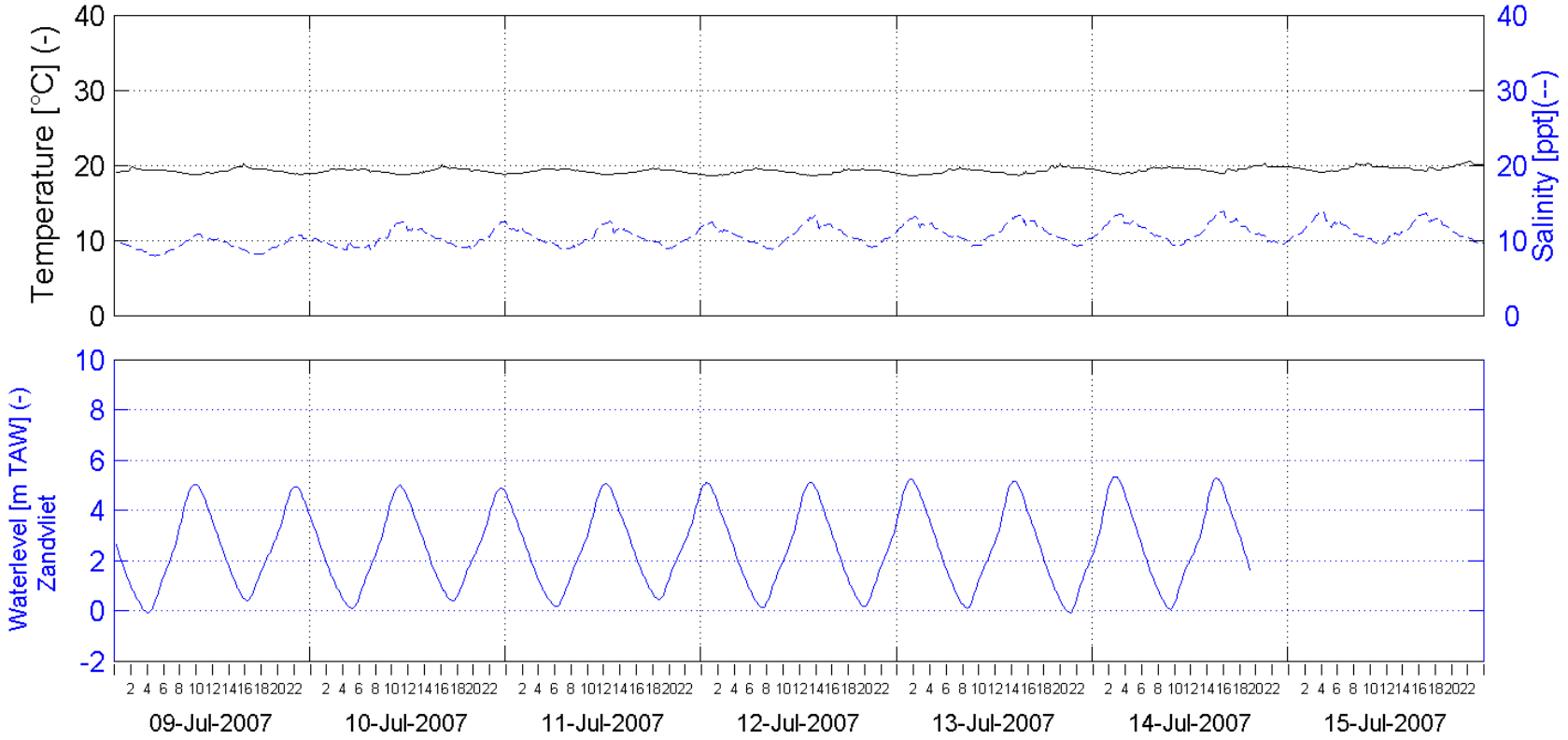
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 28 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

IMDC

In Association with:

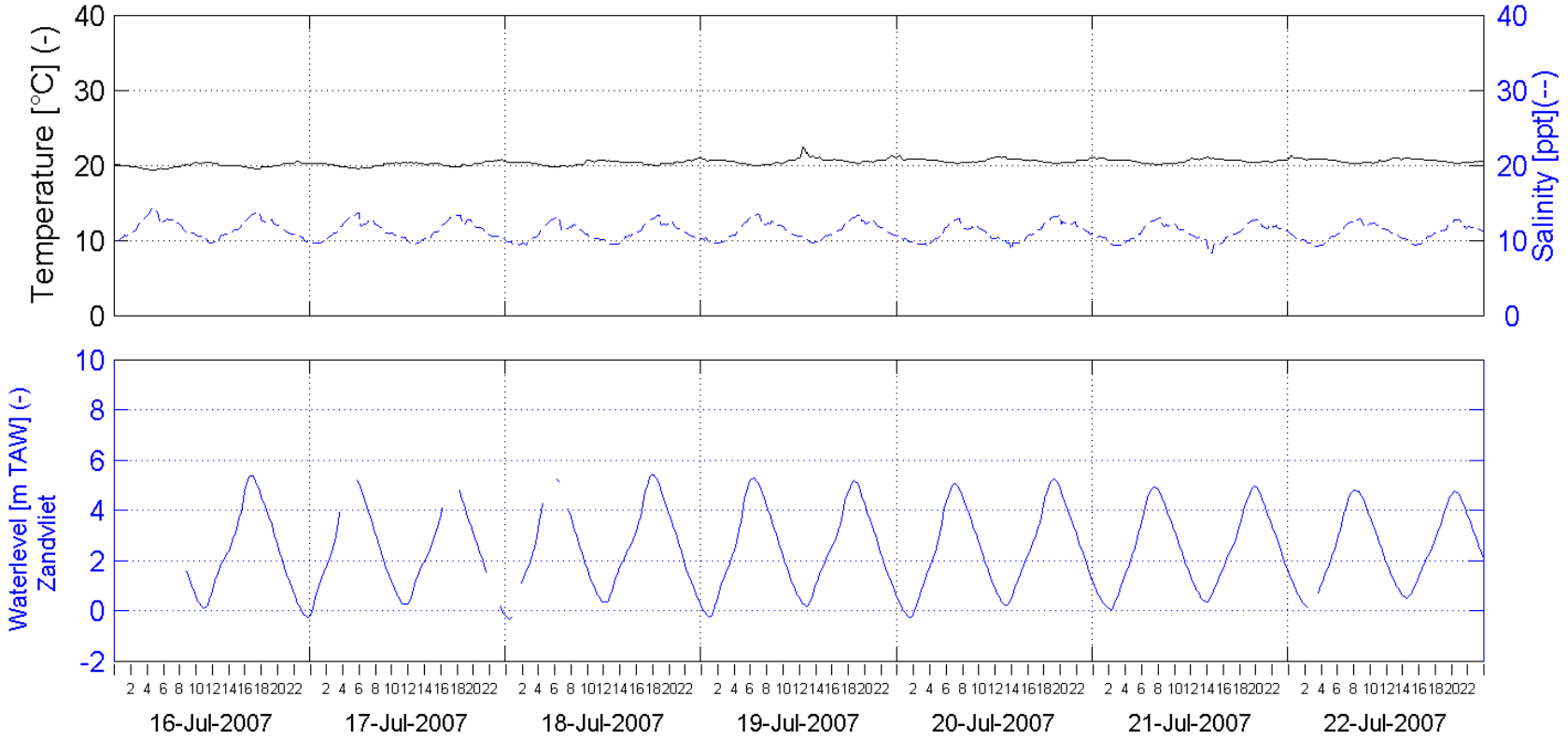
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 29 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

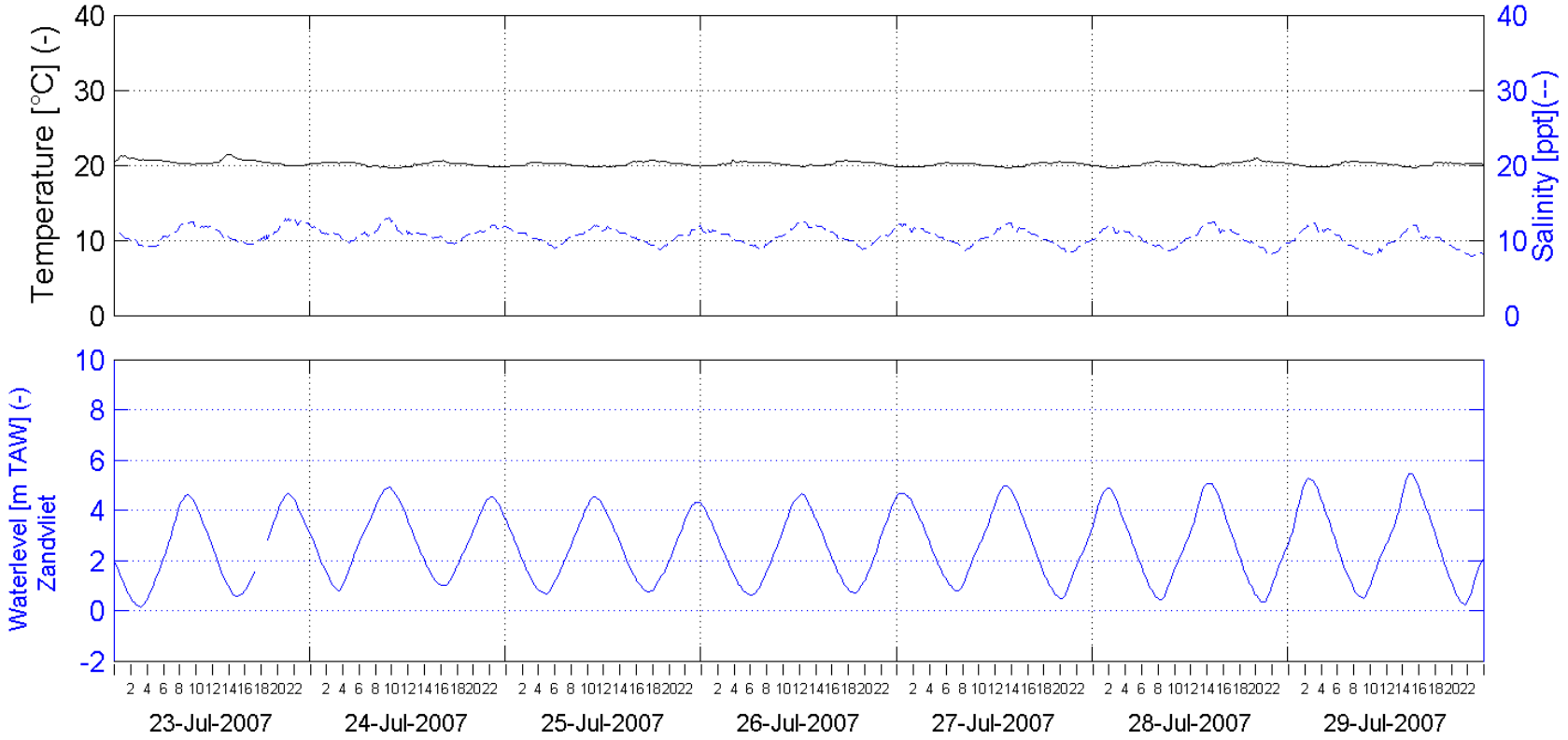
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 30 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

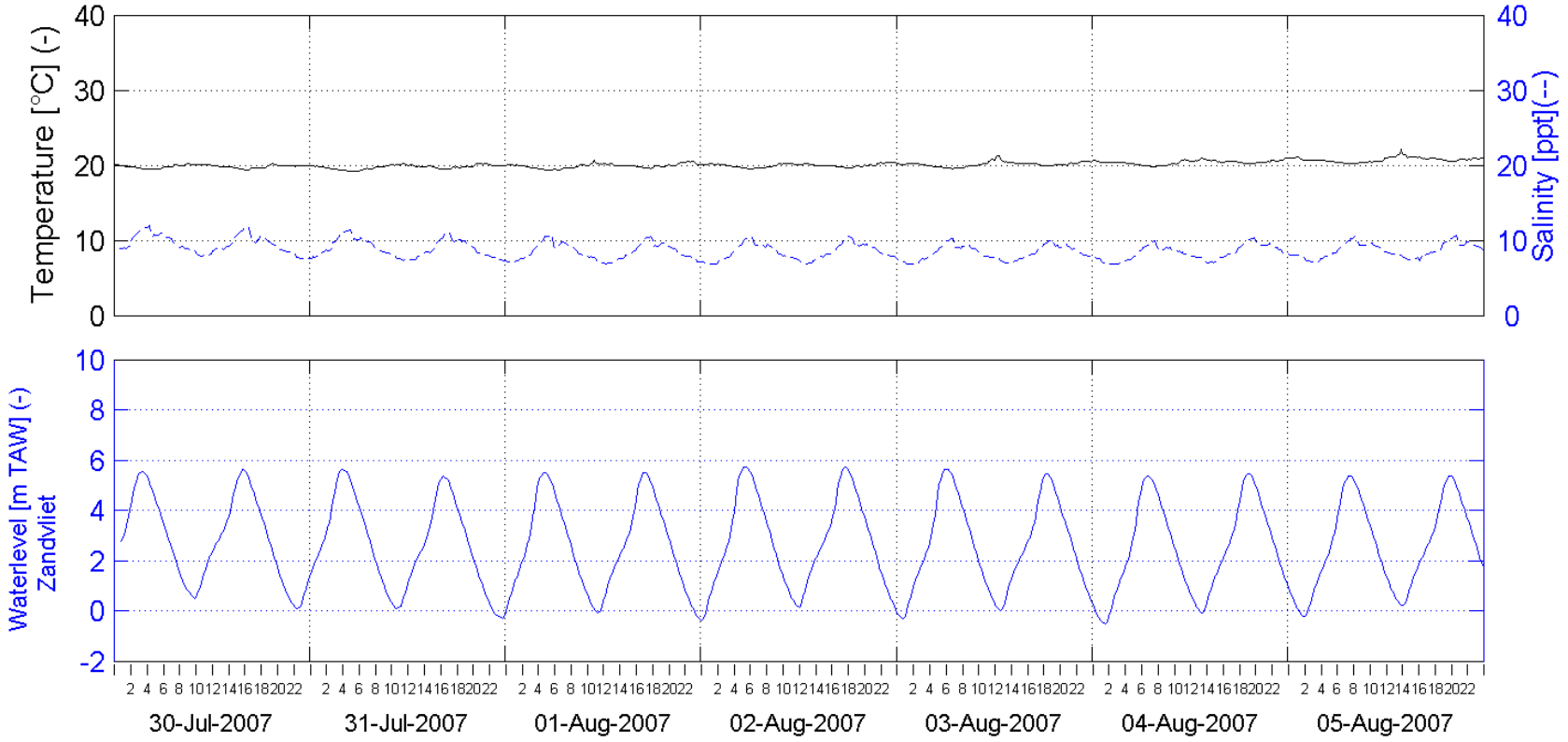
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 31 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

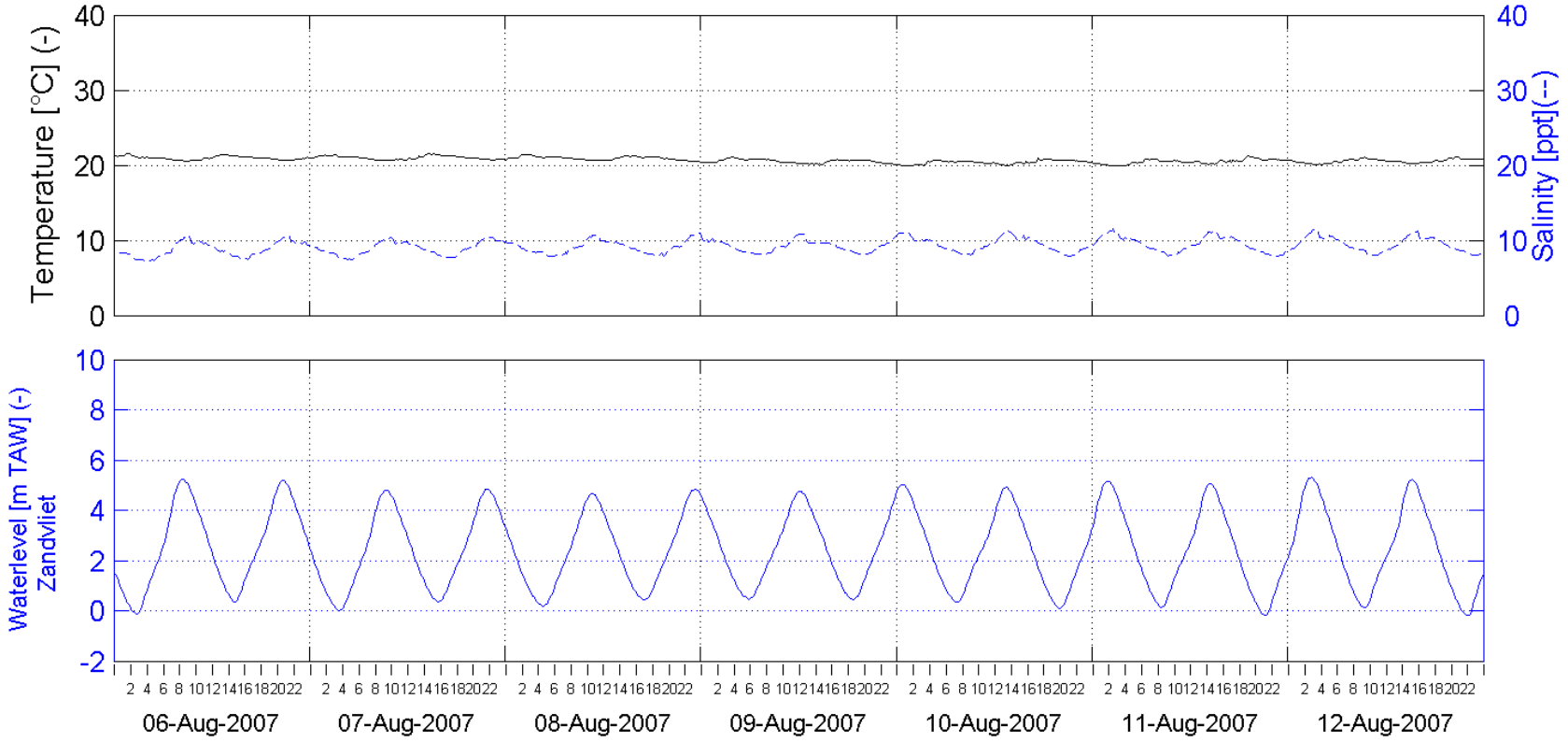
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 32 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

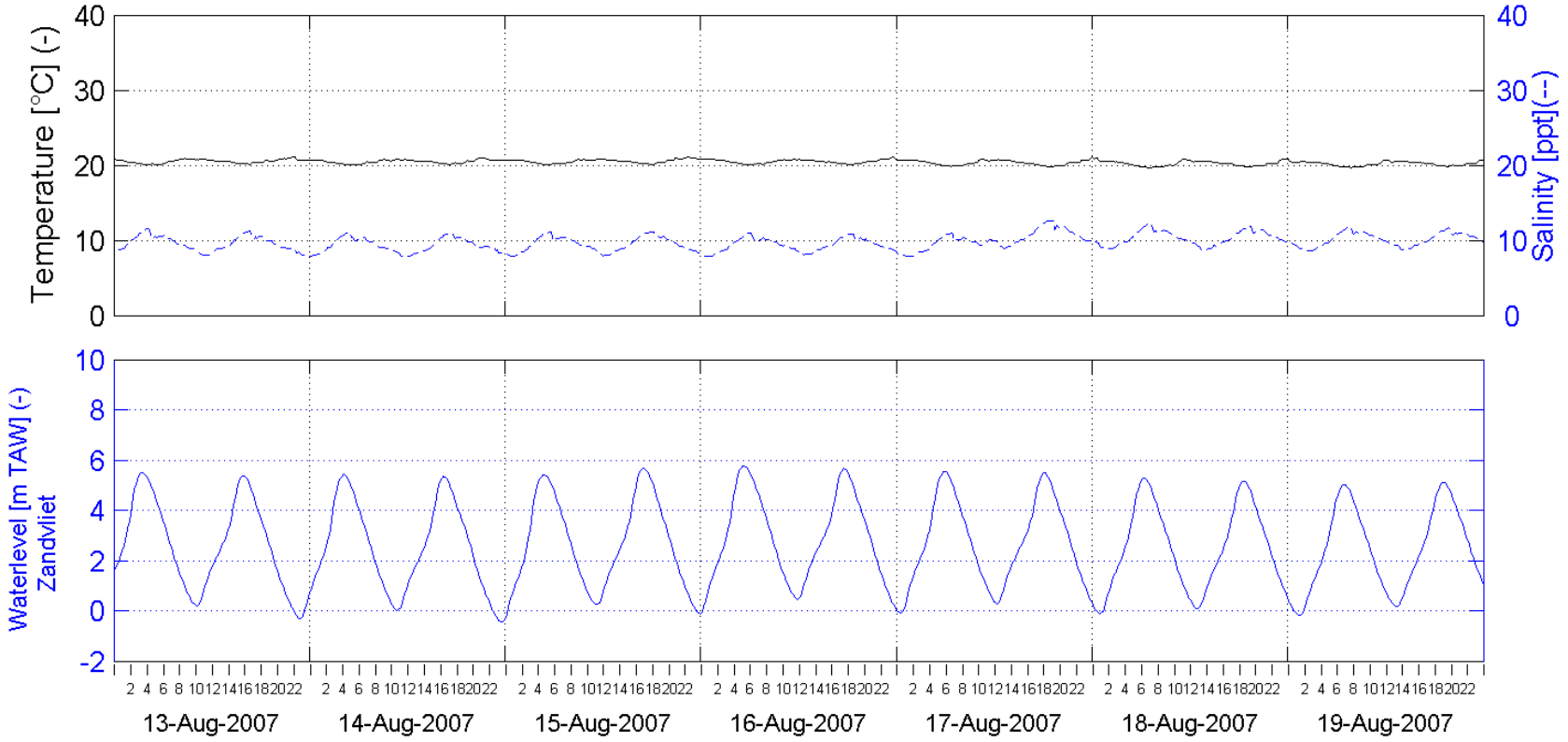
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 33 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

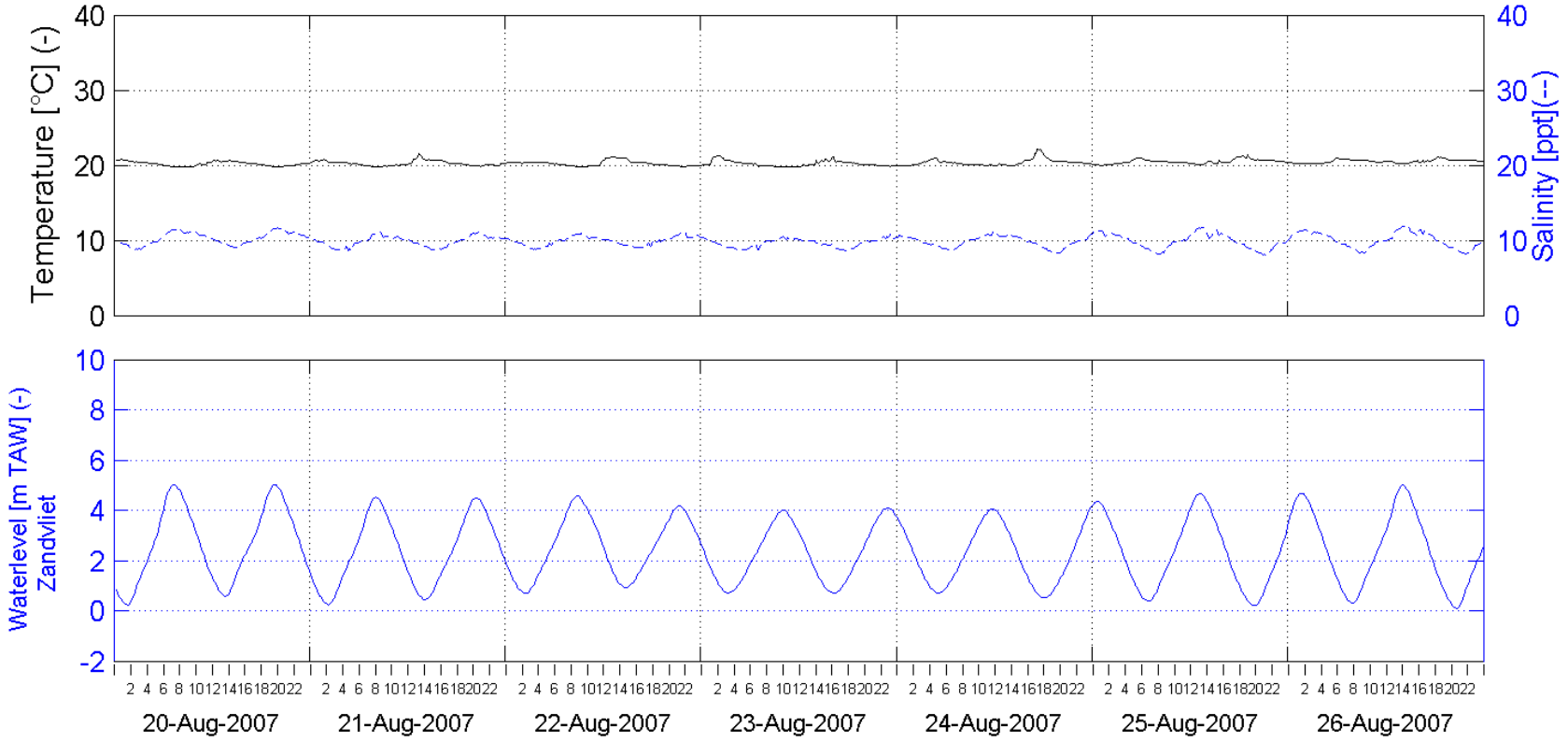
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 34 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

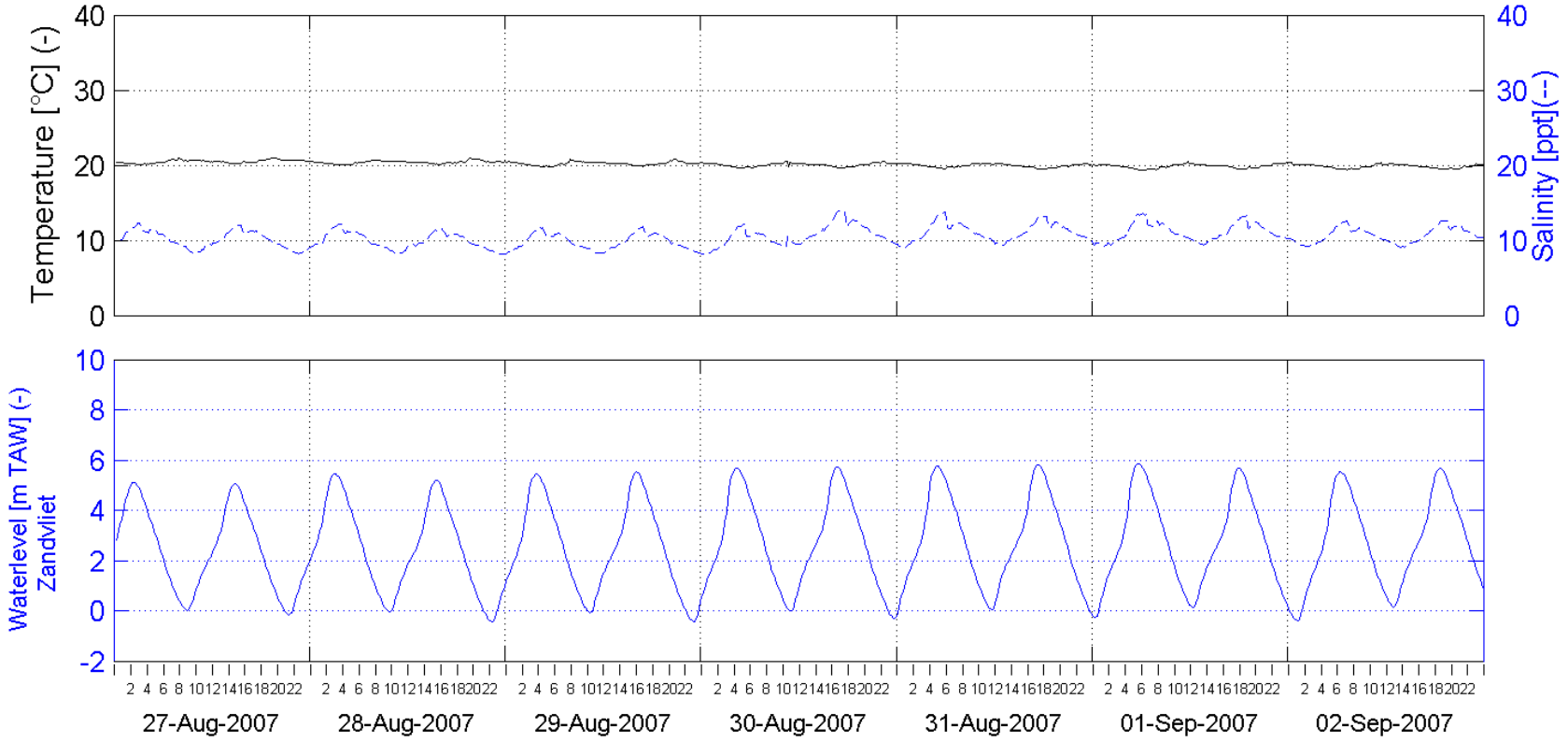
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 35 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

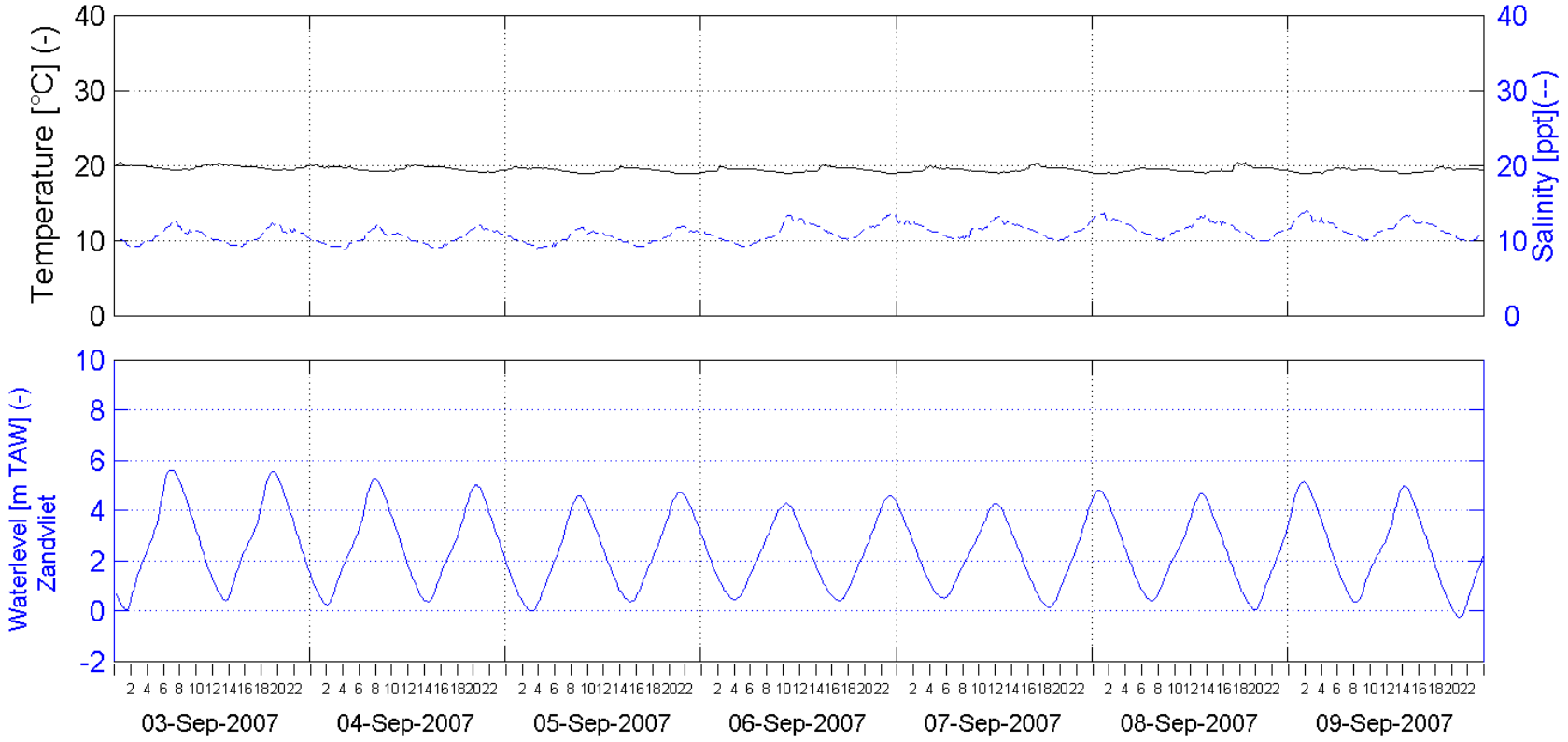
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 36 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

IMDC

In Association with:

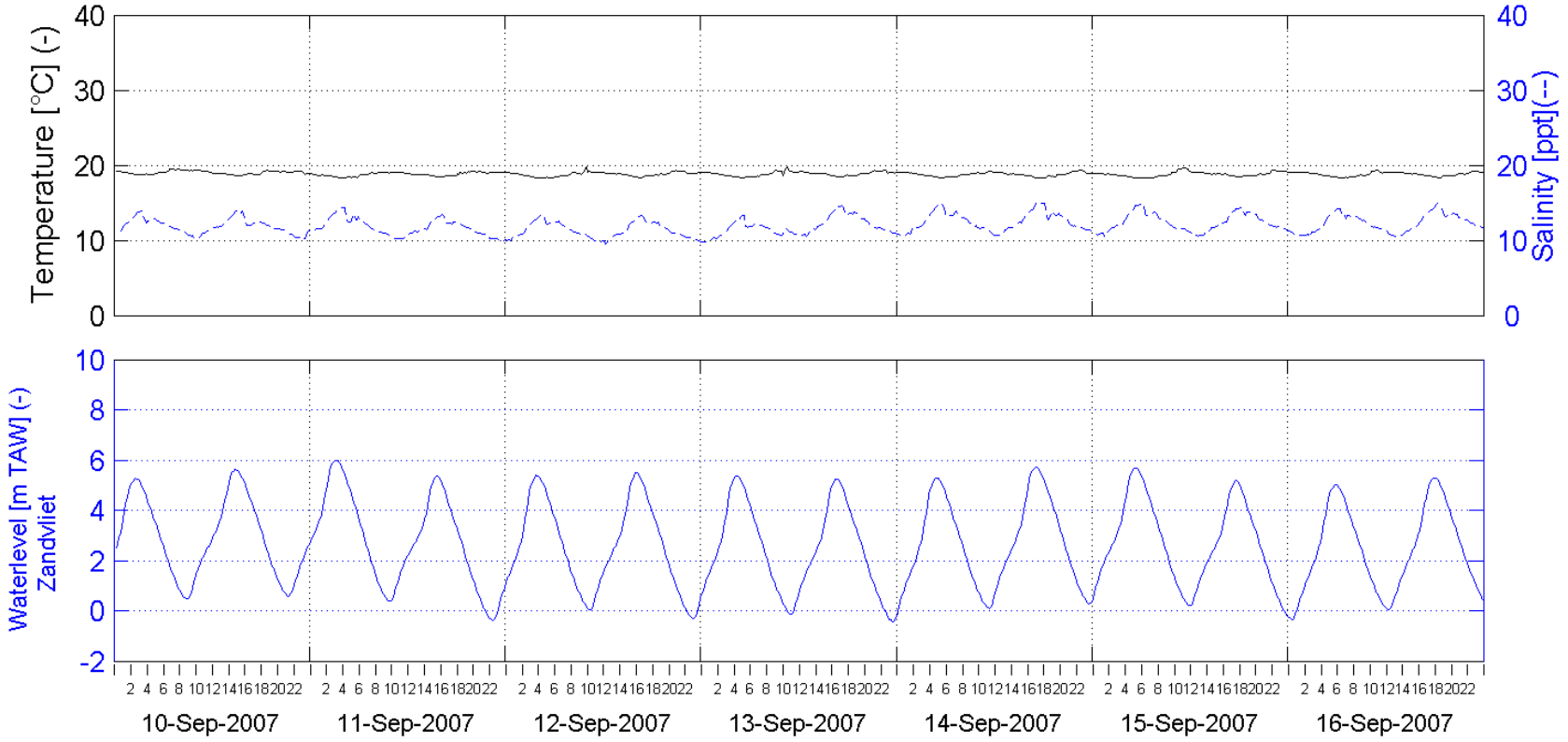
WL | delft hydraulics

GEMS International

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 37 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

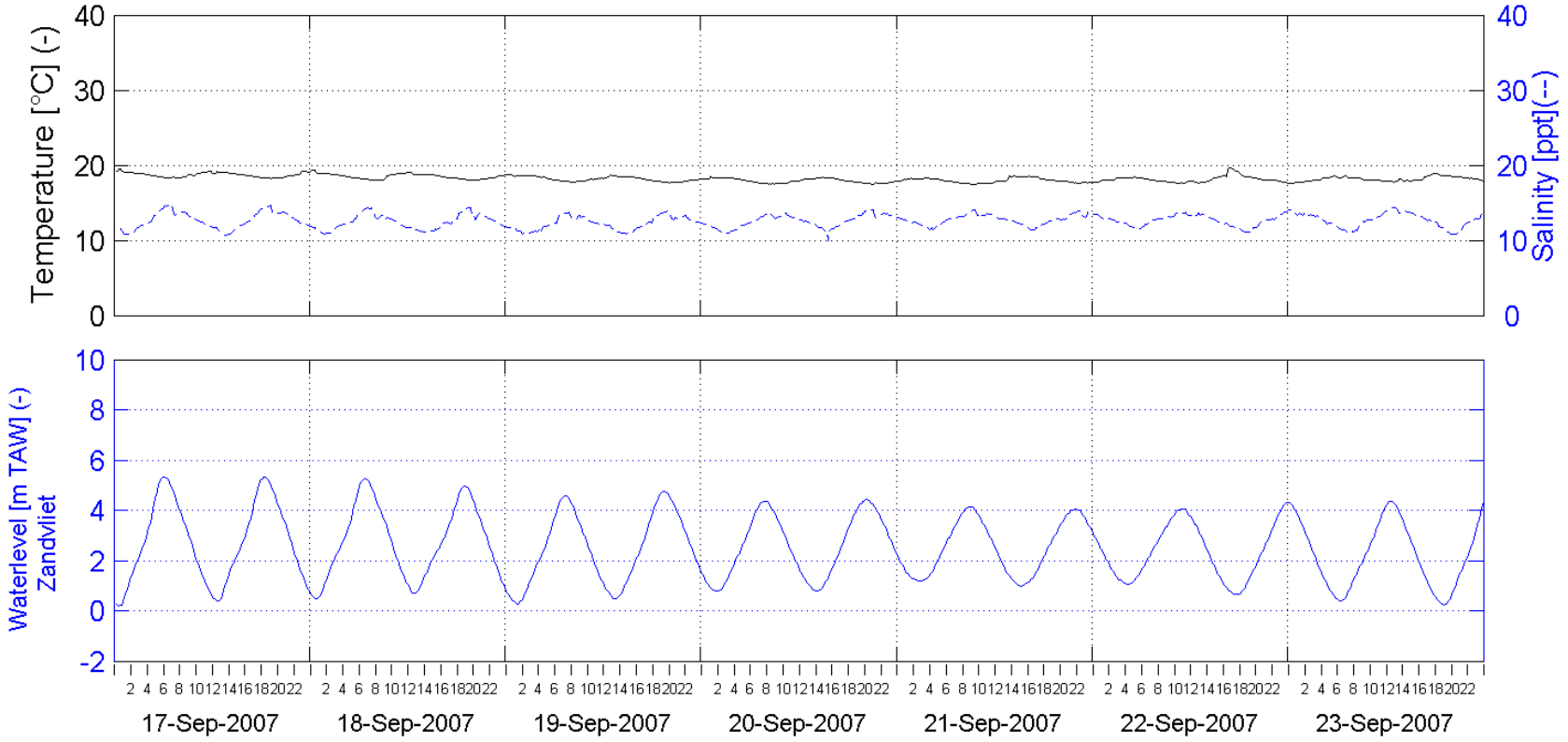
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 38 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

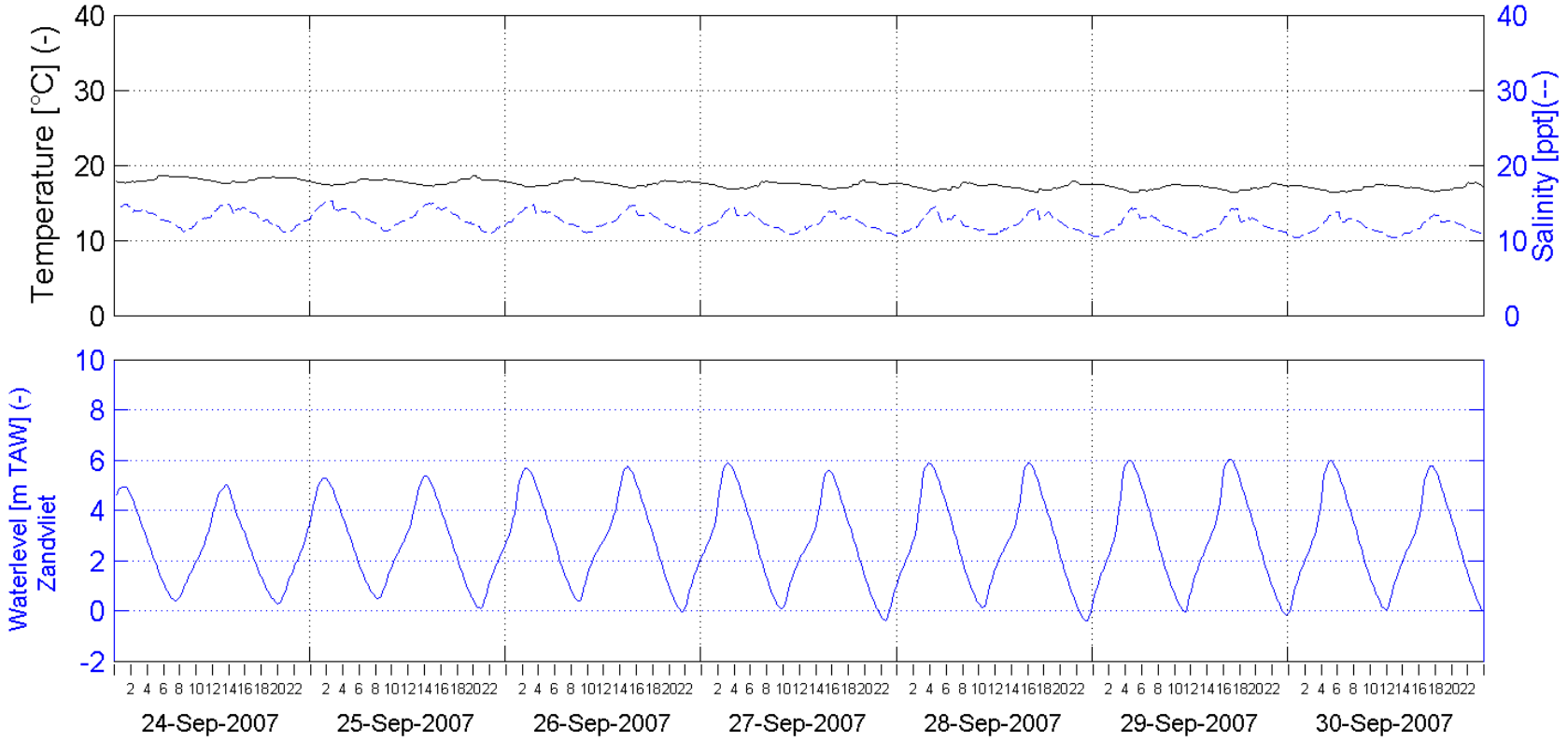
IMDC

In Association with:

I/RA/11283/07.098/MSA

Boundary conditions: Three monthly report 01/07/2007 – 30/09/2007

Week 39 - 2007



Week series of Temperature, Salinity and Tide

Location:

Prosperpolder - 2.5m above bottom (-1.5m TAW)

Processed by:

IMDC

In Association with:

I/RA/11283/07.098/MSA

C.2 Monthly results Minimum, Maximum and Average Velocity Magnitude, Temperature, Salinity & Suspended Sediment Concentration

Location: Oosterweel left bank
4.5 meter above bottom [-2.3 m TAW]

Velocity magnitude [m/s]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	0.00	1.34	0.67
February 2007	0.01*	1.36*	0.66*
March 2007	0.01*	1.13*	0.55*
April 2007	0.00	1.18	0.60
May 2007	0.01*	1.10*	0.64*
June 2007	0.01*	1.03*	0.63*
July 2007	0.00*	1.22*	0.69*
August 2007	0.01*	1.35*	0.66*
September 2007	0.00	1.47	0.65
Temperature [°C]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	6.1	9.4	7.9
February 2007	6.2*	8.2*	7.0*
March 2007	8.9*	10.5*	9.5*
April 2007	9.6	16.1	12.7
May 2007	16.1*	17.6*	16.8*
June 2007	19.5*	21.5*	20.6*
July 2007	18.6*	20.7*	19.5*
August 2007	19.2*	20.9*	20.2*
September 2007	16.0	20.1	18.3

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	-	-	-	-	-	-
February 2007	-	-	-	-	-	-
March 2007	1.0*	0.5*	2.8*	0.8*	1.7*	0.6*
April 2007	3.6	0.8	7.7	2.2	5.8	1.3
May 2007	8.3*	1.7*	9.4*	3.2*	8.8*	2.4*
June 2007	8.3*	1.1*	9.0*	2.0*	8.7*	1.4*
July 2007	7.3*	0.9*	9.2*	1.6*	8.2*	1.2*
August 2007	5.9*	0.9*	8.5*	2.0*	7.4*	1.4*
September 2007	7.8	1.6	10.2	3.2	9.0	2.4

Suspended sediment concentration [mg/l]			
Month	**Minimum**	**Maximum**	**Average**
January 2007	5	430	187
February 2007	33*	427*	254*
March 2007	16*	415*	153*
April 2007	23	508	212
May 2007	9*	958*	240*
June 2007	-	-	-
July 2007	0*	423*	64*
August 2007	9*	1372*	226*
September 2007	4	1434	205

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Location: Oosterweel left bank
1.0 meter above bottom [-5.8 m TAW]

Velocity magnitude [m/s]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	0.01	1.13	0.53
February 2007	0.01*	1.40*	0.53*
March 2007	0.00	1.36	0.52
April 2007	0.00	1.27	0.52
May 2007	-	-	-
June 2007	-	-	-
July 2007	0.01*	0.99*	0.53*
August 2007	0.01	1.21	0.52
September 2007	0.01	1.25	0.52
Temperature [°C]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	6.4	9.4	8.1
February 2007	6.9*	8.7*	7.9*
March 2007	8.4	10.5	9.3
April 2007	9.7	16.1	12.8
May 2007	-	-	-
June 2007	-	-	-
July 2007	18.7*	20.9*	20.1*
August 2007	19.2	21.1	20.2
September 2007	16.0	20.1	18.3

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	-	-	-	-	-	-
February 2007	-	-	-	-	-	-
March 2007	-	-	-	-	-	-
April 2007	-	-	-	-	-	-
May 2007	-	-	-	-	-	-
June 2007	-	-	-	-	-	-
July 2007	5.3*	0.6*	8.4*	1.7*	7.2*	1.1*
August 2007	5.5	0.6	8.3	2.1	7.1	1.3
September 2007	7.8	1.8	10.2	3.3	9.0	2.5

Suspended sediment concentration [mg/l]			
Month	***Minimum***	***Maximum***	***Average***
January 2007	13	1793	197
February 2007	36*	788*	343*
March 2007	23	579	229
April 2007	7	612	255
May 2007	-	-	-
June 2007	-	-	-
July 2007	3*	817*	66*
August 2007	1	1610	293
September 2007	7	1636	264

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

Location: Prosperpolder[3]
2.5 meter above bottom [-1.5 m TAW]

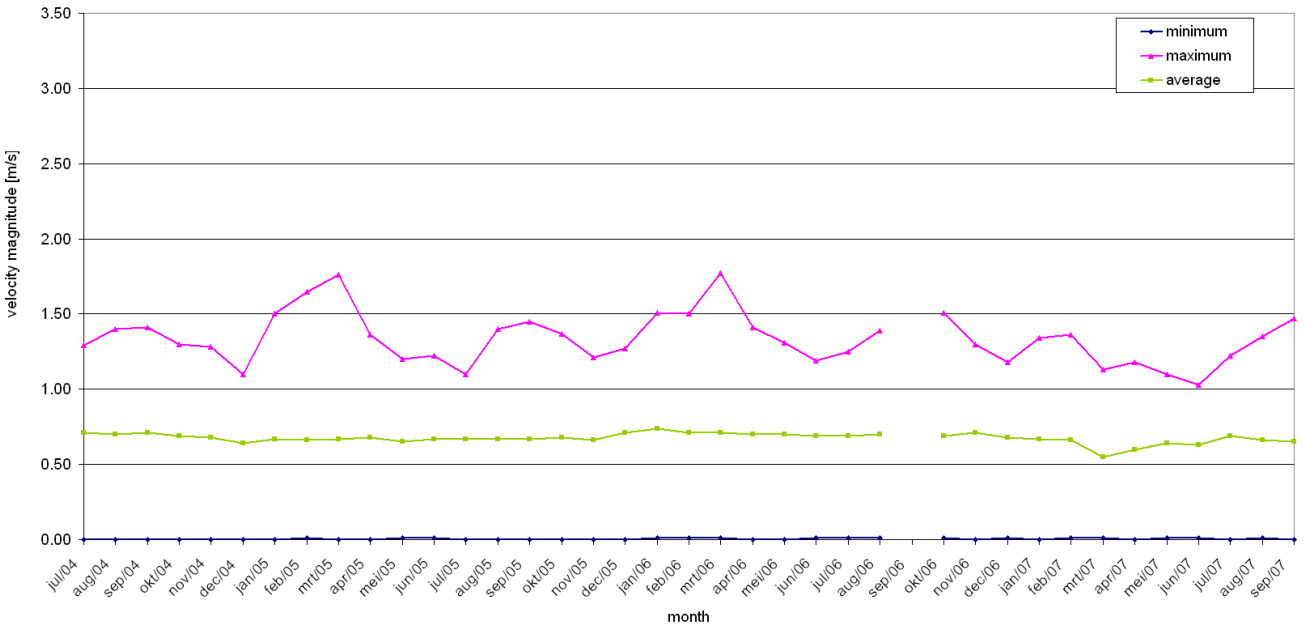
Temperature [°C]						
Month	***Minimum***		***Maximum***		***Average***	
January 2007	7.2		10.1		8.5	
February 2007	6.9		9.6		7.9	
March 2007	8.4		12.3		9.6	
April 2007	9.9		18.5		13.4	
May 2007	15.7*		18.4*		16.7*	
June 2007	17.4		22.3		20.0	
July 2007	18.4		22.4		19.8	
August 2007	19.4		22.2		20.4	
September 2007	16.4		20.5		18.6	
Salinity [ppt]						
Month	***Minimum***		***Maximum***		***Average***	
	HW	***LW***	***HW***	***LW***	***HW***	***LW***
January 2007	6.4	3.6	11.8	8.3	8.6	5.4
February 2007	6.4	3.2	9.4	6.5	8.0	4.7
March 2007	3.2	1.9	8.0	4.5	5.6	2.9
April 2007	7.7	4.8	12.2	9	10.2	7.2
May 2007	9.7*	8.5*	14.3*	10.4*	11.2*	9.1*
June 2007	12.8	10.2	15	12.1	13.6	10.8
July 2007	10.4*	8.2*	13.8*	11.1*	12.3*	9.6*
August 2007	9.3	7.0	13.8	10.0	11.0	8.6
September 2007	11.6	9.4	14.9	12.2	13.5	10.9

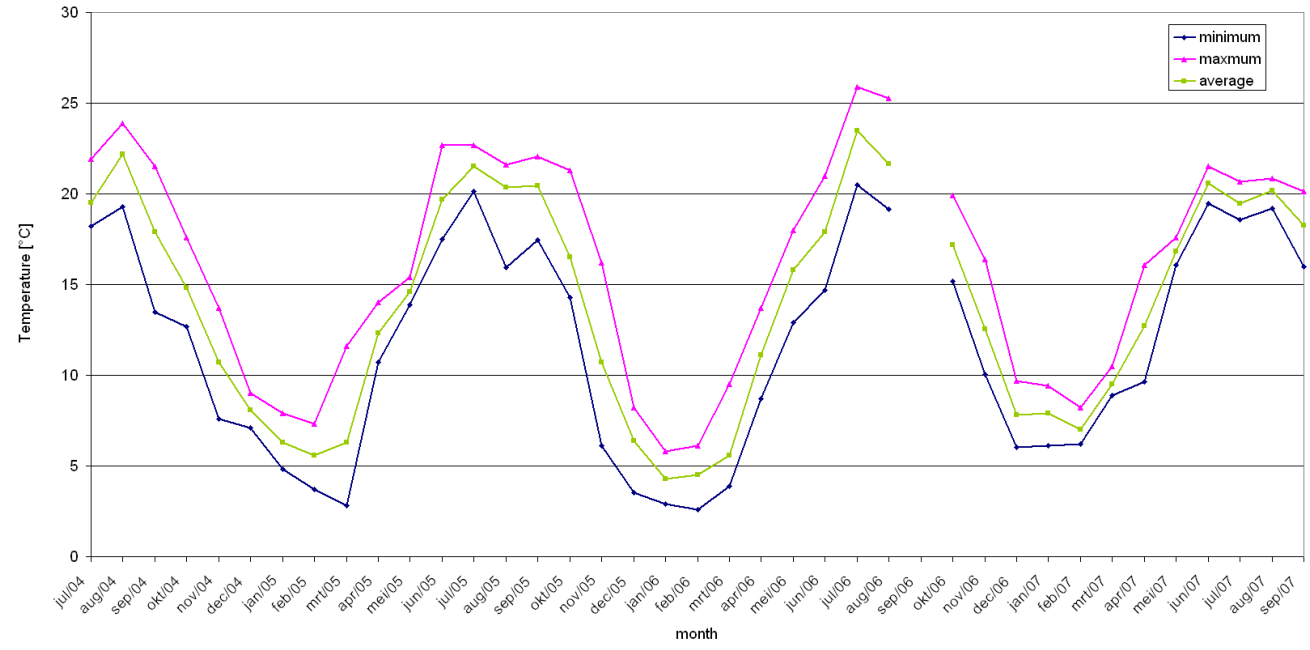
-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

[3] Current velocity and suspended sediment were not measured at Prosperpolder.

C.3 Graphs monthly results for the whole deployment period

Velocity magnitude & temperature





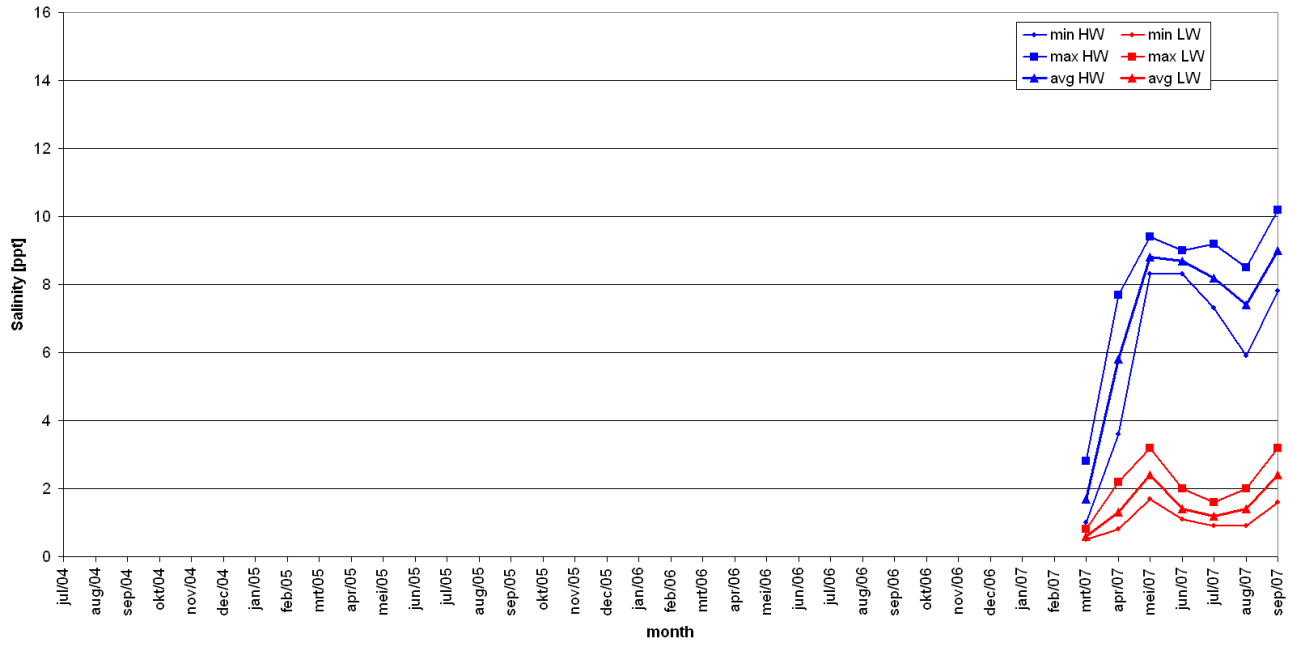
Oosterweel left bank
4.5m above bottom (-2.3m TAW)

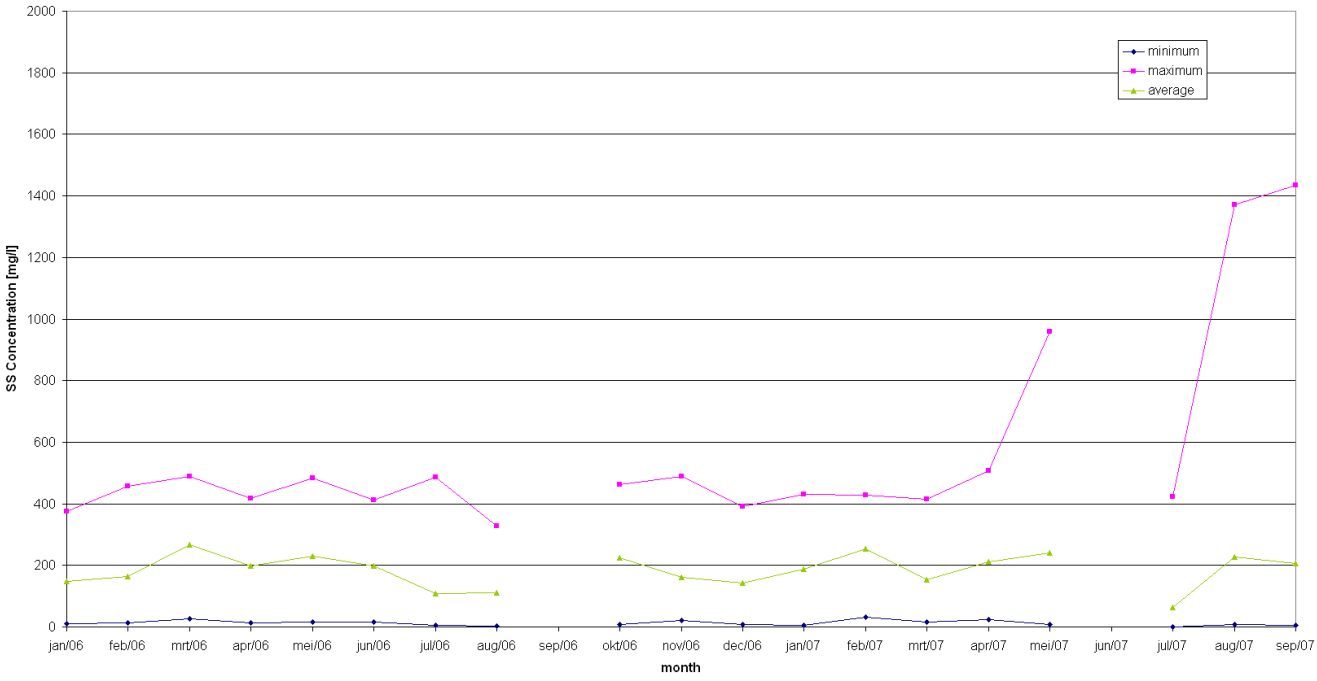
Data processed by:

In association with:

I/RA/11283/07.098/MSA

Salinity & SS Concentration





Oosterweel left bank
4.5m above bottom (-2.3m TAW)

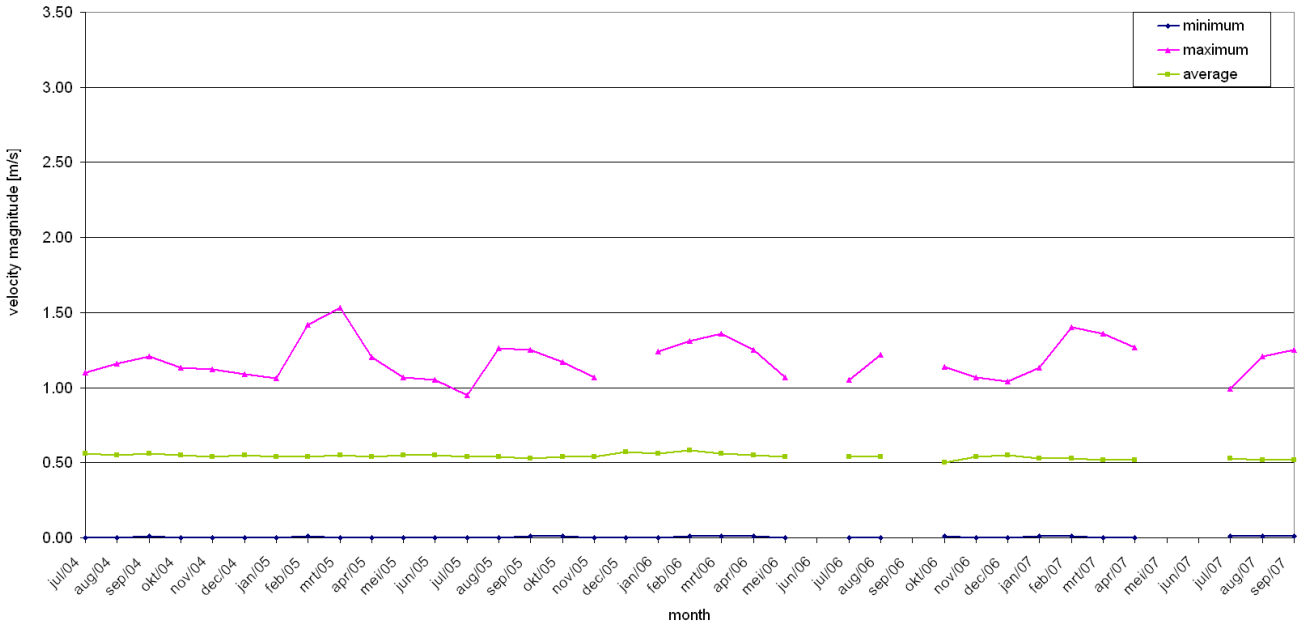
Data processed by:

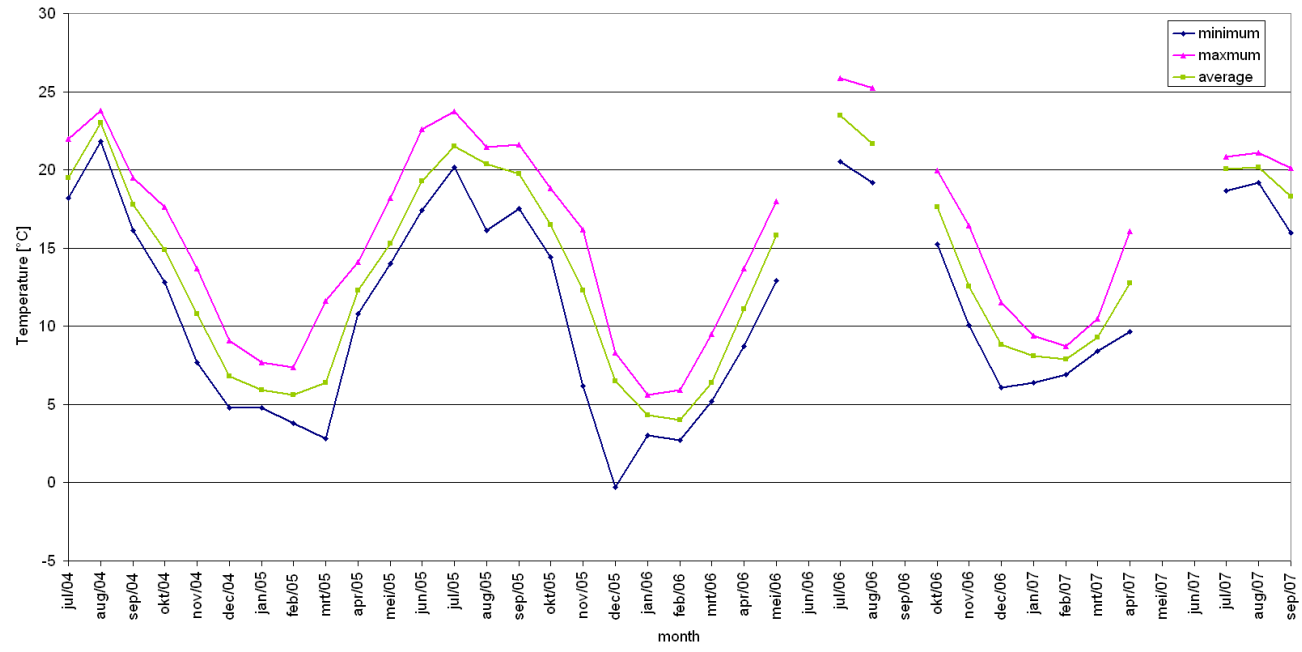
In association with:

IMDC
WL | delft hydraulics
GEMS International

I/RA/11283/07.098/MSA

Velocity magnitude & temperature





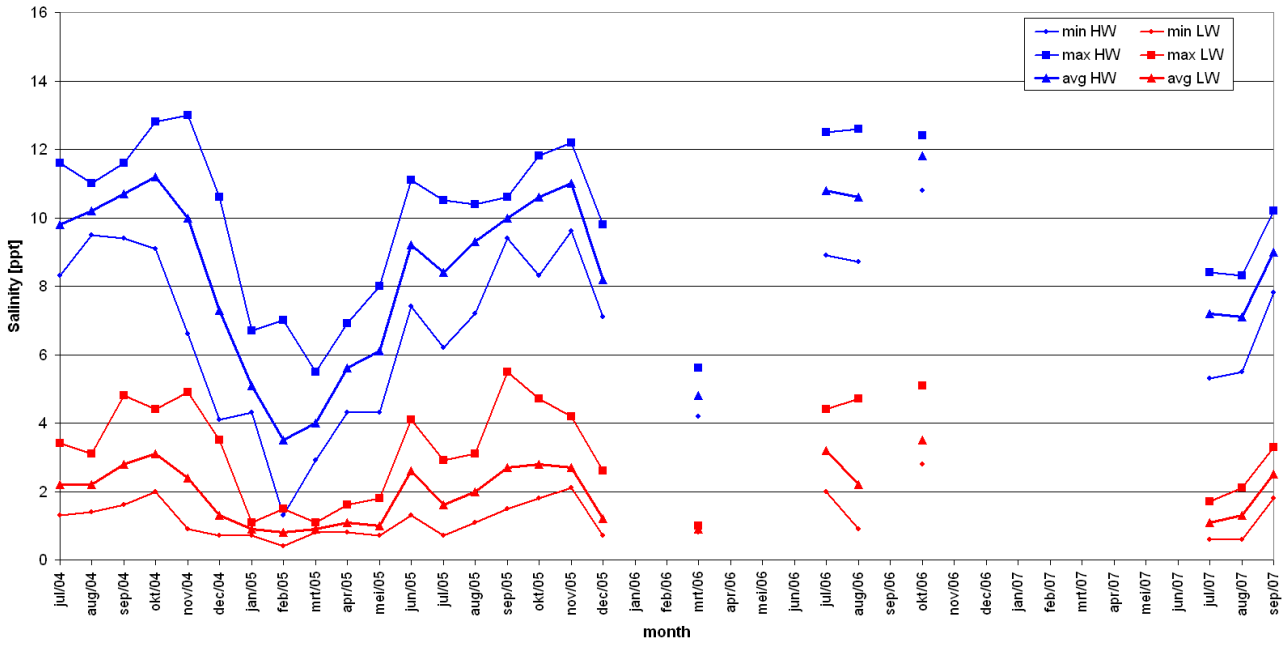
Oosterweel left bank
1m above bottom (-5.8m TAW)

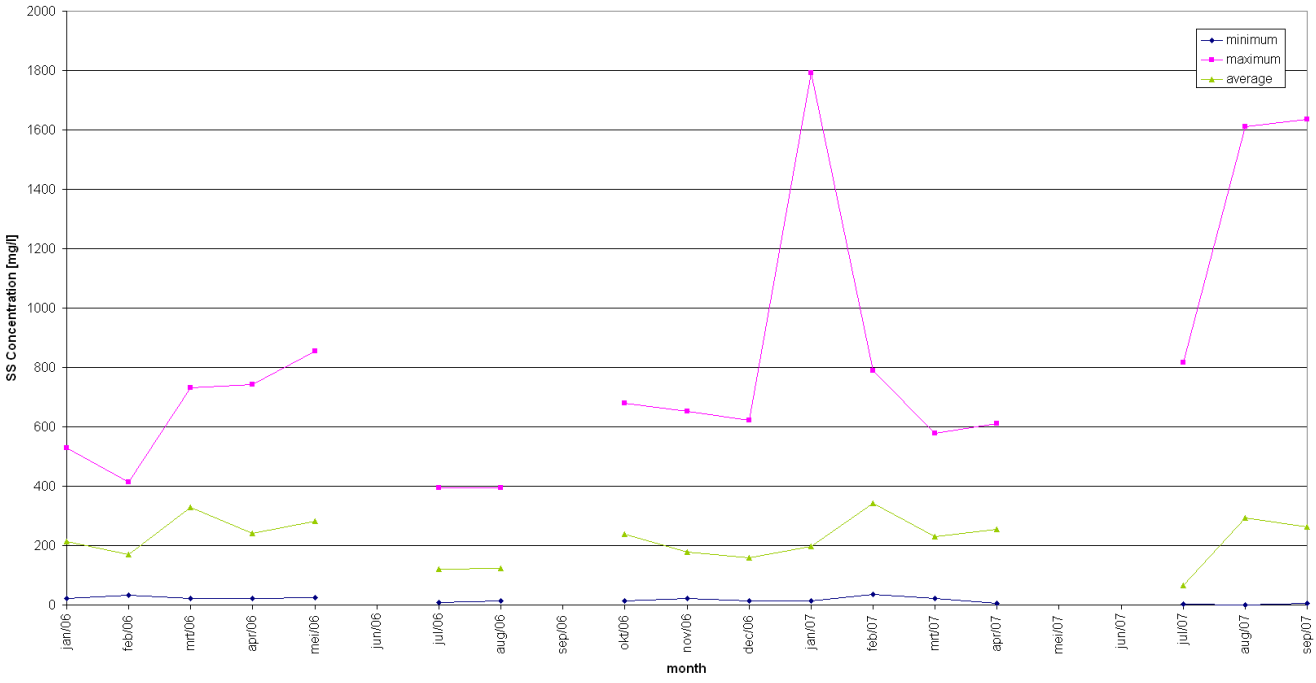
Data processed by:

In association with:

I/RA/11283/07.098/MSA

Salinity & SS Concentration





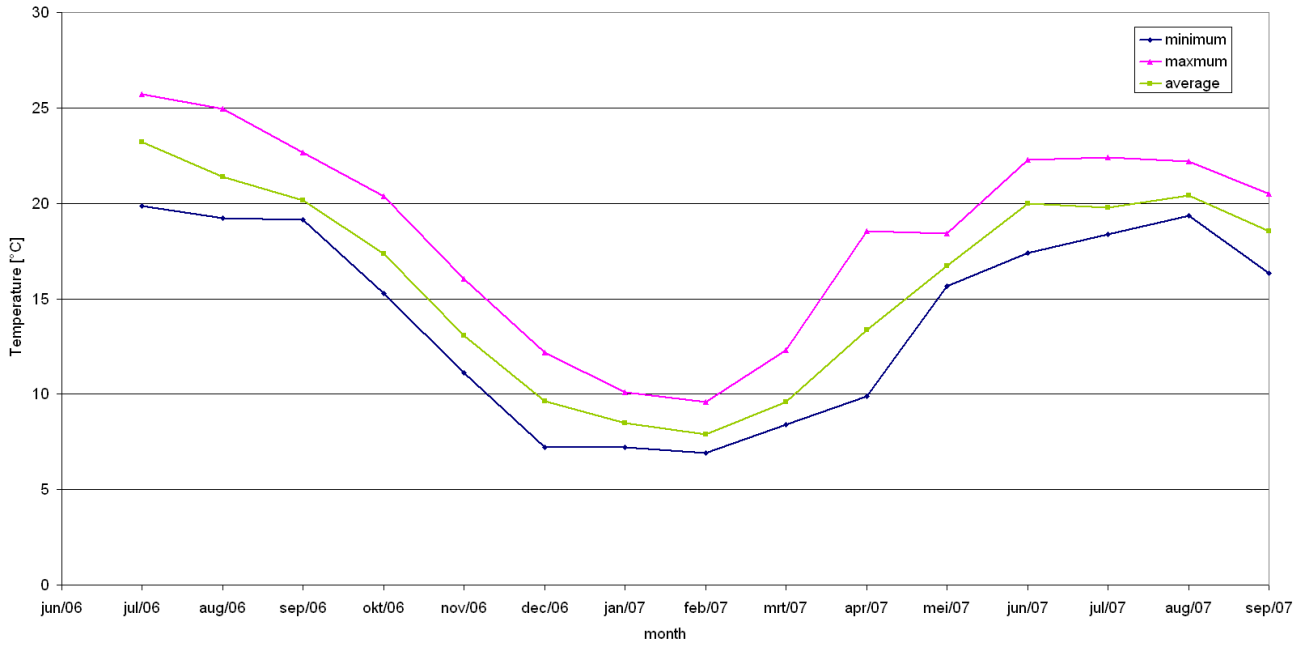
Oosterweel left bank
1m above bottom (-5.8m TAW)

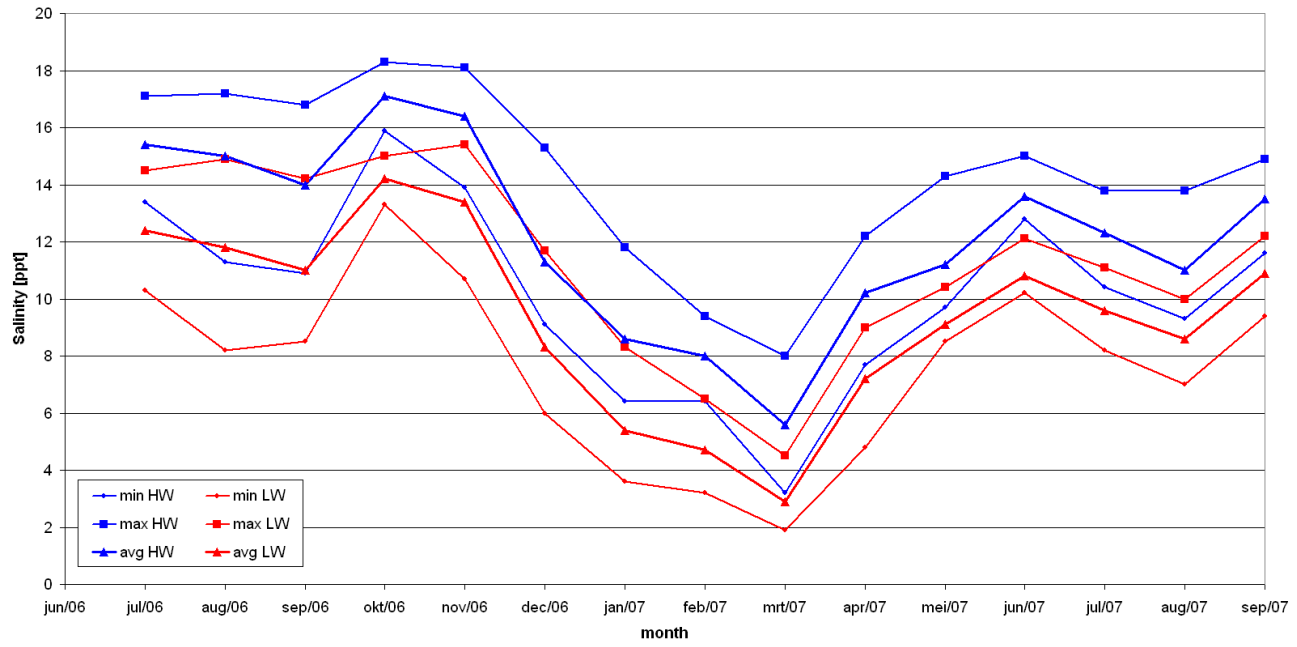
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/07.098/MSA

Temperature & Salinity





Propsperpolder
2.5m above bottom (-1.5m TAW)

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/07.098/MSA

C.4 Total result from July 2007 till September 2007 of velocity magnitude, temperature, salinity and suspended sediment concentration

Averages for the whole deployment period of each instrument [July 2007 – September 2007]

Location	***Depth [m TAW]***	***Velocity [m/s]***			***Temperature [°C]***			***SS concentration [mg/l]***		
		Min	***Max***	***Avg***	***Min***	***Max***	***Avg***	***Min***	***Max***	***Avg***
Oosterweel left bank	-2.3	0.00*	1.47*	0.66*	16.0*	20.9*	19.1*	0*	1434*	178*
Oosterweel left bank	-5.8	0.01	1.25	0.52	16.0	21.1	19.4	1	1636	227
Prosperpolder	-1.5	-	-	-	16.4	22.4	19.6	-	-	-

Salinity [ppt]							
Location	**Depth [m TAW]**	**Minimum**		**Maximum**		**Average**	
		Slack HW	***Slack LW***	***Slack HW***	***Slack LW***	***Slack HW***	***Slack LW***
Oosterweel left bank	-2.3	5.9*	0.9*	10.2*	3.2*	8.4*	1.8*
Oosterweel left bank	-5.8	5.3	0.6	10.2	3.3	7.8	1.7
Prosperpolder	-1.5	9.3	7.0	14.9	12.2	12.2	9.7

-: No data or less than 30% of the monthly data available.
*: Less than 70% of the monthly data available.

APPENDIX D.

MONTLY RESULTS: MINIMUM, MAXIMUM AND AVERAGE SALINITY AT BAALHOEK AND HOOFDPLAAT FOR THE PERIOD 01/01/2007 – 30/09/2007

Location: Baalhoek

Upper cell: floating at water surface
Lower cell: 4.7 meter above bottom [-3.1m TAW]

Salinity [ppt] (upper cell)			
Month	***Minimum***	***Maximum***	***Average***
January	5.9	17.1	10.8
February	5.2	14.7	9.9
March	3.3	13.6	7.6
April	7.1	17.8	12.3
May	5.9	20.1	15.9
June	11.2	20.4	16.4
July	7.8	19.6	14.7
Augustus	9.7	19.4	14.5
September	12.1	20.8	16.5
Salinity [ppt] (lower cell)			
Month	***Minimum***	***Maximum***	***Average***
January	5.7	17.6	11.4
February	5.7	15.7	10.5
March	3.0	14.2	8.2
April	7.0	18.4	12.9
May	12.0	20.6	16.5
June	12.4	21.1	17.0
July	9.9	19.7	15.0
Augustus	10.2	20.7	15.3
September	12.1	21.0	16.6

-: No data or less than 30% of monthly data available
*: Less than 70% of monthly data

Location: Hoofdplaat

Floating at water surface

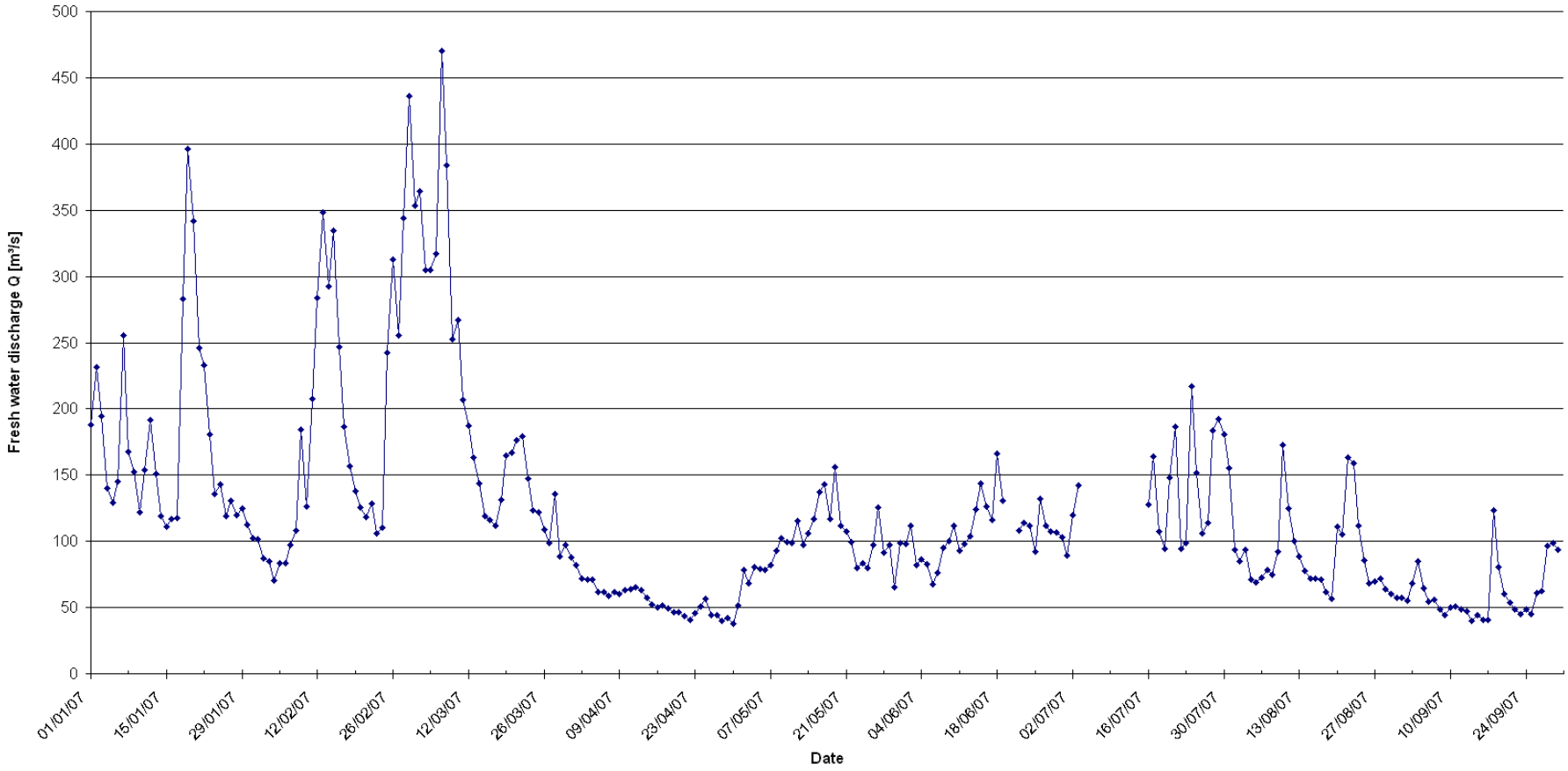
Salinity [ppt]			
Month	***Minimum***	***Maximum***	***Average***
January	18.2	28.7	25.4
February	17.5	28.4	24.4
March	18.9	34.6	23.3
April	15.9	28.0	24.9
May	25.2	32.9	29.4
June	24.7	31.5	28.1
July	22.5	29.5	27.1
Augustus	-	-	-
September	-	-	-

-: No data or less than 30% of monthly data available
*: Less than 70% of monthly data

APPENDIX E.

FRESH WATER DISCHARGE

11283 Opvolging aanslibbing Deurganckdok – Omgevingscondities juli - september 2007



Fresh water discharge

Location:
Schelle

Date:
01/01/2007 – 30/09/2007

Data processed by:

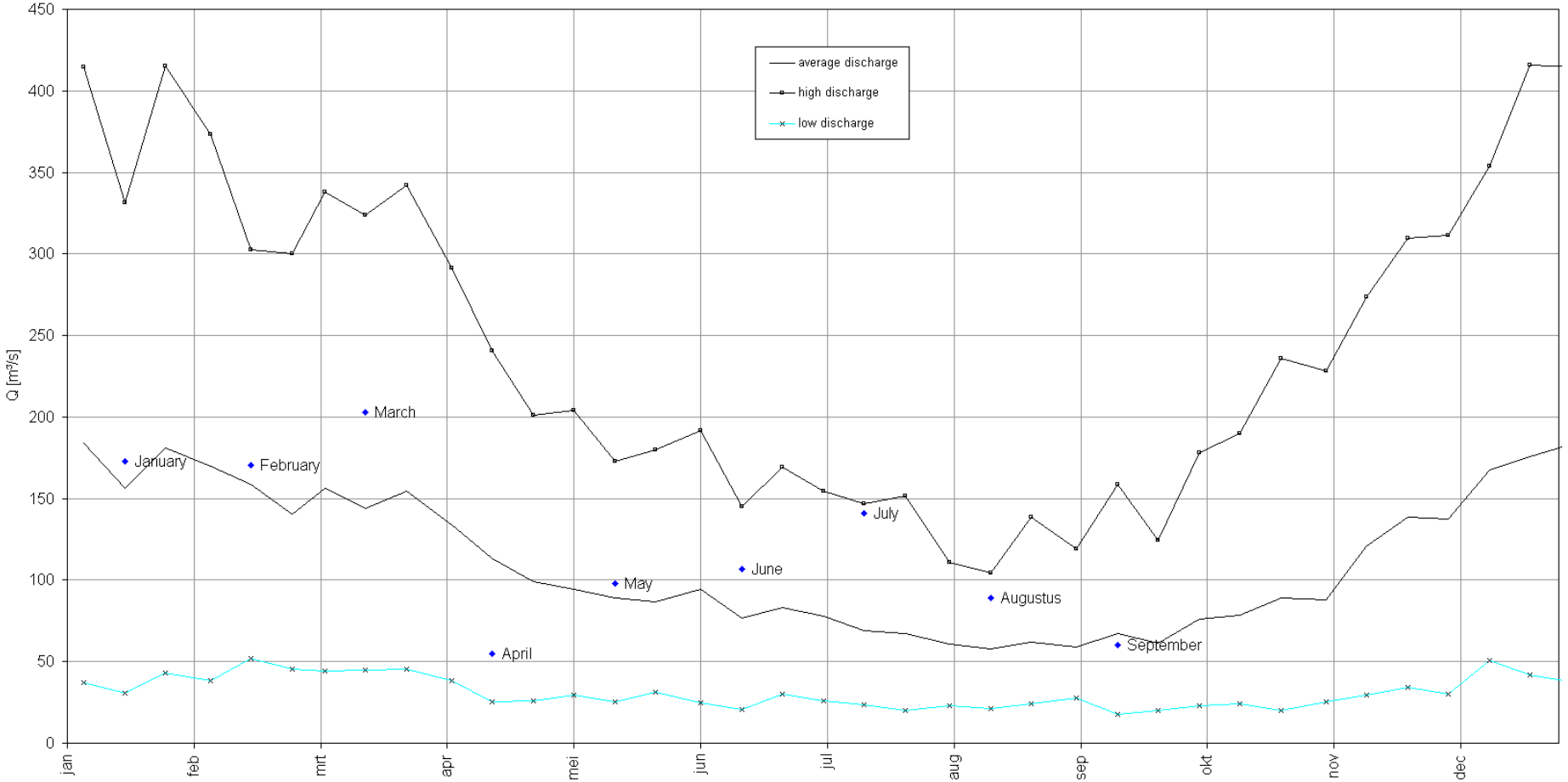
In association with:

I/RA/112831/07.098/MSA

Decade averages of the fresh water discharge [m³/s] of the Scheldt at Schelle (January 2007 – September 2007)

	First Decade	***Second Decade***	***Third Decade***
January 2007	173	198	150
February 2007	103	219	202
March 2007	345	151	121
April 2007	67	54	45
May 2007	81	120	93
June 2007	91	122	110
July 2007	130	126	153
Augustus 2007	96	87	95
September 2007	62	58	65

Average monthly discharge of 2007 compared to the long-term discharge curve (based on a long-term simulation over a period of 30 year; 1971-2000)



APPENDIX F.

OVERVIEW OF MAINTENANCE -DREDGING ACTIVITIES

01/07/2007 – 30/09/2007

Dredging and dumping volumes [10^3 m^3]

Dredging locations									
	Week 27	***Week 28***	***Week 29***	***Week 30***	***Week 31***	***Week 32***	***Week 33***	***Week 34***	***Week 35***
Drempel van Borssele	-	-	-	-	45.86	112.45	89.06	26.67	-
Pas van Terneuzen	-	-	-	-	-	-	-	42.90	-
Put van Terneuzen	-	-	-	-	-	-	-	-	-
Gat van Ossensisse	-	-	-	-	-	-	-	-	-
Drempel van Walsoorden	-	-	-	-	-	-	-	-	-
Overloop Hansweert	-	-	-	33.12	27.42	-	-	-	81.53
Drempel van Hansweert	-	-	-	-	80.81	-	-	10.28	-
Overloop van Valkenisse (B 56-62)	89.31	34.39	41.73	-	-	-	-	-	-
Drempel van Valkenisse	41.89	90.76	84.73	-	-	11.94	-	-	-
Drempel van Bath	2.58	-	-	-	-	-	-	-	-
Nauw van Bath (B 75)	7.19	-	-	-	-	-	-	-	-
Vaarwater Bath (B72-76)	7.76	-	-	-	-	-	-	-	-
Noordzeeterminal	-	-	-	-	-	-	-	-	-
Containerkaai noord	-	-	-	-	-	-	-	-	-
Containerkaai zuid	-	-	-	-	-	-	-	-	-
Vaarwater Oudendijk	-	-	-	-	-	-	-	-	-
Drempel van Zandvliet	-	-	-	-	-	-	-	-	70.95
Zandvliet+Berendrecht sluis	-	-	-	-	-	74.50	-	-	11.69
Drempel van Frederik	-	-	-	60.77	-	-	75.74	-	-
Drempel van Lillo	-	-	-	-	-	-	-	-	-
Lillo vaarwater plaat	-	-	-	-	-	-	-	-	-
Toeg Boud+Calew sluis	-	-	-	-	-	-	-	-	-
Deurganckdok	-	-	-	-	-	-	-	74.85	54.62
De Parel	-	-	-	-	-	-	-	-	-
Ketelplaat	-	-	-	-	-	-	-	-	-
Kallo sluis	-	-	-	-	-	-	26.35	32.87	1.45
Krankeloon	-	-	-	-	-	-	-	-	-
Kaaien 23-27	-	-	-	-	-	-	-	-	-

Dumping locations									
	Week 27	***Week 28***	***Week 29***	***Week 30***	***Week 31***	***Week 32***	***Week 33***	***Week 34***	***Week 35***
Spijkerplaat	-	-	-	-	26.58	-	50.00	36.02	-
Everingen	-	-	-	-	19.28	-	39.06	33.55	-
Ellewoutsdijk	90.15	104.37	90.84	13.26	48.22	64.01	-	5.31	16.29
Biezelingse Ham	34.20	20.79	35.62	19.87	60.01	60.38	-	4.97	65.24
Schaar van Waarde	24.37	-	-	-	-	-	-	-	-
Schaar Ouden Doel	-	-	-	13.78	-	-	58.86	-	70.95
Opspuitingen Deurganckdok	-	-	-	-	-	-	-	-	-
Oosterweel	-	-	-	21.45	-	32.87	22.11	52.50	32.86
Plaat van Boomke	-	-	-	-	-	-	21.12	17.47	0.98
Punt van Melsele	-	-	-	25.54	-	41.63	-	37.75	33.92
Opspuitingen Kruibeke	-	-	-	-	-	-	-	-	-

Dredging locations									
	Week 36	***Week 37***	***Week 38***	***Week 39***					
Drempel van Borssele	104.22	-	-	-					
Pas van Terneuzen	-	-	-	-					
Put van Terneuzen	-	-	-	-					
Gat van Ossensisse	-	-	-	-					
Drempel van Walsoorden	-	-	-	-					
Overloop Hansweert	-	122.44	-	-					
Drempel van Hansweert	-	-	-	88.31					
Overloop van Valkenisse (B 56-62)	-	-	-	-					
Drempel van Valkenisse	-	-	-	-					
Drempel van Bath	-	-	-	7.47					
Nauw van Bath (B 75)	-	-	-	2.76					
Vaarwater Bath (B72-76)	-	-	-	-					
Noordzeeterminal	-	-	-	-					
Containerkaai noord	-	-	-	-					
Containerkaai zuid	-	-	-	-					
Vaarwater Oudendijk	-	-	-	-					
Drempel van Zandvliet	39.15	-	-	80.70					
Zandvliet+Berendrecht sluis	69.68	1.17	-	-					
Drempel van Frederik	-	-	-	-					
Drempel van Lillo	-	-	46.51	-					
Lillo vaarwater plaat	-	-	-	-					
Toeg Boud+Calew sluis	-	-	-	-					
Deurganckdok	-	-	-	-					
De Parel	-	31.07	39.92	-					
Ketelplaat	-	-	-	-					
Kallo sluis	10.34	28.05	-	-					
Krankeloon	-	-	30.38	-					
Kaaien 23-27	-	1.19	-	-					

Dumping locations									
	Week 36	***Week 37***	***Week 38***	***Week 39***					
Spijkerplaat	-	-	-	-					
Everingen	-	-	-	-					
Ellewoutsdijk	33.09	24.10	-	21.87					
Biezelingse Ham	71.13	18.51	-	15.54					
Schaar van Waarde	-	79.83	-	61.12					
Schaar Ouden Doel	39.15	32.26	116.81	80.70					
Opspuitingen Deurganckdok	-	-	-	-					
Oosterweel	40.35	14.85	-	-					
Plaat van Boomke	6.01	13.20	-	-					
Punt van Melsele	33.65	1.17	-	-					
Opspuitingen Kruibeke	-	-	-	-					

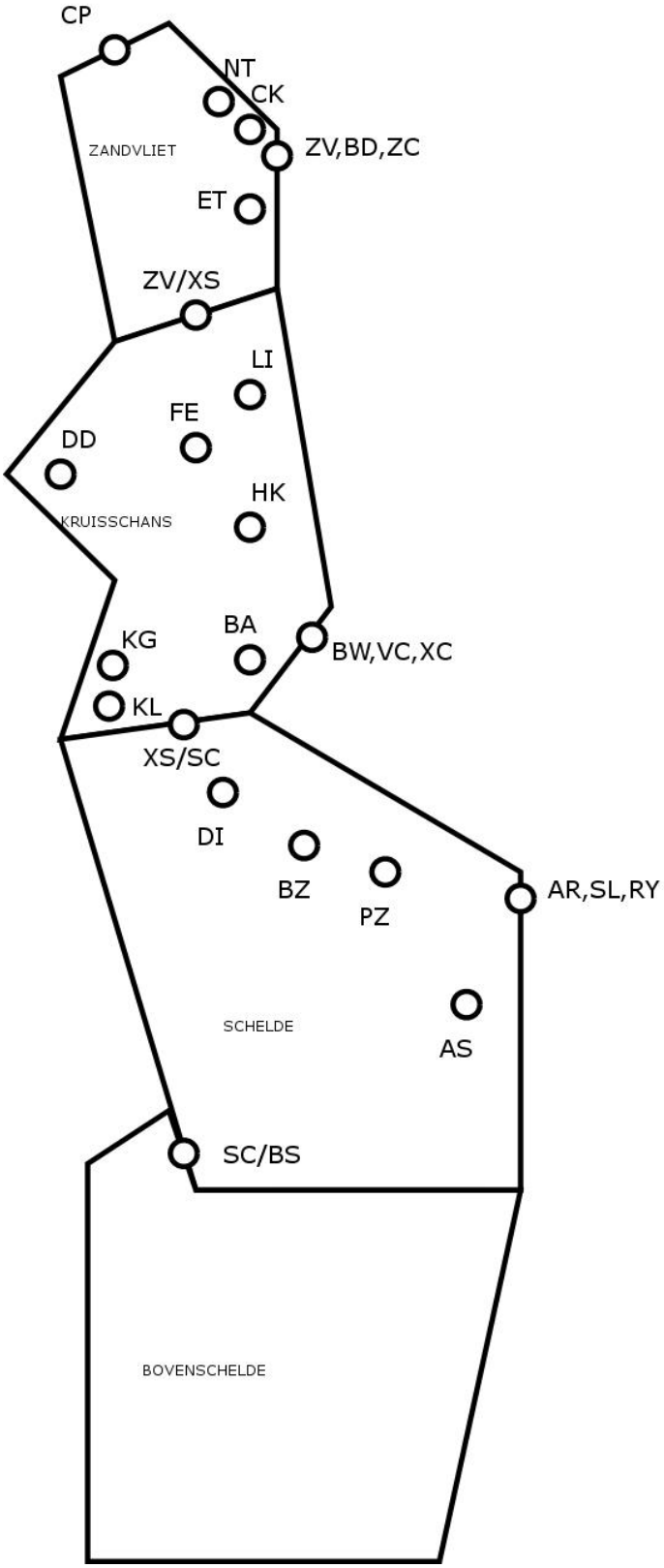
APPENDIX G.

NAVIGATION

G.1 Description of the areas

Area	*Global description*	*Detailed description*
1	Belgian border → Locks of Zandvliet – Berendrecht	Transit point CP → exit/entry point ZC, BD, ZV, NT, CK, ET or transit point ZV/XS
2	Locks of Zandvliet – Berendrecht → Deurganckdok	Transit point CP or entry/exit point ZC, BD, ZV, NT, CK, ET → transit point ZV/XS
3	Deurganckdok → Lock of Kallo	Transit point ZV/XS or entry/exit point DD → exit/entry point BA, BW, FE, HK, KG, KL, LI, VC, XC or transit point XS/SC
4	Lock of Kallo → Lock of Royers	Transit point XS/SC or entry/exit point DD, BA, BW, FE, HK, KG, KL, LI, VC, XC → entry/exit point AR, AS, BZ, DI, KT, PZ, RY, SL or transit point SC/BS

	CID	MEANING	TYPE
GA	GEBIED ANTWERPEN		
SA	Saeftinge		
	CP	Coordinatiepunt (blokgrens SA/ZV)	P
	CP2	Coordinatiepunt (blokgrens SA/ZV)	P
SC	Schelde		
	AR	Antwerpen Rede	E
	AS	Antwerpen Scheldekade/steiger	E
	AX	Antwerpen zonder detaillering	E
	BZ	BP Zwijndrecht	E
	DI	Haven Dredging International	E
	PZ	Polysar Zwijndrecht	E
	RY	Royerssluis	E
	SC/BS	Blokgrens SC/BS (boveneinde rede Antwerpen)	P
	SL	Sluizen Antwerpen Rechteroever	E
XS	Kruisschans		
	BA	Bayer Kallo	E
	BW	Boudewijnsluis	E
	DD	Deurganckdok	E
	FE	Steiger Fenol	E
	HK	Steiger Haltermann	E
	KG	Kallo geul	E
	KL	Kallosluis	E
	LI	Steiger Lillo	E
	VC	Van Cauwelaertsluis	E
	XC	Kruisschanssluiscomplex	E
	XS/SC	Blokgrens Kruisschans / Schelde	P
	XS/SC2	Blokgrens Kruisschans / Schelde	P
ZV	Zandvliet		
	BD	Berendrechtsluis	E
	CK	Containerkade Antwerpen	E
	ET	Europaterminal	E
	NT	Noordzeeterminal	E
	ZC	Zandvliet / Berendrecht sluiszencomplex	E
	ZV	Zandvliet sluis	E
	ZV/XS	Blokgrens Zandvliet / Kruisschans	P
	ZV/XS2	Blokgrens Zandvliet / Kruisschans	P



Annex-Figure G-1: Sketch of the different areas of navigation

G.2 Weekly data

Week 27 (02/07/2007 – 08/07/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	94	90	3	13	76
	0 – 8 m	840	432	407	375	462
	8 – 12 m	196	0	196	68	128
	> 12 m	37	0	37	7	30
2	Unknown	159	153	5	57	97
	0 – 8 m	620	370	249	321	296
	8 – 12 m	76	0	76	41	35
	> 12 m	12	0	12	4	8
3	Unknown	165	159	5	37	123
	0 – 8 m	579	350	228	297	279
	8 – 12 m	46	0	46	25	21
	> 12 m	1	0	1	1	0
4	Unknown	37	35	1	21	15
	0 – 8 m	138	86	52	89	49
	8 – 12 m	3	0	3	1	2
	> 12 m	0	0	0	0	0
Week 28 (09/07/2007 – 15/07/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	99	97	1	13	86
	0 – 8 m	873	431	440	425	446
	8 – 12 m	220	0	220	69	151
	> 12 m	34	0	34	9	25
2	Unknown	164	159	4	61	102
	0 – 8 m	640	375	263	357	281
	8 – 12 m	94	0	94	49	45
	> 12 m	8	0	8	5	3
3	Unknown	150	147	2	27	123
	0 – 8 m	609	366	241	342	265
	8 – 12 m	57	0	57	29	28
	> 12 m	3	0	3	3	0
4	Unknown	32	30	1	14	18
	0 – 8 m	138	87	50	93	44
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0

Week 29 (16/07/2007 – 22/07/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	90	89	1	11	79
	0 – 8 m	750	360	390	349	399
	8 – 12 m	204	0	204	65	139
	> 12 m	31	0	31	4	27
2	Unknown	125	121	4	32	93
	0 – 8 m	563	316	247	296	265
	8 – 12 m	79	0	79	37	42
	> 12 m	6	0	6	2	4
3	Unknown	143	139	4	18	125
	0 – 8 m	512	294	218	271	239
	8 – 12 m	41	0	41	17	24
	> 12 m	2	0	2	1	1
4	Unknown	26	25	1	12	14
	0 – 8 m	139	91	48	94	45
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0
Week 30 (23/07/2007 – 29/07/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	71	68	3	8	63
	0 – 8 m	761	352	409	354	405
	8 – 12 m	211	0	211	70	141
	> 12 m	28	1	27	6	22
2	Unknown	113	106	7	34	79
	0 – 8 m	549	289	260	288	259
	8 – 12 m	80	0	80	42	38
	> 12 m	9	1	8	4	5
3	Unknown	119	115	4	16	103
	0 – 8 m	512	274	238	270	240
	8 – 12 m	48	0	48	25	23
	> 12 m	2	1	1	2	0
4	Unknown	26	26	0	14	12
	0 – 8 m	112	71	41	79	32
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0

Week 31 (30/07/2007 – 05/08/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	151	147	4	24	125
	0 – 8 m	815	390	424	398	414
	8 – 12 m	198	0	198	61	137
	> 12 m	26	0	26	1	25
2	Unknown	181	176	5	59	120
	0 – 8 m	591	334	256	332	257
	8 – 12 m	78	0	78	39	39
	> 12 m	6	0	6	1	5
3	Unknown	179	174	5	37	139
	0 – 8 m	539	312	226	302	235
	8 – 12 m	48	0	48	22	26
	> 12 m	0	0	0	0	0
4	Unknown	33	32	1	18	15
	0 – 8 m	132	76	56	94	38
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0
Week 32 (06/08/2007 – 12/08/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	92	86	5	12	79
	0 – 8 m	833	403	427	381	450
	8 – 12 m	204	0	204	68	136
	> 12 m	36	0	36	7	29
2	Unknown	136	130	5	44	91
	0 – 8 m	620	357	260	330	288
	8 – 12 m	87	0	87	44	43
	> 12 m	9	0	9	2	7
3	Unknown	139	134	4	25	112
	0 – 8 m	577	339	235	311	264
	8 – 12 m	46	0	46	22	24
	> 12 m	3	0	3	0	3
4	Unknown	41	38	2	16	25
	0 – 8 m	140	91	49	92	48
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0

Week 33 (13/08/2007 – 19/08/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	117	111	6	24	92
	0 – 8 m	812	392	417	391	420
	8 – 12 m	204	1	203	56	148
	> 12 m	28	1	27	6	22
2	Unknown	149	140	9	55	93
	0 – 8 m	608	351	254	337	270
	8 – 12 m	71	1	70	34	37
	> 12 m	4	1	3	2	2
3	Unknown	146	140	6	34	111
	0 – 8 m	562	337	222	314	246
	8 – 12 m	36	1	35	16	20
	> 12 m	1	1	0	1	0
4	Unknown	41	41	0	22	19
	0 – 8 m	123	81	41	76	46
	8 – 12 m	3	0	3	2	1
	> 12 m	0	0	0	0	0
Week 34 (20/08/2007 – 26/08/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	117	115	2	12	104
	0 – 8 m	858	463	391	392	463
	8 – 12 m	179	1	178	57	122
	> 12 m	23	0	23	3	20
2	Unknown	162	158	4	47	114
	0 – 8 m	639	405	231	335	301
	8 – 12 m	67	1	66	32	35
	> 12 m	4	0	4	1	3
3	Unknown	161	158	3	30	130
	0 – 8 m	593	391	199	312	278
	8 – 12 m	37	1	36	17	20
	> 12 m	0	0	0	0	0
4	Unknown	44	42	2	14	30
	0 – 8 m	122	88	33	74	48
	8 – 12 m	1	1	0	1	0
	> 12 m	0	0	0	0	0

Week 35 (27/08/2007 – 02/09/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	95	92	3	11	81
	0 – 8 m	875	452	420	403	470
	8 – 12 m	212	0	212	69	143
	> 12 m	30	1	29	10	20
2	Unknown	135	131	4	44	88
	0 – 8 m	652	392	258	343	307
	8 – 12 m	88	0	88	46	42
	> 12 m	10	0	10	6	4
3	Unknown	138	135	3	28	107
	0 – 8 m	616	382	232	326	288
	8 – 12 m	50	0	50	25	25
	> 12 m	4	0	4	4	0
4	Unknown	51	50	1	25	26
	0 – 8 m	136	85	50	86	50
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0
Week 36 (03/09/2007 – 09/09/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	118	117	1	14	100
	0 – 8 m	882	449	432	424	457
	8 – 12 m	209	0	209	64	145
	> 12 m	34	0	34	8	26
2	Unknown	155	147	8	44	108
	0 – 8 m	665	398	266	373	291
	8 – 12 m	85	0	85	37	48
	> 12 m	11	0	11	6	5
3	Unknown	150	146	4	24	122
	0 – 8 m	631	387	243	354	276
	8 – 12 m	47	0	47	18	29
	> 12 m	2	0	2	2	0
4	Unknown	49	45	4	27	22
	0 – 8 m	170	115	55	118	52
	8 – 12 m	1	0	1	1	0
	> 12 m	0	0	0	0	0

Week 37 (10/09/2007 – 16/09/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	111	105	5	17	92
	0 – 8 m	846	429	415	394	449
	8 – 12 m	213	1	212	71	142
	> 12 m	29	0	29	5	24
2	Unknown	147	137	9	42	103
	0 – 8 m	632	379	251	335	294
	8 – 12 m	89	1	88	42	47
	> 12 m	6	0	6	3	3
3	Unknown	141	135	5	28	110
	0 – 8 m	583	360	221	314	266
	8 – 12 m	53	1	52	26	27
	> 12 m	2	0	2	2	0
4	Unknown	31	27	4	16	15
	0 – 8 m	148	106	41	109	39
	8 – 12 m	2	1	1	2	0
	> 12 m	0	0	0	0	0
Week 38 (17/09/2007 – 23/09/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	131	128	2	13	115
	0 – 8 m	905	448	454	453	446
	8 – 12 m	195	0	195	58	137
	> 12 m	26	1	25	4	22
2	Unknown	177	168	8	43	131
	0 – 8 m	670	387	280	385	279
	8 – 12 m	60	0	60	27	33
	> 12 m	8	1	7	4	4
3	Unknown	174	169	4	21	150
	0 – 8 m	632	371	258	361	265
	8 – 12 m	27	0	27	10	17
	> 12 m	2	1	1	2	0
4	Unknown	47	46	1	25	22
	0 – 8 m	155	101	53	111	44
	8 – 12 m	1	0	1	0	1
	> 12 m	1	1	0	1	0

Week 39 (24/09/2007 – 30/09/2007)						
Area	***Draught***	***Total***	***Inland navigation***	***Seagoing***	***Arrival***	***Departure***
1	Unknown	106	102	4	12	91
	0 – 8 m	853	471	379	397	450
	8 – 12 m	195	0	195	63	132
	> 12 m	35	0	35	9	26
2	Unknown	130	122	8	35	92
	0 – 8 m	654	409	242	350	298
	8 – 12 m	73	0	73	39	34
	> 12 m	10	0	10	6	4
3	Unknown	124	118	6	22	98
	0 – 8 m	618	402	213	329	283
	8 – 12 m	41	0	41	22	19
	> 12 m	2	0	2	2	0
4	Unknown	23	22	1	10	11
	0 – 8 m	140	85	55	95	45
	8 – 12 m	0	0	0	0	0
	> 12 m	0	0	0	0	0