Experiments on Rip Currents and Nearshore Circulation: Data Report

Merrick C. Haller

Robert A. Dalrymple

and

Ib A. Svendsen

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Center for Applied Coastal Research

Ocean Engineering Laboratory

University of Delaware

Newark, DE 19716

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1 Introduction

Rip currents are narrow, seaward-directed currents that extend from the inner surf zone out through the line of breaking waves. In general, rip currents return the water carried landward by waves and, under certain conditions of nearshore slope and wave activity, rip currents are the primary agent for the seaward transport of water and sediments. In general, rip currents arise from longshore variations in the incident wind-wave forcing. For example, periodic longshore variations in the incident wave field can drive coherent nearshore circulation cells. These cells exhibit broad regions of shoreward flow separated by narrow regions of offshore directed flow. If these narrow regions of offshore flow are sufficiently strong they will appear as rip currents. The necessary longshore variability in wave height can be imposed by boundary effects (e.g. non-planar beaches or groin fields) or by a superposition of wave trains (e.g. Bowen, 1969; Dalrymple, 1975). Additionally, rip current circulations may arise as an instability to the nearshore vorticity balance (Iwata, 1976; Dalrymple & Lozano, 1978).

Rip currents and their effects on nearshore circulation have been observed qualitatively in the field for many years now (e.g. Shepard *et al.*, 1941), however, there are extremely few comprehensive data sets involving rip currents. Since in the field rip currents tend to be transient, they tend to elude investigators intent on measuring them with stationary instrument deployments; though limited sets of quantitative measurements do exist (e.g. Sonu 1972; Sasaki *et al.*, 1980; Bowman *et al.*, 1988; Huntley *et al.*, 1988; Dette *et al.*, 1995; Smith and Largier, 1995). The laboratory, however, is rather conducive to the study of nearshore circulation in the presence of rip currents because the environment is more easily controlled. However, the extent of laboratory data involving rip currents on longshore varying bathymetry is limited to two brief studies (Hamm, 1992; Dronen *et al.*, 1999).

Our laboratory study, conducted on a barred beach with periodic rip channels, represents the most comprehensive to date on this topic. Results from these experiments have been used to investigate the dynamics of rip currents and their influence on the nearshore circulation system, as given by Haller *et al.*(1997a, 1997b) and Haller and Dalrymple (1999, 2000). It is expected that this data set will be useful in quantifying the driving forces of nearshore circulations, and therefore, in verifying previously advanced theories. The data set has already begun to be used in validating certain complex, and computationally intensive numerical circulation models (Haas *et al.*, 1998; Chen *et al.*, 1999). In addition, the data combined with the linear stability modeling of Haller and Dalrymple (2000) has demonstrated that rip currents exhibit unsteady motion due to the jet instability mechanism, a previously unexamined phenomena.

The intent of the present report is to complement these previous works by giving a complete description of the laboratory experiments, including the experimental procedures, experimental conditions, and the details of the data collection and processing. In addition, the present report will provide the necessary information for accessing the archived data set including the basin survey data. This report is organized into three sections. Section 2 provides a description of the experimental facilities, the details of the bathymetric survey, the coordinate system used, and the instrumentation. In Section 3 the experimental procedures are described along with the experimental test conditions, and the formats used for data archiving and the measuring locations is also given. The catalogue of measuring locations is given in the appendix and all the data files are available from the Center for Applied Coastal Research anonymous FTP site.

2 Experimental Facility

2.1 Physical Model

The laboratory experiments were performed in the Directional Wave Basin located in the Ocean Engineering Laboratory at the University of Delaware. A plan view of the wave basin is shown in Figure 1 (*a-b*). Figure 1 (*a*) also shows the coordinate axes, the origin is located at the wavemaker along one sidewall. The internal dimensions of the wave basin are approximately 17.2 m in length by 18.2 m in width with a three-dimensional "snake" wavemaker at one end. The wavemaker consists of 34 paddles of flap-type. Each paddle is controlled by a separate servo control motor through a complex arrangement of pulleys and cables. Each paddle is 0.51 m wide, 1 m in height, and hinged at its base. The paddles are mounted approximately 11.6 cm from the floor and there is a small vertical gap of approximately 2.5 cm between paddles to allow them to slide freely past each other.

Certain aspects of the wavemaker configuration were sources of noise in the incident wave field. There is approximately 30 cm between the back of the paddles and the basin wall and, since the experiments consisted solely of monochromatic wave fields, standing waves of significant amplitude were often present in the space behind the paddles causing some disturbances to leak out from between the paddles. Additionally, there is a 15 cm gap between the last paddle and the basin sidewall. These problems were reduced by the use of a swimming pool lane line both immediately in front of and in back of the paddles, and by mounting a wooden barrier in the gap between the paddle and the sidewall. Also, the majority of the measurements were taken in the basin area opposite from the paddle/sidewall gap to help avoid any effects of the gap.

As part of this experimental project, the Center for Applied Coastal Research installed a new concrete beach. The beach consists of a steep (1:5) toe located between 1.5 m and 3 m from the wavemaker with a milder (1:30) sloping section extending from the toe to the opposite wall of the basin. The design and construction of the shore parallel bars were undertaken after the construction of the concrete beach, and were performed by the first author with some assistance from Doug Baker (Technician, Civil Engineering Dept.). The three "sand bar" sections were made in the shape of a generalized bar profile from sheets of High Density Polyethylene (HDP). The interior of the bars contained supports oriented perpendicular to the shoreline. These supports were made from HDP sections 1.27 cm (0.5 in) thick spanning 1.2 m in the cross-shore direction with a maximum vertical height of 6 cm at a distance 90 cm from their seaward edge and tapering to sharp corners at both ends. The sharp corner at the bar crest due to the initial triangular shape of the support cross-section was rounded into a parabolic shape "by eye" by the technician. The supports were mounted directly into the concrete beach using small corner irons with stainless steel screws and plastic anchors. The supports were spaced approximately 61 cm apart in the longshore direction and overlayed with sheets of HDP .318 cm (.125 in) thick so that the bar sections were completely enclosed. The cover sheets were attached directly to the supports with stainless steel screws. After each bar section was completed all exposed joints and the contacts between the HDP and the beach were sealed with caulking meant for underwater use.

The completed bar system consisted of three sections, one main section spanning approxi-

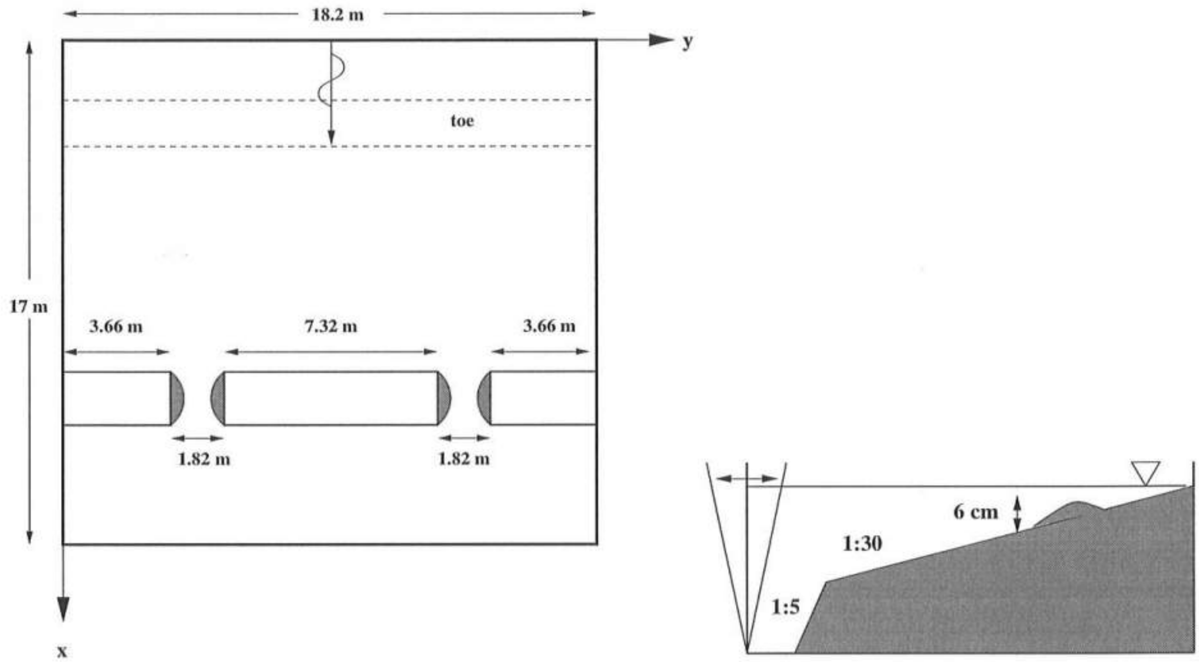

Figure 1: (*a*) Plan view and (*b*) cross-section of the experimental basin.

mately 7.32 m longshore and two half-sections approximately 3.66 m each. In order to insure that the sidewalls were located along lines of symmetry, the longest section was centered in the middle of the tank and the two half-sections were placed against the sidewalls. This left two gaps of approximately 1.82 m width located at 1/4 and 3/4 of the basin width that served as rip channels. The open edges of the bars on each side of the gaps were rounded off with cement in order to limit wave reflections from the channel sides. The seaward edges of the bar sections were located at approximately $x = 11.1$ m with the bar crest at $x = 12$ m, and their shoreward edges at $x = 12.3$ m. The wavemaker is located at $x = 0$ m. These distances were determined more accurately after the basin was surveyed as described in Section 2.2. This bar configuration caused the ratio of rip current spacing to surf zone width to range between 2.7 and 4.0 during the experiments (depending on the still water level). In the field this ratio has been found to vary between 1.5 and 8 (Huntley and Short, 1992).

2.2 Basin Survey

After the longshore bars were installed, a bathymetric survey was performed using a Total Station Theodolite. The survey data were used to establish the exact dimensions of the basin and the coordinate y-axis was placed along the wavemaker with the coordinate x-axis oriented perpindicular to the y-axis. Therefore, the coordinate x-axis is not exactly parallel with the basin sidewalls. In fact, the end of the sidewall closest to the x-axis but furthest from the wavemaker is at approximately y=-4.3 cm.

The survey data are contained in the file **allsurvey.dat**. This file contains 658 rows of

Column 1	Column 2	Column 3	Column 4	Column 5
i	j	x	y	z
row #		location of survey point		
1		depth gage		
2-6		perimeter of basin		
7-20		perimeter of bars		
21-254		basin grid markings		
255-658		bar profiles		

Table 1: Format for the basin survey data file (**allsurvey.dat**). Indices (i, j) indicate type of survey point, all distances (x,y,z) are recorded in meters.

data arranged in 5 columns and the format is given in Table 1. The first two columns of the data are indices (i, j) which generally signify the type of survey point a given row contains. For example, the first two rows of data are as follows:

100.0	**100.0**	**0.1144**	**18.0828**	**0**
0	**0**	**17.2142**	**18.1978**	**0.8214**

The first row is the survey point located directly below the water level depth gage, the bottom of the basin at this location was chosen as the origin for the z-axis (hence z=0), and this point was given the indices (100,100) arbitrarily. The second row with the indices (0,0) is the survey point from one of the basin corners. Data rows 21-254 are the survey points from the basin grid markings that were painted on the beach, these markings were used to locate the instruments during the experiment. The survey data show that the original grid markings, which were intended to be located along uniform longshore lines at integer distances (x =4.0-16.0 m) from the wavemaker, are actually displaced as much as 10 cm when the survey coordinate system is taken into account. However, most grid points are within 3-5 cm of their intended location and the corrected instrument locations are given in the appendix. Additionally, the y-axis was reversed when the original grid markings were generated, this causes an offset such that the grid marks are not along unit meter lines in the longshore direction (in the survey coordinate system). This is not a source of error, however, and was accounted for in previous publications of this data.

The survey data are plotted in Figures 2-3. Linear interpolation between the data points was used in order to make a denser bathymetric mesh for plotting the unevenly spaced survey data. These plots also provide details on the variations from longshore uniformity in the planar beach resulting from the settling of the concrete. A close examination of Figure 2 reveals the periodic variations in the concrete beach due to the concrete settling between the three support beams running in the x-direction underneath the beach. There are also smaller (horizontal) scale variations in the longshore bars. Figure 4 shows the standard deviation of the depth in the longshore direction as a function of cross-shore position. In the cross-shore regions where the bars are located, data from in the rip channels has not been used in order to remove the effect of the large depth change between bar and channel. The data shows that the variations

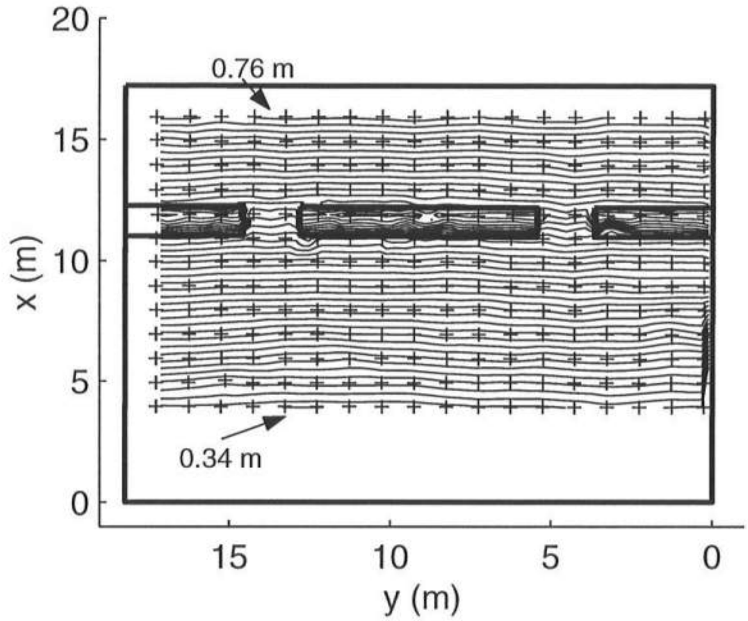

Figure 2: Contour plot of basin bathymetry with the locations of the painted grid marks denoted by (+). Contour interval is 1 cm.

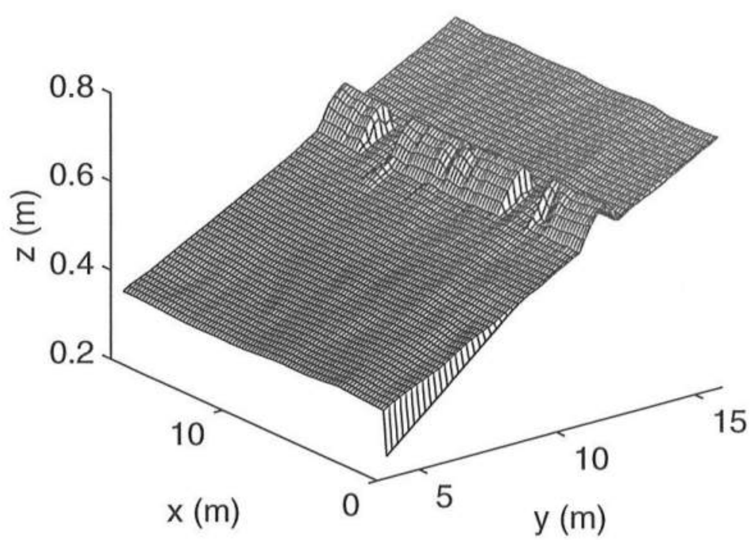

Figure 3: 3-D interpolation of wave basin survey data.

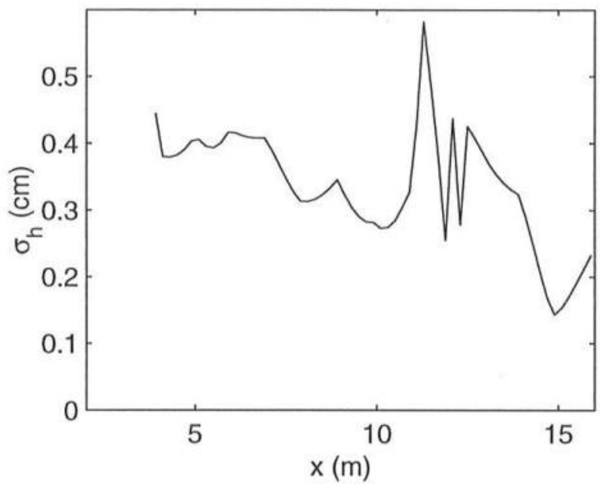

Figure 4: Standard deviation of the depth vs. cross-shore distance (data from within the rip channels has not been used at $11.1 < x < 12.3$ m).

are reasonably small and fairly consistent in the cross-shore direction with a maximum near x=11.3 m.

2.3 Instruments

Ten capacitance wave gages were used to measure time series of water surface elevation during the experiments. These gages have nearly linear response of output voltage to the water level at the gage wire and performed well during the experiments. The wave gages were calibrated quite often. In general, gages were calibrated every morning and repeatedly during the day whenever the gages were moved. Nine gages were mounted on a mobile carriage that spanned the basin in the longshore direction, the tenth gage was mounted on a separate quadripod which moved around the basin to provide reference measurements.

Three 2-D side-looking Acoustic Doppler Velocimeters (ADV's) were used to obtain time series of horizontal currents. These probes are designed to work in water depths as small as 3 cm and are hardwired to a dedicated PC for data acquisition. This PC was linked, also by cable, to the mainframe that acquired the wave data, so that the onset of data acquisition was synchronized between the ADV's and the wave gages. The ADV's do not require calibration and a mounting system was designed that allowed them to be mounted either on the beam holding the wave gages or separate aluminum box beams that could be oriented in both the x and y directions and rigged to the carriage at various locations. Considerable amount of time was spent positioning the ADV's during the experiment. Each time the sensors were moved their position had to be adjusted in three coordinate directions and their orientation was determined "by eye". This was an iterative process that involved repeated adjustments of the sensors, measuring their position, then standing at a distance and visually determining their orientation.

The total water depth in the basin was measured by a depth gage located near the wave paddles. This gage was demarcated at 0.1 mm intervals. However, the total water level in the basin varied on the order of ±1 mm from run to run.

3 Description of Experiments

3.1 Experimental Procedure

The waves were generated using the Designer Waves theory of Dalrymple (1989) assuming longshore uniformity. The mean beach profile used in the wave generation code was obtained by averaging cross-shore transects (including the bars) from the survey data. All of the tested wave conditions were monochromatic and normally incident except for one (Test F), therefore the full capabilities of the Designer Waves theory were generally not utilized. In all the experiments the theory was used to generate a uniform plane wave with target amplitude at the seaward edge of the bar system. In general, the criterion of a uniform plane wave was fairly well met offshore from the bars. However, certain longshore variations in the wave height offshore of the bars were evident during all tests. Some of these variations were attributed to a longshore modulation in the beach due to concrete settling, especially at the centerline of the tank. Also, smaller scale variations in the amplitude were present and become pronounced with increasing offshore wave height. These can be attributed to several factors including nonlinear wave effects, noise due to the gaps between paddles, and high frequency basin seiche modes.

For all experimental runs, data were sampled at 10 Hz by all sensors and data acquisition was started at or very near the onset of wave generation. During wave generation 16384 data points were sampled by each sensor, except for a few tests of longer duration. A typical experimental run consisted of the following:

1. moving all wave gages and ADV's to their given locations and making sure they are properly oriented
2. waiting for the basin oscillations to settle down, then calibrating the wave gages
3. sampling the wave gages for 102.4 seconds (at 10 Hz) during still water in order to establish a reference zero elevation
4. starting wave generation and data acquisition for all sensors
5. after each run (27.3 minutes, 1638.4 s) wait for the seiching to dissipate then repeat still water reference measurement
6. return to step 1.

3.2 Experimental Conditions

The experimental conditions such as wave height (H), wave period (T), incident angle (θ), water depth at the bar crest (h_c), and shoreline location (x_{swl}) are given in Table 2. Most of the tests had normally incident waves with $T = 1$ s with varying wave heights and water levels.

Test	H(cm)	T(sec)	$\theta(deg)$	h_c (cm)	x_{swl} (m)
B	4.41	1.0	0	4.73	14.9
C	4.94	1.0	0	2.67	14.3
D	7.56	1.0	0	2.67	14.3
E	3.68	0.8	0	2.67	14.3
F	2.63	1.0	10	2.67	14.3
G	6.79	1.0	0	6.72	15.4

Table 2: Table of experimental conditions, mean wave height (H) measured near offshore edge of center bar (x=10.9 m y= 9.2 m), wave period (T), angle of incidence (θ) at x=11 m, average water depth at the bar crest (h_c), and cross-shore location of the still water line (x_{swl}).

However, Test E had waves of 0.8 s period and Test F has an incident angle of $\theta = 10$ degrees (positive angles indicate the wave propagation direction has a component in the positive y-direction). For Test F, the Designer Wave theory was used to generate a uniform wave train with an angle of incidence $\theta = 10$ degrees near the seaward edge of the bars (x=11 m).

3.3 Data Format

The data from each of the six experiments has been sorted into individual folders and stored on compact disc. The folders are denoted by the letter of a given experiment. For example, the data from Test B are stored in the folder **Btest** in ASCII format. Within each folder the naming convention for the individual data files is given by the following:

[test letter][run #].[data type]

For example, the ADV data from run 6, Test C are found in **Ctest/C6.vel**, the corresponding wave gage data are in **Ctest/C6.wave**.

The file **C6.wave** contains 10 columns of data and each column is 16384 rows long. These are the time series of water surface elevation from each of the 10 wave gages measured in centimeters. The first column is gage 1, the second is gage 2, and so on. The measuring locations for these gages during this run are listed in Table 8 in the appendix. Incidentally, measuring locations denoted by (-) in the appendix indicate that a given sensor was not used during a particular run. As an example, the wave data from gages 1, 5, and 10 are shown in Figure 5.

The file **C6.vel** contains 7 columns of data and each column is 16384 rows long. The format for this file is $[t\ u_1\ v_1\ u_2\ v_2\ u_3\ v_3]$, where t is the time from the onset of data acquisition in seconds. Columns 2 and 3 are the u and v velocities from the first ADV (u is cross-shore velocity and v is longshore), respectively. Columns 4 and 5 are the u and v velocities from the second ADV, respectively, and columns 6 and 6 are the u and v velocities from the third ADV, respectively. All velocities are recorded in cm/sec. As an example, the u velocity data from the three ADVs are shown in Figure 6.

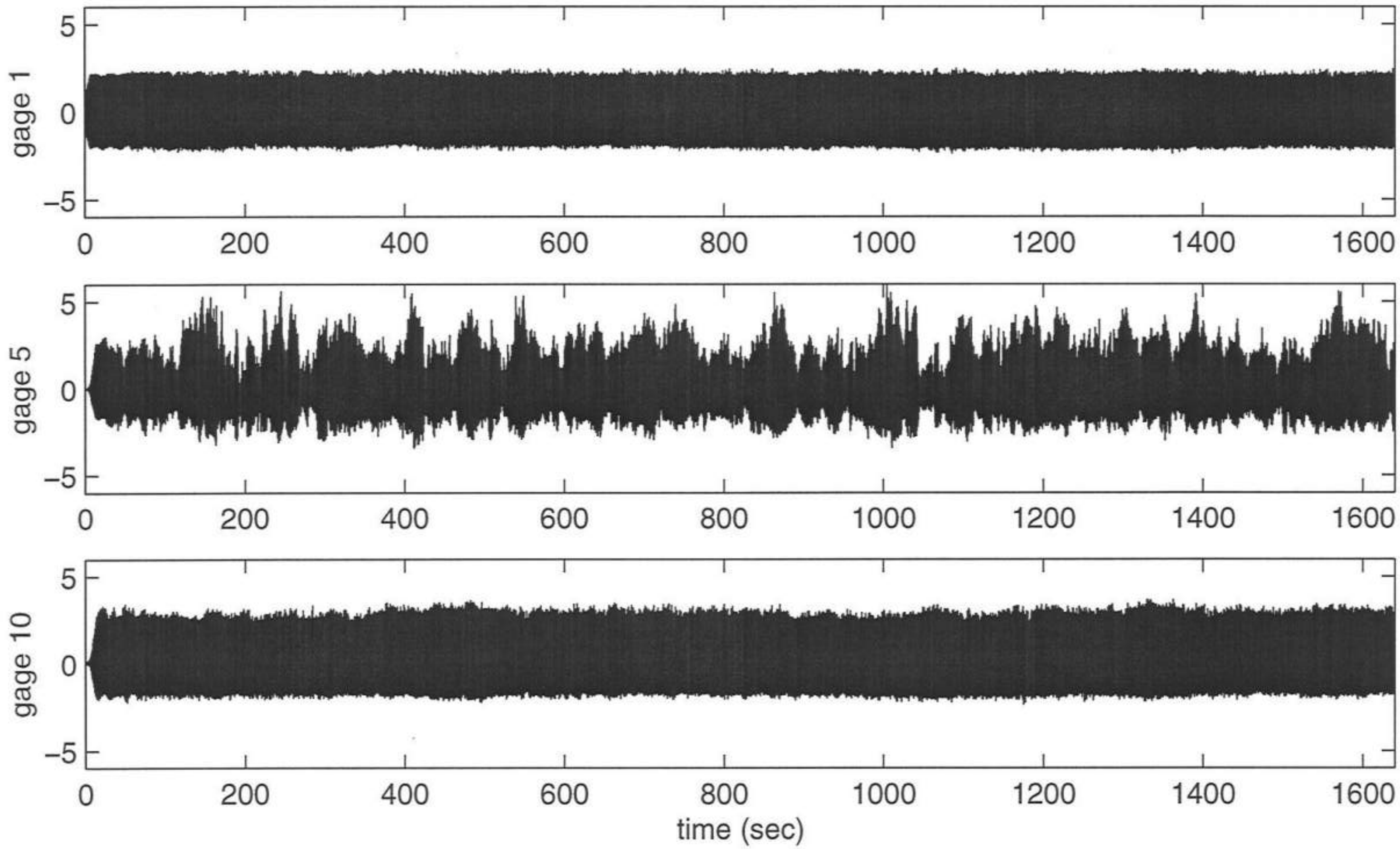

Figure 5: Time series of water surface elevation from file **C6.wav**.

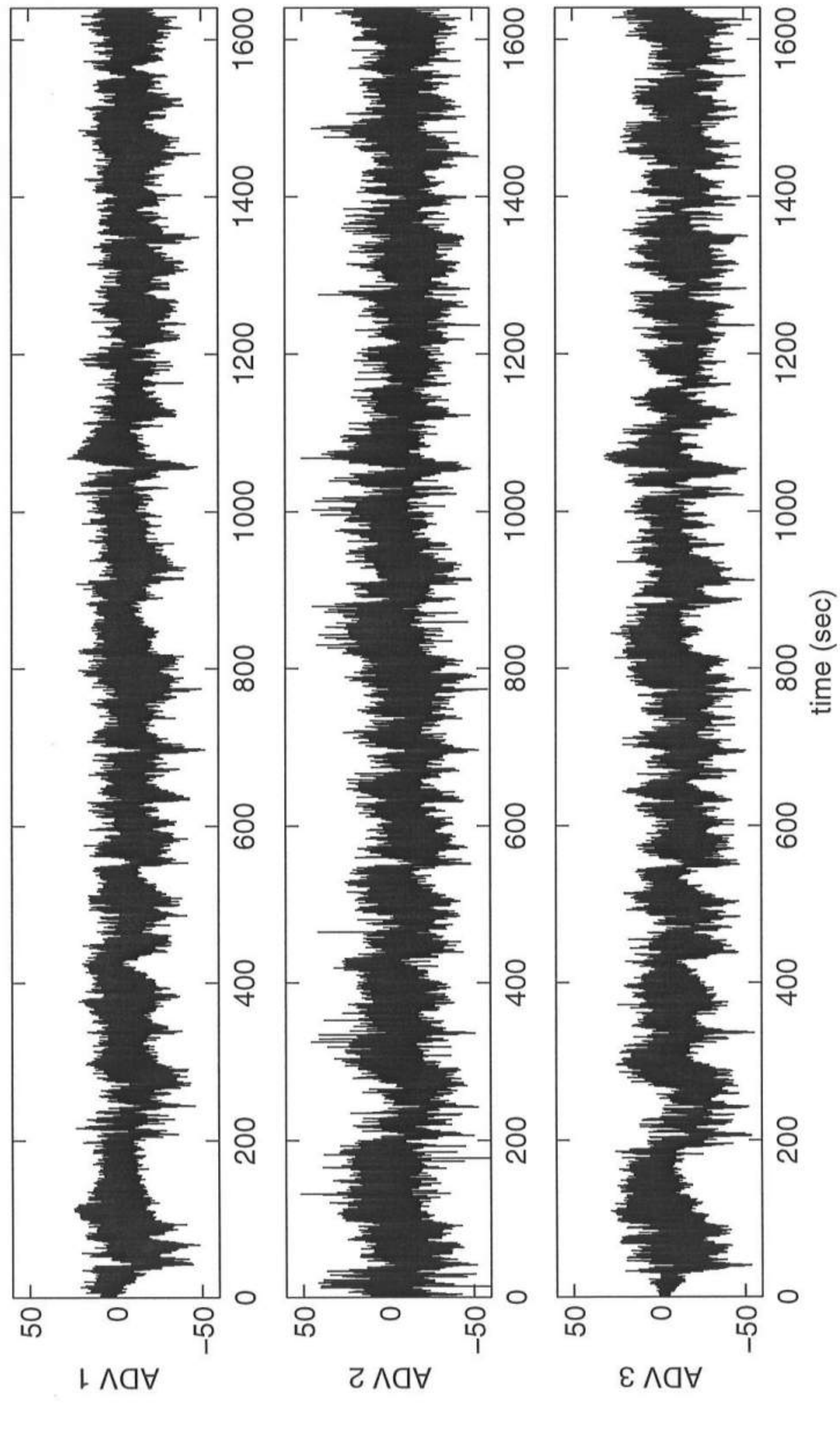

Figure 6: Cross-shore velocity time series from file **C6.vel**.

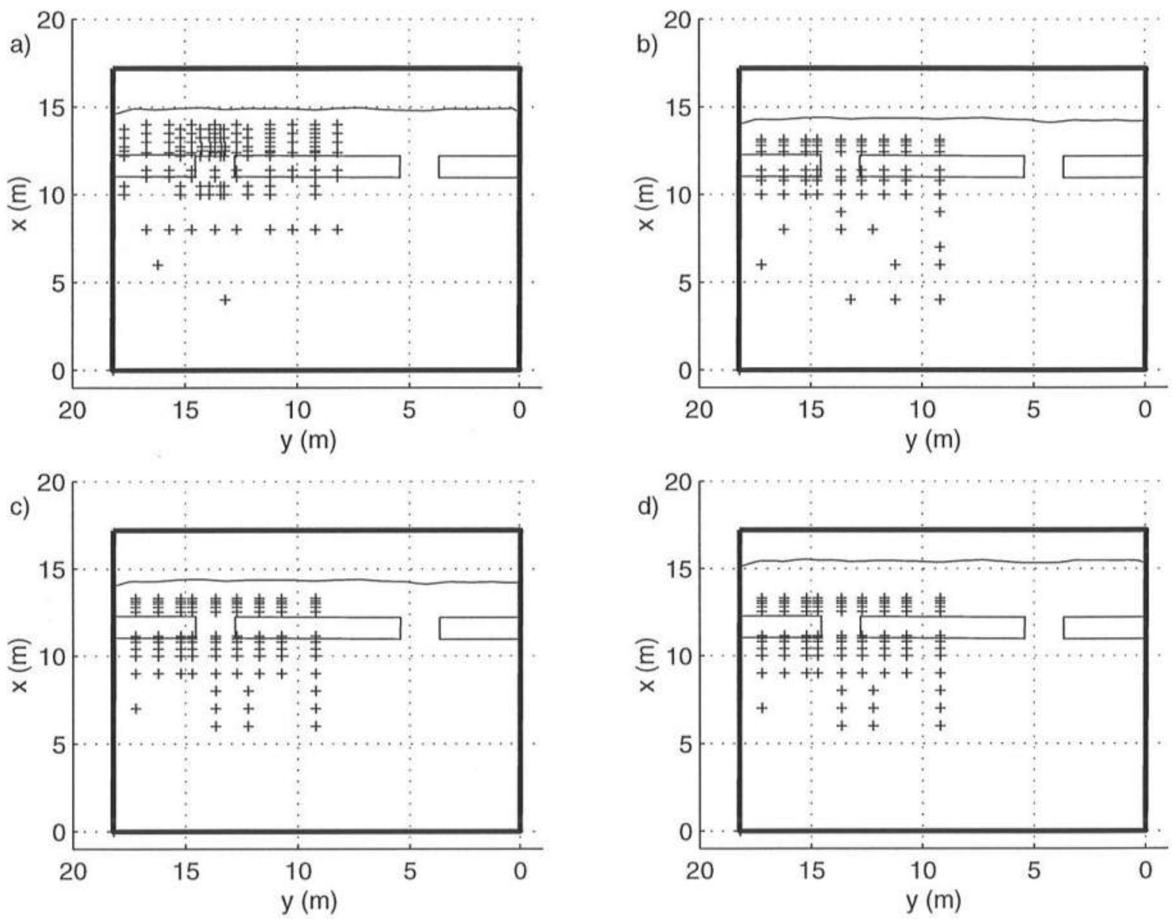

Figure 7: Wave gage sampling locations for (*a*) Test B (*b*) Test C (*c*) Tests D-F (*d*) Test G, the shoreline is shown as the solid line.

3.4 Measurement Locations

As the experimental work proceeded, the measuring location plan for all the sensors was adapted to highlight the interesting features of the nearshore circulation system. Specific results will not be discussed herein (see Haller and Dalrymple, 1999). The first test (Test B) contains the most extensive spatial map of currents. The subsequent test (Test C) concentrated on measuring the rip current flow field in detail, and the remaining tests (Tests D-G) obtained basic velocity measurements in the longshore current and in the rip. All tests contain a reasonably extensive map of the wave heights since there were many more wave gages, whereas the current measurements were always at a premium due to the lack of sensors. The locations of the wave gages and the ADV's are shown in Figures 7-8 for all tests. In general the ADV measurements were made 3 cm from the bottom, but certain offshore measurements were made at locations higher in the water column. The specific measuring locations, time series lengths for all sensors, and the depths of the ADV measurements are tabulated in the appendix. The

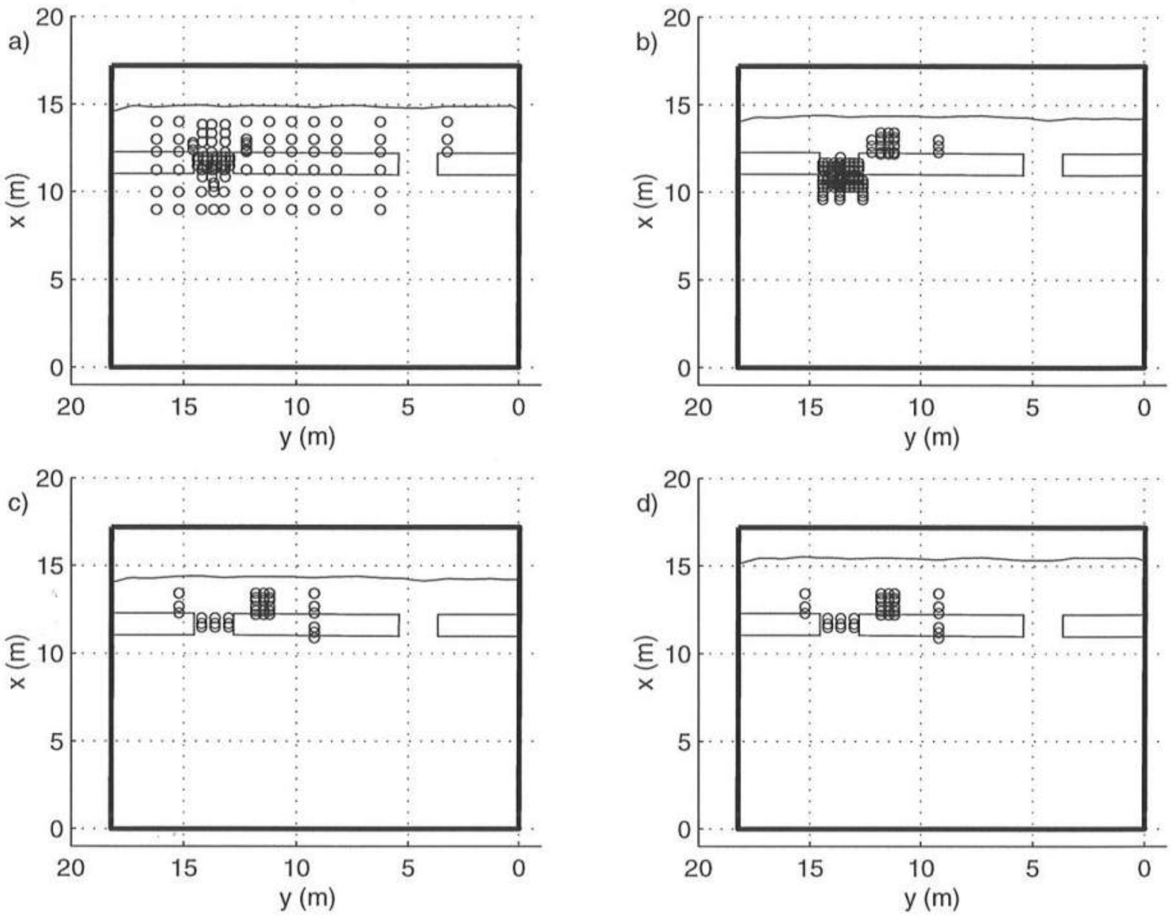

Figure 8: Current meter sampling locations for (*a*) Test B (*b*) Test C (*c*) Tests D-F (*d*) Test G, the shoreline is shown as the solid line.

sensor locations are also contained in the following data files:

***[test letter]*_*[data type]*.dat**

For example, the locations of the wave gages are found in **B_xwvpos.dat** and **B_ywvpos.dat**. These two files contain 10 columns of data 40 rows long where the rows correspond to run number and the columns correspond to sensor number. Therefore, the x, y location for wave gage number 6 during run **B15** can be found in the 15th row and 6th column of the files **B_xwvpos.dat** and **B_ywvpos.dat**, respectively. The ADV locations for **Btest** are given in **B_advpos.dat**. This file contains 6 columns of data 40 rows long. Again the rows correspond to run number the columns however, are arranged as $[x_1\ x_2\ x_3\ y_1\ y_2\ y_3]$. Therefore, the x, y location for sensor 2 during **B15** can be found in the 15th row, second and fifth coumns of **B_advos.dat**.

n	Test	x(m)	y(m)	H_m(cm)	σ_H(cm)	% var.	σ_η(cm)
30	B	4	13.2	4.75	0.06	1	0.02
10	B	6	16.2	4.11	0.05	1	0.01
5	C	4	13.2	4.82	0.05	1	0.02
5	C	7	9.2	4.32	0.04	1	0.01
4	C	4	9.2	4.17	0.02	<1	<0.01
3	C	6	9.2	5.13	0.06	1	0.01
3	C	6	11.2	5.08	0.01	<1	0.02
3	C	4	11.2	4.33	0.14	3	<0.01
2	C	9	9.2	4.76	0.02	<1	<0.01
2	C	9	4.57	4.63	0.14	3	0.01
2	C	8	4.57	4.55	0.06	1	<0.01

Table 3: Repeatability of measurements made at the offshore wave gage. Listed are number of realizations n, associated test, measurement location (x, y), mean wave height (H_m), standard deviation of mean wave height σ_H, percent variability (% var=$100 \cdot \sigma_H/H_m$), and standard deviation of the measured MWL (σ_η).

3.5 Repeatability of Measurements

In order to generate a map of this circulation system with a dense spatial resolution, the tests had to be repeated numerous times for a given set of experimental conditions. Therefore, it is important to determine how repeatable the experimental conditions were and how much variability existed among a given set of testing runs. Tests B and C consisted of 40 and 34 runs each, respectively, and during these tests certain wave measuring locations were repeated numerous times. The offshore gage remained stationary for much of Test B and represents the best estimate of experimental repeatability. The longshore instrument carriage was also left stationary from time to time which allows for additional estimates of repeatability.

Table 3 lists the repeated measurements made by the offshore gage during Tests B and C. Included are the measurement location (x, y), mean wave height (H_m) averaged from all the runs at that location, and the standard deviation of mean wave height (σ_H) and the measured mean water level (σ_η) at that location. All data were processed by first truncating the first 1024 points to remove startup effects. Next the mean wave heights were computed using a zero-up crossing method and the mean water levels (MWL) were computed as a time average of water surface elevation over the length of the truncated records. An estimate of the wave height variability is given as σ_H/H_m. The data show that the variability in wave height measured at the offshore gage was quite small during these tests, remaining less than 5 percent for all cases and approximately 1 percent for most cases. The variability in the MWL measured at the offshore gage was also very small and σ_η was always less than 0.3 mm at the offshore gage.

Figures 9-10 show the variability of wave measurements made using the longshore instrument array. These measurements were made closer to the bars and therefore can be strongly influenced by the variability of the circulation system. The increase in variability at these more

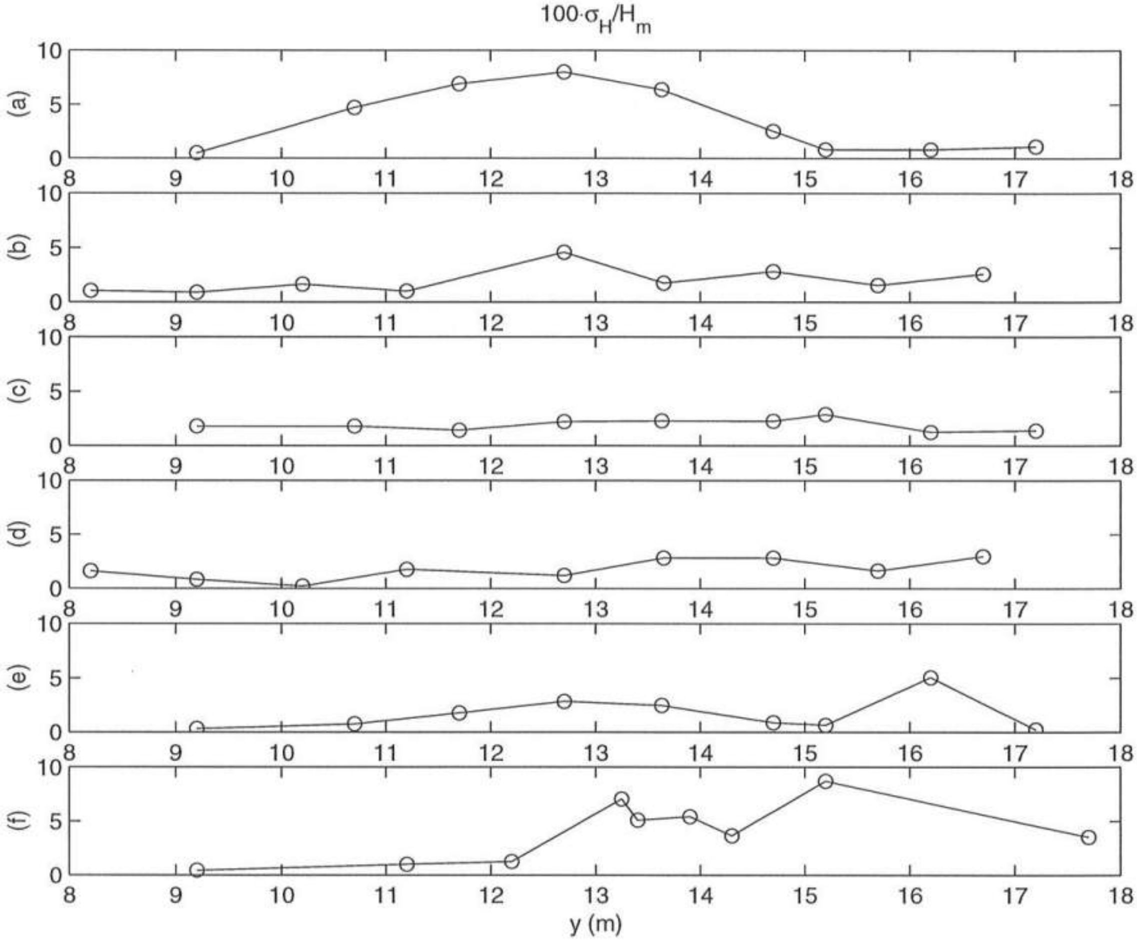

Figure 9: Repeatability of mean wave heights measured at the longshore array. Measuring locations, number of realizations, and experiments shown are (*a*) x=10 m, n=3, Test C (*b*) x=11 m, n=5, Test B (*c*) x=11 m, n=4, Test C (*d*) x=11.4 m, n=3, Test B (*e*) x=11.4, n=2, Test C (*f*) x=12.2 m, n=3, Test B.

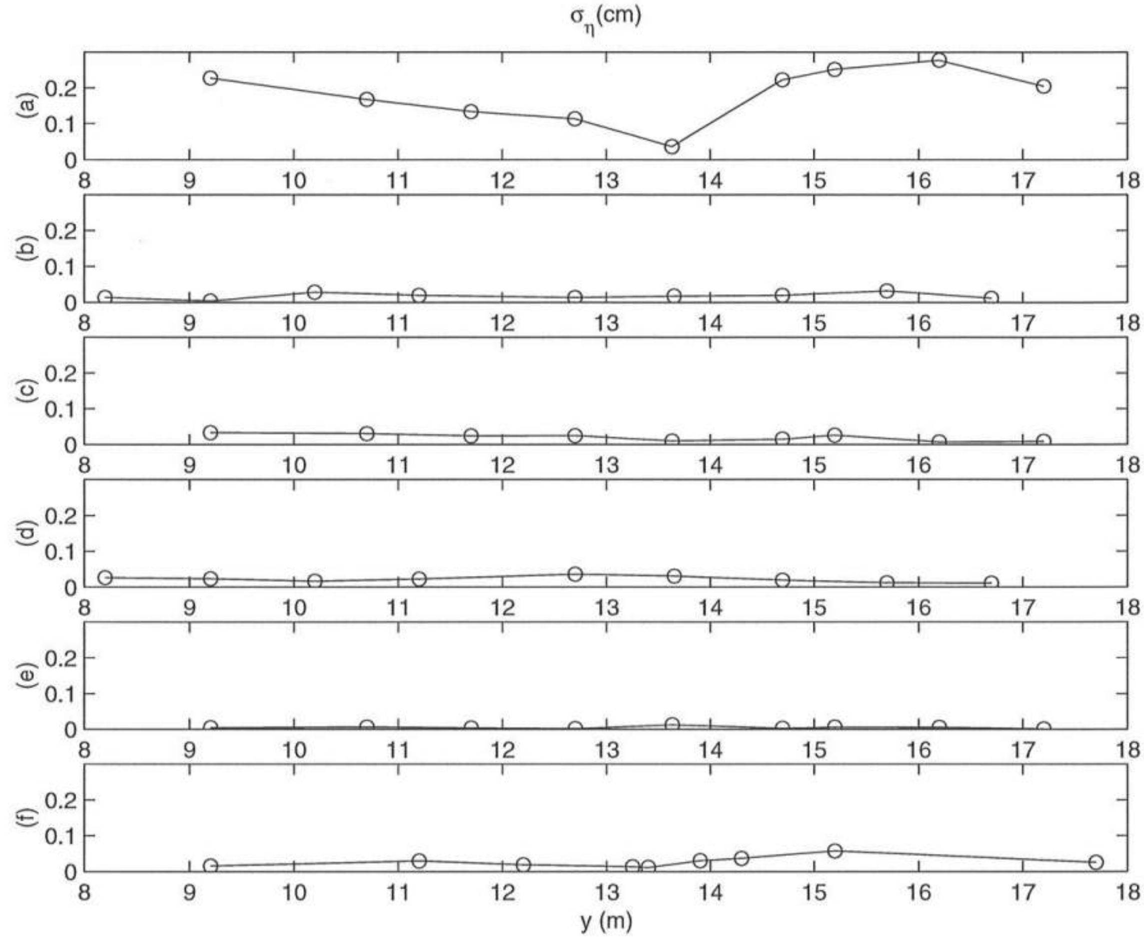

Figure 10: Repeatability of MWL measured at the longshore array. Measuring locations, number of realizations, and experiments shown are (*a*) x=10 m, n=3, Test C (*b*) x=11 m, n=5, Test B (*c*) x=11 m, n=4, Test C (*d*) x=11.4 m, n=3, Test B (*e*) x=11.4, n=2, Test C (*f*) x=12.2 m, n=3, Test B.

shoreward measuring locations is most likely a direct result of the inherent variability of the circulation near the longshore bars. However, the variability in the wave measurements is still reasonably small at these measuring locations. The variability in the measured MWL is also very small (<0.5 mm) except for the measuring line at x=10 m. The extent of measurements at this location was limited to two runs (C12,C13) and the larger variability was probably due to human error.

Other sources of experimental error include spatial errors due to inexact positioning of the sensors, these errors are estimated to be less than 1 cm. Also, the position of the ADV's relative to the bottom is estimated to be accurate within 0.5 cm.

Acknowledgments

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A Wave gage and ADV locations for all experiments

Table 4: Location of wave gages during Test B. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test B			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
1	16384	x:	3.95	10.94	10.93	10.93	10.93	10.93	10.93	10.93	10.92	10.91
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
2	16384	x:	3.95	10.94	10.93	10.93	10.93	10.93	10.93	10.93	10.92	10.91
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
3	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
4	16384	x:	3.95	10.94	10.93	10.93	10.93	10.93	10.93	10.93	10.92	10.91
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
5	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
6	16384	x:	3.95	10.94	10.93	10.93	10.93	10.93	10.93	10.93	10.92	10.91
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
7	16384	x:	3.95	10.94	10.93	10.93	10.93	10.93	10.93	10.93	10.92	10.91
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
8	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
9	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
10	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-

Table 5: Location of wave gages during Test B. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test B			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
11	16384	x:	3.95	12.30	12.30	12.30	12.30	12.30	12.30	12.30	12.30	12.30
		y:	13.25	16.73	15.73	14.73	13.67	12.72	11.23	10.25	9.25	8.20
12	16384	x:	3.95	12.93	12.94	12.95	12.94	12.94	12.95	12.95	12.95	12.95
		y:	13.25	16.73	15.73	14.73	13.68	12.73	11.23	10.23	9.23	8.23
13	16384	x:	3.95	13.44	13.44	13.44	13.44	13.44	13.44	13.44	13.44	13.44
		y:	13.25	16.73	15.73	14.73	13.68	12.73	11.23	10.23	9.23	8.23
14	16384	x:	3.95	13.95	13.94	13.95	13.95	13.94	13.94	13.94	13.95	13.95
		y:	13.25	16.72	15.73	14.72	13.68	12.72	11.22	10.22	9.22	8.21
15	16384	x:	3.95	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
16	16384	x:	3.95	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
17	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
18	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
19	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
20	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-

Table 6: Location of wave gages during Test B. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test B			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
21	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
22	16384	x:	3.95	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32
		y:	13.25	16.73	15.73	14.73	13.69	12.73	11.23	10.23	9.23	8.23
23	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
24	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
25	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
26	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
27	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
28	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
29	16384	x:	3.95	7.95	7.95	7.95	7.94	7.94	7.93	7.94	7.93	7.94
		y:	13.25	16.73	15.73	14.73	13.68	12.73	11.23	10.23	9.24	8.22
30	16384	x:	3.95	12.40	12.40	12.40	12.40	12.40	12.40	12.40	12.40	12.40
		y:	13.25	17.69	15.24	14.28	13.87	13.37	13.22	12.21	11.23	9.25

Table 7: Location of wave gages during Test B. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test B			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
31	16384	x:	5.94	12.69	12.69	12.69	12.69	12.69	12.69	12.69	12.69	12.69
		y:	16.24	17.73	15.23	14.28	13.88	13.38	13.23	12.23	11.23	9.23
32	16384	x:	5.94	13.19	13.19	13.19	13.19	13.19	13.19	13.19	13.19	13.19
		y:	16.24	17.73	15.23	14.33	13.93	13.43	13.28	12.23	11.23	9.23
33	16384	x:	5.94	13.69	13.69	13.69	13.69	13.69	13.69	13.69	13.69	13.69
		y:	16.24	17.72	15.23	14.32	13.92	13.43	13.28	12.22	11.22	9.22
34	16384	x:	5.94	13.69	13.69	13.69	13.69	13.69	13.69	13.69	13.69	13.69
		y:	16.24	17.72	15.23	14.32	13.92	13.43	13.28	12.22	11.22	9.22
35	16384	x:	5.94	12.14	12.14	12.14	12.14	12.14	12.14	12.14	12.14	12.14
		y:	16.24	17.73	15.23	14.33	13.93	13.43	13.28	12.23	11.23	9.23
36	16384	x:	5.94	12.14	12.14	12.14	12.14	12.14	12.14	12.14	12.14	12.14
		y:	16.24	17.73	15.23	14.33	13.93	13.43	13.28	12.23	11.23	9.23
37	16384	x:	5.94	-	-	-	-	-	-	-	-	-
		y:	16.24	-	-	-	-	-	-	-	-	-
38	16384	x:	5.94	12.14	12.14	12.14	12.14	12.14	12.14	12.14	12.14	12.14
		y:	16.24	17.73	15.23	14.33	13.93	13.43	13.28	12.23	11.23	9.23
39	16384	x:	5.94	9.96	9.95	9.95	9.95	9.95	9.95	9.95	9.95	9.94
		y:	16.24	17.74	15.23	14.33	13.93	13.43	13.28	12.23	11.23	9.23
40	16384	x:	5.94	10.44	10.44	10.44	10.44	10.44	10.44	10.44	10.44	10.44
		y:	16.24	17.74	15.23	14.33	13.93	13.43	13.28	12.23	11.23	9.23

Table 8: Location of wave gages during Test C. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test C			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
1	16384	x:	3.95	10.94	10.93	10.93	10.93	10.94	10.93	10.93	10.93	10.92
		y:	13.25	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
2	16384	x:	3.95	10.94	10.93	10.93	10.93	10.94	10.93	10.93	10.93	10.92
		y:	13.25	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
3	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
4	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
5	16384	x:	3.95	-	-	-	-	-	-	-	-	-
		y:	13.25	-	-	-	-	-	-	-	-	-
6	16384	x:	3.94	10.94	10.93	10.93	10.93	10.94	10.93	10.93	10.93	10.92
		y:	9.25	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
7	16384	x:	3.94	10.94	10.93	10.93	10.93	10.94	10.93	10.93	10.93	10.92
		y:	9.25	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
8	-	x:	-	-	-	-	-	-	-	-	-	-
		y:	-	-	-	-	-	-	-	-	-	-
9	16384	x:	3.94	-	-	-	-	-	-	-	-	-
		y:	9.25	-	-	-	-	-	-	-	-	-
10	16384	x:	3.94	-	-	-	-	-	-	-	-	-
		y:	9.25	-	-	-	-	-	-	-	-	-

Table 9: Location of wave gages during Test C. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test C			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
11	16384	x:	5.94	-	-	-	-	-	-	-	-	-
		y:	9.23	-	-	-	-	-	-	-	-	-
12	16384	x:	5.94	9.96	9.95	9.95	9.95	9.95	9.95	9.95	9.95	9.94
		y:	9.23	17.24	16.24	15.23	14.73	13.66	12.73	11.73	10.73	9.23
13	16384	x:	5.94	9.96	9.95	9.95	9.95	9.95	9.95	9.95	9.95	9.94
		y:	9.23	17.24	16.24	15.23	14.73	13.66	12.73	11.73	10.73	9.23
14	16384	x:	5.93	-	-	-	-	-	-	-	-	-
		y:	11.24	-	-	-	-	-	-	-	-	-
15	16384	x:	5.93	-	-	-	-	-	-	-	-	-
		y:	11.24	-	-	-	-	-	-	-	-	-
16	16384	x:	5.93	-	-	-	-	-	-	-	-	-
		y:	11.24	-	-	-	-	-	-	-	-	-
17	16384	x:	3.94	-	-	-	-	-	-	-	-	-
		y:	11.25	-	-	-	-	-	-	-	-	-
18	16384	x:	3.94	-	-	-	-	-	-	-	-	-
		y:	11.25	-	-	-	-	-	-	-	-	-
19	16384	x:	3.94	-	-	-	-	-	-	-	-	-
		y:	11.25	-	-	-	-	-	-	-	-	-
20	16384	x:	6.93	-	-	-	-	-	-	-	-	-
		y:	9.24	-	-	-	-	-	-	-	-	-

Table 10: Location of wave gages during Test C. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test C			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
21	16384	x:	6.93	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32
		y:	9.24	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
22	16384	x:	6.93	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32	11.32
		y:	9.24	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
23	16384	x:	6.93	-	-	-	-	-	-	-	-	-
		y:	9.24	-	-	-	-	-	-	-	-	-
24	16384	x:	8.94	-	-	-	-	-	-	-	-	-
		y:	9.24	-	-	-	-	-	-	-	-	-
25	16384	x:	8.94	-	-	-	-	-	-	-	-	-
		y:	9.24	-	-	-	-	-	-	-	-	-
26	16384	x:	5.94	9.96	9.95	9.95	9.95	9.95	9.95	9.95	9.95	9.94
		y:	17.25	17.24	16.24	15.23	14.73	13.66	12.73	11.73	10.73	9.23
27	16384	x:	7.94	12.93	12.93	12.95	12.95	12.94	12.94	12.95	12.95	12.95
		y:	12.23	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
28	16384	x:	8.95	12.39	12.39	12.39	12.39	12.39	12.39	12.39	12.39	12.39
		y:	13.67	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
29	16384	x:	8.95	12.74	12.74	12.74	12.74	12.74	12.74	12.74	12.74	12.74
		y:	13.67	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
30	16384	x:	9.95	13.09	13.09	13.09	13.09	13.09	13.09	13.09	13.09	13.09
		y:	13.66	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23

Table 11: Location of wave gages during Test C. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters.

Test C			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
31	16384	x:	7.94	-	-	-	-	-	-	-	-	-
		y:	13.66	-	-	-	-	-	-	-	-	-
32	16384	x:	7.94	-	-	-	-	-	-	-	-	-
		y:	13.66	-	-	-	-	-	-	-	-	-
33	16384	x:	7.95	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72
		y:	16.23	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
34	65536	x:	6.93	-	-	-	-	-	-	-	-	-
		y:	9.24	-	-	-	-	-	-	-	-	-

Table 12: Location of wave gages during Tests D-G. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters. [1]G10 has 20480 pts.

Tests D-G			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
1	16384	x:	6.93	12.93	12.93	12.95	12.95	12.94	12.94	12.95	12.95	12.95
		y:	9.24	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
2	16384	x:	7.93	12.74	12.74	12.74	12.74	12.74	12.74	12.74	12.74	12.74
		y:	9.24	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
3	16384	x:	7.94	9.96	9.95	9.95	9.95	9.95	9.95	9.95	9.95	9.94
		y:	13.66	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
4	16384	x:	6.94	11.07	11.07	11.07	11.07	11.07	11.07	11.07	11.07	11.07
		y:	13.67	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
5	16384	x:	8.95	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72
		y:	13.67	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23
6	16384	x:	8.94	12.49	12.49	12.49	12.49	12.49	12.49	12.49	12.49	12.49
		y:	9.24	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
7	16384	x:	5.94	13.09	13.09	13.09	13.09	13.09	13.09	13.09	13.09	13.09
		y:	9.23	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
8	16384	x:	5.93	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24	13.24
		y:	12.24	17.23	16.23	15.23	14.73	13.66	12.73	11.73	10.73	9.23
9	16384	x:	5.94	-	-	-	-	-	-	-	-	-
		y:	13.67	-	-	-	-	-	-	-	-	-
10	16384[1]	x:	6.93	10.94	10.93	10.93	10.93	10.94	10.93	10.93	10.93	10.92
		y:	12.23	17.23	16.23	15.22	14.73	13.66	12.73	11.73	10.73	9.23

Table 13: Location of wave gages during Tests D-G. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system. All distances measured in meters. [1]Test D only.

Tests D-G			gage #									
run	npts		1	2	3	4	5	6	7	8	9	10
11	16384	x:	7.94	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34	10.34
		y:	12.23	17.24	16.24	15.23	14.73	13.66	12.73	11.73	10.73	9.23
12	16384	x:	6.94	8.94	8.94	8.94	8.94	8.95	8.95	8.94	8.94	8.94
		y:	17.24	17.25	16.24	15.23	14.73	13.67	12.73	11.73	10.73	9.24
13[1]	16384	x:	6.94	8.94	8.94	8.94	8.94	8.95	8.95	8.94	8.94	8.94
		y:	17.24	17.25	16.24	15.23	14.73	13.67	12.73	11.73	10.73	9.24

Table 14: Location of ADV's during Test B. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system and z is the sensor distance from the local bottom. All distances measured in meters.

Test B			gage #			Test B			gage #		
run	npts		1	2	3	run	npts		1	2	3
1	16384	x:	10.77	10.77	10.77	11	16384	x:	12.19	12.19	12.19
		y:	13.18	13.79	14.19			y:	13.18	13.78	14.18
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
2	16384	x:	13.94	12.95	12.25	12	16384	x:	12.79	12.79	12.79
		y:	8.21	8.22	8.20			y:	13.18	13.78	14.18
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
3	16384	x:	13.95	12.95	12.25	13	16384	x:	13.29	13.29	13.29
		y:	9.22	9.23	9.25			y:	13.18	13.78	14.18
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
4	16384	x:	13.94	12.95	12.25	14	16384	x:	13.79	13.79	13.79
		y:	10.22	10.22	10.25			y:	13.18	13.78	14.17
		z:	0.03	0.03	0.03			z:	0.025	0.025	0.025
5	16384	x:	13.94	12.95	12.25	15	16384	x:	11.17	11.17	11.17
		y:	11.22	11.23	11.23			y:	13.18	13.78	14.19
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
6	16384	x:	13.94	12.95	12.25	16	16384	x:	11.18	9.95	8.94
		y:	12.22	12.23	12.21			y:	16.23	16.24	16.24
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
7	16384	x:	13.95	12.95	12.25	17	16384	x:	11.18	9.95	8.94
		y:	15.23	15.23	15.24			y:	15.22	15.23	15.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
8	16384	x:	13.94	12.93	12.23	18	16384	x:	11.19	9.95	8.95
		y:	16.23	16.23	16.22			y:	14.24	14.23	14.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
9	16384	x:	13.94	12.94	12.24	19	16384	x:	11.18	9.95	8.95
		y:	6.22	6.23	6.17			y:	13.68	13.68	13.69
		z:	0.03	0.03	0.03			z:	0.03	0.04	0.05
10	16384	x:	13.93	12.93	12.23	20	16384	x:	11.18	9.95	8.95
		y:	3.21	3.23	3.21			y:	13.68	13.68	13.69
		z:	0.03	0.03	0.03			z:	0.06	0.08	0.10

Table 15: Location of ADV's during Test B. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system and z is the sensor distance from the local bottom. All distances measured in meters.

Test B			gage #			Test B			gage #		
run	npts		1	2	3	run	npts		1	2	3
21	16384	x:	11.18	9.95	8.95	31	16384	x:	11.44	11.74	11.94
		y:	13.68	13.68	13.69			y:	13.16	13.16	13.16
		z:	0.09	0.12	0.15			z:	0.03	0.03	0.03
22	16384	x:	11.18	9.95	8.95	32	16384	x:	11.44	11.74	11.94
		y:	13.23	13.23	13.24			y:	13.33	13.33	13.33
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
23	16384	x:	11.18	9.95	8.95	33	27327	x:	11.44	11.74	11.94
		y:	12.23	12.23	12.23			y:	13.53	13.53	13.53
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
24	16384	x:	11.18	9.95	8.94	34	16384	x:	11.44	11.74	11.94
		y:	11.23	11.23	11.23			y:	13.53	13.53	13.53
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
25	16384	x:	11.18	9.95	8.94	35	21084	x:	11.44	11.74	11.94
		y:	10.23	10.23	10.23			y:	13.75	13.75	13.75
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
26	16384	x:	11.17	9.94	8.94	36	16384	x:	11.44	11.74	11.94
		y:	9.23	9.23	9.24			y:	13.98	13.98	13.98
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
27	16384	x:	11.16	9.94	8.94	37	16384	x:	11.44	11.74	11.94
		y:	8.23	8.23	8.24			y:	14.16	14.16	14.16
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
28	16384	x:	11.16	9.93	8.92	38	16384	x:	11.44	11.74	11.94
		y:	6.22	6.24	6.23			y:	14.40	14.40	14.40
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
29	16384	x:	9.95	10.25	10.45	39	16384	x:	12.34	12.59	12.74
		y:	13.68	13.68	13.68			y:	12.23	12.23	12.23
		z:	0.10	0.10	0.10			z:	0.03	0.03	0.03
30	16384	x:	11.44	11.74	11.94	40	16384	x:	12.34	12.59	12.74
		y:	12.98	12.98	12.98			y:	14.61	14.61	14.61
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03

Table 16: Location of ADV's during Test C. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system and z is the sensor distance from the local bottom. All distances measured in meters.

Test C			gage #			Test C			gage #		
run	npts		1	2	3	run	npts		1	2	3
1	16384	x:	10.85	10.85	10.85	11	16384	x:	10.24	10.44	10.64
		y:	13.23	13.03	12.83			y:	14.44	14.44	14.44
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
2	16384	x:	10.86	10.86	10.86	12	16384	x:	11.23	11.43	11.63
		y:	13.94	13.74	13.54			y:	12.83	12.83	12.83
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
3	16384	x:	10.86	10.86	10.86	13	16384	x:	11.23	11.43	11.63
		y:	14.44	14.24	14.04			y:	13.03	13.03	13.03
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
4	16384	x:	10.24	10.44	10.64	14	16384	x:	11.23	11.43	11.63
		y:	13.03	13.03	13.03			y:	13.23	13.23	13.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
5	16384	x:	10.24	10.44	10.64	15	16384	x:	11.23	11.43	11.63
		y:	13.23	13.23	13.23			y:	13.43	13.43	13.43
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
6	16384	x:	10.24	10.44	10.64	16	16384	x:	11.23	11.43	11.63
		y:	13.43	13.43	13.43			y:	13.63	13.63	13.63
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
7	16384	x:	10.24	10.44	10.64	17	16384	x:	11.23	11.43	11.63
		y:	13.64	13.64	13.64			y:	13.73	13.73	13.73
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
8	16384	x:	10.24	10.44	10.64	18	16384	x:	11.23	11.43	11.63
		y:	13.74	13.74	13.74			y:	13.93	13.93	13.93
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
9	16384	x:	10.24	10.44	10.64	19	16384	x:	11.23	11.43	11.63
		y:	13.94	13.94	13.94			y:	14.23	14.23	14.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
10	16384	x:	10.24	10.44	10.64	20	16384	x:	11.23	11.43	11.63
		y:	14.24	14.24	14.24			y:	14.43	14.43	14.43
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03

Table 17: Location of ADV's during Test C. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system and z is the sensor distance from the local bottom. All distances measured in meters.

Test C			gage #			Test C			gage #		
run	npts		1	2	3	run	npts		1	2	3
21	16384	x:	10.24	10.44	10.64	31	16384	x:	13.10	13.10	13.10
		y:	12.83	12.83	12.83			y:	11.83	11.48	11.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
22	16384	x:	10.24	10.44	10.64	32	16384	x:	13.35	13.35	13.35
		y:	12.63	12.63	12.63			y:	11.83	11.48	11.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
23	16384	x:	9.55	9.75	9.95	33	16384	x:	12.15	12.15	12.15
		y:	12.63	12.63	12.63			y:	11.83	11.48	11.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
24	16384	x:	9.55	9.75	9.95	34	65536	x:	11.43	11.63	11.94
		y:	13.66	13.66	13.66			y:	13.63	13.63	13.63
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
25	16384	x:	9.55	9.75	9.95						
		y:	14.43	14.43	14.43						
		z:	0.03	0.03	0.03						
26	16384	x:	12.25	12.60	12.95						
		y:	9.23	9.23	9.23						
		z:	0.03	0.03	0.03						
27	16384	x:	12.25	12.60	12.95						
		y:	12.23	12.23	12.23						
		z:	0.03	0.03	0.03						
28	16384	x:	12.25	12.25	12.25						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						
29	16384	x:	12.60	12.60	12.60						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						
30	16384	x:	12.95	12.95	12.95						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						

Table 18: Location of ADV's during Tests D-G. Npts = number of points in time series, x,y are cross-shore and longshore distances in survey coordinate system and z is the sensor distance from the local bottom. All distances measured in meters. [1]G1 has 22528 pts. [2]G4 and G6 have different locations. [3]G10 has 21600 pts. [4] Test D only.

Tests D-G			gage #			Tests D-G			gage #		
run	npts		1	2	3	run	npts		1	2	3
1	16384[1]	x:	11.43	11.63	11.93	11	16384	x:	12.25	12.60	13.35
		y:	13.63	13.63	13.63			y:	15.23	15.23	15.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
2	16384	x:	11.43	11.63	11.93	12	16384	x:	10.82	11.12	11.42
		y:	13.03	13.03	13.03			y:	9.23	9.23	9.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
3	16384	x:	11.43	11.63	11.93	13[4]	16384	x:	10.82	11.12	11.42
		y:	14.24	14.24	14.24			y:	9.23	9.23	9.23
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
4[2]	16384	x:	12.60	12.60	12.60						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						
5	16384	x:	12.15	12.15	12.15	G4	16384	x:	12.60	12.60	12.60
		y:	11.83	11.48	11.23			y:	12.23	11.98	11.63
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
6[2]	16384	x:	12.35	12.35	12.35	G6	16384	x:	12.35	12.35	12.35
		y:	11.83	11.48	11.23			y:	12.23	11.98	11.63
		z:	0.03	0.03	0.03			z:	0.03	0.03	0.03
7	16384	x:	12.95	12.95	12.95						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						
8	16384	x:	13.10	13.10	13.10						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						
9	16384	x:	13.35	13.35	13.35						
		y:	11.83	11.48	11.23						
		z:	0.03	0.03	0.03						
10[3]	16384	x:	12.25	12.60	13.35						
		y:	9.23	9.23	9.23						
		z:	0.03	0.03	0.03						