RIVET I Field Experiment at New River Inlet
SIO (Feddersen/Guza) Data Report

Scripps Institution of Oceanography
Integrative Oceanography Division
9500 Gilman Drive, La Jolla, CA 92093

Prepared by:
Rob Grenzeback, Falk Feddersen, Kai Hally-Rosendahl, Bill Boyd, Matt Spydell

1 October 2012

SIO New River Inlet Fluorometer Data Report

ADD TABLE OF CONTENTS

For any questions on this data report please contact Falk Federsen (ffeddersen@ucsd.edu) or Rob Grenzeback (rgrenzeback@ucsd.edu)

OVERVIEW OF DYE RELEASES:

For the New River Inlet Experiment, Rhodamine WT, a non-toxic pink dye, was used as a tracer to study transport and dispersion in the tidal river inlet. Between 20 and 30 gallons of highly concentrated dye was released on 7 separate days during the month long experiment. In situ measurements of the dye were made using fluorometers made by WET Labs that are designed to detect the fluorescent response of Rhodamine. This allowed for observations of dye concentrations in the inlet with a sensitivity approaching 0.01 ppb and a range of 0-400 ppb.

The WET Labs fluorometers were deployed in various ways in order to account for as much of the dye plume as possible over a large area. Scripps Institution of Oceanography (SIO) deployed fluorometers at fixed locations throughout the inlet, on two vertical arrays towed behind powerboats, affixed to two Wirewalker water column profilers, and aboard two specially equipped "Dyeski" waverunners (not described here). These were complemented by additional instruments and observations made by other groups at SIO, Naval Postgraduate School, and University of Miami RSMUS.

DESCRIPTION OF PUMPING SYSTEM:

The Rhodamine WT dye was released into the inlet in one of two methods: an "all-at-once" dye bomb release from a boat, and a slow release pumping system from the shore/boat. The dye bombs involved pouring the dye over the side from 5-gallon jugs. The pumping system was more complex. A peristaltic pump was chosen for this application on account of its relative accuracy and ease of use. This also made the most sense for handling and cleanup of the dye, because the dye was fully contained within the tubing and would not come in to contact with moving parts.

The pump used was an OMEGAFLEX® FPU500 Series PERISTALTIC PUMP with a FPU5-MT pump motor, capable of flow rates from 1.0 to 2280 mL/Min (36 GPH). The peristaltic tubing for the pump was ¼ inch inner diameter, 1/16 inch wall thickness, Tygon® R-3603 tubing. This was determined through testing to be the widest usable diameter tubing for the pump as well as the most durable. The pump was powered by two 12-volt vehicle batteries in parallel, with an inverter used to convert DC to AC output. The pump, inverter, and batteries were contained in a weatherproof box for ease of transport, protection from the elements, and containment in case of spills. Outside the pump box, the output end of the 1/4 inch I.D. Tygon® tubing was coupled to a spool of 200 feet of 5/16 inch inner diameter nylon reinforced tubing. This tubing was chosen for its resistance to kinking. The larger inner diameter also relieved backpressure created in the system allowing the dye to flow faster. The input end was coupled to a shorter 12 foot

length of the 5/16 I.D. tubing, which was lowered into the drums of dye. With the box on the shoreline of the inlet, the 200 feet of tubing was spooled out from the beach. The output end was secured along a mooring line consisting of a surface float and clump weight. The spout was attached at the middle of the mooring line so the release point would be approximately in the middle of the water column. Once the setup was ready to pump, a small boat would transport the clump anchor and tubing out into the inlet channel and set them in the desired location. Due to strong currents and rapidly changing water levels caused by tidal flow, the maximum release distance was limited to approximately 25 meters from shore. One on occasion the pump apparatus was deployed aboard a small inflatable boat in the middle of the inlet and a much shorter length of tubing (approximately 10 feet) was used.

Dye Release Locations

Day	*Location*	*Lat (deg N)*	*Long (deg W)*	*X (m)*	*Y (m)*	*Z (m)*
6	Deep Channel	34.53141	-77.34469	-652	-281	-5
7	Deep Channel	34.53141	-77.34469	-652	-281	-5
8	Deep Channel	34.53141	-77.34469	-652	-281	-5
11	Near ICW	34.54742	-77.34576	-2190	613	0
12	Near ICW	34.54963	-77.34747	-2481	616	0
19	Deep Channel	34.53126	-77.34473	-640	-293	-5
20	Mid-Inlet	34.53209	-77.34434	-697	-213	-1

Dye Release Conditions

Day	*Release Type*	*Tide*	*Waves*	*Wind*
6	Pump	Ebb	large	strong
7	Pump	Ebb	large	strong
8	Pump	Ebb	moderate	light
11	Bomb	Ebb to Flood	none	calm
12	Bomb	Ebb	none	calm
19	Pump	Flood	large	onshore
20	Pump	Ebb	small	light

Dye Pump Information

Day	*Pump Start*	*Pump Stop*	*Duration min*	*Pump Speed RPM*	*Volume Pumped L (gal)*	*Ave.Flow Rate L/min*	*Cal. Flow Rate L/min*
6	12:45	14:10*	85	450	112 (29.5)	1.32	1.34
7	12:33	14:52	139	225	112 (29.5)	0.81	0.71
8	12:36	15:01	145	225	104 (27.5)	0.72	0.67
11	8:02**	--	--	--	76 (20)	--	--

12	8:07**	--	--	--	76 (20)	--	--
19	4:48	9:54	306	90	112 (29.5)	0.37	0.29
20	12:16	13:29	73	400	112 (29.5)	1.53	1.25

*** Pump briefly (~5 min) lost suction and resumed pumping at 13:43.**

**** Dye bomb. 20 gallons of dye was poured directly from four 5-gallon water jugs. Took 2-3 min to empty all jugs.**

DYE PUMP CALIBRATIONS:

The flow rate on the peristaltic pump was adjustable from 0 to 600 rotations per minute. Each day and each time the pump rate or tubing length was changed, when possible, the pump was calibrated before and after the dye release. Calibrations were conducted by running the pump at the set speed and timing how long it took to fill each liter of a 3 L graduated beaker. Pump rates for each day are indicated on the table below. The calibration numbers were fairly consistent. The flow rates based on the calibrations are in most cases slower than the flow rates when calculated using overall pump time and volume. The exception is the first dye release when the pump temporarily lost suction, which explains its lower average flow rate. Possible reasons for the differences in average and calibrated flow rates might include variations in pump head and dye viscosity, or inaccuracies in dye volume.

Dye Pump Calibration Data

Date 5/6/2012	Pump speed (RPM)	1 Liter (time to fill, min:sec)	2 Liters	3 Liters
Pre-cal	450	:46	1:29	2:12
Post-cal 1	450	:47	1:33	2:17
Post-cal 2	450	:44	1:32	2:16

t 1	Δ t 2	Δ t 3	Ave. time to fill 1 L	Ave. flow rate (L/min)
:46	:43	:43	:43	1.40
:47	:46	:44	:45	1.33
:44	:48	:44	:46	1.30

Date 5/7/2012	Pump speed (RPM)	1 Liter (time to fill, min:sec)	2 Liters	3 Liters
Pre-cal 1	225	1:11 (FF)	2:37 (FF)	4:01 (FF)
Pre-cal 2	225	1:13 (RG)	2:38 (RG)	4:02 (RG)
Post-cal	225	1:18	2:42	4:05

Δ t 1	Δ t 2	Δ t 3	Ave. time to fill 1 L	Ave. flow rate (L/min)
1:11	1:26	1:24	1:25	0.71

1:13	1:25	1:24	01:24.5	0.71
1:18	1:24	1:23	01:23.5	0.72

Date 5/8/2012	**Pump speed (RPM)**	**1 Liter (time to fill, min:sec)**	**2 Liters**	**3 Liters**
Pre-cal 1	225	1:23	2:55	4:25
Pre-cal 2	225	1:25	2:57	4:19
Post-cal 1	225	--	2:40	4:09
Post-cal 2	225	1:16	2:47	4:19

Δ t 1	**Δ t 2**	**Δ t 3**	**Ave. time to fill 1 L**	**Ave. flow rate (L/min)**
1:23	1:32	1:30	1:31	0.66
1:25	1:32	1:22	1:27	0.69
N/A	N/A	1:29	1:29	0.67
1:16	1:31	1:32	01:31.5	0.66

Date 5/19/2012	**Pump speed (RPM)**	**0.5 Liter (time to fill, min:sec)**	**1 Liter**	**1.5 Liters**	**2 Liters**
Pre-cal	90	1:30	3:08	5:00	--
Post-cal	90	1:40	3:17	5:00	6:36

Δ t 0.5	**Δ t 1**	**Δ t 1.5**	**Δ t 2 L**	**Ave. time to fill 0.5 L**	**Ave. flow rate (L/min)**
1:30	1:38	1:52	--	1:45	0.29
1:40	1:37	1:43	1:36	1:40	0.30

Date 5/20/2012	**Pump speed (RPM)**	**1 Liter (time to fill, min:sec)**	**2 Liters**	**3 Liters**
(No Pre-cal)	--	--	--	-
Post-cal 1	400	:39	1:28	2:18
Post-cal 2	400	:44	1:31	2:17

Δ t 1 L	**Δ t 2 L**	**Δ t 3 L**	**Ave. time to fill 1 L**	**Ave. flow rate (L/min)**
--	--	--	--	--
:39	:49	:50	:49.5	1.21
:44	:47	:46	:46.5	1.29

SIO New River Inlet Fluorometer Data Report

FIXED FLUOROMETERS:

Overview

During the New River Inlet experiment 18 WET Labs fluorometers were deployed at fixed locations throughout the New River Inlet, North Carolina (see Figure 1). The fluorometers were affixed to 1 inch diameter steel pipes that were anchored in the substrate. Their sensors were upward facing at a height of approximately 0.5 meters from the sea floor (the fluorometer deployed at WHOI 68 was approximately 1.0 m from the sea floor). There were 3 separate deployments of these instruments. The first began 5/6/12, the second 5/10/12, and the third 5/18/12. Rhodamine WT fluorescent dye was released in the inlet on 2 to 3 separate occasions during each deployment. Each of the fixed fluorometers had a Rhodamine sensing channel to measure in situ dye concentration. Two of the fluorometers (loaned from NPS) had only single channel Rhodamine sensors (serial numbers 1259 & 1689). The remaining 16 were ECO Triplet fluorometers with three channels to measure Rhodamine, chlorophyll, and turbidity. 11 of the ECO Triplets were also equipped with thermistors to measure temperature. After each deployment, the fluorometer data was downloaded and saved to a .raw file and the fluorometer batteries were replaced.

Data Processing and Data Files

The data from each fluorometer was downloaded and calibrations and corrections applied. Data from each instrument was then saved as a data structure in a separate .mat file named FL_XXXX.mat, where XXXX is the serial number of the fluorometer. The variables saved in the .mat file structure include the device's WET Labs serial number ("sn"), its location, and the calibrated and corrected values for each of the data columns in the raw file. Each deployment was saved as a separate structure within the .mat file. If a fluorometer was not used during a particular deployment, there is an empty struct cell to indicate this.

Location is described in the .mat file in several separate variables. The first is the location ID (id), which is an abbreviated reference to the named location of the fluorometer (e.g. WH81 is the location of Woods Hole Oceanographic Institution's instrument location number 81; V5 is the location of SIO vector number 5). Next are the GPS coordinates, "lat" and "lon", for the latitude and longitude in degrees for each instrument location on that particular deployment. GPS coordinates were determined using Garmin marine GPS units with an accuracy of about 3 meters using the default WGS 84 datum. Note that some fluorometers were deployed at different locations on the first, second, and third deployments.

SIO New River Inlet Fluorometer Data Report

Refer to the table below for details. Finally, the "x" and "y" variables indicate the fluorometer location using the XY coordinate plane set for the experiment. Distance is measured in meters from the designated origin.

Time is referenced by the "t" variable. Time is converted from month/day/year hours/minutes/seconds to decimal days of the month. The day, hour, minute (min), and second (sec) vectors are also saved as separate variables. All data was collected in May 2012 (e.g. 10.5 is 12:00pm on May 10, 2012). All times are in Eastern Daylight Time. The raw time data is truncated at the beginning and end to exclude noise associated with deployment and recovery. The sample rate for each fluorometer was once every four seconds (0.25 hertz). Clock drifts during each deployment were recorded for each fixed fluorometer, but corrections were not applied. Note that there were significant issues with the clock on SN 660 during Deployments 1 and 2. Use this data at your own risk. The clock problem was resolved for Deployment 3. Clock drift data is listed below.

'T' is temperature. Units of temperature are degrees Celsius. 11 of the 18 fixed fluorometers that were deployed contained thermistors to measure temperature. These thermistors were calibrated at SIO prior to the experiment and calibrations are applied. The fluorometers that did not have thermistors contain a column of NaNs in the data file. This will be updated with temperature data from nearby sensors once it is fully processed.

The 'Chl' variable contains chlorophyll measurements in units of ug/L. Raw counts for chlorophyll were corrected using the calibration coefficients provided by WET Labs.

The 'tau' variable is turbidity data in units of Nephelometric Turbidity Units (NTU). Raw turbidity counts are calibrated to turbidity units using the calibrations provided by the manufacturer. Negative turbidity values are set to zero. Spikes in turbidity are then removed, and the number of spikes saved as the variable 'NUM_turb_spikes.'

Rhodamine WT concentrations in ppb are stored in the variable "D". Rhodamine dye counts are converted from raw counts to parts per billion (ppb) using calibration standards created at SIO. The resulting values are stored in the variable 'dye_cal'. Next, Rhodamine dye data are despiked to eliminate erroneous data spikes (dye_spk). The parameters for despiking were consecutive data points that differed by more than 1.2 ppb/sec. The data points that are despiked are converted to NaNs in the .mat file and the number of data points that are despiked is saved as the 'NUM_dye_spikes' variable in the .mat file as well. Two corrections are then applied. The first corrects for the enhancement and quenching effects of turbidity on dye fluorescence. The second corrects for the effects of temperature on dye fluorescence. Dye concentrations that equal less than zero are also zeroed out.
The accompanying plots of dye, turbidity, and temperature vs. time are organized by fluorometer serial number and deployment number. They are also color-coded to show when dye is released. On continuous dye release days the line plot is colored blue during the time period in which dye is being pumped into the inlet. On dye bomb release days the time when the dye is released is indicated by a red

asterix. Note that the dye bombs took approximately two minutes to complete, but on these plots the release time is marked only at the beginning of the release.

Fixed Fluorometer Locations

SN	*Deployment 1* *ID, (x,y) m*	*Deployment 2* *ID, (x,y) m*	*Deployment 3* *ID, (x,y) m*
307	WH90 (-69,-502)	WH90 (-69,-502)	WH90 (-69,-502)
308	WH85 (12,-811)	V6 (684,326)	V6 (684,326)
309	WH87 (186,-742)	WH87 (186,-742)	WH87 (186,-742)
470	V3 (138,-1039)	V3 (138,-1039)	V3 (138,-1039)
471	V4 (255,-532)	V4 (255,-532)	V4 (255,-532)
604	WH77 (334,-342)	WH78 (567,-475)	WH78 (567,-475)
605	V5 (560,-210)	V5 (560,-210)	V5 (560,-210)
606	N/A	A3 (539,815)	A3 (539,815)
607	V6 (684,326)	N/A	N/A
608	A3 (539,815)	N/A	N/A
652	A2 (257,281)	A2 (257,281)	A2 (257,281)
653	WH17 (267,1005)	WH17 (267,1005)	WH17 (267,1005)
654	V2 (12,-1017)	V2 (12,-1017)	V2 (12,-1017)
655	Towed pipe	Towed pipe	Towed pipe
656	WH06 (164,-147)	WH06 (164,-147)	WH05 (-155,-234)
657	Towed pipe	Towed pipe	Towed pipe
658	WH68 (813,42)	WH68 (813,42)	WH68 (813,42)
659	Towed pipe	Towed pipe	Towed pipe
660	WH18 (642,1020)	WH18 (642,1020)	WH18 (642,1020)
1259	V1 (-42,-1511)	V1 (-42,-1511)	V1 (-42,-1511)
1689	V8 (82,1327)	V8 (82,1327)	V8 (82,1327)

TOWED FLUOROMETERS:

Overview

Five fluorometers were also deployed on vertical towed arrays during the New River Inlet experiment. These arrays were towed behind powerboats at low speeds through the dye plume during and after the dye releases, usually along the shallowest depth contour possible. There were two towed arrays. One array consisted of 3 equally spaced fluorometers mounted along a 7 meter long pipe (Long Pipe) and the other consisted of 2 (or sometimes 3) equally spaced fluorometers mounted along 3 meter long pipe (Short Pipe). The topmost fluorometer on each array was downward facing due to its proximity to the surface. All other fluorometers were mounted with the sensor facing up towards the surface. Not all fluorometers and/or towed arrays were deployed each day. Please refer to the tables below for specifics on what was where and when. Each towed fluorometer was a WET Labs ECO Triplet with three channels to measure Rhodamine WT, chlorophyll, and turbidity. Each ECO Triplet was also equipped with a thermistor to measure temperature. 1 also contained a pressure sensor.

Data Processing and Data Files

After each deployment, the fluorometer data was downloaded and saved to a .raw file and the fluorometer batteries were replaced. Calibrations and corrections were then applied and the resulting data saved as a structure in a .mat file, named either LP_201205XX.mat or SP_201205XX.mat, where LP=”long pipe” and SP=”short pipe” and XX refers to the day of data. So LP_20120512.mat refers to long pipe data on 12 May 2012. Each .mat file contains all of the data for each fluorometer that was mounted on a particular array on a particular date. If variables are unique to a specific fluorometer on the array, they are numbered 1 through 2 (or 3) to differentiate them from one other (e.g. SN1,SN2,SN3 or D1,D2,D3). The variables that are saved in the .mat file structure include the device's WET Labs serial number ("SN"), its location, and the calibrated and corrected values for each of the data columns in the raw file.

Location is described in the .mat file in several separate variables. The first is the location ID ("id"), which is an abbreviated reference to the named location of the fluorometer (e.g. 'short_bottom' means the fluorometer was deployed at the bottom position on the short array). Next are the GPS coordinates, "lat" and "lon", for the latitude and longitude in degrees for the array as it was towed. GPS coordinates were determined using Garmin marine GPS units with an accuracy of about 3 meters using the default

WGS 84 datum. The "x" and "y" variables indicate the towed array's location on the XY coordinate plane set for the experiment. Distance is measured in meters from the designated origin. 'Z' is the depth of the fluorometer below the surface in meters. One of the boats had a fish finder and recorded water depth. The "depth" variable contains that data where available. If depth data are not available, "depth" is a vector of NaNs.

Date and time are also referenced by several variables. "Date" is the date of the deployment in YYYYMMDD format. The time variable "t" converts raw month/day/year hours/minutes/seconds to decimal days of the month. The day, hour, minute (min), and second (sec) vectors are also saved as separate variables. All data was collected in May 2012 (e.g. 10.5 is 12:00pm on May 10, 2012). All times are in Eastern Daylight Time. The raw time data is truncated at the beginning and end to exclude noise associated with deployment and recovery. Data was also converted to NaNs for times when the towed array was out of the water. The sample rate for each fluorometer was once every four seconds (0.25 hertz) on 20120506 and 20120507, and then once a second (1.0 hertz) on every subsequent deployment. The time vectors for each fluorometer on an array were interpolated to create a single time variable. This time variable was then interpolated again with the GPS data from each boat that towed an array in order to match up fluorometer data with position. Clock drifts during each deployment were recorded for each towed fluorometer, but corrections were not applied except in the instance of SN 659. Clock drift data is listed below.

'T' is temperature. Units of temperature are degrees Celsius. Temperature. All of the towed fluorometers that were deployed contained thermistors to measure temperature. These thermistors were calibrated at SIO prior to the experiment and calibrations are applied.

'P' is pressure. Units of pressure are in raw counts. During calibration it was determined that the pressure sensor on fluorometer SN 659 was unreliable, but the data is included here for completeness and is useful for determining whether the array was in the water or on the boat for maintenance/transport.

The 'Chl' variable contains chlorophyll measurements in units of ug/L. Raw counts for chlorophyll were corrected using the calibration coefficients provided by WET Labs.

The 'tau' variable is turbidity data in units of Nephelometric Turbidity Units (NTU). Raw turbidity counts are calibrated to turbidity units using the calibrations provided by the manufacturer. Negative turbidity values are set to zero. Spikes in turbidity are then removed, and the number of spikes saved as the variable 'NUM_turb_spikes.'

Rhodamine WT concentrations in ppb are stored in the variable "D". Rhodamine dye counts are converted from raw counts to parts per billion (ppb) using calibration standards created at SIO. Next, Rhodamine dye data are despiked to eliminate erroneous data spikes. The parameters for despiking were consecutive data points that differed by more than 5 ppb/sec. The data points that are despiked are converted to NaNs in the .mat file and the number of data points that are despiked is saved as the

'NUM_dye_spikes' variable in the .mat file as well. Note that this parameter was set so that the number of spikes would not equal more than 1% of all data points. Two corrections are then applied. The first corrects for the enhancement and quenching effects of turbidity on dye fluorescence. The second corrects for the effects of temperature on dye fluorescence. Negative dye values are also zeroed out. There are two sets of plots to accompany the towed fluorometer data. The first plots of dye, turbidity, and temperature vs. time are organized by towed array and date. The data from all 3 (or 2) fluorometers deployed on the particular array are plotted simultaneously and they are color-coded to differentiate top, from bottom and/or middle. The second set of plots is scatter plots of position vs. dye, turbidity, and temperature. The magnitude of dye, turbidity, and temperature are indicated by the color of the data point (see associated color bars). The bathymetry of the inlet is superimposed on each plot to give a frame of reference.

Towed Fluorometer Locations

Day	**Pipe ID*	*Top S/N, (z) m*	*Middle S/N, (z) m*	*Bottom S/N, (z) m*
6	long	655 (-1)	657 (-3.6)	659 (-6.7)
7	long	655 (-1)	657 (-3.6)	659 (-6.7)
8	short	655 (-1)	657 (-2)	659 (-3)
8	long	655 (-1)	657 (-3.6)	659 (-6.7)
11	short	607 (-1)	N/A	608 (-3)
11	long	655 (-1)	657 (-3.6)	659 (-6.7)
12	short	607 (-1)	N/A	608 (-3)
20	short	607 (-1)	N/A	608 (-3)
20	long	655 (-1)	657 (-3.6)	659 (-6.7)

Table 1. The table above shows the dates each towed array was deployed and which fluorometers were affixed to each array. It also shows the approximate depth of each sensor on the array.

New River Instrument Deployment Map

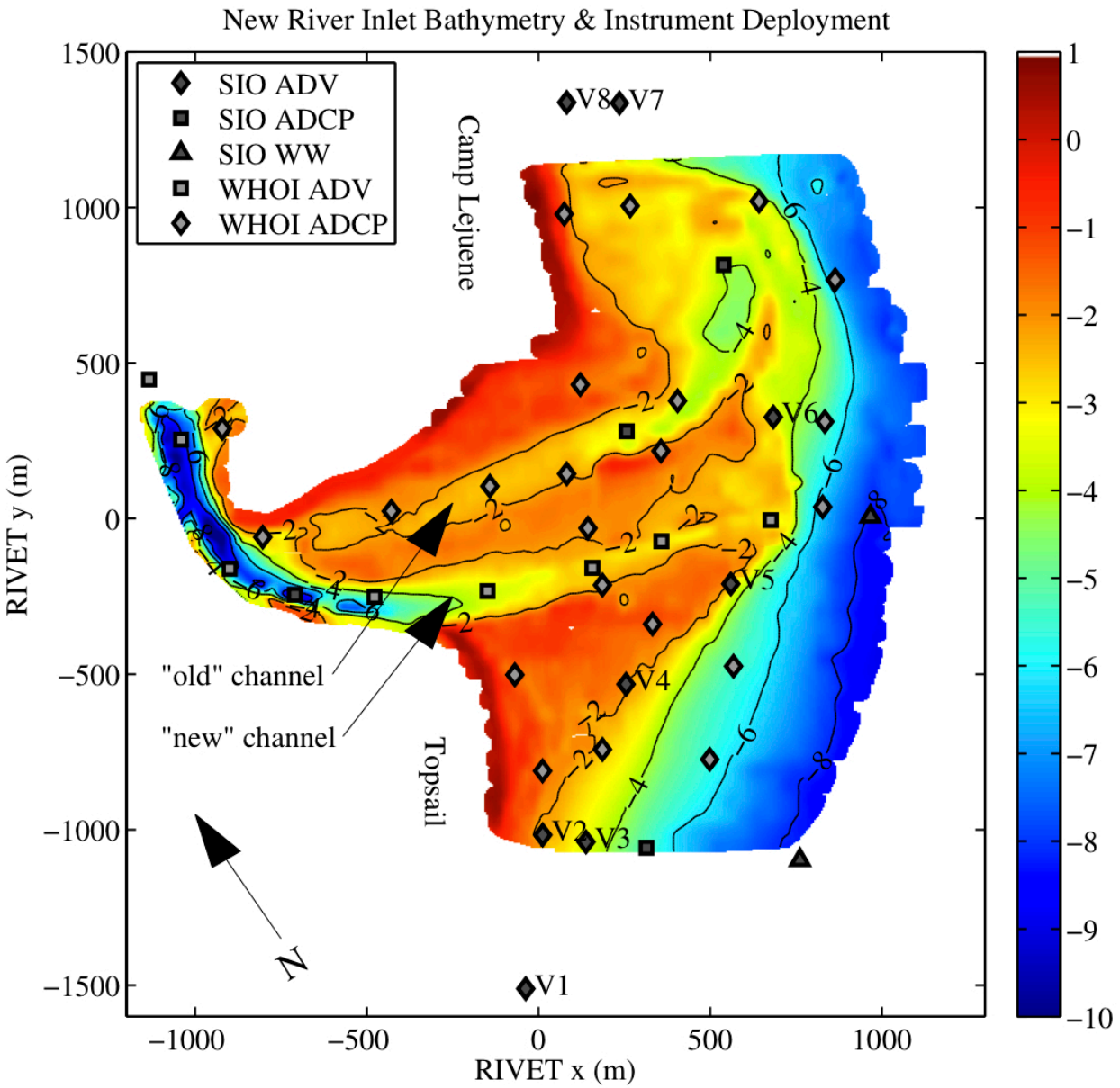

Figure 1. Map of New Rivet Inlet NC bathymetry (from the ASACE FRF) in the RIVET coordinate system with the SIO (Feddersen/Guza) and WHOI (Raubenheimer/Elgar) ADV, ADCP, and Wirewalker (WW) instrument locations as noted in the legend. The Topsail Beach side of the inlet is below and the Camp Lejeune side is on top. SIO

ADV locations are marked V1-8. All locations also had a co-located pressure sensor and many locations also had a co-located Rhodamine WT dye-sensing fluorometer. Dye was released either near x ~600m and y~-300 m, or 1.2 km further up the inlet towards the Intracoastal Waterway.

Fluorometer Clock Info for Deployment #1 (6-8 May 2012)

S/N	*Location*	*Clock set time*	*ECO time (recovery)*	*Computer time (recovery)*	*Drift (sec)*
307	WHOI 90	5/5/12 14:59:04	5/10/12 0:27:54	5/10/12 0:27:51	3
308	WHOI 85	5/5/12 15:04:34	5/9/12 20:57:33	5/9/12 20:57:09	24
309	WHOI 87	5/5/12	5/9/12 21:00:41	5/9/12 21:00:43	-2
470	SIO V3	5/5/12	5/9/12 20:50:39	5/9/12 20:50:36	3
471	SIO V4	5/5/12	5/10/12 0:25:27	5/10/12 0:25:01	26
604	WHOI 77	5/5/12	5/9/12 21:04:32	5/9/12 21:04:29	3
605	SIO V5	5/5/12 15:33:23	5/9/12 22:18:12	5/9/12 22:18:08	4
607	SIO V6	5/5/12 15:58:40	5/10/12 0:30:37	5/10/12 0:30:34	3
608	SIO A3	5/5/12 16:01:09	5/10/12 6:31:45	5/10/12 6:31:42	3
652	SIO A2	5/5/12 16:03:32	5/10/12 0:33:46	5/10/12 0:33:21	25
653	WHOI 17	5/5/12 16:07:06	5/10/12 6:20:44	5/10/12 6:20:39	5
654	SIO V2	5/5/12 16:09:54	5/9/12 21:13:09	5/9/12 21:13:04	5
655	Long pipe top	5/5/12 13:50:25	5/11/12 6:01:30	5/11/12 06:01:26**	4
656	WHOI 06	5/5/12	5/9/12 21:18:19	5/9/12 21:18:14	5
657	Long pipe mid	5/5/12 13:58:52	5/11/12 6:04:17	5/11/12 06:04:12**	5
658	WHOI 68	5/5/12 15:49:01	5/9/12 21:21:34	5/9/12 21:21:29	5
659+P	Long pipe bot	5/05/12 11:54:44*	5/11/12 6:08:44	5/11/12 06:08:40**	4
1259	SIO V1	5/5/12 18:30:45	5/9/12 14:51:43	5/9/12 14:51:40	3
1689	SIO V8	?	5/9/12 14:57:11	5/9/12 14:57:10	1
660+P	WHOI 18	5/05/12 11:61:65***	5/10/12 2:42:09	5/10/12 6:36:29	?

***computer time was 15:44:44 at the clock set time (ECO 659 is 3:50:00 slow!).**

**** Clocks for 655, 657, 659+P were reset to computer/internet time on 7 May @ ~1000. S/N 655 and 657 were each 2 seconds fast. S/N 659+P was 3:49:58 slow (it started out 3:50:00 slow, so it also gained 2 seconds). S/N 659+P took a good clock set on 7 May, so only need to deal with the 3:50:00 offset for the 6 May data file. Clocks for these 3 were likely reset on 8 May 1000 – 1100 but we don't have any notes on this.**

*****computer time was 16:16:50 at the clock set time. Both ECOs w/pressure have clock set issues. Found out from WET Labs that the clock needs to be set manually thru a terminal program, but didn't get this information until 18 May.**

Fluorometer Clock Info for Deployment #2 (11-12 May 2012)

S/N	*Location*	*Clock set time*	*ECO time (recovery)*	*Computer time (recovery)*	*Drift (sec)*
307	WHOI 90	5/10/12	5/14/12 9:55:38	5/14/12 9:55:32	6
308	SIO V6	5/10/12	5/14/12 10:24:23	5/14/12 10:24:00	23
309	WHOI 87	5/10/12	5/14/12 9:15:11	5/14/12 9:15:15	-4
470	SIO V3	5/10/12	5/14/12 9:02:17	5/14/12 9:02:10	7
471	SIO V4	5/10/12	5/14/12 9:18:26	5/14/12 9:18:03	23
604	WHOI 78	5/10/12	5/14/12 9:42:05	5/14/12 9:42:03	2
605	SIO V5	5/10/12	5/14/12 9:45:06	5/12/12 9:45:03	3
606	SIO A3	5/10/12	5/14/12 10:39:14	5/14/12 10:39:15	-1
607	short pipe top	5/11/12 6:49:07	5/12/12 15:24:05	5/12/12 15:24:04	1
608	short pipe bot	5/11/12 6:52:46	5/12/12 15:26:05	5/12/12 15:26:04	1
652	SIO A2	5/10/12	5/14/12 10:31:23	5/14/12 10:31:01	22
653	WHOI 17	5/10/12	5/14/12 11:01:13	5/14/12 11:01:20	-7
654	SIO V2	5/10/12	5/14/12 9:12:30	5/14/12 9:12:27	3
655	long pipe top	5/11/12 6:36:35	5/12/12 15:29:13	5/12/12 15:29:12	1
656	WHOI 06	5/10/12	5/14/12 9:50:42	5/14/12 9:50:38	4
657	long pipe mid	5/11/12 6:38:54	5/12/12 15:32:42	5/12/12 15:32:40	2
658	WHOI 68	5/10/12	5/14/12 10:20:33	5/14/12 10:20:30	3
659	long pipe bot	5/11/12 6:42:12	5/12/12 15:35:46	5/12/12 15:35:45	1
660	WHOI 18	5/10/12	5/14/12 10:46:54	5/14/12 10:58:52	*
1259	SIO V1	5/10/12 10:03:33	5/15/12 6:54:51	5/15/12 6:54:46	5
1689	SIO V8	5/10/12 9:56:55	5/15/12 6:58:11	5/15/12 6:58:08	3

Table 2. *No clock set time. Both ECOs w/pressure have clock set issues. Found out from WET Labs that the clock needs to be set manually thru a terminal program, but didn't get this information until 18 May. Time data may not be reliable for S/N 660 on this deployment.

Fluorometer Clock Info for Deployment #3 (19-20 May 2012)

S/N	*Location*	*Clock set time*	*ECO time (recovery)*	*Computer time (recovery)*	*Drift (sec)*
307	WHOI 90	5/18/12 11:53:31	5/24/12 9:45:48	5/24/12 9:45:44	4
308	SIO V6	5/18/12 12:00:01	5/24/12 10:59:35	5/24/12 10:59:00	35
309	WHOI 87	5/18/12 11:50:26	5/24/12 10:57:12	5/24/12 10:57:10	2
470	SIO V3	5/18/12 11:32:03	5/24/12 10:53:10	5/24/12 10:53:05	5
471	SIO V4	5/18/12 11:43:31	5/24/12 9:43:38	5/24/12 9:43:02	36
604	WHOI 78	5/18/12 12:06:40	5/24/12 10:55:51	5/24/12 10:55:48	3
605	SIO V5	5/18/12 11:56:22	5/24/12 11:01:37	5/24/12 11:01:32	5
606	SIO A3	5/18/12 12:39:20	5/24/12 9:51:10	5/24/12 9:51:07	3
607	short pipe top	5/18/12 22:41:36	5/24/12 11:06:30	5/24/12 11:06:28	2
608	short pipe bot	5/18/12 22:44:12	5/24/12 11:04:03	5/24/12 11:04:01	2
652	SIO A2	5/18/12 12:03:16	5/24/12 9:41:35	5/24/12 9:41:00	35
653	WHOI 17	5/18/12 11:11:47	5/24/12 9:47:37	5/24/12 9:47:30	7
654	SIO V2	5/18/12 11:26:51	5/24/12 9:37:59	5/24/12 9:37:53	6
655	long pipe top	5/18/12 22:35:31	5/24/12 16:44:41	5/24/12 16:44:36	5
656	WHOI 05	5/18/12 11:40:19	5/24/12 9:34:20	5/24/12 9:34:30	-10
657	long pipe mid	5/18/12 22:31:53	5/24/12 16:47:06	5/24/12 16:47:00	6
658	WHOI 68	5/18/12 11:36:20	5/24/12 10:54:33	5/24/12 10:54:26	7
659	long pipe bot	5/18/12 22:26:40	5/24/12 16:48:30	5/24/12 16:48:25	5
660	WHOI 18	5/18/12 12:54:10	5/24/12 9:52:37	5/24/12 9:52:32	5
1259	SIO V1	5/18/12 11:21:00	5/21/12 19:00:14	5/21/12 19:00:10	4
1689	SIO V8	5/18/12 11:17:03	5/21/12 19:30:33	5/21/12 19:30:31	2

WIREWALKER FLUOROMETERS:

Overview

Two Wirewalkers were deployed to collect data at New River Inlet for the duration of the experiment. Each Wirewalker carried a seabird CTD and an ECO Triplet (WET Labs) fluorometer that profiled the water column. There were two deployments of each Wirewalker. The Wirewalkers collected data from 30 April 2012 to 21 May 2012, with a turnaround on 10 May that separated deployments 1 and 2.

Wirewalker Locations:

ID	Lat (deg)	Lon (deg)	X (m)	Y (m)
Wirewalker 1	34.52065	-77.33239	966	7
Wirewalker 2	34.51673	-77.34366	761	-1097

Data Files

Data from each Wirewalker are stored in .mat files. The WW1_deploy1.mat file corresponds to Wirewalker #1 for the 1st deployment, etc. Each .mat file contains the following data:

```
>> whos
whos
  Name        Size              Bytes  Class     Attributes

  Chla        1x7437411         59499288  double
  Cond        1x7437411         59499288  double
  Dye         1x7437411         59499288  double
  Lat         1x1                   8  double
  Lon         1x1                   8  double
  Pres        1x7437411         59499288  double
  SN_ET       1x1                   8  double
  SN_SBE      1x1                   8  double
  Sal         1x7437411        118998576  double
  Temp        1x7437411         59499288  double
  Time        1x7437411         59499288  double
  Turb        1x7437411         59499288  double
```

SIO New River Inlet Fluorometer Data Report

WWnum	1x1	8 double
deploy	1x1	8 double
matfile	1x16	32 char

The "Time" variable is in units of days from 0000 1 May 2012. Wirewalker deployment location is given in variables “Lat” and “Lon”. The other variables are:

Variable	***Units***
Pres	meters
Temp	deg C
Sal	psu
Dye	ppb
Turb	ntu
Chla	ug/L

Plots of Wirewalker deployments can be found at:

http://blog.iod.ucsd.edu/RIVET/2012/09/04/results-from-both-wirewalkers-both-deployments/

Contact Falk Feddersen (falk@coast.ucsd.edu) for any questions.

Drifters at New River Inlet

Drifters were released within and outside the inlet on 8 days In May:
05/01, 05/02, 05/03, 05/04, 05/14, 05/15, 05/16, 05/17
The data is found in the /project/RIVET/drifter directory or on the rivet ftp site under the *drifter* directory.

Drifter data was collected at 1 Hz and continuous positions are in the Matlab files:
drifter_data_20120501_cont.mat
drifter_data_20120502_cont.mat etc.

In these files is a structure variable called "Release", the size
>> size(Release,2)
ans = 3
gives the number of releases on a given day.

The number of tracks is found using
>> size(Release(1).Drifter,2)
ans = 35
and tells us that there are 35 drifter tracks for release 1.

The "fields" in the structure are:
.lat, .lon, .X, .Y, .T, .flag, and .num
so that
>> plot(Release(1).Drifter(1).X,Release(1).Drifter(1).Y)
results in the track in (x,y) of drifter 1 for release 1.

To loop through all the data on a given day is done by

```
for a=1:size(Release,2)
        for b=1:size(Release(a).Drifter)
                x=Release(a).Drifter(b).X;
                t=Release(a).Drifter(b).T;
        end
end
```

Time is in Matlab time which is days past year=0. .num indicates the drifter number from the fleet of 35 drifters. size(Release(a).Drifter) may be larger than 35 since some drifters were rereleased during a single release .flag = 0, 1, or 2. with 0 meaning that the position is a GPS position, 1 means that the position was missing and filled in by linear interpolation, and 2 means that the original acceleration magnitude at that time was >=4 m/s^2 and removed (i.e. a spike in position) and then filled by linear interpolation.

GPS quality was much worse on 05/01 and 05/02 and resulted in many more position spikes and noisier data in general. Satellite coverage varied during the day so that data quality even during a single release can vary.

Linear interpolation is not the best way to fill in some of the bad/missing data. Filling in these gaps more intelligently will be done in the future.