

H12931

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H12931

LOCALITY

State(s): North Carolina

General Locality: Approaches to Wilmington

Sub-locality: East Frying Pan Shoal

2016

CHIEF OF PARTY
LCDR Matthew Jaskoski

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H12931

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s): **North Carolina**

General Locality: **Approaches to Wilmington**

Sub-Locality: **East Frying Pan Shoal**

Scale: **40000**

Dates of Survey: **09/10/2016 to 11/09/2016**

Instructions Dated: **05/18/2016**

Project Number: **OPR-G309-FH-16**

Field Unit: **NOAA Ship *Ferdinand R. Hassler***

Chief of Party: **LCDR Matthew Jaskoski**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Atlantic Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <https://www.ncei.noaa.gov/>.

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Descriptive Report to Accompany Survey H12931

Project: OPR-G309-FH-16

Locality: Approaches to Wilmington

Sublocality: East Frying Pan Shoal

Scale: 1:40000

September 2016 - November 2016

NOAA Ship *Ferdinand R. Hassler*

Chief of Party: LCDR Matthew Jaskoski

A. Area Surveyed

H12931 is located off the tip of East Frying Pan Shoal, as shown in Figure 1.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
33° 26' 58.99" N 77° 37' 17.26" W	33° 25' 30.91" N 77° 25' 28.27" W

Table 1: Survey Limits

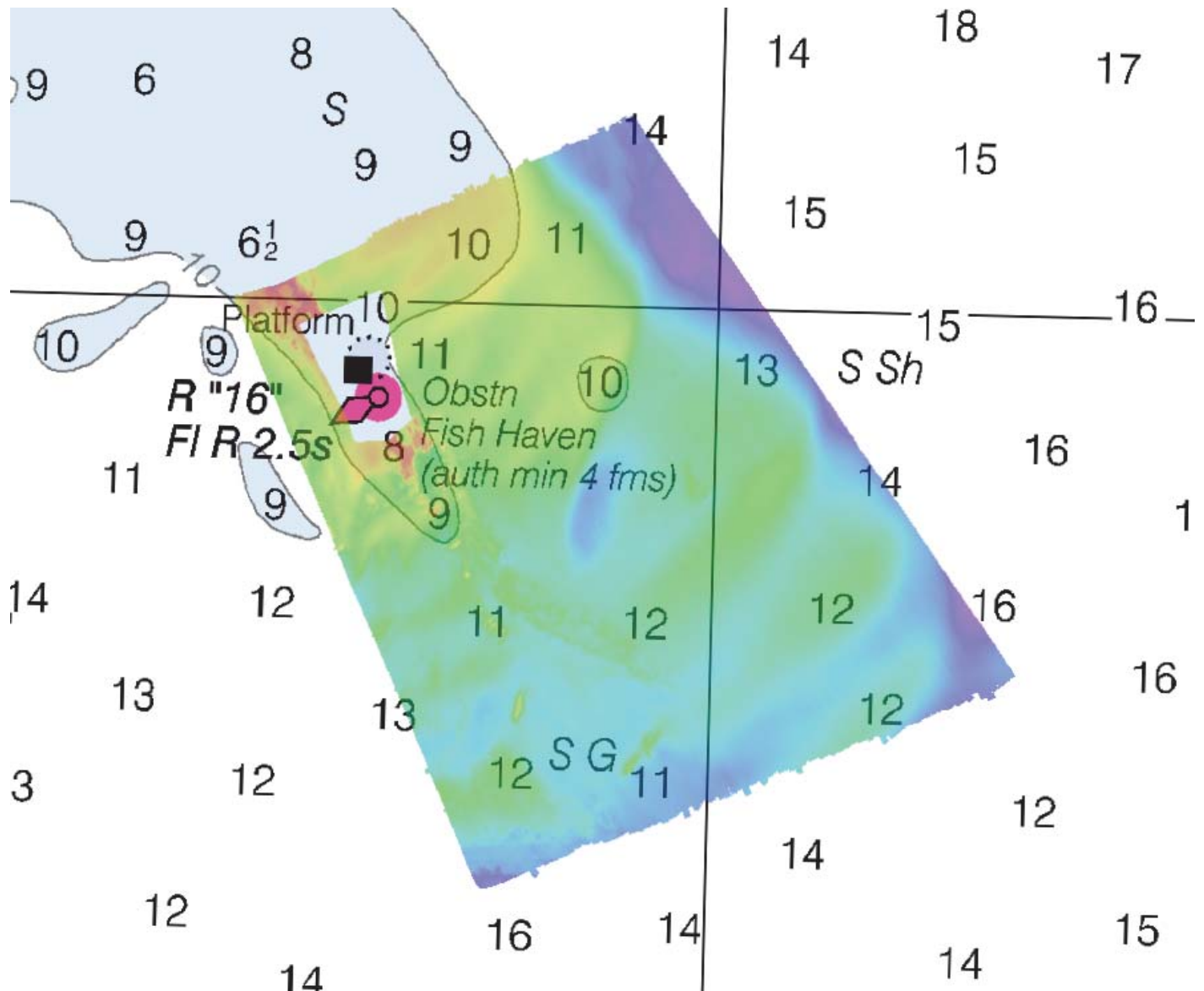


Figure 1: Extent of H12931.

Survey limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. Survey areas will address 793 SNM, of which 660 SNM are Priority 1 in accordance with the National Hydrographic Survey Priorities Edition 2012. The project is based on a request from an Atlantic Coast Port Access Route Study conducted by the Pacific Northwest National Laboratory at the request of the U.S. Coast Guard to delineate traffic corridors using AIS. This project will improve the chart for traffic navigating from port to port along the Atlantic Ocean Channel.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area. Refer to HSSD Section 5.2.2.3.	Complete Coverage Multibeam with Backscatter.

Survey coverage was acquired in accordance with the requirements listed above. There is a gap in survey coverage centered around the Frying Pan Shoals Light Tower and an adjacent fish haven (Figure 2). This shoal area was not surveyed due to time limitations and the operational and safety constraints of the vessel.

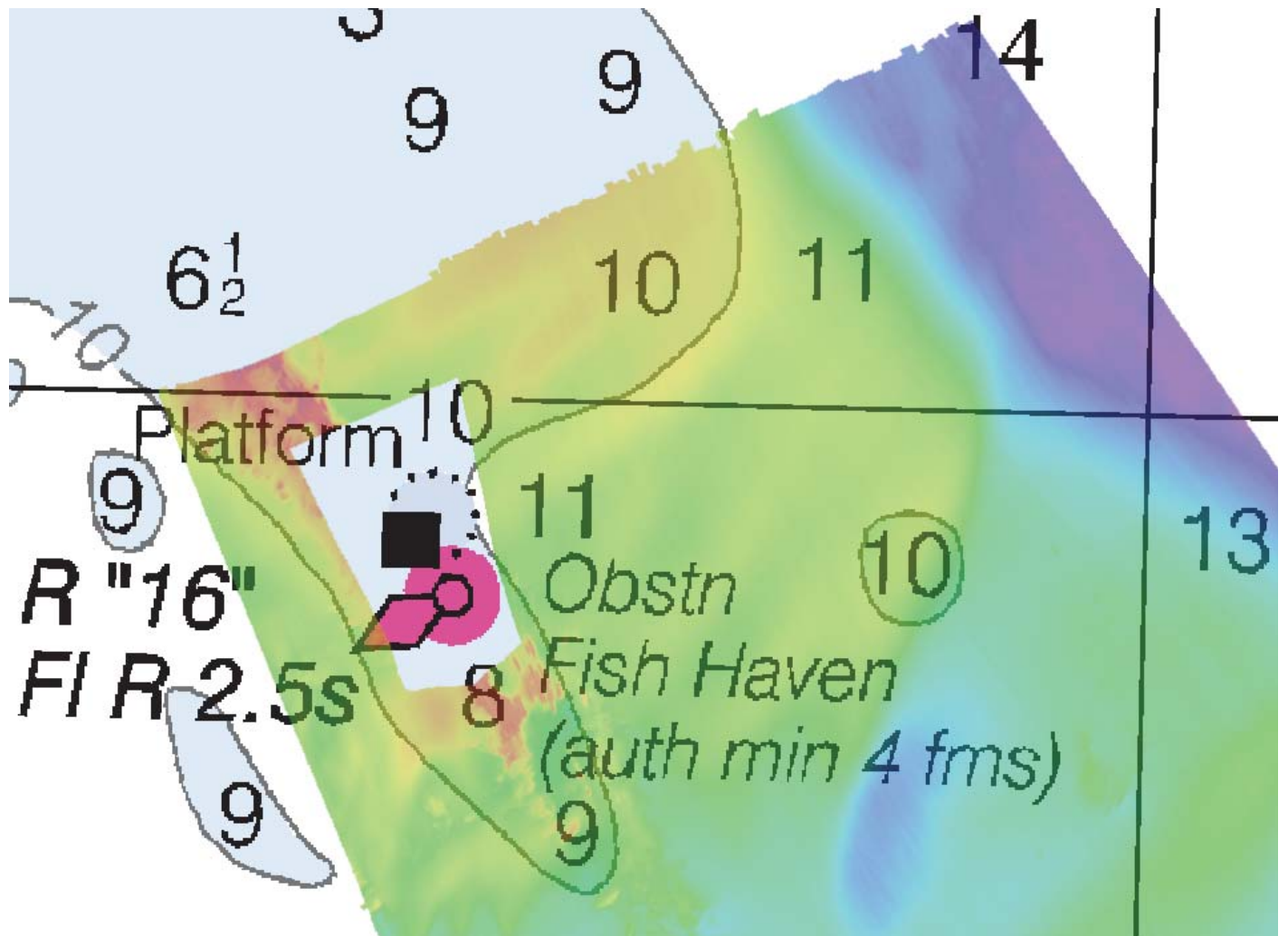


Figure 2: The shoal area around the Frying Pan Shoals Light Tower (charted platform) was not surveyed due to time limitations and the operational and safety constraints of the vessel.

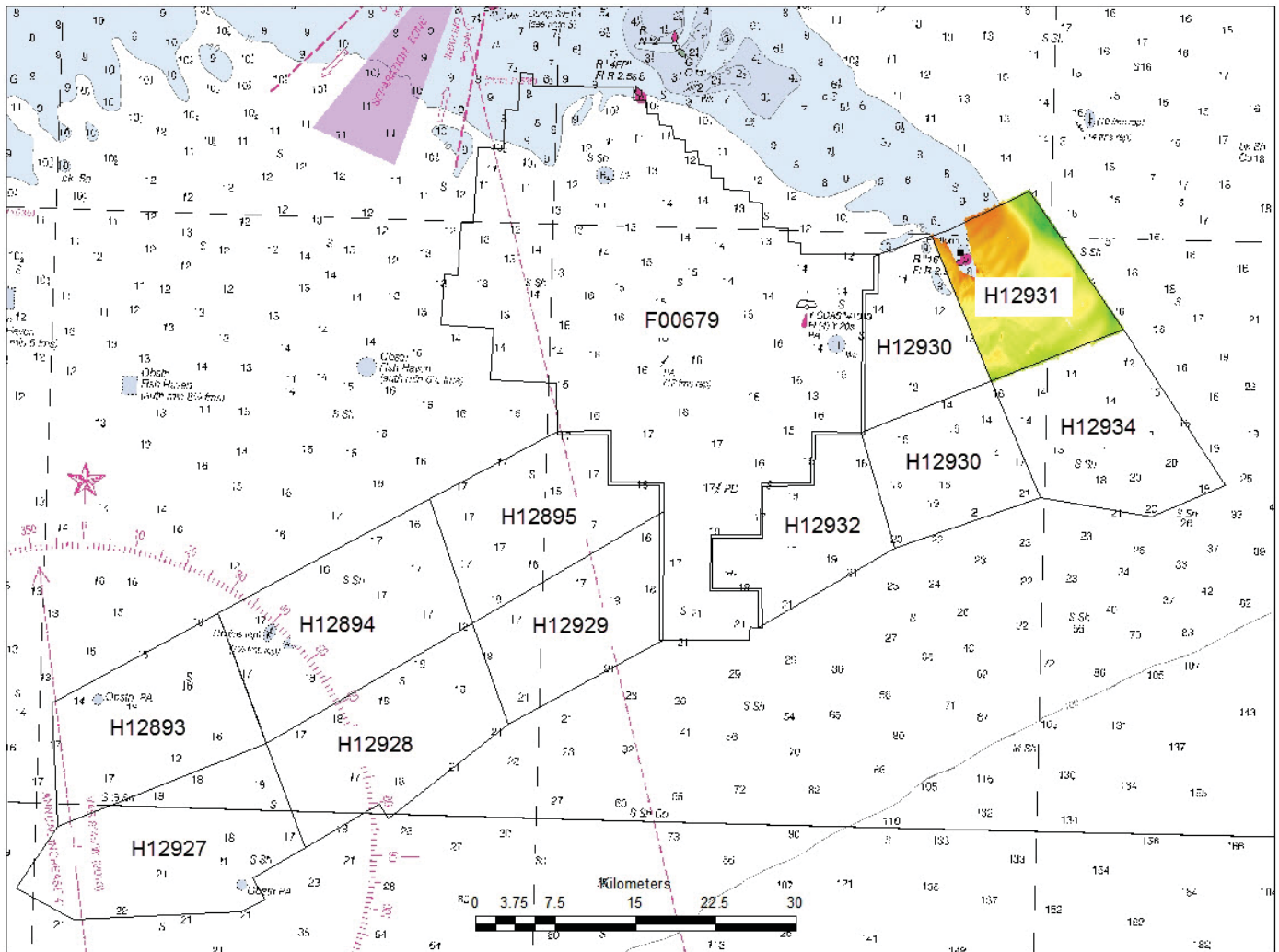


Figure 3: Survey layout for OPR-G309-FH-16 Approaches to Wilmington over raster chart 11520.

A.5 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	<i>S250</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	994.25	994.25
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	50.73	50.73
	Lidar Crosslines	0	0
Number of Bottom Samples			5
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			51.0

Table 2: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates	Day of the Year
09/10/2016	254
09/11/2016	255

Survey Dates	Day of the Year
09/12/2016	256
09/13/2016	257
09/14/2016	258
09/15/2016	259
09/25/2016	269
09/26/2016	270
10/21/2016	295
11/08/2016	313
11/09/2016	314

Table 3: Dates of Hydrography

Linear nautical miles were calculated using statistics from the port system.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures, and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	<i>S250</i>
LOA	37.7 meters
Draft	3.77 meters

Table 4: Vessels Used

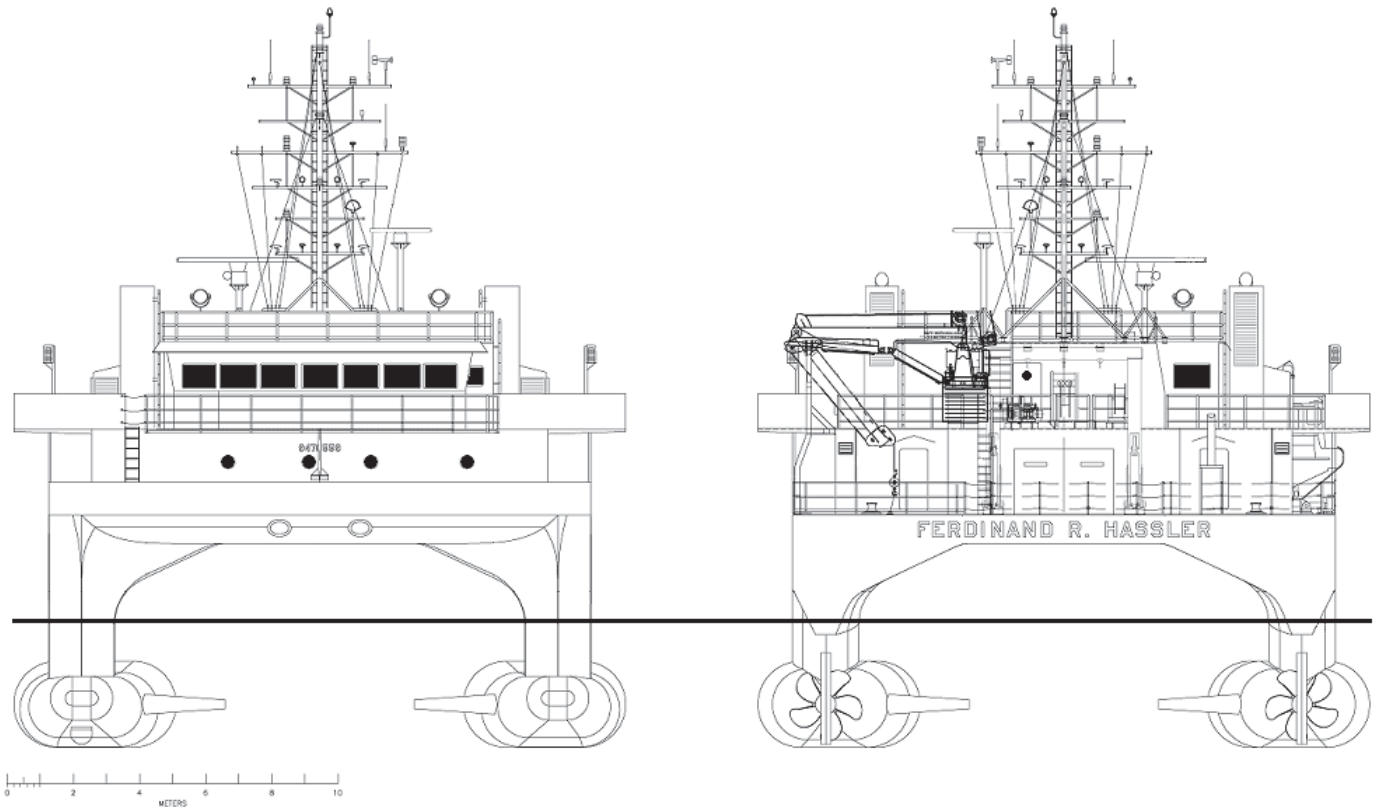


Figure 4: NOAA Ship Ferdinand R. Hassler

NOAA Ship FERDINAND R. HASSLER (S250), shown in Figure 4, acquired all surveyed soundings during operation for H12931

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Reson	7125	MBES
Applanix	POS M/V 320 V5	Positioning and Attitude System
Hemisphere	MBX-4	Positioning System
AML	MircoCTD	Sound Speed System
Brooke Ocean	MVP-200	Sound Speed System
Reson	SVP-70	Sound Speed System
Sea Bird	SBE 19+	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 5.10% of mainscheme acquisition.

The ratio of crossline to mainscheme mileage was calculated to be 5.10% which is within specifications set forth in section 5.2.4.3 of the 2016 HSSD. A geographic plot of crosslines is shown in Figure 5. To evaluate crossline agreement, two surfaces were created: one from the crossline depths, the other from mainscheme depths. These two surfaces were differenced using Caris BASE Editor. The two surfaces are in excellent agreement. The difference surface exhibits a total range of -4.18 and 1.13 meters. The relatively high range of difference values is due to several fliers in the crossline surface, but these fliers are not present in the finalized surfaces that are submitted as deliverables. The statistical analysis of the differences between the mainscheme and crossline surfaces is shown in Figure 6. The mean difference between the surfaces is 0.00 meters with a standard deviation of 0.09 meters, and 95% percent of nodes agree within +/- 0.16 meters.

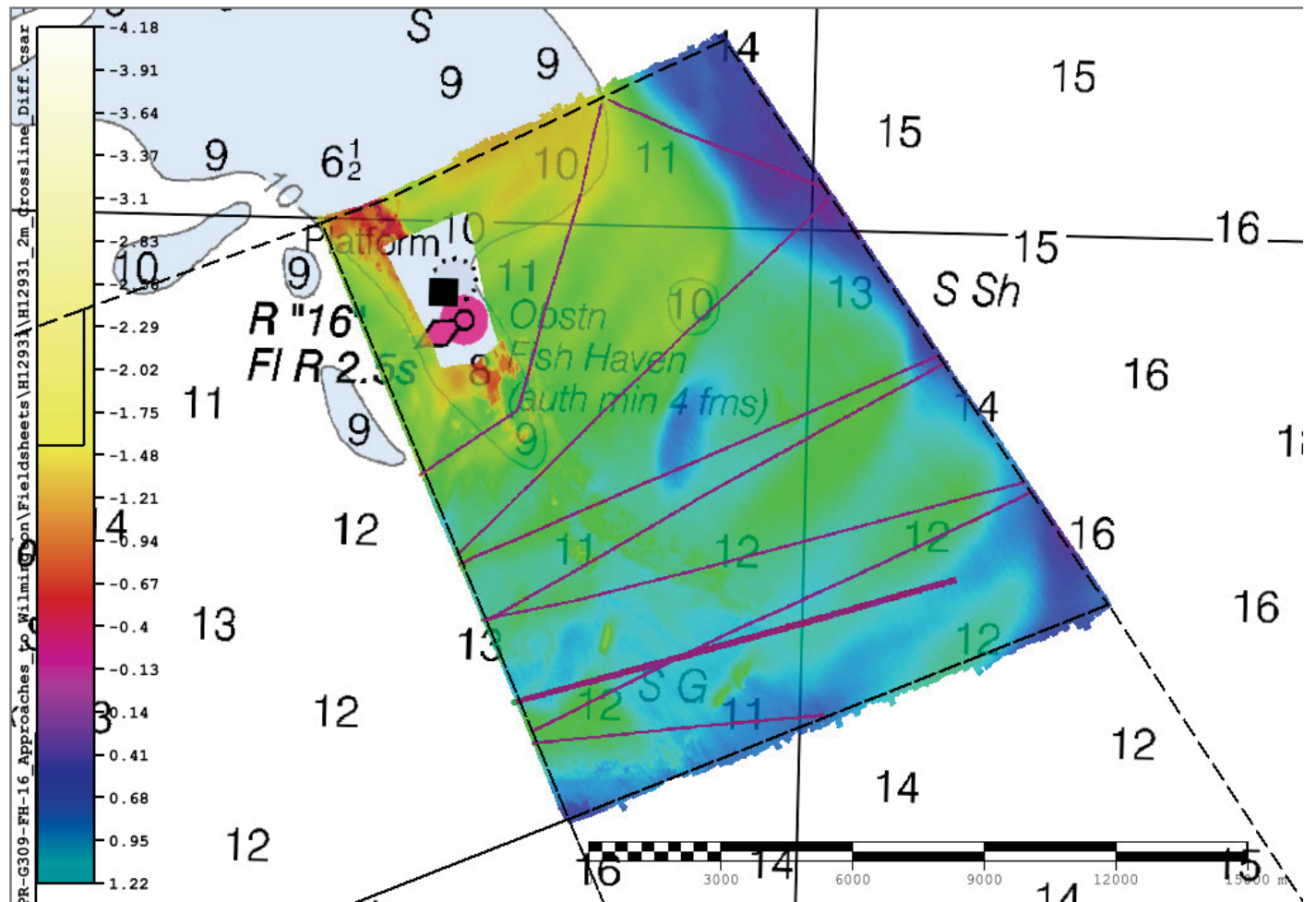


Figure 5: H12931 crossline data overlaid on mainscheme data. The legend represents the difference surface values.

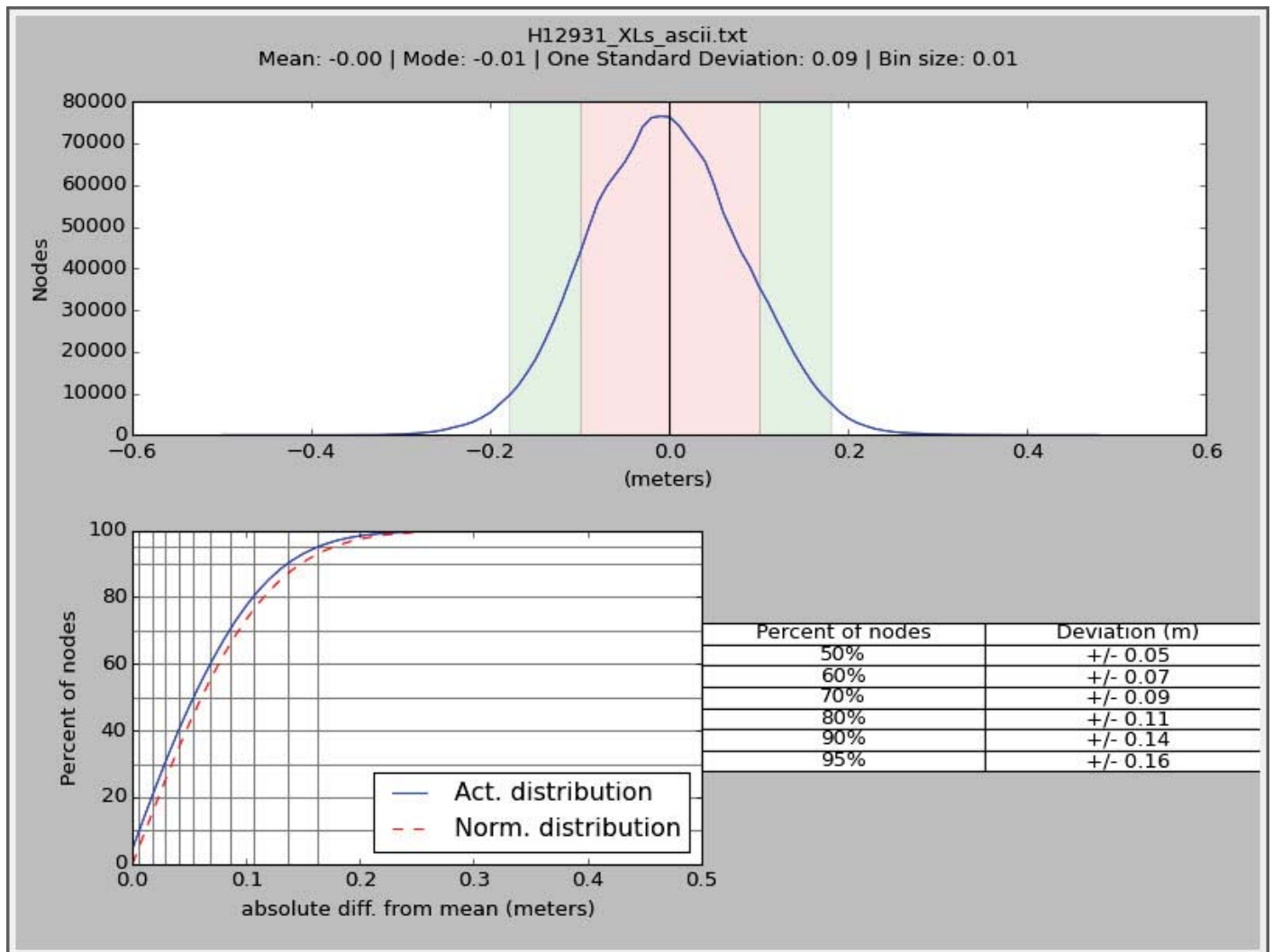


Figure 6: H12931 crossline difference statistics (mainscheme minus crosslines).

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning	Method
0.01 meters	0.148 meters	ERS via VDATUM

Table 6: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
S250	1.0 meters/second	1.0 meters/second	0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values.

Two water level correction models were associated with survey H12931. A discrete zoned tide model was provided to the field unit by CO-OPS for project OPR-G309-FH-16. In addition, a vertical datum transformation (VDatum) model was delivered to the field unit with the project files. All final gridded data for survey H12931 were reduced to MLLW using VDatum. This model functioned as a gridded separation model for GPS tide computations with a 0.148 meter uncertainty. Final TPU calculations were derived from the following sources: VDatum separation model, sound velocity (MVP, CTD, and surface sound velocimeter), HVF uncertainties, and SBET post-processed uncertainty. The sources of uncertainty that were applied during Caris processing are listed in Figure 7.

Uncertainty	Source
Position	Realtime
Sonar	Vessel
Heading	Realtime
Pitch	Realtime
Roll	Realtime
Vertical	Realtime heave
Tide	Static

Figure 7: Sources of uncertainty applied during Caris processing.

B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12930	1:40000	2016	NOAA Ship FERDINAND R. HASSLER	W
H12934	1:40000	2016	NOAA Ship FERDINAND R. HASSLER	S

Table 8: Junctioning Surveys

H12930

Survey H12931 junctions with its contemporary survey H12930 to the west, and their respective surfaces overlap by approximately 150 - 300 meters (Figure 8). The depths between the two surveys differ by -1.32 to 0.97 meters. The mean difference is -0.09 meters with a standard deviation of 0.10 meters, and 95% of nodes are within +/-0.19 meters (Figure 9).

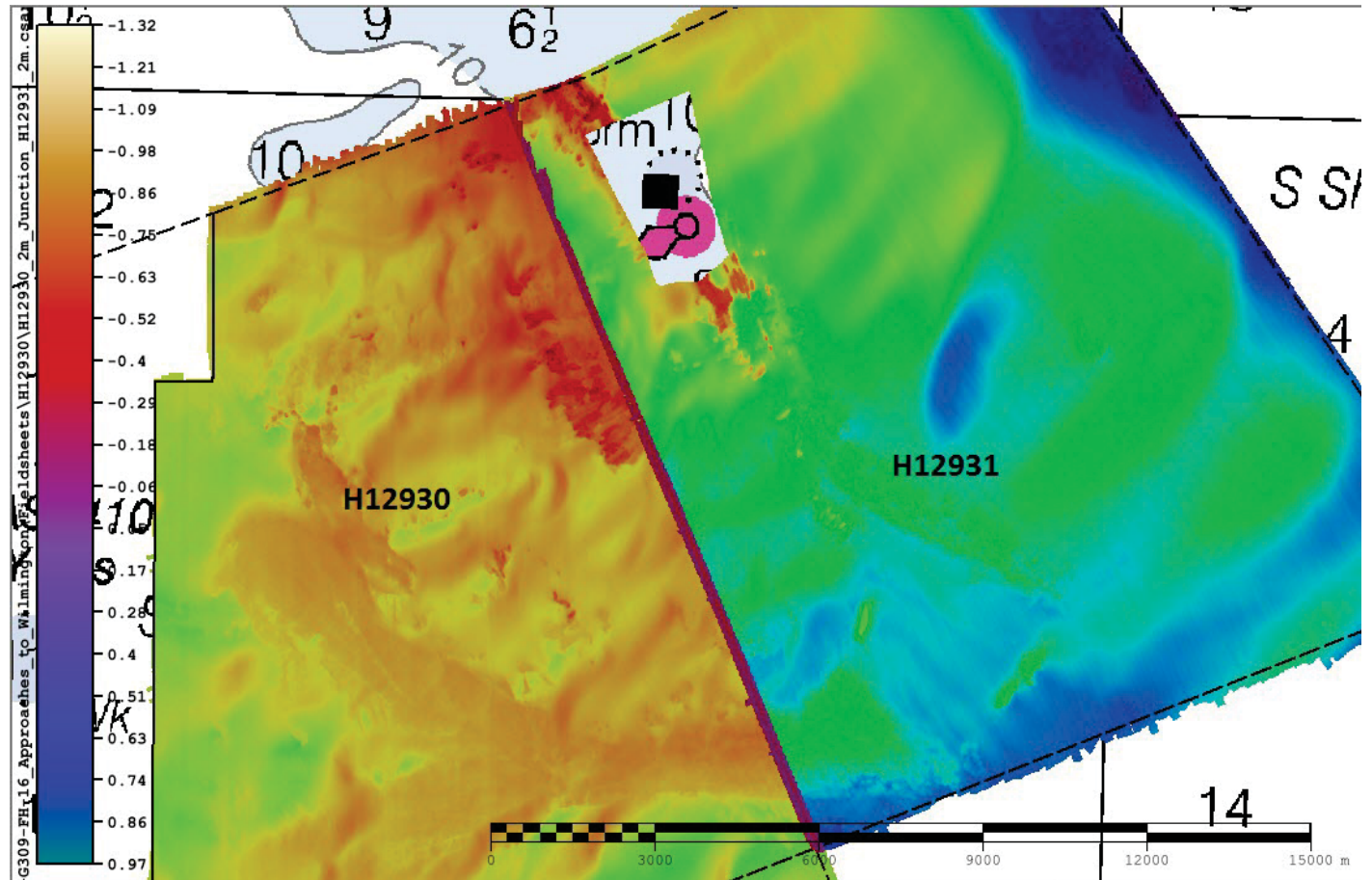


Figure 8: H12931 and H12930 junction.

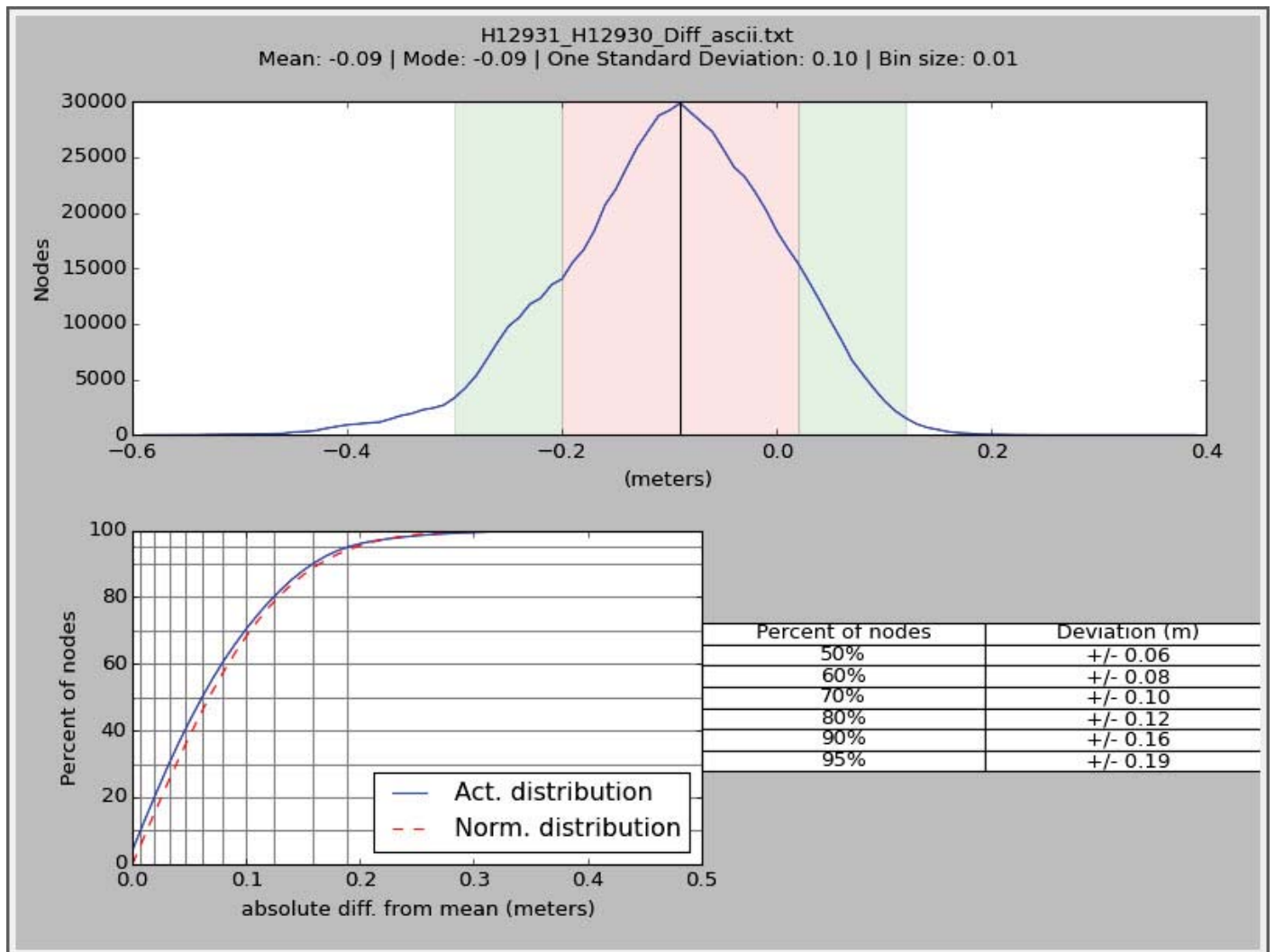


Figure 9: Difference surface statistics for H12931 and H12930.

H12934

Survey H12931 junctions with its contemporary survey H12934 to the south, and their respective surfaces overlap by approximately 150 - 300 meters (Figure 10). The depths between the two surveys differ by -0.77 to 0.41 meters. The mean difference is -0.01 meters with a standard deviation of 0.10 meters, and 95% of nodes are within +/-0.20 meters (Figure 11).

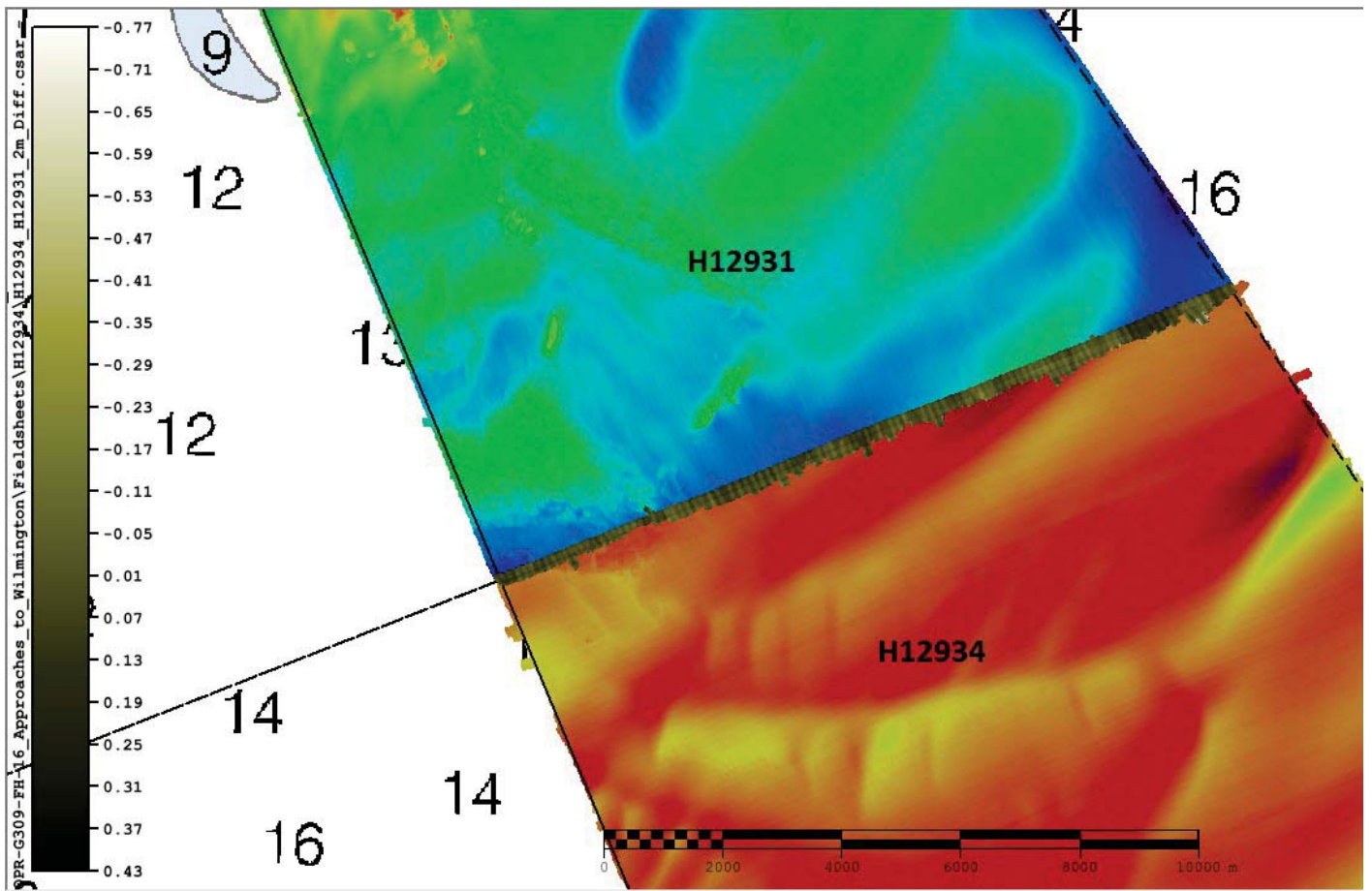


Figure 10: H12931 and H12934 junction.

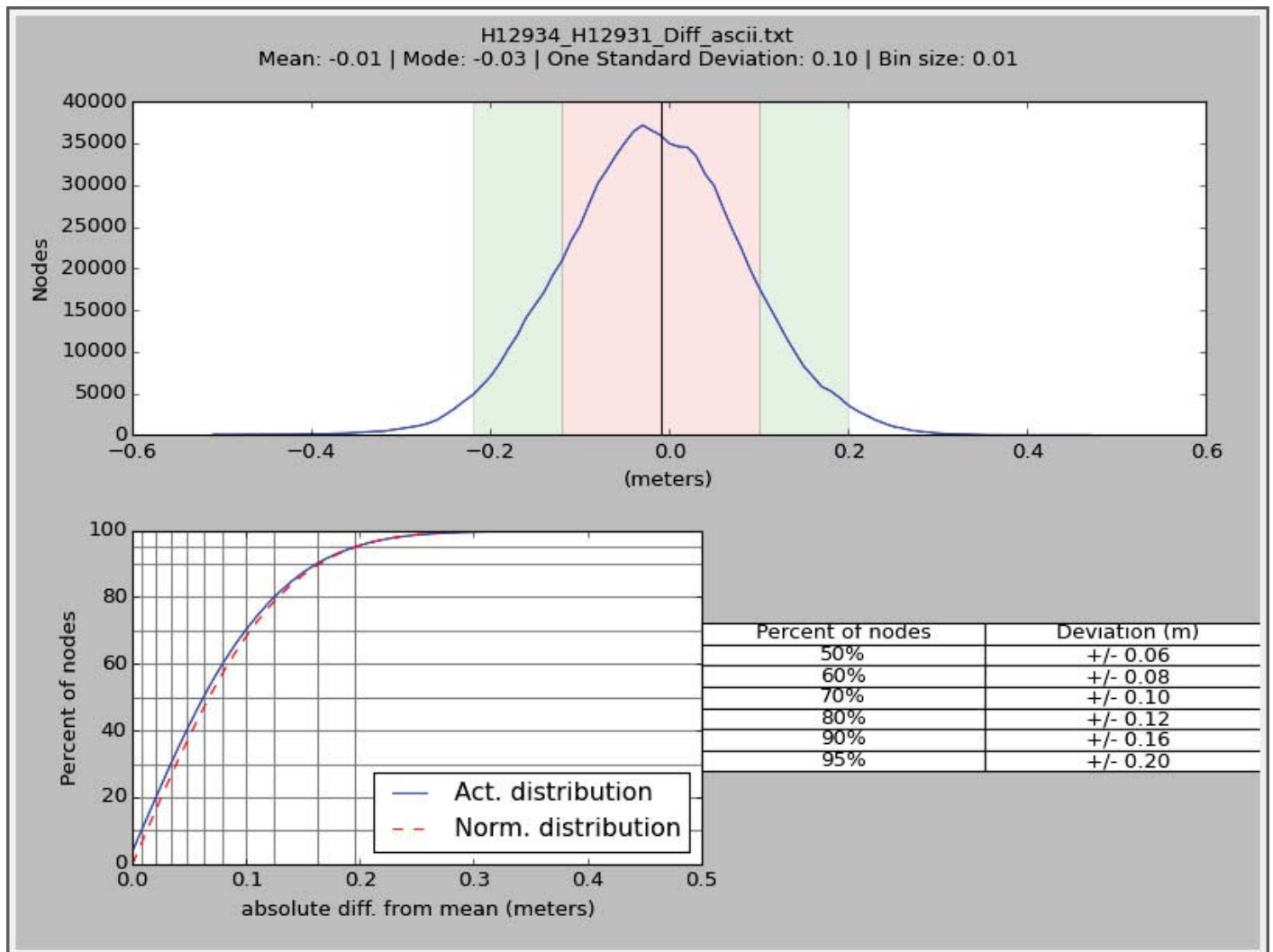


Figure 11: Difference surface statistics for H12931 and H12934.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Prior to the commencement of survey operations, the Brooke Ocean Moving Vessel Profiler (MVP) towfish with AML MicroCTD sensor was lost at sea on September 10, 2016. The Sea Bird SBE 19+ CTD sensor was used during survey H12931 to conduct sound speed casts approximately every 3 - 4 hours. Cast frequency was dependent on observed sound refraction artifacts in the processed data. The mean sampling interval for all casts was 3.4 hours, while the longest interval was 4.0 hours and the shortest interval was 1.8 hours.

A total of 44 sound speed profiles were collected for survey H12931. Most casts were conducted within the survey area, while one cast was conducted 160 meters outside of the survey coverage (Figure 12). With the exception of the final two dates of data acquisition, the water column was well mixed and exhibited minimal sound speed variability with depth (Figure 13). Overall, cast frequency was appropriate as evidenced by the ray tracing uncertainty analysis shown in Figure 14. The analysis confirmed that none of the sound speed profiles exceeded the allowance for refraction as defined in 2016 HSSD Section 5.2.3.5.

The most significant sound refraction in survey H12931 was observed during the final two dates of acquisition, reaching a maximum of approximately 0.25 meters at a depth of about 18 meters (Figure 15). This sound refraction resulted in minor artifacts in the gridded data but did not exceed the allowance for refraction as defined in 2016 HSSD Section 5.2.3.5.

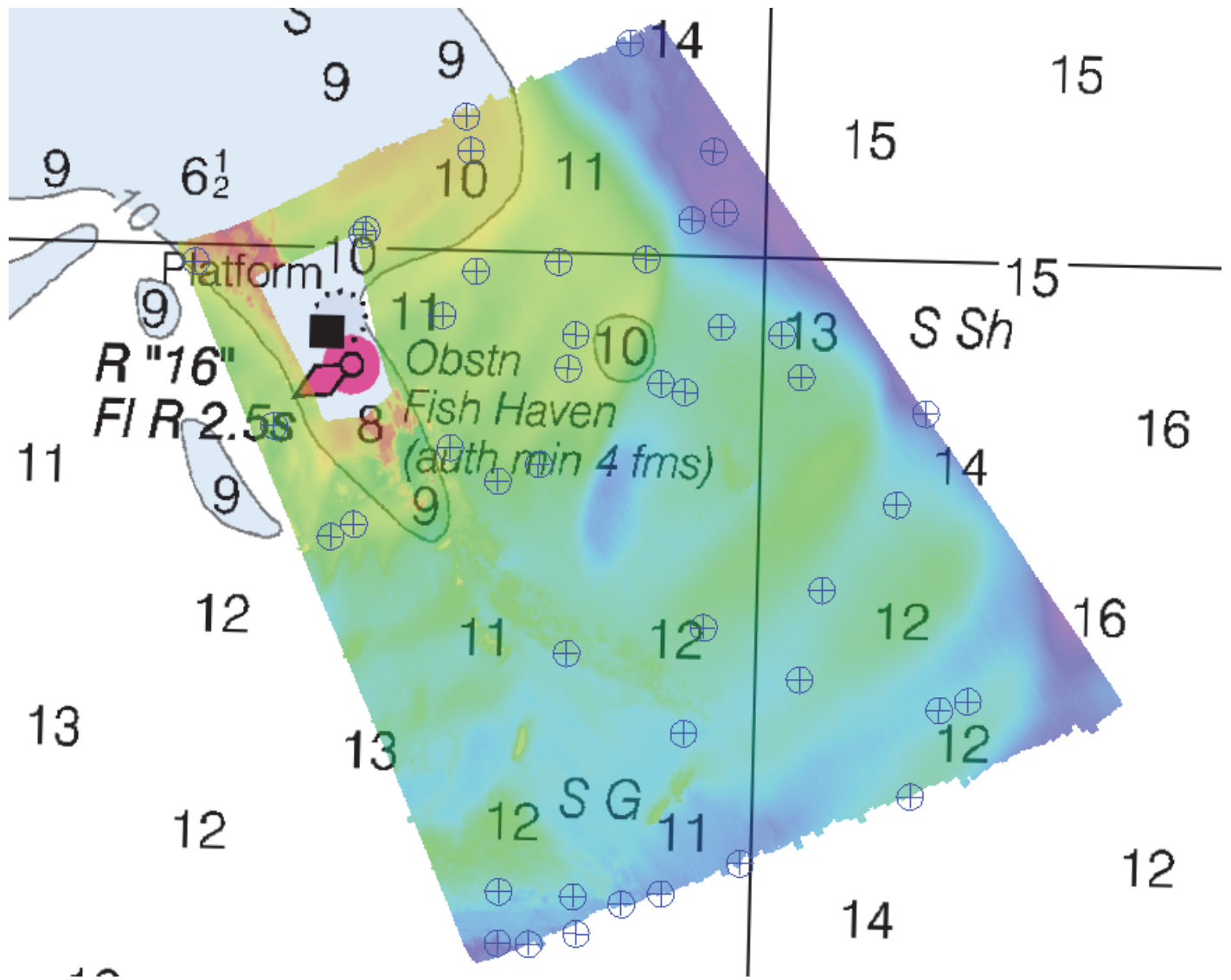


Figure 12: Locations of sound speed casts for H12931.

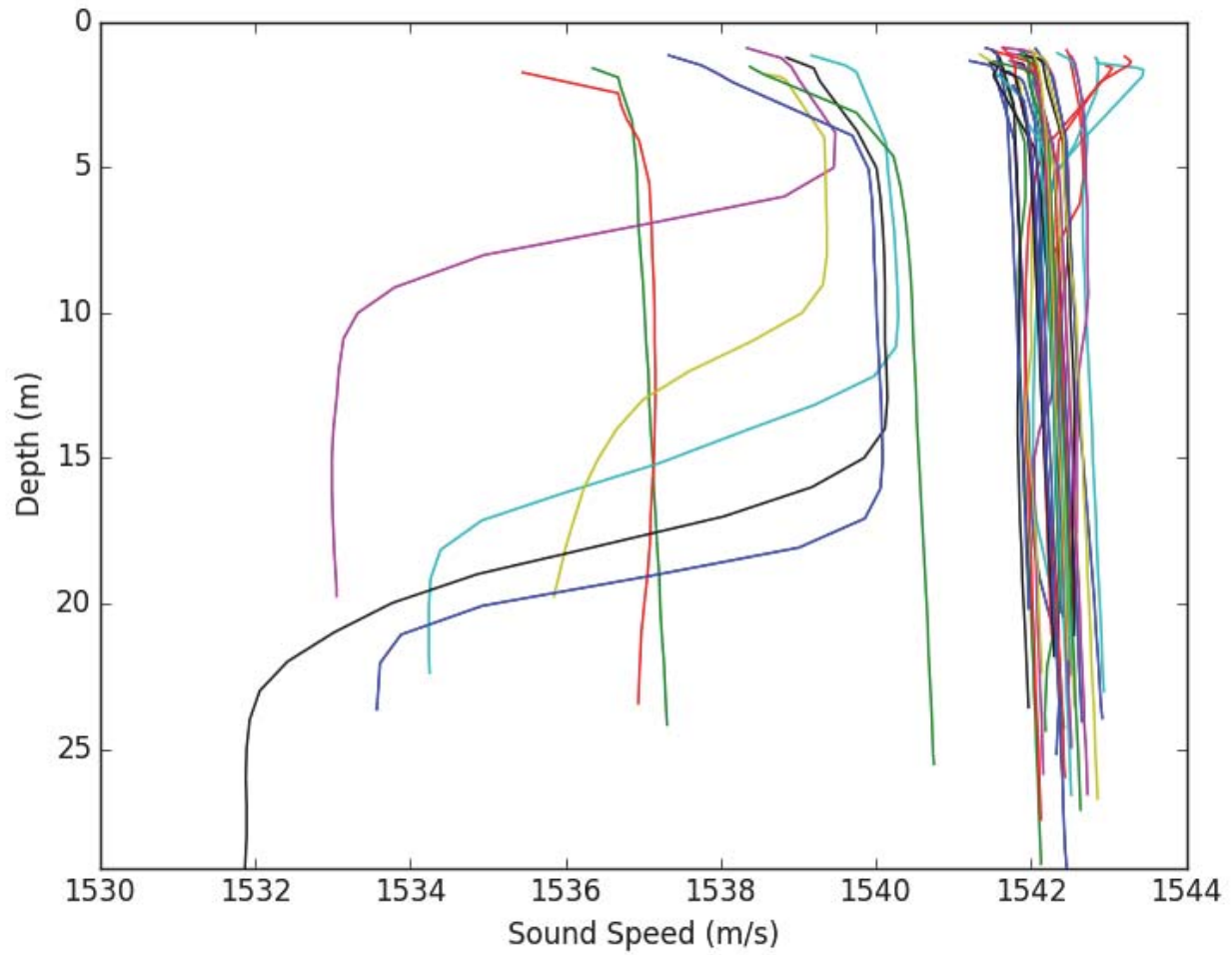


Figure 13: Plot of all sound speed profiles during the survey.

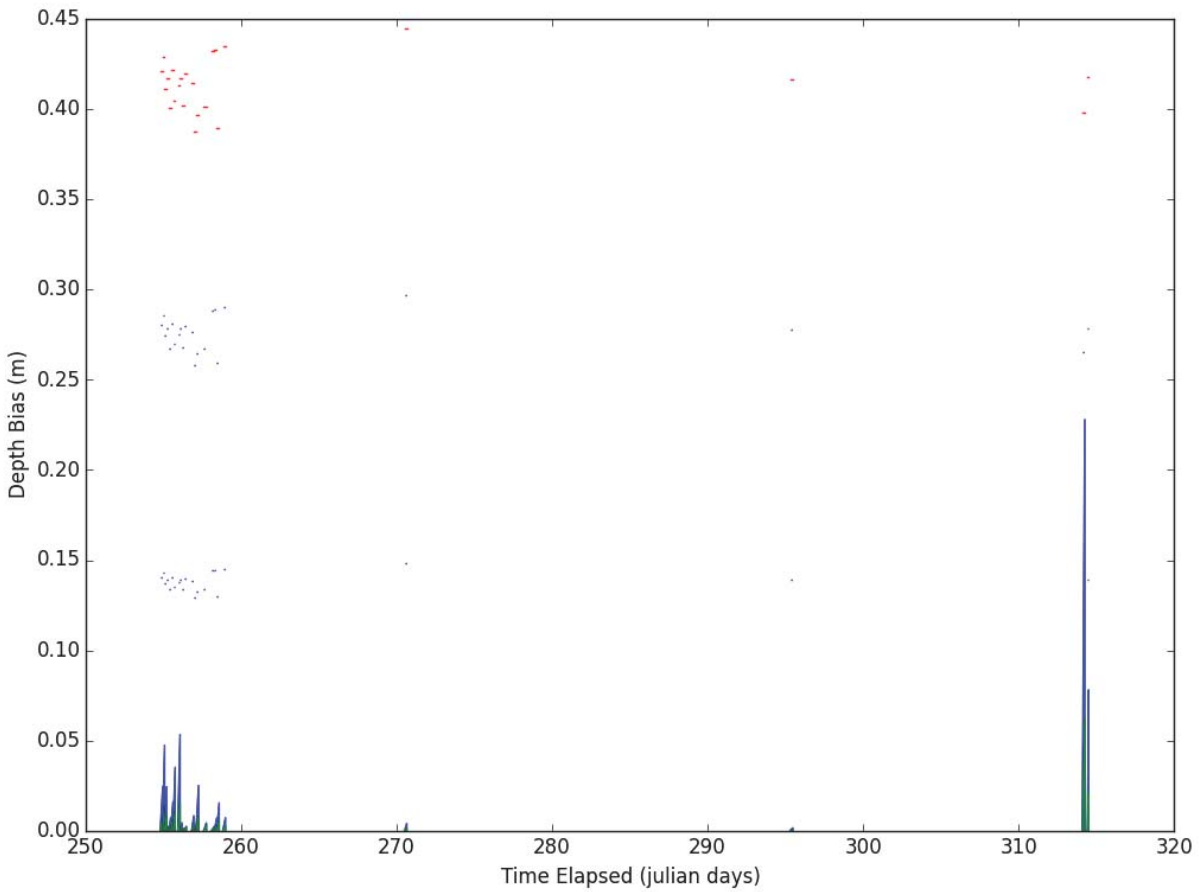


Figure 14: Ray tracing uncertainty analysis for all sound speed profiles during H12931. The blue lines represent consecutive cast comparisons, and the red dots represent the allowable vertical uncertainty due to refraction. None on the blue lines rise above the red dots, and therefore do not exceed the allowable uncertainty.

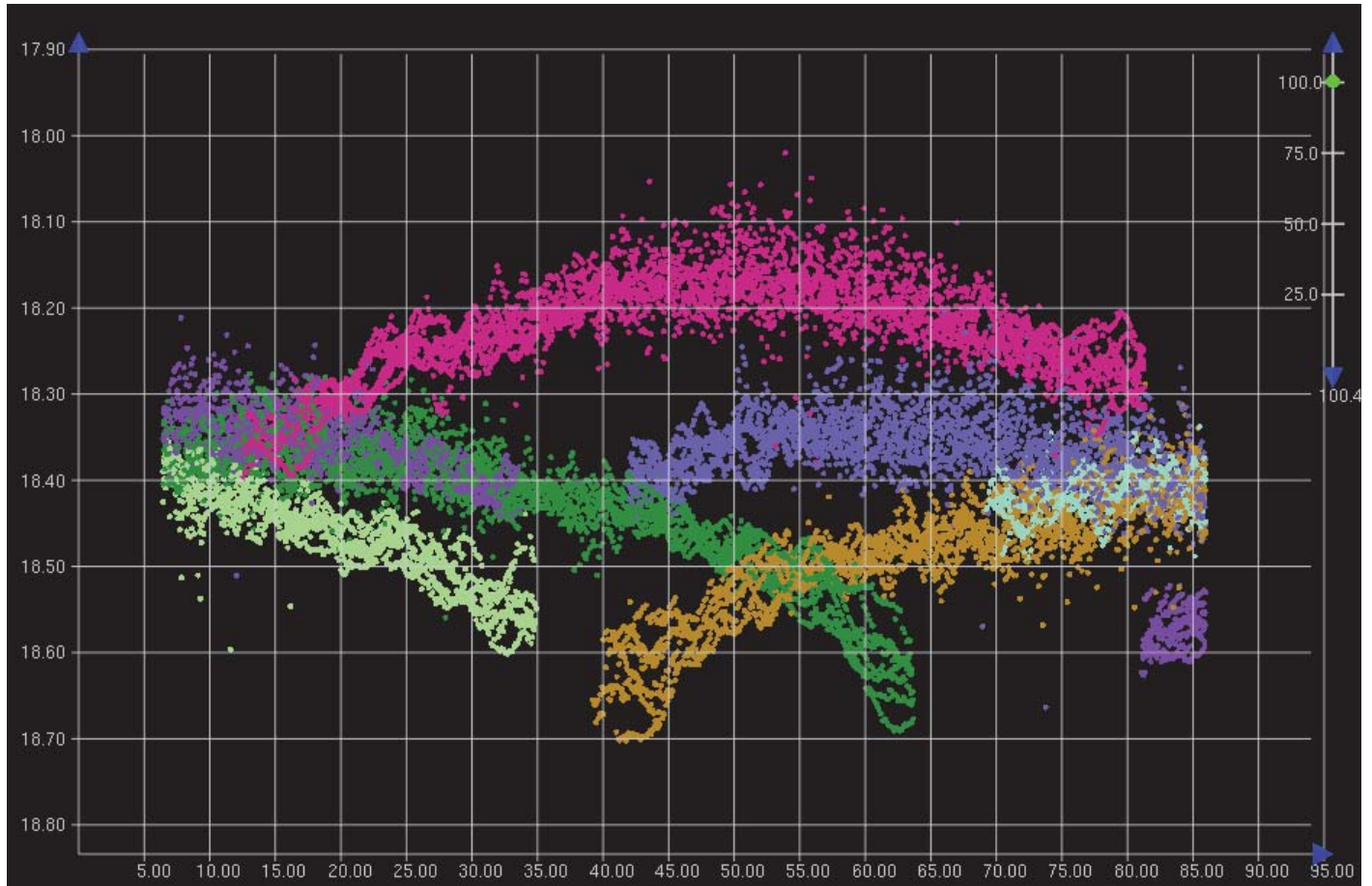


Figure 15: The maximum sound refraction in survey H1931 was approximately 0.25 meters at a depth of 18 meters, which was observed in data acquired November 9, 2016.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was logged in the RESON 7008 datagram at 25 snippets per record in the raw .s7k files. The files also contain the navigation record and bottom detections of all lines of survey H12931. The .s7k files were paired with the Caris HDCS data and processed using Fledermaus Geocoder Toolbox (FMGT). The FMGT projects and backscatter mosaics are included in the field submission. The processed mosaics are formatted as georeferenced tiff images. The following information is provided as metadata for the processing branch.

Backscatter data processing and mosaicing performed in Fledermaus FMGT version 7.6.2.

Backscatter data has a histogram range of 10 to -70dB

Backscatter data is provided in separate layers broken down by survey vessel hull number and sonar operating frequency.

H12931_S250_Port_400kHz | 4m resolution mosaic

H12931_S250_Stbd_400kHz | 4m resolution mosaic

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile Version 5.4

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12931_MB_1m_MLLW	CUBE	1 meters	12.26 meters - 29.99 meters	NOAA_1m	Complete MBES
H12931_MB_1m_MLLW_Final	CUBE	1 meters	12.26 meters - 20.00 meters	NOAA_1m	Complete MBES
H12931_MB_2m_MLLW	CUBE	2 meters	12.35 meters - 29.97 meters	NOAA_2m	Complete MBES
H12931_MB_2m_MLLW_Final	CUBE	2 meters	18.00 meters -	NOAA_2m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
			29.97 meters		

Table 9: Submitted Surfaces

B.5.3 Delayed Heave

Errors were encountered during Caris processing that prevented delayed heave from being applied to 34 survey lines. Most of the affected lines were holiday lines and delayed heave could not be applied due to their brief temporal extents, which is a known Caris issue. Delayed heave failed to apply to the remaining lines because of data gaps in the raw .000 files. None of the data was adversely affected by the lack of delayed heave.

PORT DN 255 Line 2016__2550318 (2)
 PORT DN 255 Line 2016__2551904
 PORT DN 256 Line 2016__2562252(2)
 PORT DN 257 Line 2016__2571154
 PORT DN 314 Line 2016__3140657
 PORT DN 314 Line 2016__3141018
 PORT DN 314 Line 2016__3141030
 PORT DN 314 Line 2016__3141042
 PORT DN 314 Line 2016__3141244
 PORT DN 314 Line 2016__3141348
 PORT DN 314 Line 2016__3141501
 PORT DN 314 Line 2016__3141537
 PORT DN 314 Line 2016__3141549
 PORT DN 314 Line 2016__3141555

STBD DN 255 Line 2016__2550318 (2)
 STBD DN 255 Line 2016__2551904
 STBD DN 256 Line 2016__2561125 (2)
 STBD DN 256 Line 2016__2562252(2)
 STBD DN 257 Line 2016__2571154
 STBD DN 314 Line 2016__3140240 (2)
 STBD DN 314 Line 2016__3140949
 STBD DN 314 Line 2016__3141001
 STBD DN 314 Line 2016__3141018
 STBD DN 314 Line 2016__3141042
 STBD DN 314 Line 2016__3141107
 STBD DN 314 Line 2016__3141244
 STBD DN 314 Line 2016__3141326
 STBD DN 314 Line 2016__3141344

STBD DN 314 Line 2016__3141357
 STBD DN 314 Line 2016__3141403
 STBD DN 314 Line 2016__3141421
 STBD DN 314 Line 2016__3141434
 STBD DN 314 Line 2016__3141518
 STBD DN 314 Line 2016__3141559

B.5.4 Data Density

A data density analysis was conducted to calculate the number of soundings per grid node. For both the 1 meter and 2 meter finalized surfaces, the analysis determined that greater than 95.5% of the nodes contain 5 or more soundings, which meets the data density requirement in 2016 HSSD Section 5.2.2.3 (Figures 16 and 17).

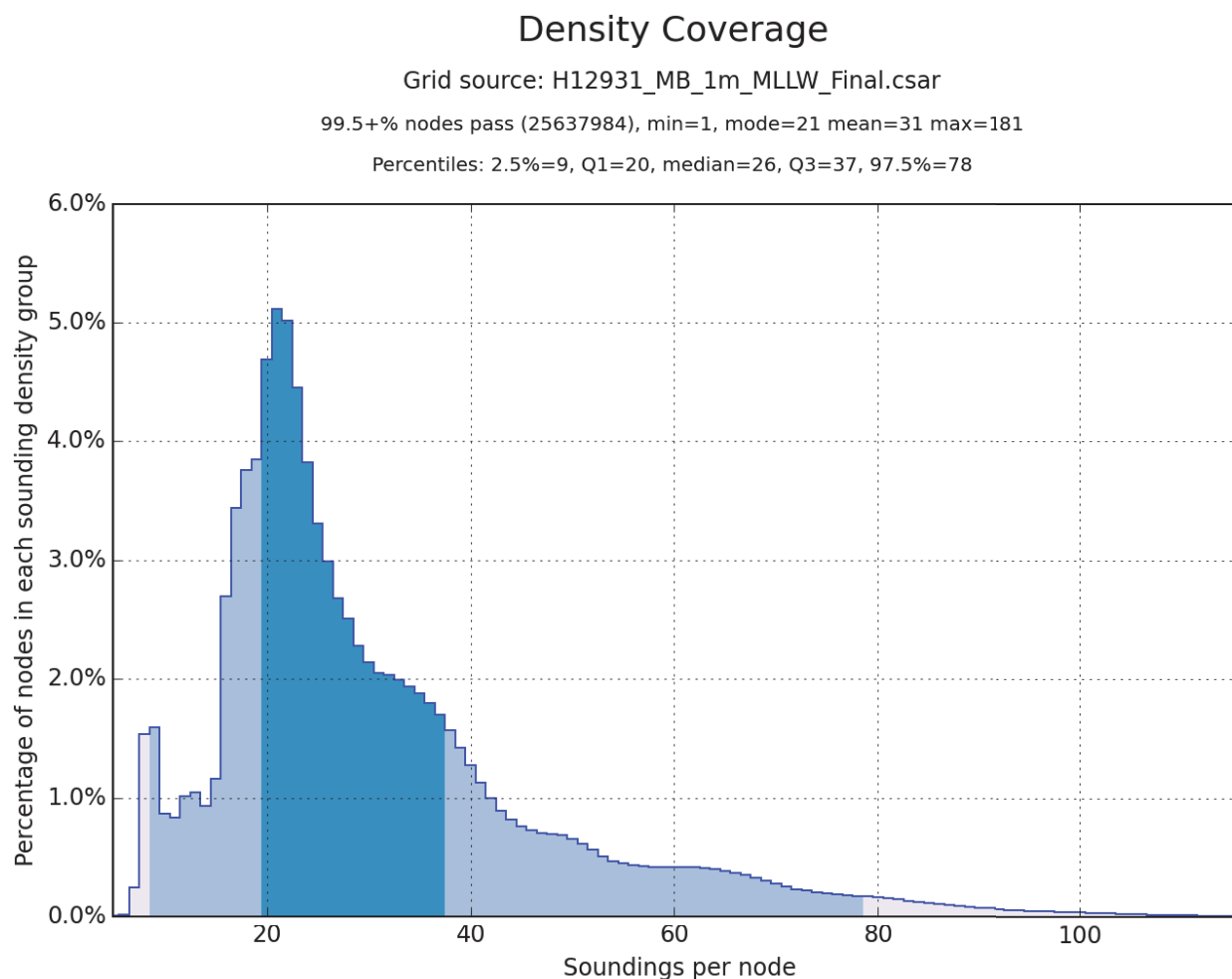


Figure 16: Data density of the 1 meter finalized surface.

Density Coverage

Grid source: H12931_MB_2m_MLLW_Final.csar

99.5+% nodes pass (42204264), min=1, mode=59 mean=70 max=528

Percentiles: 2.5%=25, Q1=50, median=62, Q3=81, 97.5%=165

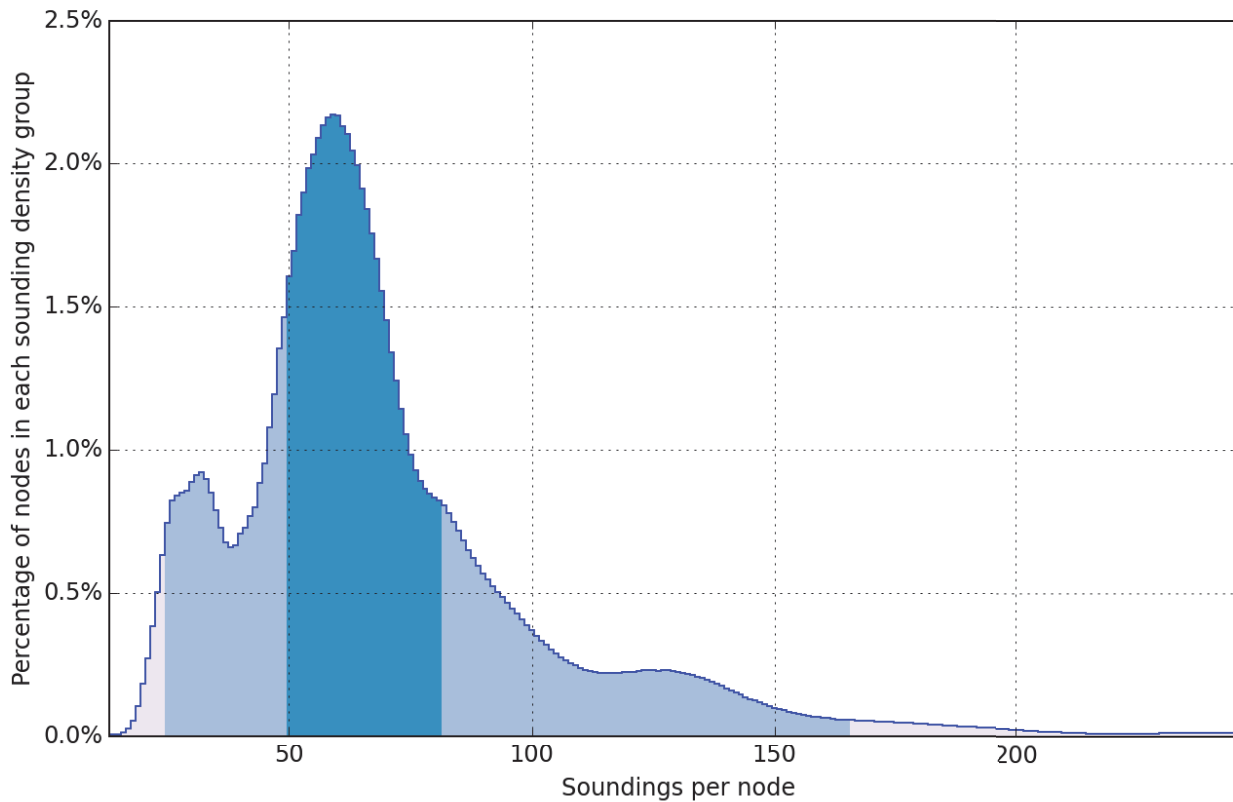


Figure 17: Data density of the 2 meter finalized surface.

B.5.5 Total Vertical Uncertainty Analysis

Pydro's Finalized CSAR Surface QA tool was used to calculate the percentage of grid nodes that meet total vertical uncertainty (TVU) specifications. For both the 1 meter and 2 meter finalized surfaces, the analysis determined that greater than 95.5% of the nodes meet the TVU specification in 2016 HSSD Section 5.1.3 (Figures 18 and 19).

Uncertainty Standards

Grid source: H12931_MB_1m_MLLW_Final.csar

99.5+% nodes pass (25638414), min=0.60, mode=0.63 mean=0.66 max=2.19

Percentiles: 2.5%=0.61, Q1=0.63, median=0.64, Q3=0.68, 97.5%=0.76

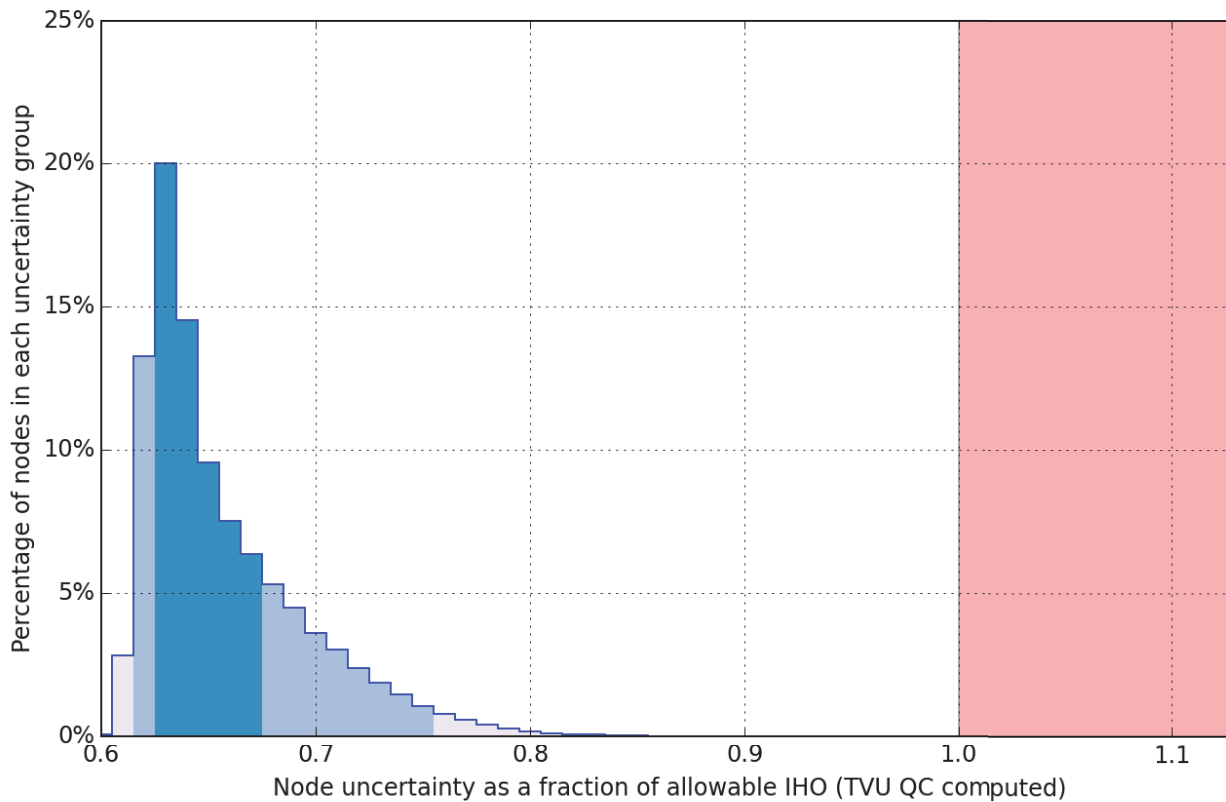


Figure 18: Total vertical uncertainty analysis for the 1 meter finalized surface.

Uncertainty Standards

Grid source: H12931_MB_2m_MLLW_Final.csar

99.5+% nodes pass (42207060), min=0.55, mode=0.61 mean=0.67 max=1.47

Percentiles: 2.5%=0.59, Q1=0.62, median=0.65, Q3=0.70, 97.5%=0.84

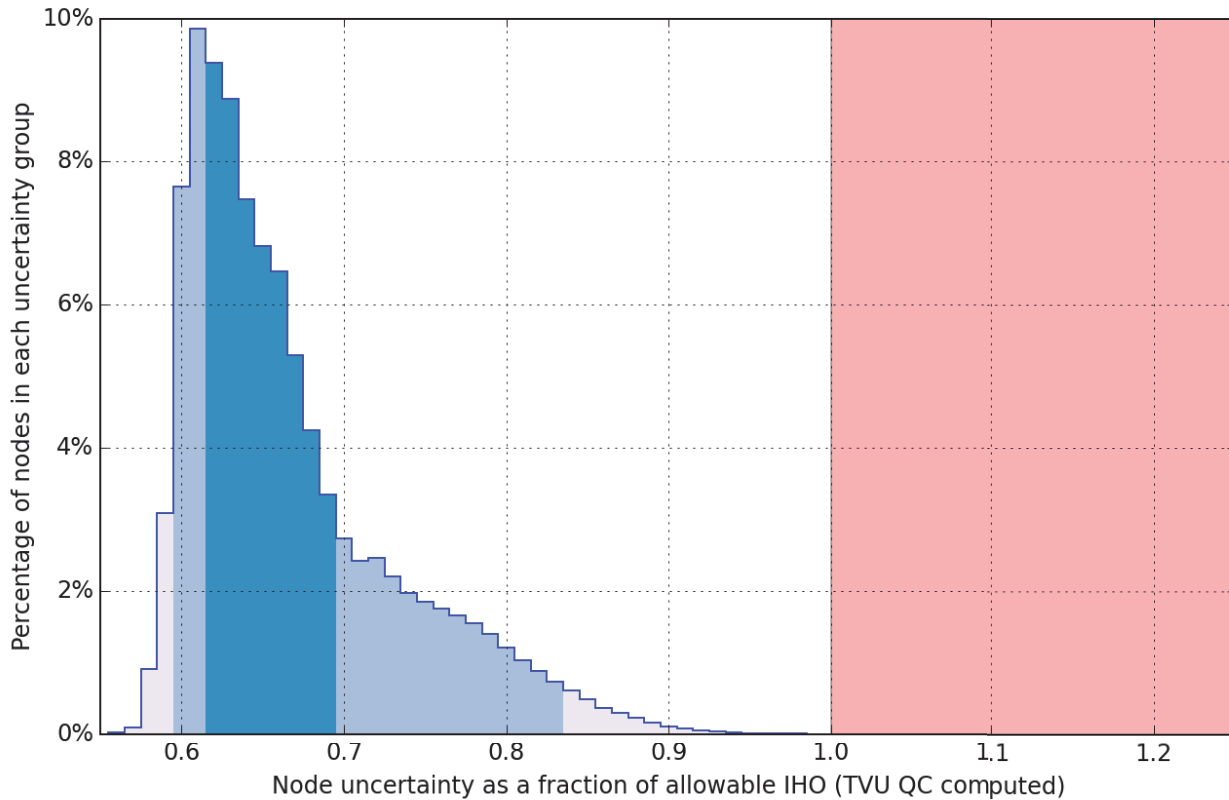


Figure 19: Total vertical uncertainty analysis for the 2 meter finalized surface.

B.5.6 No Sound Speed Correction (Caris SVC processing) After SBET Application

Based on feedback from the Atlantic Hydrographic Branch (AHB), the Ferdinand R. Hassler discovered that one element of the recommended Caris processing workflow was not followed throughout project OPR-G309-FH-16. The Caris Sound Velocity Correction (SVC) process was conducted before but not after loading Smoothed Best Estimates of Trajectory (SBETs). It is recommended to perform the SVC process after loading SBETs in order for the ray tracing to account for the updated motion and attitude information. A copy of survey H12932 was re-processed to assess the effect of not applying SVC after loading SBETs. As viewed in Caris Subset Editor, the vertical difference between processing methods ranged from 0.005 - 0.010 meters in all sampled areas, including two wrecks. The SVC processing methods were also compared using 2 meter and 4 meter difference surfaces. In the 2 meter difference surface, the depths differ by -8.17 to 3.07 meters, with a mean difference of 0.00 meters and a standard deviation of 0.00 meters, and 95% of nodes exhibit a depth difference of ± 0.01 meters. In the 4 meter difference surface, the depths differ by -0.74 to 0.62 meters, with a mean difference of 0.00 meters and a standard deviation of 0.00 meters, and 95% of nodes exhibit a depth difference of ± 0.01 meters. The high values in the difference surfaces are isolated

and limited to features and steep slopes. A detailed review confirmed that the high values in the difference surfaces are entirely the result of CUBE gridding inconsistencies and small horizontal shifts in the grid node structure rather than actual vertical differences in the sounding data. The results of this testing were discussed with HSD Operations and AHB. Based on the limited magnitude of the error, it was concluded that re-processing the entire project was unnecessary. The ship's Caris processing SOP has been updated to reflect the recommended SVC workflow. Please refer to the DAPR and the correspondence in Appendix II for more information.

C. Vertical and Horizontal Control

Additional information regarding the vertical and horizontal control of this survey can be found in the accompanying ERS Checkline Analysis and ERS Capability Memo.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Methods Used:

ERS via VDATUM

Ellipsoid to Chart Datum Separation File:

G309FH16ExpandedProjectArea_xyWGS84-MLLW_geoid12b

All soundings for this survey have been reduced to MLLW using documented VDatum techniques.

C.2 Horizontal Control

The horizontal datum for this project is World Geodetic System of 1984 (WGS84).

The projection used for this project is UTM Zone 18 North.

3-D GNSS position data was collected by Applanix POS/MV V5 systems utilizing correction data supplied by Fugro Marinestar. Fugro Marinestar is a satellite-based subscription service that improves GNSS derived position accuracies using a Precise Point Positioning (PPP) approach. The POS/MV data was post-processed in Applanix POSpac MMS to produce Smoothed Best Estimates of Trajectory (SBETs) and RMS uncertainty files using the method of Post Processed Precise Point Positioning (5P). The resulting SBETs and RMS files were applied in Caris HIPS and SIPS to all data for survey H12931. Refer to the DAPR for technical details.

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 WGS84 Horizontal Datum

The World Geodetic System of 1984 (WGS84) is listed as the required horizontal datum in 2016 HSSD Section 2.1. However, after data acquisition had already begun for project OPR-G309-FH-16, Hydrographic Technical Directive 2016-03 was published rescinding this requirement and re-establishing the North American Datum of 1983 (NAD83) as the required horizontal datum. Subsequent email correspondence from the Chief of HSD Operations stated that any survey initiated in the WGS84 datum may be continued for the duration of the project or sheet. Therefore, WGS84 was used for the entirety of project OPR-G309-FH-16.

3.3.2 Discrete Zoned Tides

All soundings for H12931 are reduced to MLLW using documented VDatum techniques. However, if it is deemed necessary to change the water level reduction method to discrete zoned tides, the following information may be useful.

- 1) The National Water Level Observation Network (NWLON) station serving as datum control for this survey is Wrightsville Beach, NC (8658163).
- 2) The verified water level file (8658163.tid) has been loaded for all data in H12931. GPS tides were applied during the final merge process for all data in H12931, as required for ellipsoid-referenced surveys.
- 3) The final discrete zoning file (G309FH2016_Rev3_CORP.zdf), as provided in the Tide Note in Appendix I, has been loaded for all data in H12931.
- 4) A request for final approved tides was sent to CO-OPS on December 6, 2016. The final Tide Note was received on December 16, 2016, providing a revised discrete zoning file (G309FH2016_Rev3_CORP.zdf) for project OPR-G309-FH-16 due to the destruction of the original datum control station (8661070 - Springmaid Pier, SC) during Hurricane Matthew (October 8 - 9, 2016).

D. Results and Recommendations

D.1 Chart Comparison

The hydrographer has compared soundings and contours generated from the survey data to the charted depths and contours. In addition, the Chart Review utility within Pydro's QC Tools was used to compare the survey soundings to the most recent electronic navigational charts.

D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNLM Date	NM Date
11536	1:80000	20	01/2015	01/17/2017	01/28/2017
11520	1:432720	45	09/2013	01/24/2017	01/28/2017

Table 10: Largest Scale Raster Charts

11536

A comparison was performed with raster chart 11536 using soundings and contours derived from the 2 meter parent surface (Figure 20). Surveyed soundings generally agree within 2 feet of charted depths. The 60 foot contours exhibit minor changes compared to the chart.

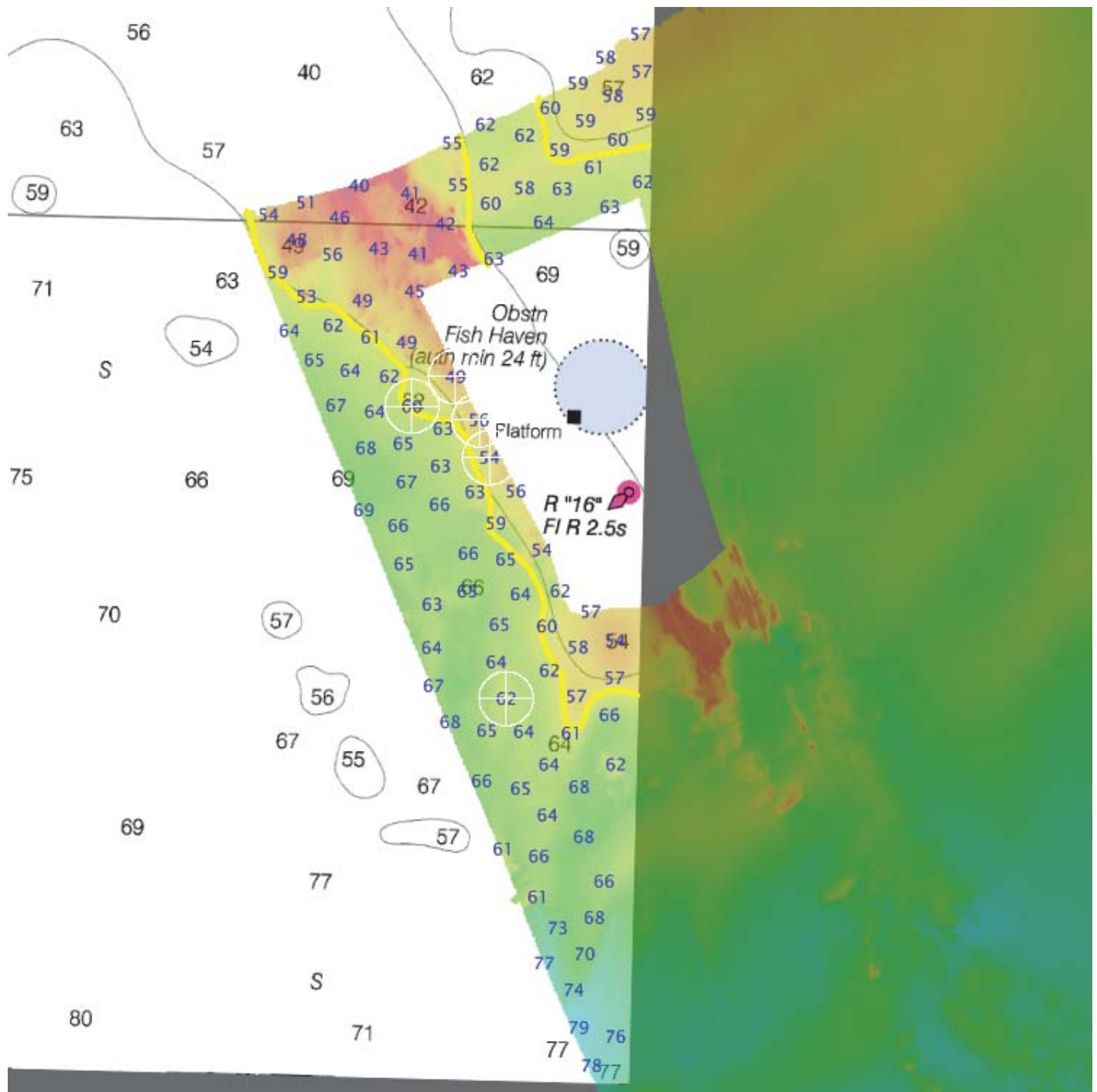


Figure 20: Chart 11536 comparison. Surveyed soundings are shown in blue and surveyed contours are shown in yellow. The white crosshairs indicate surveyed soundings that are shallower than charted depths.

11520

A comparison was performed with raster chart 11520 using soundings and contours derived from the 2 meter parent surface (Figure 21). Surveyed soundings generally agree within 1 fathom of charted depths. The 10 fathom contours exhibit minor changes compared to the chart.

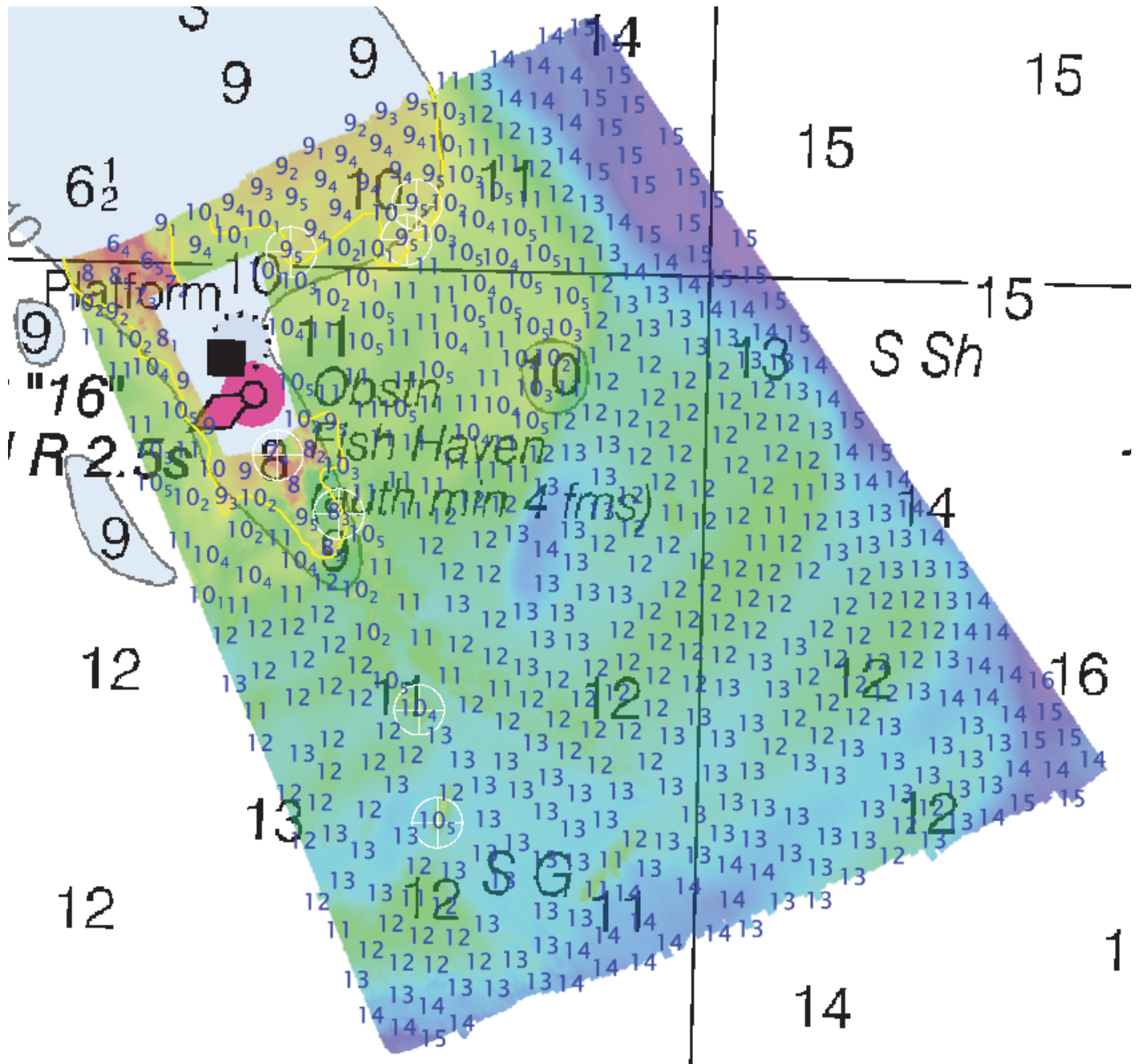


Figure 21: Chart 11520 comparison. Surveyed soundings are shown in blue and surveyed contours are shown in yellow. The white crosshairs indicate surveyed soundings that are shallower than charted depths.

D.1.2 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US4NC11M	1:80000	15	12/01/2016	02/01/2017	NO
US3SC10M	1:432720	23	01/26/2017	01/26/2017	NO

Table 11: Largest Scale ENC's

US4NC11M

A comparison was performed with electronic chart US4NC11M using soundings derived from the 2 meter parent surface and the Chart Review utility within QC Tools. The comparison agrees with the results discussed above for raster chart 11536 (Figure 20).

US3SC10M

A comparison was performed with electronic chart US3SC10M using soundings derived from the 2 meter parent surface and the Chart Review utility within QC Tools. The comparison agrees with the results discussed above for raster chart 11520 (Figure 21).

D.1.3 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.4 Charted Features

Charted features exist for this survey, but were not investigated. Refer to the final feature file for more information.

D.1.5 Uncharted Features

No uncharted features exist for this survey.

D.1.6 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

D.1.7 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.8 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.1.9 Bottom Samples

Five bottom samples were acquired for this survey. Refer to the final feature file for more information.

D.2 Additional Results

D.2.1 Shoreline

Shoreline was not assigned in the Hydrographic Survey Project Instructions or Statement of Work.

D.2.2 Prior Surveys

Prior survey comparisons exist for this survey, but were not investigated.

D.2.3 Aids to Navigation

Aids to navigation (ATONs) exist for this survey, but were not investigated. Refer to the final feature file for more information.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Platforms

Platforms exist for this survey, but were not investigated. Refer to the final feature file for more information.

D.2.8 Significant Features

No Significant Features exist for this survey.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendation

No new surveys or further investigations are recommended for this area.

D.2.11 Inset Recommendation



No new insets are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All bathymetric surfaces, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
LCDR Matthew J. Jaskoski	Chief of Party	02/27/2017	
LT Nicholas C. Morgan	Field Operations Officer	02/27/2017	 MORGAN,NICHOLAS.CHARLE S.1292288138 2017.09.26 08:36:37 -07'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continually Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positioning System timing message
ZDF	Zone Definition File

APPENDIX I
TIDES AND WATER LEVELS



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : December 16, 2016

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-G309-FH-2016_ Revised3

HYDROGRAPHIC SHEET: H12930

LOCALITY: South Frying Pan Shoal, Approaches to Wilmington, NC

TIME PERIOD: August 18 - November 8, 2016

TIDE STATION USED: 8658163 Wrightsville Beach, NC

Lat. 34° 12.8'N Long. 77° 47.2' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.206 meters

ESTIMATED ZONING ERROR: 0.37 meters

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SA108, SA109A

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Note 2: Annual leveling for Wrightsville Beach, NC (8658163) was not completed in the past year. A review of the verified leveling records from October 2006 to October 2015 shows the tide station benchmark network to be stable within an allowable 0.009 m tolerance. This Tide Note may be used as final stability verification for survey OPR-G309-FH-2016_Rev3, H12930. CO-OPS will immediately provide a revised Tide Note should subsequent leveling records indicate any benchmark network stability movement beyond the allowable 0.009 m tolerance.

HOVIS.GERALD.THOMAS.JR.1365860250

Digitally signed by
HOVIS.GERALD.THOMAS.JR.1365860250
DN: c=US, o=U. S. Government, ou=DoD,
ou=PKI, ou=OTHER,
cn=HOVIS.GERALD.THOMAS.JR.1365860250
Date: 2016.12.20 11:16:12 -05'00'

CHIEF, PRODUCTS AND SERVICES BRANCH



APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

combining sheets 7 and 10

4 messages

CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov> Sat, Aug 20, 2016 at 7:08 PM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

hey, I know we've already started a few lines on sheet 7 but what do you think about combining sheets 7 and 10 into one sheet? It would be about 88 SNM which is pretty big, but we could run North-South lines pretty efficiently

CO

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's cell: (603) 812-8748
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Sun, Aug 21, 2016 at 9:40 AM
To: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>
Cc: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

I think it makes sense to me. We had a sheet in the Chesapeake last year that was about that size. I would have to see if the depths were similar to know if it would be in the ballpark of the same amount of data.

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854
[Quoted text hidden]

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> Mon, Aug 22, 2016 at 3:23 PM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>

HSD is fine with combining sheets 7 and 10 as long as it doesn't cause processing problems. I do believe 7 is shoaler than Chesapeake.

I ask that we continue to make mosaics using a 4 meter grid.

Thank you,
Starla

[Quoted text hidden]

--
Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: 301-713-2702 x125
Cell: 360-689-1431
Website: [In-House Planned Hydrographic Surveys -2016](#)

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Tue, Aug 23, 2016 at 3:56 PM
To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Cc: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>

Thanks Starla. We'll plan on combining 7-10 then when we get out there.

-Nick

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

CORMS Morning Report - Wednesday, August 24, 2016

1 message

CORMS Operations <corms@noaa.gov>

Wed, Aug 24, 2016 at 7:52 AM

To: Morning Report <nos.co-ops.cormsmorningreport@noaa.gov>

Cc: corms@noaa.gov

CORMS Morning Report**Wednesday, August 24, 2016****ALL WATER LEVEL STATION OUTAGES** (missing all data for more than 3 days)

None.

NWLON STATION ISSUES**8658120** Wilmington (all data) was stopped from 1155 to 1409 UTC 08/23, for maintenance.**8661070** Springmaid Pier (all data) was stopped at 1607 UTC 08/23, for maintenance. A1-DCP1 water level, wind & air press were restarted at 1745 UTC 08/23, after maintenance and review. Water & air temps remain stopped for suspect data.**Great Lakes Water Level 7-Day Summary**

Pass.

MAPPING/CHARTING STATION ISSUES**8418150** Portland (all DCP's) appears suspect at 1248 UTC 08/22. All data was stopped from 1714 to 1918 UTC 08/23, for maintenance.**8661070** Springmaid Pier L2 is above 60 V until 0630 UTC 08/23 and then returned to normal. L1 appears normal. All DCP's appear missing from 0606 to 1642 UTC 08/23 and suspect (spiking) at 1648 08/23.**8741533** Pascagoula NOAA Lab L2 is below 12.5 V until 1242 UTC 08/23 and after 2354 UTC 08/23. L1 appears normal.**9463502** Port Moller (all DCP's) has several periods of intermittent data.**9464212** Village Cove water levels (all DCP's) are suspect.**PARTNER STATION ISSUES****9414575** Coyote Creek Y1-DCP1 water level is suspect (spiking) from 2100 to 2200 UTC 08/23.**9752619** Isabel Segunda, Vieques Island (PRSN) L2 is missing. L1 appears normal.**9753216** Fajardo (PRSN) L2 is missing. L1 appears normal. All DCP's appear missing from 0854 to 1130 UTC 08/23.**9754228** Yabucoa Harbor (PRSN) L2 is missing. L1 appears normal.

9757112 Caja de Muertos (PRSN) L2 is missing. L1 appears normal.

9757809 Arecibo (PRSN) L2 is missing. L1 appears normal.

9759412 Aguadilla (PRSN) (all) did not update.

9761115 Barbuda water levels (except T1-DCP1) are suspect (not following predictions).

TCOON STATION ISSUES

8775237 Port Aransas (TCOON) (all sensors) was stopped at 1704 UTC 08/23, for maintenance.

STATIONS IN HIGH WATER CONDITION

None.

PORTS ISSUES

Chesapeake Bay

8573364 Tolchester Beach C1-DCP1 wind was switched to primary at 1448 UTC 08/23, after suspect data ended and review.

Lower Columbia River

9440569 Skamokawa N1-DCP1 water level was stopped from 1720 to 2303UTC 08/23, for maintenance.

Voice/Text

St. Charles Parish Project VOICE remains out of service.

For an updated list of current PORTS outages or maintenance, click on the CORMS Instrument Status Page link:
https://corms.nos.noaa.gov/instrument_status.html

TSUNAMI REPORTS

None.

OPERATIONAL FORECAST SYSTEMS

No problems.

IT OPERATIONS

The PORTS Stations Monitor page for cb0201 York Spit LBB 22 current meter is showing no data, and it appears to be stuck at 1747 UTC 05/09/16.

SIGNIFICANT COASTAL WEATHER EVENTS

Gale Warnings are posted along southwest Alaska. High Surf Advisories are in effect for American Samoa.

TROPICAL OUTLOOK

Atlantic, Caribbean Sea, and Gulf of Mexico

At 0900 UTC 08/24, Tropical Storm Gaston was located about 975 miles west of the Cabo Verde Islands and was moving west-northwest at 15 knots. Maximum sustained winds were 60 knots with gusts to 75 knots. There are no coastal watches or warnings in effect.

A broad area of low pressure located near the southernmost of the Leeward Islands has a medium (50%) chance of becoming a tropical cyclone during the next 48 hours.

Elsewhere, tropical cyclone formation is not expected during the next 48 hours.

Eastern Pacific

An area of low pressure located about 350 miles south-southwest of Manzanillo, Mexico has a high (80%) chance of becoming a tropical cyclone during the next 48 hours.

Elsewhere, tropical cyclone formation is not expected during the next 48 hours.

Central/Western Pacific

At 0900 UTC 08/24, Tropical Depression 14W was located about 500 miles north of Guam and was moving north at 21 knots. TD 14W is moving away from the Marianas. There are no coastal watches or warnings in effect.

Elsewhere, tropical cyclone formation is not expected during the next 48 hours.

OPERATIONS STAFF

Camel Banks / Molly Smith

Continuous Operational Real-time Monitoring Service

NOAA/NOS/CO-OPS/OD/PMAB/DMAT/CORMS

<http://tidesandcurrents.noaa.gov>

301-713-2540 (desk)

301-758-4080 (cell)

1-800-For-NOAA



OPS.Ferdinand Hassler - NOAA Service Account
 <ops.ferdinand.hassler@noaa.gov>

Final Tide Notes for project OPR-G309-FH-2016_ Revised3, Registry Nos. F00679, H12893, H12894, H12895, H12929, H12930, H12931, H12932, and H12934

12 messages

Cristina Urizar - NOAA Federal <cristina.urizar@noaa.gov> Tue, Dec 20, 2016 at 1:31 PM
 To: "CO.Ferdinand Hassler" <co.ferdinand.hassler@noaa.gov>, "OPS.Ferdinand Hassler" <ops.ferdinand.hassler@noaa.gov>
 Cc: "_NOS.CO-OPS.HPT" <nos.coops.hpt@noaa.gov>, Jerry Hovis <gerald.hovis@noaa.gov>, Corey Allen <corey.allen@noaa.gov>, Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>, Castle E Parker <Castle.E.Parker@noaa.gov>, AHB Chief - NOAA Service Account <ahb.chief@noaa.gov>

Dear FERDINAND HASSLER Operations Officer,

Attached is a zipped file containing the final tide files for project OPR-G309-FH-2016_ Revised3, Registry Nos. F00679, H12893, H12894, H12895, H12929, H12930, H12931, H12932, and H12934. Below is a description of those files. If you have any problems retrieving any of the information, please give me a call. The following files are included in the zipped attachment G309FH2016_Rev3_Zoning_and_Tide_Notes.zip for project OPR-G309-FH-2016, F00679, H12893, H12894, H12895, H12929, H12930, H12931, H12932, and H12934:

F00679Rev.pdf
 H12893Rev.pdf
 H12894Rev.pdf
 H12895Rev.pdf
 H12929.pdf
 H12930.pdf
 H12931.pdf
 H12932.pdf
 H12934.pdf
 G309FH2016_Rev3_CORP.zdf

Note that the four (4) revised final tide notes for project OPR-G309-FH-2016_ Revised3, Registry Nos. F00679, H12893, H12894 and H12895 are being issued to provide consistent final tidal zoning across the project. The final tide files included in this email apply to all tide notes also included in this email.

There are nine (9) final tide notes for OPR-G309-FH-2016_ Revised3 in this email. Tide station data for Wrightsville Beach, NC (8658163) may be retrieved via the Internet from the CO-OPS website service at <http://opendap.co-ops.nos.noaa.gov/axis/text.html>. The *.pdf file is the tide note in Adobe Acrobat format with the graphic.

The following files are the MapInfo zoning files:

G309FH2016_Rev3_CORP.DAT
 G309FH2016_Rev3_CORP.ID
 G309FH2016_Rev3_CORP.IND
 G309FH2016_Rev3_CORP.MAP
 G309FH2016_Rev3_CORP.TAB
 G309FH2016_Rev3_LABP.DAT
 G309FH2016_Rev3_LABP.ID
 G309FH2016_Rev3_LABP.MAP
 G309FH2016_Rev3_LABP.TAB
 G309FH2016_Rev3_STNP.DAT
 G309FH2016_Rev3_STNP.ID
 G309FH2016_Rev3_STNP.IND

G309FH2016_Rev3_STNP.MAP
G309FH2016_Rev3_STNP.TAB

Please e-mail me when you have captured all files successfully. Give me a call at [727-209-5954](tel:727-209-5954), if there are any problems.

--
Cristina Urizar
Oceanographer

National Oceanic and Atmospheric Administration
NOS/CO-OPS/Oceanographic Division
263 13th Avenue South, Rm. 302
St Petersburg, Florida 33701
Office: [727-209-5954](tel:727-209-5954)
Cell: [301-325-6793](tel:301-325-6793)

<http://tidesandcurrents.noaa.gov>

 **G309FH2016_Rev3_Zoning_and_Tide_Notes.zip**
6604K

OPS.Ferdinand Hassler - NOAA Service Account

Mon, Jan 9, 2017 at
1:14 PM

<ops.ferdinand.hassler@noaa.gov>

To: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>

Cc: Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER

<co.ferdinand.hassler@noaa.gov>

Hi Starla,

CO-OPS has provided a revised zoning file for all of the surveys that were done pre-hurricane Matthew (H12893, 94, 95, and F00679). I was planning on doing a final shipboard review with the CO and Jeff Marshall when he comes out here over the next couple of weeks. Do we need to re-apply final tides using the new Wrightsville Beach, NC tide station that we switched to Post-Hurricane Matthew? Or should we keep it using the Springmaid Pier, SC station? I guess the question is, do we want to submit all surveys using a single tide station or Springmaid for pre-Hurricane Matthew and Wrightsville for post-Hurricane Matthew?

Personally I don't really want to have to go in and re-apply tides to three surveys that we are close to sending off. But if we think this saves headaches down the line we can.

V/r
Nick

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Mon, Jan 9, 2017 at 3:00 PM

To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, Corey Allen -

NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>

Cc: Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER

<co.ferdinand.hassler@noaa.gov>

[I will look into it. I am CCing Corey and LT Quintero on this email.](#)

[Quoted text hidden]

--

Starla D. Robinson, Physical Scientist
NOS - OCS - Hydrographic Survey Division - Operations Branch
National Oceanic Atmospheric Administration
Office: 301-713-2702 x125
Cell: 360-689-1431
Website: [HSD Planned Hydrographic Surveys](#)

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Mon, Jan 9, 2017 at 3:31 PM

To: cristina.urizar@noaa.gov

Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

Hello Cristina,

I am the HSD project manager for OPR-G309-FH-2016. The first four surveys for the project were completed well before the hurricane. They are processed and nearly complete. Would it be possible to use the original Springmaid Pier, SC final water levels and zones for those four surveys? We would like a final tide note referencing Springmaid Pier, unless there is a compelling reason not to.

Thank you,
Starla

Note that the four (4) revised final tide notes for project OPR-G309-FH-2016_Revised3, Registry Nos. F00679, H12893, H12894 and H12895 are being issued to provide consistent final tidal zoning across the project. The final tide files included in this email apply to all tide notes also included in this email.

[Quoted text hidden]

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Starla D. Robinson, Physical Scientist
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Cell: 360-689-1431
Website: [HSD Planned Hydrographic Surveys](#)

Cristina Urizar - NOAA Federal <cristina.urizar@noaa.gov>

Tue, Jan 10, 2017 at 9:05 AM

To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Cc: Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, "_NOS.CO-OPS.HPT" <nos.coops.hpt@noaa.gov>, Jerry Hovis <gerald.hovis@noaa.gov>

Good morning,

It was nice chatting with you yesterday afternoon, Starla. Below is a summary of our conversation.

Before I began working on the tide notes, Colleen reached out to Corey to discuss the various products HPT provided OCS (preliminary zoning and revised preliminary zoning) and how the files were labeled. In that conversation, Corey and Colleen agreed that the best way forward was for CO-OPS to deliver zoning based on Wrightsville Beach, NC that would be used to process all the data collected for G309 regardless of when it was collected (pre- or post-hurricane Matthew). This was to be done for three reasons:

1. The estimated error of the zoning based on Wrightsville Beach is less than the estimated error of the zoning based on Springmaid Pier.
2. To provide consistency across the project as a whole in the processing phase. Switching between control stations may introduce error.
3. To reduce any confusion regarding which files to use in the final processing of the data.

The tidal zoning provided in the previously delivered tide notes using Springmaid Pier as control (with Reg Nos. F00679, H12893, H12894 and H12895) was within OCS error tolerances.

Thank you,
Cristina

[Quoted text hidden]

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> Thu, Jan 12, 2017 at 8:52 AM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>

Hello Nick,

Could you send us an estimate on how much time it would take to apply the Wrightsville Beach, NC tide station data to the three pre-hurricane surveys and the difference in uncertainty it will gain us?

Thank you,
Starla

[Quoted text hidden]

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Starla D. Robinson, Physical Scientist
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National Oceanic Atmospheric Administration
Office: 301-713-2702 x125
Cell: 360-689-1431
Website: [HSD Planned Hydrographic Surveys](#)

OPS.Ferdinand Hassler - NOAA Service Account Thu, Jan 12, 2017 at 9:28 AM
<ops.ferdinand.hassler@noaa.gov>
To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>
Cc: Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>

Starla,

We are reviewing all 3 of Jeff's surveys with the CO tomorrow. Do we want to go down this hole? This would be a big hold-up and we are trying to review these while Jeff is here and he's likely leaving this weekend. It appears that our ship won't be getting U/W for this habitat mapping leg (likely it seems right now at least). This is affording us a really good opportunity to get these surveys off the ship. It's hard to say how long it would take but applying the tides, merging, TPU....etc, recomputed surfaces and then making changes to the DRs. Maybe call it a week? Then we'd be kicking the review down the road. What would we really gain?

-Nick

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]

Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>

Thu, Jan 12, 2017 at 10:00
AM

To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Nick,

There's a lot going on over here, so I'm trying to sort out the exact state of things and haven't gotten far yet. My intention is to try and change things as little as possible once we start down a path; minimize changes to the PI and similarly minimize changes to the requests we send to CO-OPS. Stability breeds efficiency. It seems from a very brief chat with Starla that the agreement with CO-OPS may not have been communicated to her or to you, but using the older gauge causes non-trivial costs on other offices.

If you proceed with preliminary tides, CO-OPS will need to generate a new set of final tides and we all know how long that takes. AHB will need to apply them and do all of the processing that you would do if you just applied the final already given to you, and then AHB would need to check for any problems. This also gets a little odd as any data QC issues in the surfaces they created now may not have been there when you delivered it...they are now QCing their own product instead of yours.

As for the timeline, I think a week is grossly inflated if getting this off is a priority. How many places in the DR does this exist? By memory I can think of one; updating this is a 15 minute job total for all 3 surveys. It's not much different than fixing a typo or some verbiage the CO doesn't like that's identified during the review. In fact, there is no real reason to fix it before the review; just note that it will be changed.

Apply Tides, Merge, and TPU surely take less than 3 hours total. Caris doesn't multithread efficiently unless something has changed a lot in Caris 10 and the network is the primary bottleneck on most ships, so you can run all 3 surveys on one machine or just use more than one computer, set them all to go, and come back at the end of the workday. I'm certain they would be done.

Save a copy of the current surfaces, difference the new one to highlight any major changes. That's a 20 minute process max, plus 30 for scanning the surfaces for changes.

You can also proceed with the survey review simply knowing that this process is pending, and with the expectation that any big changes get brought to the FOO/CO's attention. 99.5% of the content in the DR and the FFF will be unchanged, and the bathy should improve if anything.

If we failed to communicate the change in tide station to you, I can certainly appreciate your frustration and I apologize. However, the right answer here isn't kicking the can down the pipeline for someone else to fix, and the most efficient fix is to fix it now, on the ship.

V/r,
Russ

Lieutenant Russell Quintero, NOAA
Chief, Hydrographic Surveys Division Operations Branch
National Oceanic & Atmospheric Administration
1315 East-West Hwy, SSMC3 6217
Silver Spring, MD 20910
Cell: 970-481-2030

[Quoted text hidden]

OPS.Ferdinand Hassler - NOAA Service Account

<ops.ferdinand.hassler@noaa.gov>

To: Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>

Thu, Jan 12, 2017 at
10:13 AM

Cc: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Hi Russ,

Just FYI we had received final tides for Springmaid Pier (the original gauge) long ago. So these three surveys already have final tides applied but from Springmaid Pier.

-V/r
Nick

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]

Russell Quintero - NOAA Federal <russell.quintero@noaa.gov> Thu, Jan 12, 2017 at 10:20 AM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Yeah, I'm on the phone with CO-OPS right now and they just told me that.

I'll get back to you shortly.

Lieutenant Russell Quintero, NOAA
Chief, Hydrographic Surveys Division Operations Branch
National Oceanic & Atmospheric Administration
1315 East-West Hwy, SSMC3 6217
Silver Spring, MD 20910
Cell: 970-481-2030

[Quoted text hidden]

Russell Quintero - NOAA Federal <russell.quintero@noaa.gov> Thu, Jan 12, 2017 at 10:28 AM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Just got off the phone with CO-OPS. I was incorrectly under the assumption that you had only preliminary from the original gauge that was taken out during the hurricane.

These four have final tides for both stations. The uncertainty is slightly lower using Wrightsville, but Springmaid is in spec and can be used if it's more convenient.

F00679
H12893
H12894
H12895

These have survey before and after the hurricane and must use the Wrightsville gauge.

H12929
H12930
H12931

H12932
H12934

Hopefully that helps you get these off the ship.

R/
Russ

Lieutenant Russell Quintero, NOAA
Chief, Hydrographic Surveys Division Operations Branch
National Oceanic & Atmospheric Administration
1315 East-West Hwy, SSMC3 6217
Silver Spring, MD 20910
Cell: 970-481-2030

[Quoted text hidden]

OPS.Ferdinand Hassler - NOAA Service Account

Thu, Jan 12, 2017 at
10:38 AM

<ops.ferdinand.hassler@noaa.gov>

To: Russell Quintero - NOAA Federal <russell.quintero@noaa.gov>

Cc: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>

Great, thanks Russ. It will definitely help. I know a week was probably exaggerating but the way things go on this ship any derailment when making good progress can turn into a lot of time letting a survey sit because nobody is here to work on it. So I was exaggerating because we don't have a designated person to work on it once Jeff leaves.

-Nick

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Fwd: Wilmington Bottom Sample Guidance

7 messages

Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>

Sat, Oct 1, 2016 at 10:55 AM

To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>

----- Forwarded message -----

From: **Starla Robinson - NOAA Federal** <starla.robinson@noaa.gov>

Date: Sat, Oct 1, 2016 at 10:39 AM

Subject: Wilmington Bottom Sample Guidance

To: Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>, Michael White - NOAA Affiliate <michael.white@noaa.gov>, Juliet Kinney - NOAA Affiliate <juliet.kinney@noaa.gov>

Cc: Ashley Chappell - NOAA Federal <ashley.chappell@noaa.gov>

OPS,

Here is the guidance for the next set of the Wilmington bottom samples, and some other useful documents. Please let me know what you think, and add to this. The main changes are recording the position of the camera, and guidance on what to send to Chris and I. This is a starting place, incorporating what feedback I received from the first round.

We are going to get drop cameras for the fleet. I am was thinking we could send these documents and any resulting SOP with the drop cameras.

In addition to this guidance we would like to hear your feedback on the operation of the drop camera. Please send that review to me and Juliet and I.

It was also recommended we incorporating Coastal and Marine Ecological Classification Standard (CMECS) into our classification methodology. We are still looking into that, but if you are interested more information is at: <https://www.cmeccatalog.org/>.

Thank you,
Starla

--

Starla D. Robinson, Physical Scientist

NOS - OCS - Hydrographic Survey Division - Operations Branch

National Oceanic Atmospheric Administration

Office: 301-713-2702 x125

Cell: 360-689-1431

Website: [In-House Planned Hydrographic Surveys -2016](#)

--

LT Nick Morgan, NOAA

Operations Officer

NOAA Ship Ferndiand R. Hassler

Physical Address (UPS/FedEx):

UNH Judd Gregg Marine Research Complex

29 Wentworth Rd.

New Castle, NH 03854

Mailing Address:

PO Box 638

New Castle, NH 03854

Ship's landline: 603-431-4500

Ship's cell: 603-812-8748

Cell Phone: 907-617-0963

 **Bottom_Sample_Guidance.zip**
10828K

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> Wed, Nov 9, 2016 at 5:11 PM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, John Doroba - NOAA Federal <john.doroba@noaa.gov>, Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>, Michael White - NOAA Affiliate <michael.white@noaa.gov>, Juliet Kinney - NOAA Affiliate <juliet.kinney@noaa.gov>, Cody Guilday - NOAA Affiliate <cody.guilday@noaa.gov>
Cc: Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>

Hello FH Folk,

As you make your triumphant return, I want to remind you that we would like the additional bottom characteristic products listed in the attached guidance package.

Please make the mosaics at the same resolution the bathymetry, and record the processing times in the [backscatter metrics](#) log.

Please copy this email and documents into your correspondence folder.

Thank you,
Starla

----- Forwarded message -----

From: **Starla Robinson - NOAA Federal** <starla.robinson@noaa.gov>

Date: Sat, Oct 1, 2016 at 10:39 AM

Subject: Wilmington Bottom Sample Guidance

To: Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>, Michael White - NOAA Affiliate <michael.white@noaa.gov>, Juliet Kinney - NOAA Affiliate <juliet.kinney@noaa.gov>

Cc: Ashley Chappell - NOAA Federal <ashley.chappell@noaa.gov>

OPS,

Here is the guidance for the next set of the Wilmington bottom samples, and some other useful documents. Please let me know what you think, and add to this. The main changes are recording the position of the camera, and guidance on what to send to Chris and I. This is a starting place, incorporating what feedback I received from the first round.

We are going to get drop cameras for the fleet. I am was thinking we could send these documents and any resulting SOP with the drop cameras.

In addition to this guidance we would like to hear your feedback on the operation of the drop camera. Please send that review to me and Juliet and I.

..

Thank you,
Starla

--

Starla D. Robinson, Physical Scientist

NOS - OCS - Hydrographic Survey Division - Operations Branch

National Oceanic Atmospheric Administration

Office: 301-713-2702 x125

Cell: 360-689-1431

Website: [HSD Planned Hydrographic Surveys](#)

 **Bottom_Sample_Guidance.zip**
10828K

Michael White - NOAA Affiliate <michael.white@noaa.gov>

Thu, Nov 10, 2016 at 9:19 AM

To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Cc: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, John Doroba - NOAA Federal <john.doroba@noaa.gov>, Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>, Juliet Kinney - NOAA Affiliate <juliet.kinney@noaa.gov>, Cody Guilday - NOAA Affiliate <cody.guilday@noaa.gov>, Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>

Hi All,

The mosaics were currently being gridded at 4 meter cells. Likely the data will support finer resolutions, but it is not what the SOP instructs. The SOP states, "The final exported Mosaic (.tiff) will be approximately 5% of the Mosaic Memory used in FMGT by a single tile...If the export exceeds 20MB, use a coarser resolution." For the attached spreadsheet I would suggest having two more columns labeled "Mosaic Memory" and "Pixel Size."

Additionally:

1) The default range of the FMGT histogram is 10 to -70. Typically mosaics will only populate part of this range. If the processor resets the bounds of the histogram to match the spread of the created mosaic and *then* exports the TIFF, the resulting mosaic will have better contrast and look less "grayed out."

I placed two examples in: R:\Temporary_Fledermaus_Projects\H1229_S250Port_400kHz.fmproj\Output\SD

2) In FMGT under the Settings tab -> Processing Parameters there is a window to set the acquisition system. By selecting, "Reson 2175" the default setting will fill in for all of the fields. These can be adjusted to match the true values for each head, but having the defaults set will likely result in better mosaics. This is not in the SOP.

For the operation of the bottom camera and sediment samples:

Along with the images from the bottom sampler, Cody and I were taking images on deck of the samples and storing them in the Multimedia folder. These may be useful for additional characterization/verification of the sediment characterization. We might want to consider keeping them with the bottom sample images. I would say the bottom sample images are better at showing the in situ bottom type (ripples, bio cover, large clasts) compared to capturing fine scale sediment size. Chris Taylor may have more to say from a habitat perspective. I will attach examples.

Currently the plan is attaching one image to each sample. Do we have guidelines to choose the image? I.e. what makes one image better than the others. Attached are the images from Samples 4, 5 and 6

 **Examples.zip**

for H12930. Some show the bottom type, some a close up of the sediment and the hand sample. If we attach one image, which image?

The grab sampler also seems to take more reliable samples when the camera is attached. When the camera was not operational, we had several stations without samples but always got a sample with the device attached. Even if the camera is not working, may be worth have the device attached to the grabber.

Hope this input helps,

Mike White

[Quoted text hidden]

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Michael P. White
Hydrographic Analyst (E.R.T., Inc.)
NOAA/CCOM Joint Hydrographic Center
UNH, Durham

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Thu, Nov 10, 2016 at 5:35 PM

To: Michael White - NOAA Affiliate <michael.white@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, John Doroba - NOAA Federal <john.doroba@noaa.gov>, Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>, Juliet Kinney - NOAA Affiliate <juliet.kinney@noaa.gov>, Cody Guilday - NOAA Affiliate <cody.guilday@noaa.gov>, Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>

Cc: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>

Good point Mike,

Looking back through my files I think we did 4 meter resolution backscatter as well. So please do not do any additional 2 meter mosaic creation until I can check in with Chris.

For the final product I have been asking for a non-stretched mosaic, because that is the easiest way to keep the range consistent between sheets. If we were to expand this requirements to other projects we would want to keep it standardized between platform/sonar units. I was stretching the grayscale contrast to do the bottom sample selection. If you were the customer, what would you find useful? Or would you rebuild mosaics from the raw data?

For the Final Features file you can connect multiple images. My suggestion is choose one that shows the substrate well, and one that shows the surrounding habitat, if it adds useful data. No more than 4 images, less is better. From a habitat point of view what do you think would be useful? This is not a rhetorical question, we could use the input.

The Wilmington project is a collaboration between HSD / NCCOS / and UNH-JHC-CCOM. We have been asking for additional products and ideas along the way so we could meet each group's needs; and explore different ways of doing things. Your input is essential. Any ideas or advice you can give, now is the time, so we can add it to our recommendations.

Thank you for making this project a reality!

- Starla

[Quoted text hidden]

Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>

Fri, Nov 18, 2016 at 8:00 AM

To: Starla Robinson - NOAA Federal <starla.robinson@noaa.gov>

Cc: Michael White - NOAA Affiliate <michael.white@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, John Doroba - NOAA Federal <john.doroba@noaa.gov>, Juliet Kinney - NOAA Affiliate <juliet.kinney@noaa.gov>, Cody Guilday - NOAA Affiliate <cody.guilday@noaa.gov>, Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>, "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>

All,

Thanks for the update on this project and sorry for the delays in responding. I concur with all that Starla and Mike have presented regarding resolution for mosaics. We (NCCOS) appreciate the extra effort gathering and managing bottom sample/imagery. We look forward to reviewing the imagery and producing some preliminary seafloor characterization surfaces.

We look forward to collaborating with HSD and others on future projects where we are able to improve seafloor habitat mapping in concert with core mission objectives for OCS.

Regards,
Chris

[Quoted text hidden]

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J. Christopher Taylor, PhD
National Centers for Coastal Ocean Science
@ NOAA's Beaufort Laboratory
101 Pivers Island Road, Beaufort, North Carolina 28516
O: +1 252 838 0833 M: +1 252 723 3993
Website: <http://coastalscience.noaa.gov/>

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> Fri, Nov 18, 2016 at 6:29 PM
To: Chris Taylor - NOAA Federal <chris.taylor@noaa.gov>, "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, Adam Reed - NOAA Federal <adam.reed@noaa.gov>, "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>, Michael White - NOAA Affiliate <michael.white@noaa.gov>, Cody Guilday - NOAA Affiliate <cody.guilday@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

OPS,

Four meter backscatter mosaics, or whatever you used, are fine. How do we best get the data from you?

Thank you,
Starla

[Quoted text hidden]

Starla Robinson - NOAA Federal <starla.robinson@noaa.gov> Wed, Dec 21, 2016 at 3:19 PM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Matthew Jaskoski - NOAA Federal <Matthew.Jaskoski@noaa.gov>, Nicholas Morgan - NOAA Federal <nicholas.morgan@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>, "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Briana Welton - NOAA Federal <briana.welton@noaa.gov>, "russell.quintero" <russell.quintero@noaa.gov>

Hello Hassler,

Congratulations on pulling off another amazing and challenging year. What you have accomplished as a ship -especially a ship with no stable survey department- is impressive. I am singing your successes among the halls. I am currently writing up a project summary and I cannot wait to share it. That said...

I am looking through the preliminary bottom sample data, and I saw some things that need to be corrected before the finals are submitted. For example the S57 files have no reference to the sample site and there are no associated images, and the images in the folder do not follow naming convention. The bottom sample logs are not the version requested, they do not include the measurements from the camera face to the sampler, and they are incomplete. Given that the data was preliminary, a rushed request, and you may have corrected it already.

Again, attached is the official bottom sample guidance. Please ensure the sheet managers have this. This data will be testing our bottom image workflow from acquisition to NCEI and other data discovery platforms. It is important that the S57 files have correct attribution.

Thank you again,
Starla

[Quoted text hidden]

 **Bottom_Sample_Guidance.zip**
10828K



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

NOAA Ship Hassler SV Correct

4 messages

Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov> Wed, Feb 15, 2017 at 10:11 AM
To: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, CO HASSLER <CO.Ferdinand.Hassler@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Jaskoski,

I have reviewed the technical details associated with the situation surrounding the Hassler surveys that are currently in question. As currently understood, there are approximately 16 surveys between AHB and Hassler. The issue, as I understand it in general terms, is that the data in question was not SVP corrected after SBET computation and application to the data. Based on my technical review I would like the current remediation:

1. Pick one survey to serve as a representative example of this set. Save the current BASE surface with the SVP applied *before* SBET application as `_OLD`. Then, re-apply SVP and recompute a *new* grid. Do a difference surface and compute the min, max, average, and standard deviation for this difference surface.

Based on my review the SBET process does no change the roll, pitch, or yaw nor the location of the transducer in the water column - or at least not in a meaningful way. This representative data set should confirm that.

2. Please report the finding of this analysis. Assuming it is exceedingly small, I think the next steps are:

- Create a revised DAPR that can be used for all surveys that describes the problem and the analysis. I expect that you will work with AHB to arrange this documentation is properly included with all surveys.
- I will provide a waiver in light of this analysis that authorizes the data to proceed using the current process.
- Include both the waiver and this email in the separates for all theses surveys to document the action taken.
- Ensure Hassler SOPs are updated to ensure this process is corrected.

3. If the analysis shows anything more than a 5cm difference, please advise me. We will discuss how to proceed from there.

It is my expectation that we will manage similar problems encountered with other field units or our contractors in a similar and consistent fashion. If there are any questions, concerns, or details I have not addressed I expect you or LCDR Welton will contact me with that information.

Rick
CAPT Rick Brennan, NOAA
Chief, Hydrographic Surveys Division
1315 East-West Highway, SSMC3 Room 6823
Silver Spring, MD 20910
Work: [301-713-2700](tel:301-713-2700)
Cell: [443-994-3301](tel:443-994-3301)

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 10:36 AM
To: James J Miller <james.j.miller@noaa.gov>, Patrick Debrousse - NOAA Federal <patrick.j.debrousse@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

NOAA Ship Hassler SV Correct

9 messages

Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov> Wed, Feb 15, 2017 at 10:11 AM
To: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, CO HASSLER <CO.Ferdinand.Hassler@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Jaskoski,

I have reviewed the technical details associated with the situation surrounding the Hassler surveys that are currently in question. As currently understood, there are approximately 16 surveys between AHB and Hassler. The issue, as I understand it in general terms, is that the data in question was not SVP corrected after SBET computation and application to the data. Based on my technical review I would like the current remediation:

1. Pick one survey to serve as a representative example of this set. Save the current BASE surface with the SVP applied *before* SBET application as `_OLD`. Then, re-apply SVP and recompute a *new* grid. Do a difference surface and compute the min, max, average, and standard deviation for this difference surface.

Based on my review the SBET process does no change the roll, pitch, or yaw nor the location of the transducer in the water column - or at least not in a meaningful way. This representative data set should confirm that.

2. Please report the finding of this analysis. Assuming it is exceedingly small, I think the next steps are:

- Create a revised DAPR that can be used for all surveys that describes the problem and the analysis. I expect that you will work with AHB to arrange this documentation is properly included with all surveys.
- I will provide a waiver in light of this analysis that authorizes the data to proceed using the current process.
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It is my expectation that we will manage similar problems encountered with other field units or our contractors in a similar and consistent fashion. If there are any questions, concerns, or details I have not addressed I expect you or LCDR Welton will contact me with that information.

Rick
CAPT Rick Brennan, NOAA
Chief, Hydrographic Surveys Division
1315 East-West Highway, SSMC3 Room 6823
Silver Spring, MD 20910
Work: [301-713-2700](tel:301-713-2700)
Cell: [443-994-3301](tel:443-994-3301)

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 10:36 AM
To: James J Miller <james.j.miller@noaa.gov>, Patrick Debrousse - NOAA Federal <patrick.j.debrousse@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

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CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 10:53 AM
To: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>
Cc: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

CAPT,
Will do.

v/r
Matt

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

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OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 3:26 PM
To: Jeffery Marshall - NOAA Federal <jeffery.marshall@noaa.gov>

FYI

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

----- Forwarded message -----

From: **Richard Brennan - NOAA Federal** <richard.t.brennan@noaa.gov>
Date: Wed, Feb 15, 2017 at 10:11 AM
Subject: NOAA Ship Hassler SV Correct
To: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, CO HASSLER <CO.Ferdinand.Hassler@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

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CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov> Tue, Feb 21, 2017 at 12:55 PM
To: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>
Cc: Briana Welton <Briana.Welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

CAPT,
attached is our report of analysis of the two grids. The algorithm chose a couple different hypotheses around features and a slope area, but it appears that both grids are nearly identical. No change to VALSOU's etc.

v/r
Matt

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935

Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

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H12932 Re-SVC Process Analysis.pptx
1988K

Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Wed, Mar 1, 2017 at 8:28 AM

To: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>

Cc: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Jaskoski and CAPT Brennan,

Based on the ship's analysis, I agree that reprocessing is unnecessary. I suggest that the ship accurately document how the data have been processed either in a revised DAPR or in the DR for each survey as deviation from the DAPR for all surveys still in the ship's control; and that AHB document how the data have been processed for the surveys that are in our control.

V/r,

Bri

[Quoted text hidden]

<H12932 Re-SVC Process Analysis.pptx>

Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>

Thu, Mar 2, 2017 at 10:30 AM

To: Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Cc: "CO.Ferdinand Hassler - NOAA Service Account" <co.ferdinand.hassler@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

LCDR Welton,

I concur with your recommendations. Please proceed with this plan as you described.

LCDR Jaskoski,

Please work with AHB with regard to the best path regarding DAPR revision or documentation of this process in the DR.

Rick

CAPT Rick Brennan, NOAA

Chief, Hydrographic Surveys Division
1315 East-West Highway, SSMC3 Room 6823
Silver Spring, MD 20910
Work: 301-713-2700
Cell: 443-994-3301

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CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov>

Thu, Mar 2, 2017 at 10:39 AM

To: Richard Brennan - NOAA Federal <richard.t.brennan@noaa.gov>

3/2/2017

National Oceanic and Atmospheric Administration Mail - NOAA Ship Hassler SV Correct

Cc: Briana Welton - NOAA Federal <briana.welton@noaa.gov>, Benjamin K Evans <benjamin.k.evans@noaa.gov>, "OPS. Ferdinand Hassler" <OPS.Ferdinand.Hassler@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Samuel Greenaway - NOAA Service Account <Samuel.Greenaway@noaa.gov>, Lorraine Robidoux - NOAA Federal <lorraine.robidoux@noaa.gov>

Will do.

v/r
Matt

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

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CO.Ferdinand Hassler - NOAA Service Account <co.ferdinand.hassler@noaa.gov>

Thu, Mar 2, 2017 at 10:42 AM

To: Briana Welton - NOAA Federal <briana.welton@noaa.gov>

Cc: "OPS.Ferdinand Hassler" <ops.ferdinand.hassler@noaa.gov>

Hey Bri,
we've got these ready to go - might be able to submit them before we depart on Saturday, if not they'll be ready to go at our next inport (3/15-18)

Jasko

Lieutenant Commander Matthew Jaskoski, NOAA
Commanding Officer, NOAA Ship *Ferdinand R. Hassler* (S-250)
CO cell: (240) 687-4602
Ship's VIOP: (541) 867-8935
Sat Phone: (808) 851-3826
Personal cell: (757) 647-3356

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OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

OPR-G309-FH-16 ERS Capability Memo

1 message

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Wed, Feb 15, 2017 at 9:05 AM

To: _NOS OCS HSD ERS Deliverables <ers.deliverables@noaa.gov>

Cc: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, CO HASSLER <co.ferdinand.hassler@noaa.gov>, James J Miller <james.j.miller@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Please find the attached ERS Capability Memo for project OPR-G309-FH-16 Approaches to Wilmington.

V/r
LT Morgan

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

 **OPR-G309-FH-16_ERS_Capability_Memo.pdf**
1111K



OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov>

Hydro Hot List request, OPR-G309-FH-16

6 messages

OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Sat, Jul 9, 2016 at 6:01 AM
To: "_NOS CO-OPS OET Team" <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>
Cc: Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Good morning,

NOAA Ship *Ferdinand Hassler* is scheduled to begin survey operations on OPR-G309-FH-16 on July 12th, 2016. Please add the following station to the Hydro Hot List for OPR-G309-FH-16:

8661070 - Springmaid Pier, SC

V/r
Nick Morgan

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

Hua Yang - NOAA Affiliate <hua.yang@noaa.gov> Mon, Jul 11, 2016 at 7:54 AM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: "_NOS CO-OPS OET Team" <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Good morning Nick,

The station was just added to the [Hydro Hot List](#). Thank you for your timely notice.

Have a good survey,

Hua Yang

Hydrographic Planning Team
NOAA/National Ocean Service
Center for Operational Oceanographic Products and Services
Station 7128
1305 East West Highway, SSMC4
Silver Spring, MD 20910
Office: 240-533-0612
Email: Hua.Yang@noaa.gov
Web: <http://tidesandcurrents.noaa.gov/>

Hydro Hot List: <http://tidesandcurrents.noaa.gov/hydro.shtml>

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OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Mon, Jul 11, 2016 at 9:59 AM
To: Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>
Cc: "_NOS CO-OPS OET Team" <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Thank you very much!

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

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OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Tue, Aug 23, 2016 at 1:01 PM
To: Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>
Cc: _NOS CO-OPS OET Team <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Good morning,

I've noticed some voltage issues showing up on the Springmaid Pier tide station. I just wanted to check in to make sure that the station is operating correctly.

Thank you,
-Nick

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

[Quoted text hidden]

Colleen Fanelli - NOAA Federal <colleen.fanelli@noaa.gov> Tue, Aug 23, 2016 at 1:46 PM
To: "OPS.Ferdinand Hassler - NOAA Service Account" <ops.ferdinand.hassler@noaa.gov>
Cc: Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>, _NOS CO-OPS OET Team <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Nick,

Our field office visited the station today and replaced a blown fuse and a battery. The power system is back to working as expected. Thank you.

~Colleen

--

Colleen Fanelli
Oceanographer, Hydrographic Planning Team Lead
NOAA/National Ocean Service
Center for Operational Oceanographic Products and Services
Station 7127
1305 East-West Highway N/OPS3
Silver Spring, MD 20910
Colleen.Fanelli@noaa.gov
Phone (NEW): (240) 533 - 0615

Compare the meteorologist with his or her oceanographer colleague: the oceanographer may spend many years planning a campaign of observations of currents, temperature and salinity in a tiny area of the ocean, many weeks of discomfort on a ship taking the observations and several years analysing them back at the laboratory. All of this work is done for the research meteorologist, several times a day on a global basis, who merely has to read the numbers from an archive and construct whatever diagnostic quantity is required.

—Jan N. James, Introduction to Circulating Atmospheres

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OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> Tue, Aug 23, 2016 at 1:57 PM
To: Colleen Fanelli - NOAA Federal <colleen.fanelli@noaa.gov>

Cc: Hua Yang - NOAA Affiliate <hua.yang@noaa.gov>, _NOS CO-OPS OET Team <nos.coops.oetteam@noaa.gov>, "_NOS.CO-OPS.HPT" <NOS.COOPS.HPT@noaa.gov>, Starla Robinson - NOAA Federal <Starla.Robinson@noaa.gov>, Jonathan French - NOAA Federal <jonathan.r.french@noaa.gov>

Great, thanks!

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

On Tue, Aug 23, 2016 at 1:57 PM, OPS.Ferdinand Hassler - NOAA Service Account <ops.ferdinand.hassler@noaa.gov> wrote:

Field Operations Officer, NOAA Ship *Ferdinand R. Hassler*
29 Wentworth Road
New Castle, NH, 03854

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APPROVAL PAGE

H12931

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- H12931_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12931_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: _____

Commander Briana W. Hillstrom, NOAA
Chief, Atlantic Hydrographic Branch