

W00713

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

DESCRIPTIVE REPORT

Type of Survey: Basic Hydrographic Survey

Registry Number: W00713

LOCALITY

State(s): South Carolina

General Locality: Offshore of Charleston, South Carolina

Sub-locality: 55 NM SE of Charleston

2023

CHIEF OF PARTY
Julia Wallace

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

W00713

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): **South Carolina**

General Locality: **Offshore of Charleston, South Carolina**

Sub-Locality: **55 NM SE of Charleston**

Scale: **40000**

Dates of Survey: **06/06/2023 to 07/09/2023**

Instructions Dated: **05/08/2023**

Project Number: **OPR-G301-NF-23**

Field Unit: **NOAA Ship *Nancy Foster***

Chief of Party: **Julia Wallace**

Soundings by: **Kongsberg Maritime EM 2040 (MBES)**

Imagery by: **Kongsberg Maritime EM 2040 (MBES Backscatter)**

Verification by: **Atlantic Hydrographic Branch**

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

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <https://www.ncei.noaa.gov/>. Products created during office processing were generated in NAD83 UTM 18N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

DESCRIPTIVE REPORT SUMMARY

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instructions OPR-G301-NF-23. Survey W00713 is 55 NM SE of Charleston and covers approximately 435 square nautical miles. The southwestern section of W00713 was not mapped to assigned survey extents because of existing Nancy Foster data in that area.

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
32° 22' 32.05" N 79° 2' 23.03" W	31° 44' 33.77" N 78° 34' 29.6" W

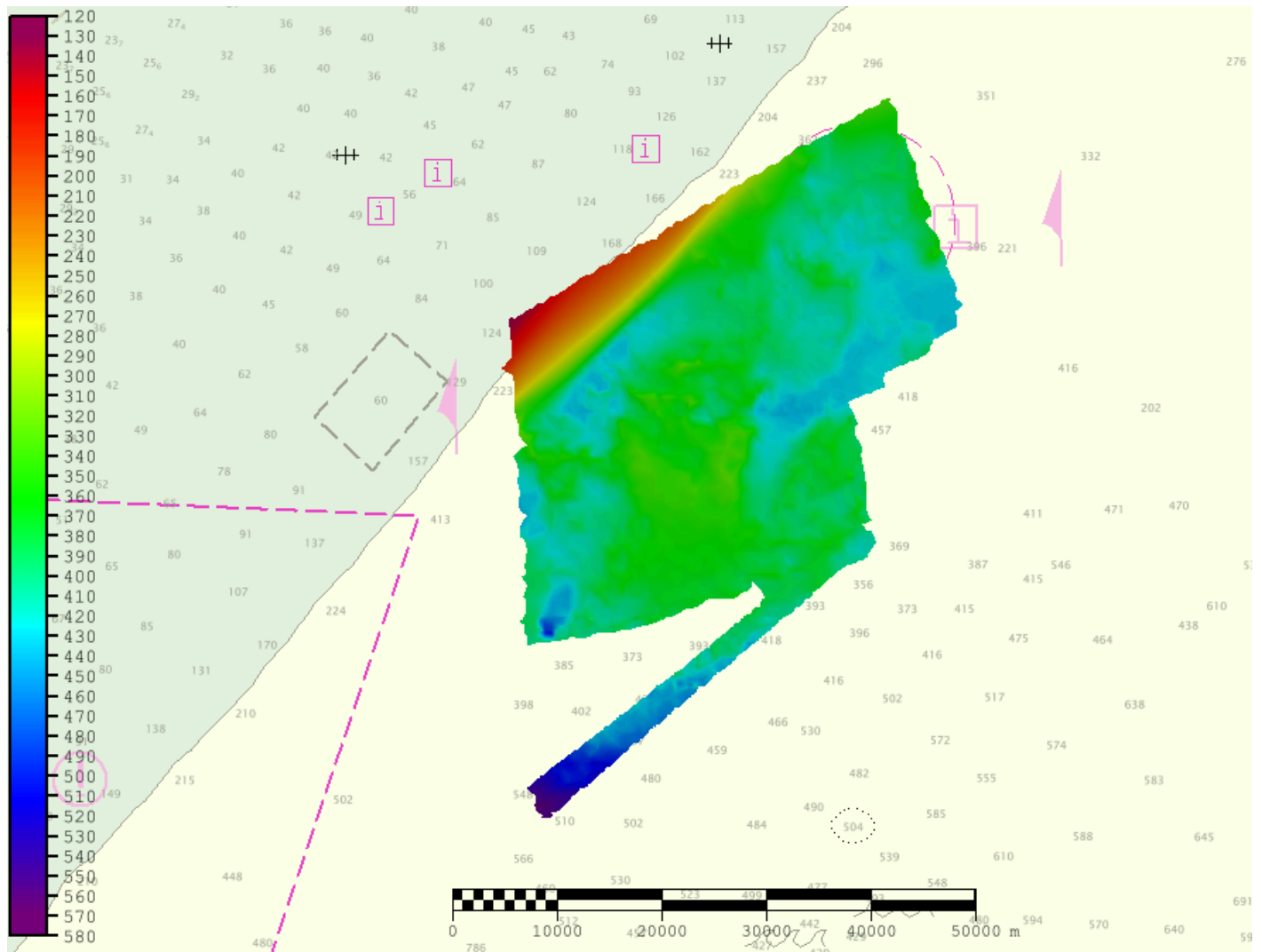


Figure 1: Survey coverage achieved for W00713 (ENC US3GA10M).

B. Survey Purpose

This project was being conducted by NOAA's Office of Coast Survey (OCS) in collaboration with academic partners to map several large priority areas offshore of South Carolina on the Blake Plateau. The objective of this survey is to collect multibeam bathymetry, acoustic backscatter, and water column data which will be used to update NOAA's nautical charting products. This survey also addresses NOAA's requirements to provide continuous multibeam coverage within the US EEZ. Survey data from this project is intended to supersede all prior survey data for this area.

C. Intended Use of Survey

The entire survey is adequate to supersede previous data.

Data acquired in W00713 meet HSSD 2023 for multibeam echo sounder (MBES) coverage requirements for complete coverage, as specified by the 2023 HSSD.

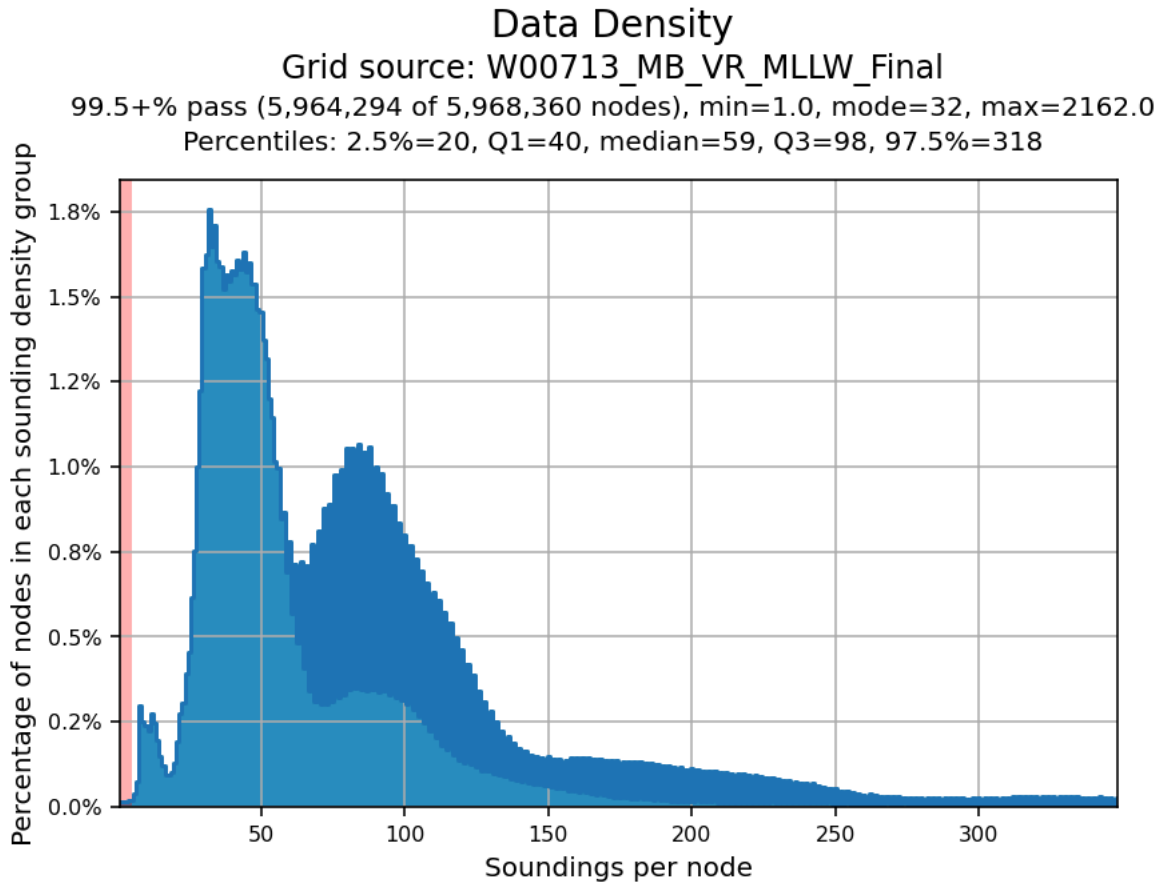


Figure 2: Pydro-derived plot showing HSSD density compliance of W00713 finalized complete coverage variable-resolution MBES data.

D. Data Acquisition and Processing

Please reference Data Acquisition and Processing Report OPR-G301-NF-23_DAPR for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods.

Raw backscatter data were acquired as .KMALL files logged during MBES operations. The raw files were paired with the processed HDCS lines in Fledermaus Geocoder Toolbox (FMGT) 7.10.1 and produced one backscatter mosaics that has been delivered with this report.

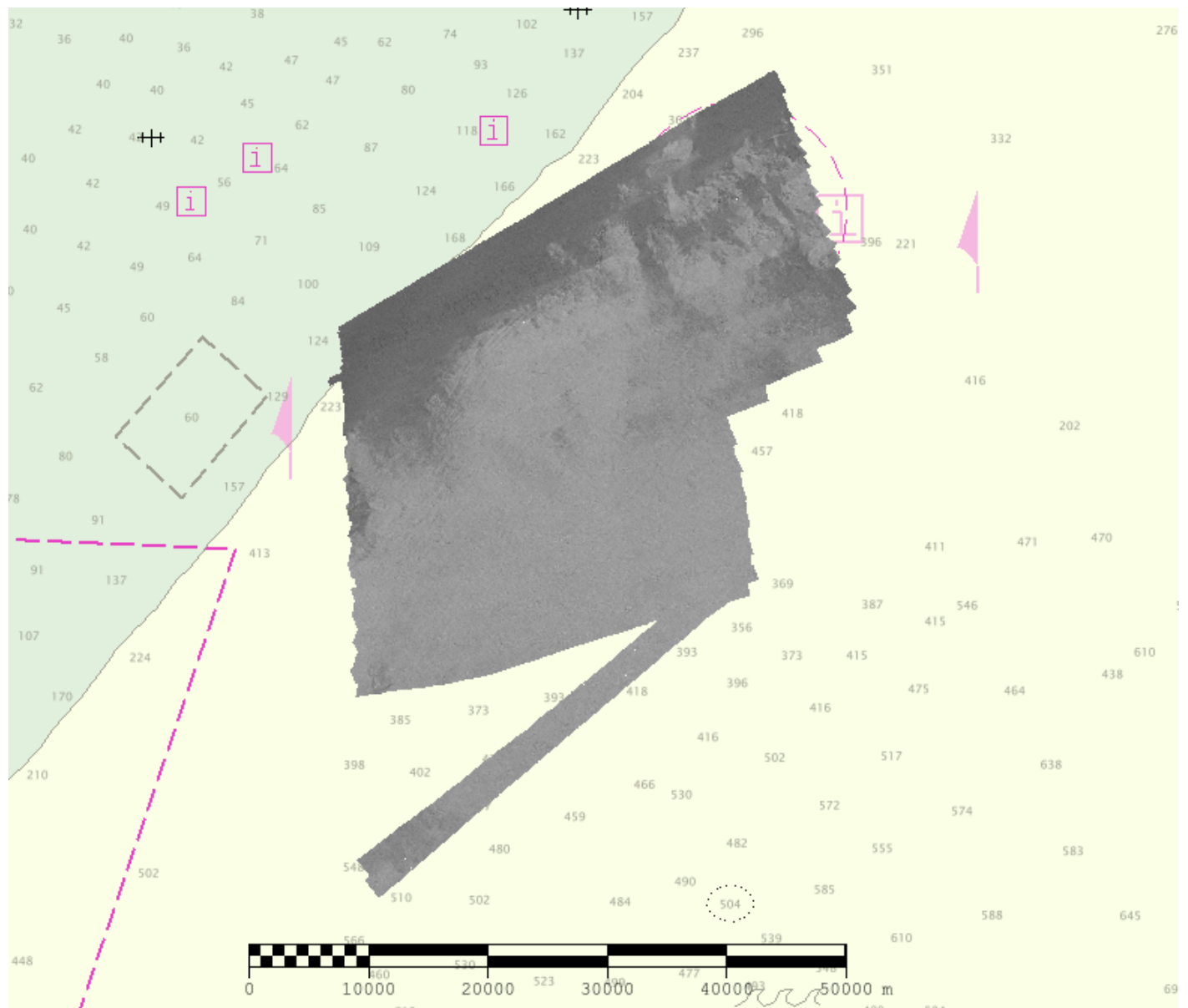


Figure 3: Overview of W00713 backscatter mosaic (US3GA10M).

Three junctions comparisons were completed for survey W00713. Two of these junctions were assigned in the Project Instructions and were both acquired by NOAA Ship *Nancy Foster*: H13307 in 2019 and H13404 in 2020. One additional junction was performed with a 2021 *Nancy Foster* data set, which is referred to as NF2106 in this report.

The junction with H13307 encompasses 6.44 square nautical miles along the northern boundary of W00713. The Compare Grids function of Pydro Explorer derived a difference surface from a variable resolution (VR) surface of each survey for comparison. Analysis of the difference surface indicated that W00713 is an average of 0.06 meters shallower than H13307 with a standard deviation of 0.57 meters.

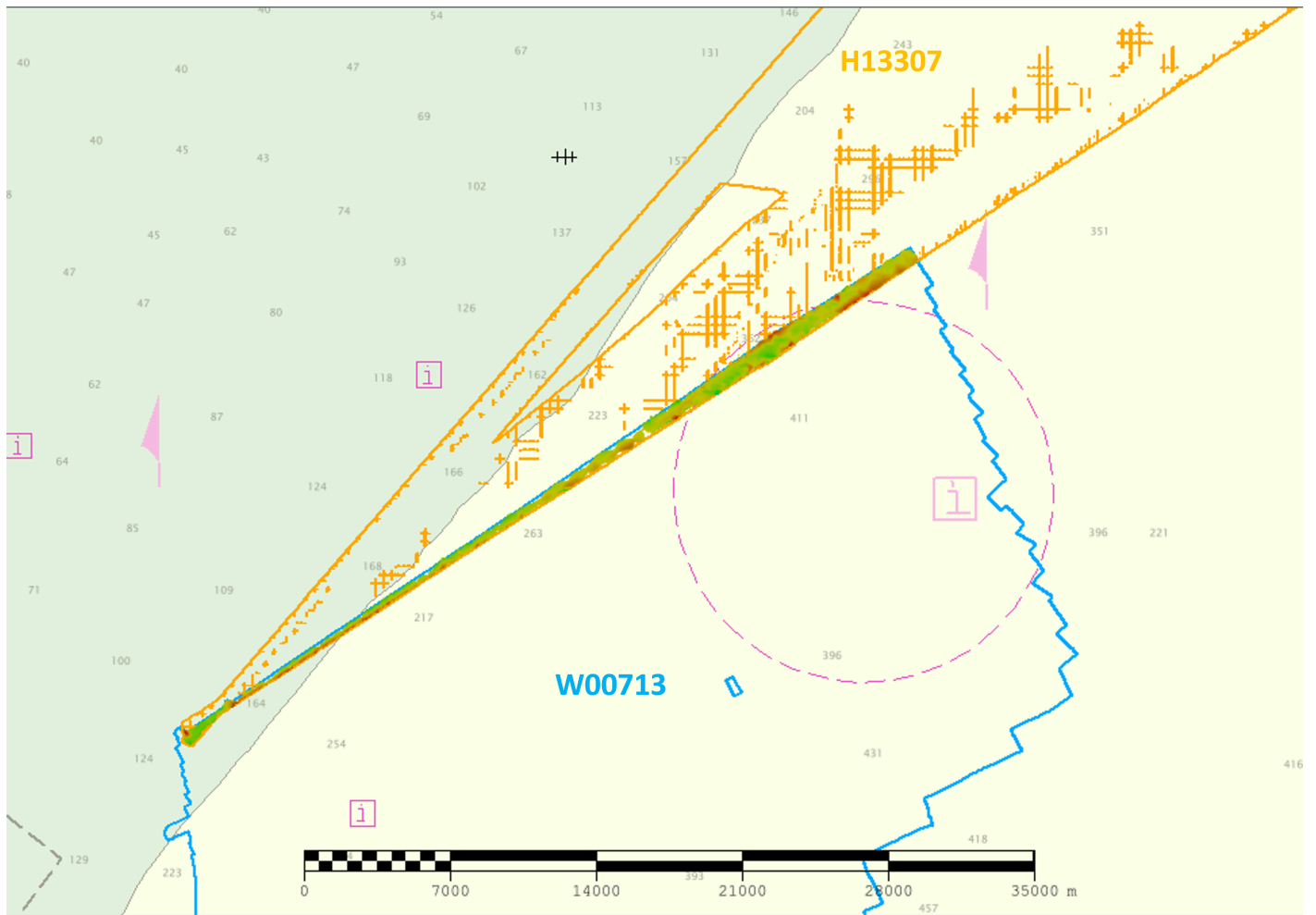


Figure 4: Overview of W00713/H13307 junction with VR difference surface (ENC US3GA10M).

W00713_MB_VR_MLLW_Final-H13307_MB_VR_MLLW_1of1
 Mean: 0.06 | Mode: -0.03 | One Standard Deviation: 0.57 | Bin size: 0.03

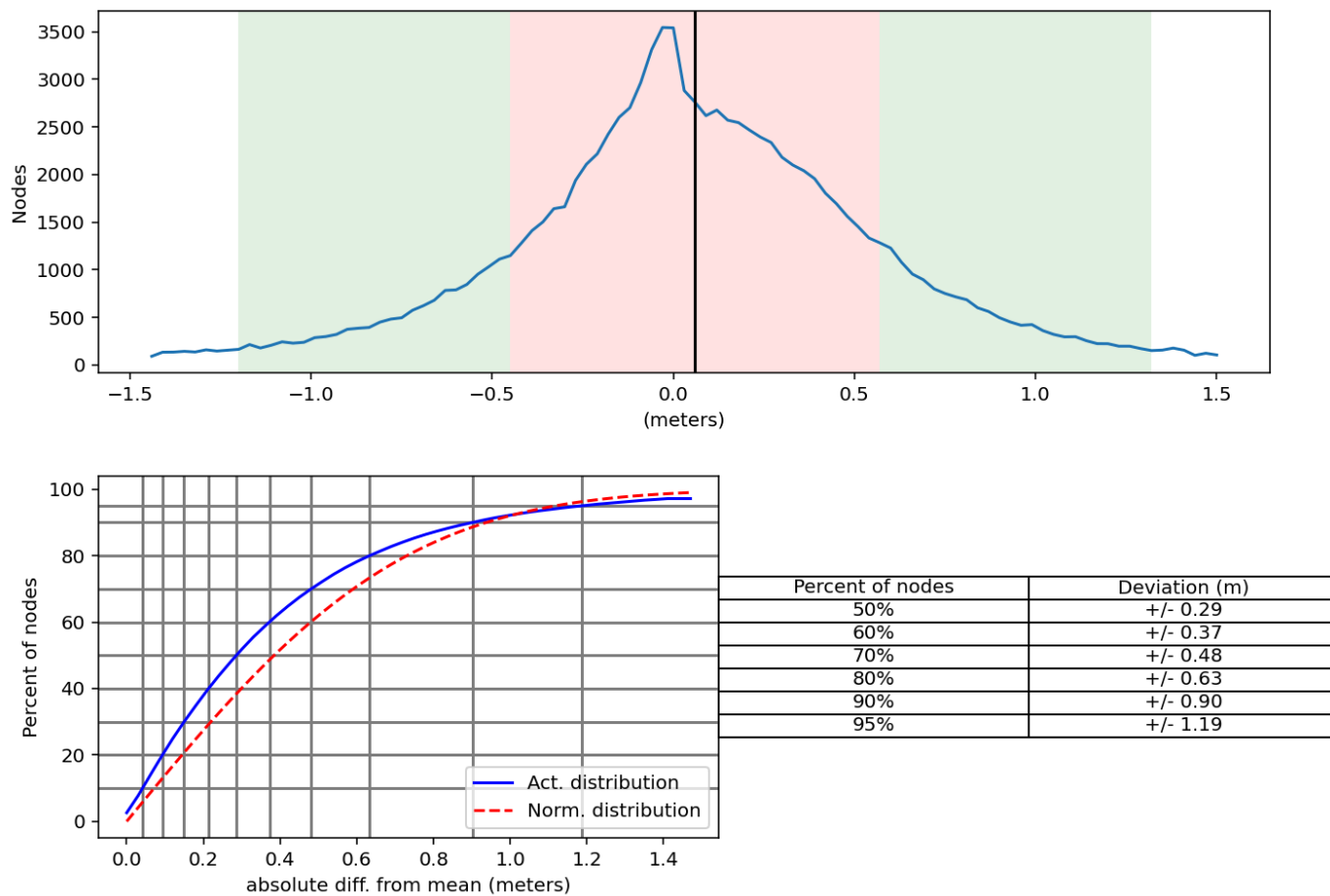


Figure 5: Pydro derived plot showing absolute difference statistics of the junction between W00713 and H13307.

Comparison Distribution

Per Grid: W00713_MB_VR_MLLW_Final-H13307_MB_VR_MLLW_1of1_fracAllowErr.csar

100% nodes pass (106128), min=0.0, mode=0.1 mean=0.1 max=0.8

Percentiles: 2.5%=0.0, Q1=0.0, median=0.0, Q3=0.1, 97.5%=0.2

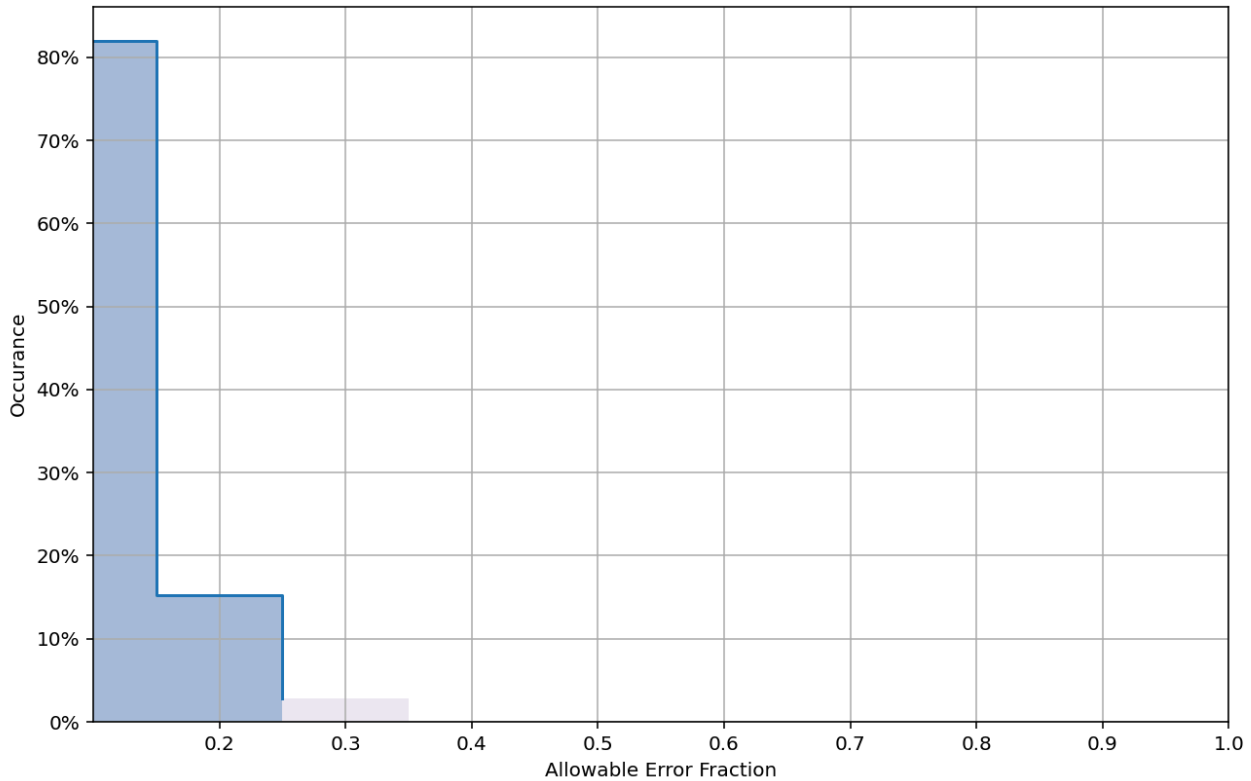


Figure 6: Pydro derived plot showing percentage-pass value of the junction between W00713 and H13307.

The junction with H13404 encompasses 6.93 square nautical miles along the northeastern boundary of W00713. The Compare Grids function of Pydro Explorer derived a difference surface from a variable resolution (VR) surface of each survey for comparison. Analysis of the difference surface indicated that W00713 is an average of 1.03 meters shallower than H13404 with a standard deviation of 1.14 meters.

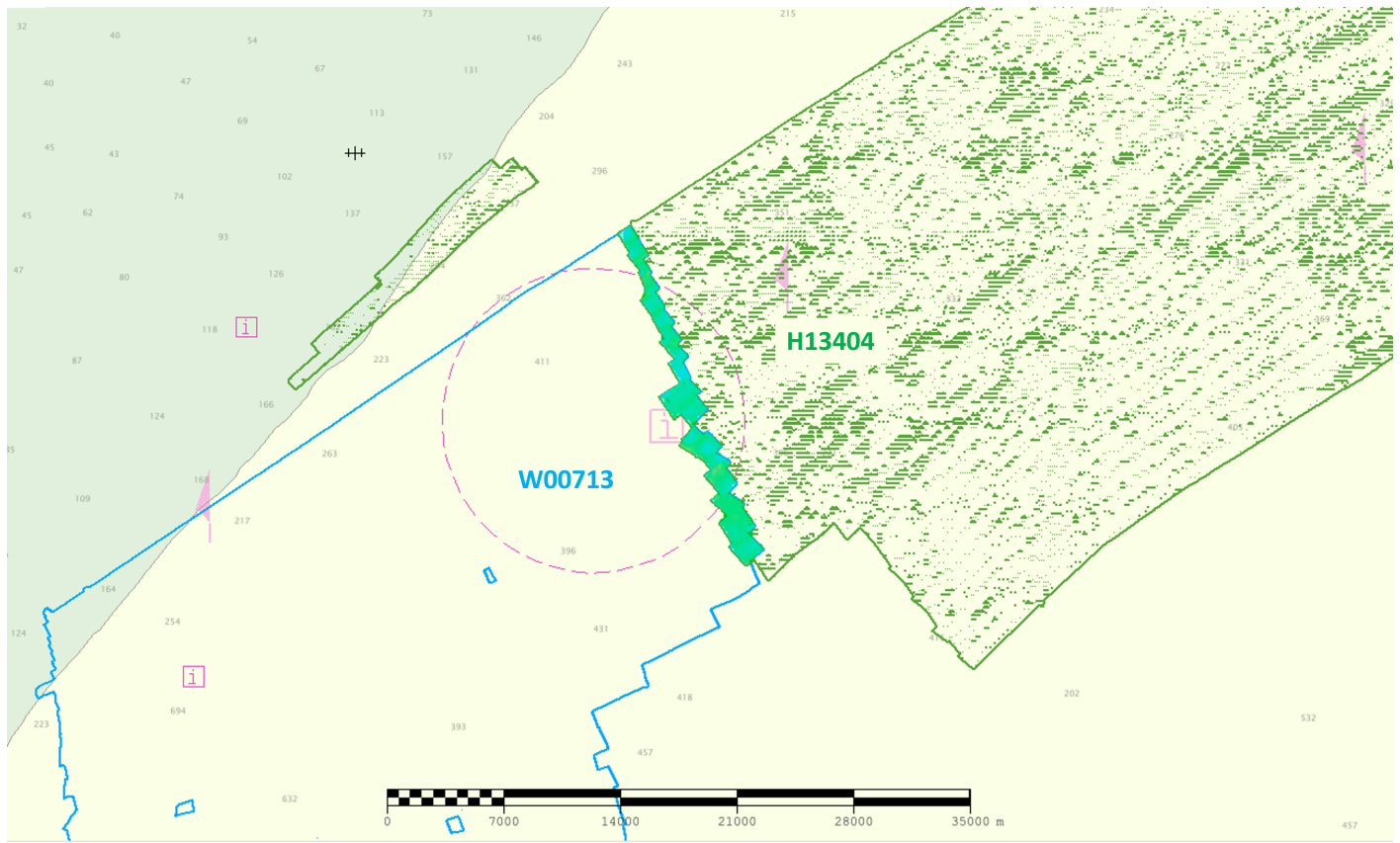


Figure 7: Overview of W00713/H13404 junction with VR difference surface (ENC US3GA10M).

W00713_MB_VR_MLLW_Final-H13404_MB_VR_MLLW_1of1
 Mean: 1.03 | Mode: 1.45 | One Standard Deviation: 1.14 | Bin size: 0.07

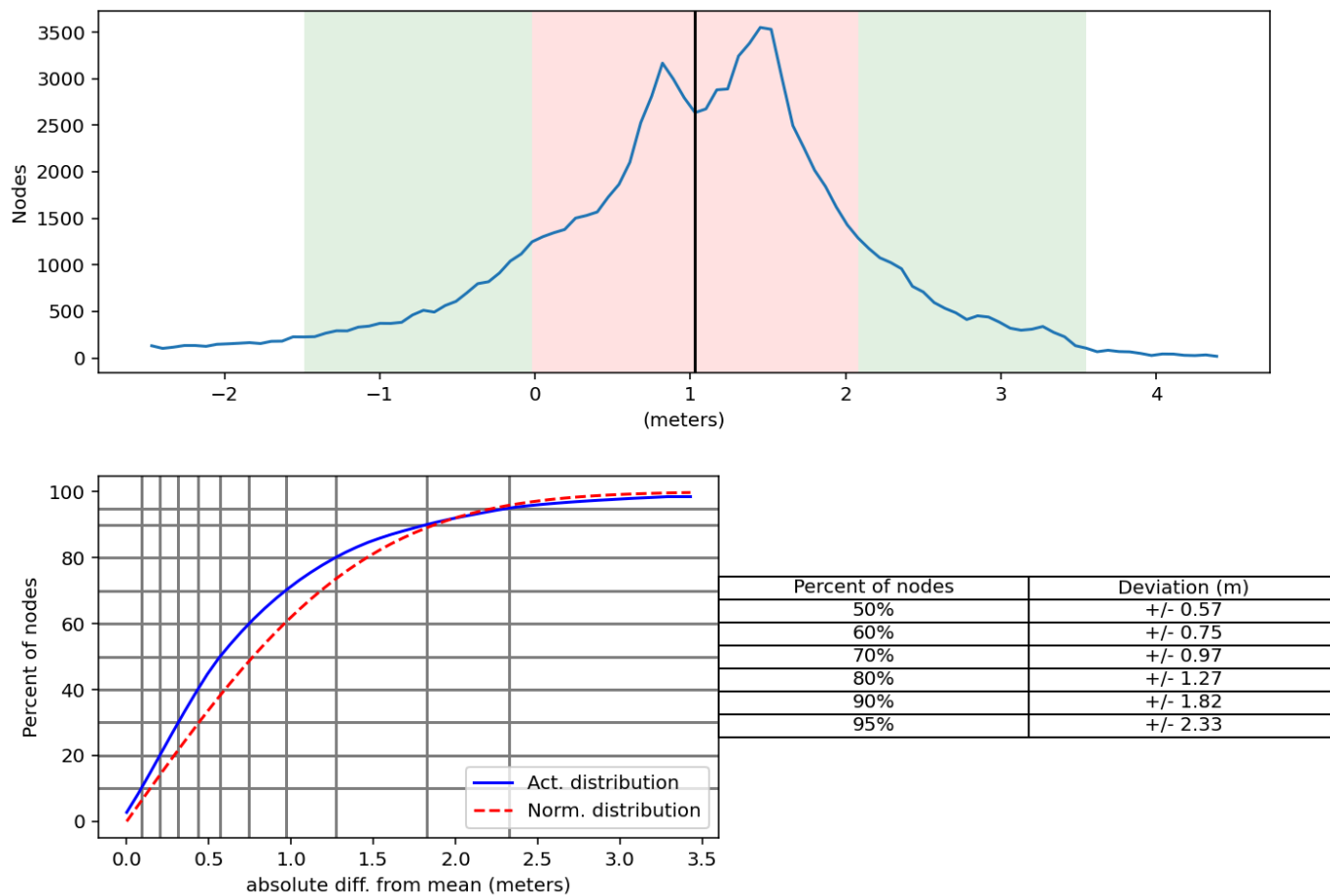


Figure 8: Pydro derived plot showing absolute difference statistics of the junction between W00713 and H13404.

Comparison Distribution

Per Grid: W00713_MB_VR_MLLW_Final-H13404_MB_VR_MLLW_1of1_fracAllowErr.csar

99.5+% nodes pass (96512), min=0.0, mode=0.1 mean=0.1 max=1.0

Percentiles: 2.5%=0.0, Q1=0.1, median=0.1, Q3=0.1, 97.5%=0.3

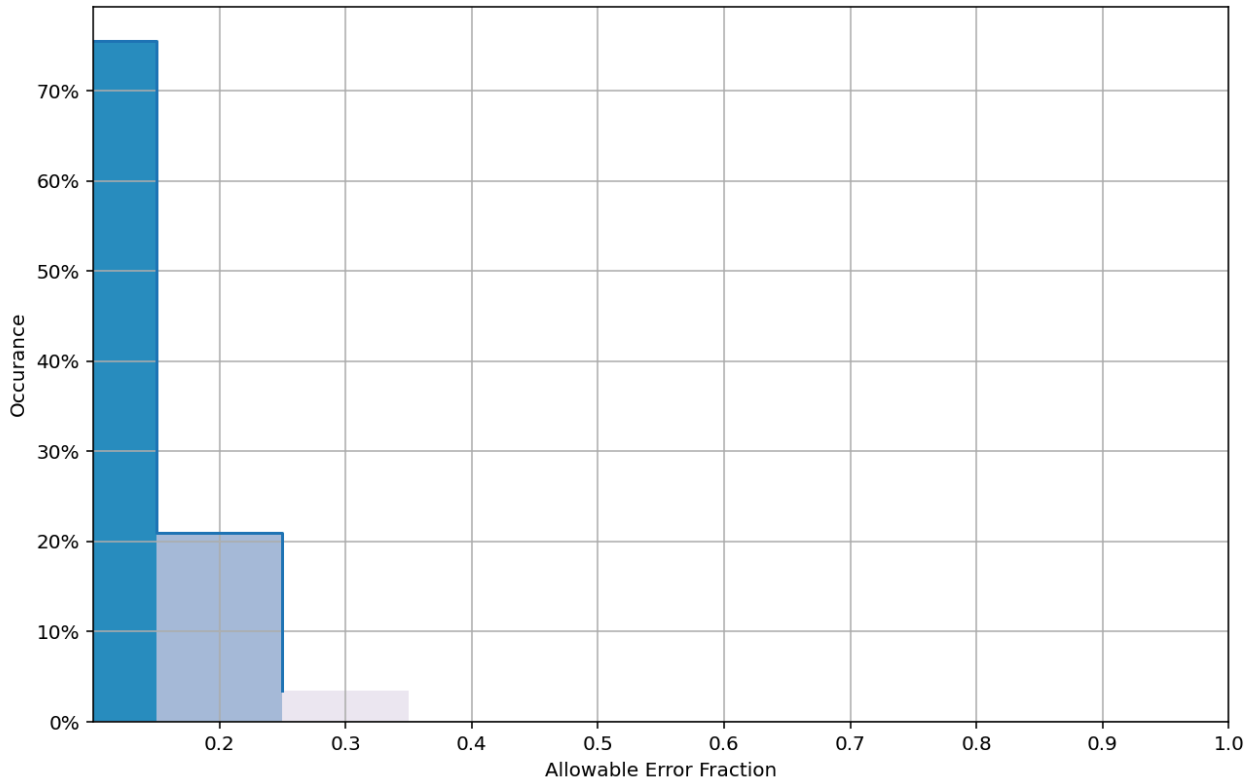


Figure 9: Pydro derived plot showing percentage-pass value of the junction between W00713 and H13404.

The junction with NF2106 encompasses 85.95 square nautical miles along the northern boundary of W00713. The Compare Grids function of Pydro Explorer derived a difference surface from a variable resolution (VR) surface of each survey for comparison. Analysis of the difference surface indicated that W00713 is an average of 1.20 meters shallower/deeper than NF2106 with a standard deviation of 2.23 meters.

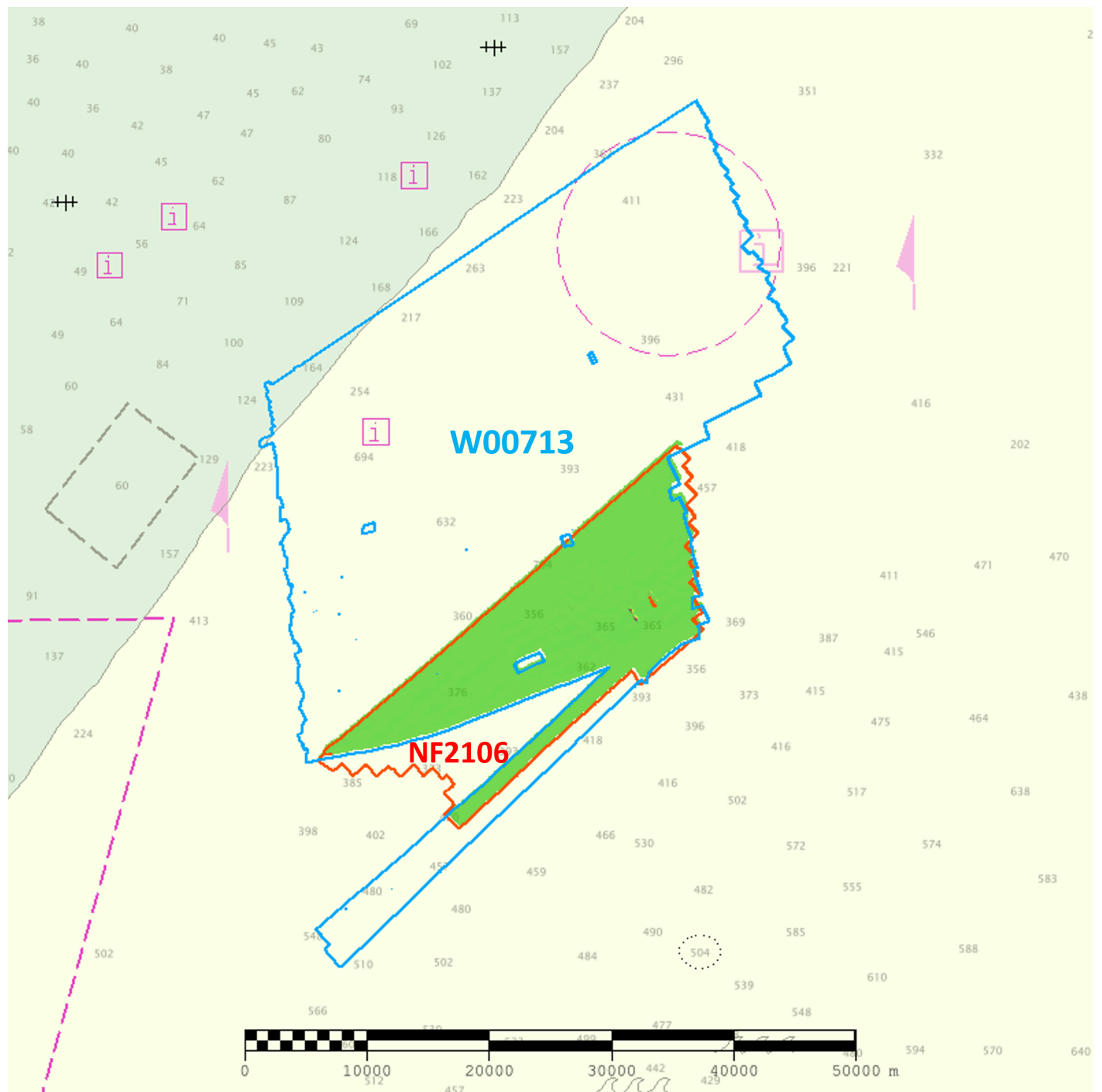
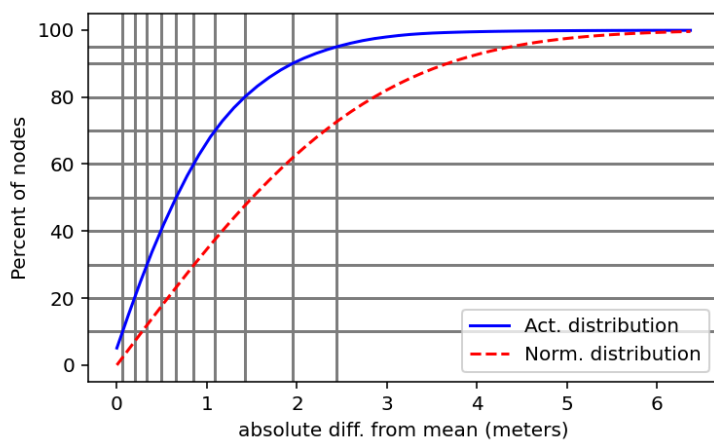
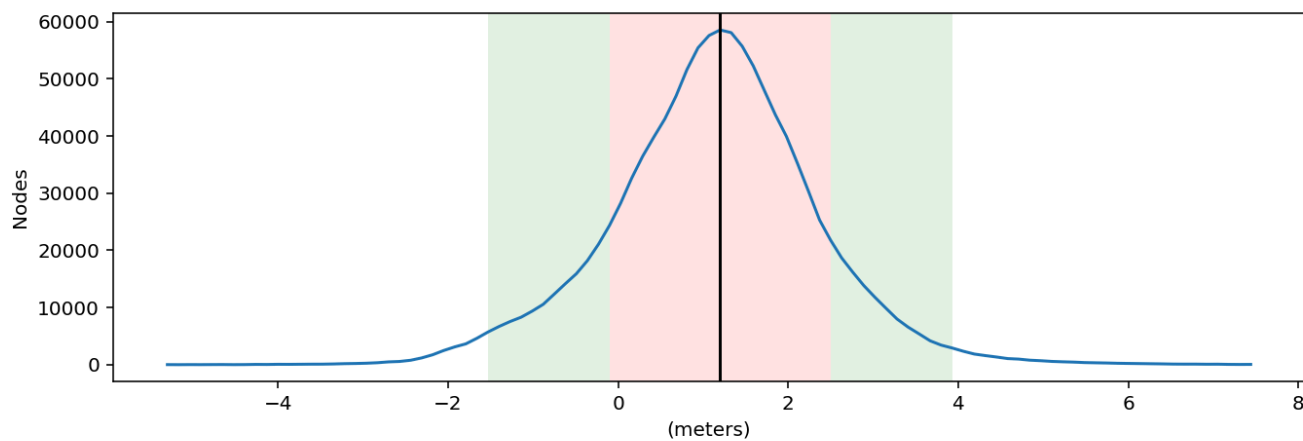


Figure 10: Overview of W00713 junction with NF2106 (ENC US3GA10M).

W00713_MB_16m_MLLW-NF2106_MB_16m
 Mean: 1.20 | Mode: 1.20 | One Standard Deviation: 2.23 | Bin size: 0.13



Percent of nodes	Deviation (m)
50%	+/- 0.66
60%	+/- 0.85
70%	+/- 1.09
80%	+/- 1.42
90%	+/- 1.95
95%	+/- 2.44

Figure 11: Absolute difference between W00713 and NF2106.

Comparison Distribution

Per Grid: W00713_MB_16m_MLLW-NF2106_MB_16m_fracAllowErr.csar

99.5+% nodes pass (1151543), min=0.0, mode=0.1 mean=0.1 max=0.315

Percentiles: 2.5%=0.0, Q1=0.1, median=0.1, Q3=0.2, 97.5%=0.3

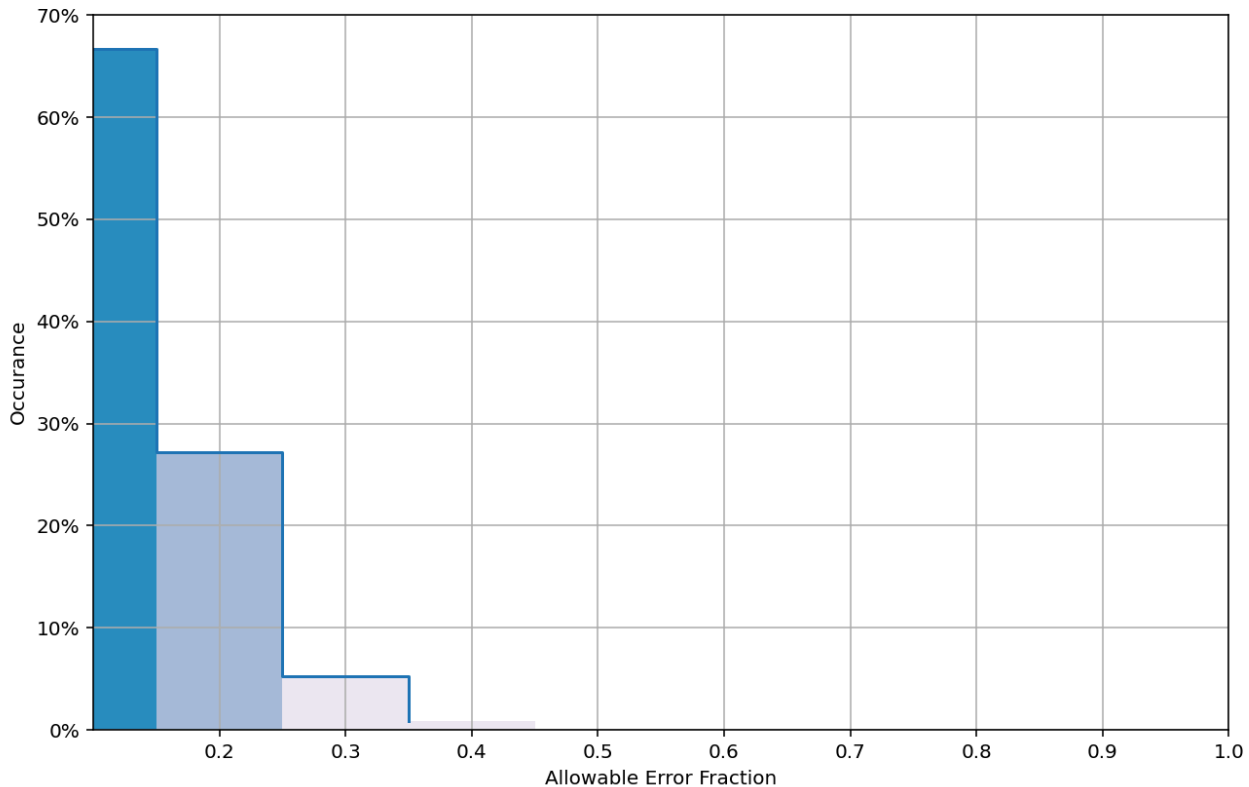


Figure 12: Percentage of allowable error for nodes between W00713 and NF2106

E. Uncertainty

The bathymetric grid for W00713 complies with uncertainty standards described in the 2023 HSSD. Total Propagated Uncertainty (TPU) values for survey W00713 were derived from a combination of fixed values for equipment and vessel characteristics and field assigned values for sound speed uncertainty. An uncertainty of 0.145 meters was provided with the Vertical Datum file (VDATUM) for this project. Some real-time and post-processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties from Kongsberg MBES sonars were recorded and applied in post-processing. See the 2023 DAPR for additional information. MarineStar positioning files, which record estimates associated with vessel position, were applied in CARIS HIPS using SBET and RMS files generated using POSpac MMS software.

QC Tools Grid QA determined that 99.5% of nodes pass uncertainty (Figure 4).

No crosslines were acquired for this survey.

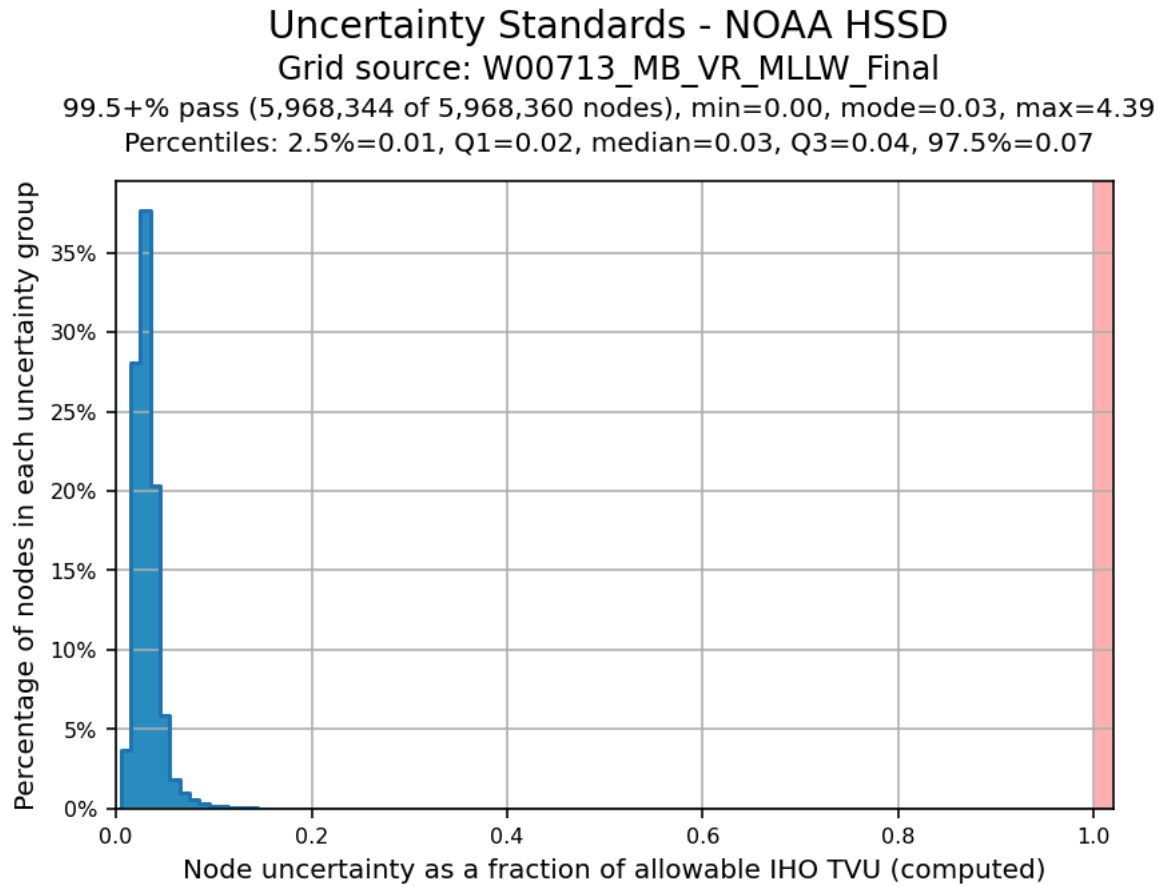


Figure 13: Pydro-derived plot showing TVU compliance of W00713 complete coverage finalized single-resolution MBES data.

F. Results and Recommendations

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

ENC	Scale	Edition	Update Application Date	Issue Date
US2EC02M	1:1200000	43	08/04/2023	08/04/2023
US3GA10M	1:449659	67	09/20/2023	09/20/2023

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
W00713_MB_VR_MLLW	CARIS Raster Surface (CUBE)	Variable Resolution m	129.2 m - 570.8 m	NOAA_VR	Complete MBES
W00713_MB_VR_MLLW_Final	CARIS Raster Surface (CUBE)	Variable Resolution m	129.2 m - 570.8 m	NOAA_VR	Complete MBES
W00713_MBAB_2m_R352_300kHz_1of1	MB Backscatter Mosaic	2 m	N/A	N/A	Complete MBES

All depths in W00713 fall within charted contours. There are no features associated with this survey.

G. Vertical and Horizontal Control

The vertical datum for this project is Mean Lower Low Water. The vertical control method used was VDatum.

The following ellipsoid-to-chart vertical datum transformation was used: VDatum Coverage_Projected2_100m_NAD83_2011-MLLW_geoid18.csar

Refer to the DAPR for a complete description of vertical control procedures.

The horizontal datum for this project is North American Datum of 1983 (NAD 83). The projection used for this project is Universal Transverse Mercator (UTM) Zone 18.

Marinestar Precise Point Positioning was used for real-time horizontal control during data acquisition.

Marinestar processing methods were used in Applanix POSPac MMS 8.4 software to produce a smoothed best-estimate of trajectory (SBET) for post-processed horizontal and vertical corrections.

H. Additional Results

Data Gaps

Several holidays exist where multibeam data could not be processed. The trackline exists but there are no soundings within the gap, however, the same gaps do not exist in the backscatter mosaics. The cause of this is unknown but is suspected to be from issues with POS data coverage.

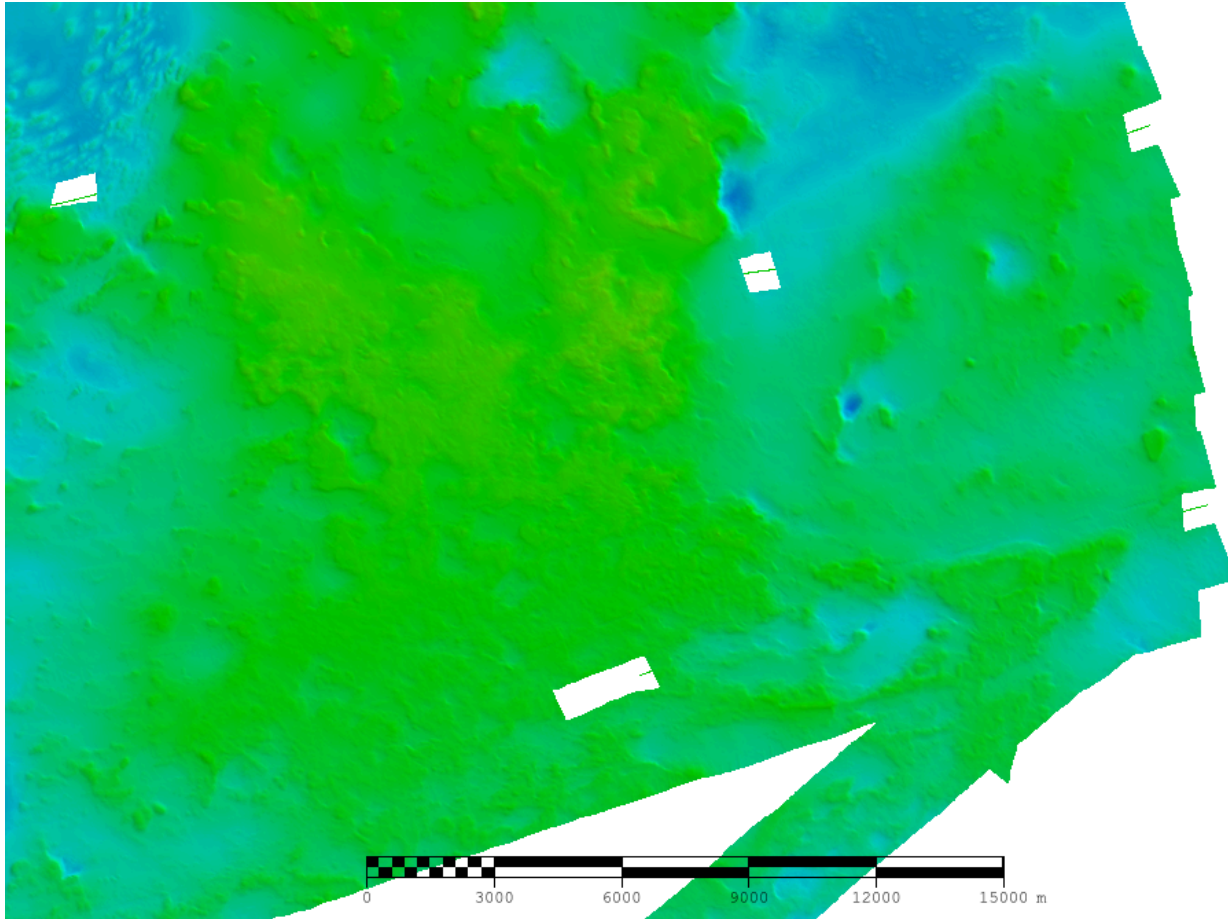


Figure 14: Overview of several unresolved data gaps in W00713.

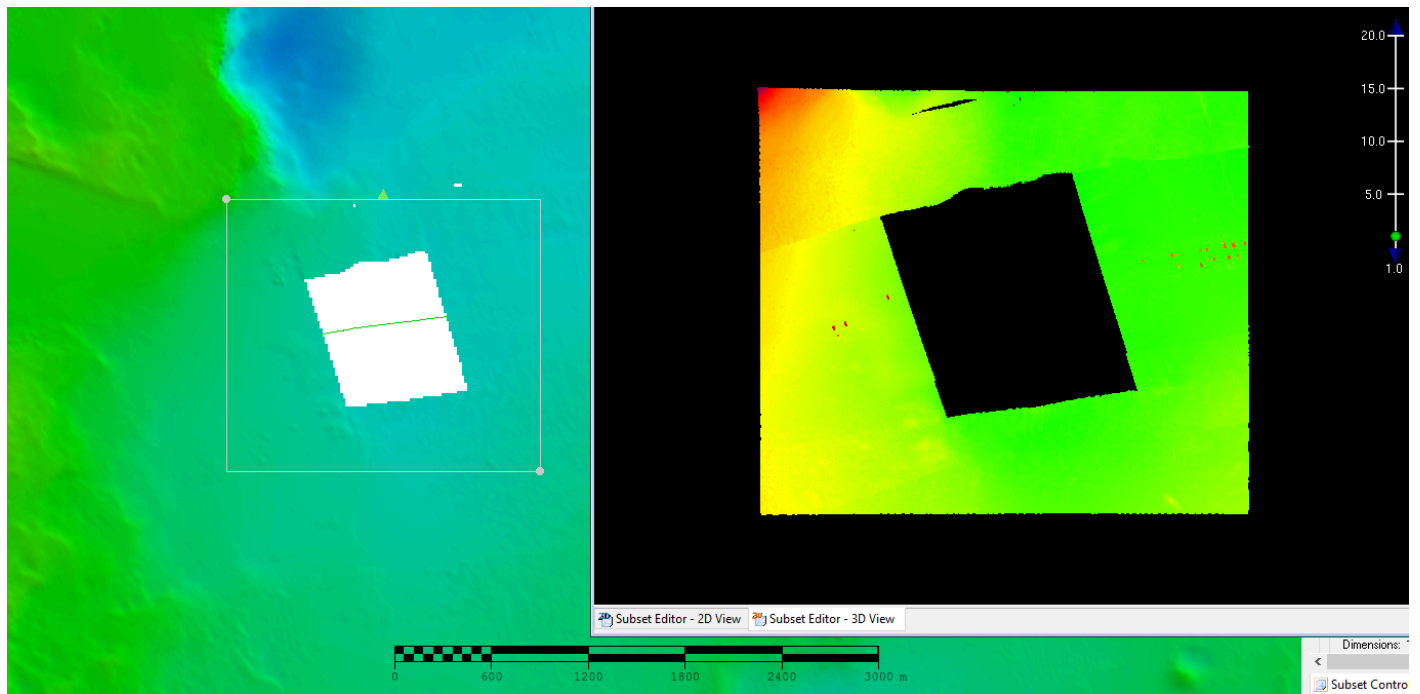


Figure 15: Subset view of gap in relation to surrounding multibeam data.

Vertical Uncertainty Spikes

There are several large spikes in uncertainty that could not be resolved, however overall uncertainty for this survey is passes HSSD requirements. QC Tools Grid QA CATZOC verifies that the survey still meets CATZOC A1 data quality.

I. Approval

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 field sheets, this Survey Summary 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 Specifications and Deliverables, Field Procedures Manual, Standing and 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 Survey Summary Report.

Approver Name	Title	Date	Signature
Julia Wallace	Chief of Party	07/03/2024	WALLACE.JULIA JJ.1541025495 Digitally signed by WALLACE.JULIA.JJ.1541025495 Date: 2024.07.16 11:22:27 -04'00'
Amanda Finn	Physical Scientist	07/03/2024	FINN.AMANDA.M ARIA.1540474253 Digitally signed by FINN.AMANDA.MARIA.15404742 53 Date: 2024.07.16 11:33:43 -04'00'