H13205

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13205

LOCALITY

State(s):	California
General Locality:	California
Sub-locality:	West Santa Cruz Channel

2018

CHIEF OF PARTY
Benjamin K Evans, CDR/NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13205**

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):	**California**
General Locality:	**California**
Sub-Locality:	**West Santa Cruz Channel**
Scale:	**20000**
Dates of Survey:	**09/26/2018 to 10/27/2018**
Instructions Dated:	**08/17/2018**
Project Number:	**OPR-L397-RA-18**
Field Unit:	**NOAA Ship Rainier**
Chief of Party:	**Benjamin K Evans, CDR/NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific 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 http://www.ncei.noaa.gov/.

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Descriptive Report to Accompany Survey H13205

Project: OPR-L397-RA-18

Locality: California

Sublocality: West Santa Cruz Channel

Scale: 1:20000

September 2018 - October 2018

NOAA Ship Rainier

Chief of Party: Benjamin K Evans, CDR/NOAA

A. Area Surveyed

The survey area is referred to as H13205, "West Santa Cruz Channel" (sheet 4) in the Project Instructions. The survey area is approximately 21.15 square nautical miles.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
34° 5' 41" N 120° 1' 26" W	33° 56' 25" N 119° 55' 50" W

Table 1: Survey Limits

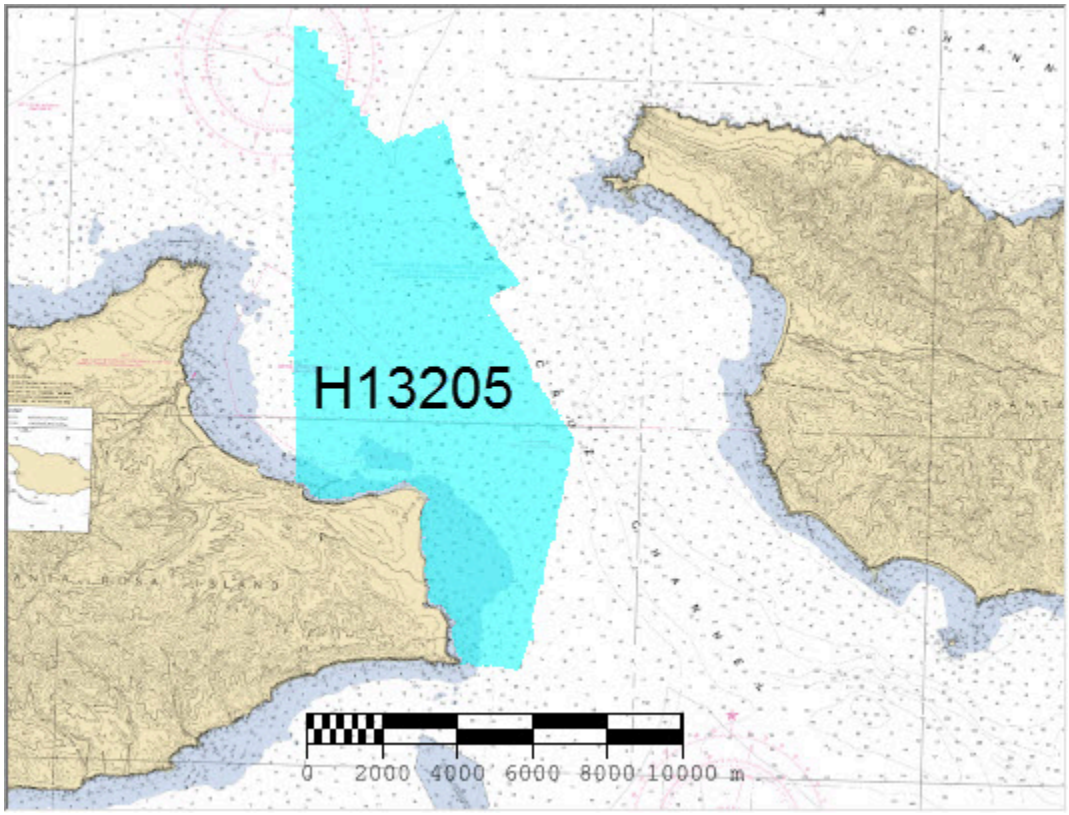


Figure 1: H13205 assigned survey area (Chart 18728).

Data were acquired within the assigned survey limits as required in the Project Instructions and HSSD.

A.2 Survey Purpose

The Channel Islands National Marine Sanctuary (CINMS) supports both recreational and commercial fishing efforts, and is regularly host to kayakers, surfers, sightseers, whale watchers, researchers, and Channel Islands National Park concessionaires. Additionally the southeast anchorage off Santa Rosa Island affords protection from southeastern weather. Much of the existing depth data of this area dates back to 1930s vintage lead line or single beam surveys, and is not surveyed to modern standards. This poses a serious risk to life, property and the delicate ecosystem within the Channel Islands National Marine Sanctuary. This survey will provide contemporary data to update National Ocean Service (NOS) nautical charting products and generate backscatter data which will be used in habitat mapping and substrate analysis.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Pydro QC Tools 2 Grid QA was used to analyze H13205 multibeam echosounder (MBES) data density. The submitted H13205 variable-resolution (VR) surface met HSSD density requirements as shown in the histograms below.

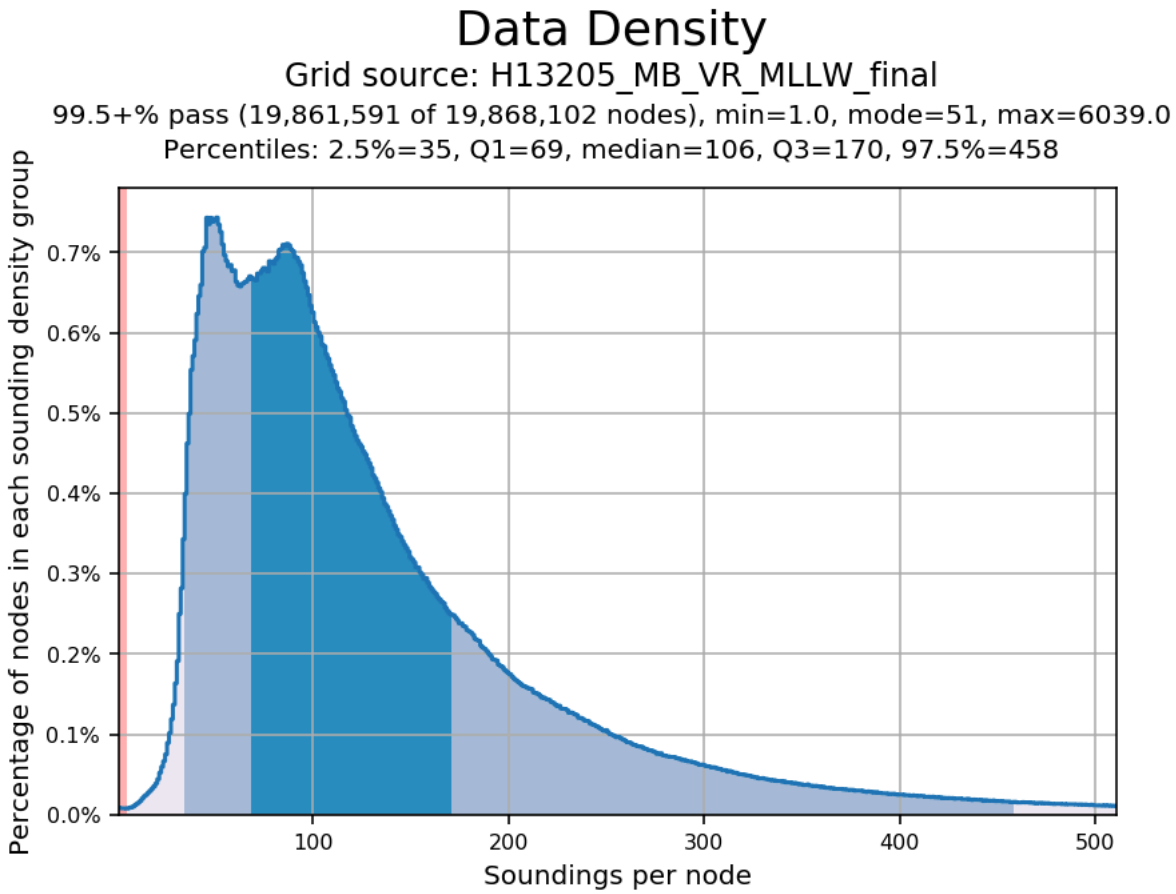


Figure 2: Pydro derived histogram plot showing HSSD density compliance of H13205 finalized variable-resolution MBES data.

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	Complete Coverage (Refer to HSSD Section 5.2.2.3)
All waters in survey area	Acquire backscatter data during all multibeam data acquisition (Refer to HSSD Section 6.2)

Table 2: Survey Coverage

Complete multibeam echosounder (MBES) coverage was acquired to the inshore limit of hydrography, the Navigable Area Limit Line (NALL). Areas where survey coverage did not reach the 3.5-meter depth contour, nor the assigned sheet limits, were due to the survey vessel reaching the extent of safe navigation as shown in the figures below. These areas are characterized as being near shore, subject to dangerous wave action or other hazards such as rocks or thick kelp. South of Skunk Point there is a gap in data (holiday) in the vicinity of nearshore rocks, which were deemed too hazardous to approach.

When the assigned survey area was completed earlier than expected, H13205 coverage was extended to northwest of the assigned survey limits. This additional surveyed area was originally part of lower priority sheets in the vicinity of Santa Cruz Island.

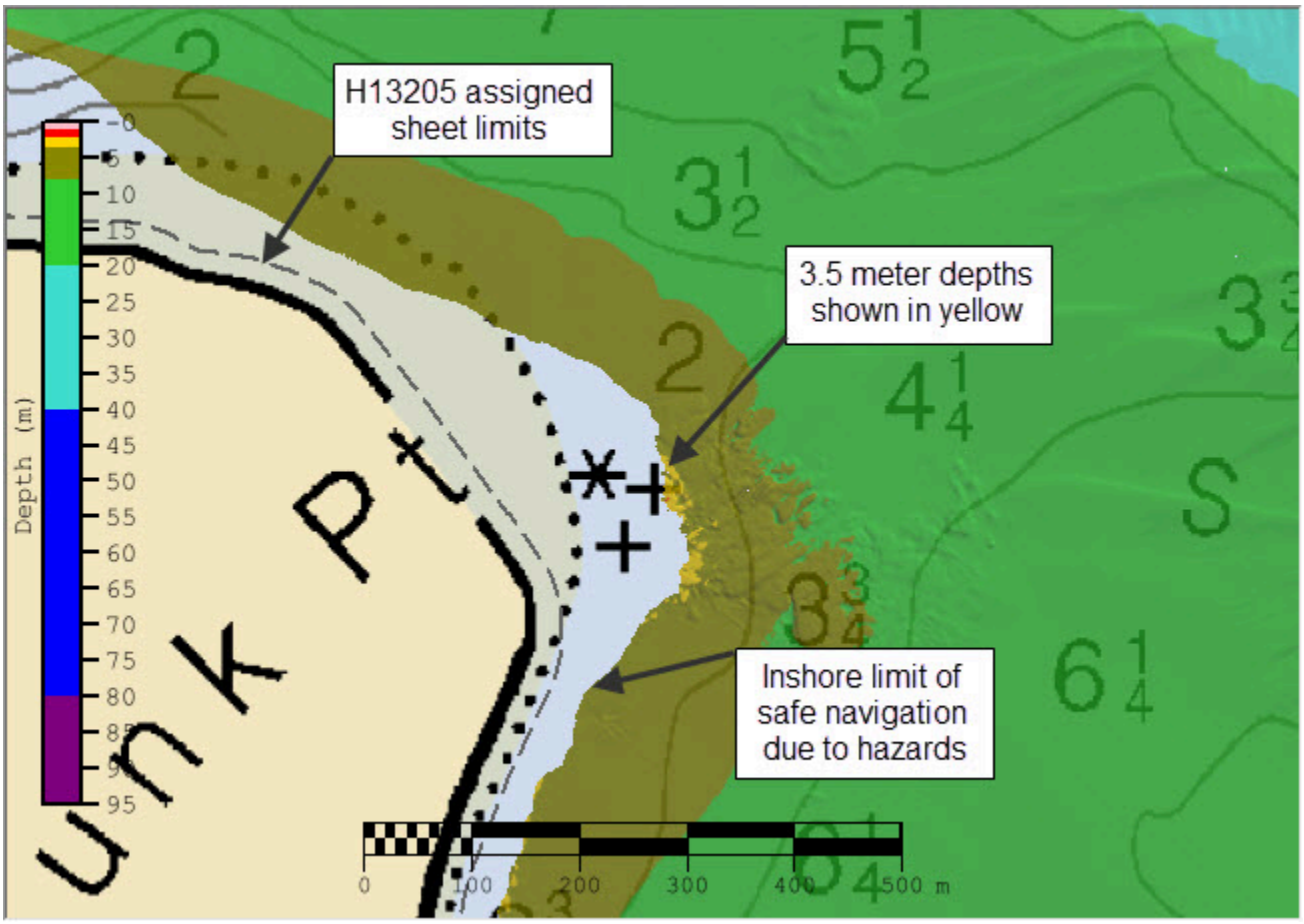


Figure 3: Examples of H13205 NALL determination; the gray dashed line indicates assigned sheet limits and the yellow indicates where the 3.5-meter contour was reached.

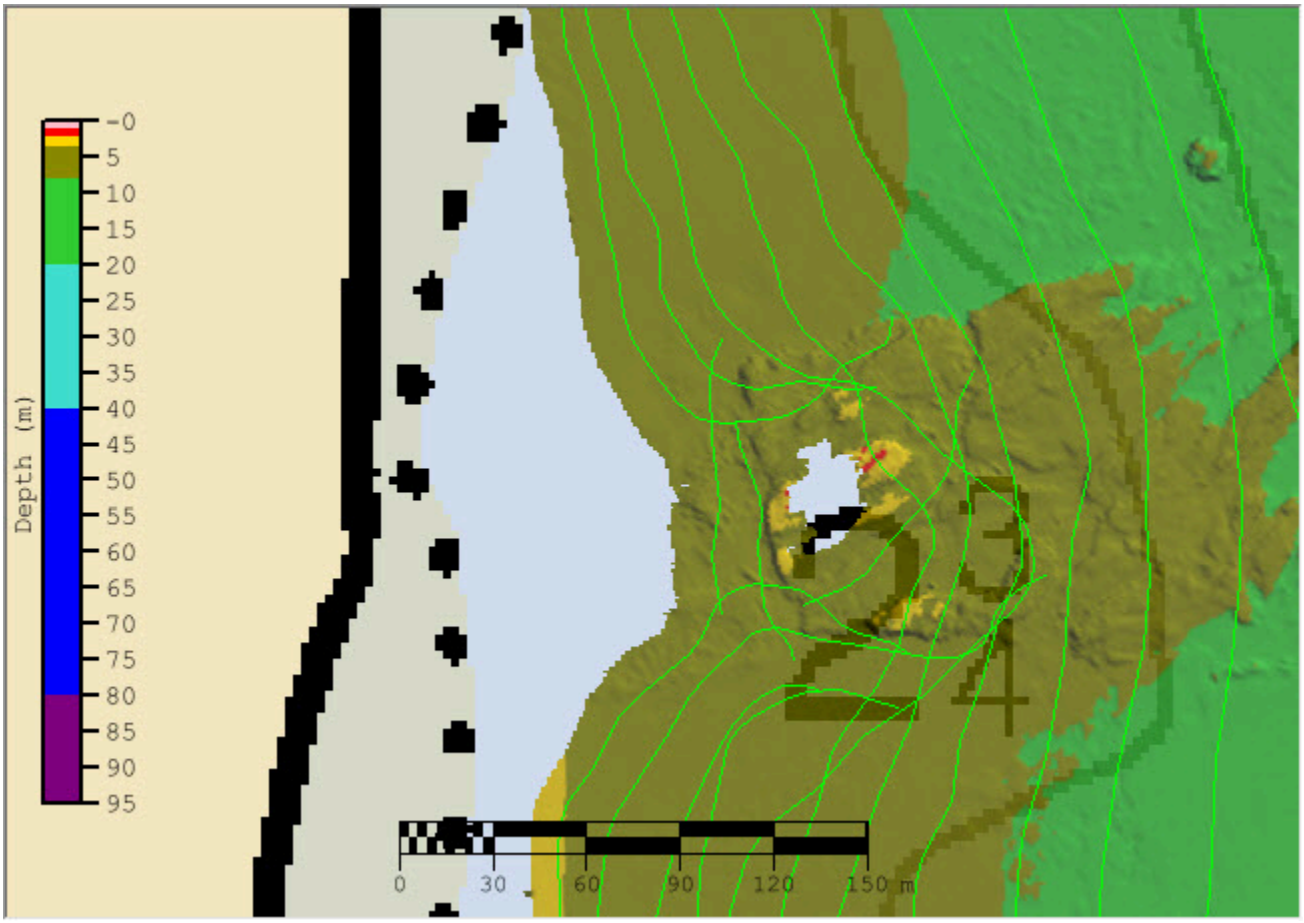


Figure 4: Holiday on top of an area that was too shoal to acquire complete MBES coverage over safely with a launch, the least depth acquired around the rock was 1.6 meters. The final feature file was updated with a rock of unknown depth placed in the center of the holiday.

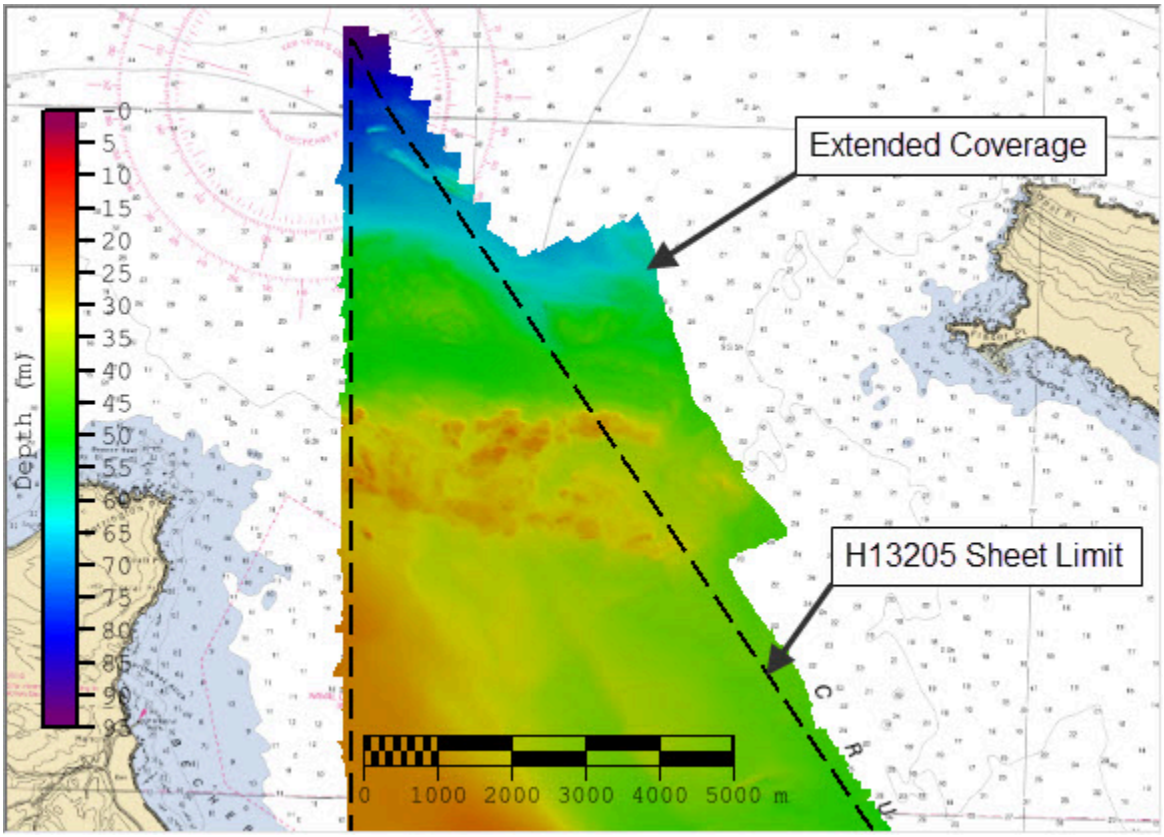


Figure 5: H13205 MBES coverage and assigned survey limits.
Note area where survey coverage was extended beyond sheet limits.

A.6 Survey Statistics

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

	HULL ID	*2801*	*2802*	*2803*	*2804*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0
	MBES Mainscheme	16.33	153.36	123.60	174.02	466.73
	Lidar Mainscheme	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0	0
	MBES/SSS Mainscheme	0	0	0	0	0
	SBES/MBES Crosslines	10.71	6.20	0	2.82	19.73
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						0
Number Maritime Boundary Points Investigated						0
Number of DPs						18
Number of Items Investigated by Dive Ops						0
Total SNM						21.15

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/26/2018	269
10/04/2018	277

Survey Dates	Day of the Year
10/05/2018	278
10/08/2018	281
10/09/2018	282
10/18/2018	291
10/19/2018	292
10/20/2018	293
10/26/2018	299
10/27/2018	300

Table 4: Dates of Hydrography

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	*2801*	*2802*	*2803*	*2804*	*2701*	*1907*
LOA	8.8 meters	8.8 meters	8.8 meters	8.8 meters	7.6 meters	5.7 meters
Draft	1.1 meters	1.1 meters	1.1 meters	1.1 meters	0.47 meters	0.35 meters

Table 5: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Applanix	POS MV 320 v5	Positioning and Attitude System
Kongsberg Maritime	EM 2040	MBES
Sea-Bird Scientific	SBE 19plus	Conductivity, Temperature, and Depth Sensor
Teledyne RESON	SVP 70	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 4.22% of mainscheme acquisition.

19.73 nautical miles of multibeam crosslines were acquired by RAINIER launches 2801, 2802, and 2804 across most depth ranges and multiple boat days. The hydrographer deems them adequate for verifying and evaluating the internal consistency of H13205 survey data. Analysis was performed using the Compare Grids function in Pydro Explorer on finalized VR surfaces of H13205 mainscheme only and crossline only data. 99.5% of nodes met allowable uncertainties. For additional results, see plots below.

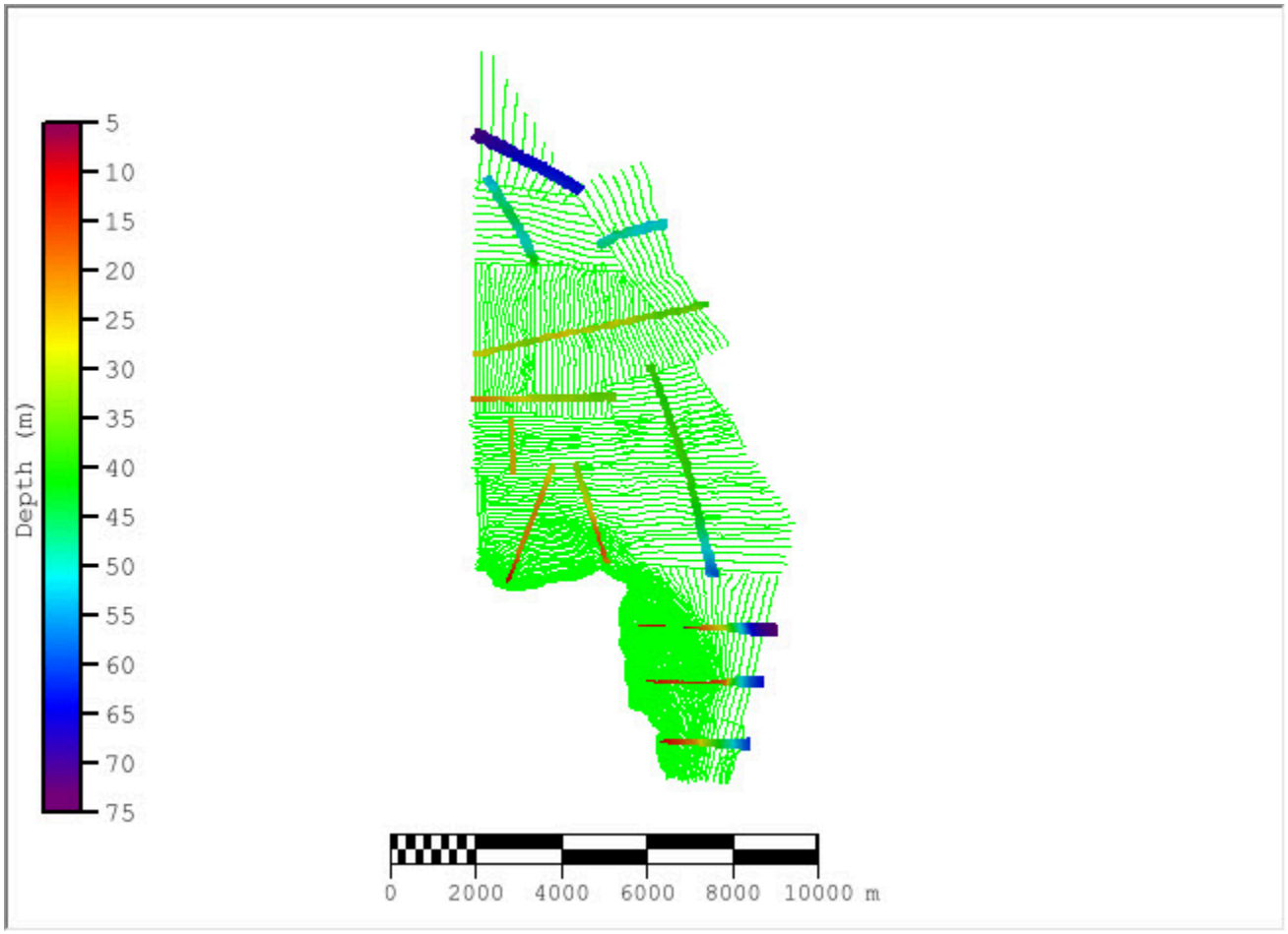


Figure 6: H13205 crossline surface overlaid on mainscheme tracklines.

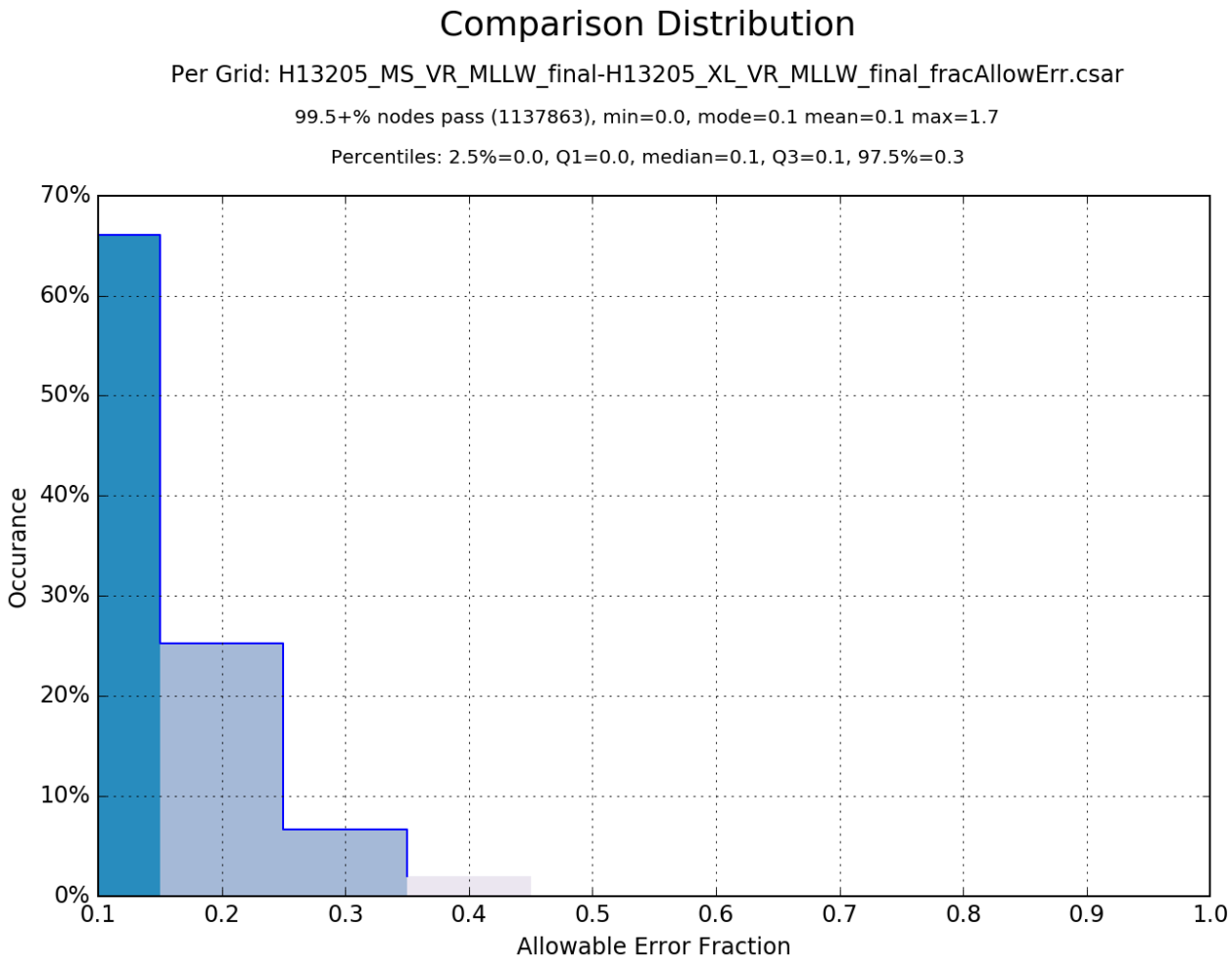
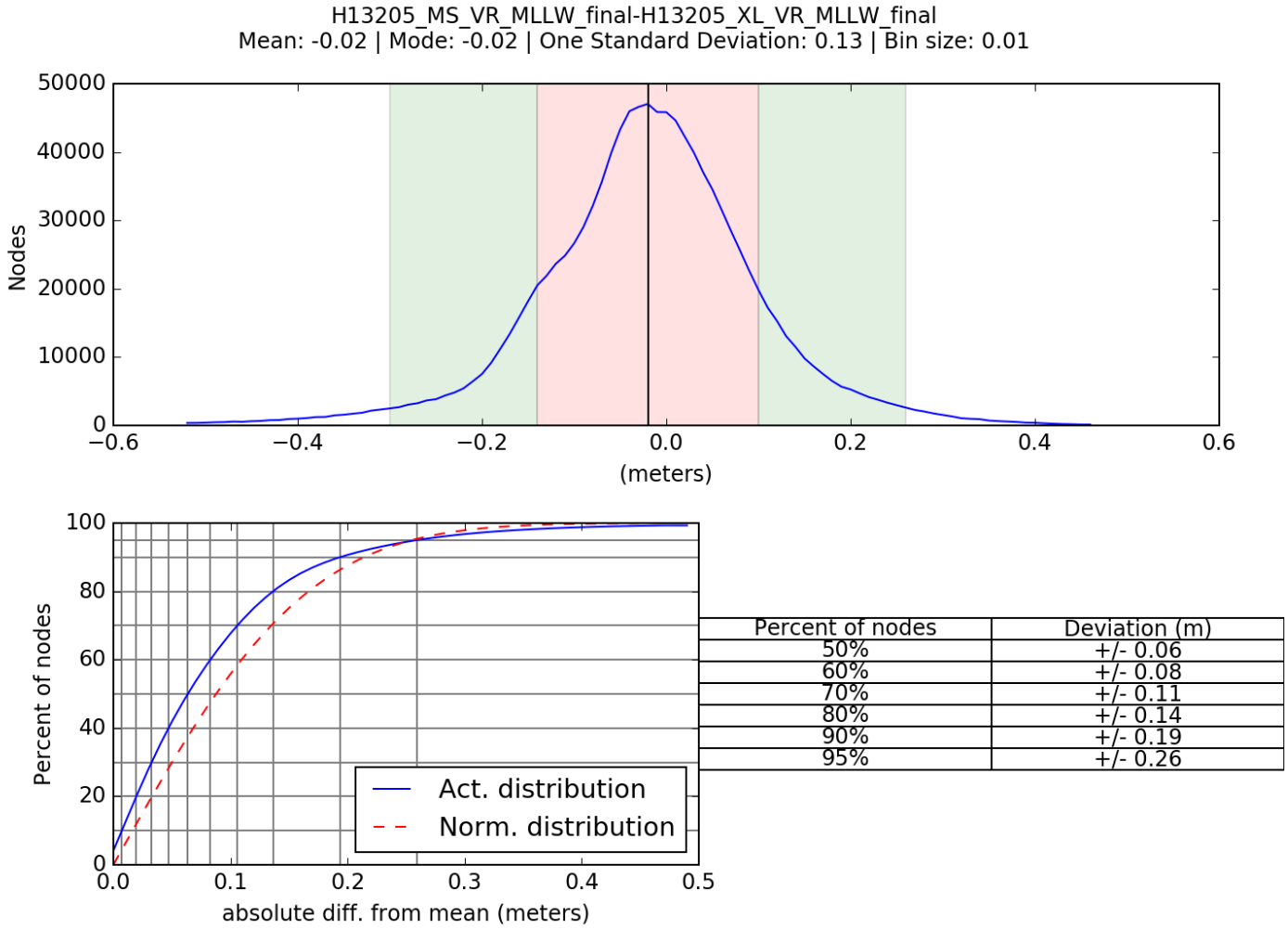


Figure 7: Pydro derived plot showing percentage-pass value of H13205 mainscheme to crossline data.



Percent of nodes	Deviation (m)
50%	+/- 0.06
60%	+/- 0.08
70%	+/- 0.11
80%	+/- 0.14
90%	+/- 0.19
95%	+/- 0.26

Figure 8: Pydro derived plot showing absolute difference statistics of H13205 mainscheme to crossline data.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.083 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
2801, 2802, 2803, 2804	3 meters/second	n\a meters/second	0.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13205 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Tidal uncertainty was provided in the metadata accompanying the NOAA vertical datum transformation model used for this survey. The uncertainty value of NOAA's Vertical Datum (VDatum) transformation model was documented in metadata that accompanied the VDatum model.

In addition to the usual a priori estimates of uncertainty, 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. Applanix TrueHeave (POS) files, which record estimates of heave uncertainty, were applied during post-processing. Finally, the post-processed uncertainties associated with vessel roll, pitch, yaw and position were applied in Caris HIPS using SBET and RMS files generated using POSPac MMS software.

Uncertainty values of the submitted finalized grid was calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools 2 was used to analyze H13205 TVU compliance, a histogram plot of the results is shown below.

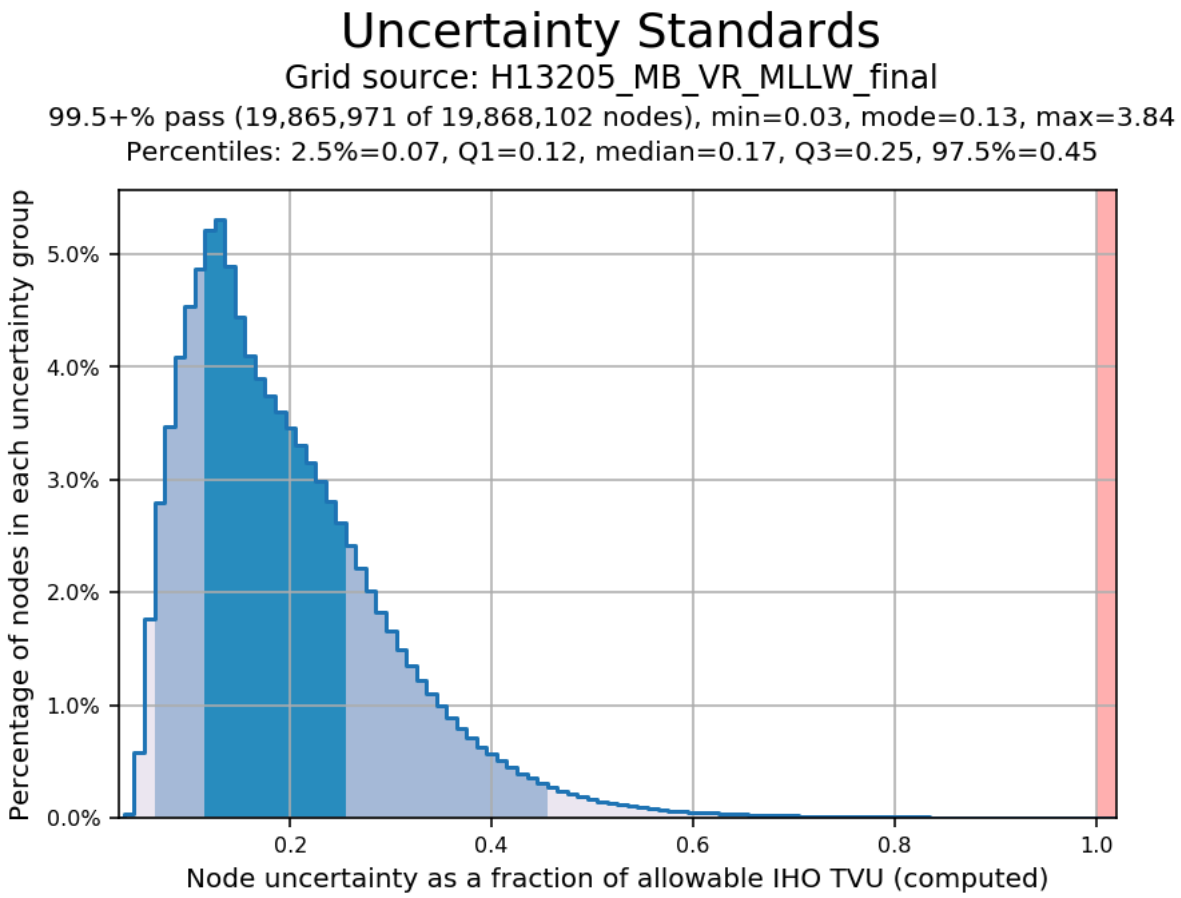


Figure 9: Pydro derived plot showing TVU compliance of H13205 finalized multi-resolution MBES data.

B.2.3 Junctions

H13205 junctions with two surveys: one contemporary and one conducted by NOAA Ship Rainier in 2017. Comparisons were made using the Compare Grids program within Pydro Explorer.

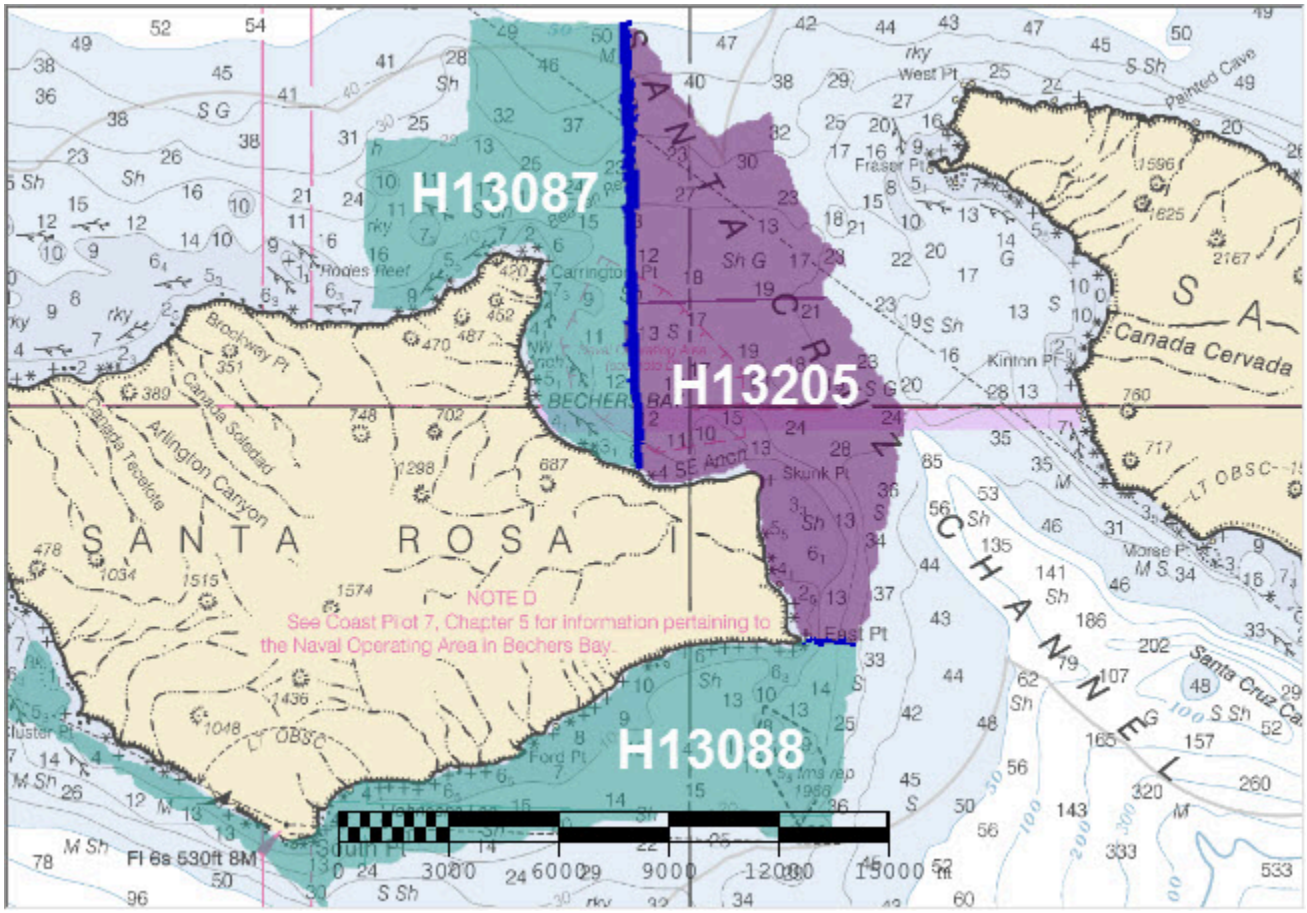


Figure 10: Overview of H13205 junctions.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13088	1:20000	2017	NOAA Ship RAINIER	S
H13087	1:20000	2018	NOAA Ship RAINIER	W

Table 9: Junctioning Surveys

H13088

The junction with 2017 survey H13088 encompassed approximately 0.1 square nautical miles along the southern boundary of H13205. Pydro's Compare Grids results showed that 99.5+% of nodes in the common area met NOAA allowable error standards. Analysis of the difference surface indicated that H13088 is an average of 0.06 meters deeper than H13205 with a standard deviation of 0.17 meters. See below graphs for more information.

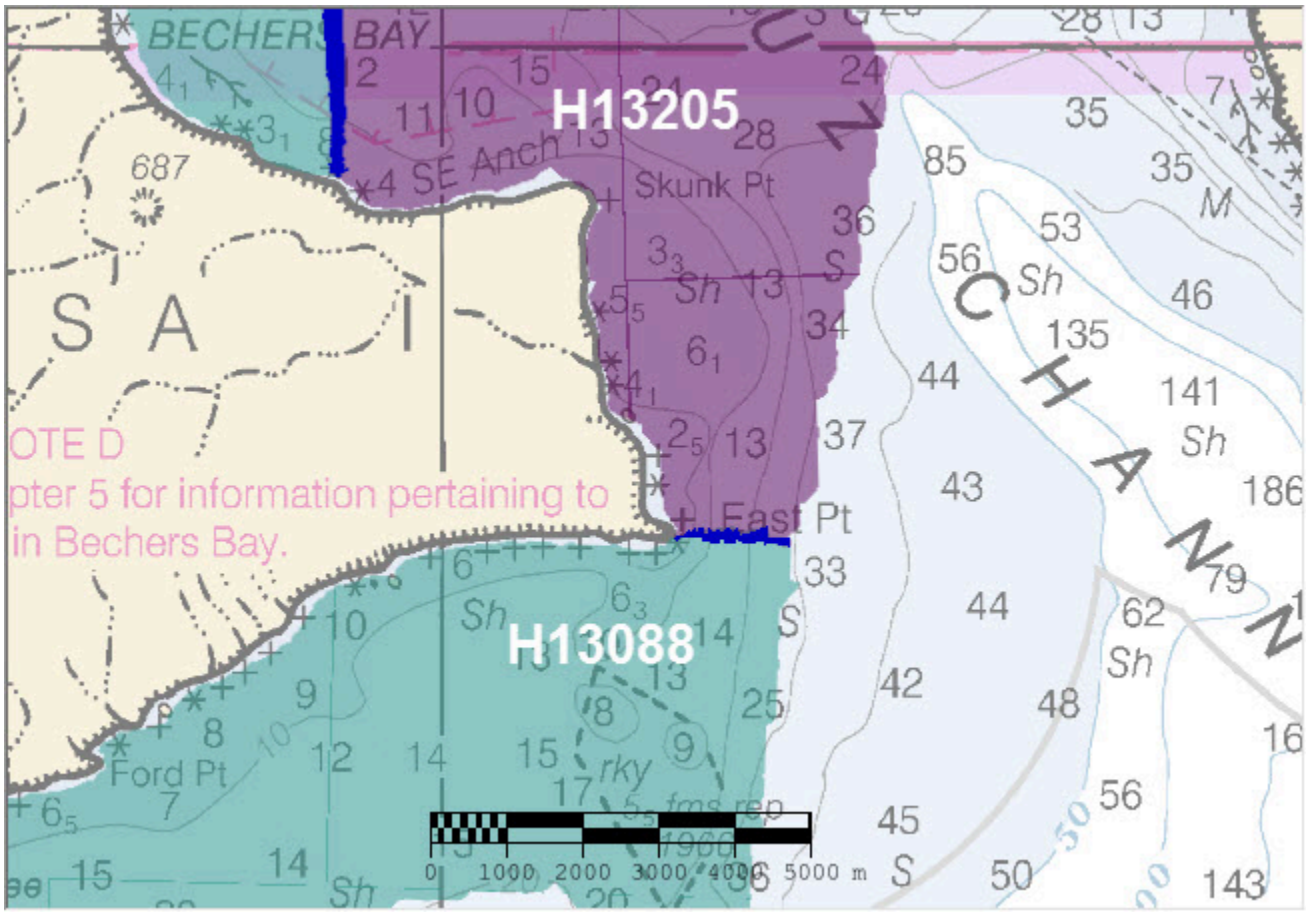


Figure 11: Overview of survey junction between H13205 and H13088.

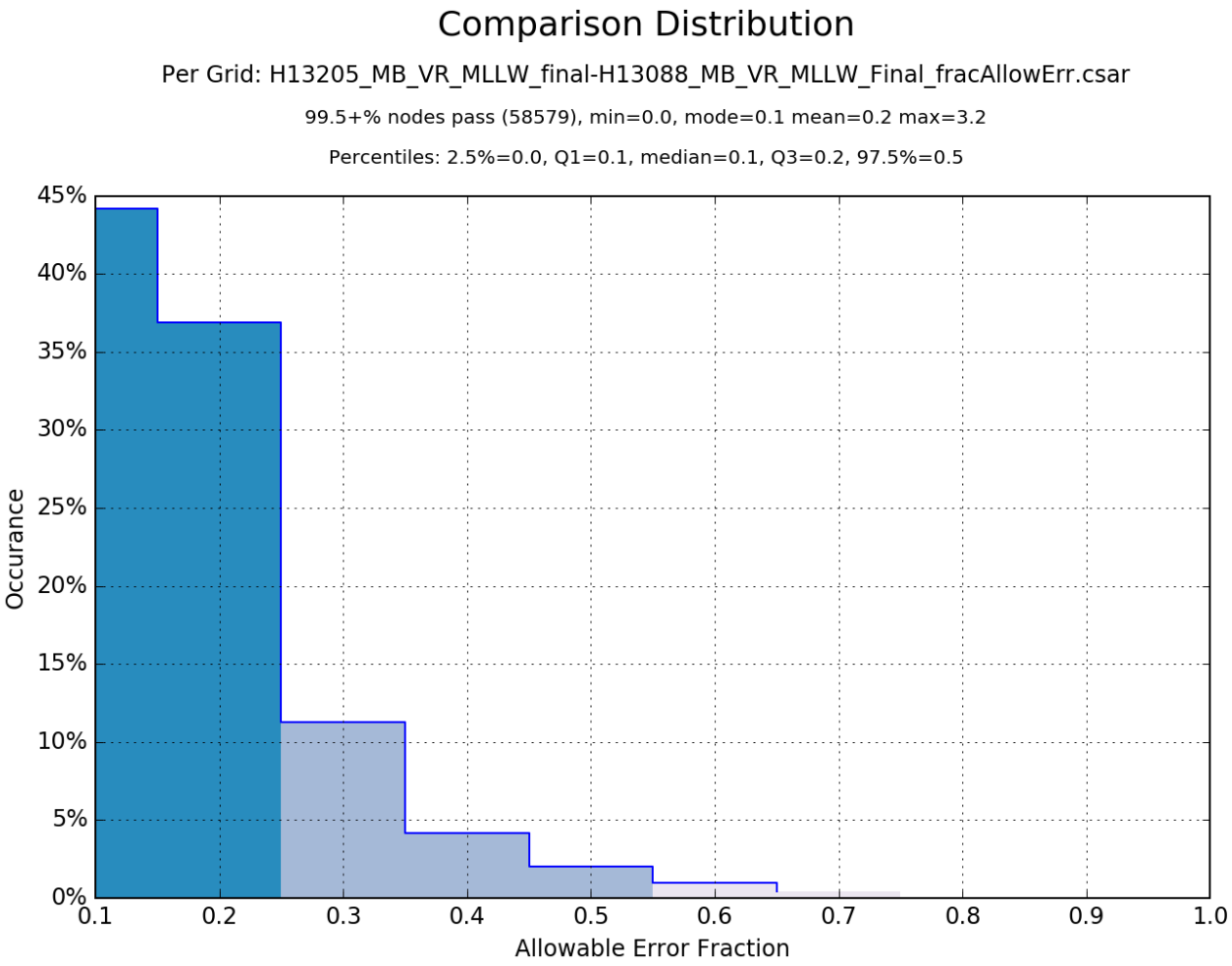
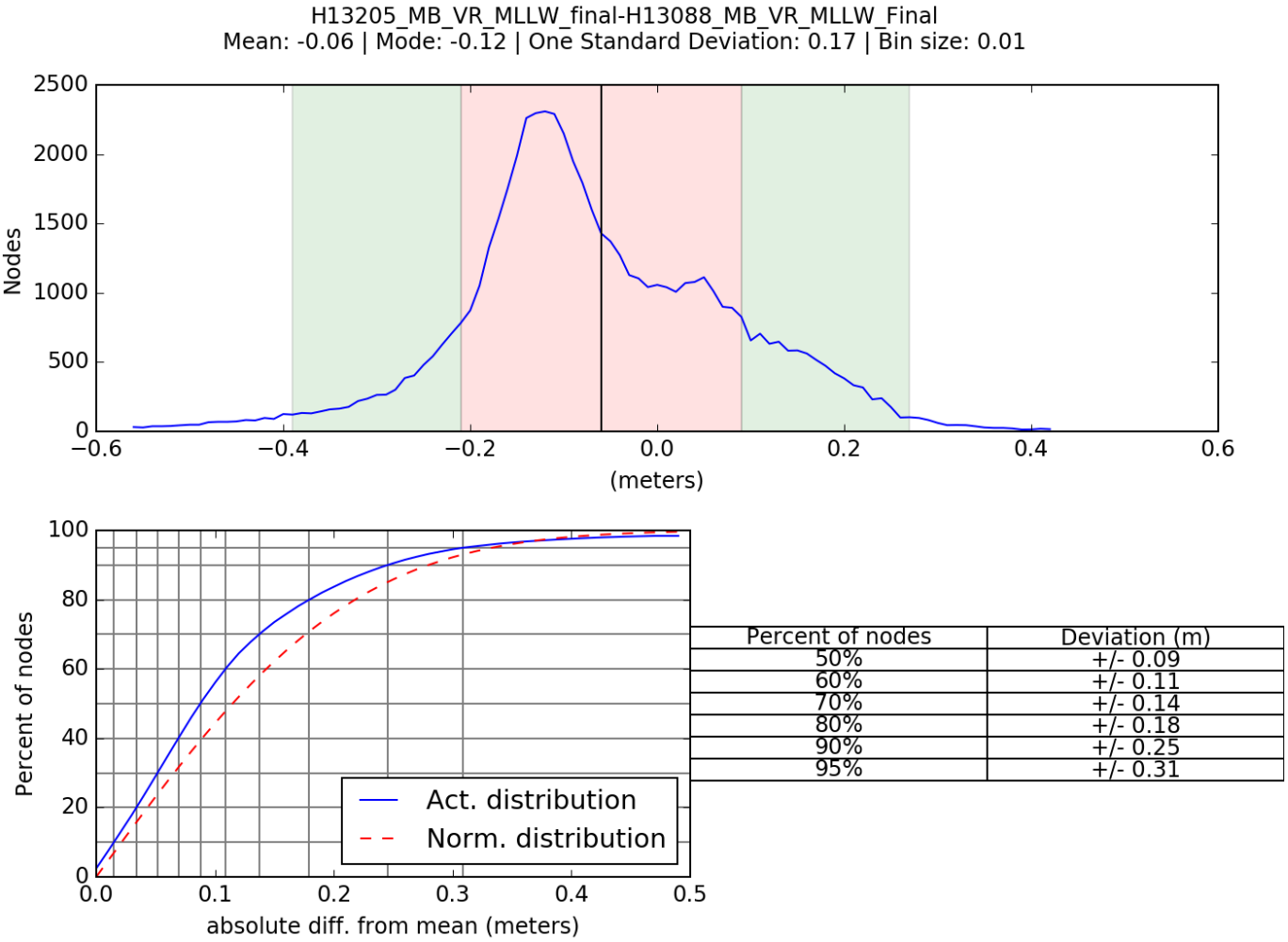


Figure 12: Pydro derived plot showing allowable error between H13205 and H13088.



Percent of nodes	Deviation (m)
50%	+/- 0.09
60%	+/- 0.11
70%	+/- 0.14
80%	+/- 0.18
90%	+/- 0.25
95%	+/- 0.31

Figure 13: Pydro derived plot showing H13205 and H13088 comparison statistics.

H13087

The junction with 2018 survey H13087 encompassed approximately 0.9 square nautical miles along the western boundary of H13087. Pydro's Compare Grids results showed that 99.5+% of nodes in the common area met NOAA allowable error standards.

Analysis of the difference surface indicated that H13205 is an average of 0.01 meters deeper than H13087 with a standard deviation of 0.10 meters. See below graphs for more information.

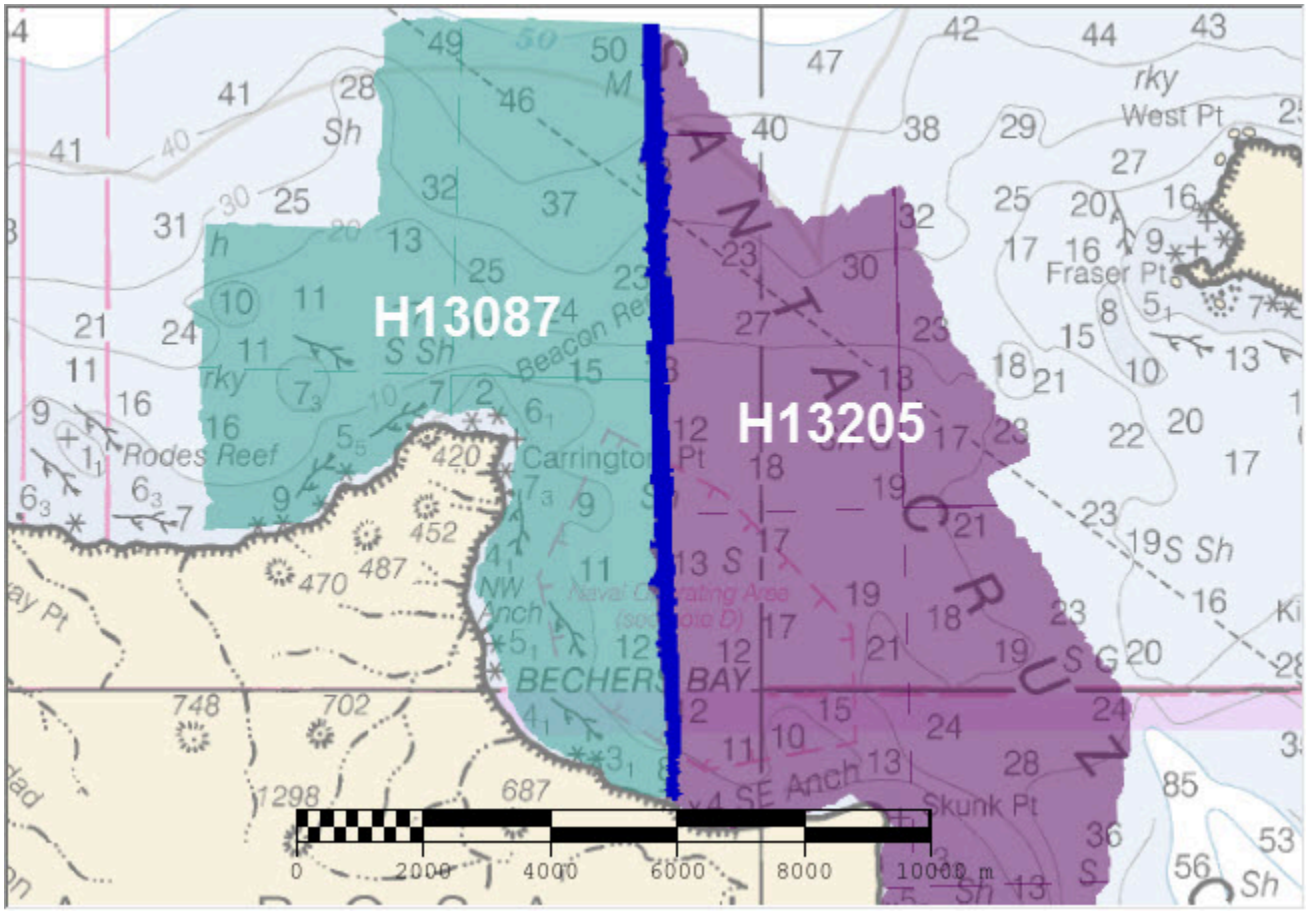


Figure 14: Overview of survey junction between H13205 and H13087.

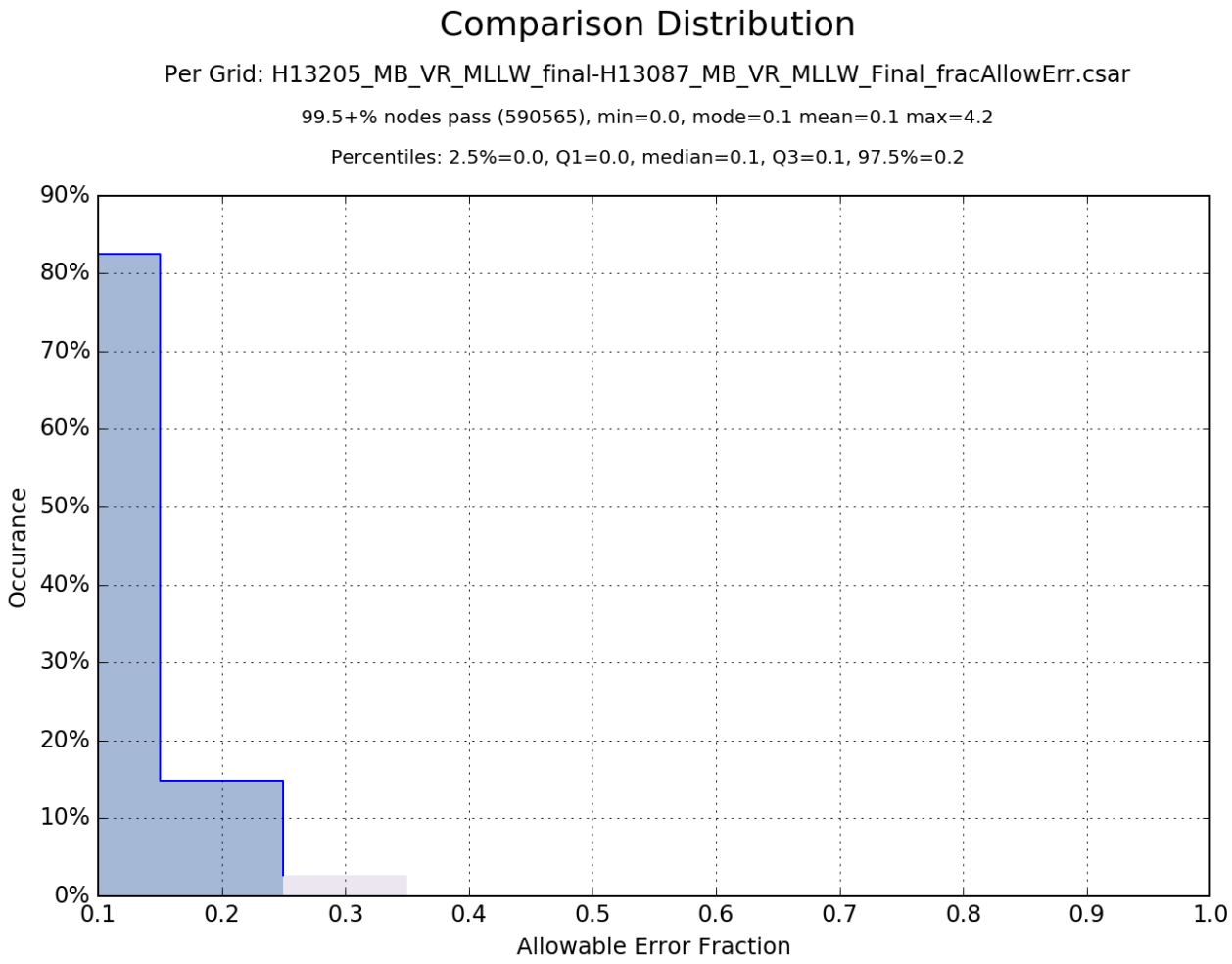
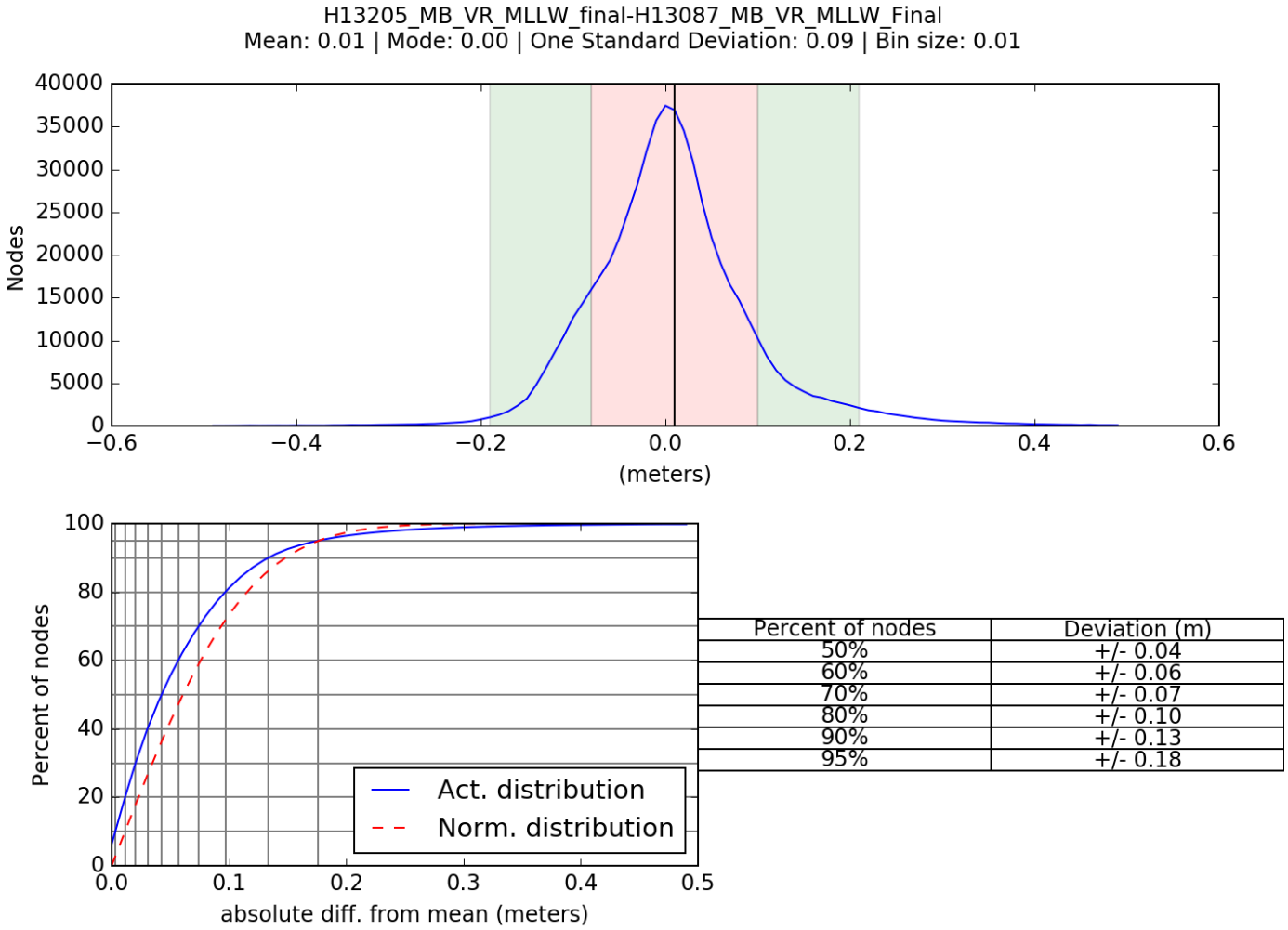


Figure 15: Pydro derived plot showing allowable error between H13205 and H13087.



Percent of nodes	Deviation (m)
50%	+/- 0.04
60%	+/- 0.06
70%	+/- 0.07
80%	+/- 0.10
90%	+/- 0.13
95%	+/- 0.18

Figure 16: Pydro derived plot showing H13205 and H13087 comparison statistics.

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

2801 Roll Bias Adjustment

An intermittent, minor roll bias was noted on some H13205 2801 MBES data. Numerous possible equipment and software related issues were investigated, however at the time of this report, a conclusive

cause of the offset has yet to be determined. A value of -0.175 degrees roll was added to 2801_EM2040.hvf in order to address this slight bias. All submitted H13205 MBES data meet HSSD specifications. TPU and Crossline Comparison analysis also indicates an improvement in data correlation.

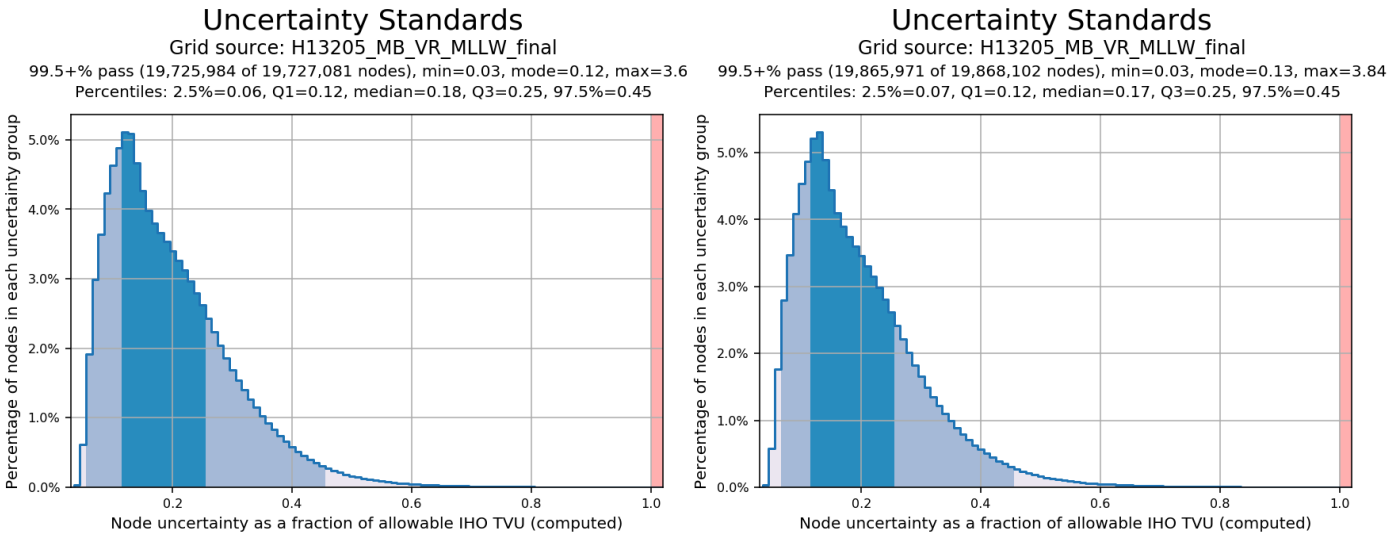


Figure 17: Pydro derived QC TVU histograms of pre (left) and post (right) roll corrected H13205 MBES data.

B.2.6 Factors Affecting Soundings

Suboptimal Sound Speed Correction

Due to water column variations such as thermal layering and salinity differences, a distinct demarcation of water masses was sometimes encountered in the field. At times, this proved problematic in the acquisition and application of optimal sound speed correction data. Despite the best efforts of the hydrographers to conduct sufficient sound speed casts distributed spatially and temporally, in some areas, particularly in the northern part of the survey, sound speed correction was suboptimal. This was evidenced by the appearance of systematic artifacts in the survey grid and the characteristic "smiles" or "frowns" of the data when viewed in subset editor. To address this issue, the Hydrographer rejected the most egregious outer beam soundings obviously in error in an attempt to produce a surface that best represented the sea floor. All examined sound speed related offsets were observed to be within NOAA HSSD standards.

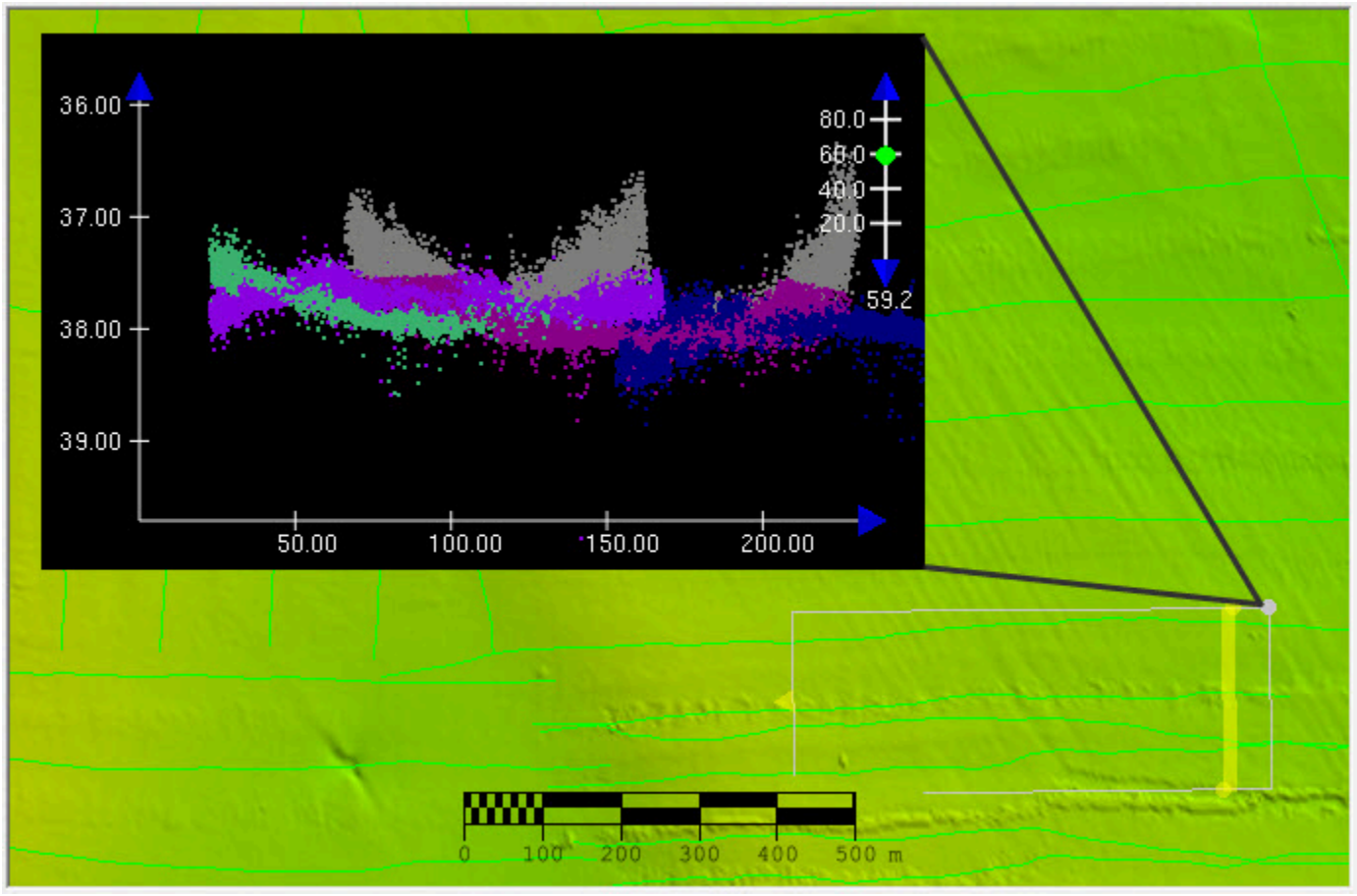


Figure 18: Example of area with suboptimal sound speed correction. Inset shows subset view with rejected sounding colored grey. It should be noted that both surface and subset are shown with high vertical exaggeration.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: 49 Sound speed profiles were acquired for this survey at discrete locations within the survey area at least once every four hours, when significant changes in surface sound speed were observed, or when operating in a new area. Sound speed profiles were obtained using Sea-Bird 19plus SEACAT Profilers. All casts were concatenated into a master file and applied to MBES data using the "Nearest distance within time" (4 hours) profile selection method with a few exceptions.

During processing it was found that occasionally Caris was not selecting the most appropriate cast during sound velocity correction. Due to processed sound speed artifacts the lines below were corrected with the following methods.

Vessel 2802 DN299 lines 0039-0043 and XL 0044 were processed by unchecking the "Use Surface Sound Speed" box.

Vessel 2802 DN281 lines 0004,0005 and 0007-0012 were processed by force applying cast "2018_281_210532.svp".
Vessel 2804 DN278 lines 0001-0007 were processed by force applying cast "2018_278_1542000.svp".

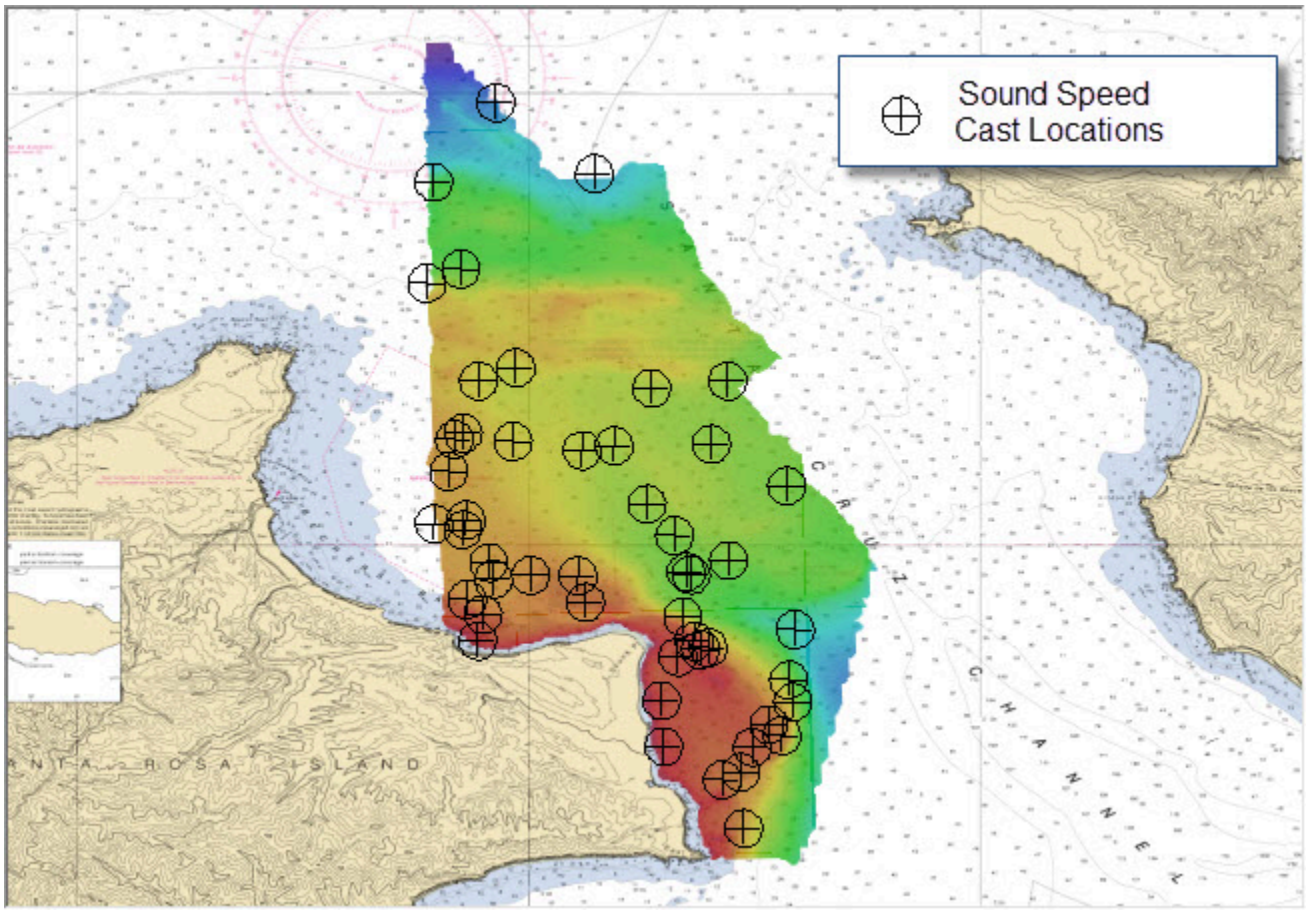


Figure 19: H13205 sound speed cast locations.

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

Raw Backscatter data were acquired as .all files and submitted to NOAA's Pacific Hydrographic Branch. Backscatter data were processed by the field unit and mosaics generated. One mosaic per vessel per frequency has been delivered with this report. All backscatter processing procedures utilized follow those detailed in the DAPR. Software used to process and produce backscatter mosaics were Fledermaus Geocoder Toolbox version 7.8.1.

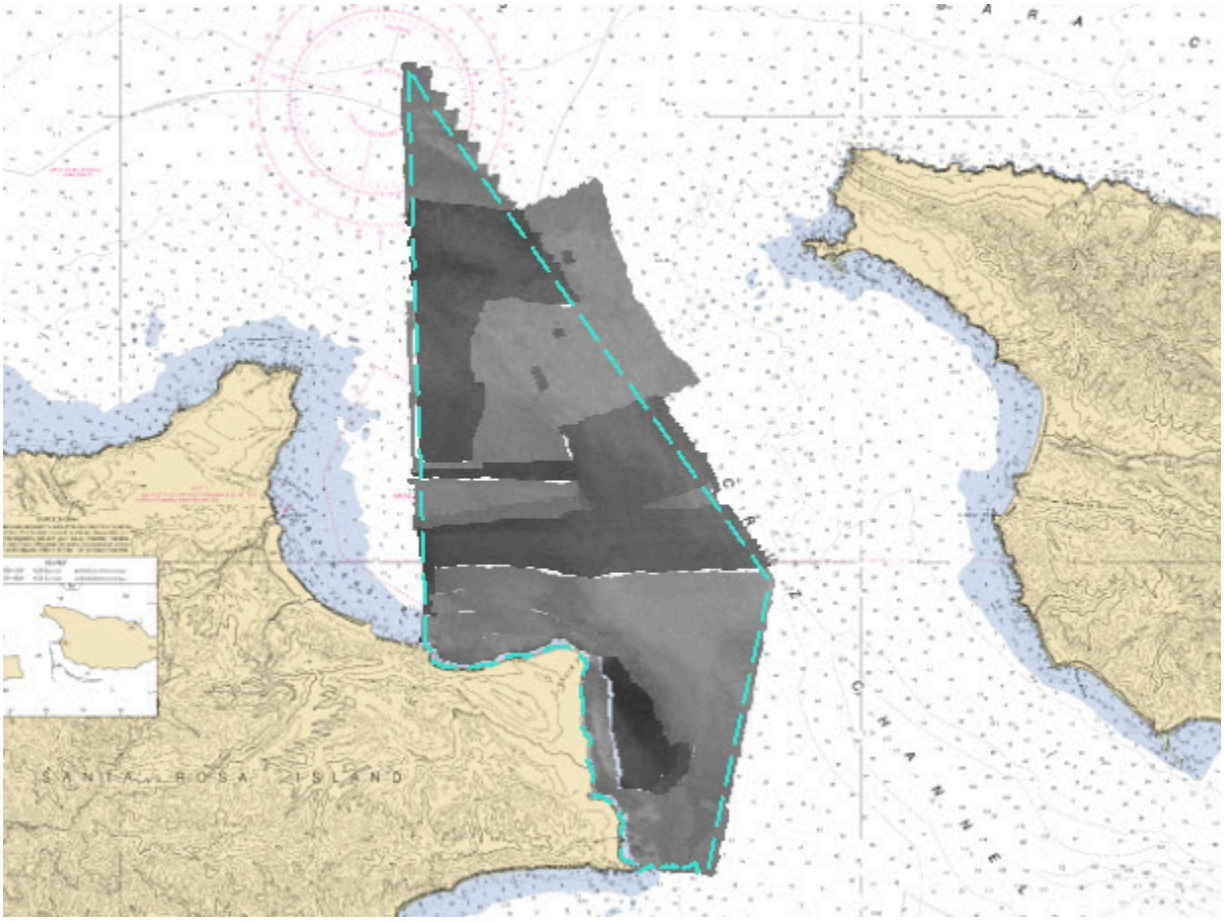


Figure 20: Overview of H13205 backscatter mosaics.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile V_5_7.

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
H13205_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	1.6 meters - 93.3 meters	NOAA_VR	Complete MBES
H13205_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	1.6 meters - 93.3 meters	NOAA_VR	Complete MBES

Table 10: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for depth-based (Ranges) Caris variable-resolution bathymetric grids as specified in the 2018 HSSD.

Pydro QC Tools 2 Detect Fliers was used with default settings to find fliers in a finalized VR surface. Obvious noise was rejected by the hydrographer in Caris Subset Editor. After data cleaning, Detect Fliers was run again and found 2 certain fliers; these were investigated and found to be false positives. The results of the Detect Fliers tool are included as a .000 files in the Separates section of this report.

Two critical soundings were created for this survey; One was identified as a Danger to Navigation. Additional information about DTONS is included in section D.1 Chart Comparison.

C. Vertical and Horizontal Control

Shoreline features were reduced to MLLW using traditional tide methods via TCARI. All MBES bathymetry were acquired relative to the ellipsoid and reduced to MLLW via VDATUM.

C.1 Vertical Control

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

Traditional Methods Used:

- TCARI

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Los Angeles, CA	9410660
Santa Monica, CA	9410840
Santa Barbara, CA	9411340
Oil Platform Harvest, CA	9411406
Port San Luis, CA	9412110
Monterey, CA	9413450

Table 11: NWLON Tide Stations

File Name	Status
H13205_tides	Final Approved

Table 12: Water Level Files (.tid)

File Name	Status
L397RA2018.tc	Final

Table 13: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 10/29/2018. The final tide note was received on 01/29/2019.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	OPR_L397_RA_18_lgECpoly_xyNAD83-MLLW_geoid12b.csar

Table 14: ERS method and SEP file

C.2 Horizontal Control

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 11.

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control for this survey.

C.3 Additional Horizontal or Vertical Control Issues

C.3.1 SBET Processing Method

Precise Positioning-Real Time Extended (PP-RTX) processing methods were used in Applanix POSPac MMS 8.2.1 software to produce SBETs for post-processing horizontal correction.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between H13205 survey data and Electronic Navigation Chart (ENC) US5CA66M using CUBE finalized VR surfaces, selected soundings and contours created in Caris HIPS.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5CA66M	1:40000	4	08/24/2017	08/24/2017	NO

Table 15: Largest Scale ENCs

US5CA66M

A comparison was made between H13205 derived survey contours and ENC US5CA66M with the following results:

The ENC's depth curves are in general agreement with H13205 derived survey contours with a few notable exceptions. Approximately 400 meters northwest of the Southeast anchorage, H13205 data revealed an uncharted 5 fathom shoal. The offshore 5 fathom shoal east of Skunk Point extends approximately 200 meters farther seaward than charted. Additionally in this same area H13205 data revealed an uncharted 3 fathom shoal. In the northern portion of Santa Cruz Channel the 20-fathom survey contour line is approximately 500 -1500 meters farther west than its charted position.

Two Dangers to Navigations (DTON) were identified in the H13205 survey area and submitted to Marine Chart Division's (MCD) Nautical Data Branch. Refer to H13205_DTON.pdf for location and descriptions.

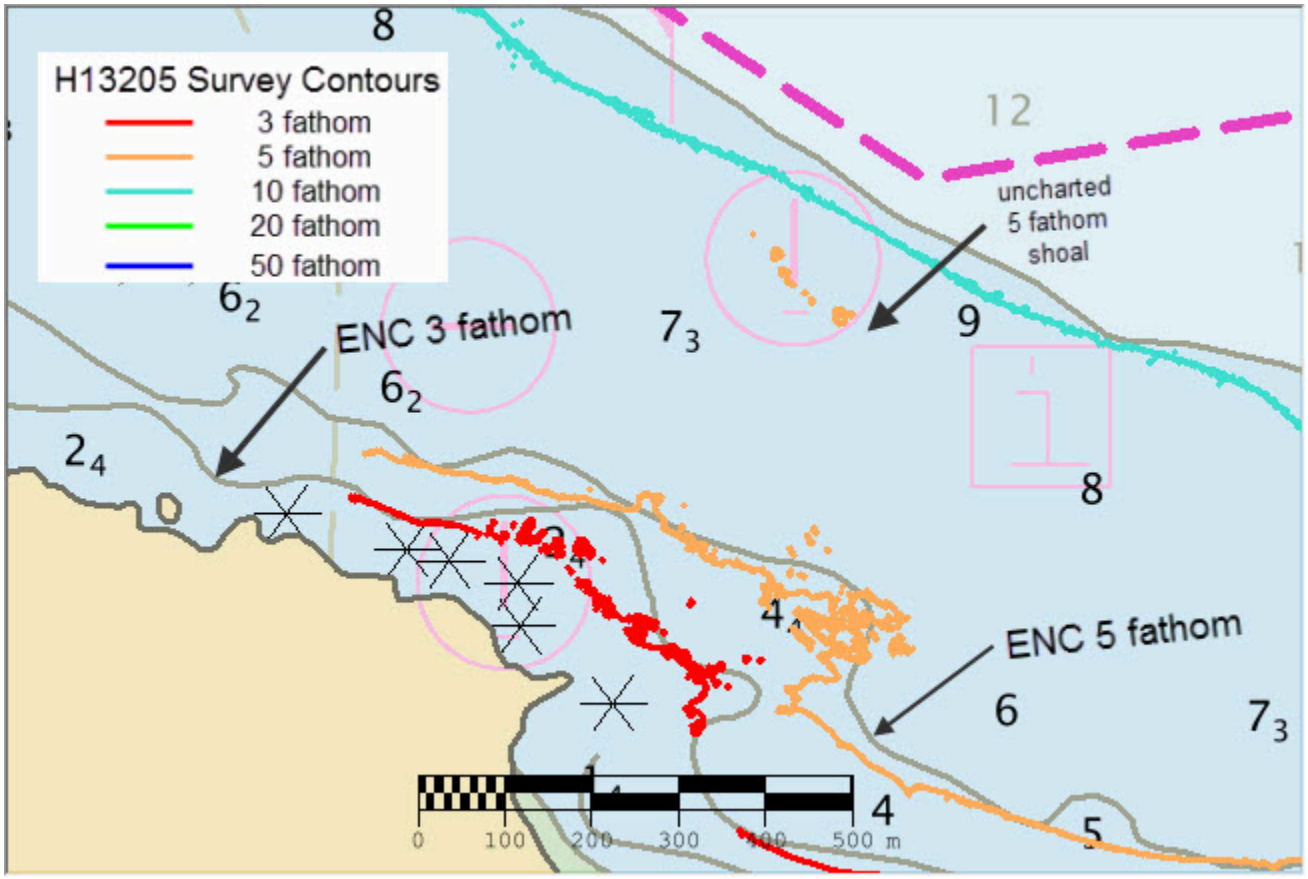


Figure 21: Section of ENC US5CA66M showing uncharted 5 fathom shoal near Southeast anchorage.

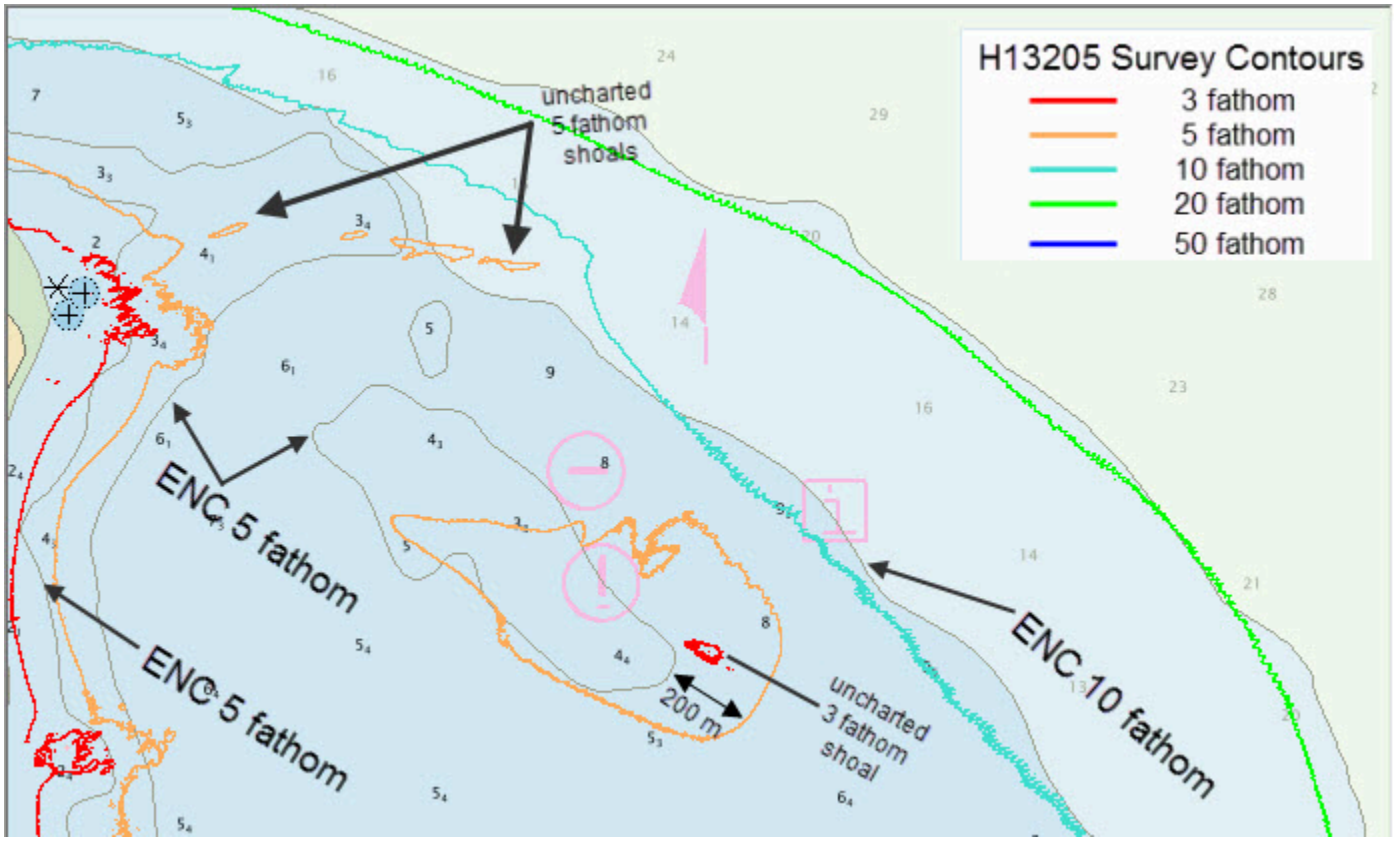


Figure 22: Shoal east of Skunk Point overlaid with 3,5,10, and 20 fathom survey contours derived from H13205.

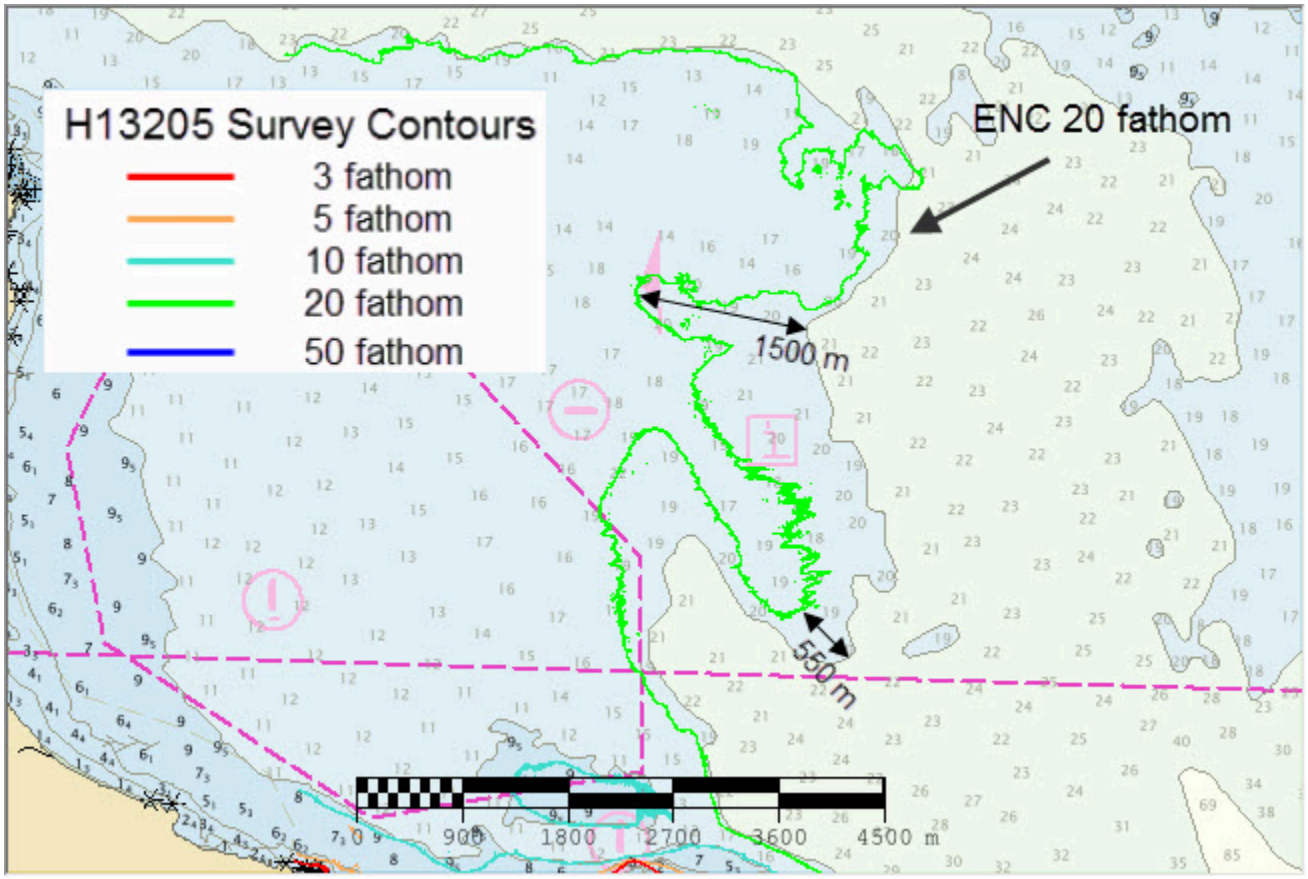


Figure 23: Section of ENC US5CA66M overlaid with 20-fathom survey contours derived from H13205. Uncharted 3 fathom shoal was submitted as a DTON.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

No charted features exist for this survey.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Shoal and Hazardous Features

Shoals and features of navigational significance are discussed in the chart comparison sections above or are included in the H13205 Final Feature File submitted with this report.

D.1.6 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.1.7 Bottom Samples

No bottom samples were required for this survey.

D.2 Additional Results

D.2.1 Shoreline

Limited shoreline verification was conducted in accordance with applicable sections of NOAA HSSD and FPM using the Project Reference File (PRF) and Composite Source File (CSF) provided with the Project Instructions. In the field, all assigned features that were safe to approach, were addressed as required with S-57 attribution and recorded in the H13205_FFF to best represent the features at chart scale. This file also includes new features found in the field as well as recommendations to update, retain or delete assigned features.

D.2.2 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

D.2.3 Overhead Features

No overhead features exist for this survey.

D.2.4 Submarine Features

No submarine features exist for this survey.

D.2.5 Platforms

No platforms exist for this survey.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.8 Construction and Dredging

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

D.2.9 New Survey Recommendation

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

D.2.10 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 field sheets, 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 Specifications and Deliverables, 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
Benjamin K. Evans, CDR/NOAA	Commanding Officer	04/09/2019	Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2019.04.17 16:21:18 -07'00'
Hadley A. Owen, LT/NOAA	Field Operations Officer	04/09/2019	Digitally signed by OWEN.HADLEY.ANNE.1410967070 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=OWEN.HADLEY.ANNE.1410967070 Date: 2019.04.10 07:25:07 -07'00'
James B. Jacobson	Chief Survey Technician	04/09/2019	JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2019.04.10 09:18:58 -07'00'
Audrey E. Jerauld	Sheet Manager	04/09/2019	JERAULD.AUDREY.ELIZABETH.1170496260 2019.04.09 14:20:18 -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	Continuously 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
ERTDM	Ellipsoidally Referenced Tidal Datum Model
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

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
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	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	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
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File

APPROVAL PAGE

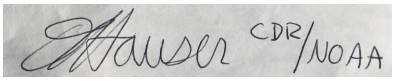
H13205

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

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey products

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.



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Approved:_____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch