

W00466

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: W00466

LOCALITY

State(s): California

General Locality: Channel Islands, California

Sub-locality: Catalina Island

2008

CHIEF OF PARTY
Pat Iampietro

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		W00466
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:	Channel Islands, California	
Sub-Locality:	Catalina Island	
Scale:	40000	
Dates of Survey:	07/06/2008 to 07/26/2008	
Instructions Dated:	09/27/2019	
Project Number:	ESD-PHB-18	
Field Unit:	Seafloor Mapping Lab, California State University Monterey Bay	
Chief of Party:	Pat Iampietro	
Soundings by:	Reson SeaBat 7125 (MBES) Reson SeaBat 7111 (MBES)	
Imagery by:	N/A	
Verification by:	Pacific Hydrographic Branch	
Soundings Acquired in:	meters at Mean Lower Low Water	
Remarks: <i>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/.</i>		

DESCRIPTIVE REPORT MEMO

September 27, 2019

MEMORANDUM FOR: Pacific Hydrographic Branch

FROM: Report prepared by PHB on behalf of field unit
Pat Iampietro
Chief Hydrographer, Seafloor Mapping Lab at California State
University Monterey Bay

SUBJECT: Submission of Survey W00466

The CSUMB Seafloor Mapping Lab (SFML) mapping services to the Resources Legacy Fund Foundation (RLFF) and California State Coastal Conservancy (SCC) included the collection and management of fine-scale seafloor data of select areas of state waters around Santa Catalina Island, Southern California in support of the Marine Life Protection Act Initiative (Phase 3) through the California Coastal and Marine Initiative (CCMI). Mapping efforts (Tier 1 & Tier 2 map products) followed those prescribed by the Ocean Protection Council California Seafloor Mapping Project.

There were no products created for this survey.

All soundings were reduced to Mean Lower Low Water using VDatum. 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.

This material is based on high-frequency GPS CORS base station services provided by the UNAVCO Facility with support from the National Science Foundation and NASA under NSF Cooperative Agreement No. EAR-0735156. Real-time vessel navigation was via an Applanix POS/MV 320 v4 system with input from a Cnav® enabled NAVCON 2050 GPS. Vessel attitude (motion), delayed heave and position data were logged at 200 Hz using an Applanix POS/MV 320 v4 system enabled for dual frequency L1/L2 GPS.

Applanix POSPAC software (version 4.31) was used to process the logged POS M/V files and create a Smoothed Best Estimated Trajectory (SBET) composed of an integrated inertial/GPS solution for use in horizontal and vertical positioning of sounding data. Realtime navigation and vertical motion information recorded in HDCS (Hydrographic Data Cleaning System) format survey data were replaced with post-processed IAPPK (Inertially Aided Post-Processed Kinematic) data imported from SBET files. Navigation data were imported at 10Hz, while heave/vertical position data were imported as GPSHeights at 50Hz. The 50Hz GPSHeight data, which incorporated vertical motion due to both high-frequency (heave) as well as lower-frequency (tidal)

oscillations, was used to compute a GPSTide model that references all soundings to NAVD88 (Geoid03) orthometric heights using the appropriate g2003xxx.bin file acquired from the National Geodetic Survey (http://www.ngs.noaa.gov/PC_PROD/GEOID03/index.shtml).

GPS base stations used in POSPAC post-processing are as follows:

Reference Station Name Source UNAVCO Website <http://facility.unavco.org/data/data.html> Base data file name 4819188p.08o Base data file date JD188 2008

Solution source NOAA NGS OPUS Website <http://www.ngs.noaa.gov/OPUS/> Reference Frame NAD_83(CORS96)(EPOCH:2002.0000)

Solution reference point antenna phase center Antenna height (m) 0 Latitude 33 26 48.05038

Longitude 118 28 45.18043 Ellipsoid height (m) 36.979(m)

Reference Station Name Source UNAVCO Website <http://facility.unavco.org/data/data.html> Base data file name 48191890.08o

Base data file date JD189 2008

Solution source NOAA NGS OPUS Website <http://www.ngs.noaa.gov/OPUS/> Reference Frame NAD_83(CORS96)(EPOCH:2002.0000)

Solution reference point antenna phase center Antenna height (m) 0 Latitude 33 26 48.05023

Longitude 118 28 45.18016 Ellipsoid height (m) 36.999(m) ± 2 m horizontal, but varies with depth.

Upon delivery to the Pacific Hydrographic Branch, ASCII files were reduced to MLLW via VDatum.

MBES and side scan data for Santa Catalina Island were collected using a combination of Reson's SeaBat 7111 and SeaBat 7125 sonar systems aboard the R/V VenTresca by the Seafloor Mapping Lab of California State University Monterey Bay. Prior to data collection, a series of planned survey lines were created using the survey navigation and planning software Hypack 2008 from Hypack, Inc. Real-time vessel navigation was via an Applanix POS/MV 320 v4 system (pitch, roll and heading accuracy $\pm 0.02^\circ$, heave accuracy $\pm 5\%$ or 5cm) with input from a Cnav® enabled NAVCON 2050 GPS.

Bathymetric data were post-processed using CARIS HIPS hydrographic data cleaning system software. Applanix POSPAC software (v 4.31) was used to process the logged POS M/V files and create a Smoothed Best Estimated Trajectory (SBET) composed of an integrated inertial/GPS solution for use in horizontal and vertical positioning of sounding data. Correction for vertical oscillation due to heave and tide was accomplished using these SBET files. Final x,y,z soundings, surface models, and derived products are relative to the NAVD88 vertical datum.

Erroneous soundings were removed in CARIS HIPS via basic filtering and detailed swath and subset cleaning; the remaining high-confidence soundings were used in surface model creation and final product generation. Soundings (x,y,z) were exported from a Swath Angle Bathymetry Associated with Statistical Error (BASE) Surface as an ASCII file with 2m, 5m, 10m, 25m, 100m, 300m, and 500m spacing. The 2m, 5m, or 10m (depending on depth range) decimated x,y,z ASCII text file was imported into Fledermaus AverageGridder to create 2m digital elevation model (DEM) grid(s). The 2m (5m, 10m) Fledermaus grid was exported as an ArcInfo ASCII raster file (.asc),

which was imported into ArcGIS Spatial Analyst to generate a 2m (5m, 10m) bathymetry ArcInfo grid.

The Pacific Hydrographic Branch utilized the 5m surface for data review and compilation purposes. During office review two different CATZOCs were determined to be used. The 5 meter surface was split into two: one with depths generally less than 20 meters, and those greater than 20 meters. Isolated groups of 20 meter areas were generalized for the ease of compilation. Uncertainties for surface W00466_MB_5m_MLLW_1of2 were calculated for CATZOC C standards ($\text{Uncertainty} = 2.00 + (0.02 * \text{Depth})$) and uncertainties for surface W00466_MB_5m_MLLW_2of2 were calculated for CATZOC B standards ($\text{Uncertainty} = 1.00 + (0.02 * \text{Depth})$).

All data were reviewed for DTONs and none were identified in this survey.

Seafloor Mapping Lab at California State University Monterey Bay acquired the data outlined in this report. Data are available at http://seafloor.csumb.edu/SFMLwebDATA_s.htm#CI

Holidays exist throughout the survey. Some are due to poor overlap between survey lines. Generally these holidays exist in depths deeper than 60 meters and on slopes. Additionally, holidays exist in areas deeper than 100 meters of water because the resolution of the surface does not support the density at these depths.

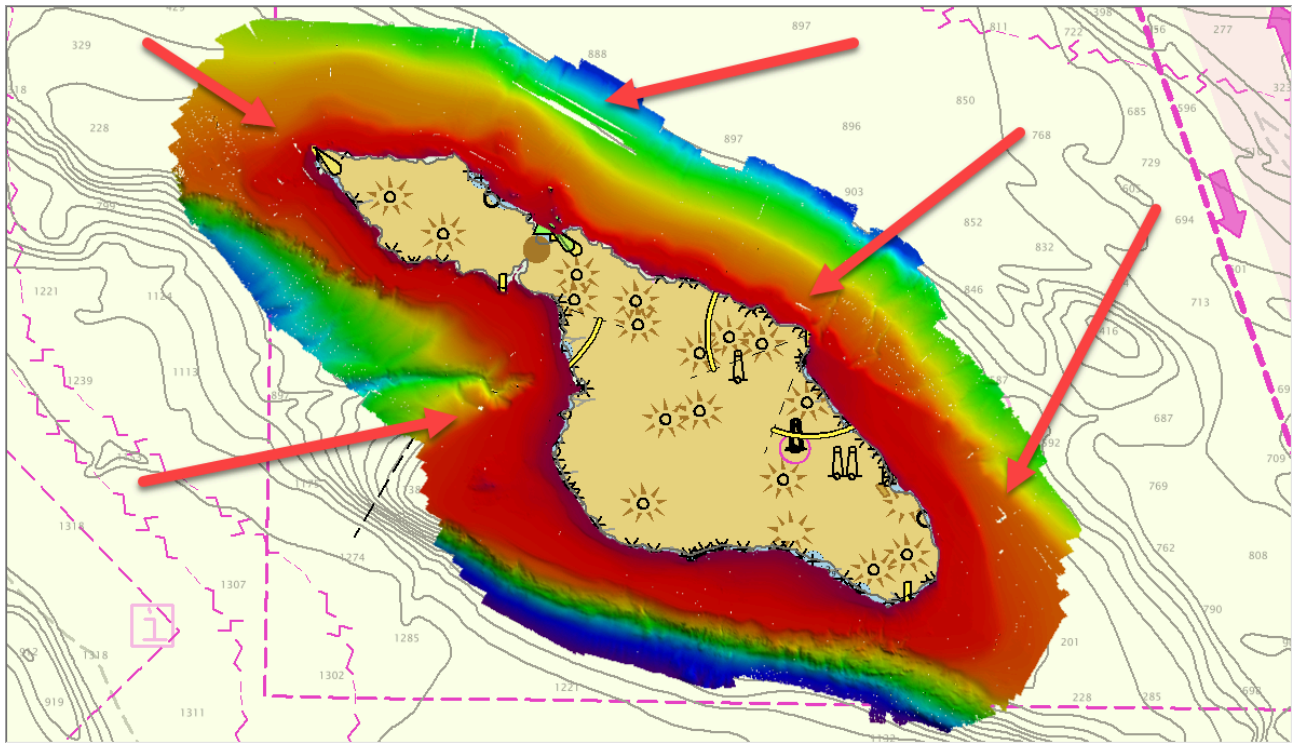
In general, the data shows very good internal consistency. It appears that the surface is free of fliers, though without the underlying HDCS data it is difficult to determine. In areas deeper than 100 meters, motion artifacts are noted. This is partially due to the resolution of the submitted data. Because the depth of these soundings (between 100-1070m), these issues do not pose a threat to safe navigation.

Flier finder and visual inspection of the 5m surface were performed to search for fliers.

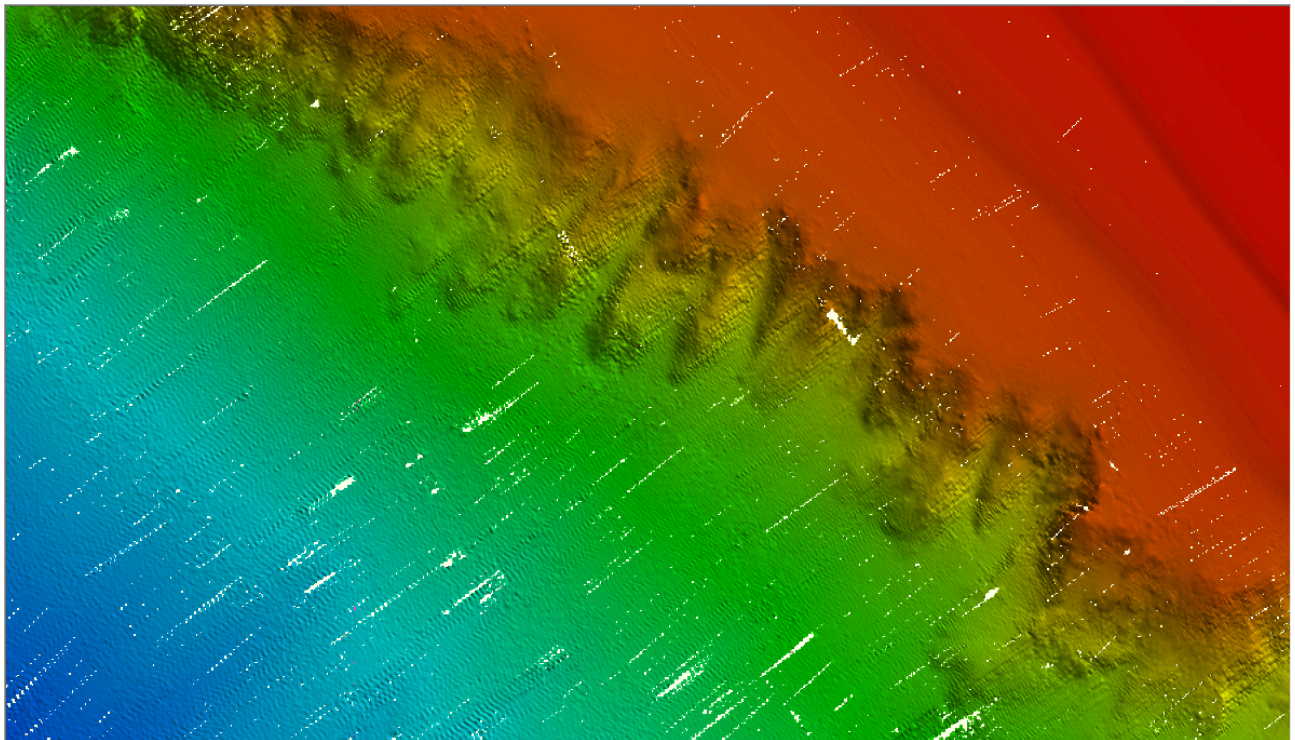
Many features were unaddressed. Due to the coarse resolution in the shallow area (5m) and the lack of HDCS data, the reviewer was unable to disprove charted features. It is highly recommended to send a survey party to perform feature investigations in the vicinity of Catalina Island.

A chart comparison was performed by the reviewer and it found that in general the chart was 5 meters deeper than charted with a standard deviation of 16.3 meters. Most differences occurred over steep slopes.

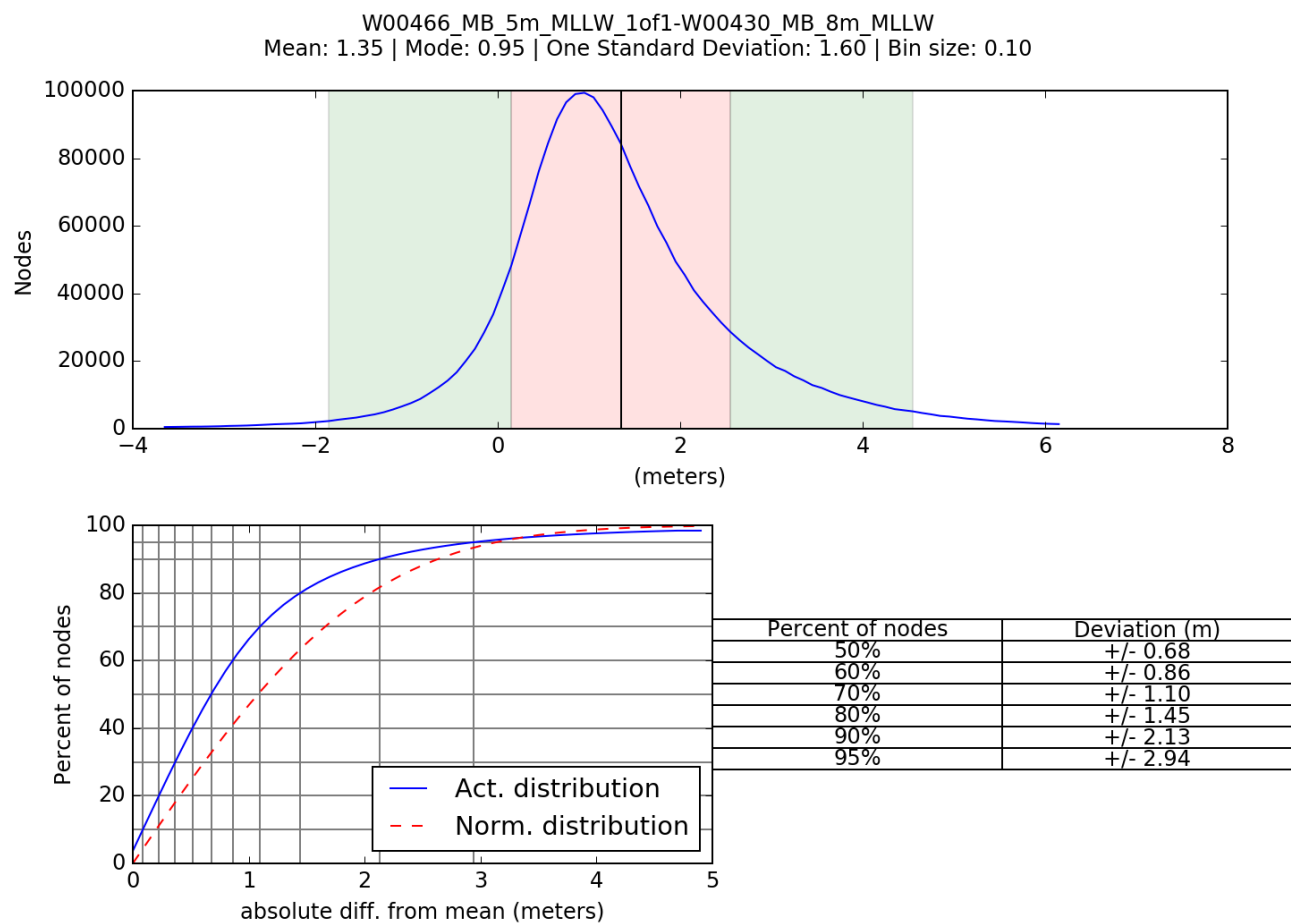
Contemporary junction analysis between W00466 and other surveys showed good correlation (see analysis below). The junction surveys were all collected by the R/V Nautilus from 2016-2017.



Example of holidays caused due to poor overlap between lines.



Example of holidays caused by improper resolution of data.



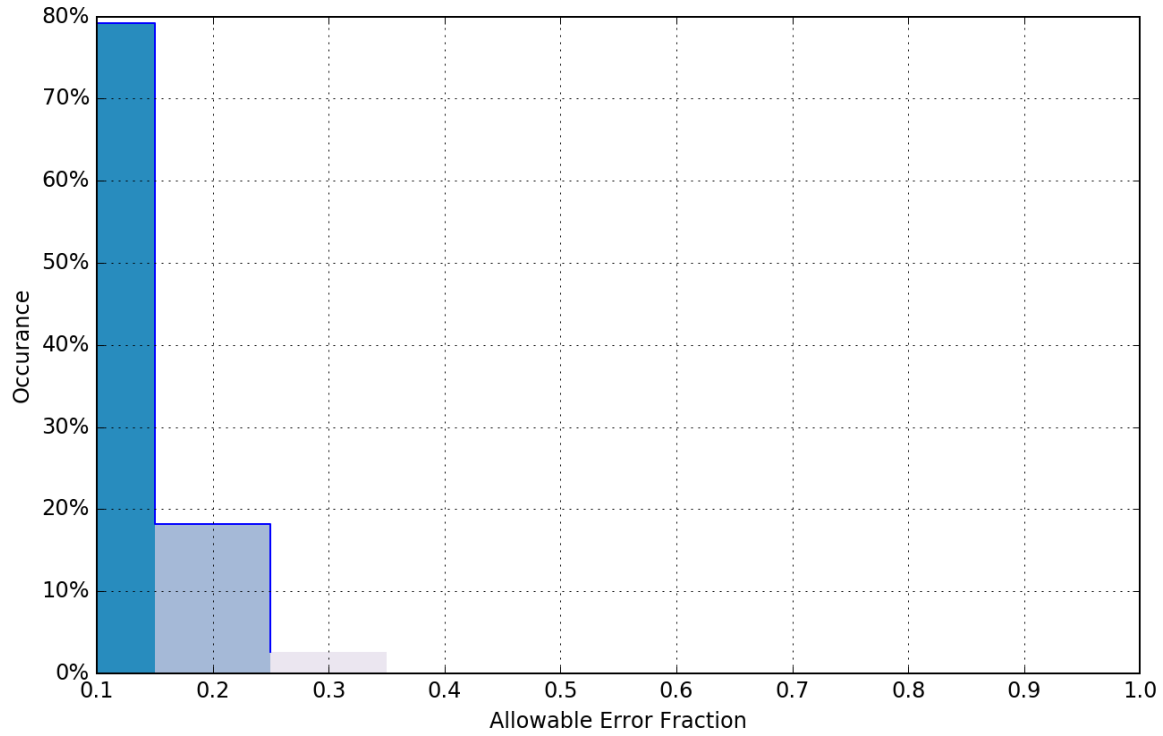
Junction comparison between W00466 and W00430.

Comparison Distribution

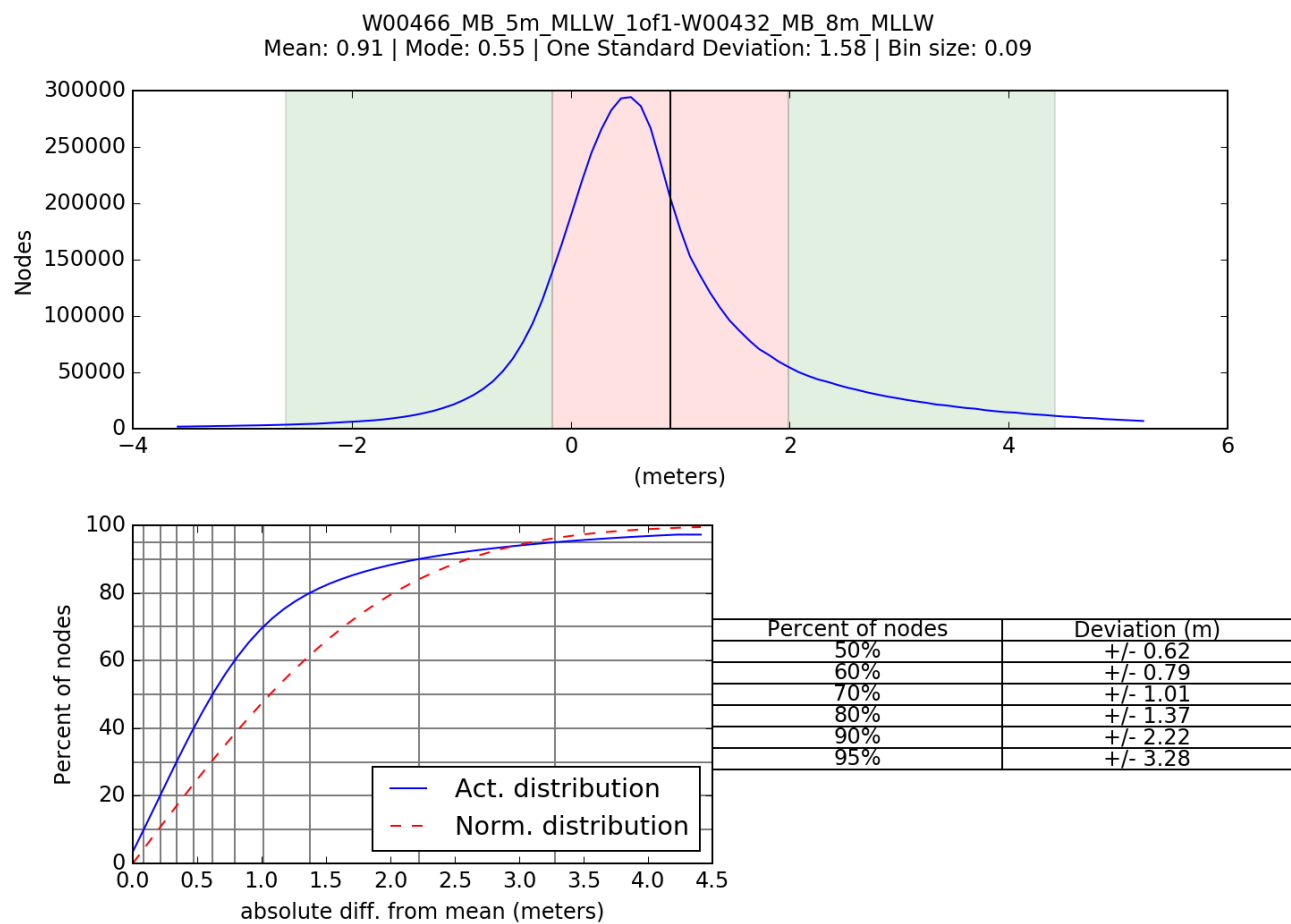
Per Grid: W00466_MB_5m_MLLW_1of1-W00430_MB_8m_MLLW_fracAllowErr.csar

99.5+% nodes pass (2287742), min=0.0, mode=0.1 mean=0.1 max=2.7

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



Junction comparison between W00466 and W00430.



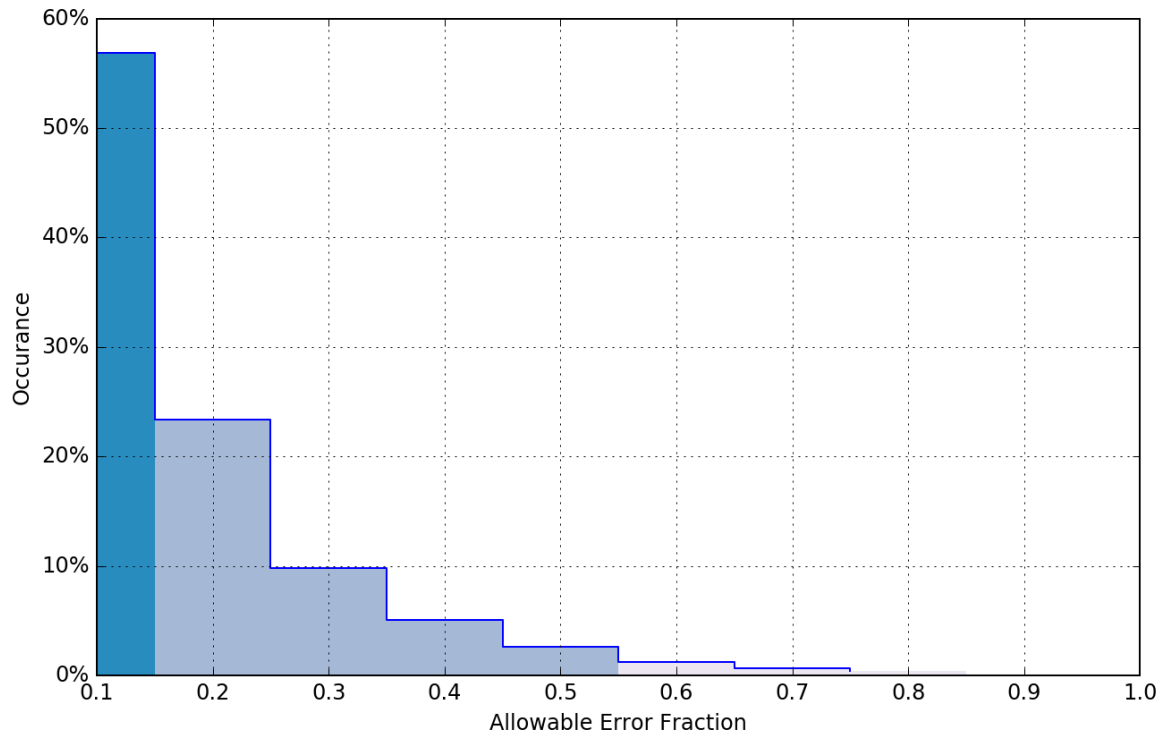
Junction comparison between W00466 and W00432.

Comparison Distribution

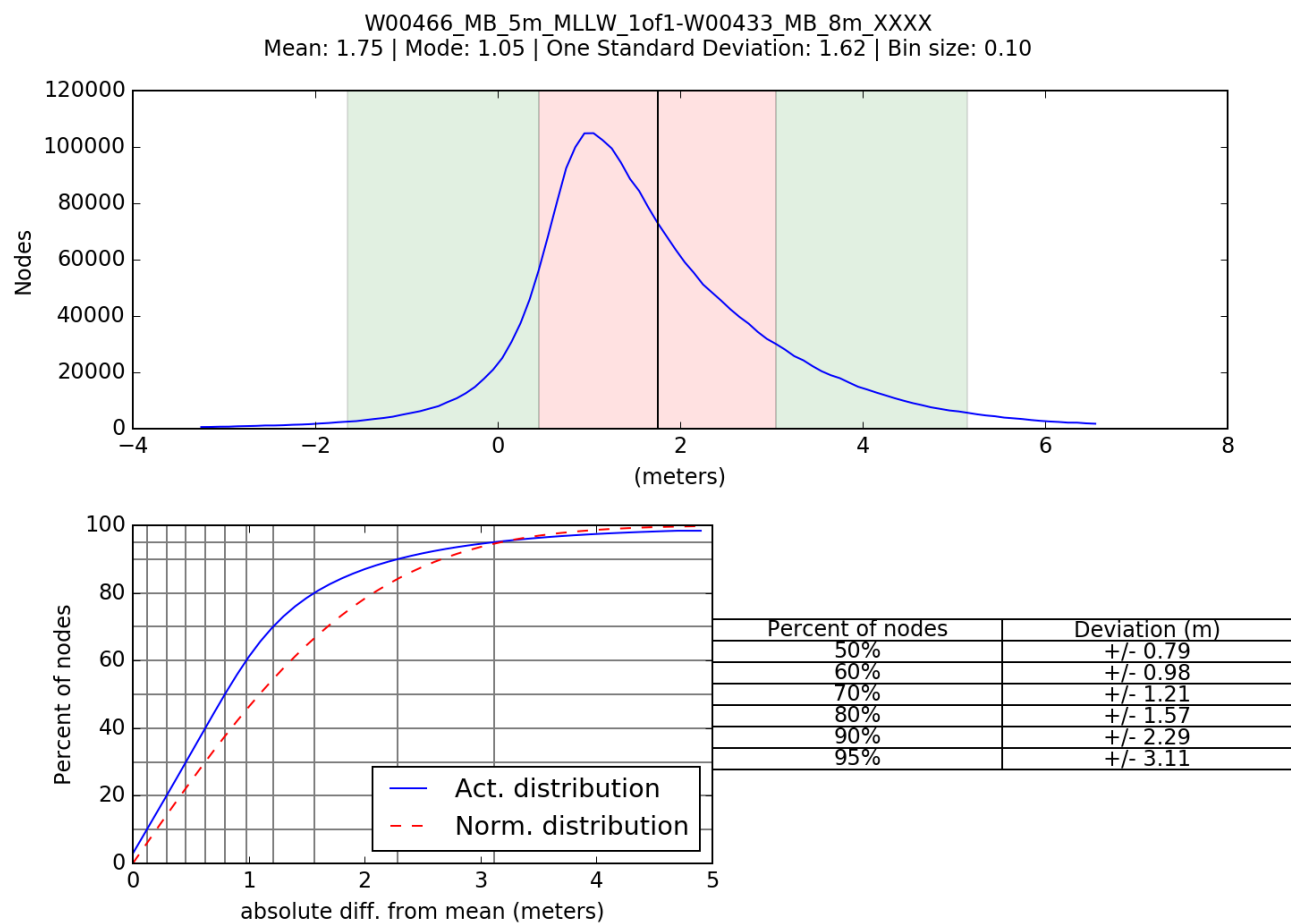
Per Grid: W00466_MB_5m_MLLW_1of1-W00432_MB_8m_MLLW_fracAllowErr.csar

99.5+% nodes pass (5910862), min=0.0, mode=0.1 mean=0.1 max=18.3

Percentiles: 2.5%=0.0, Q1=0.0, median=0.1, Q3=0.2, 97.5%=0.5



Junction comparison between W00466 and W00432.



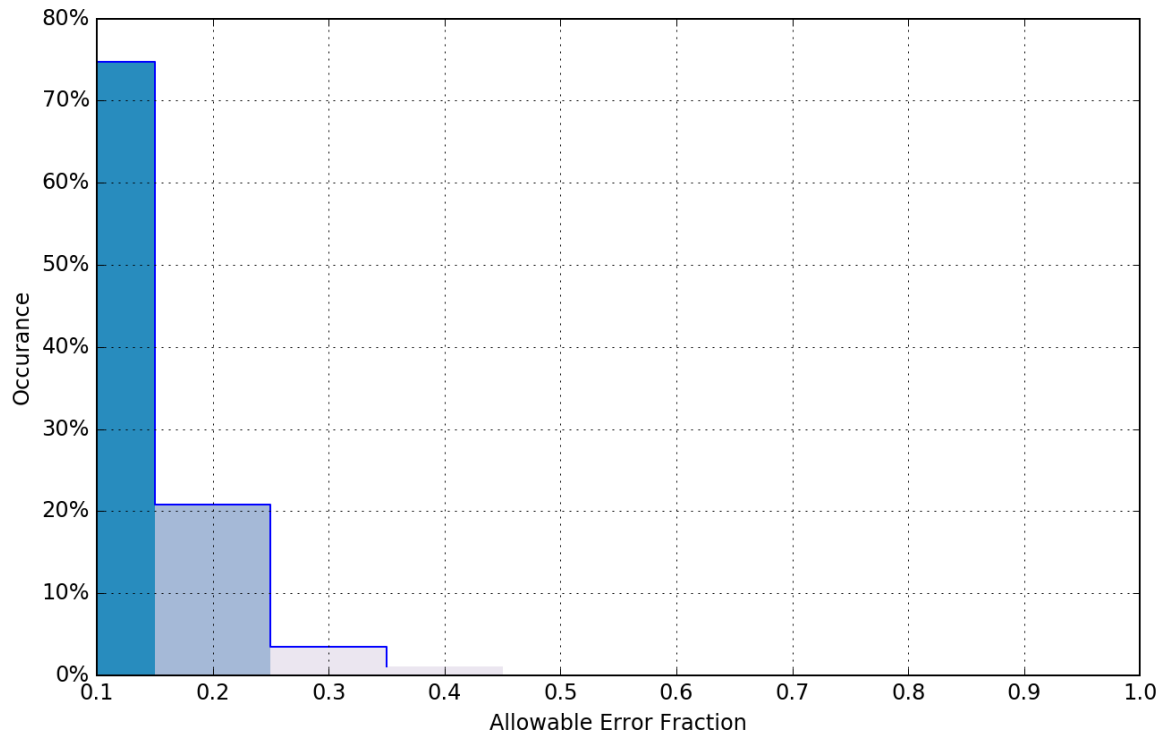
Junction comparison between W00466 and W00433.

Comparison Distribution

Per Grid: W00466_MB_5m_MLLW_1of1-W00433_MB_8m_XXX_fracAllowErr.csar

99.5+% nodes pass (2511044), min=0.0, mode=0.1 mean=0.1 max=3.1

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



Junction comparison between W00466 and W00433.

This survey does meet charting specifications and is adequate to supersede prior data.

APPROVAL PAGE

W00466

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)
- 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.

Approved: _____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch