Improving hydrographic data quality with MAC assessment tools and the HydrOffice suite

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Giuseppe Masetti
Kevin Jerram
Paul Johnson
Vicki Ferrini

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HydrOffice under NOAA grant NA20NOS4000196

MAC Assessment Tools

(Workshop this afternoon)

Ocean Mapping Community Wiki

github.com/oceanmapping/community/wiki

omcadmin@ccom.unh.edu or *mac-help@unols.org*

Assessment Tools

kjerram edited this page on Apr 6 · 40 revisions

Overview

Multibeam assessment tools described here include:

1. Swath Coverage Plotter v0.2.3
2. Swath Accuracy Plotter v0.1.0
3. BIST Plotter v0.2.2
4. File Trimmer v0.1.5
5. ECDIS Converter v0.0.3

Distribution

The standalone Python apps are available through several avenues for different users:

1. **Typical users**: each app is packaged with all libraries and zipped for easy download on Google Drive (with version notes).
   i. Just download, unzip, and run the .exe (similar to Sound Speed Manager).
   ii. The zipped packages are not available through GitHub due to file size limits.
2. **GitHub users**: apps and libraries are packaged in the multibeam_tools_distribution repository.
   i. Due to GitHub's file size limits, these are not zipped and may be more cumbersome to download for normal use.
3. **Python folks**: source code is available in the multibeam_tools repository.

Using the tools

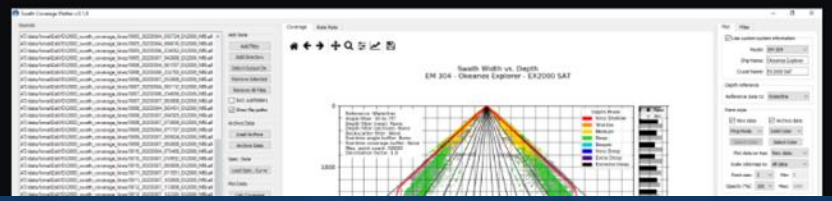
These tools are intended to give users the same plotting and reporting functions used by the MAC for routine performance testing (e.g., sea acceptance trials and quality assurance testing). Currently, only Kongsberg data formats are supported.

Hint: Most of the app features include tooltips; just hover over a button, list, or checkbox to get more information!

Instructions for data acquisition and processing are presented in the following sections. Suggestions are welcome for improving the workflow in each application.

Swath Coverage Plotter

The swath coverage plotter extracts the outermost soundings (flagged 'valid') and plots these with a variety of filtering and plotting options. Currently only .all and .kmall are supported.



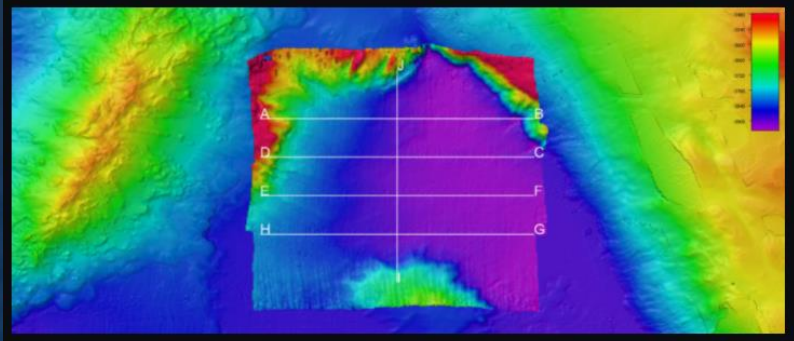
Reference survey acquisition

The reference survey should be planned over relatively flat, benign, homogenous seafloor with slopes no greater than a few degrees. Because the selected depths will likely be used for testing several different modes, the area may also be suitable for backscatter normalization across those modes [wiki development: add link to BS normalization section when complete].

The reference survey lines are planned with a few key considerations:

1. Orientation orthogonal to the crossline (or as a 'grid' if time allows)
   i. This reduces alignment of any swath biases in the reference grid with the crosslines
2. Narrow spacing (e.g., 1 WD) to achieve very high sounding density
3. Length sufficient to cover the full crossline swath width (e.g., 6-8 WD, with buffer for ship handling)
4. Number of reference lines to accommodate desired crossline length
   i. Typically 6-10 reference lines at 1 WD spacing, depending on depth, to yield several hundred crossline pings

Small regions of steeper slopes may be filtered during processing, if present (e.g., the 3900 m reference site off San Diego, below). Likewise, the number of lines may be adjusted to fit the terrain and the schedule.

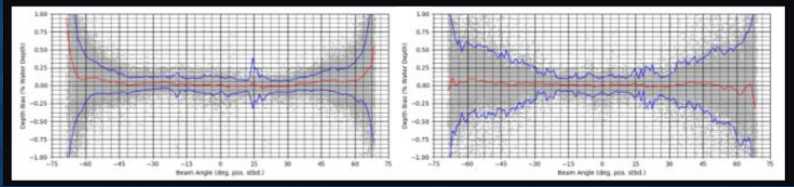


Crossline data acquisition

The primary crossline setting of interest should be the same used for the reference survey; ideally, this is a setting that would be selected automatically by the multibeam system for this depth. This provides a consistent comparison between the 'trusted' bathymetry created from a dense survey and the single-pass crossline(s) for the mode that is intended for this terrain.

As discussed in the planning constraints, there may be several modes of interest that have been grouped for this reference surface depth. Additional crosslines are added as needed and allowed by the ship schedule.

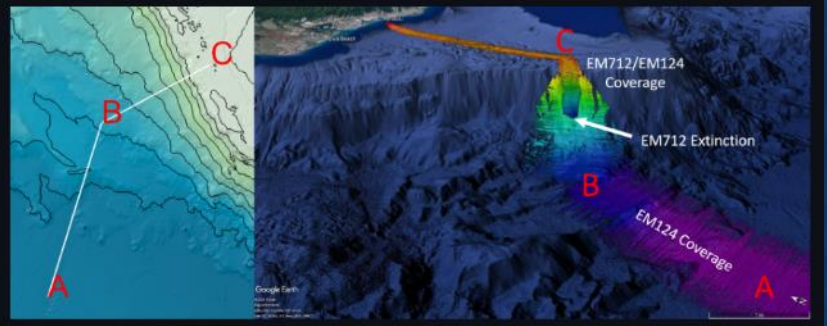
Crosslines are typically run in 'pairs' on opposite headings for each mode to assess any heading-dependent impacts, such as sea state (example below shows accuracy heading with seas and into seas shown on top and bottom, respectively). When seas are calm, this approach also supports deep roll verification using pairs of lines with the same mode and settings on opposite headings over the flat terrain.



Data collection

Ideally, swath coverage test data is collected under vessel operating parameters (e.g., speed, engine lineup, active sensors) that reflects 'typical' mapping configurations. For example, transit data collected at 12 kts with additional engines or generators online may not reflect the flow and machinery noise environment present at a typical mapping speed of 8 kts. Additional acoustic sensors (e.g., a bridge Doppler speed log) may cause interference and outliers in the coverage data that do not represent the standard mapping configuration with those sensors secured. Likewise, highly elevated sea state may not represent suitable mapping conditions.

The MAC recommends acquiring coverage test data at typical mapping speeds (e.g., 8-10 kts) and crossing contours at perpendicular angles wherever possible. Maintaining the ship heading directly up and down the slope is important for reducing coverage biases on either side of the swath that may result from the slope facing toward or away from the system. A coverage test line off HI for the R/V *Roger Revelle* EM124 / EM712 SAT is shown as an example of transiting 'up' and 'down' the major seafloor slopes in order to reduce port / starboard coverage biases across a wide depth range (~100-4000 m). In this example, the transit from waypoint A toward port was routed through waypoints B and C to cross contours more perpendicularly; this small amount of additional transit time produced much more useful data for coverage assessment.



Runtime parameters

The purpose of testing is to let the multibeam system achieve its maximum coverage under the mode it selects automatically for the given depth.

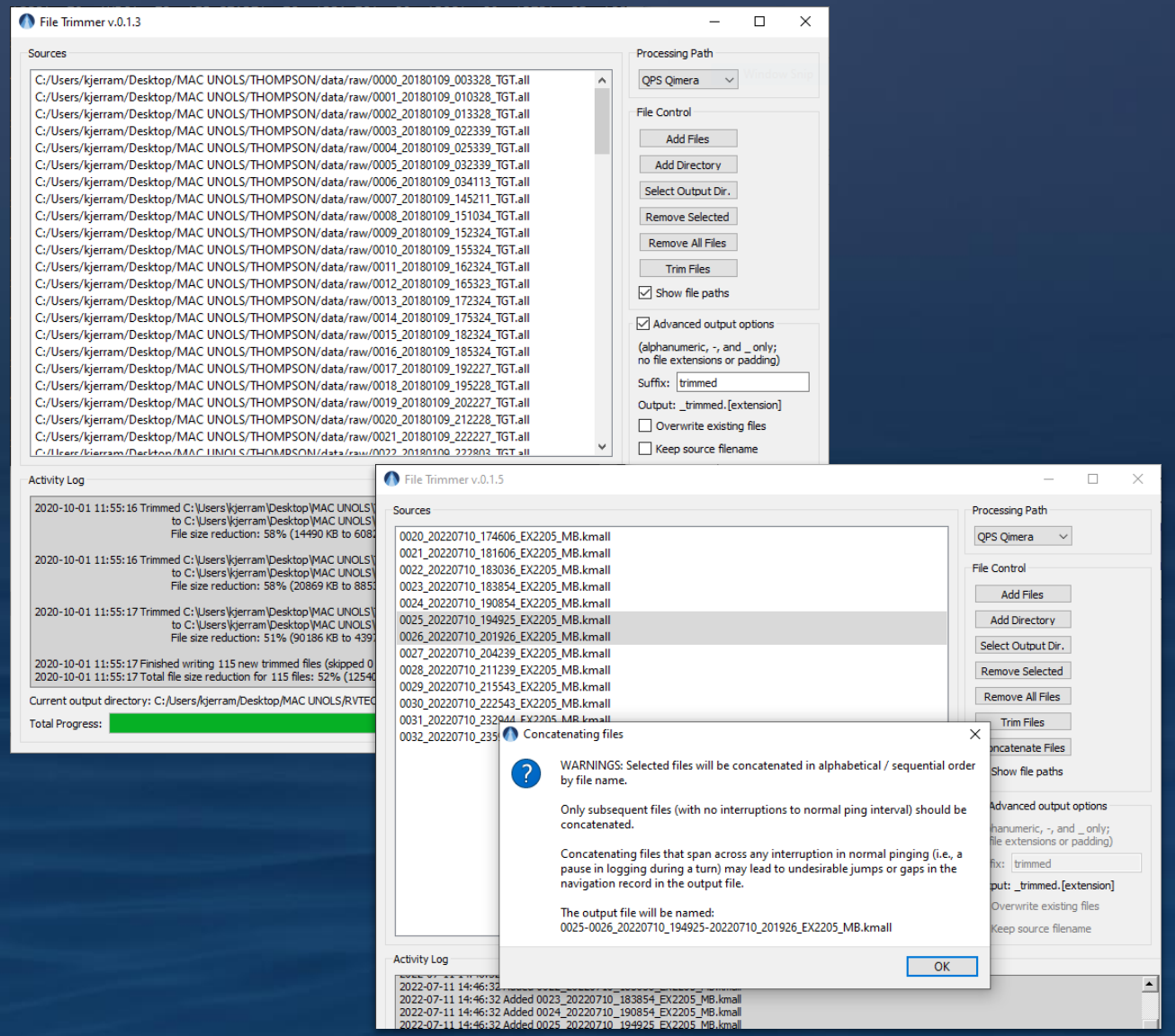
The following settings are generally recommended for Kongsberg EM systems to best illustrate 'automatic' system performance. Vessels that use different parameters during routine mapping should apply those settings where appropriate, aside from the maximum angle, coverage, and depth gates that may inadvertently limit the coverage test data.

Parameter	Recommended	Notes
Depth mode	Automatic	
Dual swath	Dynamic	
FM Transmission	Enabled	Read checkbox carefully [1]
Max angles	75°/75°	70°/70° for some systems
Max coverage	Maximum	Varies by model
Depth limits	As needed	Adjust as needed[2]
TX power	Maximum	0 dB

File Trimmer

github.com/oceanmapping/community/wiki/Assessment-Tools

1. Reduce file size for transfer to shore
2. Concatenate files for special processing
3. Protections for raw files and directories
4. Up to 90% reductions for low ping rates
5. .all format only at present
6. Soon to be unnecessary?!



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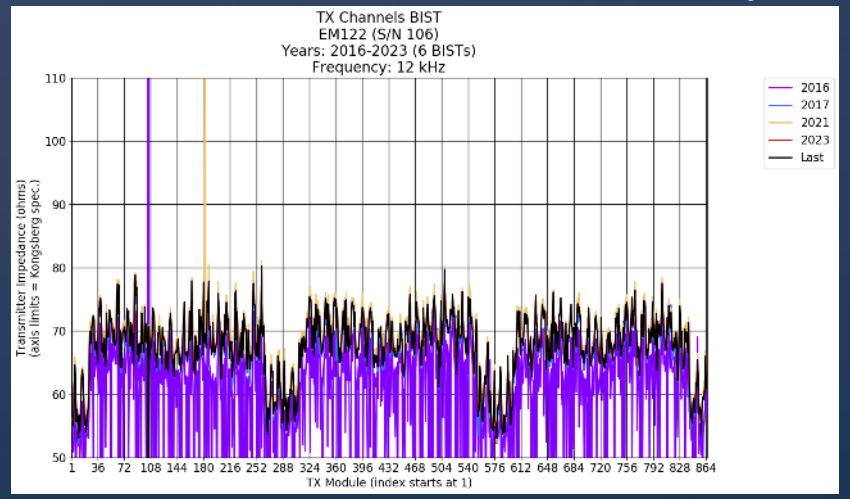
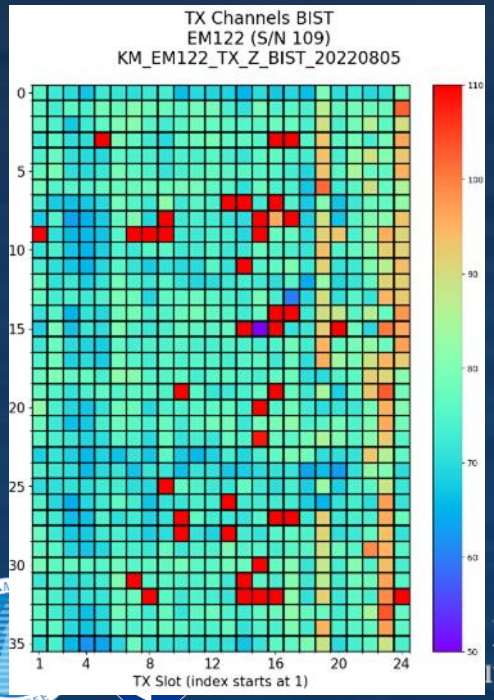
BIST Plotter: **TX and RX Channels**

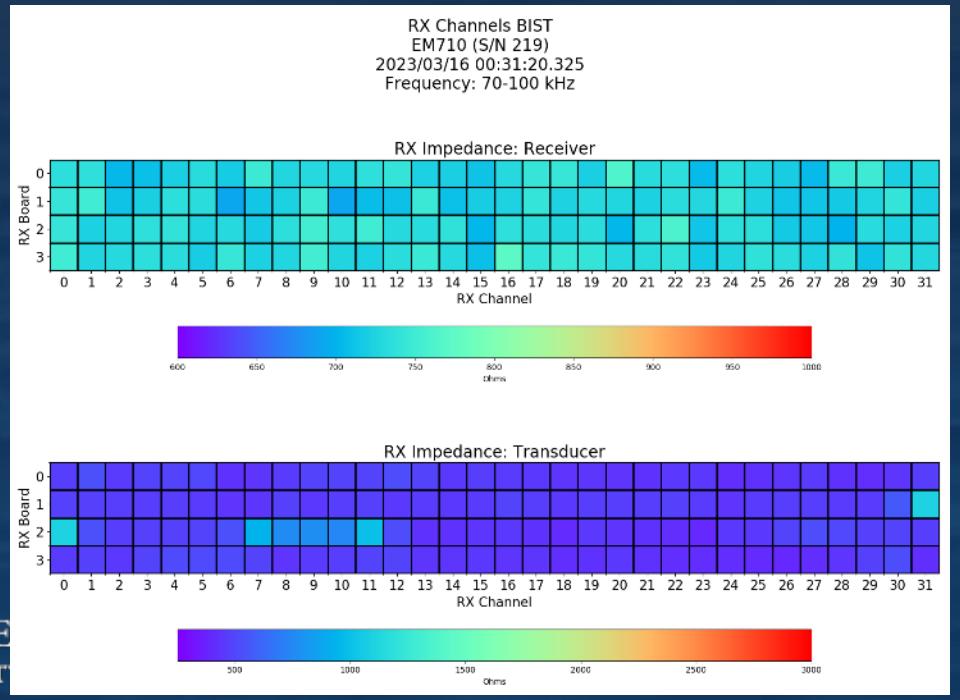
1. Verify all channels pass during SAT
2. Track failures of individual channels
3. Monitor general trends across arrays
4. Plan direct impedance measurements

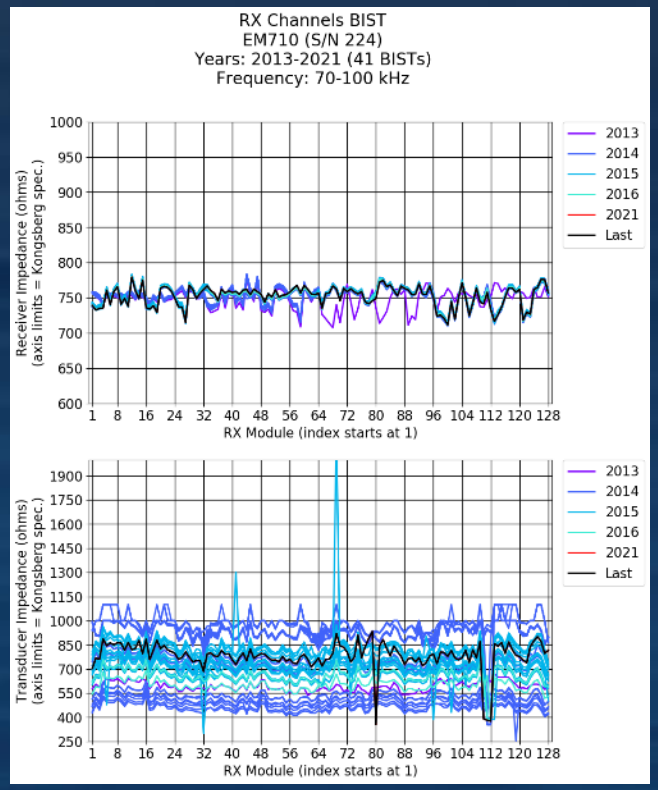
TX and RX Channels history



Single TX and RX Channels BISTs







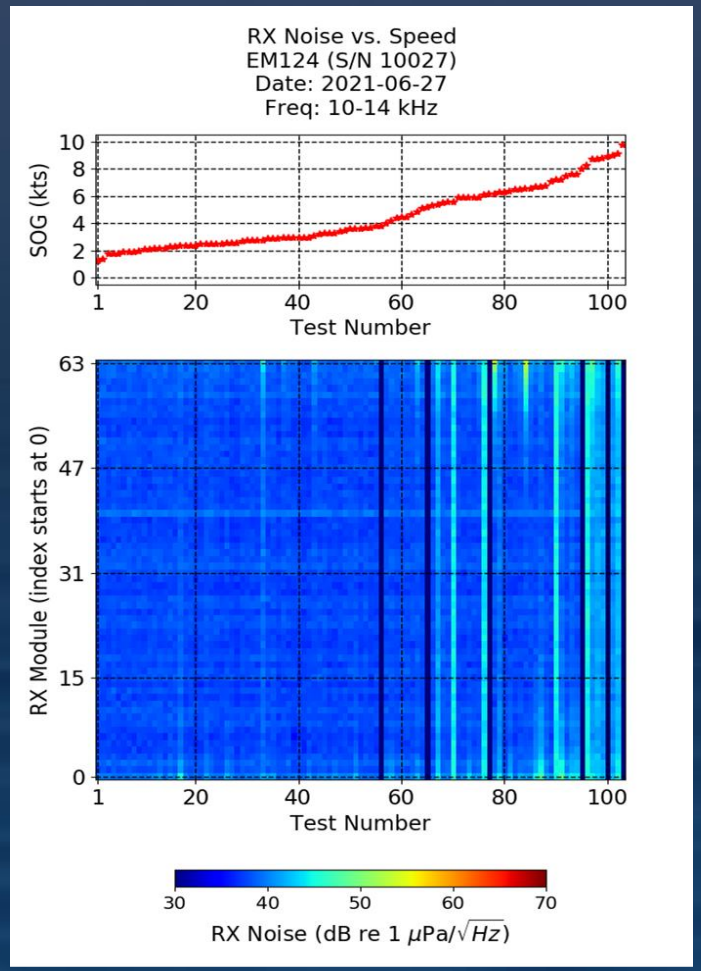
BIST Plotter: **RX Noise vs. Speed**

1. Evaluate noise trends in **calm seas**
2. Pre- and post-shipyard noise check
3. Plot noise versus:
   a. SOG / STW
   b. Engine / shaft speed
   c. Pitch / thrust %
   d. Machinery

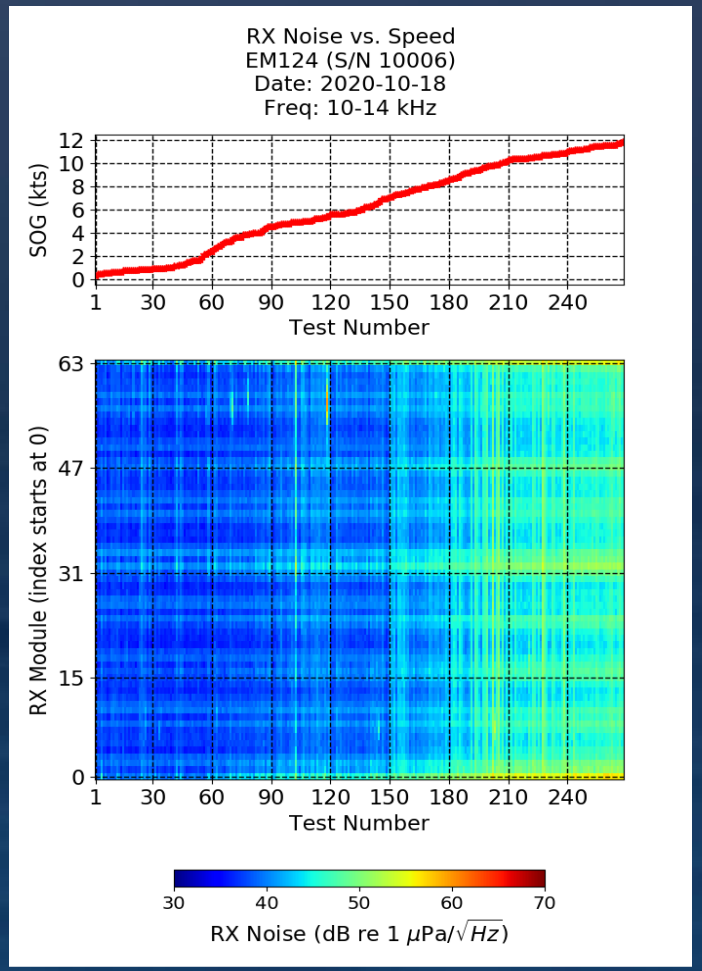
Vertical stripe = swell impact (all channels)

Horizontal stripe = noisy channel (all tests)

Vessel 1



Vessel 2



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Columbia University | Earth Institute

BIST Plotter: **RX Noise vs. Swell Direction**

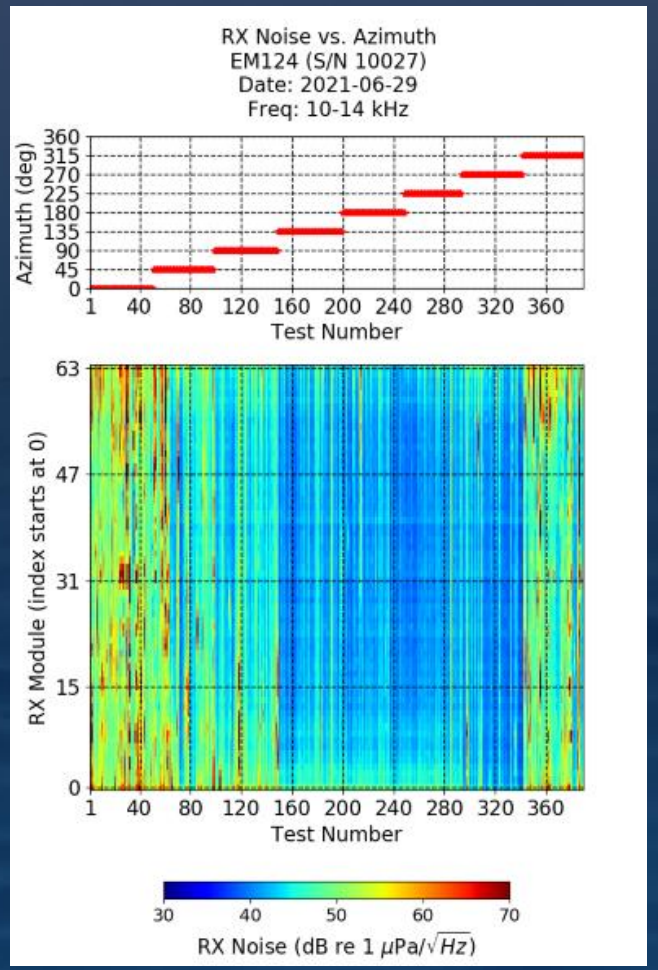
1. Evaluate noise trends in **elevated seas**
2. Identify quietest survey orientations
3. Assess bubble sweep, gondola, etc.
4. Highly vessel-dependent

Azimuth 0° = heading into swell

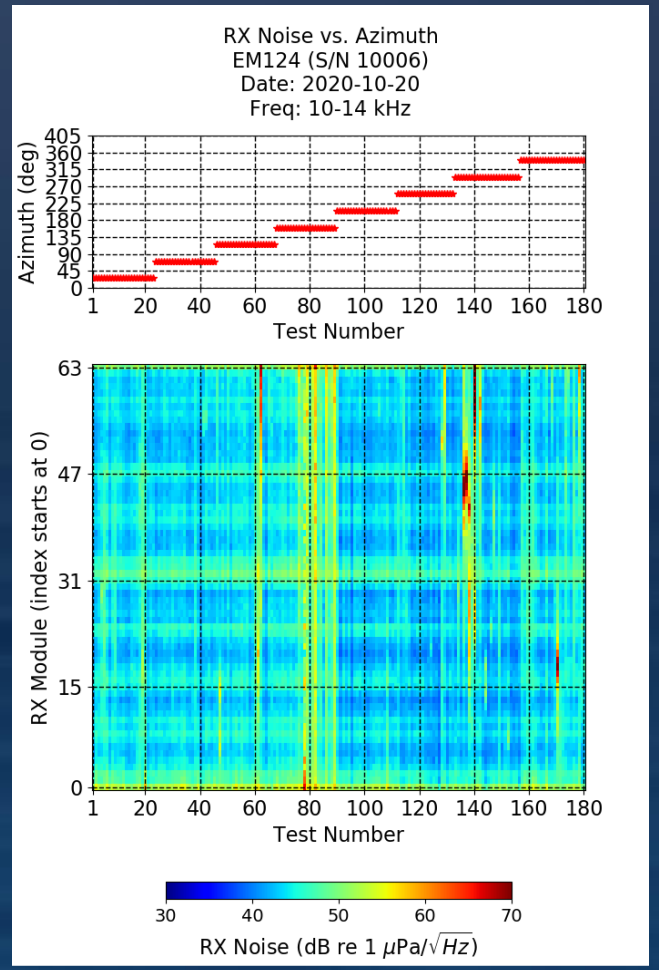
Vertical stripe = swell impact (all channels)

Horizontal stripe = noisy channel (all tests)

Vessel 1



Vessel 2



BIST Plotter: **Info on the Wiki**

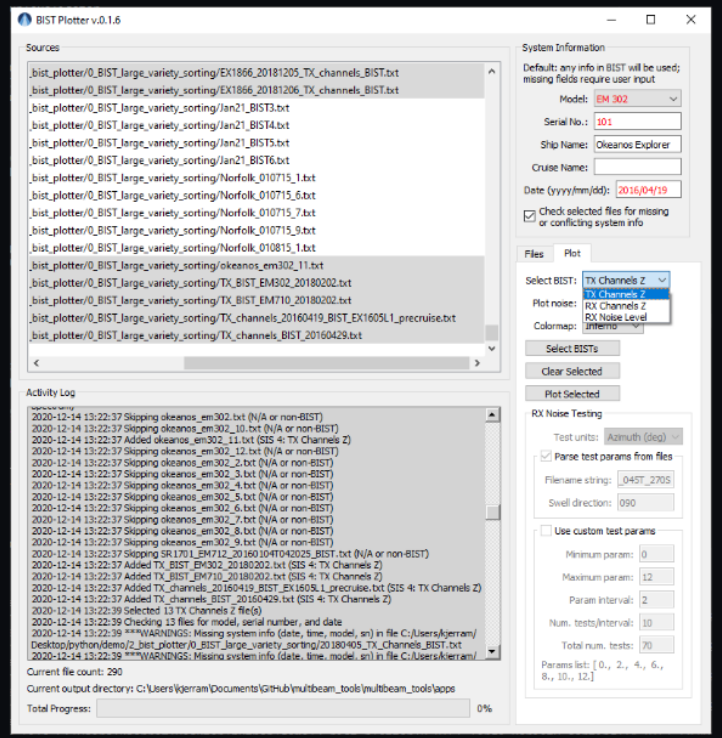
BIST Plotter

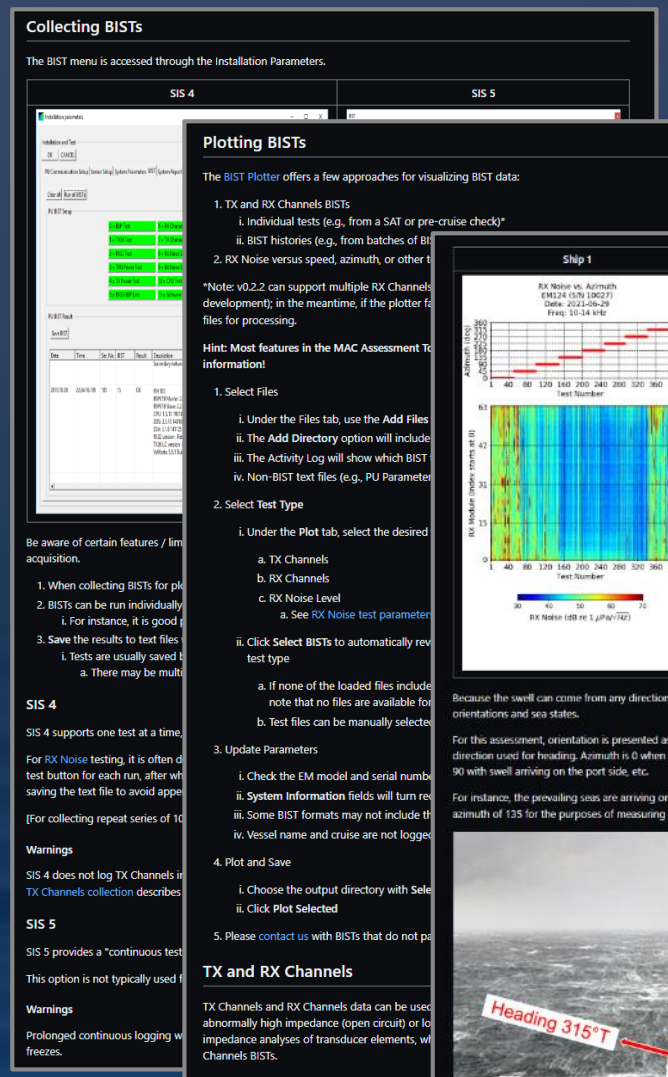
The Built-In Self-Test (BIST) plotter currently supports three types of testing:

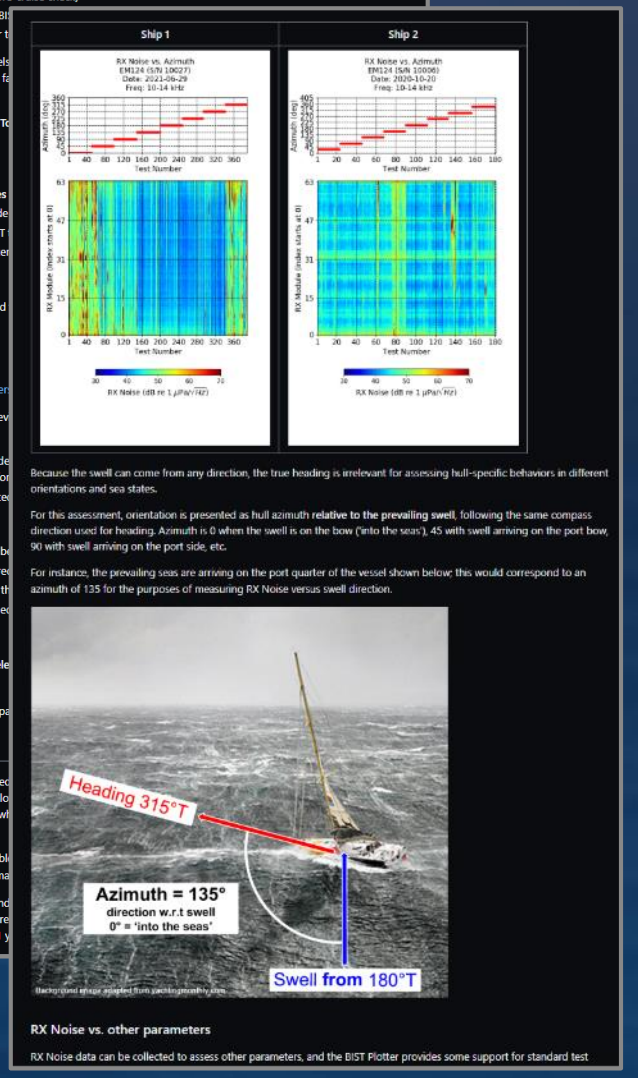
1. TX Channels
2. RX Channels
3. RX Noise Level

Collecting BISTs describes BIST logging in general, whereas specific acquisition steps for each test type are detailed in their respective sections.

Likewise, Plotting BISTs provides an overview of plotting steps; the individual test sections include more details.

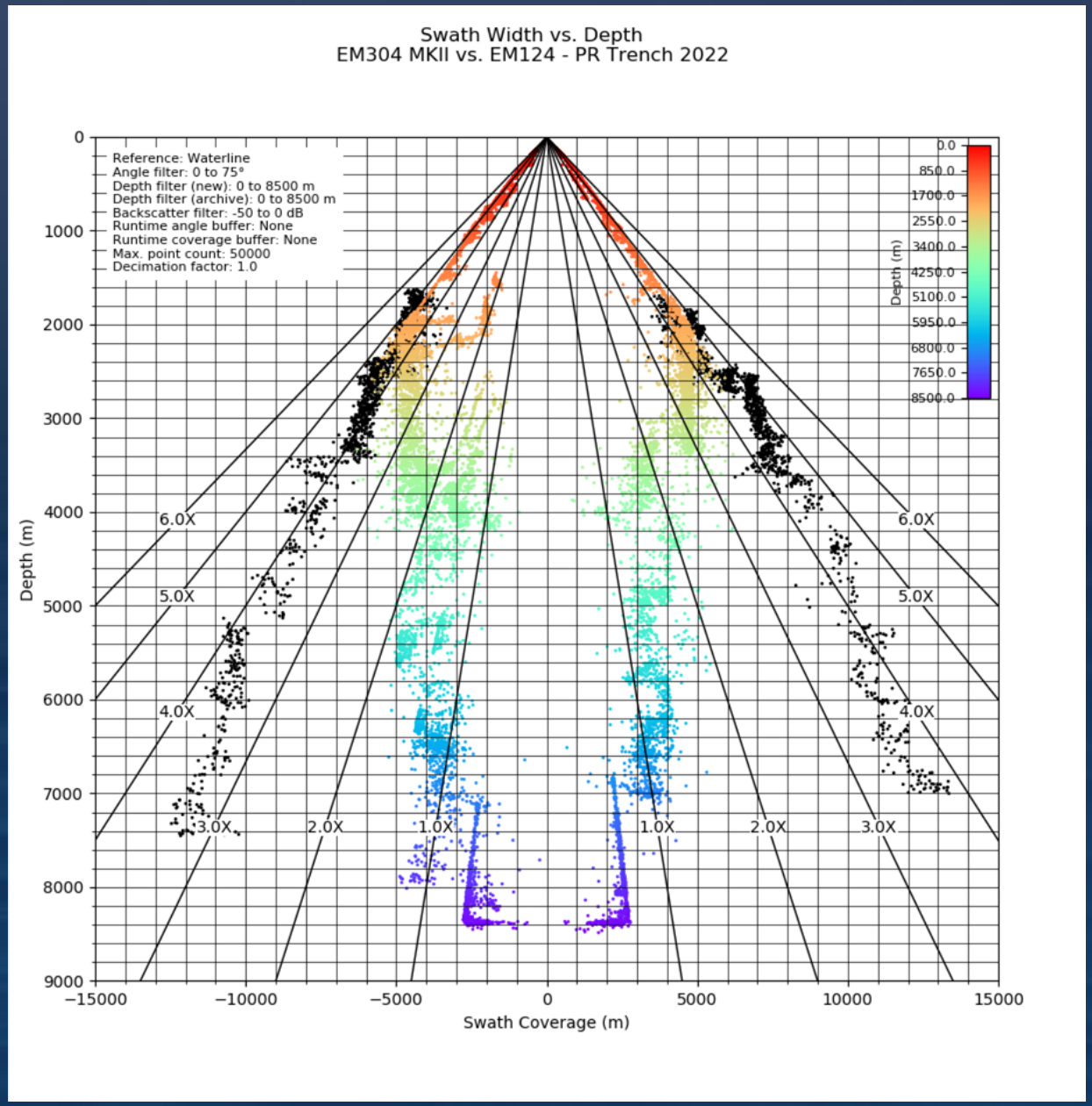






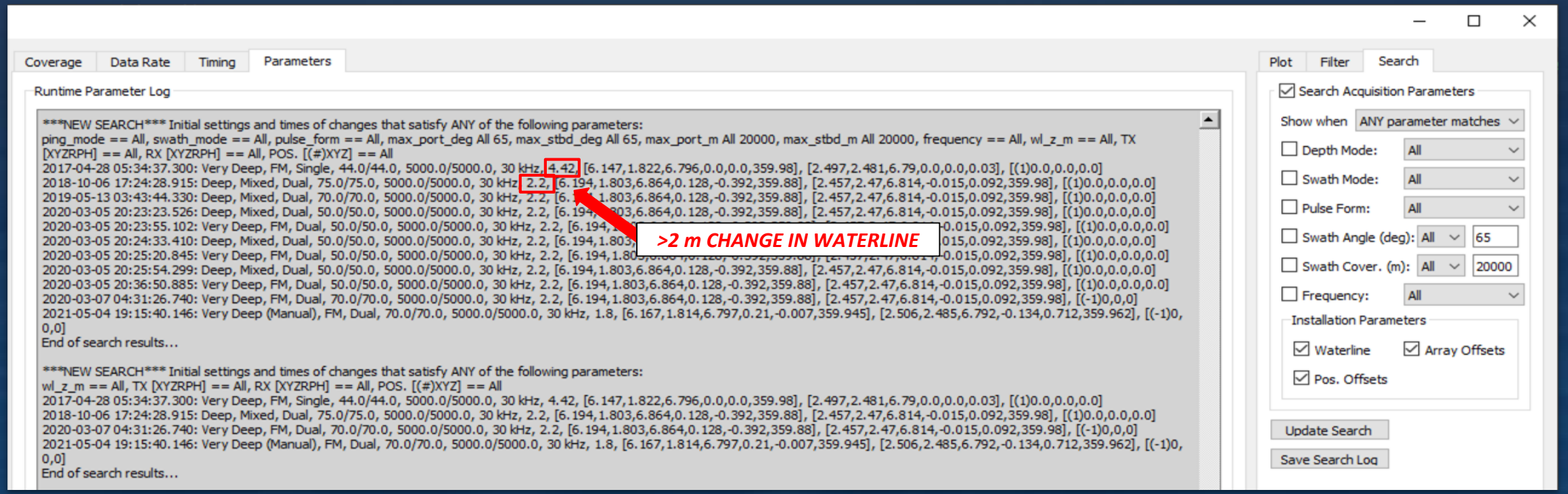
Swath Coverage Plotter: **Coverage vs. Depth**

1. Swath coverage can be limited by many factors
2. Establish baseline coverage trends during SAT
3. Track coverage trends during routine QATs
4. Opportunistic data collection on transits
    a. **Early detection** of limiting factors
5. ‘Real world’ survey planning

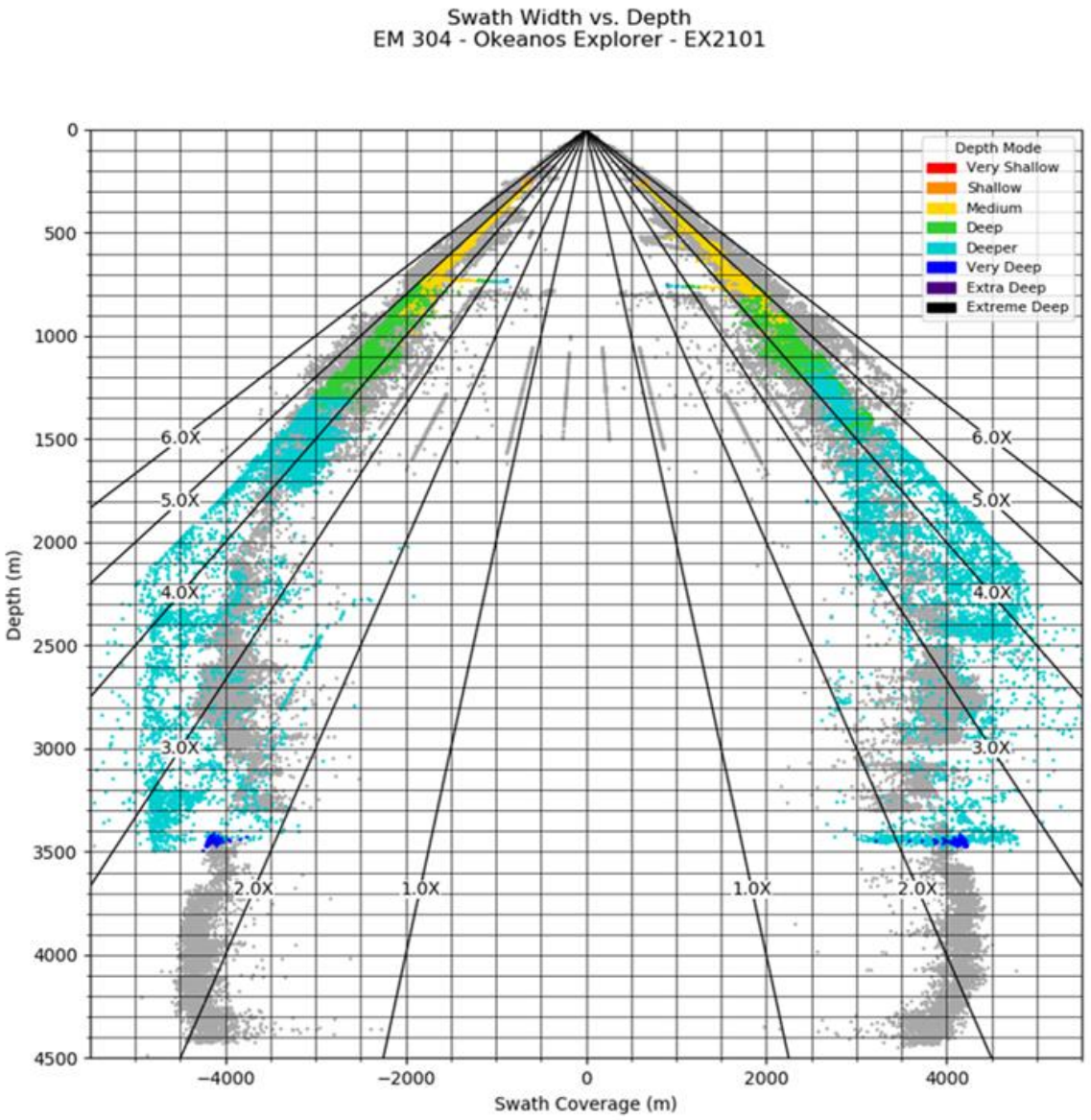


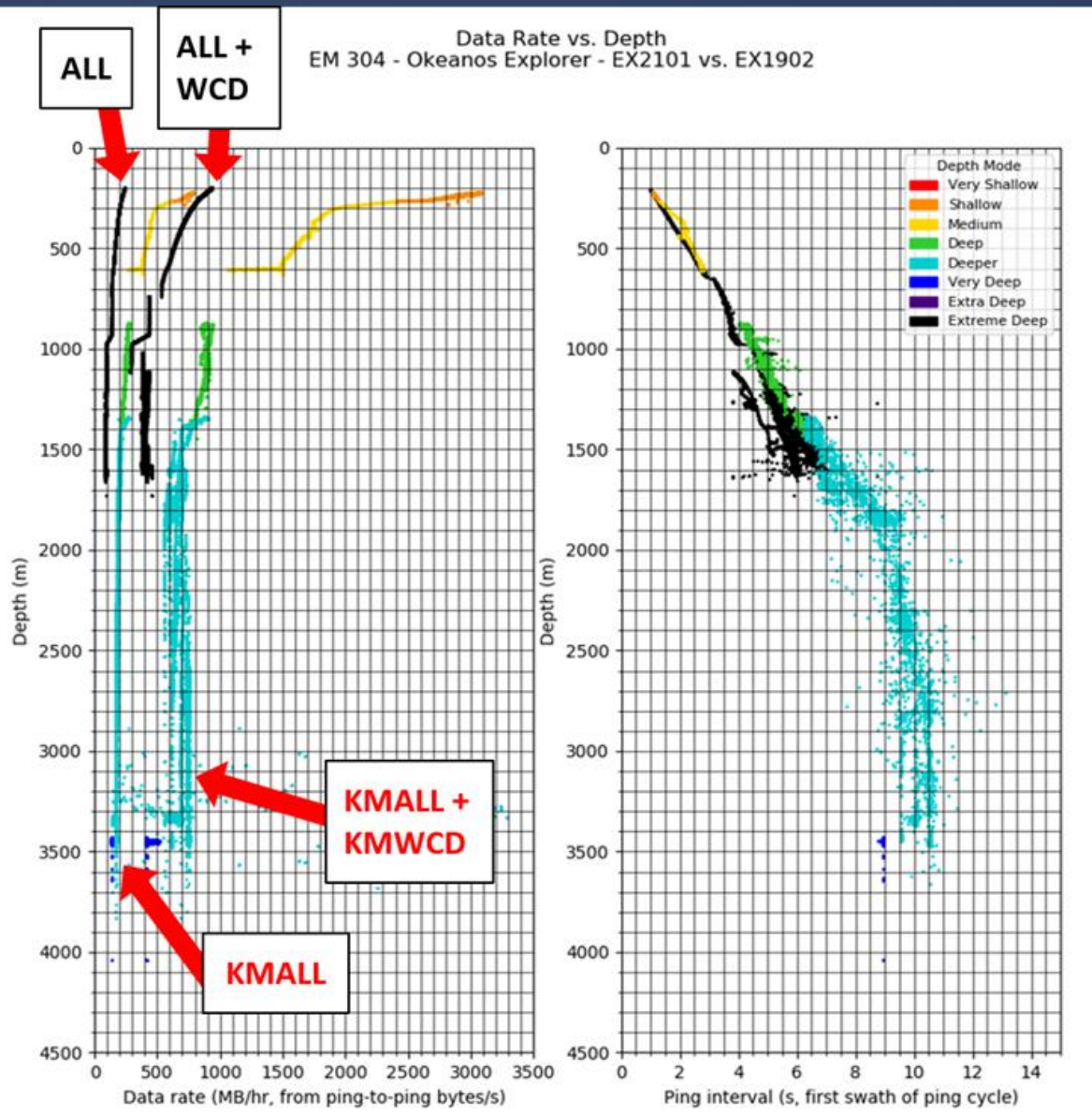
Swath Coverage Plotter: **Parameter Tracking / Search**

1. Scan large batches of files for changes to acquisition parameters:
   a. **Installation Parameters (IP)** → system geometry based on SAT/QAT
   b. **Runtime Parameters (RTP)** → sonar modes/filters selected by user
2. Query settings by thresholds (> < =) and ANY or ALL combinations



Swath Coverage Plotter: **Data Rates**



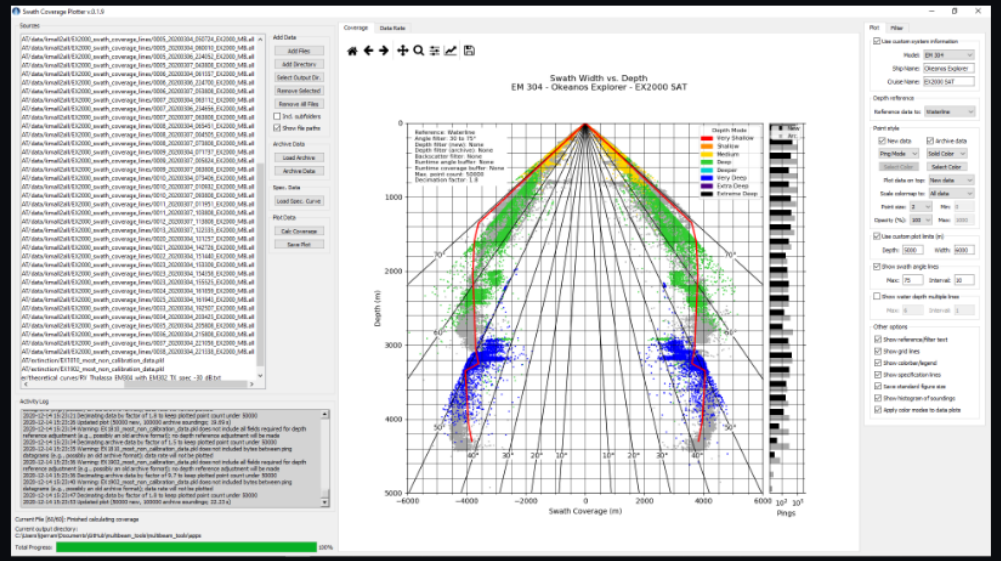


Anomalous EM304 data rates between 600-850 m have been omitted

Swath Coverage Plotter: **Info on the Wiki**

Swath Coverage Plotter

The swath coverage plotter extracts the outermost soundings (flagged 'valid') and plots these with a variety of filtering and plotting options. Currently only .all and .kmall are supported.



Purpose

Swath coverage testing is intended to illustrate the maximum coverage achieved by a given multibeam system over a wide range of depths. The depth range of interest spans from the shallowest typical operating depth for the vessel down to the practical swath extinction limit (e.g., where the system may no longer track the seafloor, generally governed by attenuation of the transmitted signal, noise levels perceived by the multibeam, and reflectivity of the seafloor).

These tests are valuable for a wide variety of purposes, such as survey planning, system acceptance testing against expected performance, evaluating noise impacts of the vessel and other sensors, and routine quality assurance testing to detect hardware degradation or damage (e.g., following a dry dock maintenance period). These data can be collected, archived, and compared throughout the service life for a given system, and across similar systems installed aboard multiple vessels. Accordingly, swath coverage testing is a standard MAC SAT and QAT activity, and can be conducted opportunistically during transits for remote processing.

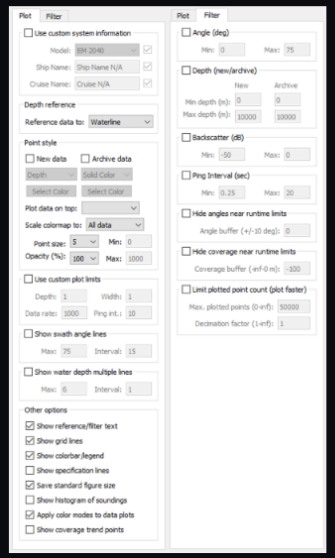
Synchronization / multiple systems

Note that multiple systems may collect swath coverage / extinction data simultaneous
interference or mistracking of the seafloor and that the performance of each system is
conditions. Multiple systems may be synchronized with a common ping trigger, such a
must be taken with any synchronization scheme in place to ensure ping triggering will
system fails to track the seafloor while another (e.g., lower frequency) maintains tracki

The EM712 / EM124 combination on R/V *Roger Revelle* provides a useful example case
deep, the EM712 may lose bottom track at ~2500 m and may be secured if transiting
EM124 must continue to collect data. If transiting from deep to shallow, the operator
recording) in ~3000 m and then start recording when the EM712 starts to develop a v
the seafloor (i.e., slightly shallower than the extinction depth, as shown in the overlapp
EM124 coverage data in Google Earth, above). Under all circumstances, the runtime pa
expected depth range, and may be adjusted throughout acquisition to reduce outliers

Plotting and filtering

1. Use the **Add Files** or **Add Directory** button (incl. subdirectories, if desired) to load
2. Select **Calc Coverage** to process the loaded coverage files.



The plotter will parse each
and associated runtime pa
results. The plotter will de
(default: maximum 50,000
limit is generally sufficient
adjustable to meet your pl

The **Plot** tab includes a var
custom plot limits and title
swath angles or multiples
various runtime parameter
order for new and archive

The **Filter** tab provides opt
representative of typical p
have been inadvertantly li
(degrees or meters) or tho
(reflectivity) values.

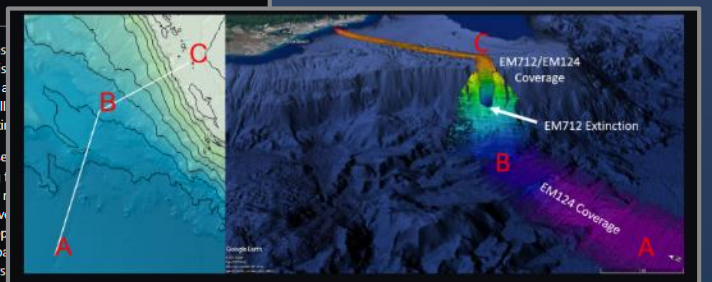
Theoretical coverage

The theoretical coverage specification provided by a manufacturer can be plotted using the **Load Spec. Curve** button to compare achieved versus expected performance.

For instance, the expected performance for a particular EM304 topside unit / EM302 TX array is shown as red curves on the port and starboard sides in the coverage plotter example above. The underlying points were manually digitized from a sea acceptance report and recorded in the specification format

RV_Thalassa_EM304_with_EM302_TX_spec_-30_dB.txt

```
-30 dB theoretical
0, 0
1350, 7200
1600, 7500
2050, 7600
3050, 7400
3250, 7200
3350, 8100
```



Runtime parameters

The purpose of testing is to let the multibeam system achieve its maximum coverage under the mode it selects automatically for the given depth.

The following settings are generally recommended for Kongsberg EM systems to best illustrate 'automatic' system performance. Vessels that use different parameters during routine mapping should apply those settings where appropriate, aside from the maximum angle, coverage, and depth gates that may inadvertently limit the coverage test data.

Parameter	Recommended	Notes
Depth mode	Automatic	
Dual swath	Dynamic	
FM Transmission	Enabled	Read checkbox carefully [1]
Max angles	75°/75°	70°/70° for some systems
Max coverage	Maximum	
Depth limits	As needed	
TX power	Maximum	
Frequency	Typical	
Pitch stabilization	Enabled	
Alongship direction	0	
Auto tilt	Off	
Yaw stabilization	RMH	
Enable scanning	Off	
Spike filter	Medium	
Range gate	Normal	
Phase ramp	Normal	

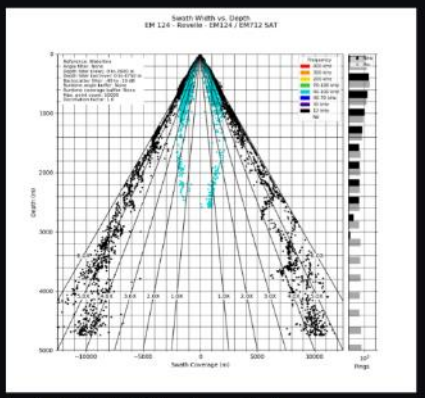
Archiving

Coverage data loaded in the plotter can be archived for future reference without having to link back to the original files.

Select 'Archive Data' to create a .pkl file with all 'new' data (soundings and runtime parameters parsed from the .all and .kmall files that have been plotted). Ensure the archive file has a descriptive name.

Select 'Load Archive' to load a .pkl file with historic coverage data. The plot order and color parameters for the archive are controlled under the Plot tab.

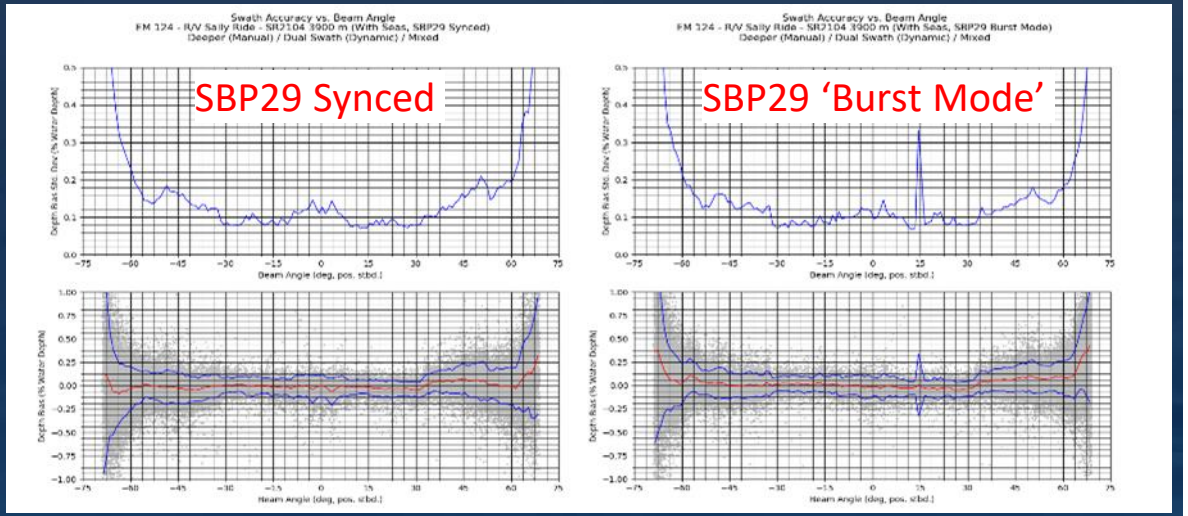
Note that the archive format will continue to change and may be replaced altogether with a new file type. More recent plotting parameters may not have been saved in early archive versions, meaning some plotting options might not be available when these are loaded. The original dataset can be reloaded and plotted to create a new archive if necessary.

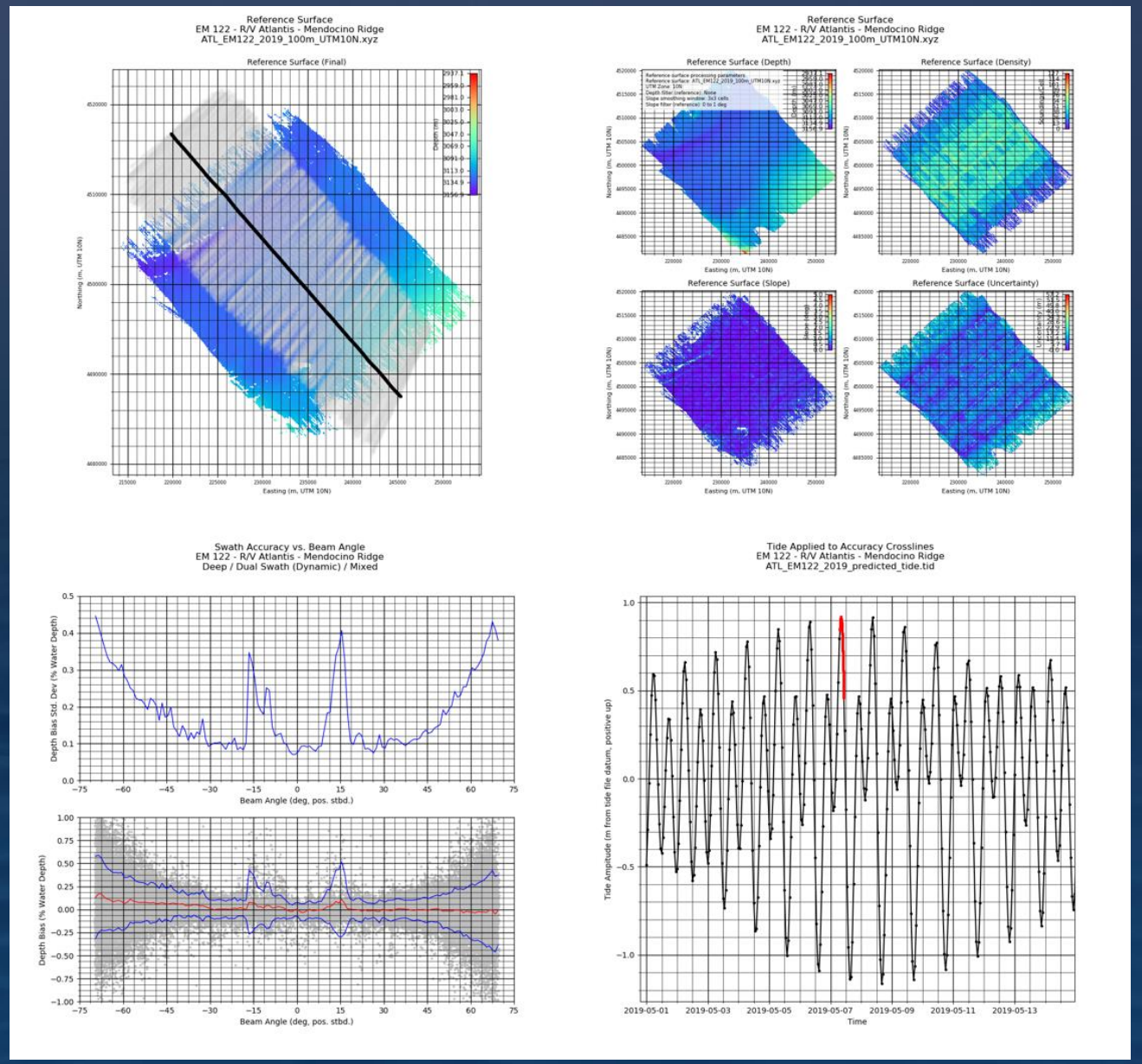


The example at right shows EM712 (blue) and EM124 (black) data colored by frequency, clearly indicating differences in coverage as the EM712 approaches attenuation. In this case, the EM124 data is loaded as an archive to show the histogram of sounding distributions for each system separately.

Swath Accuracy Plotter

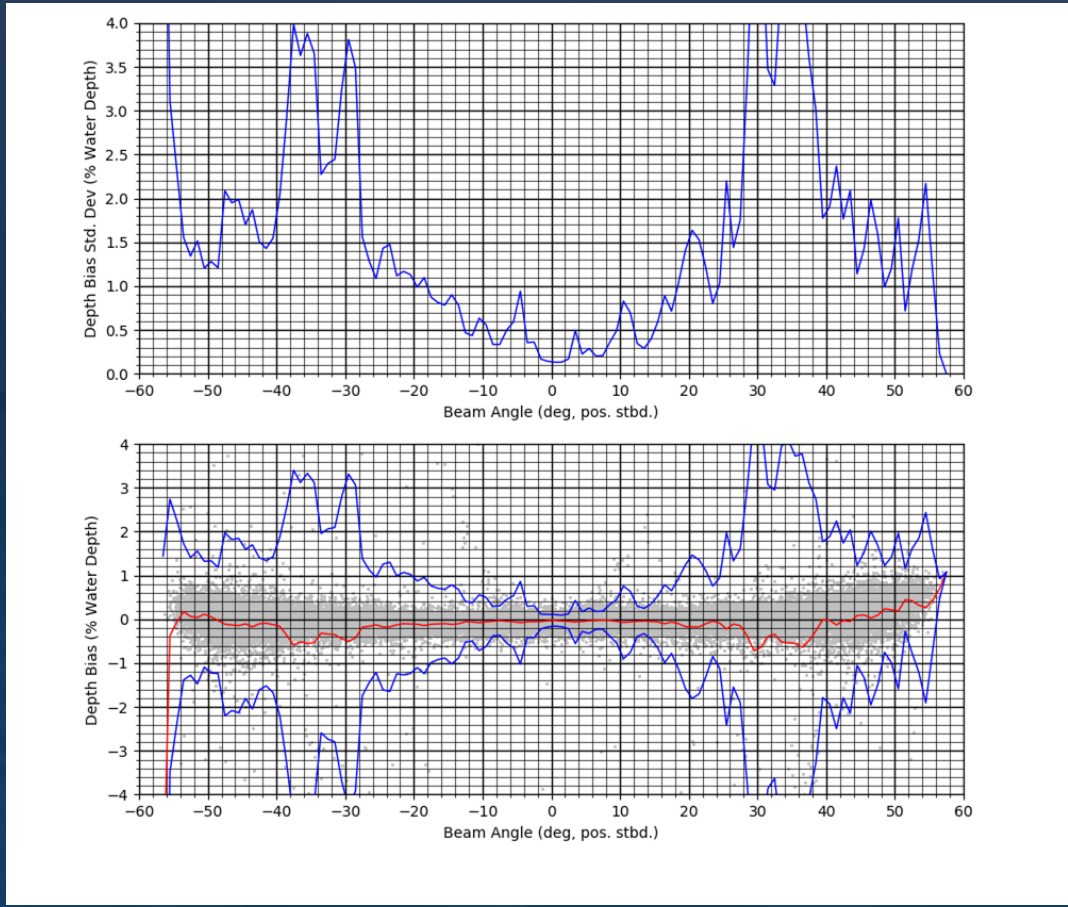
1. Swath accuracy is impacted by many factors
2. Establish baseline trends (SAT, all modes)
3. Track behavior over time (QAT, opportunistic)

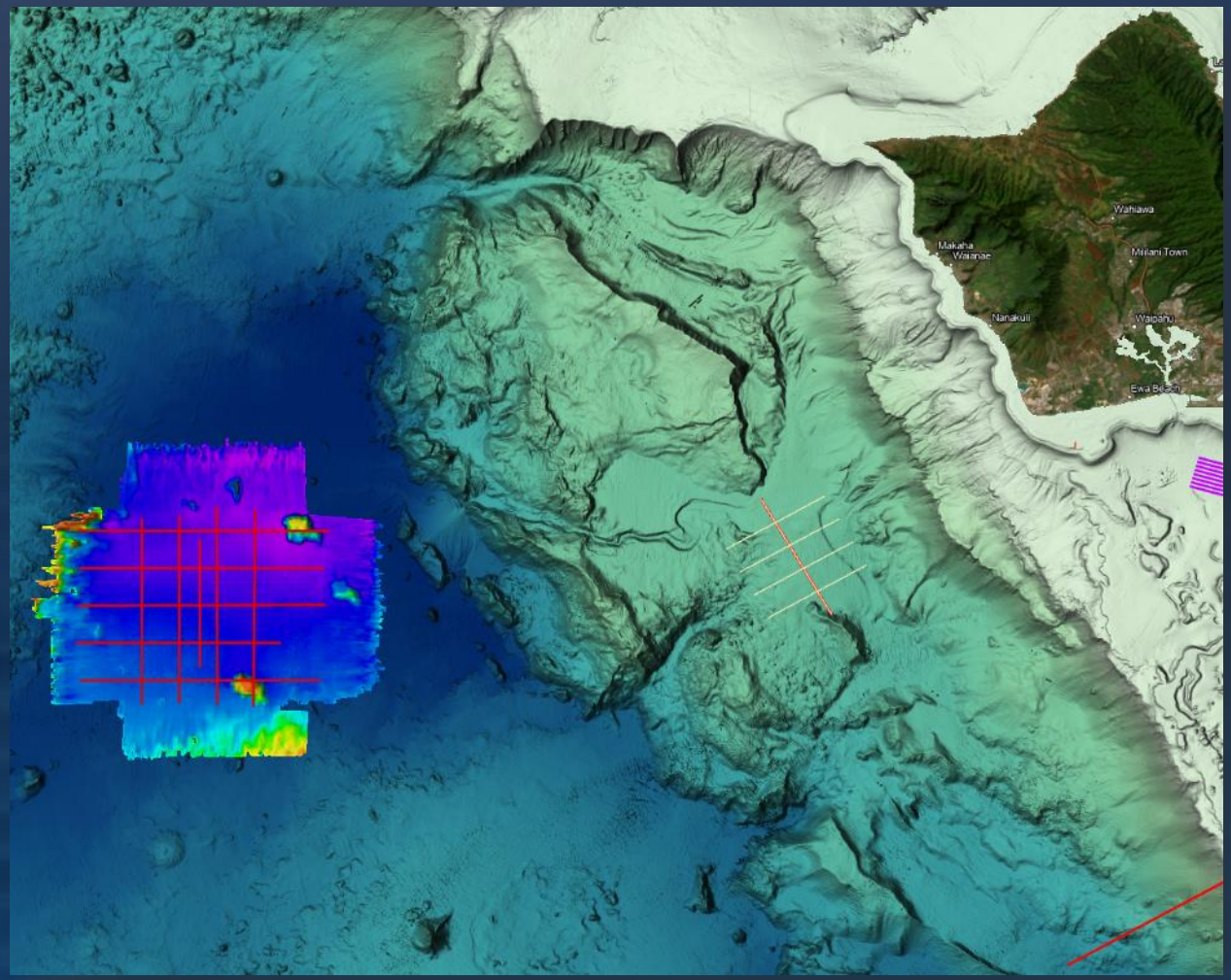




Swath Accuracy Plotter

1. Opportunistic crosslines at proven reference sites
2. Catch problems before ‘normal’ survey operations

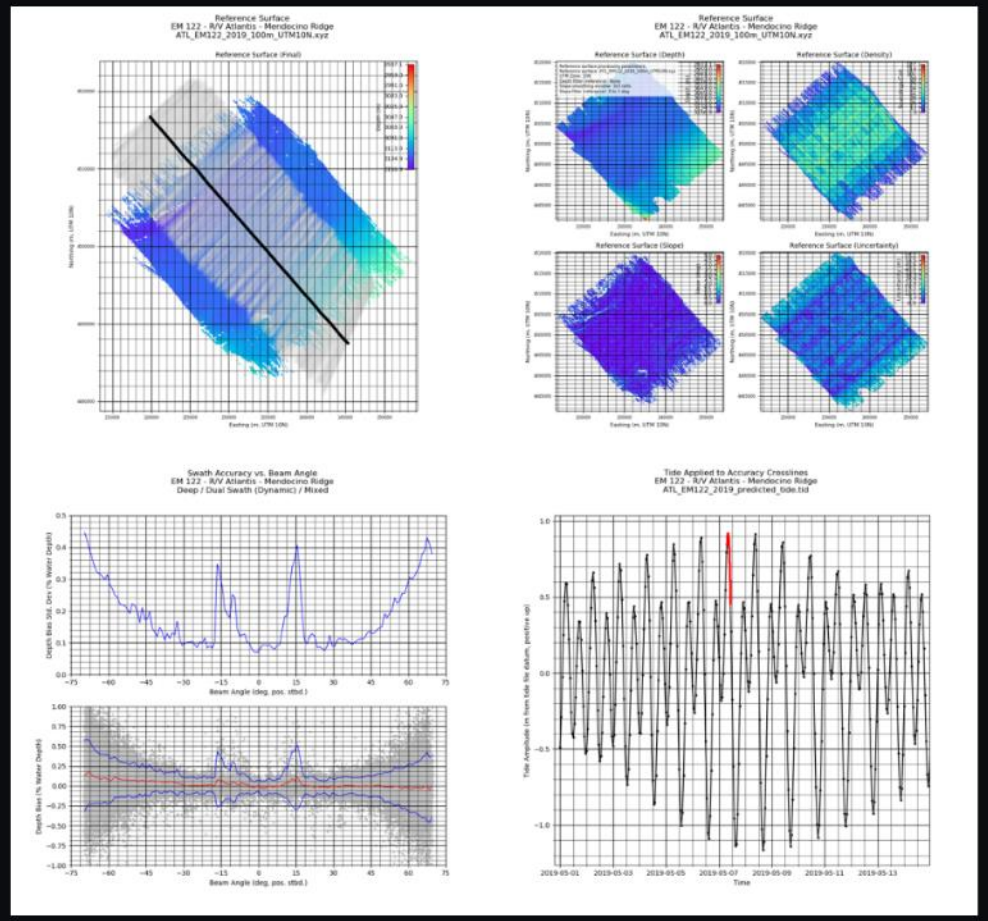




Swath Accuracy Plotter: **Info on the Wiki**

Swath Accuracy Plotter

The swath accuracy plotter compares soundings in a single-pass survey file to a trusted bathymetric reference surface. Differences between 'crossline' soundings and the reference grid are plotted as depth biases in meters (m) or as percentages of water depth (%WD). The mean and standard deviation of these differences are calculated in 1-degree bins across the swath to examine trends.



Data collection

Swath accuracy test data collection is typically broken into two parts:

1. Reference surface survey
2. Accuracy crosslines

The reference surface is typically surveyed in its entirety before accuracy c
may be useful when there is uncertainty about approaching weather or th
reverse order ensures crosslines are collected first before running as many
circumstances.

Scope of data collection

The scope of data collection depends on the modes of interest and their

For example, a new Kongsberg system might be tested across all depth m
Extra Deep or Extreme Deep, depending on system) using 'typical' runtim
set of modes is typically sufficient to characterize baseline performance u
might be repeated for quality assurance testing throughout the system's
modes to investigate data artifacts in particular conditions or depth range

More comprehensive testing or troubleshooting might include variations
each depth mode to highlight the impacts of each decision, such as:

1. single- and dual-swath;
2. FM enabled and disabled;
3. yaw stabilization enabled and disabled;
4. different survey speeds; and/or
5. other acoustic systems transmitting.

The 'depth modes' for some systems are more commonly described by th
operating at 300 kHz with short CW pulse) rather than 'Shallow' or 'Mediu
for available modes and review the typical survey runtime parameters to

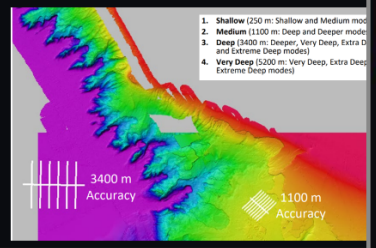
Planning constraints

For systems with discrete depth modes, it would be ideal to conduct an e
within the intended depth range for every mode. However, this is usually
and some scheduling and planning compromises must be made.

Reference depths

The reference survey is typically the largest time commitment for each tes
yield real savings. This can be done by grouping the crossline modes of ir
ideal) and identifying a smaller number of reference depths that will accor
for testing, and availability of suitable seafloor, will determine the location

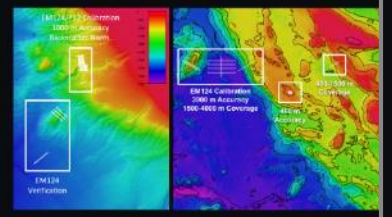
Each working area may be a compromise, selecting from the available sea
crossline modes within the constraints of scheduling and sea state. The in
sites selected during EM304 MKII sea trials aboard the *Okeanos Explorer* (
seven modes, building into the cruise plan across two distinct working are
transits across these depth ranges were used for swath coverage testing.)



Existing reference surfaces

A suitable reference surface site may already exist, in which case that survey s
trusted. For instance, several reference surfaces have been surveyed off San Fr
and San Diego (*R/V Roger Revelle*, *R/V Sikuliaq*, and *R/V Sally Ride*) at depths

These are readily reused for accuracy crossline testing in future visits by these
below). If time allows, a re-survey of an existing reference surface can provide
over the same terrain.



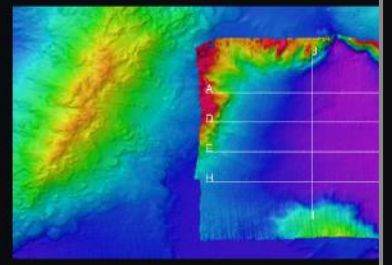
Reference survey acquisition

The reference survey should be planned over relatively flat, benign, homogen
degrees. Because the selected depths will likely be used for testing several dif
backscatter normalization across those modes (wiki development: add link to

The reference survey lines are planned with a few key considerations:

1. Orientation orthogonal to the crossline (or as a 'grid' if time allows)
   i. This reduces alignment of any swath biases in the reference grid with
2. Narrow spacing (e.g., 1 WD) to achieve very high sounding density
3. Length sufficient to cover the full crossline swath width (e.g., 6-8 WD, wit
4. Number of reference lines to accommodate desired crossline length
   i. Typically 6-10 reference lines at 1 WD spacing, depending on depth,

Small regions of steeper slopes may be filtered during processing, if present (
below). Likewise, the number of lines may be adjusted to fit the terrain and th



Reference survey settings and speed should follow the 'typical' mapping settin
narrowed to 65° on each side in order to cover slightly more than 4X WD cove
WD line spacing and increases ping rate (i.e., alongtrack sounding density) co

Sound speed profiles must be taken and applied routinely throughout the ref
Ideally, a CTD or XCTD cast is conducted to get the baseline for salinity and te
applied for processing additional XBT casts throughout data collection.

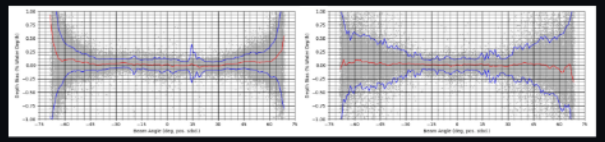
For the example EM124 3900 m reference site above, the reference lines were
transmission, and yaw stabilization enabled. The ship operated at its standard
specific decision that can be aided by RX noise-vs-speed testing) and all othe

Crossline data acquisition

The primary crossline setting of interest should be the same used for the reference survey; ideally, this is a setting that would be selected automatically by the multibeam system for this depth. This provides a consistent comparison between the 'trusted' bathymetry created from a dense survey and the single-pass crossline(s) for the mode that is intended for this terrain.

As discussed in the planning constraints, there may be several modes of interest that have been grouped for this reference surface depth. Additional crosslines are added as needed and allowed by the ship schedule.

Crosslines are typically run in 'pairs' on opposite headings for each mode to assess any heading-dependent impacts, such as sea state (example below shows accuracy heading with seas and into seas shown on top and bottom, respectively). When seas are calm, this approach also supports deep roll verification using pairs of lines with the same mode and settings on opposite headings over the flat terrain.



For the example reference site above, the crosslines were run first in the default mode for this depth (Deeper) plus Deep and Very Deep modes to capture their performance at the limits of the intended depth ranges for those modes. These first three crossline modes were collected dual-swath, FM transmission, and yaw stabilization enabled, with all other echosounders secured.

In this particular SAT example, additional crosslines were run with another echosounder (SBP29) operating in two different modes of synchronization with the EM124 ('synced' and 'burst'), as these systems will likely be operated together during future science missions. The last two crossline tests were oriented with the seas in order to reduce the impacts of bubble sweep and utilize the ship time within the constraints of a degrading sea state.

The table below provides an overview of crossline settings at this site, with user-selected mode changes in red. Note that settings determined by the system under these parameters (e.g., swath mode and pulse form when dual-swath and FM transmission are enabled) are left in gray.

Crossline Setting	Depth Mode	SBP29 Mode[3]	Swath Mode[1]	Pulse Form	Yaw Stabilization[2]	Swell Direction
1	Deeper	Off	Dual	Mixed	RMH	Into seas
2	Deep	Off	Dual	CW	RMH	With seas
3	Very Deep	Off	Single	FM	RMH	Into seas
4a	Deeper	Synced	Dual	Mixed	RMH	With seas
4b	Deeper	Burst	Dual	Mixed	RMH	With seas

Processing

The Swath Accuracy Plotter simply compares the crossline soundings to a reference surface provided by the user. It is not intended to perform data processing steps that are widely available in other software.

The user provides the following inputs:

1. **Reference bathymetric grid** processed in third-party software
   i. Format: .XYZ ASCII with no header
   ii. Projection: single UTM zone appropriate for the site
   iii. Units: meters, Z positive up
   iv. File name includes UTM zone (e.g., "SR2104_EM124_1000m_ref_surf_25m_UTM10N.xyz")
   v. Tide correction applied prior to export
2. **Crossline(s)** with sound speed applied during acquisition
   i. Format: .all or .kmall
3. OPTIONAL: **Sounding density grid** associated with the bathymetry grid
   i. Format: .XYD ASCII with no header (may export as .XYZ and simply change extension)
4. OPTIONAL: **Tide file** covering the crossline sounding times

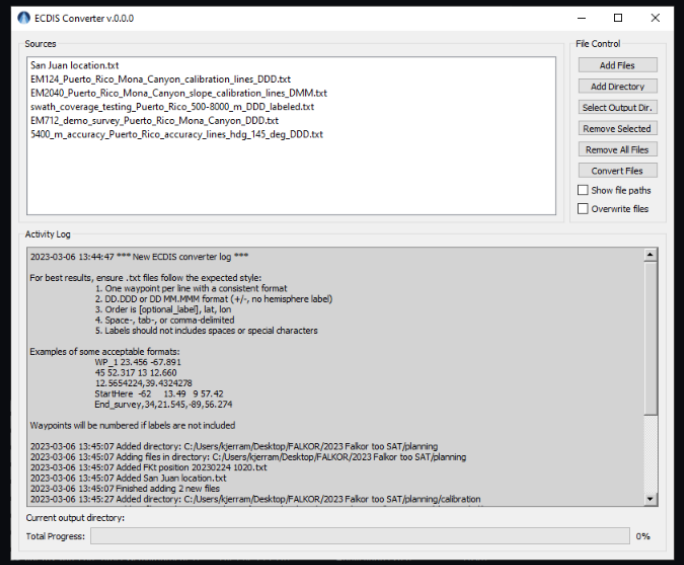
ECDIS Converter

github.com/oceanmapping/community/wik

ECDIS Converter

The ECDIS Converter loads waypoint text files and exports ECDIS .lst files for easier ingestion into ships' navigation systems. This can reduce the time, effort, and opportunity for error in transcribing scientists' waypoints into the bridge officers' preferred formats.

This application is in development and does not provide any verification for correctness of the converted waypoints. Users are responsible for checking .lst output files for agreement with expectations and safety of navigation. If in doubt, convert the waypoints manually or with other software.



Waypoint text file input

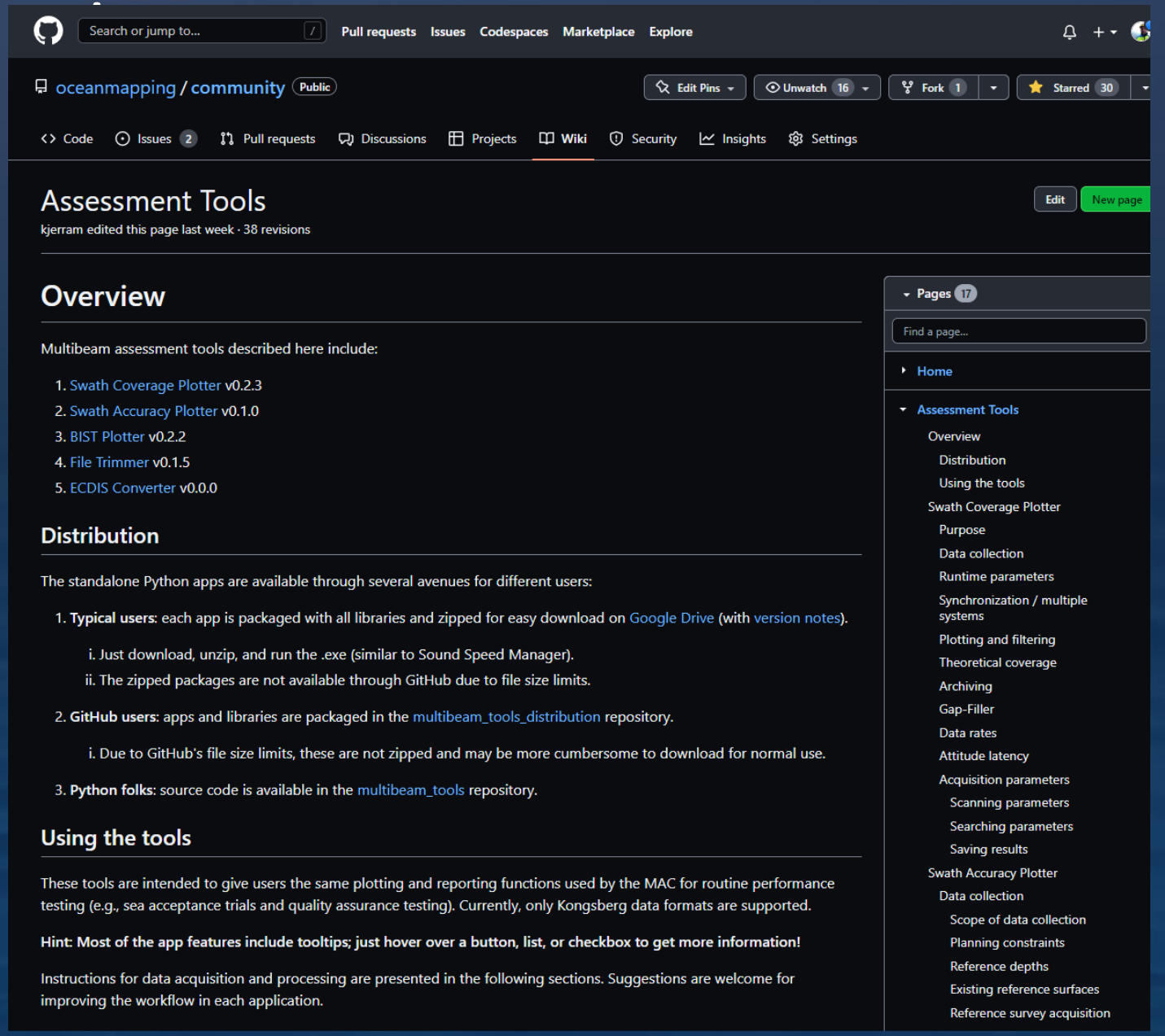
The ECDIS Converter expects the following input .txt format:

1. One waypoint per line with a consistent format
2. DD.DDD or DD MM.MMM format (+/-, no hemisphere label)
3. Order is [optional_label], lat, lon
4. Space-, tab-, or comma-delimited
5. Labels should not includes spaces or special characters

Converting to ECDIS format

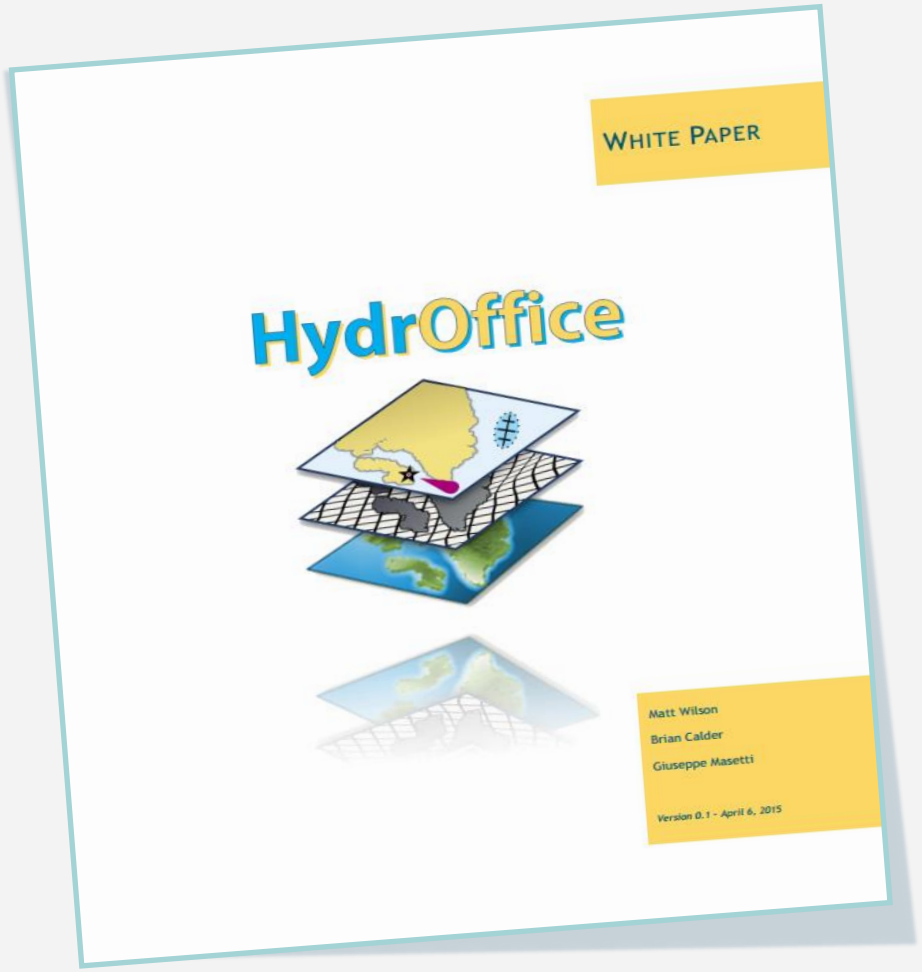
To export ECDIS .lst files:

1. Add waypoint text files or a source directory
2. Select the output directory, if desired
   i. If an output directory is not selected, each .lst export will be written to its corresponding input location
3. By default, any existing .lst files with the same name will be skipped to avoid overwriting
   i. Select 'Overwrite files' to overwrite existing .lst files, if desired
4. Select 'Convert Files' to convert all loaded .txt files to .lst
5. Check the activity log to review any warnings or skipped files
6. Review the waypoints in the ECDIS software to verify correct interpretation
   i. ***Users are responsible for safety of navigation in all circumstances***



HydrOffice Suite

What is HydrOffice?



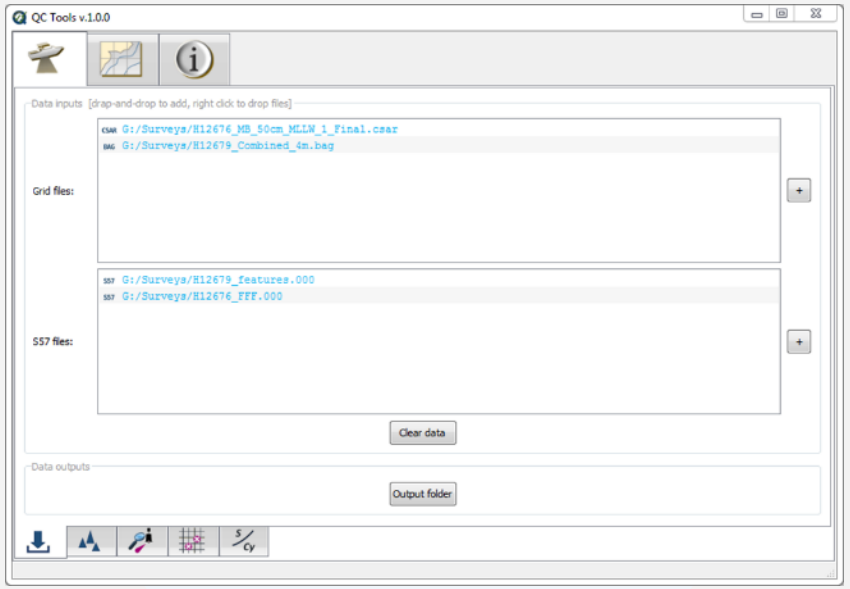
A framework of libraries and tools for Ocean Mapping

Quickly prototype and test innovative ideas

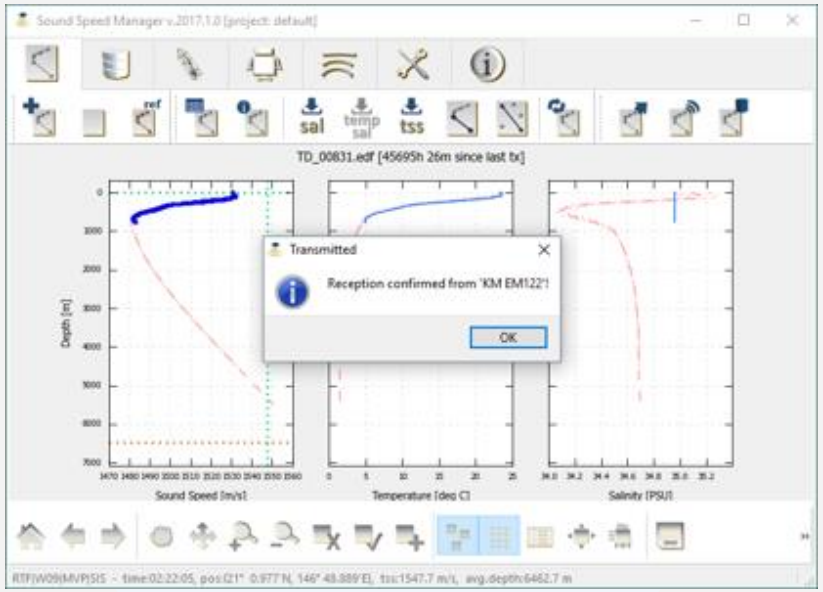
Ease the transition from research to operation

2015
White Paper

Ref.: G. Masetti, Wilson, M. J., Calder, B. R., Gallagher, B., and Zhang, C., "Research-driven Tools for Ocean Mappers", Hydro Int., vol. 21, 5. GeoMares, 2017.



July 2016
Site Review



March 2017
SSM release

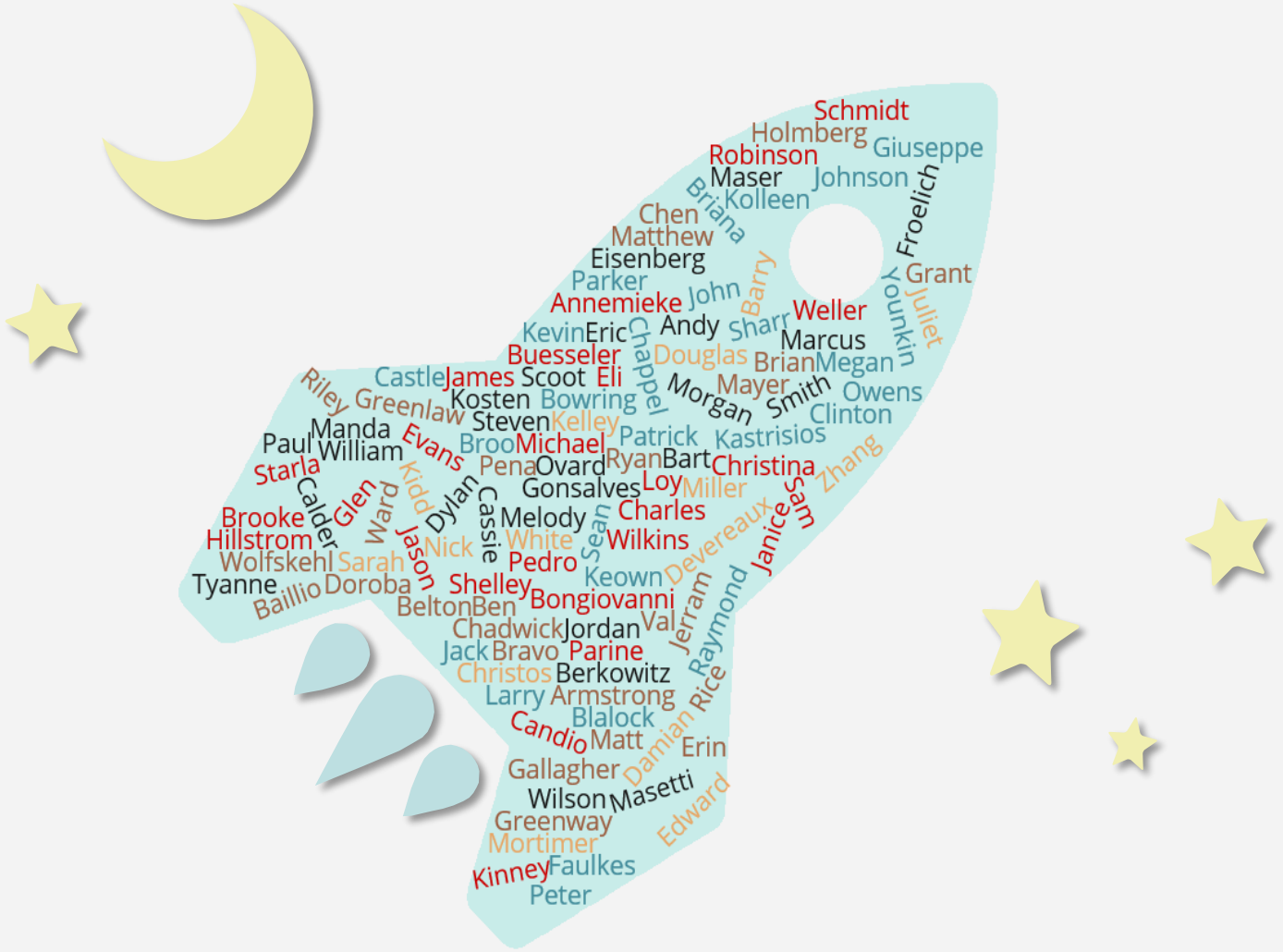
HYDROFFICE APPS

- BAG Explorer
- ENCx
- ePOM
- SmartMap
- CA Tools
- StormFix
- Bress
- …

HYDROFFICE APPS & SCRIPTS

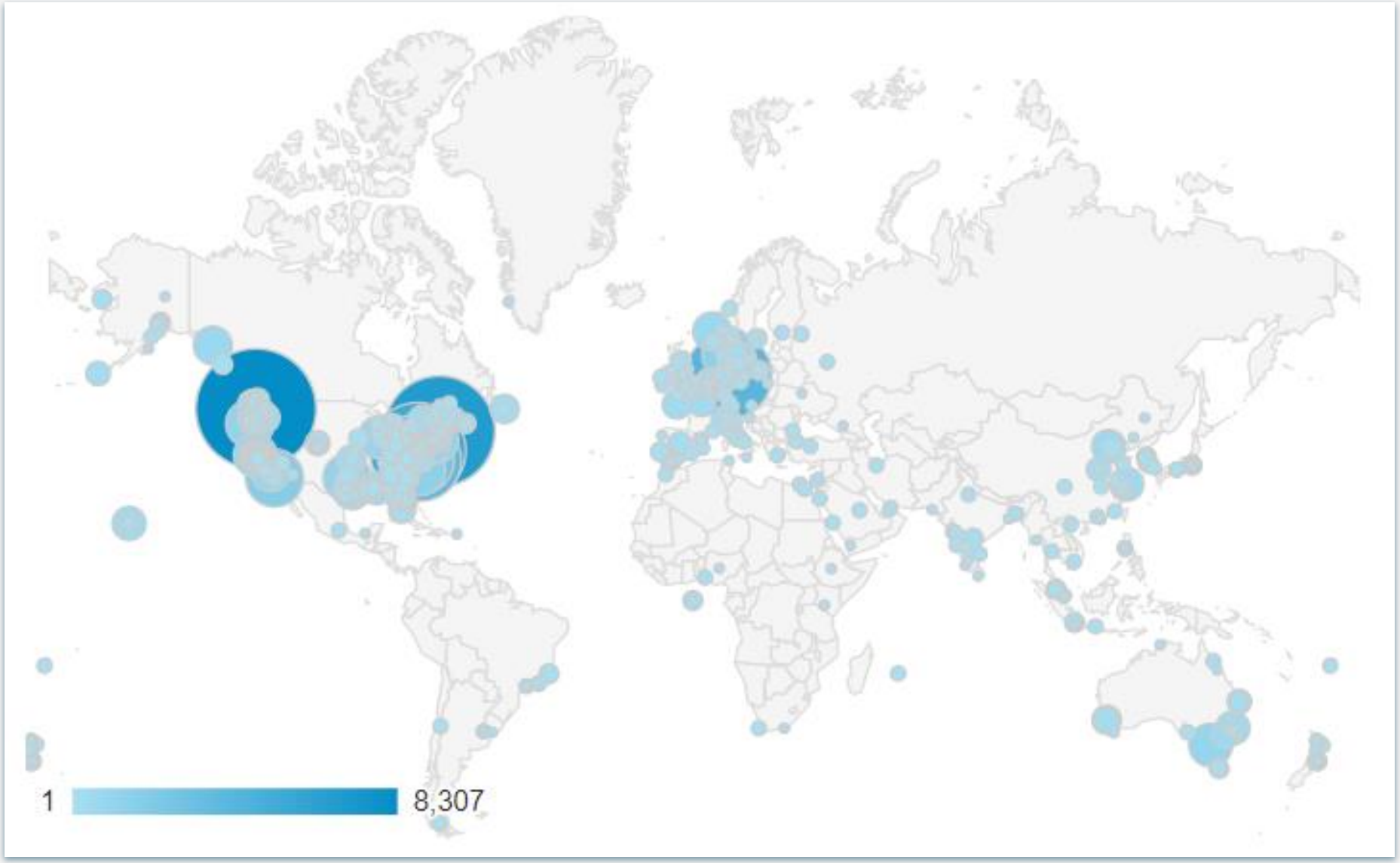
OCEAN MAPPING LIBS

PYTHON SCIENTIFIC STACK



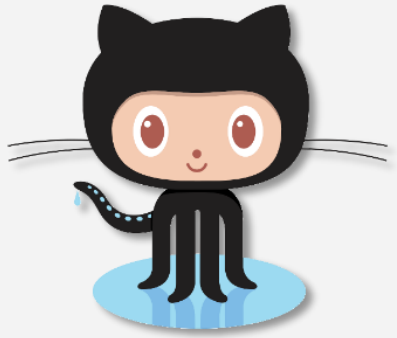
OCS-UNH CO-DEVELOPMENT

HydrOffice.org



(*) Google Analytics, Number of Sessions, May 2023.

Distribution



Python Packages

GitHub @hydroffice

Stand-alone Apps

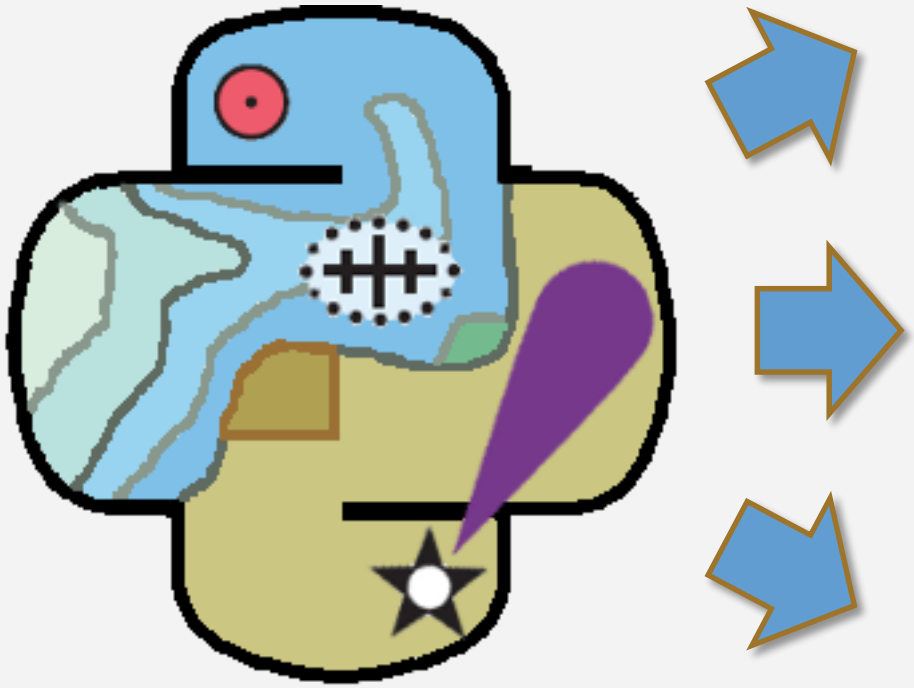
www.hydroffice.org

Pydro Universe

www.nauticalcharts.noaa.gov

What is Pydro?

Pydro Universe



A NOAA **Py**thon Distribution

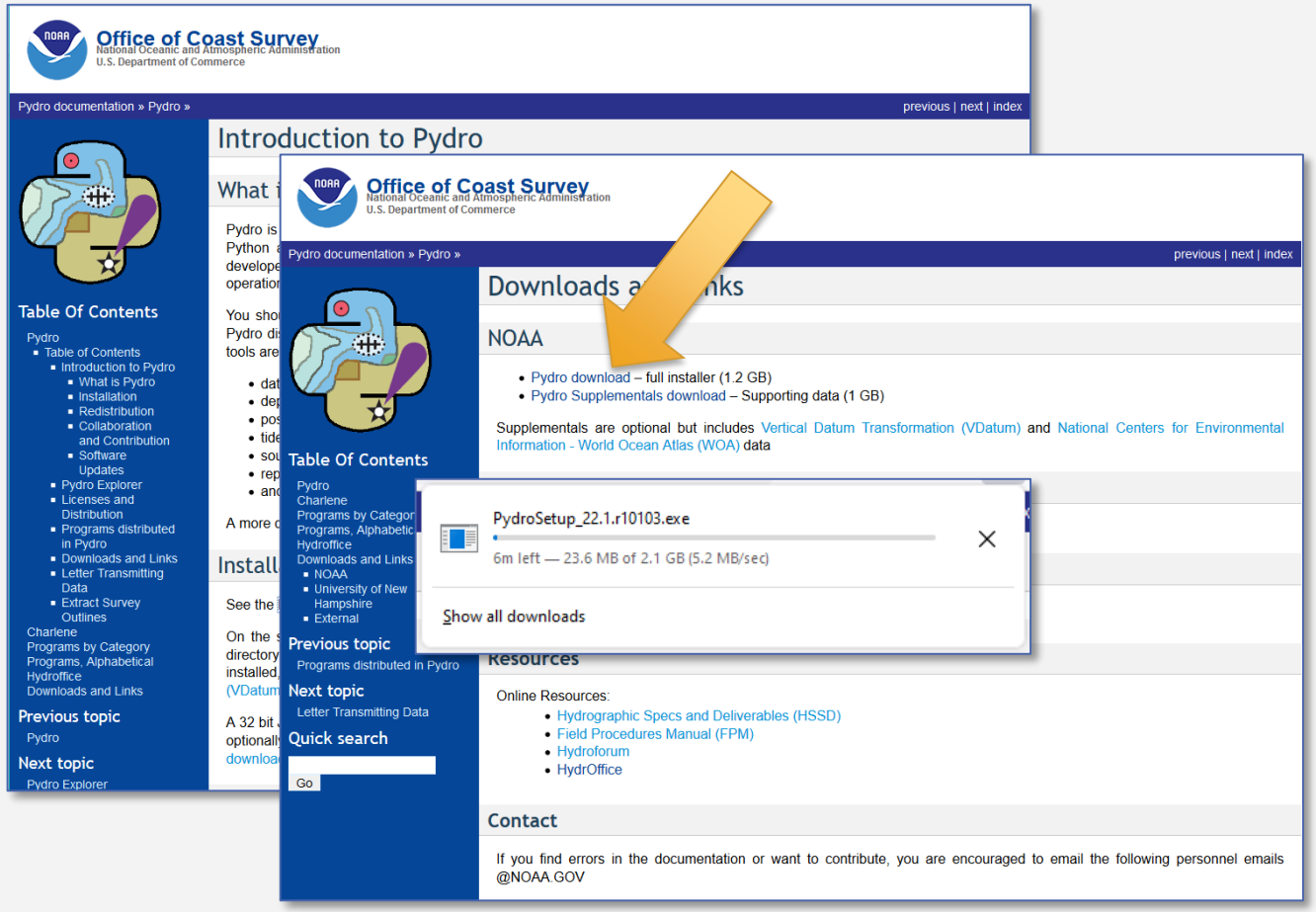
Managed by OCS HSTB

A Collection of Open-Source Hy**dro**graphic Tools

A Growing Community of People with Interests in Ocean Mapping

Pydro Installation

Url: https://svn.pydro.noaa.gov/



Sound Speed Manager

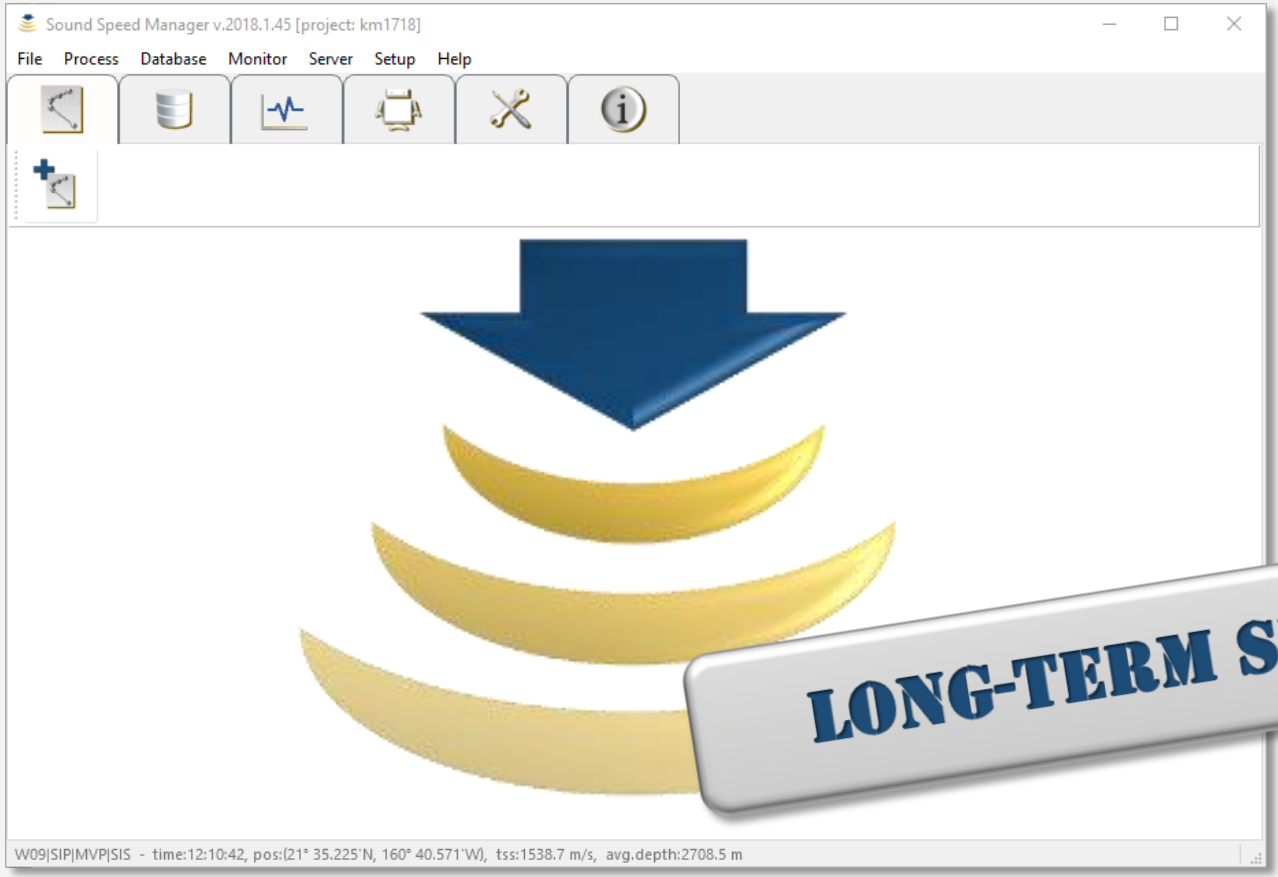
Sound Speed Manager

A **ready-to-go** and **free**
solution to ease
the **management of**
sound speed profiles
for ocean mapping

Ref.: Masetti, G. et al., *Sound Speed Manager: An open-source application to manage sound speed profiles*, International Hydrographic Review, vol. 17, pp. 31-40, 2017.

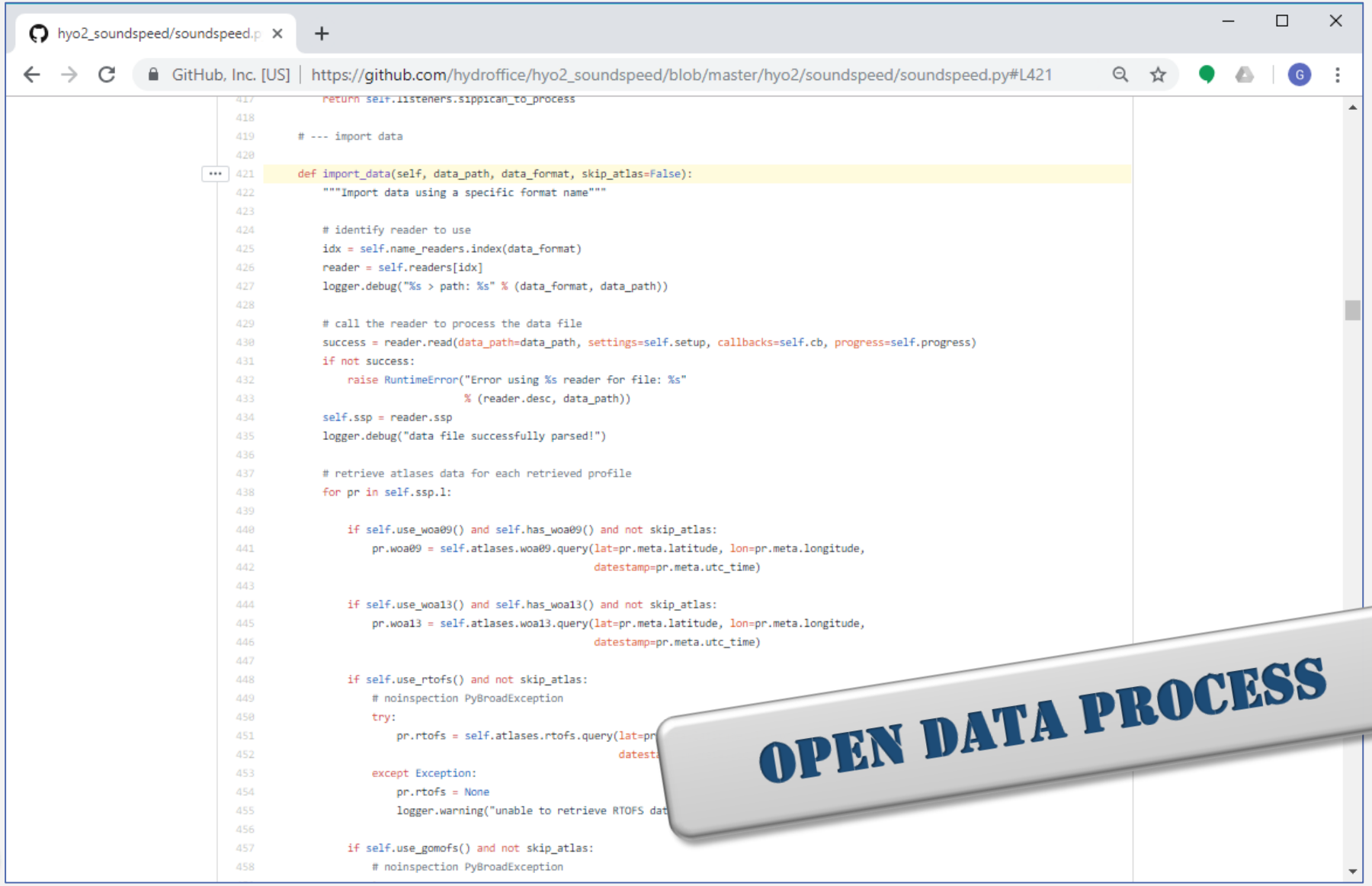
Collaborative Effort

NOAA OCS POCs:
- Barry Gallagher
- Chen Zhang

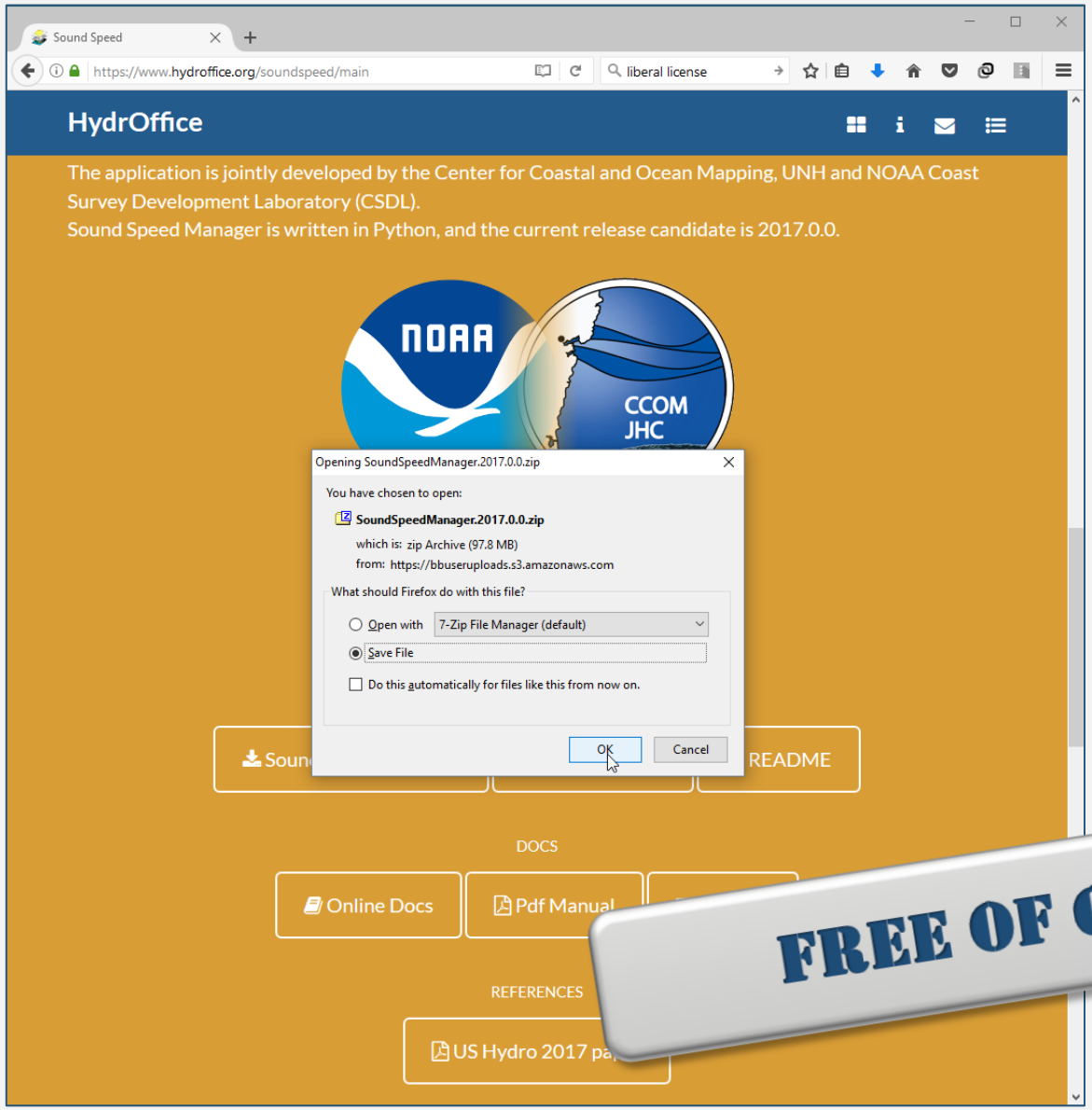


LONG-TERM SUPPORT

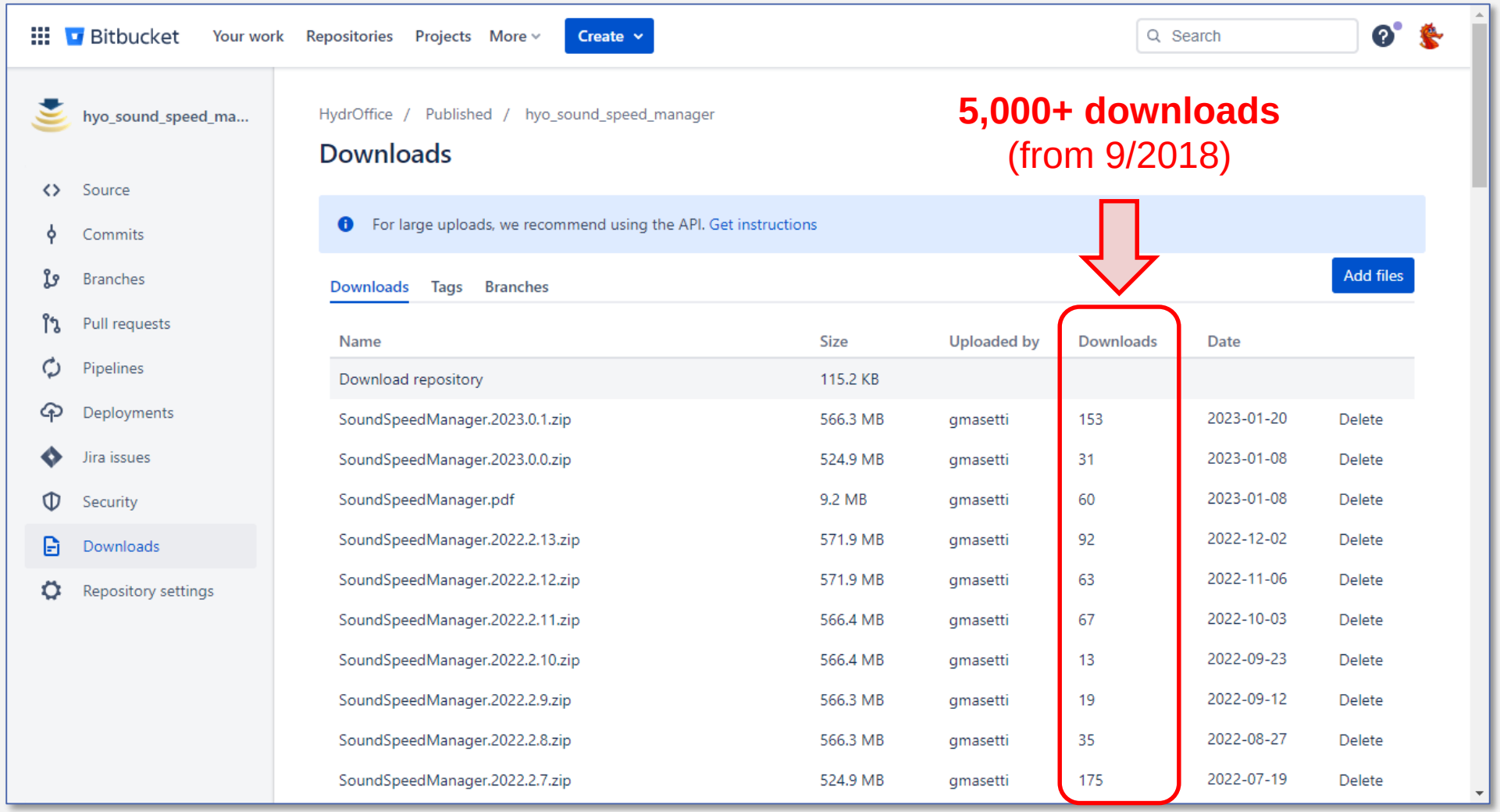
Open Source


hyo2_soundspeed/soundspeed.p
GitHub, Inc. [US] | https://github.com/hydroffice/hyo2_soundspeed/blob/master/hyo2/soundspeed/soundspeed.py#L421
return self.listeners.sippican_to_process
# --- import data
def import_data(self, data_path, data_format, skip_atlas=False):
"""Import data using a specific format name"""
# identify reader to use
idx = self.name_readers.index(data_format)
reader = self.readers[idx]
logger.debug("%s > path: %s" % (data_format, data_path))
# call the reader to process the data file
success = reader.read(data_path=data_path, settings=self.setup, callbacks=self.cb, progress=self.progress)
if not success:
raise RuntimeError("Error using %s reader for file: %s"
% (reader.desc, data_path))
self.ssp = reader.ssp
logger.debug("data file successfully parsed!")
# retrieve atlases data for each retrieved profile
for pr in self.ssp.l:
if self.use_woa09() and self.has_woa09() and not skip_atlas:
pr.woa09 = self.atlases.woa09.query(lat=pr.meta.latitude, lon=pr.meta.longitude,
datestamp=pr.meta.utc_time)
if self.use_woa13() and self.has_woa13() and not skip_atlas:
pr.woa13 = self.atlases.woa13.query(lat=pr.meta.latitude, lon=pr.meta.longitude,
datestamp=pr.meta.utc_time)
if self.use_rtofs() and not skip_atlas:
# noinspection PyBroadException
try:
pr.rtofs = self.atlases.rtofs.query(lat=pr
datest
except Exception:
pr.rtofs = None
logger.warning("unable to retrieve RTOFS dat
if self.use_gomofs() and not skip_atlas:
# noinspection PyBroadException
OPEN DATA PROCESS

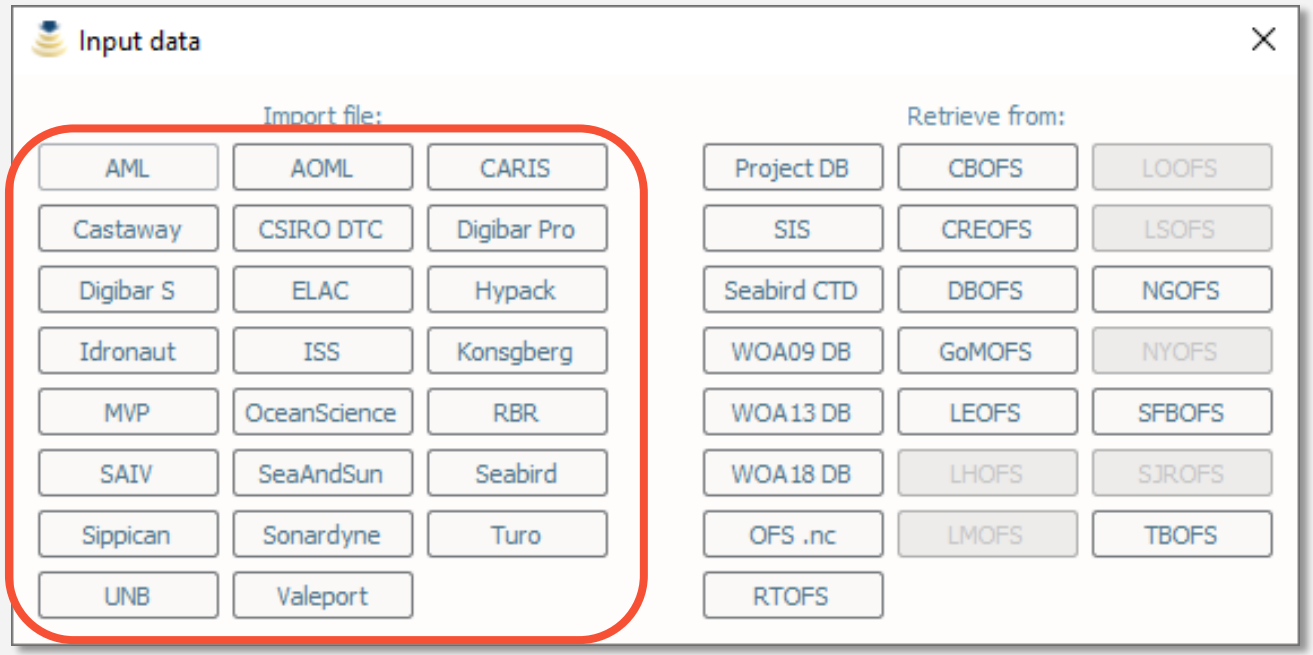
Liberal License

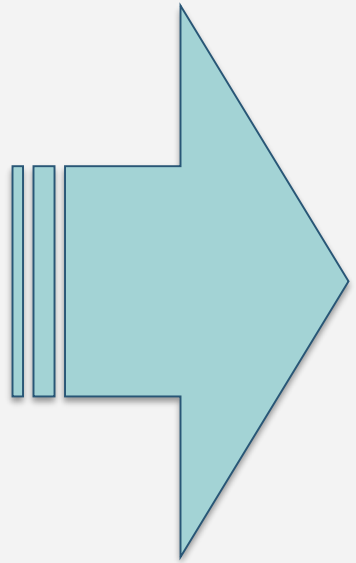


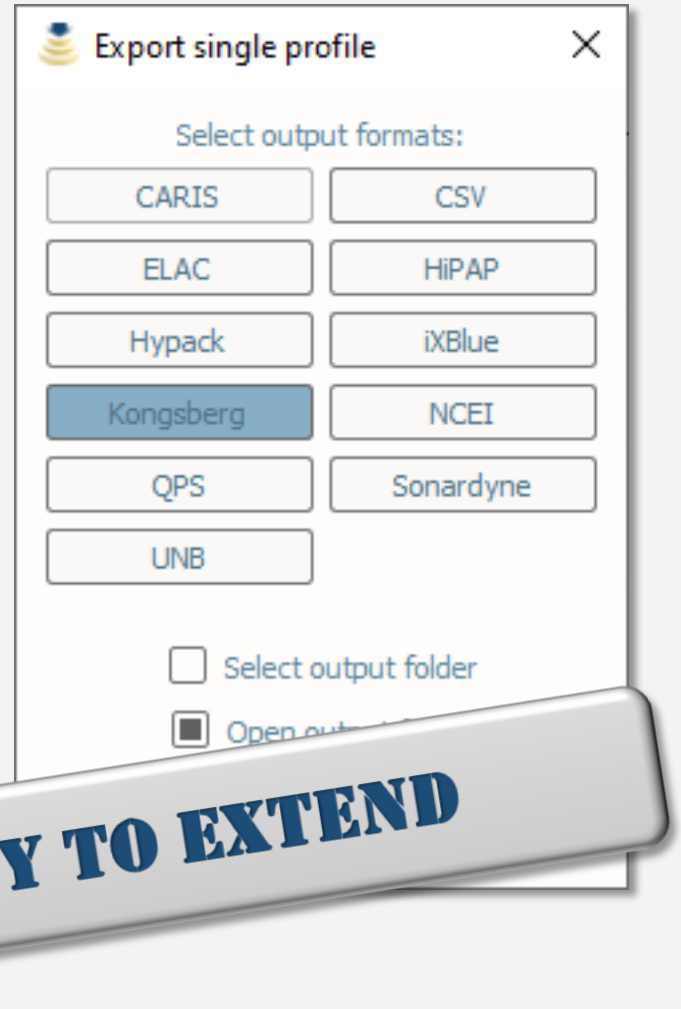
Large User Base



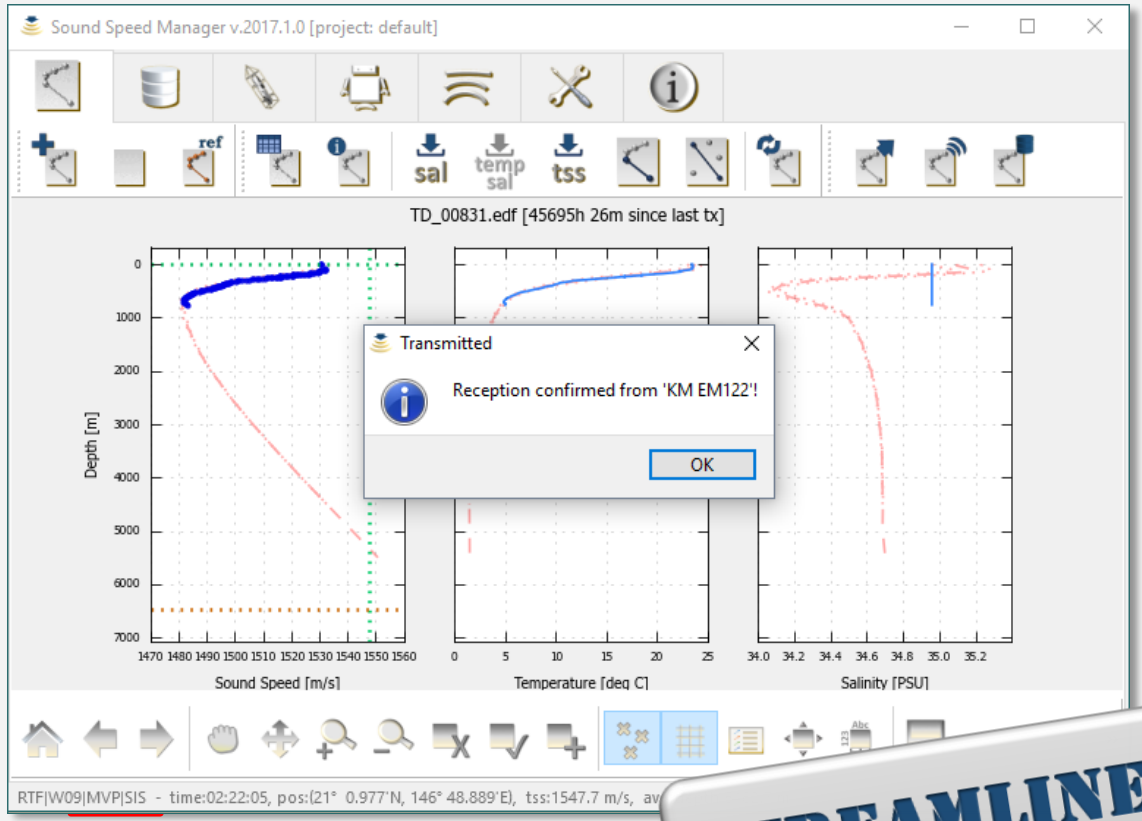
Format Converter



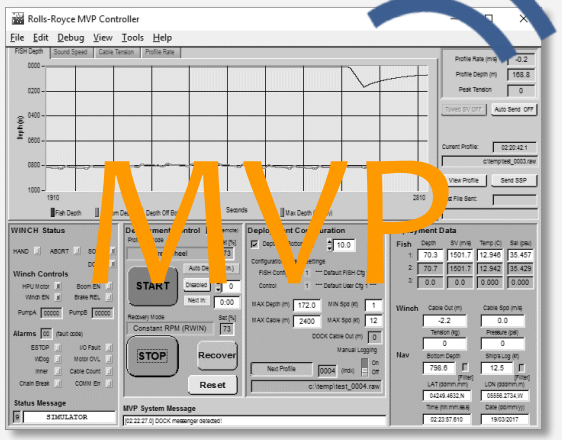




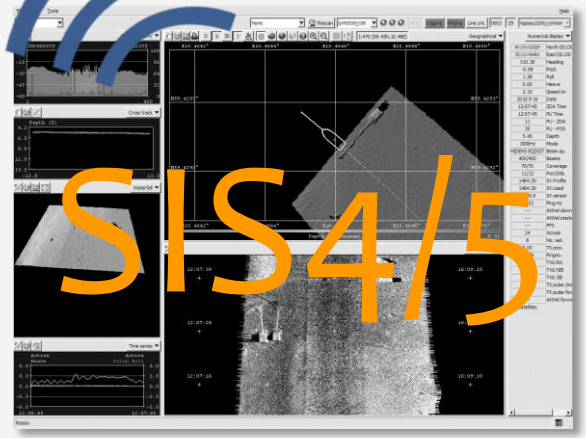
EASY TO EXTEND



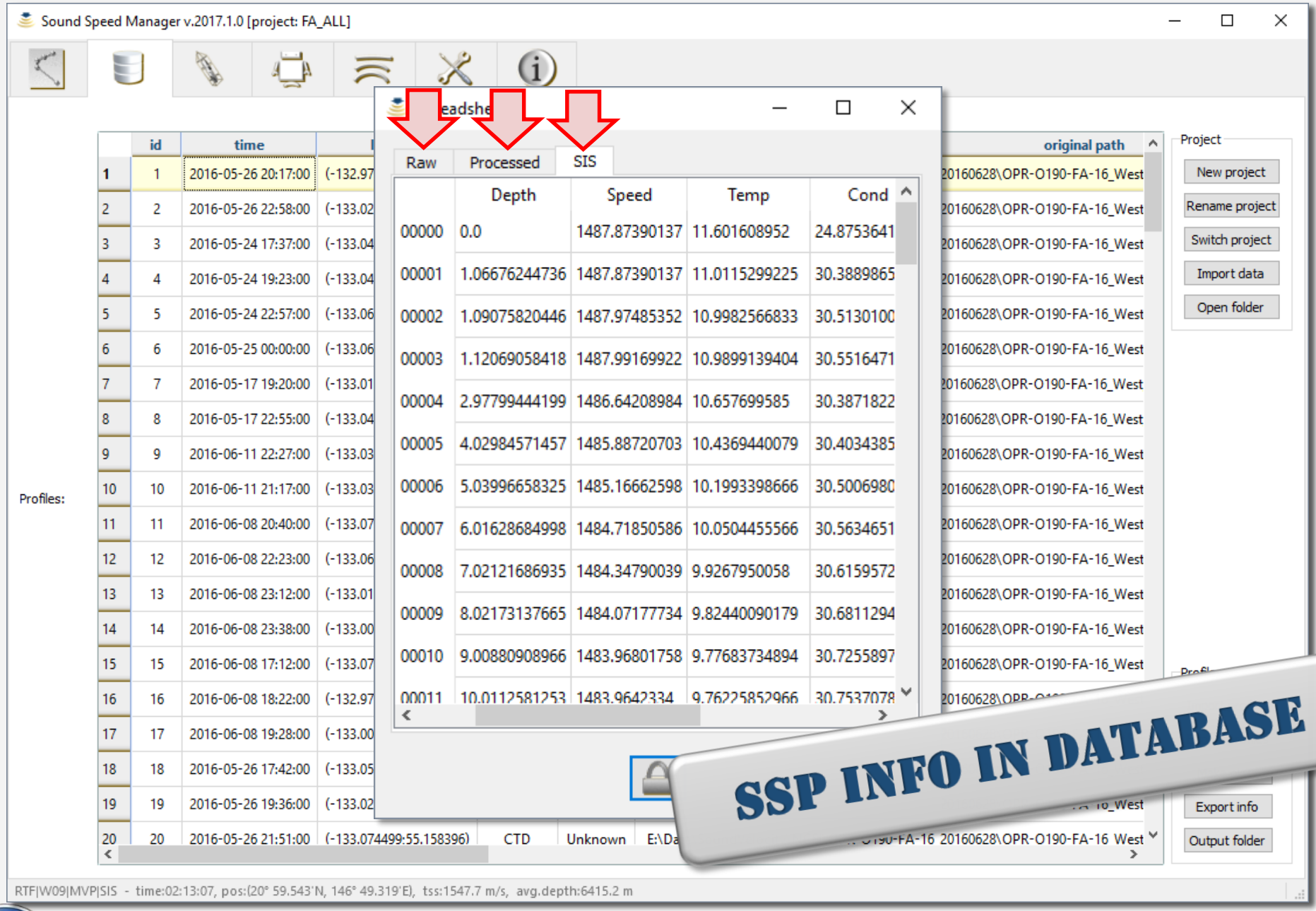
STREAMLINE WORKFLOWS

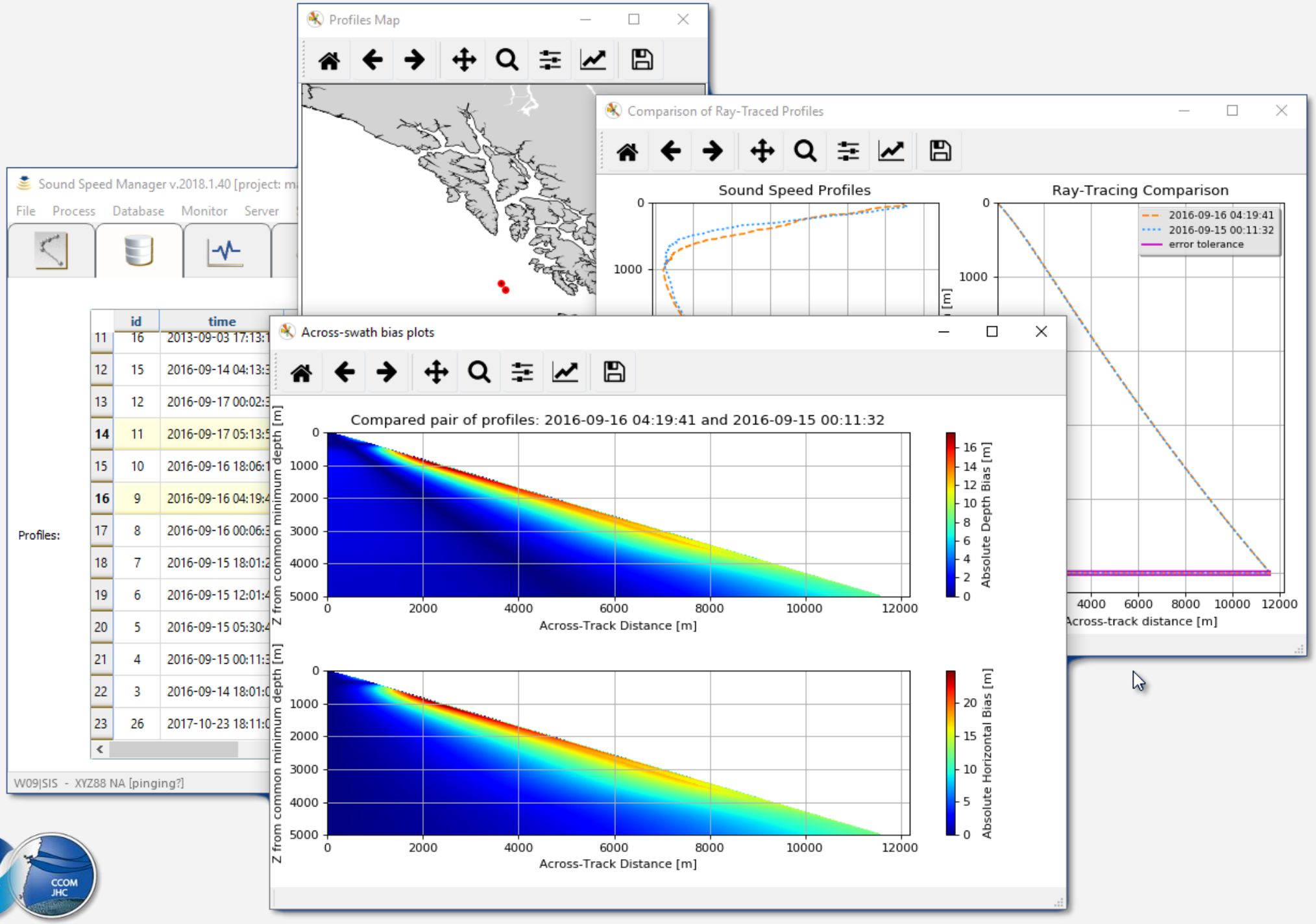


MVP

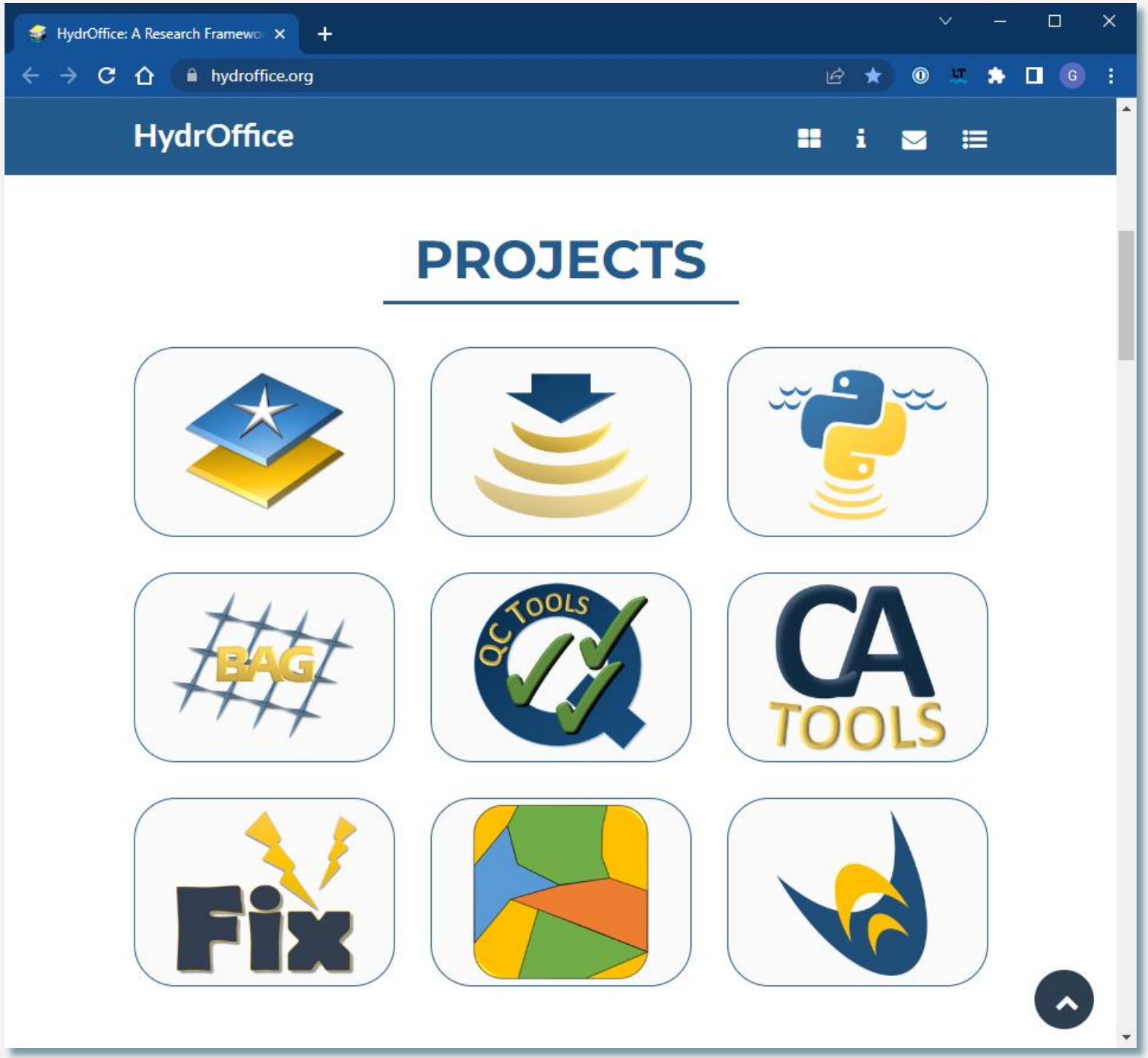


SIS4/5


Sound Speed Manager v.2017.1.0 [project: FA_ALL]
Raw
Processed
SIS
Depth Speed Temp Cond
00000 0.0 1487.87390137 11.601608952 24.8753641
00001 1.06676244736 1487.87390137 11.0115299225 30.3889865
00002 1.09075820446 1487.97485352 10.9982566833 30.5130100
00003 1.12069058418 1487.99169922 10.9899139404 30.5516471
00004 2.97799444199 1486.64208984 10.657699585 30.3871822
00005 4.02984571457 1485.88720703 10.4369440079 30.4034385
00006 5.03996658325 1485.16662598 10.1993398666 30.5006980
00007 6.01628684998 1484.71850586 10.0504455566 30.5634651
00008 7.02121686935 1484.34790039 9.9267950058 30.6159572
00009 8.02173137665 1484.07177734 9.82440090179 30.6811294
00010 9.00880908966 1483.96801758 9.77683734894 30.7255897
id time
original path
Profiles:
Project
New project
Rename project
Switch project
Import data
Open folder
Export info
Output folder
SSP INFO IN DATABASE
RTF|W09|MVP|SIS - time:02:13:07, pos:(20° 59.543'N, 146° 49.319'E), tss:1547.7 m/s, avg.depth:6415.2 m


Profiles Map
Comparison of Ray-Traced Profiles
Sound Speed Profiles
Ray-Tracing Comparison
2016-09-16 04:19:41
2016-09-15 00:11:32
error tolerance
Across-track distance [m]
Sound Speed Manager v.2018.1.40 [project: m
File
Process
Database
Monitor
Server
Profiles:
id
time
W09|SIS - XYZ88 NA [pinging?]
Across-swath bias plots
Compared pair of profiles: 2016-09-16 04:19:41 and 2016-09-15 00:11:32
Z from common minimum depth [m]
Across-Track Distance [m]
Absolute Depth Bias [m]
Absolute Horizontal Bias [m]

Other Useful Tools


HydrOffice: A Research Framewo
hydroffice.org
HydrOffice
PROJECTS
BAG
QC TOOLS
CA
TOOLS
Fix


Questions?
For comments and feedback:
kjerram@ccom.unh.edu [MAC Tools]
gmasetti@ccom.unh.edu [HydrOffice]