

Propagation Characteristics of High-Frequency Sounds Emitted During High-Resolution Geophysical Surveys: Acoustic Modeling Effort

Final Data Adjustment (Calibration) Report

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List of Acronyms, Symbols, and Abbreviations

10logR	cylindrical spreading
20logR	spherical spreading
μPa	micropascal
ϕ	phi (grain size)
AOS	Applied Ocean Sciences, LLC
CSA	CSA Ocean Sciences Inc.
dB	decibel
f	frequency
HF	high-frequency
Hz	hertz
ISO	International Organization for Standardization
kHz	kilohertz
km	kilometer
LF	low-frequency
L_E	sound exposure level
$L_{E,12h}$	cumulative 12-hour sound exposure level
$L_{E,ss}$	single-strike sound exposure level
$L_{E,w}$	weighted sound exposure level
L_p	sound pressure level
$L_{p,90\%}$	90% root-mean-square sound pressure level
$L_{p,pk}$	zero to peak sound pressure level
$L_{p,pk-pk}$	peak to peak sound pressure level
$L_{p,rms}$	root-mean-square sound pressure level
L_{pk}	peak sound pressure level
m	meter
MF	mid-frequency
MSP	mean-square sound pressure
$p(t)$	sound pressure time series
PE	parabolic equation
PL	propagation loss
RAM	range-dependent acoustic model
re	with reference to
rms	root-mean-square
RMSE	root-mean-square-error
s	second
SEL	sound exposure level
SEL_{ss}	single-strike sound exposure level
SEL_w	weighted sound exposure level
SL	source level
SNR	signal to noise ratio

SPL	sound pressure level
SSP	sound speed profile
TL	transmission loss
U.S.	United States
USGS	United States Geological Survey

1 Data Adjustment Introduction

The Bureau of Ocean Energy Management (BOEM) “Propagation Characteristics of High-Frequency Sounds Emitted During High-Resolution Geophysical Surveys: Open Water Testing” project goal was to execute a field test plan that measured the sound fields generated by high-resolution geophysical (HRG) source signals. Open-water testing was Phase II of this BOEM project. During Phase II, there were significant challenges with the data collection hardware at sea, and scientists and engineers exerted extraordinary effort to obtain valid acoustic data, including extensive troubleshooting and multiple re-deployments of the data collection buoys. Troubleshooting efforts resulted in a considerable amount of useful acoustic measurements, which were presented in the Phase II report (Halvorsen and Heaney, 2018). **Figure 1.1-1** shows the plan view of the recording buoy positions from the Phase II report (Halvorsen and Heaney, 2018), where most often the ‘C’ buoy position was not included in the field array.

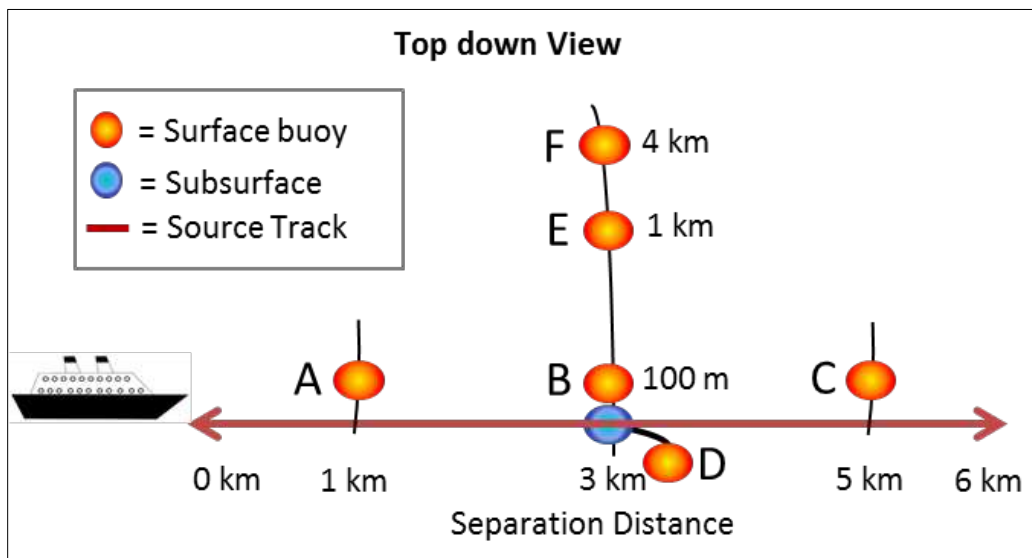


Figure 1.1-1. Buoy orientation, as shown in the Phase II report (Halvorsen and Heaney, 2018).

The objective of this task was to determine and apply adjustment factors to the received signal levels. Adjustment factors were determined to address unresolved issues from Phase II related to hydrophone sensitivity, gain settings, and the occasional failed collection of global positioning system (GPS) navigation data on the recording buoys. There were several instances when equipment settings were not documented for the hydrophones on one or more buoys during each run. Specifically, the two values not always documented, but needed for conversion from raw WAV file data to pascals, were recorder hardware gain and hydrophone sensitivity. Once these issues were addressed, adjustments were made to the recording buoy locations and received signal levels.

During analysis of the Phase II data, the recorder hardware gain setting errors were partially addressed. Each hydrophone channel on each buoy was compared to other hydrophones on that buoy (if possible) to

verify individual gain settings. However, this simple data check was not capable of identifying the incorrectly documented gains across all channels on a buoy. Therefore, to ascertain whether all channels (hydrophones) on a buoy needed an adjustment factor on the recorder hardware gain, simple acoustic propagation modeling was incorporated into the adjustment factor decisions by making plots of sound exposure level (SEL) versus range.

For each recording buoy, there were two or more hydrophones with different sensitivities to capture the signal dynamic range. The basic design included one hydrophone of higher sensitivity and one of lower sensitivity at each recording depth (however, with the hardware challenges, one of these often did not function). The recording hardware had different channels programmed to include a gain of ± 10 decibels (dB). Each hydrophone was supposed to be plugged into a specific channel with the preprogrammed gain; however, this is where undocumented errors are known to have occurred. The 10-dB interval will be referred to later in this report as the “padding log error”. These issues resulted in a range of received level errors from 0 to ± 50 dB. For example, a single recording channel with an incorrect gain setting could result in a signal level adjustment factor that differed from the other channels. The combination of hydrophone sensitivity, gain setting, and incorrect channel selection led to overall received level errors between two hydrophones on the same buoy, with differences up to ± 50 dB. The sensitivity of any hydrophone that did not record signals would be difficult to determine. Therefore, if a hydrophone’s sensitivity was not documented, a few decibels could be added to the ambiguity of the system. Hydrophone sensitivity is an important variable in converting voltage to pascals and remains an important component in determining an adjustment factor; however, it may not be possible to isolate that value from the gain settings. The comingling of issues raised the level of uncertainty, but these nondeterminate issues will be circumscribed during the modeling step.

Another issue that occurred in the field was the occasional failure of the GPS devices on the buoys. Although a non-acoustic issue, these failures impacted the determination of the signal level relative to the passing sound source. The manufacturer’s settings on the hydrophones were assumed to be accurate, but without using a monitoring hydrophone for each source, there was no way to verify the hydrophone sensitivities for every buoy *in situ*. Ultimately, errors in buoy location affect the comparison of acoustic modeling versus measurements and increase the uncertainty. A higher than expected received sound level at any hydrophone on a buoy could be a result of incorrect gain settings (too high), incorrectly documented sensitivity of the hydrophone, and/or the unknown location of the recording buoy’s distance from the sound source. While it would be ideal to use increments of ± 10 dB to determine adjustment factors to ± 50 dB, it was found that increments of ± 5 dB better captured the combinations of gain, sensitivity, and location errors. Parsing out the position error versus the gain and sensitivity errors of each hydrophone was a challenging goal of this project.

2 Adjustment Factors

The objective of this chapter is to assign adjustment factors to each acoustically recorded HRG source mode at each of the five field test sites. To achieve this objective, stepwise efforts included (1) using model and inter-buoy comparisons to visually determine the necessity and amount of an adjustment factor, which is required to compensate for the combination of sensitivity and gain errors; and (2) using plotted models of the SEL fall-off with range and a cost function to determine buoy location. The results of these two steps were combined to generate the final received level adjustment factors needed to

progress to the model data comparison task of this project. The low-frequency (LF) and mid-frequency (MF) source calibration methods were the same. The high-frequency (HF) source calibration methods did not follow LF and MF methods, but rather capitalized on the results.

Most buoys remained in their original positions, however a storm occurred at Site 3 and there were strong currents that moved buoys at site 5. These shifts were recognized and incorporated into buoy positions. Buoy positions were estimated using 1) GPS when available, 2) dead reckoning derived from buoy deployment/recovery positions, and 3) estimations from acoustic inversion when the data were available (i.e., position D was available for localization) (Halvorsen and Heaney 2018).

There were outlying data that resulted in ‘noise’ that are not true acoustic data (**Figure 2.1-1**). This noise was removed from analysis; but it was not always removed from graphical representation so the reader could better understand the uncertainty and/or limitations of the measurement systems and field scenarios.

Figure 2.1-1 shows examples of acoustic data and noise within plots of SEL versus range. These data are usually shown by buoy-specific colors, but in these examples noise is shown as red dots. The top graph shows a band of good data (black dots) and a lot of noise surrounding them. In the bottom graph, when data points flatten out, that data is then in the noise floor. Received levels of the sound sources were low enough to reach the noise floor of the system, so the system could no longer record these quieter received levels. Again, this noise was filtered out of further modeling and processing steps.

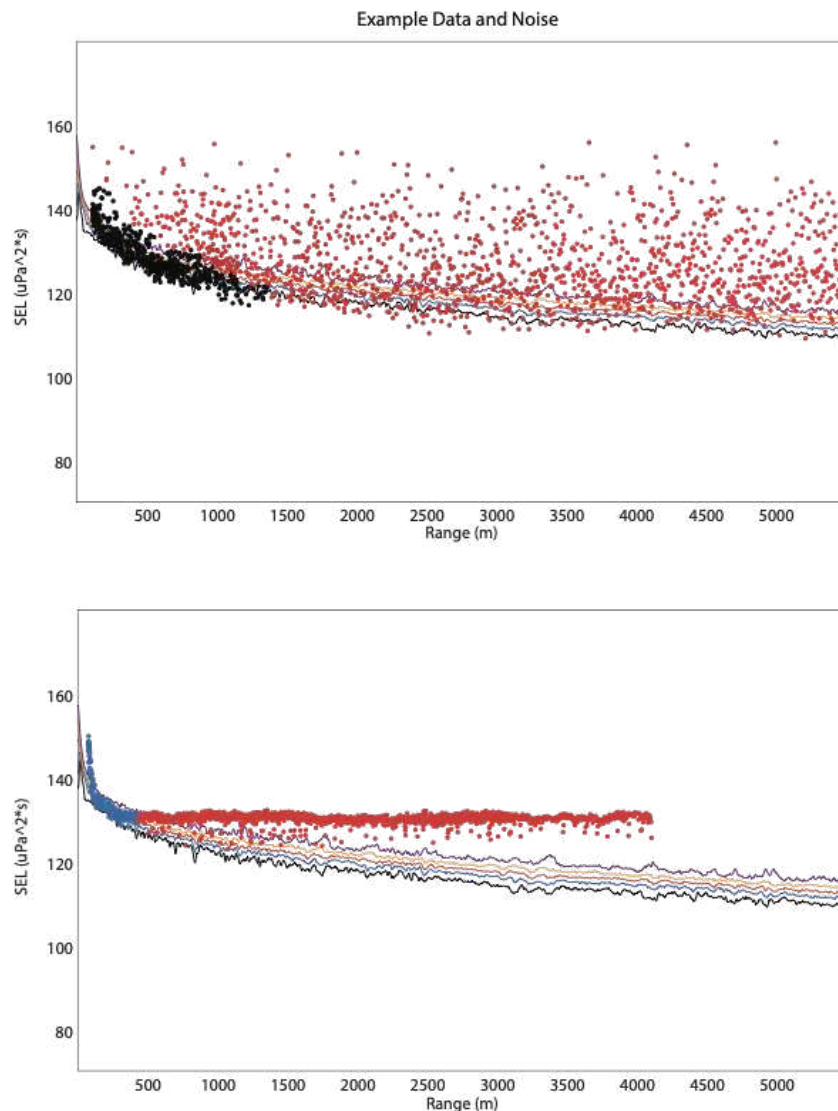


Figure 2.1-1. Examples of data and noise on buoys.

Modeled (lines) versus measured data (dots) for a source. Top: buoy with acoustic data (black dots) and noise (red dots). Bottom: buoy with acoustic data (blue dots) and noise (red dots), the noise is within the noise floor and is identifiable by its flat presentation, i.e., there is no fall off with range. The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental variability (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black).

2.1 Low-Frequency Sound Source Adjustment Factor Methods – Parabolic Equation, Percentiles, and GPS Cost Functions

Custom bash and C scripts for each hydrophone systematically created plots to search for the errors mentioned in **Section 1.0**. This process was performed on each buoy during each run for every sound source at every site. The primary mechanism for determining adjustment factors on the acoustic measurements was inter-buoy comparison paired with the plots of SEL as a function of range at each site. The parabolic equation (PE) was the algorithm of choice to make these SEL versus range plots. The most

appropriate buoy position to compare *in situ* measurements with the PE model was at the closest point of approach (CPA) between the boat and sound source.

The spectral shape of each source was generated from the CPA measurement position data to calculate the signal's SEL. The SEL then was adjusted to match the Naval Undersea Warfare Center's (NUWC) source level (SL) observations at 1-meter (m) measurement range (Crocker and Fratantonio, 2016).

Environmental inputs to the PE included a summer sound speed profile (SSP) for the water column depths at each of the five sites (10 m for Sites 1 and 2, 30 m for Sites 3 and 4, and 100 m for Site 5), a flat seafloor (based on minimal signal propagation to 4 kilometers [km]), and appropriate grain sizes for each site. The appropriate grain sizes in phi (ϕ), based on the Wentworth chart, included 5 ϕ for mud (Sites 1 and 3), 3 ϕ for sandy silt (Site 5), and 1 ϕ for sand (Sites 2 and 4). For the PE model, a point source (for the LF sources) was positioned at 3 m depth. The acoustic propagation modeling also included uncertainty, particularly for sediment type (over a small range), source depth and hydrophone position in both range and depth. The percentiles (5th, 25th, 50th, 75th, and 95th) were a visual way to depict this uncertainty in modeled SEL versus range. Thus, percentiles were computed (1) across hydrophone depth from the surface to the seafloor, (2) at 20 m of range closer to or farther from the source, and (3) for sediment grain sizes $\pm 1 \phi$ to capture an expected amount of environmental variation. The percentiles were plotted and overlaid with the received SEL measurements (**Figure 2.1-2**). If a measurement was within the percentiles of expected error (uncertainty), it was scored as acceptable (i.e., no adjustment factor was needed). However, if the measurement was mostly beyond the percentiles of expected error, it was scored as an error that needed an adjustment factor in gain, sensitivity, and/or position.

Figure 2.1-2 shows measured SEL data (dots) and the PE-modeled SEL percentiles (lines), which show the 5th, 25th, 50th, 75th, and 95th percentiles that capture the uncertainty of the modeled sound field for the Mini Sparker (Mode 28) source at Site 3 (for each hydrophone, Run 30, Deployment 3). The measured SEL data are from the Phase II analysis. Initial visual examination showed three buoys' data had very good agreement with the model: Buoy 11 (red; position B), Buoy 8 (yellow; position E), and Buoy 10 (yellow; position E), while three buoys showed poor agreement: Buoy 12 (black; position A), Buoy 6 (blue; position D), and Buoy 9 (purple; position F).

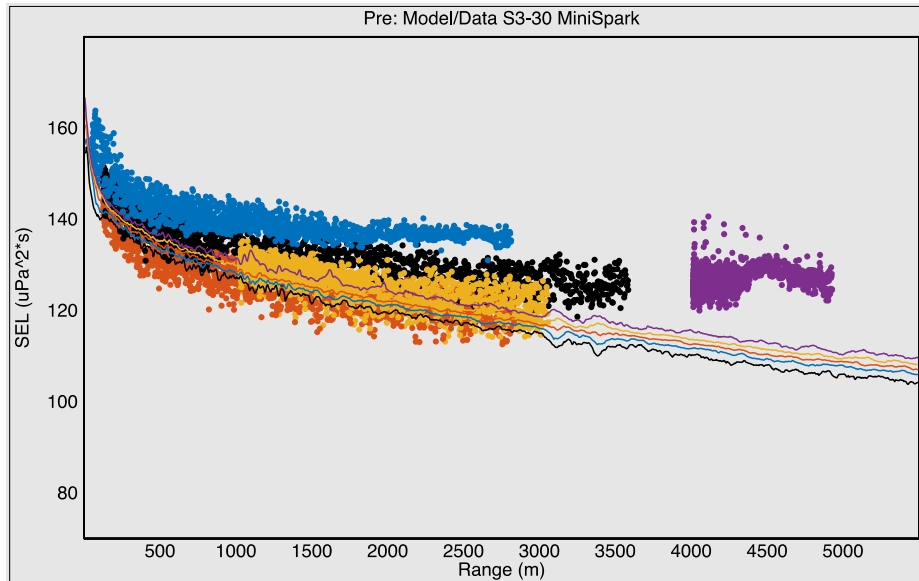


Figure 2.1-2. Modeled (lines) versus measured data (dots) for Mini Sparker, Mode 28, at Site 3, Deployment 3, Run 30.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental variability (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for six buoys (Buoy 6, blue; Buoys 8 and 10, yellow; Buoy 9, purple; Buoy 11, red; Buoy 12, black). Divergence of Buoys 6, 9, and 12 from the percentile range is visible.

Buoy 12 was 10 to 20 dB higher than Buoys 8, 10, and 11 as well as the model. Buoy 9, the farthest position, was more than 20 dB too high. Based on the consistency between the model results and the measurements for buoys at closer ranges, it is unlikely that the model was off by 10 to -20 dB beyond 1,000 m. Therefore, it was determined that Buoys 6, 9, and 12 required adjustment factors.

Buoy 6 was at position D, which had a CPA when the sound source passed directly over the hydrophone. As mentioned earlier, the hydrophone at the CPA is an important position to consider when assigning an adjustment factor. However, this buoy's data did not match the model at farther ranges. Beyond 500 m, the measured data amplitudes from Buoy 6 were too high relative to the model. In this example, as the Mini Sparker moved away from Buoy 6, the hydrophone did not record the lower-level signals and the signal to noise ratio (SNR) was poor. When considering the levels at only the short ranges, the data were still 10 dB higher than expected. Therefore, a -10 dB adjustment factor was applied, which is reflective of all the errors (recorder and hydrophone gain setting). The final observation regarding the Buoy 6 data was that the closing and opening of the ship (approaching and moving away from the receiver, respectively) had different received levels. Between 0 and 200 m, two clouds of blue dots, or two values at each range (one closing, one opening), existed when the expectation was for there to be matching values between opening and closing. The source signal was expected to be the same in azimuth; therefore, this difference indicated an error in the buoy's GPS location. When the buoy was not in its expected position, plotting received levels versus range illuminated those errors.

Figure 2.1-2 illustrates the confounding effect that navigation and settings errors had on the data, and there is an inherent redundancy and overlap between the errors. It was difficult to determine if the issues lied in received levels (e.g., data were 10 dB too high), buoy position (e.g., if the receiver should be

200 m closer), or some combination of the two, because either justification would be equivalent for applying an adjustment factor of -10 dB. The primary evidence that disambiguated the gain and buoy position errors was the fall-off of the SEL slope with range. SEL plots and cost function plots (**Figures 2.1-2 and 2.1-3**) showing the most likely GPS position shift were investigated side by side for each buoy as a visualization tool.

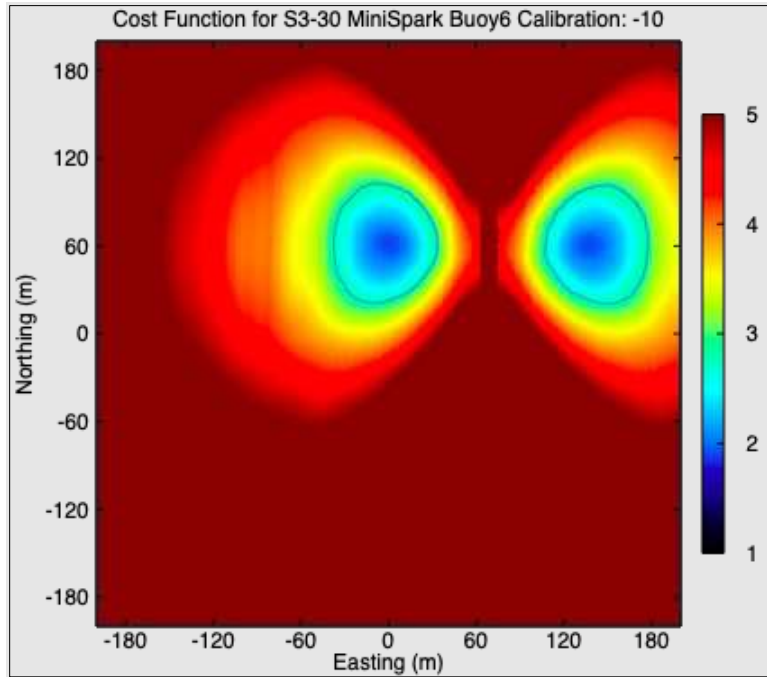


Figure 2.1-3. Example cost function for Mini Sparker, Mode 28, at Site 3, Deployment 3, Buoy 6, Run 30.

Results indicate the root-mean-square-error (RMSE) between the model/data sound exposure level (SEL) as a function of position after a -10 dB adjustment factor was applied. Depicted as meters in error to the north (vertical axis) and to the east (horizontal axis). Left-right ambiguity is expected for omnidirectional sources like the Mini Sparker.

Cost function plots (**Figure 2.1-3**) were made with an optimization search algorithm over a 400×400 m area centered on the expected GPS position. Within the grid, the measured SEL versus range in each 1×1 m cell was computed via a look-up table generated by the modeled SEL. The same 1×1 m cell was created for modeled SEL data and compared to the measured SEL data. This dual comparison of the measured and modeled SEL resulted in a cost function across the grid space that is the root-mean-square-error (RMSE) in decibels between the measured and modeled SEL for a given buoy position. The global minimum of the cost function (the best position match of the model and data based on that grid cell's lowest RMSE value) provided the best shift across latitude and/or longitude needed to adjust the buoy position for a given data set and applied adjustment gain factors.

A blue contour line at 1 dB RMSE above the global minimum was overlaid on the plot to illustrate relative uncertainty in range (meters) inherent to the cost function's optimization search. A 1-dB RMSE contour line 200 m wide has high positional uncertainty from east to west, while a 1-dB RMSE contour line 10 m high would be interpreted as low uncertainty from north to south. For example, if a 1-dB RMSE

contour line (e.g., in **Figure 2.1-3**) had a 1-dB RMSE contour line of approximately 20 m in all directions from its global minimum, then confidence would be high in the location results across all bearings.

In the Mini Sparker cost function at Site 3 for Buoy 6, Deployment 3, Run 30 (**Figure 2.1-4**), there was a well-defined minimum RMSE of approximately 1.5 dB at 60 m north and 0 m west of the original GPS location. There was an ambiguity as to which side of the ship's track line the source was on, but this was expected because of symmetry. The interpretation of **Figure 2.1-3** was the position that best matched the data's SEL fall-off with range was 60 m north of the expected position, which was about a 2-dB difference and within the range of expected environmental error. Therefore, adjusting the buoy's position was deemed unnecessary.

A model-data comparison plot of the Buoy 6 results before and after a -10 dB adjustment factor (and no buoy location adjustment) was applied and verified that -10 dB was the best possible adjustment factor (**Figure 2.1-4**). In **Figure 2.1-4**, the model is shown by the blue dots, the pre-adjusted data are yellow dots, and the adjusted data are black dots. The pre-adjusted data were higher amplitude than the model, indicating an error in the data received levels. The two separate clouds of yellow dots were a result of the approaching and receding source transits being different and an indication of GPS position error. The black dots are the adjusted data that included the navigation optimization algorithm, which removed the spread between the two clouds of dots, thus correcting for the difference in approaching and receding source transits.

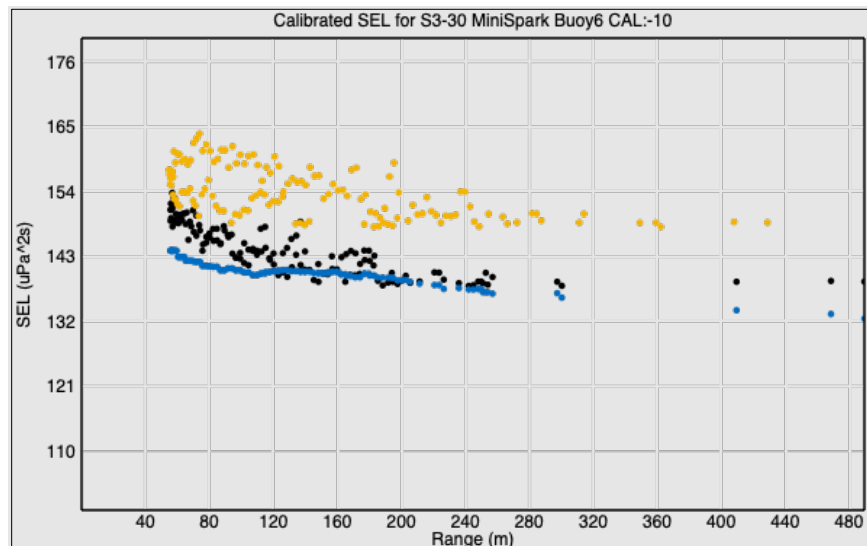


Figure 2.1-4. The modeled data for Mini Sparker (blue line), Mode 28, at Site 3, Deployment 3, Buoy 6, Run 30.

Pre-adjusted (yellow dots) and adjusted (black dots) data with a -10 dB adjustment and buoy position shift of 60 m to the south.

Unfortunately, data from the other buoys were not as straightforward to resolve as the example provided by the closest buoy (Buoy 6). The recorded data from buoys farther from the sound source track line (**Figure 2.1-2**) were explored, but position estimation was more difficult. For example, Buoys 10 and 8 (both at position E) did not require gain adjustment factors, but they did need buoy location adjustments

to align the data with the CPA range (**Figures 2.1-5 and 2.1-6**). The cost functions for these two buoy positions were vague because they had a high RMSE value and wide 1-dB contours relative to Buoy 6.

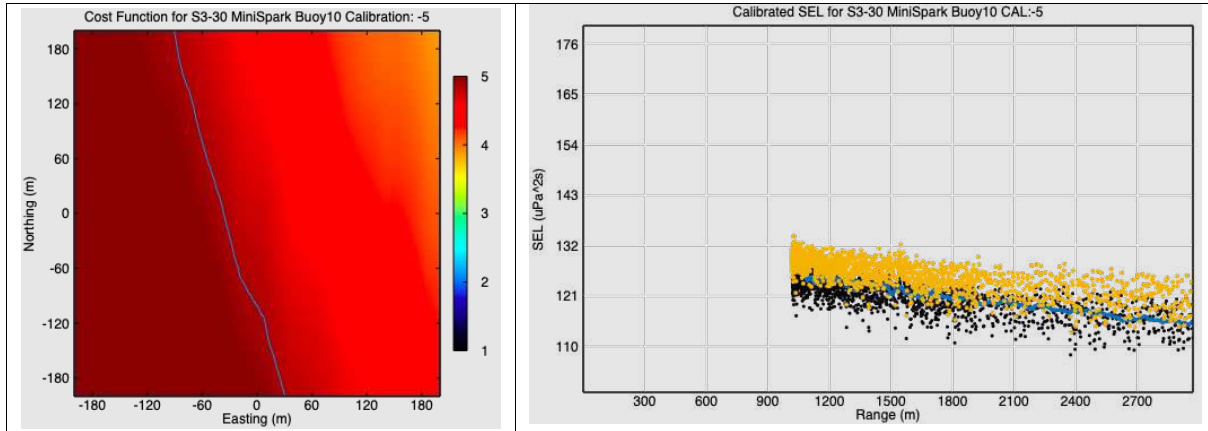


Figure 2.1-5. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 3, Deployment 3, Buoy 10, Run 30.

Left: Buoy positional shift to the northeast. Right: Adjustment of the pre-adjusted data (yellow dots) to align the adjusted data (black dots) with the model (blue dots).

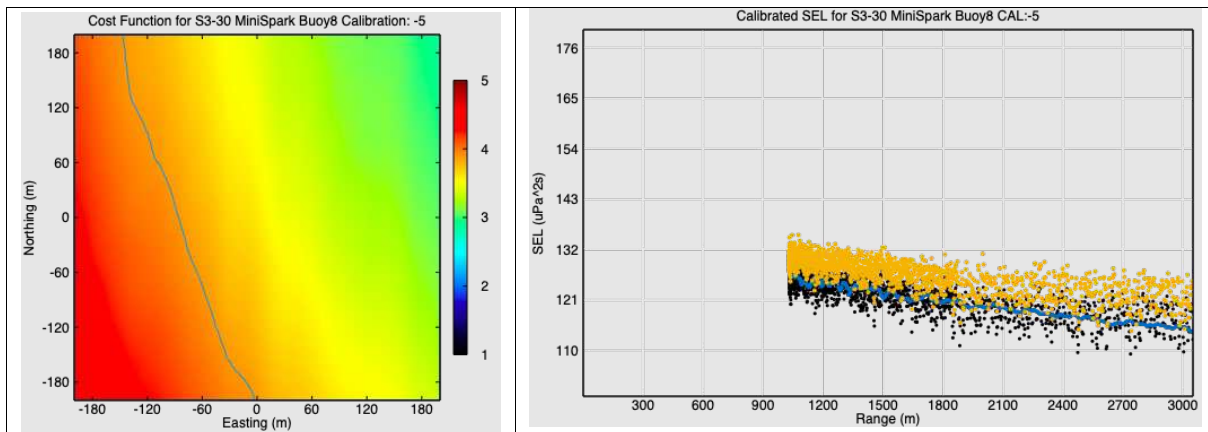


Figure 2.1-6. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 3, Deployment 3, Buoy 8, Run 30).

Left: Buoy 8 was co-located with Buoy 10 and shows buoy positional shift to the northeast. Right: Adjustment of the pre-adjusted data (yellow dots) and alignment of the adjusted data (black dots) with the model (blue dots). The co-localization of buoys provided a check to the determined shift.

In the most extreme cases, the cost function failed to provide insight into navigation errors. For example, the Mini Sparker, Mode 28, Buoy 9, Position F, at Site 3 for Deployment 3, Run 30, showed poor (low RMSE) buoy position shift, likely because it was 4 km away from the sound source CPA (**Figure 2.1-7**). However, the measured data (yellow dots) had an error shown by being approximately 20 dB higher than the model (blue dots; **Figure 2.1-7**). In this case, applying a -20 dB adjustment factor to the data (black dots) made it match the model because position error in the cost function was too high to glean valuable information.

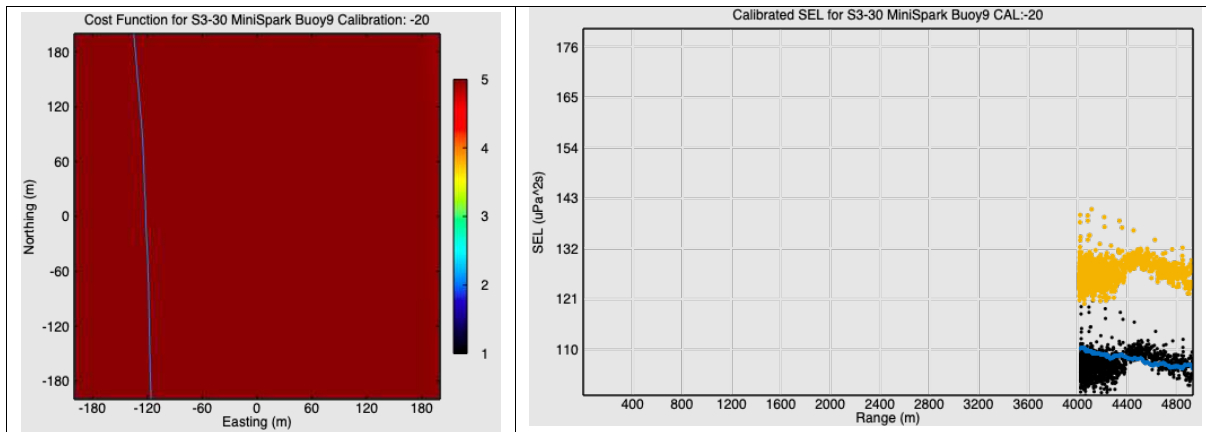


Figure 2.1-7. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 3, Deployment 3, Buoy 9, Run 30.

Left: A cost function with no visible information for a buoy positional shift. The cost function root-mean-square error (RMSE) had a minimum of 4.91 dB (red in the color bar) at a 200 m east and north shift in position. Right: A -20 dB adjustment was applied to the pre-adjusted data (yellow dots), which mostly aligned the adjusted data (black dots) with the model (blue dots).

Buoy 11, position E, had a source receiver range extent from 200 m to 3,000 km, which provided robust information about the buoy position. The pre-adjustment data were a good model/data match (**Figure 2.1-8**). The cost function minimum was near 3 dB approximately 100 m north but difficult to determine from east to west. This cost function's 1-dB contour was more than 100 m, making it highly uncertain and not trustworthy enough to warrant a GPS change.

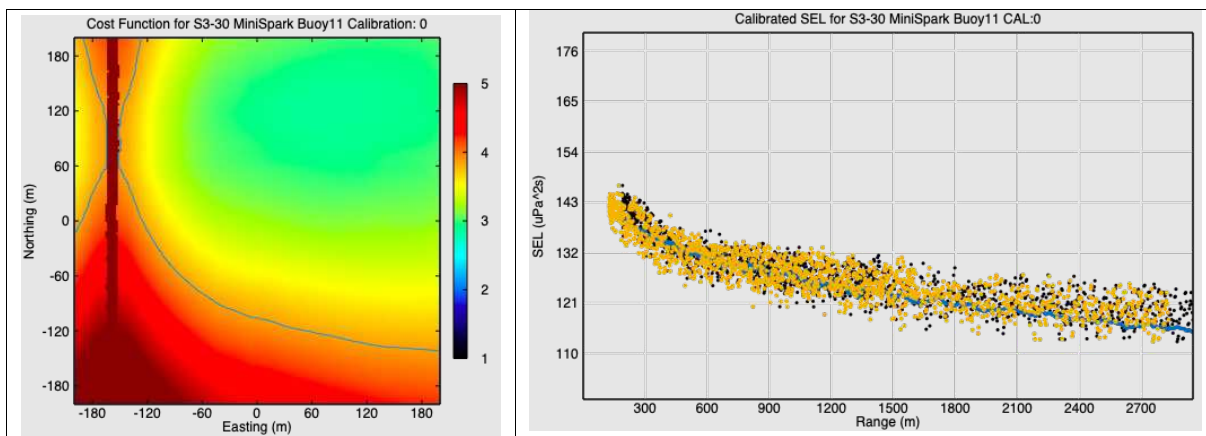


Figure 2.1-8. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 3, Deployment 3, Buoy 11, Run 30.

Left: A broad cost function root-mean-square error (RMSE) minimum at 100 m north and 60 m east. The dark red line is the ship track. Right: No adjustment factor was applied to the pre-adjusted data (yellow dots); the adjusted data (black dots) are in alignment with the model (blue dots).

The Mini Sparker, Mode 28, Buoy 12, Position E, at Site 3, Deployment 3, Run 30, had a source receiver range extent from 200 m to 3,000 km, which provided robust information about the buoy position. An adjustment factor of -10 dB was required to match the Buoy 12 data to the model (**Figure 2.1-9**). The cost function had a minimum, but it was broadly eastward with a value greater than 4 dB RMSE, illustrating

there was not much information in the position to provide a good estimate of the buoy position adjustment. The model/data comparison is shown in the right panel of **Figure 2.1-9**. Both the levels and the fall-off with range were well matched in the inversion.

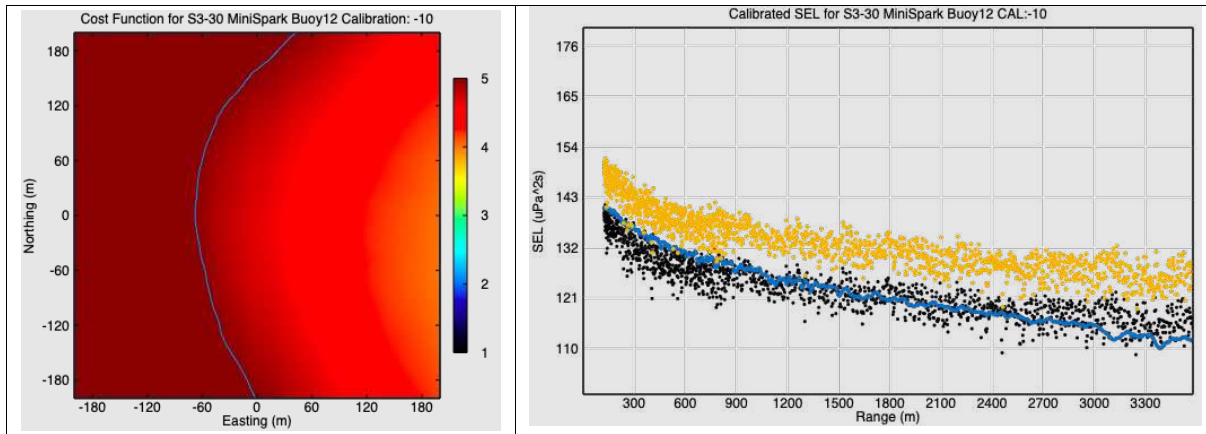


Figure 2.1-9. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 3, Deployment 3, Buoy 12, Run 30.

Left: A cost function root-mean-square error (RMSE) of >4 dB, for an eastward shift. Right: To help correct the pre-adjusted data (yellow dots), a -10 dB adjustment factor was applied to generate the adjusted data (black dots), which align with the model (blue dots).

After applying the gain adjustment factors and navigational buoy shifts to the pre-adjusted data of the six buoys, the adjusted data were plotted together (**Figure 2.1-10**). The results verify that the adjusted data fit within the expected model uncertainty (percentile range). The agreement between the adjusted measured and modeled SEL shows that although the data needed adjustments (there were three buoys with 0 dB adjustment factors), the fall-off of SEL with range was well matched by the model. Note that Buoy 6 data (blue) were filtered to include only signals above a certain threshold (140 dB) to eliminate SNR errors. The resulting adjustment factors, location shifts, 1-dB contour distances, and RMSE decibel values were tabulated and are presented in **Appendix A.1**, Table A-1.

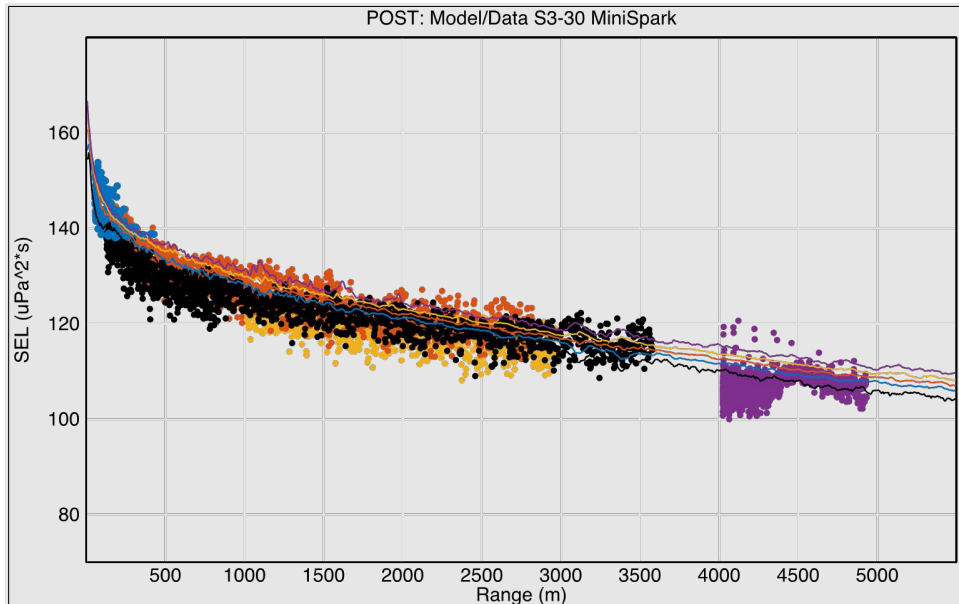


Figure 2.1-10. Adjusted data for Mini Sparker, Mode 28, at Site 3, Deployment 3, Run 30.

Six buoys (dots)—Buoys 6 and 10, blue; Buoy 8, yellow; Buoy 9, black; Buoy 11, red; and Buoy 12, black—plotted over the percentiles of expected errors (lines) from environmental influence to visually verify that applied adjustment factors were accurate and effective.

Simultaneous gain and navigation adjustments were applied and presented for every run at every site for LF omnidirectional sources, which were expected to be the least challenging sources for which to determine adjustment factors (Modes 28 to 41). Methodology to determine adjustment factors for the MF and HF sources (Modes 1 to 25) will be addressed in **Sections 2.2** and **2.3**, respectively. Final adjustment factors and average buoy position shifts are provided in **Appendix A.1**, Table A.1-1.

2.2 Mid-Frequency Sound Source Adjustment Factor Methods –Parabolic Equation, Percentiles, and Extrapolated GPS Positions

Custom bash and C scripts systematically created plots for determination of adjustment factors following the same methodology of matching data to modeled uncertainty percentiles as the calibration of the LF sources. The plots were created for each hydrophone on each buoy during each run for every (MF sound source at every site. One difference existed between the LF and MF methods. To determine LF adjustment factors, all *in situ* data were adjusted to match the entire SEL fall-off with range contour using a point-source model. This meant data from the CPA and data out to 5 km from the LF sound source were used to determine the adjustment factors. However, to determine MF adjustment factors, only the *in situ* data from the CPA were used because the MF sound sources are directional by nature and there was a high possibility that the recording captured only the in-beam signals. Therefore, the reliable data are from as close to the receiver as possible (i.e., the CPA). To explain further, data received from greater distance capture energy that likely is outside the main lobe of the directional beamform signal, which would provide unreliable information. Therefore, to avoid using data from a side lobe of the signal beam, data were only considered from the CPA. The received signals at the CPA presumably were most representative of the levels transmitted on-axis from a directional MF transducer. It also was assumed that received signals from greater distances likely were outside the main lobe of the beam pattern and, therefore, too unreliable to compare against the SEL fall-off with range contour plotted in the model. The buoy-by-buoy methods from the LF calibration section will not be repeated here because the methodology was the same. Furthermore, a summary of the adjustment factors per deployment is provided in tabular form in **Appendix A.2**, Table A.2-1.

The GPS position determination was similar to the LF methods. If an LF source was tested during the same run as an MF source, then the LF GPS position adjustment was applied to the MF source. This extrapolation of LF GPS positions to concurrent MF positions was needed because MF sources are naturally more directional; thus, the LF GPS cost functions were more reliable. However, if an MF source occurred during a run when no LF sources were tested, then the same GPS cost function method was used to determine a more accurate position of the MF buoy. Final adjustment factors and average buoy position shifts are provided in **Appendix A.2**, Table A.2-1.

2.3 High-Frequency Sound Source Adjustment Factor Methods – Extrapolating Low- and Mid-Frequency Results

HF sources are highly directional, more so than MF sources. Therefore, data at the CPA were less likely to be sufficient to apply adjustment factors to HF sources, particularly for distant buoys. For most deployments, several LF and MF adjustment factors were used to extrapolate HF adjustment factors. In a few cases, LF and/or MF sources were tested during the same run as HF sources. HF adjustment factors, therefore, were determined by applying the same adjustment factor that occurred most often (mode) or on average (median) for LF and MF sources during the same run (when possible) or deployment at the same site. Mode and median were calculated instead of mean because these represented not only the most common adjustment factor but also eliminated any sources that had extremely different and/or potentially false positive signal adjustments. If mode and median adjustment factor values were not the same,

preference was given to adjustment factors that were 10-dB intervals over 5-dB intervals because the “logging pad error” interval was 10 dB.

HF GPS position shifts in each buoy were calculated from the average location shift in the same buoy for LF and MF sources during the same deployment at the same site. The mean was used instead of the median and mode because distance was a continuous variable instead of a categorical variable (i.e., there were no interval requirements, like the 5- or 10-dB adjustment factor intervals).

Calculating modes and medians for HF adjustment factors, instead of comparing data to the model, meant there were no model (blue) lines plotted in the adjustment factor figures as there were for the LF and MF sources. Rather, the HF figures are plots of pre-adjusted (yellow) and adjusted (black) data over range. Also, no cost functions were calculated and, therefore, are not included in the HF adjustment figures. Final adjustment factors and average buoy position shifts are provided in **Appendix A.3**, Table A.3-1.

2.4 Summary of Data Adjustment Methods

In summary, the following procedure was established to estimate the adjustment factor per buoy needed to address the combined gain and GPS errors. LF methods served as the basis for this summary. Any changes for MF-specific methods are in *italics* and HF-specific methods are in **bold**.

1. Plot all pre-adjusted data over the environmental error (uncertainty) percentiles.
2. Select a buoy with measured data outside the expected modeled SEL variability and assign an adjustment factor in intervals of ± 5 dB that would most likely close the gap between the data and model.
 - a. *Only use buoys with measured data at the CPA that were outside the expected modeled SEL variability at the CPA for MF sources.*
 - b. **Skip to Step 4 for HF sources.**
3. Identify and filter out the SNR.
4. Using adjusted data (from Step 2), apply the optimization search algorithm (i.e., the GPS cost function) to compute the most likely distances and direction the buoy should be shifted for the data to align with the model. Estimate the average radius from the global minimum of the cost function to the 1-dB contour to determine how much relative uncertainty is present.
5. Document the adjustment factor, latitudinal or longitudinal position shifts, and average 1-dB radius in a table and move onto the next buoy.
 - a. **Use the documented adjustment factors for LF and MF sources to calculate the median and mode adjustment factors.**
 - i. **When median and mode are the same, document this value as the HF adjustment factor for all sources at the same deployment.**
 - ii. **When median and mode are not the same, use the most common value in 10-dB increments for the HF adjustment factors for all sources at the same deployment.**
 - b. **Use the documented GPS position shifts to calculate average latitudinal and longitudinal shifts at each buoy position per deployment and use these means as the values for HF buoy position shifts at the same deployment.**

6. After all buoys are complete, replot data with all applied gain adjustment factors and positional buoy shifts to ensure all adjusted measured data match the model.
 - a. *Ensure all adjusted measured data at the CPA match the model at the CPA for MF sources.*
 - b. **Only replot the data for HF sources to illustrate the adjustment factors.**

Thirteen LF sources and their results plots, one from each of the twelve deployments, were adjusted following this methodology and displayed as examples per deployment. For the twelve MF sources, adjustment factor determinations were only at the CPA; thus, plots document each buoy before and after the adjustment factors were applied. Fifteen HF sources were adjusted following this methodology, one from each of the twelve deployments, and their results plots are presented in **Appendix A.3** as examples per deployment. Results tables for the LF sources (**Appendix A.1**, Table A.1-1), MF sources (**Appendix A.2**, Table A.2-1), and HF sources (**Appendix A.3**, Table A.3-1) list the adjustment factors for every buoy, run, and mode at each site, as outlined in **Figure 2.1-11** from the Phase II report (Halvorsen and Heaney, 2018).

Table 3.0-1. Compilation of HRG data acquisition status identified by buoy number and buoy position for each site.

	Buoy Position in the Acoustic Field Array									
	A-HS	A-LS	B-HS	B-LS	C-HS	C-LS	D-LS	E-HS	E-LS	F-HS
Site 1										
Deployment 1		11		12			6	5	8	9
Site 2										
Deployment 1	12			11			6	10		9
Deployment 2	8		5	11			6	10	12	9
Site 3										
Deployment 1	9	11	5	12			8	10	7	6
Deployment 2		5		12			8		7	6
Deployment 3	12		7	11			6	10	8	9
Site 4										
Deployment 1	6	6	7	7	5	5	8	9	9	11
Deployment 2	6	6	7	7			8	9	9	11
Deployment 3		7		12			8	6		5
Site 5										
Deployment 1		12	5	11			6	9	8	10
Deployment 2		12	5	11			6	9	8	10
Deployment 3		12		11			6	9	8	10

HRG = high-resolution geophysical; HS = high-sensitivity hydrophone; LS = low-sensitivity hydrophone.
 Green = buoy deployed, acoustic data recorded; red = buoy deployed, but no data recorded; gray = no buoy deployed; numbers (5-12) inside cells = buoy number.
 Note: D-HS and F-LS hydrophones were not included during any testing.

Figure 2.1-11. Table of deployments at each site from the Phase II report (Halvorsen and Heaney, 2018).

3 Bibliography

- Crocker, S.E. and F.F. Fratantonio. 2016. Characteristics of sounds emitted during high-resolution marine geophysical surveys. Naval Undersea Warfare Center Division New Port Technical Report 12,203. For Bureau of Ocean Energy Management, Environmental Assessment Division and United States Geological Survey. 259 pp.
- Halvorsen, M.B. and K.D. Heaney. 2018. Propagation characteristics of high-resolution geophysical surveys: open water testing. U.S. Department of the Interior, Bureau of Ocean Energy Management, Sterling, VA. Prepared by CSA Ocean Sciences Inc. OCS Study BOEM 2018-052. 806 pp.

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A.1 Appendix A: Low-Frequency Results

A.1.1 Site 1, Deployment 1

Mini Sparker Mode 28, Run 4, Buoys 5, 6, 8, and 9 (Figures A.1-1 and A.1-2).

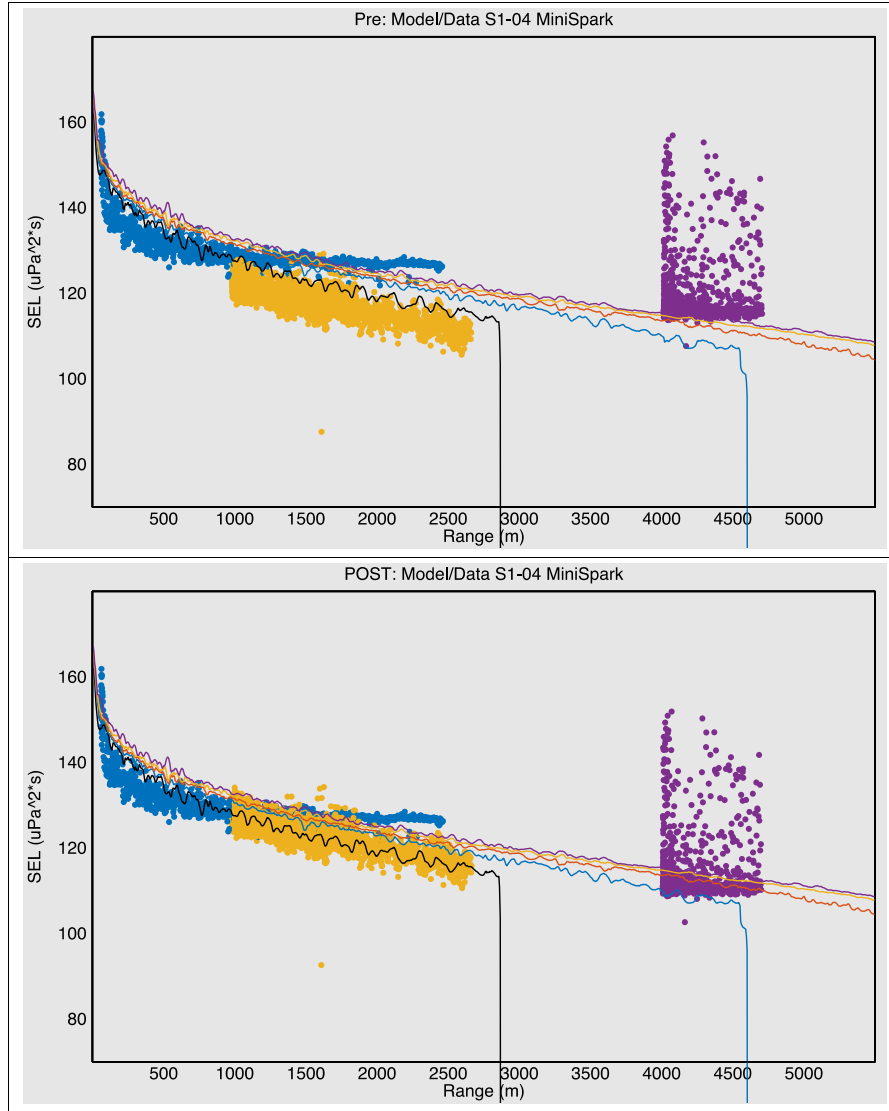


Figure A.1-1. Modeled (lines) versus measured (dots) data for Mini Sparker, Mode 28, at Site 1, Deployment 1, Run 4.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for four buoys (Buoys 5 and 8, yellow; Buoy 6, blue; Buoy 9, purple). Top: pre-adjusted data; Bottom: adjusted data (dots).

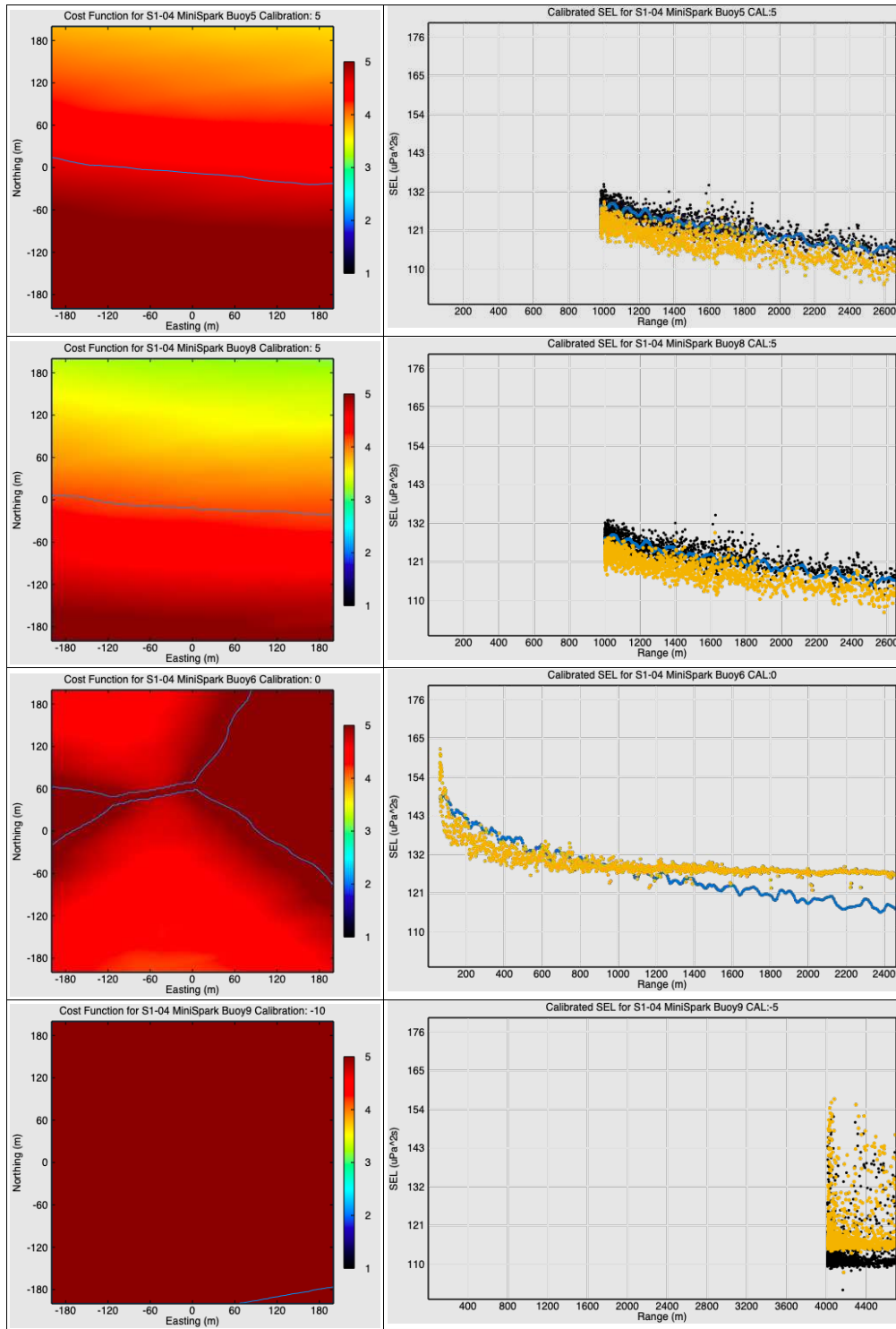


Figure A.1-2. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 1, Deployment 1, Run 4.

Left: Cost functions for the buoy locations (top to bottom: Buoys 5, 8, 6, and 9). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.2 Site 2, Deployment 1

Mini Sparker Mode 28, Run 6, Buoys 6 and 11 (Figures A.1-3 and A.1-4).

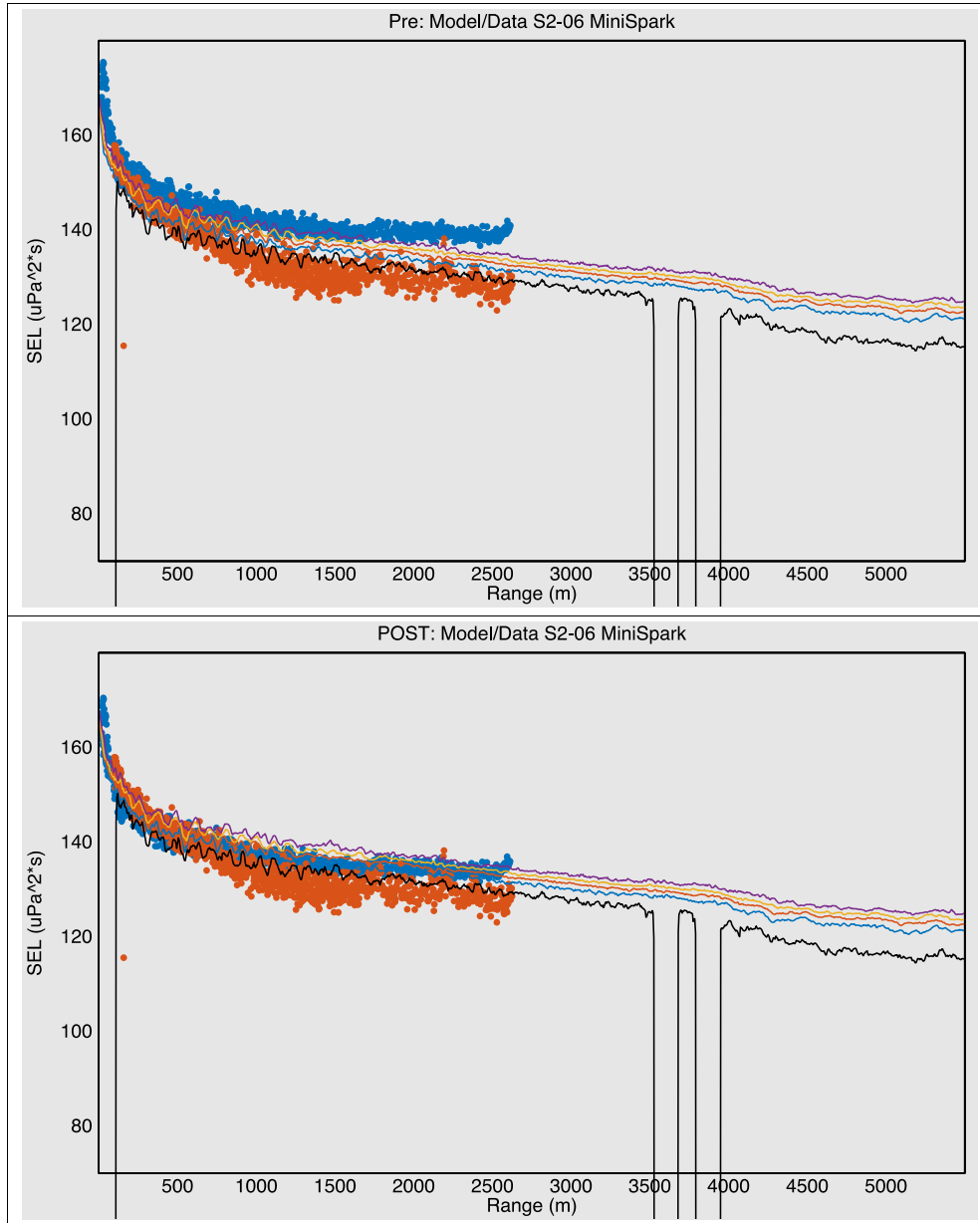


Figure A.1-3. Modeled (lines) versus measured (dots) data for Mini Sparker, Mode 28, at Site 2, Deployment 1, Run 6.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for two buoys (Buoy 6, blue; Buoy 11, red). Top: pre-adjusted data; Bottom: adjusted data (dots).

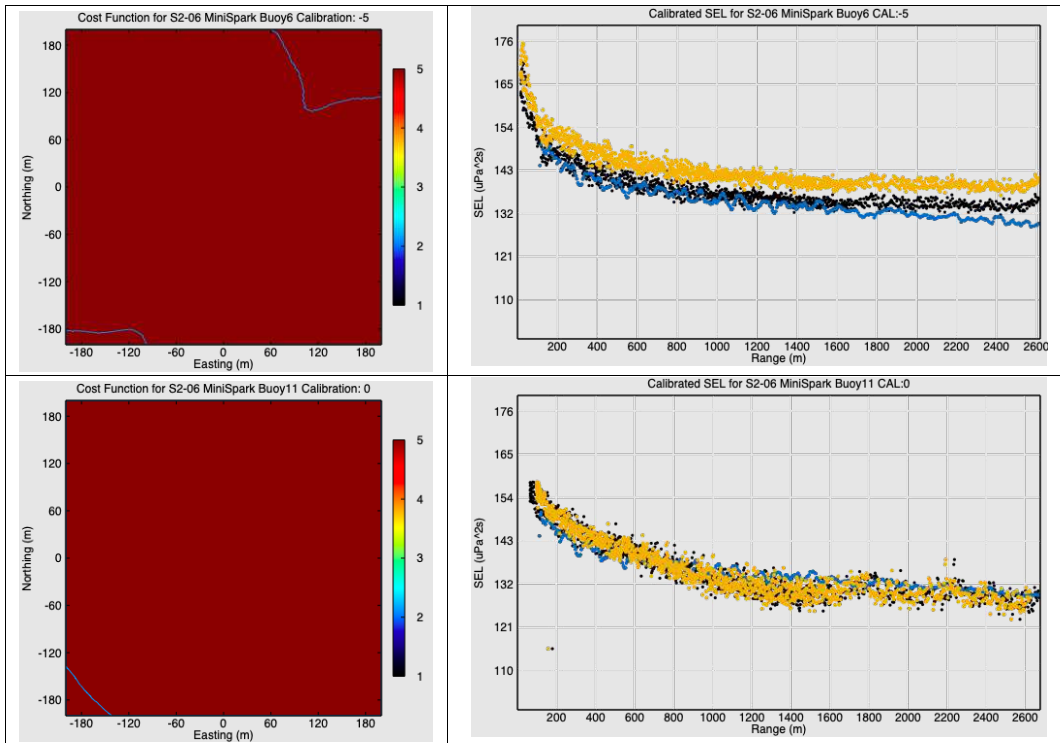


Figure A.1-4. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 2, Deployment 1, Run 6.

Left: Cost functions for the buoy locations (top: Buoy 6; bottom: Buoy 11). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.3 Site 3, Deployment 1

252 S-Boom, Mode 26, Run 6, Buoys 5 and 11 (Figures A.1-5 and A.1-6).

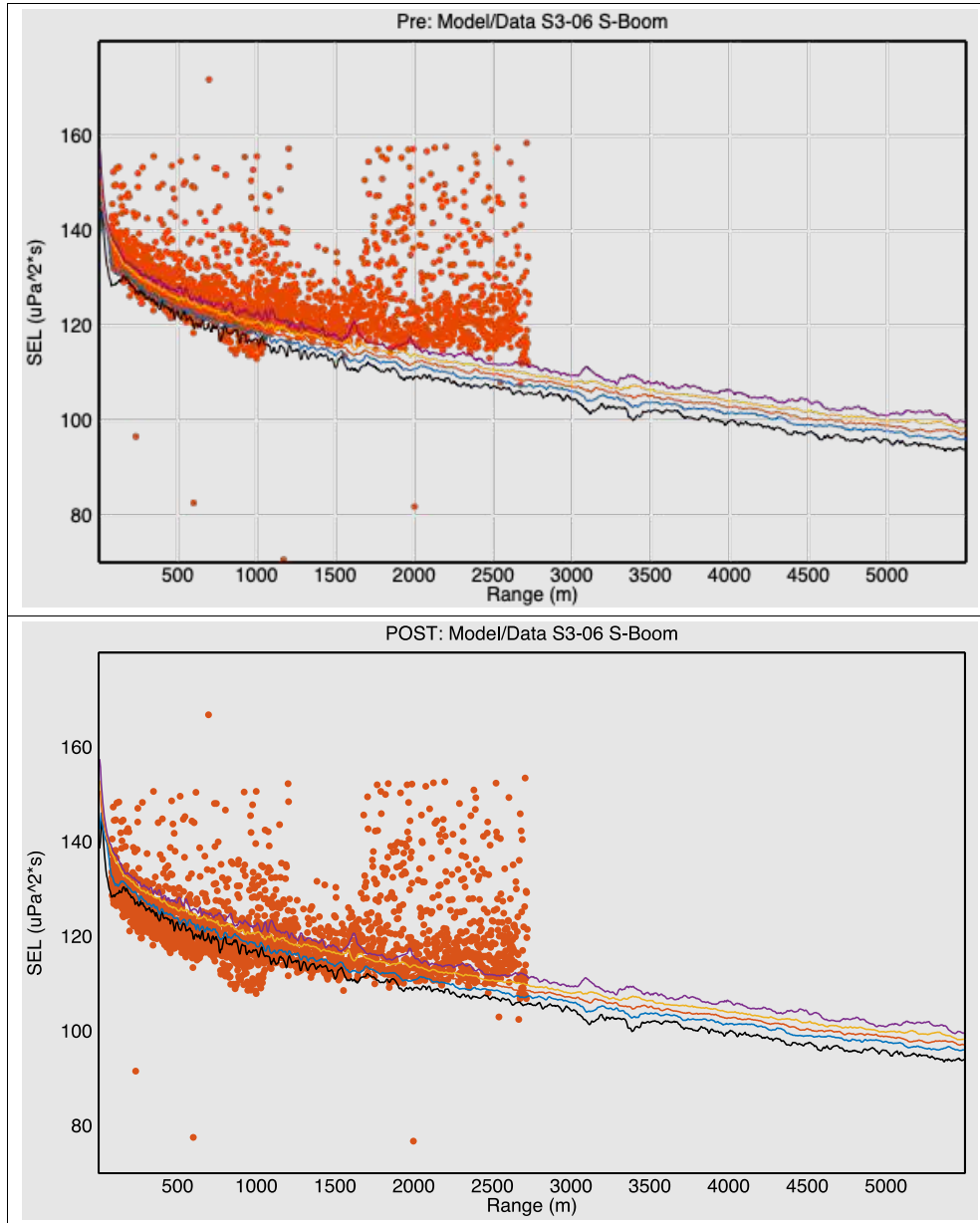


Figure A.1-5. Modeled (lines) versus measured (dots) data for 252 S-Boom, Mode 26, at Site 3, Deployment 1, Run 6.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for two buoys (Buoy 5, red; and; Buoy 12, red). Buoys 7 and 8 were deployed but had bad data. Top: pre-adjusted data; Bottom: adjusted data (dots).

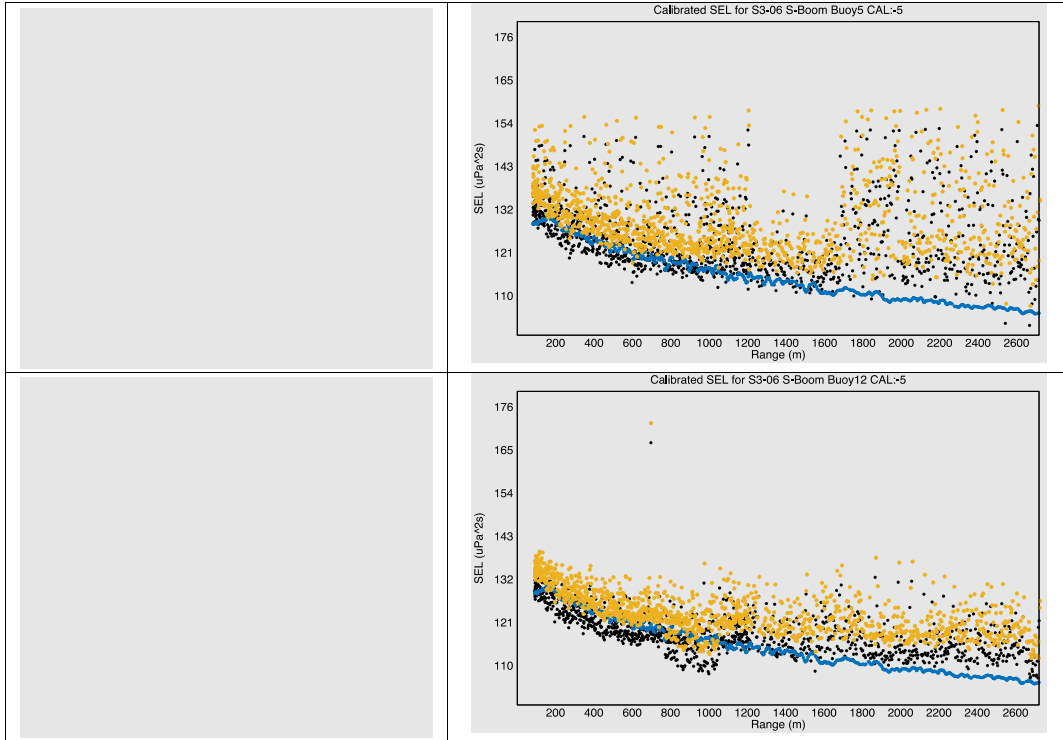


Figure A.1-6. Cost functions of buoy locations and SEL comparisons for 252 S-Boom, Mode 26, at Site 3, Deployment 1, Run 6.

Left: Cost functions for the buoy locations (top: Buoy 5; bottom: Buoy 12). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.4 Site 4, Deployment 1

252 S-Boom, Mode 26, Run 6, Buoys 6 and 8 (Figures A.1-7 and A.1-8).

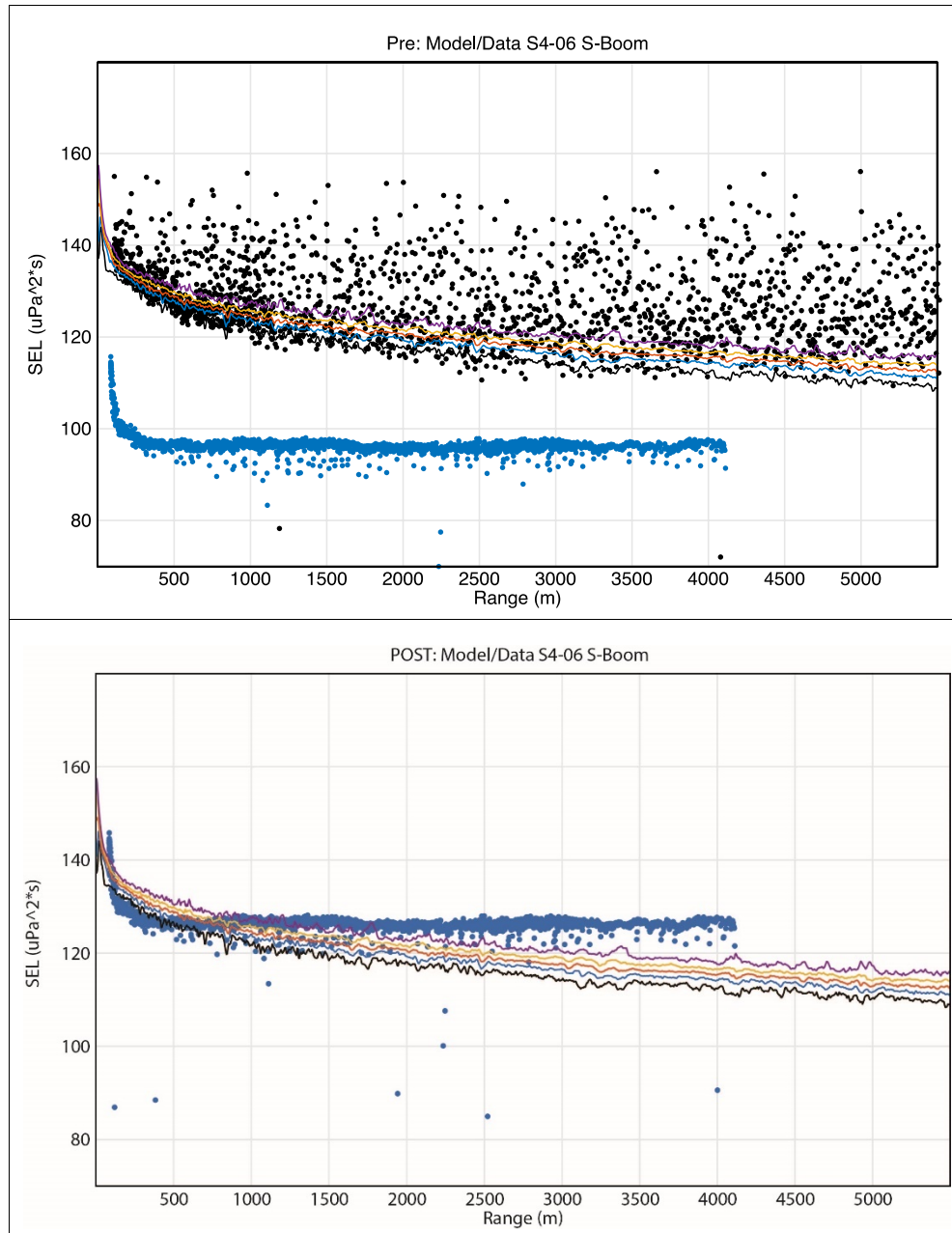


Figure A.1-7. Modeled (lines) versus measured (dots) data for 252 S-Boom, Mode 26, at Site 4, Deployment 1, Run 6.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for two buoys (Buoy 6, blue; Buoy 8, black). Buoy 6 navigation data were too poor quality for a cost function, so they are not included in the rest of the example and the adjusted data plot is not presented. Top: pre-adjusted data; Bottom: adjusted data (dots).

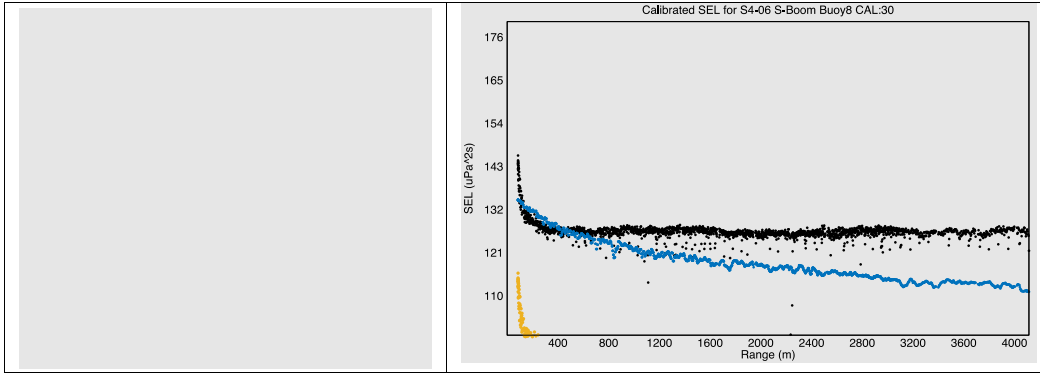


Figure A.1-8. Cost function of buoy location and SEL comparisons for 252 S-Boom, Mode 26, at Site 4, Deployment 1, Run 6.

Left: Cost function for the buoy location (Buoy 8). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.5 Site 5, Deployment 1

Delta Sparker, Mode 39, Run 1, Buoys 5, 6, 8, 9, and 12 (Figures A.1-9 and A.1-10).

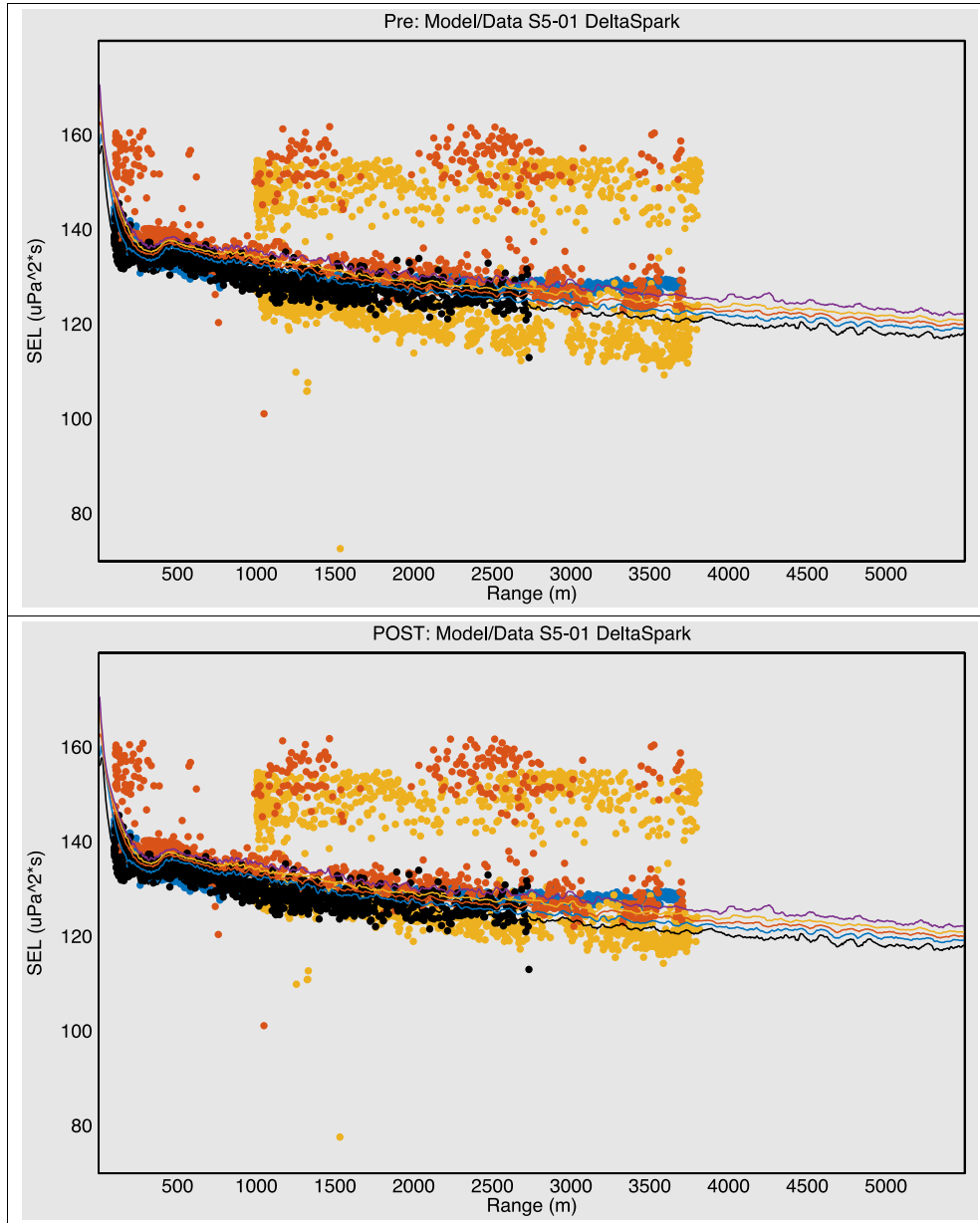


Figure A.1-9. Modeled (lines) versus measured (dots) data for Delta Sparker, Mode 39, at Site 5, Deployment 1, Run 1.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for five buoys (Buoy 5, red; Buoy 6, blue; Buoys 8 and 9, yellow; Buoy 12, black). The double stack of dots indicates bad data that were not used in the model-data comparison. Top: pre-adjusted data; Bottom: adjusted data (dots).

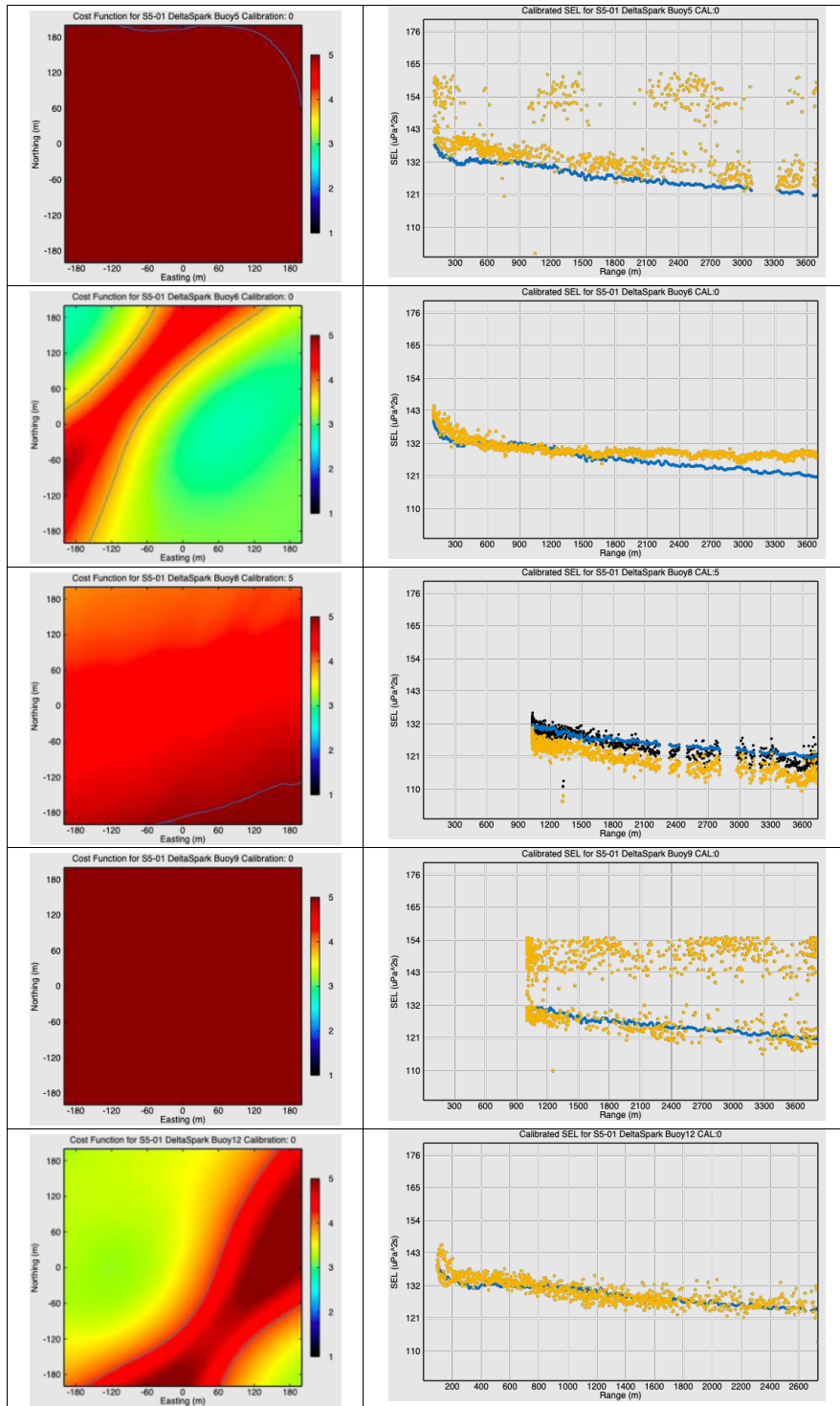


Figure A.1-10. Cost functions of buoy locations and SEL comparisons for Delta Sparker, Mode 39, at Site 5, Deployment 1, Run 1.

Left: Cost functions for the buoy locations (top to bottom: Buoys 5, 6, 8, 9, and 12). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.6 Site 2, Deployment 2

Mini Sparker Mode 29, Run 34, Buoys 5, 9, 10, and 11 (Figures A.1-11 and A.1-12).

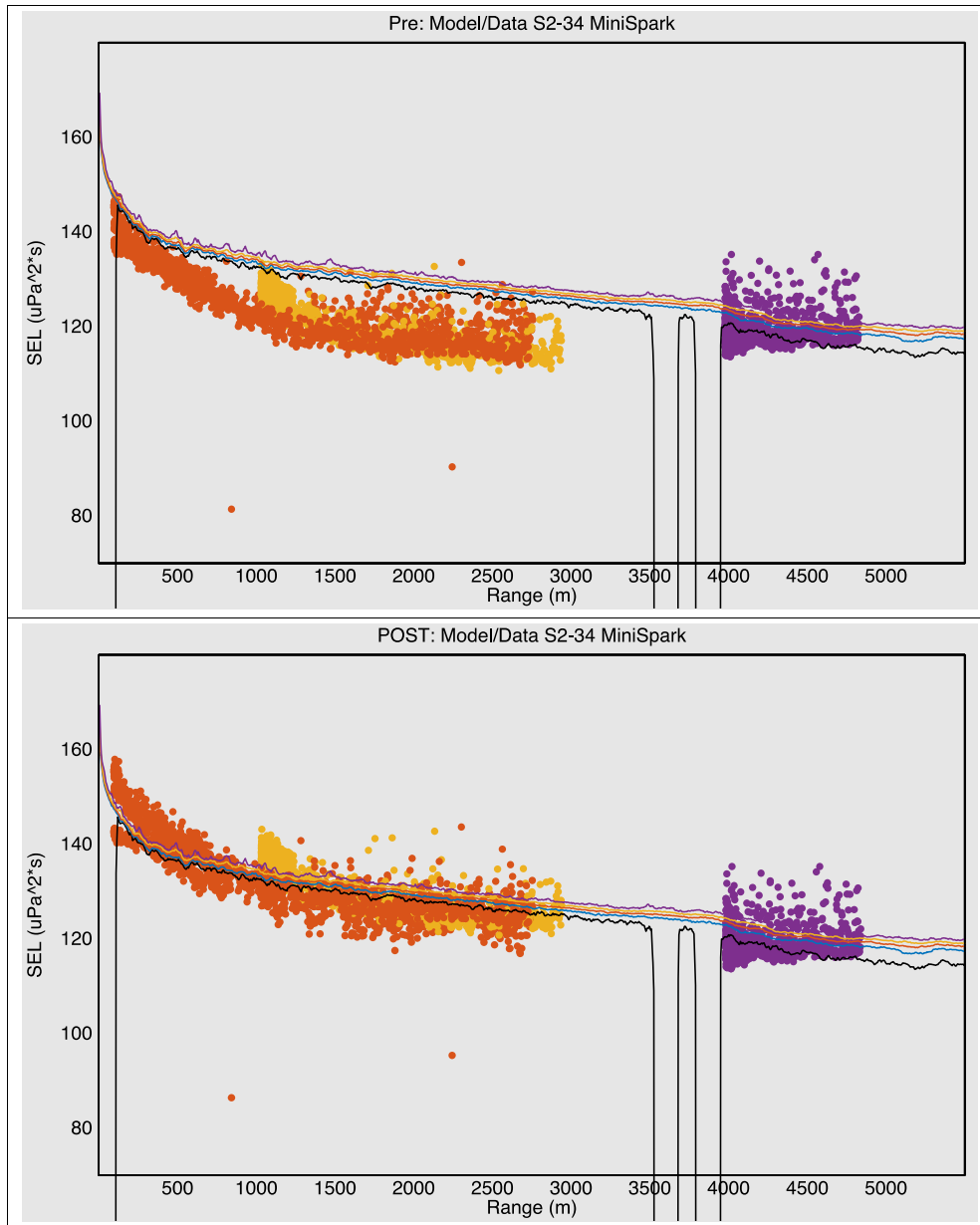


Figure A.1-11. Modeled (lines) versus measured (dots) data for Mini Sparker, Mode 29, at Site 2, Deployment 2, Run 34.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for four buoys (Buoy 5, red; Buoy 9, purple; Buoy 10, yellow; and Buoy 11, red). Top: pre-adjusted data; Bottom: adjusted data (dots).

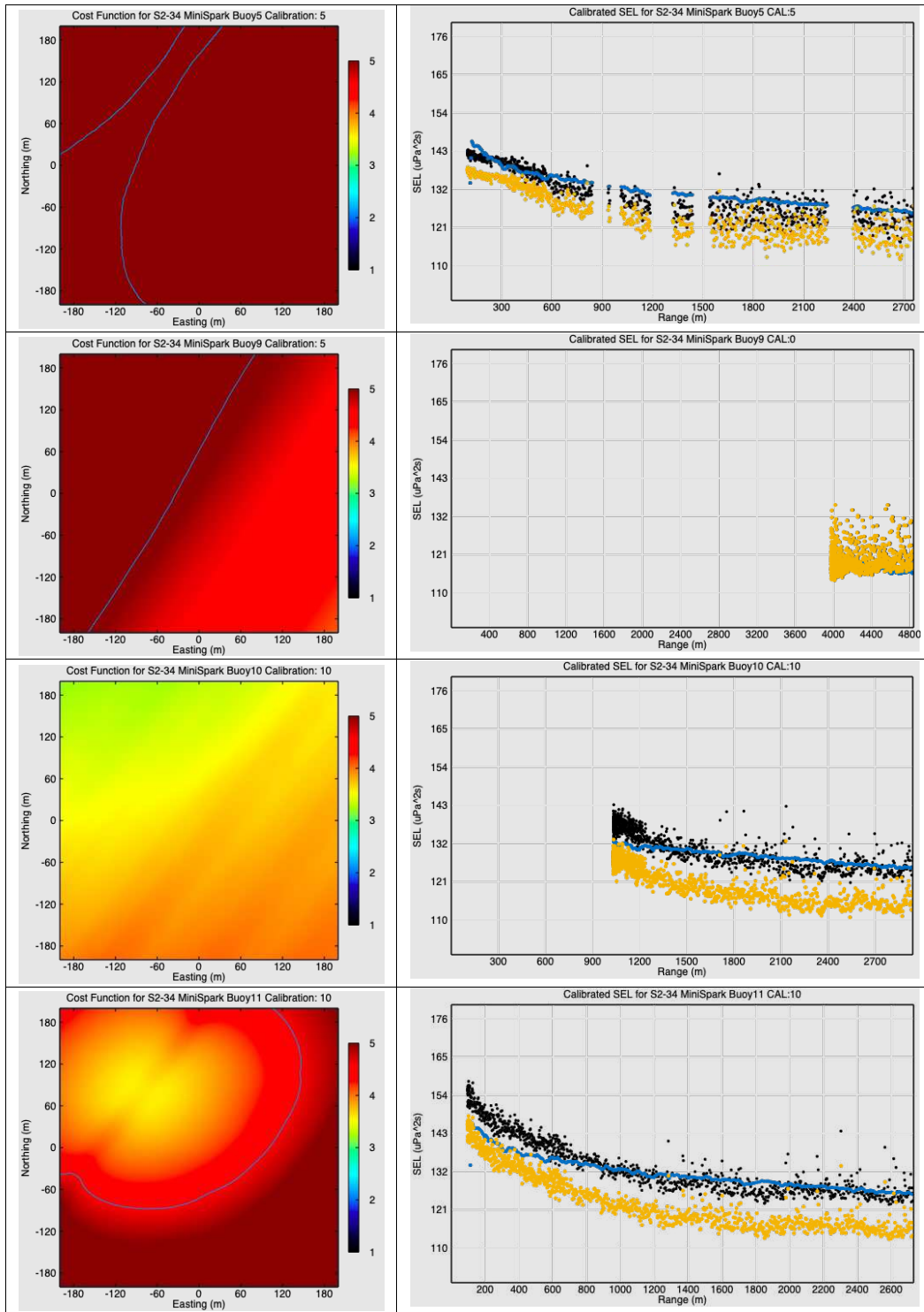


Figure A.1-12. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 29, at Site 2, Deployment 2, Run 34.

Left: Cost functions for the buoy locations (top to bottom: Buoys 5, 9, 10, and 11). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.7 Site 3, Deployment 2

Mini Sparker Mode 29, Run 11, Buoys 5, 6, and 12 (**Figures A.1-13 and A.1-14**).

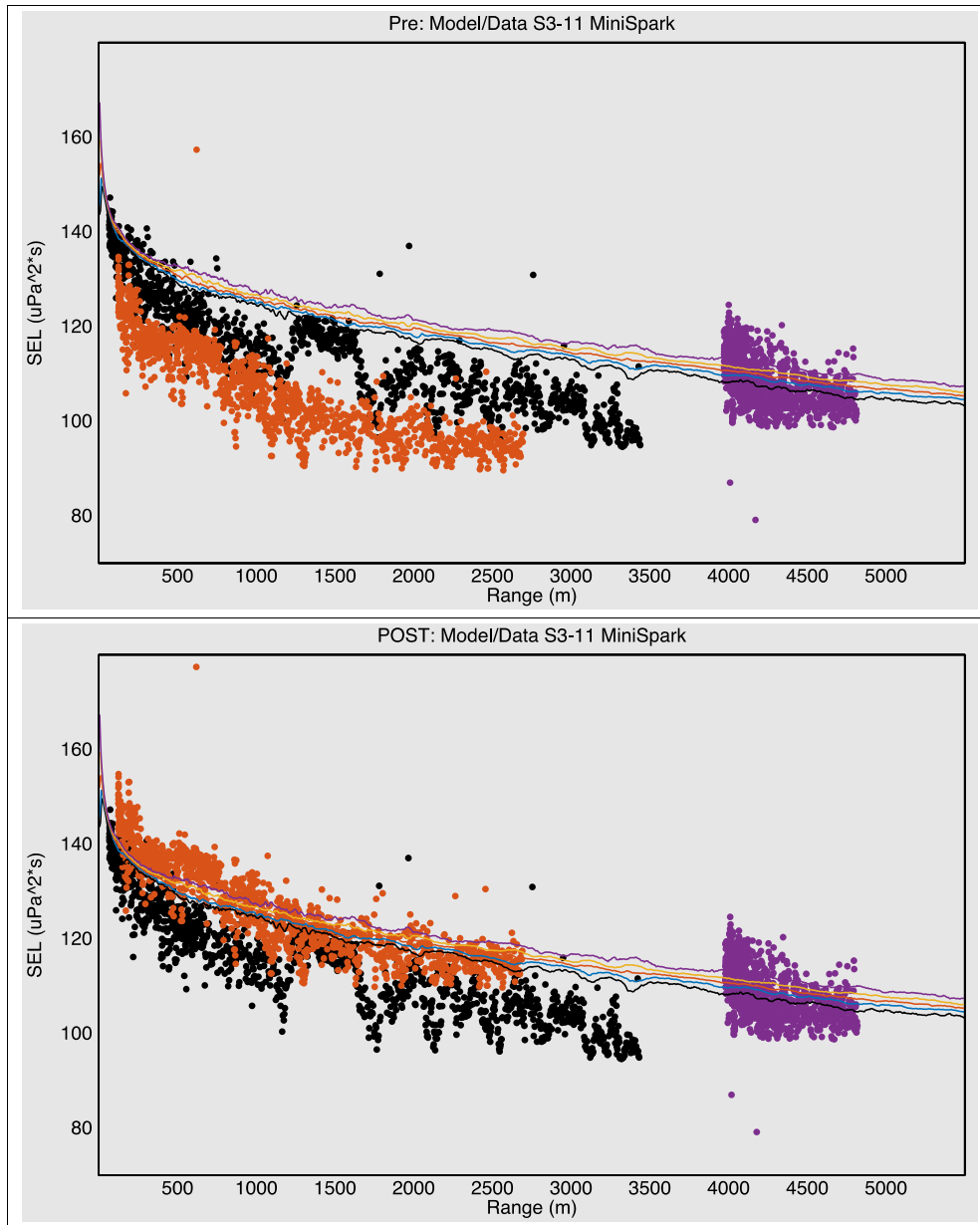


Figure A.1-13. Modeled (lines) versus measured (dots) data for Mini Sparker, Mode 29, at Site 3, Deployment 2, Run 11.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for three buoys (Buoy 5, black; Buoy 6, purple; Buoy 12, red). Top: pre-adjusted data; Bottom: adjusted data (dots).

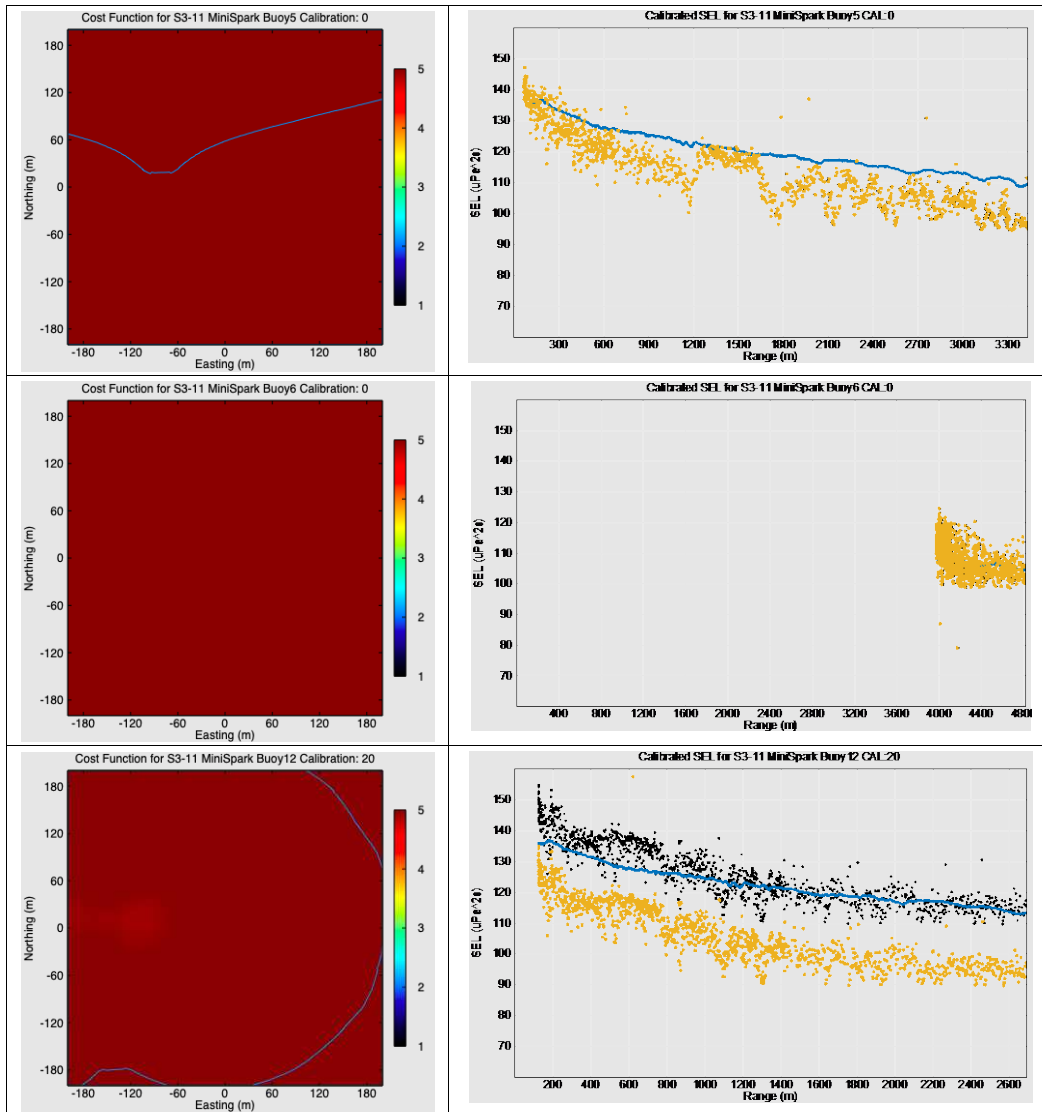


Figure A.1-14. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 29, at Site 3, Deployment 2, Run 11.

Left: Cost functions for the buoy locations (top to bottom: Buoys 5, 6, and 12). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.8 Site 4, Deployment 2

No run from Deployment 2 at Site 4 had viable data for calculating adjustment factors.

A.1.9 Site 5, Deployment 2

Mini Sparker Mode 28, Run 19, Buoys 6, 8, 9, 10, 11, and 12 (Figures A.1-15 and A.1-16).

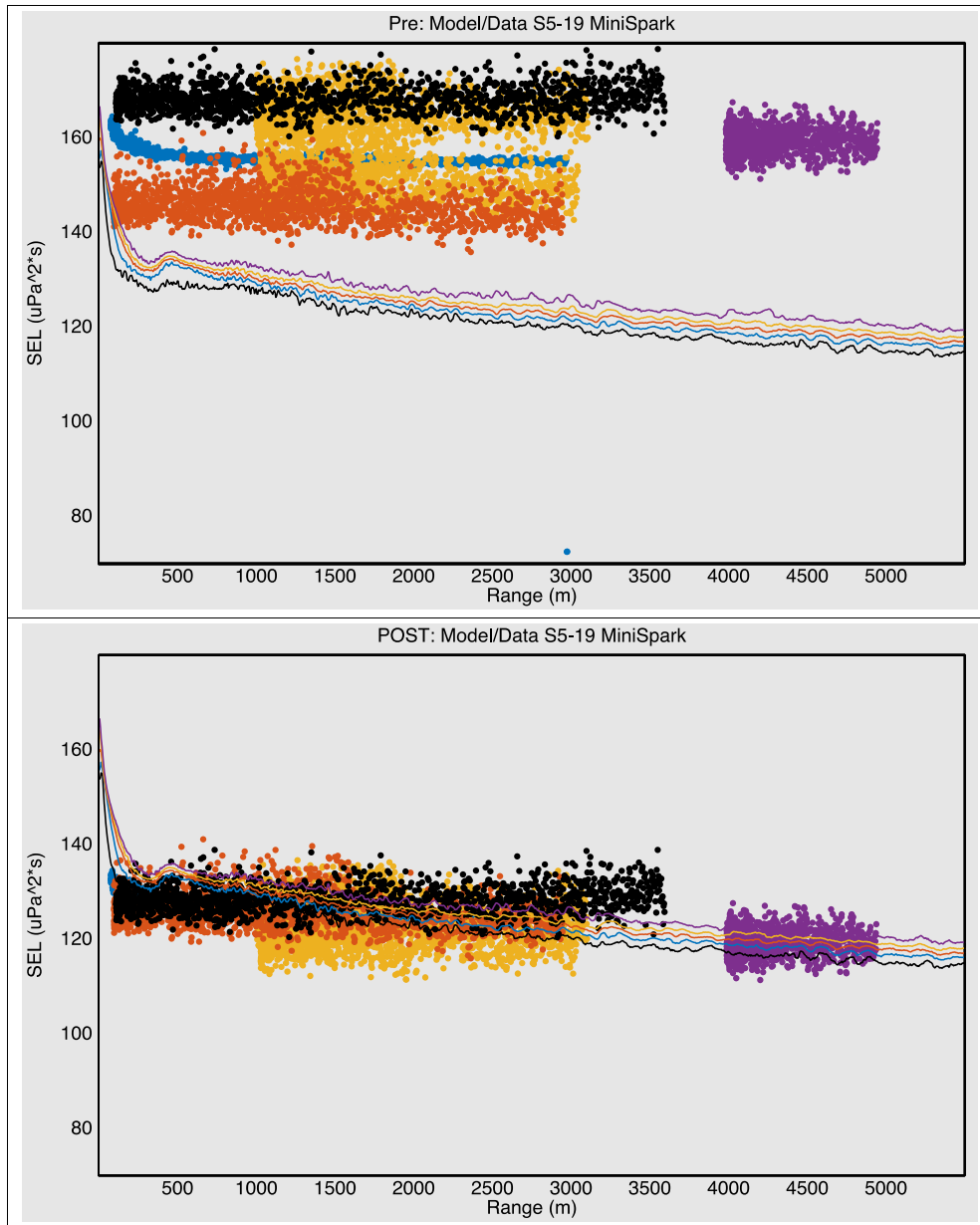


Figure A.1-15. Modeled (lines) versus measured (dots) data for Mini Sparker, Mode 28, at Site 5, Deployment 2, Run 19.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for six buoys (Buoy 6, blue; Buoys 8 and 9, yellow; Buoy 10, purple; Buoy 11, red; Buoy 12, black). Top: pre-adjusted data; Bottom: adjusted data (dots).

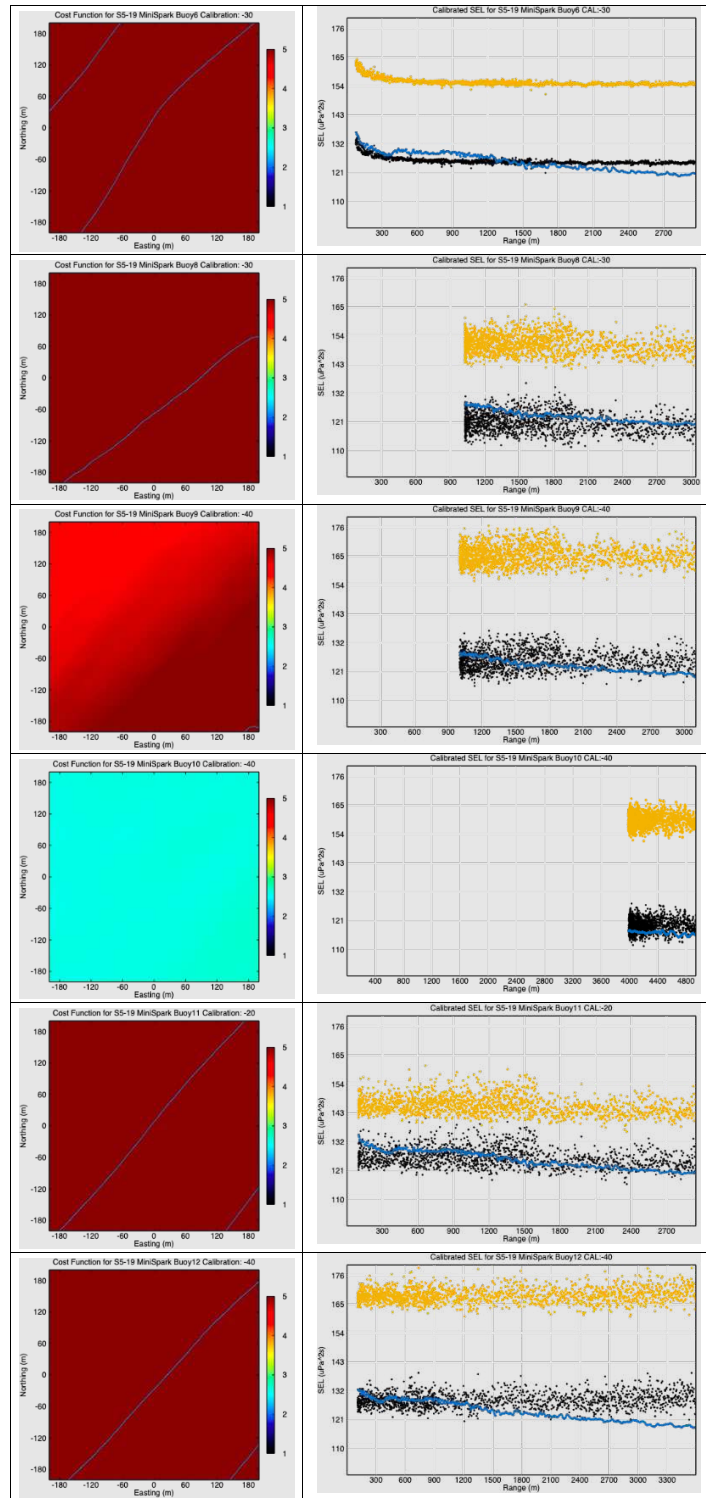


Figure A.1-16. Cost functions of buoy locations and SEL comparisons for Mini Sparker, Mode 28, at Site 5, Deployment 2, Run 19.

Left: Cost functions for the buoy locations (top to bottom: Buoys 6, 8, 9, 10, 11, and 12). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.10 Site 3, Deployment 3

The low-frequency source at Site 3 for Deployment 2 is shown in Section 2.1 of the main report.

A.1.11 Site 4, Deployment 3

Bubble Gun Mode 33, Run 28, Buoys 5 and 12 (Figures A.1-17 and A.1-18).

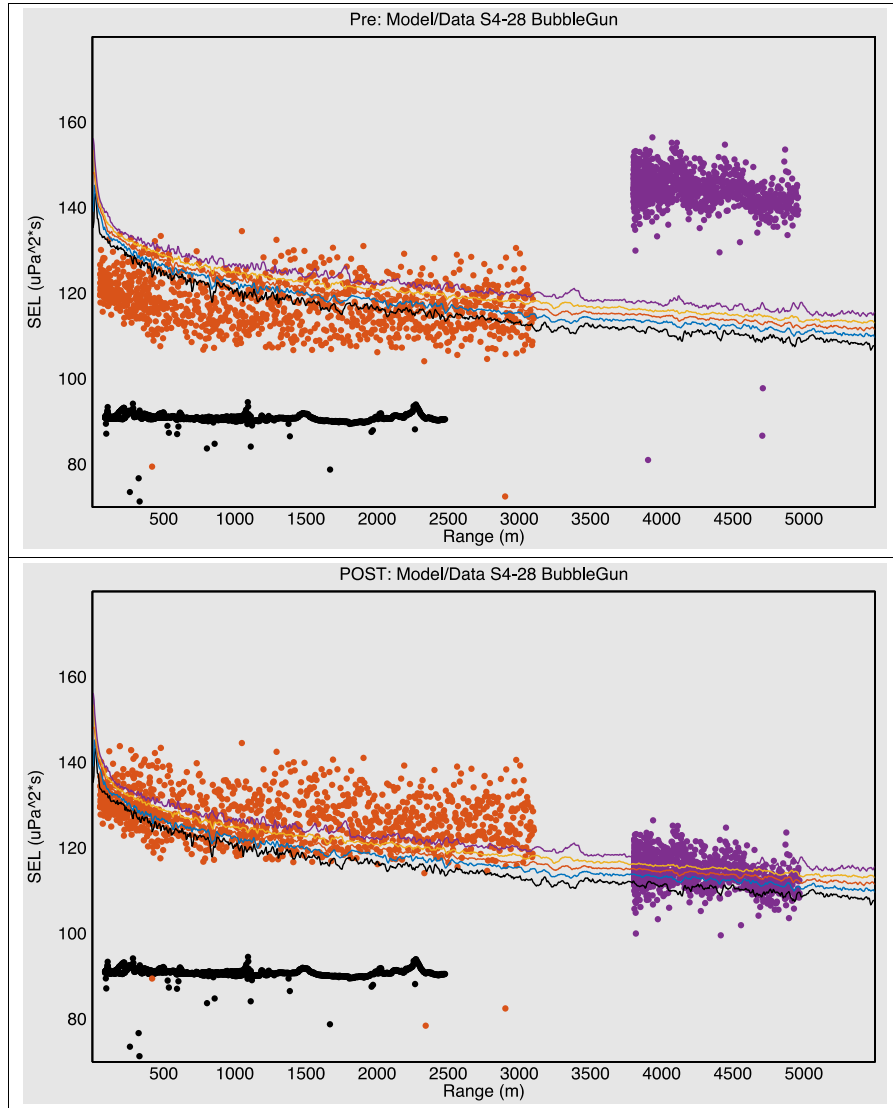


Figure A.1-17. Modeled (lines) versus measured (dots) data for Bubble Gun, Mode 33, at Site 4, Deployment 3, Run 28.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for three buoys (Buoy 5, purple; Buoy 7, black; Buoy 12, red). Top: pre-adjusted data; Bottom: adjusted data (dots). Buoy 7 (black) only had bad data, so while plotted, the data were not adjusted.

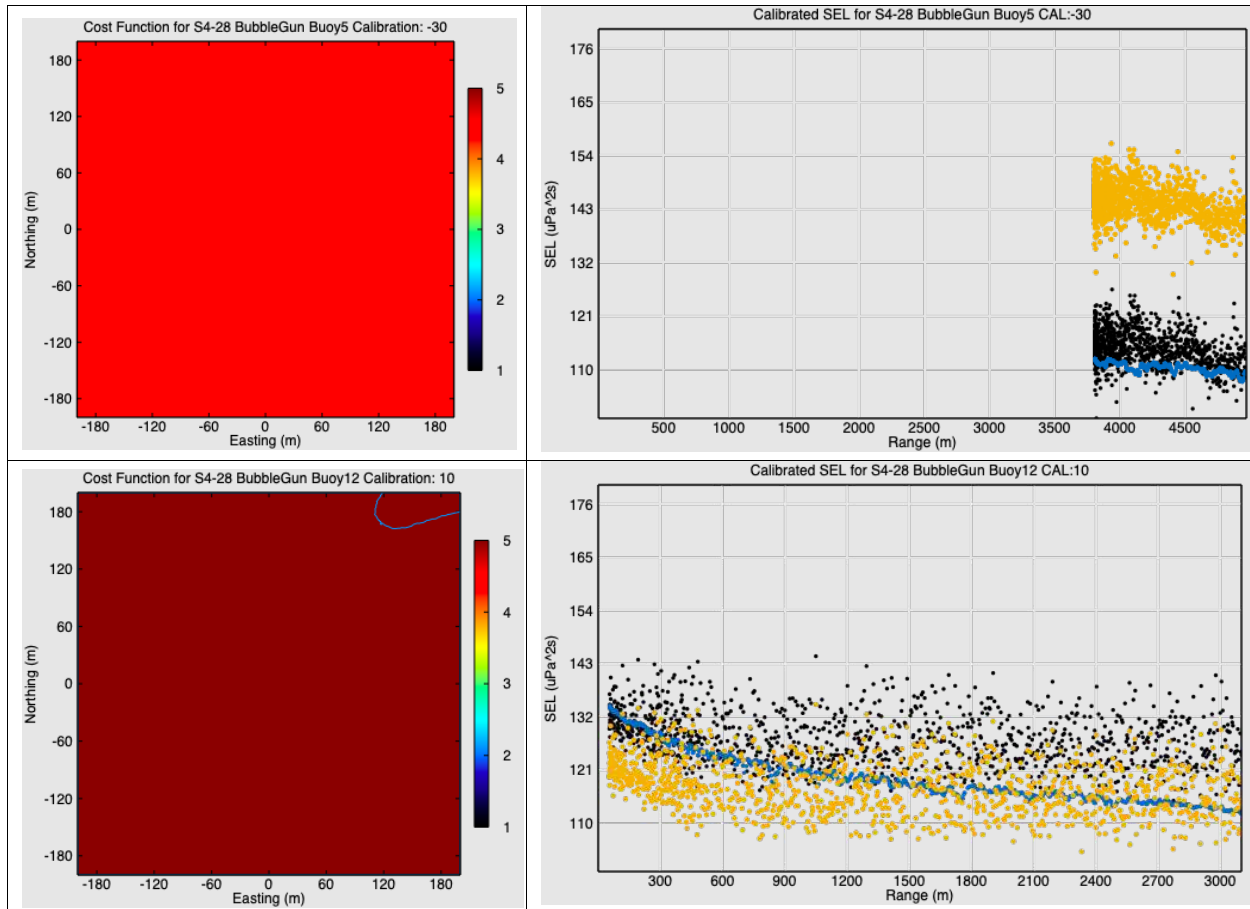


Figure A.1-18. Cost functions of buoy locations and SEL comparisons for Bubble Gun, Mode 33, at Site 4, Deployment 3, Run 28.

Left: Cost functions for the buoy locations (top: Buoy 5; bottom: Buoy 12). Right: Sound exposure level (SEL) versus range compared to the model (blue line), pre-adjusted data (yellow), and adjusted data (black).

A.1.12 Site 5, Deployment 3

No low-frequency source occurred during Deployment 3 at Site 5.

A.1.13 Low-Frequency Results Table

Table A.1-1. Adjustment factors for all low-frequency sources.

Source	Mode	Site	Deployment	Run	frequency	Channel	Buoy Position															
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1
252 S-Boom	26	1	1	3	LF	na	6	-10 dB	na	--	na	--	na	--	na	--	5	10 dB	8	10 dB	9	-20 dB
252 S-Boom	26	1	1	3	LF	na	6	200 S	na	--	na	--	na	--	na	--	5	70 N	8	200 N	9	200 N
252 S-Boom	26	1	1	3	LF	na	6	200 E	na	--	na	--	na	--	na	--	5	200 W	8	200 W	9	200 W
252 S-Boom	26	1	1	3	LF	na	6	10.59	na	--	na	--	na	--	na	--	5	3.32	8	2.98	9	5.16
252 S-Boom	26	1	1	3	LF	na	6	>400m	na	--	na	--	na	--	na	--	5	>400 m	8	>380 m	9	>400 m
Mini Sparker	28	1	1	4	LF	na	6	0 dB	na	--	na	--	na	--	na	--	5	5 dB	8	5 dB	9	-5 dB
Mini Sparker	28	1	1	4	LF	na	6	200 S	na	--	na	--	na	--	na	--	5	200 N	8	200 N	9	192 S
Mini Sparker	28	1	1	4	LF	na	6	58 W	na	--	na	--	na	--	na	--	5	196 E	8	200 E	9	200W
Mini Sparker	28	1	1	4	LF	na	6	4.16	na	--	na	--	na	--	na	--	5	3.65	8	3.17	9	7.57
Mini Sparker	28	1	1	4	LF	na	6	>260 m	na	--	na	--	na	--	na	--	5	>200 m	8	>200 m	9	>400 m
Mini Sparker	29	1	1	5	LF	na	6	0 dB	na	--	na	--	na	--	na	--	5	bad	8	30 dB	9	-10 dB
Mini Sparker	29	1	1	5	LF	na	6	50 N	na	--	na	--	na	--	na	--	5	bad	8	200 S	9	200 S
Mini Sparker	29	1	1	5	LF	na	6	64 W	na	--	na	--	na	--	na	--	5	bad	8	36 W	9	36 W
Mini Sparker	29	1	1	5	LF	na	6	12.55	na	--	na	--	na	--	na	--	5	bad	8	2.52	9	13.98
Mini Sparker	29	1	1	5	LF	na	6	>400 m	na	--	na	--	na	--	na	--	5	bad	8	>210 m	9	>380 m
Bubble Gun	33	1	1	13	LF	na	6	bad	na	--	na	--	na	--	na	--	5	10 dB	8	bad	9	no data
Bubble Gun	33	1	1	13	LF	na	6	bad	na	--	na	--	na	--	na	--	5	200 N	8	bad	9	no data
Bubble Gun	33	1	1	13	LF	na	6	bad	na	--	na	--	na	--	na	--	5	196 W	8	bad	9	no data
Bubble Gun	33	1	1	13	LF	na	6	bad	na	--	na	--	na	--	na	--	5	5.25	8	bad	9	no data
Bubble Gun	33	1	1	13	LF	na	6	bad	na	--	na	--	na	--	na	--	5	>170 m	8	bad	9	no data
252 S-Boom	26	2	1	4	LF	0	6	0 dB	na	--	na	--	na	--	na	--	na	--	na	--	F	bad
253 S-Boom	26	2	1	4	LF	0	6	48 N	na	--	na	--	na	--	na	--	na	--	na	--	F	bad
254 S-Boom	26	2	1	4	LF	0	6	156 W	na	--	na	--	na	--	na	--	na	--	na	--	F	bad
255 S-Boom	26	2	1	4	LF	0	6	4.96	na	--	na	--	na	--	na	--	na	--	na	--	F	bad
256 S-Boom	26	2	1	4	LF	0	6	>400 m	na	--	na	--	na	--	na	--	na	--	na	--	F	bad
257 S-Boom	27	2	1	5	LF	0	6	0 dB	na	--	na	--	11	15 dB	na	--	na	--	na	--	na	--
258 S-Boom	27	2	1	5	LF	0	6	200 S	na	--	na	--	11	54 S	na	--	na	--	na	--	na	--
259 S-Boom	27	2	1	5	LF	0	6	200 E	na	--	na	--	11	178 E	na	--	na	--	na	--	na	--
260 S-Boom	27	2	1	5	LF	0	6	4.42	na	--	na	--	11	3	na	--	na	--	na	--	na	--
261 S-Boom	27	2	1	5	LF	0	6	>200 m	na	--	na	--	11	>200 m	na	--	na	--	na	--	na	--
Mini Sparker	28	2	1	6	LF	0	6	-5 dB	na	--	na	--	11	0 dB	na	--	na	--	na	--	9	bad
Mini Sparker	28	2	1	6	LF	0	6	0 N	na	--	na	--	11	110 N	na	--	na	--	na	--	9	bad
Mini Sparker	28	2	1	6	LF	0	6	22 E	na	--	na	--	11	140 W	na	--	na	--	na	--	9	bad
Mini Sparker	28	2	1	6	LF	0	6	5.70	na	--	na	--	11	5.10	na	--	na	--	na	--	9	bad
Mini Sparker	28	2	1	6	LF	0	6	>260 m	na	--	na	--	11	>400 m	na	--	na	--	na	--	9	bad
Mini Sparker	29	2	1	7	LF	0	6	10 dB	na	--	na	--	11	no data	na	--	na	--	na	--	9	bad
Mini Sparker	29	2	1	7	LF	0	6	14 N	na	--	na	--	11	no data	na	--	na	--	na	--	9	bad
Mini Sparker	29	2	1	7	LF	0	6	42 E	na	--	na	--	11	no data	na	--	na	--	na	--	9	bad
Mini Sparker	29	2	1	7	LF	0	6	2.68	na	--	na	--	11	no data	na	--	na	--	na	--	9	bad
Mini Sparker	29	2	1	7	LF	0	6	>100 m	na	--	na	--	11	no data	na	--	na	--	na	--	9	bad
AA251	30	2	1	26	LF	na	6	30 dB	na	--	na	--	11	45 dB	na	--	na	--	na	--	9	10 dB
AA251	30	2	1	26	LF	na	6	24 N	na	--	na	--	11	20 S	na	--	na	--	na	--	9	200 S
AA251	30	2	1	26	LF	na	6	16 W	na	--	na	--	11	62 W	na	--	na	--	na	--	9	200 E
AA251	30	2	1	26	LF	na	6	7.76	na	--	na	--	11	2.66	na	--	na	--	na	--	9	3.43
AA251	30	2	1	26	LF	na	6	>400 m	na	--	na	--	11	>120 m	na	--	na	--	na	--	9	>200 m
AA251	31	2	1	27	LF	na	6	30 dB	na	--	na	--	11	45 dB	na	--	na	--	na	--	9	10 dB
AA251	31	2	1	27	LF	na	6	108 N	na	--	na	--	11	26 S	na	--	na	--	na	--	9	200 S
AA251	31	2	1	27	LF	na	6	200 W	na	--	na	--	11	32 W	na	--	na	--	na	--	9	200 E

Table A.1-1. (Continued).

Source	Mode	Site	Deployment	Run	frequency	Channel	Buoy Position															
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1
AA251	31	2	1	27	LF	na	6	8.16	na	--	na	--	11	2.51	na	--	na	--	na	--	9	5.18
AA251	31	2	1	27	LF	na	6	>400m	na	--	na	--	11	>150 m	na	--	na	--	na	--	9	>400 m
Bubble Gun	32	2	1	26	LF	na	6	0 dB	na	--	na	--	11	10 dB	na	--	na	--	na	--	9	bad
Bubble Gun	32	2	1	26	LF	na	6	144 N	na	--	na	--	11	188 S	na	--	na	--	na	--	9	bad
Bubble Gun	32	2	1	26	LF	na	6	200 W	na	--	na	--	11	200 E	na	--	na	--	na	--	9	bad
Bubble Gun	32	2	1	26	LF	na	6	5.78	na	--	na	--	11	5.40	na	--	na	--	na	--	9	bad
Bubble Gun	32	2	1	26	LF	na	6	>400 m	na	--	na	--	11	>400m	na	--	na	--	na	--	9	bad
Bubble Gun	33	2	1	27	LF	na	6	-10 dB	na	--	na	--	11	10 dB	na	--	na	--	na	--	9	-20 dB
Bubble Gun	33	2	1	27	LF	na	6	200 N	na	--	na	--	11	200 S	na	--	na	--	na	--	9	200 S
Bubble Gun	33	2	1	27	LF	na	6	200 W	na	--	na	--	11	200 E	na	--	na	--	na	--	9	200 E
Bubble Gun	33	2	1	27	LF	na	6	5.62	na	--	na	--	11	5.48	na	--	na	--	na	--	9	5.07
Bubble Gun	33	2	1	27	LF	na	6	>400 m	na	--	na	--	11	>400 m	na	--	na	--	na	--	9	>400 m
252 S-Boom	26	3	1	6	LF	na	8	bad	na	--	na	--	5	-5 dB	12	-5 dB	7	bad	na	--	na	--
252 S-Boom	26	3	1	6	LF	na	8	bad	na	--	na	--	5	66 S	12	176 S	7	bad	na	--	na	--
252 S-Boom	26	3	1	6	LF	na	8	bad	na	--	na	--	5	14 E	12	200 E	7	bad	na	--	na	--
252 S-Boom	26	3	1	6	LF	na	8	bad	na	--	na	--	5	11.69	12	5.72	7	bad	na	--	na	--
252 S-Boom	26	3	1	6	LF	na	8	bad	na	--	na	--	5	>400 m	12	>400 m	7	bad	na	--	na	--
252 S-Boom	27	3	1	7	LF	na	8	bad	na	--	na	--	5	-10 dB	12	-10 dB	7	bad	na	--	na	--
252 S-Boom	27	3	1	7	LF	na	8	bad	na	--	na	--	5	194 S	12	94 S	7	bad	na	--	na	--
252 S-Boom	27	3	1	7	LF	na	8	bad	na	--	na	--	5	92 W	12	138 E	7	bad	na	--	na	--
252 S-Boom	27	3	1	7	LF	na	8	bad	na	--	na	--	5	10.32	12	5.05	7	bad	na	--	na	--
252 S-Boom	27	3	1	7	LF	na	8	bad	na	--	na	--	5	>400 m	12	>400 m	7	bad	na	--	na	--
252 S-Boom	26	5	1	8	LF	na	6	-15 dB	12	-5 dB	na	--	na	--	na	--	9	0 dB	8	0 dB	10	-10 dB
252 S-Boom	26	5	1	8	LF	na	6	44 S	12	60 S	na	--	na	--	na	--	9	178 S	8	200 N	10	200 S
252 S-Boom	26	5	1	8	LF	na	6	32 E	12	200 W	na	--	na	--	na	--	9	200 E	8	200 W	10	200 E
252 S-Boom	26	5	1	8	LF	na	6	4.55	12	4.24	na	--	na	--	na	--	9	5.42	8	2.7	10	7.03
252 S-Boom	26	5	1	8	LF	na	6	>120 m	12	>260 m	na	--	na	--	na	--	9	>400 m	8	>400 m	10	>400 m
252 S-Boom	27	5	1	9	LF	na	6	-30 dB	12	-15 dB	na	--	11	-40 dB	na	--	9	-10 dB	8	-10 dB	10	-15 dB
252 S-Boom	27	5	1	9	LF	na	6	32 S	12	58 S	na	--	11	200 N	na	--	9	200 N	8	200 N	10	46 N
252 S-Boom	27	5	1	9	LF	na	6	186 E	12	200 W	na	--	11	112 W	na	--	9	200 W	8	198 W	10	198 W
252 S-Boom	27	5	1	9	LF	na	6	4.66	12	4.2	na	--	11	5.46	na	--	9	3.53	8	2.81	10	3.27
252 S-Boom	27	5	1	9	LF	na	6	>320 m	12	>120 m	na	--	11	>400 m	na	--	9	>320 m	8	>260 m	10	>400 m
Delta Sparker	39	5	1	1	LF	na	6	0 dB	12	0 dB	na	--	5	0 dB	na	--	9	0 dB	8	5 dB	10	no data
Delta Sparker	39	5	1	1	LF	na	6	2 S	12	2 N	na	--	5	182 S	na	--	9	200 S	8	200 N	10	no data
Delta Sparker	39	5	1	1	LF	na	6	76 E	12	126 W	na	--	5	76 E	na	--	9	166 W	8	194 W	10	no data
Delta Sparker	39	5	1	1	LF	na	6	2.80	12	3.20	na	--	5	12.82	na	--	9	16.00	8	3.94	10	no data
Delta Sparker	39	5	1	1	LF	na	6	>120 m	12	>120 m	na	--	5	>400 m	na	--	9	>400 m	8	>400 m	10	no data
Mini Sparker	28	5	1	3	LF	na	6	-30 dB	12	-10 dB	na	--	5	-40 dB	na	--	9	-40 dB	8	-10 dB	10	-50 dB
Mini Sparker	28	5	1	3	LF	na	6	104 S	12	44 S	na	--	5	10 N	na	--	9	200 N	8	200 N	10	198 N
Mini Sparker	28	5	1	3	LF	na	6	200 E	12	124 W	na	--	5	194 E	na	--	9	200 W	8	200 W	10	190 W
Mini Sparker	28	5	1	3	LF	na	6	1.30	12	2.31	na	--	5	9.63	na	--	9	24.56	8	2.90	10	13.5
Mini Sparker	28	5	1	3	LF	na	6	>120 m	12	>150 m	na	--	5	>400 m	na	--	9	>400 m	8	>120 m	10	>400 m
Mini Sparker	29	5	1	4	LF	na	6	-20 dB	12	bad	na	--	5	no data	na	--	9	-5 dB	8	0 dB	10	no data
Mini Sparker	29	5	1	4	LF	na	6	18 N	12	bad	na	--	5	no data	na	--	9	20 N	8	52 S	10	no data
Mini Sparker	29	5	1	4	LF	na	6	198 E	12	bad	na	--	5	no data	na	--	9	200 E	8	182 E	10	no data
Mini Sparker	29	5	1	4	LF	na	6	4.72	12	bad	na	--	5	no data	na	--	9	7.52	8	1.95	10	no data
Mini Sparker	29	5	1	4	LF	na	6	>180 m	12	bad	na	--	5	no data	na	--	9	>400 m	8	>400 m	10	no data
Mini Sparker	29	5	1	5	LF	na	6	-20 dB	12	0 dB	na	--	5	no data	na	--	9	5 dB	8	5dB	10	no data
Mini Sparker	29	5	1	5	LF	na	6	138 S	12	180 N	na	--	5	no data	na	--	9	200 S	8	200 W	10	no data

Table A.1-1. (Continued).

Source	Mode	Site	Deployment	Run	frequency	Channel	Buoy Position															
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1
Mini Sparker	29	5	1	5	LF	na	6	200 E	12	200 W	na	--	5	no data	na	--	9	140 E	8	200 N	10	no data
Mini Sparker	29	5	1	5	LF	na	6	6.72	12	3.39	na	--	5	no data	na	--	9	10.61	8	2.55	10	no data
Mini Sparker	29	5	1	5	LF	na	6	>400 m	12	>180 m	na	--	5	no data	na	--	9	>400 m	8	>400 m	10	no data
252 S-Boom	26	2	2	31	LF	na	na	--	na	--	na	--	5	-5	11	0	10	bad	na	--	9	-10 dB
253 S-Boom	26	2	2	31	LF	na	na	--	na	--	na	--	5	200 S	11	200 S	10	bad	na	--	9	200 S
254 S-Boom	26	2	2	31	LF	na	na	--	na	--	na	--	5	198 E	11	128 E	10	bad	na	--	9	200 E
255 S-Boom	26	2	2	31	LF	na	na	--	na	--	na	--	5	3.96	11	3.39	10	bad	na	--	9	2.68
256 S-Boom	26	2	2	31	LF	na	na	--	na	--	na	--	5	>320 m	11	>260m	10	bad	na	--	9	>200 m
257 S-Boom	27	2	2	32	LF	na	na	--	na	--	na	--	5	-5	11	10	10	bad	na	--	9	bad
258 S-Boom	27	2	2	32	LF	na	na	--	na	--	na	--	5	200 S	11	200 S	10	bad	na	--	9	bad
259 S-Boom	27	2	2	32	LF	na	na	--	na	--	na	--	5	26 W	11	52 W	10	bad	na	--	9	bad
260 S-Boom	27	2	2	32	LF	na	na	--	na	--	na	--	5	6.19	11	6.87	10	bad	na	--	9	bad
261 S-Boom	27	2	2	32	LF	na	na	--	na	--	na	--	5	>400 m	11	>400m	10	bad	na	--	9	bad
Mini Sparker	28	2	2	33	LF	na	na	--	na	--	na	--	5	10 dB	11	15 dB	10	20 dB	na	--	9	20 dB
Mini Sparker	28	2	2	33	LF	na	na	--	na	--	na	--	5	6 S	11	8 S	10	190 N	na	--	9	200 S
Mini Sparker	28	2	2	33	LF	na	na	--	na	--	na	--	5	140 E	11	200 E	10	200 E	na	--	9	200 E
Mini Sparker	28	2	2	33	LF	na	na	--	na	--	na	--	5	2.87	11	7.47	10	3.71	na	--	9	5.25
Mini Sparker	28	2	2	33	LF	na	na	--	na	--	na	--	5	>180m	11	>400m	10	>400 m	na	--	9	>400m
Mini Sparker	29	2	2	34	LF	na	na	--	na	--	na	--	5	5 dB	11	10 dB	10	20dB	na	--	9	10 dB
Mini Sparker	29	2	2	34	LF	na	na	--	na	--	na	--	5	54 N	11	90 N	10	200 N	na	--	9	200 S
Mini Sparker	29	2	2	34	LF	na	na	--	na	--	na	--	5	200 E	11	100 W	10	198 W	na	--	9	200 E
Mini Sparker	29	2	2	34	LF	na	na	--	na	--	na	--	5	5.12	11	3.58	10	3.20	na	--	9	3.20
Mini Sparker	29	2	2	34	LF	na	na	--	na	--	na	--	5	>400 m	11	>150 m	10	>400 m	na	--	9	>400 m
Mini Sparker	28	3	2	10	LF	na	na	--	5	-10 dB	na	--	12	no data	na	--	na	--	na	--	6	-30 dB
Mini Sparker	28	3	2	10	LF	na	na	--	5	200 N	na	--	12	no data	na	--	na	--	na	--	6	200 S
Mini Sparker	28	3	2	10	LF	na	na	--	5	194 W	na	--	12	no data	na	--	na	--	na	--	6	200 W
Mini Sparker	28	3	2	10	LF	na	na	--	5	13.54	na	--	12	no data	na	--	na	--	na	--	6	8.35
Mini Sparker	28	3	2	10	LF	na	na	--	5	>400 m	na	--	12	no data	na	--	na	--	na	--	6	>400m
Mini Sparker	29	3	2	11	LF	na	na	--	5	0 dB	na	--	12	20 dB	na	--	na	--	na	--	6	0 dB
Mini Sparker	29	3	2	11	LF	na	na	--	5	200 S	na	--	12	12 N	na	--	na	--	na	--	6	200 N
Mini Sparker	29	3	2	11	LF	na	na	--	5	200 E	na	--	12	114 W	na	--	na	--	na	--	6	176 E
Mini Sparker	29	3	2	11	LF	na	na	--	5	9.83	na	--	12	4.91	na	--	na	--	na	--	6	5.12
Mini Sparker	29	3	2	11	LF	na	na	--	5	>400 m	na	--	12	>320 m	na	--	na	--	na	--	6	>400 m
252 S-Boom	26	5	2	24	LF	na	6	0 dB	12	5 dB	na	--	11	10 dB	na	--	8	10 dB	9	10 dB	10	10 dB
252 S-Boom	26	5	2	24	LF	na	6	200 S	12	54 N	na	--	11	82 N	na	--	8	198 S	9	200 S	10	200 S
252 S-Boom	26	5	2	24	LF	na	6	6 W	12	4 E	na	--	11	2 E	na	--	8	174 W	9	200 E	10	200 E
252 S-Boom	26	5	2	24	LF	na	6	4.48	12	3.14	na	--	11	2.96	na	--	8	2.03	9	9.11	10	22.42
252 S-Boom	26	5	2	24	LF	na	6	>150 m	12	>320 m	na	--	11	>100 m	na	--	8	>400 m	9	>400 m	10	>400m
252 S-Boom	27	5	2	25	LF	na	6	-10 dB	12	-10 dB	na	--	11	-5 dB	na	--	8	-5 dB	9	0 dB	10	-5 dB
252 S-Boom	27	5	2	25	LF	na	6	32 S	12	98 S	na	--	11	54 N	na	--	8	68 S	9	200 S	10	200 S
252 S-Boom	27	5	2	25	LF	na	6	30 E	12	200 W	na	--	11	4 E	na	--	8	200 W	9	198 E	10	200 E
252 S-Boom	27	5	2	25	LF	na	6	3.12	12	4.76	na	--	11	4.23	na	--	8	3.63	9	16.12	10	24.71
252 S-Boom	27	5	2	25	LF	na	6	>100 m	12	>180 m	na	--	11	>180 m	na	--	8	>400 m	9	>400 m	10	>400m
Mini Sparker	28	5	2	19	LF	na	6	-30 dB	12	-40 dB	na	--	11	-20 dB	na	--	8	-30 dB	9	-40 dB	10	-40 dB
Mini Sparker	28	5	2	19	LF	na	6	200 S	12	200 N	na	--	11	194 N	na	--	8	200 N	9	200 N	10	68 N
Mini Sparker	28	5	2	19	LF	na	6	198 E	12	120 W	na	--	11	120 W	na	--	8	200 W	9	200 W	10	200 W
Mini Sparker	28	5	2	19	LF	na	6	5.17	12	6.06	na	--	11	5.18	na	--	8	6.59	9	4.37	10	2.57
Mini Sparker	28	5	2	19	LF	na	6	>400 m	12	>400 m	na	--	11	>400 m	na	--	8	>400 m	9	>400 m	10	>400 m
AirGun	34	5	2	14	LF	na	6	bad	12	30 dB	na	--	11	30 dB	na	--	8	30 dB	9	40 dB	10	bad

Table A.1-1. (Continued).

Source	Mode	Site	Deployment	Run	frequency	Channel	Buoy Position															
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1
AirGun	34	5	2	14	LF	na	6	bad	12	200 N	na	--	11	200 N	na	--	8	56 N	9	152 S	10	bad
AirGun	34	5	2	14	LF	na	6	bad	12	50 E	na	--	11	52 W	na	--	8	200 W	9	172 W	10	bad
AirGun	34	5	2	14	LF	na	6	bad	12	3.56	na	--	11	5.41	na	--	8	2.99	9	13.35	10	bad
AirGun	34	5	2	14	LF	na	6	bad	12	>320 m	na	--	11	>400 m	na	--	8	>400 m	9	>400 m	10	bad
AirGun	38	5	2	28	LF	na	6	-5 dB	12	-5 dB	na	--	11	no data	na	--	8	bad	9	-5 dB	10	bad
AirGun	38	5	2	28	LF	na	6	70 N	12	200 N	na	--	11	no data	na	--	8	bad	9	194 N	10	bad
AirGun	38	5	2	28	LF	na	6	200 W	12	98 W	na	--	11	no data	na	--	8	bad	9	200 W	10	bad
AirGun	38	5	2	28	LF	na	6	9.11	12	1.27	na	--	11	no data	na	--	8	bad	9	1.03	10	bad
AirGun	38	5	2	28	LF	na	6	>400m	12	>60m	na	--	11	no data	na	--	8	bad	9	>120 m	10	bad
AirGun	34	5	2	29	LF	na	6	bad	12	20 dB	na	--	11	no data	na	--	8	30 dB	9	20 dB	10	bad
AirGun	34	5	2	29	LF	na	6	bad	12	190 N	na	--	11	no data	na	--	8	76 S	9	196 S	10	bad
AirGun	34	5	2	29	LF	na	6	bad	12	24 E	na	--	11	no data	na	--	8	200 W	9	2 E	10	bad
AirGun	34	5	2	29	LF	na	6	bad	12	4.38	na	--	11	no data	na	--	8	3.11	9	15.89	10	bad
AirGun	34	5	2	29	LF	na	6	bad	12	>150 m	na	--	11	no data	n0	--	8	>400 m	9	>400 m	10	bad
AirGun	34	5	2	30	LF	na	6	0 dB	12	20 dB	na	--	11	no data	na	--	8	0 dB	9	-10 dB	10	bad
AirGun	34	5	2	30	LF	na	6	68 S	12	24 N	na	--	11	no data	na	--	8	198 S	9	200 S	10	bad
AirGun	34	5	2	30	LF	na	6	4 W	12	200 E	na	--	11	no data	na	--	8	198 E	9	200 W	10	bad
AirGun	34	5	2	30	LF	na	6	10.48	12	4.4	na	--	11	no data	na	--	8	3.45	9	4.11	10	bad
AirGun	34	5	2	30	LF	na	6	>400 m	12	>260 m	na	--	11	no data	na	--	8	>400 m	9	>400 m	10	bad
AirGun	35	5	2	15	LF	na	6	0 dB	12	0 dB	na	--	11	0 dB	na	--	8	5 dB	9	0 dB	10	0 dB
AirGun	35	5	2	15	LF	na	6	78 N	12	48 S	na	--	11	198 N	na	--	8	200 N	9	198 S	10	188 N
AirGun	35	5	2	15	LF	na	6	200 E	12	198 W	na	--	11	94 W	na	--	8	200 W	9	200 W	10	38 W
AirGun	35	5	2	15	LF	na	6	10.30	12	3.85	na	--	11	7.66	na	--	8	2.85	9	6.56	10	8.89
AirGun	35	5	2	15	LF	na	6	>400 m	12	>150m	na	--	11	>400 m	na	--	8	>260 m	9	>400 m	10	>400 m
AirGun	36	5	2	16	LF	na	6	5 dB	12	5 dB	na	--	11	5 dB	na	--	8	5 dB	9	5 dB	10	bad
AirGun	36	5	2	16	LF	na	6	6 S	12	194 N	na	--	11	198 N	na	--	8	200 N	9	58 S	10	bad
AirGun	36	5	2	16	LF	na	6	36 W	12	196 W	na	--	11	142 W	na	--	8	200 W	9	56 W	10	bad
AirGun	36	5	2	16	LF	na	6	8.54	12	2.29	na	--	11	4.03	na	--	8	3.93	9	4.74	10	bad
AirGun	36	5	2	16	LF	na	6	>400 m	12	>400m	na	--	11	>250 m	na	--	8	>320 m	9	>400 m	10	bad
AirGun	34	5	2	17	LF	na	6	0 dB	12	0 dB	na	--	11	0 dB	na	--	8	0 dB	9	10 dB	10	bad
AirGun	34	5	2	17	LF	na	6	26 S	12	110 S	na	--	11	192 N	na	--	8	200 N	9	136 S	10	bad
AirGun	34	5	2	17	LF	na	6	34 E	12	168 W	na	--	11	194 W	na	--	8	200 W	9	6 W	10	bad
AirGun	34	5	2	17	LF	na	6	9.01	12	1.54	na	--	11	4.33	na	--	8	3.49	9	4.62	10	bad
AirGun	34	5	2	17	LF	na	6	>400 m	12	>320 m	na	--	11	>320 m	na	--	8	>320 m	9	>400 m	10	bad
AirGun	37	5	2	18	LF	na	6	5 dB	12	5 dB	na	--	11	no data	na	--	8	5 dB	9	5 dB	10	bad
AirGun	37	5	2	18	LF	na	6	102 N	12	6 N	na	--	11	no data	na	--	8	200 N	9	188 S	10	bad
AirGun	37	5	2	18	LF	na	6	158 E	12	22 E	na	--	11	no data	na	--	8	200 W	9	146 E	10	bad
AirGun	37	5	2	18	LF	na	6	8.26	12	1.49	na	--	11	no data	na	--	8	2.89	9	7.10	10	bad
AirGun	37	5	2	18	LF	na	6	>400 m	12	>100m	na	--	11	no data	na	--	8	>300 m	9	>400 m	10	bad
Mini Sparker	28	3	3	30	LF	na	6	-10	12	-10	na	--	11	0	na	--	8	-5	10	-5	9	-20
Mini Sparker	28	3	3	30	LF	na	6	62 N	12	68 S	na	--	11	122 N	na	--	8	200 N	10	200 N	9	200 N
Mini Sparker	28	3	3	30	LF	na	6	0 W	12	200 E	na	--	11	78 E	na	--	8	200 E	10	200 E	9	200 E
Mini Sparker	28	3	3	30	LF	na	6	1.86	12	4.01	na	--	11	2.88	na	--	8	2.90	10	3.88	9	4.91
Mini Sparker	28	3	3	30	LF	na	6	>30 m	12	>260 m	na	--	11	>230 m	na	--	8	>300 m	10	>280 m	9	>400 m
252 S-Boom	26	3	3	29	LF	na	6	bad	12	bad	na	--	11	10 dB	na	--	8	20 dB	10	20 dB	9	bad
252 S-Boom	26	3	3	29	LF	na	6	bad	12	bad	na	--	11	200 N	na	--	8	200 S	10	104 S	9	bad
252 S-Boom	26	3	3	29	LF	na	6	bad	12	bad	na	--	11	200 E	na	--	8	200 W	10	94 E	9	bad
252 S-Boom	26	3	3	29	LF	na	6	bad	12	bad	na	--	11	9.84	na	--	8	6.78	10	6.11	9	bad
252 S-Boom	26	3	3	29	LF	na	6	bad	12	bad	na	--	11	>400 m	na	--	8	>400 m	10	>400 m	9	bad

Table A.1-1. (Continued).

Source	Mode	Site	Deployment	Run	frequency	Channel	Buoy Position															
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1
252 S-Boom	27	3	3	28	LF	na	6	bad	12	5 dB	na	--	11	10 dB	na	--	8	0 dB	10	0 dB	9	bad
252 S-Boom	27	3	3	28	LF	na	6	bad	12	200 N	na	--	11	200 S	na	--	8	200 S	10	200 S	9	bad
252 S-Boom	27	3	3	28	LF	na	6	bad	12	86 E	na	--	11	152 E	na	--	8	200 E	10	146 E	9	bad
252 S-Boom	27	3	3	28	LF	na	6	bad	12	6.51	na	--	11	8.19	na	--	8	6.1	10	6.72	9	bad
252 S-Boom	27	3	3	28	LF	na	6	bad	12	>400 m	na	--	11	>400 m	na	--	8	>400 m	10	>400 m	9	bad
252 S-Boom	26	4	1	6	LF	na	8	30 dB	6	0 dB	na	--	na	--	na	--	9	bad	na	--	na	--
252 S-Boom	26	4	1	6	LF	na	8	104 N	6	bad	na	--	na	--	na	--	9	bad	na	--	na	--
252 S-Boom	26	4	1	6	LF	na	8	68 W	6	bad	na	--	na	--	na	--	9	bad	na	--	na	--
252 S-Boom	26	4	1	6	LF	na	8	6.4	6	bad	na	--	na	--	na	--	9	bad	na	--	na	--
252 S-Boom	26	4	1	6	LF	na	8	>400 m	6	bad	na	--	na	--	na	--	9	bad	na	--	na	--
252 S-Boom	26	4	3	21	LF	na	8	bad	7	-40 dB	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	26	4	3	21	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	26	4	3	21	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	26	4	3	21	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	26	4	3	21	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	27	4	3	22	LF	na	8	40 dB	7	-60 dB	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	27	4	3	22	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	27	4	3	22	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	27	4	3	22	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
252 S-Boom	27	4	3	22	LF	na	8	bad	7	bad	na	--	12	bad	na	--	na	--	na	--	5	bad
Mini Sparker	29	4	3	25	LF	na	na	--	7	bad	na	--	12	0 dB	na	--	na	--	na	--	9	-10 dB
Mini Sparker	29	4	3	25	LF	na	na	--	7	bad	na	--	12	118 N	na	--	na	--	na	--	9	200 N
Mini Sparker	29	4	3	25	LF	na	na	--	7	bad	na	--	12	94 W	na	--	na	--	na	--	9	200 W
Mini Sparker	29	4	3	25	LF	na	na	--	7	bad	na	--	12	3.49	na	--	na	--	na	--	9	7.49
Mini Sparker	29	4	3	25	LF	na	na	--	7	bad	na	--	12	>180 m	na	--	na	--	na	--	9	>400 m
Mini Sparker	28	4	3	26	LF	na	na	--	7	bad	na	--	12	0 dB	na	--	na	--	na	--	9	bad
Mini Sparker	28	4	3	26	LF	na	na	--	7	bad	na	--	12	118 N	na	--	na	--	na	--	9	bad
Mini Sparker	28	4	3	26	LF	na	na	--	7	bad	na	--	12	94 W	na	--	na	--	na	--	9	bad
Mini Sparker	28	4	3	26	LF	na	na	--	7	bad	na	--	12	3.49	na	--	na	--	na	--	9	bad
Mini Sparker	28	4	3	26	LF	na	na	--	7	bad	na	--	12	>150 m	na	--	na	--	na	--	9	bad
Bubble Gun	33	4	3	28	LF	na	na	--	7	bad	na	--	12	10 dB	na	--	na	--	na	--	5	bad
Bubble Gun	33	4	3	28	LF	na	na	--	7	bad	na	--	12	200 S	na	--	na	--	na	--	5	bad
Bubble Gun	33	4	3	28	LF	na	na	--	7	bad	na	--	12	98 W	na	--	na	--	na	--	5	bad
Bubble Gun	33	4	3	28	LF	na	na	--	7	bad	na	--	12	7.52	na	--	na	--	na	--	5	bad
Bubble Gun	33	4	3	28	LF	na	na	--	7	bad	na	--	12	>400 m	na	--	na	--	na	--	5	bad

-- = no information; bad = data quality too poor to ascertain an adjustment factor; dB = decibel; E = east; HRG = high-resolution geophysical; LF = low-frequency; m = meter; na = not applicable; no data = buoy did not function; N = North; S = south; W = west.

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A.2 Appendix A: Mid-Frequency Results

A.2.1 Site 1, Deployment 1

Knudsen 3260, Mode 24, Run 2, Buoys 5, 6, and 8. Buoy 9 had bad data (*Figure A.2-1*).

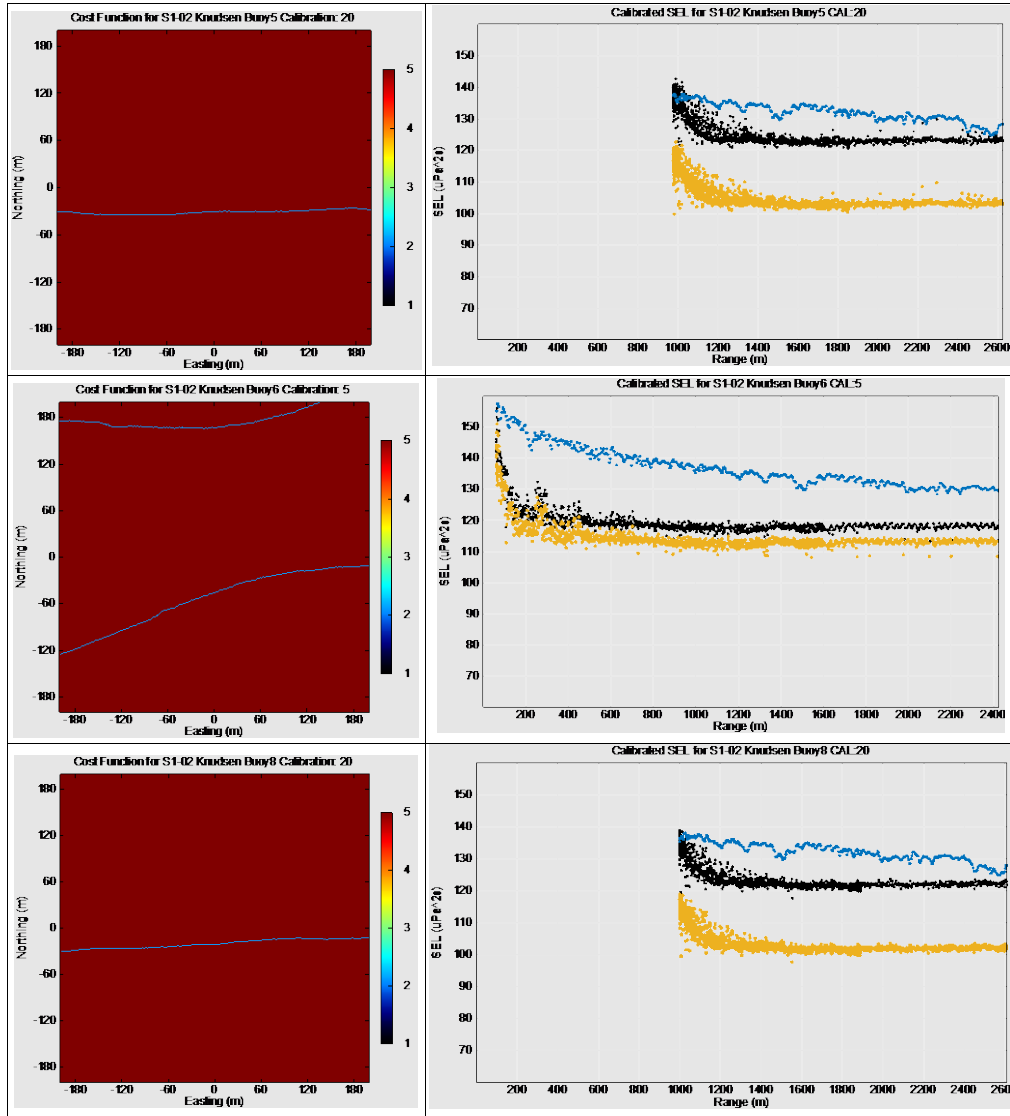


Figure A.2-1. Cost functions of buoy locations and SEL comparisons for Knudsen 3260, Mode 24, at Site 1, Deployment 1, Run 2.

Left: Cost functions for the buoy locations (top to bottom: Buoys 5, 6, and 8). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.2 Site 2, Deployment 1

Knudsen 3260, Mode 23, Run 1, Buoys 6 and 11. Buoy 9 had bad data (*Figure A.2-2*).

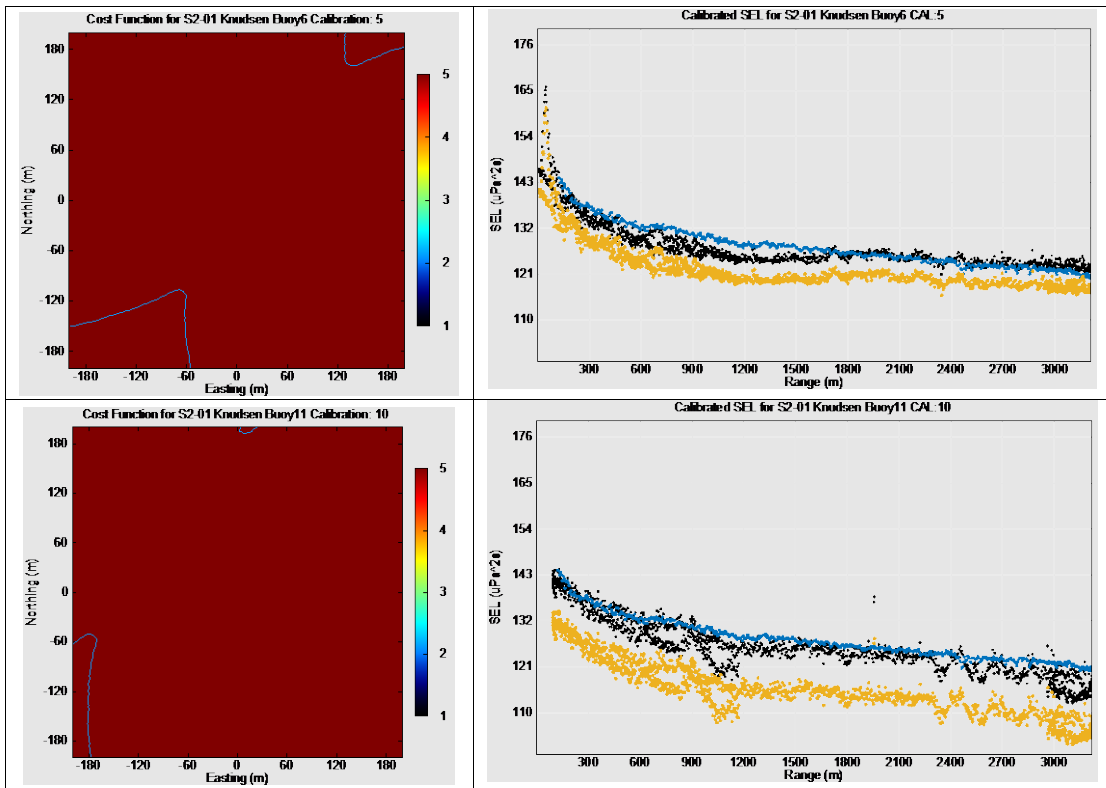


Figure A.2-2. Cost functions of buoy locations and SEL comparisons for Knudsen 3260, Mode 23, at Site 2, Deployment 1, Run 1.

Left: Cost functions for the buoy locations (top: Buoy 6; bottom: Buoy 11). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.3 Site 3, Deployment 1

Knudsen 3260, Mode 25, Run 7, Buoys 5 and 12. Buoys 7 and 8 had bad data (**Figure A.2-3**).

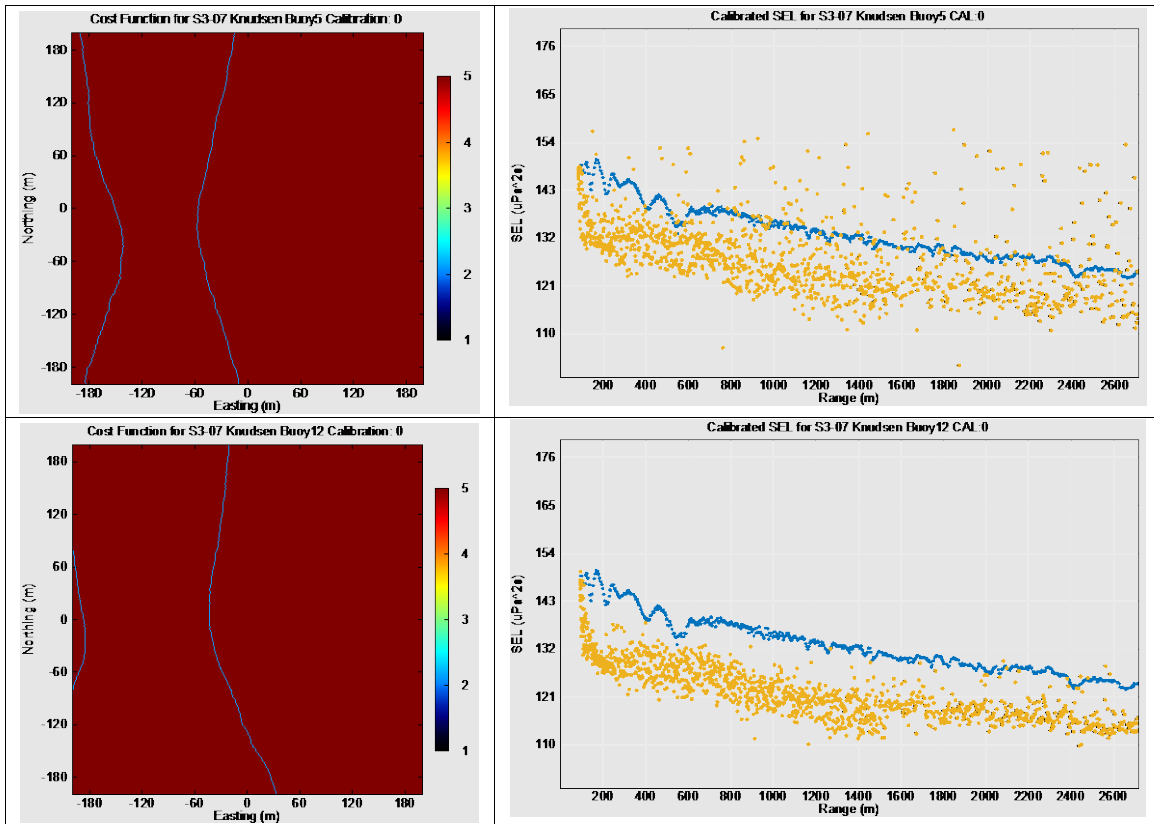


Figure A.2-3. Cost functions of buoy locations and SEL comparisons for Knudsen 3260, Mode 25, at Site 3, Deployment 1, Run 7.

Left: Cost functions for the buoy locations (top: Buoy 5; bottom: Buoy 12). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.4 Site 4, Deployment 1

ET512, Mode 20, Run 1, Buoys 5 (Hydrophone 2), 6 (Hydrophone 1), 7 (Hydrophones 1 and 2), 9 (Hydrophone 2), and 11. Buoy 8 had bad data (**Figure A.2-4**).

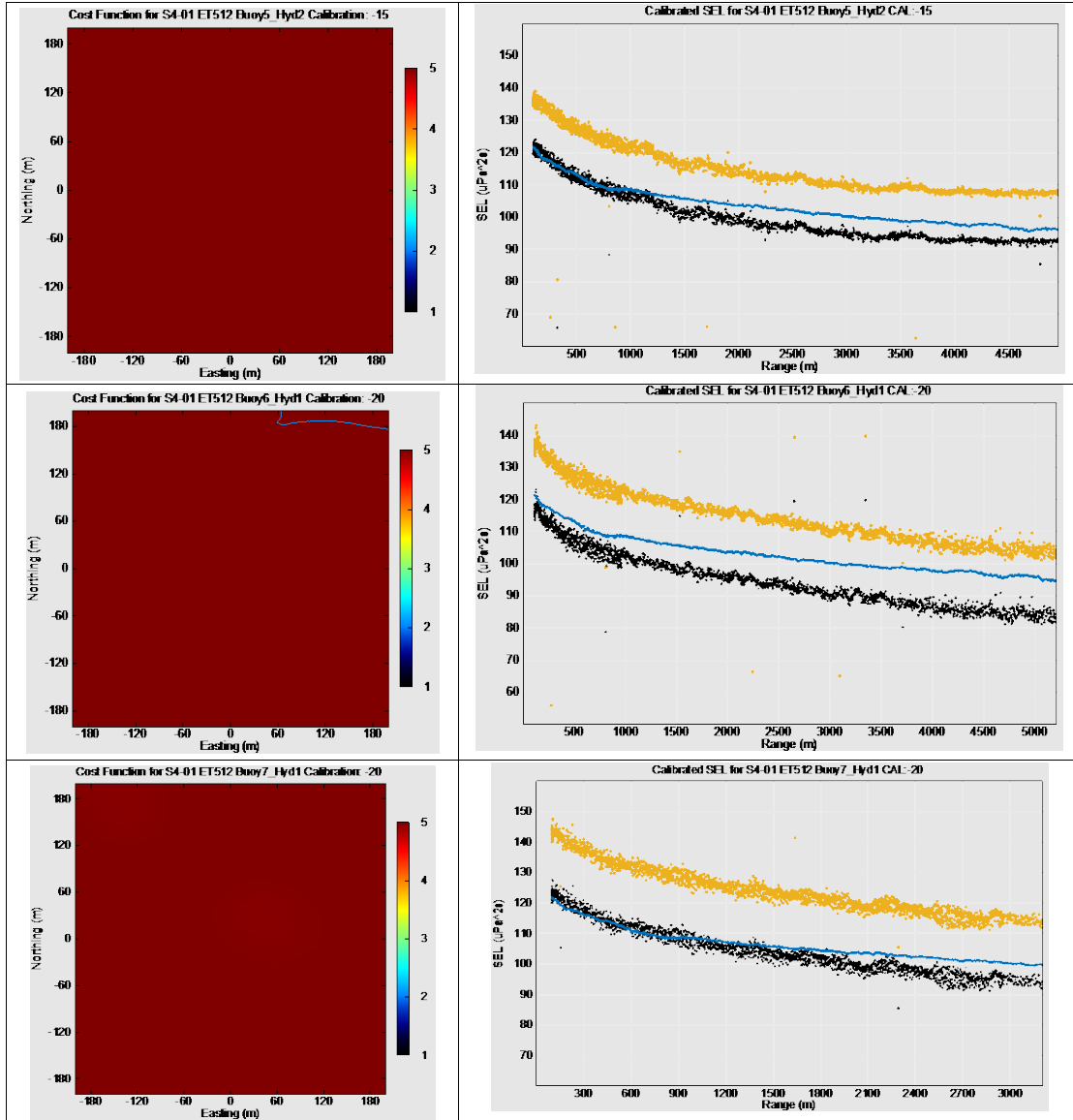


Figure A.2-4. Cost functions of buoy locations and SEL comparisons for ET512, Mode 20, at Site 4, Deployment 1, Run 1.

Left: Cost function for the buoy locations (Buoys 5_Hyd2, 6_Hyd1, 7_Hyd1, 7_Hyd2, 9_Hyd2, and 11). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

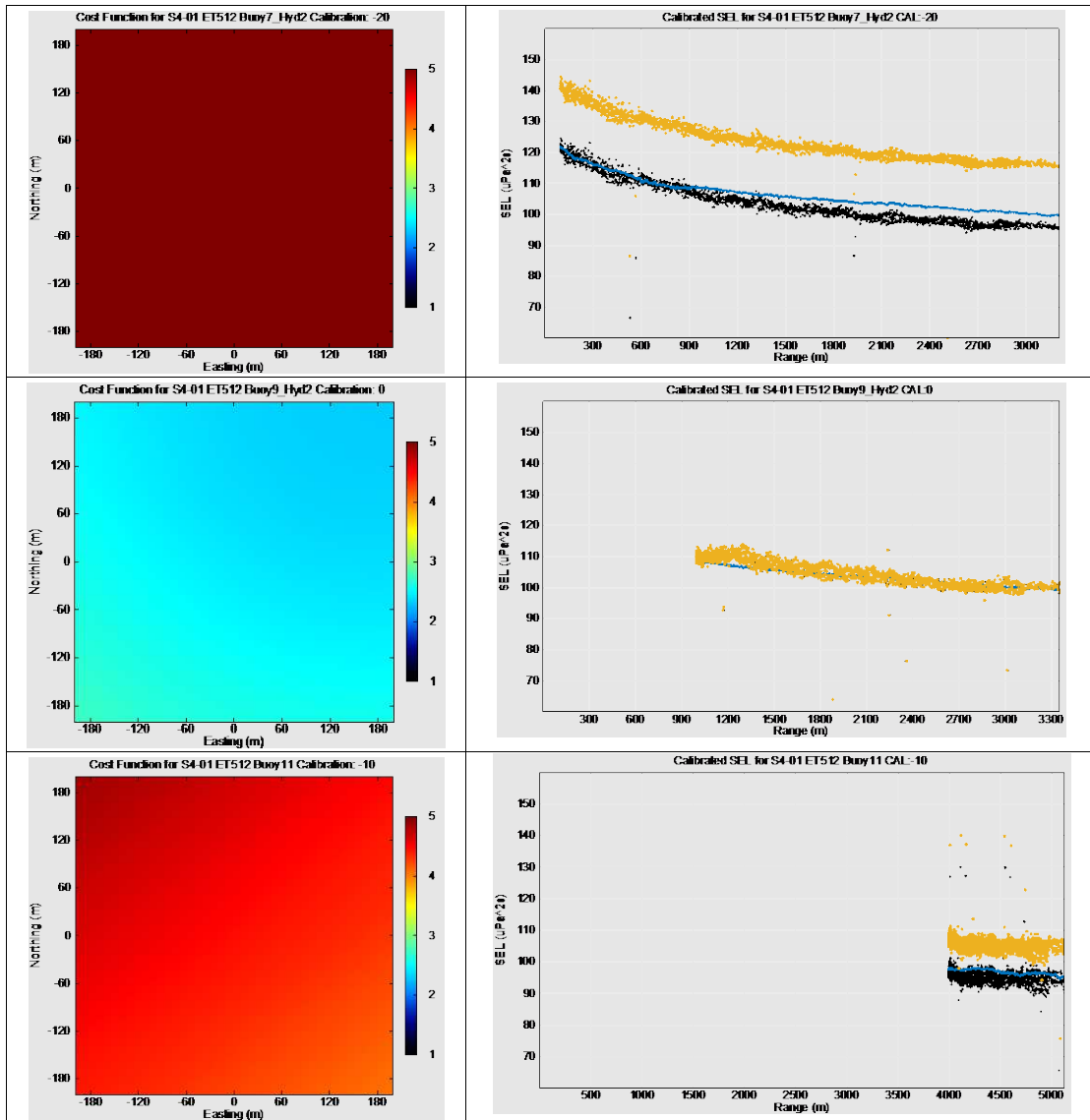


Figure A.2-4 (Continued). Cost functions of buoy locations and SEL comparisons for ET512, Mode 20, at Site 4, Deployment 1, Run 1.

Left: Cost function for the buoy locations (top to bottom: Buoy 5 Hydrophone 2, Buoy 6 Hydrophone 1, Buoy 7 Hydrophone 1, Buoy 7 Hydrophone 2, Buoy 9 Hydrophone 2, and Buoy 11). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.5 Site 5, Deployment 1

ET512, Mode 21, Run 4, Buoys 8 and 9. Buoys 6 and 12 had bad data (**Figure A.2-5**).

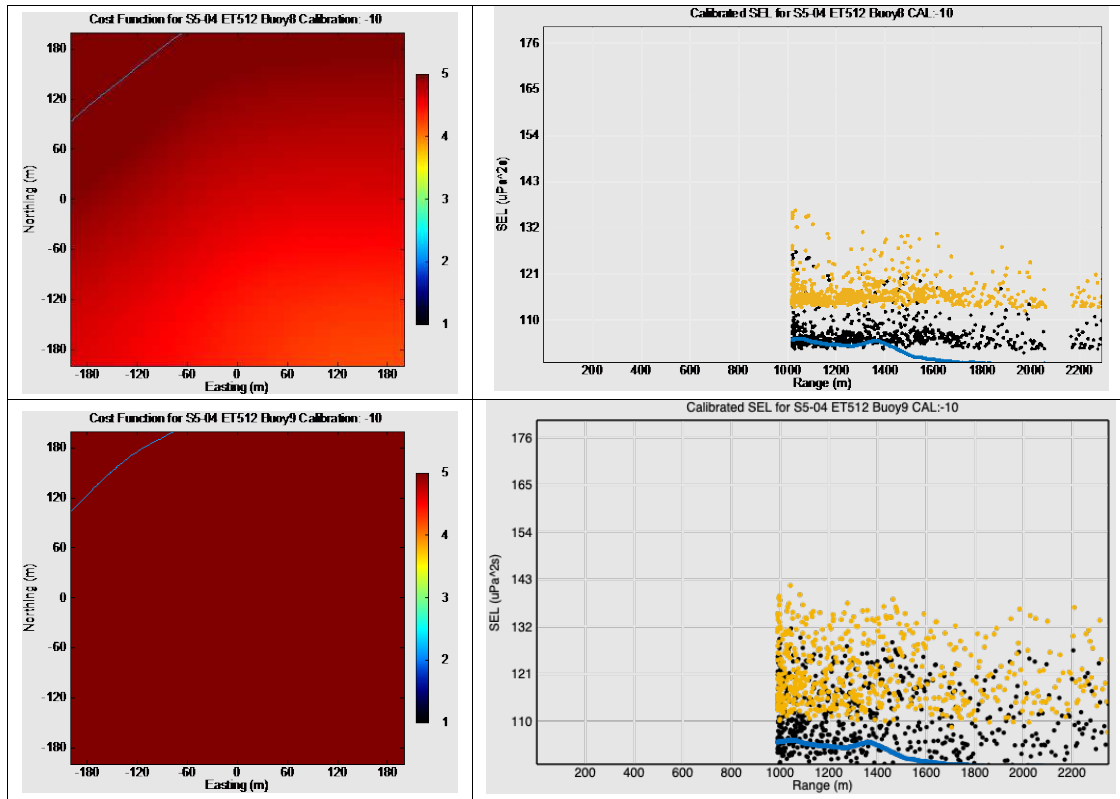


Figure A.2-5. Cost functions of buoy locations and SEL comparisons for ET512, Mode 21, at Site 5, Deployment 1, Run 4.

Left: Cost functions for the buoy locations (top: Buoy 8; bottom: Buoy 9). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.6 Site 2, Deployment 2

SBP424, Mode 19, Run 34, Buoys 5 and 11. Buoy 9 had bad data (*Figure A.2-6*).

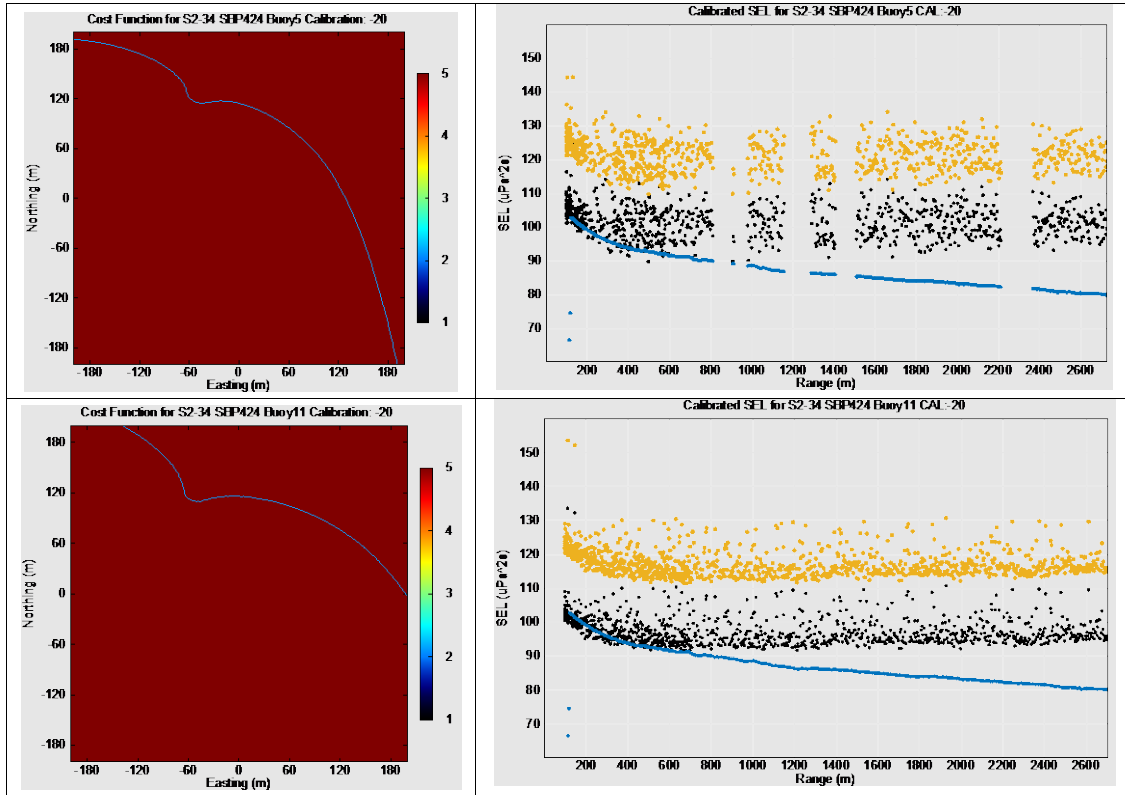


Figure A.2-6. Cost functions of buoy locations and SEL comparisons for SBP424, Mode 19, at Site 2, Deployment 2, Run 34.

Left: Cost functions for the buoy locations (top: Buoy 5; bottom: Buoy 11). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.7 Site 3, Deployment 2

SBP424, Mode 17, Run 11, Buoys 5, 6, and 12 (Figure A.2-7).

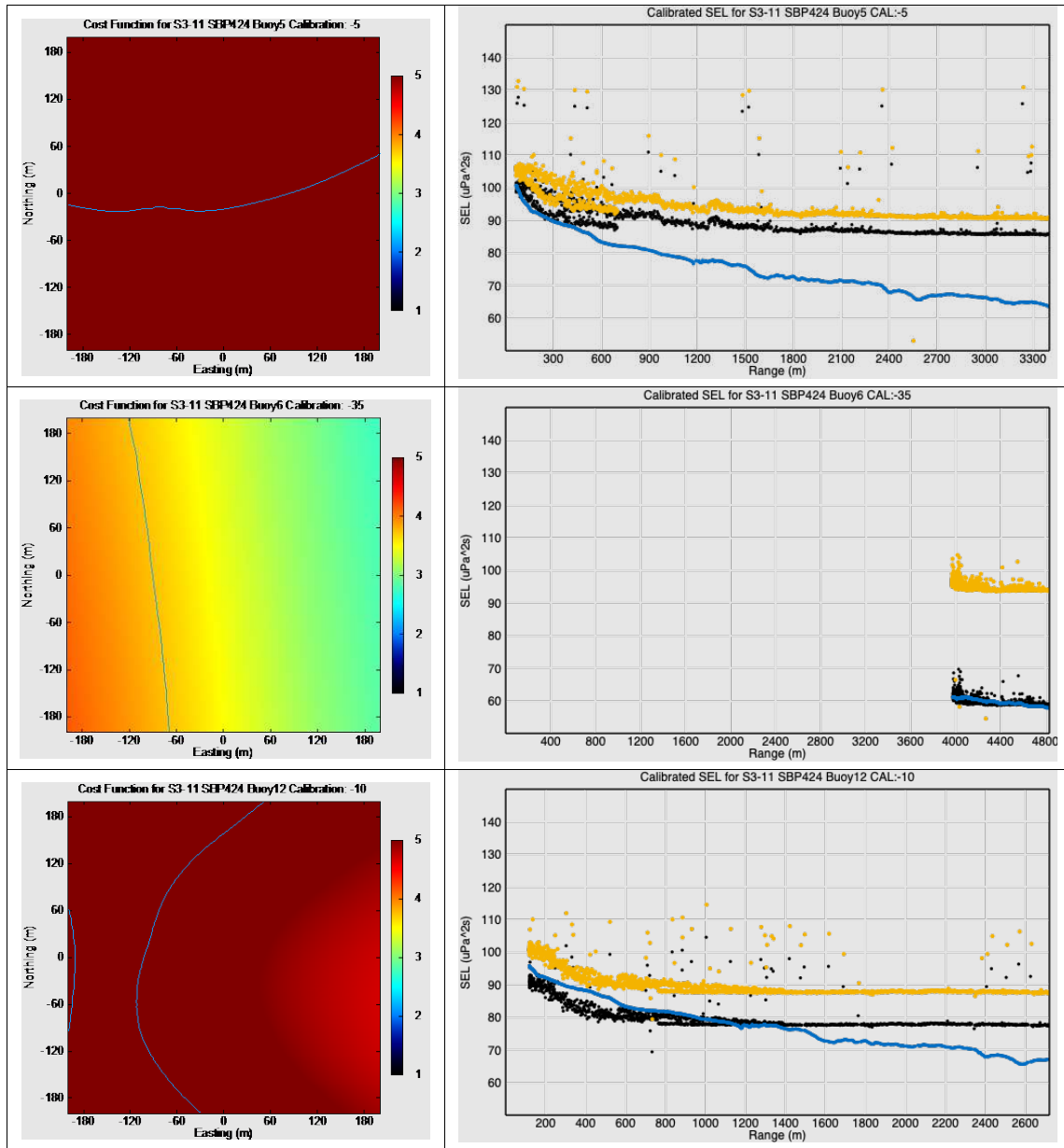


Figure A.2-7. Cost functions of buoy locations and SEL comparisons for SBP424, Mode 17, at Site 3, Deployment 2, Run 11.

Left: Cost functions for the buoy locations (top to bottom: Buoys 5, 6, and 12). Right: Sound exposure level (SEL) versus time of the adjusted data (black) compared to the model (blue) where the closest point of approach is the peak.

A.2.8 Site 4, Deployment 2

SBP424, Mode 16, Runs 10 and 11, Buoy 9 (Figure A.2-8).

Cost functions were not possible to generate with bad navigation data files; therefore, a plot of the percentiles compared with pre-adjusted data are shown for two runs, buoy 9 for run 10 and buoy 9, hydrophone 2 for run 11. Without cost functions, adjustment factors cannot be calculated or applied with the position optimization; thus, an adjusted plot is not available. Any adjustment factors are only able to be determined by visual comparison between the percentiles and the plotted pre-adjusted data.

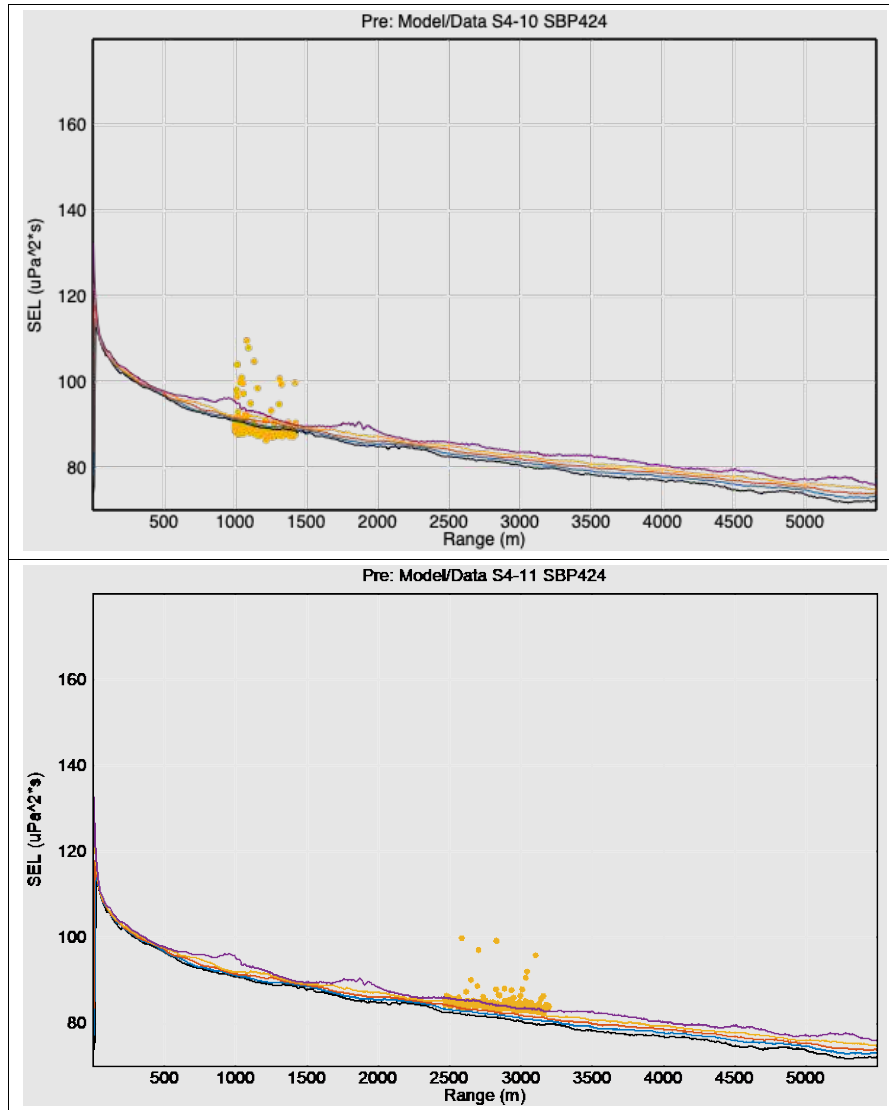


Figure A.2-8. Modeled (lines) versus measured (dots) data for SBP424, Mode 16, at Site 4, Deployment 2, Runs 10 and 11.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for Buoy 9 during run 10 (top) and Buoy 9, hydrophone 2 during run 11 (bottom).

A.2.9 Site 5, Deployment 2

ET512, Mode 20, Run 19, Buoys 6, 8, 9, 10, 11, and 12 (Figure A.2-9).

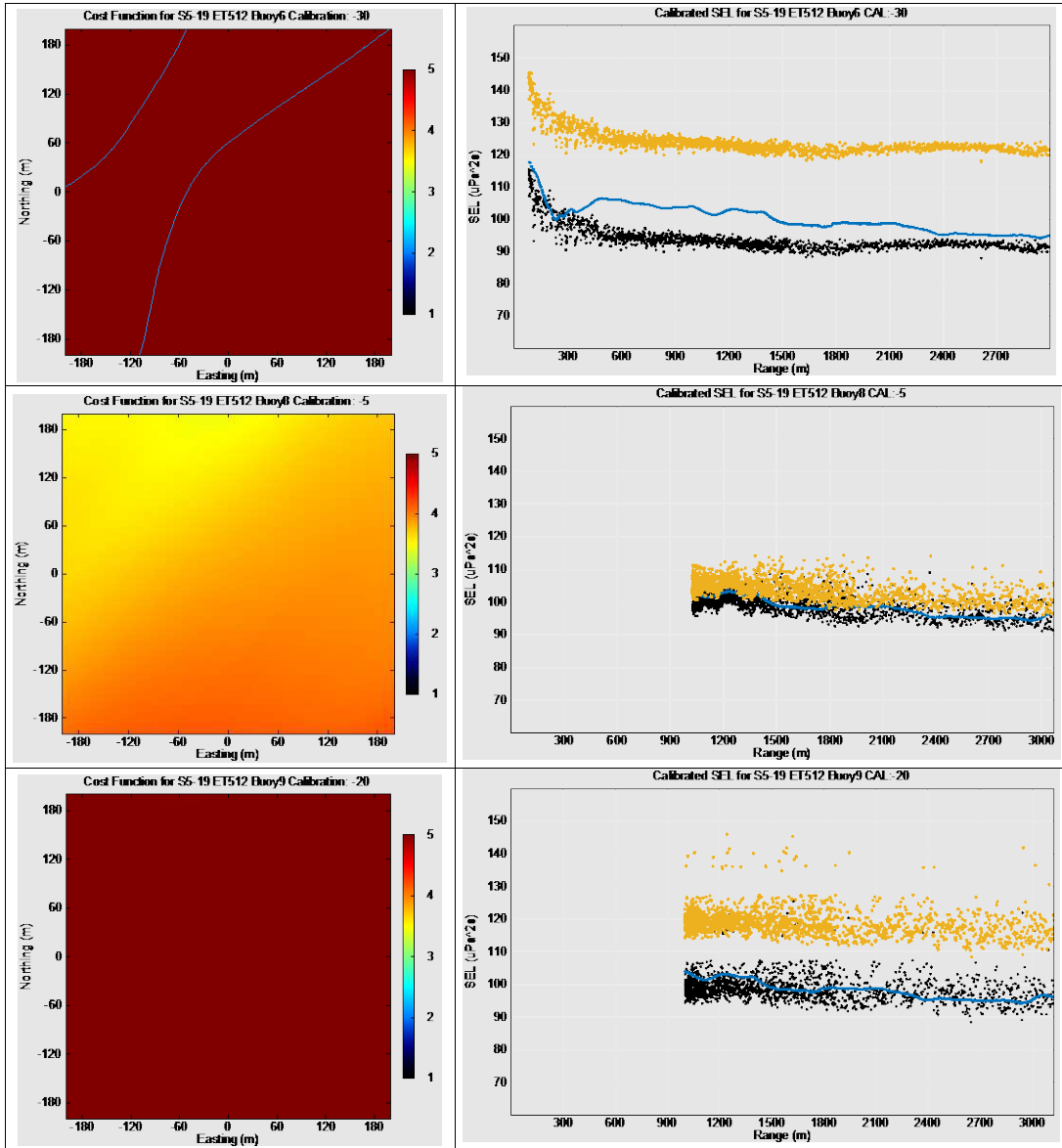


Figure A.2-9. Cost functions of buoy locations and SEL comparisons for ET512, Mode 20, at Site 5, Deployment 2, Run 19.

Left: Cost functions for the buoy locations (top to bottom: Buoys 6, 8, 9, 10, 11, and 12). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

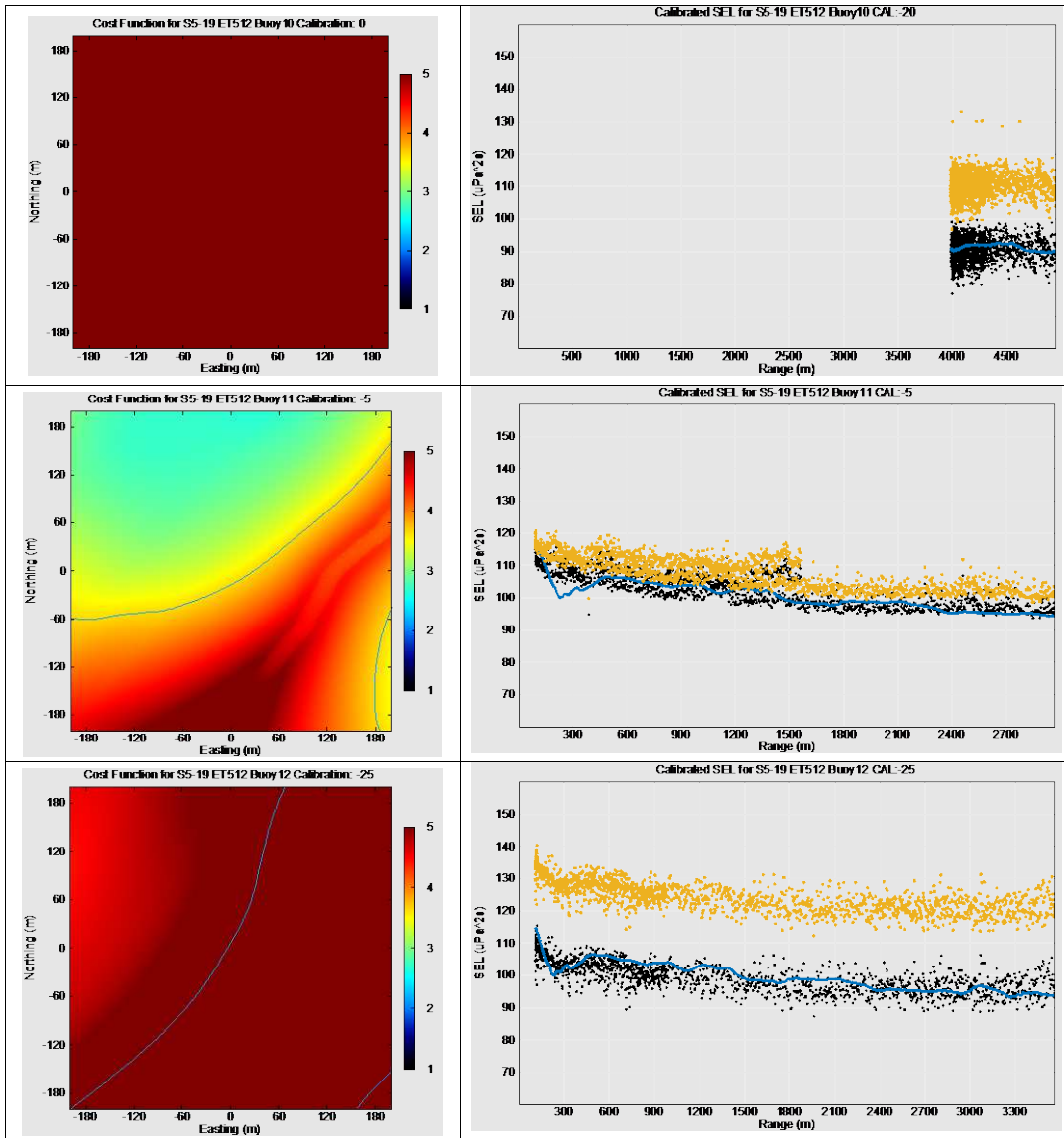


Figure A.2-10 (Continued). Cost functions of buoy locations and SEL comparisons for ET512, Mode 20, at Site 5, Deployment 2, Run 19.

Left: Cost functions for the buoy locations (top to bottom: Buoys 6, 8, 9, 10, 11, and 12). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.10 Site 3, Deployment 3

SBP424, Mode 18, Run 31, Buoys 6, 11, and 12. Buoys 8, 9, and 10 had bad data (Figure A.2-10).

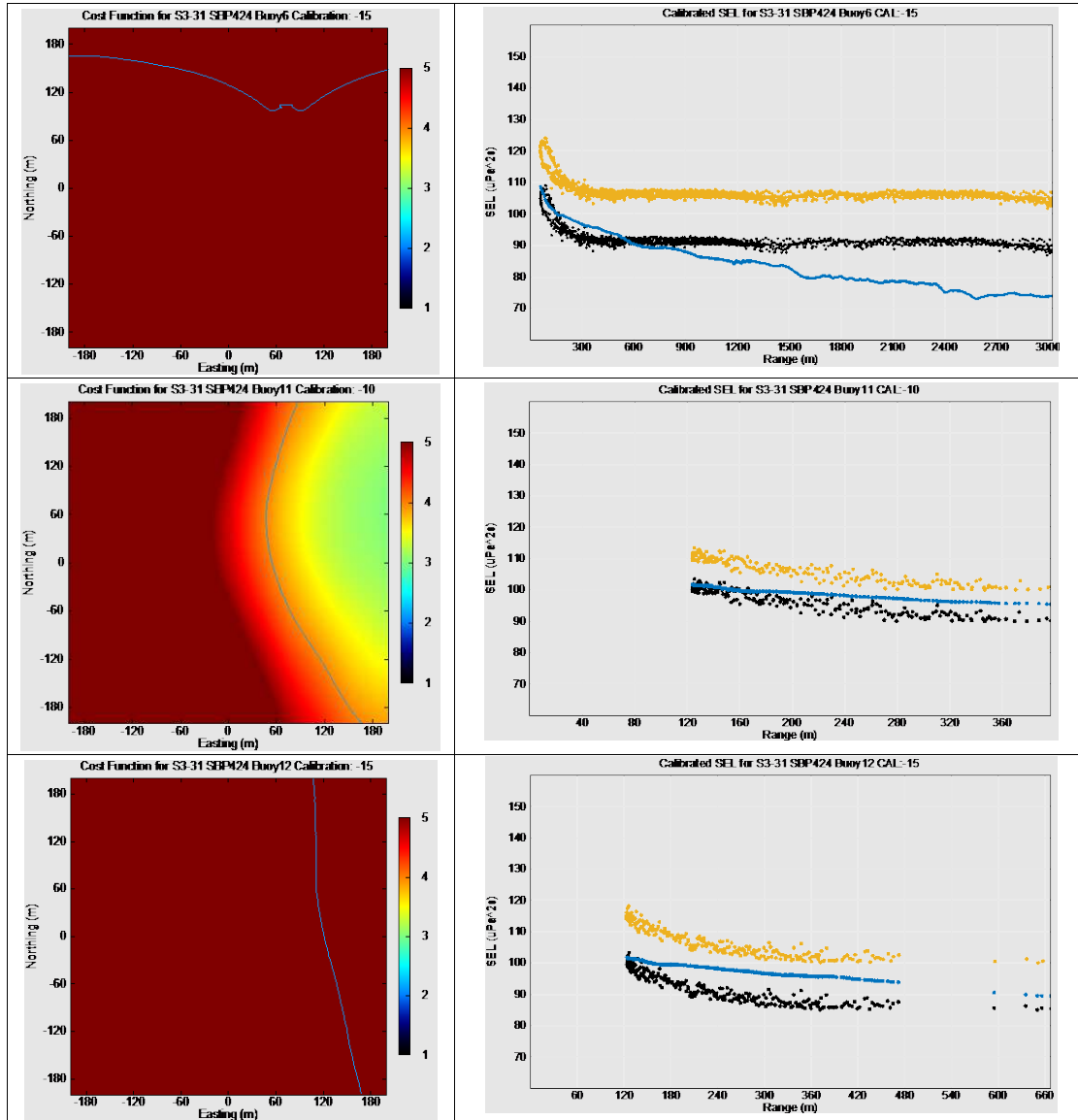


Figure A.2-11. SEL comparisons for SBP424, Mode 18, at Site 3, Deployment 3, Run 31.

Left: Cost functions for the buoy locations (top to bottom: Buoys 6, 11, and 12). Right: Sound exposure level (SEL) versus range compared to the model (blue), pre-adjusted data (yellow), and adjusted data (black).

A.2.11 Site 4, Deployment 3

SBP424, Mode 19, Run 27, Buoys 5 and 12. Buoy 7 had bad data (**Figure 2.2.-11**).

Cost functions were not possible to generate with bad navigation data files at Site 4 during deployment 3; therefore, plots comparing percentiles and pre-adjusted data are shown. Buoy 7 data were bad. Data from Buoys 5 and 12 at the closest point of approach were shifted by -20 dB relative to the percentile range. Because no GPS data were available, position optimization could not be performed.

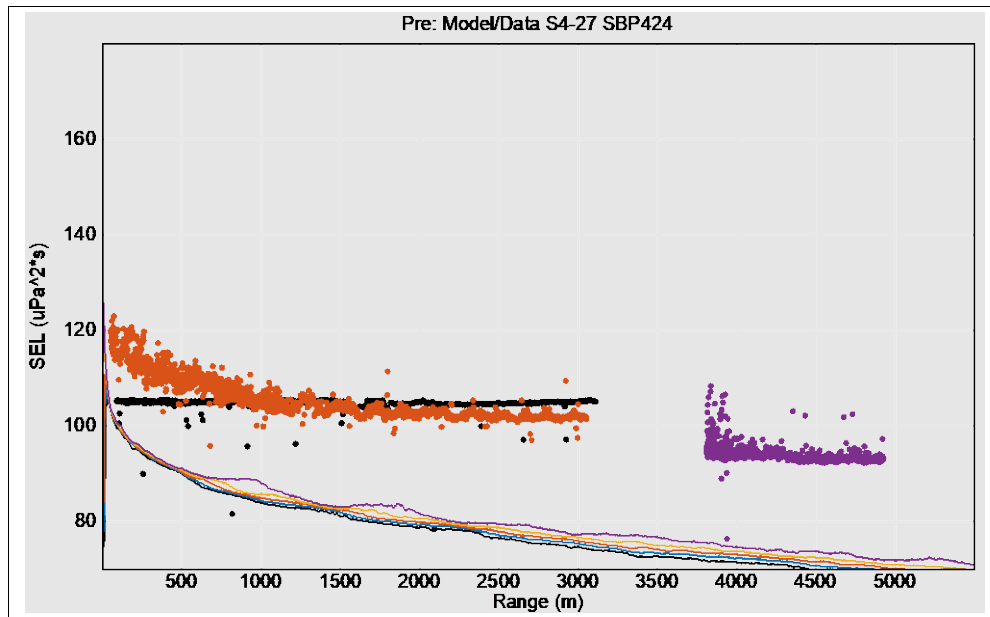


Figure A.2-12. Modeled (lines) versus measured (dots) data for SBP424, Mode 19, at Site 4, Deployment 3, Run 27.

The five percentile lines of the modeled sound exposure level (SEL) illustrate the potential environmental error (95th, purple; 75th, yellow; 50th, red; 25th, blue; 5th, black). The dots are measured SEL versus range for Buoys 5 (red), 12 (purple), and 7 (black; bad data).

A.2.12 Site 5, Deployment 3

No mid-frequency source occurred during Deployment 3 at Site 5.

A.2.13 Mid-Frequency Results Table

Table A-2.1. Adjustment factors for all mid-frequency sources.

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position												C				
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1		Buoy#	E2	Buoy#	F1
ET424 3100P	16	1	1	3	MF	0	6	-30 dB	--	--	--	--	--	--	--	5	-10 dB	8	-20 dB	9	bad	--	--
ET424 3100P	16	1	1	3	MF	0	6	200 S	--	--	--	--	--	--	--	5	140 S	8	200 N	9	bad	--	--
ET424 3100P	16	1	1	3	MF	0	6	200 E	--	--	--	--	--	--	--	5	200 W	8	200 W	9	bad	--	--
ET424 3100P	16	1	1	3	MF	0	6	>400 m	--	--	--	--	--	--	--	5	>400 m	8	>200 m	9	bad	--	--
ET424 3100P	16	1	1	3	MF	0	6	7.79 dB RMSE	--	--	--	--	--	--	--	5	6.3 dB RMSE	8	4.21 dB RMSE	9	bad	--	--
ET3200XS	18	1	1	4	MF	0	6	-40 dB	--	--	--	--	--	--	--	5	5 dB	8	bad	9	bad	--	--
ET3200XS	18	1	1	4	MF	0	6	200 S	--	--	--	--	--	--	--	5	56 N	8	bad	9	bad	--	--
ET3200XS	18	1	1	4	MF	0	6	200 E	--	--	--	--	--	--	--	5	200 W	8	bad	9	bad	--	--
ET3200XS	18	1	1	4	MF	0	6	>400 m	--	--	--	--	--	--	--	5	>380 m	8	bad	9	bad	--	--
ET3200XS	18	1	1	4	MF	0	6	25.02 dB RMSE	--	--	--	--	--	--	--	5	2.19 dB RMSE	8	bad	9	bad	--	--
ET3200XS	19	1	1	5	MF	0	6	-40 dB	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET3200XS	19	1	1	5	MF	0	6	200 S	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET3200XS	19	1	1	5	MF	0	6	200 E	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET3200XS	19	1	1	5	MF	0	6	>400 m	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET3200XS	19	1	1	5	MF	0	6	19.21 dB RMSE	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET512i	20	1	1	1	MF	0	6	0 dB	--	--	--	--	--	--	--	5	0 dB	8	0 dB	9	bad	--	--
ET512i	20	1	1	1	MF	0	6	176 S	--	--	--	--	--	--	--	5	200 N	8	200 N	9	bad	--	--
ET512i	20	1	1	1	MF	0	6	200 W	--	--	--	--	--	--	--	5	200 E	8	200 E	9	bad	--	--
ET512i	20	1	1	1	MF	0	6	>400 m	--	--	--	--	--	--	--	5	>400 m	8	>400 m	9	bad	--	--
ET512i	20	1	1	1	MF	0	6	8.47 dB RMSE	--	--	--	--	--	--	--	5	7.28 dB RMSE	8	5.25 dB RMSE	9	bad	--	--
ET512i	21	1	1	2	MF	0	6	-30 dB	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET512i	21	1	1	2	MF	0	6	200 S	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET512i	21	1	1	2	MF	0	6	200 E	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET512i	21	1	1	2	MF	0	6	>400 m	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
ET512i	21	1	1	2	MF	0	6	33.16 dB RMSE	--	--	--	--	--	--	--	5	bad	8	bad	9	bad	--	--
Knudsen3260	23	1	1	1	MF	0	6	10 dB	--	--	--	--	--	--	--	5	20 dB	8	20 dB	9	0 dB	--	--
Knudsen3260	23	1	1	1	MF	0	6	200 S	--	--	--	--	--	--	--	5	200 N	8	200 N	9	18 N	--	--
Knudsen3260	23	1	1	1	MF	0	6	119 E	--	--	--	--	--	--	--	5	200 E	8	200 E	9	200 W	--	--
Knudsen3260	23	1	1	1	MF	0	6	>400 m	--	--	--	--	--	--	--	5	>240 m	8	>180 m	9	>400 m	--	--
Knudsen3260	23	1	1	1	MF	0	6	6.41 dB RMSE	--	--	--	--	--	--	--	5	4.49 dB RMSE	8	3.67 dB RMSE	9	11.16 dB RMSE	--	--
Knudsen3260	24	1	1	2	MF	0	6	5 dB	--	--	--	--	--	--	--	5	20 dB	8	20 dB	9	0 dB	--	--
Knudsen3260	24	1	1	2	MF	0	6	200 S	--	--	--	--	--	--	--	5	200 N	8	200 N	9	200 S	--	--
Knudsen3260	24	1	1	2	MF	0	6	194 E	--	--	--	--	--	--	--	5	150 W	8	90 W	9	168 E	--	--
Knudsen3260	24	1	1	2	MF	0	6	>400 m	--	--	--	--	--	--	--	5	>400 m	8	>400 m	9	>400 m	--	--
Knudsen3260	24	1	1	2	MF	0	6	21.72 dB RMSE	--	--	--	--	--	--	--	5	11.09 dB RMSE	8	12.5 dB RMSE	9	7.53 dB RMSE	--	--
ET424 3100P	16	2	1	4	MF	0	6	-10 dB	--	--	--	--	11	-10 dB	--	--	--	--	--	--	--	--	--
ET424 3100P	16	2	1	4	MF	0	6	192 S	--	--	--	--	11	4 S	--	--	--	--	--	--	--	--	--
ET424 3100P	16	2	1	4	MF	0	6	200 W	--	--	--	--	11	200 E	--	--	--	--	--	--	--	--	--
ET424 3100P	16	2	1	4	MF	0	6	>400 m	--	--	--	--	11	>220 m	--	--	--	--	--	--	--	--	--

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
ET424 3100P	16	2	1	4	MF	0	6	13.83 dB RMSE	--	--	--	--	11	2.57 dB RMSE	--	--	--	--	--	--	--	--	--	--
ET424 3100P	17	2	1	5	MF	0	6	-5 dB	--	--	--	--	11	5 dB	--	--	--	--	--	--	--	--	--	--
ET424 3100P	17	2	1	5	MF	0	6	200 S	--	--	--	--	11	200 S	--	--	--	--	--	--	--	--	--	--
ET424 3100P	17	2	1	5	MF	0	6	200 W	--	--	--	--	11	96 W	--	--	--	--	--	--	--	--	--	--
ET424 3100P	17	2	1	5	MF	0	6	>400 m	--	--	--	--	11	>400 m	--	--	--	--	--	--	--	--	--	--
ET424 3100P	17	2	1	5	MF	0	6	15.25 dB RMSE	--	--	--	--	11	8.82 dB RMSE	--	--	--	--	--	--	--	--	--	--
ET3200XS	18	2	1	6	MF	0	6	-20 dB	--	--	--	--	11	-20 dB	--	--	--	--	--	--	--	--	--	--
ET3200XS	18	2	1	6	MF	0	6	8 S	--	--	--	--	11	86 N	--	--	--	--	--	--	--	--	--	--
ET3200XS	18	2	1	6	MF	0	6	36 E	--	--	--	--	11	200 E	--	--	--	--	--	--	--	--	--	--
ET3200XS	18	2	1	6	MF	0	6	>400 m	--	--	--	--	11	>400 m	--	--	--	--	--	--	--	--	--	--
ET3200XS	18	2	1	6	MF	0	6	7.23 dB RMSE	--	--	--	--	11	4.92 dB RMSE	--	--	--	--	--	--	--	--	--	--
ET3200XS	19	2	1	7	MF	0	6	-30 dB	--	--	--	--	11	-20 dB	--	--	--	--	--	--	--	--	--	--
ET3200XS	19	2	1	7	MF	0	6	200 S	--	--	--	--	11	200 S	--	--	--	--	--	--	--	--	--	--
ET3200XS	19	2	1	7	MF	0	6	200 W	--	--	--	--	11	14 W	--	--	--	--	--	--	--	--	--	--
ET3200XS	19	2	1	7	MF	0	6	>400 m	--	--	--	--	11	>400 m	--	--	--	--	--	--	--	--	--	--
ET3200XS	19	2	1	7	MF	0	6	13.88 dB RMSE	--	--	--	--	11	7.66 dB RMSE	--	--	--	--	--	--	--	--	--	--
ET512i	20	2	1	1	MF	0	6	bad	--	--	--	--	11	0 dB	--	--	--	--	--	--	9	bad	--	--
ET512i	20	2	1	1	MF	0	6	bad	--	--	--	--	11	74 S	--	--	--	--	--	--	9	bad	--	--
ET512i	20	2	1	1	MF	0	6	bad	--	--	--	--	11	200 E	--	--	--	--	--	--	9	bad	--	--
ET512i	20	2	1	1	MF	0	6	bad	--	--	--	--	11	>400 m	--	--	--	--	--	--	9	bad	--	--
ET512i	20	2	1	1	MF	0	6	bad	--	--	--	--	11	5.84 dB RMSE	--	--	--	--	--	--	9	bad	--	--
ET512i	21	2	1	2	MF	0	6	0 dB	--	--	--	--	11	0 dB	--	--	--	--	--	--	--	--	--	--
ET512i	21	2	1	2	MF	0	6	10 N	--	--	--	--	11	158 N	--	--	--	--	--	--	--	--	--	--
ET512i	21	2	1	2	MF	0	6	24 E	--	--	--	--	11	148 E	--	--	--	--	--	--	--	--	--	--
ET512i	21	2	1	2	MF	0	6	>100 m	--	--	--	--	11	>400 m	--	--	--	--	--	--	--	--	--	--
ET512i	21	2	1	2	MF	0	6	3.97 dB RMSE	--	--	--	--	11	5.81 dB RMSE	--	--	--	--	--	--	--	--	--	--
ET512i	22	2	1	3	MF	0	6	-5 dB	--	--	--	--	11	-5 dB	--	--	--	--	--	--	9	bad	--	--
ET512i	22	2	1	3	MF	0	6	2 N	--	--	--	--	11	162 S	--	--	--	--	--	--	9	bad	--	--
ET512i	22	2	1	3	MF	0	6	18 E	--	--	--	--	11	10 E	--	--	--	--	--	--	9	bad	--	--
ET512i	22	2	1	3	MF	0	6	>400 m	--	--	--	--	11	>200 m	--	--	--	--	--	--	9	bad	--	--
ET512i	22	2	1	3	MF	0	6	9.31 dB RMSE	--	--	--	--	11	3.39 dB RMSE	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	23	2	1	1	MF	0	6	5 dB	--	--	--	--	11	10 dB	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	23	2	1	1	MF	0	6	134 N	--	--	--	--	11	110 S	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	23	2	1	1	MF	0	6	146 W	--	--	--	--	11	200 E	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	23	2	1	1	MF	0	6	>400 m	--	--	--	--	11	>400 m	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	23	2	1	1	MF	0	6	6.04 dB RMSE	--	--	--	--	11	6.44 dB RMSE	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	24	2	1	2	MF	0	6	10 dB	--	--	--	--	11	20 dB	--	--	--	--	--	--	--	--	--	--
Knudsen3260	24	2	1	2	MF	0	6	200 N	--	--	--	--	11	52 N	--	--	--	--	--	--	--	--	--	--
Knudsen3260	24	2	1	2	MF	0	6	194 W	--	--	--	--	11	200 E	--	--	--	--	--	--	--	--	--	--
Knudsen3260	24	2	1	2	MF	0	6	>400 m	--	--	--	--	11	>400 m	--	--	--	--	--	--	--	--	--	--

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
Knudsen3260	24	2	1	2	MF	0	6	10.38 dB RMSE	--	--	--	--	11	7.68 dB RMSE	--	--	--	--	--	--	--	--	--	--
Knudsen3260	25	2	1	3	MF	0	6	5 dB	--	--	--	--	11	bad	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	25	2	1	3	MF	0	6	188 N	--	--	--	--	11	bad	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	25	2	1	3	MF	0	6	200 W	--	--	--	--	11	bad	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	25	2	1	3	MF	0	6	>400 m	--	--	--	--	11	bad	--	--	--	--	--	--	9	bad	--	--
Knudsen3260	25	2	1	3	MF	0	6	8.11 dB RMSE	--	--	--	--	11	bad	--	--	--	--	--	--	9	bad	--	--
ET512i	20	3	1	1	MF	0	--	--	--	--	--	--	5	-15 dB	12	-15 dB	7	bad	--	--	--	--	--	--
ET512i	20	3	1	1	MF	0	--	--	--	--	--	--	5	52 S	12	28 S	7	bad	--	--	--	--	--	--
ET512i	20	3	1	1	MF	0	--	--	--	--	--	--	5	150 E	12	200 E	7	bad	--	--	--	--	--	--
ET512i	20	3	1	1	MF	0	--	--	--	--	--	--	5	>400 m	12	>260 m	7	bad	--	--	--	--	--	--
ET512i	20	3	1	1	MF	0	--	--	--	--	--	--	5	5.06 dB RMSE	12	3.94 dB RMSE	7	bad	--	--	--	--	--	--
ET512i	21	3	1	2	MF	0	--	--	--	--	--	--	5	-15 dB	12	-15 dB	7	bad	--	--	--	--	--	--
ET512i	21	3	1	2	MF	0	--	--	--	--	--	--	5	198 N	12	200 N	7	bad	--	--	--	--	--	--
ET512i	21	3	1	2	MF	0	--	--	--	--	--	--	5	200 E	12	200 E	7	bad	--	--	--	--	--	--
ET512i	21	3	1	2	MF	0	--	--	--	--	--	--	5	>400 m	12	>400 m	7	bad	--	--	--	--	--	--
ET512i	21	3	1	2	MF	0	--	--	--	--	--	--	5	10.07 dB RMSE	12	9.23 dB RMSE	7	bad	--	--	--	--	--	--
ET512i	22	3	1	1	MF	0	--	--	--	--	--	--	5	-15 dB	12	-15 dB	7	bad	--	--	--	--	--	--
ET512i	22	3	1	1	MF	0	--	--	--	--	--	--	5	58 N	12	42 S	7	bad	--	--	--	--	--	--
ET512i	22	3	1	1	MF	0	--	--	--	--	--	--	5	200 E	12	200 E	7	bad	--	--	--	--	--	--
ET512i	22	3	1	1	MF	0	--	--	--	--	--	--	5	>400 m	12	>400 m	7	bad	--	--	--	--	--	--
ET512i	22	3	1	1	MF	0	--	--	--	--	--	--	5	7.96 dB RMSE	12	4.95 dB RMSE	7	bad	--	--	--	--	--	--
Knudsen3260	23	3	1	6	MF	0	--	--	--	--	--	--	5	0 dB	12	0 dB	7	bad	--	--	--	--	--	--
Knudsen3260	23	3	1	6	MF	0	--	--	--	--	--	--	5	154 N	12	194 N	7	bad	--	--	--	--	--	--
Knudsen3260	23	3	1	6	MF	0	--	--	--	--	--	--	5	200 E	12	200 E	7	bad	--	--	--	--	--	--
Knudsen3260	23	3	1	6	MF	0	--	--	--	--	--	--	5	>400 m	12	>400 m	7	bad	--	--	--	--	--	--
Knudsen3260	23	3	1	6	MF	0	--	--	--	--	--	--	5	13.02 dB RMSE	12	11.67 dB RMSE	7	bad	--	--	--	--	--	--
Knudsen3260	25	3	1	7	MF	0	8	bad	--	--	--	--	5	0 dB	12	0 dB	7	bad	--	--	--	--	--	--
Knudsen3260	25	3	1	7	MF	0	8	bad	--	--	--	--	5	172 N	12	198 N	7	bad	--	--	--	--	--	--
Knudsen3260	25	3	1	7	MF	0	8	bad	--	--	--	--	5	200 E	12	200 E	7	bad	--	--	--	--	--	--
Knudsen3260	25	3	1	7	MF	0	8	bad	--	--	--	--	5	>400 m	12	>400 m	7	bad	--	--	--	--	--	--
Knudsen3260	25	3	1	7	MF	0	8	bad	--	--	--	--	5	13.02 dB RMSE	12	16.32 dB RMSE	7	bad	--	--	--	--	--	--
ET512i	20	4	1	1	MF	0	8_Hyd2	bad	6_Hyd1	-20 dB	--	--	7_Hyd1	-20 dB	7_Hyd2	-20 dB	9_Hyd2	0 dB	--	--	11	-10 dB	5_hyd2	-15 dB
ET512i	20	4	1	1	MF	0	8_Hyd2	bad	6_Hyd1	58 N	--	--	7_Hyd1	32 N	7_Hyd2	148 S	9_Hyd2	194 N	--	--	11	200 S	5_hyd2	58 N
ET512i	20	4	1	1	MF	0	8_Hyd2	bad	6_Hyd1	200 E	--	--	7_Hyd1	42 E	7_Hyd2	142 E	9_Hyd2	196 E	--	--	11	200 E	5_hyd2	200 E
ET512i	20	4	1	1	MF	0	8_Hyd2	bad	6_Hyd1	>400 m	--	--	7_Hyd1	>400 m	7_Hyd2	>400 m	9_Hyd2	>400 m	--	--	11	>400 m	5_hyd2	>400 m
ET512i	20	4	1	1	MF	0	8_Hyd2	bad	6_Hyd1	6.21 dB RMSE	--	--	7_Hyd1	4.97 dB RMSE	7_Hyd2	5.56 dB RMSE	9_Hyd2	2.3 dB RMSE	--	--	11	4.05 dB RMSE	5_hyd2	6.21 dB RMSE
ET512i	21	4	1	2	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	-15 dB	7_Hyd2	-15 dB	9_Hyd2	5 dB	--	--	11	0 dB	5_hyd2	-10 dB
ET512i	21	4	1	2	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	82 S	7_Hyd2	160 S	9_Hyd2	200 S	--	--	11	200 S	5_hyd2	56 N
ET512i	21	4	1	2	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	26 E	7_Hyd2	200 E	9_Hyd2	200 E	--	--	11	200 E	5_hyd2	200 E
ET512i	21	4	1	2	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	>400 m	7_Hyd2	>400 m	9_Hyd2	>400 m	--	--	11	>400 m	5_hyd2	>400 m
ET512i	21	4	1	2	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	6.36 dB RMSE	7_Hyd2	6.25 dB RMSE	9_Hyd2	2.64 dB RMSE	--	--	11	2.39 dB RMSE	5_hyd2	5.82 dB RMSE
ET512i	22	4	1	3	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	-20 dB	7_Hyd2	-20 dB	9_Hyd2	0 dB	--	--	11	-5 dB	5_hyd2	-15 dB
ET512i	22	4	1	3	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	84 S	7_Hyd2	194 S	9_Hyd2	184 N	--	--	11	56 S	5_hyd2	2 S

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
ET512i	22	4	1	3	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	114 E	7_Hyd2	200 E	9_Hyd2	90 W	--	--	11	200 W	5_hyd2	200 E
ET512i	22	4	1	3	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	>400 m	7_Hyd2	>260 m	9_Hyd2	>400 m	--	--	11	>400 m	5_hyd2	>400 m
ET512i	22	4	1	3	MF	0	8_Hyd2	bad	--	--	--	--	7_Hyd1	5.18 dB RMSE	7_Hyd2	3.53 dB RMSE	9_Hyd2	4.51 dB RMSE	--	--	11	4.41 dB RMSE	5_hyd2	4.51 dB RMSE
Knudsen3260	23	4	1	6	MF	0	8	30 dB	6	bad	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
Knudsen3260	23	4	1	6	MF	0	8	200 N	6	bad	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
Knudsen3260	23	4	1	6	MF	0	8	200 W	6	bad	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
Knudsen3260	23	4	1	6	MF	0	8	>400 m	6	bad	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
Knudsen3260	23	4	1	6	MF	0	8	15.69 dB RMSE	6	bad	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET512i	20	5	1	3	MF	0	6	-40 dB	12	-20 dB	--	--	5	-30 dB	--	--	8	-20 dB	9	-30 dB	10	-15 dB	--	--
ET512i	20	5	1	3	MF	0	6	102 S	12	30 S	--	--	5	200 S	--	--	8	200 N	9	200 S	10	200 S	--	--
ET512i	20	5	1	3	MF	0	6	200 E	12	70 W	--	--	5	200 W	--	--	8	4 E	9	46 E	10	200 W	--	--
ET512i	20	5	1	3	MF	0	6	>230 m	12	>120 m	--	--	5	>400 m	--	--	8	>400 m	9	>400 m	10	>400 m	--	--
ET512i	20	5	1	3	MF	0	6	3.64 dB RMSE	12	3.19 dB RMSE	--	--	5	19.53 dB RMSE	--	--	8	5.29 dB RMSE	9	25.55 dB RMSE	10	37.76 dB RMSE	--	--
ET512i	21	5	1	4	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	-10 dB	9	-10 dB	--	--	--	--
ET512i	21	5	1	4	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	200 S	9	200 S	--	--	--	--
ET512i	21	5	1	4	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	200 E	9	200 E	--	--	--	--
ET512i	21	5	1	4	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	>320 m	9	>400 m	--	--	--	--
ET512i	21	5	1	4	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	4.21 dB RMSE	9	16.86 dB RMSE	--	--	--	--
ET512i	22	5	1	5	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	-20 dB	--	--	--	--	--	--
ET512i	22	5	1	5	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	200 N	--	--	--	--	--	--
ET512i	22	5	1	5	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	114 W	--	--	--	--	--	--
ET512i	22	5	1	5	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	>400 m	--	--	--	--	--	--
ET512i	22	5	1	5	MF	0	6	bad	12	bad	--	--	--	--	--	--	8	4.04 dB RMSE	--	--	--	--	--	--
Knudsen3260	23	5	1	10	MF	0	6	-20 dB	12	-5 dB	--	--	5	bad	11	bad	8	10 dB	9	10 dB	10	5 dB	--	--
Knudsen3260	23	5	1	10	MF	0	6	198 S	12	200 N	--	--	5	bad	11	bad	8	200 N	9	200 N	10	196 S	--	--
Knudsen3260	23	5	1	10	MF	0	6	200 E	12	200 W	--	--	5	bad	11	bad	8	200 W	9	200 W	10	200 E	--	--
Knudsen3260	23	5	1	10	MF	0	6	>400 m	12	>400 m	--	--	5	bad	11	bad	8	>400 m	9	>400 m	10	>400 m	--	--
Knudsen3260	23	5	1	10	MF	0	6	11.2 dB RMSE	12	15.56 dB RMSE	--	--	5	bad	11	bad	8	6.63 dB RMSE	9	7.84 dB RMSE	10	3.94 dB RMSE	--	--
Knudsen3260	23	5	1	11	MF	0	6	-10 dB	12	-10 dB	--	--	5	bad	11	bad	8	10 dB	9	10 dB	10	-10 dB	--	--
Knudsen3260	23	5	1	11	MF	0	6	198 S	12	198 S	--	--	5	bad	11	bad	8	200 N	9	154N	10	200 N	--	--
Knudsen3260	23	5	1	11	MF	0	6	200 E	12	200 E	--	--	5	bad	11	bad	8	200 W	9	200 W	10	200 W	--	--
Knudsen3260	23	5	1	11	MF	0	6	>400 m	12	>400 m	--	--	5	bad	11	bad	8	>400 m	9	>400 m	10	>400 m	--	--
Knudsen3260	23	5	1	11	MF	0	6	9.11 dB RMSE	12	19.24 dB RMSE	--	--	5	bad	11	bad	8	3.49 dB RMSE	9	7.66 dB RMSE	10	8.78 dB RMSE	--	--
ET424 3100P	16	2	2	31	MF	0	--	--	--	--	--	--	5	bad	11	bad	10	bad	--	--	9	bad	--	--
ET424 3100P	16	2	2	31	MF	0	--	--	--	--	--	--	5	bad	11	bad	10	bad	--	--	9	bad	--	--
ET424 3100P	16	2	2	31	MF	0	--	--	--	--	--	--	5	bad	11	bad	10	bad	--	--	9	bad	--	--
ET424 3100P	16	2	2	31	MF	0	--	--	--	--	--	--	5	bad	11	bad	10	bad	--	--	9	bad	--	--
ET424 3100P	16	2	2	31	MF	0	--	--	--	--	--	--	5	bad	11	bad	10	bad	--	--	9	bad	--	--
ET424 3100P	17	2	2	32	MF	0	--	--	--	--	--	--	5	0 dB	11	5 dB	10	bad	--	--	9	bad	--	--
ET424 3100P	17	2	2	32	MF	0	--	--	--	--	--	--	5	200 S	11	200 S	10	bad	--	--	9	bad	--	--
ET424 3100P	17	2	2	32	MF	0	--	--	--	--	--	--	5	200 E	11	162 W	10	bad	--	--	9	bad	--	--
ET424 3100P	17	2	2	32	MF	0	--	--	--	--	--	--	5	>400 m	11	>400 m	10	bad	--	--	9	bad	--	--

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
ET424 3100P	17	2	2	32	MF	0	--	--	--	--	--	--	5	6.08 dB RMSE	11	10.84 dB RMSE	10	bad	--	--	9	bad	--	--
ET3200XS	18	2	2	33	MF	0	--	--	--	--	--	--	5	-20 dB	11	-20 dB	10	-30 dB	--	--	9	-35 dB	--	--
ET3200XS	18	2	2	33	MF	0	--	--	--	--	--	--	5	56 S	11	52 S	10	86 N	--	--	9	50 N	--	--
ET3200XS	18	2	2	33	MF	0	--	--	--	--	--	--	5	44 W	11	170 E	10	200 E	--	--	9	18 W	--	--
ET3200XS	18	2	2	33	MF	0	--	--	--	--	--	--	5	>400 m	11	>400 m	10	>400 m	--	--	9	>400 m	--	--
ET3200XS	18	2	2	33	MF	0	--	--	--	--	--	--	5	11.36 dB RMSE	11	5.34 dB RMSE	10	3.33 dB RMSE	--	--	9	2.87 dB RMSE	--	--
ET3200XS	19	2	2	34	MF	0	--	--	--	--	--	--	5	-20 dB	11	-20 dB			--	--	9	bad	--	--
ET3200XS	19	2	2	34	MF	0	--	--	--	--	--	--	5	200 S	11	200 S			--	--	9	bad	--	--
ET3200XS	19	2	2	34	MF	0	--	--	--	--	--	--	5	200 W	11	148 W			--	--	9	bad	--	--
ET3200XS	19	2	2	34	MF	0	--	--	--	--	--	--	5	>400 m	11	>400 m			--	--	9	bad	--	--
ET3200XS	19	2	2	34	MF	0	--	--	--	--	--	--	5	9.29 dB RMSE	11	12.9 dB RMSE			--	--	9	bad	--	--
ET512i	20	2	2	29	MF	0	--	--	--	--	--	--	5	5 dB	11	5 dB	10	10 dB	--	--	9	5 dB	--	--
ET512i	20	2	2	29	MF	0	--	--	--	--	--	--	5	200 S	11	200 S	10	200 S	--	--	9	200 N	--	--
ET512i	20	2	2	29	MF	0	--	--	--	--	--	--	5	178 E	11	200 W	10	200 E	--	--	9	200 W	--	--
ET512i	20	2	2	29	MF	0	--	--	--	--	--	--	5	>400 m	11	>320 m	10	>400 m	--	--	9	>400 m	--	--
ET512i	20	2	2	29	MF	0	--	--	--	--	--	--	5	4.66 dB RMSE	11	3.89 dB RMSE	10	5.75 dB RMSE	--	--	9	5.01 dB RMSE	--	--
ET512i	21	2	2	30	MF	0	--	--	--	--	--	--	5	0 dB	11	5 dB	10	10 dB	--	--	9	-5 dB	--	--
ET512i	21	2	2	30	MF	0	--	--	--	--	--	--	5	60 N	11	22 N	10	200 N	--	--	9	200 N	--	--
ET512i	21	2	2	30	MF	0	--	--	--	--	--	--	5	198 E	11	32 E	10	106 E	--	--	9	200 W	--	--
ET512i	21	2	2	30	MF	0	--	--	--	--	--	--	5	>400 m	11	>200 m	10	>400 m	--	--	9	>400 m	--	--
ET512i	21	2	2	30	MF	0	--	--	--	--	--	--	5	7.61 dB RMSE	11	4.46 dB RMSE	10	2 dB RMSE	--	--	9	4.93 dB RMSE	--	--
Knudsen3260	23	2	2	29	MF	0	--	--	--	--	--	--	5	15 dB	11	15 dB	10	15 dB	--	--	9	15 dB	--	--
Knudsen3261	23	2	2	29	MF	0	--	--	--	--	--	--	5	114 S	11	200 S	10	200 S	--	--	9	200 S	--	--
Knudsen3262	23	2	2	29	MF	0	--	--	--	--	--	--	5	200 W	11	200 W	10	198 E	--	--	9	200 E	--	--
Knudsen3263	23	2	2	29	MF	0	--	--	--	--	--	--	5	>400 m	11	>400 m	10	>400 m	--	--	9	>400 m	--	--
Knudsen3264	23	2	2	29	MF	0	--	--	--	--	--	--	5	4.11 dB RMSE	11	5.67 dB RMSE	10	7.42 dB RMSE	--	--	9	6.8 dB RMSE	--	--
Knudsen3265	24	2	2	30	MF	0	--	--	--	--	--	--	5	20 dB	11	20 dB	10	15 dB	--	--	9	0 dB	--	--
Knudsen3266	24	2	2	30	MF	0	--	--	--	--	--	--	5	18 N	11	38 N	10	198 N	--	--	9	200 S	--	--
Knudsen3267	24	2	2	30	MF	0	--	--	--	--	--	--	5	200 E	11	200 E	10	200 W	--	--	9	200 E	--	--
Knudsen3268	24	2	2	30	MF	0	--	--	--	--	--	--	5	>400 m	11	>400 m	10	>400 m	--	--	9	>400 m	--	--
Knudsen3269	24	2	2	30	MF	0	--	--	--	--	--	--	5	6.39 dB RMSE	11	8.27 dB RMSE	10	14.59 dB RMSE	--	--	9	6.99 dB RMSE	--	--
ET424 3100P	16	3	2	10	MF	0	--	--	5	-15 dB	--	--	--	--	--	--	--	--	--	--	6	-35 dB	--	--
ET424 3100P	16	3	2	10	MF	0	--	--	5	200 N	--	--	--	--	--	--	--	--	--	--	6	200 S	--	--
ET424 3100P	16	3	2	10	MF	0	--	--	5	98 E	--	--	--	--	--	--	--	--	--	--	6	200 W	--	--
ET424 3100P	16	3	2	10	MF	0	--	--	5	>400 m	--	--	--	--	--	--	--	--	--	--	6	>400 m	--	--
ET424 3100P	16	3	2	10	MF	0	--	--	5	10.22 dB RMSE	--	--	--	--	--	--	--	--	--	--	6	6.12 dB RMSE	--	--
ET424 3100P	17	3	2	11	MF	0	--	--	5	-5 dB	--	--	12	-10 dB	--	--	--	--	--	--	6	-35 dB	--	--
ET424 3100P	17	3	2	11	MF	0	--	--	5	200 N	--	--	12	50 S	--	--	--	--	--	--	6	200 N	--	--
ET424 3100P	17	3	2	11	MF	0	--	--	5	20 W	--	--	12	20 E	--	--	--	--	--	--	6	200 E	--	--
ET424 3100P	17	3	2	11	MF	0	--	--	5	>400 m	--	--	12	>360 m	--	--	--	--	--	--	6	>260 m	--	--
ET424 3100P	17	3	2	11	MF	0	--	--	5	11.86 dB RMSE	--	--	12	4.67 dB RMSE	--	--	--	--	--	--	6	2.74 dB RMSE	--	--
ET3200XS	18	3	2	12	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	18	3	2	12	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	18	3	2	12	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
ET3200XS	18	3	2	12	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	18	3	2	12	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	19	3	2	13	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	19	3	2	13	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	19	3	2	13	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	19	3	2	13	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET3200XS	19	3	2	13	MF	0	--	--	5	bad	--	--	12	bad	--	--	--	--	--	--	6	bad	--	--
ET424 3100P	16	4	2	10	MF	0	--	--	6	0 dB	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	10	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	10	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	10	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	11	MF	0	--	--	6	0 dB	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	11	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	11	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	11	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	11	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	16	4	2	11	MF	0	--	--	6	bad nav	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET424 3100P	17	4	2	12	MF	0	--	--	--	--	--	--	--	--	--	--	9	-20 dB	--	--	--	--	--	--
ET424 3100P	17	4	2	12	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET424 3100P	17	4	2	12	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET424 3100P	17	4	2	12	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET424 3100P	17	4	2	12	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET424 3100P	17	4	2	12	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET3200XS	18	4	2	14	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET3200XS	18	4	2	14	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET3200XS	18	4	2	14	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET3200XS	18	4	2	14	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET3200XS	18	4	2	14	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad	--	--	--	--	--	--
ET3200XS	19	4	2	13	MF	0	--	--	--	--	--	--	--	--	--	--	9	-40 dB	--	--	--	--	--	--
ET3200XS	19	4	2	13	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET3200XS	19	4	2	13	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET3200XS	19	4	2	13	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET3200XS	19	4	2	13	MF	0	--	--	--	--	--	--	--	--	--	--	9	bad nav	--	--	--	--	--	--
ET512i	20	5	2	29	MF	0	6	-30 dB	12	-25 dB	--	--	11	-5 dB	--	--	8	-5 dB	9	-20 dB	10	0 dB	--	--
ET512i	20	5	2	29	MF	0	6	200 S	12	104 N	--	--	11	200 N	--	--	8	200 N	9	200 S	10	8 N	--	--
ET512i	20	5	2	29	MF	0	6	200 E	12	200 W	--	--	11	26 E	--	--	8	22 W	9	54 W	10	200 W	--	--
ET512i	20	5	2	29	MF	0	6	>400 m	12	>200 m	--	--	11	>200 m	--	--	8	>400 m	9	>400 m	10	>400 m	--	--
ET512i	20	5	2	29	MF	0	6	9.67 dB RMSE	12	4.45 dB RMSE	--	--	11	2.65 dB RMSE	--	--	8	3.45 dB RMSE	9	4.98 dB RMSE	10	17.53 dB RMSE	--	--
ET424 3100P	16	3	3	30	MF	0	6	bad	12	-10 dB	--	--	11	-5 dB	--	--	8	bad	10	bad	9	-40 dB	--	--
ET424 3100P	16	3	3	30	MF	0	6	bad	12	200 N	--	--	11	30 N	--	--	8	bad	10	bad	9	200 N	--	--
ET424 3100P	16	3	3	30	MF	0	6	bad	12	200 E	--	--	11	122 E	--	--	8	bad	10	bad	9	200 E	--	--
ET424 3100P	16	3	3	30	MF	0	6	bad	12	>400 m	--	--	11	>120 m	--	--	8	bad	10	bad	9	>360 m	--	--
ET424 3100P	16	3	3	30	MF	0	6	bad	12	8.34 dB RMSE	--	--	11	4.69 dB RMSE	--	--	8	bad	10	bad	9	3.38 dB RMSE	--	--
ET3200XS	18	3	3	31	MF	0	6	-15 dB	12	-15 dB	--	--	11	-10 dB	--	--	8	bad	10	bad	9	bad	--	--
ET3200XS	18	3	3	31	MF	0	6	200 S	12	200 N	--	--	11	60 N	--	--	8	bad	10	bad	9	bad	--	--
ET3200XS	18	3	3	31	MF	0	6	200 W	12	200 E	--	--	11	200 E	--	--	8	bad	10	bad	9	bad	--	--
ET3200XS	18	3	3	31	MF	0	6	>400 m	12	>400 m	--	--	11	>150 m	--	--	8	bad	10	bad	9	bad	--	--
ET3200XS	18	3	3	31	MF	0	6	7.08 dB RMSE	12	5.78 dB RMSE	--	--	11	2.99 dB RMSE	--	--	8	bad	10	bad	9	bad	--	--
ET512i	20	3	3	21	MF	0	6	-20 dB	12	-15 dB	--	--	11	-10 dB	--	--	8	0 dB	10	-5 dB	9	0 dB	--	--
ET512i	20	3	3	21	MF	0	6	38 N	12	200 S	--	--	11	200 N	--	--	8	68 N	10	200 N	9	200 S	--	--
ET512i	20	3	3	21	MF	0	6	200 W	12	200 E	--	--	11	200 E	--	--	8	22 E	10	200 E	9	48 E	--	--
ET512i	20	3	3	21	MF	0	6	>400 m	12	>400 m	--	--	11	>400 m	--	--	8	>400 m	10	>260 m	9	>400 m	--	--

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position												C					
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1		Buoy#	E2	Buoy#	F1	Buoy#
ET512i	20	3	3	21	MF	0	6	5.17 dB RMSE	12	7.29 dB RMSE	--	--	11	8.43 dB RMSE	--	--	8	1.64 dB RMSE	10	3.99 dB RMSE	9	2.35 dB RMSE	--	--
ET512i	21	3	3	22	MF	0	6	-15 dB	12	-10 dB	--	--	11	-5 dB	--	--	8	bad	10	5 dB	9	bad	--	--
ET512i	21	3	3	22	MF	0	6	116 S	12	200 S	--	--	11	196 N	--	--	8	bad	10	200 S	9	bad	--	--
ET512i	21	3	3	22	MF	0	6	200 W	12	200 E	--	--	11	200 E	--	--	8	bad	10	200 E	9	bad	--	--
ET512i	21	3	3	22	MF	0	6	>400 m	12	>400 m	--	--	11	>400 m	--	--	8	bad	10	>350 m	9	bad	--	--
ET512i	21	3	3	22	MF	0	6	5.12 dB RMSE	12	10.79 dB RMSE	--	--	11	7.79 dB RMSE	--	--	8	bad	10	1.57 dB RMSE	9	bad	--	--
ET512i	22	3	3	23	MF	0	6	-20 dB	12	-10 dB	--	--	11	-10 dB	--	--	8	bad	10	-5 dB	--	--	--	--
ET512i	22	3	3	23	MF	0	6	200 S	12	200 N	--	--	11	86 N	--	--	8	bad	10	60 N	--	--	--	--
ET512i	22	3	3	23	MF	0	6	14 E	12	92 E	--	--	11	200 E	--	--	8	bad	10	120 W	--	--	--	--
ET512i	22	3	3	23	MF	0	6	>400 m	12	>400 m	--	--	11	>260 m	--	--	8	bad	10	>400 m	--	--	--	--
ET512i	22	3	3	23	MF	0	6	17.07 dB RMSE	12	6.42 dB RMSE	--	--	11	3.43 dB RMSE	--	--	8	bad	10	4.58 dB RMSE	--	--	--	--
Knudsen3260	23	3	3	27	MF	0	6	20 dB	12	20 dB	--	--	11	30 dB	--	--	8	20 dB	10	15 dB	9	-5 dB	--	--
Knudsen3260	23	3	3	27	MF	0	6	200 N	12	200 S	--	--	11	170 S	--	--	8	200 S	10	200 S	9	200 S	--	--
Knudsen3260	23	3	3	27	MF	0	6	200 W	12	200 E	--	--	11	156 E	--	--	8	200 E	10	200 E	9	200 E	--	--
Knudsen3260	23	3	3	27	MF	0	6	>150 m	12	>400 m	--	--	11	>230 m	--	--	8	>400 m	10	>400 m	9	>400 m	--	--
Knudsen3260	23	3	3	27	MF	0	6	3.19 dB RMSE	12	6 dB RMSE	--	--	11	2.74 dB RMSE	--	--	8	12.49 dB RMSE	10	17.9 dB RMSE	9	26.64 dB RMSE	--	--
Knudsen3260	25	3	3	28	MF	0	6	0 dB	12	10 dB	--	--	11	20 dB	--	--	8	15 dB	10	15 dB	9	bad	--	--
Knudsen3260	25	3	3	28	MF	0	6	200 N	12	200 S	--	--	11	200 N	--	--	8	200 N	10	200 S	9	bad	--	--
Knudsen3260	25	3	3	28	MF	0	6	200 W	12	200 E	--	--	11	200 E	--	--	8	200 E	10	200 E	9	bad	--	--
Knudsen3260	25	3	3	28	MF	0	6	>400 m	12	>400 m	--	--	11	>400 m	--	--	8	>400 m	10	>400 m	9	bad	--	--
Knudsen3260	25	3	3	28	MF	0	6	11.66 dB RMSE	12	13.7 dB RMSE	--	--	11	6.94 dB RMSE	--	--	8	14.08 dB RMSE	10	13.7 dB RMSE	9	bad	--	--
ET424 3100P	16	4	3	25	MF	0	--	--	--	--	--	--	12	0 dB	--	--	--	--	--	--	5	-20 dB	--	--
ET424 3100P	16	4	3	25	MF	0	--	--	--	--	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET424 3100P	16	4	3	25	MF	0	--	--	--	--	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET424 3100P	16	4	3	25	MF	0	--	--	--	--	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET424 3100P	16	4	3	25	MF	0	--	--	--	--	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET424 3100P	17	4	3	26	MF	0	--	--	7	bad	--	--	12	-10 dB	--	--	--	--	--	--	5	-20 dB	--	--
ET424 3100P	17	4	3	26	MF	0	--	--	7	bad	--	--	12	198 S	--	--	--	--	--	--	5	188 N	--	--
ET424 3100P	17	4	3	26	MF	0	--	--	7	bad	--	--	12	124 W	--	--	--	--	--	--	5	200 W	--	--
ET424 3100P	17	4	3	26	MF	0	--	--	7	bad	--	--	12	>400 m	--	--	--	--	--	--	5	>400 m	--	--
ET424 3100P	17	4	3	26	MF	0	--	--	7	bad	--	--	12	6.51 dB RMSE	--	--	--	--	--	--	5	8.99 dB RMSE	--	--
ET3200XS	18	4	3	27	MF	0	--	--	7	bad	--	--	12	-20 dB	--	--	--	--	--	--	5	bad	--	--
ET3200XS	18	4	3	27	MF	0	--	--	7	bad	--	--	12	200 S	--	--	--	--	--	--	5	bad	--	--
ET3200XS	18	4	3	27	MF	0	--	--	7	bad	--	--	12	200 W	--	--	--	--	--	--	5	bad	--	--
ET3200XS	18	4	3	27	MF	0	--	--	7	bad	--	--	12	>400 m	--	--	--	--	--	--	5	bad	--	--
ET3200XS	18	4	3	27	MF	0	--	--	7	bad	--	--	12	11.13 dB RMSE	--	--	--	--	--	--	5	bad	--	--
ET3200XS	19	4	3	28	MF	0	--	--	7	bad	--	--	12	-20 dB	--	--	--	--	--	--	5	-20 dB	--	--
ET3200XS	19	4	3	28	MF	0	--	--	7	bad	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET3200XS	19	4	3	28	MF	0	--	--	7	bad	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET3200XS	19	4	3	28	MF	0	--	--	7	bad	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
ET3200XS	19	4	3	28	MF	0	--	--	7	bad	--	--	12	bad nav	--	--	--	--	--	--	5	bad nav	--	--
Knudsen3260	23	4	3	21	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	23	4	3	21	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	23	4	3	21	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	23	4	3	21	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	23	4	3	21	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	25	4	3	22	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--

Table A-2.1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
Knudsen3260	25	4	3	22	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	25	4	3	22	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	25	4	3	22	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--
Knudsen3260	25	4	3	22	MF	0	8	bad	7	bad	--	--	12	bad	--	--	--	--	--	--	5	bad	--	--

-- = no information; bad = data quality too poor to ascertain an adjustment factor; dB = decibel; E = east; HRG = high-resolution geophysical; m = meter; MF = mid-frequency; na = not applicable; no data = buoy did not function; N = North; S = south; W = west.

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A.3 Appendix A: High-Frequency Results

A.3.1 Site 1, Deployment 1

Klein 3000, Mode 6, Run 12, Buoys 5 and 6 (Figure A.3-1).

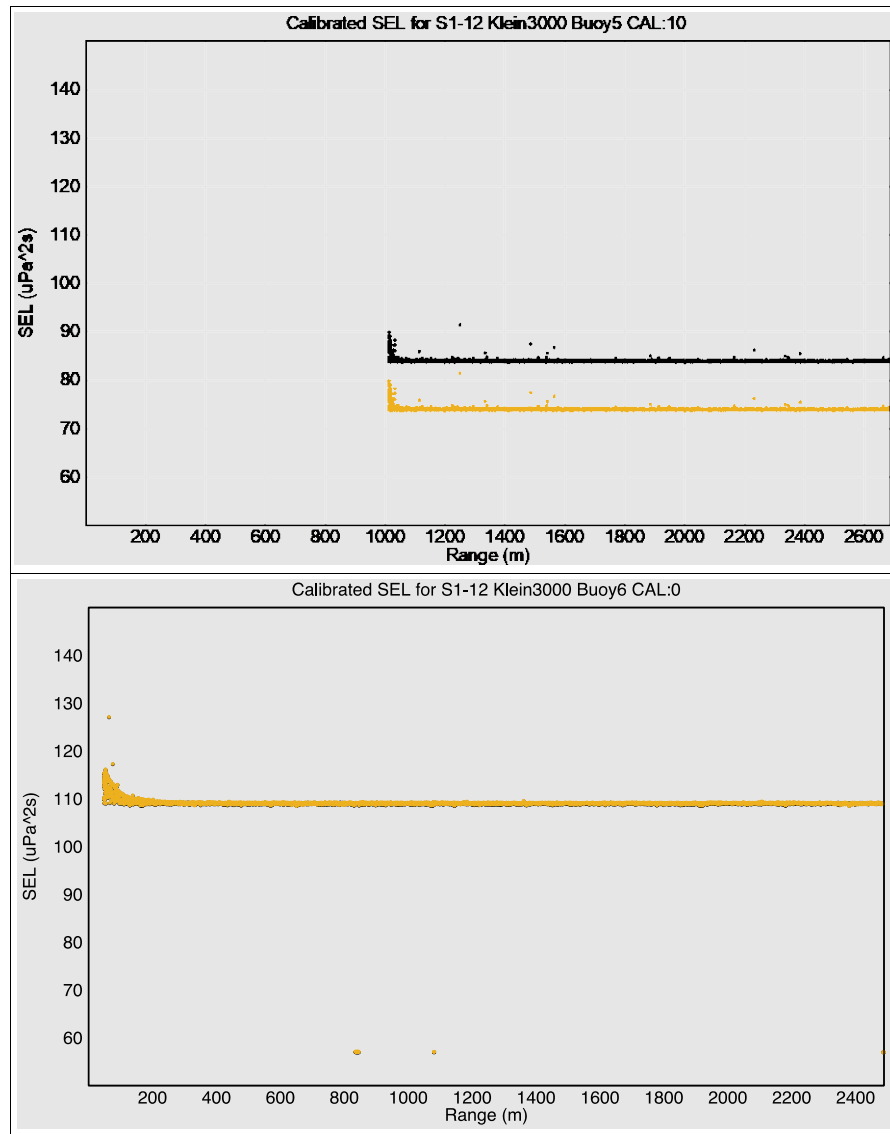


Figure A.3-1. SEL comparisons for Klein 3000, Mode 6, at Site 1, Deployment 1, Run 12. Sound exposure level (SEL) versus range (top: Buoy 5; bottom: Buoy 6). Pre-adjusted data (yellow) and adjusted data (black).

A.3.2 Site 2, Deployment 1

Reson 7125, Mode 1, Run 12, Buoys 6 and 11 (Figure A.3-2).

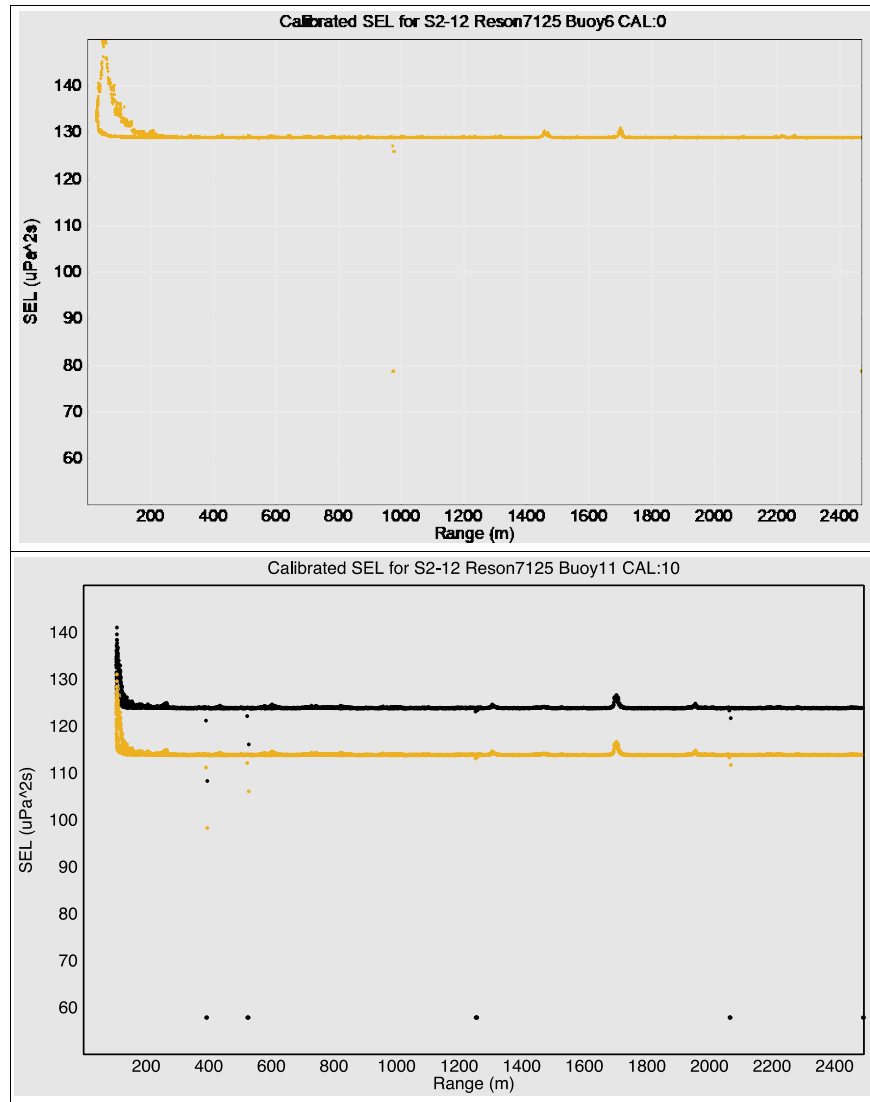


Figure A.3-2. SEL comparisons for Reson 7125, Mode 1, at Site 2, Deployment 1, Run 12. Sound exposure level (SEL) versus range (top: Buoy 6; bottom: Buoy 11). Pre-adjusted data (yellow) and adjusted data (black).

A.3.3 Site 3, Deployment 1

EK60, Mode 14, Run 2, Buoys 5 and 12 (Figure A.3-3).

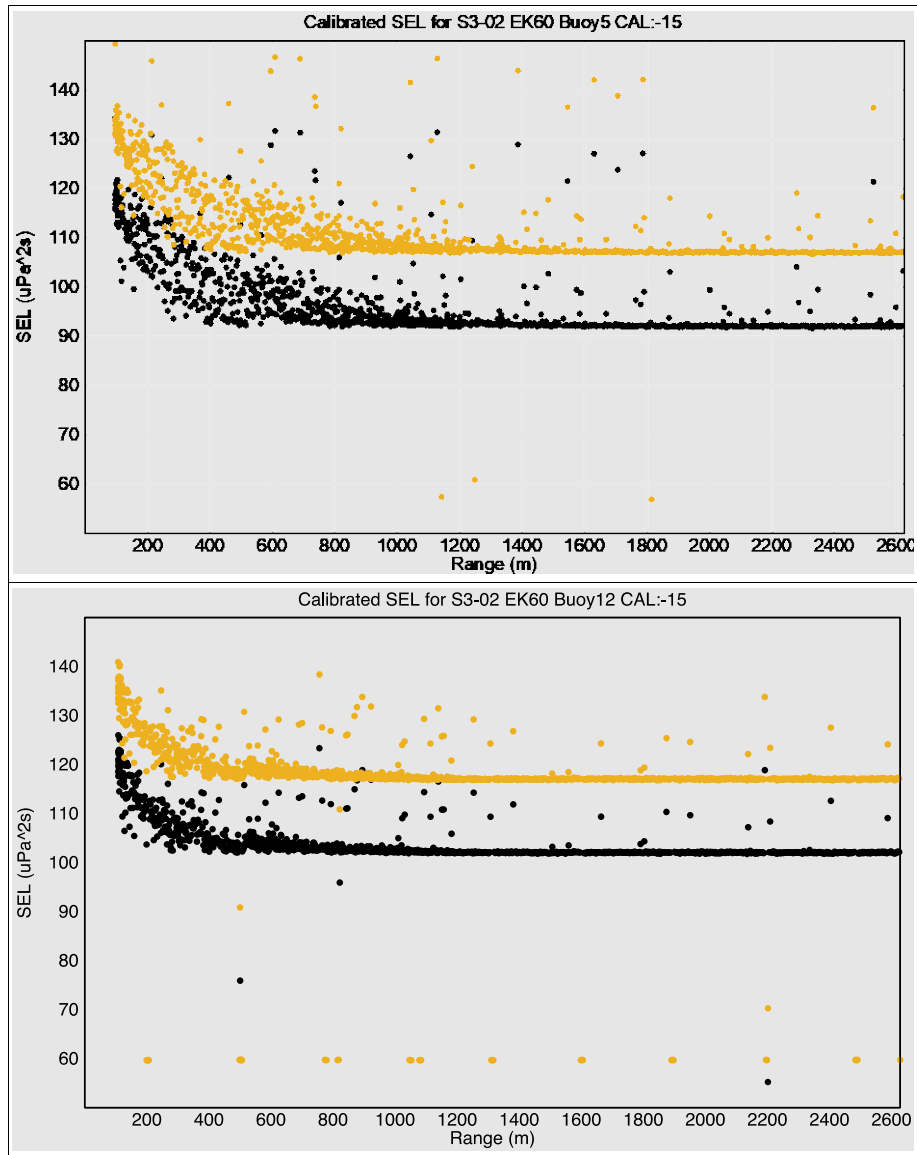


Figure A.3-3. SEL comparisons for EK60, Mode 14, at Site 3, Deployment 1, Run 2.

Sound exposure level (SEL) versus range (top: Buoy 5; bottom: Buoy 12). Pre-adjusted data (yellow) and adjusted data (black).

A.3.4 Site 4, Deployment 1

EK60, Mode 15, Run 3, Buoys 5, 7 (both hydrophones), 9, and 11 (Figure A.3-4).

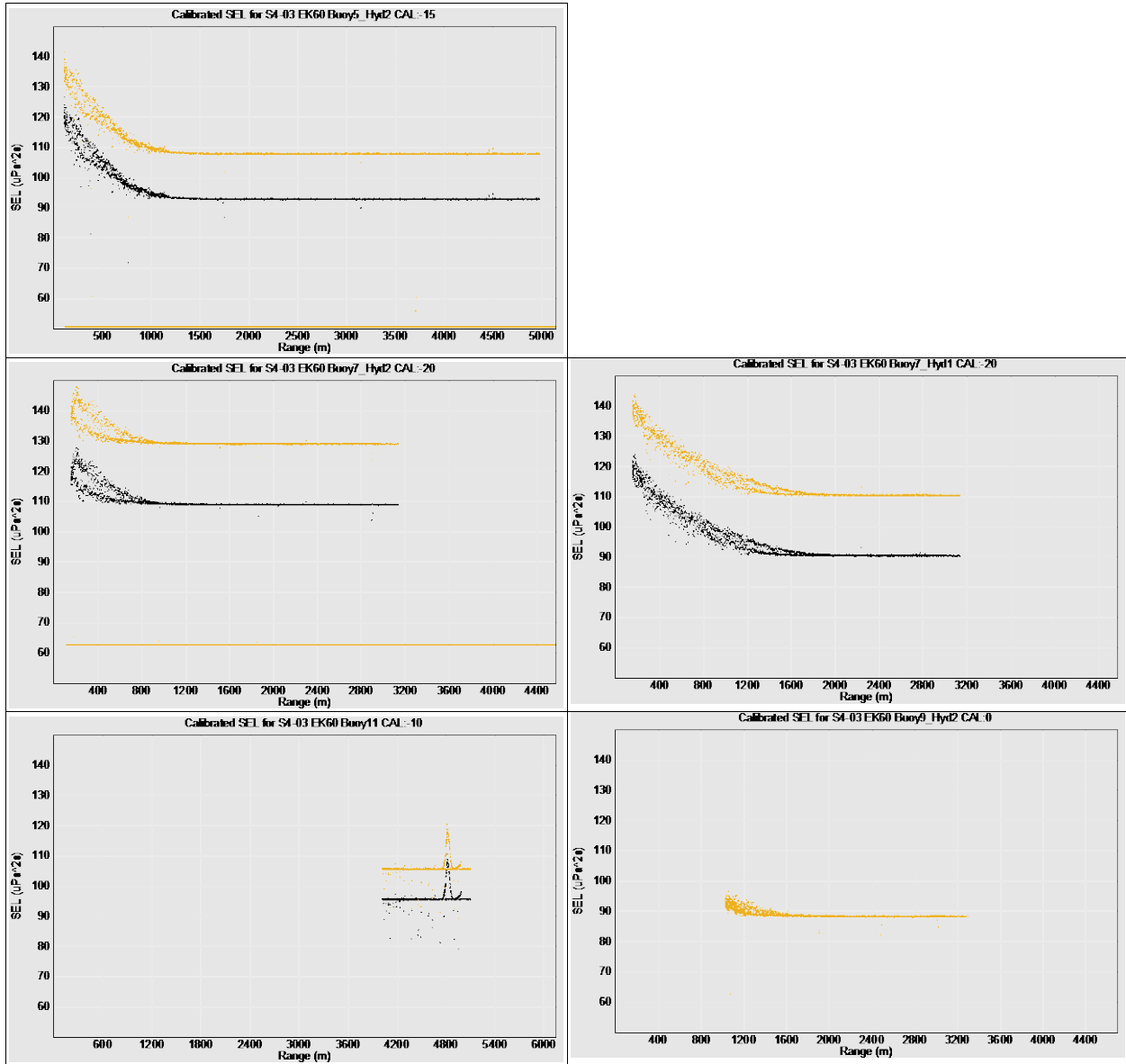


Figure A.3-4. SEL comparisons for EK60, Mode 15, at Site 4, Deployment 1, Run 3.

Sound exposure level (SEL) versus range. Top to bottom: Buoy 5 hydrophone 2; Buoy 7 hydrophone 2 (left), hydrophone 1 (right); Buoy 11 hydrophone 2 (left); and Buoy 9 hydrophone 2 (right). Pre-adjusted data (yellow) and adjusted data (black).

A.3.5 Site 5, Deployment 1

Reason 7111, Mode 3, Run 6, Buoys 6, 11, and 12 (Figure A.3-5).

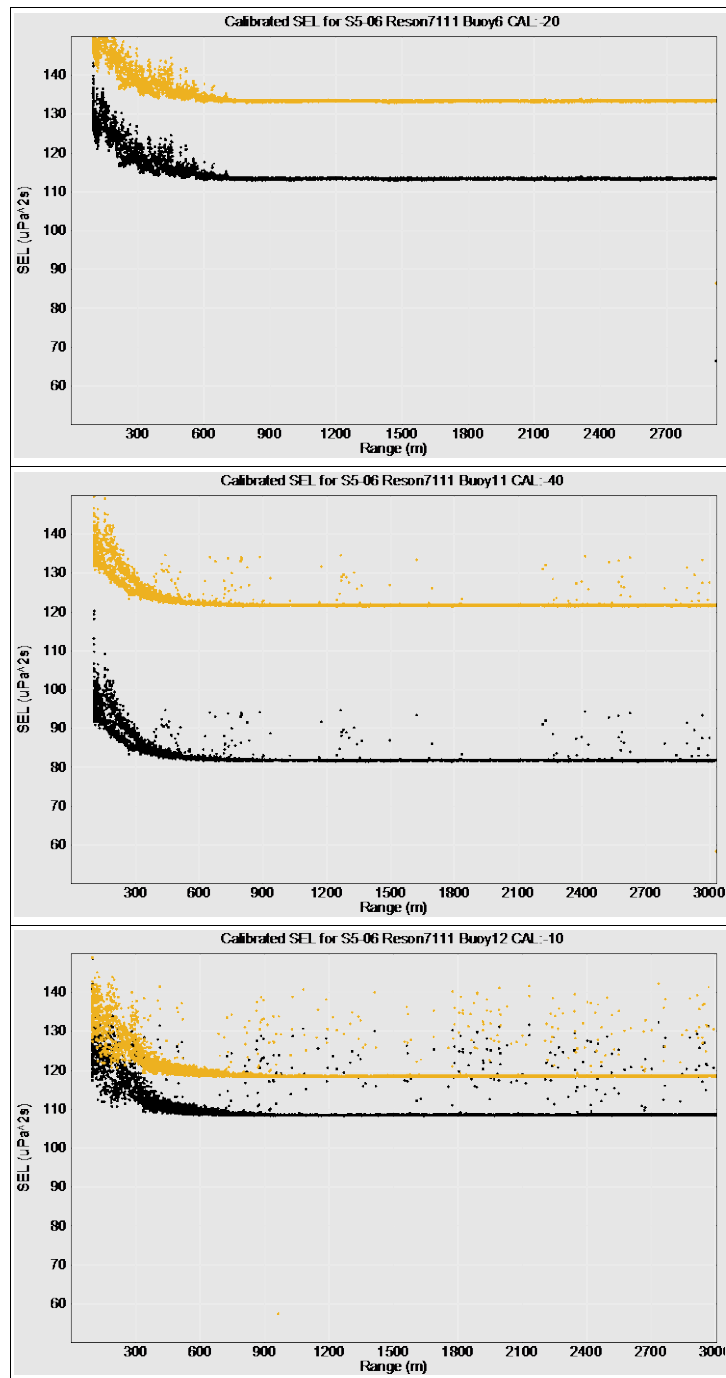


Figure A.3-5. SEL comparisons for Reson 7111, Mode 3, at Site 5, Deployment 1, Run 6. Sound exposure level (SEL) versus range (top to bottom: Buoys 6, 11, and 12). Pre-adjusted data (yellow) and adjusted data (black).

A.3.6 Site 2, Deployment 2

Klein 3000, Mode 5, Run 40, Buoys 5 and 11 (Figure A.3-6).

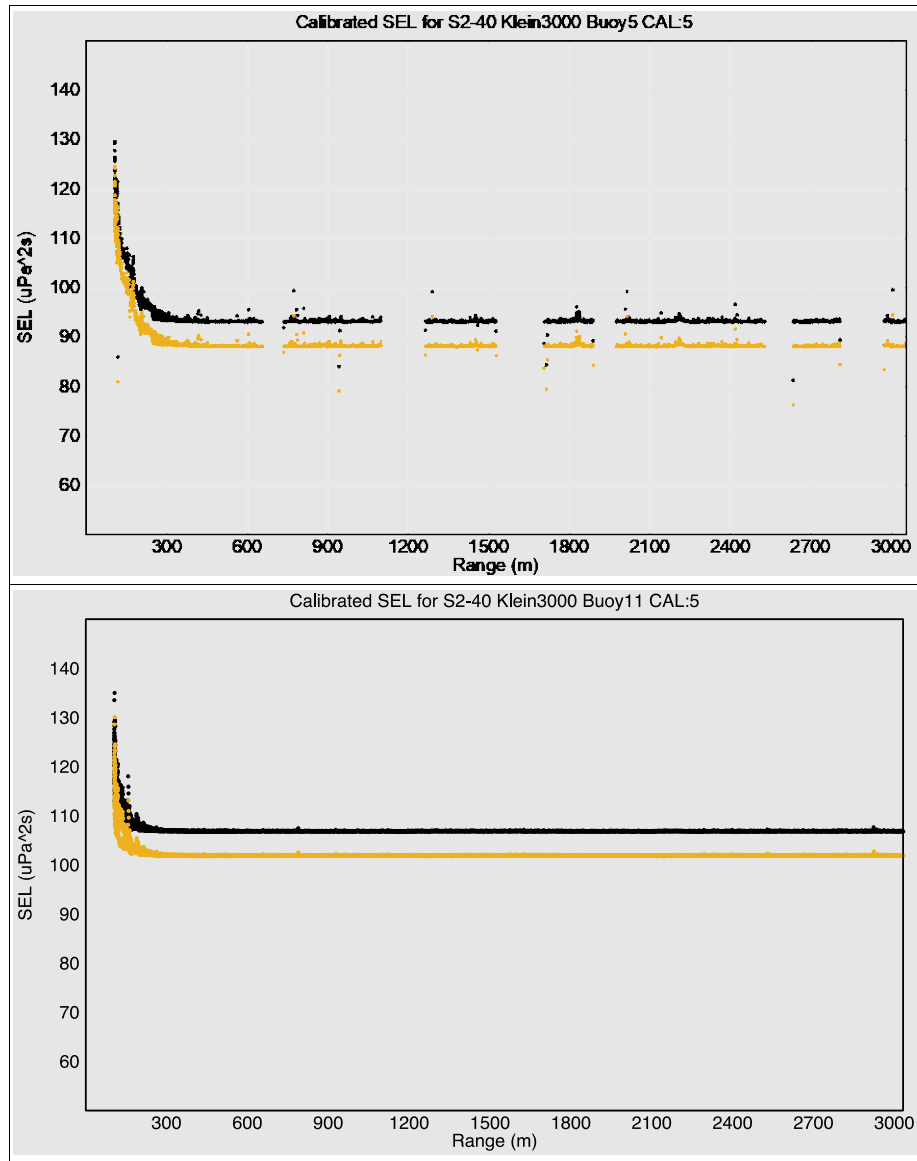


Figure A.3-6. SEL comparisons for Klein 3000, Mode 5, at Site 2, Deployment 2, Run 40.

Sound exposure level (SEL) versus range (top: Buoy 5; bottom: Buoy 11). Pre-adjusted data (yellow) and adjusted data (black).

A.3.7 Site 3, Deployment 2

Klein 3000, Mode 5, Run 18, Buoys 5, 6, and 12 (Figure A.3-7).

During Deployment 2 at Site 3, no low- or mid-frequency sources had good data to provide adjustment factors to the high-frequency sources that did have good data. Therefore, the figures below show only the unadjusted data, which will be adjusted, if needed, in the model-data comparison section.

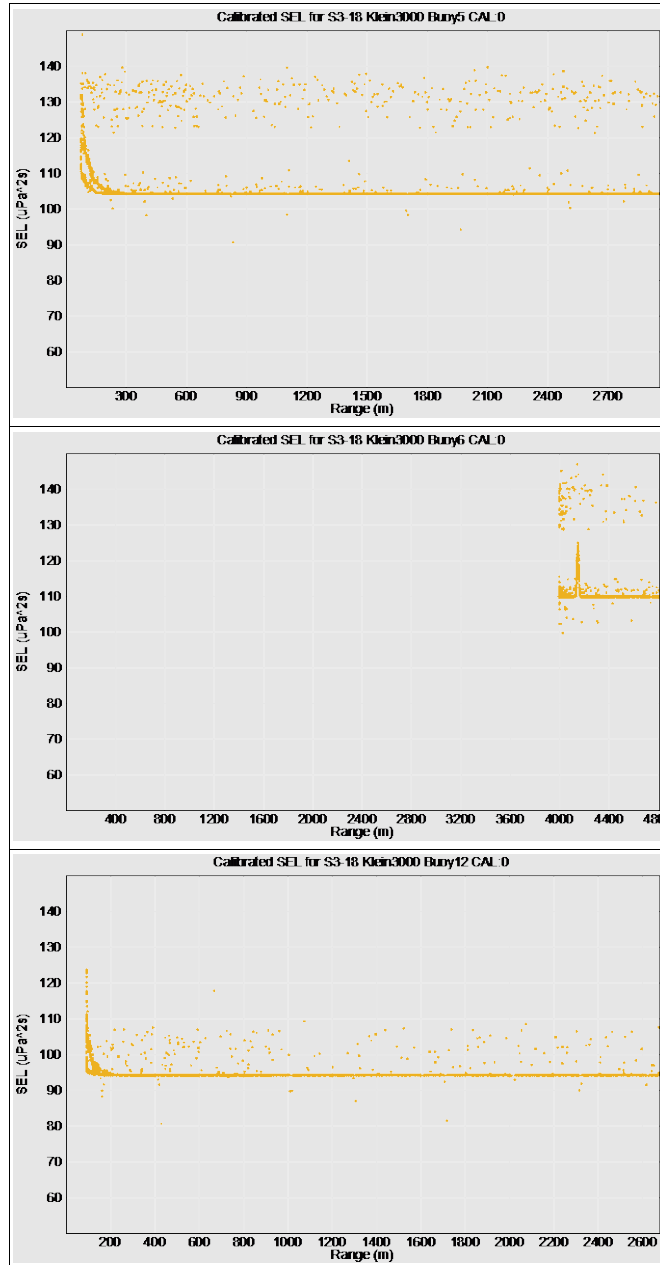


Figure A.3-7. SEL original data for Klein 3000, Mode 5, at Site 3, Deployment 2, Run 18. Sound exposure level (SEL) versus range (top to bottom: Buoys 5, 6, and 12). Pre-adjusted data (yellow) and adjusted data (black).

A.3.8 Site 4, Deployment 2

No buoy during the high-frequency source runs recorded good data.

A.3.9 Site 5, Deployment 2

EK60, Mode 13, Run 24, Buoys 6, 11, and 12 (Figure A.3-8).

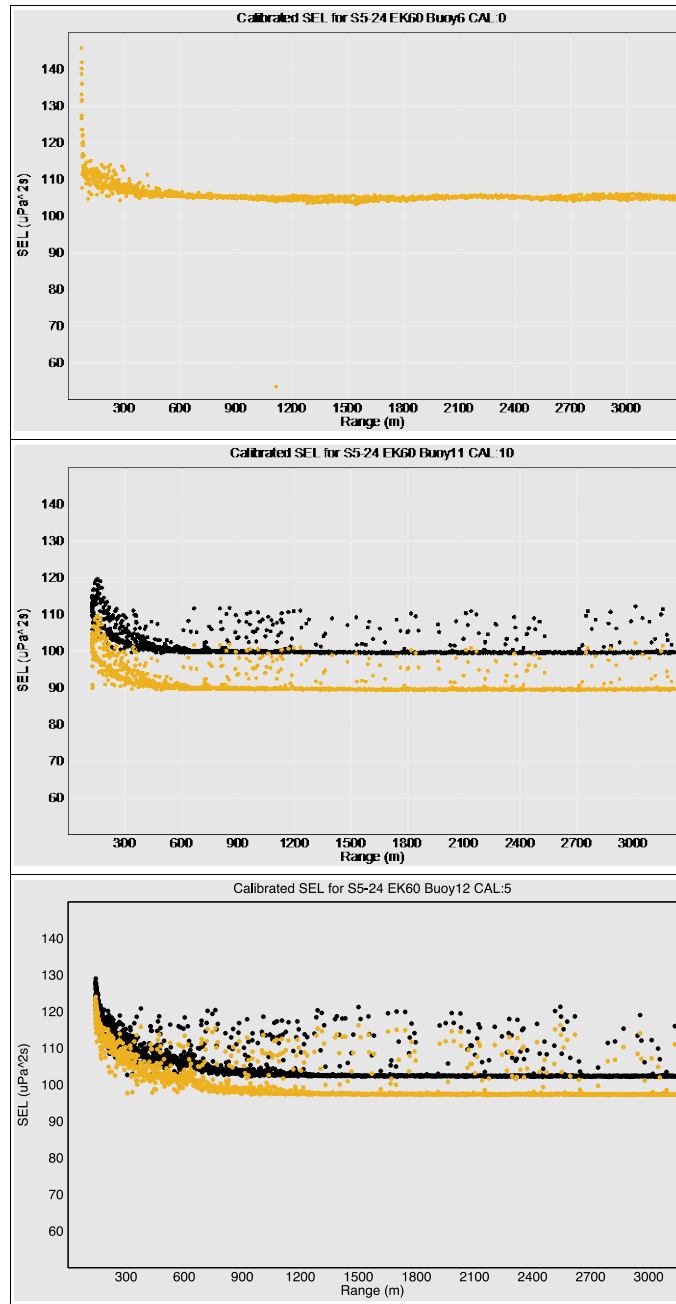


Figure A.3-8. SEL comparisons for EK60, Mode 13, at Site 5, Deployment 2, Run 24. Sound exposure level (SEL) versus range (top to bottom: Buoys 6, 11, and 12). Pre-adjusted data (yellow) and adjusted data (black).

A.3.10 Site 3, Deployment 3

SwathPlus, Mode 12, Run 33, Buoys 6, 11, and 12 (Figure A.3-9).

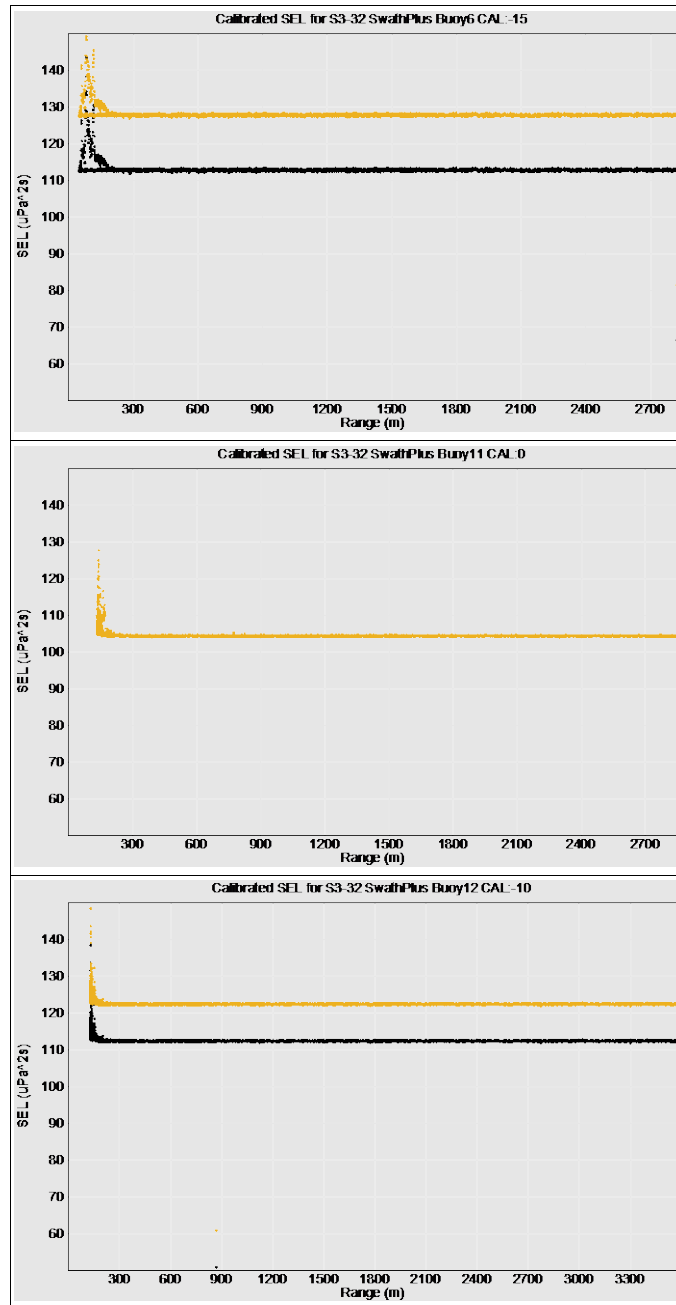


Figure A.3-9. SEL comparisons for SwathPlus, Mode 12, at Site 3, Deployment 3, Run 33. Sound exposure level (SEL) versus range (top to bottom: Buoys 6, 11, and 12). Pre-adjusted data (yellow) and adjusted data (black).

A.3.11 Site 4, Deployment 3

Reson7125, Mode 1, Run 31, Buoys 5 and 12 (Figure A.3-10).

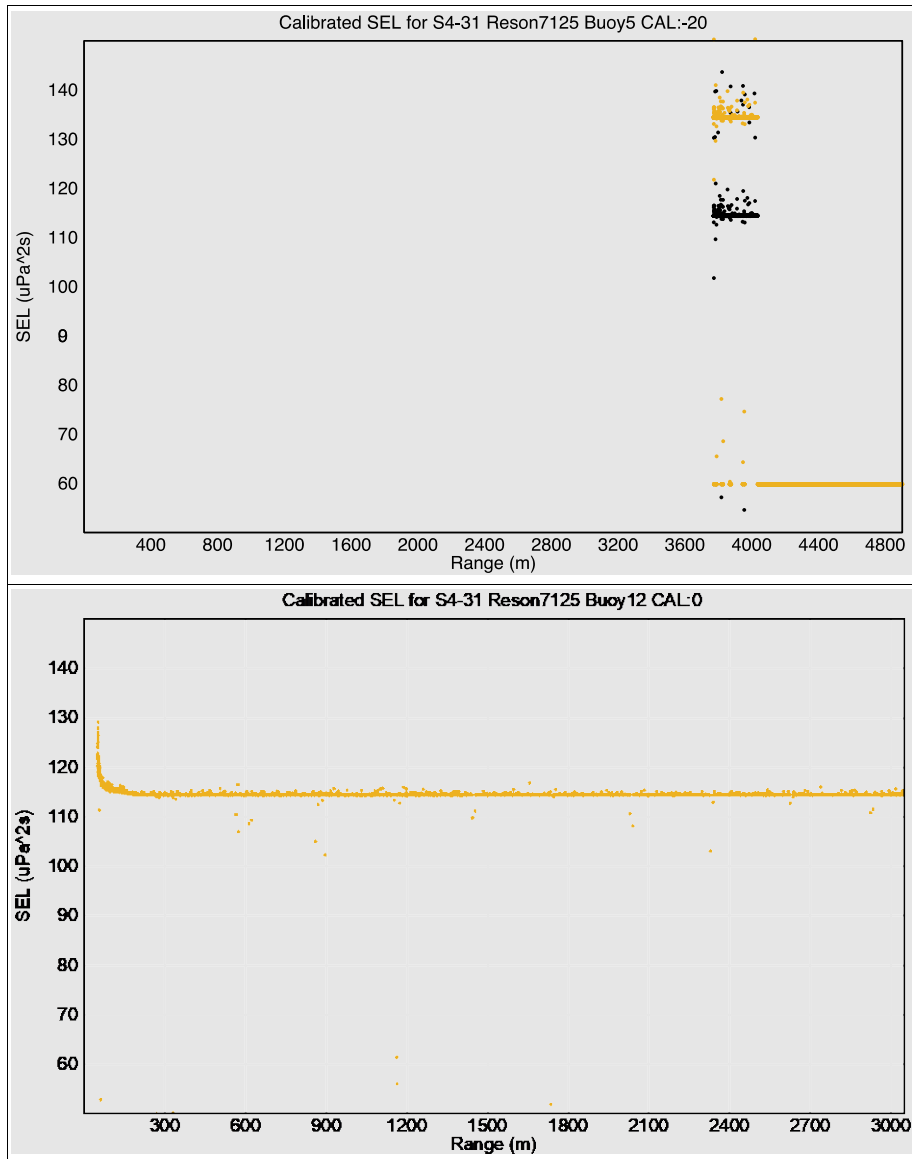


Figure A.3-10. SEL comparisons for Reson7125, Mode 1, at Site 4, Deployment 3, Run 31. Sound exposure level (SEL) versus range, (top: Buoy 5; bottom: Buoy 12). Pre-adjusted data (yellow) and adjusted data (black).

A.3.12 Site 5, Deployment 3

No sources were operated at Site 5 during Deployment 3.

A.3.13 High-Frequency Results Table

Table A.3-1. Adjustment factors for all high-frequency sources.

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
Reson 7125	1	1	1	8	HF	0	6	0 dB	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Reson 7125	1	1	1	8	HF	0	6	153 S	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Reson 7125	1	1	1	8	HF	0	6	83 E	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Reson 7125	2	1	1	9	HF	0	6	Bad	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Reson 7125	2	1	1	9	HF	0	6	Bad	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Reson 7125	2	1	1	9	HF	0	6	Bad	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Klein 3000	5	1	1	11	HF	0	6	0 dB	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Klein 3000	5	1	1	11	HF	0	6	153 S	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Klein 3000	5	1	1	11	HF	0	6	83 E	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Klein 3000	6	1	1	12	HF	0	6	0 dB	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Klein 3000	6	1	1	12	HF	0	6	153 S	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Klein 3000	6	1	1	12	HF	0	6	83 E	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Edgetech 4200	7	1	1	6	HF	0	6	0 dB	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Edgetech 4200	7	1	1	6	HF	0	6	153 S	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Edgetech 4200	7	1	1	6	HF	0	6	83 E	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Edgetech 4200	8	1	1	7	HF	0	6	0 dB	--	--	--	--	--	--	--	--	5	Bad	8	Bad	9	-10 dB	--	--
Edgetech 4200	8	1	1	7	HF	0	6	153 S	--	--	--	--	--	--	--	--	5	Bad	8	Bad	9	75 S	--	--
Edgetech 4200	8	1	1	7	HF	0	6	83 E	--	--	--	--	--	--	--	--	5	Bad	8	Bad	9	94 W	--	--
SwathPlus	9	1	1	10	HF	0	6	0 dB	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
SwathPlus	9	1	1	10	HF	0	6	153 S	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
SwathPlus	9	1	1	10	HF	0	6	83 E	--	--	--	--	--	--	--	--	5	Bad	8	Bad	--	--	--	--
Reson 7125	1	2	1	12	HF	0	6	0 dB	--	--	--	--	--	--	11	10 dB	--	--	--	--	9	Bad	--	--
Reson 7125	1	2	1	12	HF	0	6	81 N	--	--	--	--	--	--	11	50 S	--	--	--	--	9	Bad	--	--
Reson 7125	1	2	1	12	HF	0	6	83 W	--	--	--	--	--	--	11	101 E	--	--	--	--	9	Bad	--	--
Reson 7125	2	2	1	13	HF	0	6	Bad	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Reson 7125	2	2	1	13	HF	0	6	Bad	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Reson 7125	2	2	1	13	HF	0	6	Bad	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Klein 3000	5	2	1	14	HF	0	6	0 dB	--	--	--	--	--	--	11	10 dB	--	--	--	--	9	Bad	--	--
Klein 3000	5	2	1	14	HF	0	6	81 N	--	--	--	--	--	--	11	50 S	--	--	--	--	9	Bad	--	--
Klein 3000	5	2	1	14	HF	0	6	83 W	--	--	--	--	--	--	11	101 E	--	--	--	--	9	Bad	--	--
Klein 3000	6	2	1	15	HF	0	6	0 dB	--	--	--	--	--	--	11	10 dB	--	--	--	--	9	Bad	--	--
Klein 3000	6	2	1	15	HF	0	6	81 N	--	--	--	--	--	--	11	50 S	--	--	--	--	9	Bad	--	--
Klein 3000	6	2	1	15	HF	0	6	83 W	--	--	--	--	--	--	11	101 E	--	--	--	--	9	Bad	--	--
Edgetech 4200	7	2	1	8	HF	0	6	Bad	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Edgetech 4200	7	2	1	8	HF	0	6	Bad	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Edgetech 4200	7	2	1	8	HF	0	6	Bad	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Edgetech 4200	8	2	1	9	HF	0	6	0 dB	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Edgetech 4200	8	2	1	9	HF	0	6	81 N	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
Edgetech 4200	8	2	1	9	HF	0	6	83 W	--	--	--	--	--	--	11	Bad	--	--	--	--	9	Bad	--	--
SwathPlus	9	2	1	10	HF	0	6	0 dB	--	--	--	--	--	--	11	10 dB	--	--	--	--	9	Bad	--	--
SwathPlus	9	2	1	10	HF	0	6	81 N	--	--	--	--	--	--	11	50 S	--	--	--	--	9	Bad	--	--
SwathPlus	9	2	1	10	HF	0	6	83 W	--	--	--	--	--	--	11	101 E	--	--	--	--	9	Bad	--	--
SwathPlus	11	2	1	12	HF	0	6	0 dB	--	--	--	--	--	--	11	10 dB	--	--	--	--	9	Bad	--	--
SwathPlus	11	2	1	12	HF	0	6	81 N	--	--	--	--	--	--	11	50 S	--	--	--	--	9	Bad	--	--
SwathPlus	11	2	1	12	HF	0	6	83 W	--	--	--	--	--	--	11	101 E	--	--	--	--	9	Bad	--	--
Edgetech 4200	7	3	1	?	HF	0	8	Bad	--	--	--	--	5	Bad	12	Bad	7	Bad	--	--	--	--	--	--
Edgetech 4200	7	3	1	?	HF	0	8	Bad	--	--	--	--	5	Bad	12	Bad	7	Bad	--	--	--	--	--	--
Edgetech 4200	7	3	1	?	HF	0	8	Bad	--	--	--	--	5	Bad	12	Bad	7	Bad	--	--	--	--	--	--
Edgetech 4200	8	3	1	?	HF	0	8	Bad	--	--	--	--	5	Bad	12	Bad	7	Bad	--	--	--	--	--	--

Table A.3-1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
Edgetech 4200	8	3	1	?	HF	0	8	Bad	--	--	--	--	5	Bad	12	Bad	7	Bad	--	--	--	--	--	--
Edgetech 4200	8	3	1	?	HF	0	8	Bad	--	--	--	--	5	Bad	12	Bad	7	Bad	--	--	--	--	--	--
SwathPlus	10/11	3	1	4	HF	0	8	Bad	--	--	--	--	5	-10 dB	12	Bad	7	Bad	--	--	--	--	--	--
SwathPlus	10/11	3	1	4	HF	0	8	Bad	--	--	--	--	5	52 S	12	Bad	7	Bad	--	--	--	--	--	--
SwathPlus	10/11	3	1	4	HF	0	8	Bad	--	--	--	--	5	119 E	12	Bad	7	Bad	--	--	--	--	--	--
SwathPlus	12	3	1	5	HF	0	8	Bad	--	--	--	--	5	-10 dB	12	-10 dB	7	Bad	--	--	--	--	--	--
SwathPlus	12	3	1	5	HF	0	8	Bad	--	--	--	--	5	52 S	12	52 S	7	Bad	--	--	--	--	--	--
SwathPlus	12	3	1	5	HF	0	8	Bad	--	--	--	--	5	119 E	12	119 E	7	Bad	--	--	--	--	--	--
EK60	13	3	1	1	HF	0	8	Bad	--	--	--	--	5	-15 dB	12	-15 dB	7	Bad	--	--	--	--	--	--
EK60	13	3	1	1	HF	0	8	Bad	--	--	--	--	5	52 S	12	52 S	7	Bad	--	--	--	--	--	--
EK60	13	3	1	1	HF	0	8	Bad	--	--	--	--	5	119 E	12	119 E	7	Bad	--	--	--	--	--	--
EK60	14	3	1	3?	HF	0	8	Bad	--	--	--	--	5	-15 dB	12	-15 dB	7	Bad	--	--	--	--	--	--
EK60	14	3	1	3?	HF	0	8	Bad	--	--	--	--	5	52 S	12	52 S	7	Bad	--	--	--	--	--	--
EK60	14	3	1	3?	HF	0	8	Bad	--	--	--	--	5	119 E	12	119 E	7	Bad	--	--	--	--	--	--
EK60	15	3	1	2?	HF	0	8	0 dB	--	--	--	--	5	-15 dB	12	-15 dB	7	Bad	--	--	--	--	--	--
EK60	15	3	1	2?	HF	0	8	No ref.	--	--	--	--	5	52 S	12	52 S	7	Bad	--	--	--	--	--	--
EK60	15	3	1	2?	HF	0	8	No ref.	--	--	--	--	5	119 E	12	119 E	7	Bad	--	--	--	--	--	--
Reson 7111	3	4	1	4	HF	0	8	Bad	6	-20 dB	--	--	7_H	Bad	7_L	Bad	9	Bad	--	--	11	Bad	5	-15 dB
Reson 7111	3	4	1	4	HF	0	8	Bad	6	58 N	--	--	7_H	Bad	7_L	Bad	9	Bad	--	--	11	Bad	5	37 N
Reson 7111	3	4	1	4	HF	0	8	Bad	6	200 E	--	--	7_H	Bad	7_L	Bad	9	Bad	--	--	11	Bad	5	200 E
Reson 7111	4	4	1	5	HF	0	8	Bad	6	-20 dB	--	--	7_H	-20 dB	7_L	-20 dB	9	Bad	--	--	11	Bad	5	-15 dB
Reson 7111	4	4	1	5	HF	0	8	Bad	6	58 N	--	--	7_H	127 S	7_L	106 S	9	Bad	--	--	11	Bad	5	37 N
Reson 7111	4	4	1	5	HF	0	8	Bad	6	200 E	--	--	7_H	105 E	7_L	121 E	9	Bad	--	--	11	Bad	5	200 E
EK60	13	4	1	1	HF	0	8	Bad	6	-20 dB	--	--	7_H	-20 dB	7_L	-20 dB	9	0 dB	--	--	11	Bad	5	-15 dB
EK60	13	4	1	1	HF	0	8	Bad	6	58 N	--	--	7_H	127 S	7_L	106 S	9	59 N	--	--	11	Bad	5	37 N
EK60	13	4	1	1	HF	0	8	Bad	6	200 E	--	--	7_H	105 E	7_L	121 E	9	102 E	--	--	11	Bad	5	200 E
EK60	14	4	1	2?	HF	0	8	Bad	6	Bad	--	--	7_H	-20 dB	7_L	-20 dB	9	0 dB	--	--	11	Bad	5	-15 dB
EK60	14	4	1	2?	HF	0	8	Bad	6	Bad	--	--	7_H	127 S	7_L	106 S	9	59 N	--	--	11	Bad	5	37 N
EK60	14	4	1	2?	HF	0	8	Bad	6	Bad	--	--	7_H	105 E	7_L	121 E	9	102 E	--	--	11	Bad	5	200 E
EK60	15	4	1	3?	HF	0	8	Bad	6	Bad	--	--	7_H	-20 dB	7_L	-20 dB	9	0 dB	--	--	11	-10 dB	5	-15 dB
EK60	15	4	1	3?	HF	0	8	Bad	6	Bad	--	--	7_H	127 S	7_L	106 S	9	59 N	--	--	11	128 S	5	37 N
EK60	15	4	1	3?	HF	0	8	Bad	6	Bad	--	--	7_H	105 E	7_L	121 E	9	102 E	--	--	11	0 E	5	200 E
Reson 7125	1	5	1	12	HF	0	6	Bad	12	-10 dB	--	--	11	-40 dB	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7125	1	5	1	12	HF	0	6	Bad	12	10 N	--	--	11	10 N	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7125	1	5	1	12	HF	0	6	Bad	12	168 W	--	--	11	88 E	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7125	2	5	1	13	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7125	2	5	1	13	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7111	3	5	1	6	HF	0	6	-20 dB	12	-10 dB	--	--	11	-40 dB	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7111	3	5	1	6	HF	0	6	83 S	12	10 N	--	--	11	10 N	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7111	3	5	1	6	HF	0	6	161 E	12	168 W	--	--	11	88 E	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7111	4	5	1	7	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7111	4	5	1	7	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	9	Bad	8	Bad	10	Bad	--	--
Reson 7111	4	5	1	7	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	9	Bad	8	Bad	10	Bad	--	--
EK60	13	5	1	8	HF	0	6	-20 dB	12	-10 dB	--	--	11	Bad	--	--	9	0 dB	8	-10 dB	10	-15 dB	--	--
EK60	13	5	1	8	HF	0	6	83 S	12	10 N	--	--	11	Bad	--	--	9	71 N	8	71 N	10	39 S	--	--
EK60	13	5	1	8	HF	0	6	161 E	12	168 W	--	--	11	Bad	--	--	9	65 W	8	65 W	10	97 W	--	--
EK60	15	5	1	9	HF	0	6	-20 dB	12	-10 dB	--	--	11	Bad	--	--	9	0 dB	8	-10 dB	10	Bad	--	--
EK60	15	5	1	9	HF	0	6	83 S	12	10 N	--	--	11	Bad	--	--	9	71 N	8	71 N	10	Bad	--	--
EK60	15	5	1	9	HF	0	6	161 E	12	168 W	--	--	11	Bad	--	--	9	65 W	8	65 W	10	Bad	--	--
Reson 7125	1	2	2	38	HF	0	--	--	--	--	--	--	5	Bad	11	Bad	10	Bad	--	--	9	Bad	--	--

Table A.3-1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
Reson 7125	1	2	2	38	HF	0	--	--	--	--	--	--	5	Bad	11	Bad	10	Bad	--	--	9	Bad	--	--
Reson 7125	1	2	2	38	HF	0	--	--	--	--	--	--	5	Bad	11	Bad	10	Bad	--	--	9	Bad	--	--
Reson 7125	2	2	2	39	HF	0	--	--	--	--	--	--	5	Bad	11	Bad	10	Bad	--	--	9	Bad	--	--
Reson 7125	2	2	2	39	HF	0	--	--	--	--	--	--	5	Bad	11	Bad	10	Bad	--	--	9	Bad	--	--
Reson 7125	2	2	2	39	HF	0	--	--	--	--	--	--	5	Bad	11	Bad	10	Bad	--	--	9	Bad	--	--
Klein 3000	5	2	2	40	HF	0	--	--	--	--	--	--	5	5 dB	11	5 dB	10	Bad	--	--	9	Bad	--	--
Klein 3000	5	2	2	40	HF	0	--	--	--	--	--	--	5	69 S	11	69 S	10	Bad	--	--	9	Bad	--	--
Klein 3000	5	2	2	40	HF	0	--	--	--	--	--	--	5	57 E	11	57 E	10	Bad	--	--	9	Bad	--	--
Klein 3000	6	2	2	41	HF	0	--	--	--	--	--	--	5	5 dB	11	5 dB	10	Bad	--	--	9	Bad	--	--
Klein 3000	6	2	2	41	HF	0	--	--	--	--	--	--	5	69 S	11	69 S	10	Bad	--	--	9	Bad	--	--
Klein 3000	6	2	2	41	HF	0	--	--	--	--	--	--	5	57 E	11	57 E	10	Bad	--	--	9	Bad	--	--
Edgetech 4200	7	2	2	35	HF	0	--	--	--	--	--	--	5	5 dB	11	Bad	10	Bad	--	--	9	Bad	--	--
Edgetech 4200	7	2	2	35	HF	0	--	--	--	--	--	--	5	69 S	11	Bad	10	Bad	--	--	9	Bad	--	--
Edgetech 4200	7	2	2	35	HF	0	--	--	--	--	--	--	5	57 E	11	Bad	10	Bad	--	--	9	Bad	--	--
Edgetech 4200	8	2	2	36	HF	0	--	--	--	--	--	--	5	5 dB	11	Bad	10	Bad	--	--	9	Bad	--	--
Edgetech 4200	8	2	2	36	HF	0	--	--	--	--	--	--	5	69 S	11	Bad	10	Bad	--	--	9	Bad	--	--
Edgetech 4200	8	2	2	36	HF	0	--	--	--	--	--	--	5	57 E	11	Bad	10	Bad	--	--	9	Bad	--	--
SwathPlus	10	2	2	37	HF	0	--	--	--	--	--	--	5	Bad	11	5 dB	10	Bad	--	--	9	Bad	--	--
SwathPlus	10	2	2	37	HF	0	--	--	--	--	--	--	5	Bad	11	69 S	10	Bad	--	--	9	Bad	--	--
SwathPlus	10	2	2	37	HF	0	--	--	--	--	--	--	5	Bad	11	57 E	10	Bad	--	--	9	Bad	--	--
Reson 7125	1	3	2	17	HF	0	--	--	5	Pending	--	--	12	Pending	--	--	--	--	--	--	6	Bad	--	--
Reson 7125	1	3	2	17	HF	0	--	--	5	0 N	--	--	12	12 N	--	--	--	--	--	--	6	Bad	--	--
Reson 7125	1	3	2	17	HF	0	--	--	5	3 W	--	--	12	114 W	--	--	--	--	--	--	6	Bad	--	--
Reson 7125	2	3	2	16	HF	0	--	--	5	Bad	--	--	12	Bad	--	--	--	--	--	--	6	Bad	--	--
Reson 7125	2	3	2	16	HF	0	--	--	5	Bad	--	--	12	Bad	--	--	--	--	--	--	6	Bad	--	--
Reson 7125	2	3	2	16	HF	0	--	--	5	Bad	--	--	12	Bad	--	--	--	--	--	--	6	Bad	--	--
Reson 7111	3	3	2	14	HF	0	--	--	5	Bad	--	--	12	Pending	--	--	--	--	--	--	6	Bad	--	--
Reson 7111	3	3	2	14	HF	0	--	--	5	Bad	--	--	12	12 N	--	--	--	--	--	--	6	Bad	--	--
Reson 7111	3	3	2	14	HF	0	--	--	5	Bad	--	--	12	114 W	--	--	--	--	--	--	6	Bad	--	--
Reson 7111	4	3	2	15	HF	0	--	--	5	Bad	--	--	12	Bad	--	--	--	--	--	--	6	Bad	--	--
Reson 7111	4	3	2	15	HF	0	--	--	5	Bad	--	--	12	Bad	--	--	--	--	--	--	6	Bad	--	--
Reson 7111	4	3	2	15	HF	0	--	--	5	Bad	--	--	12	Bad	--	--	--	--	--	--	6	Bad	--	--
Klein 3000	5	3	2	18	HF	0	--	--	5	Pending	--	--	12	Pending	--	--	--	--	--	--	6	Pending	--	--
Klein 3000	5	3	2	18	HF	0	--	--	5	0 N	--	--	12	12 N	--	--	--	--	--	--	6	0 N	--	--
Klein 3000	5	3	2	18	HF	0	--	--	5	3 W	--	--	12	114 W	--	--	--	--	--	--	6	12 W	--	--
Klein 3000	6	3	2	19	HF	0	--	--	5	Pending	--	--	12	Pending	--	--	--	--	--	--	6	Pending	--	--
Klein 3000	6	3	2	19	HF	0	--	--	5	0 N	--	--	12	12 N	--	--	--	--	--	--	6	0 N	--	--
Klein 3000	6	3	2	19	HF	0	--	--	5	3 W	--	--	12	114 W	--	--	--	--	--	--	6	12 W	--	--
Reson 7125	1	4	2	17	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
Reson 7125	1	4	2	17	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
Reson 7125	1	4	2	17	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
Reson 7125	2	4	2	18	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
Reson 7125	2	4	2	18	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
Reson 7125	2	4	2	18	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
EdgeTech4200	7	4	2	8	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
EdgeTech4200	7	4	2	8	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
EdgeTech4200	7	4	2	8	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
EdgeTech4200	8	4	2	9	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
EdgeTech4200	8	4	2	9	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
EdgeTech4200	8	4	2	9	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
SwathPlus	10	4	2	15	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	

Table A.3-1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position															C		
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#		F1	Buoy#
SwathPlus	10	4	2	15	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
SwathPlus	10	4	2	15	HF	0	--	--	--	--	--	--	--	--	--	--	9	Bad	--	--	--	--	--	
Reson 7125	1	5	2	12	HF	0	6	0 dB	12	5 dB	--	--	11	10 dB	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7125	1	5	2	12	HF	0	6	48 S	12	84 N	--	--	11	164 N	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7125	1	5	2	12	HF	0	6	57 E	12	62 W	--	--	11	90 W	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7125	2	5	2	13	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7125	2	5	2	13	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7125	2	5	2	13	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7111	3	5	2	6	HF	0	6	0 dB	12	5 dB	--	--	11	10 dB	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7111	3	5	2	6	HF	0	6	48 S	12	84 N	--	--	11	164 N	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7111	3	5	2	6	HF	0	6	57 E	12	62 W	--	--	11	90 W	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7111	4	5	2	7	HF	0	6	0 dB	12	5 dB	--	--	11	10 dB	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7111	4	5	2	7	HF	0	6	48 S	12	84 N	--	--	11	164 N	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7111	4	5	2	7	HF	0	6	57 E	12	62 W	--	--	11	90 W	--	--	8	Bad	9	Bad	10	Bad	--	--
EK60	13	5	2	8	HF	0	6	0 dB	12	5 dB	--	--	11	10 dB	--	--	8	Bad	9	Bad	10	Bad	--	--
EK60	13	5	2	8	HF	0	6	48 S	12	84 N	--	--	11	164 N	--	--	8	Bad	9	Bad	10	Bad	--	--
EK60	13	5	2	8	HF	0	6	57 E	12	62 W	--	--	11	90 W	--	--	8	Bad	9	Bad	10	Bad	--	--
EK60	15	5	2	9	HF	0	6	0 dB	12	5 dB	--	--	11	10 dB	--	--	8	Bad	9	Bad	10	Bad	--	--
EK60	15	5	2	9	HF	0	6	48 S	12	84 N	--	--	11	164 N	--	--	8	Bad	9	Bad	10	Bad	--	--
EK60	15	5	2	9	HF	0	6	57 E	12	62 W	--	--	11	90 W	--	--	8	Bad	9	Bad	10	Bad	--	--
Reson 7125	1	3	3	34	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7125	1	3	3	34	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7125	1	3	3	34	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7125	2	3	3	35	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7125	2	3	3	35	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7125	2	3	3	35	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7111	3	3	3	24	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7111	3	3	3	24	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7111	3	3	3	24	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7111	4	3	3	25	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7111	4	3	3	25	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7111	4	3	3	25	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
Klein 3000	5	3	3	36	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
Klein 3000	5	3	3	36	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
Klein 3000	5	3	3	36	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
Klein 3000	6	3	3	37	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
Klein 3000	6	3	3	37	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
Klein 3000	6	3	3	37	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
EdgeTech 4200	7	3	3	29	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	10	Bad	9	Bad	--	--
EdgeTech 4200	7	3	3	29	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	10	Bad	9	Bad	--	--
EdgeTech 4200	7	3	3	29	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	10	Bad	9	Bad	--	--
EdgeTech 4200	8	3	3	29	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	10	Bad	9	Bad	--	--
EdgeTech 4200	8	3	3	29	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	10	Bad	9	Bad	--	--
EdgeTech 4200	8	3	3	29	HF	0	6	Bad	12	Bad	--	--	11	Bad	--	--	8	Bad	10	Bad	9	Bad	--	--
SwathPlus	10	3	3	32	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
SwathPlus	10	3	3	32	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
SwathPlus	10	3	3	32	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
SwathPlus	12	3	3	33	HF	0	6	-15 dB	12	-10	--	--	11	0 dB	--	--	8	Bad	10	Bad	9	Bad	--	--
SwathPlus	12	3	3	33	HF	0	6	6 N	12	7 N	--	--	11	41 N	--	--	8	Bad	10	Bad	9	Bad	--	--
SwathPlus	12	3	3	33	HF	0	6	123 W	12	162 E	--	--	11	161 E	--	--	8	Bad	10	Bad	9	Bad	--	--
Reson 7125	1	4	3	31	HF	0	8	Bad	7	Bad	--	--	12	0 dB	--	--	--	--	--	5	-20 dB	--	--	

Table A.3-1. (Continued).

Source	Mode	Site	Deployment	Run	Frequency	Channel	Buoy Position																	
							Buoy#	D	Buoy#	A1	Buoy#	A2	Buoy#	B1	Buoy#	B2	Buoy#	E1	Buoy#	E2	Buoy#	F1	Buoy#	C
Reson 7125	1	4	3	31	HF		8	Bad	7	Bad	--	--	12	12 N	--	--	--	--	--	--	5	200 N	--	--
Reson 7125	1	4	3	31	HF		8	Bad	7	Bad	--	--	12	95 W	--	--	--	--	--	--	5	200 W	--	--
Reson 7125	2	4	3	32	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
Reson 7125	2	4	3	32	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
Reson 7125	2	4	3	32	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
EdgeTech 4200	7	4	3	24	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
EdgeTech 4200	7	4	3	24	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
EdgeTech 4200	7	4	3	24	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
EdgeTech 4200	7	4	3	23	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
EdgeTech 4200	7	4	3	23	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
EdgeTech 4200	7	4	3	23	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
SwathPlus	9	4	3	30	HF		8	Bad	7	Bad	--	--	12	0 dB	--	--	--	--	--	--	5	Bad	--	--
SwathPlus	9	4	3	30	HF		8	Bad	7	Bad	--	--	12	12 N	--	--	--	--	--	--	5	Bad	--	--
SwathPlus	9	4	3	30	HF		8	Bad	7	Bad	--	--	12	95 W	--	--	--	--	--	--	5	Bad	--	--
SwathPlus	10	4	3	29	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
SwathPlus	10	4	3	29	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--
SwathPlus	10	4	3	29	HF		8	Bad	7	Bad	--	--	12	Bad	--	--	--	--	--	--	5	Bad	--	--

-- = no information; bad = data quality too poor to ascertain an adjustment factor; dB = decibel; E = east; HRG = high-resolution geophysical; m = meter; MF = mid-frequency; na = not applicable; no data = buoy did not function; N = north; S = south; W = west.

A.4 Appendix A: Bibliography

Halvorsen, M.B. and K.D. Heaney. 2018. Propagation characteristics of high-resolution geophysical surveys: open water testing. U.S. Department of the Interior, Bureau of Ocean Energy Management, Sterling, VA. Prepared by CSA Ocean Sciences Inc. OCS Study BOEM 2018-052. 806 pp.