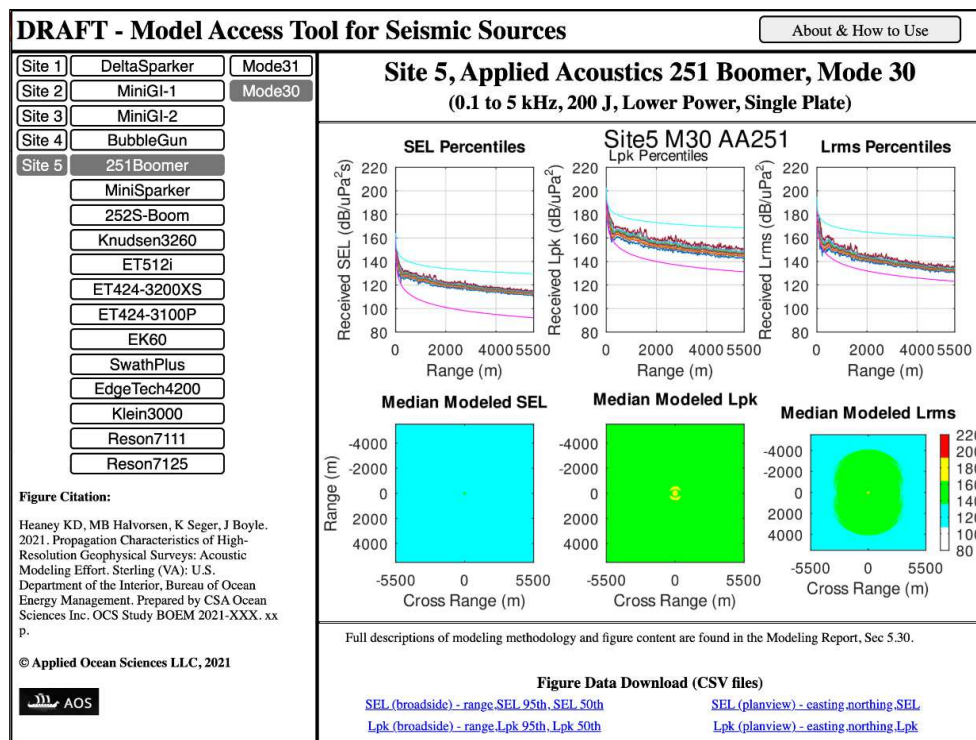


Propagation Characteristics of High-Frequency Sounds Emitted During High-Resolution Geophysical Surveys: Acoustic Modeling Effort

Webtool User Manual



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REPORT AVAILABILITY

To download a PDF file of the report affiliated with this User Manual, go to the U.S. Department of the Interior, Bureau of Ocean Energy Management [Data and Information Systems webpage](http://www.boem.gov/Data-and-Information-Systems-webpage) (<http://www.boem.gov/Environmental-Studies-EnvData/>), click on the link for the Environmental Studies Program Information System (ESPIS), and search on 2021-039. The report is also available at the National Technical Reports Library at <https://ntrl.ntis.gov/NTRL/>.

REPORT CITATION

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Contents

1.0	Web Tool Page Commands	1
2.0	Web Tool Model Interpretations	3
3.0	Literature Cited	4

1.0 Web Tool Page Commands

After navigating to the website, there are five buttons or links (**Figure 1**) to use in viewing and downloading model figures and .csv files:

1. Select Site
2. Select Source
3. Select operational Mode of the source - the results figure will appear as well as the links to the associated .csv files
4. Select a .csv file to download matrices of values for range vs received level for each percentile's values or for median plan views
5. Use the About & How to Use button for additional information

Steps 1 to 3 can be done interchangeably. The results image will not appear until all three parameters have been selected.

The links to the .csv files appear below the figure, the broadside percentiles are on the left, and the plan view medians are on the right. The .csv files contain the values that were used to generate each plot. For the broadside percentile.csv files, the 50th and 95th percentile values for the metrics (SEL, L_{pk} , and L_{rms}) are provided. Within the percentile .csv files, data are arranged into three columns. The left column is range steps and each row down is 10 m further from the source. The middle column is the 50th percentile and the last column on the right is the 95th percentile. For the plan view .csv files, the median metric values (for each SEL, L_{pk} , and L_{rms}) are provided. For the plan view .csv files, data are arranged into a matrix of values in the exact dimensions as viewed on the images whereby range and cross-range are the rows and columns, respectively, at 20 m spacing and the source is the center value of the matrix. These .csv files are provided for the user to display the data in the way most amenable to their need, like extracting a single percentile, displaying fewer percentile lines, or overlaying data on their own models for visual comparison.

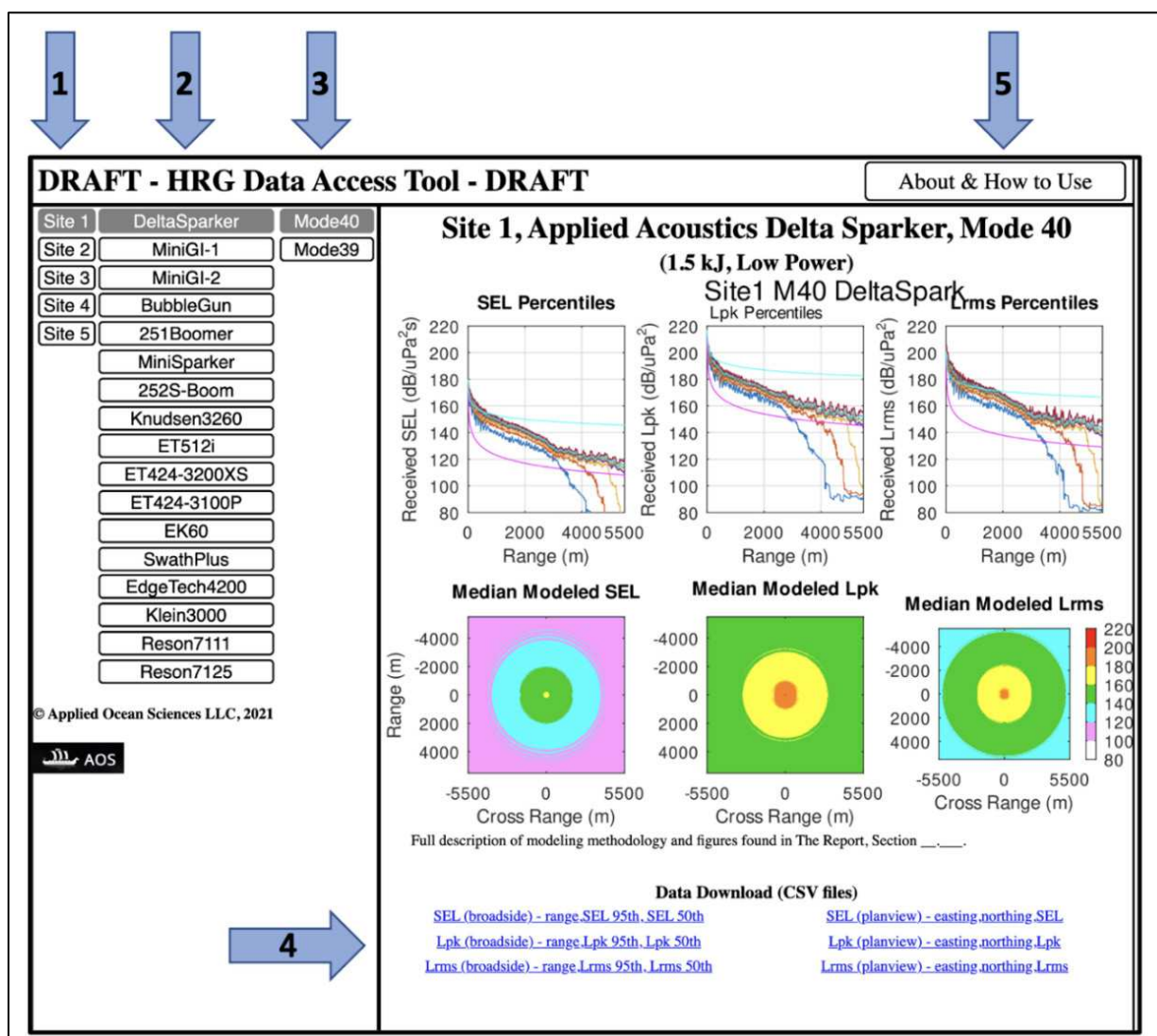


Figure 1. Web Tool interface

To view a figure, select a site (1), a source (2), and a source mode (3). Figure loads as well as .csv files below the figure (4). Select the 'About & How to Use' button for further instructions (5) at the top right.

2.0 Web Tool Model Interpretations

Usage of the HRG Web Tool assumes that the user has a basic understanding of acoustics, oceanography, and HRG sources and has read “*The Acoustic Modeling Effort*” by Heaney et al. (2021) which is the main report for this project. The reader should refer to each section in “*The Acoustic Modeling Effort*” for source-specific information such as the spectra, directionality, source settings, and other acoustic model parameters.

The ocean environment is highly variable. These models were run through 11 different grain sizes, 11 source depth values, and receiver positions that were grouped in 20-m ranges over all depths. Received signals that these models were compared against for validation were collected during sea states 0 or 1. Therefore, not all environmental and field test variability is contained in these models.

The data in this report need to be carefully interpreted given the layers of complexity involved in the collection, troubleshooting, and modeling phases. This report is intended to be transparent to both the troubleshooting solutions employed in processing *in situ* data and the presence of noise in the data when compared to models. Uncertainty was incorporated into the models as much as possible to reflect realities like environmental conditions constantly changing in the ocean and positions of receivers changing with the current strength. With these uncertainties and troubleshooting methods in mind, the data and modeling reported here apply only to these five sites during summer conditions in calm seas. Extrapolation to other sites in different seasons and under different weather conditions should only be performed in collaboration with an underwater acoustician to incorporate the influence of environmental parameters and how the variety of signals could most likely propagate in said environments.

3.0 Literature Cited

Heaney KD, MB Halvorsen, KD Seger, KJ Boyle. 2021. Propagation characteristics of high-resolution geophysical surveys: acoustic modeling effort. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. Prepared by CSA Ocean Sciences Inc. OCS Study BOEM 2021-021. 289 p + apps.