

Echoview 10 release notes

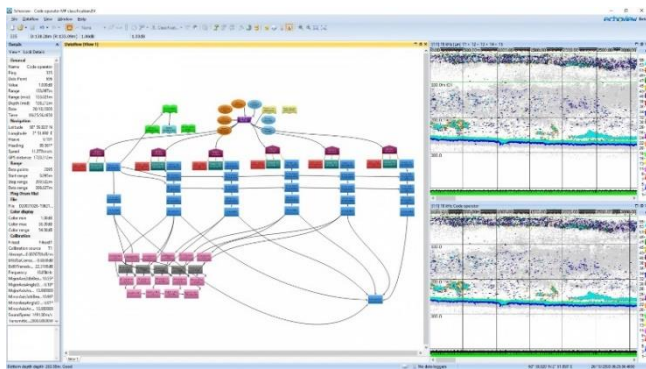
Echoview Software is committed to improving the depth and efficiency of your acoustic data processing, regardless of your processing methodology. We are pleased to introduce features in Echoview 10 that will improve processing speed and simplify your workflow.

Echoview 10 is available to all license holders with an up-to-date Maintenance and Technical Support (MATS) subscription. To find out if your MATS subscription is current please contact sales@echoview.com.

Code operator

Echoview 10 includes a new virtual variable called the Code operator, which has a built-in Python interpreter and can be used for custom algorithm development. This new operator is licensed with the Advanced Operators module.

The Code operator takes advantage of Echoview's abilities to read and visualize hydroacoustic data, whilst applying any algorithm provided in a Python source file. Echoview supports and includes the Python NumPy and SciPy libraries which offer a wide range of open-source scientific computing and numerical integration capabilities. Python is a popular and fast-growing programming language, with a wide variety of frameworks, libraries and IDEs available for data analysis.



The Code operator can be used to reduce multiple complex Dataflow steps into a single-step operation.

The Dataflow window shown in the image above includes 20 variables in pink and grey that are required to generate the composite echogram described in Jech and Michaels (2006). The Code operator can be used to reduce these 20 variables into a single step, which is the object in the bottom-right corner of the Dataflow window. The echograms show the output for the 20-step process on the top and the single Code operator step on the bottom, which is identical. Note that a custom color scheme has been applied to these echograms.

Code operator variables can be incorporated into your workflow in the Echoview Dataflow window, and the resulting output can be viewed as an echogram. Python files can easily be shared between EV files and with other users.

The Code operator is a highly flexible alternative to using Echoview's Formula operator, and is easier than exporting data to MATLAB or other formats for further manipulation with limited visualization capabilities.

```
Example.py
1 from echoview import OperatorBase, MeasurementType
2 import numpy as np
3
4 class Operator(OperatorBase):
5     """Multifrequency classification as per Jech and Michaels (2006)"""
6
7     def eval(self, inputs):
8         ping_data = np.copy(inputs[0].measurement.data)
9         targetDB = -66.00 # Data threshold
10
11         for x in range(0, ping_data.size):
12             sampleSum = 0
13             if inputs[0].measurement.data[x] >= targetDB:
14                 sampleSum+=1
15             if inputs[1].measurement.data[x] >= targetDB:
16                 sampleSum+=3
17             if inputs[2].measurement.data[x] >= targetDB:
18                 sampleSum+=9
19             if inputs[3].measurement.data[x] >= targetDB:
20                 sampleSum+=7
21             if inputs[4].measurement.data[x] >= targetDB:
22                 sampleSum+=13
23
24         ping_data[x] = sampleSum
25         return ping_data
26
```

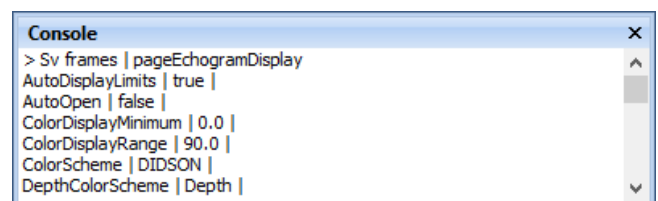
The Python function used by the Code operator described above.

The Command interface and Console dialog box

The Command interface is a new and alternative way to control Echoview, with Echoview 10 including the ability to read and edit variable properties. It uses simple, string-based syntax to identify variables and specify actions, with a flat structure and filtering that allows for efficient use.

The Command interface can be accessed via COM or using the Console dialog box, which includes automatic completion of object and action names to reduce typing to a minimum. VBScript files can be automatically generated from Console content.

The Command interface is licensed with the Automation module.

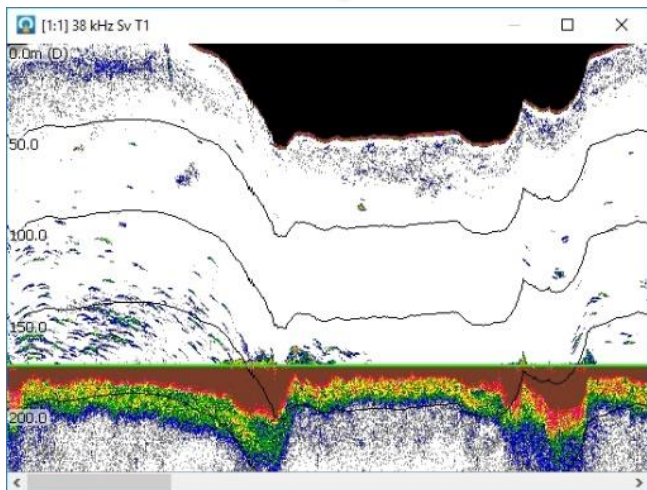
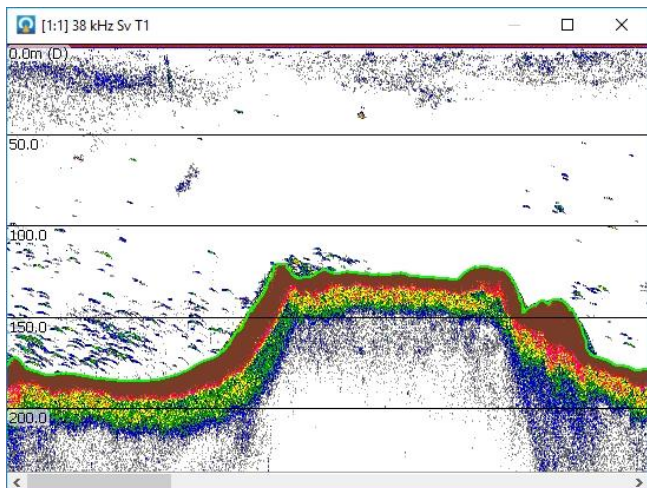


The Console dialog box.

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Line-referenced echogram view

Echoview 10 will include a new option: the ability to view pings referenced to a line. Sometimes referred to as a bottom lock view, this option visually flattens data and provides a new perspective on your echograms.



Top: Original echogram with detected bottom line in green.
Bottom: Line-referenced echogram.

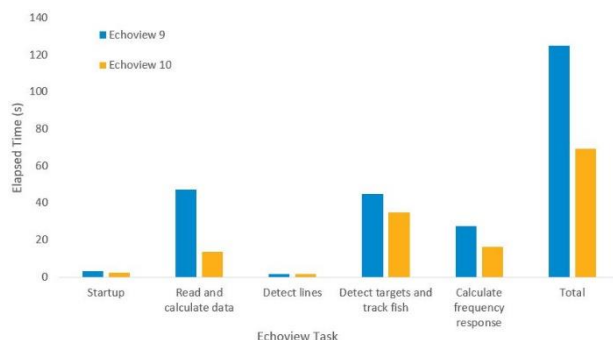
The line-referenced view is selected via an option in the Echogram Display page of the Variable Properties dialog box. While it's ideal to use with a bottom line in order to speed up checks on the success of the bottom detection algorithm, any line in an EV file can be used as the reference line.

When using this new option, you can define and edit all lines.

Faster calculations for Simrad EK80 data

We have introduced multithreading when loading and calculating Simrad EK80 sample data, which means that Echoview 10 is much faster for viewing echograms and performing analyses on pulse compressed variables derived from all supported products in the EK80 family of echosounders, including ES80, WBAT, EKAuto and Kongsberg EA640 data files. The change also includes the added benefit of being able to interact with Echoview while this data is being loaded and calculated.

Our tests show that Echoview 10 is more than 50% faster than Echoview 9 for viewing the full extent of pulse compressed echograms, and other downstream calculations (such as detecting targets, tracking fish, calculating wideband frequency response graphs and exporting results) also show performance improvements.



Comparison of Echoview 9 and Echoview 10 performance when using Simrad EK80 wideband data.

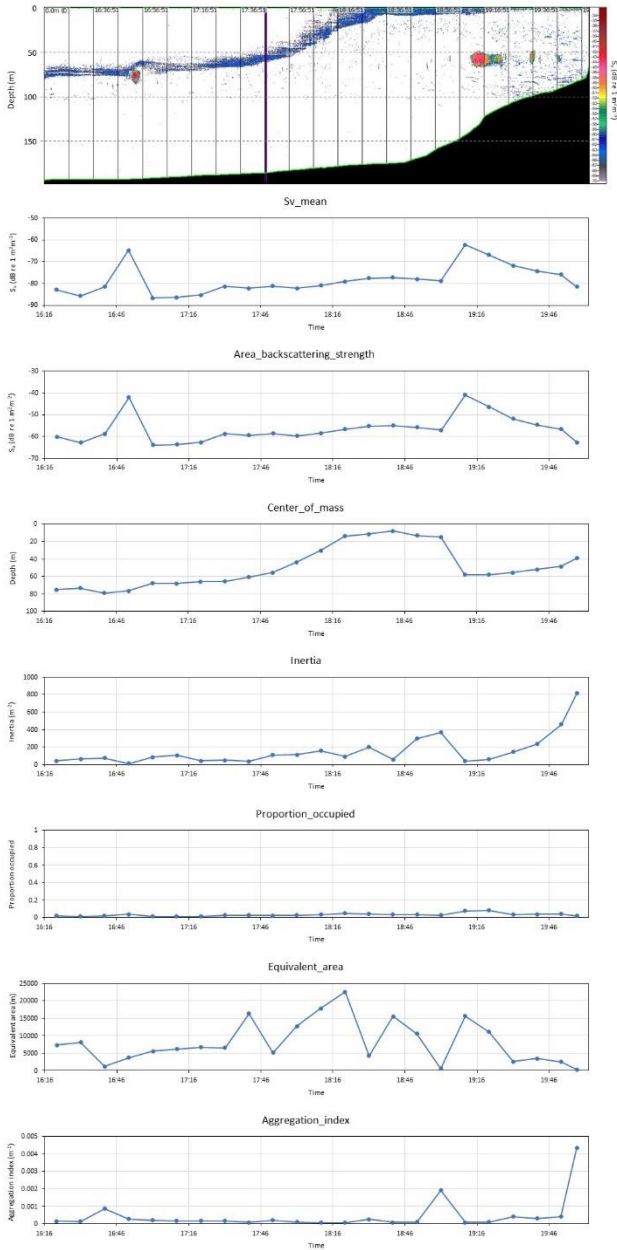
New analysis variables and exports

Echoview 10 includes five new analysis export variables that can be used to characterize vertical distributions of acoustic backscatter through time.

The new analysis variables are:

- Center of mass
- Inertia
- Proportion occupied
- Equivalent area
- Aggregation index

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AZFP echogram (data kindly shared by ASL Environmental) showing a euphausiid layer migrating to the surface plus several high-backscatter aggregations, with graphs for echointegration metrics below. Metrics were calculated for the full water column in 10-minute intervals.

The calculations for these echointegration metrics (or “echometrics”) are as described in Urmy S.S., Horne J.K., and Barbee D.H. (2012) Measuring the vertical distributional variability of pelagic fauna in Monterey Bay. ICES Journal of Marine Science, 69(2), 184–196.



The analysis variables can be included in the Analysis by Regions, Analysis by Cells, and Analysis by Regions by Cells integration exports.

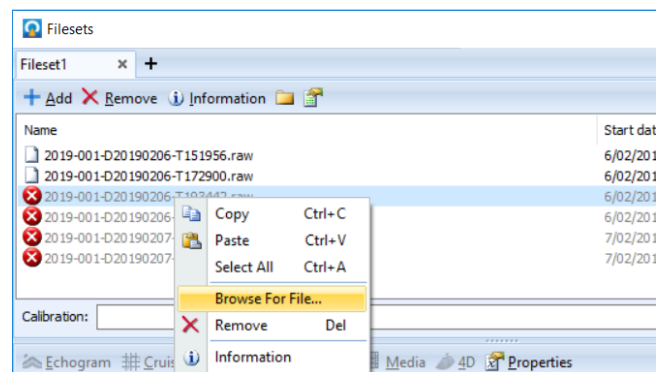
Echoview 10 also includes new analysis variables for altitude, a measure of the distance from the bottom and top of a region to the exclude-below line:

- Region bottom altitude max
- Region bottom altitude mean
- Region bottom altitude min
- Region top altitude max
- Region top altitude mean
- Region top altitude min

We have also included a new export that is compatible with the ICES acoustic trawl survey database in the CSV file format. New settings for required metadata values have also been added to the Transducer and EV File Properties dialog boxes.

Other improvements and additions

- Official support for the Kongsberg Mesotech Flexview .imb file format
- Efficiently locate data files that can't be found when opening an EV file by right-clicking and choosing to Browse for file



Use Browse For File to locate missing data files.

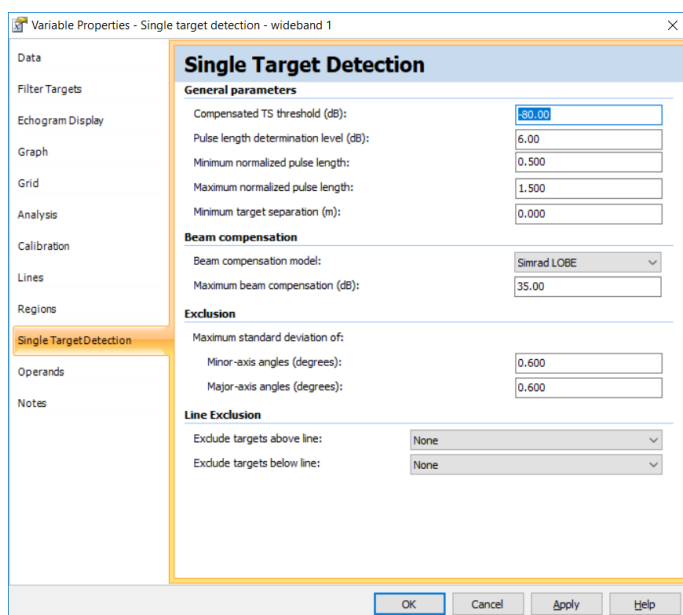
- New features that make it easier to explore and bring line data into Echoview:
 - Lines can now be exported to *.depth.csv files when exporting from a line graph, a line table, or a line object on the dataflow (all line points will be included). Export to *.line.csv files remains an option when exporting from an echogram window (one line measurement per ping will be included)

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- Both *.depth.csv and *.line.csv files are supported data file formats and can be added to Echoview Filesets – a much easier entry point than needing to edit *.evl files in earlier versions of Echoview
- Export of complex values from wideband data to CSV files from regions, selections and echograms
- Wideband frequency response data can now be exported for fish track regions in single target detection - wideband echograms
- Improvements and additions to the Single target detection - Wideband operator algorithm and settings:
 - A new setting, Minimum target separation, can be used to prevent or reduce the detection of multiple targets from a single object
 - Normalized calculations and settings, including the Minimum and Maximum Normalized Pulse Length operator settings, now use the pulse compressed effective pulse length, which is more appropriate for pulse compressed data than the transmitted pulse length
 - TS of a target is calculated using the peak sample in the identified power pulse

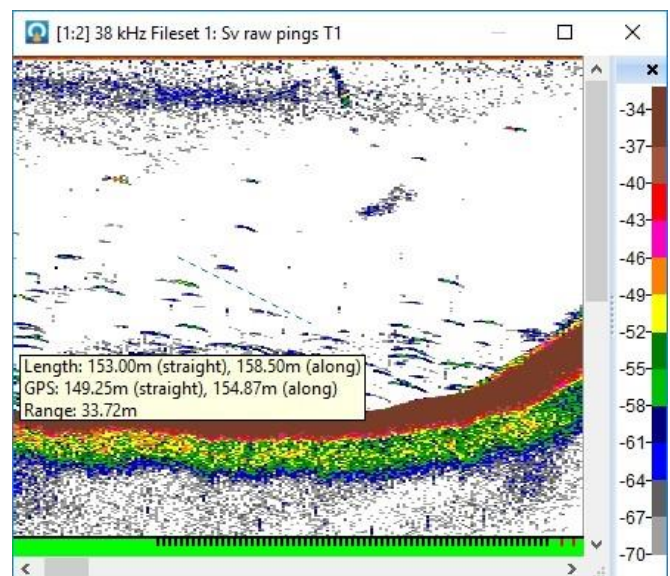
of raw variables based on frequency features that were introduced in Echoview 9

- The Threshold offset operator now also allows the detection of the maximum threshold as well as the minimum threshold
- New shortcut keys:
 - CTRL+SHIFT+P to force a calculation of all samples in the active echogram
 - F9 to show or hide the Details dialog box
- The single beam line pick algorithms now allow negative start and stop depths for bottom detection
- The Tape measure tool now displays five measurements when measuring distances between two or more points on an echogram:
 - Length straight-line distance
 - Length along-track distance
 - GPS straight-line distance
 - GPS along-track distance
 - Range



Single target detection - wideband operator settings.

- ASL Environmental Sciences' AZFP file format can now be used with the automatic creation of transducers for different frequencies and the derivation



Tape measure tool metrics.

Echoview 10 is compatible with Windows 7, Windows 8.1 and Windows 10, and can only be installed on 64-bit editions of these operating systems.

A full list of features can be found on the "New in Echoview 10" pages in the help file that's installed with Echoview 10.