dBSea

Underwater sound propagation prediction

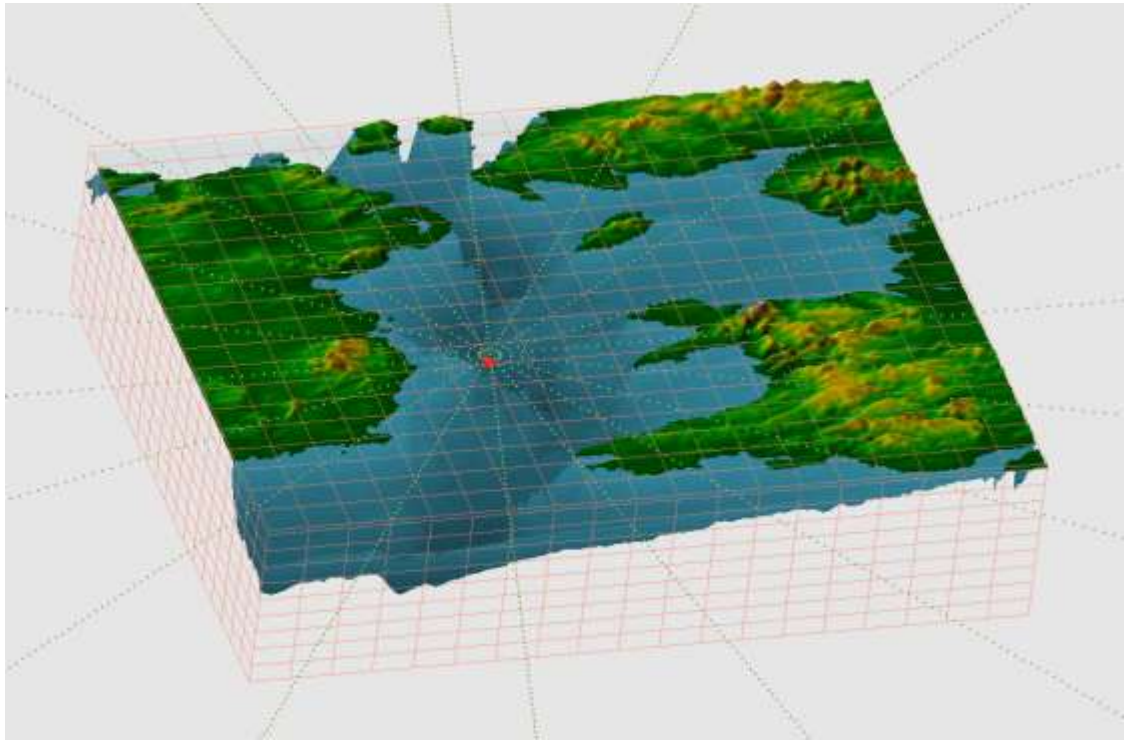
Client(s):
Anyone who views this document/presentation

Background:

- Increased awareness that marine noise is a significant pollutant.
- Acknowledgement that neither spreadsheet models or complicated coding interface models were conducive to good practise in impact assessment.

Key features of dBSea

- Industry leading propagation modelling,
- Full range dependency for all environmental variables
- Any number of moving or stationary sources
- User friendly interface, data input and results export.



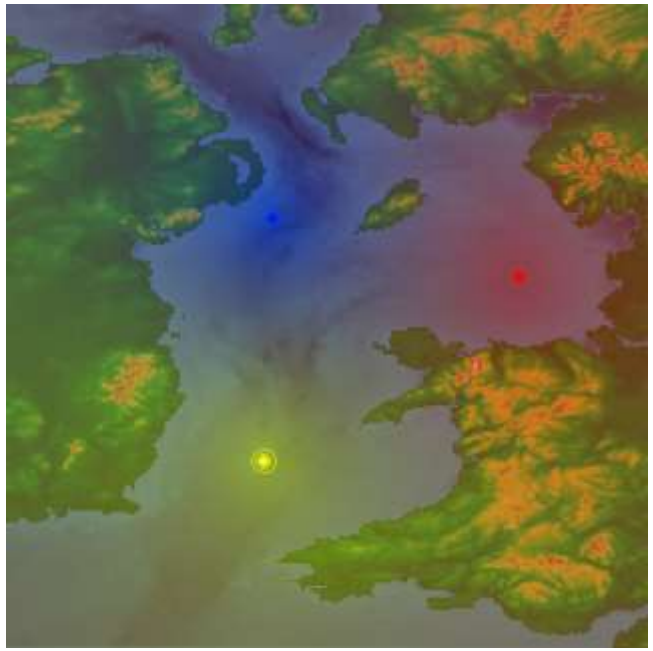
Propagation modelling

dBSea uses 3 advanced propagation solvers to cover frequencies from 10 Hz to 168 Hz

- dBSeaPE – a parabolic equation solver, ideal for low frequency propagation problems
- dBSeaModes – a normal modes solver, compliments dBSeaPE for low frequency problems
- dBSeaRay – a ray tracing solver, applicable to all frequencies but excels at high frequencies
- Any combination of solvers can be used

Environmental variables

- Import Sound speed profile, sediment profile, bathymetry, current, temperature and salinity with copy/paste operations.
- Or if you have a lot of data, dBSea supports JSON script import



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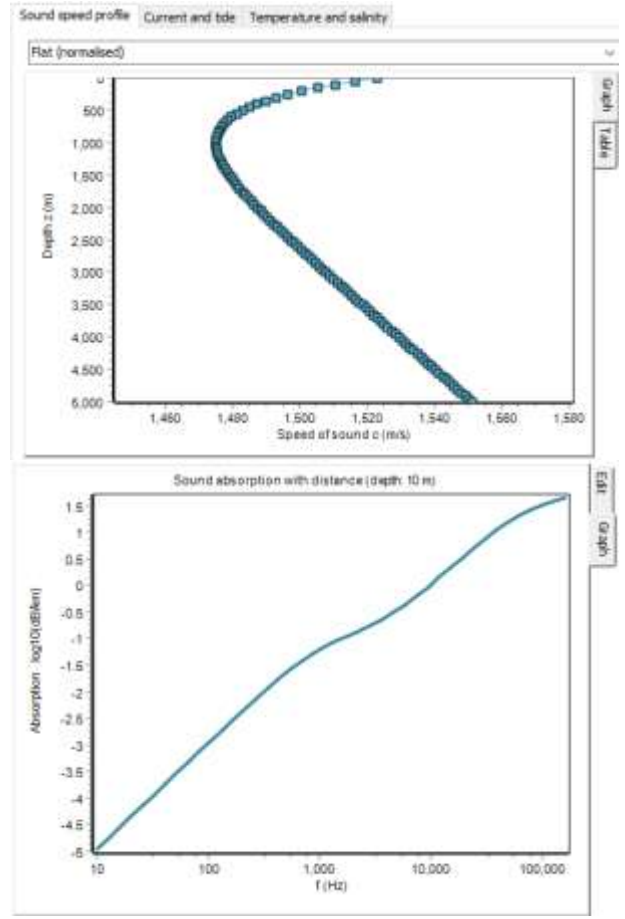
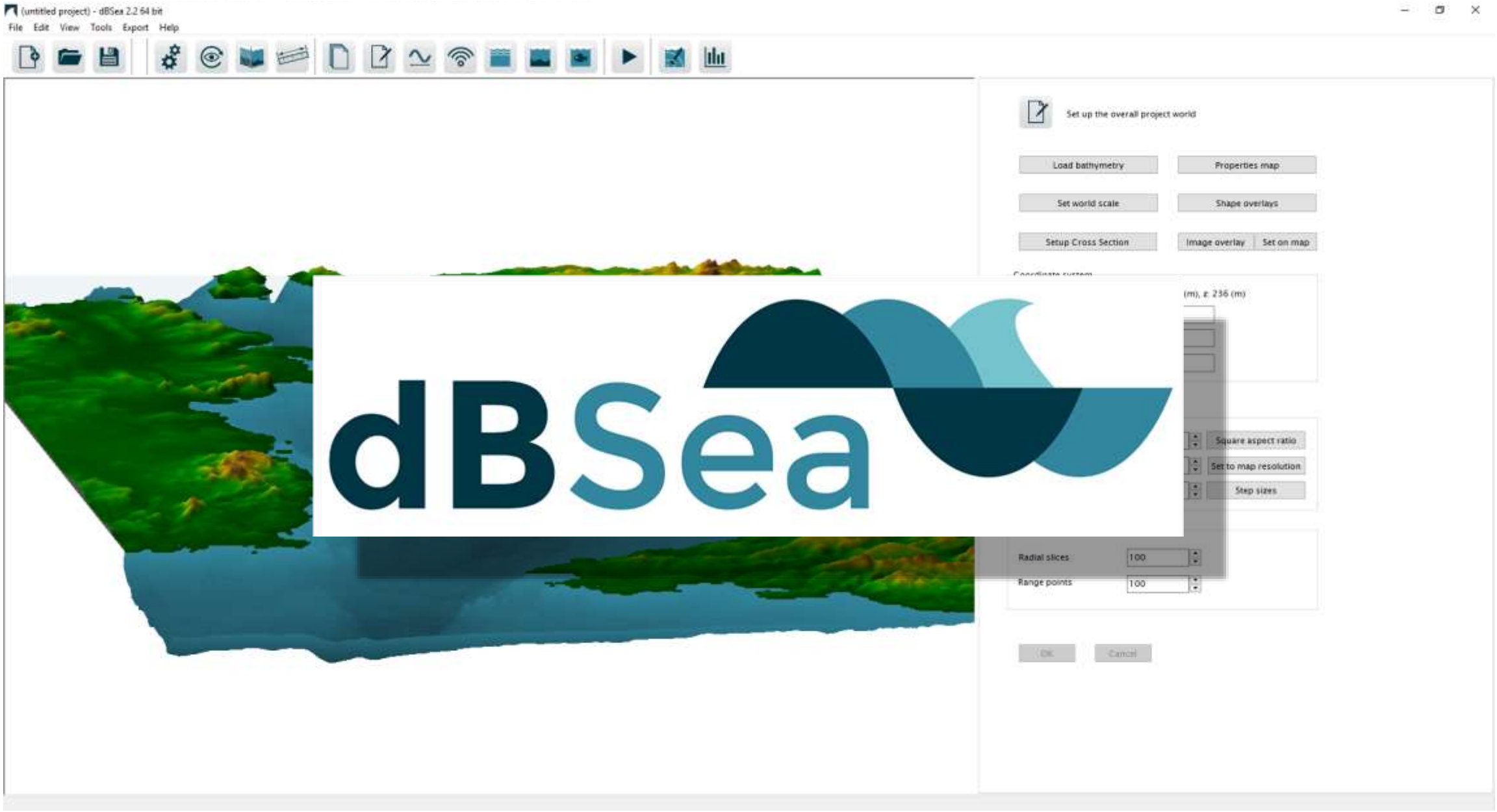
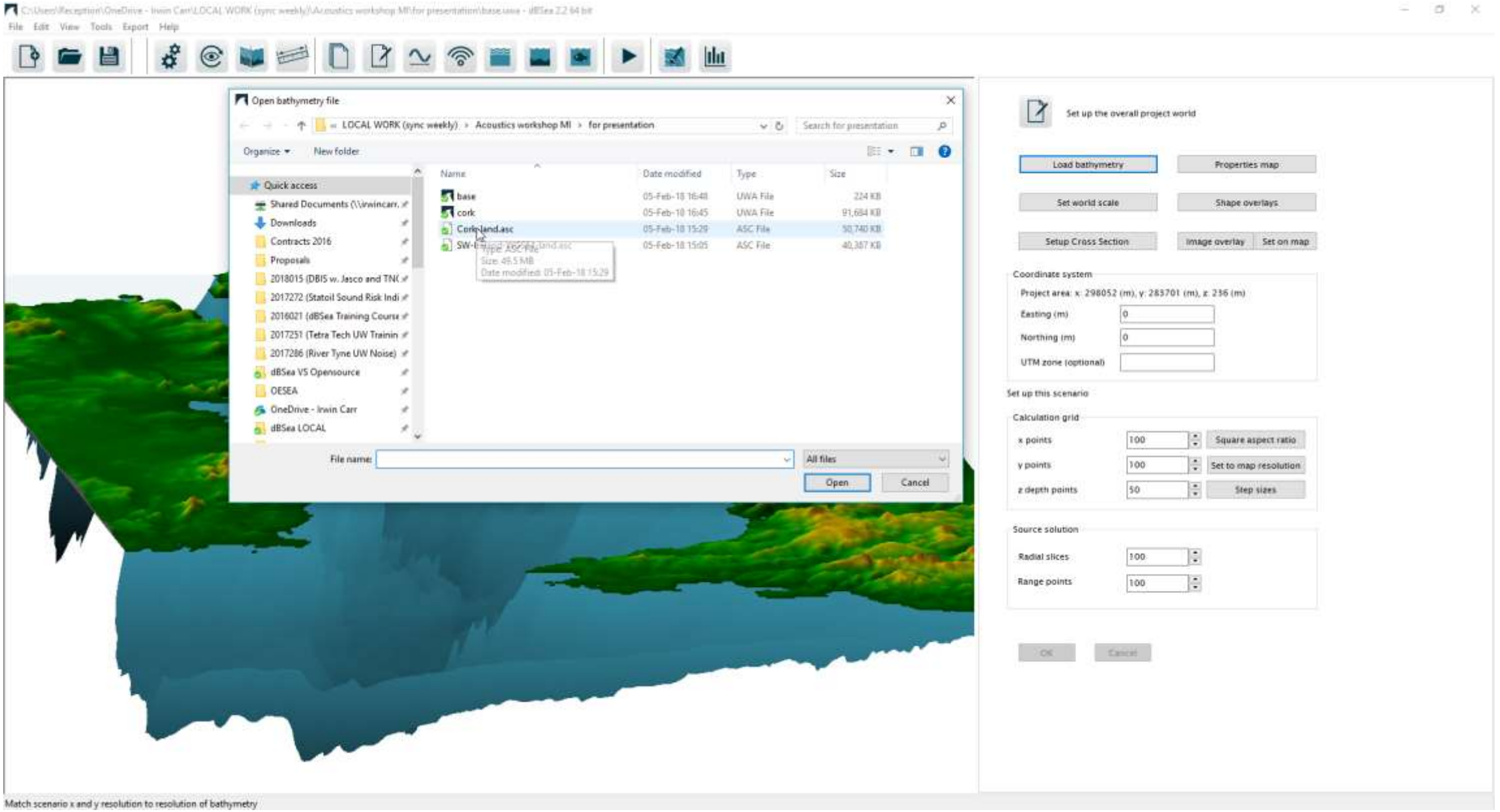
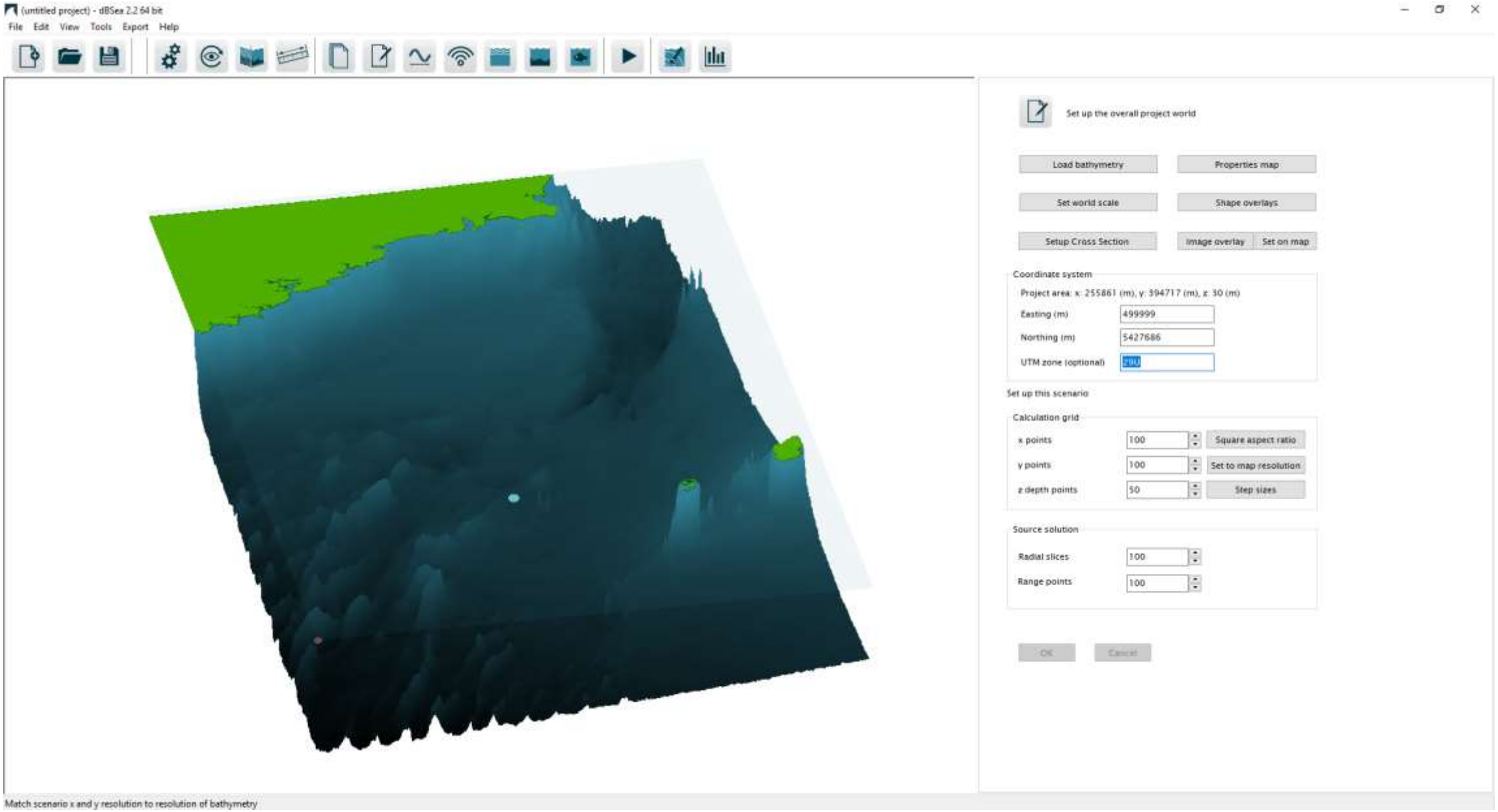


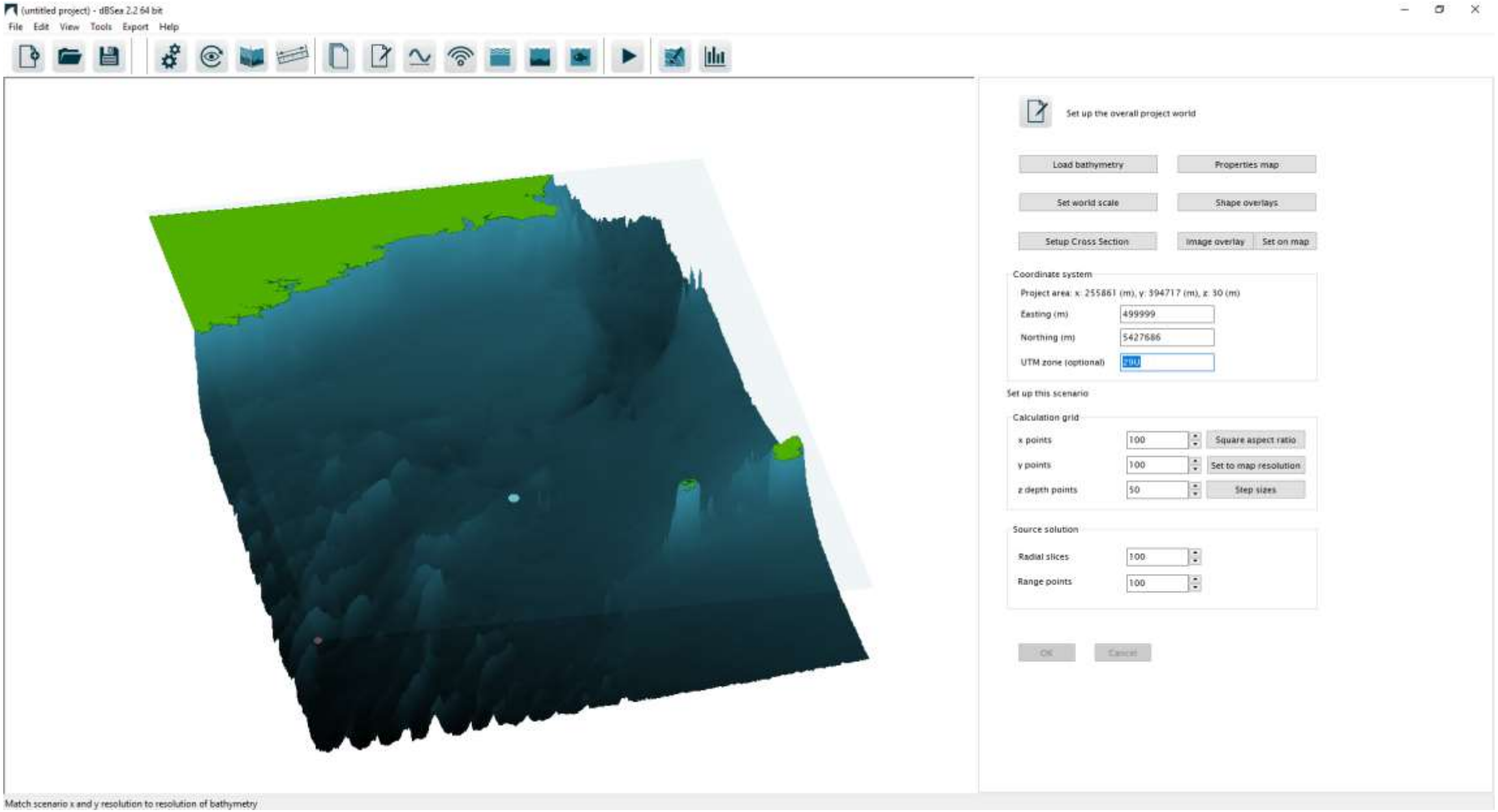
Work flow


(untitled project) - dBSea 2.2 64 bit
File Edit View Tools Export Help
Set up the overall project world
Load bathymetry
Properties map
Set world scale
Shape overlays
Setup Cross Section
Image overlay
Set on map
Square aspect ratio
Set to map resolution
Step sizes
Radial slices
100
Range points
100
OK
Cancel
dBSea

dBSea


File Edit View Tools Export Help
Open bathymetry file
LOCAL WORK (sync weekly) › Acoustics workshop MI › for presentation
Search for presentation
Organize
New folder
Quick access
Shared Documents (\\irwincarr...
Downloads
Contracts 2016
Proposals
2018015 (DBIS w. Jasco and TNO
2017272 (Statoil Sound Risk Indi
2016021 (dBSea Training Course
2017251 (Tetra Tech UW Trainin
2017286 (River Tyne UW Noise)
dBSea V5 Opensource
OESEA
OneDrive - Irwin Carr
dBSea LOCAL
Name
Date modified
Type
Size
base
05-Feb-18 16:48
UWA File
224 KB
cork
05-Feb-18 16:45
UWA File
91,684 KB
Corkland.asc
05-Feb-18 15:29
ASC File
50,740 KB
05-Feb-18 15:05
ASC File
40,387 KB
Type: ASC File
Size: 49.5 MB
Date modified: 05-Feb-18 15:29
File name:
All files
Open
Cancel
Set up the overall project world
Load bathymetry
Properties map
Set world scale
Shape overlays
Setup Cross Section
Image overlay
Set on map
Coordinate system
Project area: x: 298052 (m), y: 283701 (m), z: 236 (m)
Easting (m)
0
Northing (m)
0
UTM zone (optional)
Set up this scenario
Calculation grid
x points
100
Square aspect ratio
y points
100
Set to map resolution
z depth points
50
Step sizes
Source solution
Radial slices
100
Range points
100
OK
Cancel
Match scenario x and y resolution to resolution of bathymetry


(untitled project) - dBSea 2.2 64 bit
File Edit View Tools Export Help
Set up the overall project world
Load bathymetry
Properties map
Set world scale
Shape overlays
Setup Cross Section
Image overlay
Set on map
Coordinate system
Project area: x: 255861 (m), y: 394717 (m), z: 30 (m)
Easting (m)
499999
Northing (m)
5427686
UTM zone (optional)
30U
Set up this scenario
Calculation grid
x points
100
Square aspect ratio
y points
100
Set to map resolution
z depth points
50
Step sizes
Source solution
Radial slices
100
Range points
100
OK
Cancel
Match scenario x and y resolution to resolution of bathymetry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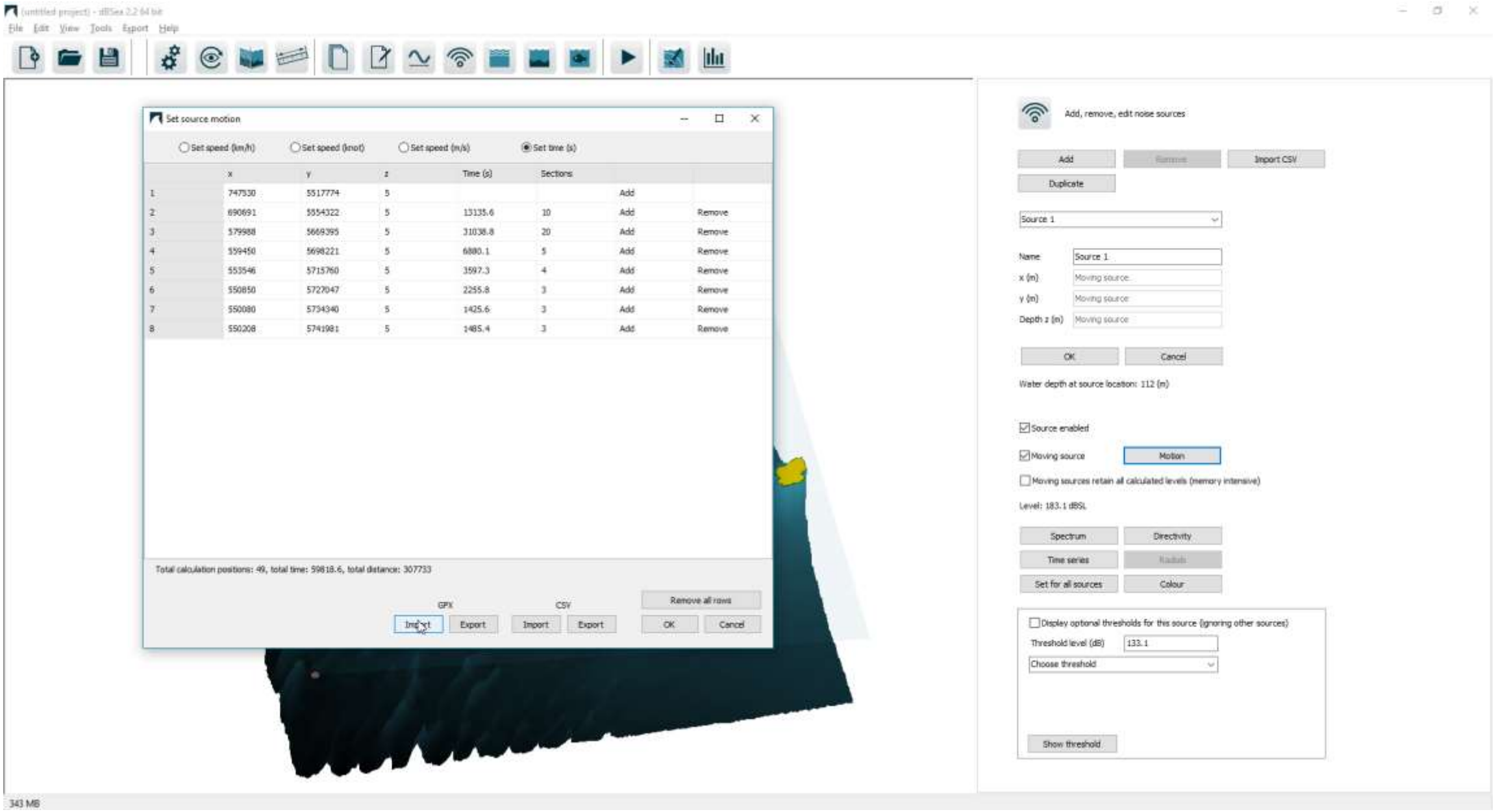
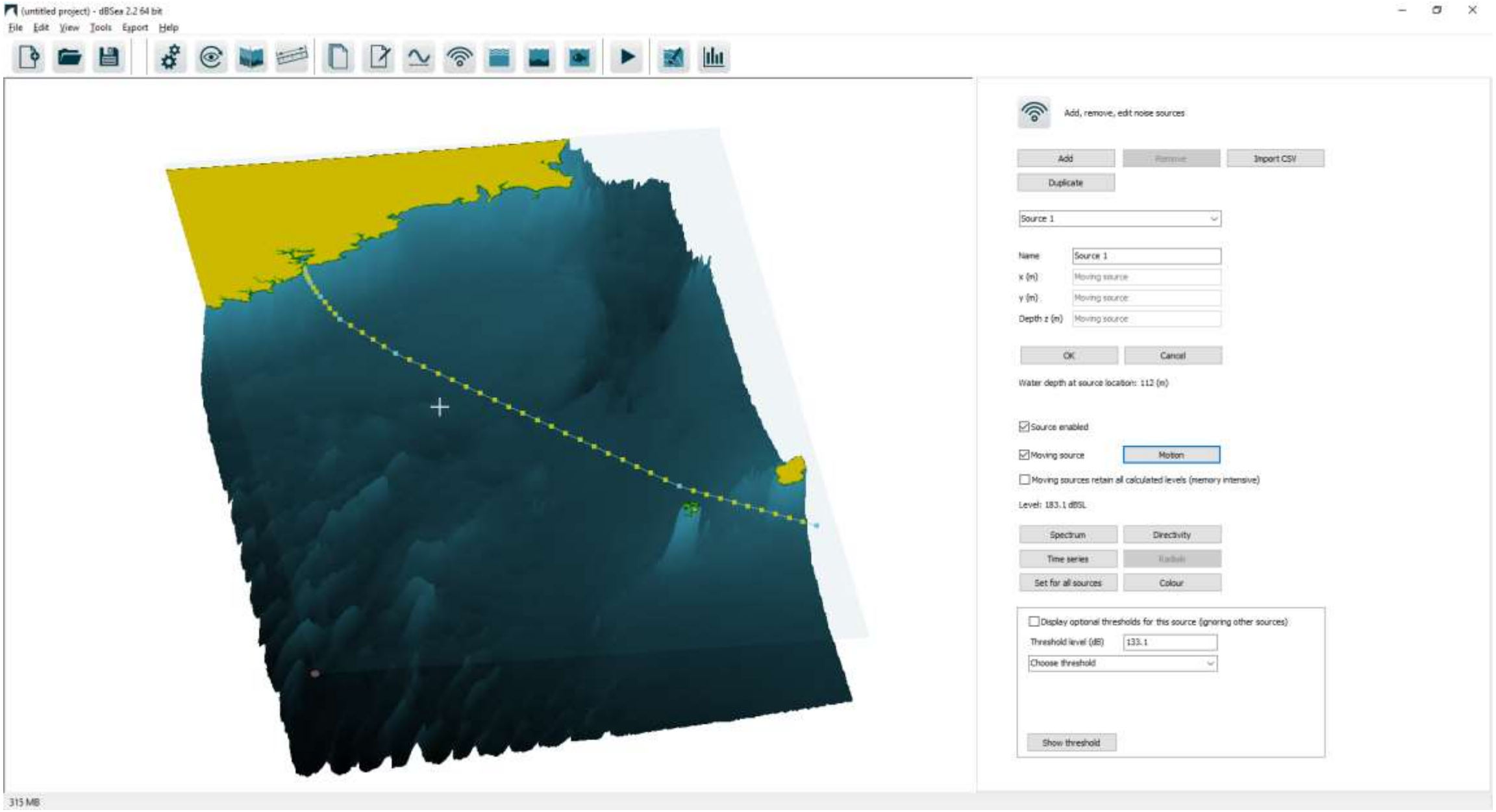
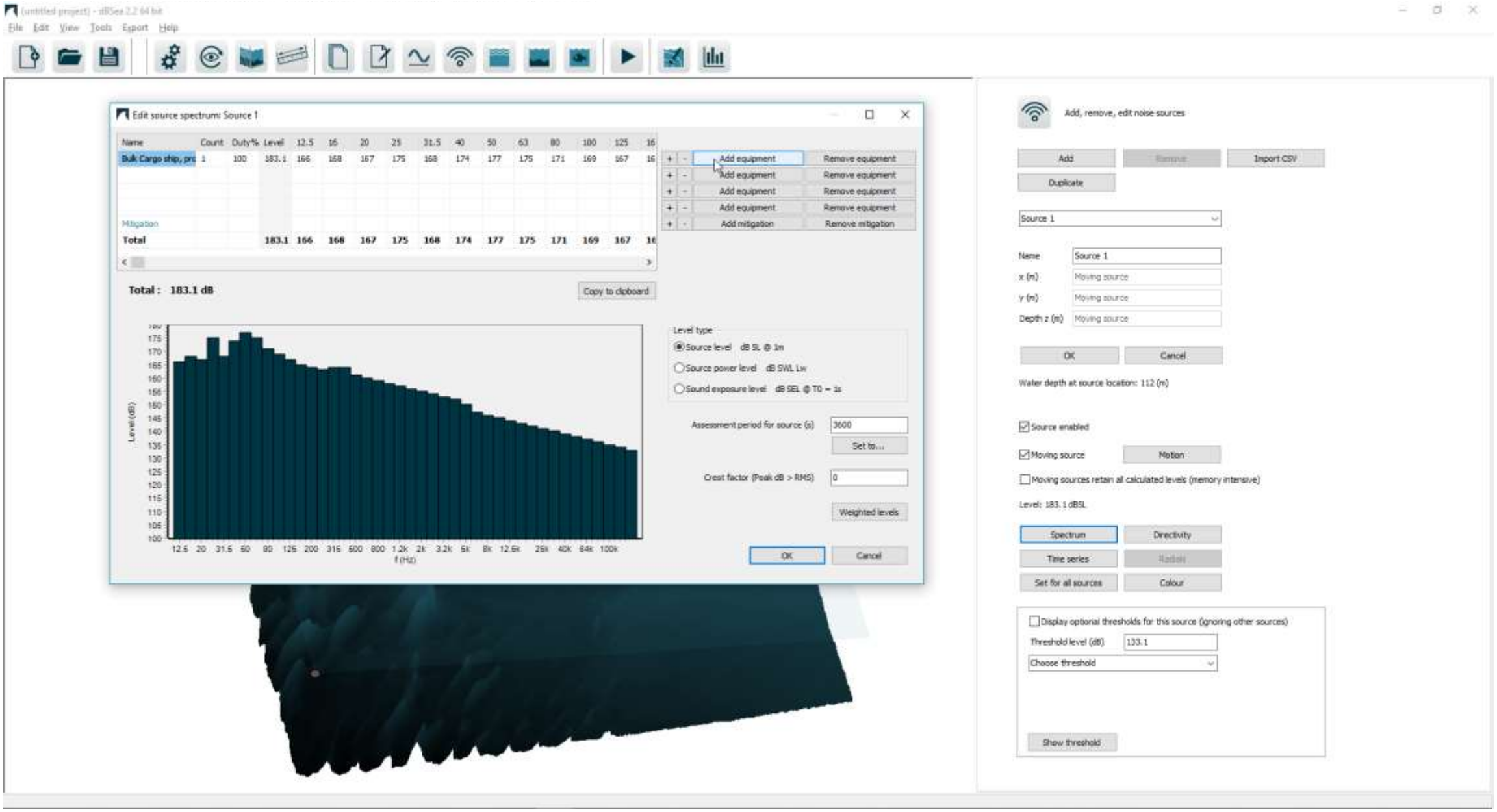
100
Range points
100
OK
Cancel
Match scenario x and y resolution to resolution of bathymetry


(untitled project) - dBSea 2.2 64 bit
File Edit View Tools Export Help
Set source motion
Set speed (km/h)
Set speed (knot)
Set speed (m/s)
Set time (s)
x
y
z
Time (s)
Sections
1 747530 5517774 5 Add
2 690691 5554322 5 13135.6 10 Add Remove
3 579988 5669395 5 31038.8 20 Add Remove
4 559450 5698221 5 6880.1 5 Add Remove
5 553546 5715760 5 3597.3 4 Add Remove
6 550850 5727047 5 2255.8 3 Add Remove
7 550080 5734340 5 1425.6 3 Add Remove
8 550208 5741981 5 1485.4 3 Add Remove
Total calculation positions: 49, total time: 59818.6, total distance: 307733
GPX
Import
Export
CSV
Import
Export
Remove all rows
OK
Cancel
Add, remove, edit noise sources
Add
Remove
Import CSV
Duplicate
Source 1
Name
Source 1
x (m)
Moving source
y (m)
Moving source
Depth z (m)
Moving source
OK
Cancel
Water depth at source location: 112 (m)
Source enabled
Moving source
Motion
Moving sources retain all calculated levels (memory intensive)
Level: 183.1 dBSL
Spectrum
Directivity
Time series
Radials
Set for all sources
Colour
Display optional thresholds for this source (ignoring other sources)
Threshold level (dB)
133.1
Choose threshold
Show threshold
343 MB


(untitled project) - dBSea 2.2 64 bit
File Edit View Tools Export Help
Add, remove, edit noise sources
Add
Remove
Import CSV
Duplicate
Source 1
Name
Source 1
x (m)
Moving source
y (m)
Moving source
Depth z (m)
Moving source
OK
Cancel
Water depth at source location: 112 (m)
Source enabled
Moving source
Motion
Moving sources retain all calculated levels (memory intensive)
Level: 183.1 dBSL
Spectrum
Directivity
Time series
Radials
Set for all sources
Colour
Display optional thresholds for this source (ignoring other sources)
Threshold level (dB)
133.1
Choose threshold
Show threshold
315 MB

dBSea


Edit source spectrum: Source 1
Total : 183.1 dB
Copy to clipboard
Add equipment
Remove equipment
Add mitigation
Remove mitigation
Level type
Source level dB SL @ 1m
Source power level dB SWL Lw
Sound exposure level dB SEL @ T0 = 1s
Assessment period for source (s)
3600
Set to...
Crest factor (Peak dB > RMS)
Weighted levels
OK
Cancel
Add, remove, edit noise sources
Add
Import CSV
Duplicate
Source 1
Name
x (m)
y (m)
Depth z (m)
Moving source
Water depth at source location: 112 (m)
Source enabled
Moving source
Motion
Moving sources retain all calculated levels (memory intensive)
Level: 183.1 dBSL
Spectrum
Directivity
Time series
Set for all sources
Colour
Display optional thresholds for this source (ignoring other sources)
Threshold level (dB)
133.1
Choose threshold
Show threshold

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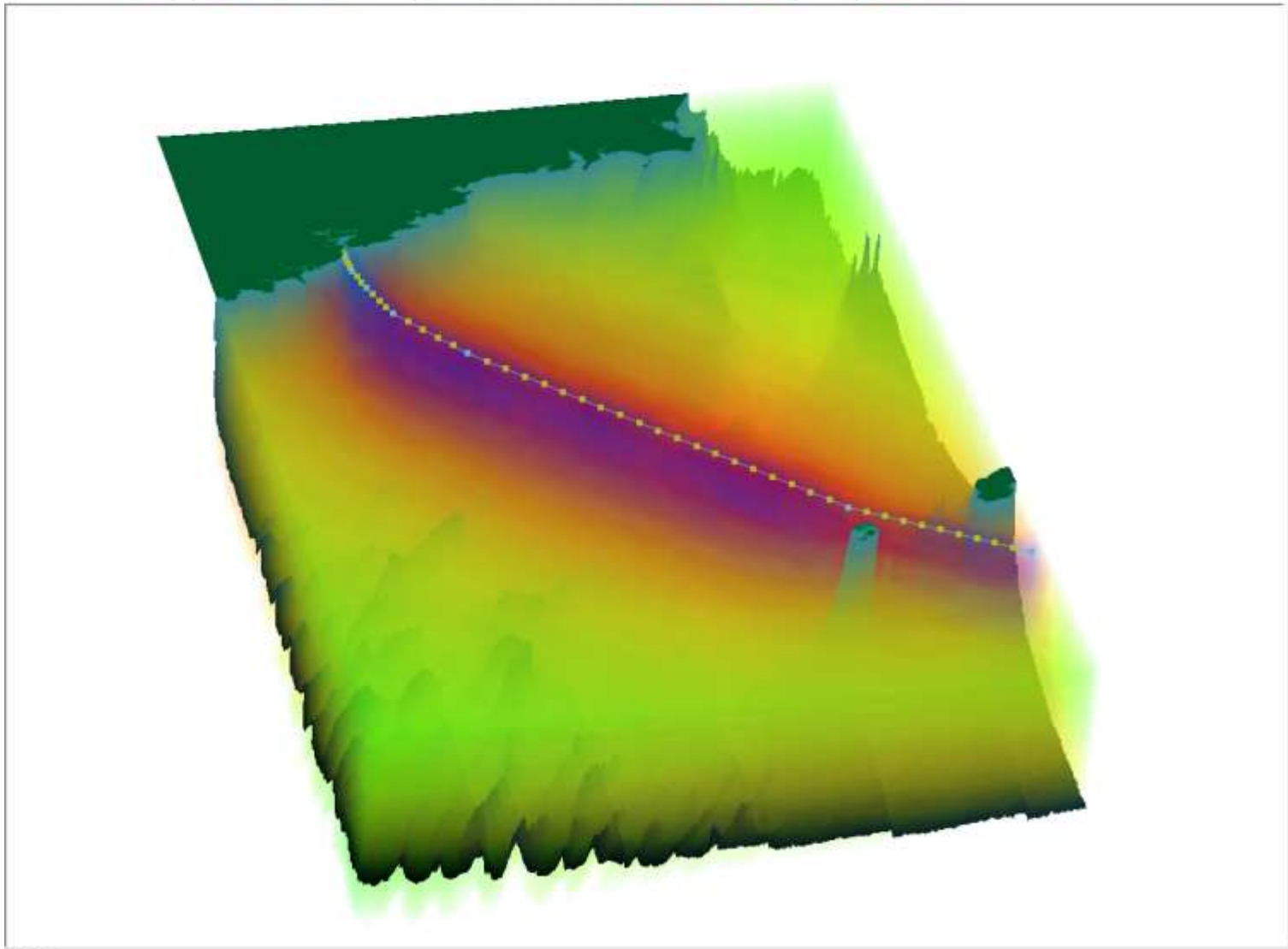
File Edit View Tools Export Help

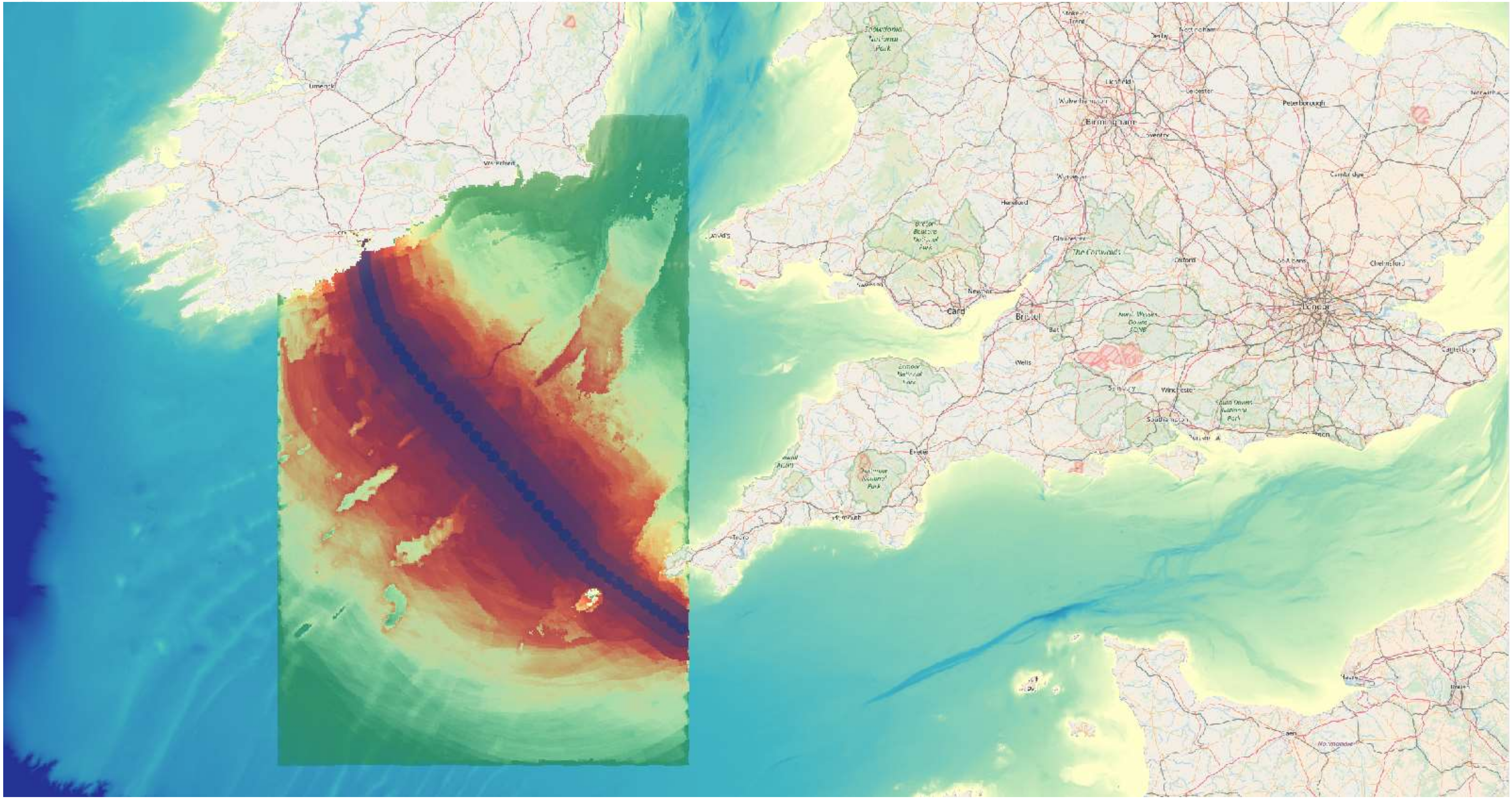


Marine species weightings

None

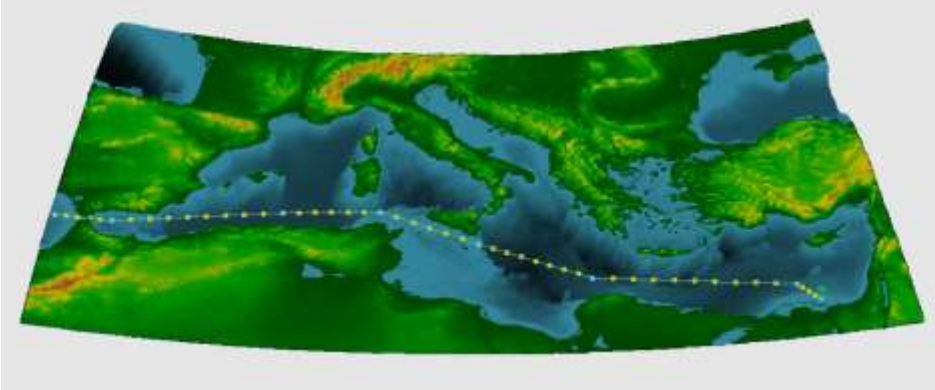
None
NOAA LF cetaceans (low frequency)
NOAA MF cetaceans (mid frequency)
NOAA HF cetaceans (high frequency)
NOAA phocid pinnipeds (earless seals)
NOAA otariid pinnipeds (eared seals)
NOAA sirenians (manatees and dugongs)
Cod
Haddock
Zander
Pollack
Atlantic salmon
Sardine
Catfish
Harbour porpoise
Killer whale
Bottlenose dolphin
Beluga whale
Harbour seal
Deprecated NOAA LF cetaceans
Deprecated NOAA MF cetaceans
Deprecated NOAA HF cetaceans
Deprecated NOAA Phocid pinnipeds
Deprecated NOAA Otariid pinnipeds
Phocoena phocoena
Atlantic Cod
Plaice
Dab
Pollock
Herring
Grey Seal
Harbour Seal
fin whale
Minke whale
Orcs orcinus
Tursiops truncatus
NOAA LF Species TTS
NOAA MF Species TTS
NOAA HF Species TTS
NOAA PW Species TTS
NOAA OW Species TTS
Human AIR dB(A) weighting
Human Underwater Modelled
Human underwater, Modelled, normalised
Pelagic Fish, excl. Clupeiformes
NOAA OW (Otariid, Eared Seals)
Fish, pelagic + Demersal
NOAA PW (Phocid, True Seals)

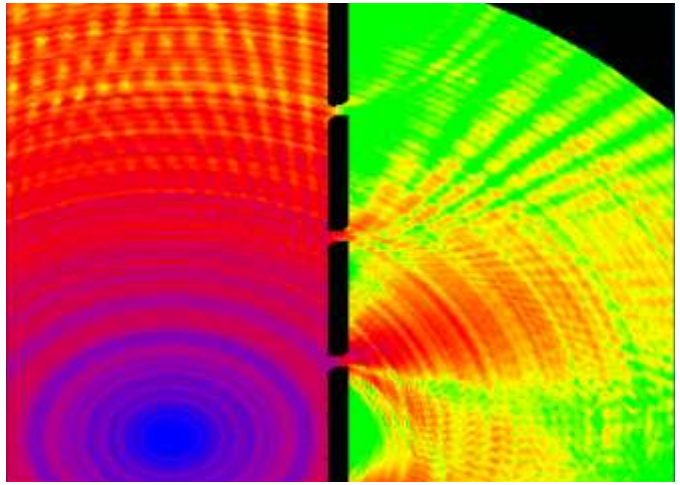
1.58 GB



Sources and probes

- Import any number of sources and probes, either moving or stationary, from csv or GPX files
- Soon to have autonomous “animats” that populate and move around the scenario according to sound levels, conspecifics and the environment, while being exposed to noise.

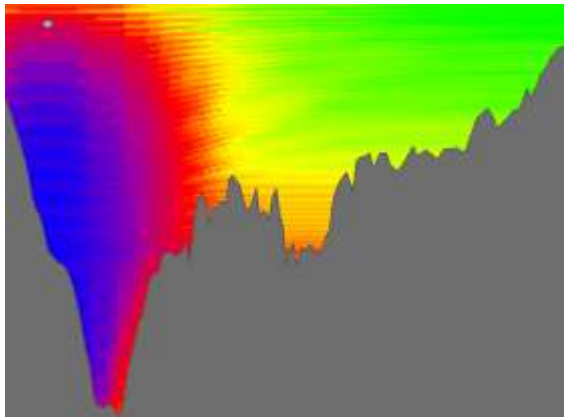


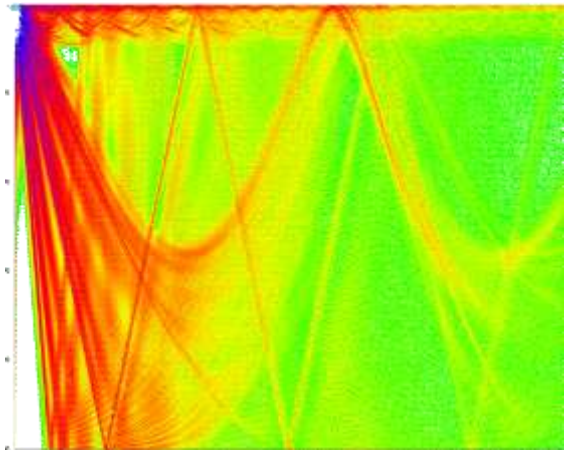


Inspect Data

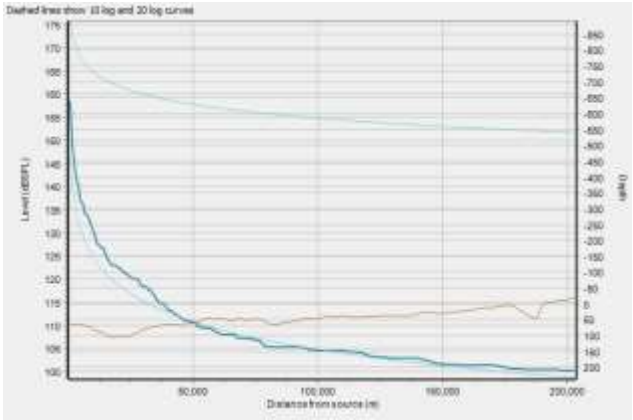
- Use a number of in-build tools to validate and inspect models before export of results.

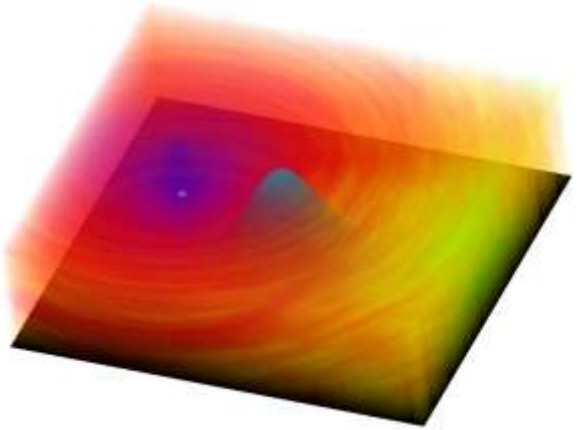
Transects



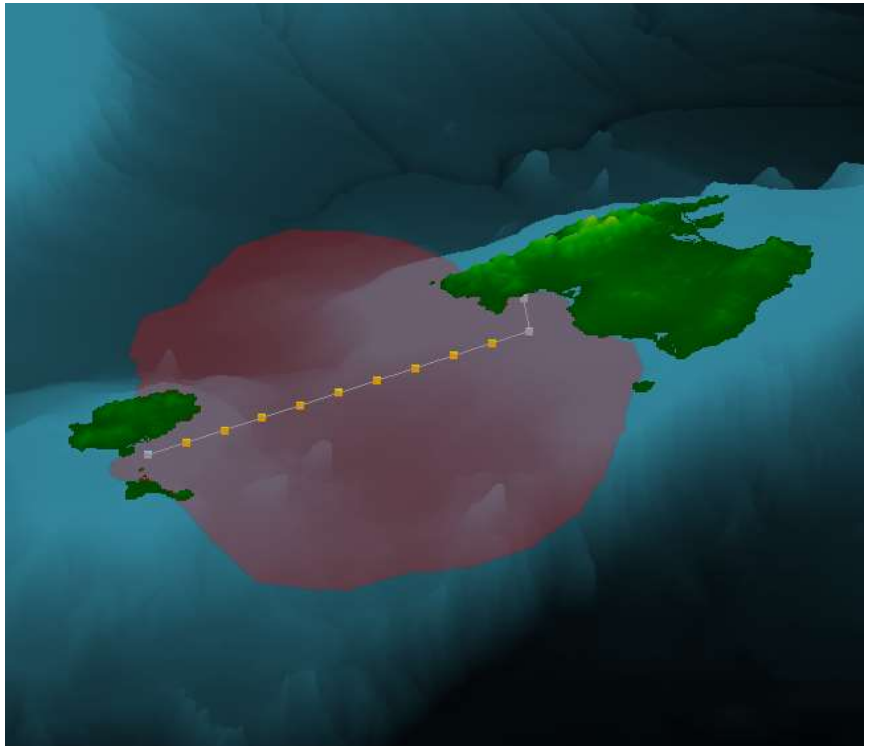


Transmission losses





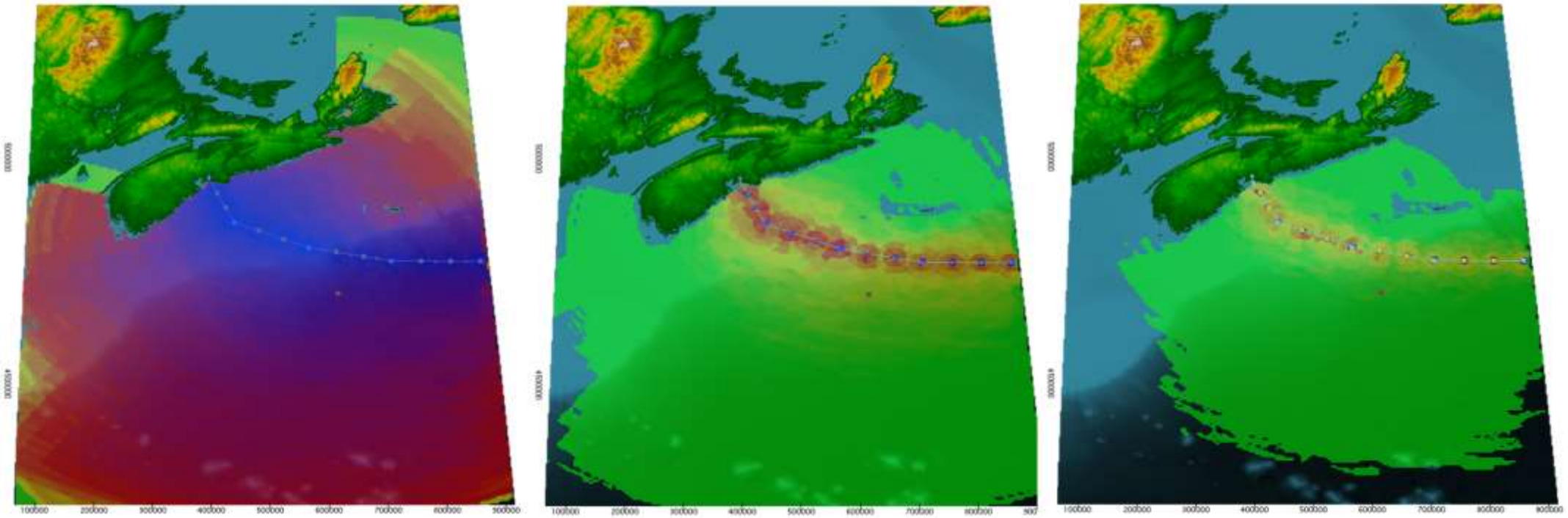
Exclusion zones



Inspect Data

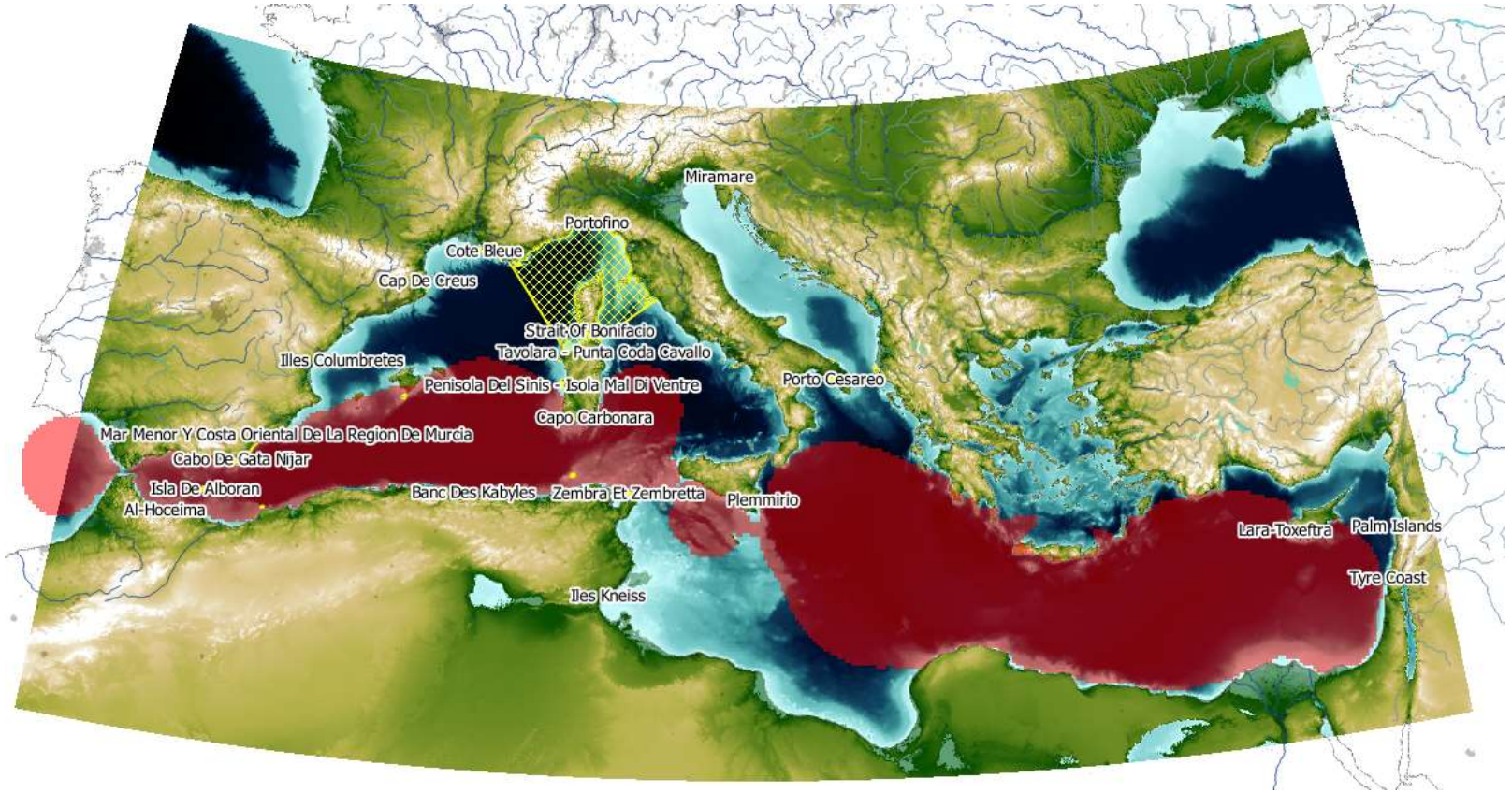
Use a number of in-build tools to validate and inspect models before export of results.

Multiple scenarios – comparison of mitigation efforts, different receivers or equipment types



Data export

Export levels, exclusion zones or bathymetry, to integrate with you favourite GIS-solution



Thank you for listening!