

# **SHIPWRECK DATA PROCESSING AND VISUALISATION**

## **DTM, POINT CLOUDS AND BACKSCATTER**

Last update: 17/06/2022

# Contents

<b>1</b>	<b>Purpose of the guide .....</b>	<b>3</b>
<b>2</b>	<b>NaviEdit .....</b>	<b>4</b>
<b>3</b>	<b>NaviModel .....</b>	<b>7</b>
3.1	DTMs.....	7
3.2	Point Clouds .....	11
3.3	Backscatter intensity .....	13
<b>4</b>	<b>Discussion.....</b>	<b>14</b>
<b>5</b>	<b>Version descriptions .....</b>	<b>15</b>

# 1 Purpose of the guide

The scope of this guide is to briefly present a methodology for visualising shipwrecks using a dataset of Viking longships.

The data was collected in the Kongsberg .kml format, but any of the NaviEdit compatible formats can be used (for e.g. .sbd, .hsx).

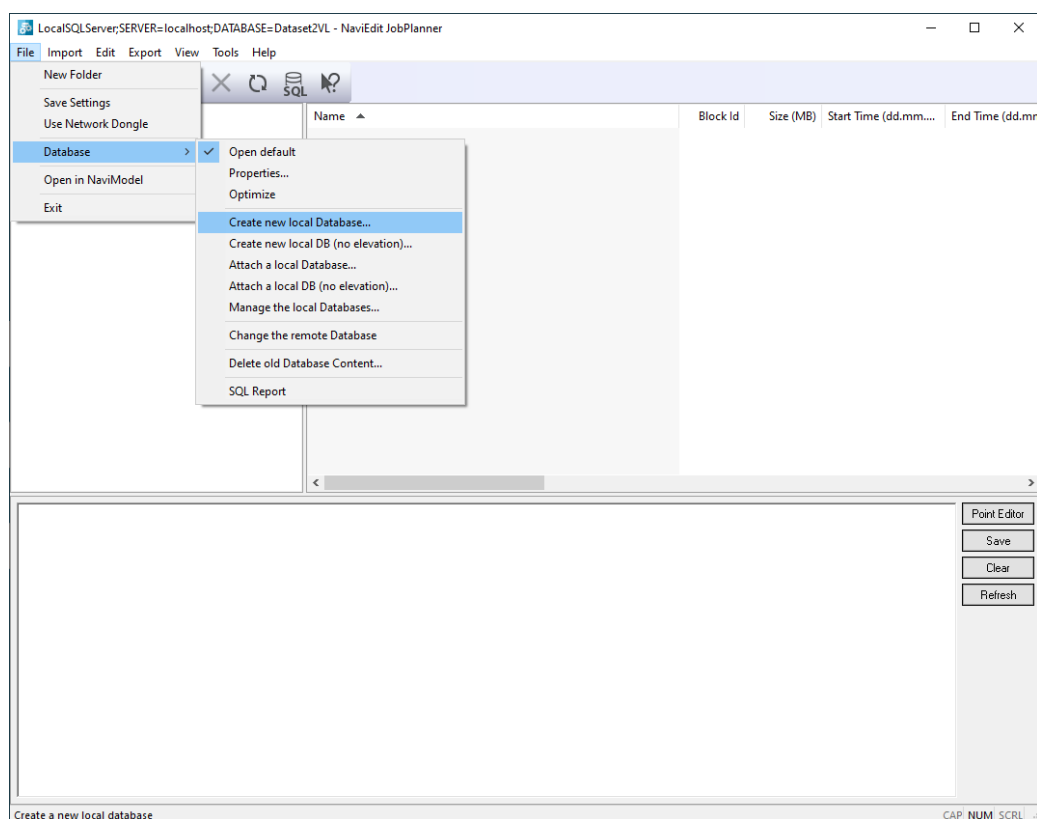
This step-by-step guide will take the user from importing the data to proper visualisation and being able to perform measurements.

## 2 NaviEdit

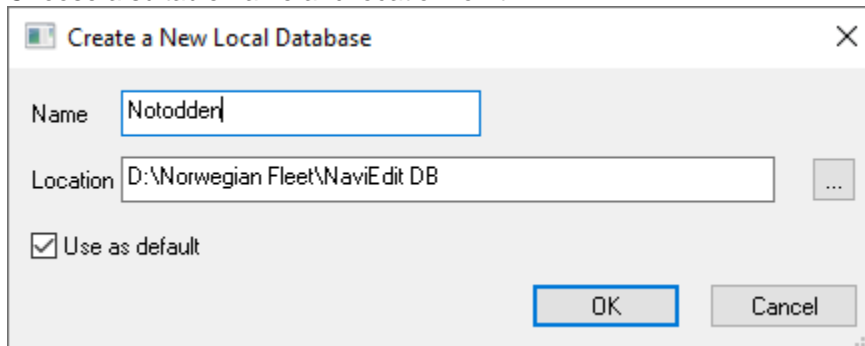
For best practices the data should be to load first in NaviEdit so that data adjustments could be possible using the NaviEdit tools if needed, such as:

- Adjustment to the existing patch test values
- SVP corrections
- Applying tides
- Editing of GPS Heights
- Editing of navigation
- Kalman filtering
- Geodesy changes
- Beam filtering
- Others

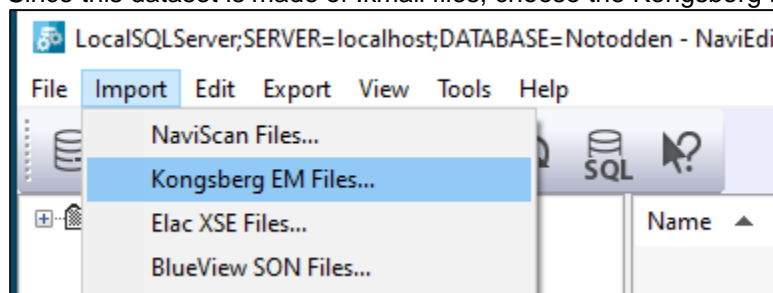
Start by creating a new NaviEdit database



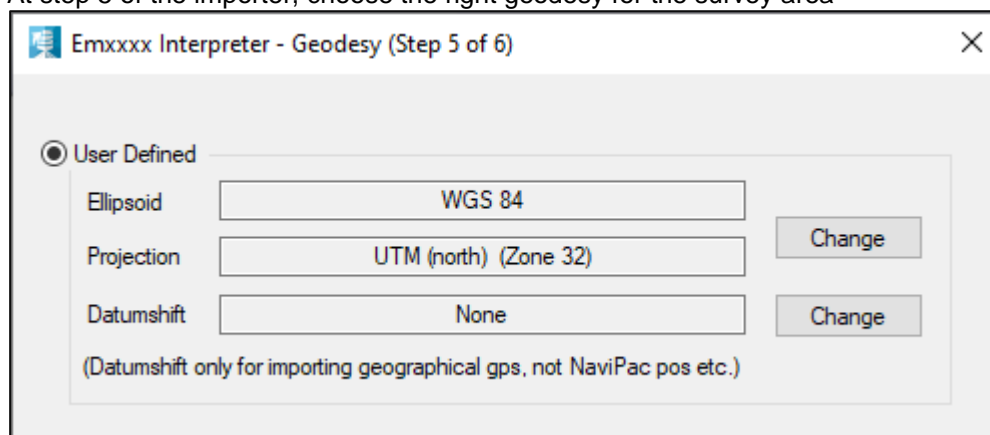
Choose a suitable name and location for it.



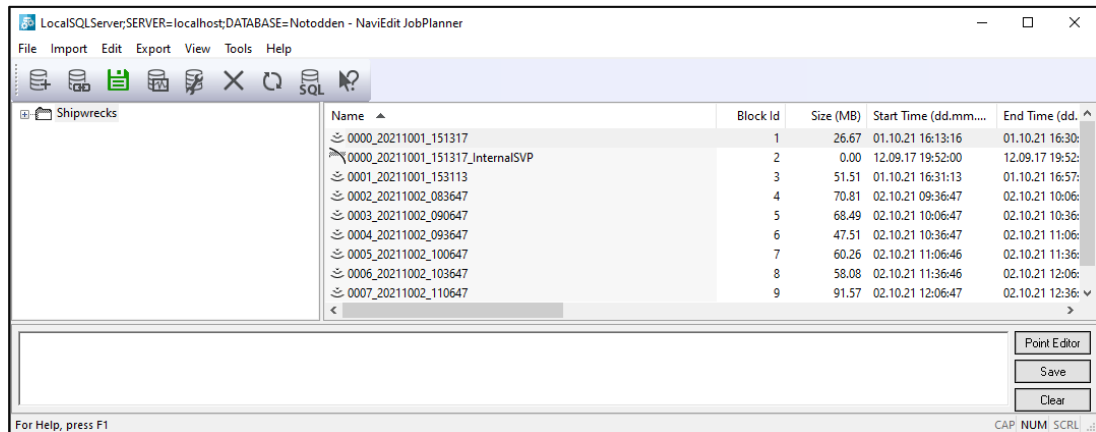
Since this dataset is made of .kml files, choose the Kongsberg EM importer



At step 5 of the importer, choose the right geodesy for the survey area



The files are now loaded into NaviEdit



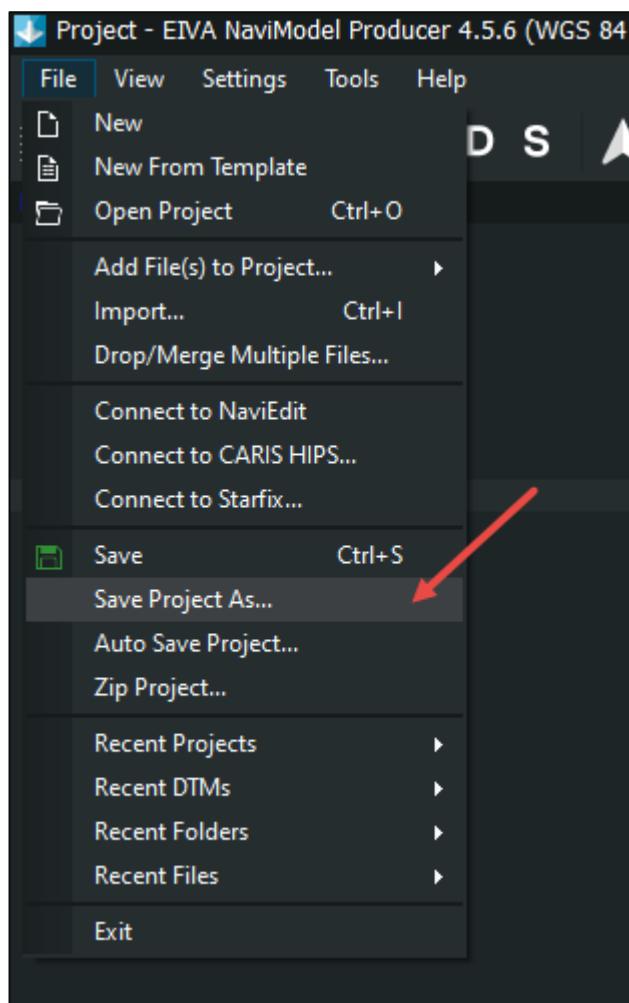
If further adjustment is needed, please read the [NaviEdit manual](#).

## 3 NaviModel

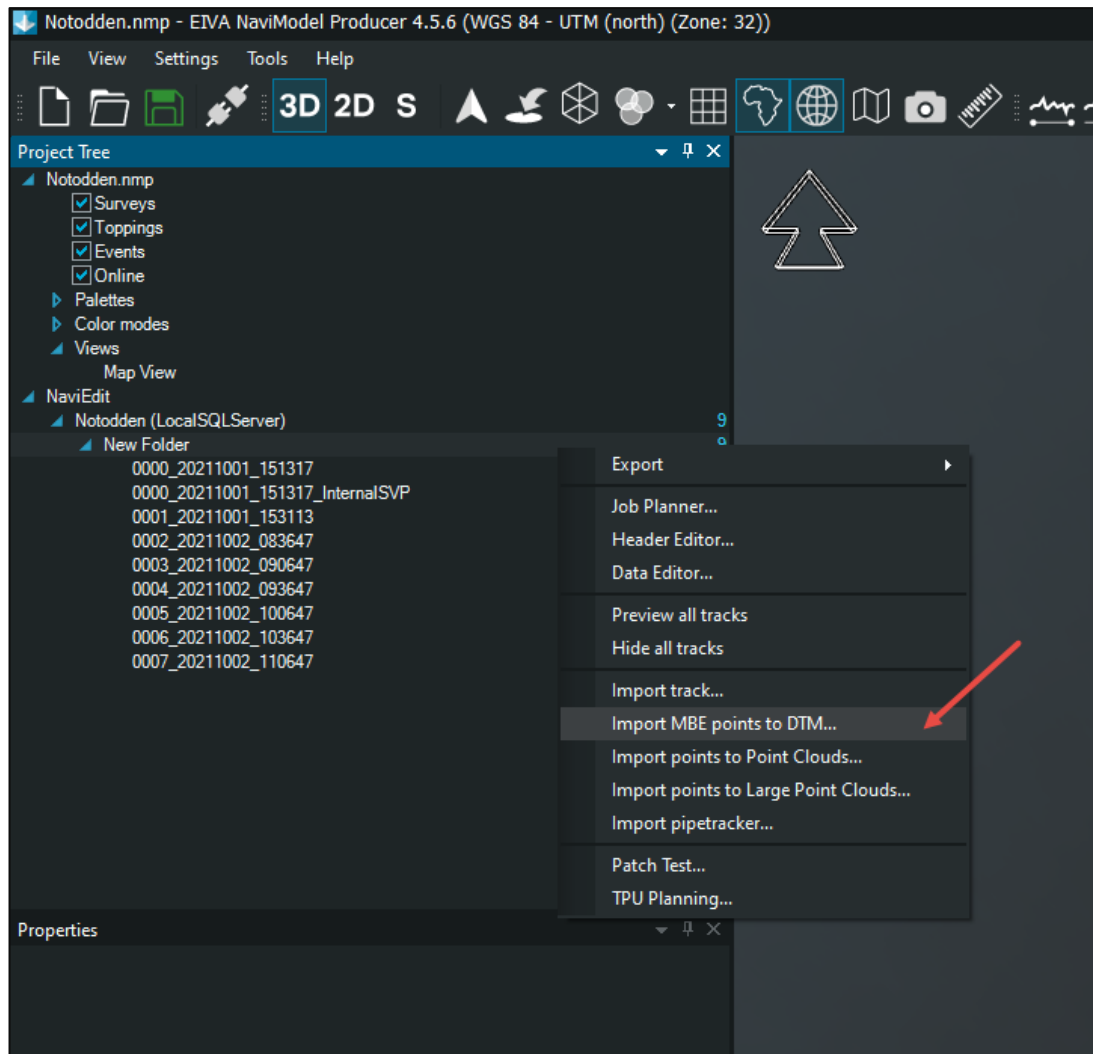
The next step is to bring the data loaded in NaviEdit into NaviModel.

### 3.1 DTMs

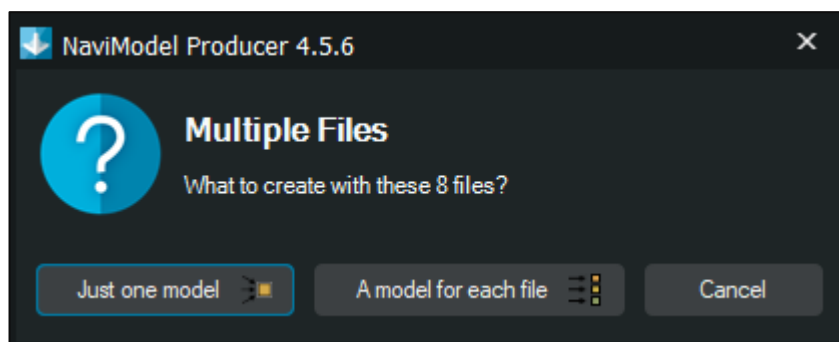
Open NaviModel and use the Save Project As... command so that you create a NaviModel project. This is important as not working on your project will result in the creation of DTM files somewhere on your drive. When you will want to save your project, you will be prompted if you want to copy the DTM files or use them as external. This will lead to either a duplication of the files, as they will be copied to your project folder or flagging them as external with the risk of losing the files when backing-up just the NaviModel project and NaviEdit databases.



Create a DTM of the whole survey site to locate the shipwreck positions.

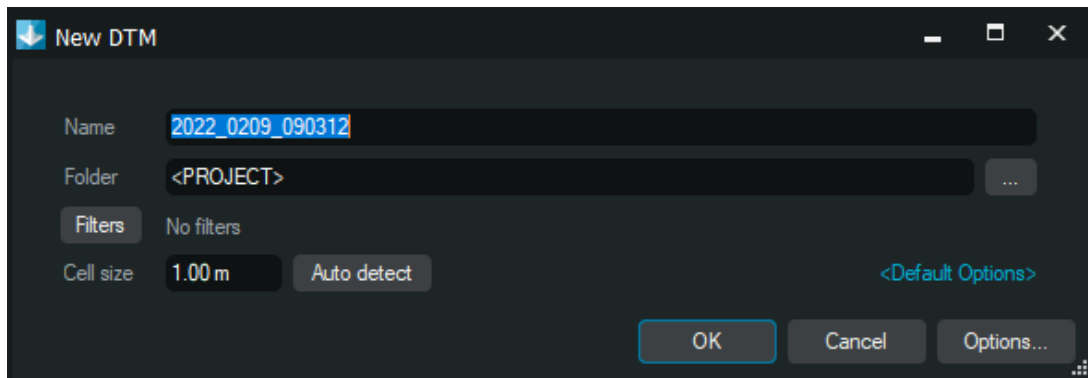


Easiest option is to create just a DTM from multiple files

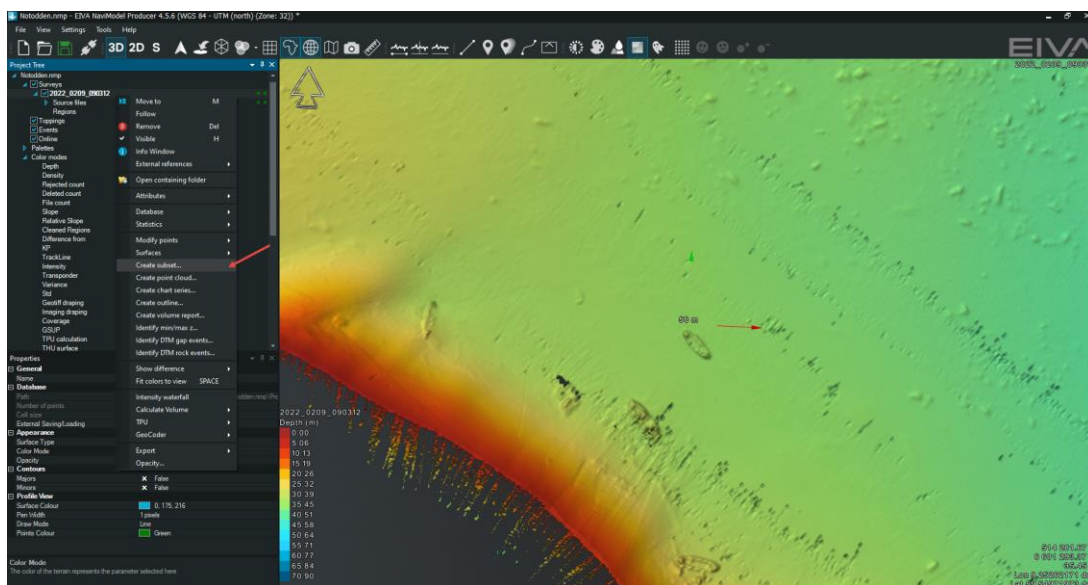




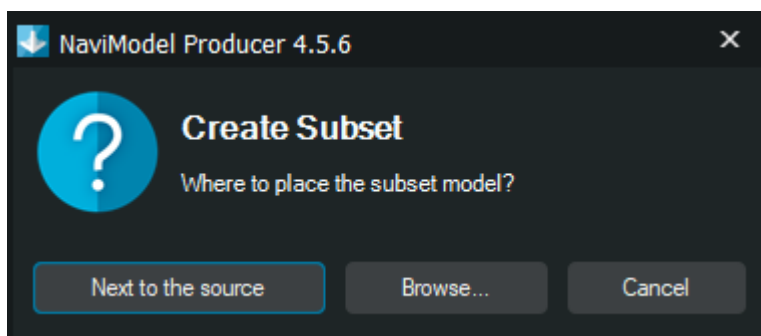
Choose a cell size value, small enough to see the contour of the shipwrecks but large enough so that the DTM will be easy to load and display.



Locate a shipwreck, a group of shipwrecks or an area of interest and create a subset DTM.

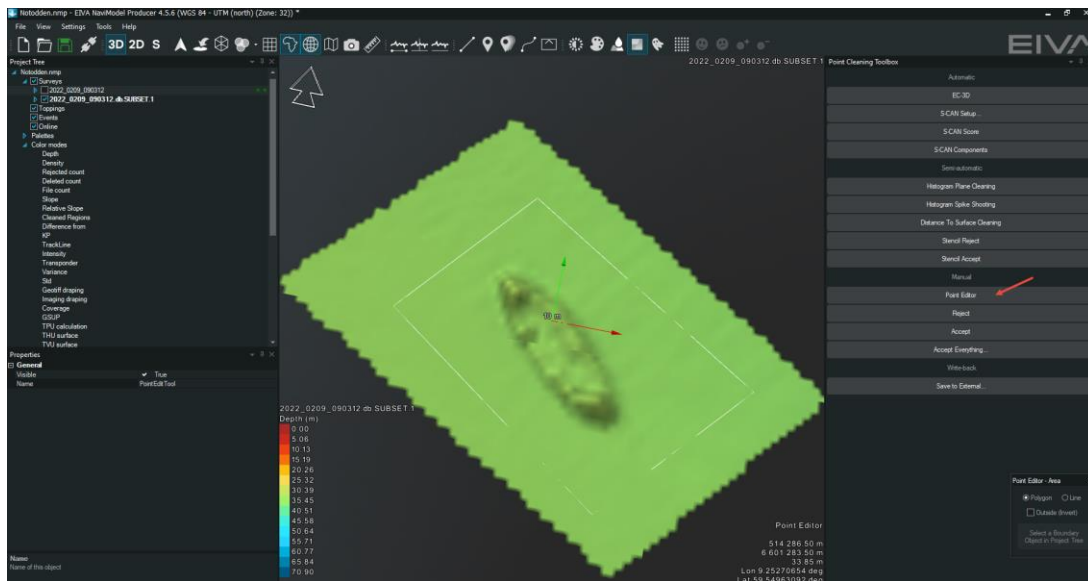


Place it next to the source DTM

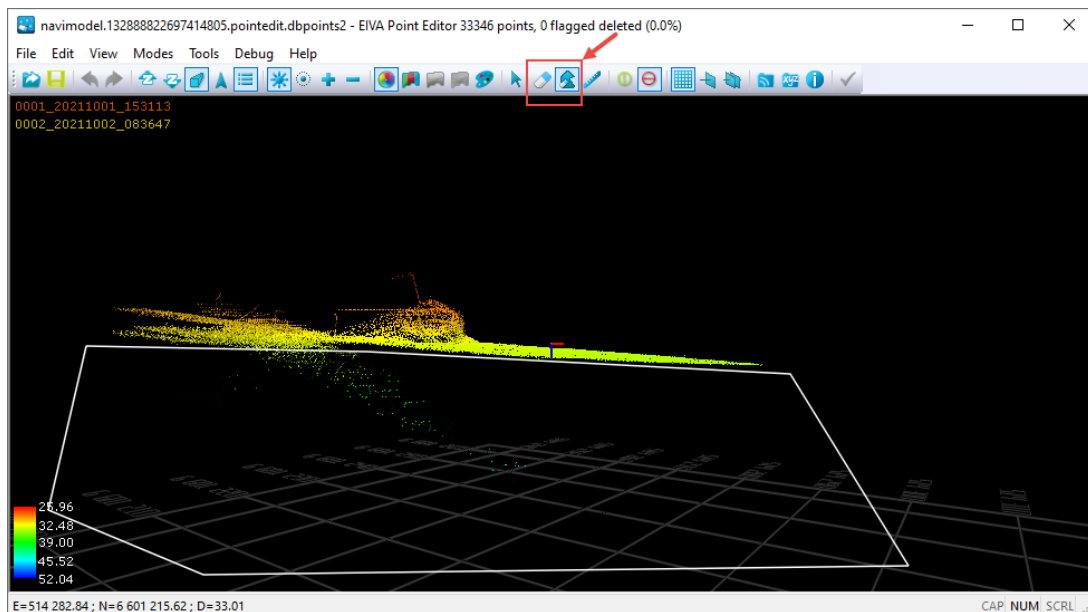


You can use the available DTM cleaning tools in NaviModel to clean the area. However, since the area of interest is small in size but great care should be taken of any details (even the scattered soundings of masts, railings, beams) the manual cleaning with the Point Editor sounds like the best option.

Press CTRL+P to open the Point Cleaning Toolbox. The toolbox can be activated also from View – Views – Point Cleaning Toolbox.

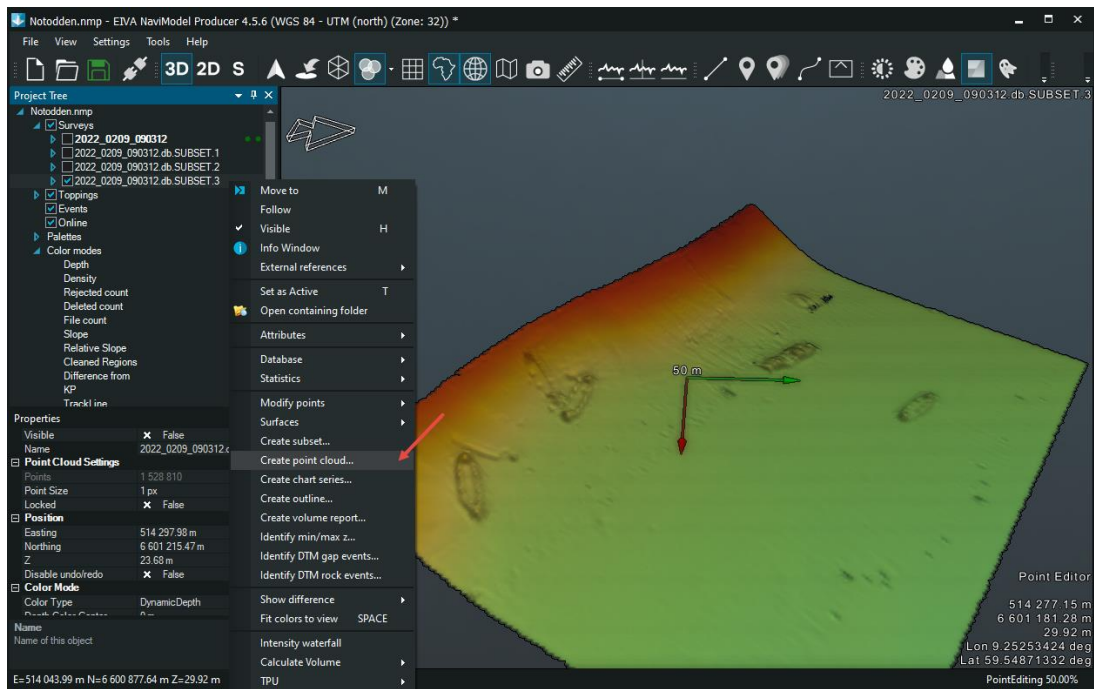


In Point Editor, rotate and use the Eraser Tool and Region Eraser tools to remove noise around the shipwreck and keep only valid soundings.

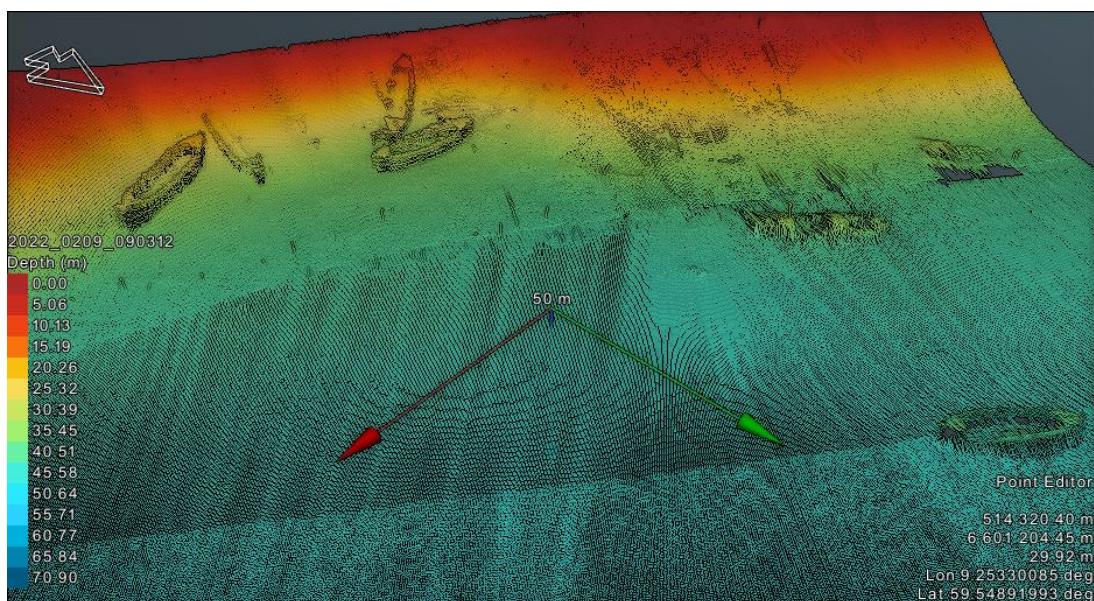


## 3.2 Point Clouds

After the cleaning is complete, a point cloud of individual soundings can be created that will show much higher degree of details.

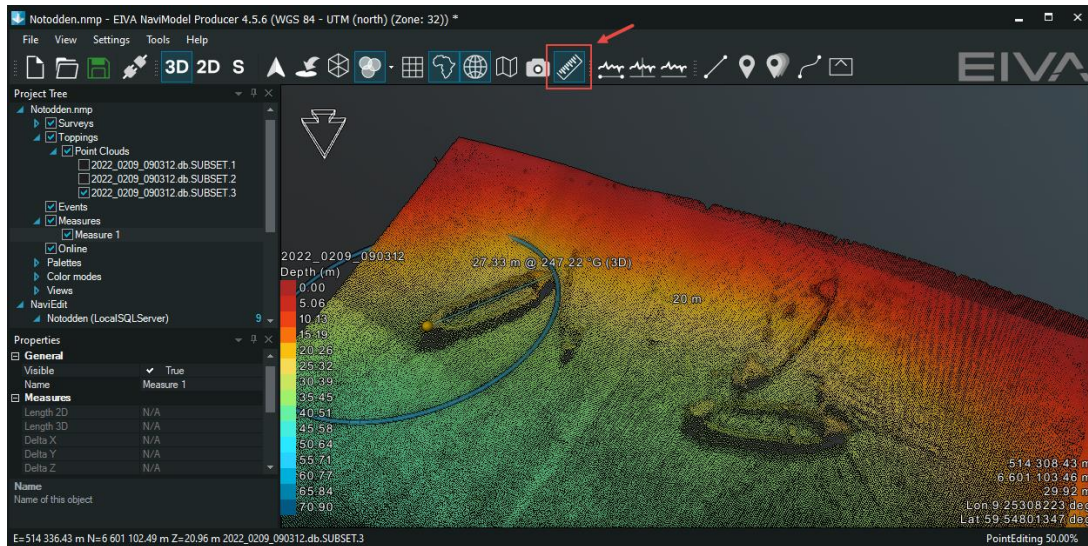


The resulting point cloud can be visualised in 3D in the Map Viewer.

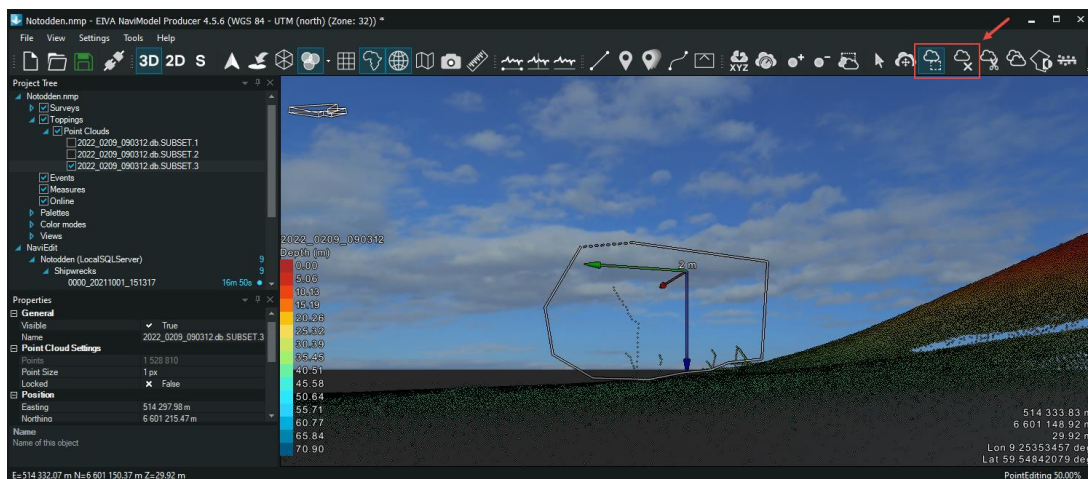




The Measure tool is best to be used on Point Clouds as they have the best level of detail.



You can further remove points in the point cloud using the Point Cloud Toolbar. The Region tool and Remove Region can be used to select and remove further noise inside the current Map View.

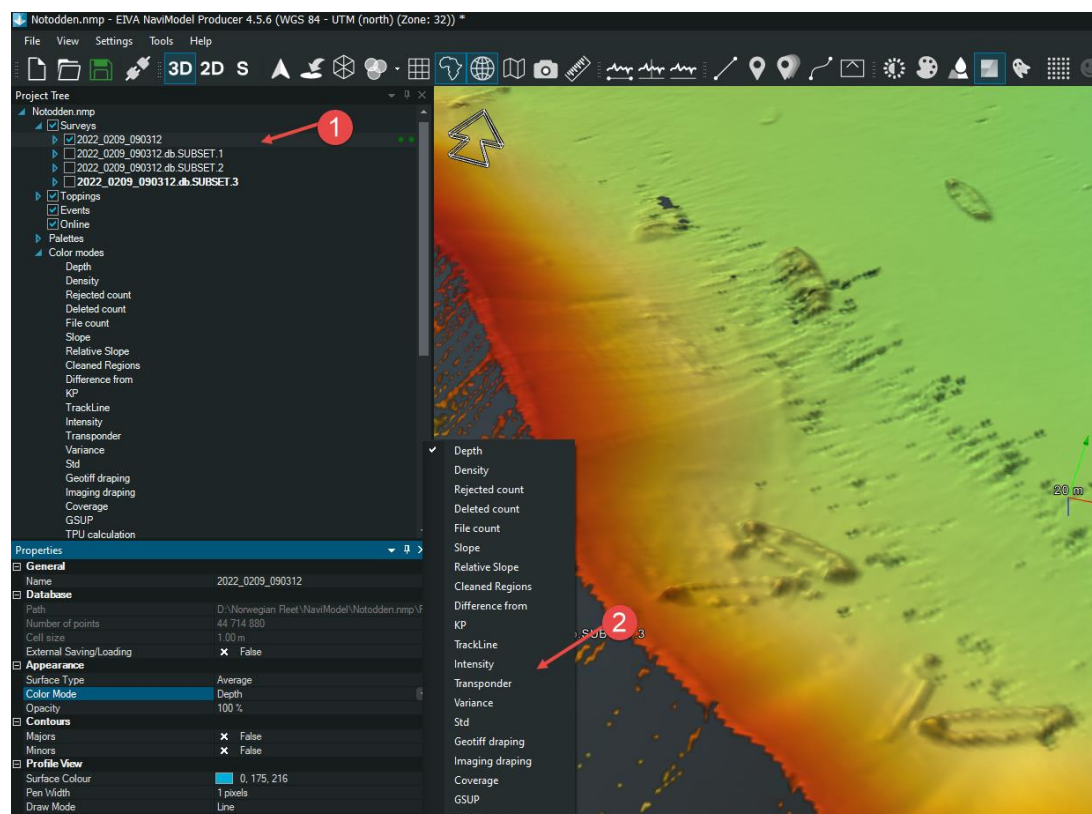


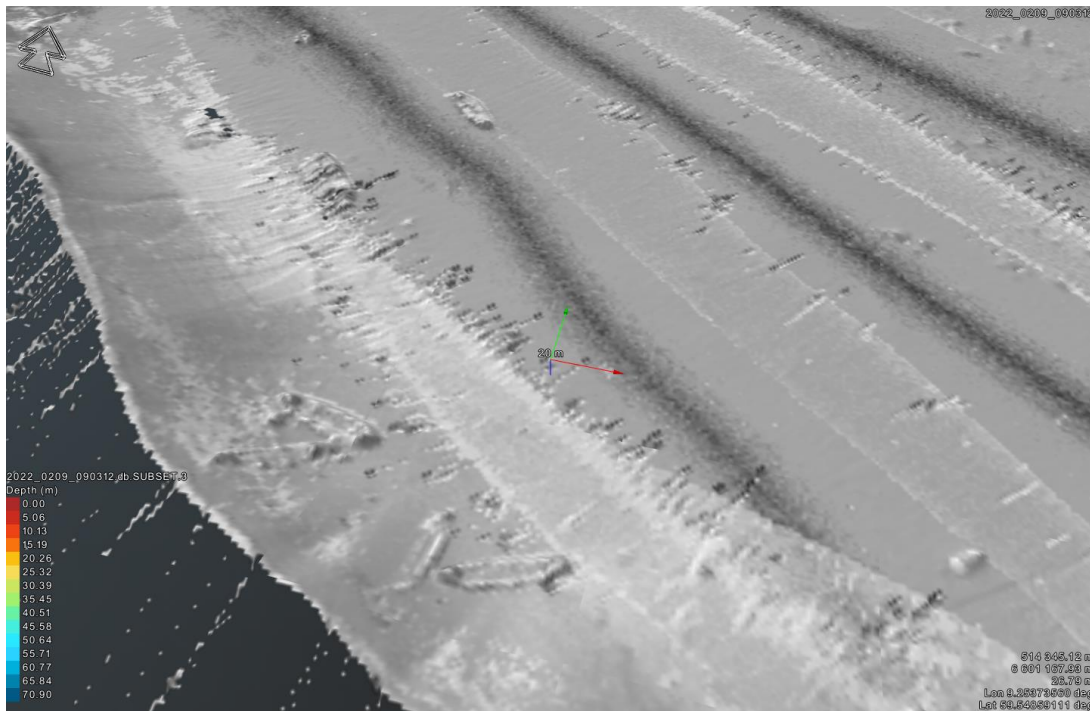
More information on the available tools and options for working with Point Clouds can be found in NaviModel's Help (F1).

### 3.3 Backscatter intensity

Further to the DTM and Point Clouds, backscatter intensity can be used to display the sonar data.

Here is how to set NaviModel to colour the model according to the backscatter intensity of the soundings. This will show the differences in acoustic properties of different materials.





More information about how to better display your backscatter intensity data in Navimodel can be found in this [FAQ](#).

## 4 Discussion

The steps for the current methodology were chosen to simplify and optimize the workflow specific for visualising shipwreck data. Either Point Clouds or Backscatter Intensity can be created straight from the acquisition file and there is no need to first create the DTM. The DTM was chosen to be analysed first as this would be the most efficient way to search for targets of interest and use the computer resources.

Additionally, if no adjustment is needed from NaviEdit, the data files can be also loaded straight into NaviModel by drag and dropping the files on top of the Map View. This option works fine for files in the EIVA .sbd format but not on all formats supported by NaviEdit!

This workflow was recommended as this is just a step by step how to guide for inexperienced users. Advanced users can alternate the steps or just focus on the type of visualisation that suits their needs.

## 5 Version descriptions

Version	Date	Author	Description
4.5.6	09/02/2022	VLA	Initial draft