An Roinn Comhshaoil, Aeráide agus Cumarsáide
Department of the Environment, Climate and Communications

Geological Survey Ireland
Suirbhéireacht Gheolaíochta Ireland | Éireann

Marine Institute
Foras na Mara

INFOMAR
Integrated Mapping for the Sustainable Development of Ireland's Marine Resource

Improving the accessibility of INFOMAR data to the fishing industry & related users.

February 2022

Geological Survey Ireland, founded in 1845, is the national earth science agency. It is responsible for providing geological advice and information and for the acquisition of data for this purpose. GSI produces a range of products including maps, reports and databases and acts as a knowledge centre and project partner in all aspects of Irish geology. GSI is a division of The Department of the Environment, Climate and Communications (DECC).

Geological Survey Ireland
Block 1, Booterstown Hall
Booterstown, Blackrock
Co Dublin, A94 N2R6
Tel. +353-1-678 2000
Fax +353-1-668 1782
LoCall 1890 449900
www.gsi.ie

Marine Institute

The Marine Institute is the national agency responsible for Marine Research, Technology Development and Innovation (RTDI). It seeks to assess and realise the economic potential of Ireland's 220 million acre marine resource; promote the sustainable development of marine industry through strategic funding programmes and essential scientific services; and safeguard our marine environment through research and environmental monitoring. The Institute was set up under the 1991 Marine Institute Act.

INFOMAR Programme

INtegrated Mapping **FO**r the Sustainable Development of Ireland's **Ma**rine **R**esource (INFOMAR) is Ireland's National Marine Mapping Programme, the follow-on project to the Irish National Seabed Survey (INSS), and is a joint venture between Geological Survey Ireland (GSI) and the Marine Institute and is funded by the Department of the Environment, Climate and Communications (DECC).
www.infomar.ie

Disclaimer

The data presented in this report, particularly hydrographic data, is acquired as part of a national baseline study and should not be used for navigational purposes.

Although every effort has been made to ensure the accuracy of the material contained in this report, complete accuracy cannot be guaranteed. Neither Geological Survey Ireland, the Marine Institute nor the author accepts any responsibility whatsoever for loss or damage occasioned, or claimed to have been occasioned, in part or in full as a consequence of any person acting or refraining from acting, as a result of a matter contained in this report.

Glossary

INFOMAR:	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
GSI:	Geological Survey Ireland
MI:	Marine Institute
IHO:	International Hydrographic Organisation
UKHO:	United Kingdom Hydrographic Office
DECC:	Department of Communications, Climate Action and Environment.
DAFM:	Department of Agriculture, Food and the Marine
MBES:	Multibeam Echosounder
LAT:	Lowest Astronomical Tide

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Lead Authors	Team Role
David Hardy	Geologist, Marine and Coastal Unit, Geological Survey Ireland.

Approved By	Position	Date
Sean Cullen	Head of Marine and Coastal Unit, Geological Survey Ireland.	16th February 2022

Contents

List of Figures

1 Background

INFOMAR (Integrated Mapping for the Sustainable Development of Ireland's Marine Resource) is a twenty-year programme to map the physical, chemical, and biological features of Ireland's seabed. INFOMAR is funded by the Department of the Environment, Climate and Communications (DECC), and delivered by joint management partners Geological Survey Ireland and the Marine Institute.

INFOMAR aims to provide comprehensive and accessible marine datasets for Irish waters. These products will foster growth within the national blue economy & facilitate the sustainable development of Ireland's marine resource.

To this end, data collected during INFOMAR (and the preceding Irish National Seabed Survey (INSS)) is freely available to all users, since 2006. Principle among these datasets is high resolution measurements of seabed depth (bathymetry), which are of immediate use to the fishing industry and related users.
However, while the data has been available, technical limitations have limited its integration with the software products commonly used in these sectors.

This document aims to address this and provide a series of instructions to enable integration of INFOMAR data with software based 'commercial chart plotters', such as:

- TimeZero (formerly MaxSea)
- Olex

The instructions provided will enable system vendors, or end-users themselves, to incorporate INFOMAR data in a 'self-service' manner; using freely available software and data downloads already accessible on INFOMAR websites.

Widespread availability and use of this data by the fishing industry and related users, should provide efficiencies and indirect financial return to the State.

Integration of the same data with a third package (FishingWin/TurboWin products, formerly known as Sodena) is offered by Seafield Navigation Ltd, and available through Irish distributors BelcoMarine and Barry Electronics Ltd.

2 Disclaimers

This document outlines procedures for accessing bathymetric data from the INFOMAR website and incorporating this information into commercial chart plotters commonly used on fisheries vessels and related end-users.
While INFOMAR expends considerable effort to provide accurate and reliable information through its website, the processing performed differs substantively to that applied when producing official nautical / hydrographic charts. **As a result, information obtained from the INFOMAR website should not be used be used as a basis for navigation and users are referred to the official UKHO charts covering Irish waters.**

Sources of difference relate to:

- INFOMAR reports the mean depth per resolution cell – while an official hydrographic product would commonly report the least/shoal depth.
- Gridding parameters used by INFOMAR create a continuous surface (which may alter depths), rather than discrete soundings featured on official chart products.
- Additional and independent QA/QC procedures performed by UKHO.
- Data reduction and presentation by UKHO – to highlight the most significant depths and enable easy reading of the data.

Additionally, each chart plotter performs its own interpolation and extrapolation of data points (beyond that performed by INFOMAR when producing gridded products). The reader's attention is directed to the relevant subsections where this is identified and partially quantified.

NOT TO BE USED FOR NAVIGATION

3 Document Structure

Section 4 details accessing INFOMAR's Data Download Portal. This website allows the user to select and download bathymetric data for their area/s of interest, in a self-service manner. The documentation guides the user through options and formats that need to be selected. The steps in this section need to be followed for all 'chart plotter' software.

Section 5 provides a workflow using an open source & free GIS package (QGIS) to merge several INFOMAR survey areas to a unified surface. This can then provide the basis for loading into 'chart plotter' software. The steps in this section need to be followed for all 'chart plotter' software.

Section 6 provides a workflow for loading data into TimeZero (formerly MaxSea) software. The outputs from the preceding Section 5 are processed through a further custom utility, and then imported to TimeZero for use.

Section 7 provides a workflow for loading data into Olex software. The outputs from Section 5 are processed through a further custom utility and optional compression step, and then imported to Olex for use.

4 Accessing & Downloading data from the INFOMAR Data Download Portal

All data acquired by the INFOMAR project is freely available – but due to the complex nature of the data, there is an unavoidable delay between the data being acquired (vessels working in an area) and the data being available for download (data fully processed, quality controlled and considered ready for public use).

1. On an internet connected computer – open a web browser (Chrome, Internet Explorer) and go to 'www.infomar.ie/data'. The page below should load. Click on the hyperlink contained in the 'map area' to be brought to the data download portal.

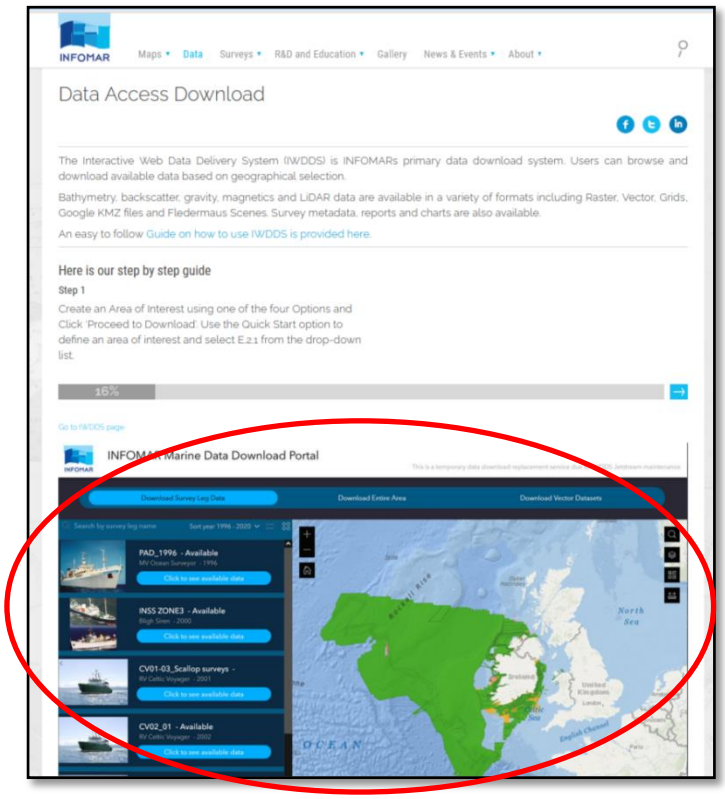


Figure 1: INFOMAR Data webpage, click on the map to be brought to the Data Download Portal.

2. The Data Download Portal should open and appear as below; the 'Download Survey Leg Data' tab should be highlighted at the top of the page.

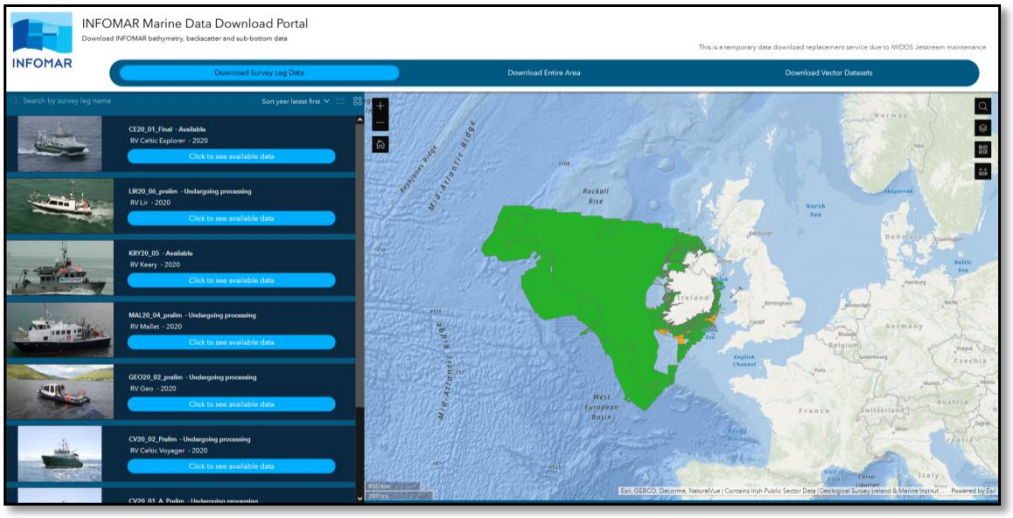


Figure 2: Data Download Portal, on initial display.

3. Desired data can be most easily selected using the geographic/map component of the display. Like most online maps, the + and – signs can be used to zoom in (as can a mouse scroll wheel); the viewing area can be panned/moved by 'left-clicking and holding'.
   Legs for which downloads are available are coloured green; those still undergoing processing are coloured orange.

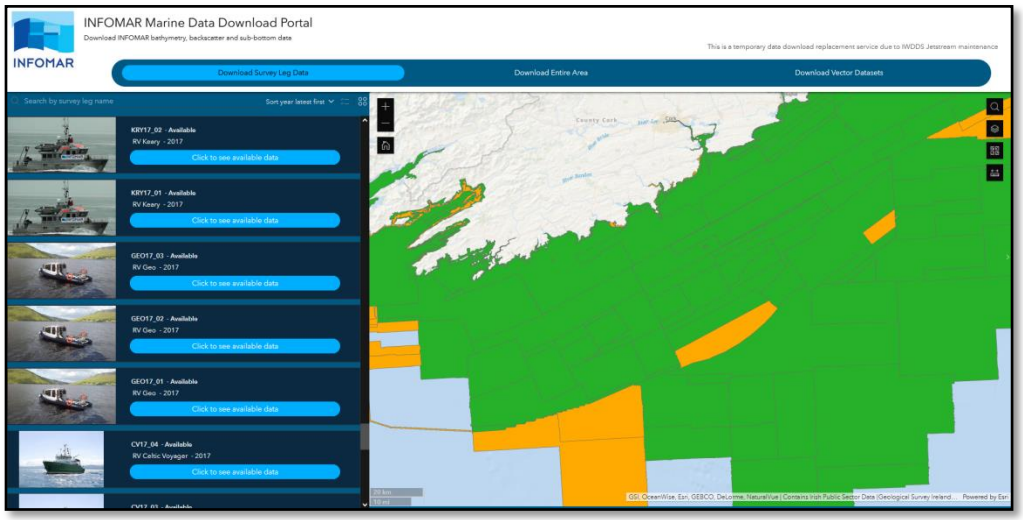


Figure 3: Data Download Portal, after zooming in and panning to SE coast. Green areas represent data currently available, orange areas represent datasets that will be available in the future.

4. Individual areas/polygons can be selected by 'short' left-clicking within their boundaries. Once selected, the area will be highlighted (turning a bluish tone) and a pop-up dialog will appear.
   Scroll down in this dialog to find the entry labelled 'ESRI GRID DOWNLOAD LINK' and click the adjacent 'View' button to begin downloading data for the area.

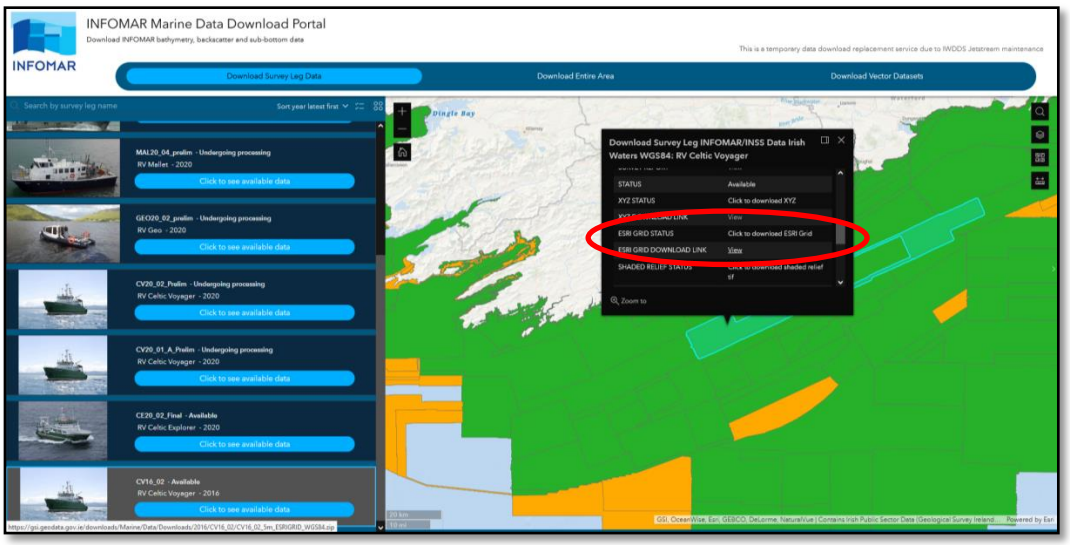


Figure 4: Data Download Portal, area selected and ESRI GRID option found in pop-up dialog.

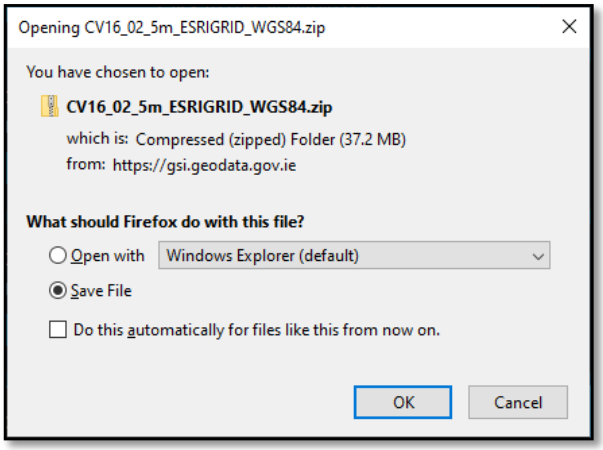


Figure 5: Data Download Portal, complete download of data file. Depending on browser settings, it may ask you to specify the download location or place the file in a default 'Downloads' folder.

5. The last step must be repeated for all areas/polygons/surveys that cover your area of interest and desired coverage.
   Importantly – the ESRI GRID DOWNLOAD type must be used for all, as future steps depend on this.
6. Once downloaded – the file can be found – then right-click on the file and choose "Extract All…" – and follow the onscreen instructions.
7. Each individual survey will then also have to be extracted, using the same method.

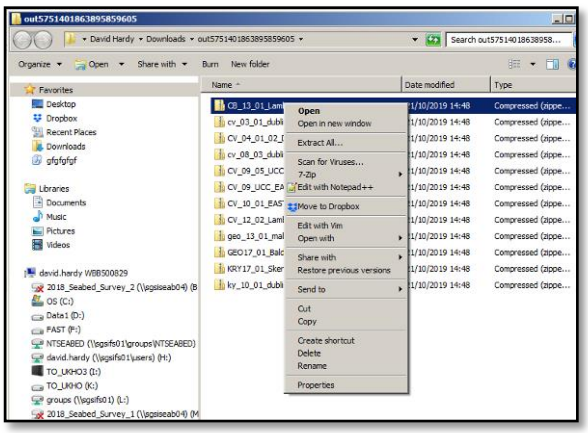


Figure 6: INFOMAR Data Download Portal, extracting downloaded data files in Windows Explorer.

8. Once all of these have been 'extracted' – the zip files can be deleted.

Single, Lower, Resolution Import

With recent and ongoing improvements to the INFOMAR Data Download Portal, it's possible to download a single 'merged' file containing the majority of data acquired by INFOMAR, albeit at a lower resolution of one reading every 10m^2. Where this meets user requirements, it can significantly simplify and accelerate the process of importing to chart plotter software.

This is accessed by navigating to the INFOMAR Data Download Portal as described above. Instead of remaining on the default 'Download Survey Leg Data' tab – select the 'Download Entire Area' tab. The extent of included data is indicated by a single blue polygon, which extends around much of the coastline of Ireland. To download, select the '10m ESRI Grid entire area' option on the left hand pane. This file is being actively updated to add new data and resolve any errors, so note the 'Last Updated' metric for record keeping.

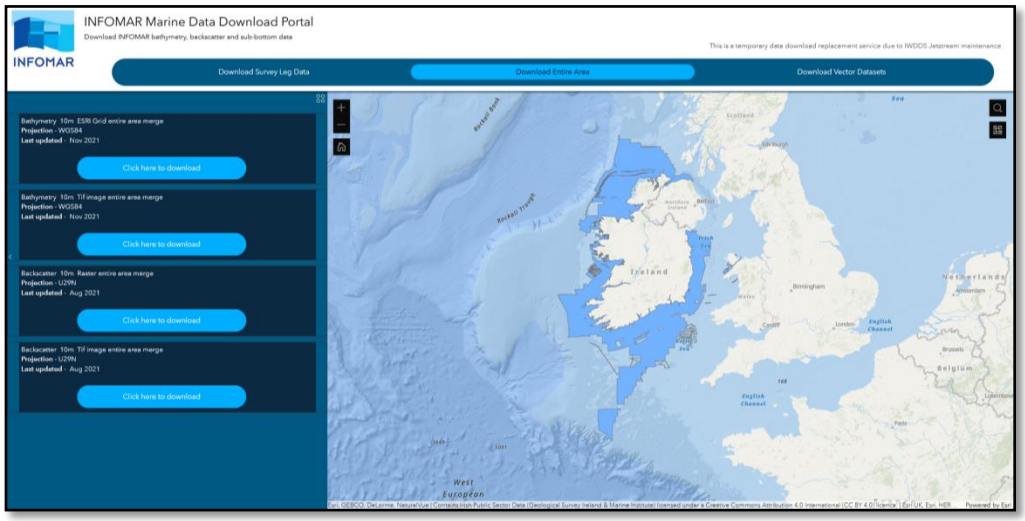


Figure 7: INFOMAR Data Download Portal, ready to download a 10m grid representing all available INFOMAR coverage.

This single merged surface can be loaded into QGIS (following chapter, steps 1-6 and then from step 12) and used as the basis for the remainder of processing.

Data Licence

5 Working with the Data in GIS

Using a web browser – download QGIS which will allow us to convert all the data files from the INFOMAR website to a format suitable for loading into a variety of chart plotter software. This can be accessed at https://qgis.org/en/site/forusers/download.html.

1. On the website – choose to download the Standalone Installer for the most recent version.

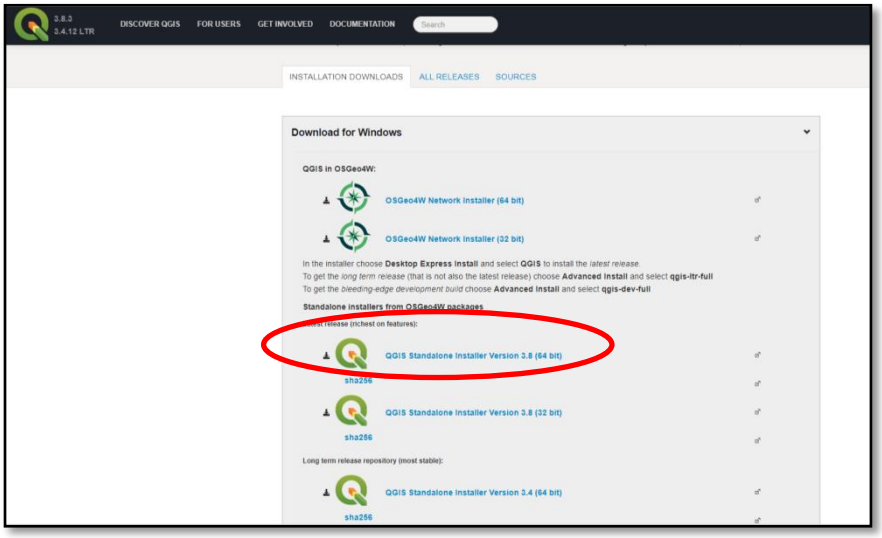


Figure 8: QGIS, download page with required installer highlighted.

2. Once downloaded, install the software to your computer, following the steps included in its install wizard.

3. Once installation is complete – launch the QGIS software from the Windows Start menu – if it gives you multiple options, choose the simplest.

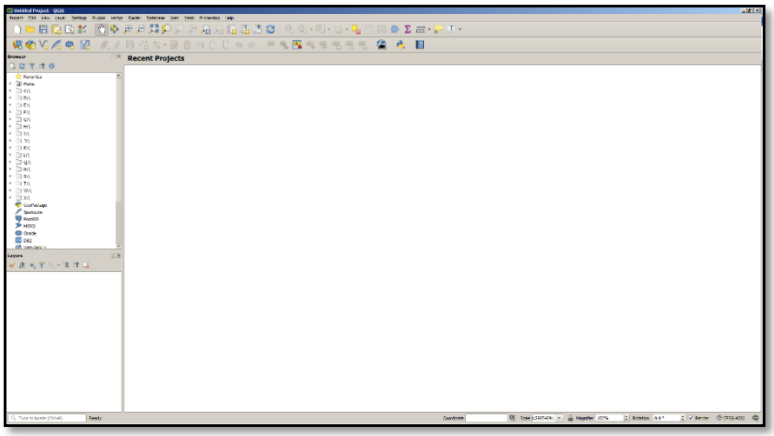


Figure 9: QGIS, main interface prior to loading any data files.

4. Review the list of folders created at the end of the preceding section. Within the folder names, the resolution of each area is noted (in metres, M), most should be at 5m. Subdivide these into folders based on their resolution – 2m, 5m or 10m. The following steps in this section should be repeated in 'batches' for each resolution band.

5. In Windows Explorer, navigate to the downloaded data files. In the search box, type 'hdr.adf' and press Return.

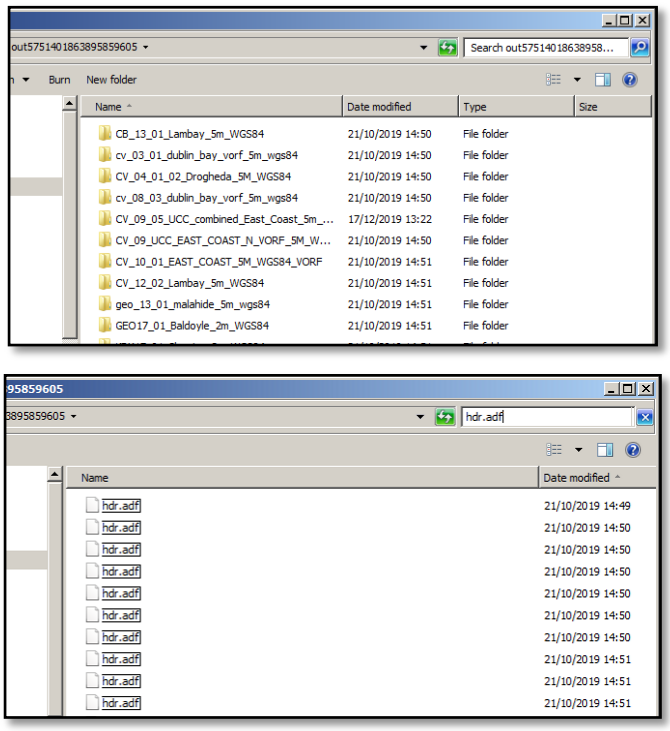


Figure 10: QGIS, using the search function in Windows Explorer to find all 'hdr.adf' files.

6. The Search query should return one 'hdr.adf' file for each zip extracted in the previous chapter.

7. Select all these files and drag and drop them to the main QGIS window to load them into the software. You should see the main window updated with all the data files.

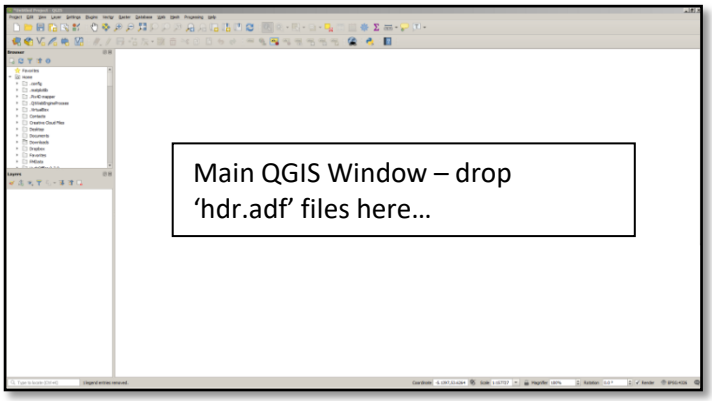
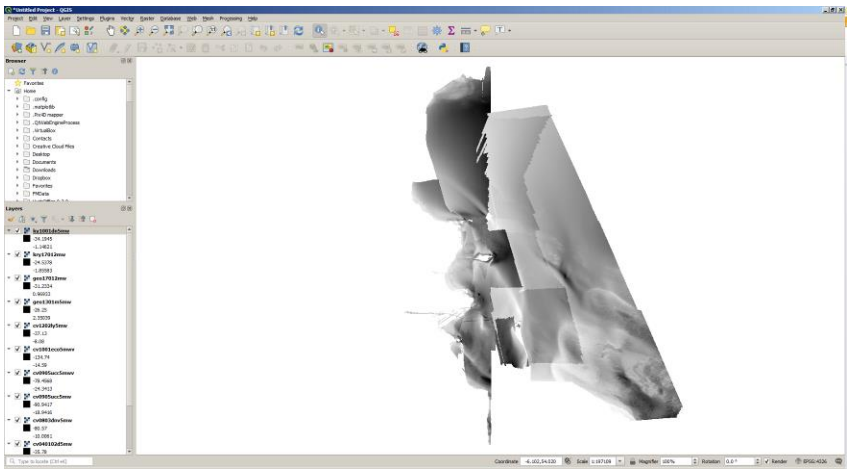
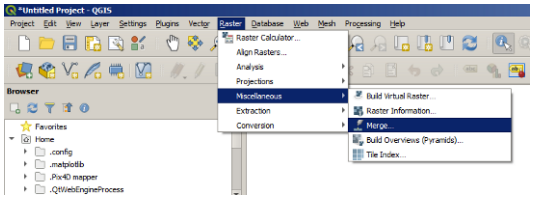


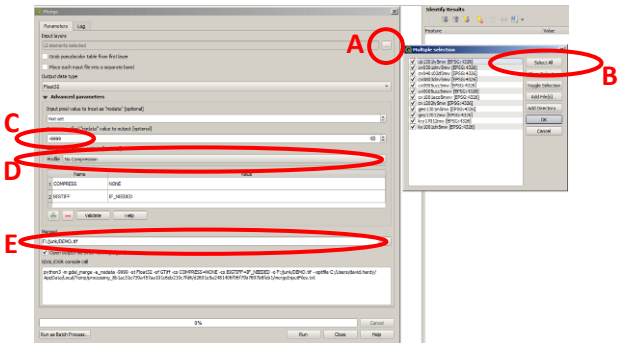
Figure 11: QGIS, dropping the 'hdr.adf' files onto main QGIS work area, to load files.



8. Now it's time to 'merge' all these files into a single image. On the main menu of QGIS, go to Raster → Miscellaneous → Merge



9. A new interface will appear, containing options for the 'Merge' tool:



   i. Click on the button labelled A – in the window that appears, press 'Select All' (B) and then press OK.

   ii. In the box labelled C, type -9999.

   iii. In the dropdown labelled D, choose the 'No Compression' option.

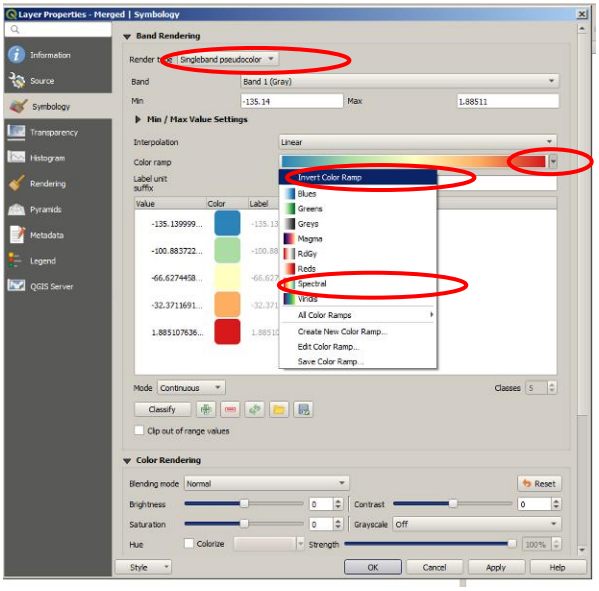
   iv. In the area labelled E – define where the merged file will be saved.

10. Press 'Run' at the bottom of this interface and the processing may take a reasonable length of time, dependent on the size of your area of interest.

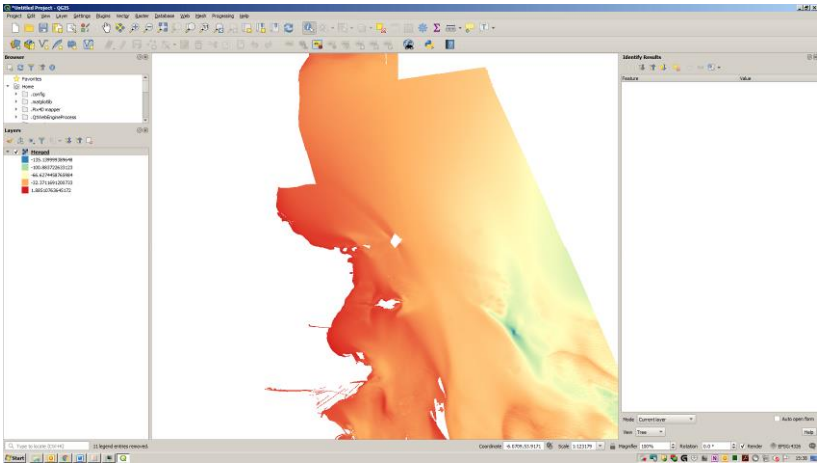
11. A new entry called 'Merged' will be added to the Layers panel (bottom left of the QGIS window). All the other entries can now be removed – right click and select remove.

12. The colour grading applied to the 'Merged' layer can be adjusted by right clicking on the layer and choosing 'Properties'.

13. In the dialog than then appears, select the ‘Symbology’ tab. Change the Render Type to ‘Singleband Pseudocolour’. Choose the Spectral colour ramp and then also select to Invert the scheme, then press OK.

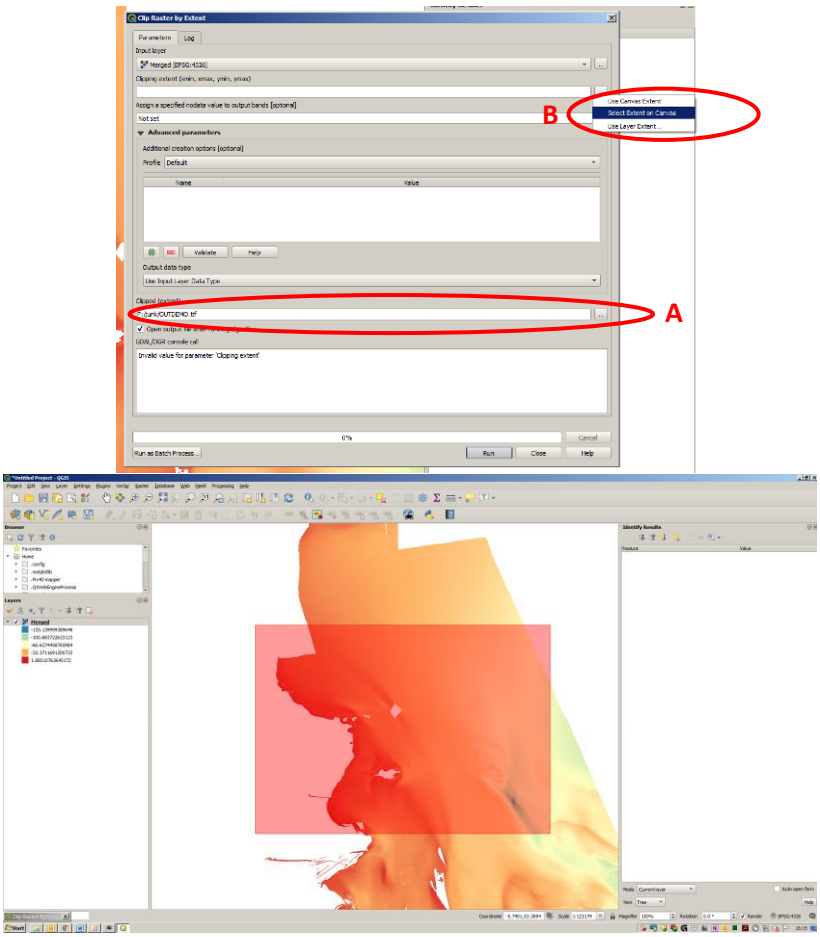


14. The improved colour contrast will make it easier to see features in the data. This is valuable as the next step involves clipping the data to the required area of interest.



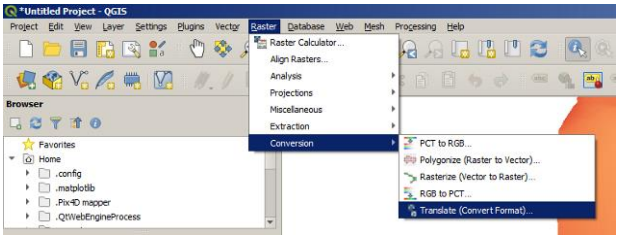
15. From the QGIS main menu, choose Raster → Extraction → Clip Raster by Extent.

16. In the dialog that appears, select a name and location for the ‘clipped’ data to be saved to (A); using the button located near B, choose the extent of the area on ‘canvas’

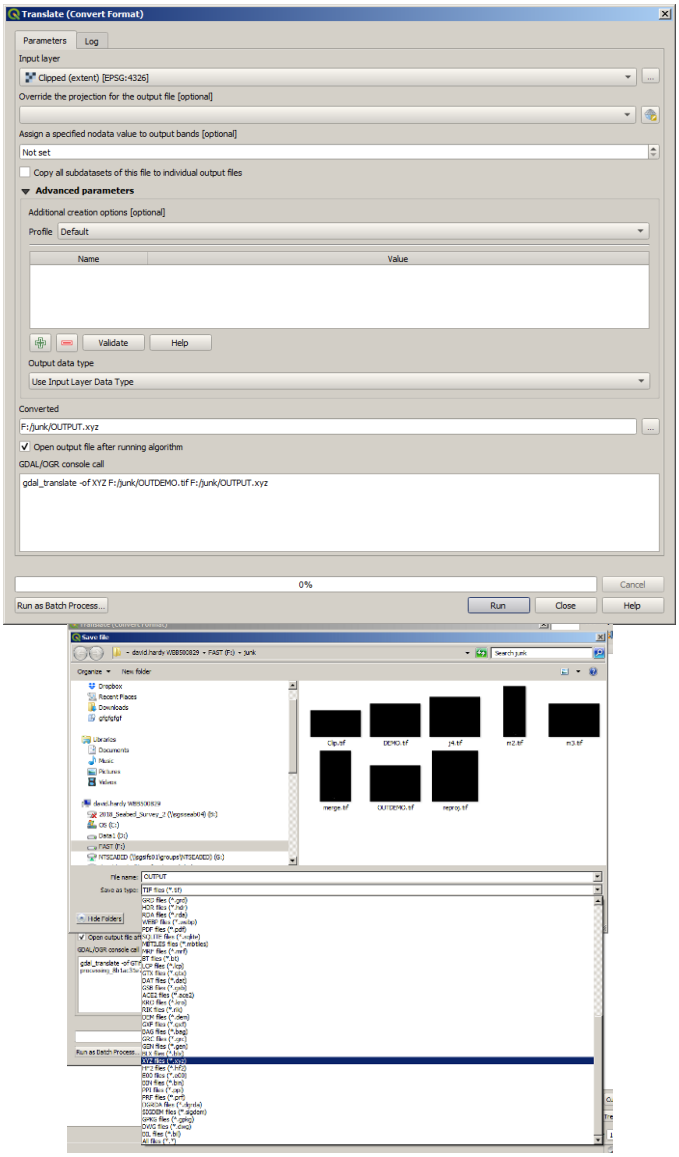


17. Once you've drawn the required extent, press Run – and a new clipped data file will be generated. Check that the extent and area covered is as expected.

18. Ensure that the 'Clipped' file is highlighted in the Layer panel, then select Raster → Conversion → Translate (Convert Format), from the main QGIS menu.



19. A dialog will appear – specify the output file name and location. But, importantly, you must also change the file type to 'XYZ' option.



20. Press Run on the dialog --- and then ensure (with Windows Explorer) that the output file is located where expected and has the XYZ file extension. This XYZ file is what will be utilised in the next section (Section 6 – TimeZero or Section 7 – Olex).

6 Importing Data to TimeZero Software

Requirements

- This guide has been prepared based on TimeZero Professional V4. Difficulties may be encountered with other/earlier products in the TimeZero range – particularly earlier products under the MaxSea brand (V12 and earlier). Contact your software vendor for additional information.

- In addition, the 'PBG Module' (an optional extra) is also required – contact your software vendor for additional information.

- Rendering high-resolution in 2D & 3D requires a moderately powerful computer – contact your software/hardware vendor if in doubt.

Method

1. Download the 'INFOMAR-TimeZero.exe' utility, available at:

   https://drive.google.com/drive/folders/1kebrkDBMkW-0SAEi69v6hIi2jOkK00ve?usp=sharing

   - This utility formats the output from Section 5 Step 20, to that required for loading to TimeZero software.

2. Double-click the 'INFOMAR-TimeZero.exe' file to launch the utility. Windows may 'pop-up' a warning, preventing the utility from running. To bypass this, press the 'More info' hyperlink; and then press the 'Run anyway' button when the window updates.

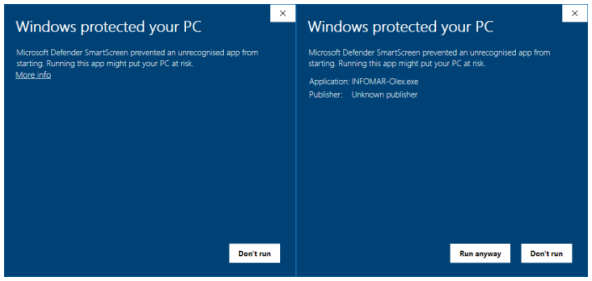


Figure 12: TimeZero, Windows warning for unknown software like the INFOMAR utilities.

3. Once the software has launched, a simple dialogue is presented. Use the 'Select File' button to select a file for processing; then the 'Process File' to commence. Only a single file can be processed at a time.

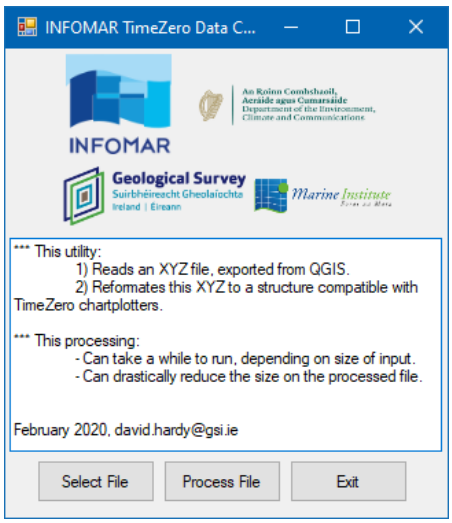


Figure 13: TimeZero, INFOMAR conversion utility main window.

4. Dependent on the size of the file, processing can take several minutes. Once complete, a notification message appears.

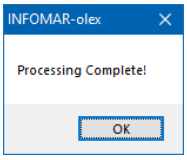


Figure 14: TimeZero, INFOMAR utility processing complete notification.

5. The processed data is placed in the same location as the input, but the phrase 'TIMEZEROready' is added to the filename e.g. Kerry.xyz would be converted to KerryTIMEZEROready.xyz. It is normal behaviour for this file to be smaller than the input (often significantly) e.g. a 600mb input file can generate a 20mb output file.

6. If the previous steps were not performed on the TimeZero computer, copy the 'TIMEZEROready' file to USB and move to the computer on which TimeZero is installed.

7. Launch TimeZero, and from the TimeZero (top left) main menu – choose Import/Export.

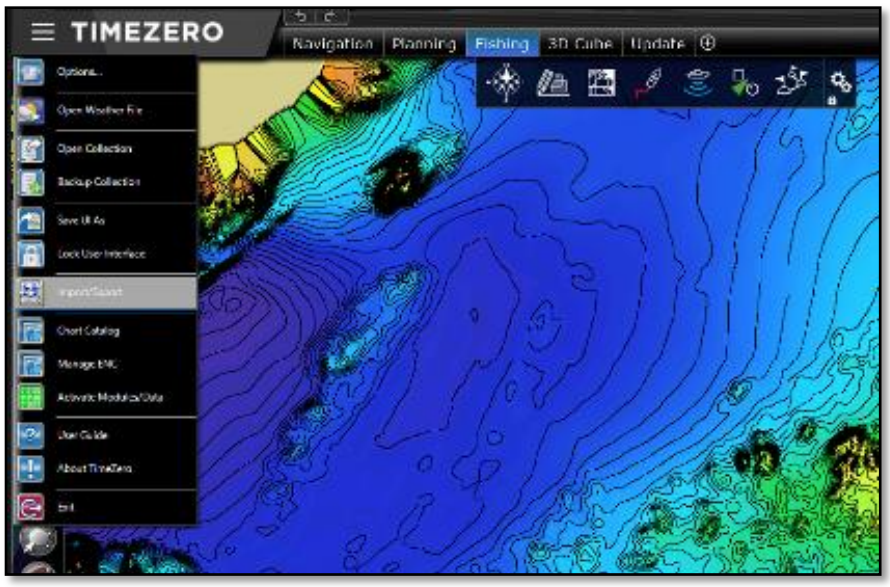


Figure 15: TimeZero, 'Fishing' window with main menu opened and 'Import/Export' option highlighted.

8. A screen will appear – ensure import data is selected; then press 'Next'.

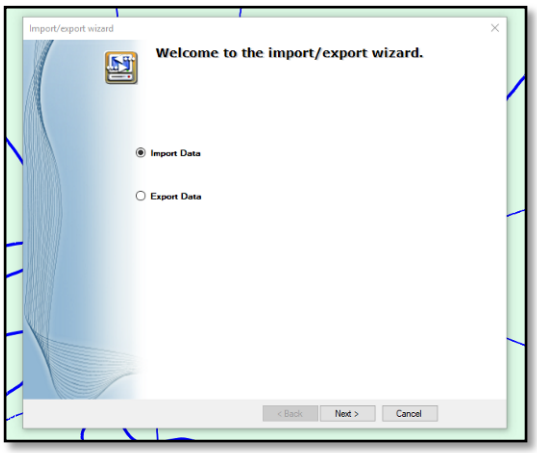


Figure 16: TimeZero, first step of import/export wizard.

9. Scroll down on the next page, until the 3D Data section is reached. Select the 'Depth Data – XYZ' format; then press 'Next'.

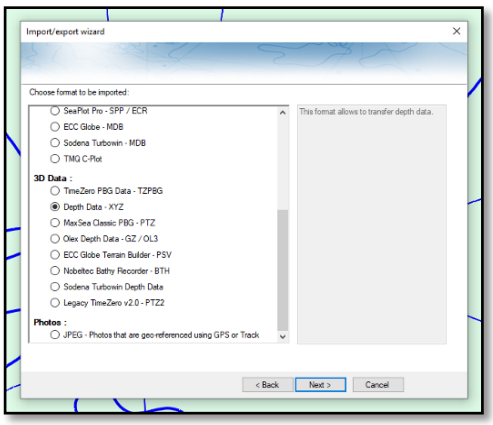


Figure 17: TimeZero, second step of import/export wizard.

10. On the next page – options exist to filter the data being imported. Leave all options unmodified or blank. Then press 'Next'.

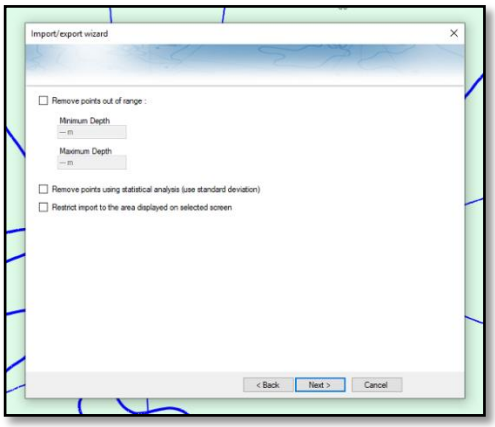


Figure 18: TimeZero, third step of import/export wizard, all filter options left blank.

11. On the next step, select the 'TIMEZEROready' file with the Windows dialog – and then click 'Next'.

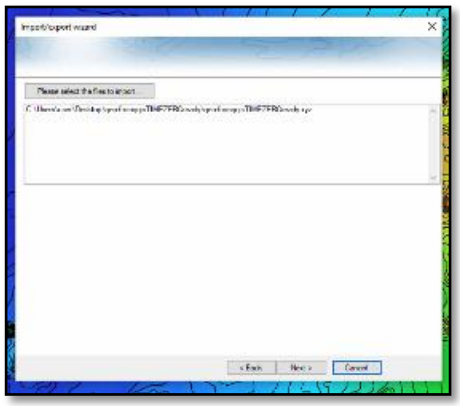


Figure 19: TimeZero, fourth step of import/export wizard, select 'TIMEZEROready' file and press next.

12. The import process should then proceed. Depending on the size of the input file, it may take a substantial length of time. A dialog summarising the input process may appear, which can be dismissed.

13. Assess the results of the input. In the geographic view, navigate to where the margins of the XYZ file should have been and compare the contours presented. This will be particularly effective in areas of high relief.

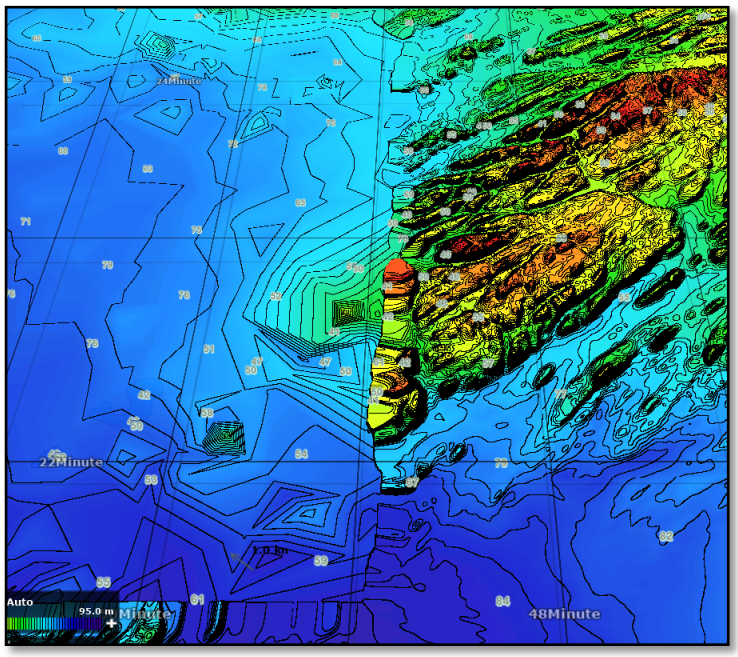


Figure 20: TimeZero, assessing the impact of the INFOMAR data at the margins of the imported area. Left, represents the default bathymetry provided in TimeZero; right, represents the high-resolution data imported with the method above.

TimeZero Interpolation & Extrapolation

The TimeZero 'Personal Bathymetry Grid' (PBG) is designed to record and display data from a ships' own single-beam echosounder / depth-finder; rather than the high resolution, full coverage data provided by INFOMAR.

To generate grids from the expected single-beam echosounder inputs, it interpolates and extrapolates records; including INFOMAR data loaded using the method above. This processing 'extends' coverage beyond the boundaries of the loaded data; and can also fill small holes caused by data gaps. Most importantly, the processing can also 'fill' any gaps occurring at the top of shoals or other obstructions, with inaccurate data.

Figure 21: TimeZero, view of INFOMAR data loaded, showing interpolation of the eastern margins of the imported data area. Figure 21 shows a loaded dataset, with extrapolation along the eastern margin. Figure 22 displays data from an inshore shallow water survey. The extrapolation significantly extends the loaded area, while interpolation causes depth to be generated over Lambay Island.

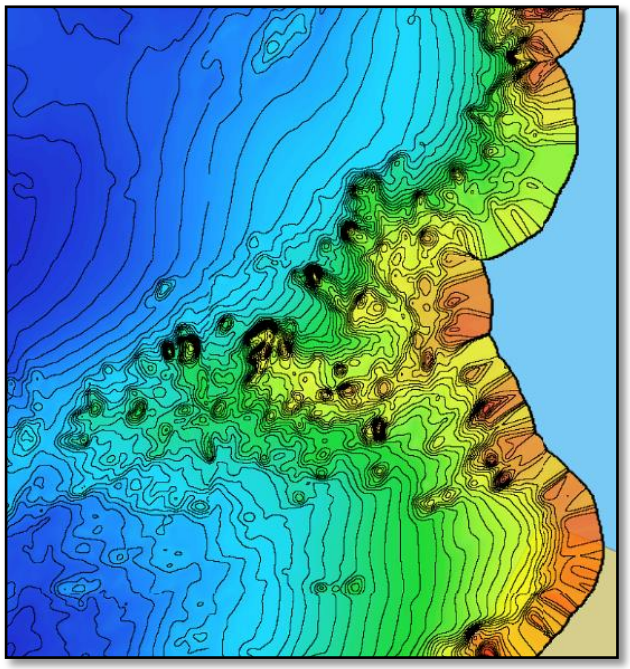


Figure 21: TimeZero, view of INFOMAR data loaded, showing interpolation of the eastern margins of the imported data area.

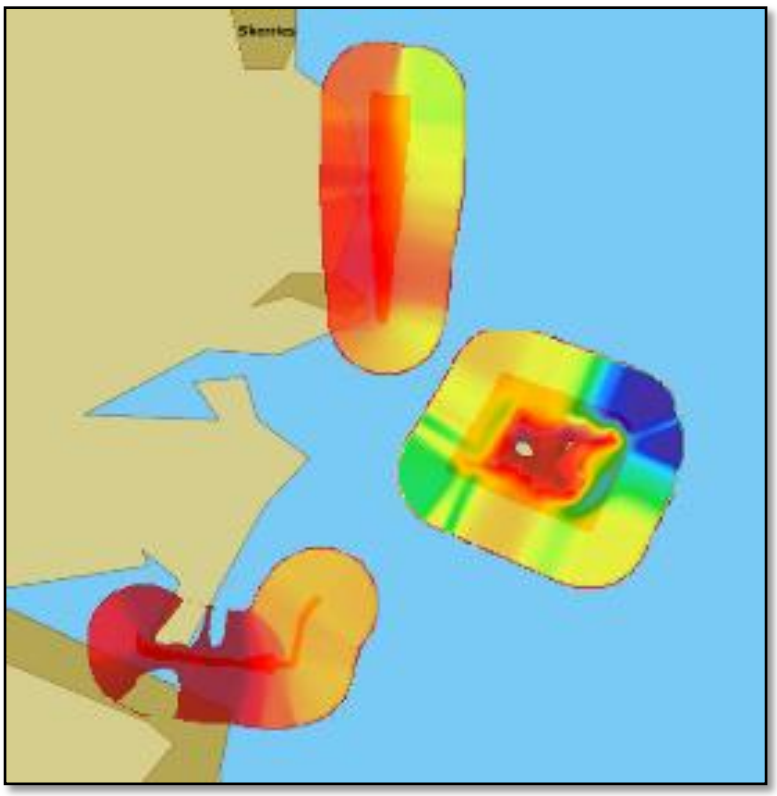


Figure 22: TimeZero, extrapolation and interpolation on a nearshore survey. Solid colours represent 'real' data loaded, while the transparent areas are interpolated or extrapolated. Importantly, the interpolation extends depth readings across onshore Lambay Island.

No options are exposed to the user, allowing control of the range/distance for which extrapolation and interpolation are allowed.
However, the menu options allow a visual distinction to be made between 'real' data areas, and those that are present due to extrapolation and interpolation. When configured correctly, 'real' data is presented as solid colours, while extrapolated/interpolated areas are presented as transparent.
To enable this display, the PBG Menu must be selected from the Control Bar at the top of the TimeZero window. The option for both 'PBG Points' and 'Imported 3D Database' should be ticked.

Figure 23: TimeZero, PBG menu showing options required to allow visual discrimination between 'real' data and interpolated/extrapolated coverage.

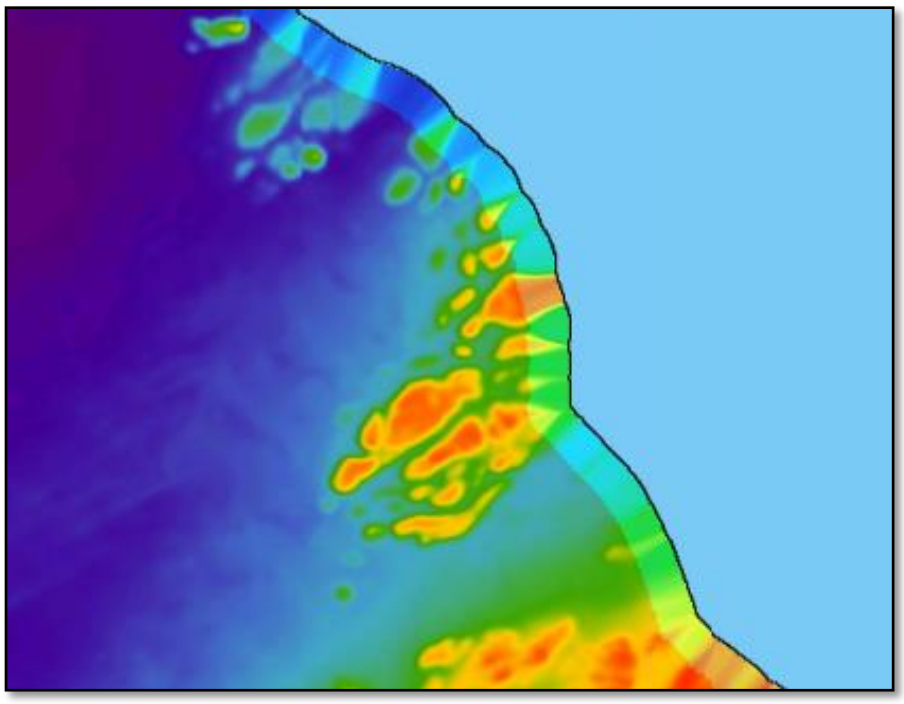


Figure 24: TimeZero, INFOMAR data loaded after enabling the PBG options required to discriminate true coverage. Solid colours represent the imported data, semi-transparent represents the results of the inbuilt interpolation.

7 Importing Data to Olex Software

Requirements

- The steps below require the full Olex software package and cannot be followed with the 'Olex LT office' or Lino products. To our knowledge, no extensions beyond Olex itself are required.
- The procedure was compiled using Olex v14.6 (2020 release) but should be usable from Olex v7.31 onwards.
- Where an older Olex version is available, the free updates available at www.olex.no should be used to update the software installed.

Method

1. Download the 'INFOMAR-Olex.exe' utility, available at:

   https://drive.google.com/drive/folders/1kebrkDBMkW-0SAEi69v6hIi2jOkK00ve?usp=sharing

   - This utility formats the output from Section 5 Step 20, to that required for loading into Olex software.

2. Double-click the 'INFOMAR-Olex.exe' file to launch the utility. Windows may 'pop-up' a warning, preventing the utility from running. To bypass this, press the 'More info' hyperlink; and then press the 'Run anyway' button when the window updates.

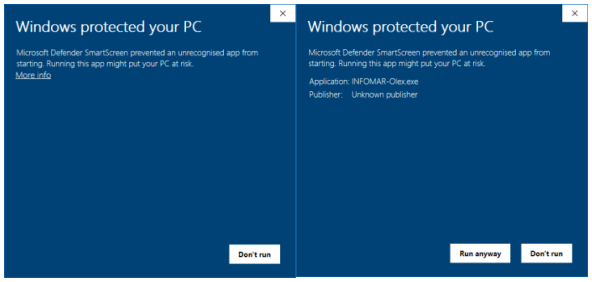


Figure 25: Olex, Windows warning for unknown software like the INFOMAR utilities.

3. Once the software has launched, a simple dialogue is presented. Use the 'Select File' button to select a file for processing; then the 'Process File' to commence. Only a single file can be processed at a time.

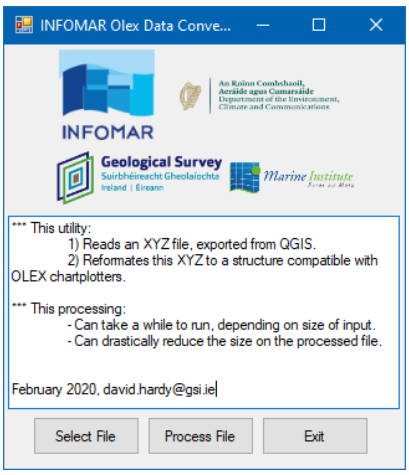


Figure 26: Olex, INFOMAR conversion utility main window.

4. Dependent on the size of the file, processing can take several minutes. Once complete, a notification message appears.

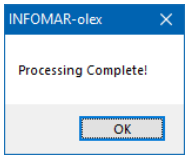


Figure 27: Olex, INFOMAR utility processing complete notification.

5. The processed data is placed in the same location as the input, but the phrase 'OLEXready' is added to the filename e.g. Kerry.xyz would be converted to KerryOLEXready.xyz. It is normal behaviour for this file to be smaller than the input (often significantly) e.g. a 600mb input file can generate a 20mb output file.

6. If the processed 'OLEXready' file is less than 3.9GB/3900MB size, it can be simply copied to a FAT32 formatted USB key (most USB keys come preformatted this way). If the 'OLEXready' file is larger than 3.9GB, the additional steps presented in the following section 'Compressing Files for Olex' need to be followed before copying data to the USB key.

7. All further steps take place on the dedicated linux-based Olex computer. This should be powered on, and the Olex software allowed to run in the usual manner.

8. A new 'Seafloor Database' needs to be created within OLEX. This is covered in greater detail in the OLEX manual. We recommend using one or more dedicated Seafloor Databases for INFOMAR data.

    i. The interface to create a new Seafloor Database is accessed from the 'Layers' button → tick 'Manage Seafloor Databases…'

    ii. This pops-up a new interface at the lower left of display. Choose the 'Create New' option.

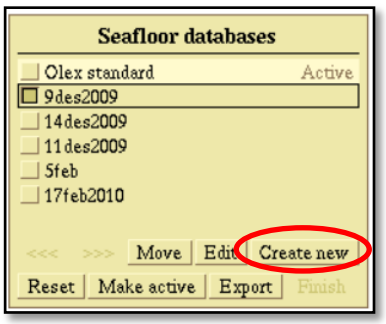


Figure 28: Olex, creating a new Seafloor Database.

iii. The New Database panel appears. Use the 'Edit Name' button to provide a user-friendly name. Use the arrows next to 'Resolution' to set an appropriate value for the data you intend to load (e.g. if most of the source datasets have a resolution of 5m – set this to 5.6m). Use the 'Specify' button to set the search radius – this should be a 2x or 3x multiple of the Resolution value.

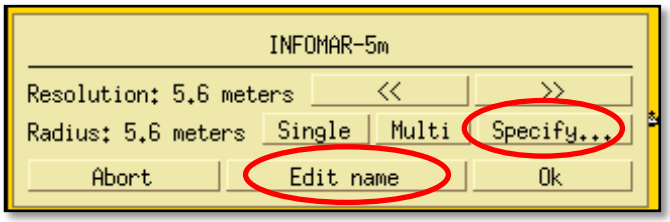


Figure 29: Olex, defining resolution, radius and name for a new Seafloor Database.

iv. Press 'Ok' – and a dialogue will appear asking if you want to 'Shift Bottom Calculation' to the new Seafloor Database --- choose 'Yes'.

9. Insert the USB key containing the 'OLEXready.xyz' file (or 'OLEXready.xyz.gz' if compression is required) into the Olex computer. This will be autodetected and a dialogue will appear – select the device that is not labelled 'Local drive' or 'DVD' (so represents the USB disk that has been inserted). On the next dialogue, choose to 'Read from'.

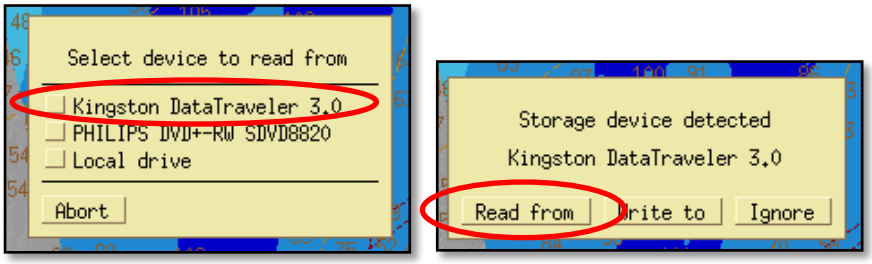


Figure 30: Olex, dialogues following insertion of a USB stick.

10. Select the 'OLEXready file to be imported and press 'Read'. The import process will begin; during import, several stages of progress bar will display. Importing large files can take a

substantial amount of time, during which the rest of Olex will be slow and unresponsive. As the import process ends, Olex will draw the newly generated seafloor model.

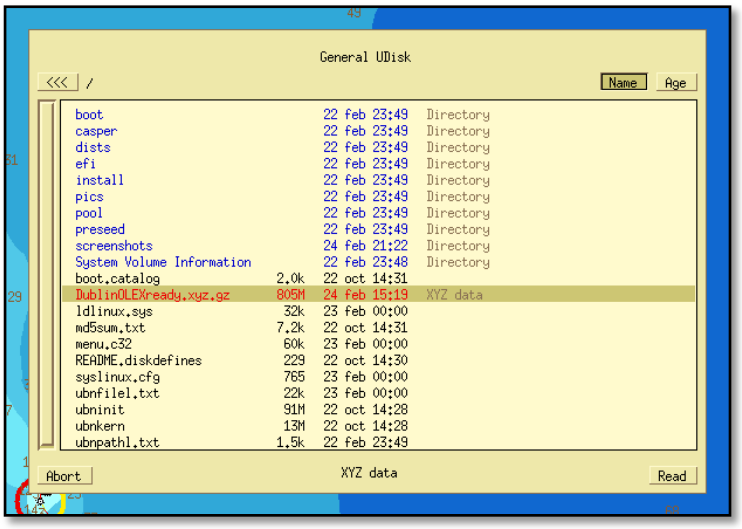


Figure 31: Olex, select the file for import and press 'Read'.

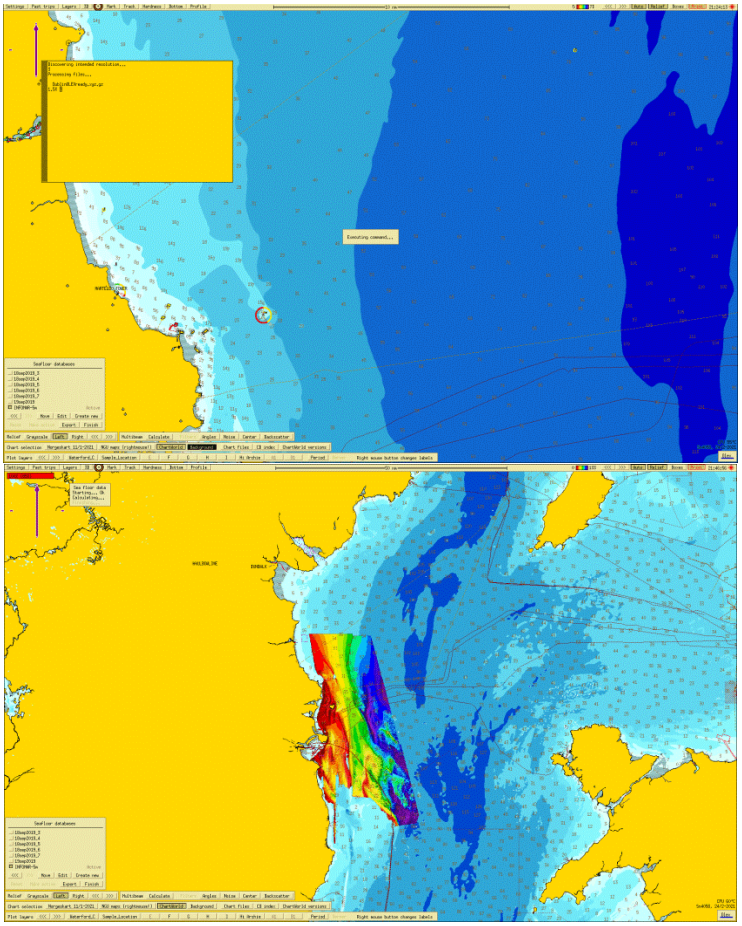


Figure 32: Olex, several steps of progress bar are displayed, until the newly imported seafloor model is shown.

Olex Interpolation & Extrapolation

The extent of interpolation used by Olex is determined by the radius parameter specified in the 'New Seafloor Database' dialog series. This provides good control over the extent of interpolation/extrapolation when values are specified as above. A radius value of 2-3 times the input resolution allows Olex to fill minor holes in the coverage and only extends the coverage by a minor amount.

However, the default value for radius is much larger. When this default value is used, the coverage is extended significantly and data can be interpolated across areas where this is not appropriate.

Figure 33 and Figure 34 contrast the use of appropriate radius values (2-3 x grid resolution) vs. the default value. While the interpolation of data onto an island is easily recognised, this interpolation can also be expected to occur in more subtle scenarios where it can not be readily identified.

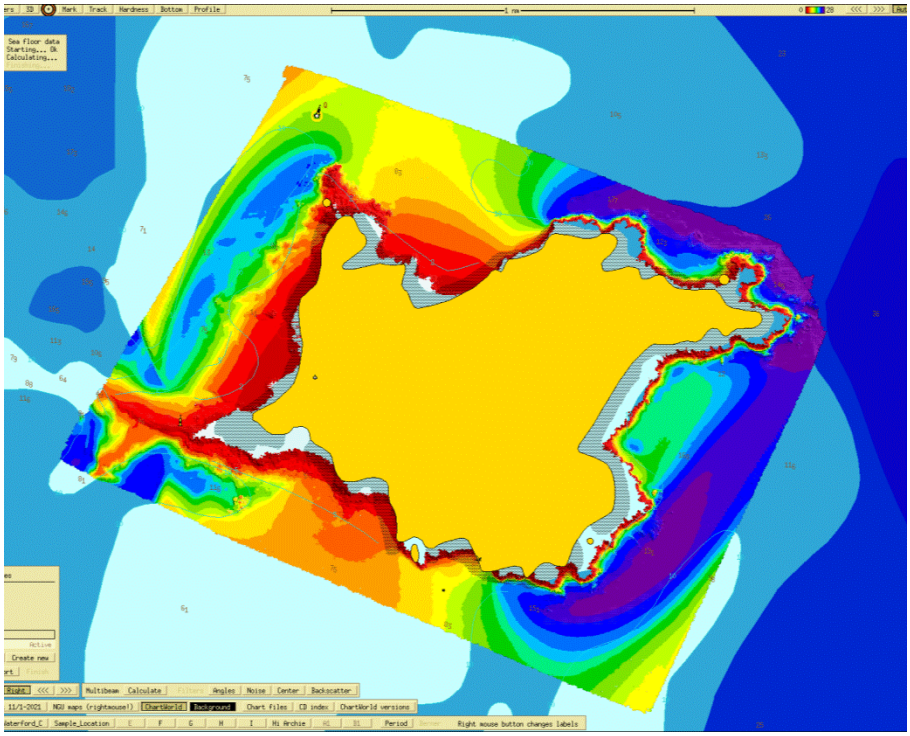


Figure 33: Olex, data loaded with appropriate radius defined. Data has not been extrapolated beyond the true coverage loaded and has not been interpolated onto Lambay Island.

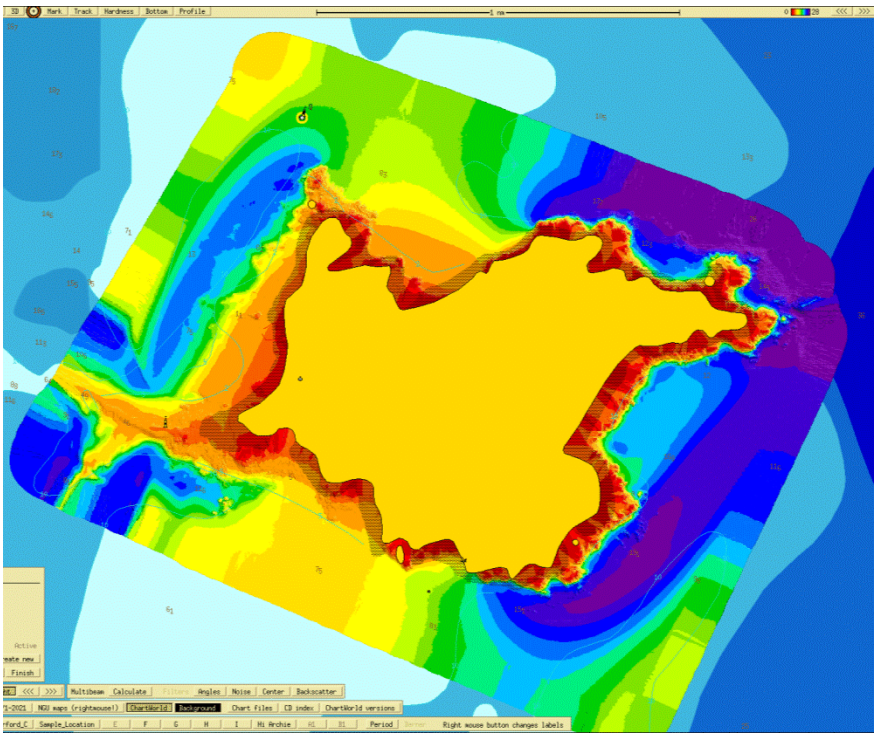


Figure 34: Olex, data loaded using the default radius. Data has been extrapolated significantly and interpolated to cover parts of Lambay Island.

Compressing Files for Olex

Olex systems can only recognise USB keys formatted with the FAT32 filesystem. This formatting limits the largest possible filesize to 4GB, which can be exceeded by the bathymetry needed to cover a large area.

This section details how to compress an 'OLEXready' file that is >4GB, so that it can be copied onto a FAT32 USB key for use with Olex. The compression used is natively understood by the Olex software, allowing the compressed file to be loaded.

1. Download and install the '7-Zip' package from: https://www.7-zip.org/
2. In Windows Explorer, browse to the 'OLEXready' file and right-click on it. 7-Zip will have installed a new entry for itself, go down to this and choose the 'Add to archive…' entry.
3. The 'Add to Archive' window will appear. Set the Archive format to 'gzip' (all other options are not compatible with Olex). This will lead to '.gz' being appended to the filename – DO NOT change this.
4. In most cases, the 'Compression level' can be left at the default value of Normal. If the compressed 'OLEXready.xyz.gz' is still larger than 4GB, this value can be adjusted to the 'Ultra' setting. This achieves even greater compression, but takes substantially longer to run.
5. All other options should be left at default, to maintain compatibility with the Olex software.

6. Once the compression has completed, the output file (ending in 'OLEXready.xyz.gz) can be copied to the FAT32 formatted USB key and the remainder of the import process completed in Olex (step 7 onwards in the preceding section).

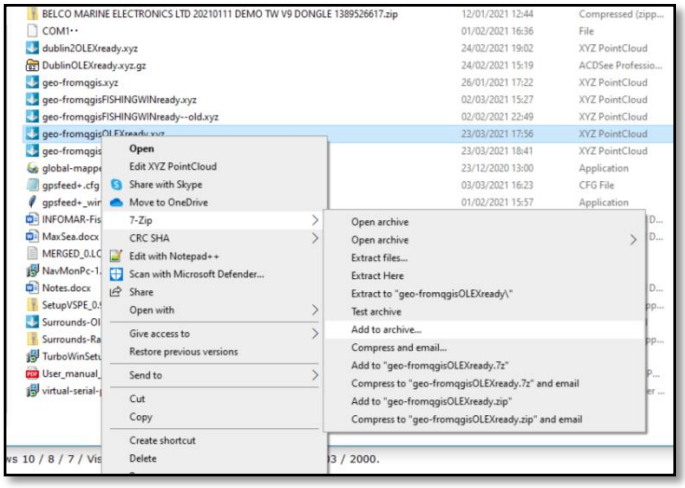


Figure 35: Olex, choosing the 7-Zip 'Add to archive...' option.

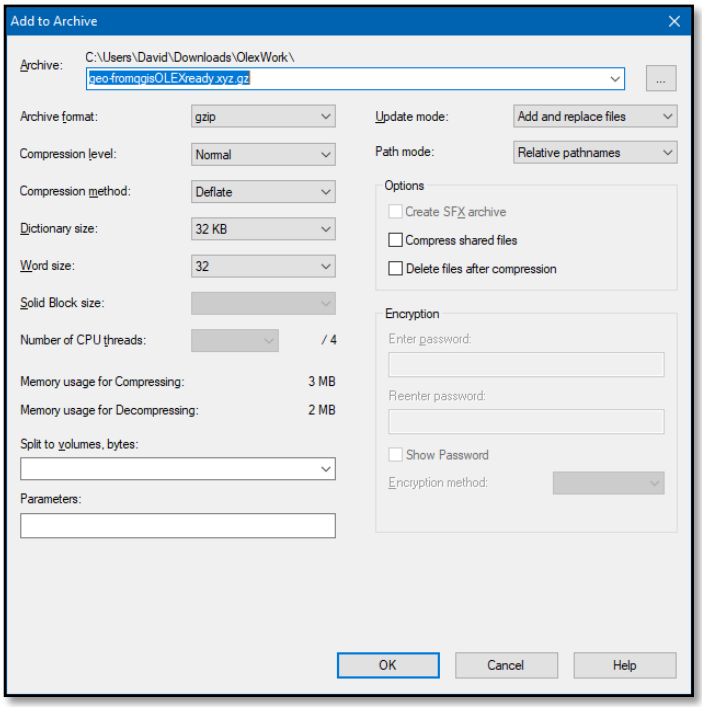


Figure 36: Olex, choosing the correct options for 7-Zip compression.