ABSTRACT

During two research cruises in May and July of 2016 multibeam bathymetry and water column data were acquired from the western and southern coasts of Ireland in an average of 100 m water depth. These areas were surveyed and mapped by the Marine Institute of Ireland and Geological Survey of Ireland as part of INFOMAR using the R/V Celtic Voyager outfitted with a Kongsberg EM2040 echosounder. During this cruise more than ten shipwrecks, some of which were previously uncharted, were mapped in high resolution for the first time. Water column data were collected over the wrecks in addition to standard bathymetry data. CARIS HIPS 10.0 and QPS Qimera software were used to post-process both the bathymetric and water column data. Water column data were added to the gridded surface, over the wreck sites to accurately find least depth soundings. This process is done to provide a more complete and accurate image of the wreck site beyond what bottom tracking alone could detect. This poster will compare the workflow and end products produced by QPS Qimera 1.4.3 and CARIS HIPS 10.1.

BACKGROUND

In recent years multibeam sonar has gained the ability to record the sonar time series associated with each beam as it travels to the sea bed and back, obtaining an image of the water column along the way. This ability to map the water column along with the seafloor was originally intended to serve fisheries, but now has the function to help many applications. Water column data can serve as a quality control function to get a more accurate model even with competing interference. Interference can come from many things and cause the bottom to be inaccurately represented, and can occur from other sonars, bubble wash down, bottom detection failures, thermoclines, fish targets and – the main focus of this poster – false tracking (or false bottom soundings). Beginning in the Fall of 2010 the data were worked solely with CARIS HIPS 9.1. During this time some obstacles were encountered, and were re-examined using HIPS and SIPS 10.1 and 10.2. Qimera 1.4 also allows for a comparative analysis. HIPS and SIPS has had the capability of analyzing water column data and add it to the bathymetric data and surface since 2013 (Version 8.0). Qimera 1.4 also includes the capability to analyze water column data. Errors were found being generated from an incorrect representation of our research and experience with these two software programs, acknowledging we have no formal training regarding water column processing. Comparisons represent only our findings during this study. Issues encountered may well be repairable.

METHODS

- Data were acquired in the southern Irish Sea with an EM2040 Kongsberg on the R/V Celtic Voyager. Wrecks identified were in ~100 m of water. 3 lines parallel to the wreck were used, with >200% swath cover, plus 1 cross line. The swath was narrowed for higher data density.

RESULTS

- There is great similarity between water column fans in Qimera, and HIPS and SIPS' Swath Editor (figure 2, 5). Both software programs show the area of high intensity, which might lead the user to conclude that the feature should be added to the gridded surface. Qimera has 2D and 3D views, but HIPS and SIPS Subset Editor has greater ability for broad point cloud type editing. Qimera allows the user to overlap fans on the gridded surface to best find the actual point location. HIPS and SIPS requires a few more steps than Qimera, and takes significantly longer in processing time. Many steps in HIPS and SIPS require a series of options requiring selection by the user, while some of these steps are automated in Qimera and others do not exist in Qimera (e.g., load tile, compute TPU, and merge). HIPS and SIPS allows for more quantitative analyses, and data can be viewed and edited in different editors to allow for a more dynamic interpretation.

Ease of Use and Problems Faced

- In Qimera the user only has to take 4 steps to progress from raw data to looking at the water column fan, resulting in a very streamlined process. The program prompts the user via a Dynamic Workflow to do all the steps from the time the program is opened until the gridded surface is created. The user only has to open the swath editor.
- A few problems were encountered with user additional soundings added in the water column fan. This was a bug that was fixed from 4.3.2 to 4.3.3 (see images at right).
- Overall, Qimera has a very user friendly interface that helps the user get to the final product quickly.

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REFERENCES


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