Developing a grid from ENC soundings

The following outlines an example of one method that could be used to include ENC data into the global GEBCO grid.

The method uses routines from Generic Mapping Tools (GMT), 'surface' gridding routine, this models a surface based on the input data, filling all grid cells.
http://gmt.soest.hawaii.edu/doc/latest/surface.html

Experimented with including: ENC soundings, data from other surveys in the area, e.g. data from ship tracks (held at the IHO DCDB), coastline data (defining '0' contour) and including land data in the gridding algorithm.

The generated grid was clipped to follow the approximate region of the ENC coverage and was then included in the global grid using remove-restore.

The following code outlines the procedure used to generate a grid using 'surface' largely based on ENC soundings and additional trackline data.

The images at the end of the document show an example of gridding ENC data plus other data sources for a region off Brazil.

Input data sources as ASCII xyz files:

- samerica_enc.xyz – ENC sounding data
- samerica_trackline.xyz – ship trackline sounding data
- samerica_cst_pts_zero.xyz – coastline values exported at x,y,z (Z=0) from Global Self-consistent, Hierarchical, High-resolution Geography Database (GSHHG) coastline
- samerica_land.xyz – land elevations

Blockmedian filter the input data

- blockmedian samerica_enc.xyz samerica_trackline.xyz samerica_cst_pts_zero.xyz samerica_land.xyz -R-52/-30/-8/6 -I15s -V -Q > block.med

Grid the data

- surface block.med -R-52/-30/-8/-2 -I15s -V -T0.35 -Gsamerica_brazil.nc

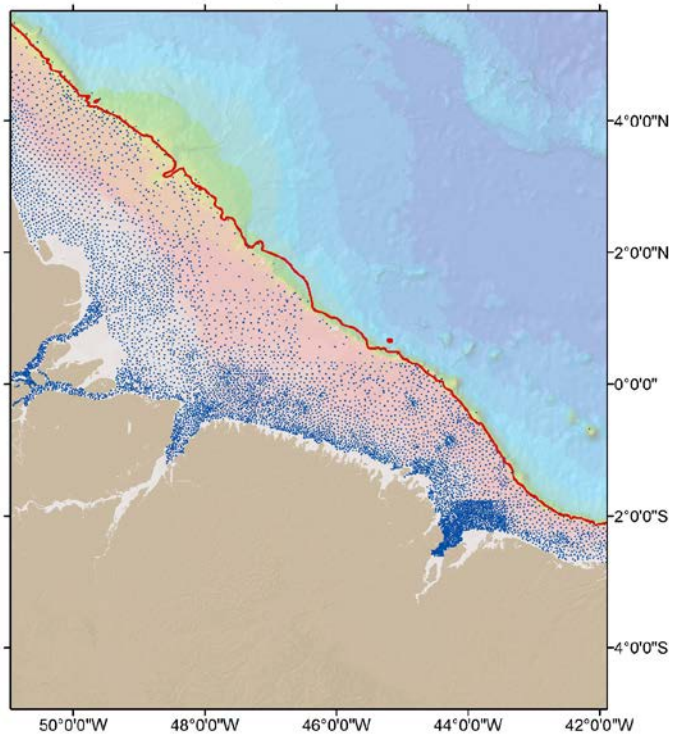
You can limit the Z range in the grid file (using –Lu) and then add in the land data separately

- surface block.med -R-52/-30/-8/-2 -I15s -V -T0.35 -Gsamerica_brazil.nc –Lu-0.1

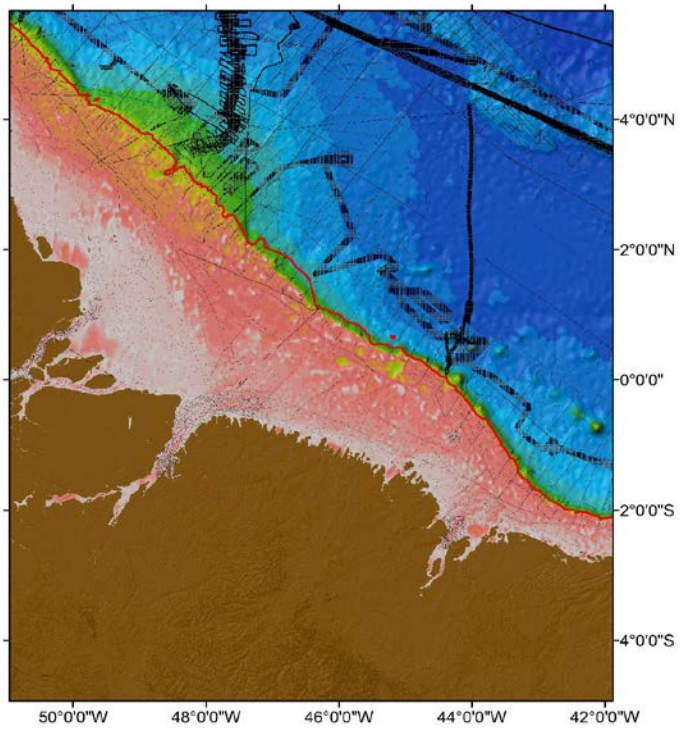
This implementation of surface produces a gridline registered grid, 'grdsample' can be used to toggle to create a pixel registered grid.

grdsample samerica_brazil.nc –Gsamerica_brazil_samp.nc –T --- generated a pixel registered grid

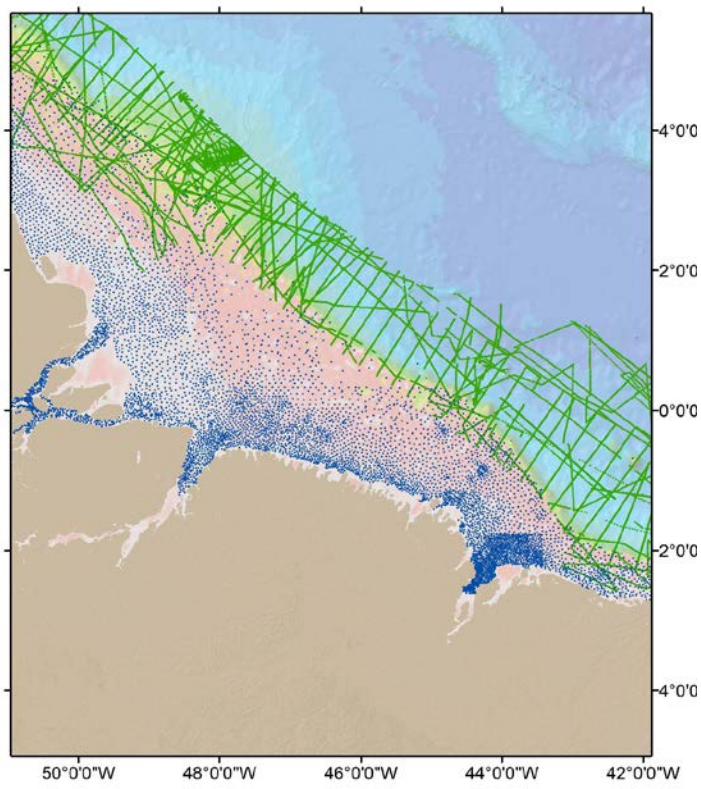
ENC sounding coverage off Brazil, red line = 200m contour



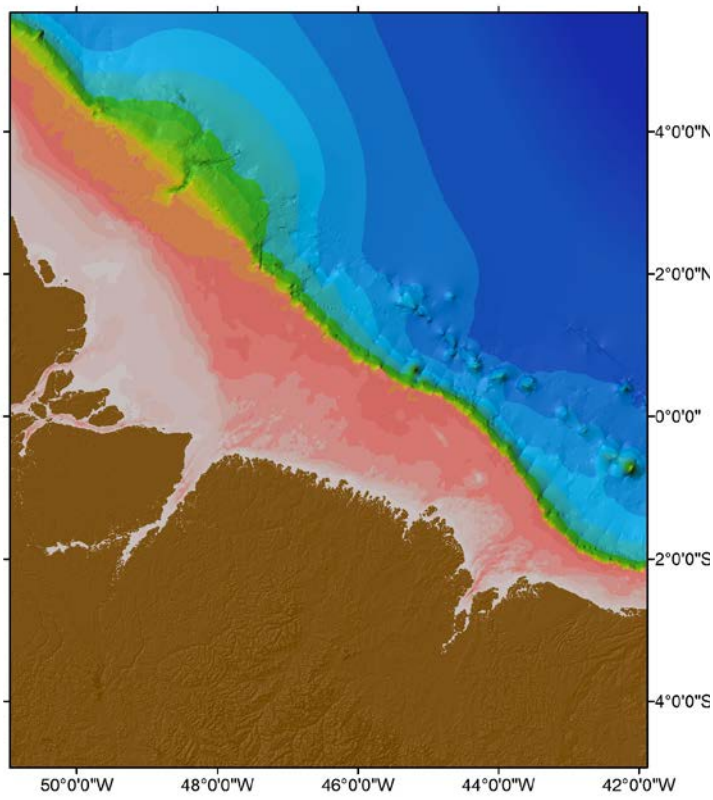
SRTM15-plus, overlain by SID grid (black dots/lines)



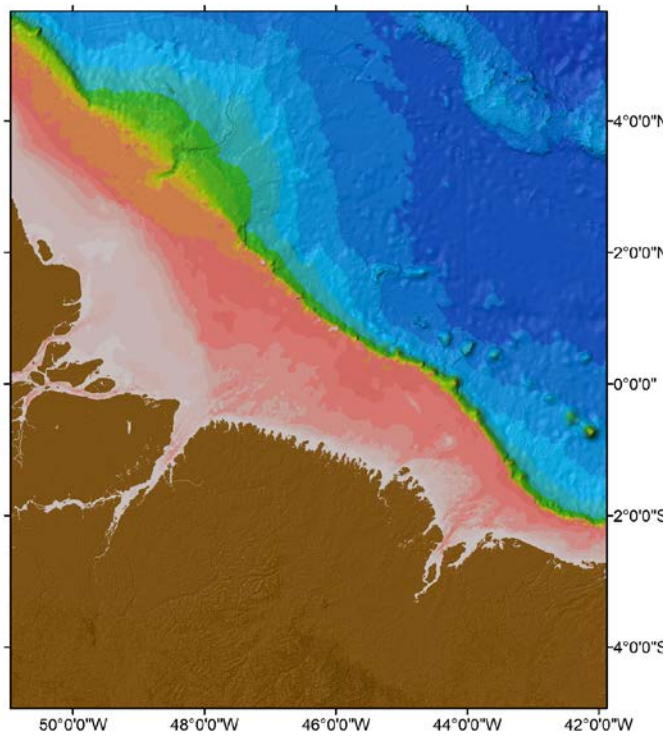
Input to gridding routine, ENC soundings (blue)
and soundings from tracklines (greeen)



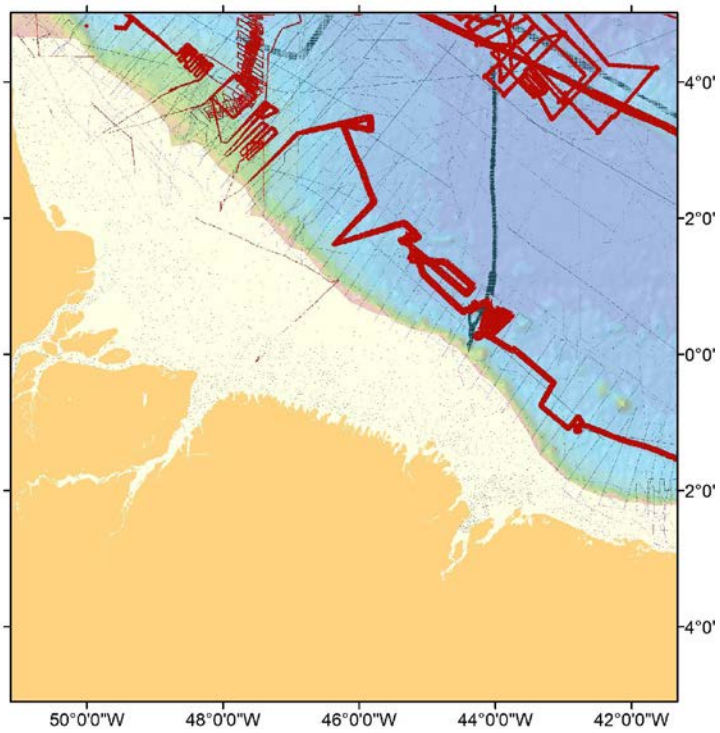
Grid produced from ENC soundings and trackline data



ENC/trackline grid merged with SRTM15_plus
to produce GEBCO_2019



GEBCO_2019 Grid overlain by SID grid



The light cream coloured areas are coded as '15', i.e. interpolated based on a computer algorithm. Cells constrained by ENC soundings are coded '14' and coloured black in the above image. The ENC sounding coverage is difficult to see at the scale of the above image.

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