Nippon Foundation / GEBCO Training Program 2012/2013

The visit to a international laboratory is included in the training program to round out the students training, to help them build networks and to deepen some of their newly-acquired theoretical knowledge. This includes familiarization with the programs the visited organization is engaged in, as well as some directed work under supervision.

SHARED BENEFITS: Students Lab Visit to NATIONAL GEOPHYSICAL DATA CENTER

MARINE GEOLOGY & GEOPHYSICS DIVISION

THE DEVELOPMENT OF A DIGITAL ELEVATION MODEL AROUND PORTSMOUTH, NH

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Goal of this project:

The goal of the project was to build a bathymetric-topographic Digital Elevation Model (DEM) around the area of Portsmouth, NH. A DEM has multidisciplinary applications for ocean engineering and coastal engineering using geographic information systems (GIS) software. The DEM was developed using a number of bathymetric and topographic datasets, allowing us to apply the knowledge gained from the Nippon Foundation/GEBCO training course.

Work flow of developing DEM:

1. Setting area and Data collection

The area around Portsmouth, NH was selected to develop a DEM as this area is surveyed annually during the CCOM Hydrographic Field School. Bathymetric , topographic and bathymetric-topographic datasets covering for this area were collected from the floowing sources: NOAA's National Ocean Service (NOS), Center for Coastal and Ocean Mapping/Joint Hydrographic Center (CCOM/JHC) and U.S. Geological Survey (USGS). Figure 1 shows the footprint of datasets used to develop DEM. The shoreline data for Portsmouth area (Fig. 2) was extracted from NOAA shoreline database (http://www.ngs.noaa.gov/NSDE/).

2. Datum conversion

Datasets used to build Portsmouth DEM were originally referenced to various horizontal and vertical datums. For example, vertical datums of datasets include Mean Lower Low Water (MLLW), Mean Low Water (MLW) and North American Vertical Datum of 1988 (NAVD88). The datum conversion tool "Vdatum" (http://vdatum.noaa.gov) was used to establish common datums in developing the DEM . All datasets were transformed to the horizontal datum of NAD83 and vertical datum of NAVD88.

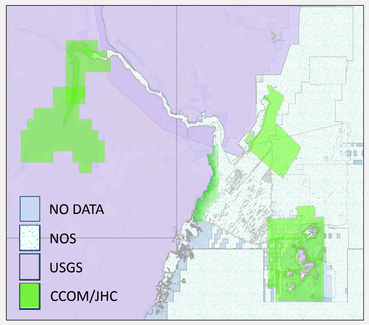


Fig.1 Footprint of datasets used to develop DEM

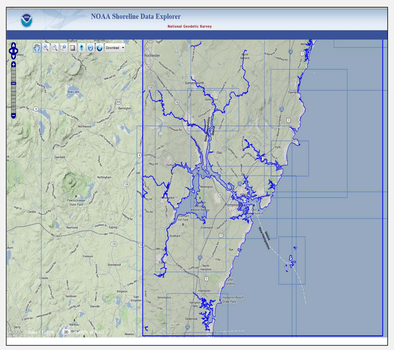


Fig. 2 Source and coverage of shoreline data
http://www.ngs.noaa.gov/NSDE/

3. Creating base bathymetric surface in GMT

Before building the DEM, a base bathymetric surface which has 1/3 arc second grid cell size was created by using GMT program surface . Bathymetric datasets and shoreline data were used to create this base bathymetric surface. The depth of shore line was defined as -1.0 m in order to divide the land and water areas.

4. Building the DEM in MB system

In this step, a certain gridding weight was assigned to each topographic and bathymetric dataset based on the data quality to determine the data contribution in creating the DEM in MB system (Fig. 3). The tool 'mbgrid' with spline tension were used to interpolate values for data gaps.

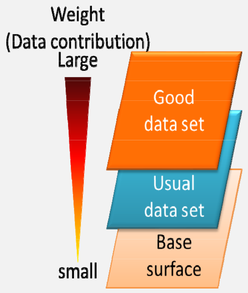
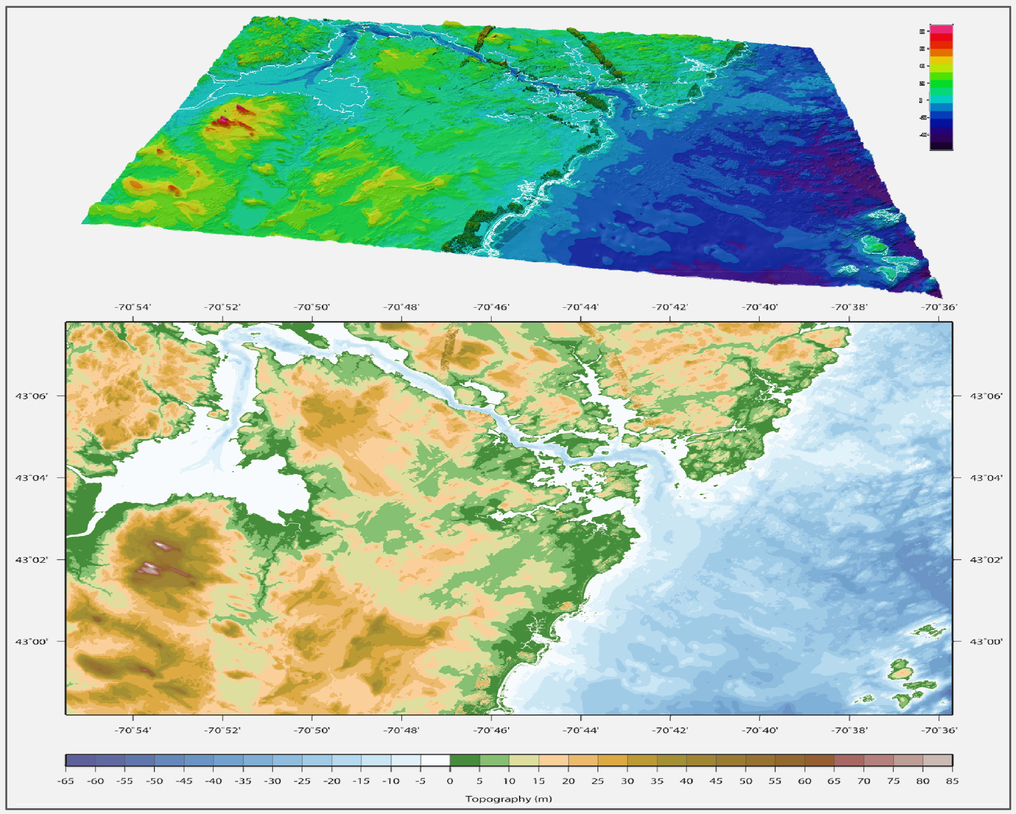


Fig. 3 Concept of assigning gridding weight

5. Development of Portsmouth DEM

Figure 4 shows the created bathymetric-topographic DEM of Portsmouth, NH. The grid size of 1/9 arc second (~3 m) was selected to produce this final product.

Fig. 4 Digital Elevation Model of Portsmouth, NH



NATIONAL OCEAN SERVICE SIDE SCAN SONAR DATA INVENTORY DEVELOPMENT

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Aim of the project:

The aim of the project was to identify the NOS surveys' datasets with towed Side Scan Sonar data collected, **generate mosaics as the new product**, based on available data and make them easily available within the hydrographic surveys database, in addition to bathymetry data and other oceanographic information.

Actions:

1. Surveys within the NOS surveys database, where Side Scan Sonar data were collected, were identified using their metadata.
2. Surveys with Side Scan mosaics already posted as a products online were identified using online tools.

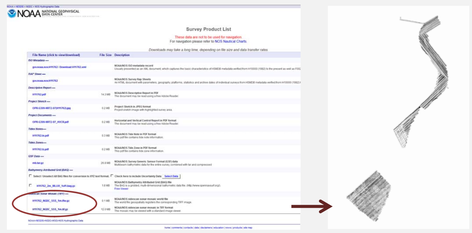

Fig. 1 Examination of online data for posted TIFF mosaics – H11762 survey as an example. (http://www.ngdc.noaa.gov/mgg/bathymetry/hydro.html)

3. Side Scan mosaics, as geo-referenced images, were generated for those surveys, where side scan data were collected and processed.
   They will be made publicly-available as a new product offered by NGDC.

Results:

1. **The inventory of 312 surveys** containing towed Side Scan data was established.
2. **17 surveys were processed** using Caris HIPS and SIPS software.
3. **26 georeferenced TIFF mosaics generated** as the new products.

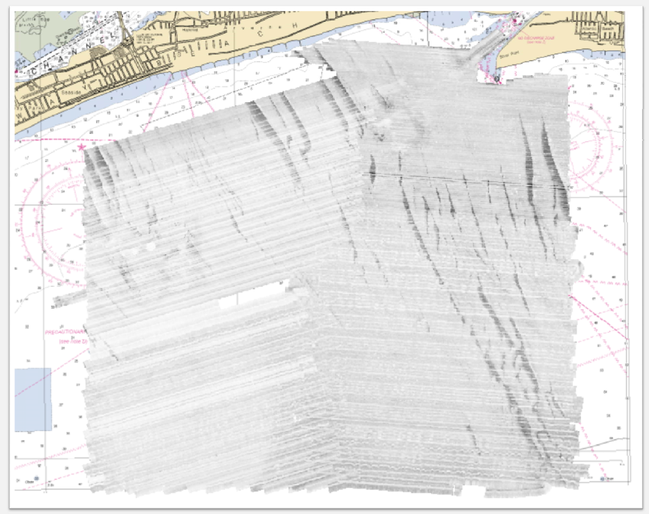

Fig. 2 An example of project product. Side Scan Sonar mosaic, with 1m resolution, 200% coverage, generated from H12138 survey data, displayed over the nautical chart No. 12305.

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