Bathymetric Data Protocols

MMSDIWG – 05 October 2021

Introduction:

Bathymetric Data Protocols ensure that data requests to support an emerging need can be successfully accomplished. These requests could support something like Disaster Response (i.e. Hurricanes, Earthquakes, Oil Spill), or even a situation like Search and Rescue.

Bathymetric data is made available by hydrographic offices in nautical products like ENCs, as gridded bathymetric models, and as raw and/or processed data from national and international data repositories, or point clouds. ENCs are designed for navigation and provide a generalized shoal-biased impression of bathymetry. Gridded bathymetric models provide more details but are generally large data sets. Raw and processed data are provided to repositories, are of varying quality, and made available to the public.

Choice: use ENC data or gridded bathymetry model?

Many hydrographic offices have set up web services (WMS, WMTS, WFS, WCS, API Features, …). These web services can serve many different standards, and are generally available through portals to discover and view data sets that are readily available for machine-to-machine interaction. Human-to-human means of communication could be used as a backup for this spatial infrastructure, or as a channel for additional interaction.

Choice: use portals and web services or human communication?

List of portals:

1. Bathymetric portals
    a. IHO/IOC General bathymetric Chart of the Oceans (GEBCO): www.gebco.net.
    b. IHO Data Center for Digital Bathymetry (DCDB): https://www.ngdc.noaa.gov/iho.
    c. The International Bathymetric Chart of the Caribbean (IBCCa) is a regional UNESCO-IOC project of GEBCO: www.gebco.net/about_us/committees_and_groups/scrum/ibcca/.
    d. The GEBCO/Nippon Foundation Seabed 2030 project: https://www.iho-machc.org/seabed2030.html.
    e. EMODnet Bathymetry: https://portal.emodnet-bathymetry.eu/?menu=19
2. ENC portals
    a. MACHC ENC Online viewer: https://www.iho-machc.org/MACHC-ENCOnline/
3. General portals
    a. Caribbean Marine Atlas: https://www.caribbeanmarineatlas.net/
    b. Caribbean Geoportal: https://www.caribbeangeoportal.com/

c. MACHC MSDIWG Inventory: https://www.iho-machc.org/mmsdiwg.html

List of web services:

1. GEBCO:
    https://www.gebco.net/data_and_products/gebco_web_services/web_map_service/mapserv
2. IHO Data Center for Digital Bathymetry
    https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/multibeam_dynamic/MapServer
    https://gis.ngdc.noaa.gov/arcgis/rest/services/multibeam_mosaic/ImageServer
    https://gis.ngdc.noaa.gov/arcgis/rest/services/multibeam_mosaic_subsets/ImageServer
    https://gis.ngdc.noaa.gov/arcgis/rest/services/csb/MapServer
    https://gis.ngdc.noaa.gov/arcgis/rest/services/web_mercator/trackline_combined_dynamic/MapServer/1
3. EMODNet Bathymetry:
    https://ows.emodnet-bathymetry.eu/wms
    https://tiles.emodnet-bathymetry.eu
    https://ows.emodnet-bathymetry.eu/wfs
    https://ows.emodnet-bathymetry.eu/wcs
    https://rest.emodnet-bathymetry.eu/
4. MACHC ENC Online:
    https://gis.charttools.noaa.gov/arcgis/rest/services/MACHC/MACHC_ENCOnline_Public/MapServer/exts/Maritime Chart Server/WMSServer
5. National web services:
    Accessible through https://www.iho-machc.org/mmsdiwg.html.
6. ESRI Living Atlas:
    https://livingatlas.arcgis.com/

Check list for human communication:

1. Identify area of need for Bathymetry
    a. Port Area
    b. Approaches
    c. Coastal Areas
2. Disaster Response Request Process
    a. Coordinate with Hydrographic Office
    b. Coordinate with Primary Charting Authority
    c. Coordinate with MACHC Chair / Vice Chair
    d. Coordinate with RENC (Regional ENC Coordination Center)
    A contact list is available at https://www.iho-machc.org/dr.html.
3. Data types needed for Disaster Response
    a. ENC/paper chart
        A worldwide catalogue of all ENCs is available at
        https://iho.maps.arcgis.com/apps/webappviewer/index.html?id=06d967702c7f4094bbc5b4f8e485b712&mobileBreakPoint=300
    b. Gridded bathymetric model
    c. Other bathymetric Surface
    d. Other?

4. Data formats
    a. XYZ
    b. BAG
    c. S-102
    d. Shape
    e. GEOTIFF
    f. other
5. Process for sharing with Disaster Response organizations
    a. Email
    b. FTP
    c. Website
6. Data Validation and Verification
    a. Is it authoritative data?
    b. What quality indicators are available? Is the following information available?
        i. IHO order
        ii. CATZOC
        iii. total horizontal and vertical uncertainties (THU & TVU)
        iv. used sensors and methods?
    c. Is the data complete?
        i. full coverage according to S-44
        ii. completeness of the available data in the area
        iii. completeness of the survey
        iv. completeness of the transfer file containing data?
    d. What is the survey date?
7. Restrictions (The Creative Commons standards are recommended.)
    a. Can I reuse the data in my own products?
        i. A distinction should be made between commercial products and SOLAS-dependent products for which bathymetric data reuse is in the interest of safety of navigation and meets no restrictions.
    b. Can I share the data with others?
    c. Should I delete the data after usage?
    d. Should I acknowledge the source?