Oceans Melting Greenland Singlebeam Bathymetry Data User's Guide

Dataset

OMG Bathymetry SBES Level 2 Data

Authors

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Introduction

Global sea level rise will be one of the major environmental challenges of the 21st Century. Oceans Melting Greenland (OMG) will pave the way for improved estimates of sea level rise by addressing the question: To what extent are the oceans melting Greenland's ice from below? Over a five-year campaign, OMG will observe changing water temperatures on the continental shelf surrounding Greenland, and how marine glaciers react to the presence of warm, salty Atlantic Water. The complicated geometry of the sea floor steers currents on the shelf and often determines whether Atlantic Water can reach into the long narrow fjords and interact with the coastal glaciers. Because knowledge of these pathways is a critical component of modeling the interaction between the oceans and ice sheet, OMG will facilitate improved measurements of the shape and depth of the sea floor in key regions as well.

The bathymetry survey was primarily conducted using multi-swath Multibeam Echo Sounder System (MBES) equipment and procedures. This bathymetry data was collected by a smaller vessel using a Singlebeam Echo Sounder System (SBES). The SBES data provides only a single measurement of water depth, directly beneath the ship, but this data was collected in a few regions where the MBES survey was not able to reach.

Campaigns

This data set consists of data from multiple campaigns.

2015 Ocean Research Project

This campaign was conducted by Ocean Research Project aboard the vessel R/V Ault. The data was collected during a survey of Greenland's Western coastline in August and September 2015 using a Singlebeam Echo Sounder System consisting of a 1 Kw singlebeam sonar with an integrated GPS that has a maximum 2100 feet depth range. See the field report https://podaac-tools.jpl.nasa.gov/drive/files/allData/omg/L2/docs/2015/Appendix_A-Daily_Field_Reports.pdf for more details.

2016 Ocean Research Project

This campaign was conducted by Ocean Research Project aboard the vessel R/V Ault. The data was collected during a survey of Greenland's Northwest coastline in July and August 2016 using a Singlebeam Echo Sounder System consisting of a high frequency Odom CV200 at 200 to 24 kHz operating to 5000 feet deep or Simrad's NSS7 evo2's paired with Navico's BSM-1 and Airmar Lowrance sonar hub module the 1 kW SS260 operating at 200 to 50 kHz to 2500 feet. See the field report https://podaac-tools.jpl.nasa.gov/drive/files/allData/omg/L2/docs/2016/Appendix_A-Daily_Reports.pdf for more details.

Format

The file names for this data set are of the form "OMG_Bathy_SBES_L2_<time_coverage_start>.nc" where <time_coverage_start> is formatted as "YYYYMMDDhhmmss". The data files are in NetCDF format and are compliant with the Climate and Forecast (CF) Metadata Conventions. The data file is formatted as follows:

```
dimensions:
        obs = UNLIMITED ; // (X currently)
variables:
        double lat(obs) ;
                lat:_FillValue = -9999. ;
                lat:long_name = "latitude" ;
                lat:standard_name = "latitude" ;
                lat:units = "degrees_north" ;
                lat:coverage_content_type = "coordinate" ;
                lat:axis = "Y" ;
                lat:valid_max = 90. ;
                lat:valid_min = -90. ;
        double lon(obs) ;
                lon:_FillValue = -9999. ;
                lon:long_name = "longitude" ;
                lon:standard_name = "longitude" ;
                lon:units = "degrees_east" ;
                lon:coverage_content_type = "coordinate" ;
                lon:axis = "X" ;
                lon:valid_max = 180. ;
                lon:valid_min = -180. ;
        float altitude(obs) ;
                altitude:_FillValue = -9999.f ;
                altitude:long_name = "altitude" ;
                altitude:standard_name = "altitude" ;
                altitude:units = "meters" ;
                altitude:positive = "up" ;
```

altitude:coverage_content_type = "physicalMeasurement" ;
altitude:coordinates = "lat lon" ;
altitude:grid_mapping = "UTM_Projection" ;
altitude:axis = "Z" ;
altitude:valid_min = -5000. ;
altitude:valid_max = 0. ;
double Xc(obs) ;
Xc:_FillValue = -9999. ;
Xc:long_name = "X-coordinate in UTM system" ;
Xc:standard_name = "projection_x_coordinate" ;
Xc:units = "meters" ;
Xc:coverage_content_type = "coordinate" ;
Xc:axis = "X" ;
Xc:valid_max = 834000. ;
Xc:valid_min = 160000. ;
double Yc(obs) ;
Yc:_FillValue = -9999. ;
Yc:long_name = "Y-coordinate in UTM system" ;
Yc:standard_name = "projection_y_coordinate" ;
Yc:coverage_content_type = "coordinate" ;
Yc:units = "meters" ;
Yc:axis = "Y" ;
Yc:valid_max = 9300000. ;
Yc:valid_min = 0. ;
char UTM_Projection ;
UTM_Projection:long_name = "UTM_Projection" ;
UTM_Projection:grid_mapping_name = "universal_transverse_mercator" ;
UTM_Projection:utm_zone_number = XXL ;

For every observation (obs), the latitude and longitude of the measurement are provided along with the elevation (altitude) represented in meters above sea level. The observation also includes the Universal Transverse Mercator (UTM) coordinates Easting and Northing, respectively. Each data file also includes several global variables to further describe the data contained within the file. These variables are as follows (values containing X's represent variables that have product specific values):

:title = "OMG Bathymetry SBES Level 2 Data" ;
:summary = "This file contains Singlebeam Echo Sounder System (SBES) survey measurements of sea floor depth along a ship track. The SBES system records only a single depth, directly below each ship location." ;
:keywords = "Bathymetry, Seafloor Topography, Water Depth" ;
:keywords_vocabulary = "NASA Global Change Master Directory (GCMD) Science Keywords" ;
:Conventions = "CF-1.6, ACDD-1.3" ;

:id = "OMG_Bathy_SBES_L2" ;
:uuid = "XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX" ;
:naming_authority = "gov.nasa.jpl" ;
:cdm_data_type = "Trajectory" ;
:history = "<campaign-specific>" ;
2015: "Transformed input product XXXXXXXXXX.XXX into NetCDF format. This product was updated on August 1, 2019 to be consistent with the improved precision update of the lat and lon variables in the other SBES products. The lat and lon values in this product remain unchanged after the update."
2016: "Transformed input product XXXXXXXXXX.XXX into NetCDF format. This product was updated on August 1, 2019 in order to improve the precision of the lat and lon variables."
:source = "<campaign-specific>" ;
2015: "Bathymetry data collected with a 1 Kw singlebeam sonar with an integrated GPS that has a maximum 2100 feet depth range."
2016: "Bathymetry data collected with the high frequency Odom CV200 at 200 to 24 kHz operating to 5000 feet deep or Simrad\'s NSS7 evo2\'s paired with Navico\'s BSM-1 and Airmar Lowrance sonar hub module the 1 kW SS260 operating at 200 to 50 kHz to 2500 feet." ;
:platform = "R/V Ault Vessel" ;
:instrument = "Multiple Singlebeam Echo Sounder Systems (SBES)" ;
:processing_level = "L2" ;
:comment = "<campaign-specific>" ;
2015: "This data was collected during the 2015 survey of the Greenland's Western coastline."
2016: "This data was collected during the 2016 survey of the Greenland's Northwest coastline." ;
:standard_name_vocabulary = "NetCDF Climate and Forecast (CF) Metadata Convention" ;
:acknowledgement = "This research was carried out by the Jet Propulsion Laboratory, managed by the California Institute of Technology under a contract with the National Aeronautics and Space Administration." ;
:license = "Freely Distributed" ;
:product_version = "1.0" ;
:references = "DOI:10.5067/OMGEV-SBES1" ;
:creator_name = "Joshua K. Willis" ;
:creator_email = "Joshua.K.Willis@jpl.nasa.gov" ;
:creator_url = "https://dx.doi.org/10.5067/OMGEV-SBES1" ;
:creator_type = "Person" ;
:creator_institution = "NASA Jet Propulsion Laboratory" ;
:institution = "NASA Jet Propulsion Laboratory" ;
:project = "Oceans Melting Greenland (OMG)" ;
:program = "NASA Earth Venture Suborbital-2 (EVS-2)" ;

:contributor_name = "Ocean Research Project (ORP)" ;
:contributor_role = "Ocean Research Project performed the survey in the field, collected the data and performed the initial processing." ;
:publisher_name = "PO.DAAC" ;
:publisher_email = "podaac@podaac.jpl.nasa.gov" ;
:publisher_url = "https://dx.doi.org/10.5067/OMGEV-SBES1" ;
:publisher_type = "group" ;
:publisher_institution = "NASA Jet Propulsion Laboratory" ;
:geospatial_lat_min = "XX.XXXXXXXXXX" ;
:geospatial_lat_max = "XX.XXXXXXXXXX" ;
:geospatial_lat_units = "degrees north" ;
:geospatial_lat_resolution = "<campaign-specific>" ;
2015: "0.001f"
2016: "0.00000000000001f"
:geospatial_lon_min = "-XX.XXXXXXXXXX" ;
:geospatial_lon_max = "-XX.XXXXXXXXXX" ;
:geospatial_lon_units = "degrees east" ;
:geospatial_lon_resolution = "<campaign-specific>" ;
2015: "0.001f"
2016: "0.000000000000001f" ;
:geospatial_vertical_min = "-XXX.XX" ;
:geospatial_vertical_max = "-X.XX";
:geospatial_vertical_resolution = "0.001f" ;
:geospatial_vertical_units = "meters" ;
:geospatial_vertical_positive = "up" ;
:time_coverage_start = "XXXX-XX-XXTXX:XX:XX" ;
:time_coverage_end = "XXXX-XX-XXTXX:XX:XX" ;
:time_coverage_duration = "P8D" ;
:date_created = "XXXX-XX-XXTXX:XX:XX" ;

Citation

This research was carried out by the Jet Propulsion Laboratory, managed by the California Institute of Technology under a contract with the National Aeronautics and Space Administration. Use of this data should be cited as follows:

> OMG. 2019. OMG Swath Gridded Singlebeam Echo Sounding (SBES) Bathymetry. Ver. 1. PO.DAAC, CA, USA. Dataset accessed [YYYY-MM-DD] at https://doi.org/10.5067/OMGEV-SBES1.

Contact

For questions please email podaac@podaac.jpl.nasa.gov or visit the PO.DAAC forum

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