Metadata

Field	Value
Dataset Name	NEMO-ANHA4 Sea ice locking of icebergs
Dataset General Type	Model data
Dataset Type	Dataset
Dataset Level	2
Program Website	
Keyword Vocabulary	Polar Data Catalogue
Keyword Vocabulary URL	https://www.polardata.ca/pdcinput/public/keywordlibrary
Theme	
Title	Marine
URL	https://canwin-datahub.ad.umanitoba.ca/data/group/marine
Dataset Status	Planned
Maintenance and Update Frequency	Not planned
Dataset Last Revision Date	2023-11-07
Dataset DOI	10.34992/mq60-c722

Field	Value
Metadata Creation Date	2023
Publisher	CanWIN

Dataset Authors

Dataset Authors 1

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Contributors

Contributors 1

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Role	
Email	
Affiliation	

Field	Value
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Project Data Curator Affiliation	Centre for Earth Observation Science - University of Manitoba
Dataset Collection Start Date	2002-01-01
Dataset Collection End Date	2017-12-31

Sample Collection
 	
 Sample Collection 1
 	
     Sampling Instrument Name
 	
     Standardized Sampling Instrument Name
 	
     Sample Collection Method Name
 	
     Comment
 	
     Method Link
 	
     Method Summary
 	
     Method Description Type
	
	Methods

Activity Collection Type	

Field	Value
Preferred citation	
Analytical Instrument	
Analytical Instrument 1	
Analytical Instrument Name	Nucleus for European Modelling of the Ocean (NEMO) v3.6
Standardized Analytical Instrument Name	
Analytical Instrument Identifier Id	
Analytical Instrument Title Type	Alternative Title
Analytical Instrument Identifier Type	
Analytical Method	
Analytical Method 1	
Analytical Method Name	NEMO - ANHA4 simulations
Method Link	

Method Summary

The atmosphere was forced with CGRF (Smith et al., 2014), Greenland solid and liquid discharges with Bamber et al. (2018) dataset, and river runoff with HydroGFD (Stadnyk et al., 2021). Initial and boundary conditions were taken from GLORYS2v3 (Masina et al., 2017). The model was run from 2002 to 2017, and outputs were obtained as 5-day averages (for gridded variables). Iceberg trajectory files were generated daily. The two simulations, SIL and CTL, only differ with respect to how the sea ice force on icebergs is parameterized. CTL follows the traditional drag parameterization present in NEMO-ICB (Marsh et al., 2015), while SIL introduces a new formulation where icebergs are locked in sea ice if the latter reaches a strength (proportional to sea ice concentration and thickness) that is capable of withstanding all the other forces acting on the iceberg without breaking. See Marson et al. (2023/2024) for more details. ### Output files: **1. griddedOutput.nc** Here, you will find variables related to the ocean and sea ice that are outputted in the ANHA4 grid (544 x 800). All variables are placed at T-points (Arakawa-C grid): • lat: latitude of each grid T-point in ANHA4 • lon: longitude of each grid T-point in ANHA4 • SIL_melttracer: vertically-integrated (m) passive tracer linked to iceberg melt by the end (Dec 31 2017) of the SIL simulation. • CTL_melttracer: vertically-integrated (m) passive tracer linked to iceberg melt by the end (Dec 31 2017) of the CTL simulation. • SIL_uovel_winter: U component of ocean velocity averaged between 0-100 m from 2004-2017 for the months of January to March in the SIL simulation. • SIL_vovel_winter: V component of ocean velocity averaged between 0-100 m from 2004-2017 for the months of January to March in the SIL simulation. • SIL_uivel_winter: U component of sea ice velocity averaged from 2004-2017 for the months of January to March in the SIL simulation. • SIL_vivel_winter: V component of sea ice velocity averaged from 2004-2017 for the months of January to March in the SIL simulation. **2. CTL_trajfiles and SIL_trajfiles folders** The folders contain information from each particle (cluster of bergs) and the environmental conditions surrounding them at each simulation day for CTL and SIL runs. Each file contains a single variable, indicated by the filename. You will notice that there are four files for each variable (*_01.nc through *_04.nc). This was done because of the large number or particles generated by simulation (over 34,000). Therefore, the first 3 files have 10,000 particles each, and the fourth file has the remaining 4,025. The variables are matrices of size 5,840 by 10,000 (except for the ones in file *_04.nc, which are 5,840 by 4,025). Each column contains a time series for one particle, and each row represents day of simulation, from January 01, 2002 to December 31, 2017. Therefore, if you wanted to plot the

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	trajectory of the 10th 'calved' particle in CTL, you would plot all the rows of the 10th column of lon_01.nc versus all the rows of the 10th column of lat_01.nc contained in the CTL_trajfiles folder. Notice that the columns are usually padded with NaN's in the first and last rows, when the particle did not exist (was not yet calved or had already melted completely). So, you can calculate how many days a particle has survived by counting the rows with data in them. The variables available for each simulation are: • xi: particle's position in the ANHA4 grid along x • yj: particle's position in the ANHA4 grid along y • lat: particle's latitude • lon: particle's longitude • length, width, thickness: dimensions of icebergs contained in the particle • icnt: sea ice concentration • ithk: sea ice thickness at the particle's position • uvel, vvel: particle velocity components • uta, vta: wind velocity components at the particle's position • uti, vti: sea ice velocity components at the particle's position • uto, vto: ocean velocity components at the particle's position
Laboratory	
Comments	
Variables Measured	
Licence Name or Copyright Statement	Creative Commons Attribution 4.0 International
Copyright Statement	
Licence Type	Open
Embargo Date	
Licence URL	https://spdx.org/licenses

Field	Value
Terms of Access	CanWIN datasets are licensed individually, however most are licensed under the Creative Commons Attribution 4.0 International (CC BY 4.0) Public License. Details for the licence applied can be found using the Licence URL link provided with each dataset. By using data and information provided on this site you accept the terms and conditions of the License. Unless otherwise specified, the license grants the rights to the public to use and share the data and results derived therefrom as long as the proper acknowledgment is given to the data licensor (citation), that any alteration to the data is clearly indicated, and that a link to the original data and the license is made available.
Terms of Use	By accessing this data you agree to [CanWIN's Terms of Use](/data/publication/canwin-data-statement/resource/5b942a87-ef4e-466e-8319-f588844e89c0).

Awards

Awards 1

Award Title	NSERC Discovery
Website	
Funder Name	NSERC
Funder Identifier Code	
Funder Identifier Type	
Funder Identifier Scheme	
Grant Number	RGPIN202102921

Related Resources

Related Resources 1

Field	Value
Related Resource Name	
Resource Code	
Identifier Type	
Relationship To This Dataset	
Resource Type	Online Resource
Type	
Series Name	
Publications	
Publications 1	
Publication Name	
Identifier Code	
Identifier Type	
Relationship to this dataset	
Resource Type	Online Resource
Publication Type	
Spatial regions	baffin-bay
Spatial extent West Bound Longitude	
Spatial extent East Bound Longitude	
Spatial extent South Bound Latitude	
Spatial extent North Bound Latitude	

Data and Resources

Field	Value
URL	https://canwinerddap.ad.umanitoba.ca/erddap/files/NEMO_ANHA4_SeaIceLocking_309d_54a5_54cc/
Name	NEMO_ANHA4 simulations
Description	**Sea ice driven iceberg drift in Baffin Bay.** Simulations carried out with NEMO at 1/4 degree resolution over the Arctic and Northern Hemisphere Atlantic (ANHA) domain. SIL differs from CTL only in the parameterization of the sea ice force over icebergs; for CTL it is simply a drag force, in SIL sea ice above 90% concentration is capable of locking icebergs. - Please select the **ERDDAP Server - Individual Files** tab below to see and download individual files. - To download the entire CTL and SIL folders, please click the **ERDDAP Server - Zipped Folders** tab.
Format	
Resource Category	data
URL	https://canwin-datahub.ad.umanitoba.ca/data/dataset/06dcb72d-b105-4655-8aab-3c7af6f0e453/resource/5bc299fb-85de-4222-84db-6007bfc44968/download/supplemental-information.pdf
Name	Supplemental Information
Description	Information about the **structure of the data files**, **variables** in each file and **model initialization**.
Format	PDF
Resource Category	supplemental