# Metadata

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|---|---|
| **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/en/group/marine |
| **Dataset Status** | Planned |
| **Maintenance and Update Frequency** | Not planned |
| **Dataset Last Revision Date** | 2023-11-07 |
| **Dataset DOI** | 10.34992/mq60-c722 |
| **Metadata Creation Date** | 2023 |
| **Publisher** | CanWIN |
| **Dataset Authors** | |

**Dataset Authors 1**

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|---|---|
| **Name** | Marson, Juliana |
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## Contributors

**Contributors 1**

| | |
|---|---|
| **Name** | |
| **Role** | |
| **Email** | |
| **Affiliation** | |
| **ORCID ID** | |

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|---|---|
| **Project Data Curator** | Marson, Juliana |
| **Project Data Curator email** | Juliana.MariniMarson@umanitoba.ca |
| **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

## 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

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|---|---|
| **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 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** | |

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| **License Name** | Creative Commons Attribution 4.0 International |
| **Licence Type** | Open |
| **Embargo Date** | |
| **Licence URL** | https://spdx.org/licenses |

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## 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

**Related Resource Name**

**Resource Code**

**Identifier Type**

**Relationship To This Dataset**

**Resource Type** Online Resource

**Type**

**Series Name**

## Publications

### Publications 1

**Publication Name**

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|---|---|
| **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

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|---|---|
| **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 |

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| **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 |