



# GLERL Great Lakes Ice Thickness Data Base, 1966-1979, Version 1

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## USER GUIDE

### How to Cite These Data

As a condition of using these data, you must include a citation:

Sleator, F. E. 1995. *GLERL Great Lakes Ice Thickness Data Base, 1966-1979, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center.

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FOR QUESTIONS ABOUT THESE DATA, CONTACT [NSIDC@NSIDC.ORG](mailto:NSIDC@NSIDC.ORG)

FOR CURRENT INFORMATION, VISIT <https://nsidc.org/data/G00803>



National Snow and Ice Data Center

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# 1 DATA DESCRIPTION

## 1.1 Summary

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The Great Lakes Ice Thickness Data Base is made up of observations made by paid and cooperative ice observers who made ice thickness observations at approximately 30 bays and harbors per year during the years 1966-1979. The period of record varies from 4 to 10 years depending on when the site was established. Data were acquired using augers and visual observations. The data are useful for site-specific shoreline engineering studies, winter navigation projects and remote sensing ground truth. Constraints on the data include the relatively short period of record (eleven seasons maximum for any one station). Additionally, the time series may not reflect the full winter severity range. Nearshore data may not be valid for nearby locations or representative of offshore conditions, and ice type codes (the visual observation code) changed in 1974/75. Both old and new code lists are available.

## 1.2 File Information

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### 1.2.1 Format

The columns of data in each file are listed in Table 1. Data files are in ASCII format.

Table 1. Column Descriptions of the Data Files

| Column                              | Description  |
|-------------------------------------|--|
| Station Number                      | The GLERL station number.  |
| Year                                | Year of observation.   |
| Month                               | Month of observation.  |
| Day                                 | Day of observation.  |
| Estimation Flag                     | 'E' if data are estimated.   |
| Total Thickness                     | Total ice thickness in inches for data1.dat or centimeters for data2.dat                                     |
| Lake Ice Thickness                  | Total thickness of any lake ice.   |
| Snow Ice Thickness                  | Total thickness of any snow ice.   |
| Columns 8 through 15, four sets of: | Additional Layer Code: See Table 2 for description.<br>Additional Layer Thickness: Total thickness of layer. |
| Water Level                         | The distance from the top of the water surface to the bottom of the ice sheet.                               |
| Snow Depth                          | The depth of snow on the ice.  |
| Snow Condition                      | Numeric code describing the condition of the snow. See Table 3 for details.                                  |

| Column             | Description   |
|--------------------|---|
| Ice Condition      | Numeric code describing the condition of the ice. See Table 4 for details.                          |
| Event Code         | Numeric code describing significant events affecting the observation site. See Table 5 for details. |
| Event Day          | Day which the above event occurred.   |
| Event Month        | Month which the above event occurred.   |
| Visual Observation | Numeric code describing the condition of the ice surface on the lake. See Table 6 for details.      |

Table 2. Additional Layer Codes

| Code | Description |
|------|-------------|
| 1    | Snow        |
| 2    | Slush       |
| 3    | Snow Ice    |
| 4    | Lake Ice    |
| 5    | Water       |
| 6    | Frozen Rain |

Table 3. Snow Condition Codes

| Code | Description |
|------|-------------|
| 1    | Wet         |
| 2    | Dry         |
| 3    | Packed      |
| 4    | Melting     |
| 5    | Fluffy      |
| 6    | Crusted     |
| 7    | Drifted     |

Table 4. Ice Condition Codes

| Code | Description    |
|------|----------------|
| 1    | Thaw Holes     |
| 2    | Windrowed      |
| 3    | Puddled        |
| 4    | Flooded        |
| 5    | Cracked        |
| 6    | Dry            |
| 7    | Solid          |
| 8    | Melting        |
| 9    | Candled        |
| 10   | Piled on Shore |
| 11   | Broken         |

Table 5. Event Codes

| Code | Description                            |
|------|--|
| 1    | Skim ice at measurement site           |
| 2    | Freeze over at measurement site        |
| 3    | Shore moat                             |
| 4    | Breakup                                |
| 5    | Ice free                               |
| 6    | Unnatural breakup (ice breaker, etc.)  |
| 7    | Measurement site moved to new location |

Table 6. Visual Observation Codes

| Code | Description     |
|------|-----------------|
| 1    | Open water      |
| 2    | Solid ice       |
| 3    | Honeycombed ice |
| 4    | Windrowed ice   |
| 5    | Slush ice       |
| 6    | Drifting ice    |
| 7    | Ice gorge       |

Table 7 lists data files as well as files with FORTRAN code designed to access the database. Note that this code was developed on an SGI running IRIX 4.0.1 and is intended to be updated by the

user for the appropriate operating environment. The two FORTRAN routines, once compiled, allow the user to select a subset of the database based upon station number. The station number can be read from the coordinate index listing.

Table 7. Data File Descriptions

| File           | Description  |
|----------------|--|
| data1.dat      | Ice thickness data file for English units (inches)   |
| data2.dat      | Ice thickness data file for metric units (centimeters)   |
| display_ice1.f | FORTRAN routine to access English units data   |
| display_ice2.f | FORTRAN routine to access metric units   |
| ice.loc        | Coordinate index for the observation stations  |
| thickness.tar  | Contains all the data files and FORTRAN routines for this data set compressed into one tar file. The file is 1.2 MB. |

### 1.2.2 File Size

The total size of the data set is 1.2 MB.

## 1.3 Spatial and Temporal Coverage

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The data cover 30 bays and harbors in the Great Lakes. Station locations are fairly evenly spread along the U.S. shores of Lake Superior with eleven stations concentrated in the Whitefish Bay area, are mostly north of the Keweenaw-Manistee line around Lake Michigan, are mostly near the Straits of Mackinaw on Lake Huron, include only seven stations on Lake Erie/Lake St. Clair, and are along the southeastern and eastern shores of Lake Ontario. The latitude and longitude of the stations is located in the file ice.loc in the format Nxx-xx/Wxxx-xx. The data span 1966 to 1979.

## 2 DATA ACQUISITION AND PROCESSING

### 2.1 Sample Data Record

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```

1000680113E01 01 00
1000680120                                4
1000680127E01 01 00                        5
1000680203 07 07 00                        07 01      40802
1000680210E02 02 00                        02          10902
    
```

## 2.2 Quality, Errors, and Limitations

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The metric unit data for station 127 on December 23, 1970 contain an invalid data type. This appears to have resulted from an error in digitizing the data for the additional layers. The English data for this day appears to be unreliable as well.

## 3 VERSION HISTORY

Table 8. Version History Summary

| Version | Release Date  | Description of Changes   |
|---------|---------------|--|
| 1.0     | 1995          | Initial release  |
|         | July 2006     | This document was reformatted. F. Fetterer reviewed this document. |
|         | July 2017     | A. Windnagel fixed broken links in the References section.         |
|         | November 2020 | Converted to PDF   |

## 4 RELATED DATA SETS

- [GLERL Great Lakes Air Temperature/Degree Day Climatology](#)
- [GLERL Radiation Transfer Through Freshwater Ice](#)
- [GLERL Great Lakes Ice Concentration Data Base, 1960-1979](#)
- [Great Lakes Surface Ice Reports from U.S. Coast Guard](#)

## 5 CONTACTS AND ACKNOWLEDGMENTS

Dr. Frederick E. Sleator  
 NOAA/GLERL  
 2205 Commonwealth Boulevard  
 Ann Arbor, MI 48105-1561

### Acknowledgments

This data set is maintained at NSIDC with support from the NOAA National Geophysical Data Center.

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## 7 DOCUMENT INFORMATION

### 7.1 Author

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NSIDC Technical Writers



## 7.2 Publication Date

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1995

## 7.3 Revision History

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17 November 2020