Global Lake and River Ice Phenology Database, Version 1

USER GUIDE

How to Cite These Data

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

Benson, B., J. Magnuson, and S. Sharma. 2000, updated 2020. *Global Lake and River Ice Phenology Database, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. https://doi.org/10.7265/N5W66HP8. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/G01377

National Snow and Ice Data Center

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1 DETAILED DATA DESCRIPTION

1.1 Summary

The Global Lake and River Ice Phenology Database contains freeze and thaw/breakup dates as well as other descriptive ice cover data for 865 lakes and rivers in the Northern Hemisphere. Of the 542 water bodies that have records longer than 19 years, 370 of them are in North America and 172 are in Eurasia. 249 lakes and rivers have records longer than 50 years, and 66 have records longer than 100 years. A few water bodies have data available prior to 1845. This database, with water bodies distributed around the Northern Hemisphere, allows for the analysis of broad spatial patterns as well as long-term temporal patterns.

This data set was prepared by the North Temperate Lakes Long-Term Ecological Research (NTL-LTER) program at the Center for Limnology (CFL) at the University of Wisconsin-Madison (UW) from data submitted by participants in the Lake Ice Analysis Group (LIAG). LIAG is an international ad hoc group of scientists who participated in a 1996 workshop sponsored by CFL and the National Science Foundation (NSF) Division of Environmental Biology (DEB) Long-Term Ecological Research (LTER) program as well as other data contributors. The group is especially interested in continuous data extending for 30 years or more. If you wish to contribute data for inclusion in the database, please contact Corinna Gries (cgries@wisc.edu) at CFL.

The data are stored in a standard format in a database. NSIDC has developed a Web-based user interface to the database that allows users to search the database and retrieve data by the available parameters. The interface also includes a link to more general information about the lakes and rivers in the database, including, for example, latitude and longitude. The output can be directed to a Web browser, a gzipped file, or a tab-separated ASCII text file.

Note: The term phenology in the data set title refers to the seasonal phenomenon of the freezing and thawing of lake and river ice.

Access to the *Global Lake and River Ice Phenology Database* data set is unrestricted, but users are encouraged to register for the data. Registered users will automatically receive e-mail notification about any product changes. To register, visit the data set landing page and click on the “SUBSCRIBE” button.

1.2 Data Set Purpose

This data set provides a long-term record of freeze and thaw/breakup dates of ice on rivers and lakes across the Northern Hemisphere that will allow analysis of broad spatial patterns and long-term temporal patterns.

1.3 Data Collection Notes

The freeze date (ice on) is defined as the first date on which the water body was observed to be completely ice covered, and the breakup date (ice off) is the date of the last breakup observed before the summer open water phase. Note, however, that individual sites (such as lakes) have adopted different definitions for "completely ice covered" that differ from site to site but that are consistent within each site in recent years. Also note that for Russian river data, the ice-off date is the date of the start of ice drift on the river (this could be before, concurrent with, or after the date when complete ice coverage is over). Ice duration is the number of days that a water body is completely covered with ice. For example, a lake that thawed for several days in mid-winter and then refroze would have the duration calculated as the number of days from ice-on to ice-off minus those days when it thawed. For Russian rivers, duration is measured from the ice-on date to the date the river is no longer completely covered; the reported ice-off date (start of ice drift) is not used in the calculation of duration for these rivers.

Historical observations were made for different reasons such as religious, cultural, practical (the need for transportation over ice or open water), or out of curiosity. Most of the records show ice-off and ice-on dates, but some show only that the water body froze completely in a given year (Magnuson et al., 2000).

2 SOFTWARE AND TOOLS

2.1 Get Data

The database can be accessed in a number of ways. You can download the complete database tables as comma separated value (CSV) text files via HTTPS: https://noaadata.apps.nsidc.org/NOAA/G01377/.

- Freeze/Thaw Dates database: liag_freeze_thaw_table.csv
- Physical Characteristics database: liag_physical_character_table.csv

Additionally, there are two web search interfaces that allow the user to customize each query to the database by specifying geographical coverage, date range, and a combination of available parameters and text such as lake or river name. To search for freeze dates, thaw dates, and ice duration, use the Freeze/Thaw Dates Search interface. To retrieve physical characteristic information for the lakes and rivers in the database, use the Physical Characteristics Search interface. For more information on these two interfaces, see sections 2.2 and 2.3.

Searches use simple text and are not case sensitive. Refer to Section 2.4 Search Tips for pointers on finding all the available information in the database for a particular lake or river.

2.2 Freeze/Thaw Parameters

The Freeze/Thaw Dates Search interface allows you to retrieve freeze dates, thaw dates, and ice duration for the lakes and rivers in the LIAG freeze/thaw database.

2.2.1 Input

The possible input parameters are listed in Table 1.

Table 1. LIAG Search Interface Input Parameters

Parameter	Description
Country	Countries to choose from: Canada, China, Finland, Germany, Hungary, Japan, Norway, Russia, Russia-Estonia, Sweden, Switzerland, and United States
Latitude and Longitude	Allows user to create a geographical box around a region by entering a northernmost and southernmost latitude and a westernmost and easternmost longitude.
Lake or River Name	Free text field to enter the name of the lake or river. It is case insensitive.
Name Code	Alphanumeric code that uniquely identifies a lake or river. Case sensitive.
Lake and/or River:	Choose lake data only, river data only, or both
Minimum Year	Minimum search year (inclusive). Note: This parameter is on the Freeze/Thaw Dates interface only.
Maximum Year	Maximum search year (inclusive). Note: This parameter is on the Freeze/Thaw Dates interface only.

2.2.2 Output

The possible output parameters of the Freeze/Thaw Dates Search interface are listed in Table 2.

Table 2. Freeze/Thaw Search Output Parameters

Output Parameter	Description
Ice On Date	Freeze date: Defined as the first date on which the water body was observed to be completely ice covered. The format is YYYY, M[M], D[D]; where YYYY is the 4-digit year, M[M] is the 1- or 2-digit month, and D[D] is the 1- or 2-digit day of month. If -999 is set for the year, this either means that the lake or river did not freeze or it is unknown if it froze or not. See the *Froze* field to determine which is the case. If the month or day are -999, but the year is valid, then the exact date of freeze is not known.

Ice Off Date	Thaw/Breakup date: Defined as the date of the last breakup observed before the summer open water phase. The format is YYYY, M[M], D[D]; where YYYY is the 4-digit year, M[M] is the 1- or 2-digit month, and D[D] is the 1- or 2-digit day of month. If -999 is set for the year, the date of thaw/breakup is not known.
Ice Duration	The number of days that a water body is completely covered with ice. The format is a 1- to 3-digit day of year (ddd). If the values is -999, then the duration is unknown.
Season	Ice season given in the form YYYY-YY: 4-digit fall year to 2-digit spring year.
Froze	Denotes whether or not lake or river froze during the season (Y: yes, N: no, U: unknown)
Latitude	Latitude of the measurement in decimal degrees
Longitude	Longitude of the measurement in decimal degrees
Lake or River Name	Name of the lake or river. Note: A lake or river may be in the database more than once due to spelling differences in the names.
Name Code	Unique code to identify a lake or river. Created by data managers at the Center for Limnology (CFL) at the University of Wisconsin, Madison.
Lake or River	Lake or River Flag (L: lake, R: river)
Country Name	Name of the country in which the body of water resides.
Comments	General comments concerning the data record made by contributors or CFL data managers.

2.2.3 Sort

You can sort the Freeze/Thaw Dates Search by one of the following parameters:

- Ice Duration
- Season
- Latitude
- Longitude
- Lake Name
- Lake or River (lakes, then rivers)
- Country Name

2.2.4 Output Format

Users may choose from three output formats: output to a Web browser, output to a gzipped CSV (comma-separated) ASCII file, or output to a TSV (Tab-Separated) ASCII file. The value -999 is used for missing or unknown values.

2.3 Physical Characteristics Parameters

The Physical Characteristics Search interface allows you to retrieve physical characteristic information for lakes and rivers in the LIAG Freeze/Thaw Database.

2.3.1 Input

See Table 1 for a description of input parameters.

2.3.2 Output

The output parameters of the Physical Characteristics Search interface are listed in Table 3.

Table 3. Physical Characteristics Search Output Parameters

Output Parameter	Description
Lake or River Name	Name of the lake or river. **Note**: A lake or river may be in the database more than once due to spelling differences in the names.
Name Code	Unique code to identify a lake or river. Created by data managers at the Center for Limnology (CFL) at the University of Wisconsin, Madison.
Lake or River	Lake or River Flag (L: lake, R: river)
Continent	1-character continent code A: Asia E: Europe N: North America
Country	Name of the country in which the lake or river resides. See Table 1 for a list of countries.
State	Name of the state in which the lake or river resides, if applicable.
Latitude	Latitude in decimal degrees.
Longitude	Longitude in decimal degrees.
Elevation	Elevation of lake or river above sea level in meters
Mean Depth	Mean depth of lake or river in meters
Max Depth	Maximum depth of lake or river in meters
Median Depth	Median depth of lake or river in meters
Surface Area	Surface area of lake or river in square kilometers
Shoreline Length	Shoreline length of lake in kilometers
Largest City Population	Population of largest city on lake

Output Parameter	Description
Power Plant Discharge	A flag indicating if a power plant discharges into the lake or river Y: Yes N: No -: Unknown
Area Drained	The area drained by streams in square kilometers (for a lake or river)
Landuse Code	Landuse code of the area surrounding the lake or river. Every code that applies to a lake or river is listed in this field. U: Urban A: Agricultural F: Forest G: Grassland O: Other -999: Missing/unknown
Conductivity	Conductivity of the water in microsiemens per centimeter (µS/cm)
Secchi Depth	Depth the secchi disk reached in meters.
Contributor	Last name of investigator who submitted the data. See list of Contributing Scientists (pdf, 88KB).
Inlet Stream	A flag indicating if a lake has an inlet stream. Y: Yes N: No -: Unknown
Comments	General comments concerning the data record made by contributors or CFL data managers.

2.3.3 Sort

The output from the Physical Characteristics Search can be sorted by one of the following parameters:

- Lake Name
- Latitude
- Longitude
- Country Name
- Lake or River (lakes, then rivers)
- Mean Depth
- Max Depth
- Surface Area
- Area Drained

2.3.4 Output Format

Users may choose from three output formats: output to a Web browser, output to a gzipped CSV (comma-separated) ASCII file, or output to a TSV (Tab-Separated) ASCII file. The value -999 is used for missing or unknown values.

2.4 Search Tips

For each query, the user may include choices from several categories. If the user does not select anything from a given group of choices, the search does not use that group to filter the data. For instance, if no country is specified, the search includes all the countries by default; if no latitude or longitude is specified, the search defaults to the full geographical range; if no lake name or code is specified, the search includes all lake names and codes, and so on.

- For searches that may generate a large amount of data, it is best to save the data as a gzip file instead of sending the output to the browser.
- Searches ignore the word "lake" in a lake name.
- If you do not select anything from a given group of choices, the search does not use that group to filter the data. For instance, if no geographical information is specified, the search includes all regions by default; if no lake name or code is specified, the search includes all lake names and codes, and so on.
- Lake or River name is case insensitive, however,
- Search by a country or by a latitude and longitude but not by both.
- The lake name field includes actual lake names as well as station names, while the lake code field uniquely identifies each sampling site. Since there might be more than one sampling site on a lake, it may be necessary to search for the lake name and then for the particular site.
- To make sure that you find all the data for a particular lake or river, do a larger more general search first; and then refine your query based on the data retrieved by the first query.
- If you search by lake name, you may find that there is more than one spelling used for the lake or that there is more than one site that contains the name you requested.
- The spelling for some lake and river names may vary because of the way they were transliterated from the original language, for instance, Lake Baikal and Lake Baykal refer to the same lake, but were translated to the Latin alphabet from the Cyrillic alphabet in different ways.
- To avoid missing data for a particular lake with slightly different spelling entries, do a search using latitude and longitude information instead.
- The most accurate method of finding all the lake or river data in a specific region is to do a latitude and longitude search.
- Users may search for a particular lake or river name, or a range of latitude and longitude. The interface ignores the word "lake" in a request for a particular lake name. For example, a search for the name "Great Slave Lake" will return several matches for "Great Slave" as shown on the following list of uniquely identifying lake codes:

```
The following items matched the word(s) %GREAT%SLAVE%%.

Find the lake you want in the list below, and using the corresponding lake
code, use your browser's "Back" button to place this code in the "lakecode"
field on the previous page:

(Fields are: lake or river name, lake code, country, latitude, longitude) GREAT
SLAVE LAKE, WRS258, CANADA, 60.8300, -115.7800 GREAT SLAVE LAKE (CHRISTIE BAY),
WRS254, CANADA, 62.4000, -110.7300 GREAT SLAVE LAKE - CHARLTON BAY, WRS255,
CANADA, 62.7200, -111.1700 GREAT SLAVE LAKE - MCLEOD BAY, WRS256, CANADA,
62.7200, -110.1700 GREAT SLAVE LAKE - POLICE BAY, WRS257, CANADA, 62.7200, -
109.1700 RESOLUTION BAY GREAT SLAVE LAKE, WRS369, CANADA, 61.1800, -113.6800
```

The following example is one possible output from a query using the lake code "WRS258" from the above list, in addition to several other possible parameters and sort codes:

```
You asked for:

iceon_year, iceon_month, iceon_day , iceoff_year, iceoff_month,
iceoff_day , duration, season, latitude, longitude, lakename,
lakecode

Where:

country = 'CANADA' AND lakename LIKE '%GREAT%SLAVE%%' AND
lakecode LIKE 'WRS258' AND iceon_year >=
1900 AND iceoff_year <= 2000
Sorted by:

duration
1957, 12, 14, -999, -999, -999, -999, 1957-58, 60.8300, -115.7800, GREAT SLAVE
LAKE, WRS258
1959, 12, 9, -999, -999, -999, -999, 1959-60, 60.8300, -115.7800, GREAT SLAVE
LAKE, WRS258
1960, 12, 7, -999, -999, -999, -999, 1960-61, 60.8300, -115.7800, GREAT SLAVE
LAKE, WRS258
1961, 12, 15, -999, -999, -999, -999, 1961-62, 60.8300, -115.7800, GREAT SLAVE
LAKE, WRS258
1956, 12, 15, 1957, 7, 1, 198, 1956-57, 60.8300, -115.7800, GREAT SLAVE LAKE,
WRS258
1958, 12, 18, 1959, 7, 4, 198, 1958-59, 60.8300, -115.7800, GREAT SLAVE LAKE,
WRS258
```

3 DATA ACQUISITION AND PROCESSING

3.1 Data Sources

The Lake Ice Analysis Group (LIAG) at the University of Wisconsin compiled the data from several individual collections. See a list of Contributing Scientists (pdf, 88KB). The oldest records are from Germany dating back to 874 and Japan dating back to 1444. The contributing countries are the following:

- Canada
- China
- Finland
- Germany
- Hungary
- Japan
- Norway
- Russia
- Russia-Estonia
- Sweden
- Switzerland
- United States

3.2 Data Updates and Corrections

The database managers are not liable for ensuring the accuracy of the original data; this is the responsibility of individual data contributors. Some basic quality control checks were performed on contributed data and, in some cases, corrections were made; however, we recommend that users of the database screen the data for inconsistencies that might indicate errors.

April 2022

Corrected the ice-off dates for certain years between 2006-2019 for 20 Maine Lakes. The source of these dates for 2007-2008 onwards for 19 of these lakes are the Maine Department of Agriculture, Conservation and Forestry (DACF). For China Lake, all the data are from the Townline/China Lake Association. Discrepancies in the ice-off dates of one day early were discovered, which were either due to a miscalculation of the Julian day or typographical errors. These have now been corrected so that the ice-off dates in the database match those reported by Maine DACF or the Townline/China Lake Association. Also, new ice-off dates for the 2014-2015 season for Pennessewassee (Norway) Lake, Eagle Lake, and China Lake were added.

April 2021

New data was added for 144 lakes. Table 4 lists the lakes with new data in this update. Lakes with a * next to the lakecode also had an update made to their latitude and longitude listed in the database to make them more accurate.

Table 4. April 2021 Lake Updates

lakecode	lakename	lakecode	lakename
ARAI1*	LAKE SUWA (ARAI)	JK22	PAAJARVI - KARSTULA (1415)
DML1*	LEJ DA SAN MUREZZAN	JK23	KIVIJARVI - SAARENKYLA (1407)

lakecode	lakename	lakecode	lakename
DMR1	LAKE MENDOTA	JK24	SAANIJARVI (1403)
DMR2	LAKE MONONA	JK25	HAUKIVESI
EK28	LAKE CONSTANCE	JK26	INARI - NELLIM
GAH1*	LAKE AUBURN	JK28	KILPISJARVI
GAH10	KEZAR LAKE	JK30	KUORTANEENJARVI
GAH11	MARANACOOK LAKE	JK31	LENTUA
GAH12*	MARANACOOK LAKE	JK32	LESTIJARVI
GAH14*	MOOSELOOKMEGUNTIC LAKE	JK34	MUTUSJARVI
GAH15*	PENNESSEEWASSEE (NORWAY) LAKE	JK36	OIJARVI
GAH16*	PONKAPOAG POND	JK37	OUNASJARVI
GAH18*	PORTAGE LAKE	JK40	PIELINEN
GAH2*	AZISCOHOS LAKE	JK42	REHJA
GAH20*	RICHARDSON LAKE	JK45	VISUVESI
GAH21*	SEBAGO LAKE	JK46	PALOVESI
GAH22*	SEBEC LAKE	JK47	SIMPELEJARVI
GAH23*	SQUA PAN LAKE	JK48	AHTARINJARVI
GAH24	SUNAPEE LAKE	JK49	KUIVAJARVI
GAH25*	SWAN LAKE	JK51	SAAKSJARVI - SAAKSKOSKI
GAH26*	THOMPSON LAKE	KMS10	GEORGE
GAH27*	UMBAGOG LAKE	KMS11*	MIRROR
GAH28*	WEST GRAND LAKE	KMS14*	OTSEGO
GAH29	LAKE WINNIPESAUKEE	KMS18	SCHROON
GAH3*	CHINA LAKE	KMS2	BRANT
GAH4*	COBBOSSEECONTEE LAKE	KMSM1	MOOSEHEAD LAKE
GAH5*	DAMARISCOTTA LAKE	LR1	ONEIDA
GAH6	EAGLE LAKE	LR2	CAZENOVIA
GAH7*	EMBDEN POND	MICH03*	GULL LAKE
GAH8*	FIRST CONNECTICUT LAKE	MICH06*	FAIR LAKE
GAH9*	HOUGHTONS (HOOSICWHISICK) POND	MINN1	BIG SANDY
GW202	RUNN	MINN11	FOUNTAIN
GW240	ORSASJON	MINN12	MINNETONKA
GW341*	NACKTEN	MINN13	DIAMOND(MAIL)
GW369	KALLSJON	MINN15*	RAINY
GW512*	GOUTA	MINN17	FALL
GW592*	JUKKASJARVI	MINN18	WINSTED

lakecode	lakename	lakecode	lakename
JJM1*	ALLEQUASH LAKE	MINN19*	SISSETON
JJM15*	LAKE ESCANABA	MINN2*	DETROIT
JJM17*	LAKE NEBISH	MINN20	MILLE LACS
JJM18*	LAKE WINGRA	MINN21*	SHETEK
JJM19*	MYSTERY LAKE	MINN23	MINNEWASKA
JJM2*	BIG MUSKELLUNGE LAKE	MINN25	KABETOGAMA
JJM22*	SHELL LAKE	MINN27	OSAKIS
JJM23*	SPRUCE LAKE	MINN28*	CLEAR
JJM24	BIG GREEN LAKE	MINN29*	WHITE BEAR
JJM27	LAKE GENEVA	MINN3	BIG STONE
JJM3	CRYSTAL BOG	MINN30	BUFFALO
JJM33	LAKE SUPERIOR AT BAYFIELD	MINN31	BEMIDJI
JJM4*	CRYSTAL LAKE	MINN32	BONE
JJM6	SPARKLING LAKE	MINN33*	GALPIN
JJM7*	TROUT BOG	MINN34*	GREEN
JJM8*	TROUT LAKE	MINN38*	SHAGAWA
JK01	OULUJARVI	MINN39	LOWER PRIOR
JK02	LAKE KALLAVESI (4079)	MINN4	WACONIA
JK03	LAKE NASIJARVI (3568)	MINN40	KABEKONA
JK04	LAKE VESIJARVI (1462)	MINN41*	LAX
JK05	LAKE PAIJANNE (1463)	MINN6	GULL
JK06	MUURASJARVI (1401)	MINN7	ITASCA
JK07	KALMARINJARVI (1417)	MINN8	GUNFLINT
JK08	SUMMASJARVI (1419)	NG1	LAKE BAIKAL
JK09	PIELAVESI - SAVIA (1427)	PJD15*	LAKE OF BAYS HAYSTACK
JK10	HANKAVESI - RAUTALAMPI (1436)	PJD4	CHEMONG
JK11	YLA-KIVIJARVI - JURVALA (1488)	PJD7	DRC LAKES MEAN
JK12	LAPPAJARVI - HALKOSAARI (4703)	RA1*	LAKE MUEGGELSEE
JK13*	KITUSJARVI (3548)	RA2*	NEHMITZSEE
JK14	KUKKIA - PUUTIKKALA (3512)	RA3*	STECHLINSEE
JK16	ALA-KIVIJARVI - YLA-MUNNI (1489)	RAA3*	GRAND TRAVERSE BAY
JK17	ALA-RIEVELI (1468)	RB43*	LANGELMAVESI S
JK18	VESIJARVI - LAHTI (1461)	RH1	RANGELEY LAKE
JK19	JAASJARVI - HARTOLA (1457)	USGS1	CHAMPLAIN
JK21	IISVESI (1433)	WRS302	LAKE NIPISSING

May 2020

Corrected Lake Suwa Japan data with lake code ARAI1 were added back into the database and six new years (2008 - 2013) of Tornio River (EK26) data were also added.

Note: In Sharma et al. (2016, pg 6), the authors make the following statement about the Lake Suwa data:

"Unfortunately, there are missing data in the midyears of the time series (1505–1515) and more importantly, data from 1682–83 to 1922–23 are considered unreliable for analysis ice cover freeze dates. In those middle years, various changes in the calendar confused the record, ice cover dates often were indicated as approximate or were not provided even though the lake did freeze over, the group making the observations varied, and Omiwatari date or even the Omiwartari ceremony often were substituted for the ice cover date. We eliminated all data from 1682–1923 from the analyses to reduce the uncertainty in dates of ice freeze. However, the ice-freeze date between 1443–1682 and 1924–2018, in addition to the presence or absence of lake freeze from 1443–2018 are considered to be very reliable. For years when more than one data source was available (1897–1993), we numerically compared the values. In almost all years they were the same and if not, the standard deviation between the values between 1944 and 1996 was 2.65. When they were not the same, we used Arakawa over the Suwa Meteorological Observatory and Yatsurugi Shrine from 1443 to 1953; from 1953 to 1993 we used the Suwa Meteorological Observatory over the Yatsurugi Shrine, and from 1994 to 2018 we used Yatsurugi Shrine. There were 3 exceptions to these choices (1950 we used the Suwa Meteorological Observatory; 1952 and 1976 where we used information from Tadashi Arai). Ice freeze dates occur before and after January 1st, therefore we converted dates to day of year, using a zero to represent the calendar day January 1st."

September 2015

The Lake Suwa Japan data with lake code ARAI1 were temporarily removed from the database due to an error found in the calendar correction for the data.

January 2014

An update was made to the database to address discrepancies in the St. Regis Lower lake (KMS16) data noted by C. Stager of Paul Smiths College. He found several data to be conflicting with the records he had found at the college library. The discrepancies have been addressed by adding comments to KMS16 and adding a new record with lakecode: CS1. Stager feels strongly that the older data (before 1970) may be for a different lake because the college did not exist at the time. There are also some discrepancies in single dates after 1970.

In addition, the North Temperate Lakes Long Term Ecology Research (NTL-LTER) sent updates for ten lakes in the NTL region for 2010 to 2013: Allequash Lake (JJM1), Big Muskellunge Lake (JJM2), Crystal Bog (JJM3), Crystal Lake (JJM4), Lake Mendota (DMR1), Lake Monona (DMR2), Lake Wingra (JJM18), Sparkling Lake (JJM6), Trout Bog (JJM7), and Trout Lake (JJM8).

January 2012

Notice: 22 September 2015 - The Lake Suwa Japan data with lake code ARAI1 have been temporarily removed from the database due to an error found in the calendar correction for the data. The data providers are working on a correction but there is no timeline for completion.

A calendar correction was made to the Lake Suwa, Japan data. The LIAG team had erroneously assumed that the translation from the ancient Japanese calendar to Gregorian dates set the first month of the year to February and not January. However, when they consulted the original datasheets in Japan, the first month was indeed January. Therefore, the LIAG team introduced a negative 30 day correction to the Lake Suwa data before 1872 to fix this. Change applied 1 February 2012.

NSIDC has received inquiries from users asking about the location of Bigwood Lake (WRS214). Users should note that Bigwood Lake (WRS214) in the NSIDC database refers to the small lake near Sioux Lookout, Ontario and not the Bigwood Lake near Sudbury.

February 2007

The following changes were made to the NSIDC database for Detroit Lake, MN (MINN2):

New data:

- "Ice on" dates and ice duration for start years 1899, 1902, 1903, 1908, 1909, and 1980 - 2001.
- "Ice off" dates for start years 2004, 2005.

Changed data:

- "Ice on" date changed from October 28, 1913 to December 8, 1913.
- Ice duration for 1913-1914 changed from 177 days to 136 days.
- "Ice off" date changed from May 19, 1908 to April 19, 1908 for the 1907-1908 ice season.

Note that discrepancies between the NSIDC database and other sources may exist.

In February 2007, a user noted discrepancies between the Detroit Lake, MN data in our NSIDC database and the Becker County Record (Detroit Lakes Newspaper) from April of 2002. David Balsiger looked into this and noted that some discrepancies range from one to five days and some

are of even greater magnitude. Pete Boulay (Assistant State Climatologist for the Minnesota State Climatology Office, Department of Natural Resources - Division of Waters) responded with the following:

"Determining ice-out is far from an exact science. Depending on what definition of "ice-out" is used, the dates can vary considerably. Some people choose being able to get from Point "A" to Point "B" and some wait until every last ice crystal is melted.

Every effort is made to use the same source for ice out from year to year. Individuals that live on the lake have tended to be very good sources. Their view of the lake will not be flawless: (they may have limited view.) I have noted that lake residents will often call friends across the lake to verify their date. Newspapers can vary with accounts. Small newspapers may have staff that changes fairly often. One editor may have a different idea what "ice out" means from another so this can be difficult."

July 2006

NSIDC received corrections from David Balsiger (University of Wisconsin-Madison). The corrections have been fixed in the NSIDC database and include the following:

The latitude and longitude coordinates for Lake Geneva (JJM27) were changed to 42.57 (latitude) and -88.50 (longitude).

Coordinates for Lake Baikal (NG1) have been changed to 51.85 (latitude) and 104.87 (longitude).

Corrections were made for Lake Baikal (NG1) for "ice off" dates in 1981-82, 1982-83, and 1991-92 through 1995-96. "Ice on" dates were updated for 1994-95.

These errors were in the original data submitted to our data providers. Correct dates were obtained from the Minnesota state climatologist and confirmed by the original contributor.

Table 5. Corrected Dates for Detroit Lake, MN (MINN2)

Erroneous "ice off" dates for Detroit Lake, MN (MINN2)	Correct "ice off" dates for Detroit Lake, MN (MINN2)
6/11/1893	5/12/1893
5/27/1894	4/27/1894
5/9/1895	4/9/1895
5/26/1896	4/26/1896
5/18/1897	4/18/1897
5/5/1898	4/5/1898
5/28/1899	4/28/1899

Erroneous "ice off" dates for Detroit Lake, MN (MINN2)	Correct "ice off" dates for Detroit Lake, MN (MINN2)
5/18/1900	4/17/1900
4/17/1991	4/11/1991

4 REFERENCES AND RELATED PUBLICATIONS

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6 DOCUMENT INFORMATION

6.1 Document Authors

The document was originally written by NSIDC Writers in 2001 and reviewed by both Barbara J. Benson (University of Wisconsin-Madison) and Florence Fetterer (NSIDC). It has had numerous updates since then. See the Revision Date section below for details.

6.2 Publication Date

January 2001

6.3 Date Last Updated

April 2022 – A. Windnagel updated the Data Updates and Corrections section describing a correction to some Maine Lake ice-off dates.

April 2021 – A. Windnagel updated the Data Updates and Corrections section with the newly released data for 144 lakes.

May 2020 – A. Windnagel updated the Data Updates and Corrections section with the corrected Lake Suwa data and removed the 2015 notice about the data being incorrect. Also noted that six years of Torino River data were also added.

Oct. 2019 – A. Windnagel added a new reference (S. Sharma et al., 2019) to the References section.

Mar. 2017 – A. Windnagel added a large list of references to the References section.

Jan. 2014 – A. Windnagel updated the Data Updates and Corrections section with the newest data updates.

Dec. 2012 – A. Windnagel updated temporal coverage to reflect new additions to the database.

Jan. 2012 – A. Windnagel updated the documentation to reflect new additions to the database and also added tables describing the input and output parameters of the LIAG search interfaces.

Feb. 2007 – L. Ballagh updated the Data Quality Control section to include text on the updates to the Detroit Lake, MN data sent to NSIDC by David Balsiger (University of Wisconsin-Madison).

July 2006 – L. Ballagh updated the Data Quality Control section to include text on the data corrections sent to NSIDC by David Balsiger (University of Wisconsin-Madison). The data corrections were made by Barbara J. Benson and John J. Magnuson from the University of Wisconsin-Madison. I-Pin Wang updated the NSIDC database.