

# ARCLake – Data Product Description

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## Version

v1.0 22<sup>nd</sup> September 2010 1<sup>st</sup> release

## Release Notes

v1.0 First official release of ARCLake lake surface temperature (Lake ST) and lake ice concentration (LIC) products.

Draft Data Product Description (22/09/2010)

## Documentation History

22/09/10 Document created

24/09/10 Correction to table of lakes (table 7)

## Overview

This document describes the data products released through the ARCLake project, funded by the European Space Agency.

Two types of data product are available:

<b>Product Long Name</b>	<b>Short Code</b>	<b>Description</b>
Daily / Global	DG	One file per day containing data for all lakes observed that day.
Per Instrument / Per lake	PL	One file per lake per instrument (ATSR2/AATSR) containing all daily observations for that lake and instrument lifetime.

**Table 1.** Overview of the two types of data product available through ARCLake.

In both cases there are separate files for daytime and night time observations.

The structure and contents of these data products are described in detail in the following pages.

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## Daily / Global

### Overview

The DG product comprises of one file per day and contains data for all lakes observed that day. The product is stored in the NetCDF file format. Only data in locations where the satellite instrument observes a lake on the given day are stored. Consequently, the data are stored in 1-D arrays with associated location information, rather than on a 2-D global grid. Storing the data in this way reduces the file size to approximately 0.1% that required when a 2-D grid is used.

### File Naming Convention

DG product files have names of the form:

```
ARCLake_yyyymmdd_iiii_xxx.nc
```

Where:

YYYY = year  
mm = month  
dd = day  
iiii = atsr2/aatsr  
xxx = day/night flag (day or ngt)

### File Description

#### Resolution

Data are stored for cells at a longitude/latitude resolution of  $0.05^\circ \times 0.05^\circ$ .

#### File Contents

The contents of the DG files are listed in Table 2. Key data variables that exist for every grid cell are highlighted in blue (e.g. Lake\_ST). Variables that have a single value are highlighted in green (e.g. LON\_SCALE). These variables are predominantly for converting grid indices (LON/LAT) to longitude/latitude values. The remaining (unhighlighted) variables provide descriptions of the data variables and additional information about the data product (e.g. CREATION\_DATE).

Variable Name	Type	Description [units]	Contents / Array Dimensions
NCELLS	LONG	Number of cells	(e.g. 10000)
LON_SCALE	FLOAT	Scaling factor for converting longitude index (GRIDINDEX MOD LON) to longitude value at the cell centre [degrees]	0.05
LON_OFFSET	FLOAT	Offset for converting longitude index (GRIDINDEX MOD LON) to longitude value at the cell centre [degrees]	-179.975
LAT_SCALE	FLOAT	Scaling factor for converting latitude index (GRIDINDEX / LAT) to	-0.05

		latitude value at the cell centre [degrees]	
LAT_OFFSET	FLOAT	Offset for converting latitude index (GRIDINDEX / LAT) to latitude value at the cell centre [degrees]	89.975
GLOBAL_LON_ZERO	INT	Longitude at centre of westernmost cell of global grid (corresponding to LON=0) [degrees]	-179.95
GLOBAL_LAT_ZERO	INT	Latitude at centre of northernmost cell of global grid (corresponding to LAT=0) [degrees]	89.975
GLOBAL_RESOLUTION	FLOAT	Resolution of grid cells [degrees]	0.05
LON	INT	Longitudes of cells on global grid [degrees_east]	[LON]
LAT	INT	Latitudes of cells on global grid [degrees_north]	[LAT]
LAKEID	INT	Lake ID (>0 = valid lake ID)	[GRIDINDEX]
NCLOUD	INT	Number of cloudy pixels	[GRIDINDEX]
NICE	INT	Number of ice pixels	[GRIDINDEX]
NLAKE_ST	INT	Number of clear lake pixels	[GRIDINDEX]
LAKE_ST	FLOAT	Lake surface temperature [K]	[GRIDINDEX]
ERR_LAKE_ST	FLOAT	Error estimate for lake surface temperature [K]	[GRIDINDEX]
CHI2	FLOAT	Chi-squared (goodness of fit measure for OE retrieval)	[GRIDINDEX]
OBSERVATION_TIME	LONG	Observation time in seconds since 00:00 GMT [s]	[GRIDINDEX]
VALID	INT	Flag to indicate if valid LAKE_ST exists for cell (0=Valid, 1=Invalid)	[GRIDINDEX]
CHANNEL_SET	INT	Channel set used in retrieval: 1=Dual(3.7/11/12), 2=Dual(11/12), 3=Nadir(3.7/11/12), 4=Nadir(11/12)	[GRIDINDEX]
TITLE	STRING	Data product type	Daily Cell Average Data
SOURCE	STRING	Source of data	ARCLake
VERSION	STRING	ARCLake version number	1.0
CREATION_DATE	STRING	Date of creation (YYYYMMDD)	20100921

DATE	STRING	Date of observation (YYYYMMDD)	20080101
DAY_NIGHT	STRING	String to indicate day-time or night-time retrievals	Day/Night
LONGITUDE_CONVERSION	STRING		Longitude = (LON * LON_SCALE) + LON_OFFSET
LATITUDE_CONVERSION	STRING		Latitude = (LAT * LAT_SCALE) + LAT_OFFSET

**Table 2.** Contents of the Daily / Global (DG) data product.

The dimensions of the arrays are defined as follows:

LON = Number of cells along longitude dimension of global grid  
(=180/GLOBAL\_RESOLUTION)  
LAT = Number of cells along latitude dimension of global grid  
(=360/GLOBAL\_RESOLUTION)  
GRIDINDEX = Number of cells containing data  
TIME = 1

### File Structure

The key data variables (highlighted in blue in Table 2) are stored for each grid cell where the satellite instrument observes a lake. This includes cells where all observations are flagged as cloud or ice covered (i.e. NLAKE\_ST=0). These variables are stored in 1-D arrays of length NCELLS (where NCELLS is the number of cells with a lake observation for the given day).

The location of these cells is given in terms of a global grid at 0.05°x0.05° resolution (longitude range [-180,180], latitude range [90,-90]). This global grid is defined by the variables LON, and LAT, which contain the longitude and latitude values for each cell on the global grid. The variable GRIDINDEX defines the location of each observation cell on this global grid, in the form of indices of a 1-D array representing the full 2-D longitude/latitude grid (where the longitude is the fastest varying component). Indices of the 2-D grid can be determined using the conversions given by the variables LONINDEX\_CONVERSION and LATINDEX\_CONVERSION, as outlined in the example lines of IDL code below.

```
IDL> lake_st_2d = FLTARR((360/GLOBAL_RESOLUTION), (180/GLOBAL_RESOLUTION))
IDL> lonindex = GRIDINDEX MOD LON
IDL> latindex = GRIDINDEX / LON
IDL> lake_st_2d[lonindex,latindex]=LAKE_ST
```

In this example, LON is the dimension rather than the variable of the same name. Longitude and latitude values can be obtained by direct look-up of the variables LON and LAT using LONINDEX and LATINDEX as calculated above. Alternatively, they can be calculated using the *scale* and *offset* variables provided for each. Details of how to apply these are given in the variables, LONGITUDE\_CONVERSION and LATITUDE\_CONVERSION, and are also repeated below.

$$Longitude = (lonindex \times LON\_SCALE) + LON\_OFFSET$$

$$\textit{Latitude} = (\textit{lonindex} \times \textit{LAT\_SCALE}) + \textit{LAT\_OFFSET}$$

These longitude and latitude values represent the centre of the 0.05°x0.05° cells.

## Per Lake

### Overview

The PL comprises of one file per lake per instrument (ATSR2/AATSR) containing all daily observations for that lake and instrument lifetime. The product is stored in the NetCDF file format. Data are only stored for days where the satellite instrument observes the given lake. For each of these days, data are stored on a fixed 2-D grid covering the full extent of the lake, giving a set of 3-D arrays with dimensions [LON, LAT, TIME]. This can result in a significant number of unfilled grid cells but enables the data to be handled more easily.

### File Naming Convention

PL product files have names of the form:

```
ARCLakezzzz_iiii_xxx.nc
```

Where:

zzzz = lake ID number  
iiii = instrument (atsr2 or aatsr)  
xxx = day/night flag (day or ngt)

### File Description

#### Resolution

Data are stored for cells at a longitude/latitude resolution of  $0.05^\circ \times 0.05^\circ$ .

#### File Contents

The contents of the PL files are listed in Table 2. Key data variables that exist for every grid cell and day are highlighted in blue (e.g. LAKE\_ST). Variables that have the same values over all days are highlighted in green (e.g. GRIDBOUNDS). These variables are predominantly for locating the lake on a global grid. The remaining (unhighlighted) variables provide descriptions of the data variables and additional information about the data product (e.g. CREATION\_DATE).

Variable Name	Type	Description	Contents / Array Dimensions
NDAYS	LONG	Number of days with data	e.g. 1000
GRIDBOUNDS	INT	Indices of lake area bounds on full global grid at 0.05 degree resolution – [xmin, xmax, ymin, ymax]	[4]
LONLATBOUNDS	FLOAT	Longitudes/latitudes of lake area bounds on full global grid at 0.05 degree resolution – [lonmin, lonmax, latmax, latmin] (corresponds to GRIDBOUNDS and represents centre of cells) [degrees_east, degrees_north]	[4]
LON_SCALE	FLOAT	Scaling factor for converting longitude index (LON) to	0.05



		longitude value at centre of cell [degrees]	
LON_OFFSET	FLOAT	Offset for converting longitude index (LON) to longitude value at centre of cell [degrees]	-179.975
LAT_SCALE	FLOAT	Scaling factor for converting latitude index (LAT) to latitude value at centre of cell [degrees]	-0.05
LAT_OFFSET	FLOAT	Offset for converting latitude index (LAT) to latitude value at centre of cell [degrees]	89.975
GLOBAL_LON_ZERO	INT	Longitude of westernmost cell of global grid (corresponding to LON=0) [degrees_east]	-179.975
GLOBAL_LAT_ZERO	INT	Latitude of northernmost cell of global grid (corresponding to LAT=0) [degrees_north]	89.975
GLOBAL_RESOLUTION	FLOAT	Resolution of grid cells [degrees]	0.05
LAKEID	INT	Lake ID (>0 = valid lake ID)	[LON, LAT, TIME]
NCLOUD	INT	Number of cloudy pixels	[LON, LAT, TIME]
NICE	INT	Number of ice pixels	[LON, LAT, TIME]
NLAKE_ST	INT	Number of clear lake pixels	[LON, LAT, TIME]
LAKE_ST	FLOAT	Lake surface temperature [K]	[LON, LAT, TIME]
ERR_LAKE_ST	FLOAT	Error estimate for lake surface temperature [K]	[LON, LAT, TIME]
CHI2	FLOAT	Chi-squared (goodness of fit measure for OE retrieval)	[LON, LAT, TIME]
OBSERVATION_TIME	LONG	Observation time in seconds since 00:00 GMT [s]	[LON, LAT, TIME]
VALID	INT	Flag to indicate if valid LAKE_ST exists for cell (0=Valid, 1=Invalid)	[LON, LAT, TIME]
CHANNEL_SET	INT	Channel set used in retrieval: 1=Dual(3.7/11/12), 2=Dual(11/12), 3=Nadir(3.7/11/12), 4=Nadir(11/12)	[LON, LAT, TIME]
LONBOUNDS	FLOAT	Longitudes of lake area bounds on full global grid at 0.05 degree resolution [degrees_east]	[NV]
LATBOUNDS	FLOAT	Latitudes of lake area bounds on full global grid at 0.05 degree resolution [degrees_north]	[NV]

LONGRIDBOUNDS	INT	Indices of lake area longitude bounds on full global grid at 0.05 degree resolution - [xmin, xmax]	[NV]
LATGRIDBOUNDS	INT	Indices of lake area latitude bounds on full global grid at 0.05 degree resolution - [ymin, ymax]	[NV]
GLOBAL_LON_ZERO	FLOAT	Longitude at centre of westernmost cell of global grid (corresponding to lonindex=0) [degrees_east]	[NV]
GLOBAL_LAT_ZERO	FLOAT	Latitude at centre of northernmost cell of global grid (corresponding to latindex=0)	[NV]
GLOBAL_RESOLUTION	FLOAT	Resolution of grid cells	[NV]
LON_SCALE	FLOAT	Scaling factor for converting longitude index (gridindex MOD lon) to longitude value at centre of cell	[NV]
LON_OFFSET	FLOAT	Offset for converting longitude index (gridindex MOD lon) to longitude value at centre of cell	[NV]
LAT_SCALE	FLOAT	Scaling factor for converting latitude index (gridindex / lon) to latitude value at centre of cell	[NV]
LAT_OFFSET	FLOAT	Offset for converting latitude index (gridindex / lon) to latitude value at centre of cell	[NV]
TITLE	STRING	Data product type	Daily Cell Average Data
SOURCE	STRING	Source of data	ARCLake
VERSION	STRING	ARCLake version number	1.0
CREATION_DATE	STRING	Date of creation (YYYYMMDD)	20100921
ARCLAKE_NAME	STRING	Lake name	CASPIAN
ARCLAKE_ID	STRING	Lake ID	1
DAY_NIGHT	STRING	String to indicate day-time or night-time retrievals	Day
LONGITUDE_CONVERSION	STRING	Longitude=(LON*LON_SCALE)+LON_OFFSET	
LATITUDE_CONVERSION	STRING	Latitude=(LAT*LAT_SCALE)+LAT_OFFSET	

**Table 3.** Contents of the Per Lake (PL) data product.

The dimensions of the data arrays are defined as follows:

LON = Size of longitude dimension of local lake grid  
(= GRIDBOUNDS[1] - GRIDBOUNDS[0] + 1)  
LAT = Size of longitude dimension of local lake grid  
(= GRIDBOUNDS[3] - GRIDBOUNDS[2] + 1)

TIME = Number of days with observations (given by the variable NDAYS)  
NV = Size of arrays defining local grid bounds

### File Structure

The key data variables (highlighted in blue in Table 3) are stored on a fixed longitude/latitude grid for each day where the satellite instrument observes the lake. This includes days where all observations are flagged as cloud or ice covered (i.e. NLAKE\_ST=0 for all grid cells). These variables are stored in 3-D arrays with dimensions [LON, LAT, TIME], where LON and LAT represent the longitude and latitude dimensions in terms of 0.05°x0.05° cells, and TIME represents the number of days where the lake is observed.

The location of the lake grid is given in terms of indices of a global grid at 0.05°x0.05° resolution (longitude range [-180,180], latitude range [90,-90]). This global grid is defined by the variables GLOBAL\_LON\_ZERO, GLOBAL\_LAT\_ZERO, and GLOBAL\_RESOLUTION. The indices that provide the location information for the boundaries of the lake grid are held in the variables LONGRIDBOUNDS and LATGRIDBOUNDS, which contains the minimum and maximum indices for longitude and latitude. Using these variables the data for a given day (*daynumber*) can easily be placed in a 2-D global grid, as outlined in example lines of IDL code below.

```
IDL> lake_st_grid = $  
IDL> FLTARR((360/GLOBAL_RESOLUTION), (180/GLOBAL_RESOLUTION))  
IDL> lake_st_grid[LONGRIDBOUNDS[0]:LONGRIDBOUNDS[1], $  
IDL> LATGRIDBOUNDS[0]:LATGRIDBOUNDS[1]] = $  
IDL> LAKE_ST[*,* , daynumber]
```

Arrays of longitude and latitude values for the local grid cells are available in the variables, LON and LAT. These values represent the centre of grid cells.

## Detailed Data Description

### Overview

The following section describes the contents of the key data fields (highlighted in blue in Table 2 and Table 3) in more detail. These descriptions apply to both the DG and PL products. The subsequent section describes the auxiliary data (highlighted in green in Table 2 and Table 3).

### Key Data

#### LAKEID

LAKEID is an integer value that provides a unique identifier for each lake. The LAKEID values match those used in the Global Lakes and Wetlands Database (GLWD), described by Lehner and Doll [2004]. A list of associations between LAKEID and lake names is given in Table 7 in the Appendix.

#### NCLOUD

NCLOUD is the number of pixels in the cell, flagged as cloudy by the ARCLake cloud detection scheme. This value contains only the number of cloudy pixels observed over lake surfaces. Observations over land surfaces within the cell are not considered.

#### NICE

NICE is the number of pixels in the cell, flagged as ice covered by the ARCLake ice detection scheme. This value contains only the number of ice covered pixels observed over lake surfaces. Observations over land surfaces within the cell are not considered.

#### NLAKE\_ST

NLAKE\_ST is the number of pixels in the cell, flagged as clear-sky (i.e. pixels that have passed ARCLake cloud and ice detection tests). This value contains only the number of clear-sky pixels observed over lake surfaces. Observations over land surfaces within the cell are not considered.

#### LAKE\_ST

LAKE\_ST is the lake surface temperature in Kelvin (K). This is the mean value over all observations in the cell at a single time of day. It is possible for the satellite instrument to make multiple observations of the cell at different times of the day. For such cases, LAKE\_ST contains the mean of all observations in the cell at the time of maximal clear-sky (i.e. where NLAKE\_ST is largest). LAKE\_ST is provided in this form to increase the usefulness of the associated time information (OBSERVATION\_TIME).

A single LAKE\_ST is reported for each cell, using the most optimal retrieval algorithm available. The LAKE\_ST retrieval algorithm used is defined by the variable CHANNEL\_SET.

#### ERR\_LAKE\_ST

ERR\_LAKE\_ST is the estimated error in the lake surface temperature reported in the variable LAKE\_ST. Details of how this value is calculated will be given in the ARCLake ATBD.

#### CHI2

CHI2 is the  $\chi^2$  goodness of fit measure for the optimal estimation lake surface temperature retrieval. Details of how this value is calculated will be given in the ARCLake ATBD.

#### TIME

OBSERVATION\_TIME is the mean time of observations in the cell. It is recorded in seconds since midnight (UTC).

## VALID

VALID is a flag to enable a simple filtering procedure for extracting only cells with valid LAKE\_ST retrievals. VALID=0 indicates a valid LAKE\_ST value exists for the cell. VALID=1 indicates that LAKE\_ST is not available for the cell.

## CHANNEL\_SET

CHANNEL\_SET defines the retrieval algorithm used to calculate the LAKE\_ST. The choice of retrieval algorithm is based on the relative performance of the algorithms and the channel brightness temperatures available. Details of the retrieval algorithms, ranked in order of preference, are given in Table 4.

CHANNEL_SET	Algorithm Name	Channels ( $\mu\text{m}$ )	View(s)
1	D3	3.7, 11, 12	Nadir/Forward
2	D2	11, 12	Nadir/Forward
3	N3	3.7, 11, 12	Nadir
4	N2	11, 12	Nadir
-9999	No retrieval	None	None

Table 4. Retrieval algorithms used, ranked in order of preference.

## LON

In the DG product it contains the longitude indices of the cells on the 0.05° global grid. In the PL product it contains the longitude indices of the cells on the 0.05° local lake grid.

## LAT

In the DG product it contains the latitude indices of the cells on the 0.05° global grid. In the PL product it contains the latitude indices of the cells on the 0.05° local lake grid.

## Auxiliary Data

### NCELLS

NCELLS is present in the DG product only. It contains the number of 0.05°x0.05° cells with lake observations for the given day. This is the total number of cells containing observations over lakes, and therefore includes cells where no LAKE\_ST retrievals are made due to cloud or ice cover. NCELLS determines the dimension of the 1-D data arrays in the DG files.

### NDAYS

NDAYS is present in the PL product only. It contains the number of days on which the satellite instrument observes the given lake in at least one 0.05°x0.05° grid cell. As for NCELLS, this includes cases where no LAKE\_ST retrievals are made due to cloud or ice cover. NDAYS determines the 3<sup>rd</sup> dimension of the 3-D data arrays in the PL files.

### LONGRIBOUNDS

LONGRIBOUNDS is present in the PL product only. It contains the longitude indices that define the lake boundary on the 0.05° global grid.

GRIDBOUNDS Index	Index on Global Grid	Longitude/Latitude
0	Min. longitude index	Min. longitude
1	Max. longitude index	Max. longitude

Table 5. Contents of the LONGRIBOUNDS variable.

## LATGRIDBOUNDS

LATGRIDBOUNDS is present in the PL product only. It contains the latitude indices that define the lake boundary on the 0.05° global grid.

GRIDBOUNDS Index	Index on Global Grid	Longitude/Latitude
0	Min. latitude index	Max. latitude
1	Max. latitude index	Min. latitude

**Table 6.** Contents of the LATGRIDBOUNDS variable. Note that the minimum latitude index (LATGRIDBOUNDS[0]) corresponds to the maximum latitude value.

## LONBOUNDS and LATBOUNDS

LONBOUNDS and LATBOUNDS are present in the PL product only. They contain the longitude and latitude boundaries of the lake on the 0.05° grid. They correspond to the grid indices in LONGRIDBOUNDS (Table 5) and LATGRIDBOUNDS (Table 6).

## LON\_SCALE and LON\_OFFSET

These are the scaling factor and offset to be applied to convert the longitude indices of the 0.05° global grid to longitude values. Longitude indices of the global grid have range [0, 7199], representing longitudes with range [-179.975, 179.975]. The resulting longitude values correspond to the centre of the cell.

## LAT\_SCALE and LAT\_OFFSET

These are the scaling factor and offset to be applied to convert the latitude indices of the 0.05° global grid to latitude values. Latitude indices of the global grid have range [0, 3599], representing latitudes with range [89.975, -89.975]. The resulting latitude values correspond to the centre of the cell.

## GLOBAL\_LON\_ZERO

GLOBAL\_LON\_ZERO is the longitude value corresponding to a grid index of 0 on the 0.05° longitude grid. It represents the centre of the cell.

## GLOBAL\_LAT\_ZERO

GLOBAL\_LAT\_ZERO is the latitude value corresponding to a grid index of 0 on the 0.05° latitude grid. It represents the centre of the cell.

## GLOBAL\_RESOLUTION

GLOBAL\_RESOLUTION is the resolution in degrees of the grid cells on which data values are given.

## DAY\_NIGHT

DAY\_NIGHT indicates whether observations are made during daytime or night time. Data are flagged in this manner based on the solar zenith angle:  $< 90^\circ$  = daytime,  $\geq 90^\circ$  = night time.

## DATE

DATE is present in the DG product only. It is the date of observation.

## ARCLAKE\_NAME

ARCLAKE\_NAME is present in the PL product only. It is ARCLake code name for the lake for which the PL product contains data.

## ARCLAKE\_ID

ARCLAKE\_ID is present in the PL product only. It is ARCLake ID for the lake for which the PL product contains data. It should correspond to the lake ID given in the PL product filename and the

lake IDs given in the variable LAKEID. A list of associations between lake IDs and lake names are is given in Table 7 in the Appendix.

## References

Lehner, B., and P. Doll (2004), Development and validation of a global database of lakes, reservoirs and wetlands, *Journal of Hydrology*, 296, 1-22.

## Appendix

### Lake IDs

Table 7 provides an alphabetical list of lake names and their associated lake IDs. These lake IDs correspond to the LAKEID and ARCLAKE\_ID variables in the DG and PL data products. The lake IDs listed in Table 7 also correspond to those used in the PL file names (e.g. ARCLake0166\_aatsr\_day.nc contains data for Lake Abaya). Longitude and latitude values given in Table 7 represent the nominal lake centre. Depending on the shape of the lake and the location of islands within the lake, these coordinates may lie over land.

Lake ID	Lake Name	Longitude	Latitude	Country
166	ABAYA	37.83	6.30	Ethiopia
527	ABE	41.79	11.17	Ethiopia; Djibouti
152	ABERDEEN	-98.59	64.55	Canada
418	ABY	-3.23	5.23	Ivory Coast; Ghana
58	ALAKOL	81.75	46.11	Kazakhstan
30	ALBERT	30.91	1.67	Uganda; DR Congo
210	ALEXANDRINA	139.09	-35.52	Australia
1748	ALMANOR	-121.19	40.26	United States
56	AMADJUAK	-71.13	64.99	Canada
354	ANG-LA JEN	83.09	31.53	China
324	ANGIKUNI	-100.04	62.27	Canada
4	ARAL	60.08	45.13	Kazakhstan; Uzbekistan
117	ARGENTINO	-73.03	-50.33	Argentina; Chile
334	ARTILLERY	-107.82	63.17	Canada
345	ASHUANIPI	-66.14	52.69	Canada
115	ASTRAY	-66.32	54.38	Canada
23	ATHABASCA	-109.96	59.10	Canada
311	ATLIN	-133.75	59.57	Canada
312	AYAKKUM	89.35	37.55	China
226	AYLMER	-108.46	64.15	Canada
181	BAGHRASH	87.07	41.98	China
8	BAIKAL	108.14	53.63	Russia
97	BAKER	-95.28	64.13	Canada
310	BALATON	17.83	46.88	Hungary
17	BALKHASH	73.95	45.91	Kazakhstan
536	BANGONG	79.71	33.61	China
229	BARUN-TOREY	115.81	50.07	Russia
205	BAY	121.26	14.36	Philippines
145	BECHAROF	-156.40	57.85	United States
160	BELOYE	37.64	60.18	Russia
267	BEYSEHIR	31.52	37.78	Turkey
155	BIENVILLE	-72.98	55.05	Canada
280	BIG TROUT	-90.02	53.77	Canada
268	BIWA	136.08	35.25	Japan
333	BLACK	-105.73	59.05	Canada
191	BRAS D'OR	-60.83	45.95	Canada
94	BUENOS AIRES	-72.50	-46.66	Chile; Argentina
299	BUFFALO	-115.49	60.22	Canada
291	BUYR	117.69	47.81	Mongolia; China
257	CARATASCA	-83.85	15.35	Honduras



1	CASPIAN	50.36	41.85	Kazakhstan; Russia; Turkmenistan; Azerbaijan; Iran
265	CAXUANA	-51.50	-2.04	Brazil
57	CEDAR	-100.14	53.33	Canada
165	CHAMPLAIN	-73.27	44.45	United States; Canada
233	CHAO	117.57	31.57	China
153	CHAPALA	-103.05	20.21	Mexico
204	CHILKA	85.38	19.69	India
256	CHILWA	35.71	-15.32	Malawi
84	CHIQUITA	-62.61	-30.74	Argentina
119	CHISHI	29.72	-8.71	Zambia
323	CHURCHILL	-108.29	55.96	Canada
125	CLAIRE	-112.08	58.59	Canada
1188	CLEAR	-122.77	39.02	United States
275	CLINTON COLDEN	-107.45	63.94	Canada
277	COARI	-63.37	-4.25	Brazil
219	COLHUE HUAPI	-68.76	-45.47	Argentina
352	CONSTANCE	9.28	47.65	Germany; Switzerland; Austria
162	CONTWOYTO	-110.66	65.59	Canada
284	CORO	-69.86	11.56	Venezuela
137	CREE	-106.64	57.47	Canada
251	CROSS	-97.58	54.71	Canada
351	DAUPHIN	-99.77	51.27	Canada
244	DEAD	35.49	31.52	Jordan; West Bank; Israel
326	DESCHAMBAULT	-103.45	54.78	Canada
281	DORE	-107.28	54.76	Canada
49	DUBAWNT	-101.44	63.13	Canada
128	EAU CLAIRE	-74.40	56.15	Canada
297	EBI	82.92	44.86	China
305	EBRIE	-4.26	5.30	Ivory Coast
69	EDWARD	29.61	-0.39	DR Congo; Uganda
390	EGRIDIR	30.85	38.07	Turkey
254	ENNADAI	-101.31	60.96	Canada
723	ENRIQUILLO	-71.58	18.49	Dominican Republic
12	ERIE	-81.16	42.25	Canada; United States
149	ESKIMO	-132.76	69.10	Canada
270	EVANS	-77.02	50.97	Canada
1029	EVORON	136.51	51.48	Russia
156	EYASI	35.04	-3.58	Tanzania
304	FAGNANO	-68.03	-54.55	Argentina; Chile
315	FERGUSON	-105.27	69.41	Canada
404	FROBISHER	-108.22	56.37	Canada
227	GARRY	-99.40	65.95	Canada
327	GENEVA	6.25	46.37	Switzerland; France
172	GODS	-94.21	54.62	Canada
363	GRANVILLE	-100.21	56.40	Canada
252	GRAS	-110.38	64.54	Canada
9	GREAT BEAR	-121.30	65.91	Canada
11	GREAT SLAVE	-114.37	62.09	Canada
253	GUILLAUME-DELISLE	-76.28	56.33	Canada
294	HAR	93.21	48.05	Mongolia
142	HAR US	92.30	48.06	Mongolia
302	HAR-HU	97.59	38.31	China

214	HAUKIVESI	28.52	62.10	Finland
339	HAZEN	-70.94	81.80	Canada
288	HIGHROCK	-100.44	55.83	Canada
189	HOTTAH	-118.44	64.95	Canada
59	HOVSGOL	100.48	51.02	Mongolia
75	HULUN	117.38	48.97	China
109	HUNGTZE	118.53	33.34	China
5	HURON	-82.21	44.78	Canada; United States
121	HYARGAS	93.30	49.13	Mongolia
62	ILIAMNA	-154.90	59.56	United States
144	INARI	27.83	69.04	Finland
293	INDIAN RIVER	-80.64	28.24	United States
174	ISLAND	-94.70	53.85	Canada
25	ISSYKKUL	77.25	42.46	Kyrgyzstan
1441	ISTADA	67.92	32.48	Afghanistan
245	IZABAL	-89.11	15.57	Guatemala
141	KAGHASUK	-164.22	60.79	United States
246	KAMINAK	-94.90	62.20	Canada
320	KAMINURIAK	-95.79	62.96	Canada
264	KAMILUKUAK	-101.73	62.28	Canada
287	KAOYU	119.31	32.87	China
197	KARA-BOGAZ-GOL	53.54	41.23	Turkmenistan
124	KASBA	-102.27	60.34	Canada
346	KEITELE	25.99	62.89	Finland
45	KHANKA	132.42	44.94	Russia; China
218	KHANTAYSKOE	91.18	68.36	Russia
67	KIVU	29.23	-2.04	DR Congo; Rwanda
41	KOKO	100.18	36.89	China
344	KRASNOE	174.44	64.53	Russia
262	KULUNDINSKOE	79.58	52.98	Russia
325	KWANIA	32.65	1.72	Uganda
382	KYARING	88.32	31.13	China
99	KYOGA	33.01	1.50	Uganda
331	LABAZ	99.57	72.27	Russia
16	LADOGA	31.39	60.84	Russia
147	LESSER SLAVE	-115.49	55.43	Canada
140	LIMFJORDEN	9.17	56.78	Denmark
209	LLANQUIHUE	-72.79	-41.14	Chile
357	LOWER SEAL	-73.42	56.49	Canada
175	LUANG	100.38	7.46	Thailand
184	MACKAY	-111.30	63.96	Canada
101	MADRE	-97.66	24.64	Mexico
163	MALAREN	16.19	59.44	Sweden
350	MALHEUR	-118.83	43.34	United States
176	MANAGUA	-86.35	12.32	Nicaragua
231	MANGUEIRA	-52.84	-33.16	Brazil
37	MANITOBA	-98.80	50.99	Canada
368	MANOUANE	-70.99	50.76	Canada
250	MANYCH-GUDILO	42.98	46.26	Russia
100	MARTRE	-117.91	63.33	Canada
6	MICHIGAN	-87.09	43.86	United States
366	MILLE LACS	-93.65	46.24	United States
224	MINTO	-74.71	57.34	Canada

46	MIRIM	-53.25	-32.89	Brazil; Uruguay
76	MISTASSINI	-73.81	50.82	Canada
883	MONO	-118.96	38.01	United States
286	MURRAY	141.53	-6.95	Papua New Guinea
36	MWERU	28.74	-9.01	Zambia; DR Congo
343	NAHUEL HUAPI	-71.52	-40.92	Argentina
377	NAKNEK	-155.67	58.64	United States
91	NAM	90.66	30.71	China
322	NATRON	36.02	-2.34	Tanzania; Kenya
338	NERPICH'YE	162.77	56.39	Russia
32	NETILLING	-70.28	66.42	Canada
300	NGORING	97.71	34.93	China
21	NICARAGUA	-85.36	11.57	Nicaragua
38	NIPIGON	-88.55	49.80	Canada
198	NIPISSING	-79.92	46.24	Canada
211	NONACHO	-108.92	61.82	Canada
303	NORTH MOOSE	-100.16	54.05	Canada
83	NUELTIN	-99.40	60.25	Canada
10	NYASA	34.59	-11.96	Malawi; Mozambique; Tanzania
114	OKEECHIOBEE	-80.86	26.95	United States
336	OLING	97.27	34.92	China
207	OMULAKH	145.59	72.29	Russia
18	ONEGA	35.35	61.90	Russia
15	ONTARIO	-77.77	43.85	Canada; United States
187	ORIVESI	29.59	62.35	Finland
157	PAIJANNE	25.49	61.71	Finland
697	PANGONG	78.61	33.82	India; China
353	PAYNE	-73.82	59.40	Canada
50	PEIPUS	27.59	58.41	Russia; Estonia
349	PERLAS	-83.67	12.54	Nicaragua
222	PETER POND	-108.55	55.84	Canada
195	PIELINEN	29.71	63.16	Finland
213	PLAYGREEN	-97.75	54.07	Canada
232	POINT	-113.84	65.31	Canada
649	POMO	90.40	28.55	China
133	POOPO	-67.06	-18.81	Bolivia
395	PRINCESS MARY	-97.66	63.93	Canada
164	PURUVESI	29.02	61.77	Finland
273	PYA	30.98	66.07	Russia
240	PYASINO	87.78	69.77	Russia
1240	PYHAJARVI	22.28	61.00	Finland
411	PYRAMID	-119.55	40.03	United States
130	RAINY	-92.97	48.61	Canada; United States
358	RAZELM	28.97	44.83	Romania
151	RED	-95.08	48.04	United States
28	REINDEER	-102.27	57.19	Canada
321	ROGOAGUADO	-65.73	-12.91	Bolivia
127	RONGE	-104.83	55.11	Canada
22	RUDOLF	36.08	3.53	Kenya; Ethiopia
146	SAINT CLAIR	-82.73	42.50	Canada; United States
158	SAINT JEAN	-72.02	48.66	Canada
285	SAINT JOSEPH	-90.81	51.04	Canada
282	SAKAMI	-76.75	53.22	Canada

194	SALTON	-115.83	33.30	United States
167	SAN MARTIN	-72.84	-48.75	Chile; Argentina
356	SANDY	-93.03	53.00	Canada
241	SARYKAMYSHSKOYE	57.61	41.88	Turkmenistan
247	SASYKKOL	80.91	46.58	Kazakhstan
313	SCOTT	-106.07	60.02	Canada
228	SEG	33.76	63.32	Russia
170	SELAWIK	-160.73	66.51	United States
271	SELETYTENIZ	73.18	53.23	Kazakhstan
292	SELWYN	-104.68	60.00	Canada
135	SEVAN	45.29	40.39	Armenia
579	SHAMO	37.55	5.83	Ethiopia
143	SHERMAN	-97.73	67.79	Canada
236	SIMCOE	-79.42	44.47	Canada
27	SMALLWOOD	-64.31	54.19	Canada
365	SNOWBIRD	-102.94	60.64	Canada
319	SOUTH HENIK	-97.29	61.37	Canada
225	SOUTH MOOSE	-100.04	53.83	Canada
2	SUPERIOR	-88.23	47.72	Canada; United States
85	SYVASH	34.74	45.96	Ukraine
380	TAHOE	-120.04	39.09	United States
66	TAI	120.24	31.21	China
178	TAKIYUAK	-113.17	66.28	Canada
235	TAMIAHUA	-97.57	21.66	Mexico
55	TANA	37.31	11.95	Ethiopia
7	TANGANYIKA	29.46	-6.07	DR Congo; Tanzania; Zambia; Burundi
215	TANGRA	86.59	31.05	China
73	TAPAJOS	-55.14	-2.88	Brazil
316	TATHLINA	-117.64	60.54	Canada
295	TAUPO	175.90	-38.81	New Zealand
43	TAYMYR	100.76	74.48	Russia
373	TEBESJUAK	-98.98	63.76	Canada
120	TENGIZ	68.90	50.44	Kazakhstan
179	TERINAM	85.61	30.90	China
212	TESHEKPUK	-153.60	70.59	United States
20	TITICACA	-69.30	-15.92	Peru; Bolivia
150	TOBA	98.90	2.61	Indonesia
186	TOP	32.09	65.62	Russia
332	TOWUTI	121.52	-2.79	Indonesia
367	TROUT	-121.13	60.58	Canada
269	TULEMALU	-99.48	62.99	Canada
255	TUMBA	17.98	-0.82	DR Congo
425	UBINSKOE	80.05	55.47	Russia
239	ULUNGUR	87.30	47.22	China
314	UPEMBA	26.40	-8.65	DR Congo
53	UVS	92.81	50.33	Mongolia; Russia
51	VAN	42.98	38.66	Turkey
29	VANERN	13.22	58.88	Sweden
95	VATTERN	14.57	58.33	Sweden
1820	VESIJARVI	25.39	61.09	Finland
3	VICTORIA	33.23	-1.30	Tanzania; Uganda; Kenya
171	VIEDMA	-72.56	-49.59	Argentina

136	VYG	34.84	63.54	Russia
1128	WALKER	-118.71	38.70	United States
876	WEISHAN	117.24	34.61	China
169	WHOLDAIA	-104.15	60.69	Canada
340	WINNEBAGO	-88.42	44.02	United States
13	WINNIPEG	-97.25	52.12	Canada
31	WINNIPEGOSIS	-100.05	52.37	Canada
68	WOLLASTON	-103.33	58.30	Canada
44	WOODS	-94.91	49.38	Canada; United States
134	XINGU	-52.20	-2.16	Brazil
261	YAMDROK	90.76	28.97	China
126	YATHKYED	-98.07	62.69	Canada
105	ZILING	88.95	31.77	China

**Table 7.** Alphabetical list of lakes included in Phase One of the ARCLake project and their corresponding Lake IDs. Longitude values are given in degrees east. Latitude values are given in degrees north. Where more than one country is listed, the country in which the largest fraction of the lake lies is listed first.