Alaska Tidewater Glacier Terminus Positions, Version 1

USER GUIDE

How to Cite These Data

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

McNabb, R. W. and R. Hock. 2015. *Alaska Tidewater Glacier Terminus Positions, Version 1*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/3OOVUDFK3R0W. [Date Accessed].

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

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/NSIDC-0634

National Snow and Ice Data Center

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1 DATA DESCRIPTION

This data set allows for the characterization of temporal and spatial variability in Alaska tidewater glacier length and terminus position over timescales ranging from decades to sub-annual. The data set contains glacier terminus positions for 50 Alaska tidewater glaciers. There are from 120 to 327 terminus outlines per glacier, with an average of 205 outlines per glacier, and a total number of over 10,000 terminus outlines (individual glacier fronts) for the study area's six regions including Kenai Peninsula, Western Chugach, Icy Bay, Yakutat, Glacier Bay, and Coast Range.

1.1 Parameters

This data set provides glacier terminus positions.

1.1.1 Parameter Description

ASCII text files include decimal date (decdate) and length attributes. The shapefile day of year (doy), Landsat scene (lsat_scene), and projection (proj) attributes are not included in the ASCII files.

Shapefiles of glacier terminus positions for fifty Alaska tidewater glaciers.

Table 1. Primary Data Attributes

Data Field	Description
decdate	Decimal date
year	Year
doy	Day of Year
lsat_scene	Landsat scene (may also indicate "USGS Map")
proj	Projection, e.g. UTM zone 7N
length	Glacier length in kilometers

1.1.2 Sample Data Record

Figure 1 illustrates Columbia Glacier terminus positions during select years from 1972 to 2012.

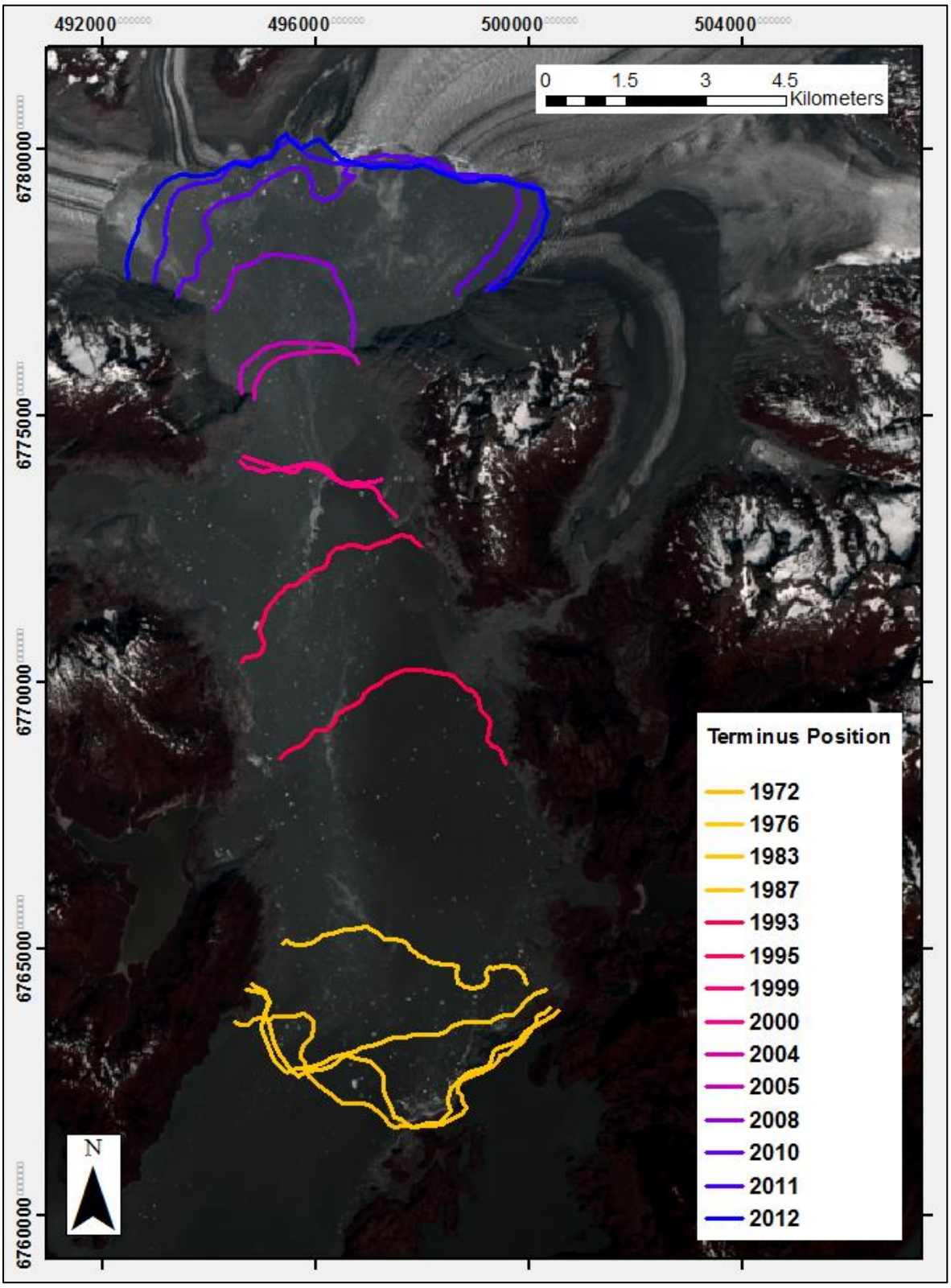

Figure 1. Columbia Glacier terminus positions 1972 to 2012

1.2 File Information

1.2.1 Format

ASCII text

ESRI ArcGIS Shapefile:

- .dbf – dBASE table that stores the attribute information of features.
- .prj – file that stores the coordinate system information.
- .shp – main file that stores the feature geometry.
- .shx – index file that stores the index of the feature geometry.

1.2.2 Directory Structure

Data are available via HTTPS in the following directory:

`https://daacdata.apps.nsidc.org/pub/DATASETS/nsidc0634_ak_tidewater_glacier_v1/`

This directory contains the following folders:

Table 2. Top-Level FTP Directory Structure

Folder Name	Description
length_timeseries	Measurement time series and length values in ASCII text files for each of the 50 glacier termini in the data set
glacier_bay	Shapefiles for Glacier Bay tidewater glaciers subregion
icy_bay	Shapefiles for Icy Bay tidewater glaciers subregion
kenai	Shapefiles for Kenai tidewater glaciers subregion
west_chugach	Shapefiles for West Chugach tidewater glaciers subregion
yakutat	Shapefiles for Yakutat tidewater glaciers subregion
coast_range	Shapefiles for Coast Range tidewater glaciers subregion

1.2.3 Naming Convention

This section explains the shapefile and text file naming convention used for this data set.

Example File Names:

```
muir.txt
muir.dbf
muir.prj
muir.shp
```

```
muir.shx
```

Convention:

```
glaciername.EXT
```

Table 3. Naming Convention for Shapefiles

String	Description
glaciername	Name of glacier
EXT	File extension. .txt (measurement time series and length text file) Shapefile format includes: .dbf (attributes) .prj (projection information) .shp (shapes) .shx (feature geometry index)

1.2.4 File Size

The complete data volume is approximately 6.8 MB.

1.3 Spatial Information

1.3.1 Coverage

Southernmost Latitude: 56.5° N
Northernmost Latitude: 61.5° N
Westernmost Longitude: 151° W
Easternmost Longitude: 132° W

1.3.2 Resolution

Derived from 30 m satellite imagery.

1.3.3 Geolocation

Universal Transverse Mercator (UTM) Zones 6N, 7N, or 8N, depending on glacier location.

1.4 Temporal Information

1.4.1 Coverage

01 January 1948 to 31 December 2012

1.4.2 Resolution

Annual terminus positions for each glacier, intermittent from 1948 to 2012.

2 DATA ACQUISITION AND PROCESSING

2.1 Background

Terminus outlines of all tidewater glaciers are manually digitized from USGS Topographic Maps and Landsat scenes.

2.2 Acquisition and Processing

As described in McNabb and Hock (2014), terminus outlines on U.S. Geological Survey (USGS) 15 minute topographic maps were digitized and georeferenced to provide a base length for glaciers before 1970 (pre-Landsat). Since topographic maps produced by the USGS are dated to the year only, in order to determine the time of year for each map a date was assigned using mean flight dates reported for each map. The nominal horizontal accuracy of the USGS 1:63,360 scale maps used in this study is 53.6 m.

For each glacier between 1972 and 2012 calving front outlines were manually digitized from all available cloud-free Landsat images, resulting in a total of more than 10,000 outlines. Estimated horizontal accuracy for digitized Landsat scenes is 60 m.

This data set contains 50 glaciers identified as existing tidewater glaciers (McNabb and Hock, 2014).

2.3 Quality, Errors, and Limitations

Some studies have indicated that errors in map topography can be much larger than the nominal error in Alaska of 53.6 m (Aðalgeirsdóttir et al., 1998; Arendt et al., 2002), though most of these errors occur in areas of low contrast, such as the accumulation zone of glaciers. Because information about potential horizontal errors was not available, it is assumed that the nominal error is correct. Nominal horizontal accuracy for digitized USGS topographic maps is 53.6 m. Horizontal

accuracy for digitized Landsat scenes is estimated at 60 m, incorporating both georeferencing errors and errors in the manual digitization (McNabb and Hock, 2014).

3 SOFTWARE AND TOOLS

Text data files may be opened by any text editor or word processing program that reads ASCII text files.

Shapefiles can be readily accessed using GIS software such as ArcGIS and QGIS.

4 RELATED DATA SETS

MEaSUREs Annual Greenland Outlet Glacier Terminus Positions from SAR Mosaics

5 RELATED WEBSITES

Alaska Satellite Facility

6 CONTACTS AND ACKNOWLEDGMENTS

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7 REFERENCES

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Arendt, A., K. Echelmeyer, W. Harrison, C. Lingle, and B. Valentine. 2002. Rapid wastage of Alaska glaciers and their contribution to rising sea level, *Science*, 297(5580):382–386.

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8 DOCUMENT INFORMATION

8.1 Publication Date

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8.2 Date Last Updated

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