

# Glacier Thickness Database (GlaThiDa)

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This dataset adheres to the Frictionless Data [Tabular Data Package](#) specification. All metadata is provided in `datapackage.json`. This README is automatically generated from the contents of that file.

- `version` 3.0.1
- `created` 2019-03-12
- `id` <https://doi.org/10.5904/wgms-glathida-2019-03>
- `description` Internationally collected, standardized dataset on glacier thickness from in-situ and remotely sensed observations, based on data submissions, literature review and airborne data from NASA's Operation IceBridge.

GlaThiDa is a contribution to the working group on Glacier ice thickness estimation ([http://www.cryosphericosciences.org/wg\\_glacierIceThickEst.html](http://www.cryosphericosciences.org/wg_glacierIceThickEst.html)), which was formed under the auspices of the International Association of Cryospheric Sciences (IACS). The working group – led by Daniel Farinotti, Liss Marie Andreassen and Huilin Li – will ensure the continuation and expansion of GlaThiDa.

The data might be subject to errors and inaccuracies. Hence, we strongly suggest performing data quality checks and, in case of ambiguities, to contact us as well as the original investigators and agencies.

- `homepage` [https://www.gtn-g.ch/data\\_catalogue\\_glathida/](https://www.gtn-g.ch/data_catalogue_glathida/)
- `profile` tabular-data-package
- `publisher` World Glacier Monitoring Service (WGMS)
- `temporalCoverage` 1935/2018-07-26
- `spatialCoverage` Global
- `inLanguage` en
- `license` Open access for scientific and educational purposes under requirement of correct citation of the database (<https://doi.org/10.5904/wgms-glathida-2019-03>), related publication (<https://doi.org/10.1016/j.gloplacha.2014.09.003>), and/or the original investigators, agencies, and references listed in the database.
- `citation` GlaThiDa Consortium (2019): Glacier Thickness Database 3.0.1. World Glacier Monitoring Service, Zurich, Switzerland. DOI:[10.5904/wgms-glathida-2019-03](https://doi.org/10.5904/wgms-glathida-2019-03)

To cite a subset of the data, refer to the investigators and references listed in the database. For example:

Dowdeswell et al. (2002), in: GlaThiDa Consortium (2019): Glacier Thickness Database 3.0.1. World Glacier Monitoring Service, Zurich, Switzerland. DOI:[10.5904/wgms-glathida-2019-03](https://doi.org/10.5904/wgms-glathida-2019-03)

The GlaThiDa Consortium consists of the authors and contributors listed below.

## Credits

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## Sources

Published datasets incorporated into GlaThiDa, listed in order of appearance. This list should not be considered complete.

- [Ice thickness measurements on South Tyrolean glaciers 1996-2014](#)
- [Ground-penetrating radar \(GPR\) point measurements of ice thickness in Austria](#)
- [Ice thickness of Kilimanjaro's Northern Ice Field mapped by ground-penetrating radar](#)
- [\[tentative\] Swiss Glacier Thickness \(1999-2015\), release 2018](#)
- [Subglacial topography, ice thickness, and bathymetry of Kongsfjorden, northwestern Svalbard](#)
- [Pre-IceBridge MCoRDS L2 Ice Thickness, Version 1](#)
- [IceBridge HiCARS 1 L2 Geolocated Ice Thickness, Version 1](#)
- [IceBridge HiCARS 2 L2 Geolocated Ice Thickness, Version 1](#)

- [IceBridge MCoRDS L2 Ice Thickness, Version 1](#)
- [IceBridge PARIS L2 Ice Thickness, Version 1](#)
- [IceBridge WISE L2 Ice Thickness and Surface Elevation, Version 1](#)

## Data structure

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The dataset is composed of three tabular data files, referred to here as `T`, `TT`, and `TTT`. The metadata describing their structure follows the Frictionless Data [Tabular Data Resource](#) specification.

All data files share a common format, structure, and encoding:

- `format` `csv`
- `mediatype` `text/csv`
- `encoding` `utf-8`
- `profile` `tabular-data-resource`
- `dialect`
  - `header` `true`
  - `delimiter` `,`
  - `lineTerminator` `\n`
  - `quoteChar` `"`
  - `doubleQuote` `true`
- `schema`
  - `missingValues` `[""]`

### T Glacier thickness: Overview

- `description` Glacier-wide data and summary metadata for each ice thickness survey.
- `path` `data/T.csv`
- `schema`
  - `primaryKey` `[GlaThiDa_ID]`

#### **GlaThiDa\_ID** Survey identifier

- `description` Unique identifier assigned by the World Glacier Monitoring Service (WGMS) to each survey. Links the corresponding entries in tables `T`, `TT`, and `TTT`.

Note: For data submission, use your own identifier that is unique within your submitted data.

- `type` `integer`
- `required` `true`
- `unique` `true`

#### **POLITICAL\_UNIT** Glacier country

- `description` Two-character code (ISO 3166 Alpha-2) of the country in which the glacier is located. A list of codes is available at <https://www.iso.org/obp/ui/#search/code/>.
- `type` `string`
- `required` `true`

- `enum` [AF, AX, AL, DZ, AS, AD, AO, AI, AQ, AG, AR, AM, AW, AU, AT, AZ, BS, BH, BD, BB, BY, BE, BZ, BJ, BM, BT, BO, BQ, BA, BW, BV, BR, IO, BN, BG, BF, BI, CV, KH, CM, CA, KY, CF, TD, CL, CN, CX, CC, CO, KM, CD, CG, CK, CR, CI, HR, CU, CW, CY, CZ, DK, DJ, DM, DO, EC, EG, SV, GQ, ER, EE, SZ, ET, FK, FO, FJ, FI, FR, GF, PF, TF, GA, GM, GE, DE, GH, GI, GR, GL, GD, GP, GU, GT, GG, GN, GW, GY, HT, HM, VA, HN, HK, HU, IS, IN, ID, IR, IQ, IE, IM, IL, IT, JM, JP, JE, JO, KZ, KE, KI, KP, KR, KW, KG, LA, LV, LB, LS, LR, LY, LI, LT, LU, MO, MK, MG, MW, MY, MV, ML, MT, MH, MQ, MR, MU, YT, MX, FM, MD, MC, MN, ME, MS, MA, MZ, MM, NA, NR, NP, NL, NC, NZ, NI, NE, NG, NU, NF, MP, NO, OM, PK, PW, PS, PA, PG, PY, PE, PH, PN, PL, PT, PR, QA, RE, RO, RU, RW, BL, SH, KN, LC, MF, PM, VC, WS, SM, ST, SA, SN, RS, SC, SL, SG, SX, SK, SI, SB, SO, ZA, GS, SS, ES, LK, SD, SR, SJ, SE, CH, SY, TW, TJ, TZ, TH, TL, TG, TK, TO, TT, TN, TR, TM, TC, TV, UG, UA, AE, GB, UM, US, UY, UZ, VU, VE, VN, VG, VI, WF, EH, YE, ZM, ZW]

### **GLACIER\_NAME** Glacier name

- `description` The name of the glacier, written in capital letters (A-Z).

In order to ensure global interoperability of our dataset, glacier names should only contain the following characters: A-Z (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), 0-9 (0, 1, 2, 3, 4, 5, 6, 7, 8, 9), - (dash), . (period), : (colon), () (parentheses), / (forward slash), ' (apostrophe), and (space).

Characters which do not fall into the given range should be transliterated. If no Latin name exists or if it contains accents, please apply the following rules:

- Neglect the use of accents.
- If available, use the International Organization for Standardization (ISO) standards for transliteration (<https://www.iso.org/ics/01.140.10/x/>), neglecting the use of accents.
- Some specific rules apply: Å → AA, Æ → AE, Ä → AE, ð → D, Ø → OE, œ → OE, Ö → OE, ß → SS, þ → TH, Ü → UE.

If a name is too long, a meaningful abbreviation should be used. In this case, the full name should be listed in `REMARKS` .

- `type` string
- `maxLength` 60
- `pattern` `^[0-9A-Z \-\.:\(\)\/\']*$`
- `required` false

### **GLACIER\_DB** Glacier database

- `description` The database to which `GLACIER_ID` refers, if provided.
  - GLIMS: Global Land Ice Measurements from Space
  - RGI: Randolph Glacier Inventory
  - WGI: World Glacier Inventory
  - FOG: Fluctuations of Glaciers
  - OTH: Other (full name should be listed in `REMARKS` )
- `type` string
- `required` false
- `enum` [GLIMS, RGI, WGI, FOG, OTH]

### **GLACIER\_ID** Glacier identifier

- `description` Identifier of the glacier in the database specified in `GLACIER_DB` . For the Randolph Glacier Inventory (RGI), the database version should be included as part of the glacier identifier (e.g. 'RGI60-07.00244').
- `type` string
- `maxLength` 14
- `required` false

#### **LAT** Glacier latitude (°, WGS 84)

- `description` Latitude in decimal degrees (°, WGS 84), with up to six decimal places. Positive values indicate the northern hemisphere and negative values indicate the southern hemisphere. Three decimal places may not be sufficient depending on the proximity to other glaciers.

The point ( `LAT` , `LON` ) should be in the upper part of the glacier ablation area, in the main channel, and sufficiently high so as not to be lost if the glacier retreats.

- `type` number
- `minimum` -90
- `maximum` 90
- `pattern` `^\-?[0-9]*(\.[0-9]{0,6})?$`
- `required` true

#### **LON** Glacier longitude (°, WGS 84)

- `description` Longitude in decimal degrees (°, WGS 84), with up to six decimal places. Positive values indicate east of the zero meridian and negative values indicate west of the zero meridian. Three decimal places may not be sufficient depending on the proximity to other glaciers.

The point ( `LAT` , `LON` ) should be in the upper part of the glacier ablation area, in the main channel, and sufficiently high so as not to be lost if the glacier retreats.

- `type` number
- `minimum` -180
- `maximum` 180
- `pattern` `^\-?[0-9]*(\.[0-9]{0,6})?$`
- `required` true

#### **SURVEY\_DATE** Survey date

- `description` Date of the survey, formatted as YYYYMMDD (4-digit year, 2-digit month, and 2-digit day). Use '99' to designate unknown day or month (e.g. 20100199, 20109999). For surveys spanning multiple dates, the first date should be given and the dates further described in `REMARKS` .
- `type` date
- `format` `%Y%m%d`
- `required` false

#### **ELEVATION\_DATE** Surface elevation date

- `description` Date of the provided surface elevations (e.g. TT.LOWER\_BOUND, TT.UPPER\_BOUND, TTT.ELEVATION), formatted as YYYYMMDD (4-digit year, 2-digit month, and 2-digit day). Use '99' to

designate unknown day or month (e.g. 20100199, 20109999). For elevations spanning multiple dates, the first date should be given and the dates further described in `REMARKS` . The source – for example, the digital elevation model (DEM) from which elevations were extracted, or whether elevations were measured with satellite navigation during the survey – should be described in `REMARKS` .

- `type` date
- `format` %Y%m%d
- `required` false

#### **AREA** Total area (km<sup>2</sup>)

- `description` Total glacier area (km<sup>2</sup>), up to five decimal places. If the date for the area is different from `ELEVATION_DATE` , it should be noted in `REMARKS` .
- `type` number
- `minimum` 0
- `pattern` `^[0-9]*(\.[0-9]{0,5})?$`
- `required` false

#### **MEAN\_SLOPE** Mean glacier slope (°)

- `description` Mean surface slope over the entire glacier (°), as an integer. If the date for the slope is different from `ELEVATION_DATE` , it should be noted in `REMARKS` .
- `type` integer
- `minimum` 0
- `maximum` 90
- `required` false

#### **MEAN\_THICKNESS** Mean glacier thickness (m)

- `description` Mean ice thickness (m), as an integer. Ideally, this represents the interpolated mean over the entire glacier rather than the mean of the individual thickness measurements. Otherwise, it should be noted in `REMARKS` and `DATA_FLAG` should be set to '2'.
- `type` integer
- `minimum` 0
- `maximum` 999999
- `required` false

#### **MEAN\_THICKNESS\_UNCERTAINTY** Uncertainty of mean glacier thickness (m)

- `description` Estimated random error of `MEAN_THICKNESS` (m), as an integer.
- `type` integer
- `minimum` 0
- `maximum` 999999
- `required` false

#### **MAXIMUM\_THICKNESS** Maximum glacier thickness (m)

- `description` Maximum ice thickness (m), as an integer.
- `type` integer
- `minimum` 0
- `maximum` 999999



- `required` false

### **MAX\_THICKNESS\_UNCERTAINTY** Uncertainty of maximum glacier thickness (m)

- `description` Estimated random error of `MAXIMUM_THICKNESS` (m), as an integer.
- `type` integer
- `minimum` 0
- `maximum` 999999
- `required` false

### **SURVEY\_METHOD** Survey method

- `description` Survey method used.
  - DRlh: Drilling (hydrothermal)
  - DRlm: Drilling (mechanical)
  - GPRa: Ground penetrating radar (airborne)
  - GPRt: Ground penetrating radar (terrestrial)
  - GPR: Ground penetrating radar (either both airborne and terrestrial, or unknown)
  - GEL: Geoelectric
  - HYM: Hydrometric
  - SEI: Seismic
  - OTH: Other (should be described in `SURVEY_METHOD_DETAILS` )
- `type` string
- `enum` [DRlh, DRlm, GPRa, GPRt, GPR, GEL, HYM, SEI, OTH]
- `required` false

### **SURVEY\_METHOD\_DETAILS** Survey method details

- `description` Details useful to assess the uncertainty of the ice thickness measurements. For example, 'GPR full-range system, 100-MHz shielded antenna, constant wave velocity in ice of 0.168 m per ns.'
- `type` string
- `required` false

### **NUMBER\_OF\_SURVEY\_POINTS** Number of survey points

- `description` Total number of survey points taken. Should be equal to either the number of points in table `TTT` , the number of points originally surveyed, or the number of points used to estimate the mean thickness over the glacier ( `T.MEAN_THICKNESS` ) or elevation intervals ( `TT.MEAN_THICKNESS` ). The specific meaning should be given in `REMARKS` .
- `type` integer
- `minimum` 0
- `required` false

### **NUMBER\_OF\_SURVEY\_PROFILES** Number of survey profiles (#)

- `description` Total number of survey profiles taken. Should be equal to either the number of listed profiles (i.e. the number of unique values of `TTT.PROFILE_ID` ), the number of profiles originally surveyed, or the number of profiles used to estimate the mean thickness over the glacier ( `T.MEAN_THICKNESS` ) or elevation intervals ( `TT.MEAN_THICKNESS` ). The specific meaning should be given in `REMARKS` .

- type integer
- minimum 0
- required false

### **TOTAL\_LENGTH\_OF\_SURVEY\_PROFILES** Total length of survey profiles (km)

- description Total length of survey profiles taken (km), up to two decimal places. Should be equal to either the total length of the listed profiles (i.e. the sum of the lengths of each profile, `TTT.PROFILE_ID` , based on the coordinates of the points, `TTT.POINT_LAT` and `TTT.POINT_LON` ), the total length of the profiles originally surveyed, or the total length of the profiles used to estimate the mean thickness over the glacier ( `T.MEAN_THICKNESS` ) or elevation intervals ( `TT.MEAN_THICKNESS` ). The specific meaning should be given in `REMARKS` .
- type number
- minimum 0
- pattern `^[0-9]*(\.[0-9]{0,2})?$`
- required false

### **INTERPOLATION\_METHOD** Interpolation method

- description Interpolation method used to extrapolate ice thickness from survey points to the entire glacier.
  - IDW: Inverse distance weighting
  - KRG: Kriging
  - ANU: ANUDEM, including ArcInfo TOPOGRID and ArcGIS Topo To Raster)
  - TRI: Triangulation, including Triangulated irregular network (TIN)
  - OTH: Other (should be described in `REMARKS` )
- type string
- enum [IDW, KRG, ANU, TRI, OTH]
- required false

### **INVESTIGATOR** Investigators

- description Name of the people or agencies that performed the survey or processed the data. For people, both first and last name should be given, complemented by other identifiers such as their affiliation or ORCID (<http://orcid.org>).
- type string
- required false

### **SPONSORING\_AGENCY** Sponsoring agencies

- description Name and location of the agencies that sponsored the survey or hold the data.
- type string
- required false

### **REFERENCES** References

- description References to published literature directly relating to the survey, including the Digital Object Identifier (DOI) or URL when available.
- type string

- `required` false

### **DATA\_FLAG** Data flag

- `description` Whether glacier thickness is erroneous or limited to parts of the glacier. All issues should be described in `REMARKS`.
  - 1: Erroneous glacier thickness
  - 2: Glacier thickness limited to parts of glacier
  - 3: Other issue
- `type` integer
- `enum` [1, 2, 3]
- `required` false

### **REMARKS** Remarks

- `description` Any other important information about the survey not included elsewhere.
- `type` string
- `required` false

## **TT** Glacier thickness: By elevation interval

- `description` Glacier thickness by intervals of surface elevation, typically derived from maps of ice thickness.
- `path` data/TT.csv
- `schema`
  - `primaryKey` [ GlaThiDa\_ID , SURVEY\_DATE , LOWER\_BOUND , UPPER\_BOUND ]
  - `foreignKeys`
    - [1]
      - `fields` [ GlaThiDa\_ID ]
      - `reference`
        - `resource` T
        - `fields` [ GlaThiDa\_ID ]

### **GlaThiDa\_ID** Survey identifier

- `description` Unique identifier assigned by the World Glacier Monitoring Service (WGMS) to each survey. Links the corresponding entries in tables `T` , `TT` , and `TTT` .

Note: For data submission, use your own identifier that is unique within your submitted data.

- `type` integer
- `required` true

### **POLITICAL\_UNIT** Glacier country

- `description` Two-character code (ISO 3166 Alpha-2) of the country in which the glacier is located. A list of codes is available at <https://www.iso.org/obp/ui/#search/code/>.
- `type` string
- `required` true

- `enum` [AF, AX, AL, DZ, AS, AD, AO, AI, AQ, AG, AR, AM, AW, AU, AT, AZ, BS, BH, BD, BB, BY, BE, BZ, BJ, BM, BT, BO, BQ, BA, BW, BV, BR, IO, BN, BG, BF, BI, CV, KH, CM, CA, KY, CF, TD, CL, CN, CX, CC, CO, KM, CD, CG, CK, CR, CI, HR, CU, CW, CY, CZ, DK, DJ, DM, DO, EC, EG, SV, GQ, ER, EE, SZ, ET, FK, FO, FJ, FI, FR, GF, PF, TF, GA, GM, GE, DE, GH, GI, GR, GL, GD, GP, GU, GT, GG, GN, GW, GY, HT, HM, VA, HN, HK, HU, IS, IN, ID, IR, IQ, IE, IM, IL, IT, JM, JP, JE, JO, KZ, KE, KI, KP, KR, KW, KG, LA, LV, LB, LS, LR, LY, LI, LT, LU, MO, MK, MG, MW, MY, MV, ML, MT, MH, MQ, MR, MU, YT, MX, FM, MD, MC, MN, ME, MS, MA, MZ, MM, NA, NR, NP, NL, NC, NZ, NI, NE, NG, NU, NF, MP, NO, OM, PK, PW, PS, PA, PG, PY, PE, PH, PN, PL, PT, PR, QA, RE, RO, RU, RW, BL, SH, KN, LC, MF, PM, VC, WS, SM, ST, SA, SN, RS, SC, SL, SG, SX, SK, SI, SB, SO, ZA, GS, SS, ES, LK, SD, SR, SJ, SE, CH, SY, TW, TJ, TZ, TH, TL, TG, TK, TO, TT, TN, TR, TM, TC, TV, UG, UA, AE, GB, UM, US, UY, UZ, VU, VE, VN, VG, VI, WF, EH, YE, ZM, ZW]

#### **GLACIER\_NAME** Glacier name

- `description` The name of the glacier, written in capital letters (A-Z).

In order to ensure global interoperability of our dataset, glacier names should only contain the following characters: A-Z (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), 0-9 (0, 1, 2, 3, 4, 5, 6, 7, 8, 9), - (dash), . (period), : (colon), () (parentheses), / (forward slash), ' (apostrophe), and (space).

Characters which do not fall into the given range should be transliterated. If no Latin name exists or if it contains accents, please apply the following rules:

- Neglect the use of accents.
- If available, use the International Organization for Standardization (ISO) standards for transliteration (<https://www.iso.org/ics/01.140.10/x/>), neglecting the use of accents.
- Some specific rules apply: Å → AA, Æ → AE, Ä → AE, ð → D, Ø → OE, œ → OE, Ö → OE, ß → SS, þ → TH, Ü → UE.

If a name is too long, a meaningful abbreviation should be used. In this case, the full name should be listed in `REMARKS` .

- `type` string
- `maxLength` 60
- `pattern` `^[0-9A-Z \-\.:\(\)\ \\' ]*$`
- `required` false

#### **SURVEY\_DATE** Survey date

- `description` Date that the ice thickness was surveyed in the elevation interval, formatted as YYYYMMDD (4-digit year, 2-digit month, and 2-digit day). Use '99' to designate unknown day or month (e.g. 20100199, 20109999). For surveys spanning multiple dates, the first date should be given and the dates further described in `REMARKS` .
- `type` date
- `format` `%Y%m%d`
- `required` false

#### **LOWER\_BOUND** Lower elevation bound (m)

- `description` Lower boundary of the surface elevation interval (m), as an integer. Elevations should be relative to mean sea level (geoid) unless noted in `REMARKS` or `T.REMARKS` .
- `type` integer

- `maxLength` 4
- `required` true

#### **UPPER\_BOUND** Upper elevation bound (m)

- `description` Upper boundary of the surface elevation interval (m), as an integer. Elevations should be relative to mean sea level (geoid) unless noted in `REMARKS` or `T.REMARKS` .
- `type` integer
- `maxLength` 4
- `required` true

#### **AREA** Total interval area (km<sup>2</sup>)

- `description` Total glacier area (km<sup>2</sup>), up to five decimal places, for the elevation interval. If the date for the area is different from `ELEVATION_DATE` , it should be noted in `REMARKS` .
- `type` number
- `minimum` 0
- `pattern` `^[0-9]*(\.[0-9]{0,5})?$`
- `required` false

#### **MEAN\_SLOPE** Mean interval slope (°)

- `description` Mean surface slope (°), as an integer, for the elevation interval. If the date for the slope is different from `ELEVATION_DATE` , it should be noted in `REMARKS` .
- `type` integer
- `minimum` 0
- `maximum` 90
- `required` false

#### **MEAN\_THICKNESS** Mean interval thickness (m)

- `description` Mean ice thickness (m), as an integer, for the elevation interval. Ideally, this is the interpolated mean of the entire elevation interval rather than the mean of the individual thickness measurements. Otherwise, it should be noted in `REMARKS` and `DATA_FLAG` should be set to '2'.
- `type` integer
- `minimum` 0
- `maximum` 999999
- `required` true

#### **MEAN\_THICKNESS\_UNCERTAINTY** Uncertainty of mean interval thickness (m)

- `description` Estimated random error of `MEAN_THICKNESS` (m), as an integer.
- `type` integer
- `minimum` 0
- `maximum` 999999
- `required` false

#### **MAXIMUM\_THICKNESS** Maximum interval thickness (m)

- `description` Maximum ice thickness (m), as an integer, for the elevation interval.
- `type` integer

- `minimum` 0
- `maximum` 999999
- `required` false

### **MAX\_THICKNESS\_UNCERTAINTY** Uncertainty of maximum interval thickness (m)

- `description` Estimated random error of `MAXIMUM_THICKNESS` (m), as an integer.
- `type` integer
- `minimum` 0
- `maximum` 999999
- `required` false

### **DATA\_FLAG** Data flag

- `description` Whether ice thickness is erroneous or limited to parts of the elevation interval. Issues specific to the elevation interval should be described in `REMARKS` while issues common to all elevation intervals should be described in `T.REMARKS`.
  - 1: Erroneous ice thickness
  - 2: Ice thickness limited to parts of elevation interval
  - 3: Other issue
- `type` integer
- `enum` [1, 2, 3]
- `required` false

### **REMARKS** Remarks

- `description` Any other important information about the survey – specific to the elevation interval – not included elsewhere.
- `type` string
- `required` false

## **TTT** Glacier thickness: Point measurements

- `description` Glacier thickness measured at specific points.
- `path` data/TTT.csv
- `schema`
  - `primaryKey` [ `GlaThiDa_ID` , `SURVEY_DATE` , `PROFILE_ID` , `POINT_ID` ]
  - `foreignKeys`
    - [1]
      - `fields` [ `GlaThiDa_ID` ]
      - `reference`
        - `resource` T
        - `fields` [ `GlaThiDa_ID` ]

### **GlaThiDa\_ID** Survey identifier

- `description` Unique identifier assigned by the World Glacier Monitoring Service (WGMS) to each survey. Links the corresponding entries in tables `T` , `TT` , and `TTT` .

Note: For data submission, use your own identifier that is unique within your submitted data.

- type integer
- required true

#### **POLITICAL\_UNIT** Glacier country

- description Two-character code (ISO 3166 Alpha-2) of the country in which the glacier is located. A list of codes is available at <https://www.iso.org/obp/ui/#search/code/>.
- type string
- required true
- enum [AF, AX, AL, DZ, AS, AD, AO, AI, AQ, AG, AR, AM, AW, AU, AT, AZ, BS, BH, BD, BB, BY, BE, BZ, BJ, BM, BT, BO, BQ, BA, BW, BV, BR, IO, BN, BG, BF, BI, CV, KH, CM, CA, KY, CF, TD, CL, CN, CX, CC, CO, KM, CD, CG, CK, CR, CI, HR, CU, CW, CY, CZ, DK, DJ, DM, DO, EC, EG, SV, GQ, ER, EE, SZ, ET, FK, FO, FJ, FI, FR, GF, PF, TF, GA, GM, GE, DE, GH, GI, GR, GL, GD, GP, GU, GT, GG, GN, GW, GY, HT, HM, VA, HN, HK, HU, IS, IN, ID, IR, IQ, IE, IM, IL, IT, JM, JP, JE, JO, KZ, KE, KI, KP, KR, KW, KG, LA, LV, LB, LS, LR, LY, LI, LT, LU, MO, MK, MG, MW, MY, MV, ML, MT, MH, MQ, MR, MU, YT, MX, FM, MD, MC, MN, ME, MS, MA, MZ, MM, NA, NR, NP, NL, NC, NZ, NI, NE, NG, NU, NF, MP, NO, OM, PK, PW, PS, PA, PG, PY, PE, PH, PN, PL, PT, PR, QA, RE, RO, RU, RW, BL, SH, KN, LC, MF, PM, VC, WS, SM, ST, SA, SN, RS, SC, SL, SG, SX, SK, SI, SB, SO, ZA, GS, SS, ES, LK, SD, SR, SJ, SE, CH, SY, TW, TJ, TZ, TH, TL, TG, TK, TO, TT, TN, TR, TM, TC, TV, UG, UA, AE, GB, UM, US, UY, UZ, VU, VE, VN, VG, VI, WF, EH, YE, ZM, ZW]

#### **GLACIER\_NAME** Glacier name

- description The name of the glacier, written in capital letters (A-Z).

In order to ensure global interoperability of our dataset, glacier names should only contain the following characters: A-Z (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z), 0-9 (0, 1, 2, 3, 4, 5, 6, 7, 8, 9), - (dash), . (period), : (colon), () (parentheses), / (forward slash), ' (apostrophe), and (space).

Characters which do not fall into the given range should be transliterated. If no Latin name exists or if it contains accents, please apply the following rules:

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- Some specific rules apply: Å → AA, Æ → AE, Ä → AE, ð → D, Ø → OE, œ → OE, Ö → OE, ß → SS, þ → TH, Ü → UE.

If a name is too long, a meaningful abbreviation should be used. In this case, the full name should be listed in REMARKS.

- type string
- maxLength 60
- pattern `^[0-9A-Z \-\.:\(\)\/' ]*$`
- required false

#### **SURVEY\_DATE** Survey date

- description Date that the point was surveyed, formatted as YYYYMMDD (4-digit year, 2-digit month, and 2-digit day). Use '99' to designate unknown day or month (e.g. 20100199, 20109999).
- type date

- `format` %Y%m%d
- `required` false

#### **PROFILE\_ID** Profile identifier

- `description` Identifier for the survey profile which the point belongs to (if applicable). Should serve to both distinguish between different profiles and to sort the profiles in the order in which they were collected (e.g. 1, 2, 3, ...).
- `type` string
- `maxLength` 8
- `required` false

#### **POINT\_ID** Point identifier

- `description` Identifier for the point. Should serve to both distinguish between different points and to sort the profiles in the order in which they were collected (e.g. 1, 2, 3, ...).
- `type` string
- `maxLength` 8
- `required` true

#### **POINT\_LAT** Point latitude (°, WGS 84)

- `description` Latitude in decimal degrees (°, WGS 84), with up to seven decimal places. Positive values indicate the northern hemisphere and negative values indicate the southern hemisphere.
- `type` number
- `minimum` -90
- `maximum` 90
- `pattern` `^\-?[0-9]*(\.[0-9]{0,7})?$`
- `required` true

#### **POINT\_LON** Point longitude (°, WGS 84)

- `description` Longitude in decimal degrees (°, WGS 84), with up to seven decimal places. Positive values indicate east of the zero meridian and negative values indicate west of the zero meridian.
- `type` number
- `minimum` -180
- `maximum` 180
- `pattern` `^\-?[0-9]*(\.[0-9]{0,7})?$`
- `required` true

#### **ELEVATION** Point elevation (m)

- `description` Point elevation (m), as an integer. Elevations should be relative to mean sea level (geoid) unless noted in `REMARKS` or `T.REMARKS` .
- `type` integer
- `maxLength` 6
- `required` false

#### **THICKNESS** Ice thickness (m)

- `description` Ice thickness (m), as an integer, measured at the point.



- type integer
- minimum 0
- maximum 999999
- required true

#### **THICKNESS\_UNCERTAINTY** Uncertainty of ice thickness (m)

- description Estimated random error of THICKNESS (m), as an integer.
- type integer
- minimum 0
- maximum 999999
- required false

#### **DATA\_FLAG** Data flag

- description Whether ice thickness is erroneous. Issues specific to the point should be described in REMARKS while issues common to all points in the survey should be described in T.REMARKS .
  - 1: Erroneous ice thickness
  - 3: Other issue
- type integer
- enum [1, 3]
- required false

#### **REMARKS** Remarks

- description Any other important information about the survey – specific to the point – not included elsewhere.
- type string
- required false