

Submission of Glacier Fluctuation Data to the World Glacier Monitoring Service

—
Observation Period 2010/11

—
General Guidelines

What is it all about?

The World Glacier Monitoring Service (WGMS) continuously publishes internationally collected and standardised data on changes in glaciers throughout the world. The compiled data is published at 5-yearly intervals in the 'Fluctuations of Glaciers' (FoG) which include detailed information on the observed glaciers, variations in the position of glacier fronts, mass balance results, changes in area, volume and thickness, as well as addenda from earlier years. Furthermore, the publication includes index measurements and annexed maps as well as information on special events such as cases concerning glacier hazards and dramatic changes. The WGMS call-for-data is sent out one year after the end of the measurement period on the Northern Hemisphere (i.e., September 30), which allows the investigators to analyse and publish their own data before it is made readily available to the scientific community and the public. To speed up and facilitate the access to glacier fluctuation information, preliminary mass balance data is published annually on the website of the WGMS and biennially in the 'Glacier Mass Balance Bulletin' (GMBB).

General guidelines and scope of the two publications

In the FoG all glacier observations are published that fall within the five year measurement period (e.g., 2005–2010 for the upcoming FoG Vol. X) and are processed according to the data standards of the WGMS, as described below. The bi-annual GMBB reports on glacier mass balance values measured with the direct glaciological method. The bulletin consists of two parts – basic information in which glaciers are included with three or more calculated specific net balances, covering both hydrological years (e.g., 2009/10 and 2010/11 for the GMBB No. 12 to be published in 2013), and a detailed part with information from selected glaciers in various mountain ranges and with long measurement series (at least 6 years of observations). The time period known as the hydrological year is defined by the end of the year, i.e., in the Northern Hemisphere the hydrological year of 2010/11 starts October 1st, 2010 and ends September 30th, 2011. In the Southern Hemisphere the hydrological year of 2011 starts April 1st, 2010 and ends March 31st, 2011. In each country the data collection is to be organised by the National Correspondent of the WGMS according to this '**General Guidelines**' and the '**Notes on the Completion of the Data Sheets**' and using the '**Digital Data Submission Form**'.

How to submit the data?

For the submission of glacier fluctuation data to the WGMS, the **Digital Data Submission Form** is recommended to be used. The excel-based form is organised in worksheets A–F, with corresponding attributes descriptions in the **Notes on the Completion of the Data Sheets** (see links below). If you prefer to submit your data in any other format (e.g., csv, ascii), please make sure to meet the data scheme, field names and units as described in these latter notes on the completion of the data sheets.

For the observation period 2010/11, as well as addenda from earlier years, the following information is to be submitted:

- Standardised data on glacier fluctuations and corresponding meta-data, including estimates on maximum error of the reported values (cf. data sheets A–E).
- Information on special events, especially concerning glacier hazards and dramatic changes in glaciers (cf. data sheet F - SPECIAL EVENT).
- Full contact information on principal investigators, sponsoring agencies, and sources of data, as well as of the national correspondent

Based on the compiled data and information from this call-for-data, we will publish the GMBB No. 12 (2010-2011) and later on the FoG 2010–2015 (Vol. XI).

For a publication of the glacier data in the basic information part of the GMBB No. 12 (2010–2011) – which will be published in 2013 – the glacier mass balance data (annual balance, ELA and AAR values) from direct glaciological measurements (independent of meteorological or hydrological observations) are mandatory. For the publication in the part with detailed information the values of balance as a function of altitude is needed as well as the following additional material:

- Black and white scanned **photograph** (at least 600 dpi, no PDF) showing the entire glacier, referenced by author and date of photograph (more recent and/or better photographs than the already published ones are welcome).
- Short **text** commenting on the general characteristics of the glacier and on the reported balance years; the text should include information on the current glacier extent and size, inter-/extrapolation methods, available geodetic surveys, mean annual air temperature and annual precipitation at ELA, remaining ice thickness, etc.
- **Three digital maps** of around A4 size showing the outlines of the glacier, the scale, the direction to the north and a) topography and observation network, b) annual balance distribution for the two observation years.
- **Point mass balance measurements** at stakes and pits that were used to calculate the glacier mass balance (cf. data sheet EEE - MASS BALANCE POINT).

The last issues of the FoG and GMBB might serve you as an example during the data preparation (for web-links see below).

For the submission of other glacier data, such as reconstruction of glacier fluctuation series, new glacier inventories, or large collections of overview and repeat photographs of glaciers, please follow the links and instructions on the website of the Global Terrestrial Network for Glaciers (GTN-G; for web-link see below).

DEADLINES FOR DATA SUBMISSION:

Please submit full details on glacier fluctuation data for the observation period of 2010/11 and addenda from earlier years as soon as possible but no later than by **1st of December 2012!!!**

Questions & support

For any further questions or need for support, the WGMS staff is willing to assist you!

Links

This General Guidelines: http://www.wgms.ch/downloads/WGMS_GuidelinesforDataSubmission.pdf

Digital Data Submission Form: http://www.wgms.ch/downloads/WGMS_DataSubmissionForm.xls

Notes on the Completion of the Data Sheets: http://www.wgms.ch/downloads/WGMS_AttributeDescription.pdf

List of National Correspondents of WGMS: <http://www.wgms.ch/nc.html>

Last issues of the FoG: <http://www.wgms.ch/fog.html>

Last issues of the GMBB: <http://www.wgms.ch/gmbb.html>

Links and instructions for the submission of other glacier data types: http://www.gtn-g.org/data_submission.html

A - GENERAL INFORMATION

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in cases of new glacier entries related to available fluctuation data[#]; for glaciers already existing in the FoG database, POLITICAL UNIT (A1), GLACIER NAME (A2) AND WGMS ID (A3) are to be used in data sheets B to F.

A1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (for 2 digit abbreviations, see ISO 3166 country code, available at www.iso.org).

Political unit is part of WGI key (positions 1 and 2).

Political unit is part of FoG and MBB key (positions 1 and 2).

A2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters.

Format: max. 30 column positions.

If necessary, the name can be abbreviated; in this case, please give the full name under "A16 - REMARKS".

A3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS data base.

For new glacier entries, this key is assigned by the WGMS.

A4 - HYDROLOGICAL CATCHMENT AREA [*alpha-numeric code; 5 digits*]

Part of WGI key: Position 3 denotes the continent. Positions 4 to 7 denote the drainage basin; cf. Müller (1978).

A5 - FREE POSITION [*alpha-numeric code; 2 digits*]

Part of WGI number: Positions 8 and 9 are freely chosen identification numbers; cf. Müller (1978).

A6 - LOCAL CODE [*alpha-numeric code; 3 digits*]

Part of WGI number: Positions 10 to 12; cf. Müller (1978).

A7 - LOCAL PSFG [*alpha-numeric code; 5 digits*]

The local PSFG number is part of FoG and MBB key (positions 3 to 7).

It consists of 4 or, as an exception, 5 numerical digits. Empty spaces should be filled with the digit 0.

The PSFG key is to be assigned by the National Correspondents of the WGMS according to existing national glacier inventories or similar glacier numerations.

A8 - GEOGRAPHICAL LOCATION (GENERAL) [*alpha-numeric code; up to 30 digits*]

Refers to a large geographical entity (e.g. a large mountain range or large political subdivision) which gives a rough idea of the location of the glacier, without requiring the use of a map or an atlas.

Examples: Western Alps, Southern Norway, Polar Ural, Tien Shan, Himalayas.

A9 - GEOGRAPHICAL LOCATION (SPECIFIC) [*alpha-numeric code; up to 30 digits*]

Refers to a more specific geographical location (e.g. mountain group, drainage basin), which can be found easily on a small scale map of the country concerned.

Examples: Rhone Basin, Jotunheimen

A10 - LATITUDE [*decimal degree North or South; up to 6 digits*]

The geographical coordinates should refer to a point in the upper ablation area; for small glaciers, this point may lie outside the glacier.

Latitude should be given in decimal degrees, positive values indicating the northern hemisphere and negative values indicating the southern hemisphere.

Latitude should be given to a maximum precision of 4 decimal places.

[#] For new glacier entries, you may check the World Glacier Inventory for existing information:
http://nsidc.org/data/glacier_inventory/index.html

A11 - LONGITUDE [*decimal degree East or West; up to 7 digits*]

The geographical coordinates should refer to a point in the upper ablation area; for small glaciers, this point may lie outside the glacier.

Longitude should be given in decimal degrees, positive values indicating east of zero meridian and negative values indicating west of zero meridian.

Longitude should be given to a maximum precision of 4 decimal places.

A12 - CODE [*numeric code; 3 digits*]

Classification should be given in coded form, according to "Perennial Ice and Snow Masses" (Technical papers in hydrology, UNESCO/IAHS, 1970). The following information should be given:

- Primary Classification Digit 1
- Form Digit 2
- Frontal Characteristics Digit 3

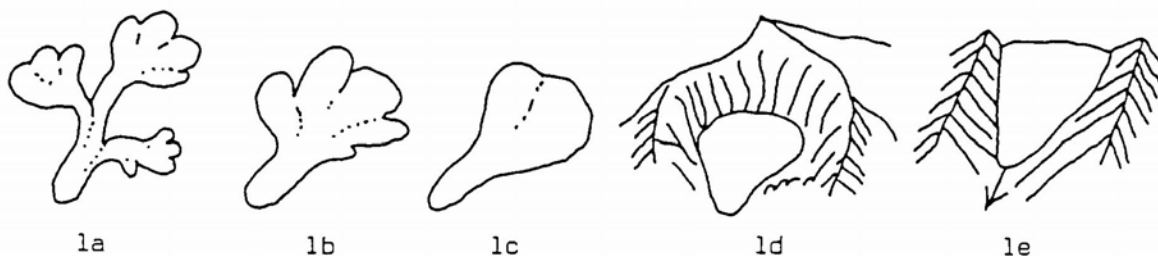
A12a - PRIMARY CLASSIFICATION - Digit 1

0	Miscellaneous	Any type not listed below (please explain)
1	Continental ice sheet	Inundates areas of continental size
2	Icefield	Ice masses of sheet or blanket type of a thickness that is insufficient to obscure the subsurface topography
3	Ice cap	Dome-shaped ice masses with radial flow
4	Outlet glacier	Drains an ice sheet, icefield or ice cap, usually of valley glacier form; the catchment area may not be easily defined
5	Valley glacier	Flows down a valley; the catchment area is well defined
6	Mountain glacier	Cirque, niche or crater type, hanging glacier; includes ice aprons and groups of small units
7	Glacieret and snowfield	Small ice masses of indefinite shape in hollows, river beds and on protected slopes, which has developed from snow drifting, avalanhcng, and/or particularly heavy accumulation in certain years; usually no marked flow pattern is visible; in existence for at least two consecutive years.
8	Ice shelf	Floating ice sheet of considerable thickness attached to a coast nourished by a glacier(s); snow accumulation on its surface or bottom freezing
9	Rock glacier	Lava-stream-like debris mass containing ice in several possible forms and moving slowly downslope

Note: The parent glacier concept (cf. A15 - PARENT GLACIER) can be used for the classification of complex glacier systems (e.g., ice cap or icefield with outlet glaciers) or of disintegrating/coalescing glaciers over time.

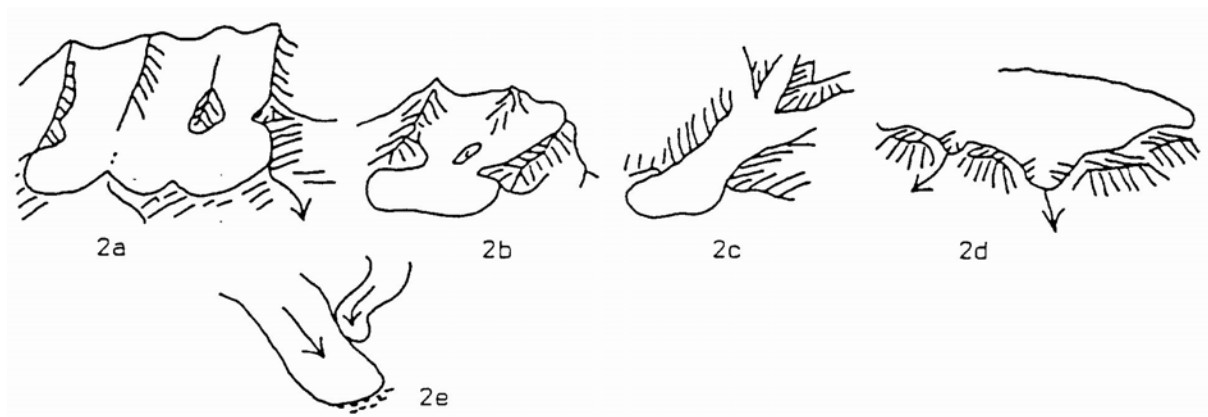
A12b - FORM – Digit 2

0	Miscellaneous	Any type not listed below (please explain)
1	Compound basins	Two or more individual valley glaciers issuing from tributary valleys and coalescing (Fig. 1a)
2	Compound basin	Two or more individual accumulation basins feeding one glacier system (Fig. 1b)
3	Simple basin	Single accumulation area (Fig. 1c)
4	Cirque	Occupies a separate, rounded, steep-walled recess which it has formed on a mountain side (Fig. 1d)
5	Niche	Small glacier in a V-shaped gully or depression on a mountain slope (Fig. 1e); generally more common than genetically further-developed cirque glacier.
6	Crater	Occurring in extinct or dormant volcanic craters
7	Ice apron	Irregular, usually thin ice mass which adheres to mountain slope or ridge
8	Group	A number of similar ice masses occurring in close proximity and too small to be assessed individually
9	Remnant	Inactive, usually small ice masses left by a receding glacier



A12c - FRONTAL CHARACTERISTICS – Digit 3

- | | | |
|---|---|---|
| 0 | Miscellaneous | Any type not listed below (please explain) |
| 1 | Piedmont | Icefield formed on a lowland area by lateral expansion of one or coalescence of several glaciers (Fig. 2a, 2b) |
| 2 | Expanded foot | Lobe or fan formed where the lower portion of the glacier leaves the confining wall of a valley and extends on to a less restricted and more level surface (Fig. 2c) |
| 3 | Lobed | Part of an ice sheet or ice cap, disqualifed as an outlet glacier (Fig. 2d) |
| 4 | Calving | Terminus of a glacier sufficiently extending into sea or lake water to produce icebergs; includes- for this inventory- dry land ice calving which would be recognisable from the "lowest glacier elevation" |
| 5 | Coalescing, non-contributing (Fig. 2e) | |
| 6 | Irregular, mainly clean ice (mountain or valley glaciers) | |
| 7 | Irregular, debris-covered (mountain or valley glaciers) | |
| 8 | Single lobe, mainly clean ice (mountain or valley glaciers) | |
| 9 | Single lobe, debris-covered (mountain or valley glaciers) | |



A13 - EXPOSITION OF ACCUMULATION AREA [cardinal point; up to 2 digits]

The main orientation of the accumulation area using the 8 cardinal points (8-point compass).

A14 - EXPOSITION OF ABLATION AREA [cardinal point; up to 2 digits]

The main orientation of the ablation area using the 8 cardinal points (8-point compass).

A15 - PARENT GLACIER [numeric code; 5 digits]

Links separated glacier parts with (former) parent glacier, using WGMS ID (see "A2 WGMS ID").

A16 - REMARKS [alpha-numeric]

Any important information or comments not included above may be given here. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

B - STATE

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in order to report length and elevation range of glaciers with available fluctuation data.

B1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

B2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

B3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS data base (cf. "A3 - WGMS ID").

B4 - YEAR [*year*]

Year of present survey.

B5 - MAXIMUM ELEVATION OF GLACIER [*m a.s.l.*]

Altitude of the highest point of the glacier.

B6 - MEDIAN ELEVATION OF GLACIER [*m a.s.l.*]

Altitude of the contour line which halves the area of the glacier.

B7 - MINIMUM ELEVATION OF GLACIER [*m a.s.l.*]

Altitude of the lowest point of the glacier.

B8 - ELEVATION ACCURACY [*m*]

Estimated maximum error of reported elevations.

B9 - LENGTH [*km*]

Maximum length of glacier measured along the most important flowline (in horizontal projection).

B10 - LENGTH ACCURACY [*km*]

Estimated maximum error, in length.

B11 - SURVEY DATE [*numeric; 8 digits*]

Date of present survey.

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "B15 - REMARKS"

B12 - SURVEY METHOD [*alphabetic code; 1 digit*]

The survey method should be given using the following alphabetic code:

A = Aerial photography

B = Terrestrial photogrammetry

C = Geodetic ground survey (theodolite, tape, etc.)

D = Combination of A, B or C (please explain under "B15 - REMARKS")

E = Other methods (please explain under "B15 - REMARKS")

B13 - INVESTIGATOR [*alpha-numeric*]

Name(s) of the person(s) or agency doing the field work and/or the name(s) of the person(s) or agency processing the data.

B14 - SPONSORING AGENCY *[alpha-numeric]*

Full name, abbreviation and address of the agency where the data are held.

B15 - REMARKS *[alpha-numeric]*

Any important information or comments not included above may be given here as well as short references to related publications. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

C - FRONT VARIATION

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in order to report glacier length change records mainly from in-situ and remote sensing measurements.*

C1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

C2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

C3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS data base (cf. "A3 - WGMS ID").

C4 - YEAR [*year*]

Year of present survey.

C5 - FRONT VARIATION [*m*]

Variation in the position of the glacier front (in horizontal projection) between the previous and present survey.

Positive values: advance

Negative values: retreat

C6 - FRONT VARIATION ACCURACY [*m*]

Estimated maximum error for front variation.

C7 - QUALITATIVE VARIATION [*alphabetic code; 2 digits*]

If no quantitative data are available for a particular year, but qualitative data are available, then the front variation should be denoted using the following symbols. They should be positioned in the far left of the data field.

+X : Glacier in advance

-X : Glacier in retreat

ST : Glacier stationary

SN : Glacier front covered by snow making survey impossible.

Qualitative variations will be understood with reference to the previous survey data, whether this data is qualitative or quantitative.

C8 - SURVEY DATE [*numeric; 8 digits*]

Date of present survey.

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "C13 - REMARKS"

C9 - SURVEY METHOD [*alphabetic code; 1 digit*]

The survey method should be given using the following alphabetic code:

A = Aerial photography

B = Terrestrial photogrammetry

C = Geodetic ground survey (theodolite, tape etc.)

D = Combination of a, b or c (please explain under "C13 - REMARKS")

E = Other direct methods or reconstructions such as based on historical sources, geomorphological evidence, dating of moraines (please explain under "C13 - REMARKS")

C10 - REFERENCE DATE *[numeric, 8 digits]*

Date of previous survey

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "C13 - REMARKS"

C11 - INVESTIGATOR *[alpha-numeric]*

Name(s) of the person(s) or agency doing the fieldwork and/or the name(s) of the person(s) or agency processing the data.

C12 - SPONSORING AGENCY *[alpha-numeric]*

Full name, abbreviation and address of the agency where the data are held.

C13 - REMARKS *[alpha-numeric]*

Any important information or comments not included above may be given here as well as short references to related publications. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

** For the submission of front variation series mainly based on reconstruction methods (e.g., paintings, drawings, written sources, photography, maps, and moraine dating), please contact the WGMS staff.*

D - CHANGE

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in order to report changes in thickness, area and volume from geodetic surveys and/or area data of glaciers with available fluctuation data.

D1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

D2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

D3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS data base (cf. "A3 - WGMS ID").

D4 - YEAR [*year*]

Year of present survey.

D5 - LOWER BOUNDARY [*m a.s.l.*]

Lower boundary of altitude interval.

If refers to entire glacier, then lower bound = 9999.

D6 - UPPER BOUNDARY [*m a.s.l.*]

Upper boundary of altitude interval

If refers to entire glacier, then upper bound = 9999.

D7 - AREA SURVEY YEAR [*km²*]

Glacier area of each altitude interval (in horizontal projection) in the survey YEAR.

D8 - AREA CHANGE [*1000 m²*]

Area change for each altitude interval.

D9 - AREA CHANGE ACCURACY [*1000 m²*]

Estimated maximum error for area change.

D10 - THICKNESS CHANGE [*mm*]

Specific ice thickness change for each altitude interval.

D11 - THICKNESS CHANGE ACCURACY [*mm*]

Estimated maximum error for thickness change.

D12 - VOLUME CHANGE [*1000 m³*]

Ice volume change for each altitude interval.

D13 - VOLUME CHANGE ACCURACY [*1000 m³*]

Estimated maximum error for volume change.

D14 - SURVEY DATE [*numeric; 8 digits*]

Date of present survey.

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "D19 - REMARKS"

D15 - SURVEY METHOD [*alphabetic code; 1 digit*]

The survey method should be given using the following alphabetic code:

A = Aerial photography

B = Terrestrial photogrammetry

C = Geodetic ground survey (theodolite, tape etc.)

D = Combination of a, b or c (please explain under "D19 - REMARKS")

E = Other methods (e.g., LIDAR, map comparison; please explain and add at least one reference under "D19 - REMARKS")

D16 - REFERENCE DATE [*numeric; 8 digits*]

Date of previous survey.

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "D19 - REMARKS"

D17 - INVESTIGATOR [*alpha-numeric*]

Name(s) of the person(s) or agency doing the fieldwork and/or the name(s) of the person(s) or agency processing the data.

D18 - SPONSORING AGENCY [*alpha-numeric*]

Full name, abbreviation and address of the agency where the data are held.

D19 - REMARKS [*alpha-numeric*]

Any important information or comments not included above may be given here as well as short references to related publications. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

E - MASS BALANCE OVERVIEW

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in order to report glacier mass balance data.

E1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

E2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

E3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS database (cf. "A3 - WGMS ID").

E4 - YEAR [*year*]

Year of present survey.

E5 - TIME MEASUREMENT SYSTEM [*alphabetic code; 3 digits*]

The time measurement system should be given using the following 3 digit alphabetic code:

FLO = floating-date system

FXD = fixed-data system

STR = stratigraphic system

COM = combined system; usually of STR and FXD according Mayo et al. (1972)

OTH = other

Please give floating survey dates in E6-E8 for all time systems and explain methodological details (e.g., fixed calendar dates and correction methods) under "E22 - REMARKS".

Note that FLO was newly introduced in 2011 in order to reduce earlier ambiguities. Before that, mass balance results based on the floating-date system were (at least theoretically) reported as OTH. For definitions of the above time measurement systems and more details see Cogley et al. (2011).

E6 - BEGINNING OF SURVEY PERIOD [*numeric; 8 digits*]

Date on which survey period began.

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "E22 - REMARKS"

E7 - END OF WINTER SEASON [*numeric; 8 digits*]

Date of end of winter season.

If known, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "E22 - REMARKS"

E8 - END OF SURVEY PERIOD [*numeric; 8 digits*]

Date on which survey period ended.

For each survey, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "E22 - REMARKS"

E9a - ELA PREFIX [*alphabetic code, 1 digit*]

Prefix denoting if the equilibrium line was below (" $<$ ") or above (" $>$ ") the minimum or maximum elevation of the glacier, respectively. Leave this field empty if the mean altitude of the equilibrium line was within the glacier elevation range.

E9b - EQUILIBRIUM LINE ALTITUDE [m a.s.l.]

Mean altitude (averaged over the glacier) of the end-of-mass-balance-year equilibrium line (ELA).
Give glacier minimum or maximum elevation if the ELA was below or above the elevation range of the glacier, respectively.

E10 - ELA ACCURACY [m]

Estimated maximum error of ELA.

E11 - MINIMUM NUMBER OF MEAS. SITES USED IN ACCUMULATION AREA [numeric]

The minimum number of different sites at which measurements were taken in the accumulation area.
Repeat measurements may be taken for one site, in order to obtain an average value for that site, but the site is still only counted once.

E12 - MAXIMUM NUMBER OF MEAS. SITES USED IN ACCUMULATION AREA [numeric]

The maximum number of different sites at which measurements were taken in the accumulation area.
Repeat measurements may be taken for one site, in order to obtain an average value for that site, but the site is still only counted once.

E13 - MINIMUM NUMBER OF MEAS. SITES USED IN ABLATION AREA [numeric]

The minimum number of different sites at which measurements were taken in the ablation area.
Repeat measurements may be taken for one site, in order to obtain an average value for that site, but the site is still only counted once.

E14 - MAXIMUM NUMBER OF MEAS. SITES USED IN ABLATION AREA [numeric]

The maximum number of different sites at which measurements were taken in the ablation area.
Repeat measurements may be taken for one site, in order to obtain an average value for that site, but the site is still only counted once.

E15 - ACCUMULATION AREA [km²]

Accumulation area in horizontal projection.

E16 - ACCUMULATION AREA ACCURACY [km²]

Estimated maximum error for accumulation area.

E17 - ABLATION AREA [km²]

Ablation area in horizontal projection.

E18 - ABLATION AREA ACCURACY [km²]

Estimated maximum error for ablation area.

E19 - ACCUMULATION AREA RATIO [%]

Accumulation area divided by the total area, multiplied by 100. Given in percent.

E20 - INVESTIGATOR [alpha-numeric]

Name(s) of the person(s) or agency doing the fieldwork and/or the name(s) of the person(s) or agency processing the data.

E21 - SPONSORING AGENCY [alpha-numeric]

Full name, abbreviation and address of the agency where the data are held.

E22 - REMARKS [alpha-numeric]

Any important information or comments not included above may be given here as well as short references to related publications. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

EE - MASS BALANCE

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in order to report glacier mass balance data with values related to the data given in data sheet E.

EE1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

EE2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

EE3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS database (cf. "A3 - WGMS ID").

EE4 - YEAR [*year*]

Year of present survey.

EE5 - LOWER BOUNDARY OF ALTITUDE INTERVAL [*m a.s.l.*]

If refers to entire glacier, then lower bound = 9999.

EE6 - UPPER BOUNDARY OF ALTITUDE INTERVAL [*m a.s.l.*]

If refers to entire glacier, then lower bound = 9999.

EE7 - ALTITUDE INTERVAL AREA [*km²*]

Area of each altitude interval (in horizontal projection).

EE8 - SPECIFIC WINTER BALANCE [*mm w.e.*]

Specific means the total value divided by the total glacier area under investigation. Specific winter balance equals the net winter balance divided by the total area of the glacier.

EE9 - SPECIFIC WINTER BALANCE ACCURACY [*mm w.e.*]

Estimated maximum error for specific winter balance.

EE10 - SPECIFIC SUMMER BALANCE [*mm w.e.*]

Specific means the total value divided by the total glacier area, in this case, it is the net summer balance divided by the total area of the glacier.

EE11 - SPECIFIC SUMMER BALANCE ACCURACY [*mm w.e.*]

Estimated maximum error for specific winter balance.

EE12 - SPECIFIC ANNUAL BALANCE [*mm w.e.*]

Annual mass balance of glacier divided by the area of the glacier.

EE13 - SPECIFIC ANNUAL BALANCE ACCURACY [*mm w.e.*]

Estimated maximum error for specific annual balance.

EE14 - REMARKS [*alpha-numeric*]

Any important information or comments not included above may be given here. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

EEE - MASS BALANCE POINT

NOTES ON THE COMPLETION OF THE DATA SHEET

This data sheet should be completed in order to report point mass balance data with values related to the data given in data sheets E and EE.

EEE1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

EEE2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

EEE3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS database (cf. "A3 - WGMS ID").

EEE4 - YEAR [*year*]

Year of present survey.

EEE5 - POINT ID [*alpha-numeric; 4 digits*]

4 digit key identifying the stake or pit.

EEE6 - POINT LATITUDE [*decimal degree North or South; up to 6 digits*]

Latitude of stake or pit given in decimal degrees, positive values indicating the northern hemisphere and negative values indicating the southern hemisphere.

Latitude should be given to a maximum precision of 4 decimal places.

EEE7 - POINT LONGITUDE [*decimal degree East or West; up to 7 digits*]

Longitude of stake or pit given in decimal degrees, positive values indicating east of zero meridian and negative values indicating west of zero meridian.

Longitude should be given to a maximum precision of 4 decimal places.

EEE8 - POINT ELEVATION [*m a.s.l.*]

Elevation above sea level of stake or pit.

EEE9 - POINT WINTER BALANCE [*mm w.e.*]

Winter mass balance at stake or pit.

EEE10 - POINT SUMMER BALANCE [*mm w.e.*]

Summer mass balance at stake or pit.

EEE11 - POINT ANNUAL BALANCE [*mm w.e.*]

Annual mass balance at stake or pit.

EEE12 - REMARKS [*alpha-numeric*]

Any important information or comments not included above, such as measured or estimated density of snow/firn/ice, may be given here.

F - SPECIAL EVENT

NOTES ON COMPLETION OF THE DATA SHEET

This data sheet should be completed in cases of extraordinary events, especially concerning glacier hazards and dramatic changes in glaciers.

F1 - POLITICAL UNIT [*alphabetic code; 2 digits*]

Name of country or territory in which glacier is located (cf. "A1 - POLITICAL UNIT").

F2 - GLACIER NAME [*alpha-numeric code; up to 30 digits*]

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A2 - GLACIER NAME".

F3 - WGMS ID [*numeric code; 5 digits*]

5 digit key identifying glacier in the WGMS database (cf. "A3 - WGMS ID").

F4 - EVENT DATE [*numeric; 8 digits*]

Date of event.

For each event, please indicate the complete date in numeric format (YYYYMMDD).

Missing data: For unknown day or month, put "99" in the corresponding position(s) and make a note under "F6 - EVENT DESCRIPTION".

For events lasting for several days, please indicate the date of the main event, and describe the sequence of the event under "F6 - EVENT DESCRIPTION".

F5 - EVENT TYPE [*binary code; 6 digits*]

Indicate the involved event type(s) using 1 = event type involved and 0 = event type not involved for the following event types:

F5a - GLACIER SURGE

F5b - CALVING INSTABILITY

F5c - GLACIER FLOOD (including debris flow, mudflow)

F5d - ICE AVALANCHE

F5e - TECTONIC EVENT (earthquake, volcanic eruption)

F5f - OTHER

F6 - EVENT DESCRIPTION [*alpha-numeric*]

Please give quantitative information wherever possible, for example:

- Glacier surge: Date and location of onset, duration, flow or advance velocities, discharge anomalies and periodicity;

- Calving instability: Rate of retreat, iceberg discharge, ice flow velocity and water depth at calving front;

- Glacier flood (including debris flow, mudflow): Outburst volume, outburst mechanism, peak discharge, sediment load, reach and propagation velocity of flood wave or front of debris flow / mudflow;

- Ice avalanche: Volume released, runout distance, overall slope (ratio of vertical drop height to horizontal travel distance) of avalanche path;

- Tectonic event: Volumes, runout distances and overall slopes (ratio of vertical drop height to horizontal travel distance) of rockslides on glacier surfaces, amount of geothermal melting in craters, etc.

F7 - DATA SOURCE [*alpha-numeric*]

Please indicate at least one reference or source which could help the reader to locate more detailed information, or give the name(s) of contact person(s) who would be able to supply additional information.

F8 - REMARKS [*alpha-numeric*]

Any important information or comments not included above may be given here. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.

The amount and/or kind of possible destruction, particular technical measures taken against glacier hazards, or special studies carried out in connection with the event may be given.