

# 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](http://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.

**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

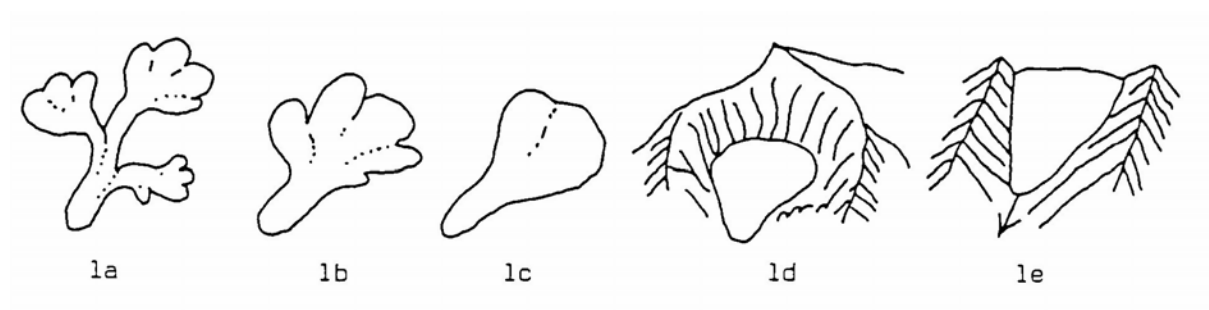
**A12a - PRIMARY CLASSIFICATION - Digit 1**

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.

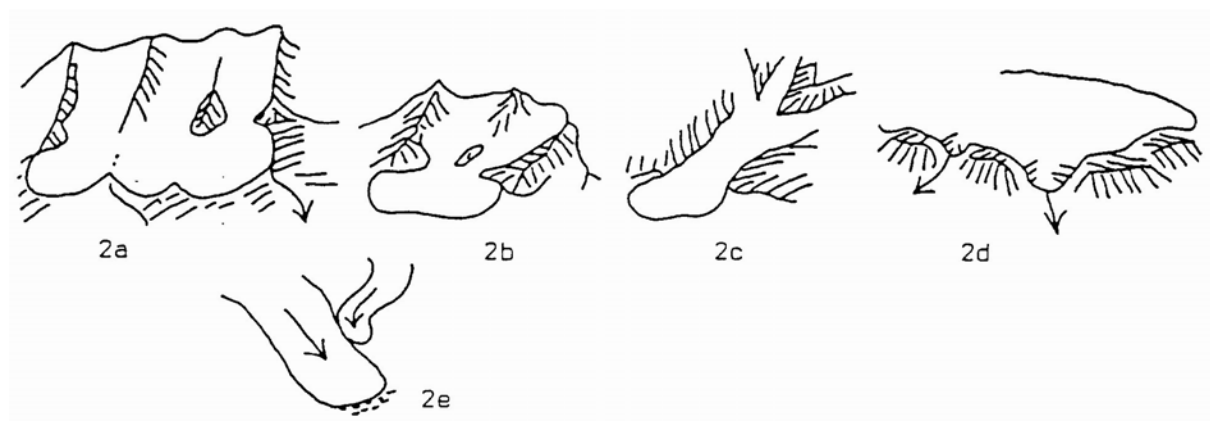
## A12b - FORM – Digit 2

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, disqualifies 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. 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 data.

**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 methods (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. Comments about the accuracy of the numerical data may be made, including quantitative comments. Only significant decimals should be given.



## 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** *[km<sup>2</sup>]*

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

**D8 - AREA CHANGE** *[1000 m<sup>2</sup>]*

Area change for each altitude interval.

**D9 - AREA CHANGE ACCURACY** *[1000 m<sup>2</sup>]*

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 m<sup>3</sup>]*

Ice volume change for each altitude interval.

**D13 - VOLUME CHANGE ACCURACY** *[1000 m<sup>3</sup>]*

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. 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 [km<sup>2</sup>]**

Accumulation area in horizontal projection.

**E16 - ACCUMULATION AREA ACCURACY [km<sup>2</sup>]**

Estimated maximum error for accumulation area.

**E17 - ABLATION AREA [km<sup>2</sup>]**

Ablation area in horizontal projection.

**E18 - ABLATION AREA ACCURACY [km<sup>2</sup>]**

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. 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** *[km<sup>2</sup>]*

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.



# R - RECONSTRUCTION SERIES

## NOTES ON COMPLETION OF THE DATA SHEET

This data sheet should be completed in cases of adding a new reconstruction series for a glacier.

For glaciers already existing in the FoG database, POLITICAL UNIT (A1), WGMS ID (A2) and GLACIER NAME (A3) are to be used in data sheets R and RR.

For new glaciers, please start by completing data sheet A: GENERAL INFORMATION.

### **R1 - POLITICAL UNIT** *[alphabetic code; 2 digits]*

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

### **R2 - 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".

### **R3 - WGMS ID** *[numeric code; 5 digits]*

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

### **R4 - REC SERIES ID** *[numeric code; 5 digits]*

Numeric key identifying the glacier reconstruction series in the WGMS data base. This key is assigned by WGMS only.

### **R5 - GRAPH** *[file name; 30 digits]*

File name, incl. format ending (e.g. JPG or TIFF), of the figure showing the reconstructed, cumulative front variation graph.

Ideally, the graph does show the best estimate of the cumulative front variation as well as curves for corresponding minimal and maximum extents as well as information on reconstruction methods and moraine defined maxima.

### **R6 - INVESTIGATOR** *[alpha-numeric]*

Name(s) of the person(s) responsible for the glacier reconstruction series.

### **R7 - LITERATURE** *[file name; 30 digits]*

Reference(s) to publications about the reconstruction series and applied methods.

### **R8 - SPONSORING AGENCY** *[alpha-numeric]*

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

### **R9 - REMARKS** *[alpha-numeric]*

Any important information or comments not included above may be given here.

# RR - REC FRONT VARIATION

## NOTES ON COMPLETION OF THE DATA SHEET

This data sheet should be completed in cases of adding a new reconstruction series for a glacier.

For glaciers already existing in the FoG database, POLITICAL UNIT (A1), WGMS ID (A2) and GLACIER NAME (A3) are to be used in data sheets R and RR.

For new glaciers, please start by completing data sheet A: GENERAL INFORMATION.

### **RR1 - POLITICAL UNIT** *[alphabetic code; 2 digits]*

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

### **RR2 - 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".

### **RR3 - WGMS ID** *[numeric code; 5 digits]*

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

### **RR4 - REC SERIES ID** *[numeric code; 5 digits]*

Numeric key identifying the glacier reconstruction series in the WGMS data base. This key is assigned by WGMS only.

### **RR5 - YEAR** *[year]*

Year of 'present' glacier state.

### **RR6 - REFERENCE YEAR** *[year]*

Previous year of reconstructed glacier state.

### **RR7 - FRONT VARIATION** *[m]*

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

Positive values: advance

Negative values: retreat

The reconstructed front variation (RR7) should mark the best estimate of the glacier extent in the corresponding year (RR5).

### **RR8 - QUALITATIVE VARIATION** *[alphabetic code; 2 digits]*

If no quantitative data are available for a particular year, but qualitative data are available, then front variation should be denoted using the following symbols.

+X : Glacier in advance

-X : Glacier in retreat

ST : Glacier stationary

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

### **RR9 - LOWEST ELEVATION** *[m a.s.l.]*

Altitude of the lowest point of the glacier.

### **RR10 - HIGHEST ELEVATION** *[m a.s.l.]*

Altitude of the highest point of the glacier.

### **RR11 - YEAR ACCURACY** *[years]*

Estimated maximum error of reported year.

**RR12 - REF YEAR ACCURACY [years]**

Estimated maximum error of reported reference year.

**RR13 - FRONT VAR POS ACCURACY [m]**

Estimated maximum positive error for front variation.

Reconstructed front variation (RR7) plus the front variation positive accuracy (RR13) should mark the maximum estimation for the glacier extent in the corresponding year (R5).

If the best estimate of the front variation corresponds to the maximum glacier extent, the FRONT VAR NEG ACCURACY is to be set to zero.

**RR14 - FRONT VAR NEG ACCURACY [m]**

Estimated maximum negative for front variation.

Reconstructed front variation (RR7) minus the front variation negative accuracy (RR14) should mark the minimum estimation for the glacier extent in the corresponding year (R5).

If the best estimate of the front variation corresponds to the minimum glacier extent, the FRONT VAR NEG ACCURACY is to be set to zero.

**RR15 - ELEVATION ACCURACY [m]**

Estimated maximum error of reported elevations.

**RR16 – MORaine DEFINED MAX [alphabetic code; 3 digits]**

Years with moraine defined positions of the glacier tongue can be marked with one of the following 3-digit codes:

MMP: moraine mainly preserved

MPE : moraine partly eroded

MME: moraine mainly eroded

Instead of a moraine, other objects with an exact location such as a large boulder or a building can indicate a precise position of the glacier tongue. In this case, the above codes are to be used with a description of the object in the remarks (RR18).

**RR17 – METHOD CODE [alphabetic code; 3 digits]**

For description of the method(s) used to reconstruct the glacier extent in the corresponding year (RR5), the following codes can be given:

HIS : historical sources (not specified)  
PAI : oil painting  
DRA : drawing  
PRT : print  
PHO : photograph  
MAP : map  
WRS : written source  
RAD : radiocarbon date  
DEN : dendrochronology  
EXD : exposure date  
REL : relative date  
COM : combined  
OTH : other

The method(s) used can be specified in more detail under METHOD REMARKS (RR18), e.g. weathering rind thickness, lichenometry or Schmidt hammer rebound for REL.

A combination of methods is to be indicated by COM; the applied methods can be listed and described under METHOD REMARKS (RR18).

**RR18 – METHOD REMARKS [alpha-numeric]**

Remarks related to the method(s) listed under METHOD CODE (RR17).

**RR19 – REMARKS [alpha-numeric]**

Any important information or comment(s) not included above may be given here.