

## **A GENERAL INFORMATION**

### **NOTES ON THE COMPLETION OF THE DATA SHEET**

#### **A1 POLITICAL UNIT**

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 WGMS ID**

5 digit key identifying glacier in the WGMS data base.

#### **A3 GLACIER NAME**

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".

#### **A4 HYDROLOGICAL CATCHMENT AREA**

Part of WGI key: Position 3 denotes the continent. Positions 4 to 7 denote the drainage basin.

#### **A5 FREE POSITION**

Part of WGI number: Positions 8 and 9 are freely chosen identification numbers.

#### **A6 LOCAL CODE**

Part of WGI number: Positions 10 to 12

#### **A7 LOCAL PSFG**

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.

#### **A8 GEOGRAPHICAL LOCATION (GENERAL)**

Refers to a very 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.

Format: max. 30 positions.

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

#### **A9 GEOGRAPHICAL LOCATION (SPECIFIC)**

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

Format: max. 30 positions.

## A10 LATITUDE

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 accuracy of 4 decimal places.

## A11 LONGITUDE

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 accuracy of 4 decimal places.

## A12 CODE

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

### A12.1 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   |

## A12.2 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 gulley 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  |



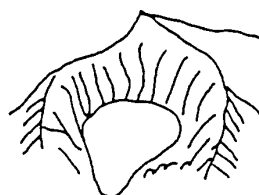
1a



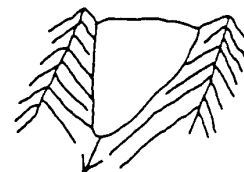
1b



1c



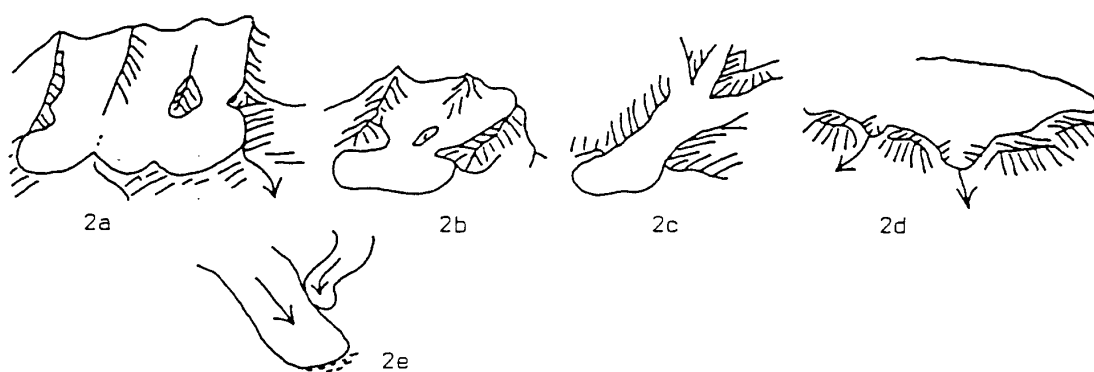
1d



1e

### A12.3 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

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

#### A14 EXPOSITION OF ABLATION AREA

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

#### A15 PARENT GLACIER

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

#### A16 REMARKS

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**

#### **B1 POLITICAL UNIT**

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

#### **B2 WGMS ID**

5 digit key identifying glacier in the WGMS data base (cf. "A2 WGMS ID").

#### **B3 GLACIER NAME**

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A3 GLACIER NAME").

#### **B4 YEAR**

Year of present survey.

#### **B5 MAXIMUM ELEVATION OF GLACIER**

Altitude of the highest point of the glacier.

#### **B6 MEDIAN ELEVATION OF GLACIER**

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

#### **B7 MINIMUM ELEVATION OF GLACIER**

Altitude of the lowest point of the glacier.

#### **B8 ELEVATION ACCURACY**

Estimated maximum error of reported elevations.

#### **B9 LENGTH**

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

#### **B10 LENGTH ACCURACY**

Estimated maximum error, in length.

#### **B11 SURVEY DATE**

Date of present survey.

For each survey, please indicate the complete date (day, month, year).

Missing data: For unknown day or month, put "01" in the corresponding position(s) and make a note under "B15 REMARKS"

## B12 SURVEY METHOD

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

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

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

## B15 REMARKS

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

#### C1 POLITICAL UNIT

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

#### C2 WGMS ID

5 digit key identifying glacier in the WGMS data base (cf. "A2 WGMS ID").

#### C3 GLACIER NAME

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A3 GLACIER NAME").

#### C4 YEAR

Year of present survey.

#### C5 FRONT VARIATION

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

Signs:

- + Advance
- Retreat

#### C6 FRONT VARIATION ACCURACY

Estimated maximum error for front variation.

#### C7 QUALITATIVE VARIATION

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

Date of present survey

For each survey, please indicate the complete date (day, month, year).

Missing data : For unknown day or month, put "01" in the corresponding position(s) and make a note under "C13 REMARKS"



### C9 SURVEY METHOD

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

Date of previous survey

For each survey, please indicate the complete date (day, month, year).

Missing data : For unknown day or month, put "01" in the corresponding position(s) and make a corresponding note under "C13 REMARKS"

### C11 INVESTIGATOR

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

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

### C13 REMARKS

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 SECTION**

### **NOTES ON THE COMPLETION OF THE DATA SHEET**

#### **D1 POLITICAL UNIT**

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

#### **D2 WGMS ID**

5 digit key identifying glacier in the WGMS data base (cf. "A2 WGMS ID").

#### **D3 GLACIER NAME**

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A3 GLACIER NAME").

#### **D4 YEAR**

Year of present survey.

#### **D5 LOWER BOUNDARY**

Lower boundary of altitude interval.

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

#### **D6 UPPER BOUNDARY**

Upper boundary of altitude interval

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

#### **D7 AREA**

Area of each altitude interval (in horizontal projection).

#### **D8 AREA CHANGE**

Area change for each altitude interval.

#### **D9 AREA CHANGE ACCURACY**

Estimated maximum error for area change.

#### **D10 THICKNESS CHANGE**

Thickness change for each altitude interval.

#### **D11 THICKNESS CHANGE ACCURACY**

Estimated maximum error for thickness change.

#### **D12 VOLUME CHANGE**

Volume change for each altitude interval.

#### **D13 VOLUME CHANGE ACCURACY**

Estimated maximum error for volume change.

#### D14 SURVEY DATE

Date of present survey

For each survey, please indicate the complete date (day, month, year).

Missing data : For unknown day or month, put “01” in the corresponding position(s) and make a corresponding note under “D19 REMARKS”

#### D15 SURVEY METHOD

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, RADAR, map comparison; please explain and add at least one reference under “D19 REMARKS”)

#### D16 REFERENCE DATE

Date of previous survey.

For each survey, please indicate the complete date (day, month, year).

Missing data: For unknown day or month, put “01” in the corresponding position(s) and make a corresponding note under “D19 REMARKS”

#### D17 INVESTIGATOR

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

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

#### D19 REMARKS

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**

#### **E1 POLITICAL UNIT**

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

#### **E2 WGMS ID**

5 digit key identifying glacier in the WGMS database (cf. "A2 WGMS ID").

#### **E3 GLACIER NAME**

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A3 GLACIER NAME").

#### **E4 YEAR**

Year of present survey.

#### **E5 TIME MEASUREMENT SYSTEM**

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

STR	Stratigraphic system
FXD	Fixed data system
COM	Combined system
OTH	Other (please explain under "E22 REMARKS")

#### **E6 BEGINNING OF SURVEY PERIOD**

Date on which survey period began.

For each survey, please give the complete date (day, month, year).

Missing data: For unknown day or month, put "01" in the corresponding position(s) and make a note under "E22 REMARKS"

#### **E7 END OF WINTER SEASON**

Date of end of winter season (day, month, year, if known).

Missing data: For unknown day or month, put "01" in the corresponding position(s) and make a note under "E22 REMARKS"

#### **E8 END OF SURVEY PERIOD**

Date on which survey period ended.

For each survey, please give the complete date (day, month, year).

Missing data: For unknown day or month, put "01" in the corresponding position(s) and make a note under "E22 REMARKS"

#### **E9 EQUILIBRIUM LINE ALTITUDE (ELA)**

Mean altitude (averaged over the glacier) of the (end of mass balance year) equilibrium line.

#### E10 EQUILIBRIUM LINE ALTITUDE ACCURACY

Estimated maximum error of ELA.

#### E11 MINIMUM NUMBER OF MEASUREMENT SITES USED IN ACCUMULATION AREA

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 MEASUREMENT SITES USED IN ACCUMULATION AREA

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 MEASUREMENT SITES USED IN ABLATION AREA

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 MEASUREMENT SITES USED IN ABLATION AREA

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

Accumulation area in horizontal projection.

#### E16 ACCUMULATION AREA ACCURACY

Estimated maximum error for accumulation area.

#### E17 ABLATION AREA

Ablation area in horizontal projection.

#### E18 ABLATION AREA ACCURACY

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

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

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

#### E22 REMARKS

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.

## **F MASS BALANCE**

### **NOTES ON THE COMPLETION OF THE DATA SHEET**

#### **F1 POLITICAL UNIT**

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

#### **F2 WGMS ID**

5 digit key identifying glacier in the WGMS database (cf. "A2 WGMS ID").

#### **F3 GLACIER NAME**

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A3 GLACIER NAME").

#### **F4 YEAR**

Year of present survey.

#### **F5 LOWER BOUNDARY OF ALTITUDE INTERVAL**

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

#### **F6 UPPER BOUNDARY OF ALTITUDE INTERVAL**

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

#### **F7 ALTITUDE INTERVAL AREA**

Area of each altitude interval (in horizontal projection).

#### **F8 SPECIFIC WINTER BALANCE**

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.

#### **F9 SPECIFIC WINTER BALANCE ACCURACY**

Estimated maximum error for specific winter balance.

#### **F10 SPECIFIC SUMMER BALANCE**

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.

#### **F11 SPECIFIC SUMMER BALANCE ACCURACY**

Estimated maximum error for specific winter balance.

#### **F12 SPECIFIC NET BALANCE**

Net balance of glacier divided by the area of the glacier.

#### **F13 SPECIFIC NET BALANCE ACCURACY**

Estimated maximum error for specific net balance.

**F14 INVESTIGATOR**

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.

**F15 SPONSORING AGENCY**

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

**F16 REMARKS**

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.



## **G 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 uncommon changes in glaciers.

#### **G1 POLITICAL UNIT**

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

#### **G2 WGMS ID**

5 digit key identifying glacier in the WGMS database (cf. "A2 WGMS ID").

#### **G3 GLACIER NAME**

The name of the glacier, written in CAPITAL letters. Use the same spelling as in "A3 GLACIER NAME").

#### **G4 EVENT DATE**

Date of event.

For events lasting for several days, please indicate the date of the main event, and describe the sequence of the event under "G6. EVENT DESCRIPTION."

#### **G5 EVENT TYPE**

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

G5.1 GLACIER SURGE

G5.2 CALVING INSTABILITY

G5.3 GLACIER FLOOD (including debris flow, mudflow)

G5.4 ICE AVALANCHE

G5.5 TECTONIC EVENT (earthquake, volcanic eruption)

G5.6 OTHER

#### **G6 EVENT DESCRIPTION**

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 (i.e., ratio of vertical drop

height to horizontal travel distance) of avalanche path;

- Tectonic event: Volumes, runout distances and overall slopes of rockslides on glacier surfaces, amount of geothermal melting in craters, etc.

#### G7 DATA SOURCE

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.

#### G8 REMARKS

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.