

Winter snow accumulation on Swiss glaciers in 2026

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Summary

The end-of-winter snow cover on 25 glaciers (with detailed surveys on 13 glaciers) was measured within the programme Glacier Monitoring Switzerland (GLAMOS) in April and May 2026. Snow depth soundings distributed over the glacier's elevation range, and snow density measurements were performed to calculate the snow water equivalent. Winter snow accumulation on the glacier surface represents an essential variable to understand the potential impact of melting during the coming summer season. This year's results show strongly below-average snow depths on glaciers. Regional differences are evident with partly close to record-low snow amounts on glaciers in Southeastern Switzerland (Engadin) and average values only in the westernmost parts of the Bernese Oberland and Valais. Extrapolated to all Swiss glaciers, there's a winter snow deficit of 25% compared to the period 2010-2020.

Zusammenfassung

Die Schneemenge am Ende des Winters wurde im April und Mai 2026 im Rahmen des Schweizer Gletschermessnetzes (GLAMOS) auf 25 Gletschern gemessen (mit detaillierten Erhebungen auf 13 Gletschern). Daten zur Schnee-Akkumulation auf der Gletscheroberfläche über den Winter stellen eine wichtige Grundlage dar, um die möglichen Auswirkungen der Schmelze während der kommenden Sommersaison zu verstehen. Dazu wurden grossflächig verteilte Schneesondierungen über die gesamte Höhenerstreckung des Gletschers, sowie Schneedichtemessungen durchgeführt. Die Ergebnisse zeigen stark unterdurchschnittliche Schneehöhen auf Gletschern. Die Daten weisen auf regionale Unterschiede mit teilweise fast rekordtiefen Schneemengen auf Gletschern in der Südostschweiz hin. Nur im westlichsten Berner Oberland und Wallis lagen die Schneemengen nahe dem Durchschnittswert. Hochgerechnet auf alle Schweizer Gletscher ergibt sich ein Defizit von 25% weniger Winterschnee im Vergleich zum Zeitraum 2010-2020.



Snow density measurements (Grosser Aletschgletscher, left), and snow depth probing (Vadret Pers, right) in late winter 2026. Photos: L. Hösl / L. van Tricht

1. Measurements and basic approach

Within the standard observational programme of Glacier Monitoring Switzerland (GLAMOS) detailed end-of-winter measurements of winter snow accumulation were performed on 13 glaciers in April and early May 2026 (Fig. 1). In addition, snow depth surveys with a reduced effort were conducted on 12 glaciers, resulting in a total of 25 glaciers throughout Switzerland with information on winter snow accumulation. The aim is to determine the glacier-wide winter mass balance, and thus to prolong multi-decadal series of this quantity which is crucial for understanding the effects of shifts in meteorological forcing on glacier mass change. Winter snow accumulation recharges glacier mass if it persists over the summer season. Furthermore, it refers to the protective layer of the ice and, hence, is an important quantity to estimate the potential impact of subsequent summer melting on annual mass balance, or overall ice volume loss.

Long-term measurement programmes are ongoing on the surveyed glaciers. The measurements of winter mass balance, with a spatial coverage of the entire glacier surface, has however only been intensified about 20 years ago. As snow depth shows strong small-scale spatial variability, a dense coverage of local measurements is needed to capture the spatial distribution and total snow mass deposited on the glacier surface. Typically, 50 to 200 individual snow depth measurements, consisting of 2-3 snow soundings at each point, are acquired (Appendix A.1, A.2). Bulk density of the entire snow column down to the ice/firn surface is determined at 1-5 sites per glacier. The number of these measurements depends on the glacier's elevation range and are acquired by coring (GLAMOS, 2021). Subsequently, all snow depth observations are converted to water equivalent and are spatially extrapolated to the scale of the entire glacier using a model-based approach that is optimally considering the spatial variability and inhomogeneities in sampling (Huss et al., 2021; GLAMOS, 2025, GLAMOS, 2026). This approach also resolves the daily glacier-wide mass balance and thus allows determining the dates of the late-summer minimum surface, as well as a homogenization of the results to common and thus comparable dates. Here, 30 April is considered as a reference date for the end of winter.

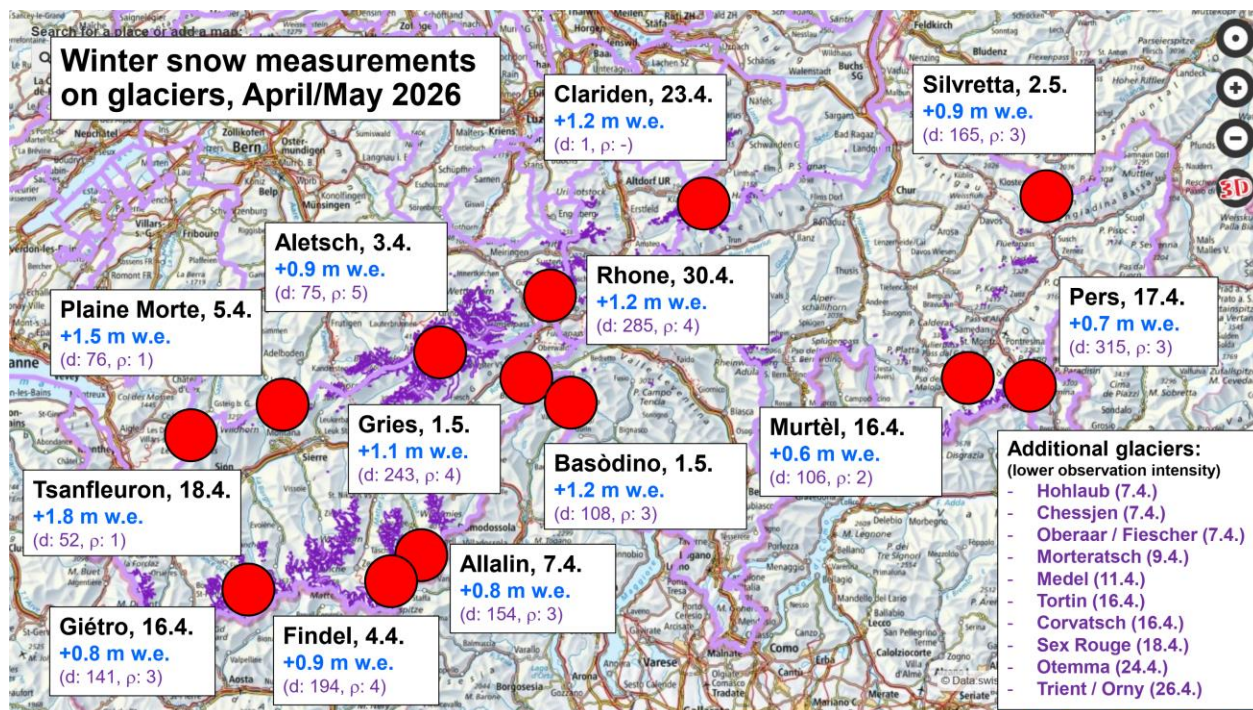


Figure 1: Overview of winter snow accumulation measurements performed on Swiss glaciers in April and May 2026. For all visited glaciers the date of the survey, as well as the glacier-wide winter mass balance (blue) is given. The number of snow depth soundings (d) and the number of snow density survey points (ρ) is stated in purple.

The observations were started in early April and could be completed already in the first days of May (Fig. 1), even though final surveys on two glaciers are still pending. Measurement conditions in April 2026 were characterized by optimal weather and generally low snow depth. The snow cover was rather poorly consolidated at most sites and did not exhibit significant ice layers that would make the measurements more laborious. Throughout the entire month of April, no major snow fall event occurred and melting on the glacier tongues started unusually early due to high air temperatures. In 2026, recently implemented winter measurement programmes were consolidated, e.g. on Glacier du Giétro and Gletscher da Medel. In addition to the main monitoring sites, several glaciers with additional snow depth measurements, mostly related to short-term projects or private initiatives, could be included in the evaluations for the first time in 2026 (e.g. Oberaargletscher, Glacier du Trient).

2. Results

Summary figures for all investigated glaciers are shown and interpreted below. The Appendix contains glacier-specific figures allowing in-depth insights regarding different variables, such as the spatial distribution of winter snow across the glacier, or the temporal dynamics of glacier mass balance.

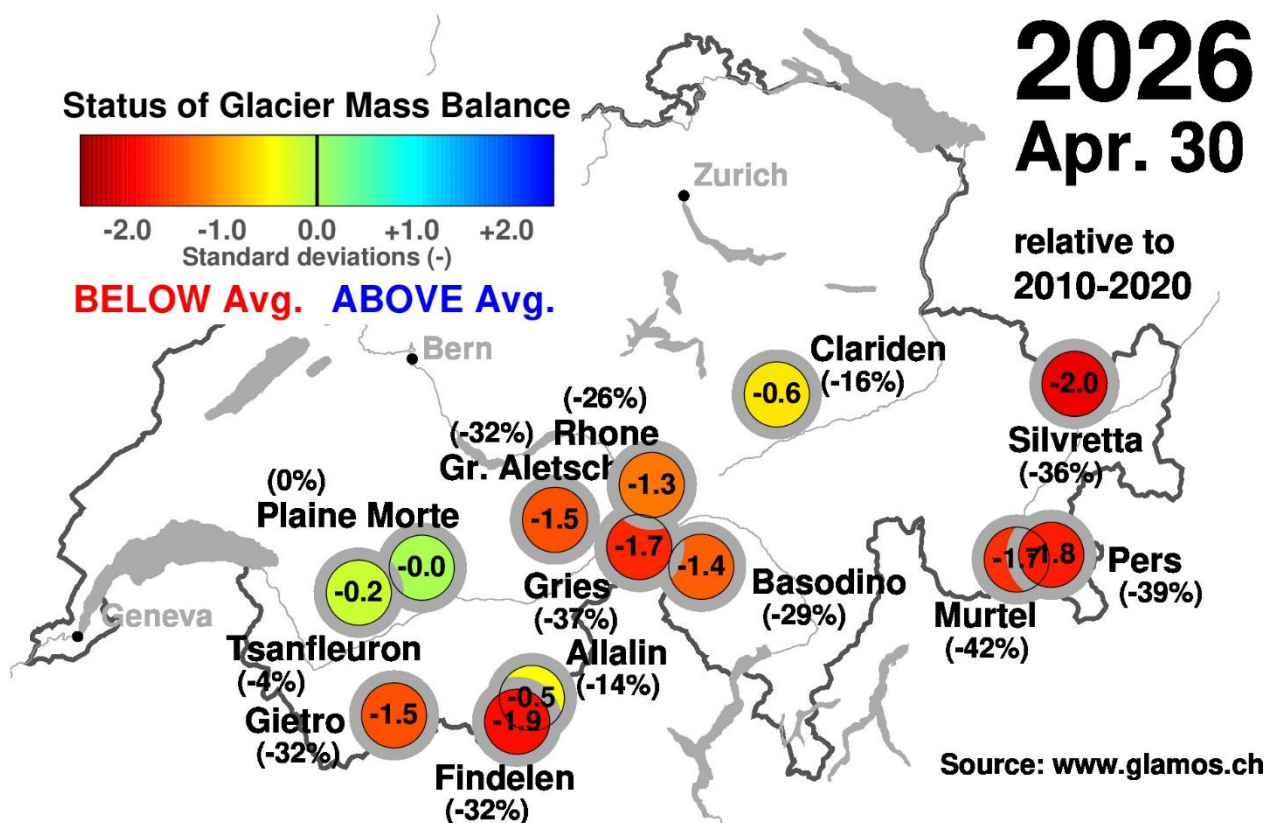


Figure 2: Anomaly of winter mass balance for all surveyed glaciers homogenized to 30 April 2026 relative to the average of the period 2010-2020 expressed in standard deviations. The difference in percent is given. Yellow-red colours indicate below-average snow conditions, and green-blue colours above-average snow conditions.

By the end of April 2026, the winter snow accumulation on glaciers was strongly below average for almost all measurement sites across the Swiss Alps (Fig. 2). Winter mass balances of between +0.6 m water equivalent (w.e.) (Murtel) to +1.8 m w.e. (Tsanfleuron) were measured (Fig. 1). In most regions this is below the observed snow amount in April/May 2025 that was also characterized by a relevant snow deficit. As absolute values of winter mass balance are difficult to be directly compared among glaciers due to

different local climates (i.e. precipitation totals), we compare the individual glaciers' deviation from the decadal average (2010-2020). These anomalies are expressed in standard deviations, which gives insights into the frequency of occurrence. For the winter mass balance homogenized to 30 April 2026 we find that glaciers are between 0.0 and 2.0 standard deviations below their respective mean values, with a median of -1.5 standard deviations (Fig. 2). With respect to 2010-2020 this corresponds to a difference of winter snow of between 0% to -42% . Even though for many glaciers these values do not reach the minimal winter snow accumulation in the very dry winters of 2022 and 2023, a new record-low winter balance has been registered for glaciers in the Engadin (Pers, Murtèl), and other glaciers (e.g. Grosser Aletsch, Rhone, Silvretta) are close to the lowest snow depth observed since the year 2000 (Appendix A.4).

A trend from Northwest to the Southeast is visible, related to the prevailing weather patterns in the winter of 2025/2026 (Fig. 2). Only glaciers in the western Bernese Oberland and the westernmost Valais (Plaine Morte, Trient, Tsanfleuron, Sex Rouge) show winter mass balances close to the 2010-2020 average. On all other glaciers, winter balance is moderately to strongly below the long-term average with 15 to 40% less winter snow accumulation than usual. This pertains to glaciers in the Southern and Eastern Valais (e.g. Findel, Giétro, Gries, Grosser Aletsch, Rhone), the Central Swiss Alps (Clariden), the Ticino (Basódino), and Eastern and Southeastern Switzerland (Silvretta, Pers, Murtèl) with the most pronounced snow deficit. In comparison to previous years the deficit is partly also explained by the warm and dry month of April that resulted in a net mass loss on some glaciers instead of the typical continuation of the snow accumulation phase (Fig. 3, Appendix A.5).

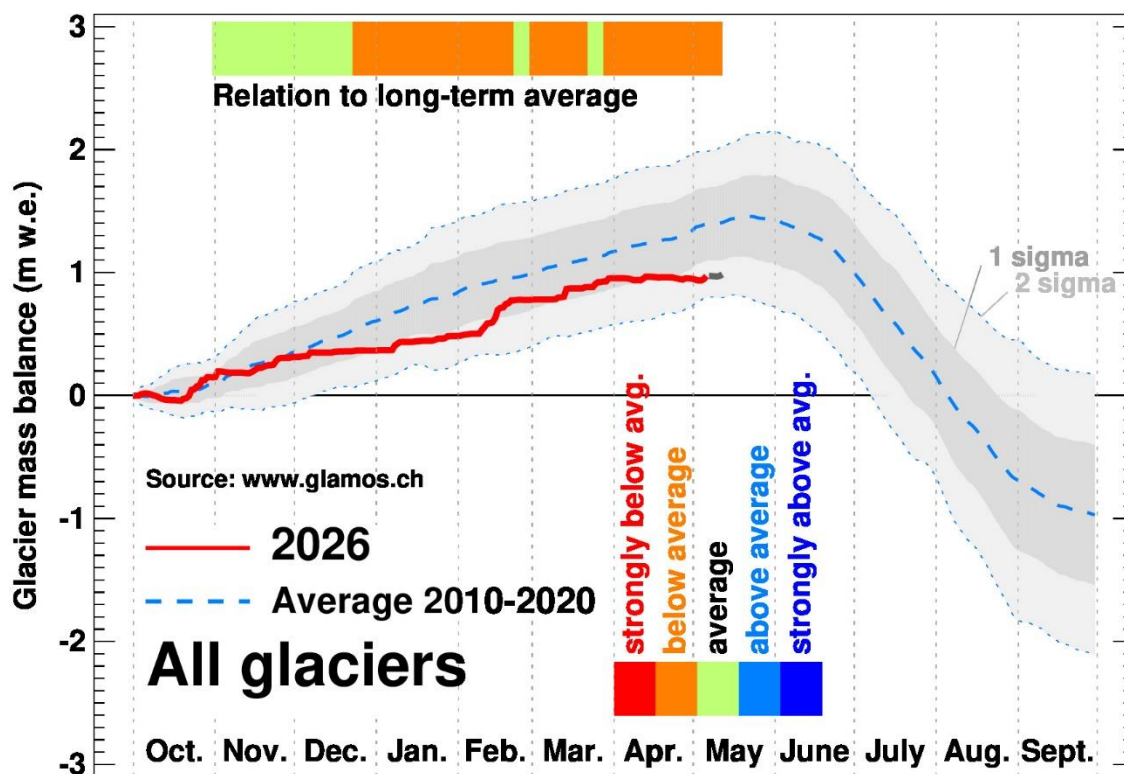


Figure 3: Cumulative daily mass balance for Swiss glaciers in the hydrological year 2026 up to the release date of the report (red) in comparison to the average and the spread of the years 2010-2020. Results based on the 6-day weather forecast are in grey. The top bar indicates periods throughout the year with below- or above-average mass balance. Here, the arithmetic average of the main surveyed glaciers (Fig. 1) is shown. Note that the series are referenced to the start of the hydrological year (1 Oct). Snow accumulation in September thus leads to apparent shifts of the snow signal in overall cumulative daily mass balance in this visualization.

The temporal evolution of the winter snow accumulation on glaciers was characterized by an early onset with snow precipitation down to the glacier termini in the second half of September 2025. Warm and sunny weather then prevailed until late October resulting in sustained ice ablation below ca. 2600 m a.s.l. while the higher reaches of the glaciers remained snow-covered. For most glaciers, the late-summer minimum of glacier mass balance occurred around 22 September 2025. The growth of snow cover on glaciers started deviating negatively from the normal trend in December and the snow deficit grew during a dry period until mid-February (Fig. 3). Thanks to substantial and repeated snow fall events in February and March, average snow depth conditions were approached in some regions of Switzerland, e.g. in the Southern Valais and the Bernese Alps (see Appendix A.5). The almost absent net snow accumulation and onsetting melt in early April however brought the year 2026 to the level of the driest winters of the recent decades (e.g. 2011, 2022, 2023).

When extrapolating the winter snow accumulation anomalies homogenized to 30 April 2026 to all 1'300 glaciers in the Swiss Glacier Inventory (Linsbauer et al., 2021), thus accounting for differences in regional sampling density, we find a strongly below-average winter mass balance on Swiss glaciers (Fig. 4). We do not extend this regional-scale analysis beyond the year 2005, as the spatial density of measurements was too low before. For 2026, 25% less winter snow was present on glaciers relative to the period 2010-2020 on the Swiss-wide scale. This value ranks 4th over the last two decades and is expected to unfold its impact on glacier mass balance via earlier disappearance of the protective snow cover during the coming summer. Notably, the two recent years with comparably low winter snow cover – 2022 and 2023 – resulted in record annual mass losses due to an unfavourable combination with summer heat waves (GLAMOS, 2026). The regional snow deficit was least pronounced in the Valais and the Rhine basin (–24%) but represents the lowest value in the Engadin (–40%).

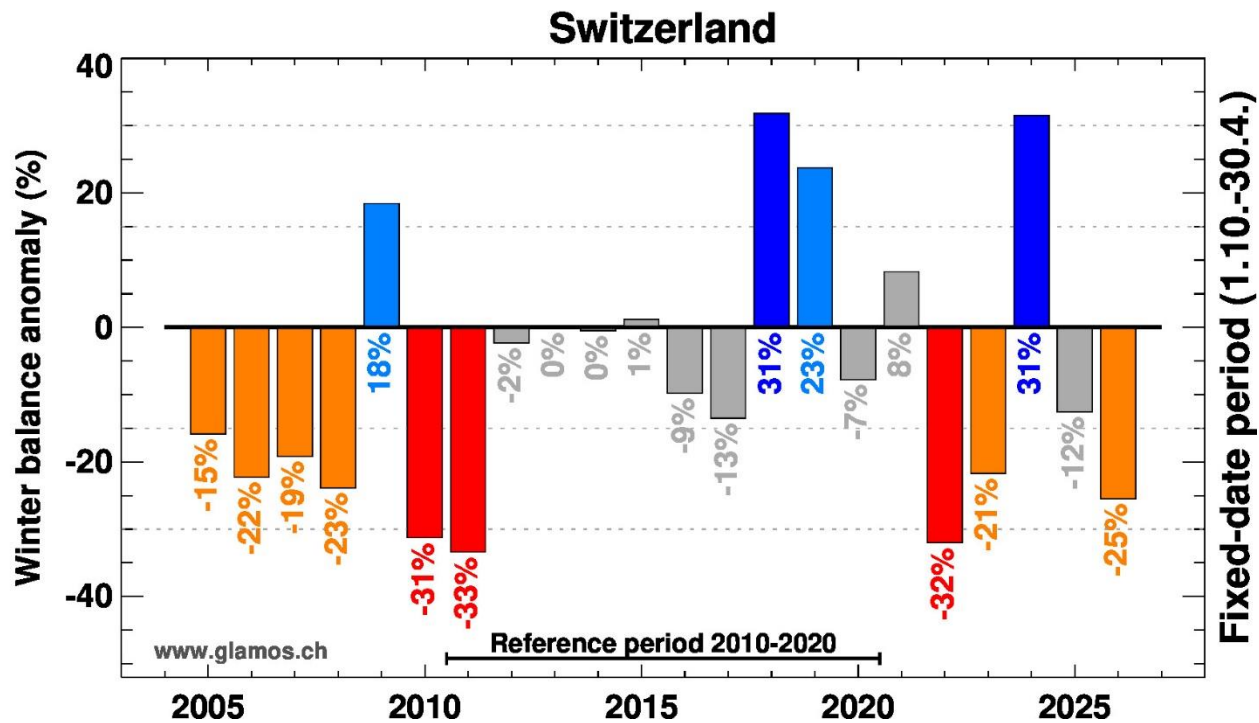


Figure 4: Relative winter snow accumulation anomaly with respect to the period 2010-2020 at the reference date 30 April extrapolated to all glaciers in Switzerland over the last two decades. Colours visualize average (grey), below-average (orange/red) and above-average (light blue/dark blue) years.

Besides snow depth and its spatial distribution, snow density is an important variable to determine the winter mass balance of glaciers. Long-term records of end-of-winter snow density indicate substantial temporal variations, even though the measurements have always been acquired at roughly the same time of the year (Fig. 5). Measured snow densities in April/May 2026 are clearly below the long-term average which is attributed to the generally low snow depths. Average snow density depends on the considered glacier (Fig. 5). This is explained by differences in overall snow depths (that generally correlate with density), as well as differences in the typical dates of the field survey for the individual sites.

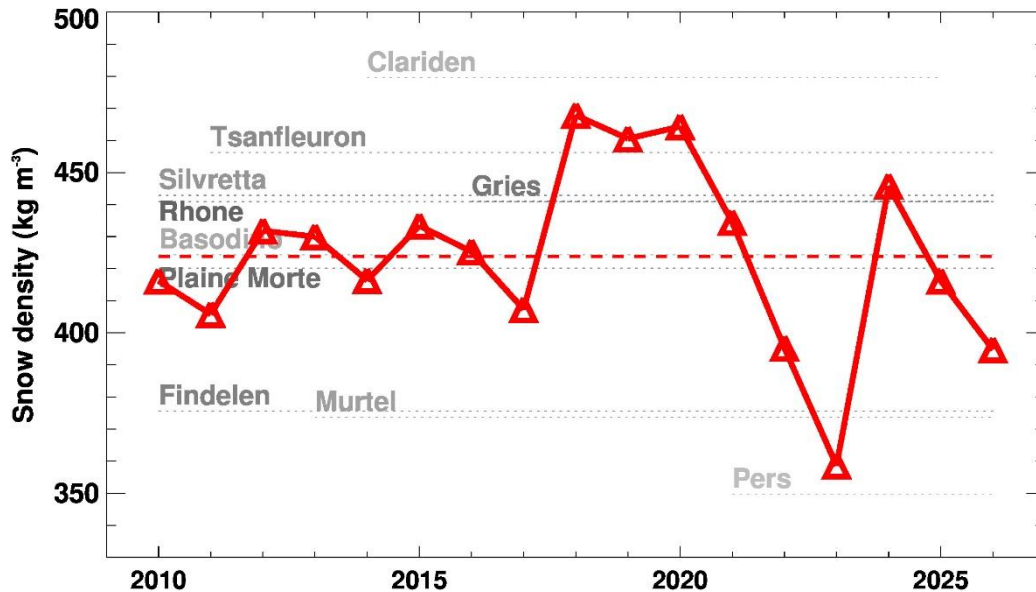


Figure 5: Measured variations in average snow density since the year 2010 for selected glaciers. The red line/symbols show the mean of all glaciers, and the grey, dotted lines refer to the overall average density and the temporal data coverage of individual glaciers.

Funding

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3. Appendix

A.1 Spatial distribution of winter mass balance

The figures below show the extrapolated winter mass balance distribution in metres water equivalent (m w.e.) at the observation date. Measurement points of snow depth are indicated with black solid dots. The spatial extrapolation accounts for processes of local snow redistribution. Glaciers are ordered alphabetically.

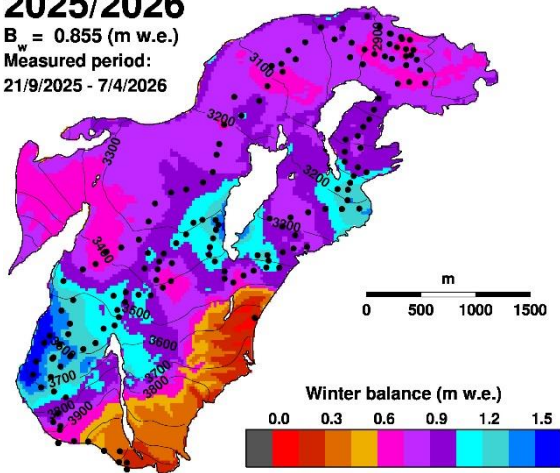
ALLALINGLETSCHER

2025/2026

$B_w = 0.855$ (m w.e.)

Measured period:

21/9/2025 - 7/4/2026

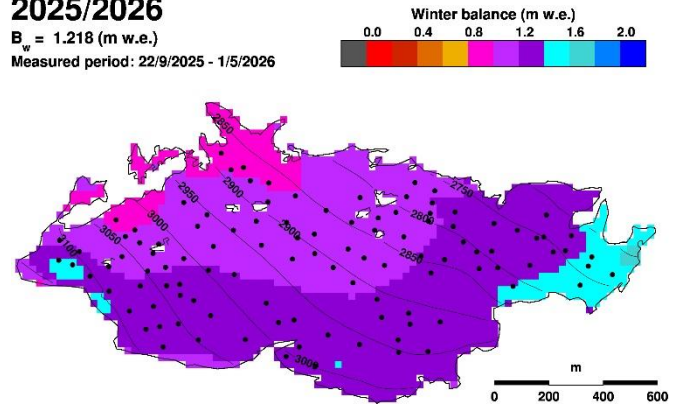


GHIACCIAIO DEL BASODINO

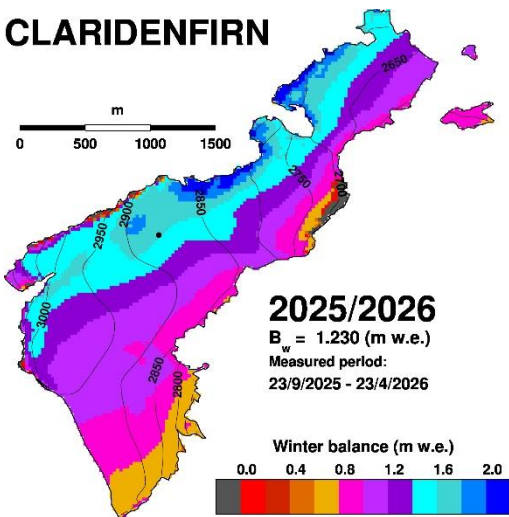
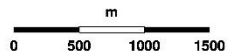
2025/2026

$B_w = 1.218$ (m w.e.)

Measured period: 22/9/2025 - 1/5/2026



CLARIDENFIRN



2025/2026

$B_w = 1.230$ (m w.e.)

Measured period:

23/9/2025 - 23/4/2026

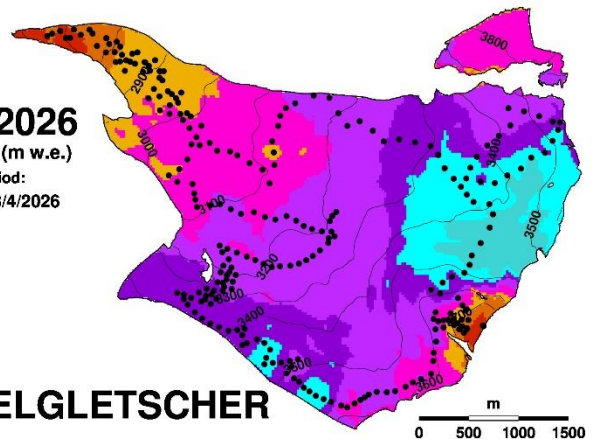
2025/2026

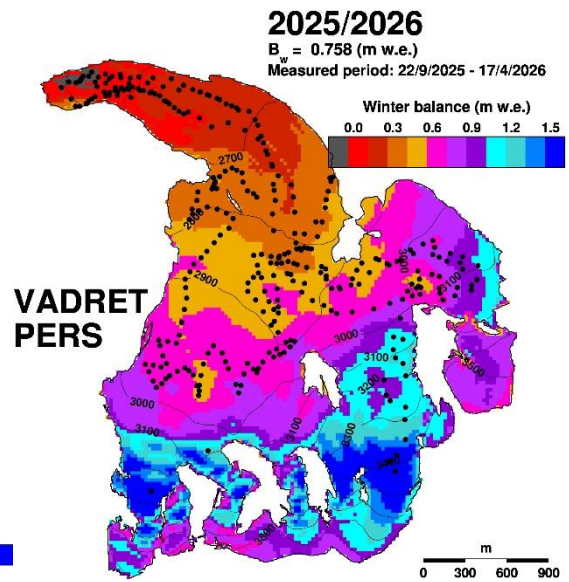
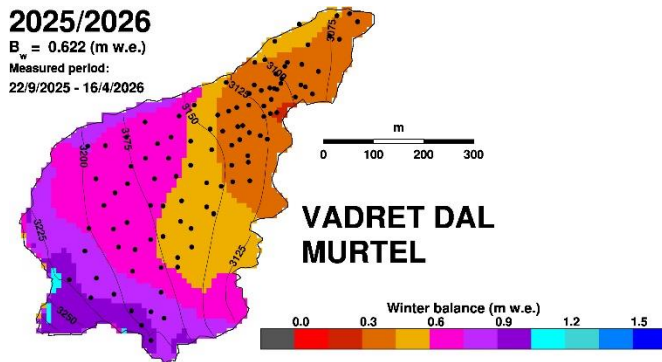
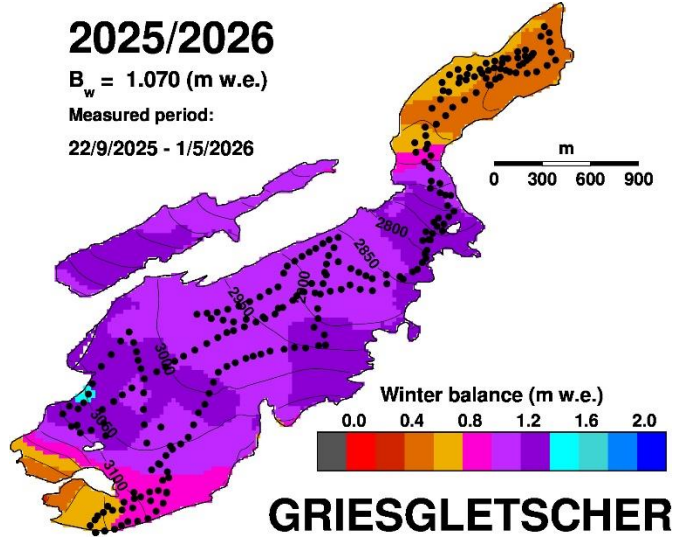
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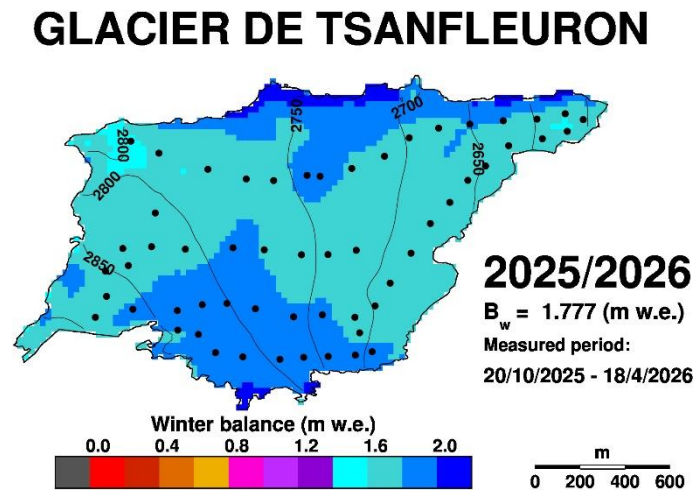
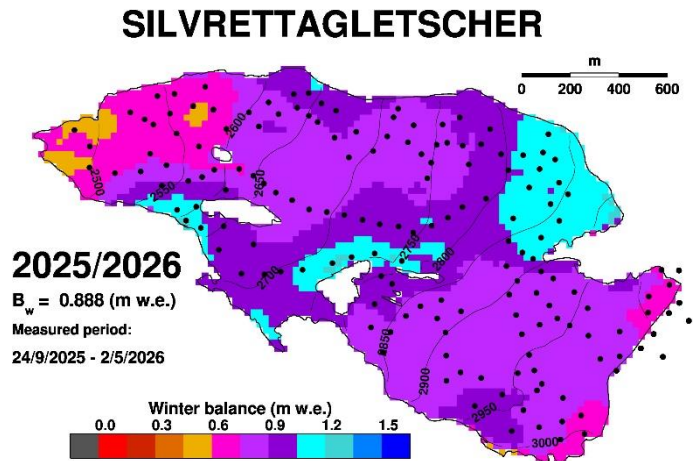
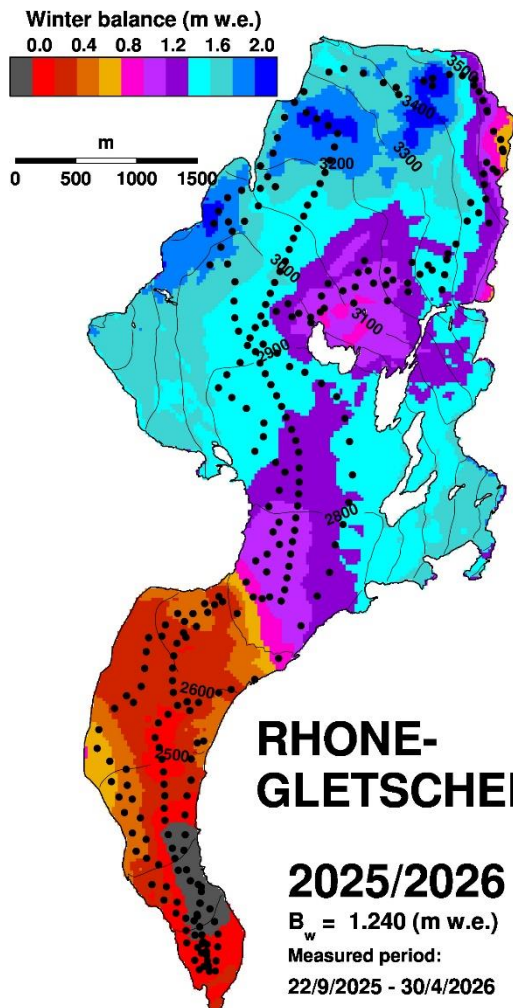
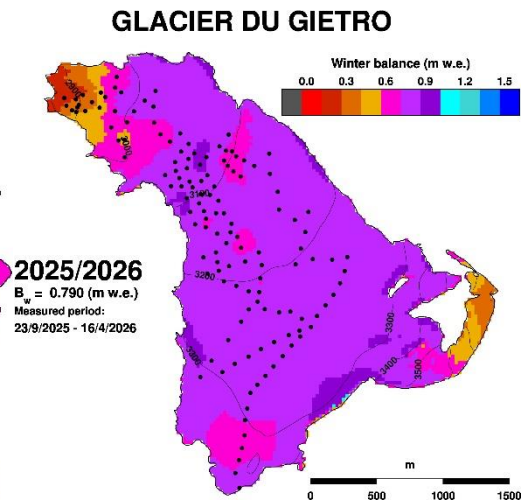
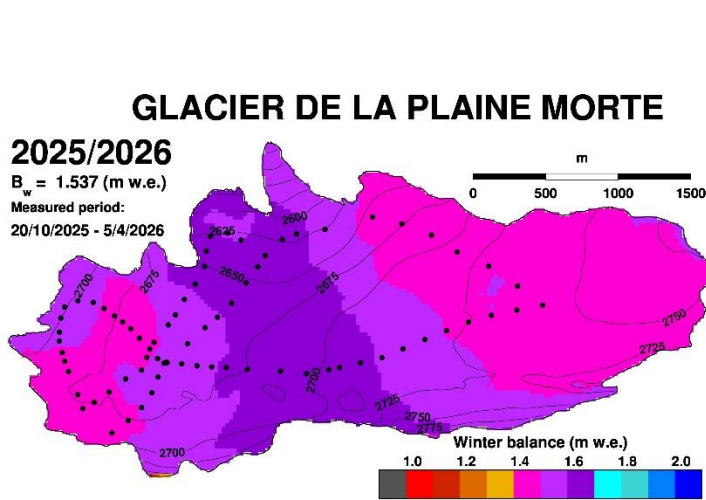
Measured period:

22/9/2025 - 8/4/2026

FINDELGLETSCHER

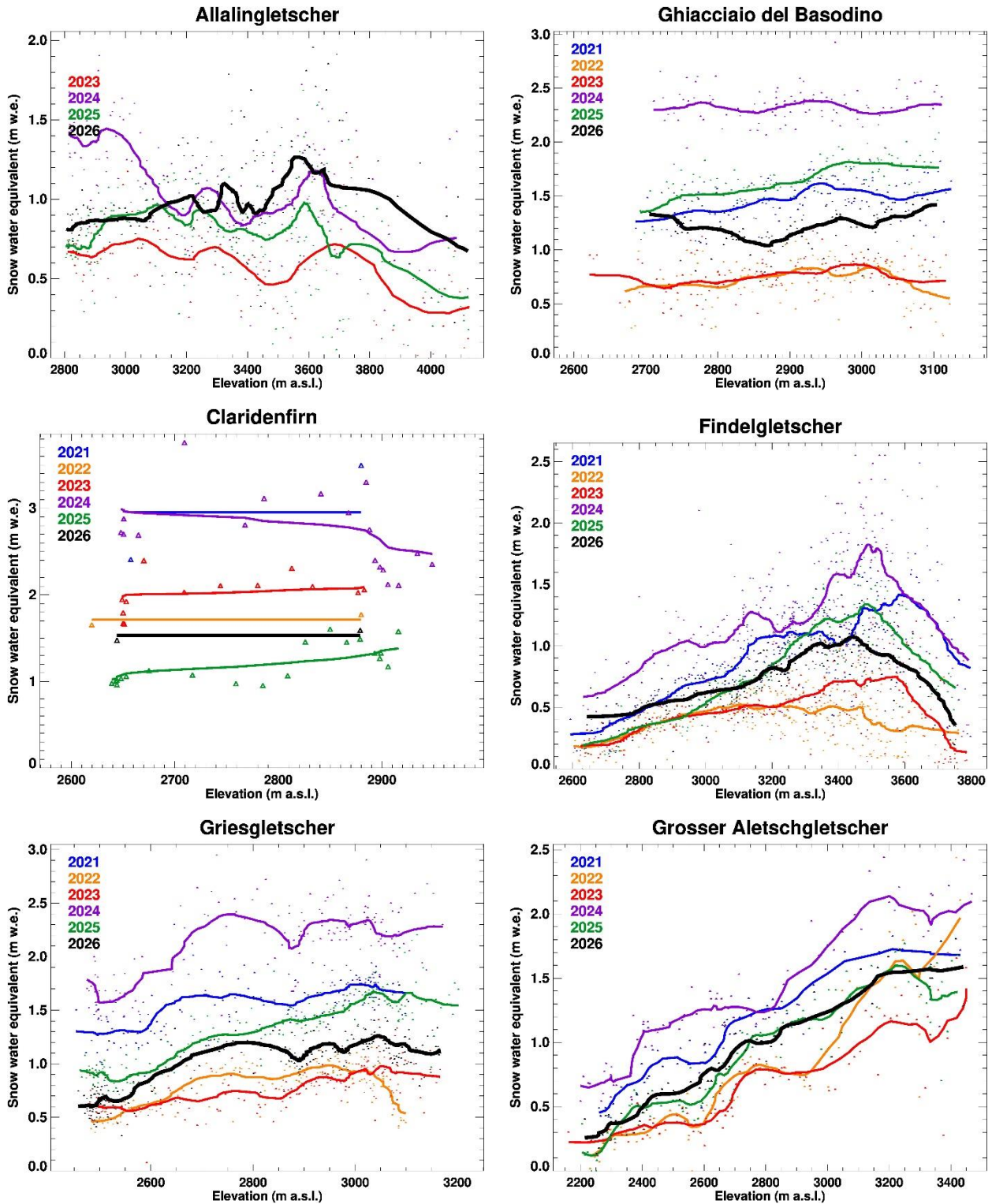


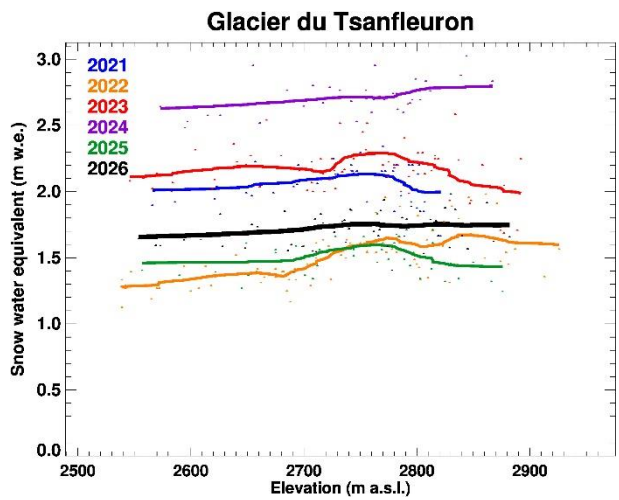
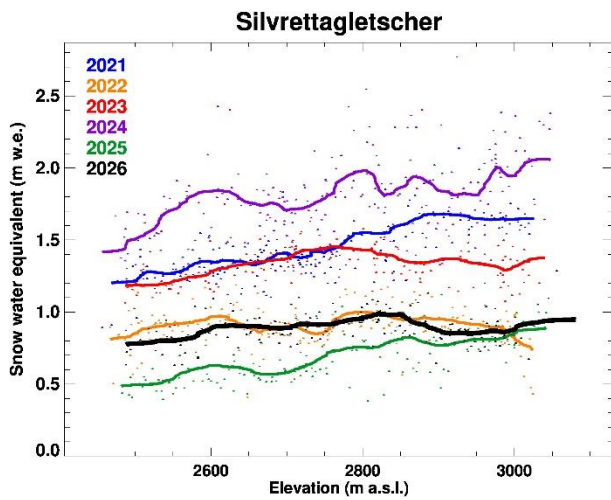
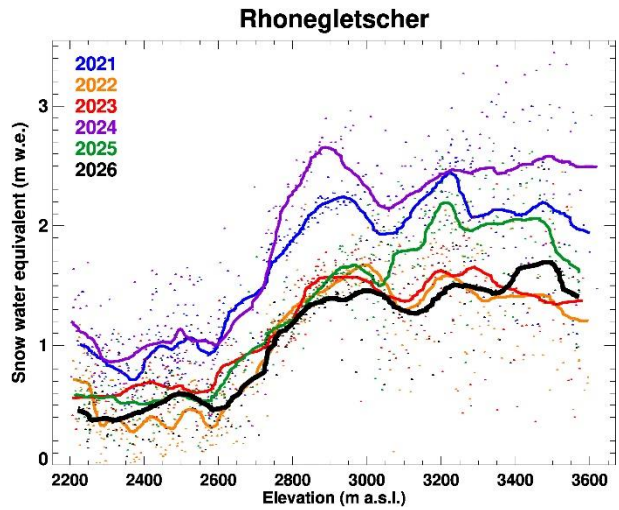
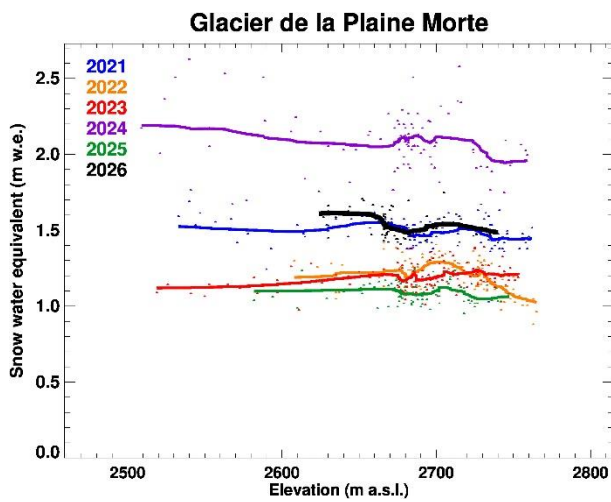
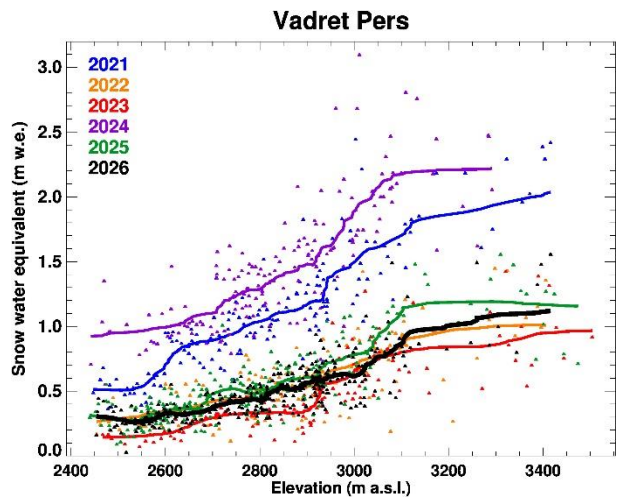
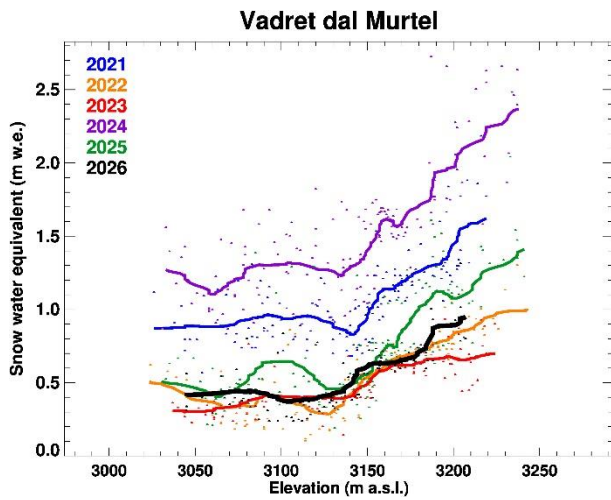




A.2 Elevation distribution of observed winter snow accumulation 2021 to 2026

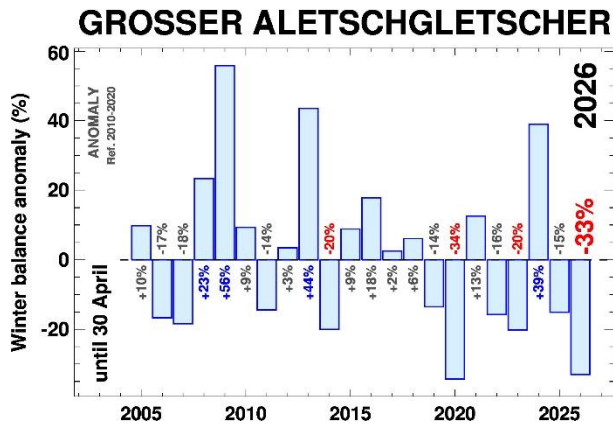
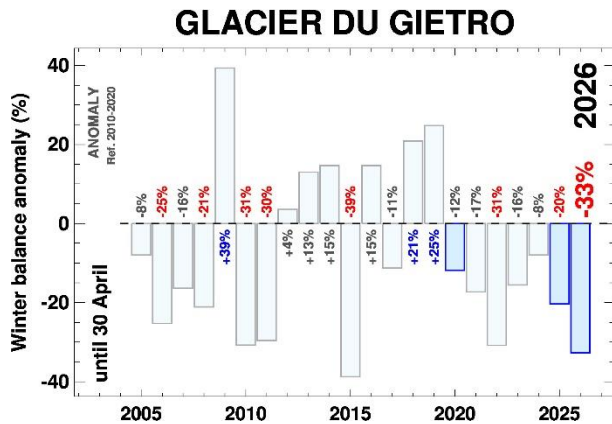
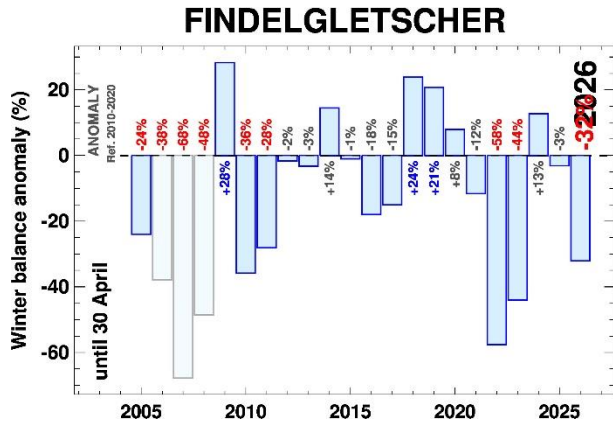
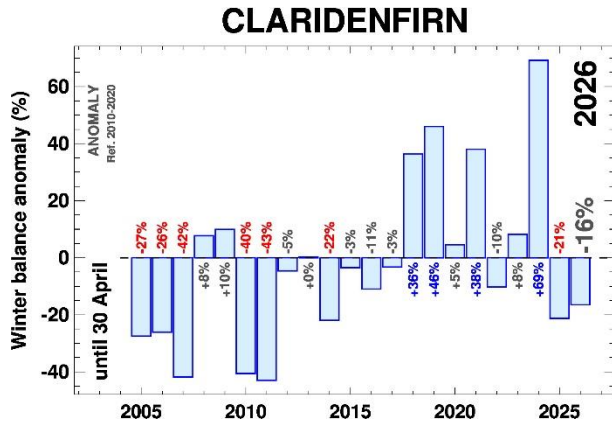
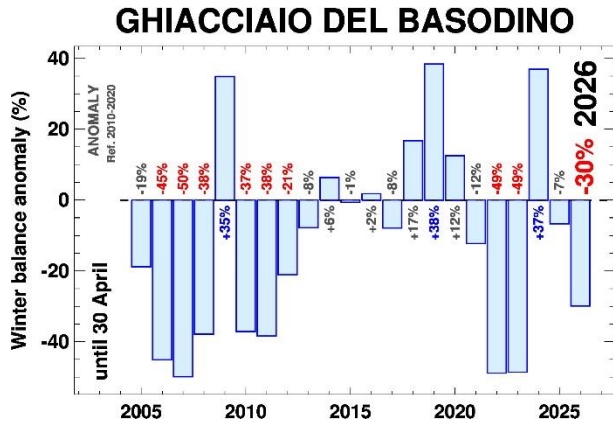
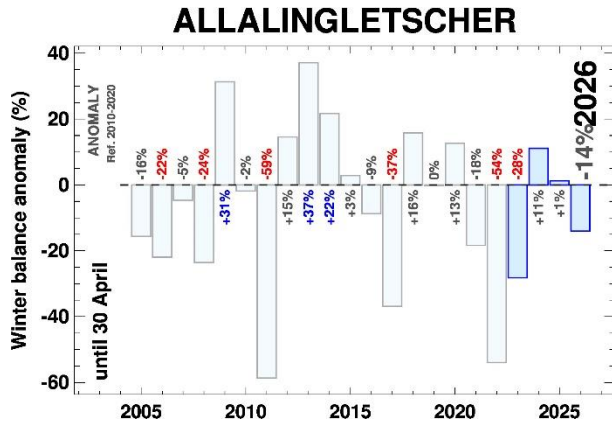
The figures below show measured local winter snow water equivalent on the glacier surface (symbols) depending on elevation over the last seven years (2021-2026, if available), smoothed with a thick line. The measurements of April 2026 are shown in black. The glaciers are alphabetically ordered.



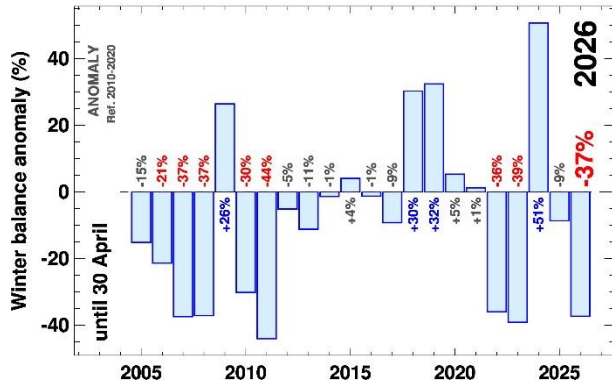


A.3 Winter mass balance anomaly homogenized to 30 April

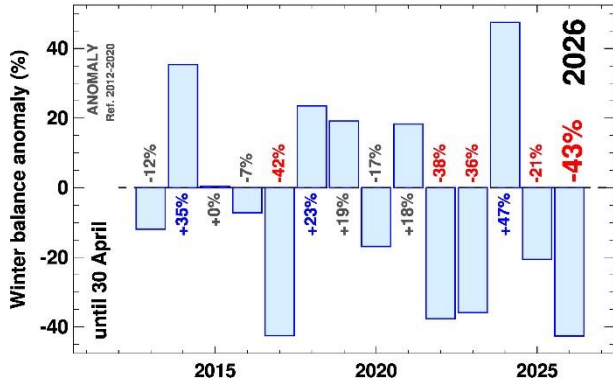
The figures below show the relative winter mass balance anomaly homogenized to 30 April of each year with respect to the measurements in the period 2010-2020. The last 20 years are displayed and the year 2026 is highlighted. Grey numbers refer to years relatively close to the average, blue numbers indicate strongly above-average years and red numbers indicate strongly below-average years, respectively. Light bars for a few glaciers show years where results are not based on in situ measurements but modelling. The glaciers are alphabetically ordered.



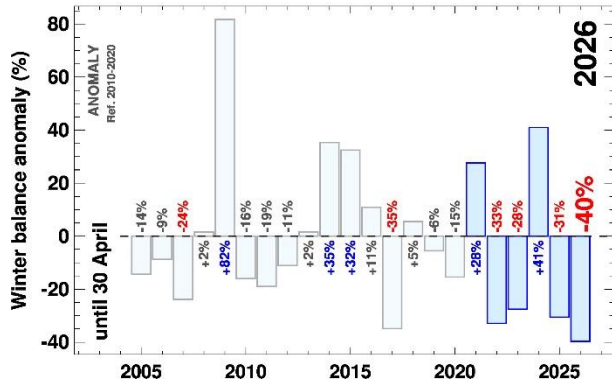
GRIESGLETSCHER



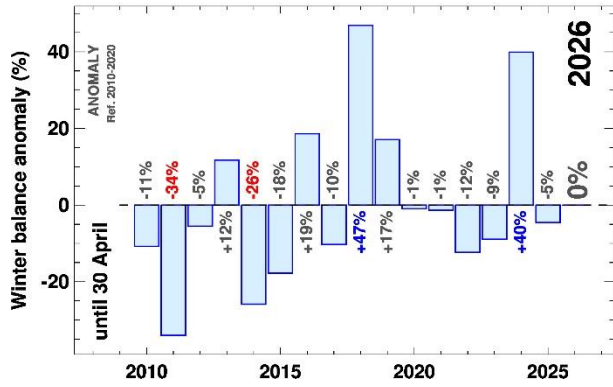
VADRET DAL MURTEL



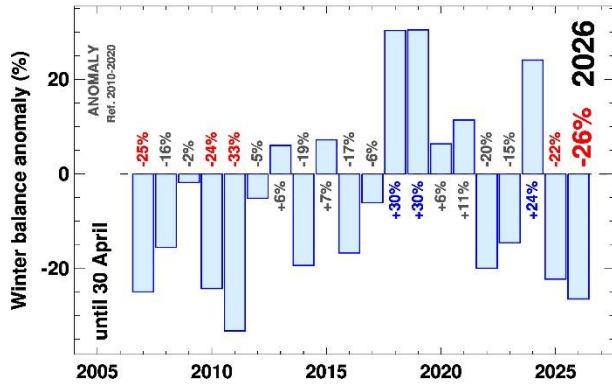
VADRET PERS



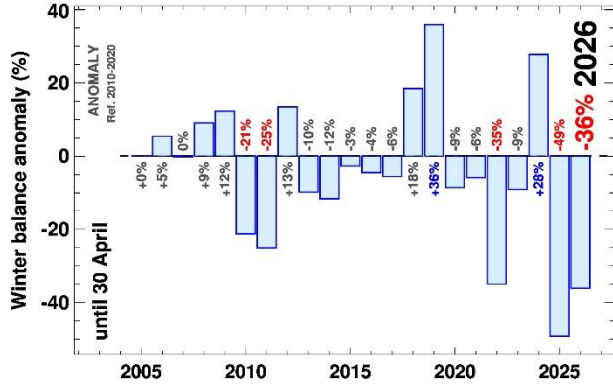
GLACIER DE LA PLAINE MORTE



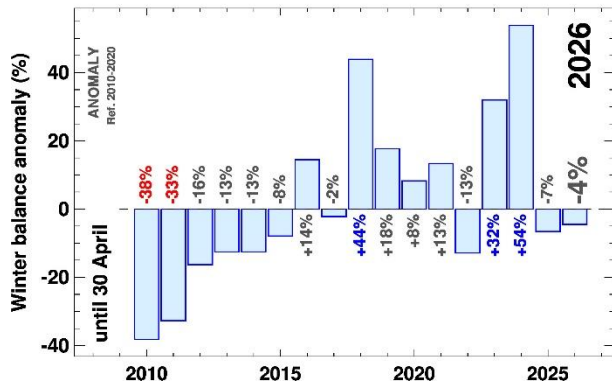
RHONEGLETSCHER



SILVRETTAGLETSCHER



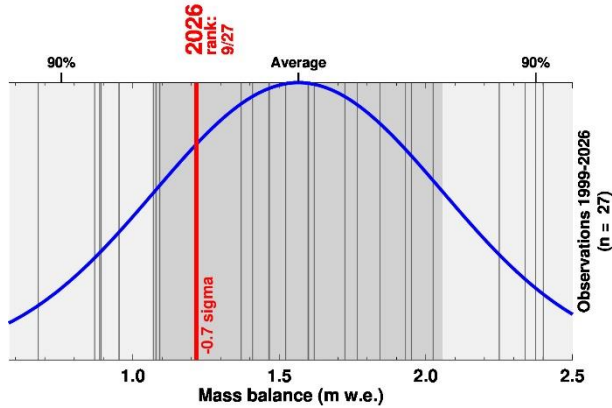
GLACIER DE TSANFLEURON



A.4 Winter mass balance 2026 compared to all years since 2000

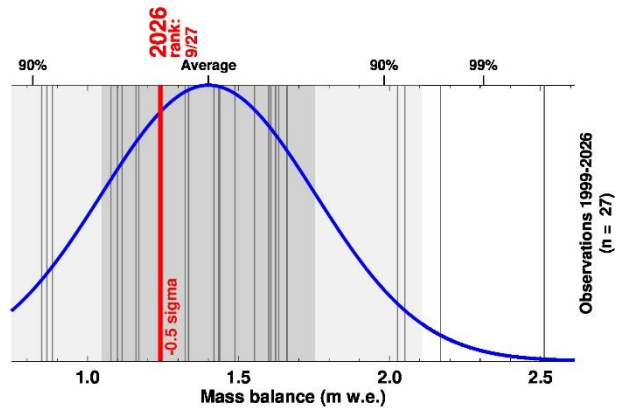
The figures below show the statistical distribution of measured glacier-wide winter mass balances since the year 2000 homogenized to 30 April (vertical lines). Ranges corresponding to 1 (dark grey) and 2 (light grey) standard deviations are shown, as are the boundaries encompassing 90% and 99% of the statistical distribution (ticks). The year 2026 is indicated with the thick, red line and the rank of 2026 starting from the least positive winter balance is given. The glaciers are alphabetically ordered.

Ghiacciaio del Basodino



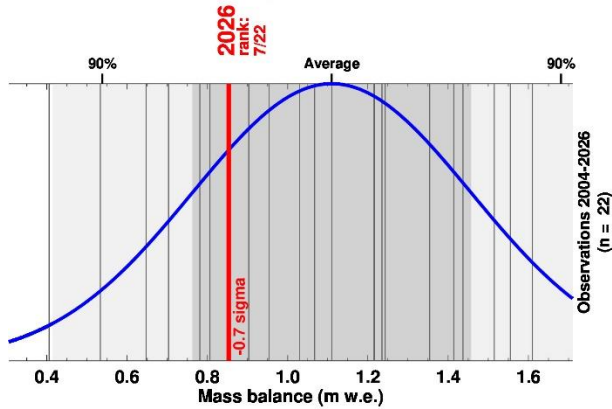
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: G. Kappenberger

Claridenfirn



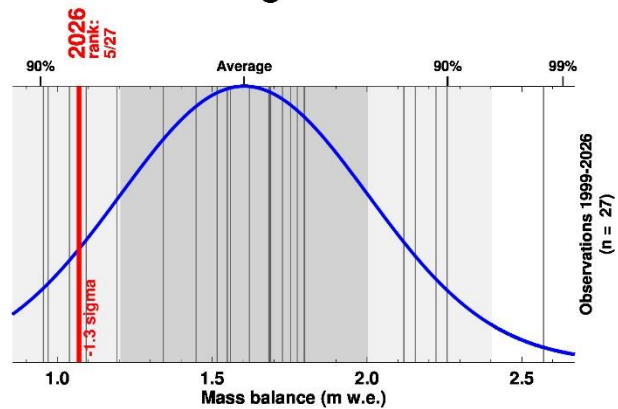
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: U. Steinegger

Findelgletscher



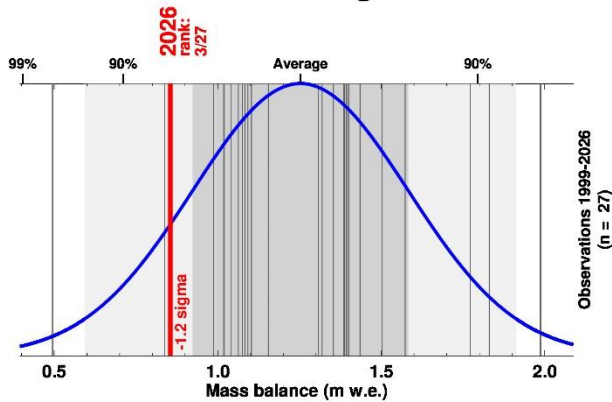
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Huss, A. Linsbauer

Griesgletscher



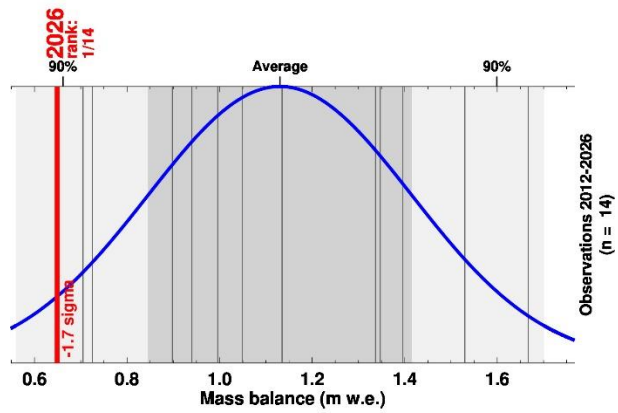
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Huss

Grosser Aletschgletscher



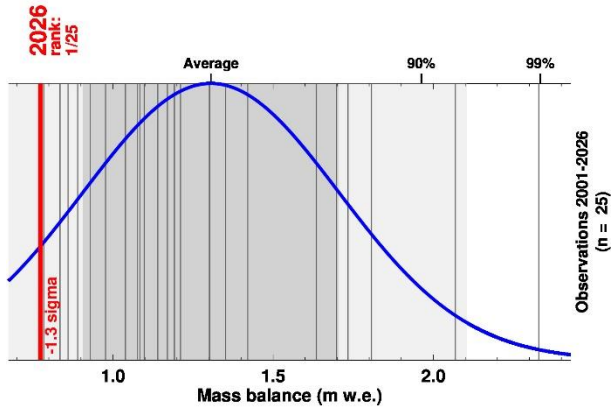
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Huss

Vadret dal Murtel



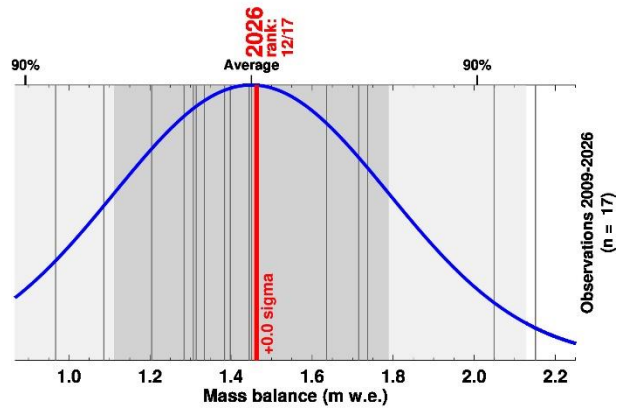
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Huss

Vadret Pers



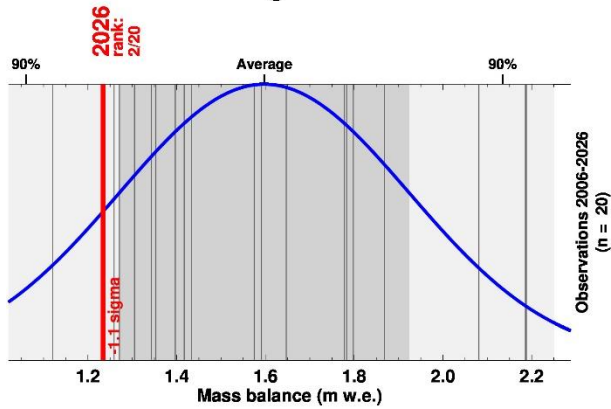
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Huss, A. Linsbauer

Glacier de la Plaine Morte



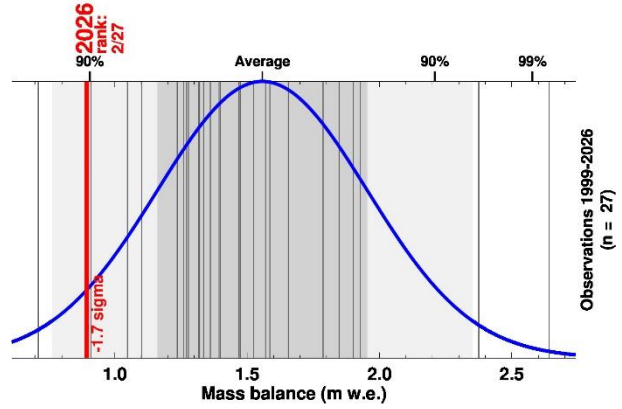
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Huss

Rhonegletscher



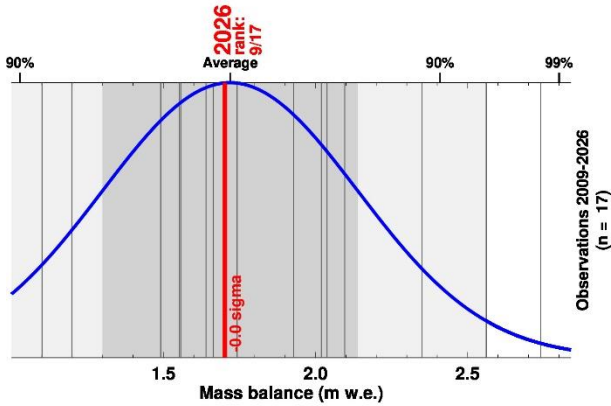
Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: A. Bauder

Silvrettagletscher



Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: A. Bauder

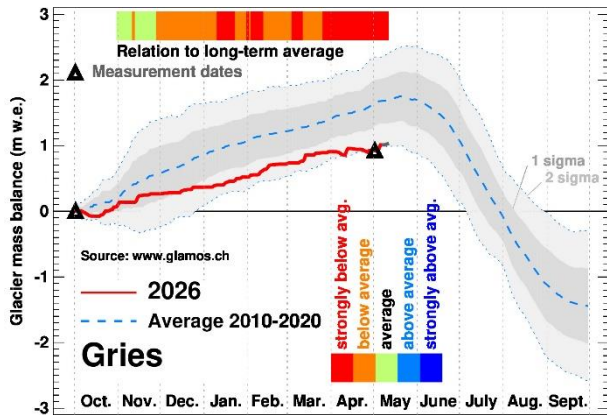
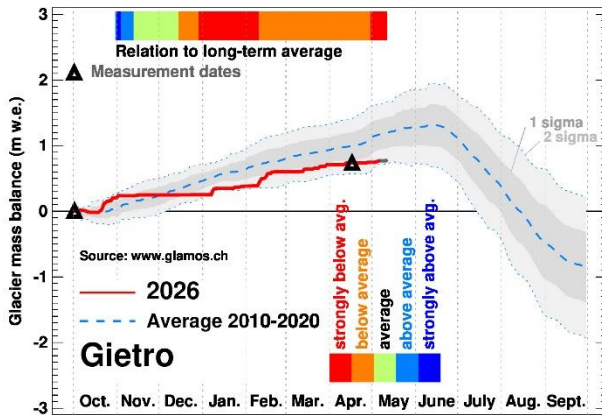
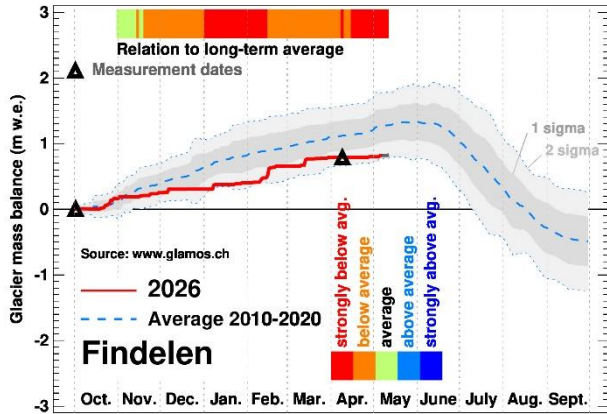
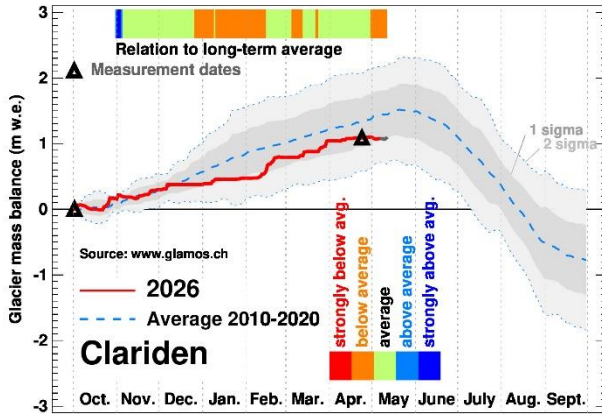
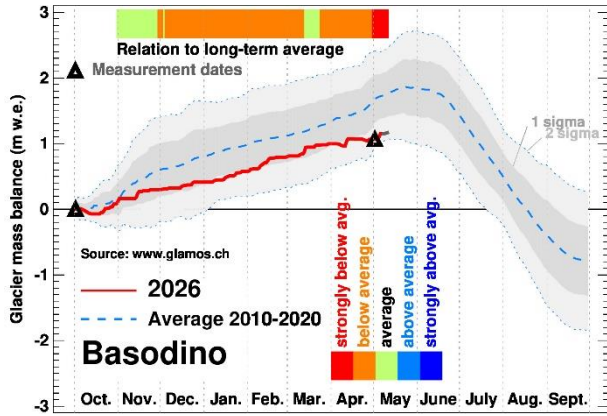
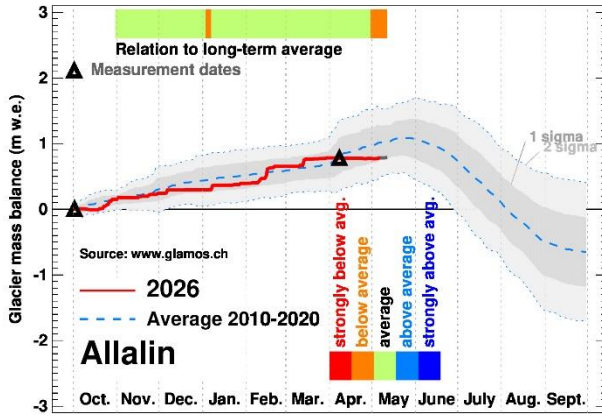
Glacier du Tsanfleuron



Glacier-wide WINTER mass balance (30.4.)
Source: www.glamos.ch; principal investigator: M. Fischer

A.5 Temporal evolution of mass balance during the hydrological year 2026

The figures below show the modelled daily cumulative mass balance in the hydrological year 2026 up to the date of the report (red line) in comparison to the average and the spread of the years 2010-2020. Data based on the 6-day weather forecast are shown in dark grey. The measurement date, by which the daily cumulative glacier-wide mass balance is constrained, is shown with a black triangle. The top bar indicates periods throughout the year with below- or above-average mass balance. The glaciers are alphabetically ordered.



Winter snow accumulation on Swiss glaciers in 2026

