



The Cold Spell That Never Happened: Climatological Assessment of the Winter 2025/26 Cold and Snowfall Episodes in Bucharest and Their Disproportionate Media Representation

Monica Ionita¹, Bogdan Antonescu^{2,3} and Viorica Nagavciuc¹

¹Alfred Wegener Institute Helmholtz Center for Polar and Marine Research, Bremerhaven, Germany

5 ²University of Bucharest, Faculty of Physics, Măgurele, Romania

³National Institute for Earth Physics, Măgurele, Romania

Correspondence: Monica Ionita (Monica.Ionita@awi.de)

Abstract

10 The winter of 2025/26 in Romania generated intense media coverage characterizing cold and snowfall episodes in Bucharest and south-eastern Romania as historically exceptional. Here, we evaluate this characterization against a multi-source climatological analysis spanning up to 148 years of instrumental records. Using daily minimum temperature data from Bucuresti Filaret station (1879–2026) and monthly mean temperatures from 65 stations across Romania, we show that both January and February 2026 were anomalously warm relative to the 1971–2000 baseline (country-mean anomalies of +2.3°C and +2.2°C, respectively), with positive temperature anomalies recorded at nearly all 65 stations. 15 Cold spell detection, using the 10th percentile threshold of the daily minimum temperature (TN10p), confirmed zero cold spell days throughout the winter 2025/26. The principal high-impact event, the 18th of February 2026 blizzard, was driven by a classical Mediterranean cyclone characterized by an upper-level potential vorticity streamer and an anomalously high integrated water vapor transport directed towards south-eastern Romania. Content analysis of 89 Romanian and international media items (~112,400 words) reveals 692 alarm-vocabulary occurrences (6.2 per 1,000 words). Outlet alarm-vocabulary density correlates strongly and negatively with the provision of historical context (Pearson $r = -0.88$; $p < 0.001$). We interpret this amplification as consistent with both the Social Amplification of Risk Framework and a shifting experiential baseline mechanism. Our study demonstrates that heavy snowfall in a warming climate can occur in the complete absence of any thermal cold extreme, and underscores the practical consequences of conflating precipitation and temperature hazards in emergency communication, and proposes a standardized context protocol for national 25 meteorological services.

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1 Introduction

The public perception of winter weather extremes is shaped not only by direct thermal experience but, in an increasingly mediatized environment, substantially by the framing of events in broadcast, digital, and print media (Berglez and Al-Saqaf, 2021; Boykoff and Boykoff, 2004; Capstick and Pidgeon, 2014; Pasquaré and Oppizzi, 2012; Peisker et al., 2026). Where media representations diverge systematically from the scientific characterization of a hazard, the consequences extend beyond inaccurate public understanding, which might lead to misallocation of preparedness resources and erosion of the epistemic authority of meteorological institutions. The Social Amplification of Risk Framework (SARF; (Kasperson et al., 1988)) provides the conceptual foundation for understanding how events assessed as relatively minor by technical experts can elicit disproportionately large societal responses through the amplifying effects of media, institutional, and cultural processes.

The winter of 2025/26, in Romania, offers a particularly instructive case study within this framework. Between early January and late February 2026, the national and international media produced a high-intensity wave of coverage characterizing cold and snowfall episodes in Bucharest and south-eastern Romania in catastrophist terms, employing strongly dramatizing language in headlines such as: "*Panică la ANM din cauza vremii*" (Panic at the Romanian Meteorological Administration due to weather condition), "*Bomba cu ger siberian lovește România*" (the freezing bomb from Siberia hits Romania), and "*Iadul alb – în România urmează cel mai sever episod de iarnă din acest an*" (the white hell – In Romania we will experience the worst cold spell throughout this winter). During the principal event on 18th of February 2026, Bucharest, the capital city of Romania, received ~44cm of snow accumulation over several hours, triggering 495 emergency service interventions and causing widespread disruption to transport and electricity networks, and power outages affecting approximately 200,000 homes nationally¹. These impacts were real and locally severe. Nevertheless, from a thermal point of view, January (February) 2026 were normal at the national scale, with the country-mean monthly temperature, averaged at 65 meteorological stations distributed homogeneously across the country, recording a value of -1.5°C (+1.9°C), representing an anomaly of +2.3°C (+2.2°C) relative to the 1971–2000 climatology. Moreover, the monthly mean temperature anomalies for both January and February 2026 were positive at nearly all of the 65 Romanian stations analyzed, confirming that the mean temperature for both months exceeded the 1971–2000 reference period normal (Figure 1). However, the language used to describe them implied a thermally exceptional winter, or even an historically extraordinary cold event, rather than a disruptive, but meteorologically more specific winter hazard.

A possible mechanism contributing to this mismatch between perception and climatological reality is the phenomenon of the shifting experiential baseline. (Moore et al., 2019), using social media post volume as a proxy for weather remarkability, demonstrated empirically that the implicit reference period against which people assess weather as normal or abnormal is calibrated primarily to conditions experienced in the preceding 2–8 years, with greatest weight on the most recent 2–4 years. Under long-term warming, this mechanism implies that a return to historically ordinary cold conditions after a run of anomalously mild winters will be perceived as exceptional even when it falls well within the pre-warming distributional envelope. For example, February 2024 was warmer by +7.30°C in Romania (the warmest February since 1961), while January 2025 was warmer by +6.5°C compared to the reference period 1971 – 2000. Moreover, the sequence of mild winters observed at Bucharest Filaret (and not only), where the past 14 winters were all characterized by positive temperature anomalies (Figure S1), and the period 2020 – 2025 being the warmest over the past ~150 years, appears to have displaced the experiential reference against which both journalists and the public assessed the 2026 cold episodes. Precisely because snow has become less persistent over many lowland regions in Romania, consistent with documented widespread declines in snow-cover duration and snow-cover-day frequency across most regions of the

¹ <https://www.reuters.com/sustainability/boards-policy-regulation/snowstorm-cuts-power-200000-homes-across-romania-2026-02-18/>



country (Amihăesei et al., 2024; Birsan and Dumitrescu, 2014), such events may be systematically overrepresented in public risk perception relative to their climatological frequency and thermal magnitude.

80 The conflation of cold spells and high-impact snowfall events represents a recurring source of ambiguity in the scientific literature on changing winter extremes. (IPCC, 2021) has assessed with virtual certainty that cold extremes have become less frequent and less severe over most land regions due to anthropogenic forcing, while heavy precipitation has increased in many regions and is projected to continue increasing in Europe. Moreover, extreme snowfall does not respond to warming in the same way as mean snowfall, with heavy snowfall often occurring near an optimal temperature range close to freezing, so a warmer atmosphere can still produce intense snow events, provided temperatures remain low enough for precipitation to fall as snow (D’Errico et al., 2022; Gottlieb and Mankin, 2024; O’Gorman, 2014; O’Gorman and Schneider, 2009). Recent European climatological analyses reinforce this point, indicating that changes in snowfall extremes cannot be inferred from temperature trends alone, because they depend on the interplay between thermodynamic forcing and large-scale circulation variability (D’Errico et al., 2022). For the eastern part of Europe and the Balkans, cold spells have been defined as multi-day periods with daily minimum temperature below a percentile threshold, underscoring the importance of using explicit, reproducible thermal criteria rather than impressionistic language when characterizing winter hazards (Busuioc et al., 2015; Piticar et al., 2018).

90 The Romanian event in January – February 2026 makes the distinction between cold event and snow event, especially relevant. Snowfall in Romania, and especially heavy snowfall, remains strongly linked to synoptic forcing associated with Mediterranean cyclones. In a recent study (Amihăesei et al., 2026) have shown that approximately half of cold-season snowfall accumulation in Romania is associated with Mediterranean cyclones, and that more than 70% of heavy snowfall episodes are linked to such systems. In this respect, a substantial snowfall event in Bucharest may be both meteorologically plausible and societally disruptive, while still failing to qualify as a cold spell from a thermal point of view. Thus, the central paradox of the 2025/26 winter therefore becomes clear: the event was experienced and narrated as a major cold wave, while the thermal signal itself remained unexceptional in the long-term instrumental record.

95 Against this background, the present study evaluates the January–February 2026 winter episodes in Bucharest and south-eastern Romania from a climatological point of view, independent of prevailing media characterizations. The specific objectives are: i) to place the 2026 monthly anomalies within the long-term frequency distribution of cold spells, with direct comparison to the benchmark cold winters of 1929, 1942, and 1954; ii) to provide synoptic overview of the 18th of February 2026 snowfall event, identifying the responsible large-scale mechanisms and characterizing the associated moisture transport pathway; iii) to conduct a systematic content analysis of alarm-register vocabulary across 105 89 Romanian and international news items covering the January–February 2026 episodes, quantifying the frequency and distributional pattern of thermally exaggerating terminology within the Social Amplification of Risk Framework (SARF; (Kasperson et al., 1988)) and iv) to propose a communication protocol for national meteorological services.

110 2 Data and methods

110 2.1 Station and large-scale data

115 The primary dataset analyzed in this study is the daily meteorological records for precipitation and minimum temperature from Bucuresti Filaret station (44.42°N, 26.10°E, 85 a.s.l) spanning the period 1st of January 1879 to 28th February 2026. This is one of the longest meteorological records in the eastern part of Europe. In addition to some publicly available data, for this study, we also used recently digitized meteorological records from the yearly meteorological books of the Romanian Meteorological Institute (Hepites S., 1899; Ionita and Nagavciuc, 2024, 2025). Next to the meteorological records at Bucuresti Filaret, we also made use of monthly mean temperatures at 65 meteorological stations distributed homogeneously at the country level (Figure 1 and S3) over the period January 1961 – February 2026. To obtain



a long-term perspective of extreme cold events, we made use of other long-term meteorological records, which are available mainly for the southern and eastern parts of Romania (Table S1).

120 The large-scale drivers of the extreme snowfall event in February 2026 are analyzed by employing the hourly data for the Potential Vorticity (PV) at 300K isentropic surface, the 850 and 500 hPa geopotential height (Z850 and Z500), the 850 hPa temperature (TT850), and the integrated water vapor transport (IWT). These data have been extracted from the ERA5 reanalysis fields (Hersbach et al., 2020), having an horizontal resolution of $0.1^\circ \times 0.1^\circ$.

2.2 Cold spell detection

125 In order to analyze extreme cold events, for the stations having long-term records (Table S1), we used an index based on a fixed threshold relative to local temperatures (e.g., the 10th percentile of the minimum daily temperature, TN10p). For the threshold based method, we used the 10th percentile of the daily minimum temperature within a 15-day window centered around each calendar day (Perkins and Alexander, 2013). The threshold-based cold spells were identified using the heatwaveR package (Schlegel and Smit, 2018), which extends the marine heatwave detection
130 framework of (Hobday et al., 2016) to cold events. For each cold spell, the following metrics are reported: duration (days) and cumulative intensity (CI, defined as the sum of all daily temperature anomalies throughout the duration of all the cold spells). For this method, we considered different durations for cold spells (i.e., 3 up to 6 consecutive days), and for the current study, we selected a 5-day period. Thus, in this study, cold spells are defined as events in which the daily TN is < TN10p for at least 5 consecutive days. Our threshold is consistent with the guidelines provided by the Expert Team on
135 Climate Change Detection and Indices (ETCCDI) and it enables us to concentrate on analyzing cold spells that are particularly severe and have the potential to cause both economic and societal impacts (Piticar et al., 2018).

2.3 Media sample analysis

A number of 89 news articles and broadcast transcripts were assembled from 14 outlets (7 Romanian-language, 7 international English-language) covering the period 5th of January to 28th February 2026. A pre-defined 12-term alarm
140 vocabulary list, operationalized in both Romanian and English, was applied to the full media sample (~112 400 words). Each item was coded for: (i) presence of any quantified long-term climatological reference; (ii) citation of a named meteorological authority; and (iii) primary framing category (Table S2 and Table S3).

3 Results

145 3.1 Spatial pattern of January and February 2026 temperature anomalies

The spatial distribution of the monthly mean temperature anomalies recorded at 65 meteorological stations across Romania during January and February 2026, referenced against the 1971–2000 climatological baseline, is presented in Figure 1. As it can be inferred from Figure 1, both months (i.e., January and February 2026) were characterized by pronounced positive temperature anomalies across the entire country, indicating a persistent warm anomaly pattern
150 throughout the first two months of 2026.

During January 2026 (Figure 1a), positive temperature anomalies were recorded at all 65 stations, with values ranging from approximately $+1.1^\circ\text{C}$ to $+4.3^\circ\text{C}$ relative to the 1971–2000 mean. The highest anomalies were concentrated in the western and central regions of the country, particularly within the Carpathian foothills and the Transylvanian Plateau (i.e., the north-western part of the country), where several stations registered temperatures exceeding $+3.5^\circ\text{C}$.
155 Notably, the high-altitude sectors of the Southern and Eastern Carpathians corresponded to locally elevated anomalies of up to $+4.3^\circ\text{C}$, suggesting an amplified warming signal at higher elevations. In contrast, the stations situated in the eastern lowlands and along the Black Sea coast exhibited comparatively lower temperature anomalies, generally in the range of



+1.1 °C to +2.0 °C, indicating a west-to-east gradient in the magnitude of the thermal departure. The stations situated in the southern part of Romania displayed temperature anomalies ranging between +2.0 °C and +2.8 °C.

160 February 2026 (Figure 1b) exhibited a substantially more intense warm anomaly signal compared to January, especially in the north-western part of the country, with positive temperature anomalies recorded across all analyzed stations and amplitudes considerably exceeding those of the preceding month. Anomaly values ranged from near-neutral conditions (approximately +0.1 °C to +0.5 °C) in the immediate vicinity of the Black Sea and the south-eastern parts of the country, to strongly positive anomalies reaching up to +5.0°C in the northwestern and western parts of the country.

165 The western regions, as well as the northwestern Transylvanian Basin, were the most affected areas, with multiple stations recording temperature anomalies between +3.7 °C and +5.0 °C. A particularly noteworthy feature of February 2026 is the contrast between the warm western interior and the near-normal conditions observed at a small number of stations in the eastern coastal zone and the south-eastern corner of the country, indicating a strong longitudinal temperature gradient across the country.

170 Comparing the two months, the area-averaged temperature anomaly increased markedly from January to February 2026, with mean national departures estimated at approximately +2.5 °C and +3.5 °C, respectively. The spatial extent of anomalies exceeding +3.0 °C was considerably broader in February, encompassing a large proportion of western, central, and northern Romania. This pattern is consistent with the advection of anomalously warm air masses from the Atlantic sector and a weakened polar vortex, which has been increasingly associated with above-normal winter temperatures across Central and Eastern Europe in recent decades (Cattiaux et al., 2010; Cohen et al., 2020, 2012).

175 Figure 2 presents the frequency distributions of January and February mean air temperature anomalies, relative to the 1971–2000 climatological baseline, at three representative meteorological stations in Romania, with long-term meteorological records: Bucuresti Filaret (1871 – 2026, Figure 2a – b), Calarasi (1898 – 2026, Figure 2c – d), and Sulina (1876 – 2026, Figure 2e – f). For each station and month, individual years are displayed as color-coded vertical lines according to their anomaly magnitude, with the three warmest and coldest years explicitly identified. Overlaid black bars represent the frequency distribution for the analyzed period, fitted with a Gaussian kernel, providing a probabilistic context within which to situate the 2026 anomaly.

180 At Bucuresti Filaret station (Figure 2a – b), the historical distributions for both January and February are approximately bell-shaped and centered near zero, reflecting the long-term climatological mean of the 1971–2000 reference period. The January 2026 air temperature anomaly (+1.5 °C) is situated in the right tail of the distribution. Similarly, the February 2026 anomaly at Bucuresti Filaret is positioned well into the positive tail (+1.8 °C), consistent with the spatially coherent warm signal identified across the national network (Figure 1). The relatively broad distribution of the winter temperature anomalies at Bucuresti Filaret, with anomalies ranging from approximately –8 °C to +7 °C in January and from –9 °C to +9 °C in February, highlights a strong interannual variability. The Calarasi station (Figure 2c–
190 d), located in the southern part of the country, displays comparable distributional characteristics to those observed at Bucuresti Filaret, with the historical spread for January extending from approximately –8 °C to +8 °C and for February from approximately –11 °C to +9 °C. In both January (+1.1 °C) and February (+1.4 °C) 2026, the anomaly values recorded at Calarasi fall on the positive side of the probability density function (PDF). For the Sulina meteorological station (Figure 2e–f), situated on the Black Sea coast within the Danube Delta, the January (+1.1 °C) and February (+1.2 °C) temperature anomalies are similar to the ones observed at the other analyzed stations (i.e., Bucuresti Filaret and Calarasi), and the
195 2026 value still falls within the upper portion of the PDF.

Taken together, the PDFs in Figure 2 place the January and February 2026 temperature anomalies in their full long-term historical context, confirming that both months rank among the anomalously warm winter months recorded at these stations. The consistency of this finding across climatologically distinct stations, from the continental interior to the



200 coastal margin, strengthens the conclusion that the warm anomaly of early 2026 was a spatially coherent one, while the progressive shift of extreme warm years towards the right tail of the distribution, visible across all panels, is furthermore consistent with the long-term warming signal observed across Romania and the broader European region over the 20th and 21st centuries (Birsan and Dumitrescu, 2014; Cheval et al., 2014; Piticar et al., 2018).

3.2 Daily temperature and snow depth evolution of the 18 February 2026 snowfall episode

205 The main “extreme” event of February 2026 was the blizzard and snowfall which occurred between 17th and 18th of February. Figure 3 illustrates the day-by-day evolution of daily maximum (TX) and minimum (TN) temperatures alongside snow depth accumulation at Bucuresti Filaret meteorological station, over the period 1st of January to 28th of February 2026. The two-months record reveals a thermally dynamic winter season characterized by frequent alternations between mild and relatively cold episodes and a concentrated snow accumulation event in the second half of February.

210 Throughout January 2026, the daily temperature record exhibits strong day-to-day variability, with the daily maximum temperature (TX) oscillating between approximately -4°C and $+12^{\circ}\text{C}$ and TN ranging from approximately -10°C to $+3^{\circ}\text{C}$. Despite several brief cold incursions, most notably around 12–13 January and 19–20 January, when TN dropped below -8°C and TX remained near or below 0°C , the overall thermal character of the month was dominated by mild intervals with TX frequently exceeding $+5^{\circ}\text{C}$. Snow depth during January was modest and relatively stable, generally remaining below 10 cm, reflecting the combination of occasional snowfall during relatively cold days and rapid melt during the intervening mild episodes. This pattern is characteristic of a transitional continental winter regime, in which the ground snow cover is repeatedly established and partially ablated on synoptic timescales.

215 The transition into February 2026 brought an initial continuation of mild conditions, with TX values reaching $+6.2^{\circ}\text{C}$ to $+6.4^{\circ}\text{C}$ around 4–6 February. The period leading up to the 18th February episode was characterized by predominantly above-zero daily TX and only marginally sub-zero minima, maintaining the broadly anomalous warm character identified in the monthly mean analysis. It is against this mild background that the major snow accumulation event of 18th of February 2026 must be understood. The snowfall event of 18th of February, which produced a rapid increase in snow depth to approximately 40–45 cm, the largest single accumulation of the 25/2026 winter season, coincided with daily maximum temperatures near or slightly above 0°C , and minimum temperatures only marginally below freezing. This seemingly contradictory co-occurrence of heavy snowfall and near-zero temperatures has a well-established physical basis. Snowfall does not require strongly negative temperatures; rather, it requires only that the wet-bulb temperature at the surface remains at or below 0°C , a condition that can be maintained even when the dry-bulb air temperature is as high as $+2^{\circ}\text{C}$ to $+4^{\circ}\text{C}$, particularly under conditions of high atmospheric moisture content and active precipitation (D’Errico et al., 2022; Gottlieb and Mankin, 2024; Jennings et al., 2018; Matsuo and Sasyo, 1981b, a).

225 During intense precipitation events, the evaporative cooling of falling snowflakes, as they partially melt and re-evaporate into a sub-saturated lower atmosphere, can further suppress the near-surface wet-bulb temperature below the freezing point, sustaining solid precipitation even in conditions that appear thermally marginal. In the context of the February 2026 event, the relatively warm and moist air masses that had driven the positive temperature anomalies throughout the month also supplied the abundant atmospheric moisture necessary to fuel a high-intensity precipitation event. The snowfall event on the 18th of February is thus physically consistent with a warm, moisture-rich synoptic environment. It must be noted that this episode was particularly abundant in the south-eastern corner of the country (Figure S2) severely affecting the Bucharest metropolitan area (a densely populated urban hub in Southeast Europe with ~ 2.6 million inhabitants). The event held high societal relevance, as it significantly disrupted the capital’s infrastructure and operations at the country’s main international airport.

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240 **3.3 Synoptic drivers of the 18th February 2026 snowfall episode**

To put the snowfall event of 18th of February 2026 into a large-scale perspective, Figure 4 presents the hourly synoptic evolution of the large-scale atmospheric circulation and the water vapor transport prior to and at the peak of the event. The sequence of figures, covering the period from 21:00 UTC on 17th February to 09:00 UTC on 18th February at three-hourly intervals, reveals the complex interplay of dynamic and thermodynamic forcing mechanisms that culminated with the snowfall event. The left column in Figure 4 displays the Potential Vorticity (PV) at the 300 K isentropic surface overlaid with the 500 hPa geopotential height (Z500) contours; the middle column shows 850 hPa temperature (TT850) and 850 hPa geopotential height (Z850); and the right column shows the magnitude and direction of the vertically integrated water vapor transport (IWT).

The PV and Z500 fields (Figure 4a, 4d, 4g, 4j, and 4m) show the progressive eastward and southeastward extension of an upper-level trough over central and southeastern Europe during the analyzed period. On the 17th February 21:00 UTC (Figure 4a), a high-PV streamer is visible over western and central Europe, indicative of a stratospheric intrusion associated with the equatorward extension of the polar tropopause. By 18th February 00:00–03:00 UTC (Figure 4d and 4g), this PV streamer amplifies and deepens over the Balkan Peninsula and the northern Aegean region, with the 500 hPa geopotential height contours showing a pronounced trough axis oriented from northwest to southeast. Such upper-level PV structures are well established drivers of Mediterranean cyclogenesis, as the downward extension of a stratospheric PV anomaly into the troposphere provides the necessary upper-level forcing for surface low-pressure development (Flaounas et al., 2022; Hoskins, 1997; Ionita and Nagavciuc, 2021). By 06:00 - 09:00 UTC on 18th February (Figure 4j and 4m), the upper trough continues to deepen and becomes more positively tilted, indicating an active baroclinic development phase consistent with cyclone intensification over the eastern Mediterranean and its extension towards the Black Sea and the south-eastern part of Romania.

The 850 hPa temperature and geopotential height fields (Figure 4b, 4e, 4h, 4k, and 4n) reveal a well-defined baroclinic structure consistent with a Mediterranean cyclone. On the 17th February 21:00 UTC (Figure 4b), a warm sector centered over the central Mediterranean and the Adriatic Sea is evident, with TT850 values exceeding +10 °C, flanked to the northwest by a sharp cold front with a strong temperature gradient. The Z850 geopotential height contours indicate a developing low-pressure center in the vicinity of the central Mediterranean, which is tracking northeastward over time. By the 18th February 03:00–06:00 UTC (Figure 4h and 4k), the cyclone center has progressed towards the Aegean Sea and the northern Balkans, with post-frontal cold air advection bringing below-freezing temperatures at 850 hPa over Romania and the Carpathian region. The cold air advection at 850 hPa is of particular physical relevance: while surface temperatures remained near 0 °C (Figure 3), the arrival of cold mid-tropospheric air steepened the environmental lapse rate, destabilizing the lower troposphere and promoting the frontal ascent of the moisture-rich air mass, which was released as heavy snowfall. Mediterranean cyclones of this type, which develop in the Gulf of Genoa or the central Mediterranean and track southeastward towards the Balkans, are well documented in the literature and are known to be important drivers of high-impact winter precipitation events over Romania and southeastern Europe (Amihăsesei et al., 2026; Catrina et al., 2019; Flaounas et al., 2022).

Analysis of the vertically integrated water vapor transport (Figure 4c, 4f, 4i, 4l and 4o) reveals the mechanisms by which abundant atmospheric moisture was channeled towards the affected region, consistent with the high snowfall accumulation recorded, despite the near-surface temperatures close to 0 °C. On the 17th February 21:00 UTC (Figure 4c), a distinct IWT corridor with values exceeding 200–300 kg m⁻¹ s⁻¹ is identified over the central Mediterranean, oriented northeastward in association with the warm conveyor belt of the developing cyclone. This moisture flux progressively intensifies and rotates cyclonically, reaching the Adriatic Sea, the Balkans, and eventually Romania by the 18th of



February 03:00–06:00 UTC (Figure 4i and 4l). The transport vectors confirm a strong southwesterly to southerly moisture flux ahead of the cold frontal boundary, channeling large quantities of warm, Mediterranean-sourced water vapor directly towards the snowfall region.

285 Overall, the synoptic analysis in Figure 4 indicated that the heavy snowfall event on the 18th February 2026 was driven by a classical Mediterranean cyclone, characterized by an upper-level PV streamer which in turn induced a surface cyclogenesis over the central Mediterranean, with a warm conveyor belt transporting anomalously large quantities of moisture towards Romania, followed by cold frontal uplift and rapid precipitation onset. The combination of a thermodynamically mild background state, consistent with the positive temperature anomaly throughout February over the whole country, and a dynamically active Mediterranean cyclone delivering elevated moisture flux created conditions
290 in which heavy snowfall could occur despite near-zero surface temperatures.

3.4 Historical context: long-term frequency distributions and benchmark cold winter

The ten most intense cold spells recorded at the Bucuresti Filaret meteorological station over the 1879–2026 period, ranked by their cumulative intensity (defined as the sum of daily minimum temperature anomalies accumulated over the duration of each cold spell event) are shown in Table 1. The ranking reveals a pronounced concentration of the
295 most severe cold spell winters in the first half of the twentieth century, with the some of the top positions occupied by the winters of 1929, 1942 and 1954. Each of these events were characterized by cumulative intensities exceeding 300 °C and durations between 33 and 67 days. The winter of 2026 is included at the base of the table for reference, recording a cumulative intensity of 0 °C, a duration of 0 days and 0 cold spell occurrences, a result that supports the findings in this study about the relatively warm 2025/2026 winter season and places it in stark contrast to the climatological cold spell
300 regime documented over the preceding 148 years.

The winter of 1929 ranked first with a cumulative intensity of 828.3 °C and a duration of 67 days distributed across four distinct events, representing the most severe cold season recorded at Bucuresti Filaret over the instrumental period (Figure 5a). This winter was part of a pan-European extreme cold event driven by an exceptionally persistent high-pressure blocking system over Scandinavia and the Eurasian continent, which favored the prolonged advection of Arctic and Siberian air masses into southeastern Europe (Twardosz and Kossowska-Cezak, 2016). Across Romania, temperatures at mountain stations dropped to values as low as –38 °C, and the lower Danube was subject to an extended ice cover period, with the latest break-up date on record at Tulcea documented in March 1929 (Ionita et al., 2018). The winter of 1942 ranked third with a cumulative intensity of 544.5 °C (Figure 5b), coincided with some of the lowest absolute minimum temperatures ever measured on Romanian territory: on 25 January 1942, the station at Bod (Braşov Depression)
310 recorded –38.5 °C, which remains the all-time minimum temperature record for Romania (Busuioc et al., 2010). The broader climatological context of this event is closely linked to the severe Eastern European winters of the early 1940s, during which persistent anticyclonic blocking over the continent and abnormally cold air inflow from the northeast produced extreme cold anomalies across the Carpathian-Pannonian region (Brönnimann, 2005; Lejenäs, 1989). The winter of 1954, ranked seventh with a cumulative intensity of 376.3 °C and a total duration of 33 days, was similarly
315 notable for its intensity across the Balkans and southeastern Europe, including a severe blizzard episode in the south of Romania in early February 1954, recorded with wind speeds of 70–125 km h⁻¹. This particular winter is documented as one of the worst winters of the mid-20th century over the region, during which the Black Sea partially froze (Ionita et al., 2018; Teodoreanu, 2017).

Figure 6 presents the interannual variability of three cold spell characteristics at Bucuresti Filaret over the 1879–
320 2026 period: the number of cold spells per winter (Figure 6a), the cumulative intensity expressed in °C per winter (Figure 6b), and the total cold spell duration in days per winter (Figure 6c). The three indicators reveal a consistent long-term



decline in cold spell activity across all metrics, superimposed on pronounced decadal-scale variability, with the most intense and prolonged cold spell winters concentrated in the first half of the observational record. The number of cold spells per winter ranges from 0 for the most recent winters, including 2026, to a maximum of 5 events throughout winters during the late 19th and early 20th centuries (Figure 6a). A clear reduction in the frequency of winters with 3 or more cold spells is evident from approximately the 1960s onward, with the post-1980 period dominated by winters recording either 1 or no cold spell events. Figure 6b corroborates this trend, when the events with cumulative intensity below -400 °C are confined almost exclusively to the pre-1960 period, with the single most extreme value of approximately -828 °C recorded in the winter of 1929. Since approximately 1970, cumulative intensities rarely exceed -200 °C, and the most recent decades show a progressive trend towards zero. Figure 6c shows, in a similar manner, a marked reduction in the duration of winter cold spells, with winters exceeding 50 CS days restricted entirely to the 1929 and 1942 period, and the post-1985 record characterized by winters rarely exceeding 15 days of cold spell conditions. The reduction in the number of CSs, the duration and intensity, is consistent with the well-documented long-term warming trend over Romania and Central and Eastern Europe since the late twentieth century, which has substantially reduced both the frequency and intensity of cold spells (Busuioc et al., 2015; Piticar et al., 2018; Twardosz and Kossowska-Cezak, 2016).

To assess whether the CS variability documented at Bucuresti Filaret is representative of a broader spatial pattern across Romania, Figure S3 presents the cumulative intensity and the total duration of CSs per winter, at five additional long-term meteorological stations distributed across the country, namely Baia Mare (northwest), Arad (west), Drobeta Turnu Severin (southwest), Turnu Magurele (south) and Calarasi (southeast). Despite the differing climatic sub-regimes represented by these stations, which is significantly impacted by the Carpathian Mountains, the long-term evolution of cold spell variability is remarkably coherent across the stations. At all analyzed stations, the cumulative intensity and the total duration shows the same qualitative structure as at Bucuresti Filaret: a period of high interannual variability and recurrent intense CSs spanning the late 19th and first half of the 20th century, followed by a progressive and sustained reduction in both metrics from approximately the 1960s–1970s onward. The winters of the late 1920s to early 1940s stand out as the most severe across all stations, while over the most recent decades, the cumulative intensity values approach zero at each station, and the total cold spell duration per winter is either minimal or absent. This spatial coherence of the declining cold spell trend across climatologically distinct regions of Romania strengthens the conclusion that the observed reduction is not a localized signal, but rather reflects a large-scale thermodynamic shift in winter circulation and temperature regimes over the entire country.

Overall, the winter of 2026 is consistently characterized by zero cumulative intensity and zero cold spell duration across all stations in Figure S3, mirroring the result at Bucuresti Filaret and confirming that the complete absence of winter cold spell activity in 2025/2026 was a spatially coherent, country-wide phenomenon. This uniform response across the observational network, from the western margin of the country to the southeastern lowlands and the northwestern foreland, provides unambiguous evidence that the winter of 2026 represents an unprecedented departure from the historical cold spell regime at the national scale. Taken together, Figures 6 and S3 demonstrate that the long-term decline in cold spell frequency, intensity, and duration documented in the instrumental record is not only statistically robust at the reference station of Bucuresti Filaret, but constitutes a spatially pervasive signal across Romania, fully consistent with the accelerated regional warming (Adamescu et al., 2025; Busuioc et al., 2015; IPCC, 2021; Piticar et al., 2018).

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3.5 Long-Term Evolution of Winter Precipitation and Cold Nights Frequency at Bucuresti Filaret (1865–2026)

Figure 7 presents the long-term evolution of three complementary diagnostic variables at Bucuresti Filaret over the period 1879–2026, namely the monthly total precipitation (Figure 7a and 7b), daily maximum precipitation (Figure 7c and 7d), and the TN10p index (defined as the percentage of days within a given month on which the daily minimum temperature falls below the calendar day-specific 10th percentile of the 1971–2000 baseline distribution, Figure 7e and 7f). The concurrent examination of precipitation totals and TN10p is motivated by the recognition that cold spell catalogues, while highly informative about the intensity and persistence of extreme cold events, captures only part of the climatological signal associated with cold winter conditions. The TN10p index, as a percentile-based threshold metric, provides a statistically robust, threshold-independent characterization of the frequency of anomalously cold nights, thereby complementing the cold spell approach by detecting sub-threshold cold anomalies that would not qualify as formal cold spells, but nonetheless, represent significant departures from climatological norms. Together, these two methodological frameworks, event-based cold spell detection and percentile-based TN10p analysis, offer a more complete picture of the cold temperature regime than either approach can provide in isolation.

The monthly total precipitation series for January (Figure 7a) and February (Figure 7b) exhibit substantial interannual variability throughout the observational record, with no statistically long-term trend in either month. January totals range from near zero in extremely dry years to a maximum of 132.3 mm in the wettest Januarys on record (i.e., 1966), while February totals display a comparable spread, with an exceptional value of 147.1 mm recorded in the late 19th century (i.e., 1895). The absence of a secular trend in the monthly precipitation totals is consistent with the broader climatological literature on winter precipitation variability over southeastern Europe, where interannual and decadal variability driven by large-scale circulation modes, particularly the North Atlantic Oscillation and Mediterranean cyclone activity, dominates over any anthropogenically forced long-term signal (Adamescu et al., 2025; Birsan and Dumitrescu, 2014; Flaounas et al., 2022; Trigo et al., 2002; Vicente-Serrano et al., 2025). Notably, the total precipitation in February 2026 (i.e., 119.8 mm) ranks fourth among the historical February precipitation distribution (Figure 7b), consistent with the anomalously heavy snowfall event from February 2026, further illustrating how a warm background state, in winter, can coexist with and facilitate exceptional precipitation amounts through enhanced atmospheric moisture availability.

The maximum daily precipitation series for January (Figure 7c) and February (Figure 7d) reveal a similar pattern of high interannual variability without a clear monotonic trend, though individual extreme values are distributed across the full length of the record. The most notable feature of Figure 7d is the exceptionally high maximum daily precipitation value recorded in February 2026, which ranks as the highest single-day precipitation total (i.e., 54.5 mm measured on the 18th of February 2026) in the February recorded at this station. This value is consistent with the synoptic analysis presented in Section 3.3, wherein the warm conveyor belt of the Mediterranean cyclone delivered an anomalously high integrated water vapor flux towards Romania, generating an intense, short-duration precipitation event that manifested as heavy snowfall at the surface.

The TN10p time series for January (Figure 7e) and February (Figure 7f) provide the most direct quantitative evidence of the long-term reduction in cold night frequency at Bucuresti Filaret. In the late 19th and early 20th centuries, TN10p values frequently exceeded 30–40 % in January, with isolated winters recording values approaching or exceeding 60–65 %, indicating that in these years the majority of nights fell below the climatological 10th percentile threshold. The winters of 1929 and approximately 1942 are clearly identifiable as pronounced peaks in the TN10p series for both months, with February values for these years approaching 80–90%, consistent with their dominant position in the cold spell ranking (Table 1) and the extreme daily minimum temperature departures documented in Figure 5. A progressive and statistically robust decline in TN10p values is evident from approximately the 1950s onward in both panels, with the post-



1990 period characterized by January and February TN10p values that rarely exceed 20% and frequently fall below 10%. The year 2026 records a TN10p value of 0% in both January and February, confirming that not a single night during either month fell below the 10th percentile threshold of the 1971–2000 baseline, a result that is physically coherent with the absence of cold spells documented in Figure 6 and the persistently above-normal daily minimum temperatures shown in Figure 3.

The complementarity between the cold spell approach (which takes into account also the persistence of cold day) and the TN10p index, per se, is particularly helpful when analyzed across the full length of the observational record. Cold spell detection, as applied in Sections 3.4 and 3.5, identifies events that exceed a fixed absolute threshold and persist for at least 5 days, and is therefore particularly sensitive to the most extreme cold episodes; however, it may underestimate the frequency of cold anomalies in winters where temperatures are persistently low but do not meet the event definition criterion. The TN10p index, by contrast, operates on a relative, percentile-based threshold calibrated to the local climate distribution, and is therefore capable of detecting anomalously cold nights even in winters without formal cold spells, while also remaining sensitive to gradual distributional shifts in the temperature record associated with long-term warming. The convergence of both metrics towards zero in recent winters provides robust evidence that the thermal character of winter at Bucuresti Filaret has undergone a fundamental shift, one that is not an artefact of any single methodological choice, but is replicated across independent detection frameworks.

420 4 Discussion

4.1 Media amplification within the SARF framework

The multi-source observational evidence presented in the preceding sections collectively establishes that the 2025/26 boreal winter season exhibited no statistically discernible cold anomaly relative to climatological baselines, at either Bucuresti or at the country level. Thus, understanding why media framing deviated so sharply from this evidence requires engagement with the mechanisms identified by the Social Amplification of Risk Framework (Capstick and Pidgeon, 2014; Kaspersen et al., 1988). SARF posits that hazard signals are systematically amplified or attenuated as they pass through successive “amplification stations” (e.g., scientific institutions, operational forecasters, media organizations, and interpersonal networks) before reaching the general public. In the present case, the meteorological office communications were calibrated, correctly identifying the 18th February event as an extreme precipitation event and issuing appropriately time-limited Red Code alerts. The amplification occurred in the editorial transformation of these communications: the operationally accurate statement that the event was the most severe blizzard of this winter was reinterpreted by the media as evidence of historical exceptionality, a fundamentally different and empirically unfounded claim.

The content analysis confirms the structural character of this amplification (Figures S4 and S5). Only 10 of 89 items (11.2%) contained any quantified long-term climatological reference. 'Record' appeared 81 times, with no baseline period specified in 77 cases (95.1%); 'unprecedented' appeared 40 times despite being factually incorrect for every observable metric of the 2026 winter. The outlet-level scatter plot (Figure S5a) quantifies this relationship: alarm-vocabulary density correlates strongly and negatively with the proportion of items containing a baseline reference (Pearson $r = -0.88$; $p < 0.001$), confirming that contextual deficit and alarm amplification are structurally coupled across outlets rather than being incidental features of a few outlets. Romanian-language outlets deployed alarm vocabulary at 8.3 per 1,000 words versus 3.6 per 1,000 words for international outlets (Figure S4; Table S2), a pattern consistent with the more competitive domestic news-market dynamics documented by (Boykoff and Boykoff, 2004). The primary-framing analysis (Figure S5b) reinforces this. “Catastrophist framing” accounted for 61% of all coded Romanian items versus 33% of international items, while “Contextual framing” reached only 3% among Romanian outlets. Only one of



445 14 outlets published counter-framing during the event period, and only one Romanian outlet provided any baseline citation
at rates comparable to international science-news outlets (55%). The temporal structure of this amplification is illustrated
in Figure S6, which shows the daily aggregate alarm-vocabulary count across all 14 outlets. Two principal amplification
episodes are identifiable: the first (approximately 8–22 January 2026) corresponds to a Yellow Code alert from the
Romanian Meteorological Administration, with moderate alarm output peaking near 15 occurrences per day; the second
450 and dominant episode (18–24 February 2026) corresponds to the Red Code snowstorm and produced a sharp spike
reaching approximately 35 occurrences per day, roughly 7–8 times the background rate, with elevated output persisting
for approximately six days post-event, consistent with the cascade mechanism described by (Kasperson et al., 1988).
Representative examples of the claim–reality gap is documented in Table S3, which pairs each headline's implied
historical assertion with the corresponding climatological evidence.

455 In a recent study, (Moore et al., 2019) demonstrated empirically that the implicit climate reference used by non-
scientists is calibrated primarily to weather experienced in the preceding 2–8 years, with disproportionate emphasis placed
on the most recent 2–4 years. This shifting baseline mechanism (Pauly, 1995) has direct implications for the 2026 case.
The warm winters of 2020–2025 at Bucharest Filaret, continuous with the regional warming trend across the whole
country (Adamescu et al., 2025; Busuioc et al., 2010; Croitoru and Piticar, 2013), appear to have displaced the experiential
460 reference against which journalists and the public evaluated the 2026 “cold episodes”. This reflects a reversal in
perception: against a warming background climate, relatively modest cold episodes may be experienced as increasingly
anomalous, even as the long-term occurrence of true cold extremes declines. This mechanism might not be not irrational
at the individual level, but can become problematic when it shapes institutional media framing, mainly because the
misperception is then amplified and distributed to audiences who have no independent means of correction (Berglez and
465 Al-Saqaf, 2021; Pasquaré and Oppizzi, 2012; Peisker et al., 2026).

4.2 Precipitation–cold wave conflation and its practical consequences

The systematic conflation of a precipitation extreme (the 18th February snow event) with a temperature extreme
(a cold wave or cold spell) has practical consequences beyond inaccurate communication. The societal management
responses appropriate to a cold wave (e.g., fuel security, protection of vulnerable populations from prolonged
470 hypothermia, extended agricultural disruption) differ materially from those appropriate to a heavy snowfall event, which
demands primarily rapid surface clearance and short-term traffic management. The ~45 cm accumulation at Bucuresti,
while operationally challenging, is modest by historical standards (Table S4). For example, during February 1954 at
Calarasi a snow depth of 173 cm was recorded, and in Bucuresti “the snow was so deep that in the spring, after it melted,
cars crushed by tank tracks were found”². The extreme accumulation of snow was accompanied by sustained temperatures
475 ranging between –25° to –20°C and wind gusts exceeding 125 km/h, conditions radically different from those of February
2026. As the cold spell summary panels in Figure S3 demonstrate, the 2026 winter is virtually absent from the cold spell
record at all five long-term stations (Baia Mare, Arad, Drobeta Turnu Severin, Turnu Magurele, and Calarasi), contrasting
starkly with the deep negative anomalies of winters such as 1929, 1942, 1954, 1963, and 1985, which are visually
dominant across all panels. The 2026 accumulation at Bucharest corresponds to approximately 29% of the 1954 Calarasi
480 value, the most extreme snowfall on record at low-elevation stations (< 1000 m) (Table S4).

²https://web.archive.org/web/20120128220151/http://www.historia.ro/exclusiv_web/general/articol/prizonierii-marelui-viscol-iarna-anului-1954



4.3 Recommendations for operational communication

The mismatch identified in this study is not inevitable. Several national meteorological services, including the Royal Netherlands Meteorological Institute (KNMI), Deutscher Wetterdienst (DWD), and Météo-France, routinely issue post-event summaries that place observed temperature and precipitation anomalies in a long-term climatological context. Building on these practices, we outline a six-element protocol for national meteorological services operating in comparable settings. Some elements could also be adapted by media outlets to improve communication of impending high-impact weather. More broadly, strengthening public education in the interpretation of extreme-weather information is likely to be important, as clearer contextualization may reduce unwarranted alarm and limit the spread of misinformation.

1. All alert communications for cold or snowfall events should include a standardized context statement specifying: (i) the current anomaly in °C relative to the 1971–2000 normal; (ii) the percentile rank of the anomaly; (iii) whether the event satisfies pre-defined cold spell criterion; and (iv) the most relevant historical analogue with key metrics.
2. A publicly accessible Winter Climate Dashboard, updated daily, could report current TN10p values, active cold-spell events, and annual cumulative cold-spell intensity relative to the long-term record.
3. Press releases could distinguish explicitly between precipitation-driven and temperature-driven events, with the governing mechanism and expected duration stated clearly.
4. A journalist engagement protocol establishing a “context in climate coverage” standard could be developed and piloted with major Romanian media outlets.
5. Communication products could include concise explanatory material on the interpretation of extreme-weather indicators and terminology, particularly the distinction between anomalous, severe, and climatologically extreme conditions.
6. Targeted educational initiatives could support improvements in weather and climate literacy, particularly with respect to the interpretation of warnings and the historical context of extreme events.

5 Conclusions

This study provides a comprehensive climatological assessment of the winter 2025/26 cold and snowfall episodes in Bucharest and south-eastern Romania, and quantifies the degree to which their media representation deviated from the scientific evidence. Winter 2025/26 was thermally anomalous warm at the country level, with both January and February 2026 being characterized by positive mean temperature anomalies at all 65 Romanian stations analyzed, with country-mean departures of +2.3 °C and +2.2 °C relative to the 1971–2000 baseline, respectively. Cold spell detection using the ETCCDI-consistent TN10p criterion (minimum temperature below the 10th percentile for at least 5 consecutive days) yielded 0 cold spells and 0 cold spell days at all six long-term stations, namely, Bucuresti Filaret, Baia Mare, Arad, Drobeta Turnu Severin, Turnu Magurele, and Calarasi, confirming that the complete absence of cold spell activity was a spatially coherent, country-wide phenomenon. The TN10p index registered 0% at Bucuresti Filaret in both January and February 2026, placing this winter in sharp contrast with historical benchmark winters such as 1929 (cumulative intensity: 828.3 °C, duration: 67 days), 1942 (cumulative intensity: 544.5 °C, duration: 52 days), and 1954 (cumulative intensity: 376.3 °C, duration: 33 days).

The 18th of February 2026 high-impact event was a precipitation extreme, not a thermal one. A classical Mediterranean cyclone was the responsible mechanism for the extreme snow accumulation. An upper-level potential



vorticity streamer over the Balkan Peninsula drove surface cyclogenesis in the central Mediterranean, with a warm conveyor belt delivering an exceptionally high integrated water vapor flux (exceeding 200–300 kg m⁻¹ s⁻¹) towards the south-eastern part of Romania. Cold air advection at 850 hPa in the post-frontal sector maintained near-zero surface wet-bulb temperatures, sustaining heavy snowfall despite the mild background thermal state. The resulting ~45 cm accumulation at Bucuresti, while societally disruptive, represents approximately 29 % of the historical maximum low-elevation snow depth recorded in Romania (173 cm at Calarasi in February 1954). The precipitation totals recorded in February 2026 at Bucuresti Filaret (i.e., 110.8 mm, out of which 54.5 mm on 18th of February alone) is fully consistent with the thermodynamic amplification of Mediterranean moisture flux expected in a warmer atmosphere.

The media coverage of the January–February 2026 episodes exhibited systematic alarm amplification that was structurally decoupled from the climatological evidence. Across 89 items from 14 outlets, alarm-register vocabulary occurred at 6.2 per 1,000 words (692 total occurrences), with Romanian-language outlets deploying alarm terms at more than twice the rate of international English-language outlets (8.3 vs. 3.6 per 1,000 words). ‘Catastrophist’ framing accounted for 61% of Romanian items versus 16% of international items. Only 11.2% of all items contained any quantified long-term climatological reference, and the outlet-level correlation between alarm density and the absence of baseline context was strongly negative ($r = -0.88$, $p < 0.001$), confirming that contextual deficit and alarm amplification are structurally coupled. This pattern is consistent with the Social Amplification of Risk Framework (Kasperson et al., 1988). While the meteorological service communications were technically accurate, the editorial transformation of these communications at successive amplification stations produced a cascade of historically unfounded claims, with alarm-vocabulary output reaching ~7–8 times the background rate in the six days following the 18th of February Red Code event.

The shifting experiential baseline mechanism (Moore et al., 2019) provides a plausible cognitive explanation for these patterns. The sequence of 14 consecutive anomalously warm winters at Bucuresti Filaret, and the exceptionally warm period of 2020–2025, appears to have displaced the implicit climatological reference against which both journalists and the public evaluated the 2026 episodes. Under progressive warming, the potential return of near-normal cold conditions is increasingly likely to be perceived as exceptional, an inversion of the warming signal. This mechanism is not irrational at the individual level, but becomes problematic when institutionalized in media framing and amplified across large audiences, eroding the epistemic baseline needed to assess genuine climate risk.

Moreover, the conflation of precipitation and thermal hazards has practical emergency management consequences. Cold wave protocols (fuel security, protection from prolonged hypothermia, extended agricultural disruption) differ materially from those appropriate to a heavy snowfall event (surface clearance, short-term transport management). Misclassifying the February 2026 event as a cold wave rather than a blizzard thus risks misallocating preparedness resources and generating public fatigue that may undermine the credibility of future legitimate cold extremes, which, while less frequent in a warming climate, will continue to occur.

These findings point to the need for a more context-based communication framework for national meteorological services. Such a framework could include standardized contextual information in cold- and snowfall-related alerts, a publicly accessible Winter Climate Dashboard, clearer distinction in press releases between precipitation-driven and temperature-driven events, a structured protocol for engagement with major media outlets, and targeted educational measures to improve public understanding of extreme-weather information. Together, these measures could support more accurate interpretation of hazardous events, while reducing unwarranted alarm and limiting misinformation.

More broadly, the winter 2025/26 case illustrates a paradox that is likely to become more common under continued warming: as mild winters become the experiential norm, episodic heavy snowfall events driven by Mediterranean cyclones may be systematically overrepresented in public risk perception relative to their climatological frequency and thermal magnitude. Accurate communication of this paradox, that heavy snowfall and cold spells are



physically distinct phenomena with different drivers, different historical frequencies, and diverging future trajectories, is
a challenge that extends beyond Romania and applies across mid-latitude regions where warming winters coexist with
565 continued vulnerability to high-impact winter precipitation events. We argue that the Bucharest winter of 2026 is best
understood not as an exceptional cold spell, but as a high-impact snowfall event embedded in a warming climate and
amplified by a narrative of thermal exceptionalism, in other words, as the cold spell that never happened.

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590 **Author contributions.** MI conceived the ideas and designed the methodology together with VN. VN digitalized the unpublished data used in this manuscript. MI analyzed the data and drafted and led the writing of the manuscript with significant input from BA and VN. All authors contributed critically to the writing of the manuscript.

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595 **Data availability.** The data that support the findings of this study are available from the corresponding author upon reasonable request.

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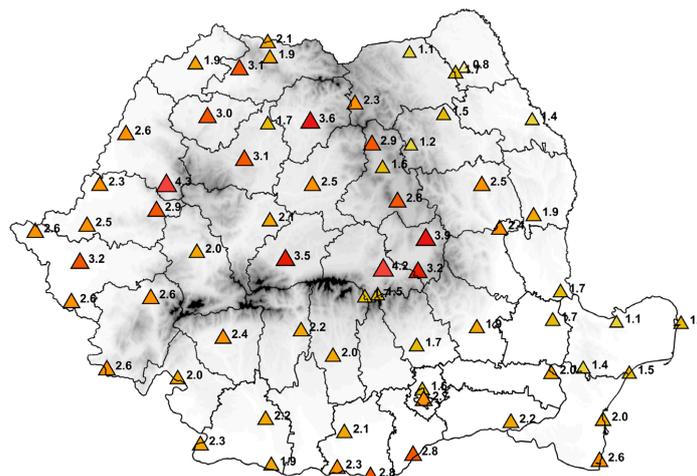


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a)



Mean Temperature Anomaly - January 2026



b)

Mean Temperature Anomaly - February 2026

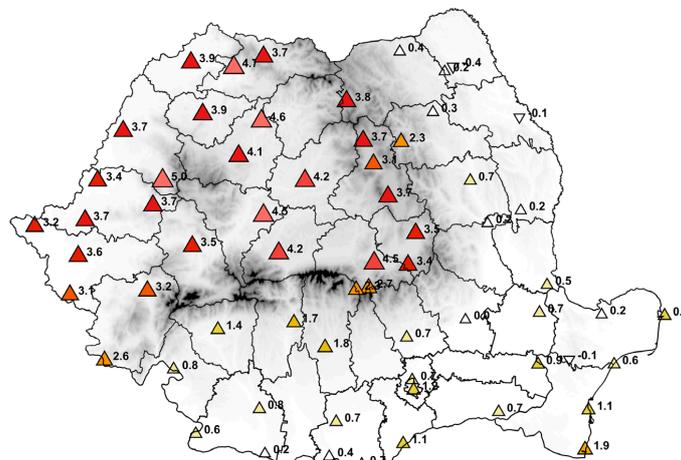


Figure 1. Monthly mean temperature anomalies at 65 meteorological stations in Romania. a) January 2026 mean air temperature anomaly and b) February 2026 mean air temperature anomaly. Analyzed period: 1961 – 2026. Climatological baseline: 1971 – 2000. Units: °C.

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a)

b)

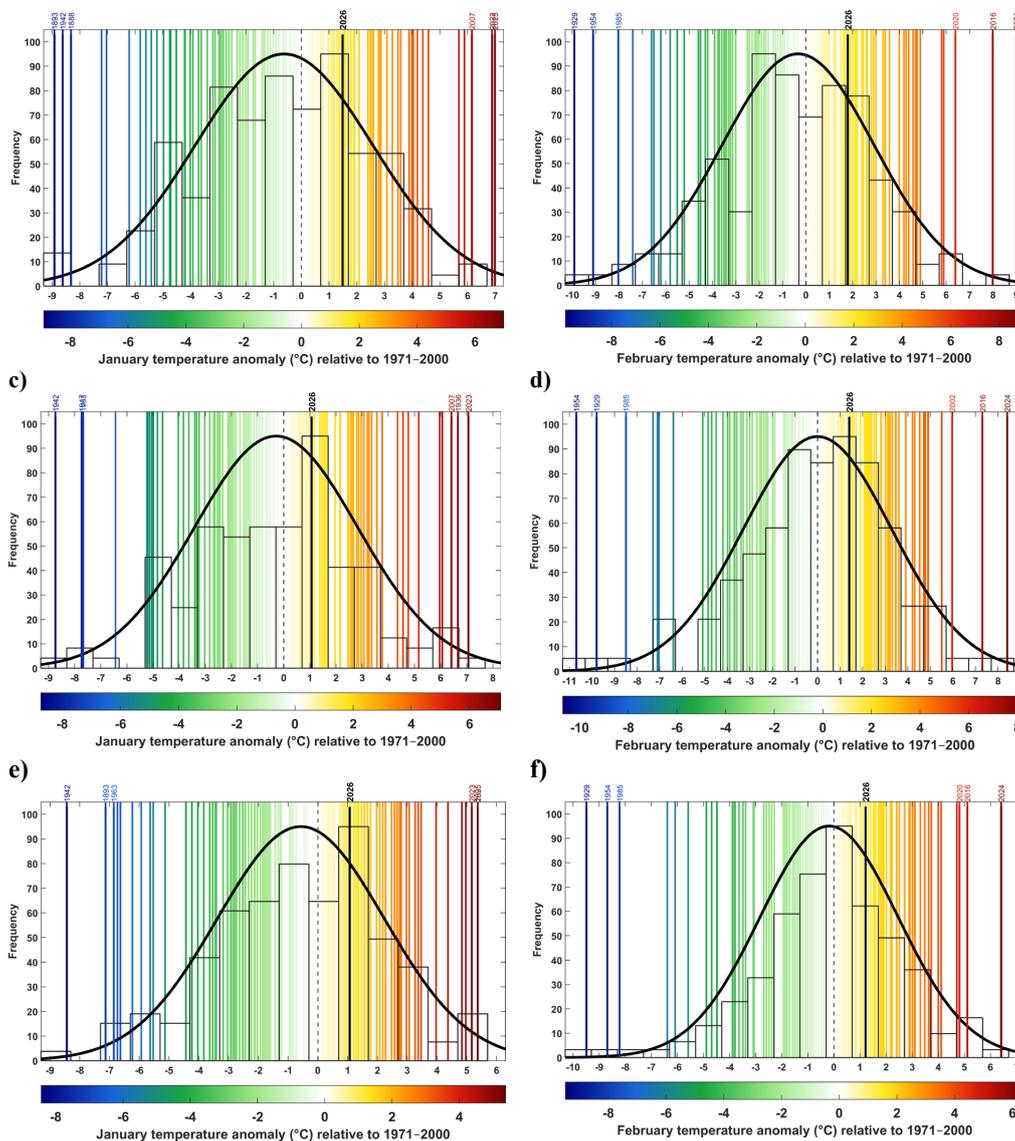


Figure 2. a) January mean air temperature anomaly for 1879 – 2025 at Bucuresti Filaret meteorological station. The three warmest and coldest months are highlighted. Black bars represent the distribution for the 1871 – 2026 period; b) as in a) but for the February mean air temperature anomaly; c) as in a) but for Calarasi meteorological station; d) as in b) but for Calarasi meteorological station; e) as in a) but for Sulina meteorological station; e) as in b) but for Sulina meteorological station. Units: °C.

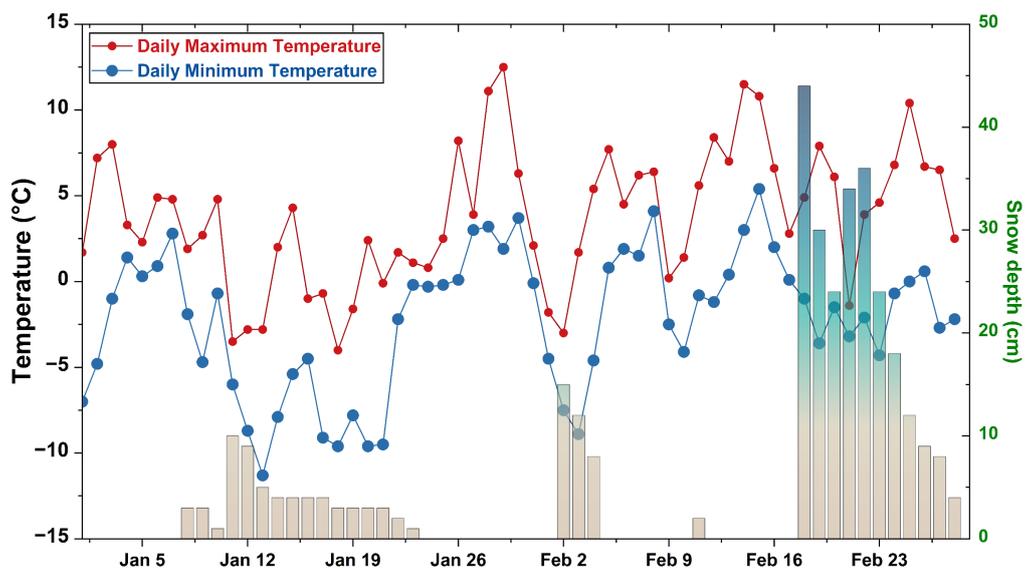


Figure 3. Temporal evolution of the daily maximum (red line) and minimum (blue line) temperature and the daily evolution of snow depth (bars) for January and February 2026.

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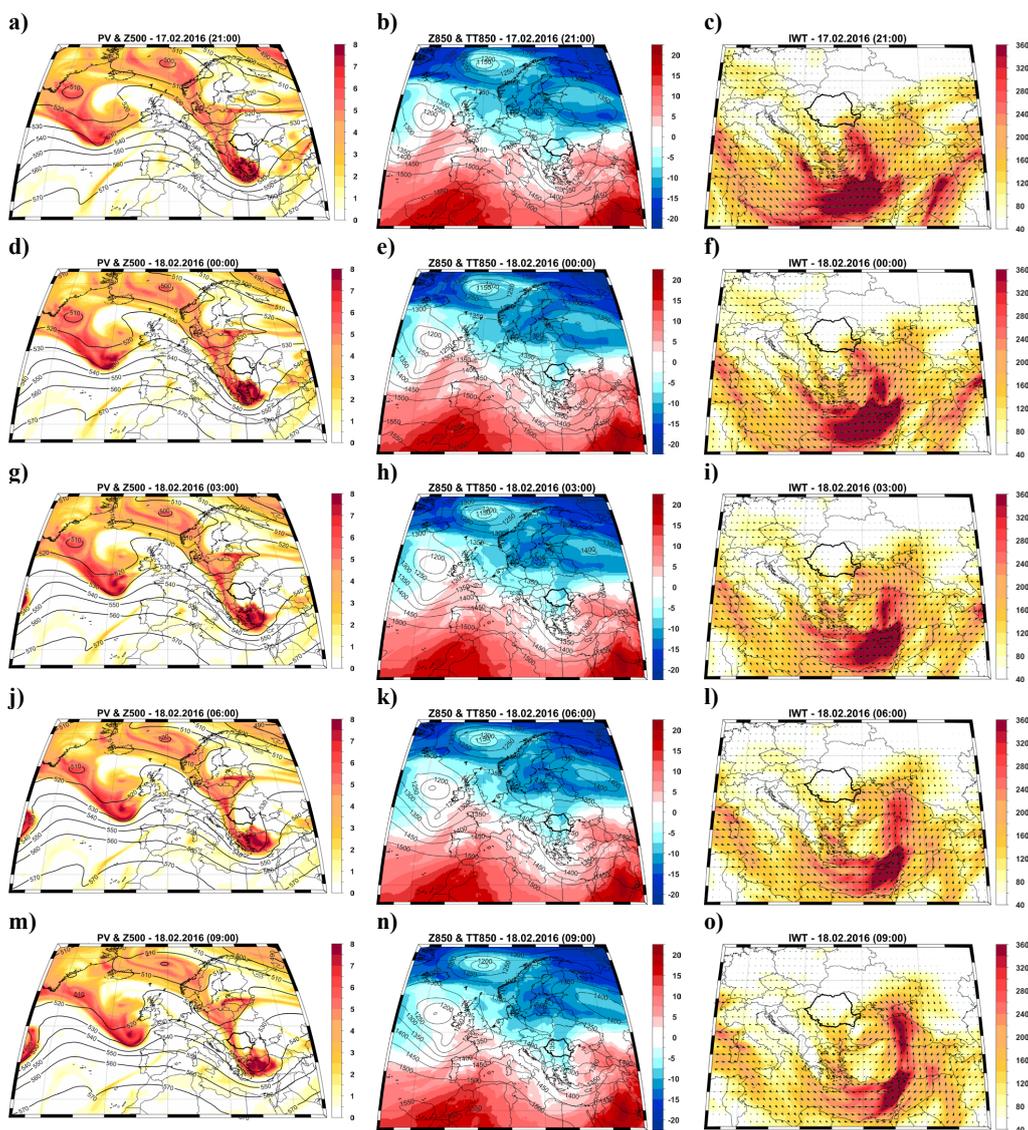


Figure 4. First column: Hourly Potential Vorticity (PV) at 300 K (shaded colors) and hourly Geopotential Height at 500mb (Z500) (contour lines). Middle column: Hourly temperature at 850mb (TT850) and geopotential height at 850mb (Z850). Last column: Magnitude (shaded colors) and direction (vectors) of the hourly integrated water vapor transport (IWT). Units: PV (PVU; $1 \text{ PVU} = 10^{-6} \text{ K kg}^{-1} \text{ m}^2 \text{ s}^{-1}$); Z500 (m); Z850 (m); TT850 (K) and WVT ($\text{kg s}^{-1} \text{m}^{-1}$).

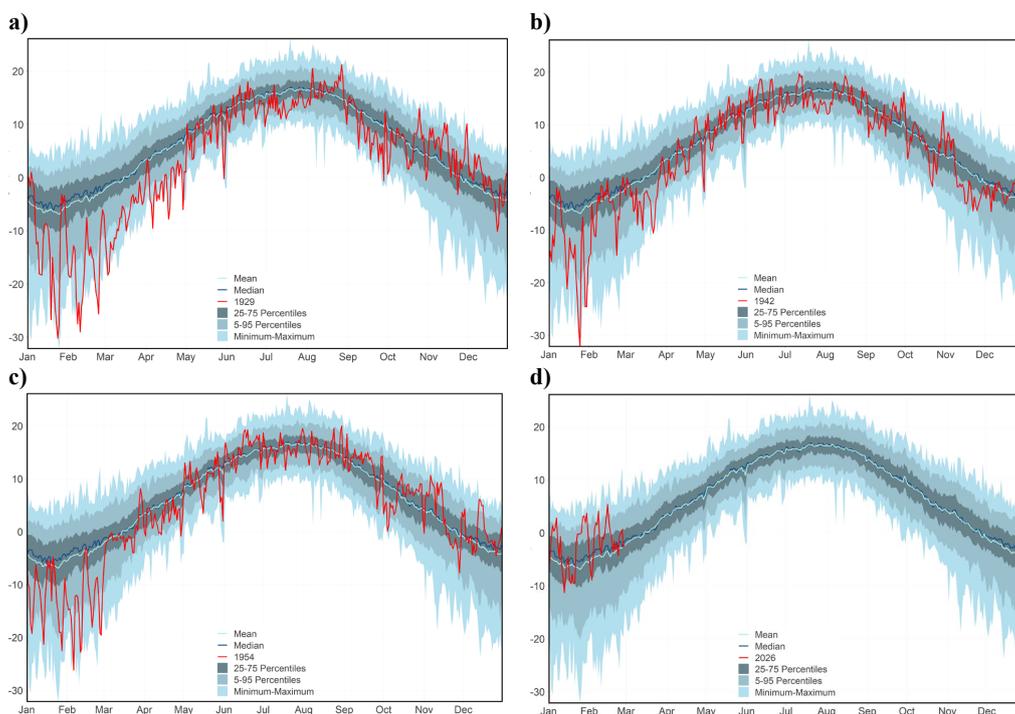


Figure 5.a) The evolution of the daily minimum temperature (red line), for the year 1929, at Bucuresti Filaret meteorological station compared to the daily minimum temperature pattern on an annual basis (blue shaded line); b) as in a) but for the year 1942; c) as in a) but for the year 1954 and d) as in a) but for the year 2026 (only January and February). In a), b) c) and d) the period 1879–2025 was used to compute the daily minimum temperature statistics. Units (°C)

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785

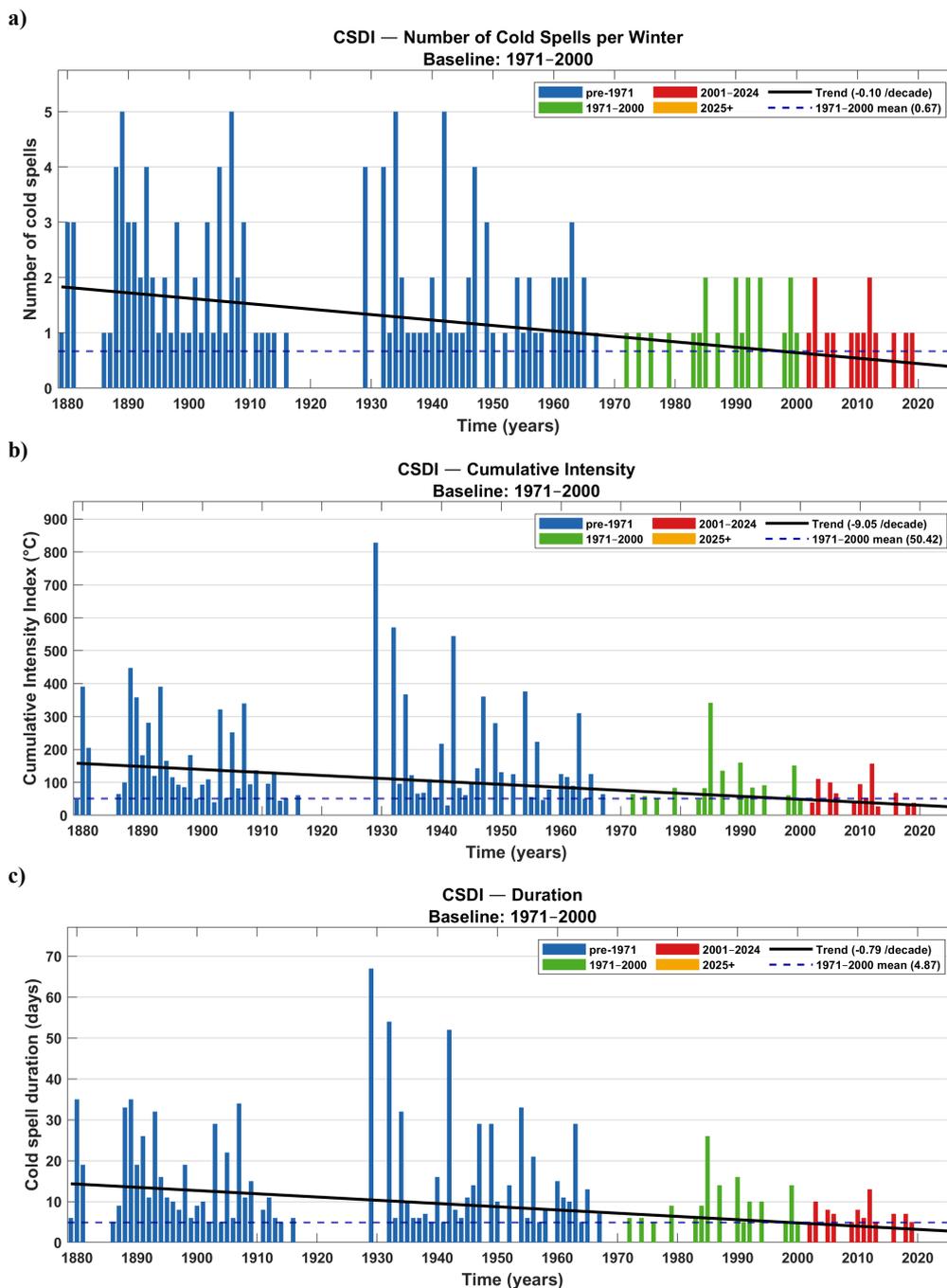


Figure 6. Winter (November - March) cold spell summary at Bucuresti Filaret, over the 1879–2026. a) Number of cold spells per winter; b) Cumulative intensity (°C) per winter and c) Total cold spell days per winter. For the winter 2025/26 only the data from November of Feruary was used.

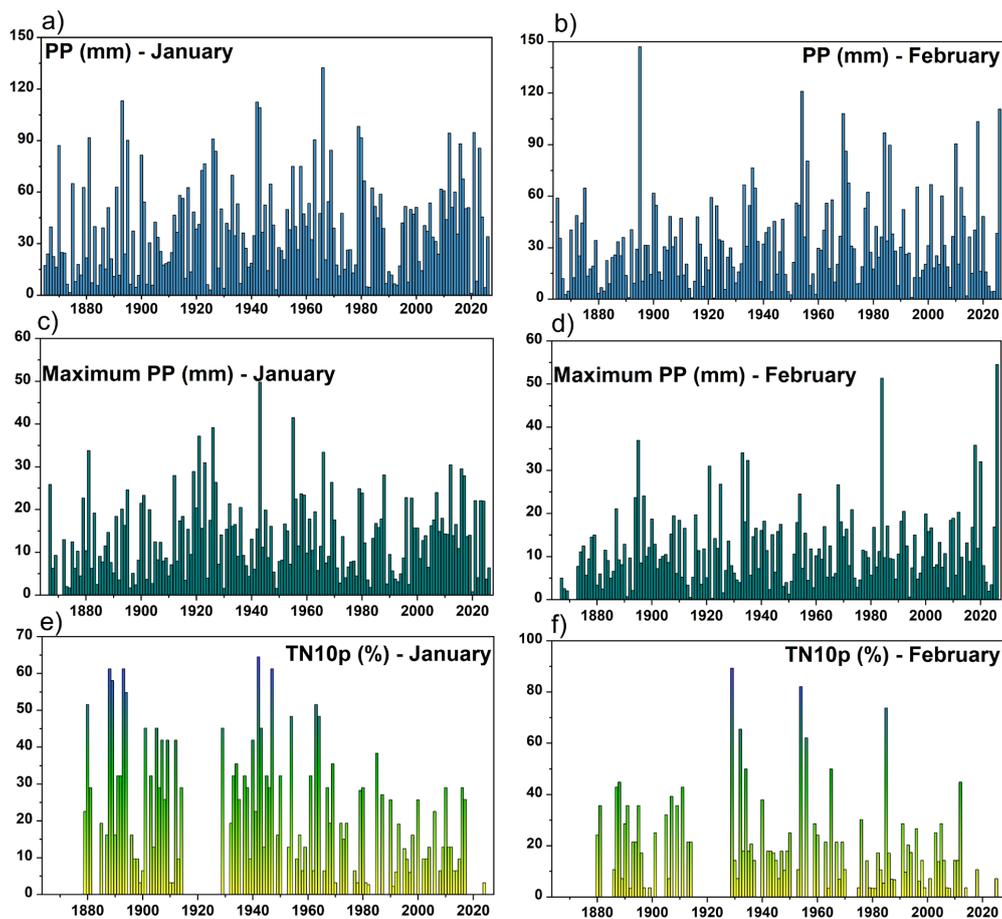


Figure 7. Long-term evolution of precipitation and low temperatures, in terms of TN10p index, at Bucuresti Filaret meteorological station. a) Monthly precipitation total for January over the period 1865 – 2026; b) as in a) but for February precipitation; c) Maximum precipitation observed in January over the period 1879 – 2026 at Bucuresti Filaret station; d) same as in c) but for February.

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Table 1. Cold spell catalogue at Bucharest Filaret (1879–2026), ranked by cumulative intensity (sum of the minimum temperature anomalies recorded for all the cold spells in the respective winter). The 2026 entry is highlighted.

Rank	Year	Cum. intensity (°C days)	Duration (days)	N
1	1929	828.3	67	4
2	1932	675.4	67	4
3	1942	544.5	52	5
4	1888	447.6	33	4
5	1880	391.1	35	3
6	1893	390.8	32	4
7	1954	376.3	33	3
8	1934	367.3	32	5
9	1947	360.6	29	4
10	1985	341.7	26	2
—	2026	0	0	0