Cemaden
National Center for Monitoring and Early Warning of Natural Disasters

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STATE OF CLIMATE, EXTREMES AND DISASTERS IN BRAZIL IN 2025

FEBRUARY 2026

Volume 02

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MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

BRAZILIAN GOVERNMENT
BRASIL
STANDING WITH THE BRAZILIAN PEOPLE

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MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION
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SUMMARY

INTRODUCTION

The year 2025 was the third warmest on record on the planet (based on data until November 2025). The global average temperature reached 14.97 °C, 1.47 °C above the pre-industrial level (1850–1900). The result was only 0.01 °C below 2023 and 0.13 °C below 2024, which remains the hottest year in the time series (Figure 1). The Copernicus Climate Change Service (C3S, https://climate.copernicus.eu/copernicus-2025-course-be-joint-second-warmest-year-november-third-warmest-record) report further shows that the last 11 consecutive years have been among the warmest in history, reinforcing a clear and ongoing trend of global warming.

In the tropics, air and sea surface temperatures were slightly less extreme than in 2023 and 2024, in part due to the presence of near-neutrality conditions or a weak La Niña in the Pacific Ocean. Even so, the values remained above the historical average in several regions.

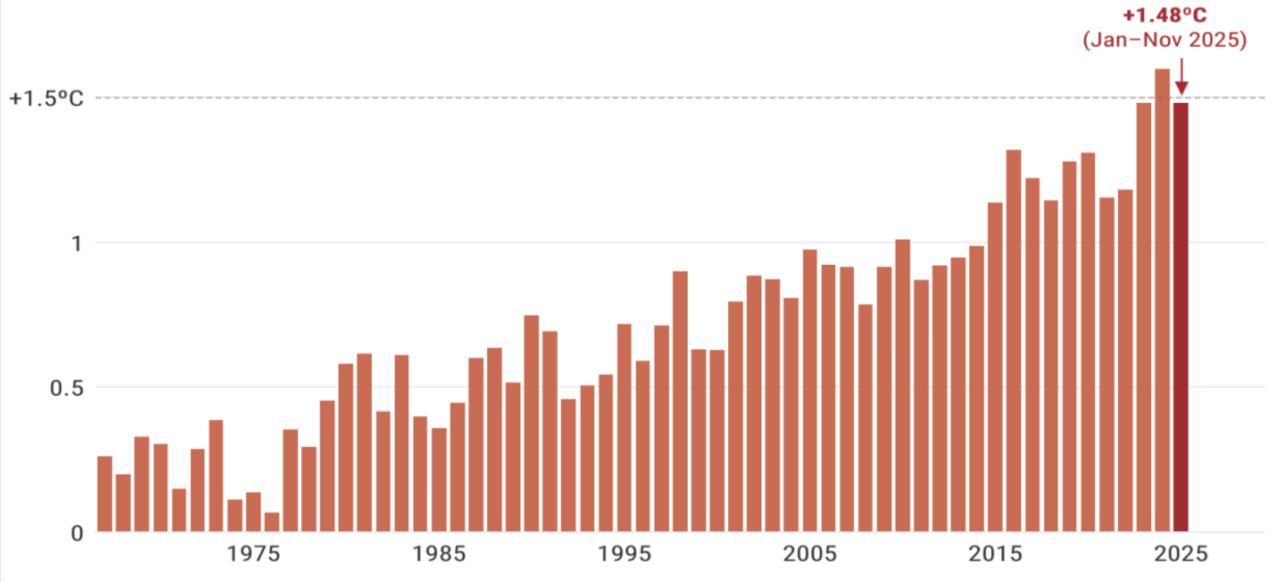


Figure 1 –Annual global surface air temperature anomalies (°C) relative to the pre-industrial period of 1850–1900, from 1967 to 2025. The 2025 value is based on data from January to November. (Data source: ERA5. Credit: C3S/ECMWF).

According to the World Meteorological Organization (WMO) State of the Climate report, presented at the 30th United Nations Climate Change Conference (COP30), https://library.wmo.int/viewer/69674/?offset=#page=5&viewer=picture&o=bookmarks&n=0&q=), to experience below normal rainfall and drought during the first half of 2025. This situation has affected the central region of South America, including

the Amazon since 2023, due to the presence of El Niño. In Brazil, the levels of the Amazon and São Francisco rivers were lower than normal.

High global temperatures, coupled with record levels of atmospheric water vapor by 2025, have triggered unprecedented heat waves, droughts, fires, and heavy rainfall, causing significant impacts and misery for millions of people.

The year 2025 in Brazil was marked by high temperatures and extreme weather events, consistent with the global warming trend, although it was slightly less warm than 2024, the year of record temperatures.

According to the National Institute of Meteorology (INMET, https://portal.inmet.gov.br/noticias/ver%C3%A3o-2024-2025-foi-o-sexto-mais-quente-no-brasil-desde-1961), the summer of 2024/2025 was the sixth hottest in Brazil since 1961, with the temperature 0.34 °C above the historical average. Intense heat waves especially affected the South of the country at the beginning of the year, with cities recording peaks above 40 °C in February. In the last five years, Brazil has registered an increasing pattern of record temperatures.

Temperatures around the globe have indeed been increasing, and the trend in the coming years is for more extreme events, including increasingly frequent and intense heatwaves, and fewer but more intense cold waves. Certain regions are more susceptible to extreme temperatures and the consequences of extreme weather, particularly the South, Southeast, and Midwest.

Thousands of Brazilian municipalities have experienced climate disasters, including heavy rainfall and flooding, as well as dry spells, droughts, and heatwaves. The COP-30 debates reinforced this perception. The summer of 2025 was marked by a combination of extreme weather events that affected several regions of Brazil. Heavy rainfall at the beginning of the season, followed by successive heat waves and prolonged drought, created a scenario of sharp contrasts. The La Niña phenomenon, combined with persistent atmospheric patterns, was decisive for rainfall and temperature behavior over the months, resulting in a season of extremes that affected everything from agriculture to urban mobility.

The sources of information to obtain data on weather and climate extremes in 2025 are: CEMADEN (https://www.cemaden.gov.br), INMET (https://www.inmet.gov.br), CPTEC/INPE (https://www.cptec.inpe.br), CLIMATEMPO (https://www.climatempo.com.br), ReliefWeb (https://reliefweb.int/), OCHA (https://www.unocha.org/), PreventionWeb (https://www.preventionweb.net/), Flood Awareness Brazil(https://global-flood.emergency.copernicus.eu/news/209-floods-in-brazil-june-2025/), The Watchers (https://watchers.news/2025/02/10/7-dead-as-extreme-rainfall-causes-flooding-and-landslides-in-pernambuco-brazil/), Brasil de Fato

(https://www.brasildefato.com.br/2025/08/25/chuvas-intensas-deixam-mais-de-700-desabrigados-e-desalojados-em-dezenas-de-cidades-do-rs/) and news web sites CNN Brasil, SBT News, G1, Folha de São Paulo, O Estado de São Paulo, O Globo, Correio do Povo, among others.

RAINFALL

In 2025, Brazil had a very irregular rainfall pattern — with periods of rainfall above climatology in some regions and long dry periods in others, in addition to extreme events throughout the year (Figure 2). The summer was very hot and had irregular rainfall. In the North and parts of the Northeast, there was significant rainfall, with high accumulations, driven by the Intertropical Convergence Zone (ITCZ). In several parts of the Midwest and Southeast, especially in some areas of Mato Grosso, Goiás, São Paulo, and Minas Gerais, rainfall was below the climatological average. The influence of the South Atlantic Convergence Zone (SACZ) led to episodes of heavy rain in December and early January, but rainfall then decreased in many areas. In Paraná, rainfall in January was below average in many areas, with values below historical climatology. In several regions of Brazil there were long periods without rain, especially in late summer and winter 2025. Some areas experienced 60 to 90 consecutive days without rainfall, exceeding historical climatology, which exacerbated drought conditions. In cities such as Campo Grande (Mato Grosso do Sul state), February 2025 saw increased rainfall compared to 2024. However, it was still below the historical monthly climatology.

Figure 3 shows some significant extreme rainfall events, droughts, and disasters that affected Brazil in 2025. Further details are presented in this Section.

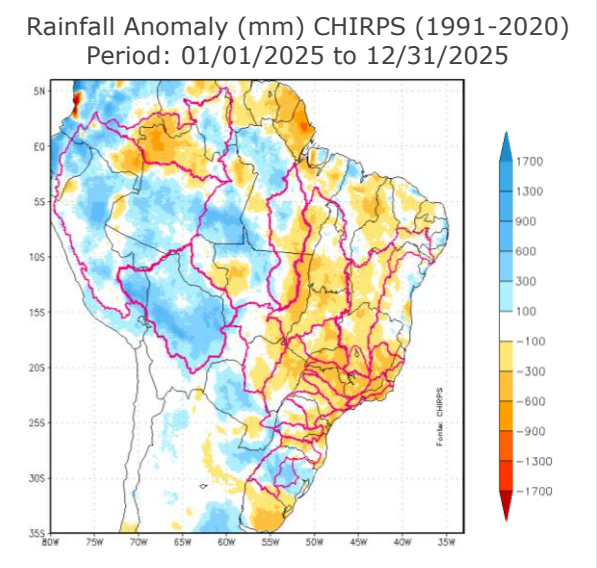


Figure 2 – Rainfall anomalies (mm) in Brazil in 2025, relative to the 1991–2020 climatology. (Data source: CHIRPS; estimates and map: CEMADEN).

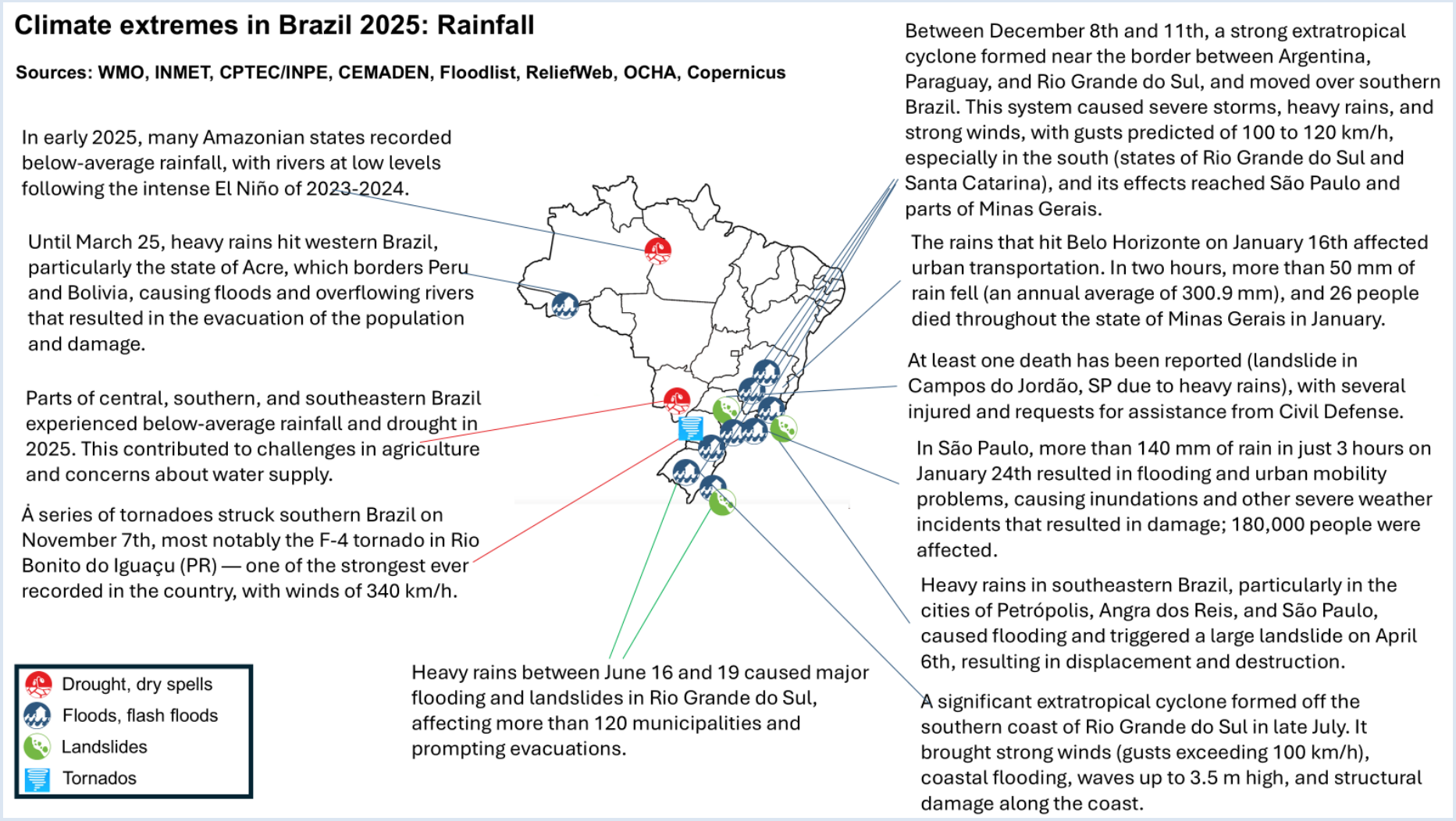


Figure 3 – Examples of episodes of intense rainfall, drought, and climate related disasters that affected Brazil in 2025. (Source: WMO, INMET, CPTEC/INPE, CEMADEN, Floodlist, ReliefWeb, OCHA, Copernicus).

Extreme rainfall

The beginning of summer was marked by heavy rainfall, especially in December and part of January. Some episodes of heavy rainfall and their associated disasters are listed below.

- Heavy rains in some locations in 24-48 hours, causing floods, flooding, and landslides in urban and rural areas, power outages; 7 deaths, landslides, and transport interruptions in several cities in the Agreste and Zona da Mata in Pernambuco happened on January 11 and 12. As a result of the rains, 270 people were left homeless and displaced, and thousands were affected.

- Extremely heavy rains hit the Metropolitan Region of Vale do Aço (Minas Gerais) between January 12 and 13, causing floods and landslides and at least 12 confirmed deaths; thousands were left homeless and displaced. This was one of the year's first major weather disasters, caused by extreme precipitation.

- Frequent rains in Belo Horizonte until the 10th and, between the 11th and 26th of January, became irregular, occurring in the form of isolated showers. The 17th saw the heaviest rainfall in the center-south region, with 29.2 mm in Santo Agostinho and 39.0 mm in Pampulha. The monthly rainfall total was 345.6 mm, close to the historical monthly average (January climatology: 330.9 mm).

- On January 24, the city of São Paulo recorded the third highest rainfall volume since INMET measurements began in 1961—125.4 mm.

- Belo Horizonte recorded 20 days of rainfall in January, accumulating a monthly total of 345.6 mm, exceeding the historical average (330.9 mm), which caused flash floods, landslides, and 24 deaths.

- Florianópolis recorded more than 350 mm of accumulated rainfall between January 15 and 17, causing floods, landslides, and collapse of buildings.

- In São Paulo, more than 140 mm of rainfall in just 3 hours on January 24 resulted in floods and urban mobility problems that resulted in damage; 180,000 people were affected due to power cuts.

- On February 6, 2025, Recife declared a state of maximum alert due to heavy rains and suspended classes. Rainfall exceeding 300 mm caused flooding, service interruptions, and landslides in several cities across the state.

- Heavy rains have affected the state of Amazonas since March 4, causing floods and landslides that resulted in casualties and damage; two people were

injured, and one missing person.

- From March 21, heavy rains affected western Brazil, particularly the state of Acre, on the border with Peru and Bolivia, causing flooding and overflowing rivers, resulting in evacuations and damage to communities. The Acre River registered 14.34 m on March 23.

- In April, heavy rains and intense winds affected the states of Rio Grande do Sul and Santa Catarina, causing floods and severe weather incidents, mainly due to strong winds, which resulted in casualties and damage.

- In April, the Central-West and Southeast regions stood out, with some cities registering volumes above the climatological average of the period, such as, for example, Teresópolis, in Rio de Janeiro, which accumulated 689.4 mm, when the average is 106.3 mm, which represented an increase of 548%.

- Heavy rains in the Southeast region of Brazil, mainly in the cities of Petrópolis, Angra dos Reis and São Paulo, which resulted in floodings and triggered massive landslides on April 6, causing population displacements and destruction.

- In Santa Catarina, until May 12, there were two deaths in the region of the municipalities of Palmitos and Caibi; six injured people in the municipality of Mondaí, 20 families homeless and 150 houses damaged throughout the state. In Rio Grande do Sul, 13 people were left homeless and two houses were damaged in the municipality of Santa Maria, as well as approximately 100 houses were damaged in the municipality of Soledade.

- Between June 16 and 20, heavy rains, ranging from 117 mm to more than 170 mm, affected several municipalities in Rio Grande do Sul, leading to the overflow of rivers, culminating in hundreds of municipalities affected by flooding, displacement of thousands of people and multiple damage to infrastructure.

- On June 23-24, 2025, in Rio Grande do Sul, heavy rains caused floods and landslides in several municipalities in Rio Grande do Sul. Rivers such as Uruguay, Jacuí and Taquari have exceeded alert levels, causing the displacement of families, calamity decrees and several confirmed deaths. These disasters affected 120 municipalities, leading to the evacuation of areas. Some cities in Rio Grande do Sul recorded rainfall of more than 110 mm/day.

- The events in the South region in June were part of a pattern of heavy rainfall during the austral winter, with rising rivers and multiple municipalities affected by floods outside the traditional

summer period. At the end of June, an extratropical cyclone caused rainfall of 240 mm in Rio Grande do Sul in a few days.

- On August 25, heavy rains affected several cities in the state of Rio Grande do Sul: roofs, tree falls and flooding in dozens of municipalities; cities in a state of public calamity. Damage to hundreds of homes and 35 schools and 700 homeless.

- On November 23, a hailstorm in Erechim, RS, affected more than 43 thousand people, damaging thousands of homes and leaving hundreds injured. The municipality declared a state of emergency in response.

- Between December 8-9, storm systems in Rio Grande do Sul caused heavy rainfall, winds, lightning and hail, causing flash flooding in several regions, with damage to infrastructure and displacement of residents.

- The heavy rain that hit the city of São Paulo on the afternoon of December 27 left the entire city in a state of alert due to flooding and 158,268 properties without electricity in Greater São Paulo.

- The state of Acre once again recorded above-average rainfall in October 2025, ending a period of prolonged drought. The accumulated volume of precipitation reached 204.6 mm, surpassing the historical average of 150 mm by 36.5%. The result indicated that October was the wettest month in the last five years, except in 2022.

- The Acre River rose 3.84 m in less than 24 hours in the city of Rio Branco, having exceeded the overflow quota on the morning of December 27, reaching 14.03 m.

Drought and dry spells

The beginning of 2025 was marked by below-average rainfall in many Amazonian states, with rivers at low levels after the intense El Niño of 2023-2024, and slow recovery of rivers at the beginning of the year. Levels were still low in the Negro, Solimões and Madeira rivers. In February, municipalities located in the states of Amazonas and Acre still registered severe drought. In the Northeast region, irregular rains also delayed the recharge of the reservoirs.

- In March and April, in the Northeast, the drought intensified, causing a reduction in soil moisture, especially in the interior of Bahia and Piauí. In this period, 62 municipalities presented severe drought conditions.

- In April 2025, the South, Southeast and Northeast regions recorded an intensification of the drought compared to the previous month. According to the Integrated Drought Index, 7 municipalities in the interior of São Paulo were in a condition of extreme drought.

- Between May and June, the Midwest and Southeast recorded water stress in pastures and crops and an increased risk of forest fires at the beginning of winter. According to the drought monitoring in family farming carried out by CEMADEN, considering the sowing dates between April and May 2025, 1 municipality in Bahia presented a very high risk of impacts, 236 municipalities registered a high risk and 563 a moderate risk. These results reflect the drought conditions observed in that period and the high vulnerability of the sector, with a higher concentration of risks in the North, Northeast and Southeast regions, varying according to the sowing month (April or May) (RiSAF - DROUGHT RISK IN FAMILY FARMING JUN/25 — CEMADEN).

- In July and August, the Midwest, Southeast and North had air humidity below 20% in several cities, a significant increase in wildfires and forest fires, smaller rivers and reservoirs falling in the Southeast and Midwest. Between June and July, the drought intensified, with an increase in the number of municipalities in severe drought (from 101 to 148) and in moderate to extreme drought (from 1,018 to 1,480), forming a corridor of water deficit from the Southeast to the Midwest and North of the country. After two years of severe droughts, the state of Amazonas faced a mild to moderate drought in August 2025, with an estimated impact on 20 to 30 municipalities. The forecast is that about 120 thousand families — approximately 480 thousand people — were affected throughout the state.

- In September, the North and Midwest recorded a critical combination of drought and heat waves, which increased the risk of fires. According to INPE's fire monitoring data, approximately 28 thousand active hot spots were registered. Although it was a high value, it was lower than that recorded in previous years (https://terrabrasilis.dpi.inpe.br/queimadas/situacao-atual/estatisticas).

- In October and November, parts of central, Southern and Southeastern Brazil recorded below-normal rainfall and droughts in 2025, in addition to delayed spring rains in part of the country. This contributed to impacts on agricultural and water supply concerns. In November, severe to extreme drought conditions persisted in

MATOPIBA (Maranhão, Tocantins, Piauí and Bahia areas), in the interior of Bahia and in the central area of the Paraná Basin, with more intense water deficits in southern Goiás, eastern Mato Grosso do Sul, São Paulo and Minas Gerais. In this period, the municipalities in extreme drought increased from 2 to 5, and those in severe drought, from 472 to 490, with greater expansion of the affected areas in Piauí, Bahia and northern Minas Gerais.

- In the Southeast, the drought situation demands the need for risk management and preparation for prolonged droughts, to avoid a possible new water crisis in the Metropolitan Region of São Paulo (RMSP) in the summer of 2025-2026.

- In December, in the Southeast, there was a gradual return of rainfall in several regions, but in an irregular way, generating floods in cities such as São Paulo and Rio de Janeiro.

- In November 2025, eight states recorded droughts in 100% of the territory: Ceará, the Federal District, Goiás, Minas Gerais, Piauí, Rio de Janeiro, São Paulo, and Tocantins.

As a result of the deficit of accumulated rainfall, especially in the second half of 2025, according to the Integrated Drought Index (IDI) of CEMADEN presented in Figure 4, the drought conditions continued in part of the state of Amazonas, in a large part of the Midwest, in the state of São Paulo, and in the Triângulo Mineiro region, in the December-January-February (DJF) quarter, although less intense than in the previous months in 2025, totaling about 70 municipalities with severe or extreme drought conditions. In the following period, March-April-May (MAM), the drought situation worsened again, especially in the central region of the country, due to the accumulated rainfall below average recorded in March. Despite this, approximately 400 municipalities, distributed throughout the national territory, still had severe and extreme drought conditions.

In the following months, June-July-August (JJA), drought persisted along the corridor that covers the North, Midwest and Northeast regions of the country, totaling 114 municipalities with severe and extreme drought (Figure 4). In the September-October-November (SON) quarter, this total increased to 503 municipalities, reflecting the intensification of the drought mainly in the MATOPIBA region (part of Bahia, Tocantins, Piauí and Maranhão) and in part of São Paulo, Goiás and Minas Gerais (Figure 5). In these states, areas in exceptional drought conditions were also observed. In terms of duration, part of these areas already had drought in the severe to exceptional categories for up to 10 consecutive months, considering the December 2025 update (Figure 6).

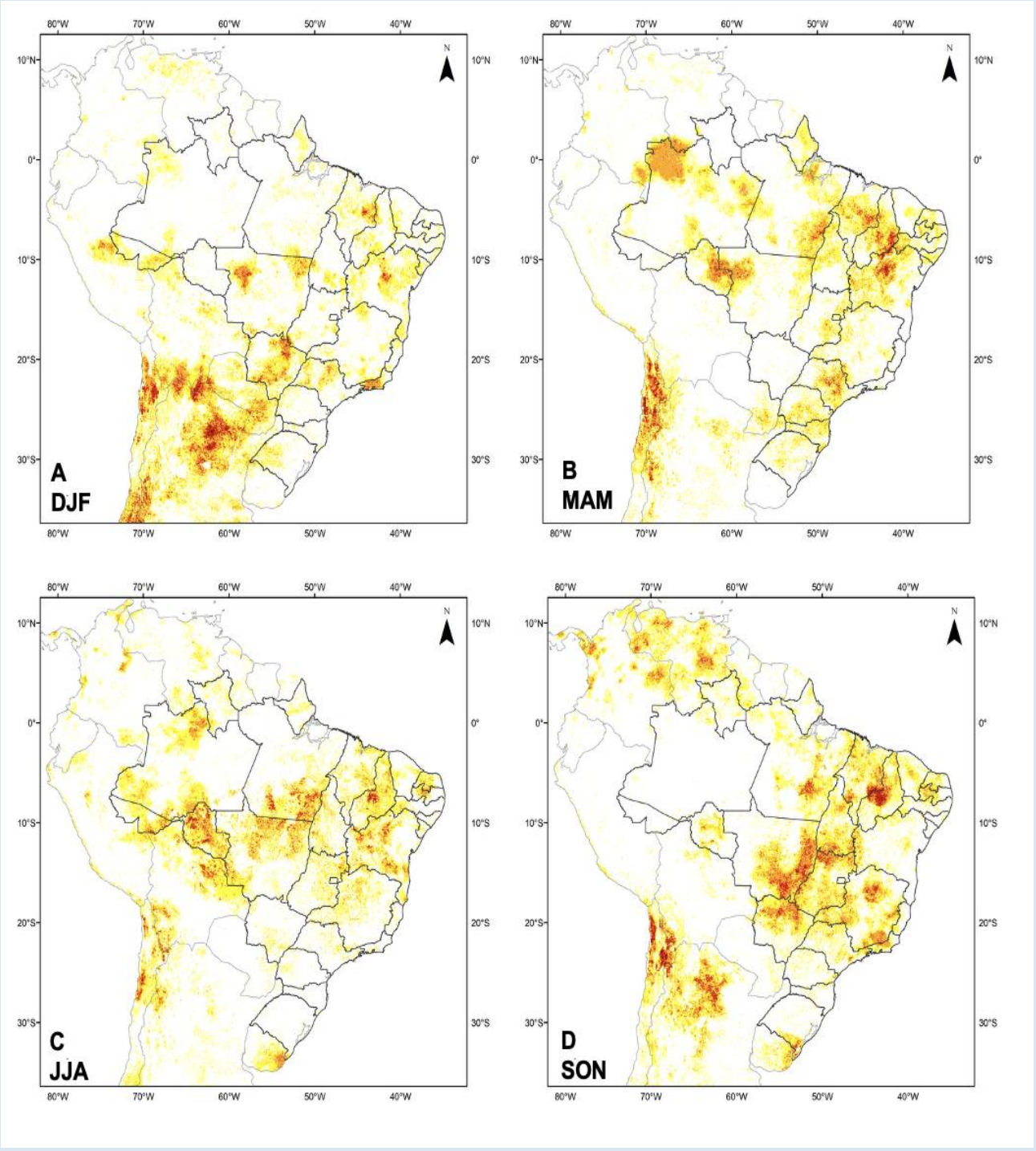


Figure 4 – Seasonal Integrated Drought Index (IDI) in Brazil in 2025, for the quarters DJF (A), MAM (B), JJA (C) and SON (D). (Source: CEMADEN).

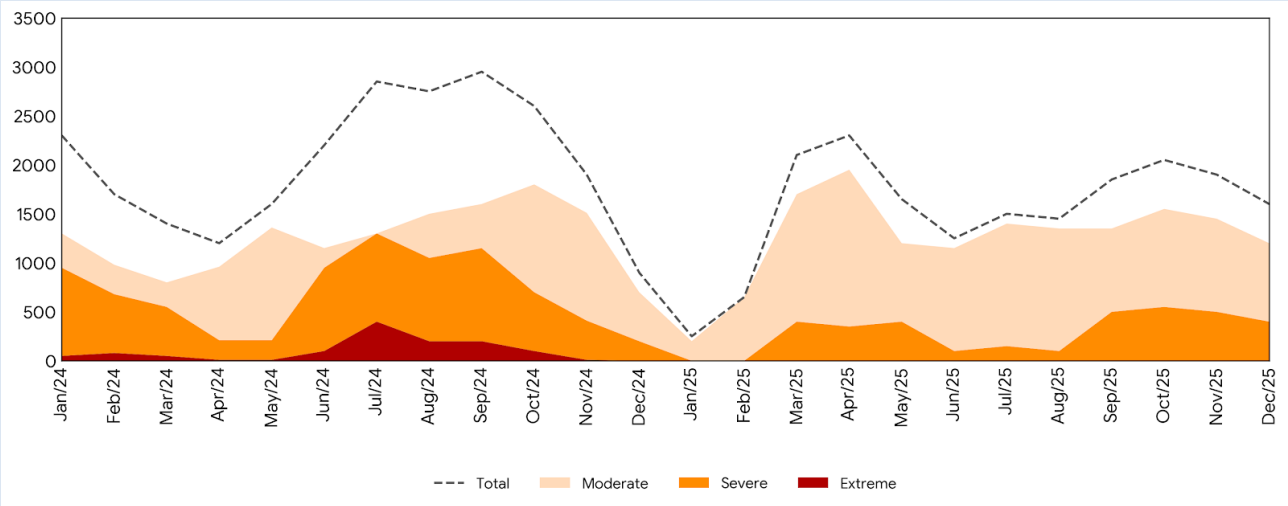


Figure 5 – Total municipalities with moderate to extreme drought in Brazil, between January 2024 and December 2025, according to the three-month Integrated Drought Index (IDI-3). (Source: CEMADEN).

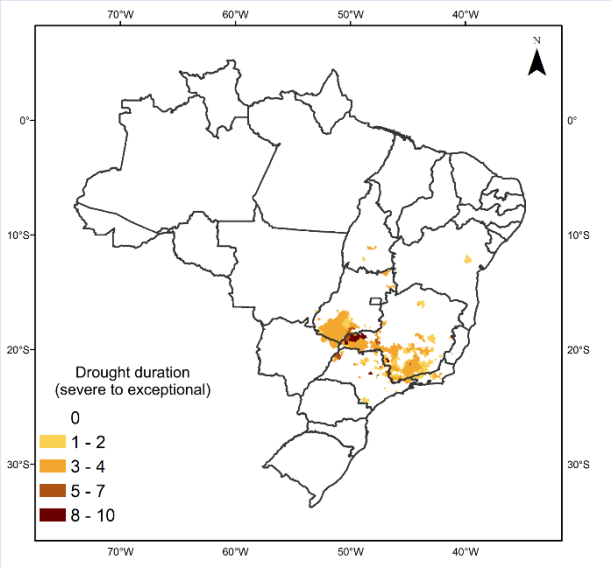


Figure 6 - Duration of drought considering severe to exceptional categories, estimated from the Integrated Drought Index (IDI), which indicates the number of consecutive months in which these conditions were observed, based on the situation in force in December 2025. (Source: CEMADEN)

In general, in the national context, the drought was more extensive in 2024 than in 2025. Even so, the persistence of the water deficit in some regions throughout 2025 contributed to the pressure on water resources, especially in the Southeast, as will be detailed below.

In terms of water resources, the basins monitored by CEMADEN (Figure 7) were in a critical condition in early 2025, characterized by a predominance of severe to exceptional hydrological drought conditions across large river systems in the Northern and Midwest regions of the country.

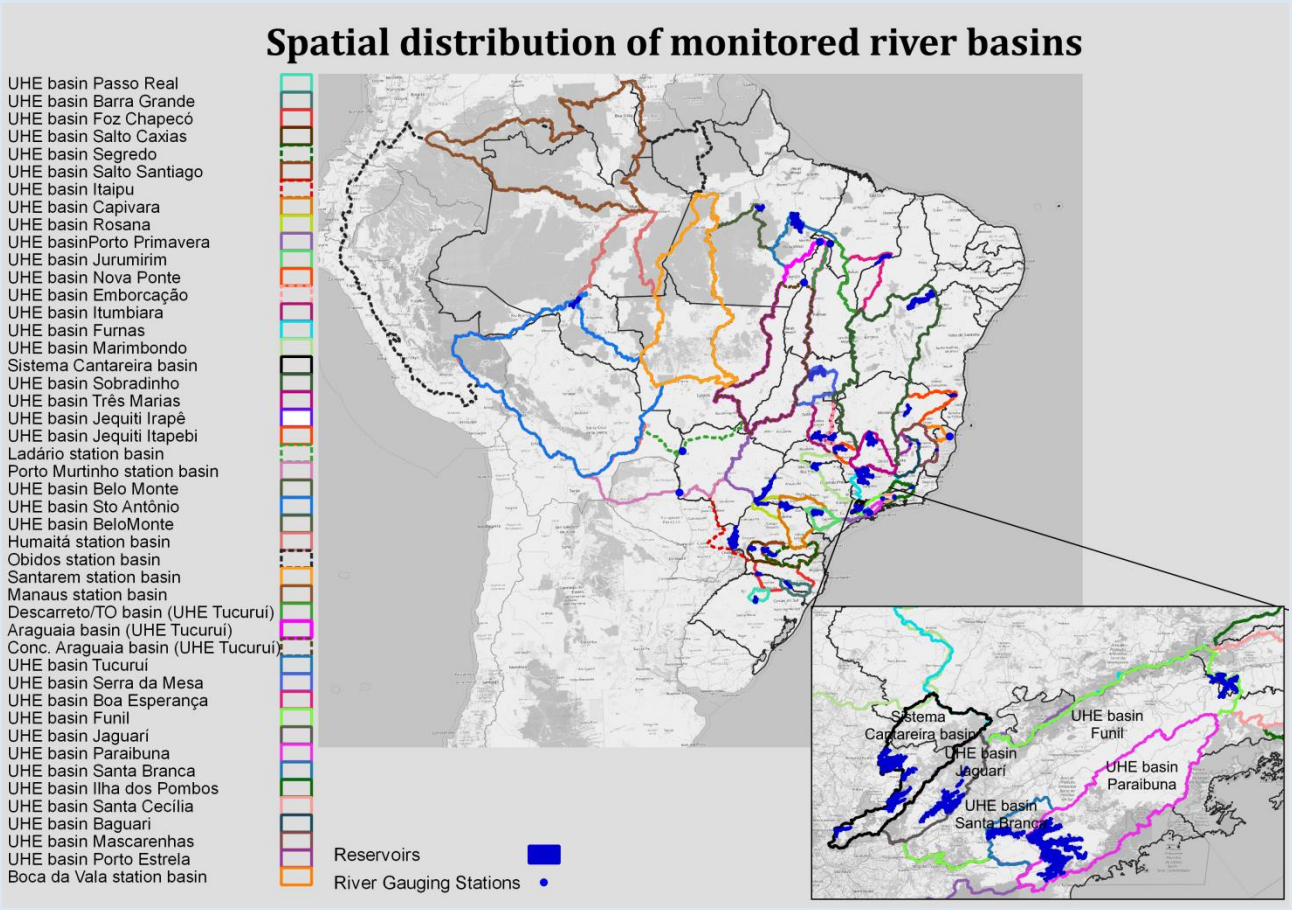


Figure 7 – Priority hydrographic basins for hydropower generation, water supply, and navigation in Brazil, monitored by CEMADEN in the context of hydrological drought (Source: CEMADEN).

In early 2025, Solimões, Negro, Madeira, Amazonas river basins (up to the Óbidos gauging station), and the Paraguay River, according to the Two-variate Standardized Index (TSI, Cuartas et al., 2024), were under exceptional hydrological drought conditions (Figure 8). Throughout the year, these basins showed a progressive weakening of hydrological drought conditions, particularly in basins in the Northern region, which ended the year under normal conditions, except for the Negro River basin, which remained under moderate drought conditions. In contrast, the Paraguay River basin in the Midwest region persisted under exceptional drought conditions for 18 months. In other regions of the country (Figure 8), hydrological drought conditions in early 2025 ranged from extreme drought in the Araguaia and middle Paraná River basins to moderate drought in the Paranapanema, Uruguay, and Xingu River basins, while the remaining basins were under mild drought or normal conditions. The overall conditions remained relatively stable throughout the dry season, with only slight improvement observed by September 2025.

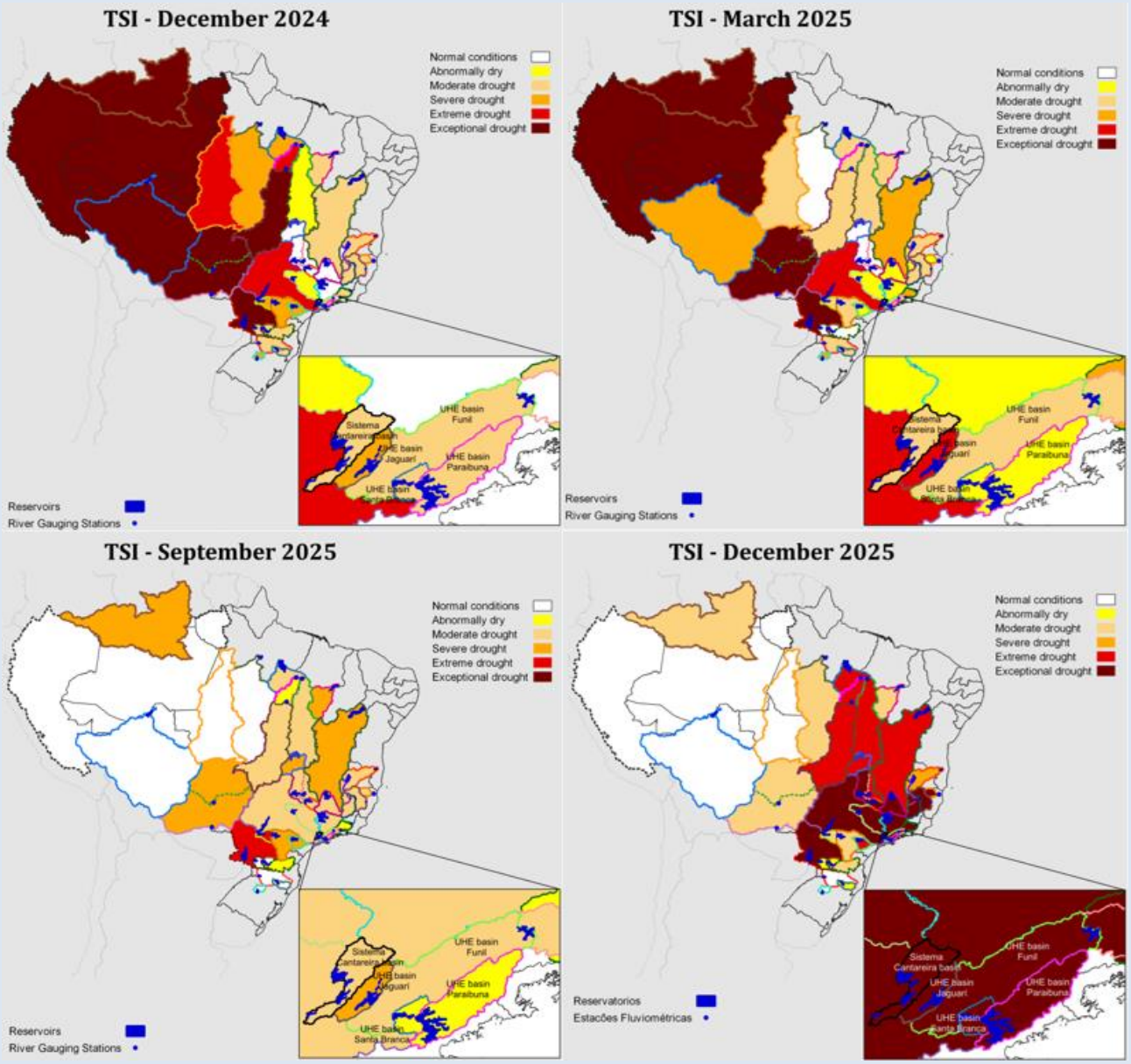


Figure 8 – Two-variate Standardized Index - TSI for selected months: December 2024, March 2025 (end of the rainy season in Central and Southeastern Brazil), September 2025 (end of the dry season), and December 2025 (Source: CEMADEN).

The Paraná River basin started 2025 with heterogeneous hydrological drought conditions across its sub-basins: normal conditions in the headwater sub-basins; severe drought in the Paranapanema sub-basin; extreme drought in the middle Paraná up to the Porto Primavera Hydroelectric Power Plant (HPP); and exceptional drought in the downstream incremental reach up to the Itaipu HPP. Rainfall during the 2024–2025 wet season, together with isolated events during the dry season, contributed to a weakening of drought conditions in the middle and lower Paraná, which ended the dry season (September 2025) under moderate and extreme drought conditions, respectively. In contrast,

the headwater sub-basins experienced a worsening of conditions, ending September 2025 under moderate drought.

However, the early rainy season of 2025-2026 (October to December) in the Southeast region was characterized by irregular and below-average rainfall, with some areas experiencing up to 60 consecutive dry days during the period. This contributed to a widespread intensification of drought conditions across the Paraná River basin, which ended 2025 under exceptional drought conditions across approximately 80% of its area. In addition, beyond the generalized worsening in the Paraná River basin and in other basins such as the Paraíba do Sul and Doce rivers, a critical situation persisted in the São Francisco and Tocantins-Araguaia basins, both key for hydropower generation in the country, thereby increasing water security risks.

This worsening was critically reflected in water supply systems, especially the Cantareira System, the main water supply source for the Metropolitan Region of São Paulo. The Cantareira System started 2025 under moderate hydrological drought conditions, with 50.4% water storage, and ended the year under exceptional drought conditions, with only 20.2% storage, the lowest level recorded since the 2014–2015 water crisis (Figure 9).

This critical situation is not solely driven by hydroclimatic factors, since 2024 and 2025 were characterized by water withdrawals above the average observed over the 2016–2023 period (post-water crisis), by 24% and 30%, respectively (Figure 10). This increase is not directly explained by population growth in the Metropolitan Region of São Paulo, which, according to the 2022 Census of the Brazilian Institute of Geography and Statistics (IBGE), has increased by approximately 1.05 million inhabitants since 2010. Instead, the rise in water withdrawals from the Cantareira System may be related to increased demand driven by higher per capita consumption and industrial water use.

Further details are available in the bulletins from CEMADEN's Monthly Impact Meetings: (https://www.gov.br/cemaden/pt-br/assuntos/monitoramento/boletim-de-impactos).

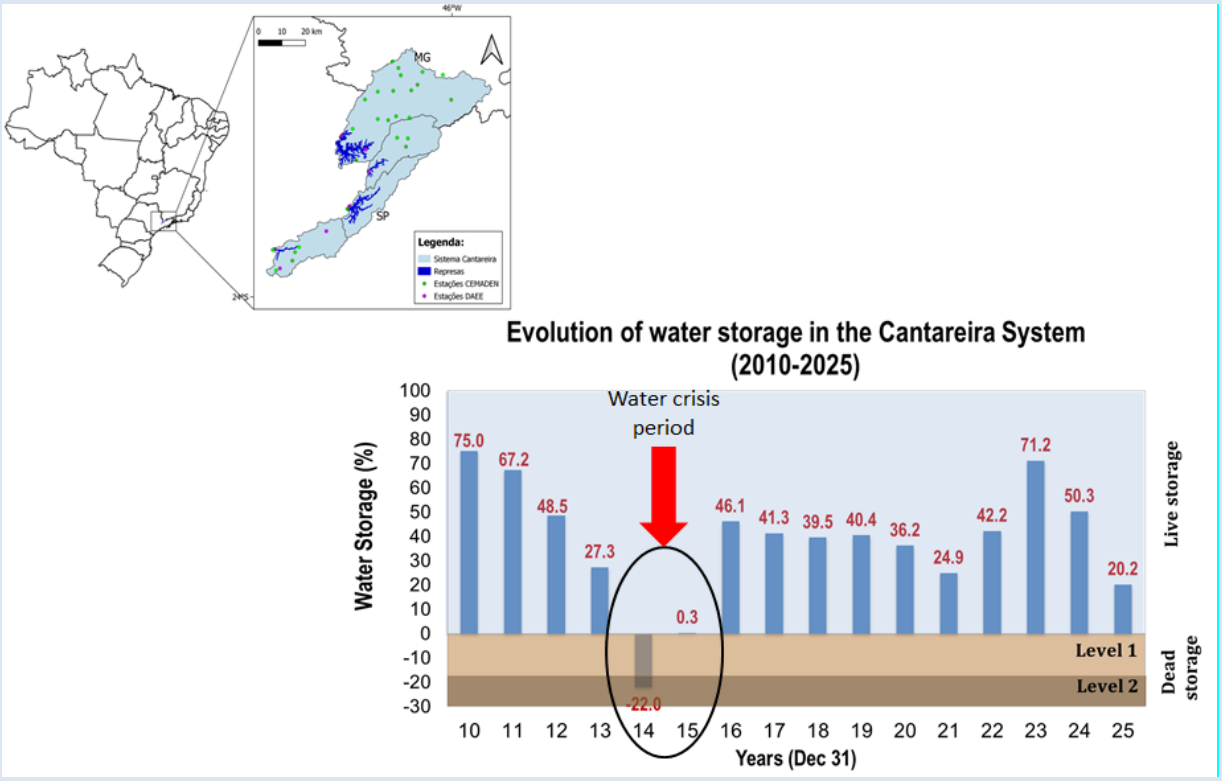


Figure 9 – Temporal evolution of water storage in the Cantareira System (%), based on end-of-December values for the period 2010–2025 (Source: CEMADEN).

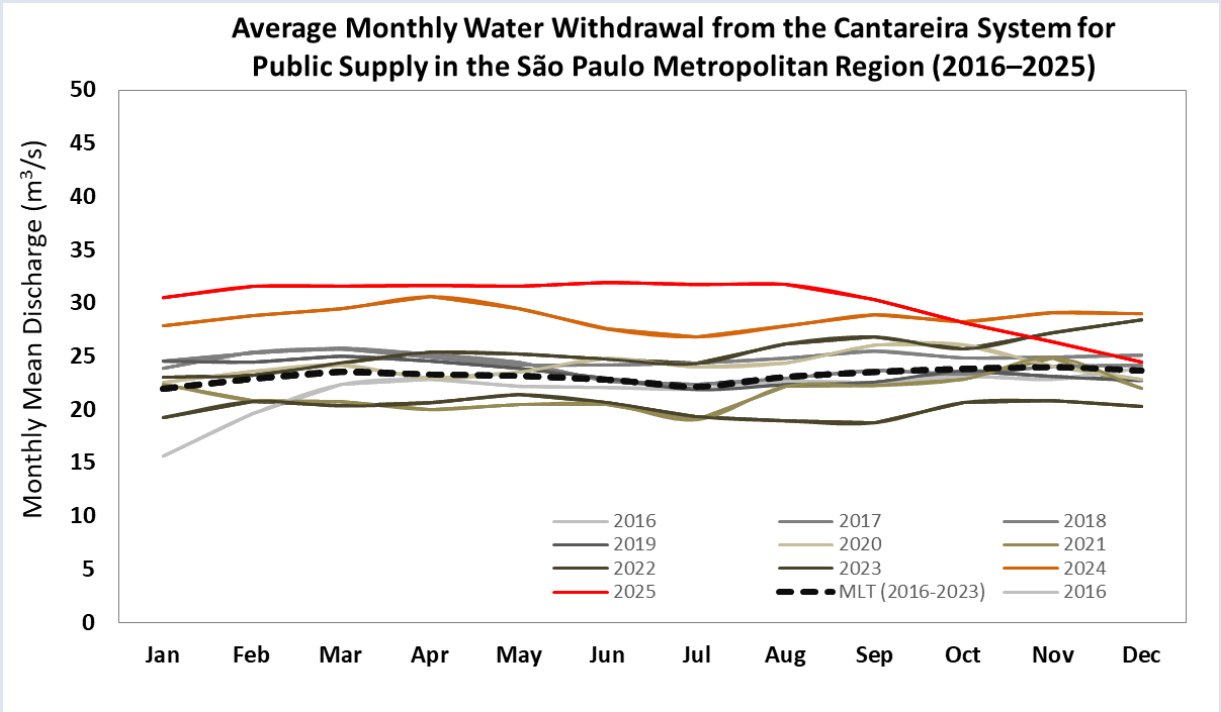


Figure 10 – Withdrawals of water to supply the Metropolitan Region of São Paulo, in the period from 2016 to 2025, after the 2014-2015 water crisis. (Source: CEMADEN).

TEMPERATURE

The summer that began in December 2024 and ended in March 2025 was one of the warmest ever recorded in Brazil since 1961, remaining among the hottest in the historical series (INMET). Average temperatures were above the historical average in much of the country, with several intense heat waves, especially in the South and other regions (Figure 11). This intense heat occurred despite the presence of the La Niña phenomenon, which normally reduces average temperatures, suggesting that other factors, such as climate change, contributed to the warming. The autumn and winter of 2025 presented above-average temperatures in most regions, although cold fronts caused sudden drops in temperature, with records of record cold and frost in the south of the country. During the winter and other periods throughout 2025, extreme temperatures were recorded in the North and Northeast, with maximums close to 42 °C in some capitals and cities. In late spring and early summer of 2025, there were cold fronts in the South and Center-South, bringing milder temperatures and even atypical weather conditions for the season in some regions. The period from August to October was particularly dry in many areas, intensifying the drought in the Southeast and parts of the Midwest and South. In cities such as São Paulo, and other capitals in the Southeast, there were sharper variations throughout the year, with milder days interspersed with heat waves.

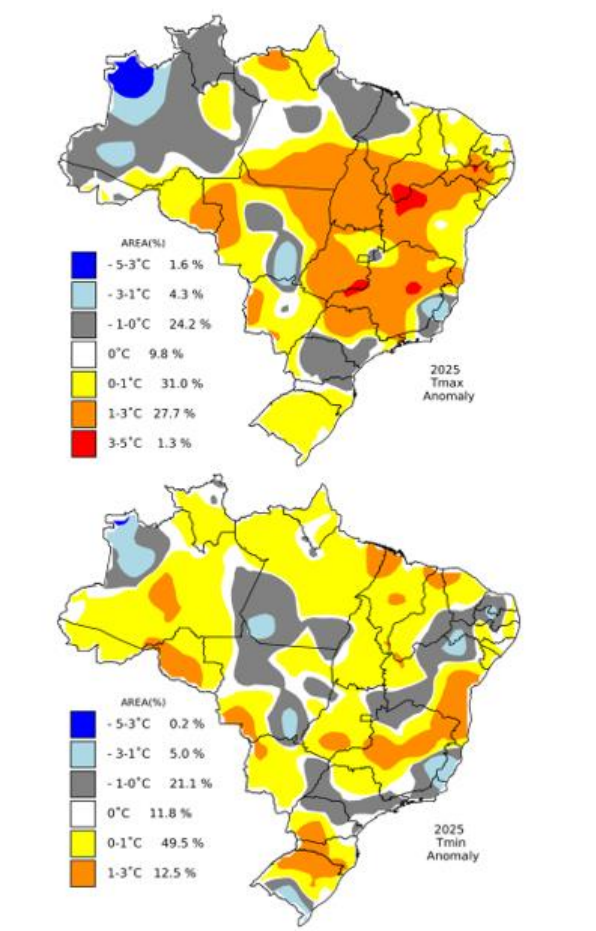


Figure 11 – Maximum temperature (Tmax, °C) and minimum temperature (Tmin, ºC) anomalies in Brazil in 2025, in relation to climatology for the period 1991-2020. The colors represent the temperature anomaly intervals, and the percentages indicate the fraction of the country area (%) covered by each anomaly class (Data source: CPC Global temperature, estimate and map: CEMADEN).

The year as a whole saw above-average temperatures in many parts of the country, heavily influenced by summer heatwaves and continued warming trends. In some locations, the pattern included warmer-than-normal periods and extremes of heat, reflecting both seasonal variations as well as consistent signs of the global warming trend. In some

areas, there were reports of prolonged periods of intense heat that demanded the attention of residents and health services.

Figure 12 shows some significant heat and cold wave events that affected Brazil in 2025. Further details are presented in this Section.

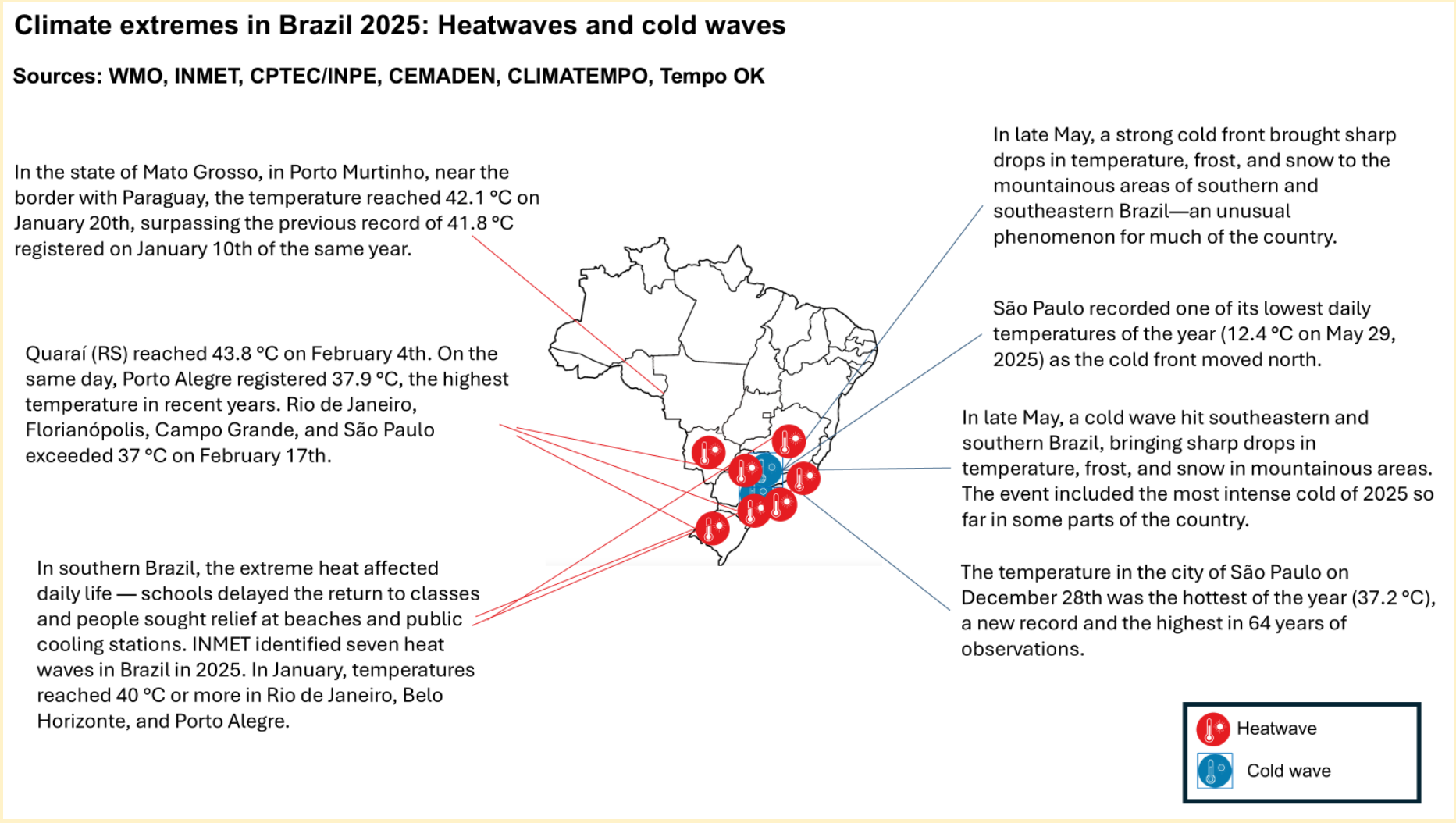


Figure 12 – Examples of episodes of heat and cold waves that affected Brazil in 2025. (Source: WMO, INMET, CPTEC/INPE, CEMADEN, CLIMATEMPO, Tempo OK).

Heat waves

In 2025 there was a strong concentration of heat waves (HW) in January and February (summer); one episode occurred in March (autumn); New waves occurred in early spring (September) and the year ended with extreme heat at the end of December, already in summer. In total, 2025 recorded 7 HW (Table 1).

It is observed that throughout 2025, HW was recorded in most cities, with episodes of 10 days or more in the summer of 2025 in all locations in Figure 13. However, the most severe heat episodes at the end of the year (HW7) were observed in southeastern Brazil, where temperatures above 35 °C were recorded. These HW's lasted for more than 9 days. In Quaraí, Rio Grande do Sul, the HW's during the summer were more intense, especially in February; however, the HW7 in December was not very intense. In the Center-South, temperatures were consistently above average, driven by 7 consecutive waves. These HW's kept the heat persistent and raised the thermal records in several cities, especially February, the hottest month of the summer. Between January and February, in Southern Brazil, maximum temperatures reached ~39–40 °C in several cities in Rio Grande do Sul. Quaraí recorded 43.8 °C on February 4, the highest in Brazil in that period. In the Southeast, São Paulo recorded 33.3 °C, the record temperature of the season on January 18. In February, Rio de Janeiro recorded between 42 and 44 °C, one of the most intense peaks of the year. On 20 February, temperatures remained high in several Brazilian capitals. Rio de Janeiro: 38.8 °C; Campo Grande: 34.4 °C; Porto Velho: 33.8 °C; São Paulo: 32.9 °C.

In September, the Midwest, Southeast, North and Northeast were affected by a heat wave. Maximum temperatures recorded: Cuiabá (MT) - 41.4 °C, Campo Grande (MS) - 38.7 °C, Brasília (DF) - 33.6 °C, Coxim (MS) - 41.3 °C Rondonópolis (MT) - 41.0 °C, Pedro Gomes (MS) - 40.9 °C, Valparaíso (SP) and Porangatu (GO) - 40.5 °C.

Brazil faced the seventh HW's in the first week of summer 2025/2026. On December 28, São Paulo recorded a new heat record for the month and the highest index in 64 years. The maximum reached 37.2 °C, measured at the Mirante de Santana station (INMET), in the north of the city. The value surpassed the record of Friday (26), when the maximum temperature was 36.2 °C. It was the third record in four days, and the marks are the highest in the period since 1961. The State of Rio de Janeiro registered, in the last days of the year, more than 2 thousand attendances of people who fell ill due to the heat in health centers. On December 25, the city of Rio de Janeiro reached the historical maximum temperature of 40.1 °C. Several cities in the state of São Paulo, (such as Campinas, Sorocaba, Piracicaba and Taubaté), recorded temperatures between 37 °C and 39 °C, evidencing the extent of the event.

Table 1 – Timeline of heat waves (HW) that affected Brazil in 2025, with indication of the periods and the main regions affected. The dates correspond to approximate time ranges HW's occurrence (≥5 days above the local climatological threshold), based on INMET syntheses. (Sources: INMET, CPTEC/INPE, CLIMATEMPO, COPERNICUS).

Period	Main Region Affected
HW1: 14-23 Jan	South, Midwest
HW2: 2–12 Feb	South, Midwest
HW3: 14–20 Feb	Southeast, Northeast, South
HW4: 1–8 Mar	South, Midwest
HW5: 1-12 Sep	Midwest, North, Northeast, Southeast
HW6: 18-22 Sep	Southeast, Midwest, North
HW7: 24–31 Dec	Southeast, Midwest

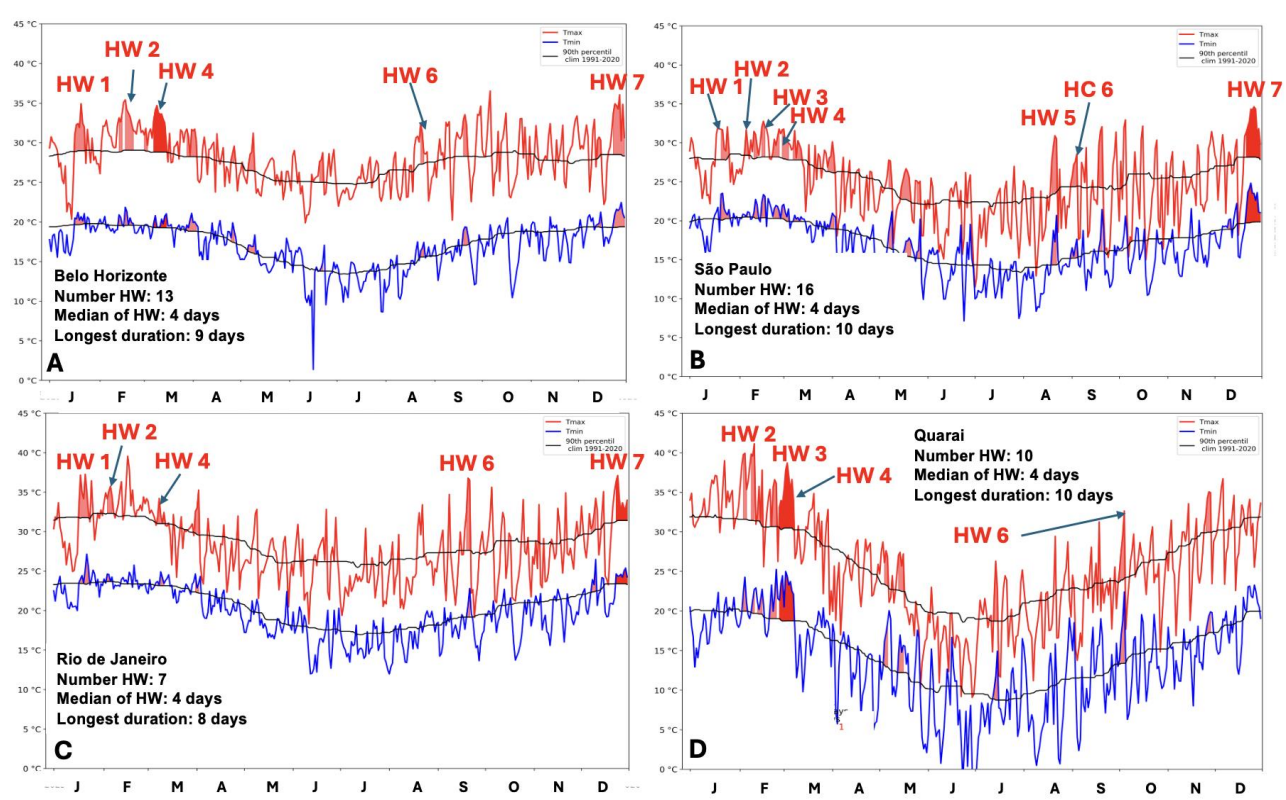


Figure 13 – Time series of maximum (Tmax) and minimum (Tmin) temperature at four locations in Brazil, from January 1, 2025, to December 31, 2025: (a) Belo Horizonte (MG), (b) São Paulo (SP), (c) Rio de Janeiro (RJ), (d) Quaraí (RS). The values are compared to the climatological average (1991-2020, represented by the black lines). Heat wave (HW) events are indicated by red letters, as described in Table 1. (Source: NOAA CPC temperature data, Marengo et al. 2025, 2026).

As is characteristic of heat waves, the Southeast was affected by an atmospheric block that prevented the arrival of cold fronts and kept warm air masses over the region, raising temperatures above the historical

average. In large cities, urban heat islands raise temperatures, with concrete and asphalt trapping heat and reducing nighttime cooling (Figure 14).

Climate change is directly related to the increase in the frequency and intensity of heat waves. Global warming has raised average temperatures and altered atmospheric patterns, making events like these more common and intense.

According to Marengo et al. (2026), the heat waves of summer 2025 and December 2025 were characterized by positive geopotential height anomalies of 850 and 200 hPa, at the characteristic levels of blocking patterns over tropical and subtropical South America, with hot and dry air. Maximum temperature extremes are consistently higher during periods characterized by these positive geopotential height anomalies.

Termômetro de rua marca até 39ºC na cidade de São Paulo

São Paulo, 12/26/2025

28.dez.2025 - Termômetro na avenida Paulista chegou a marcar 40ºC neste domingo, dia em que a via fica fechada para carros

São Paulo, 12/28/2025


Termômetro em uma rua no Rio de Janeiro mostra 39°C — Foto: Fernando Frazão/Agencia Brasil via BBC

Rio de Janeiro, 12/27/2025

Pedestres enfrentam sol e calor em São Paulo

São Paulo, 12/27/2025

Figure 14 – Images of heat waves episodes in São Paulo and Rio de Janeiro during 2025. (Sources: G1, Folha de São Paulo, O Globo).

Cold waves

In 2025, in Brazil, there were 7 cold wave episodes (CW), especially during the winter, with significant temperature drops, frost records and part of the country affected by intense polar air masses (Table 2). The month of June 2025 was marked by two consecutive cold events — the second, particularly intense, with a significant impact on the South, Southeast and even part of the Center-West.

In May, in the South, there was a sudden drop in temperature, with minimums close to 5 °C in several areas. The most severe cold episodes occurred between May and September (CW2 to CW7). In Quaraí (RS) and Curitiba (PR), temperatures were close, with the latter city registering 0 °C and reaching negative values in Quaraí (Figure 15).

Between June 24 and 25, a strong CW hit the South, Southeast and Midwest regions, resulting in negative minimum temperatures in the South. The lowest temperatures in the South region were recorded in the cities of Quaraí and Cambará do Sul, both with 0.9 °C; São José dos Ausentes and Colombo (PR), with 1.1 °C; Marechal Cândido Rondon (PR), with 2.1 °C; Rio do Campo (SC), with 2.9 °C; and Erechim and Vacaria (RS), both with 3 °C. On June 25, 2025, several cities in southern Brazil recorded minimum temperatures below 0 °C in elevated areas: General Carneiro (PR): −7.8 °C, São José dos Ausentes (RS): −4.5 °C. Regions such as Pinheiro Machado (RS) recorded snow locally. Strong frosts were observed in several parts of the South region.

On June 29, the occurrence of snow was recorded in the municipalities of São José dos Ausentes, in Rio Grande do Sul, and São Joaquim, in Santa Catarina. The phenomenon occurred due to the combination of an intense mass of cold air of polar origin with the humidity available in the region, creating the ideal conditions for the formation of snowflakes. Temperatures remained below 2 °C in the early hours of the day, with 0 °C at the São José dos Ausentes weather station.

In early July 2025, a new cold air mass impacted mainly the South Region, with minimums below –5 °C. In Dom Pedrito (RS) and Bagé (RS), for example, minimum temperatures of -4.3 °C and -5.0 °C, respectively, were recorded on July 2nd. The most impacted regions include South Brazil, Mato Grosso do Sul, south-central and western Mato Grosso, part of São Paulo, areas in the states of Rondônia and Acre, and the extreme south of Amazonas. In addition, the episodes of frost were intense in several cities in Rio Grande do Sul.

Table 2 – Timeline of the cold waves (CW) that affected Brazil in 2025, with an indication of the periods and the main regions affected. The dates correspond to approximate time ranges CW's occurrence (<5 days below the local climatological threshold), based on INMET syntheses. (Sources: INMET, CPTEC/INPE, CLIMATEMPO, COPERNICUS).

Period	Main Region Affected
CW1: 5-16 Apr	South, Southeast, Midwest
CW2: 27-31 May	South, Southeast, Midwest
CW3: 8-14 Jun	South, Midwest
CW4: 23-27 Jun	South, Southeast
CW5: 30 Jun-4 Jul	South, Southeast, Midwest
CW6: 8-13 Aug	South, Southeast
CW7: 3-8 Sep	South, Southeast, Midwest

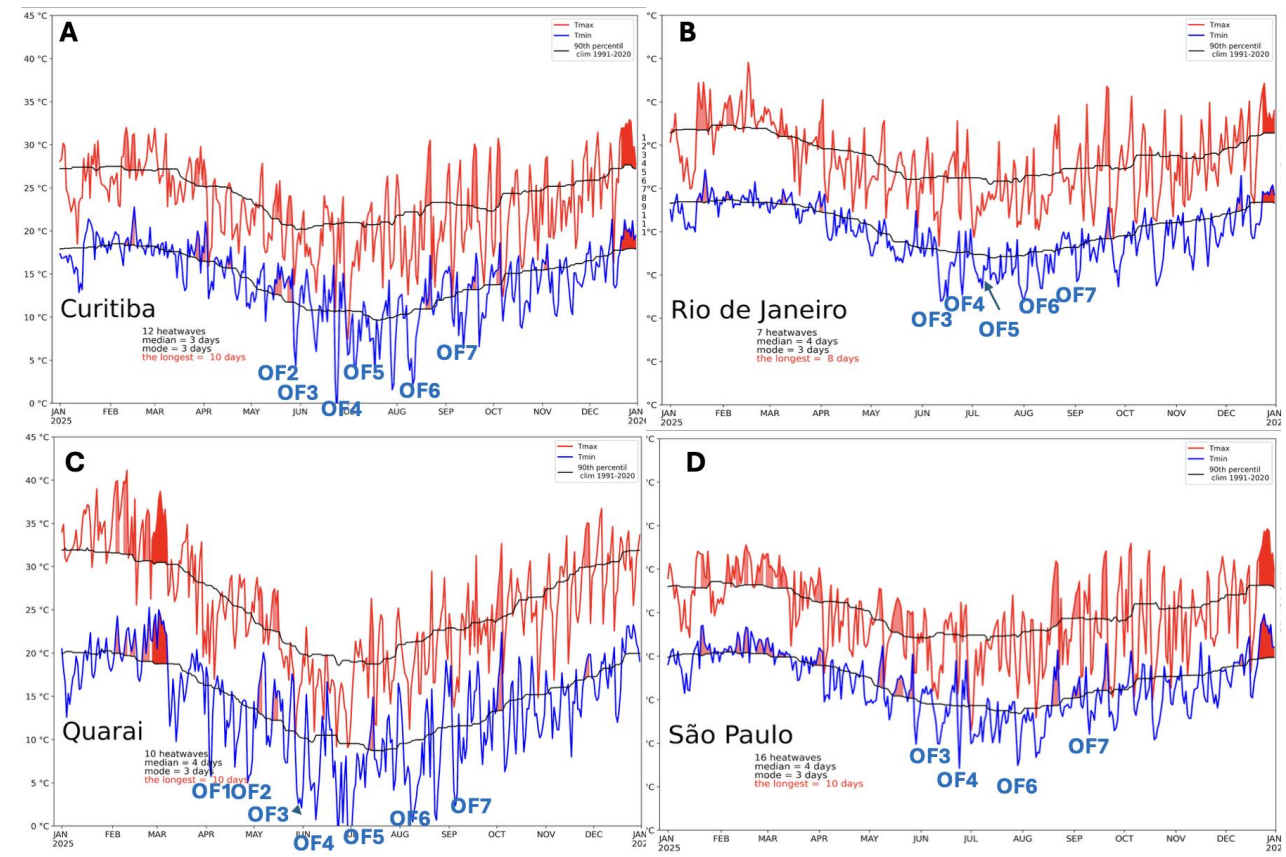


Figure 15 – Time series of maximum (Tmax) and minimum (Tmin) temperature at four locations in Brazil, from January 1, 2025, to December 31, 2025: (a) Curitiba (PR), (b) Rio de Janeiro (RJ), (c) Quarai (RS), (d) São Paulo (SP). The values are compared to the climatological average (1991-2020, represented by the black lines). Cold wave episodes (OF) are indicated by blue letters, as described in Table 2. (Source: NOAA CPC temperature data, Marengo et al. 2025, 2026).

Between August 9th and 12th, minimum temperatures were close to 0 °C and with frosts of weak to moderate intensity. Cold episodes with polar air masses also affected parts of the Southeast and Midwest, with minimums below zero recorded in places such as Monte Verde (MG, −2.9 °C) and a marked drop in temperatures at dawn in high-altitude areas. Between June 20 and August 13, 2025, the average minimum temperature in São Paulo was ~12.2 °C, the lowest since 1994, consolidating this as the coldest winter in more than 30 years (Figure 16).

Campos de Jordão, 07/29/2025

Porto Alegre, 06/22/2025

São Paulo, 09/30/2025

São Joaquim, 07/02/2025

Figure 16 – Images of cold waves episodes in São Paulo, Campos do Jordão, Porto Alegre and São Joaquim. (Sources: G1, Folha de São Paulo).

CYCLONES, TORNADOES

An intense sequence of tornadoes affected South of Brazil on November 7, 2025, days before COP-30 in Belém (PA), with emphasis on the tornado classified as F4 (estimated winds between 333 and 418 km/h) in Rio Bonito do Iguaçu (PR) and regions nearby, such as Guarapuava and Candói. This event was one of the strongest ever recorded in the country. Left 7 dead, hundreds injured and widespread destruction of urban and rural infrastructure (Figure 17).

Extratropical cyclones are the most common in Brazil. This is because, unlike tropical cyclones, which have a warm core, extratropical cyclones have a cold core and characterize regions with a milder climate. They occur between latitudes of 30° and 60° in both hemispheres and are always associated with the passage of a cold front. In December, the action of an extratropical cyclone in Brazil caused intense wind gusts between Rio Grande do Sul and Rio de Janeiro, which were recorded in the early hours between December 8 and 9, generating intense instabilities in the South and Southeast of Brazil, with voluminous rains, gusts of wind and various inconveniences to the population. In December, a rare extratropical cyclone for the time of year formed, with cyclonic winds, tornadoes and significant damage in the South and Southeast.

On December 10, there was a historic gust of wind in São Paulo — Congonhas Airport recorded 96.3 km/h, the most intense in a dry environment since 1963. Accumulated rainfall of 190 mm was recorded in less than 24 hours at the Canguçu station (RS). Other stations located in the southeast of the state also recorded rainfall above 100 mm; while in São Paulo, Rio de Janeiro and Santa Catarina, the cyclone's displacement caused strong gusts of wind. In São Paulo, strong winds (up to 83 km/h), which persisted for several hours, caused major inconveniences, such as falling trees, damage to the power grid and interruptions of essential services. The situation also affected air transport, leading to the cancellation of flights at the state's airports and generating delays and cancellations at the airports of Rio de Janeiro and Brasília.

Rio Bonito do Iguaçu ficou 90% destruída após passagem de tornado — Foto: Jefferson Silva/ Rádio Campo Aberto/ Coprossel

Os efeitos do tornado no Paraná — Foto: Reprodução/TV Globo

Figure 17 – Images of the tornado destruction that affected Rio Bonito do Iguaçu-PR on November 7, 2025. (Sources: G1, TV Globo).

DISASTERS

Warmings and occurrences of climate disasters

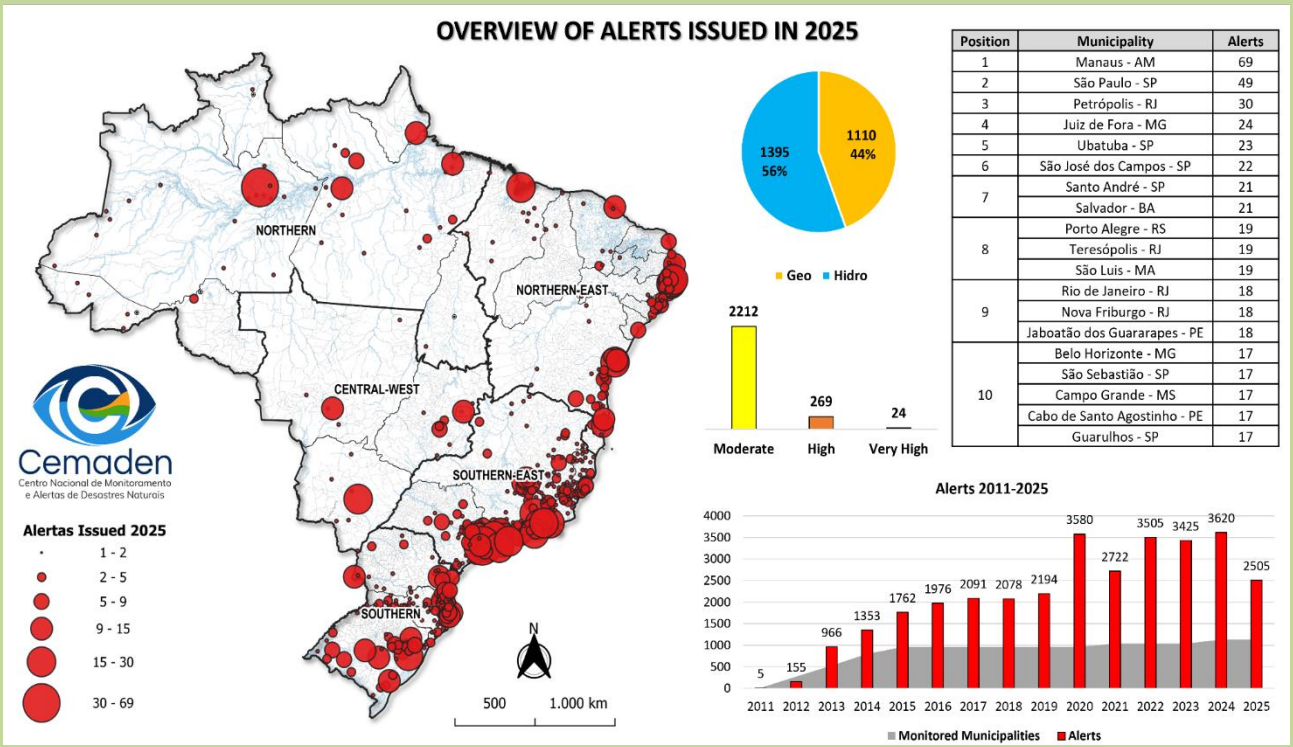
Brazil registered 7,539 climate disasters between 2020 and 2023, an increase in 222.8% compared to 2,335 occurrences verified in the 1990s. In the same period, the proportion of affected municipalities jumped from 27% to 83%. Rainfall was responsible for 86% of the deaths recorded in climate disasters in the country. Between 2020 and 2023, about 8.7 million people were displaced or left homeless due to floods — a number that corresponds to 94% of all cases in the period. In the 1990s, the total number of people affected by rainfall was 43,242; between 2020 and 2023, the number jumped to 6,835,168 — a growth of more than 8,000% (UNIFESP Science Tide Program, 2025).

According to CEMADEN, Minas Gerais is the Brazilian state with the highest number of cities at risk during the rainy season. Of the 853 municipalities in Minas Gerais, 306 are considered more susceptible to landslides, flash floods, and floods, which represents a danger for about 1.5 million people. In all, 2,095 cities in Brazil are exposed to geo-hydrological risks, according to the list of municipalities most susceptible to the typologies and that should be prioritized in the Union's actions in risk and disaster management according to the Civil House of the Presidency of the Republic. Approximately 75% of Brazil's population (~150 million Brazilians) live in them.

According to the United Nations Office for Disaster Risk Reduction (UNDRR, https://www.undrr.org/news/flood-management-collaboration-rio-grande-do-sul-looks-future-resilient-recovery/), , Brazil has already recorded, in recent years, floods with the displacement of tens or even hundreds of thousands of people (e.g., floods in 2024 in Rio Grande do Sul affected millions, with hundreds of thousands displaced), suggesting that events in 2025, although structurally smaller, continue within a pattern of increasing social and economic impact.

In February and March 2025, CEMADEN issued hundreds of alerts for hydrological hazards (floods and flash floods) and geological hazards (landslides), indicating extreme weather activity in the country. In June 2025, in Rio Grande do Sul, heavy rains caused floods and landslides in several municipalities in Rio Grande do Sul. Rivers such as Uruguay, Jacuí and Taquari have exceeded alert levels, causing the displacement of families, calamity decrees and several confirmed deaths.

Figure 18 presents the overview of alerts issued in 2025 and shows the wide spatial distribution of preventive action among the 1,133 municipalities monitored. In total, 2,505 alerts were sent throughout the year, with emphasis on the Southeast region, which concentrated approximately 50% of



Position	Municipality	Alerts
1	Manaus - AM	69
2	São Paulo - SP	49
3	Petrópolis - RJ	30
4	Juiz de Fora - MG	24
5	Ubatuba - SP	23
6	São José dos Campos - SP	22
7	Santo André - SP	21
	Salvador - BA	21
8	Porto Alegre - RS	19
	Teresópolis - RJ	19
	São Luis - MA	19
9	Rio de Janeiro - RJ	18
	Nova Friburgo - RJ	18
	Jaboatão dos Guararapes - PE	18
10	Belo Horizonte - MG	17
	São Sebastião - SP	17
	Campo Grande - MS	17
	Cabo de Santo Agostinho - PE	17
	Guarulhos - SP	17

Figure 18 – Overview of alerts issued in 2025 (Source: CEMADEN).

this total, which reflects the recurrence of adverse geo-hydrological conditions in densely urbanized and widely monitored areas.

The reading of the time series (2011–2025) allows us to observe that, after a period of growth and stabilization of the number of alerts at high levels from 2020 onwards (958 municipalities monitored), the year 2025 (1133 monitored) showed a reduction in the total number of alerts issued, especially in relation to 2024. This decrease reflected the specific geo-hydrological conditions of the analyzed period. Even with the reduction observed in 2025, the volume of alerts remained higher than the values recorded in the initial phase of monitoring, which indicates that the system continued to operate at a high level of activity.

This behavior suggests that institutional capacity, coverage and the protocols for issuing alerts remained consolidated throughout the period, and that the interannual variations observed were predominantly modulated by the manifestation, intensity and persistence of extreme rainfall events and their associated geo-hydrological impacts.

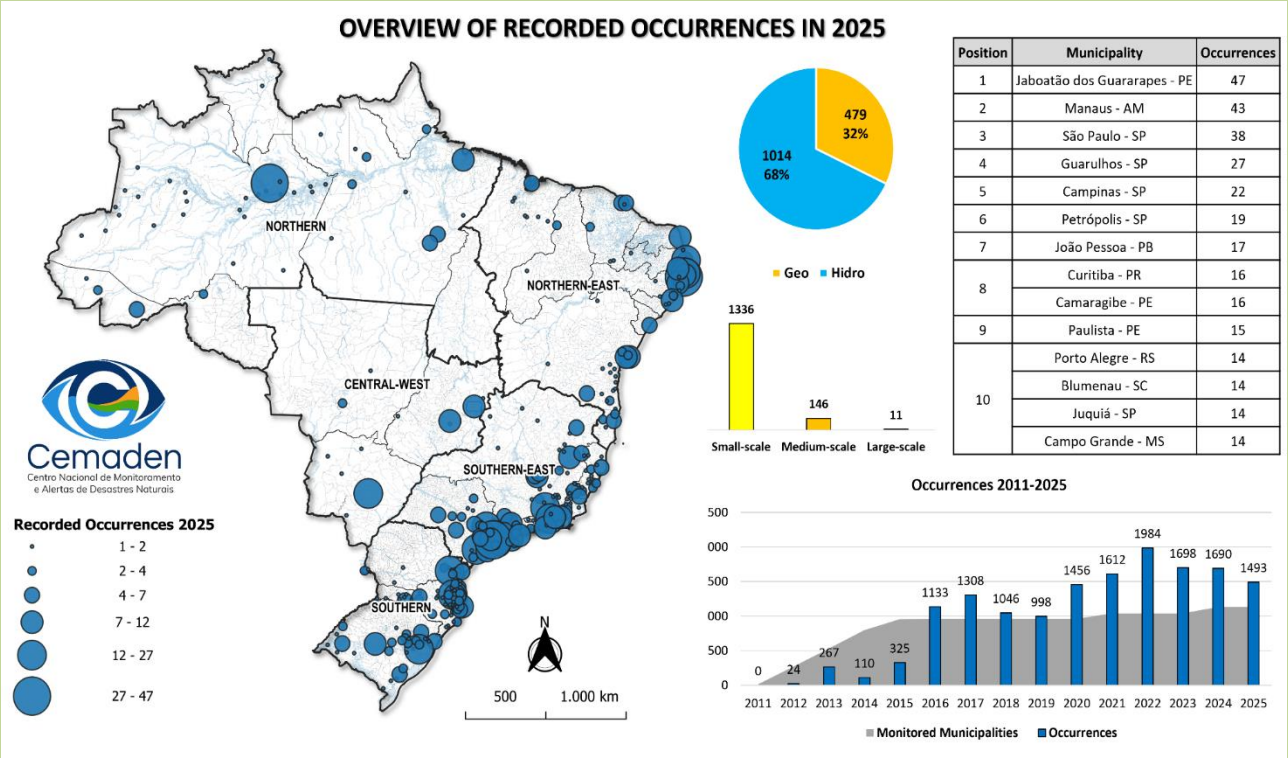
In terms of severity, there was a predominance of alerts classified as moderate, which reflected a pattern of continuous observation associated mainly with scenarios in which potential small impacts are expected. These alerts were mostly related to recurrent episodes of rainfall, in which the risk required permanent monitoring, although without immediate expectation of widespread damage. At the same time, the

presence of alerts classified as High indicated situations in which the increase in risk required a higher level of attention and coordination with civil protection authorities. On the other hand, Very High-level alerts, although less frequent, were associated with critical scenarios, characterized by the expectation of potential large-scale impacts, with a higher probability of severe damage to the population, urban infrastructure, and essential services.

Also, in relation to the alerts, the ranking of the municipalities that received the most alerts throughout 2025 reinforces the concentration of monitoring activity in territories with recurrence of adverse geo-hydrological conditions. The municipalities positioned at the top of the ranking had a high frequency of alerts throughout the year, indicating not only the repetition of rainfall episodes, but also the persistence of risk scenarios that required continuous monitoring by CEMADEN. This pattern suggests the presence of structural factors, such as physiographic characteristics, vulnerable urban occupation and history of events, which increase the sensitivity of these territories to the occurrence of intense rainfall and its consequences. At the same time, the ranking shows that the volume of alerts was not distributed homogeneously among the monitored municipalities, reflecting the spatial heterogeneity of geo-hydrological risk in the country and pointing to the relevance of territory analyses that consider the recurrence of alerts as an important indicator for the planning of preventive actions and disaster risk reduction.

Figure 19, in turn, summarizes the occurrences recorded in 2025 and allows us to assess how these events materialized in the territory. In total, 1,493 events were recorded, with emphasis again on the Southeast region, which concentrated about 43% of the occurrences. There was a predominance of occurrences of hydrological origin in relation to those of geological origin, indicating that events such as floods, flash floods, and urban flooding were more frequent than mass movements in the set of records analyzed.

The occurrences were concentrated in a more restricted set of municipalities, compared to the alerts, with a predominance of events classified as small. In the case of small hydrological events, these records corresponded to isolated episodes, usually small and rapid, involving urban flooding, river flooding, and flash floods, with damage restricted to the level of streets and neighborhoods and characterized by a rapid response of local structures. On the other hand, small geological events were associated, above all, with punctual and induced mass movements, such as falling barriers, instability of slopes and small landslides, often with localized damage and of lesser spatial scope.



Position	Municipality	Occurrences
1	Jaboatão dos Guararapes - PE	47
2	Manaus - AM	43
3	São Paulo - SP	38
4	Guarulhos - SP	27
5	Campinas - SP	22
6	Petrópolis - SP	19
7	João Pessoa - PB	17
8	Curitiba - PR	16
	Camaragibe - PE	16
9	Paulista - PE	15
10	Porto Alegre - RS	14
	Blumenau - SC	14
	Juquiá - SP	14
	Campo Grande - MS	14

Figure 19 – Overview of recorded occurrences in 2025 (Source: CEMADEN).

The presence of medium and large occurrences in some specific municipalities evidenced more vulnerable territorial contexts, in which the intensity of the events and local conditions favored the generation of more significant damage. Also, regarding the occurrences recorded in 2025, the ranking of the municipalities that concentrated the highest number of records showed not only the recurrence of geo-hydrological events, but also important differences in institutional response capacity and in the publicity of impacts. The municipalities positioned at the top of the ranking showed greater efficiency in the processes of registration and reporting of occurrences, especially through official instruments, such as the CEMADEN occurrence form, the information bulletins and the media coverage. This pattern indicates that a high rate of administrative response, combined with greater visibility of events and the articulation between different institutional actors, contributed to the increase in the number of formalized records.

The analysis of the annual evolution of occurrences in the period from 2011 to 2025 indicates a progressive growth in the number of records throughout the time series, especially from the second half of the 2010s. In the first years of the period analyzed, the occurrences presented lower values and greater interannual irregularity, reflecting both the lower systematization of the records and the lower integration between the information bases available at the time. From 2016 onwards, there was

a more consistent increase in the number of occurrences, with annual oscillations associated with the occurrence of extreme events of greater scope and the continuous process of vulnerability of the territories, marked by urban expansion in susceptible areas, the intensification of the occupation of risk areas and persistent structural weaknesses.

In recent years, particularly after 2020, the level of occurrences has remained high, although with variations between years, indicating the consolidation of a scenario in which geo-hydrological events began to manifest themselves with greater frequency and recurrence in the Brazilian territory. In this context, the volume recorded in 2025, although lower than in the years with the highest peak, remained above the values observed in the initial phase of the series, reinforcing the trend of structural increase in occurrences over the period analyzed. This trajectory suggests that the observed annual oscillations predominantly reflected the intensity and spatial distribution of geo-hydrological events, in a context of greater territorial exposure and vulnerability, in addition to greater capacity to record the impacts associated with these events. The joint observation of Figures 18 and 19 shows that not every alert resulted in a recorded occurrence, which is compatible with the preventive logic of monitoring and with the adoption of anticipatory response measures.

Figures 18 and 19 show an increase in the number of alerts and occurrences since 2022, the year in which major disasters occurred and with many fatalities occurred in Recife (PE) and Petrópolis (RJ). The years 2023 and 2024 were of El Niño and warmer North Tropical Atlantic, which generated extremes of rain and geo-hydrological disasters throughout the country, aggravated by the occurrence of more active meteorological phenomena affecting several regions of the country. In 2025 there were no El Niño/La Niña events of strong intensity (or of considerable intensity), which may have contributed to fewer extreme events and fewer alerts and occurrences. In this context, the behavior observed in 2025 reinforces the importance of analyses that consider not only the absolute number of alerts and occurrences, but also the climate context of the data and the relationship between the probability of occurrence and the potential impact.

In an integrated manner, Figures 18 and 19 indicate that 2025 was marked by high operational activity, with a strong articulation between monitoring, issuing alerts, and recording occurrences. The hierarchy of alert levels, associated with the selective materialization of impacts on the territory and the temporal evolution of occurrences, reinforces the relevance of joint analyses between alerts and impacts to qualify the evaluation of the effectiveness of the system and deepen the understanding of the spatial patterns of risk and vulnerability associated with geo-hydrological events in the country.

Impacts associated with climate disasters

Figure 20 shows the magnitude and distribution impacts associated with hydrometeorological events in 2025, including floods, flash floods, floods, mass movements, and episodes of heavy rainfall. Human damage stood out in the Northern Region of Brazil, where there was a greater concentration of affected municipalities and significant numbers of people impacted, totaling more than 202 thousand people directly affected, which shows the recurrence of large-scale hydrological events and their direct effects on the population.

In total, the events recorded in 2025 resulted in 336,656 people directly affected. Among the most severe impacts, the highest number of fatalities in the municipality of Ipatinga in Minas Gerais stood out, with 10 deaths associated with an episode of heavy rain that occurred in January 2025. The largest contingent of injured and sick, totaling 5,202 people, was recorded in Manacapuru in Amazonas, because of the floods that occurred in June 2025. Regarding the homeless, the highest number was recorded in Beruri in Amazonas, with 4,039 people affected by the floods of July 2025. The highest number of displaced people was recorded in Belém in Pará, where 10,012 people had to temporarily leave their homes due to heavy rains in the same period. There is also a record of an elderly person missing after a flood recorded in June 2025 in the municipality of Candelária in Rio Grande do Sul, this shows that events of this nature generated serious human consequences in different regions of the country.

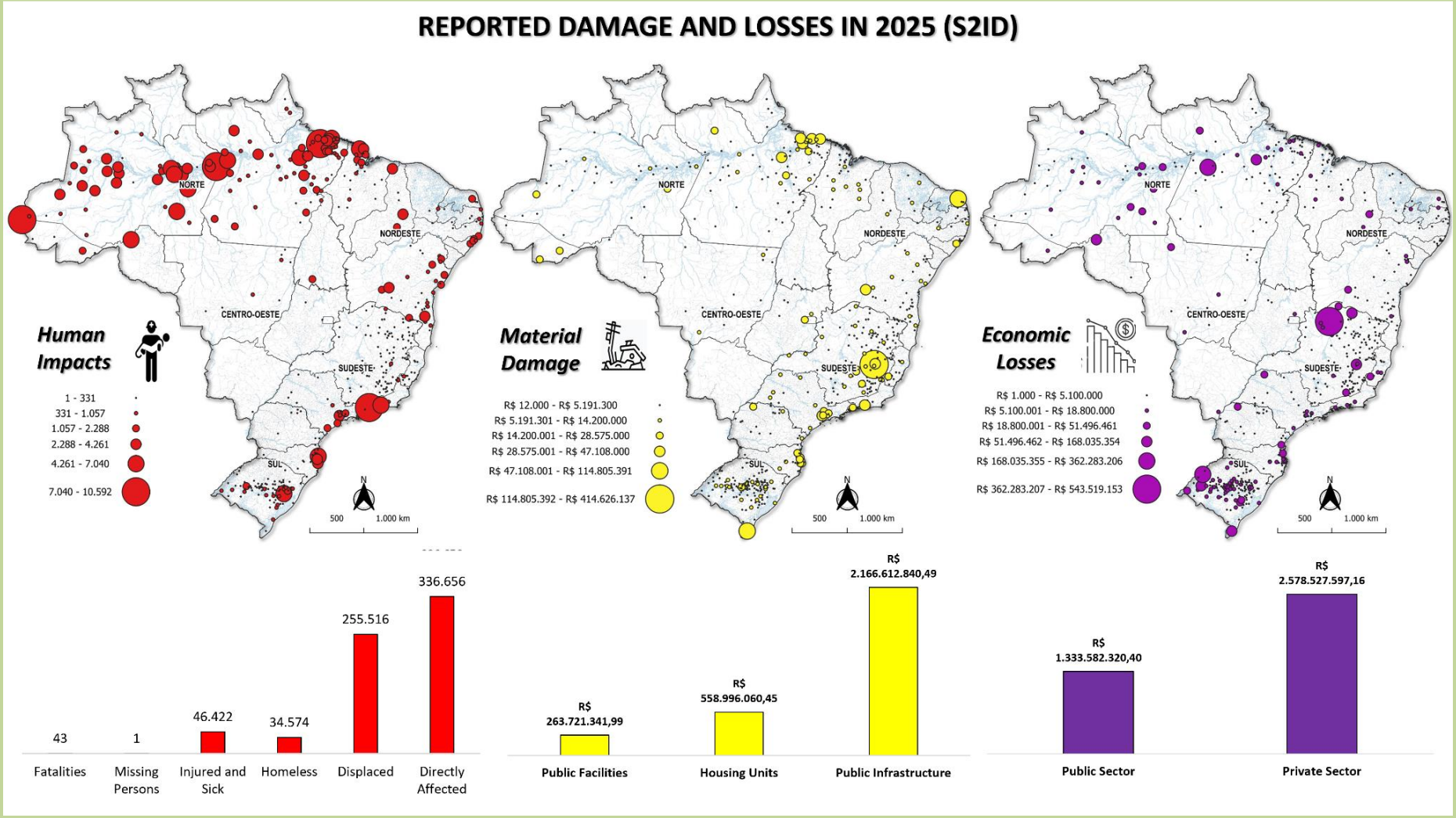


Figure 20 – Summary of damages and losses reported as a result of hydrological events, mass movements and heavy rainfall in 2025 (Source: SEDEC).

In addition to the human impacts, the material damage associated with hydrometeorological events in 2025 totaled approximately 2.9 billion reais, with emphasis on the Southeast region, which concentrated about 1.1 billion of these amounts. In the breakdown by typology, the largest losses related to housing units were recorded in the municipality of Beruri (Amazonas), with approximately R$ 33.6 million. Damage to public facilities, including health units, education, service providers and equipment for community use, was highest in the municipality of Rio Largo (Alagoas), totaling about 19.4 million reais. Damage to public infrastructure was more significant in the municipality of Ipatinga (Minas Gerais), because of the episode of heavy rain that occurred in January 2025, evidencing relevant impacts on road systems and other urban structures.

Regarding economic losses, approximately 3.9 billion reais in losses were recorded, with emphasis on the South region, which totaled about 1.5 billion reais. Public losses were higher in the municipality of Belterra (Pará), due to an episode of extreme rainfall that occurred in March 2025, in which only Costs related to medical care, public health and emergency medical care totaled approximately 356 million reais. Regarding private losses, the biggest highlight was the municipality of São Francisco (MG), because of heavy rains recorded in December 2025, when losses estimated at approximately 526 million reais in local agriculture were recorded.

In an integrated manner, Figure 20 showed that the impacts observed in 2025 were not restricted to isolated occurrences, but presented a recurrent pattern of human, material, and economic damage associated with the occurrence of extreme hydrometeorological events, with strong regional expression and significant effects on the population, urban infrastructure, and the local economy. It is noteworthy that the data presented were based on the S2iD Damage Management Report (https://s2id.mi.gov.br), , prepared based on information declared by the municipalities that had the emergency or public calamity recognized by the Union, which gave the records an official character and, at the same time, reinforced the dependence of these analyses on the local capacity to record and report the impacts.

CONCLUSIONS

- The year 2025 in Brazil was marked by a wide variety of hydrometeorological extremes and climate related, associated with global warming and natural climate variability. Globally, the average of the last three years (2023-2024-2025) recorded temperatures more than 1.5 °C above pre-industrial levels.

- In 2025, intense rainfall events continued to be part of a growing trend of climate disasters in Brazil, with extreme rainfall being the main triggers for landslides and mass runs, especially in regions with rugged terrain and human occupation in risk areas.

- Throughout the year, several regions of the Southeast and South faced isolated storms with heavy rain, hail and intense winds, causing urban disturbances and damage.

- Much of the country entered a drought in early 2025. El Niño, in transition to neutrality, contributed to the drought in the North and Midwest and to the irregularity of rainfall in the Northeast in the summer of 2025. Droughts in 2025 had a strong indirect impact on fires, public health, energy, and agriculture.

- The beginning of 2025 was critical in the North and Midwest regions. After a small improvement, the irregularity of the 2025/2026 rainy season has again intensified the hydrological drought in several basins.

- In the electricity sector, the Paraná, São Francisco, and Tocantins–Araguaia basins were identified as the most affected by drought conditions, leading to increased risks to hydropower generation and heightened pressures on national water security.

- Regarding the Crisis in the Cantareira System, the reservoir reached the lowest levels ever observed since the 2014-2015 crisis (19-20% in January 2026), reflecting the climate and water withdrawals 24% and 30% above the average in the years 2024 and 2025, respectively.

- The intense heatwaves of 2025 underscored Brazil's vulnerability to climate change and extreme weather events. Heat waves particularly affected subtropical Brazil. During the summer of 2025, air temperatures in much of South Brazil exceeded 40 °C, reflecting the extreme conditions of the heat wave in that region.

- Throughout 2025, cold waves were recorded in most cities in the South and Southeast and in some of the Midwest,

especially in the winter months.

- An intense sequence of tornadoes and extratropical cyclones affected the South between November and December 2025. The November tornado in Paraná had estimated winds between 333 and 418 km/h. The extratropical cyclones caused intense wind gusts between Rio Grande do Sul and Rio de Janeiro.

- The year 2025 stood out for a reduction in the total number of alerts issued, especially compared to 2024. This decrease reflected the specific geo-hydrological conditions of the analyzed period.

- The disaster events recorded in 2025 resulted in 336,656 people directly affected.

- In addition to the human impacts, the material damage associated with hydrometeorological events in 2025 totaled approximately 2.9 billion reais, with emphasis on the Southeast Region, which concentrated about 1.1 billion of these amounts.

- Recent studies and reports indicate that rainfall-related climate disasters have more than tripled in recent decades, especially those resulting from flash floods, and landslides.

- Climate change is intensifying both extreme rainfall events and periods of drought.

- These events highlight the need for more robust warning systems, as well as adaptation and climate resilience actions at all levels of government.

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MONTHLY IMPACT MEETINGS

CEMADEN holds Monthly Meetings to Assess and Forecast the Impacts of Hydro-Geo-Climate Extremes on Strategic Activities in Brazil.

The meetings present a synthesis of the impacts of extreme events observed in the last month, along with forecasts for the following three months. They provide technical and scientific knowledge to support public policies, risk management and decision-making in Brazil's strategic sectors.

The meetings are broadcast live on CEMADEN's official YouTube channel (@cemadenoficial, https://www.youtube.com/@cemadenoficial), allowing open participation and the interaction via chat.

In 2025, the 12 editions held reached around 1,000 simultaneous viewers on YouTube, totaling more than 5,000 views after the broadcasts.

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