

# The role of the press and its interest in climate change

**El papel de la prensa y su interés por el cambio climático**

**O papel da imprensa e seu interesse pelas mudanças climáticas**

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**Abstract:** The increase in Extreme Weather Events (EWE), largely driven by climate change, is also echoed in media coverage. However, their reporting shows little adaptation. This study analyses the coverage of four EWEs (hurricanes, cyclones, torrential rains, and cut-off lows) in four leading newspapers in Brazil, Mexico, Peru, and Spain during 2023. Based on a content analysis, the most relevant findings reveal a lack of depth in reporting, greater reliance on political than scientific sources, the dissociation of the EWEs with climate change, the use of photographs that accentuate negative values, and news coverage that focuses on the “after” and rarely on the “before” of these events. These findings can serve as a reference for future studies on environmental reporting and, in turn, for improving how EWEs are covered in the media, which must uphold their role as guarantors of accurate, detailed, and in-depth information in the face of the flood of disinformation already surrounding these climate phenomena.

**Keywords:** extreme weather events; climate change; media coverage; printed press.

**Resumen:** El aumento de Eventos Meteorológicos Extremos (EME), provocados en gran medida por el cambio climático, tienen también eco en la información periodística. Sin embargo, se evidencia una escasa adecuación de su tratamiento. Este trabajo presenta el análisis de la cobertura de cuatro EME (huracanes, ciclones, lluvias torrenciales y depresiones aisladas en niveles altos) en otros tantos periódicos de referencia de Brasil, México, Perú y España durante el año 2023. A partir de un análisis de contenido, los resultados más relevantes muestran una escasa profundidad de la información, acceso a fuentes más políticas que científicas, la desvinculación de los EME con el cambio climático, el empleo de imágenes en formato de fotografías que acentúan los valores negativos y coberturas informativas que se posicionan en el “después” y casi nunca en el “antes” de que se produzcan los acontecimientos. Estos hallazgos pueden servir de referencia para futuros estudios relacionados con la información sobre medio ambiente y, a su vez, para la mejora del tratamiento informativo de los EME en los medios de comunicación, que deben mantener su rol de garantes de una información precisa, detallada y profunda ante la avalancha de desinformación ya generada en torno a estos fenómenos climáticos.

**Palabras clave:** eventos meteorológicos extremos; cambio climático; tratamiento informativo; prensa impresa.

**Resumo:** O aumento dos Eventos Meteorológicos Extremos (EME), causado em grande parte pelas mudanças climáticas, também é refletido nas informações jornalísticas. No entanto, há evidências da necessidade de uma cobertura mais qualificada. Este artigo apresenta uma análise da cobertura de quatro EMEs (furacões, ciclones, chuvas torrenciais e depressões isoladas em níveis elevados) em quatro jornais de referência do Brasil, México, Peru e Espanha durante o ano de 2023. Com base em uma análise de conteúdo, os resultados mais relevantes mostram a falta de profundidade das informações, o acesso a fontes mais políticas do que científicas, a dissociação dos EMEs com as mudanças climáticas, o uso de imagens na forma de fotografias que acentuam valores negativos e a cobertura jornalística que se posiciona no “depois” e quase nunca no “antes” da ocorrência dos eventos. Essas descobertas podem servir de referência

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para futuros estudos relacionados à informação ambiental e, por sua vez, para melhorar o tratamento informativo dos EMEs na mídia, que deve manter seu papel de garantidora de informações precisas, detalhadas e aprofundadas diante da avalanche de desinformação já gerada em torno desses fenômenos climáticos.

*Palavras-chave:* eventos climáticos extremos; mudanças climáticas; cobertura jornalística; mídia impressa.

## 1. Introduction

The report prepared by the World Meteorological Organization (Organización Meteorológica Mundial [OMM], 2024a) confirmed that in 2023, all inhabited continents were affected by Extreme Weather Events (EWEs), defined by Estrada Legrá et al. (2023, p. 6) as a type of “exceptional climatic or meteorological phenomenon occurring in a specific place and time of year”<sup>1</sup>. The incidence of disasters increased fivefold over a 50-year period, from 1970 to 2019, according to data recorded in a previous WMO report (OMM, 2021), due to climate change and the occurrence of EWEs. Nevertheless, in that document, the same organisation highlighted a notable improvement in information delivery mechanisms.

The annual report from the University of Boulder Observatory (Nacu-Schmidt et al., 2024) shows that media coverage of EWEs increased significantly in 2023. The press remains a valuable resource for raising awareness of the most vulnerable environments to particular impacts (Fernández et al., 2022), but it must adopt a comprehensible discourse to enhance public interest in these events (Beling Loose et al., 2022). In this context, the scientific literature has focused on the reporting of climate change, the climate crisis, and EWEs, although a significant body of research is devoted to single-case studies without considering the specific characteristics of each medium (Mompeller et al., 2020).

In contrast, this study examines different EWEs based on their coverage in four newspapers from four countries – three in the Americas and one in Europe: Brazil, Mexico, Peru and Spain. This geographical framework was selected based on the research team members’ in-depth knowledge of each newspaper and their respective access to country-specific data. This choice allows for a detailed exploration that leverages the diversity of contexts to identify meaningful patterns. Additionally, the international collaboration among the researchers fosters an enriching exchange of knowledge.

The study thus focuses on coverage in general-interest newspapers considered “serious press”, as per the definitions provided by Macassi Lavander (2002), Cappellini (2004), and Redondo García (2013), and which have the widest circulation in the selected countries. The World Risk Report 2023 (Auer Frege et al., 2024) shows that Mexico is the highest-risk country in

1 Original Spanish text: “fenómeno climático o fenómeno meteorológico excepcional producido en un determinado lugar y época del año”.

the Americas and the fourth worldwide; Peru ranks thirteenth internationally and third on the continent; while Brazil occupies the forty-fourth position in the Americas. Although Europe has the lowest overall risk rate among all continents, Spain has the second-highest index in the region (56th in the global ranking), surpassed only by Italy.

In short, the research provides an analysis of journalistic content related to the most significant EWEs in these countries during 2023. This can be used to identify the characteristics of their media coverage in countries with highly distinctive features, offering a more comprehensive and integrated perspective than that provided by a single case study.

## **2. Status of the issue**

The seriousness of the multiple impacts associated with the occurrence of EWEs has led to media representations that have been analysed in the scientific literature from various perspectives. In this regard, the media coverage of this phenomenon and of climate change has been studied with approaches largely focused on the characteristics, consequences, and measures that should be applied, not only to inform but also to educate, as a fundamental principle in professional journalistic practice.

In general, research on this topic highlights poor or counterproductive media coverage, with a clear bias toward negativity in the news (Andersen et al., 2024), primarily focused on catastrophic consequences (Romero-Díaz & Pérez Morales, 2021) and tending toward sensationalism (Castillo Esparcia & López Gómez, 2021). This negative framing of climate risk news, rather than motivating different audiences, can foster a self-perception of helplessness in addressing these issues (Dutra Balbé & Beling Loose, 2020). From the perspective of social media, Pearce et al. (2019) note these platforms' potential to construct new imaginaries around climate change, but they can also hinder its proper conceptualisation within society. As an alternative to this trend, it would be appropriate to provide information on how to address the effects of climate change through planning, which, according to Sousa et al. (2021) in their study of Brazil's Tocantins region, must necessarily be undertaken to respond to projected climate scenarios, such as a potential decrease in rainfall or a probable increase in temperatures.

Regarding sources, coverage is largely limited to the official version provided by governments and other political actors (Muguerza & Arce, 2022), which, according to Freyle Granados and Arroyave Cabrera (2020), does not always align with the interests of the common good. Gonzales García (2018) also concludes that the media tends to relegate scientific actors and experts to a secondary role, even though, as Caruso (2022) notes, they are key contributors, alongside other sectors, in providing solutions to mitigate the effects of these events. In this vein, Díaz Echarri et al. (2024) reveal that

one of the pillars of journalism concerning environmental issues – climate change – is often not included on the agenda of certain media outlets.

The relationship between EWEs and climate change also presents a pessimistic picture. For example, in the case study by Andrade et al. (2023) on the heavy rainfall that affected São Paulo, Brazil, content on X (formerly Twitter) from various public information entities did not relate this meteorological event to climate change. Clarke and Otto (2022) suggest reporting on the connection between the two, even in the absence of attribution studies. However, several studies (Lozano Ascencio et al., 2022; Visconti & Young, 2024; De Sola Pueyo, 2024) indicate that the media rarely make this connection. On the few occasions when they do, the coverage is superficial and relies on very generic, descriptive statements (Painter et al., 2020).

This perspective on attribution can lead to a biased public attitude, in which people only become concerned about climate change when EWEs occur recently and are prolonged or severe (Konisky et al., 2016). While it is true that EWEs increase public attention to climate change (Moernaut et al., 2022), scientifically linking all extreme weather events to anthropogenic climate change remains complex, as concluded by Osaka and Bellamy (2020). Moreover, although impact attribution methods are currently under extensive development, significant improvements are still needed, including more accurate use of climate models and greater precision in damage functions that translate meteorological variables into an accurate assessment of socioeconomic impacts (Noy et al., 2024).

Media coverage is framed purely as informational, placing greater emphasis on the effects of EWEs than on their causes or potential solutions (Lopera Pareja, 2017; Gonzales García, 2018). Amaral et al. (2024) found similar results when examining the profiles of newspapers on the social media platform X, with content overwhelmingly focused on the consequences of EWEs and little attention paid to warnings or response protocols. Regarding this same social media platform, Andrade et al. (2023) note that content production by the public is indirectly associated with educational and economic levels, meaning that less-resourced groups have very limited capacity to disseminate information about the climate crisis on these digital platforms.

In general, the media tend to limit themselves to reporting the facts without allowing for more complex analysis (Muguerza & Arce, 2022), and there is a clear lack of specialised, critical, and interpretive journalism that would enable deeper exploration of background information (Monterroza et al., 2022). This, in turn, reinforces alarmism (Lozano Ascencio & Puertas Cristóbal, 2020) and contributes little to motivating audiences or presenting possible courses of action (Appelgren & Jönsson, 2021).

Spatial contextualisation is also important for empowering citizens and seeking solutions. Geographic proximity similarly affects the journalist's role, as they become a direct witness and, consequently, enhance

their sense of responsibility as a public service (Nieves-Pizarro et al., 2019). However, much of the news analysed by Freyle Granados and Arroyave Cabrera (2020) has an international scope, with barely one in ten reports being local or regional.

These characteristics, which contribute to inadequate media coverage of EWEs and, more broadly, environmental journalism, have a range of consequences also documented in the scientific literature. Andersen et al. (2024) warn that negativity in news reporting can increase audience mental distress, leading people to avoid the news while reinforcing feelings of anxiety, sadness, or depression (Bilkay et al., 2024). Presenting only the effects without addressing the causes does not encourage awareness of the risks, and as a result, necessary preventive measures are often not taken (Rotger et al., 2018).

Biased reporting that focuses solely on certain political or activist sources hampers a full representation of the issues, ignoring causes and mitigation strategies (Castillo Esparcia & López Gómez, 2021). Activist groups themselves perceive media coverage as disconnected from people, offering no clear or well-defined solutions (Beling Loose et al., 2022). Claims about EWEs that lack scientific grounding and appear in journalistic content also undermine credibility regarding the existence of climate change, a vulnerability that can be exploited by climate change deniers if scientific evidence is not robustly presented and these phenomena are overly politicised (Painter et al., 2020).

Against this backdrop, the research proposes various measures to provide high-quality reporting on environmental journalism, particularly concerning climate change and EWEs. To cover natural disasters, Salabarría Melián et al. (2024) recommend, among other points, being critical without grandiosity or alarmism, demonstrating strong analytical skills, and respecting the dignity of affected individuals. On this matter, Bilkay et al. (2024) suggest using neutral terms – for example, preferring “affected people” over “victims”.

Scientific dissemination is also a fundamental element to incorporate into media agendas (Díaz Echarri et al., 2024), focusing on providing the causes and preventive measures to improve public acceptance of science. In the same vein, Teso Alonso et al. (2018) propose, among other recommendations, increasing coverage of these topics, strengthening science and environmental journalism with greater specialisation, and avoiding controversy when there is scientific consensus. In this way, journalism can become educational and responsible, rather than interpretive and oriented toward spectacle (Muñoz-Pico et al., 2021), with journalists playing a key role in encouraging the adoption of urgently needed environmental measures (Mocatta, 2024).

### 3. Objectives and hypotheses

The study has the general objective of analysing how major print newspapers in Brazil, Spain, Mexico, and Peru covered their most impactful extreme weather events in 2023: Heavy Rains in *Folha de S. Paulo*, Flooding in *El País*, Hurricane Otis in *El Universal*, and Cyclone Yaku in *El Comercio*. The research is structured around a threefold approach, with the following specific objectives:

SO1: To analyse the formal structure of the articles, including length, journalistic genre, and authorship.

SO2: To examine the textual content in relation to the temporal context, the role of the main spokesperson, and whether it is linked to climate change.

SO3: To consider non-textual elements (images) included in the articles, if any, focusing on the quantity of images, the format of the main image, and the type of message or polarity it aims to convey to the audience.

Based on these objectives and taking into account the recommendations and analyses from previous research, the following hypotheses are proposed:

(H1) The newspapers analysed rely more heavily on journalist-written news articles – the most recognised informative genre – than on other types closer to opinion pieces, such as those authored by expert contributors, which could complement the reported information to enhance public knowledge and critical thinking regarding these extreme weather events.

(H2a) The majority of textual content is not linked to climate change, and

(H2b) it is contextualised primarily from a political rather than a scientific perspective, based on the profile of the sources quoted in the text.

(H3) Most images are photographs with strong visual impact, predominantly negative, while other types, such as infographics or maps, which likely provide less emotional appeal but more detailed information and therefore greater understanding of the EWE, are largely overlooked.

### 4. Methodology

Using content analysis techniques, this study examines the media coverage of EWEs that, according to the World Meteorological Organization (OMM, 2024b) and the Spanish State Meteorological Agency (Agencia Estatal de Meteorología [AEMET], 2024), had the greatest impact in 2023 in the selected countries: Brazil, Spain, Mexico and Peru. This selection is based on the specific expertise of the research team members regarding the context of these countries. The study adopts a multiple case study approach, which makes it possible to describe and understand the established cases by emphasising their unique features (Canta Honores & Quesada Llanto, 2021), while also providing a holistic view of all of them. For categorisation

purposes, the names assigned by the official meteorological services are used. Accordingly, the events under study are:

- 1) Extreme rains. The disaster in São Sebastião, Brazil, took place between 20 and 28 February 2023, when this phenomenon triggered landslides. According to an article published by scientists from Brazil's Centre for Monitoring and Early Warning of Natural Disasters (Cemaden) (Marengo et al., 2023), cumulative precipitation reached 683 millimetres in less than 15 hours – the highest level ever recorded in the country – compared to a usual monthly average of 300 millimetres. The disaster resulted in the deaths of 65 people and the displacement of around 2,000.
- 2) Hurricane Otis: It began on 22 October 2023 as a Category 1 storm and, within a span of nine hours three days later, intensified to Category 5 – the highest level on the Saffir-Simpson scale – according to data from the annual report by the National Meteorological Service's General Coordination (Méndez Girón & Gallegos Benítez, 2024). It made landfall near the tourist area of Acapulco, with wind speeds rising from 130 to 270 kilometres per hour. The same report notes that it was the first hurricane of this category to strike these coasts since 1950. It caused severe destruction along the coast of Guerrero State and in nearby mountainous areas. The report prepared by the United Nations Office for the Coordination of Humanitarian Affairs (Oficina de las Naciones Unidas para la Coordinación de Asuntos Humanitarios [OCHA], 2023a) yielded devastating figures, with nearly one million people affected and 48 fatalities.
- 3) Cyclone Yaku. Since September 2022, Peru had been experiencing heavy rainfall that triggered severe flooding. The already critical situation worsened with the arrival of Cyclone Yaku on 4 March 2023, with a red alert in place until 15 March, according to warnings from the National Meteorology and Hydrology Service of Peru (Servicio Nacional de Meteorología e Hidrología del Perú, 2023a) and its monitoring report (Servicio Nacional de Meteorología e Hidrología del Perú, 2023b). Cyclone Yaku, a weather phenomenon detected along the Peruvian coast, exacerbated existing conditions and significantly increased both human and material losses. The Executive Summary of the National Institute of Civil Defence (Instituto Nacional de Defensa Civil [INDECI], 2023) reported 61 deaths, over 50,000 people affected, and 8 missing across the country. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA, 2023b) estimated that, four months after its onset, more than 164,000 people were still facing urgent needs.
- 4) Cut-off low: Represented in Spanish by the acronym “DANA” (Depresión Aislada a Niveles Altos – Isolated High-Level Depression).

Although it affected much of the Iberian Peninsula, its impact was particularly severe in the central region – Ávila, Segovia, Toledo, and especially the southwest of Madrid – with torrential rainfall concentrated within a few hours between 3 and 4 September 2023 (Roa & Bello, 2024). However, warnings had been issued as early as 26 August, according to the report by the Spanish State Meteorological Agency (AEMET, 2023). The most serious consequence was the death of 8 people, in addition to numerous incidents across all affected provinces, according to data from the Ministry of the Interior (Ministerio del Interior, 2023). The Ministry proposed for approval in the Council of Ministers the designation of the impacted areas as a “zone seriously affected by a civil protection emergency” (ZAEPC). The Government of the Community of Madrid (Comunidad de Madrid, 2023) estimated the damages caused by the phenomenon at €58.5 million, as widespread flooding and flash floods inflicted significant damage to infrastructure, particularly potable water distribution networks, rail transport, agricultural holdings, industrial estates, as well as streets, homes, and roads.

The study selected the leading serious general-interest daily newspapers in print in each of the countries under analysis, based on circulation figures provided by the Brazilian Institute of Circulation Verification and reported by the newspaper itself (Folha de S. Paulo, 2024); by Spain’s Association for Media Research (Asociación para la Investigación de Medios de Comunicación [AIMC], 2024); by Mexico’s Directorate General of Print Media (Dirección General de Medios Impresos mexicana, 2023), together with the Digital News Report (Reuters Institute for the Study of Journalism, 2024, p. 14), which provides data on the reach of offline media in Mexico; and, finally, by the monthly media report for Peru issued by Kantar Ibope Media in January 2024. In the latter case, the newspaper *Trome*, which tops the ranking, is excluded on the grounds that it is classified as “popular journalism” (Elmahibba, 2017). This type of journalism is identified by Saad Saad (2011, p. 3) as tabloid-style sensationalist press, “marked by an excessive focus on bloodshed, with striking colour photographs and headlines that undermine the dignity of victims and their families”<sup>2</sup>.

Therefore, to achieve the proposed objectives, the newspapers selected for analysis were *Folha de S. Paulo* in Brazil, *El País* in Spain, *El Universal* in Mexico, and *El Comercio* in Peru, which ranks second in the aforementioned Kantar Ibope Media list. The editorial line of *El Comercio* is comparable to that of the other selected newspapers, all of which can be classified as “serious press”, a term used by Macassi Lavander (2002), Cappellini (2004), and Redondo García (2013), among others, in contrast to yellow or sensationalist journalism.

2 Original Spanish text: “que se exacerban en mostrar hechos de sangre con llamativas fotos a color y titulares que afectan la dignidad de las víctimas y sus familiares”.

The analysis units were identified using the *PressReader* database, applying filters for year (2023), country, and newspaper title. The designated search term in each newspaper was the name of the four EWEs. A total of 243 items were identified. The time span varied depending on the phenomenon considered and the extent of coverage in each newspaper. In this regard, the EWE receiving the longest coverage was the Peruvian case, reported from 9 March to 27 December, as it was caused by the unusual warming of sea waters in that part of the Pacific Ocean. Although not a typical tropical cyclone, it generated heavy rainfall and flooding. Coverage in *El País* (Spain) extended over slightly more than a month (1 September to 8 October), with an additional report on a cut-off low forecast published on 27 May. The Brazilian case was covered for eight days (20 to 28 February), while the units extracted from *El Universal* (Mexico) were limited to just six days, between 26 and 31 October.

Content analysis is an appropriate method for carrying out this study, in line with how the scientific literature has conceptualised this technique. In this regard, Bernete (2014, p. 222) defines it as “a systematic and objective methodology because it uses procedures, variables, and categories that follow study designs and clearly defined criteria of analysis”. It also makes it possible to interpret reality through categories (Moraima Campos & Auxiliadora Mújica, 2008). Through categorisation – detailed in the following section of this study – the hypotheses will be validated, since, as Andréu Abela (2000) points out, it allows data to be systematically and objectively evaluated.

#### **4.1. Variables and categories**

In addition to the publication frequency depending on the newspaper, the elements to be examined in the units of analysis are grouped into three thematic axes according to the objectives set. To establish the categorisation of these areas, the studies by Gonzales García (2018), Freyle Granados and Arroyave Cabrera (2020), Fernández et al. (2022), and the Fifth Report of the Climate Change Communication Observatory coordinated by Teso Alonso and Gaitán Moya (2024) are taken as references:

- Formal elements:

*Length of the reports.* The volume of each piece analysed is measured. It is classified into seven items, ranging from *Less than one column* to *More than one page*.

*Authorship of the text.* Although in some cases there may be two or more authors, for this study only the first named author is considered:

*Journalist.* If an author’s name appears without any further identifying information.

*Contributor.* If the name is accompanied elsewhere in the text by a specification of their role or profile.

*News agency.*

*Undefined.* When the author is unknown or only the newspaper's name is given.

*Journalistic genre.* The most common types in print media are considered, with Martínez Albertos (1983) serving as a reference for adapting them to this analysis:

*News.* Explains an event or occurrence by presenting its circumstances and details.

*Brief.* A much shorter version of a news item that does not go into detail.

*Feature.* Provides the facts and their context in depth, with an objective style but a highly narrative and creative approach.

*Interview.* Martínez Albertos classifies this as a type of feature. For this study, however, it is distinguished due to its clear formal structure, mainly question-and-answer.

*Chronicle.* Direct narration of information, usually covering events between two dates (the main difference from news). May include some evaluative elements but should remain essentially objective.

*Opinion.* Written by a critic or expert, who may or may not belong to the editorial team, with a free and creative style.

*Editorial.* The author includes this under opinion, but for this study it is treated separately because it fully reflects the ideological line of the newspapers analysed.

*Other.* Different from the above, or unclear in classification due to hybrid elements of two or more genres.

- Textual content. In addition to an analysis of the most frequent terms in the headlines, the following variables are considered:

*Framing.* The temporal context is examined based on the EWE. It is classified as published *Before*, *During*, or *After* the phenomenon occurs. This categorisation allows us to check whether newspapers provide alerts or preventive measures regarding the potential EWE or, conversely, limit themselves to detailing its immediate effects and short-, medium-, or long-term consequences.

*Role of the main source, if any.* The main source is identified based on the prominence they acquire within the analysed unit:

*Politicians and/or government officials.* From all levels (national, international, municipal), whether in government or the opposition.

*Activists and members of NGOs.* Includes volunteers who assist in disaster relief.

*Rescue professionals.* Firefighters, police officers, doctors acting in a professional capacity and not belonging to an NGO.

*Entrepreneurs in the primary sector.* Mainly Agriculture and Livestock.

*Entrepreneurs from the secondary and tertiary sectors.* Mainly Industry and Services.

*Scientists/researchers.* Experts in a specific area of knowledge. Appearing as individuals or as representatives of an organisation, such as a meteorological agency.

*Citizens* (victims or witnesses).

*Journalist.*

*Others.* Not included in the categories above.

Not applicable. There is no source in the unit analysed.

Link to climate change. Whether the EWE is associated with climate change in the text analysed.

*Ignores climate change as a cause of the phenomenon.* It is not mentioned or linked in any way.

*Attributes the phenomenon to climate change as the sole cause.*

*Attributes the phenomenon to climate change as one of several causes.* Also refers to other factors.

- Non-textual content. Images that illustrate or complement the unit analysed.

*Number of images.* Quantified using five categories, ranging from *None* to *More than three*.

*Format of the main image,* if any. When multiple images appear, only the most visually relevant is considered, based on its size or position within the unit. Variables are *Photography, Chart, Data Table, Map, Drawing (or Illustration), Screenshot from social media or other channels, Infographic,* and *Other* (not included in the previous categories).

*Polarity of the main image.*

*Positive.* Images that, within the context of the disaster caused by an EWE, convey something constructive. For example, a rescue, volunteers cleaning up, distributing food – in short, any depiction of aid or collaborative action to mitigate the disaster.

*Negative.* Depicts consequences or actions that worsen the EWE, such as vandalism, opportunistic behaviour by individuals or groups, injured or starving people, fatalities, or destroyed fields.

*Neutral.* Images that cannot be categorised as either positive or negative.

The data were processed and analysed using the program *SPSS v.23*.

## 5. Results

Most of the units analysed were found in the Mexican newspaper *El Universal*, which accounted for nearly a hundred items, 98 in total (40.3%). The Brazilian and Peruvian newspapers recorded respective percentages of 22.6% (55 items) and 27.2% (66 items), while in contrast only 24 units were detected in the Spanish newspaper covering the DANA, representing 9.9% of the total. The uneven news coverage is not related to its temporal span. Indeed, *El Universal*, the newspaper with the highest number of

publications, concentrated them within less than a week, giving a daily average ( $\bar{x}$ ) of 16.3 items. *Folha de S. Paulo* ranks second with 6.87 items per day. In contrast, *El País* spread its 24 reports over slightly more than a month ( $\bar{x} = 0.61$ ), and *El Comercio* covered Cyclone Yaku for almost ten months ( $\bar{x} = 0.22$ ). Although not part of this analysis, it is worth noting that *El Universal's* editorial line showed a marked focus on highlighting the poor management of state and national administrations in the aftermath of the tragedy.

### 5.1 Formal structure

More than a quarter of the items are of the shortest length defined. Some 27.9% occupy less than one column and, except for those that fill a full column (8.6%), the frequency of longer lengths decreases, reaching a minimum of 2% for items exceeding one page, corresponding to 5 of the 243 units studied. Looking at each newspaper individually, while *Folha de S. Paulo* and, above all, *El Universal* mainly favour pieces of less than one column, with respective percentages of 30.9% and 41.8%, *El Comercio* and *El País* tend to use half-page items more frequently. In the former, this occurs in 27.3% of cases, and in the Spanish paper in one fifth, a proportion that is, however, shared with items occupying two-thirds of a page.

The majority of the units (54.5%) are credited to journalists, while those from agencies are barely represented, at just 0.8%, corresponding to 2 items, both in *El Universal*. The remainder is fairly evenly distributed between contributors (21.3%) and items with an undefined author (23.4%). Aside from the data already mentioned regarding agencies, Table 1 shows that journalist authorship predominates in the Spanish (88%), Mexican (65.3%) and Brazilian (49.1%) newspapers, whereas in the Peruvian paper it ranks second (30.3%), with undefined authorship being more frequent (45.5%).

In terms of genres, more than half of the pieces analysed are informative in nature, with 33.6% classified as news and 20.1% as features, to which brief items contribute 6.1%. The more subjective genres appear less frequently, accounting for 29.9% as opinion, and only four pieces (1.6%) are editorials. Both the chronicle and the interview, which can be framed as either informative or opinion-based, have minimal representation, reaching just 4.5% and 3.3% respectively (Figure 1).

By newspaper, *El Universal* stands out for publishing more opinion

**Table 1** Authorship by Newspaper (%).

	Journalist	Contributor	Agency	Indefinite
<i>El Comercio</i>	30.3	24.2	0.0	45.5
<i>El País</i>	88.0	0.0	0.0	12.0
<i>El Universal</i>	65.3	18.4	2.0	14.3
<i>Folha de S. Paulo</i>	49.1	32.7	0.0	18.2

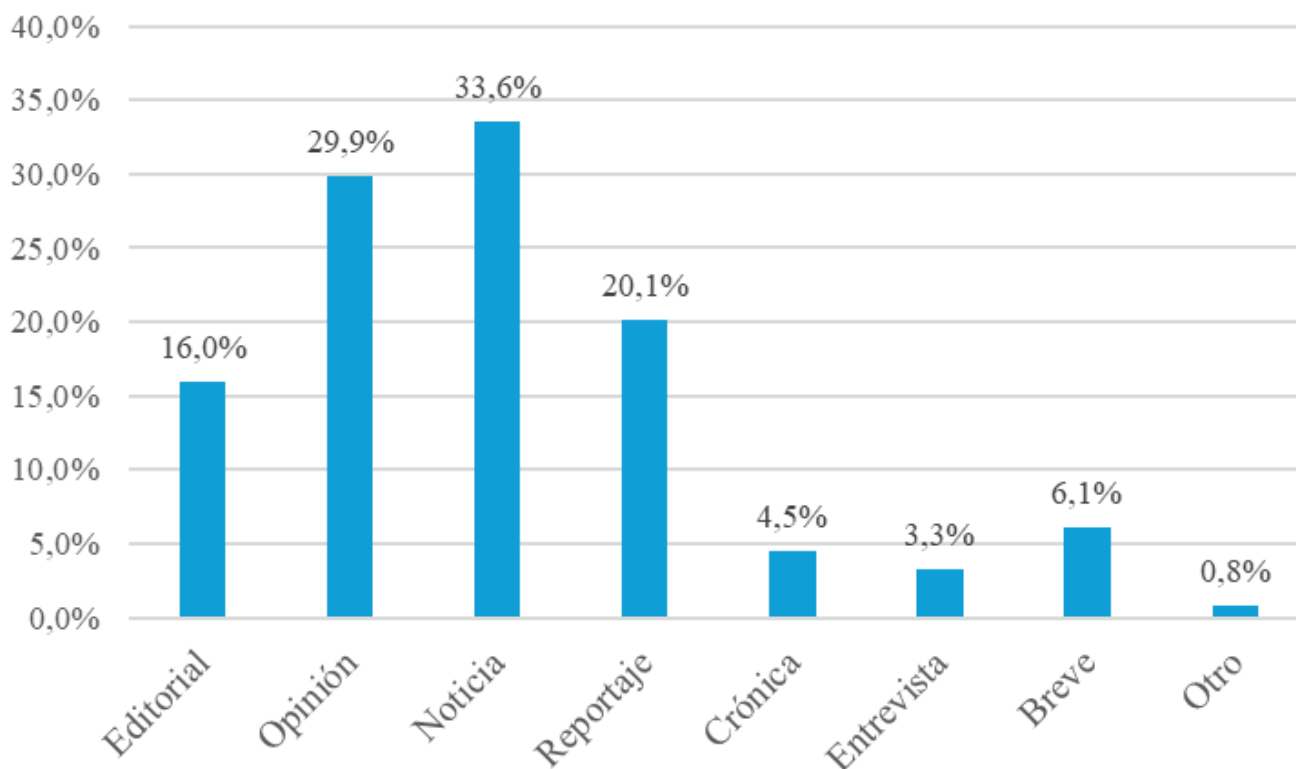
pieces (31.6%), although no editorials are recorded. The other newspapers predominantly feature news articles, especially *El País*, with 60% of its pieces falling into this information category. *El Comercio* also favours this genre (36.4%) but balances it closely with opinion articles (31.8%). Although with slightly larger differences, the Brazilian newspaper similarly relies on these two genres, with 36.4% for opinion pieces and 45.5% for news articles.

## 5.2. Textual content

Highlighting the main words in the headlines reveals that the most significant terms in this study are: “Acapulco”, “Rains”, “Disasters”, “Brazil”, “Hurricane Otis”, “Climatic”, “El Niño”, “Storm”, and “Protect”. It is logical that the nouns published by *El Universal*, the newspaper with the most articles, appear larger. However, if generic words not directly linked to the names of the EWEs analysed are highlighted, the prominent terms are: “Disasters”, “Climatic”, and “Protect”. This summary might suggest a promising balance in the narrative treatment of the news, integrating forecasts, consequences, and the link between extreme weather events and climate change. However, based on the analysis, this expectation is not met (Figure 2).

There is indeed a clear tendency to publish content after the EWE (77.9%), which indicates a focus on consequences and remedial measures rather than on precautionary actions that could be reported before the phenomenon occurs (17.2%). Only 4.9% of articles were published during the event itself, likely corresponding to those EWEs that lasted several days.

**Figure 1**  
Percentages of Journalistic Genres Used (%).





**Table 2** Time coverage of the EWEs (%).

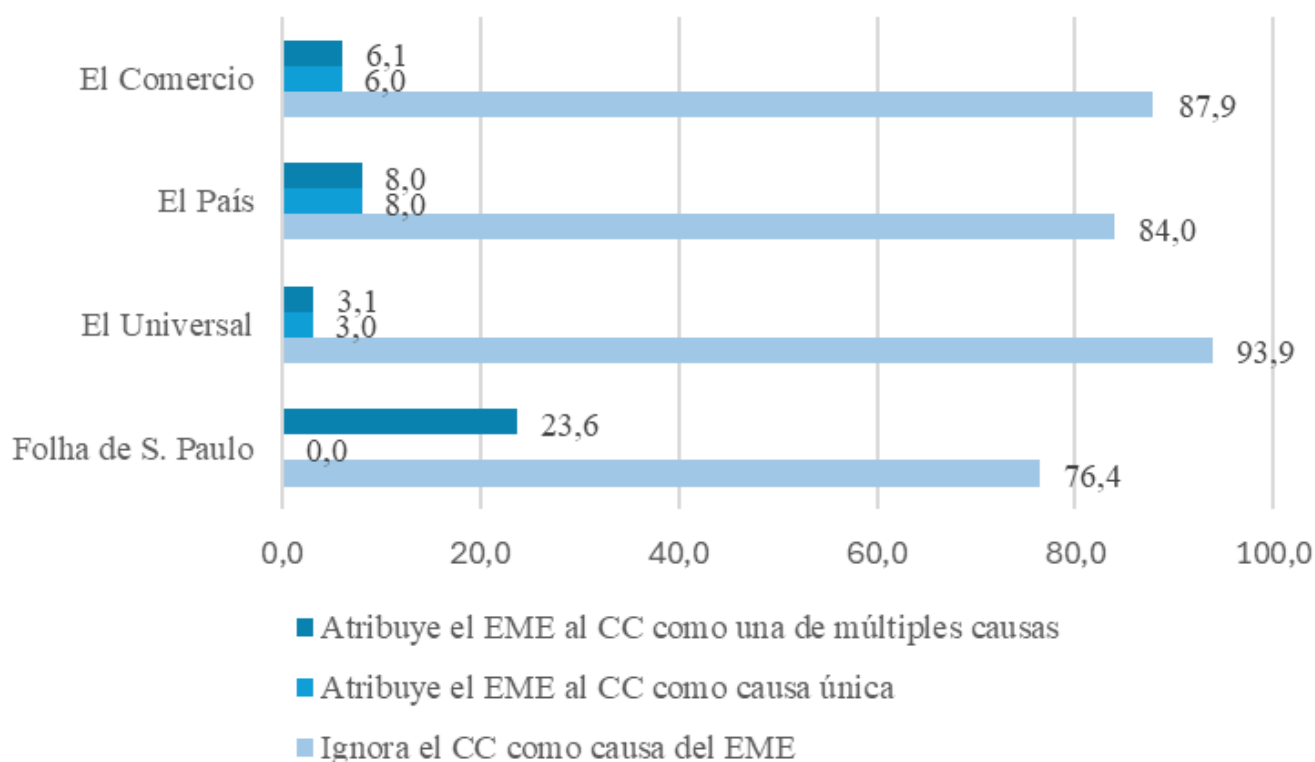
	Before	During	After
<i>El Comercio</i>	9.1	59.1	31.8
<i>El País</i>	12.0	4.0	84.0
<i>El Universal</i>	3.1	2.0	94.9
<i>Folha de S. Paulo</i>	0.0	0.0	100.0

high percentages ranging from 76.4% for the Brazilian newspaper to 93.9% for *El Universal*.

For the selection of sources in each article, there is a clear preference for politicians and government officials, with more than a quarter of the analysed content (28.8%) falling into this category. Scientific experts providing information on the EWE are also frequently cited (21.8%). In third place, given the severity of these events, newspapers tend to quote members of the public, both victims and witnesses (19.9%). Business figures of any type appear in around one in ten articles (10.3% in total), while the least frequently cited sources are rescue professionals and activists/NGO representatives, each accounting for 4.5%.

Focusing on the three most frequent source types, Table 3 shows that the Mexican newspaper largely presents the political perspective, whereas the Peruvian and especially the Spanish newspapers favour the scientific viewpoint. In the Brazilian newspaper, there is an even balance between the two (21.6%). Regarding the third category (members of the public), *El*

**Figure 3**  
 Newspaper Attribution of EWE to CC (%).



**Table 3** Sources Employed in Coverage of EWEs (%)

	Politicians/government officials	Scientists	Public
<i>El Comercio</i>	29.9	32.3	0.0
<i>El País</i>	17.6	29.4	23.5
<i>El Universal</i>	38.6	14.0	35.1
<i>Folha de S. Paulo</i>	21.6	21.6	13.7

*Comercio* does not provide any statements. *El Universal* includes them in just over a third of its content, while *El País* features them in nearly a quarter (23.5%), almost double the proportion recorded in *Folha de S. Paulo* (13.7%).

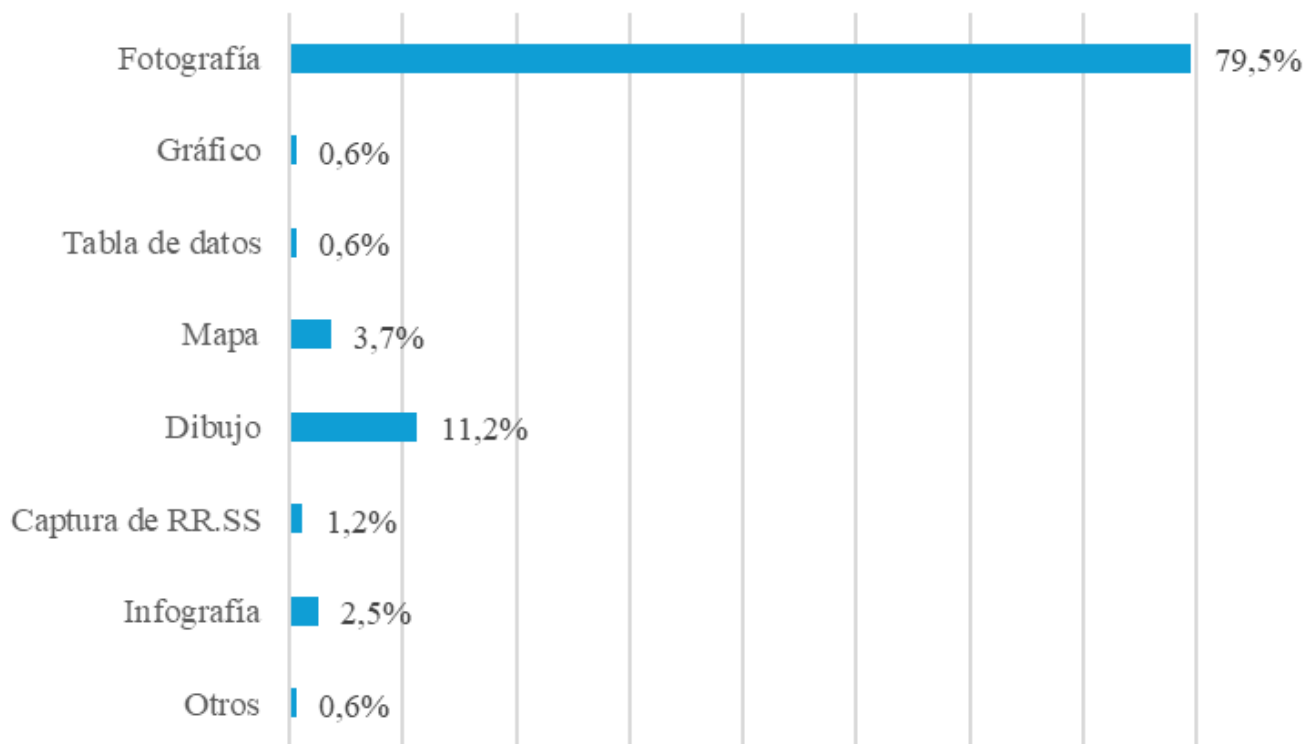
### 5.3 Non-textual content.

The majority of the units include minimal visual elements. One third of the total (34%) consist solely of text, and more than half (54.5%) contain only a single image. The remaining 11.5% are distributed across two to more than three images, although there is no consistent decreasing trend. By newspaper, the Spanish paper shows the highest proportion of content with at least one image, featuring visuals in 80% of its units, but the number of images per unit declines steadily. In the Mexican newspaper, 75% of units include non-textual elements, though most of these contain only one image (66 of the 74 units with visuals). The Brazilian newspaper has the highest proportion of units without any non-textual elements (42.2%), but both it and the Peruvian newspaper provide more than three images in roughly a third of their respective pieces.

Almost eight out of ten images presented are photographs (79.5%). Among the remaining formats, illustrations are the most common (11.2%), followed by maps (3.7%) and infographics (2.5%). The other formats appear with absolute frequencies between 1 and 2, representing percentages ranging from 0.6 to 1.2 (Figure 4).

Photographs remain the predominant format across all four newspapers. The second most frequent format, illustrations, is only used by two papers: *El Comercio* on 12 occasions and *El Universal* six times. Except for a single map in the Peruvian newspaper, the remaining five maps appear in *El País* (twice) and *Folha de S. Paulo* (three times). *Folha de S. Paulo* and *El Comercio* each account for two of the four infographics recorded.

Within the context of the tragedy posed by an EWE, this is reinforced by the negative impact of viewing these images. More than half (59.7%) are classified as negative, 22.6% as positive, and 17.6% as neutral. The tendency toward negativity is consistent across image types, except for social media screenshots, though these are negligible, with only two recorded – one



**Figure 4**  
 Percentages of the types of images used.

positive and one neutral. As for the maps, three are neutral, one positive, and two negative.

Negativity is clearly evident across all newspapers (Table 4), with marked imbalances between positive and negative images. These differences, in descending order, are seen in *El Comercio*, *El País*, and *El Universal*, showing respective gaps of 74.5, 35, and 22.5 percentage points between negative and positive images. *Folha de S. Paulo* presents a more balanced distribution of image polarity, with 50% negative and 45% positive.

## 6. Conclusions and discussion

Research into the media coverage of Extreme Weather Events (EWE) is becoming increasingly necessary for several reasons. Firstly, because of their growing frequency and the greater variety of types, as shown by the numerous and more advanced studies carried out in recent years in the field of science in general and meteorology in particular. Secondly, and

**Table 4** Polarity of the Main Image in each Newspaper (%).

	Positive	Negative	Neutral
<i>El Comercio</i>	2.1	76.6	21.3
<i>El País</i>	25.0	60.0	15.0
<i>El Universal</i>	29.2	51.4	19.4
<i>Folha de S. Paulo</i>	45.0	50.0	5.0

linked to the above, because of their possible connections with climate change, one of the greatest challenges we face worldwide, which demands the involvement of everyone at every level, including citizen participation, both collectively and individually.

It is at this point that the importance of professional journalism in the coverage provided by general-interest newspapers becomes evident, as the aim is to deliver detailed and accurate information on EWEs with the purpose of bringing citizens closer to an understanding of these phenomena. On the one hand, this can foster greater awareness and encourage their involvement in prevention and response; on the other, it can help distance them from misinformation and denialist positions, which run in direct opposition to scientific progress in this field. From the perspective of communication research, there is a large body of scholarly literature offering alternatives for quality journalism capable of achieving the goal of disseminating information on these phenomena in a way that both informs and educates different audiences.

In the empirical field, several case studies have also been carried out, with different approaches, to examine whether or not these recommendations are being followed. However, there are very few multiple case studies on the news coverage of EWEs. This study contributes an analysis of four newspapers from four different countries and, moreover, offers a comprehensive perspective on how information is disseminated from various angles, not only in terms of textual and non-textual content, but also in formal aspects that are equally crucial for capturing the attention of their audiences.

From this perspective of formal structure, the findings reveal a lack of depth in the content published about the EWEs studied, as more than half of the units analysed occupy one-third of a page or less, and only 2% extend beyond a full page. These latter cases amount to five in total, four of which are found in the Spanish newspaper and just one in the Mexican daily. The greater concentration of coverage dedicated to the DANA is offset by the limited time span in which it was addressed in this newspaper – only during 38 days, and not continuously. Despite the severity of this event, which caused, among other damage, eight deaths, it barely received sustained coverage. This may in turn hinder the public from developing a sound understanding and awareness of the issue.

Therefore, media coverage of these phenomena should be both extensive and intensive across all outlets. Such coverage should not only be measured by the quantity and length of the news items in terms of space and time, but also by the deployment of technical and human resources. Does the reporting of the consequences of EWEs require journalists specialised in environmental and climate crisis issues? In theory, no; however, it is becoming increasingly necessary for mediators to have specialised training in these areas. The results of this study show that journalists were responsible

for 54.3% of the units analysed, while, in contrast, 21.3% were authored by contributors who, with a more specialised perspective, are able to add depth to the information and thereby provide audiences with greater knowledge.

The approach taken by the newspapers analysed does not align with the recommendations made by Díaz Echarri et al. (2024) and Teso Alonso et al. (2018), who advocate for scientific communication. The findings on authorship are reinforced by the recurrence of the journalistic genres examined, which confirm the first hypothesis (H1). Indeed, more than one third of the units fall into the news format which, when combined with features and briefs (as informative genres), amount to 59.8% – exactly double the opinion pieces, which were produced largely by expert contributors from different fields.

There is a very clear trend among the newspapers analysed to publish their pieces once the EWE has already occurred. More than 77% appear afterwards, while 17.2% are published while the event is taking place. It is true that the study focuses on printed newspapers, whose immediacy and reaction capacity cannot, by any means, be compared to that of other media such as digital outlets, radio or television. However, the 4.9% of items published before the event took place is still meagre. In other words, priority is given to the consequences and the drama that EWEs entail, as well as to recovery, to the detriment of informing the public beforehand so as to avoid or mitigate their effects.

All the events analysed had already been announced by the meteorological services, yet the printed newspapers barely echoed them in the preceding days. Although immediacy is indeed a weakness for this type of medium compared with others, it could be offset by their greater strength in expanding knowledge of such events and providing more in-depth information, enabling the population to remain alert to what is about to happen. However, our results point in the opposite direction. As Monterroza et al. (2022) already suggested, there is no in-depth treatment of background factors, which results in neglecting the presentation of courses of action recommended by Appelgren and Jönsson (2021).

The absolute attribution of EWEs to anthropogenic climate change cannot be conclusive, since long-term studies of attribution methods are still required (Noy et al., 2024). This feeds into the ongoing discussion in academic literature about their coverage in the media. On the one hand, Osaka and Bellamy (2020) question how this attribution is reflected in the media; in contrast, Clarke and Otto (2022) and Visconti and Young (2024) agree on the need to link EWEs with climate change. In any case, the media dedicate little space to climate change itself (Díaz Echarri et al., 2024), and the results of this study show that the connection is minimal, confirming our second hypothesis (H2a). Indeed, 87.3% of the units analysed do not even mention it, and in the few instances where it does appear, it is mostly presented as one cause among others. All four newspapers

follow the same trend, and the Brazilian daily does not attribute it as a sole cause in any case. We are therefore dealing with content that may foster biased knowledge and attitudes among the public, as argued by Konisky et al. (2016), depriving them of information grounded in sound and fully documented science (Painter et al., 2020).

In connection with these results, the perspective given to the units analysed is mainly political, considering the profile of the main source. However, this outcome must be qualified when looking at each newspaper individually, so hypothesis 2b can only be confirmed in part. The Peruvian daily *El Comercio* and, above all, the Spanish daily *El País* prioritise the scientific profile. *Folha de S. Paulo* balances both with identical shares of 21.6%. The only newspaper showing a clear inclination towards political sources is *El Universal*, which in 38.6% of cases relies on this profile, compared to 14% from the scientific sphere. In fact, this percentage is even exceeded by that of citizens (35.1%), a figure close to that of political sources. This trend in the Mexican daily is consistent with the findings of Mugerza and Arce (2022), who observe media self-limitation in source profiles, centred on governments and other political actors, possibly due to easier access to these figures. Yet the printed press can afford a more measured approach and, consequently, a broader and more diversified use of sources.

The lack of depth and detail in reporting on EWEs, demonstrated by these results, is reinforced when examining non-textual content. More than half of the units include an image (54.5%), though it is also worth noting that 34% contain none. These figures can be linked to the already mentioned limited length of the cases analysed, which may become blurred in stylistic terms when an image is added. The format is predominantly photographic (79.5%). The choice of this format, common to all four newspapers studied, appears aimed more at creating a visual rather than an informative or educational impact, and an alarmist one at that, with a clearly negative polarity that may lead to widespread unease, as suggested by Bilkay et al. (2024).

The near absence of other formats that could aid understanding of the phenomenon, replaced instead by negative photographs, also confirms our final hypothesis (H3). Infographics, maps, charts or data tables appear in only 9.4% of the units, even though their content provides a much more concise, yet detailed and therefore more comprehensible, view of what EWEs are, their causes, how they occur, their effects, and the measures that can be taken to address them.

As a point of discussion, it can be said that the study presents some limitations arising from other variables that could also be applied. Future research could deepen the analysis of discourse through the use of qualitative methodological techniques. Similarly, selecting media according to their ideological tendency is proposed, as this variable is closely linked to the degree of support versus scepticism – or denial – regarding climate

change (Jiménez Gómez & Martín Sosa, 2022). A media analysis with a geographical focus closer to the points of incidence could also be applied, as, according to Nieves-Pizarro et al. (2019), this strengthens the responsibility of the reporting journalist, who acts simultaneously as a direct witness and an affected party.

Nevertheless, the categorisation established in this study and the results obtained can serve as a reference for other research related to the same subject and, more broadly, to all matters concerning the dissemination, communication, and consequent education on climate change. In this regard, the framework developed could be employed for studies on EWEs occurring after those analysed here, some of which have had far more severe consequences, such as the floods and landslides that affected nearly 500 cities in Rio Grande do Sul (Brazil) in April 2024, or the DANA in Valencia and Castilla-La Mancha (Spain) in October 2024, which resulted in over 200 fatalities. Likewise, it can serve as an example for print journalism professionals to compare their routines with the findings of this analysis, identify weaknesses that need to be addressed, and implement improvements to ensure they provide readers with adequate information on such a pressing challenge as climate change and its consequences.

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