Fact-checking and disinformation in Spain related to the climate issue. Trends in coverage, topic selection, and the management of news sources in the professional strategies used by *EFE Verifica*, *Maldito Clima*, and *Newtral*

Fact-checking y desinformación climática en España. Tendencias en la cobertura, tematización y gestión de fuentes en la estrategia profesional de EFE Verifica, Maldito Clima y Newtral

Enric Sendra-Duro. Bachelor's Degree in Journalism from Universitat Jaume I in Castellón, in addition to a Master's Degree in Political Analysis and Institutional Consultancy from the University of Barcelona. Professor Sendra-Duro also holds a postgraduate degree in Political Marketing and Communication from the Autonomous University of Barcelona. He is currently working toward a PhD in Communication Science at Universitat Jaume I, in which his lines of research focus on the changing face of climatic journalism, media agenda setting, and the challenges of institutional communication in the digital realm. He has given lectures related to journalism, as well as audiovisual communication and advertising at Universitat Jaume I, in addition to ten years of professional experience in corporate and institutional communication.
Universitat Jaume I, Spain
esendra@uji.es
ORCID: 0000-0002-8569-2709

ISSN: 1696-019X / e-ISSN: 2386-3978

Received: 08/12/2024 - Accepted: 16/05/2025 - Early access: 29/05/2025 - Published: 01/07/2025

Recibido: 08/12/2024 - Aceptado: 16/05/2025 - En edición: 29/05/2025 - Publicado: 01/07/2025

Abstract:

This study offers a comprehensive analysis of how three of Spain's leading fact-checking platforms address climate disinformation. These include EFE Verifica, Maldito Clima, and Newtral. Through a quantitative methodology using content analysis, four key aspects were examined: 1) degree of coverage and type of articles selected based on their textual structure and communicative purpose; 2) main topics covered; 3) diversity and quality of the sources; and 4) geographical focus of the published articles. The corpus examined includes 479 news items on climate change and the environment, produced and published in 2023 by the platforms mentioned above, which are accredited by the International Fact-Checking

Resumen:

Este artículo ofrece un análisis exhaustivo sobre cómo tres de las principales plataformas españolas de verificación de hechos –EFE Verifica, Maldito Clima y Newtral– abordan la desinformación climática. Aplicando una metodología cuantitativa basada en el análisis de contenido, se examinan cuatro aspectos clave: 1) el grado de cobertura y la tipología de piezas según su estructura textual y función comunicativa; 2) los temas principales tratados; 3) la diversidad y calidad de las fuentes utilizadas; y 4) el enfoque geográfico de las piezas publicadas. El corpus analizado comprende 479 piezas informativas publicadas en 2023 sobre cambio climático y medio ambiente, elaboradas por estas plataformas acreditadas por la International Fact-Checking Network. Los hallazgos

How to cite this article:

Sendra-Duro, E. (2025). *Fact-checking and disinformation in Spain related to the climate issue. Trends in coverage, topic selection, and the management of news sources in the professional strategies used by EFE Verifica, Maldito Clima, and Newtral. Doxa Comunicación*, 41, pp. 561-587.

https://doi.org/10.31921/doxacom.n41a2861

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Network. According to the findings, the attention paid to climate change is significant but inconsistent, as the most recurring types of published texts are verification reports and the debunking of viral hoaxes. Furthermore, the content mainly addresses extreme weather events, responsible consumption, and sustainability, with a predominantly national focus. Nevertheless, rigorousness in source management stands out, featuring considerable participation from officials, experts, the media, and digital sources. The results highlight the strategic role of verification journalism in opposing climate disinformation, due to its ability to identify trends and challenges in the short and medium term.

Keywords:

Verification platforms; media agenda; disinformation; information sources; journalism; climate change.

revelan una significativa pero desigual atención al cambio climático, con la publicación de reportajes de verificación y el desmentido de bulos virales como las tipologías de textos más recurrentes. Los contenidos giran mayoritariamente en torno a fenómenos meteorológicos extremos, el consumo responsable y la sostenibilidad, donde predomina un enfoque territorial nacional. Asimismo, destaca la rigurosidad en la gestión de fuentes, caracterizada por una abundante participación de oficiales, expertas, mediáticas y digitales. Estos resultados subrayan el papel estratégico del periodismo de verificación como un actor esencial en la lucha contra la desinformación climática, identificando tendencias y desafíos a corto y medio plazo.

Palabras clave:

Plataformas de verificación; agenda mediática; desinformación; fuentes informativas; periodismo; cambio climático.

ISSN: 1696-019X / e-ISSN: 2386-3978

1. Introduction

In a global scenario defined by growing political polarisation, along with a digital environment shaped by the rise of social media, the spread of false and misleading information has emerged as one of the major threats to social cohesion and the quality of public debate (Rodríguez-Pérez, 2019). Generally known as *disinformation*, or *fake news*, this phenomenon not only confuses citizens, but it also diverts attention from urgent problems, thereby eroding trust in public institutions and the media. According to the Reuters Institute's Digital News Report (Vara-Miguel, 2024), concern regarding the veracity of news has increased by three percentage points in the last year. The same report highlights the fact that only 40% of the world's population trusts the news, a figure that dips slightly to 39% in Spain, making this country the least trusting of the media within the European Union (Fletcher et al., 2024).

One of the issues most affected by disinformation is climate change. Considered one of the biggest threats of our time, the climate crisis is routinely challenged on digital platforms through misleading narratives that deny, minimise, or distort its seriousness. These publications not only fuel denial, skepticism, and obstructionism (Moreno-Olmeda, 2022), but they also encourage inaction in the face of an emergency that requires urgent and coordinated measures on a global scale. In this context, climate disinformation not only undermines scientific consensus, but it also weakens people's ability to make informed decisions, thereby increasing their lack of trust in the media and journalism (Van der Linden et al., 2017).

In response to this challenge, fact-checking journalism has gained prominence as a key tool for counteracting the spread of fake news and restoring trust in the news. These verification outlets have emerged in response to the saturated, polluted, digital media space, calling for journalism to be committed to truth and public service (Moreno-Gil et al., 2022). This work became more intense with the advent of the COVID-19 pandemic (Luengo and García-Marín, 2020), remaining a key media player by focusing on the detection of errors, verifying facts, and attempting to stop hoaxes.

This research analyses the way in which fact-checking platforms in Spain address the coverage of climate change, which involves identifying trends, challenges and opportunities in the fight against disinformation in an increasingly complex media and political context. To conduct this investigation, the author has used agenda-setting studies as a reference, along with the professional management of information sources as a criterion of journalistic quality.

2. Theoretical framework

2.1. Disinformation related to context of climate change

The communication revolution resulting from the advent of social media poses a profoundly negative threat to contemporary democracies, which is disinformation (Bennett & Livingston, 2018). While hoaxes are not a recent phenomenon, their current proliferation and sophistication present an unprecedented challenge to society and the media. They not only distort public debate with unfounded messages that try to confuse citizens and distract them from important issues (Farrell et al., 2019), but they also spread hate speech and foment political polarisation (Teruel-Rodríguez, 2023). In Spain, 70% of the population claim be worried about disinformation (Novoa-Jaso et al., 2024).

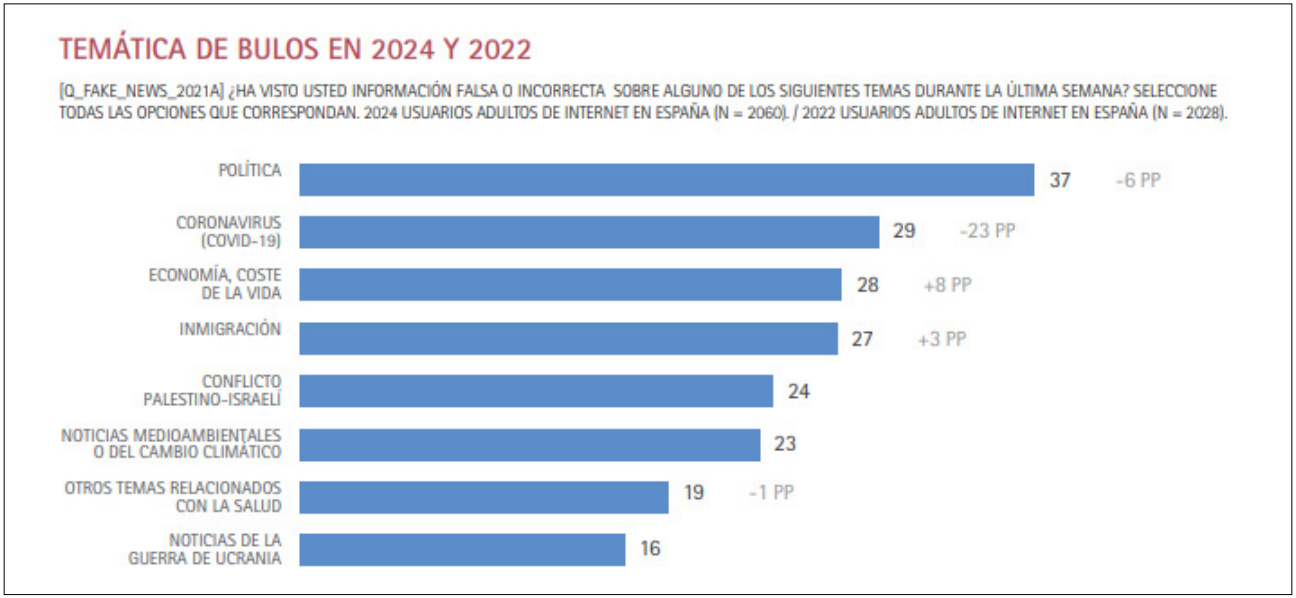
Most authors attribute the phenomenon to false, inaccurate, and erroneous information that is often presented out of context (Salaverría et al., 2020; Treen et al., 2020). Such content is misleading, yet presented and disguised as real news, which is disseminated on a massive scale to promote specific interests and cause social unrest (Aruguete et al., 2020; Pérez-Escoba and Pedrero-Esteban, 2021). The confusion between disinformation and accurate information has led to lower credibility of journalism in society (Mayoral et al., 2019). Consequently, according to authors such as Jones-Jang et al. (2019), media literacy is essential as an educational tool for improving audiences' ability to differentiate between real and fake news.

Social media platforms and networks are plagued by content that totally or partially denies the existence, causes, effects, and possible solutions to climate change. Moreover, this content underestimates the extent of its impact (Vu et al., 2019). According to data from the Reuters' *Digital News Report* (Novoa-Jaso et al., 2024), hoaxes about climate change are the sixth most common type of fake news in Spain. Their persistence highlights the difficulty in counteracting the spread of false information online regarding the climate crisis, as well as knowing how long it will continue in the digital world.

ISSN: 1696-019X / e-ISSN: 2386-3978

ISSN: 1696-019X / e-ISSN: 2386-3978

Figure 1. Hoax topics in Spain (2024 and 2022)



Source: *Digital News Report*, Spain (2024)

This phenomenon has profound implications, as environmental disinformation can undermine global efforts to combat climate change. By creating confusion related to scientific evidence, hoaxes impede decision-making aimed at implementing effective public policies (Abellán-López, 2021). To be more precise, exposure to disinformation can lead to inaction and social disinterest regarding the severity of the climate crisis (Van der Linden, 2015; Hicke et al., 2023).

The problem is that sensationalist and eye-catching content, which is intrinsically linked to disinformation, tends to spread more easily than real news (Fernández-García, 2017). Therefore, as the effects of climate change become increasingly visible and devastating, the need for specialised coverage becomes imperative (Rodrigo-Cano et al., 2021; Fernández-Castillo and Magallón-Rosa, 2023). Moreover, given the complex and technical nature of this issue, it requires the intervention and participation of expert sources in the field of information (Sendra-Duro and López-Rabadán, 2024). In this regard, the media have a fundamental responsibility, not only to inform, but also to educate and raise awareness by using accessible narratives based on rigorous scientific data, in order to combat the rising tide of disinformation (Melani-Rocha, 2015; García-Avilés et al., 2023).

2.2. Verification platforms: a way to fight against disinformation

Tactics for disseminating fake news prevail when both journalists and citizens lack the tools to verify and refute these malicious discourses and messages. Consequently, fact-checking has become a key instrument of considerable importance in combatting false content (Mayoral et al., 2018). In short, verification journalism relies on credibility and transparency as the foundation for maintaining public trust, thereby taking effective action against the spread of false and misleading information (Sanahuja-Sanahuja and López-Rabadán, 2023).

Fact-checking platforms first emerged in the United States as a civic initiative to ensure accountability. The platforms became professional organisations with the launch of FactCheck.org (2003), along with the so-called Fact-Checker of the *Washington Post* in 2007. Afterward, French media outlets such as Libération (2008) and Le Monde (2009) launched their first review instruments. In Spain, *Maldita* (2013) was the first media outlet to specialise in fact-checking, followed by *Newtral* (2018) with its journalistic monitoring project. Subsequently, established media outlets launched fact-checking initiatives, such as *EFE Verifica* (2019), which is linked to the agency's public news section.

To a large extent, the operations of fact-checking platforms rely on citizen collaboration and participatory democracy in the digital environment (Vizoso and Vázquez-Herrero, 2018). This allows readers to send publications that contain dubious messages to the editorial team and request fact-checking of the information. The objective of the fact checkers is to clarify the content by contrasting and using verification techniques or procedures that allow them to trace the items back to their source. Recently, the standardisation of fact-checking processes through the International Fact-Checking Network has significantly streamlined the task through shared methods and campaigns.

In terms of professional practises on these platforms, news writing differs from traditional journalism. According to García-Marín (2024), fact-checking should not be confined to traditional journalistic genres such as news, features, reports, etc., but should have its own typology aimed at identifying the characteristics and inner-workings of disinformation and the dynamics of cyberjournalism. This would include denial, which is news about the verification of hoaxes, as well as verification reports. Furthermore, fact-checkers consolidate their findings through a process of triangulation by cross-checking the evidence obtained with a wide variety of sources, which is a factor that contributes to journalistic quality (Casero-Ripollés and López-Rabadán, 2013). Recent studies point to a clear preference for official and expert sources, which are most frequently used by these media (Capelli et al., 2024; Chaparro-Domínguez et al., 2024). This approach helps to ensure more accuracy and rigour in their assessments. At the same time, platforms are turning to digital review methods through apps and online tools aimed at determining whether an image, video, or graphic resource has been manipulated or distorted using specialised software in order to mislead the public. Such tools are also used to trace the origin of the item (Brandtzaeg et al., 2018), which is an example of using digital hybridisation in carrying out this work (Van Leuven et al., 2018).

ISSN: 1696-019X / e-ISSN: 2386-3978

ISSN: 1696-019X / e-ISSN: 2386-3978

2.3. Verification journalism regarding the climate crisis

Studies on fact-checking platforms have increased significantly, especially due to their activity during the COVID-19 health crisis (Sanahuja-Sanahuja and López-Rabadán, 2023; López-García et al., 2021; Moreno-Gil et al. 2023). Thus, people started to see fact-checking journalism as an essential tool for public health and safety (García-Vivero and López-García, 2020). Regarding climate change, recent studies by Gallardo-Camacho et al. (2024) and Fernández and Magallón (2023) are noteworthy in Spain. Both groups of authors agree that the main role of news items is explanatory, and that extreme weather is the dominant theme. The latter group also emphasise that a national geographical perspective is prevalent. According to Quintana-Pujalte and León-Moral (2024), who have analysed media narratives on Spanish platforms regarding the United Nations 2030 Agenda, climate change is one of the most recurring issues. Along the same lines, Blanco-Herrero et al. (2024) have found a preponderance of social issues in news articles, although politics was the underlying topic, which reinforces the polarising role of disinformation.

Other relevant research in the academic field of disinformation has analysed denialist discourse in legacy media (Martín-Sosa, 2021) and, more recently, on digital platforms like YouTube (Vicente-Torrico and González-Puente, 2023). Fernández and Magallón (2023) emphasise how international events at the highest political level, such as climate summits, have become especially sensitive to disinformation dynamics, acting as critical focal points in terms of the production and circulation of biased narratives. Along the same lines, authors such as Gelado-Marcos et al. (2025) warn that messages spread globally are often adapted to local contexts to heighten their social impact. Furthermore, after analysing the most active sources of disinformation, Benaissa-Pedriza (2024) found that the origin of most disinformation is ordinary users and influencers, who spread fake news through simplistic messages and singular points of view. On the other hand, Martín et al. (2024) question the usefulness of fact-checking journalism, arguing that it fails to change the opinion of people who spread disinformation. These authors believe that it only reinforces the opinions of those who oppose disinformation.

At the international level, a significant contribution has been made by Hameleers and Van der Meer (2020), who have found that fact-checkers can achieve informational credibility in the climate debate and reducing political tension. Flack et al. (2024) have identified biased selection, slothful induction, and oversimplification as the most heavily used discursive strategies in climate change disinformation. Likewise, another noteworthy study is that of Chen (2024), whose review of scientific literature listed some of the most effective techniques for counteracting climate disinformation disseminated through emerging technology, including media literacy, algorithmic fact-checking, and interactive formats. Furthermore, Ejaz et al. (2024) warn about the incursion of companies that use branded content, a strategy that could be perceived as a form of greenwashing, and a means of strengthening their corporate reputation in terms of sustainability.

Vasileiadou (2025) analysed press coverage of the 28th United Nations Climate Change Conference (COP28). This author identified some of the main sources of false or misleading information about climate change, which included the governments of Russia and China, as well as fossil fuel exporting companies, and influencers who make profits by spreading conspiracy theories about global warming. On the other hand, another international study found that disinformation is more likely to be spread by anonymous organisations and profiles than by business magnates, celebrities, and academics (Hassan et al., 2023).

3. Methodology

3.1. Objectives

The main objective of this article is to comprehensively examine the strategies and practices of verification journalism in Spain, in order to address disinformation related to climate change.

The analysis aims to shed light on the reporting approaches and methods used by verification agencies, and to identify relevant trends that might impact the future of fact-checking journalism regarding this topic. To this end, the following strategic objectives are as follows:

O1. Quantify the volume of information produced and categorise published pieces according to their textual structure and communicative purpose, paying special attention to emerging uses that are specific to fact-checking.

O2. Analyse the priority topics that recur frequently regarding the coverage of climate disinformation by establishing patterns of the issues that receive the most attention and their relevance in media discourse.

O3. Assess the quantity, type, diversity, and representativeness of the sources used by the media. Special attention will be given to the use of digital sources and their role as specialised tools in the verification process.

O4. Identify the geographical location of each item in order determine the territorial focus of the coverage.

The novelty of this study lies in two main features. On the one hand, it uses a database covering all articles published by *EFE Verifica*, *Maldito Clima,* and *Newtral* during 2023, thereby ensuring a recent and contextualised perspective on the phenomenon. On the other hand, the analysis of professional standards related to the selection and use of sources, which are applied specifically to verification journalism in the field of climate change, represents a major step forward. This issue has not been explored previously using this methodology, which provides new insights into information dynamics in the context of a global climate emergency.

3.2. Technique

To address the objectives outlined above, a quantitative methodology through content analysis was used. This technique is essential for analysing journalistic messages, as it has a long history and is well established in communication studies, for which it enables data to be systemised (Piñuel-Raigada and Gaitán-Moya, 1995). Therefore, a specific analysis protocol was designed for the manual coding of four variables based on previous research with proven academic rigour.

Firstly, the initial variable was used to analyse the type of item published by each platform, based on its textual structure and communicative purpose. As fact-checking platforms operate in a hybrid and digital ecosystem, their output has attributes that do not fit neatly into the traditional taxonomy of journalistic genres such as news, reportage, opinion articles, etc. Instead, their production reflects the new, operational rationales specific to cyberjournalism. Among these, the most relevant are refutation (verification of hoaxes) and verification reports or articles (García-Marín, 2024). Consequently, three information categories were coded based on the following operational criteria: debunking (news item), understood as a short piece aimed at refuting false content with high level virality; report (verification report, which is an in-depth, analytical, and educational approach;

ISSN: 1696-019X / e-ISSN: 2386-3978

ISSN: 1696-019X / e-ISSN: 2386-3978

and "other communication formats", which refer to new digital formats such as podcasts, videos, and interactive elements that encourage audience participation.

Secondly, the analysis of topic trends has a long history in studies on agenda-setting and priming (McCombs, 2006; Rojas-Calderón, 2022). Identifying such trends makes it possible to determine the volume of an issue on the media agenda, since the more coverage it receives, the more newsworthy it is in the media's view (Ardèvol-Abreu et al., 2020). The theoretical approach of the present study asserts that climate change is an issue from which a wide range of sectoral topics can be inferred. This is a key issue that highlights the transversal nature of the matter and its links to different social disciplines (Radwan and Ayyad, 2024).

Thirdly, the proper management and identification of information sources is essential in providing the audience with high-quality, accurate, and transparent information, especially in the area of fact-checking journalism. In this regard, the agenda of climate change information is fueled by multiple actors including institutions, the scientific community, civil society, and interest groups (Anderson, 2017). Furthermore, digital hybridisation has expanded the range of available sources in recent years, thanks to social media and online platforms (Van Leuven et al., 2018). At the same time, fact-checking platforms are leading the way in using apps and tools designed to reveal manipulation or misrepresentation of a file (Brandtzaeg et al., 2018), which is a truly innovative trend in digital journalism (Van Leuven et al., 2018). Consequently, if a larger number and diversity of sources are consulted, the credibility and influence will be stronger. Moreover, Casero-Ripollés and López-Rabadán (2013) consider this aspect essential for evaluating professional quality.

Finally, the geographical location of the news space helps journalists contextualise the issue, as territorial proximity makes it easier for the audience to understand and interpret the information (Sendra-Duro and López-Rabadán, 2025). This variable was coded according to the dominant geographical setting of the content, which is considered the territory to which the news item mostly refers. If the hoax or topic analysed had a specific impact in Spain, it was classified as "Spain". Articles that focused on European Union policies, or on phenomena that affected several European countries, were coded as "Europe". If the focus was global, with no specific reference, it was designated as "World". In cases where multiple locations were mentioned, priority was given to the territorial focus with the highest discursive impact. The other areas were used when the content had a specific geographical association. Studying this variable would help to understand whether the Spanish media's approach to climate disinformation is presented from a perspective that is national, regional or local, or from an international viewpoint (Jerónimo and Sánchez-Esparza, 2022).

Tabla 1. Analysis protocol

	Variable	Associated values	
1	**Type and communicative purpose of the news item**	1. Debunking – News item 2. Report – verification report 3. Other communication formats	
2	**Main topic**	1. Activism 2. Biodiversity 3. World warming 4. Natural disasters 5. Consequences of climate change 6. Consumption and sustainability 7. Pollution 8. Political debate 9. Extreme weather 10. Mobility 11. Denialism 12. Ecological transition 13. Others	
3	**Information sources**	**Number of sources** 1. Without sources 2. One or two sources 3. Three sources 4. Four sources 5. Five sources 6. More than five sources	**Type of source** 1. Official 2. Economic 3. Civil society 4. Scientific 5. Interest group 6. Media 7. Digital tool 8. Social network 9. Other
4	**Informative space**	1. World 2. Spain 3. Europe 4. United States 5. Latin America 6. Middle East 7. Asia 8. Africa 9. Other	

Source: prepared by the author based on research from Sendra-Duro and López-Rabadán (2025), García-Marín (2024) and Casero-Ripollés and López-Rabadán (2013)

ISSN: 1696-019X / e-ISSN: 2386-3978

ISSN: 1696-019X / e-ISSN: 2386-3978

3.3. Sample

The sample used in this research consists of all the news pieces on climate change published during 2023 by three of the main Spanish fact-checking platforms: *EFE Verifica*, *Maldito Clima* and *Newtral*. These platforms are accredited by the International Fact-Checking Network (IFCN), and they stand out for their commitment to international standards of quality and transparency in fact-checking, which enhances the validity and reliability of the results obtained.

The corpus was compiled manually from the digital newspaper archives of these media outlets, using specific search tags such as "climate change", "climate crisis", "environment" and "global warming". This broad approach ensured that the selection included content directly related to the subject being addressed. An inter-coder reliability test was carried out on 10% of the sample (n=48 pieces), which was performed independently by two researchers. The coincidence was high, with a reliability of over 89% based on Krippendorff's Alpha index, which confirmed the consistency of the method and allowed for the refinement of identification criteria in cases that were complex or difficult to categorise (Hayes and Krippendorff, 2007).

From a methodological perspective, the suitability of this sample is a result of two factors. On the one hand, the focus on platforms known for their professional standards gives the analysis a high degree of representativeness and quality. On the other hand, 2023 was an especially active period in terms of climate disinformation, due to high-impact events such as extreme weather phenomena and international conferences on climate change, all of which provided a rich and varied context for the study.

Table 2. Total sample

Verification platform	Informative pieces
EFE Verifica	39
Maldito Clima	316
Newtral	124

Source: prepared by the author

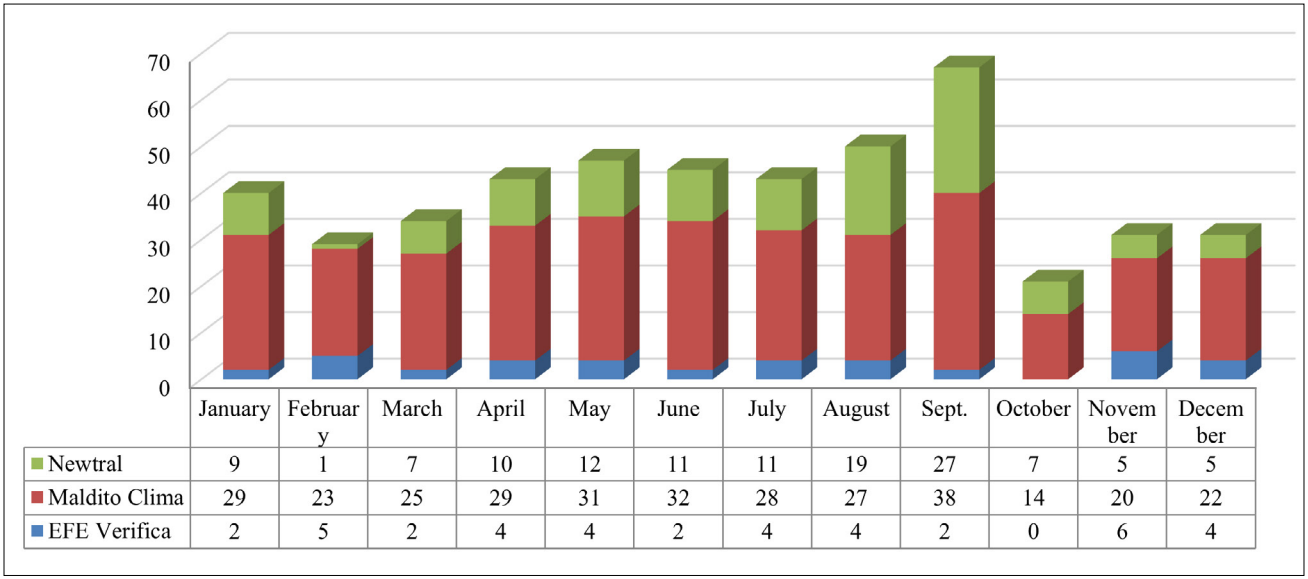
4. Results

The analysis of climate coverage on verification platforms during 2023 reveals a dynamic and complex picture, which was shaped by news production driven by high-impact events. Extreme weather such as heat waves and floods, along with international milestones like the United Nations Climate Change Conference (COP), provided a favourable context for active news monitoring. In this scenario, fact-checking platforms played a significant role in this regard, although different levels of activity were observed: *Maldito Clima* led the way with a considerable number of items at 316, followed by *Newtral* with 124, and *EFE Verifica* with 39. In the following sections, this paper explores how these platforms have addressed news coverage by identifying patterns of activity, responses to key events, and differences in their editorial approaches**.**

4.1. Coverage led by Maldito Clima and influenced by the calendar

With 66% of the total sample, *Maldito Clima* clearly stands out as the most active media outlet in its coverage of the climate crisis. Its high output reinforces its expertise as a media outlet dedicated exclusively to climate content within the overall *Maldita.es* project. This level of coverage also reflects a consistent editorial commitment to environmental issues and the fight against climate disinformation. This verifier consistently ranked higher than *EFE Verifica* and *Newtral* throughout the entire period analysed (see Figure 1). Thus, it is the leading platform in addressing climate change.

Figure 2. Volume of media coverage (n=479)



	January	Februar y	March	April	May	June	July	August	Sept.	October	Novem ber	Decem ber
Newtral	9	1	7	10	12	11	11	19	27	7	5	5
Maldito Clima	29	23	25	29	31	32	28	27	38	14	20	22
EFE Verifica	2	5	2	4	4	2	4	4	2	0	6	4

Source: prepared by the author

Newtral ranks second in terms of coverage. Although its coverage is significantly lower than that of *Maldito Clima*, it is still considerable and accounts for 26% of the total. This suggests that *Newtral* maintains a moderate level of interest in climate disinformation, although its project is broader and more general, focusing on diverse informative areas. *Newtral*'s coverage balances its role as a general fact-checker with an interest in sustainability, yet without reaching the level of specialisation of *Maldito Clima*. Although the level of activity of the former varies, it has notable peaks in specific months, such as August and September.

On the other hand, *EFE Verifica* shows significantly less coverage compared to the other two media outlets, with minimal contributions in most months. With only 8% of the total corpus, *EFE Verifica* carried out limited coverage of climate issues.

ISSN: 1696-019X / e-ISSN: 2386-3978

This figure reflects a more limited approach, probably due to the constraints of editorial space or less priority given to climate change in its news agenda.

Although the platforms *Maldito Clima, Newtral,* and *EFE Verifica* display significant differences in the total number of news items, the data reveal common patterns in peaks and slumps in media attention, suggesting that they all respond to certain events or news cycles related to climate change. Specifically, the months of September, January, and August stand out as periods with the highest coverage. This could be related to the weather itself, such as heat waves, droughts, forest fires, and cold fronts, which tend to produce a high volume of disinformation online, in addition to increased coverage by the media. The absence of significant climate events and stable weather conditions during the rest of the year most likely explain the decline in coverage, given that climate change tends to generate greater interest when it is linked to visible phenomena with an immediate impact.

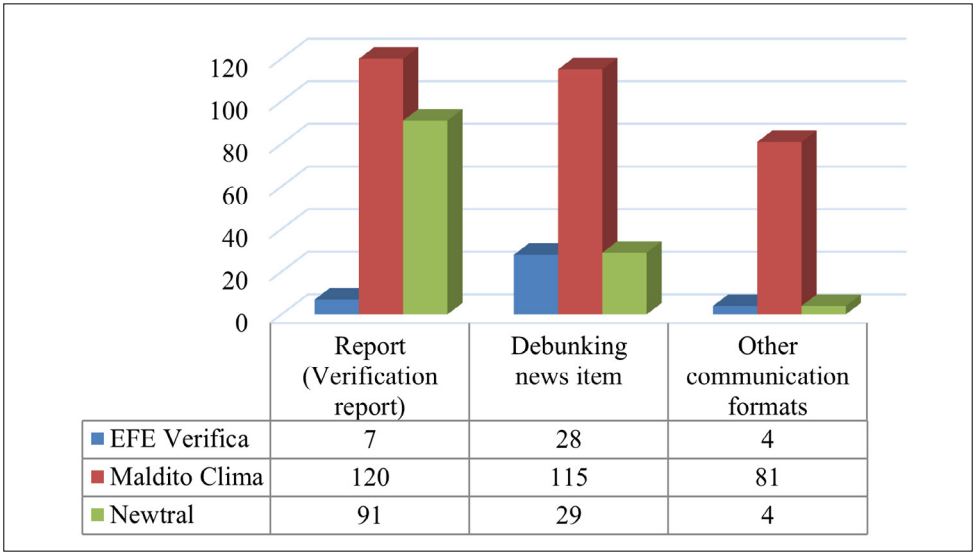
In summary, the data highlight the dominance of *Maldito Clima* in addressing climate disinformation, as well as covering peaks of activity related to key events. This uneven performance among the three platforms might be linked to news priorities and differences in professional or editorial capabilities.

4.2. The report. Fact-checking reports as an informative benchmark in the context of climate change

In terms of the type of news pieces addressed, *Maldito Clima* (129) and *Newtral* (91) lead the way in publishing reports (verification reportage), which indicates an editorial priority on in-depth analysis. This type of article allows complex issues to be contextualised, thereby allowing disinformation to be explained comprehensively and with an educational focus. The reason for this approach is based on the need to address the climate crisis as a multidimensional problem that requires the participation of a wide variety of expert sources, who can help to enhance understanding of the phenomenon.

ISSN: 1696-019X / e-ISSN: 2386-3978

Figure 3. Types of news items according to their communicative purpose (n=479)



	Report (Verification report)	Debunking news item	Other communication formats
EFE Verifica	7	28	4
Maldito Clima	120	115	81
Newtral	91	29	4

Source: prepared by the author

Maldito Clima also generated a large number of debunking news items (115), which is the type of item that is the second most used by the media, and the most symbolic of fact-checking. These informative pieces act as a dam against viral hoaxes that spread virtually through social media and demand a quick response. This type of item is precisely the most symbolic of the sample from *EFE Verifica* (28).

However, there are other publications in various formats, including audience consultations, questions and answer pieces (Q&A), short videos, and podcast episodes. *Maldito Clima* also leads this group of items with a comfortable margin, which strengthens its role as a specialised platform, thereby allowing it to explore climate issues from multiple angles and formats of digital journalism.

4.3. Ample coverage influenced by extreme weather events

The present analysis of the media agenda unveils relevant patterns regarding the priorities of verification platforms in relation to the climate crisis. The results indicate how these platforms develop their coverage to respond to the challenges of climate disinformation and its impact on public opinion.

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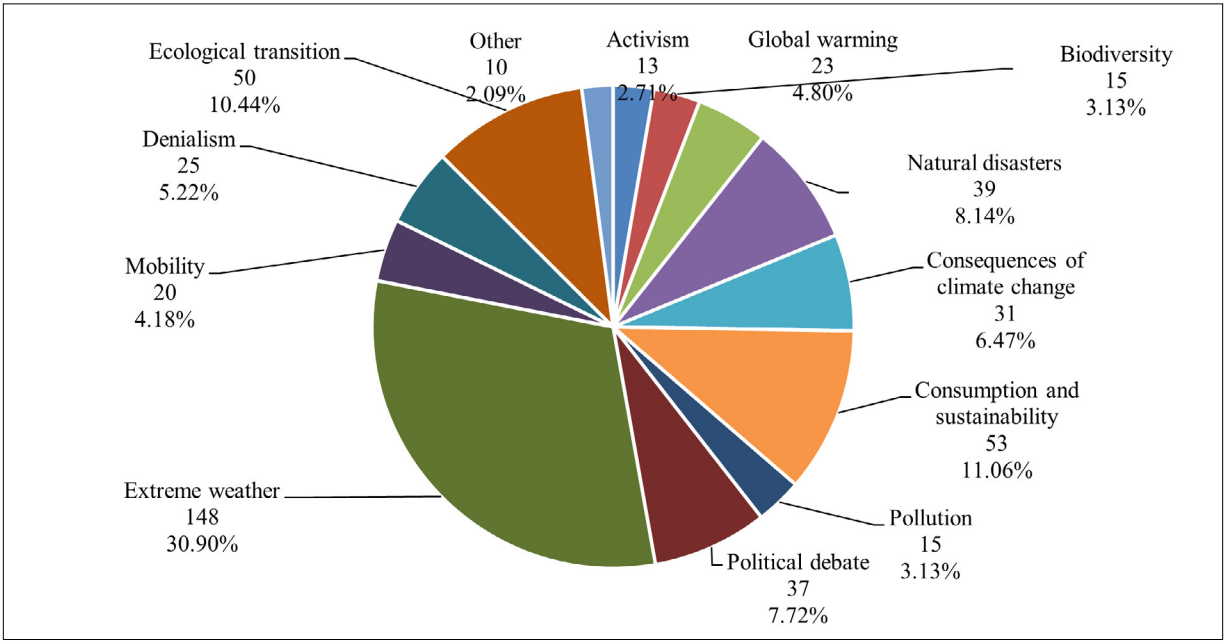
Figure 4. Coverage of topics on the climate agenda (n=479)



Source: prepared by the author

Extreme weather accounts for 30.90% of the coverage, making it the most frequently reported topic. This finding reflects the direct relationship between the visibility of events such as heat waves, droughts and floods, and the creation of disinformation narratives. In terms of news coverage, this high frequency can be explained by the urgency to respond quickly to hoaxes that emerge during adverse weather conditions. Coverage of these phenomena is specifically linked to debunking, which is often used to refute viral disinformation associated with these events.

The second most frequently addressed category is consumption and sustainability (11.06%). This priority indicates the platforms' interest in refuting hoaxes that discredit sustainable practices such as waste recycling, or that disseminate alleged bans on eating meat that prove to be false, or that make claims that vegans are trying to impose their habits on others. From the perspective of news coverage, this approach not only fights disinformation, but it also has an educational impact through informative articles that help raise public awareness.

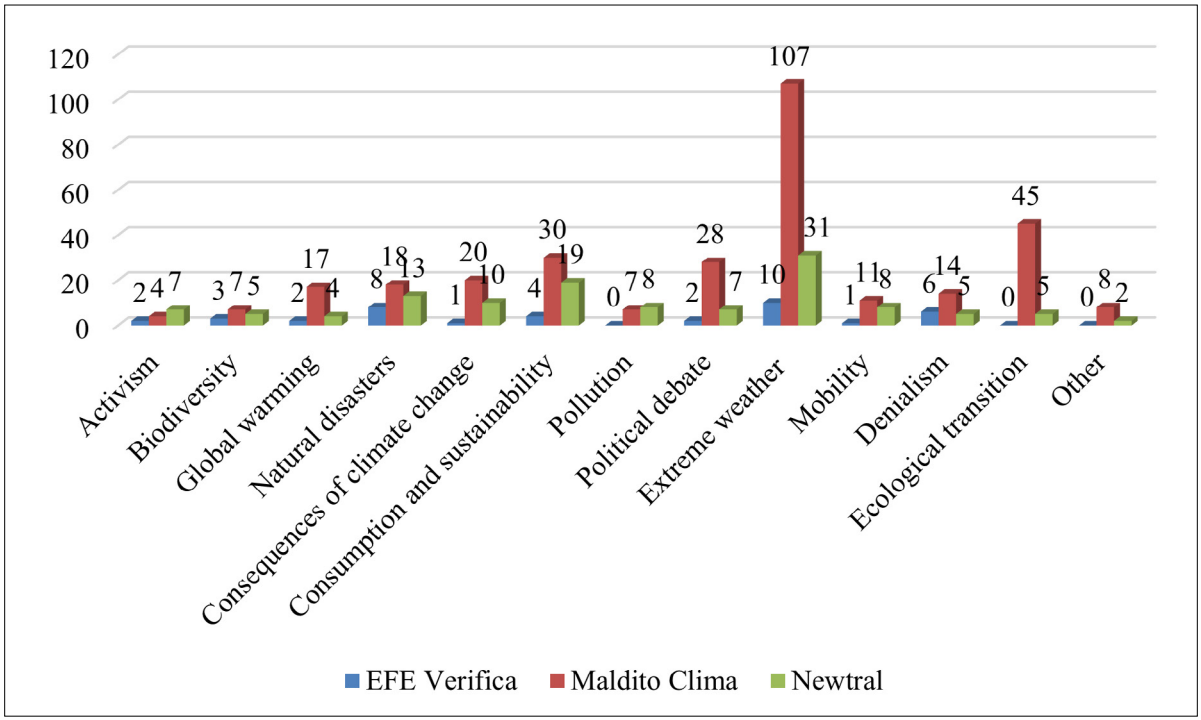
The ecological transition (10.44%) and political debate (7.72%) are two main categories that reflect the connection between the climate crisis and public policy. The ecological transition, which includes issues related to making greater use of renewable energies and decarbonisation, is an area that is frequently attacked by narratives claiming its high economic cost and lack of

viability. On the other hand, the political debate involves a discourse that discredits not only climate policies, but also the leaders, activists and international agreements related to these policies.

The category of natural disasters (8.14%) includes events such as forest fires and earthquakes, which are often taken out of context and manipulated to create confusion about their relationship with climate change. On the other hand, denialism (5.22%) includes explicit narratives that deny the existence or severity of climate change, often supported by conspiracy theories. Finally, mobility (4.18%) stands out as an emerging issue, which attacks policies such as promoting electric vehicles and low-emission urban zones (LEZs).

Categories such as global warming (4.80%), consequences of climate change (6.47%), biodiversity (3.13%), pollution (3.13%) and activism (2.71%) also reflect basic themes in the climate narrative, although their lower prominence in the sample might indicate that they do not generate as much viral disinformation as the previous topics. These categories highlight efforts by the platforms to educate the public regarding the true impact of climate change and its implications for the population.

Figure 5. Distribution of topics on each fact-checking platform (n=479)



Source: prepared by the author

ISSN: 1696-019X / e-ISSN: 2386-3978

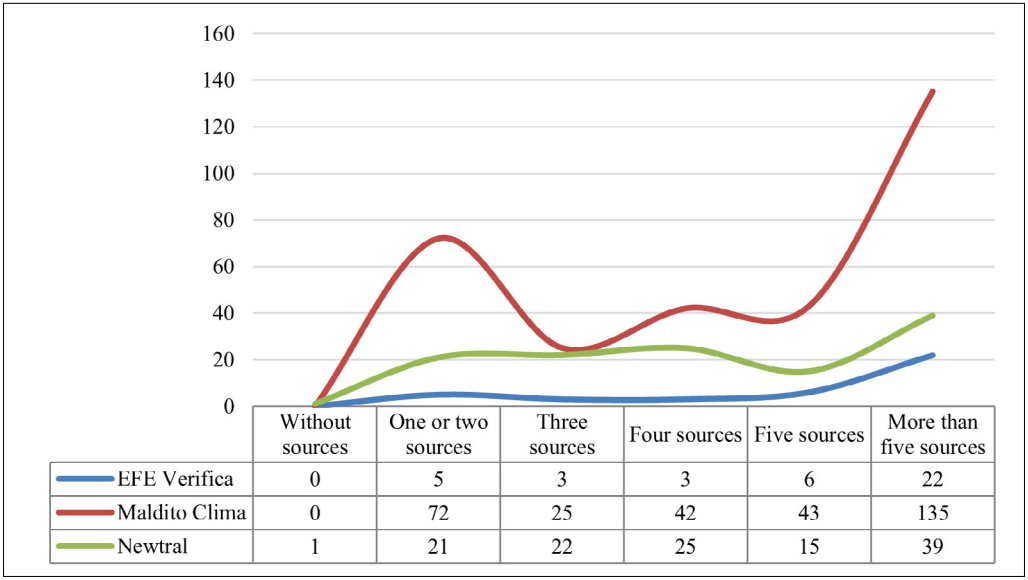
ISSN: 1696-019X / e-ISSN: 2386-3978

Each of the three media outlets shows significant differences in their editorial priorities, as well as points of convergence on key issues related to the climate crisis. *Maldito Clima* leads the way in terms of overall coverage, with a specific focus on extreme weather (107 pieces), and the ecological transition (45 pieces), followed by political debate (28 pieces). Its ability to cover a wide range of topics highlights its specialisation and comprehensive approach to the climate agenda. On the other hand, *Newtral* combines a considerable and balanced number of pieces, excelling in topics such as consumption and sustainability (19 items) and extreme weather (31 items). Finally, *EFE Verifica* has a low output in all categories, which is likely to reflect a more limited and reactive approach to its news coverage. The most frequently addressed topics are extreme weather (10 pieces) and natural disasters (8 pieces), indicating a trend toward focusing on disinformation narratives related to immediate climate events.

4.4. More than five sources per item. This indicates an abundance of professional sources.

An article with more than five sources indicates the highest level of specialisation, as it reflects a formidable effort to support the information with multiple viewpoints and solid data. This group of articles is the most relevant and common in the analysis, aggregating the largest number of news pieces (196 in total from all platforms). This approach is especially important in covering climate disinformation, where the diversity and quality of sources are essential in complex news topics, also known as *hard news*.

Figure 6. Number of sources per item (n=479)



	Without sources	One or two sources	Three sources	Four sources	Five sources	More than five sources
EFE Verifica	0	5	3	3	6	22
Maldito Clima	0	72	25	42	43	135
Newtral	1	21	22	25	15	39

Source: prepared by the author

The group of items with five sources (64 articles) is somewhere in the middle in terms of how much detail they give. Although they are not as detailed as the first group, they still show a strong effort to maintain strong journalistic standards. Likewise, articles with three sources (50 pieces), or four (70 pieces), reflect a more standard and practical approach. Articles with these numbers of sources are useful in covering current affairs, or *soft news*, which do not require in-depth analysis, or for providing quick but reliable coverage of information.

Articles with only one or two sources (98 pieces) indicate more basic coverage. Although they might be useful in cases of immediate or less relevant information, this level may lack the depth needed to address sensitive issues such as climate change.

Finally, the absence of unsourced news is a positive factor, which guarantees high-quality information that has been verified and cross-checked by editors.

4.5. Official and expert sources as a tool against viral disinformation

The present analysis highlights the importance of official and scientific sources as key tools in counteracting disinformation, as well as several significant differences between the professional models of each media outlet.

Maldito Clima stands out as the platform that uses the widest variety and highest number of sources. Its leadership in the use of official and scientific sources, with 593 and 492 mentions respectively, reflects its specialisation in the fight against climate disinformation. *Newtral* follows the same trend, with a stronger emphasis on official (234) and scientific (149) sources.

These sources are mainly public institutions or governments that are known for their perceived legitimacy and access to primary data. In the case of scientific institutions, academics also play a prominent role.

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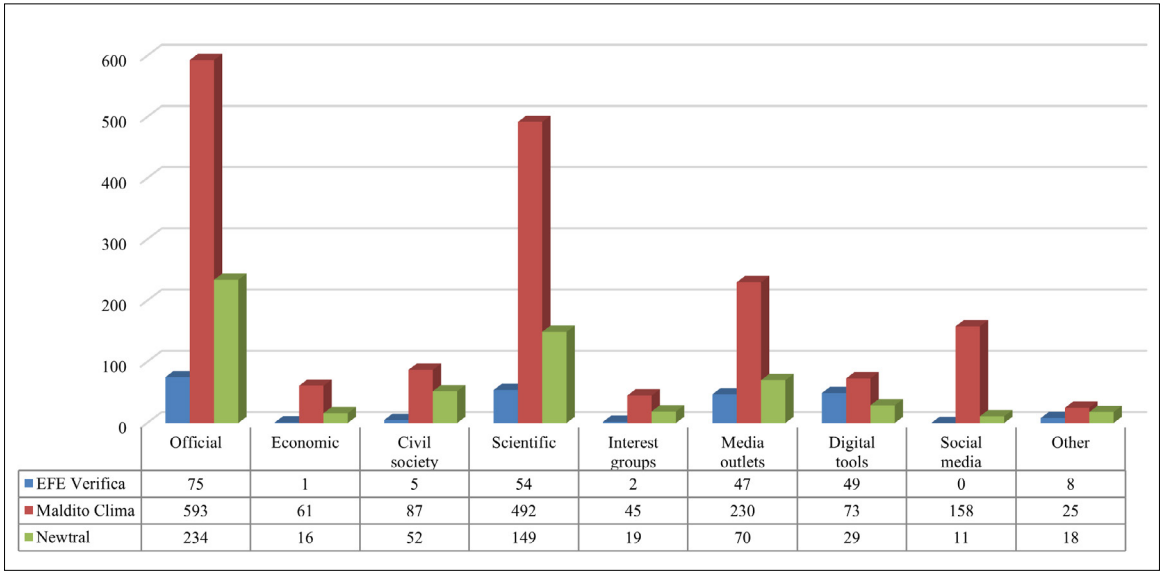
Figure 7. Distribution of information sources on each fact-checking platform (n=2.603)



	Official	Economic	Civil society	Scientific	Interest groups	Media outlets	Digital tools	Social media	Other
EFE Verifica	75	1	5	54	2	47	49	0	8
Maldito Clima	593	61	87	492	45	230	73	158	25
Newtral	234	16	52	149	19	70	29	11	18

Source: prepared by the author

Media sources are the third largest group and are also significant. These sources are from other media outlets, who act as a means of comparison and contextualisation, thereby adding an additional level of validation to the articles. Their use not only reinforces the legitimacy of fact-checked content, but also establishes synergies for collaboration within the communication ecosystem, especially through partnerships with other international fact-checking ventures. However, this trend also seems to point to self-referenced journalism.

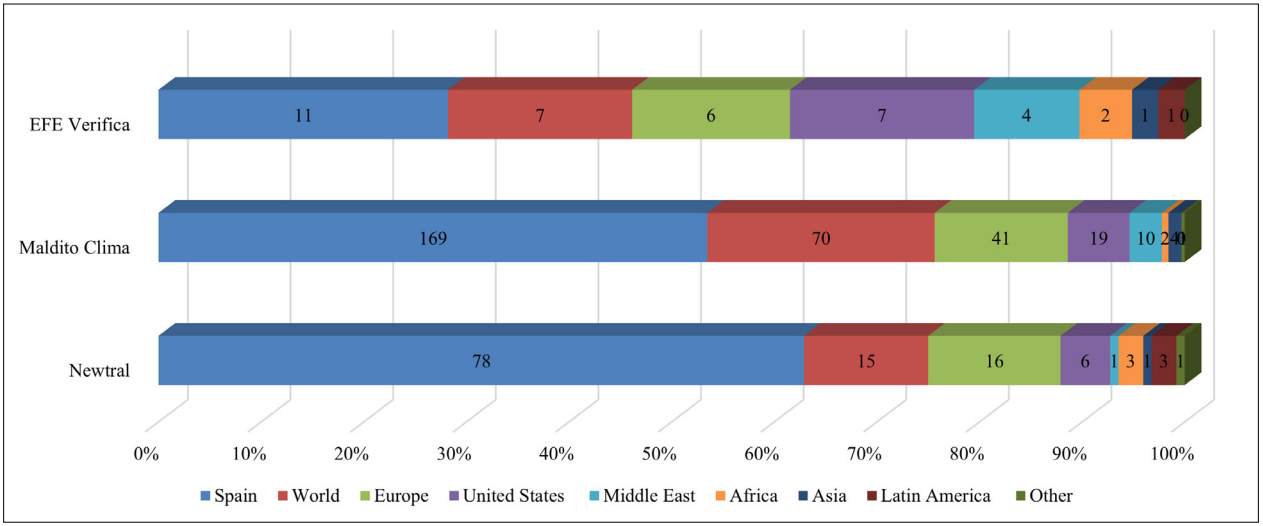
On the other hand, digital sources such as image, video, and data verification applications are an essential component of fact-checking strategies. These technologies enable the media to identify manipulations and assess their authenticity with a degree of accuracy that would be highly difficult to achieve manually. Likewise, social media works both ways: while these are the main source of disinformation and viral content, they are also a key source for refuting false content.

For its part, *EFE Verifica* makes limited use of information sources due to its low volume of coverage. Less reliance on social media and digital tools also suggests a more traditional professional and journalistic model with editorial constraints. However, despite these limitations, its timely approach can be effective in cases of rapidly spreading disinformation.

4.6. An informative overview with a focus on Spain

An analysis of the geographical perspective of the news coverage provided by *Maldito Clima*, *Newtral*, and *EFE Verifica* reveals significant trends that highlight the importance of local information, without neglecting a global perspective.

Figure 8. The geographical location of the items (n=479)



Source: prepared by the author

Spain is clearly the focus of the three platforms, accounting for the largest percentage of news items in each case: 169 in *Maldito Clima*, 78 in *Newtral*, and 11 in *EFE Verifica*.

This trend reflects the importance of local information, as the media prioritises topics of interest to their audience. Climate disinformation is mainly addressed from the viewpoint of the direct impact of climate phenomena on the national territory, such as heat waves, cold fronts, and forest fires. However, items with a global perspective were second in terms of coverage on all three platforms: 70 pieces in *Maldito Clima*, 15 in *Newtral*, and 7 in *EFE Verifica*. This approach supplemented local information with a broader context.

On the other hand, after the categories of Spain and the World, Europe and Latin America are the most prominent territories of the coverage. This could be related to the interconnection of European Union policies, as well as the impact of climate change in Latin America, which is especially vulnerable to extreme weather. Finally, the Middle East, Asia, Africa and the United States receive significantly less coverage, which highlights the geographical, cultural, linguistic, and media distance between Spain and those areas.

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5. Discussion and conclusions

During 2023, Spain faced several extreme weather events, such as heat waves, drought, and cold drops, which generated intense public and media debate. These extreme weather events created the ideal environment for the proliferation of climate disinformation, which flooded social media sites with messages that included conspiracy theories, thereby threatening social cohesion (Rodríguez-Pérez, 2019). When faced with extraordinary situations, people often look for explanations, and conspiracy theories, even if unfounded, satisfy the needs of citizens by offering presumed answers. Given the context, the first conclusion asserts that Spanish fact-checking platforms provided significant coverage in terms of quantity, yet it was unevenly distributed among the three media outlets. Moreover, the coverage was mainly based on the publication of fact-checking reportage and the debunking of viral hoaxes (O1). Moreover, based on the case study herein, three levels of news coverage have been revealed: intensive monitoring, led by *Maldito Clima*; intermediate coverage, by *Newtral*; and a somewhat limited level, by *EFE Verifica*.

On the one hand, *Maldito Clima* and *Newtral* prioritise the production of verification reportage, using broader analytical and scientific contexts, which reinforces their educational role of enhancing media literacy, not only by informing, but also by educating the audience (Melani-Rocha, 2015; Jones-Jang et al., 2019; García-Avilés et al., 2023).

On the other hand, *EFE Verifica* focuses on quickly debunking specific hoaxes, generally those that are highly viral and have immediate repercussions, through brief news items. This difference can be attributed to editorial priorities and the professional capabilities of the journalistic projects they carry out. In terms of audience reach and news production, *Maldito Clima* leads the sector with an approach that allows it to explore climate issues from multiple angles and formats of digital journalism.

Secondly, the results of the priority topic analysis (O2) show that news coverage of disinformation is deeply influenced by the nature of the false narratives, with a particular focus on extreme weather, as well as consumption and sustainability. This trend is in line with previous research (Fernández and Magallón, 2023; Gallardo-Camacho et al., 2024), which confirms a dependence on the atmospheric calendar. These topics not only dominate the attention of these platforms, but also reflect areas where false narratives have a stronger social and political impact in the digital environment. The proliferation of false content related to everyday topics such as weather, food and consumption illustrates how hoaxes try to deny not only scientific evidence, but also the legitimacy of social movements and climate policies (Farrell et al., 2019), and they promote political polarisation as well (Teruel-Rodríguez, 2023).

Furthermore, the present research offers evidence that disinformation is not limited to denying the existence of climate change, but it has evolved to include more complex strategies such as creating conspiracy theories and emitting a delayist discourse (Moreno-Olmeda, 2022). This common topic approach among the three media reflects a shared interest in counteracting narratives that try to discredit actions aimed at improving the climate situation, or that foster scepticism toward public policies.

Likewise, the quantity and diversity of sources used in news items (O3) reveal a broad approach and a clear commitment to pluralism. Moreover, such diversity is essential for achieving balanced coverage that represents society, which is a key factor in journalistic quality (Casero-Ripollés and López-Rabadán, 2013). Furthermore, the use of more than five sources per article on average confirms the richness of information and rigour in the preparation of content. In line with the findings of Sanahuja-Sanahuja and López-Rabadán (2023), the analysis of sources offers clear evidence that fact-checking platforms rely heavily

on official and expert sources, which guarantees specialised information, quality, and credibility (Rodrigo-Cano et al., 2021; Fernández-Castillo and Magallón-Rosa, 2023). This pattern reflects the commitment of these platforms to accuracy, reliability, and empirical support in their fact-checking work, which is considered a public service (Moreno-Gil et al., 2022). Along the same lines, national and international media sources are frequently used to supplement the information provided. However, excessive use of official and media sources poses a challenge for maintaining high standards of rigour and transparency, as these platforms should avoid institutional dependence and self-referential citation (Sendra-Duro and López-Rabadán, 2024).

In addition to the foregoing, this study highlights the role of digital sources in fact-checking, such as algorithms and specialised applications for detecting manipulated content (Brandtzaeg et al., 2018). These technologies enable the analysis of images, the tracing of the origin of hoaxes, and the verification of data on social media, thereby consolidating the adaptation of fact-checking journalism to a complex digital environment. This advance in digital hybridisation in the field of informative source management (Van Leuven et al., 2018) also highlights the need for continuous investment in innovation to address the growing sophistication of disinformation.

Regarding another aspect, analysis of the geographical focus (O4) suggests that climate hoaxes in Spain tend to embrace local perspectives (Fernández and Magallón, 2023), by using specific meteorological phenomena or cultural references to gain credibility. This viewpoint reinforces the importance of tackling disinformation from a domestic perspective (Jerónimo and Sánchez-Esparza, 2022), by integrating knowledge and data specific to the local context to counteract the effort to spread fake news. However, the author has also confirmed that climate disinformation goes beyond internal borders, linking itself to international events and debates such as climate change conferences and political events. Moreover, hoaxes are repeatedly duplicated in different national and regional contexts (Fernández and Magallón, 2023).

In summary, this research has revealed differences in the coverage of climate disinformation by the main fact-checking platforms in Spain. However, although one of the main differences is an unequal amount of news production, the focus of all three agencies is on refuting hoaxes and disseminating explanatory content. The most recurring themes are related to extreme weather and sustainability, in a context where disinformation tries to take advantage of specific moments of intense public exposure regarding these issues. The extensive and rigorous use of sources, together with the incorporation of digital tools, confirms the adaptation of these platforms to a complex information environment. Finally, the territorial approach reveals a strong local focus on hoaxes, yet they are connected to narratives and discourses with a worldwide reach.

When something unusual happens, people tend to look for explanations, which they often find in conspiracy theories, even if unfounded, because they offer answers that fill a need. The findings suggest that fact-checking journalism faces the ongoing challenge of confronting an increasingly sophisticated setting of disinformation narratives. The use of conspiracy theories and the proliferation of delayist rhetoric underscore the need for continuous fact-checking, not only of specific hoaxes, but also of bombastic discourse which, though not directly denying climate change, tries to slow down immediate action.

The challenges faced by fact-checking platforms in their work are as diverse as they are complex, requiring strategic and effective responses (Chen, 2024), which include media literacy campaigns and algorithmic verification. The use of new formats and narratives, such as podcasts and videos, is essential for diversifying communication methods and adapting them to the preferences of an audience subject to change. As such, this study highlights the need for more collaboration between

ISSN: 1696-019X / e-ISSN: 2386-3978

ISSN: 1696-019X / e-ISSN: 2386-3978

fact-checking platforms, and the participation of citizens (Vizoso and Vázquez-Herrero, 2018). At the same time, there is concern about the proliferation of increasingly sophisticated disinformation, such as deepfakes, as well as the emergence of greenwashing (Ejaz et al., 2024). There is also an urgent need to develop sturdy narrative frameworks not only to debunk hoaxes, but also to offer science-based stories that connect emotionally with the audience, which was the case during the COVID-19 pandemic (García-Vivero and López-García, 2020).

The present study makes a significant contribution to seeing fact-checking journalism as an essential component in the fight against climate disinformation in Spain (Hameleers and Van der Meer, 2020). Despite the active role of these platforms, it is important to emphasise that their reach is still limited, given the scale of the digital ecosystem, where disinformation spreads much more quickly and virally than verified content (Fernández-García, 2017). Furthermore, fact-checking platforms are not exempt from limitations or potential biases arising from their dependence on government sources, public subsidies, and alliances with technology companies, which leaves less room for alternative or counter-hegemonic views. This situation highlights the need to move toward more obvious mechanisms of transparency and accountability.

As this study focuses exclusively on the Spanish media, it might not be possible to extrapolate the findings to other media contexts, which highlights the need for further comparative research at the international level in the coming years. In addition, another suggestion is to conduct future research on the true impact of fact-checking on the public's perception, and on audience behaviour, by incorporating qualitative methods such as interviews and focus groups, as well as studies aimed at exploring participation and engagement on social media.

6. Acknowledgements

This article has been translated into English by Charles E. Arthur, to whom we are grateful for his diligent work.

The author would like to thank the editorial team at *Maldita.es* for granting access to their database, which was essential in carrying out this research.

7. Conflict of interest

The author declares that there is no conflict of interest in any part of this study.

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