

International Climate Misinformation: Characteristics, Diffusion and Fact-Checking

DESINFORMACIÓN CLIMÁTICA INTERNACIONAL: RASGOS, DIFUSIÓN Y *FACT-CHECKING*

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Álvaro López-Martín | University of Santiago de Compostela
✉ alvaro.lopez.martin@usc.es |  <https://orcid.org/0000-0001-7871-2137>
Bernardo Gómez-Calderón | University of Málaga
✉ bjgomez@uma.es |  <https://orcid.org/0000-0003-2537-7042>
María-Eugenia González-Cortés | University of Málaga
✉ eugenia@uma.es |  <https://orcid.org/0000-0002-8677-9507>

Abstract: Through content analysis, we explore the characteristics of climate misinformation disseminated internationally and recorded in the European verification project EuroClimateCheck during the second half of 2024. The sample (n=248) comprises false information about the climate verified by fact-checking platforms in 24 countries. There is a constant flow of disinformation, with a particular concentration in countries such as Spain (15.3%), France (13.7%) and Romania (11.7%). Looking at the anatomy of the messages, hoaxes (62.1%) and content without an identified source (64.1%) predominate, while conspiracy theories (22.6%) constitute the central theme of the disinformation narrative. Likewise, the use of audiovisual elements to bolster the narrative's credibility is commonplace. This highlights the transnational, persistent and changing nature of climate disinformation and underlines the need to strengthen verification strategies.

Keywords: Disinformation; Climate Change; Verification; Social Media; Scientific Denialism.

Resumen: Se exploran, a través de un análisis de contenido, los rasgos de la desinformación climática difundida a nivel internacional y registrada en el proyecto europeo de verificación EuroClimateCheck durante el segundo semestre de 2024. La muestra (n=248) comprende información falsa sobre el clima verificada por plataformas de *fact-checking* de 24 países. Se aprecia un flujo constante de desinformación, con una especial concentración en países como España (15,3%), Francia (13,7%) o Rumanía (11,7%). Atendiendo a la anatomía de los mensajes, priman los engaños (62,1%) y los contenidos sin fuente identificada (64,1%), mientras que las teorías de la conspiración (22,6%) constituyen el principal tema de la narrativa desinformativa. Además, resulta habitual el empleo de elementos audiovisuales para apuntalar la verosimilitud del relato. Se evidencia la naturaleza transnacional, persistente y cambiante de la desinformación climática y se subraya la necesidad de fortalecer las estrategias de verificación.

Palabras clave: desinformación; cambio climático; verificación; redes sociales; negacionismo.



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1. Introduction

Although with earlier scientific roots, the concept of «climate change» began to consolidate between the 1950s and 1970s to refer to the increasingly noticeable alterations in the planet's temperatures and its climatic patterns, caused mainly by human activity. Since then it has been gaining more prominence until it became one of the main global challenges of the 21st century, not only for its environmental impact but also for its economic, political, social and communicative repercussions. At the current rate, it is estimated that by the end of the century there will be a temperature increase of between 2.3 and 2.5 degrees, figures that are far removed from the 1.5 degrees recommended by the scientific community to avoid a much more serious and potentially irreversible impact (UNEP, 2025).

Public opinion is increasingly aware of the threat. According to the latest Eurobarometer, 85% of Europeans consider climate change to be a serious problem and agree that the fight against this phenomenon should be a priority for improving public health and the quality of life of citizens. However, the survey also reveals significant information deficits: more than half of the respondents (52%) believe that traditional media do not provide clear information about their causes and implications, while 49% state that they have difficulty distinguishing between reliable information and disinformation about climate change on social networks (European Commission, 2025).

Climate disinformation is a self-serving narrative that oscillates between explicit denial of the phenomenon and its trivialisation. In the latter case, the discourse seeks to absolve human action of responsibility, downplay the seriousness of its consequences and, therefore, deny the need for urgent action by governments and the international community.

This research explores the characteristics and structure of climate disinformation disseminated internationally through comparative analysis. Among other aspects, it examines the temporal distribution of false information, the countries in which it is most prevalent, the most used types of hoaxes, the sources to which they are attributed, the formats they take, and their main channels of dissemination. The focus is also on the work of fact-checkers and the procedures they use to verify data.

2. Current Situation

2.1. The Phenomenon of Disinformation: Rise, Credibility And Measures to Combat It

While disinformation has always existed, the phenomenon has experienced an unprecedented rise in the last decade, driven largely by three interrelated factors: first, the political and social polarization of society (Nanjundaswamy-Vasist *et al.*, 2023); second, the increasing loss of trust in the media (Primig, 2024); and third, the digitalization of society and the development of ICTs (Tandoc *et al.*, 2021). As a result of the latter, there has been a democratization of information, in which any subject can produce and disseminate messages. In this sense, it is worth highlighting the prominence of social networks and, to a lesser extent, websites for the dissemination of disinformation (Denniss & Lindberg, 2025).

This rise has not only been reflected in all areas of society, but also in scientific research (Wang *et al.*, 2025), which is allowing for a thorough understanding of the characteristics that define disinformation and the strategies it relies on. As noted by various authors (Tandoc *et al.*, 2021), intentionality is one of the key features around which the phenomenon is articulated: most definitions of disinformation or fake news (Finneman & Thomas, 2018) suggest that these messages are primarily intended to deceive or confuse the recipient.

In this sense, the psychological dimension is essential for understanding how people receive and process disinformation (Van-der-Linden *et al.*, 2025). As Freiling *et al.* (2023), audiences give more credibility to content that aligns with their ideological positions, their worldview, which gives rise to the so-called confirmation bias. Similarly, various studies (Melchior & Oliveira, 2024; Van-der-Linden *et al.*, 2025) warn that the attribution of credibility to disinformative messages is strongly conditioned by emotional factors. Strong or negative emotions —such as fear, panic, anger or anxiety— are especially effective (Faragó *et al.*, 2020).

To address the phenomenon of disinformation, fact-checking platforms have become popular in recent years (Kloss & Louit, 2024). These are media dedicated to the verification of information or content that has already been disseminated (Soo *et al.*, 2023) and such has been their strength in the last five years that authors such as Kyriakidou *et al.* (2023: 2124) define the fact-checking as a «professional reform».

Some research has questioned the effectiveness of verification platforms, due to the possible counterproductive effect of amplifying false messages when trying to fact check them (Tuñón-Navarro & Sánchez-del-Vas, 2022) or the lack

of speed with which, at times, they address the verification of information (Sádaba *et al.*, 2023). However, the bulk of academic research highlights the informative and educational value of these outlets, which constitute one of the most effective and widespread measures in the fight against disinformation (Soo *et al.*, 2023).

2.2. Climate Disinformation: Strategies And Means

Climate disinformation can be defined as the deliberate dissemination of misleading content that, driven by political or economic interests, aims to discourage the fight against climate change (Hassan *et al.*, 2024; Tomassi *et al.*, 2025). In recent years, its presence in the global information flow has grown exponentially, although the discourse it maintains has evolved, from absolute denialism to obstructionism or delayism, centred on questioning the effectiveness or timeliness of public policies undertaken to combat the climate emergency (Coan *et al.*, 2021).

The rhetorical framework that structures this type of disinformation draws on arguments aimed at exploiting certain cognitive and ideological vulnerabilities present in public opinion (Soon & Goh, 2018). Three persuasive tactics stand out as the most common: first, questioning scientific consensus, usually supported by conspiracy theories (Lewandowsky, 2021); second, denial in economic and political terms, which associates the fight against climate change with costly investments and substantial losses for workers and businesses (Martín-Sosa, 2021); and third, the use of misleading content, sometimes distorted and sometimes directly fabricated (Hassan *et al.*, 2024).

As for the channels through which climate disinformation is spread, the most common and effective ones today are social media (Brady *et al.*, 2023), whose engagement-oriented algorithms can easily amplify any type of sensationalist or misleading content (Tomassi *et al.*, 2024). X —the former Twitter— has been the most studied platform to date in the field of the fake news linked to the climate (thus, in Alinejad & Honari, 2024; Tomassi *et al.*, 2025); its use of bot networks makes it a key channel for denialist propaganda. YouTube is also a powerful source of disinformation, which in this case takes advantage of the appeal of the image to reach mass audiences (Nadal, 2024); on this network, content creators often rely on eye-catching labels or titles to increase their impact (Torrico & González, 2023). As for Facebook, it uses advertising primarily to spread obstructionist slogans (Holder *et al.*, 2023). On the other hand, for about two years now, false news related to the climate has

also found a niche on TikTok, targeting the younger audience, which is its preferred audience (Arnot *et al.*, 2024).

But the challenge is not only on the networks: consciously or unconsciously, but traditional media can also act as agents spreading disinformation. Although their rigorous standards for validating sources make them more resistant to hoaxes (Strudwicke & Grant, 2020), sometimes the desire to give voice to all actors leads the media to fall into «false balances» that only serve to amplify denialist or obstructionist discourses lacking scientific basis (Lewandowsky, 2021). In other cases, what contributes to disinformation is the spread of propaganda in the form of content sponsored by companies (branded content), a practice that raises ethical concerns but is nevertheless common (cf. Supran & Oreskes, 2017, regarding ExxonMobil and *The New York Times*).

2.3. Origin of Climate Disinformation. Verification as An Antidote

There are essentially four key groups that spread disinformation about climate change: large companies, political figures (think tanks and conservative parties), lobby groups, and individuals—whether influential or not, as we shall now see.

Numerous studies have investigated the climate disinformation campaigns undertaken by big industry, particularly the tobacco industry (Glenza, 2019) and fossil fuel companies such as the aforementioned ExxonMobil, Chevron, ConocoPhillips, BP, Shell, and Peabody Energy (cf. Supran & Oreskes, 2017; Franta, 2021, among others).

Lobbies linked to climate denialism are particularly active in the United States, where organisations such as the Cooler Heads Coalition and the Koch Family Foundation (Farrell, 2019) are pouring money into expensive campaigns to influence public opinion. And not only that: between 2000 and 2016, these entities and others of the same ilk invested more than two billion dollars in lobbying Congress to limit climate change legislation (Lewandowsky, 2021).

In the wake of international events such as the COP, disinformation activity has also been detected on the part of certain states, specifically Russia and China (Vasileiadou, 2025). On other occasions, it is ordinary users and influencers who promote hoaxes through their personal social media accounts, for ideological or financial gain (López & Llorca, 2025).

Finally, as some authors (Hassan *et al.*, 2024) note, a large part of the disinformation content related to the climate is generated by anonymous individuals. Their activity is not as intense as that of obstructive political leaders, but

currently, and thanks to social networks, they surpass companies, academics, and individual users as disseminators of hoaxes.

The most common theme of the fake news related to the climate has to do with extreme weather phenomena. In the case of Spain, this has been noted by Fernández-Castrillo and Magallón-Rosa (2023), Gallardo *et al.* (2024) and Sendra-Duro (2025). In fact, the most recent case of disinformation in the country occurred in the wake of the storm (DANA) that affected the Valencian Community in October 2024 (cf. Alonso & Tirado, 2025; López & Llorca, 2025).

Facing the activism of deniers and the massive dissemination of fake news that relate to the climate, verification platforms have become a healthy and much-needed corrective vector. According to Hameleers and Van-der-Meer (2020), the fact checkers are an essential tool for lending credibility to arguments about climate change when they are truthful, and for debunking them if their purpose is to confuse public opinion. And it is a fact that verification companies are paying increasing attention to climate disinformation, as evidenced by the creation of specific divisions in charge of it, for example, in the case of Spain, Maldito Clima, from Maldita.es.

3. Objectives

The fundamental purpose of this research was to explore the features of climate disinformation spread internationally. This was broken down into five subsidiary objectives: to examine its temporal and geographical distribution and the times of greatest activity of the phenomenon (O1); to identify the formal characteristics of disinformation content and the sources to which it is attributed (O2); to determine the topics, protagonists and countries predominant in them (O3); to identify the channels through which false information about the climate is disseminated (O4); and, finally, to quantify the sources used by fact-checking platforms to verify climate disinformation, as well as their success in identifying the origin of hoaxes (O5).

4. Methodology

In this descriptive study, content analysis was chosen as a research tool. The object of study was disinformation disseminated internationally about the climate or the environment. To narrow down the sample, all fact checking on this topic recorded between 1st July and 31st December 2024 in the EuroClimateCheck database (n=248) were selected, a joint project of the European Fact-Checking Standards Network (EFCSN) that compiles climate disinformation verified by 25 fact-checking platforms from 15 countries.

Regarding the time period, the choice of the second half of 2024 was considered optimal for obtaining an accurate approximation to our study object, as during these months a series of political events —such as the COP29 Climate Summit or the New York Climate Week— and natural ones —heatwaves in Europe, severe floods in Spain— converged, which made us assume a greater media attention to climate-related issues and, therefore, the possibility that the disinformation activity would be high.

With regard to the composition of the sample, although fake news stories have been found that have been disseminated in different countries—and therefore analysed by different fact-checking platforms—each of the fact checks has been considered an independent unit of analysis, as the opposite would have distorted the effective dimensions of the fact-checking work carried out by the verification platforms.

On the other hand, although the AFP Fact Check platform originated in France, this agency has editions in numerous countries. For greater comprehensiveness, the location of the original publication where the retraction appeared was used as a reference to code the data for the «country» variable in these cases. Therefore, although the EuroClimateCheck project is essentially European in scope, it also includes publications from AFP's editions in Argentina, Canada, Colombia, Mexico, Peru, and the United States. This gives the study a perspective that extends beyond European borders.

To examine the fact checks, an analysis sheet was used that was designed based on previous studies (Salaverría *et al.*, 2020; Blanco-Alfonso *et al.*, 2021; López-Martín *et al.*, 2021; Casero-Ripollés *et al.*, 2025), to which *ad hoc* variables were added. As a preliminary step to the analysis of the sample, a pretest was carried out with 10% of the pieces, to adjust and refine the variables and categories included in the form. This was structured into four blocks: first, registration information (date of publication of the fact check, platform responsible for verification, and country of origin); second, formal analysis (nominal and scale items related to the disinformation content, such as geographical scope —four levels are established: local/regional, national, international [the reported event affects one or more countries other than the one in which the rumour has spread] and global [issues with implications for the entire planet, such as climate change or CO2 levels]— and protagonist of the message —categorised as personal and non-personal—); third, textual analysis (type of disinformation message —according to the categorisation proposed by Salaverría *et al.* [2020]: joke, exaggeration, decontextualisation and deception—, source —once again, the taxonomy of Salaverría *et al.* [2020] was used as a reference: real, imper-

sonated, anonymous, and fictitious— and topic —climatic or environmental aspect on which the story focuses—); and fourth, characteristics of the verification work (sources consulted —classified into government sources; non-governmental policies; security and healthcare personnel; businesses; academia; associations, NGOs or organisations; media and journalists; celebrities; digital resources; social media; laws or regulations; or other sources—, means of dissemination of the disinformation content —the channels through which it has spread—, possible evidence of the use of AI in its production —yes/no— and identification of its origin —yes/no—).

Subsequently, a data matrix was constructed in the SPSS program (V27.0) from the information coded in each unit of analysis, which allowed for the descriptive and inferential statistical analysis to be carried out. To explore possible associations, the Chi-Square test (χ^2) was applied, where a confidence level of 95% was set. Due to space limitations, only those operations that yielded significant associations between the variables are reflected in the results section. Although the coding of the pieces was carried out by a single researcher, to ensure the reliability of the analysis, a random sample of 10% of the fact checks was dissected again after an interval of 10 weeks. The intra-coder reliability scores obtained ranged from 0.90 to 1 (Holsti) and 0.88 to 1 (Krippendorff's alpha), reflecting a high level of consistency and supporting the validity of the procedure used.

5. Results

5.1. Temporal and Geographical Distribution

The results show that the dissemination of climate disinformation is constant (an average of 9.18 verified items per week), with a continuous flow during the period analysed, although peaks or spikes with higher traffic of fake news are detected (Figure 1). In this sense, they could be grouped into the following periods: first, week of the 8th of July —16 verifications—; second, week of the 26th of August —13—; third, weeks of the 21st, 28th of October and 4th of November —17, 16 and 18 pieces, respectively—; and fourth, weeks of the 11th, 18th and 25th of November —13 weekly—.

In light of the international climate and political agenda, as well as the major meteorological events that occurred during the second half of 2024, the first two periods of greatest activity could be due, on the one hand, to the heat waves recorded in different countries and regions —with special mention of Antarctica— and, on the other hand, to the emergence of extreme weather

events —such as droughts or forest fires—, which are common phenomena in the summer months.

Regarding the weeks corresponding to late October and early November (the period when the analysis was most widely disseminated), in this case a series of political and natural events converged, placing the climate at the centre of the disinformation discourse spread on social media. Among these, it is worth highlighting the consequences of Hurricane Milton in the United States, the US presidential elections—in which climate change was one of the central themes of the candidates' campaigns—and, most notably, the severe flooding in Spain—declared the worst natural disaster in the country's history. Finally, the fourth surge in activity would coincide with COP29 (United Nations Climate Change Conference), held from the 11th to the 22nd of November 2024 in Baku.

Figure 1. *Weekly distribution of checks on climate disinformation*



Source: Own elaboration.

Regarding the geographical distribution of the fact-checks (Table 1), fact-checkers in Spain (15.3%), France (13.7%), and Romania (11.7%) verified the highest proportion of disinformative content. To a lesser extent, Greece stands out (7.7%) and, also above the 5% threshold, Germany (5.6%) and Belgium (5.6%). In the face of this, the denials made in the North American editions — Canada and the United States— or Latin American editions —Argentina, Colombia, Mexico, and Peru— of AFP Fact Check record minimal incidence data.

Table 1. *Distribution of fake content by verification country*

Country	Number of messages	%
Albania	4	1,5
Germany	14	5,6
Argentina	4	1,6
Austria	10	4,0
Belgium	14	5,6
Bulgaria	6	2,4
Canada	1	0,4
Colombia	3	1,2
Croatia	10	4,0
Slovenia	6	2,4
Spain	38	15,3
United States	12	4,8
Finland	8	3,2
France	34	13,7
Greece	19	7,7
Hungary	3	1,2
Italy	6	2,4
Mexico	1	0,4
Netherlands	5	2,0
Peru	3	1,2
Poland	4	1,6
Czech Republic	8	3,2
Romania	29	11,7
Serbia	6	2,4
Total	248	100,0

Source: Own elaboration.

5.2. Type of Disinformation Content

The bulk of climate-related fake news falls into the category of deception (62.1%); that is, absolutely fabricated facts. They contain messages in which, for example, the fire on the Greek island of Serifos is linked to the construction of a wind farm (12-07-2024, AFP Fact Check) or it is claimed that classic motor cars are more environmentally friendly than electric cars (17-10-2024, Oštro). 20.6% of the pieces refer to real events but presented in a false or distorted context —decontextualisations— such as the videos circulated of a Spanish beach littered with rubbish attributed to the celebration of an environmental protection festival. While the images are real, they correspond to the night of San Juan, a historic Spanish celebration of the beginning of summer (03-07-2024, AFP Fact Check).

Exaggerations are slightly lower at 16.9%. These address authentic facts but go beyond the limits of reality. For example, the rumour that crops like wheat, cocoa or tomatoes are going to disappear. Although climate change is reducing agricultural yields overall, experts point out that these plantations will not disappear (13-09-2024, Science Feedback). Only 0.4% of the sample has a satirical or humorous tone.

The Chi-Square statistical test reveals a certain relationship between the type of verified disinformation content and the theme of the message [χ^2 (30, N=248)=46,859, $p<0,05$]. A predominance of messages related to extreme weather phenomena (85.7%), conspiracy theories (78.6%) and waste and pollution (71.4%) is detected, while when they refer to issues such as fossil fuels, water or the cryosphere, they are usually linked to real facts or data, although they are presented in a decontextualized or exaggerated way.

5.3. Topics of Disinformation

The analysis reveals that climate disinformation is articulated around a wide repertoire of topics, in which messages linked to conspiracy theories predominate (22.6%). They mainly speculate about the impact of science and politics on the generation of adverse weather phenomena; thus, they link events such as the floods in Spain (06-11-2024, Faktograf), Hurricane Milton (9-10-2024, Efe Verifica) or the Cyclone Boris in Romania (20-09-2024, Fact Check) with geoen-gineering projects or the American Haarp program, through which the ionosphere is investigated by sending radio signals.

Messages about extreme weather phenomena are also recurrent (14.1%). This one includes fake news about floods, fires, storms and other phenomena, but rather than approaching them from a conspiracy theory perspective, it pro-

vides data on their alleged consequences or causes, with a clear political intent. On the other hand, disinformation content focused on climate change denial (10.9% of the sample) usually relies on isolated or decontextualized data, such as news about specific episodes of high temperatures in certain cities or countries decades ago, which are brought up with the intention of dismantling the scientific consensus around climate change. Regarding waste and pollution (11.3%), the messages focus on CO2 emissions and their impact on the climate.

Similarly, content about global warming (8.1%) and renewable energies (7.3%) stands out. For the former, the combination of weather maps that are not comparable is often used to discredit the media and accuse them of generating fear. In the latter case, the focus is usually on wind and solar energy, airing, on the one hand, alleged accidents caused by wind turbine blades and, on the other, data on the waste generated by solar panels once their useful life ends. Also recorded are fake news related to water and the cryosphere (6.9% of the total). This category includes denials about sea level or the melting of Antarctica and Greenland.

The Chi-Square statistical analysis reveals a significant relationship between the variables of subject and geographical area [χ^2 (30, N=248)=119.417, $p<0.05$]. Disinformation messages about global warming (95%), waste and pollution (64.3%), climate change denial (55.6%) and fossil fuels (50%) do not refer to any specific state, while the alleged news related to water and the cryosphere (82.4%), statements by politicians (50%), conspiracy theories (44.6%) and adverse weather phenomena (42.9%) are linked to one or several specific countries.

Looking at the topics of the false content according to the country of origin of the verification platform (Table 2), notable differences and relevant patterns can be observed. Firstly, the variety of topics registered in countries such as France (9), Spain (8), Greece (8), Romania (8) or Germany (7) stands out, which contrasts with the degree of concentration observed in territories such as Hungary, Italy, Serbia, Albania, Canada or Argentina.

There is no common trend among all countries regarding the predominant topic: thus, while messages related to conspiracy theories predominate in one third of the sample, in other places such as Austria, Hungary or Mexico, false news about waste and pollution prevail.

Table 2. *Topic of the disinformation messages by country.¹*

	Extreme weather phenom.	Consp. theories	Waste / pollution	Global warming	Climate change denial	Issues
Albania	-	50,0%	25,0%	-	-	3
Germany	-	7,1%	7,1%	21,4%	7,1%	7
Argentina	25,0%	75,0%	-	-	-	2
Austria	20,0%	10,0%	60,0%	-	10,0%	4
Belgium	7,1%	-	-	28,6%	-	6
Bulgaria	-	-	16,7%	16,7%	50,0%	4
Canada	-	-	-	-	-	1
Colombia	-	33,3%	33,3%	-	-	3
Croatia	-	40,0%	30,0%	-	10,0%	4
Slovenia	-	-	16,7%	-	-	5
Spain	47,4%	23,7%	-	2,6%	2,6%	8
EEUU	8,3%	8,3%	8,3%	25,0%	25,0%	6
Finland	37,5%	25,0%	-	25,0%	12,5%	4
France	5,9%	14,7%	17,6%	5,9%	20,6%	9
Greece	5,3%	10,5%	5,3%	5,3%	26,3%	8
Hungary	-	-	100,0%	-	-	1
Italy	-	50,0%	-	-	33,3%	3
Mexico	-	-	100,0%	-	-	1
Netherl.	20,0%	20,0%	20,0%	-	-	4
Peru	-	66,7%	33,3%	-	-	2
Poland	-	50,0%	-	25,0%	-	3
Czech Rep.	12,5%	-	-	12,5%	-	4
Romania	13,8%	44,8%	-	3,4%	6,9%	8
Serbia	-	66,7%	-	-	-	3

Source: Own elaboration.

5.4. Source Attributed

Most of the content disseminated (64.1%) lacks a source to which the information is attributed (anonymous source), a trait that, based on its transversality, could be considered defining of climate disinformation regardless of its country of dissemination or verification. However, statistical tests reveal a sig-

¹ Only topics present in at least 8% of the sample are included.

nificant aspect in the construction of these messages: the fake news with anonymous sources tend to contain more photographs [χ^2 (3, N=248)=22,901, $p<0,05$], which would thus mitigate the credibility that is lost due to the absence of people or institutions to whom the information can be attributed.

Around one-third of the messages analysed (30.2%) are backed up by real sources. Three groups or patterns can be identified here: first, messages from social media profiles, especially from TikTok, Facebook and YouTube, belonging to anonymous users, civil associations or influencers. Second, satirical websites, such as Der Postillon, or climate-sceptic blogs, with Tallbloke's Talkshop being particularly prominent; and third, politicians or public figures opposed to the fight against climate change, such as George Simion (president of the far-right Alliance for the Union of Romanians party) or Joae Biak (former editor-in-chief of the Slovenian weekly Demokracija).

Finally, few news items present supplanted (5.2%) or fictitious (0.4%) sources.

5.5. Geographical Scope And Personalisation of The Narrative

Notably, the majority of fact-checked hoaxes (71%) concern events with no direct relevance to the country in which the message was disseminated. Global disinformation (37.9%) prevails, such as climate change or the impact of CO2 emissions and, to a lesser extent, stories with an international focus, i.e. events that have taken place in foreign countries. Thus, hoaxes about the floods in Spain have been disseminated and verified in Croatia, Romania, the Czech Republic, the United States or Finland; and Hurricane Milton served as the basis for the construction of misleading content recorded in Spain, France, Austria and Romania. As for national and local or regional issues, they represent 21% and 8.1% of the sample, respectively.

Regarding the personalization of the narrative, most of the pieces analysed lack a singularized protagonist (74.6%). Only 25.4% refer to people, institutions, political parties or organizations. Statistical tests show that, the closer the geographical proximity of the event reported, the greater the tendency for personalization of the narrative [χ^2 (3, N=248)=9,254, $p<0,05$].

5.6. Dissemination Channels

Based on the information available in the fact-checks published by fact-checking platforms, the prominence of Facebook (79%) and X (47.6%) in the circulation of disinformation can be inferred. Other social networks or messaging apps such as TikTok (13.3%), Telegram (12.1%) or Instagram (9.3%), as well as por-

tals or blogs (12.9%) are also registered. Although Threads is still in its infancy, at least 6% of the pieces have been spread on this Meta social network. In contrast, the residual rate of mentions to WhatsApp in the verified ones (1.6%) is striking.

The analysis also shows that 6.9% of the disinformation content has achieved media resonance. Here, two distinct situations should be identified: first, interviews or statements that have been collected in the media, most of them conducted live; and second, data or information deliberately published by media such as *The Reason*, *OKDiario*, *The Wall Street Journal*, *Forbes*, *Courier International*, Nova24tv television or the Ben Fordham Live radio station, among others.

5.7. Verification of Disinformation

To counter disinformation, fact-checkers mainly rely on academic or expert sources (73%) and government sources (59.7%) (Table 3). This latter category includes not only consultations with ministries or government departments with responsibilities in climate matters, but also bodies financed and represented by one or more countries, such as the Intergovernmental Panel on Climate Change (IPCC), which is a regular source of information for climate verifiers in all countries. Likewise, for the verification of more than half of the pieces (52%), they rely on journalists or the media, especially from the country to which the story refers. Regarding digital resources (50%), although their incidence is notable, the repertoire of tools used is limited, mainly consisting of reverse image search engines, geolocation applications such as Google Maps or Google Earth, and advanced search systems in browsers or social networks. A notable rate is also recorded by civil associations or organizations (41.5%).

Table 3. *Verification sources used*

Sources	Frequency (% of cases)
Academic or experts	73,0
Government	59,7
Media	52,0
Digital resources	50,0
Association, NGO, trade union	41,5
Social networks	12,1
Other	11,7
Laws, treaties or regulations	10,5
Business	8,9
Security forces	6,9
Politics	3,6

Source: Own elaboration.

It can be inferred that, for the verification of each piece, the fact-checkers consult, on average, three (31.5%) or four (25%) different categories of sources. Similarly, for the verification of a significant rate of news, two types of sources are sufficient (23%). The complex structure and narrative of 15.7% of the falsehoods is noteworthy, requiring five or more types of sources to verify; at the other end of the spectrum, 4.8% of the hoaxes require only one source of information.

The statistical tests reflect a significant association between this variable and the geographical reach of the messages, so that fake news related to international or global issues are those that are associated with a greater variety of verification sources [χ^2 (18, N=248)=30,058, $p<0,05$].

After the fact-checking process, the platforms manage to identify the origin of around one-third of the climate disinformation (31.9%). In most cases, it corresponds to websites, blogs or social media profiles that are sceptical or denialist, politicians and public figures, and to a lesser extent, media outlets.

The bivariate analysis reveals several significant relationships. It is worth mentioning the incidence of the source to which the information is attributed and the topic, both of which are closely linked: verifiers are able to identify the origin of almost all hoaxes attributed to real sources [χ^2 (3, N=248)=150.277, $p<0.05$] or referring to statements by politicians [χ^2 (10, N=248)=30.088, $p<0.05$].

Other issues such as the communicative code substantially influence the identification of authorship: the contents disseminated in a textual manner seem to facilitate this aspect more [χ^2 (1, N=248)=15,679, $p<0,05$] than those in which the narrative is combined with photographs [χ^2 (1, N=248)=10,286, $p<0,05$] or videos [χ^2 (1, N=248)=5,794, $p<0,05$].

6. Discussion and Conclusions

The present research, focused on climate disinformation disseminated at the international level, has allowed us to delve deeper into a phenomenon of increasing prominence in public opinion. While years ago various authors (Coan *et al.*, 2021) warned about the dangerous rise of this type of content, the high volume of refutations recorded during the analyzed period gives extraordinary validity to these statements and highlights the interest that climate change arouses at the global level, consolidating itself as one of the thematic axes around which the disinformation agenda is articulated (cf. Tomassi *et al.*, 2025). The transnational nature of the research represents a departure from previous approaches to the subject, which, while undoubtedly illuminating, were limited to national geographical areas (cf. Thapa-Magar *et al.*, 2024; Sendra-Duro, 2025) or to specific aspects of the climate emergency (Palau-Sampio *et al.*, 2024).

From a theoretical perspective, this transnational circulation reinforces the idea that disinformation operates as a global communication ecosystem rather than as a set of isolated national phenomena. In line with the literature on networked misinformation (Denniss & Lindberg, 2025), the results suggest that climate-related hoaxes move through interconnected digital environments where narratives are replicated, adapted and redistributed across borders. This dynamic contributes to the formation of shared frames and discursive repertoires that transcend local contexts and facilitate the rapid diffusion of misleading content.

Based on the temporary distribution of the analysed messages (O1), although their dissemination maintains a constant line, peaks in the production of climate disinformation are detected coinciding in time with extreme meteorological phenomena (heatwaves, forest fires, floods) and political events such as the celebration of COP29 or electoral processes. Therefore, the construction and dissemination of these contents would be clearly marked by the international political agenda. Regarding the geographical location, the findings obtained do not show a defined pattern in this regard, although it can be inferred that there is slightly higher activity in countries where the far right has experi-

enced a significant rise in recent years (cf. Casero-Ripollés *et al.*, 2025), such as Spain, France or Romania. This would be in line with what is proposed by McNair (2018), who links the rise of disinformation—in general terms, not only related to the climate—with the growth of populist movements and radical political options.

In this sense, climate disinformation can also be interpreted through the lens of political communication theories that describe how contentious scientific issues become politicised. An example of this is the remarkable interest and misinformation surrounding the climate during the 2024 United States presidential election campaign (López-Martín, 2026). The strategic use of misleading narratives during politically salient moments suggests that disinformation functions not only as a communicative distortion but also as a discursive resource in ideological conflicts surrounding environmental policy. Consequently, the findings support the argument that climate misinformation is embedded in broader struggles over the authority of science and the legitimacy of public intervention in environmental matters (Lewandowsky, 2021).

About the formal characteristics of climate disinformation (O2), two defining features can generally be identified in all the countries analysed: the predominance of completely fabricated facts (hoaxes) and the absence of sources to which the information can be attributed. Both characteristics are common to most disinformation phenomena (cf. Malquín-Robles & Gamir-Ríos, 2023; Ruiz-Incertis *et al.*, 2024), although one characteristic seems to be distinctive of climate fake news, namely that it features a significant number of real sources. This preponderance of anonymous sources suggests that, rather than relying on or appealing to institutional authorities, much of this misleading content appeals to audiovisual resources that simulate authenticity. In this sense, the relationship identified between anonymous sources and the presence of audiovisual resources supports this interpretation and aligns with previous research highlighting the persuasive role of visual elements (Freiling *et al.*, 2023). The agents involved in the dissemination of these contents, according to the analysis, are mainly anonymous users of social networks and politicians or characters significant for their denialist positions, as previous studies had already shown (cf. Hassan *et al.*, 2024; López & Llorca, 2025; Vasileiadou, 2025).

Objective three (O3) focused on the discourse of disinformation messages. In this regard, the wide repertoire of topics registered stands out, among which three key issues can be highlighted: conspiracy theories and, to a lesser extent, extreme weather phenomena and waste and pollution. These results are consistent, at least in part, with previous findings (cf. Gallardo *et al.*, 2024;

Alonso & Tirado, 2025). In the context of climate change, conspiracy theories often channel mistrust towards scientific institutions, political elites or technological infrastructures, reinforcing the ideological polarisation described in previous research (Fragó *et al.*, 2020; Van-der-Linden *et al.*, 2025).

Regarding the issue of news, the dispersion of topics registered is especially noteworthy, as well as the predominance of certain issues depending on the country, a trait that, according to Casero-Ripollés *et al.* (2025), could be extrapolated to other phenomena such as electoral disinformation. The most populous European countries and the United States cover a wider range of topics, in contrast to the level of concentration identified in medium-sized and small states, with a few exceptions such as Italy and Canada. Therefore, this variability suggests that climate disinformation adapts to national communicative environments and media agendas.

Regarding the geographical scope of the narrative, the bulk of the pieces refer to events without direct involvement for the country in which the message is disseminated. This circumstance reduces the proximity to the narrative and, in turn, makes the verification process more difficult. Moreover, it is common for messages to lack a personal or institutional protagonist, which could be identified as another distinguishing feature of climate disinformation. However, the analysis reveals that, the greater the geographical proximity of the narrative, the greater the tendency for personalization of the messages.

Based on the information available in published fact checks, objective four (O4) aimed to identify the channels through which false information about the climate is disseminated, notably social media. Specifically, Facebook, by far, and X are the main dissemination channels, as already anticipated in previous studies (cf. Holder *et al.*, 2023; Alinejad & Honari, 2024). However, the results differ from other works that highlight the role of TikTok or YouTube in the dissemination of these contents (cf. Arnot *et al.*, 2024; Nadal, 2024). As Brady *et al.* (2023) point out, the mechanisms and algorithmic logic by which social media operate favour the rapid circulation of emotive or controversial content. In cases of climate misinformation, this dynamic can amplify narratives that question the scientific consensus or policy measures related to the climate emergency, especially in spaces where public debate is highly polarised. In this sense, the prominence of Facebook and X reinforces the idea that social media function as key spaces for the circulation and contestation of climate-related narratives (Tomassi *et al.*, 2025).

Finally, looking at the practices of fact-checkers (O5), it is clear that they rely primarily on academic or expert sources and government agencies to verify

information, as is the case in other subject areas (cf. Blanco-Alfonso *et al.*, 2021; García-Marín *et al.*, 2023; López-Martín & Córdoba-Cabús, 2024). Therefore, it does not seem necessary to have a specific specialization profile for the verification of climate content. At the same time, the predominance of academic and institutional sources underscores the authority of these sources in verifying climate-related claims. As Lewandowsky (2021) points out, many misleading narratives about climate change are based precisely on questioning the legitimacy of scientific knowledge or the consensus around it. In this way, published refutations not only seek to correct inaccurate information but also contribute to reaffirming the epistemic authority of scientific institutions in the public sphere. This function, in turn, reinforces the educational and informative role of fact-checking platforms (Blanco-Alfonso *et al.*, 2021; Soo *et al.*, 2023).

The inferential analysis found certain trends in relation to the fact-checking process, which, in turn, allows us to infer the difficulty involved in verifying certain information based on its construction. In this regard, considering the number of sources used, disinformation content with audiovisual and/or hypertext elements would, *a priori*, be easier to verify, while content referring to international or global issues would require greater scrutiny than local or national stories. After the verification process, fact-checkers are only able to identify the authorship of around one-third of the sample.

Similarly, the proportion of misleading messages that achieve media coverage is low. While in some cases the dissemination of such information is the direct responsibility of the media themselves, who publish partially erroneous data, on other occasions —especially on radio and television— it involves statements made by interviewees live on air, where there is virtually no scope for verification. The publication of fake news could be due, among other reasons, to the lack of time for the proper elaboration of the journalistic piece (cf. Herrero-Diz *et al.*, 2022) or the desire to give voice to all those involved in information related to the climate (cf. Lewandowsky, 2021); in any case, it denotes a poor professional practice. Regarding the comments made during the live broadcast, this circumstance calls for a rethink of the composition of audiovisual programme editorial teams, which could incorporate professionals capable of verifying information almost in real time, as has already been tried, for example, in some televised election debates.

Climate disinformation has been shown, according to our analysis, to be a sustained and geographically widespread practice, circulating abundantly on social networks and even colonizing traditional media outlets. Its messages share common features with any misleading content but also have thematic and

discursive characteristics (greater presence of real sources, impersonal narrative) that help to set them apart within the global flood of disinformation.

These findings also show that fact-checking organisations play a key role not only as corrective actors but also as mediators between citizens and information, performing an important role in media literacy. Furthermore, the features identified in the articles highlight the importance of strengthening media literacy regarding climate change and of providing citizens with tools to evaluate the credibility of the messages they receive critically. From this perspective, fact-checking initiatives can contribute to media literacy not only by refuting false claims but also by making their verification processes more transparent and educational, helping the public better understand how disinformation is constructed and how to identify it.

Beyond these issues, the results also raise several practical implications for the stakeholders involved. First, for fact-checking organisations, the findings suggest the need to strengthen verification strategies that go beyond debunking false content and contextualise real information circulating alongside erroneous data—a common format in climate disinformation.

Regarding the media, the results highlight the importance of integrating verification practices into journalistic routines and strengthening explanatory coverage of climate issues, especially concerning the interpretation of scientific data and extreme weather events, which are often subject to misleading interpretations. Finally, for institutional actors and public organisations, the results suggest the advisability of promoting media and science literacy policies that help citizens identify reliable sources and better understand how disinformation is constructed and circulated in the digital environment.

This study contributes to the literature on climate-related disinformation by offering a comparative perspective that goes beyond the national focus that has characterised much of previous research (Thapa-Magar *et al.*, 2024; Sendra-Duro, 2025). By analysing fact-checks produced in different contexts, the study identifies common patterns in the types of misleading narratives, the topics addressed and the verification practices applied to climate-related claims. In doing so, it offers a broader understanding of how climate disinformation circulates across countries and how fact-checking organisations respond to these dynamics, thus complementing existing national-level analyses and contributing to a more comprehensive view of the phenomenon in the international information ecosystem.

As the main limitation of this study, it should be noted that the sample is limited to the fact-checks compiled by EuroClimateCheck, which entails an-

alysing only disinformation that has previously been identified and verified by the participating fact-checking platforms, whose distribution is also not homogeneous across countries. It is logical to think, therefore, that the real volume of false content disseminated during the period studied is greater and more diverse.

To support the findings obtained, a longitudinal comparison based on the same universe would be a desirable extension of this research.

Ethics and Transparency

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Conflict of Interest

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Author Contributions

Contribution	Author 1	Author 2	Author 3	Author 4
Conceptualization	X	X	X	
Data curation	X			
Formal Analysis	X			
Funding acquisition	X	X	X	
Investigation	X	X	X	
Methodology	X	X		
Project administration	X	X	X	
Resources				
Software	X			
Supervision	X	X	X	
Validation	X			
Visualization		X	X	
Writing – original draft	X	X	X	
Writing – review & editing	X	X	X	

Data Availability Statement

Access to the data is available upon request from the corresponding author.

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