

Information and opinion in the representation of scientific consensus and skepticism on climate change, in Spanish language online publications

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Abstract

This paper explores the representation of scientific consensus and skepticism on Climate Change (CC), in online Spanish language publications, by means of a content analysis of the results of a search of "quinto informe IPCC" (5th IPCC report) on Google. Results indicate that "legacy media" represent exclusively the scientific consensus, whereas "other online publications" represent the skeptic voices. "Legacy media" tend to differentiate information from opinion, whereas "other online publications" tend to mix information and opinion, situating the IPCC report at the same epistemological level of other scientific and non-scientific sources. This leads to a non-rigorous representation of the current scientific consensus on climate change.

Keywords: Climate change; internet; skepticism; consensus; information; opinion; framing

Information and opinion as knowledge sources

Internet has created a new environment for the production and reception of information. When users search for a particular term, search engines provide a heterogeneous output, including stories produced by "legacy media" and "other online publications", like online news media outlets, scientific institutions web sites, personal blogs, etc.¹. The list of results is organized according to technical criteria rather than epistemological relevance. In this scenario, theoretically users should judge the epistemological authority of each author or, in other words, to what extent each one provides valuable information.

The epistemological authority of news outlets is based on the procedure that forms a consolidated paradigm for professional behavior (Shoemaker and Reese, 1991: 243-245). According to Reese, "knowledge is produced as a consequence of the practices that constitute the news paradigm" or, as he states following Foucault, the "ensemble of rules according to which the true and the false are separated" (Reese, 1990, 392). In fact, the authority of news corporations is based on this professional expertise.

This professional expertise underlines, as an essential part of this paradigm, that a "clear distinction must be drawn between news and opinions", given that "news is information about facts and data, while opinions convey thoughts, ideas, beliefs or value judgments on the part of media companies, publishers or journalists", and "opinions taking the form of comments on events or actions relating to individuals or

institutions should not attempt to deny or conceal the reality of the facts or data" (European Council's Parliamentary Assembly Resolution on the Ethics of Journalism 1993).

Even though this criterion is generally presented as an ethical standard (Aznar, 2005, 31; Breed, 1955, 327; Sanders, 2003, 141-142), in fact, it is based on an epistemological reason. Knowledge is possible when it is reflective of what is, according to reality, and what, by its contingent nature, could be in many ways. "*Opinion is –by itself- an estimation of the contingent: i.e. of that which could either be or not to be*" (Llano 2001, 52).

For that reason, Muñoz-Torres points out that "we can all distinguish between some crazy, arbitrary opinions, not grounded on sound evidence or sensible reasoning, and those based on cogent reasoning or on irrefutable experience. Furthermore, if all opinions were equally valid, then none of them would be, in the end, valid at all" (2012, 576). Therefore, apart from separating information and opinion, it seems reasonable to prefer those opinions that are based on more solid grounds. In this regard, within journalism, facts must prevail over opinions, since it is a mistake rushing to the interpretative state before presenting the facts (Kovac and Rosenstiel, 2003, 67).

This epistemological criterion means that there is a clear relationship between facts and the worship of opinions. Therefore, the distinction between information and opinion should be clear in any report dealing with facts –e.g. scientific certainties that could be an accurate source of knowledge. Furthermore, "it is important to distinguish between opinion and certainty. It is equally unjustified to hold as certain what is a matter of opinion, and to hold as a matter of opinion what is certain" (Llano, 2001: 51).

News corporations consider that "traditional ethic rules still apply online" (American Society of News Editors, ASNE, 2011), using the same guidelines for print media and internet publication. Ethical codes are also followed by most bloggers, who embrace the distinction between facts and opinions (Friend and Singer, 2007, 127-133). However, the huge diversity of blogs and other types of sites publishing online content are not always guided by the commitment to separate facts from opinions. Nevertheless, from an epistemological perspective, situating opinion on the same level as information diminishes the value of information, since it supports the idea that everything is subject to discussion.

In this context, informing about climate change (CC) is not an easy task, given the provisional nature of scientific knowledge (Popper, 2009: 18), the contamination of scientific knowledge with political and economic interests, and the difficult nature of the science of climate change (Barkemeyer et al. 2015).

Furthermore, any message is always produced within a certain frame. "Framing essentially involves selection and salience. To frame is to *select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and or a treatment recommendation* for the item described" (Entman, 1993, 51-52, emphasis in the original). It is precisely this process of selection and salience of data, sources and commentary, what allows creating a certain frame on the nature and causes of any issue that is dealt with. Besides, the way information and opinions are articulated within a story, help to create a specific frame that help to establish the pragmatic function of the text, performing interactions within society (Vilarnovo and Sánchez, 1992: 42).

This paper focuses on the role of information and opinion in online publications about the 5th IPCC report on climate change. We explore to what extent the way information and opinion are used can contribute to support scientific consensus or skepticism about the existence and anthropic origin of CC.

Consensus and skepticism in climate change reporting

CC has become one of the main challenges of our time. The United Nations Framework Convention on Climate Changeⁱ (UNFCCC or FCCC) defines the phenomenon as follows:

“Climate change” means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (UNFCCC or FCCC, 1992).

Currently there exists a strong consensus among the scientific community on the existence of this phenomenon and on its anthropic origin (Doran and Kendall Zimmerman, 2009). Accord to the Intergovernmental Panel on Climate Change (IPCC, 2013),

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

The conclusions of the IPCC are the most relevant source of knowledge on the subject, and are highly respected by the community of specialists in the different disciplines involved in the study of CC. A recent study indicates that between 97 and 98% of the climate researchers with the greatest number of peer-reviewed scientific publications endorse the conclusions of the IPCC. The same study concludes that the scientific relevance of those who endorse these theses (based on the number of citations their publications receive) is far greater than that of those who reject them (Anderegg *et al.*, 2010).

Despite the high level of consensus among the scientific community on the existence and origin of CC, since the first IPCC report was published there have been some scientific voices who disagree with its conclusions. They have been referred to as “skeptics” or “deniers”.

As Gavin and Marshall (2011) have stated, those who are against the consensus are not a homogeneous group, but have different ideas. Among the most relevant elements in their discourse, there are statements that cast doubts on the scientific value of the IPCC reports, by affirming that the computing model or the satellite-gathered data are not trustworthy, or that the variations in solar activity are responsible for the increase in the Earth’s temperature (Oldfield, 2005; Dessler and Parson, 2006). They also try to cast doubts on the reliability of the scientific process itself (Boehmer-Christiansen, 1994; Booker and North, 2007; Booker, 2009), and on the system of publications based on peer-review (Lawson, 2008; Booker and North, 2007; Dunlap and McCright, 2010).

As the sociologist Anthony Giddens states, “many scientists believe [the skeptics’] writings are irresponsible, since they convey to the public that there is extensive space for doubt about the origins, and probable consequences of warming, when in fact there is little” (2009, 24).

According to Hughes (2010), there have been at least three sources of opposition to the efforts to stop or reduce CC, which have, therefore, encouraged the spread of the skeptical voices. The first of these is “*bona fide* scientific critique”, which is positive and necessary as “it leads to open discussion, further investigation, and the testing of hypothesis” (Hughes, 2010, 79). Secondly, Hughes points to the lobbies created by the

fossil fuel industries and car manufacturers as sources of ideas contrary to the scientific consensus on CC, together with conservative groups who defend the principle of non-State intervention and fear that the struggle against climate change will mean greater government control, both at a national and an international level.

Thirdly, Dunlap and McCright indicate that some conservative *think tanks* have been “the most influential anti-environmental countermovement organizations at the national [US] level’ and the high media visibility of sceptics in news stories” (2003, 353).

The defenders of skeptical postures have stepped up their efforts to reach the media (Pearce, 2010; Oreskes and Conway, 2010), not so much to dominate public debate but to create sufficient doubts as to confuse the public (Dunlap and McCright, 2010).

At certain moments, skeptics have received great media attention, considerably more than their ideas have achieved within the scientific community, a fact that has at least three explanations. First of all, the complex politicization of the phenomenon, beginning in 1990, which lead the media to deal with the issue as a fundamentally political one, and therefore, subject to controversy (McComas and Shanahan, 1999; Boykoff and Boykoff, 2004, 2007; Carvalho, 2007; Corbett et al., 2009).

Secondly, together with the politicization of the phenomenon, adherence to the media principle of balance has led them to pay a similar amount of attention to the majority scientific position as to the clearly minority perspective of the skeptics, thus presenting a “duel of scientists” (Trumbo, 1995; Wilson 2000). Boykoff and Boykoff (2004) found out that, in the nineties, most articles in US prestige newspapers (52.7%) paid the same attention to the point of view that global warming is due to human activities as to the one stating that it is caused by natural climate changes.

Thirdly, alongside the journalistic balance norm, the media representation of CC is also affected by the political position of each media. In his study of climate change coverage in the British quality press, between 1985 and 2001, Carvalho (2007) concluded that the proposals and responses of the skeptics appeared, mainly, in *The Times* (conservative tendencies), whereas *The Guardian* (left-wing) and *The Independent* (variable tendencies) emphasized the existing scientific consensus.

Moreover, the attention paid to the skeptics also obeys the media tendency to focus on conflictive situations (Fernández Reyes, 2010), and newsrooms practices that leave reporters vulnerable to a technically difficult topic, especially when working under time and resource pressure (Andreadis and Smith, 2007).

As a result of such journalistic practices, the media have been helping skeptics’ objective to confuse the public, since “it is enough to keep the seeds of doubt alive”, and this can be achieved by presenting IPCC scientists as having equal weight to a “tiny handful of skeptics” (Gelbspan, 2005, 79); or “an individual with no relevant expertise in climate science” (Gavin and Marshall, 2011, 1038), often paid by for by think tanks funded by the fossil fuel industry (Hoggan *et al*, 2009).

Journalists “were constantly pressured to grant the professional deniers equal status –and time and newsprint space- and they did” (Oreskes and Conway, 2010, 214). Therefore, the media have spread misinformation originated at conservative think tanks, claiming that the scientific bases of climate change are uncertain and therefore no action should be carried out (McCright and Dunlap, 2000).

Although research into this issue focuses on specific countries and time-periods, research suggests that there are more skeptics in the USA than in Europe. Boykoff (2007) analyses coverage in US and UK

newspapers and finds out that controversy about climate science is hardly represented in UK newspapers but appears in US press.

In other countries, media research shows that journalists mainly frame their articles according to the scientific consensus (Weingart et al., 2000; Shanahan and McComas, 2004; Carvalho and Pereira, 2008; Peters and Heinrich, 2009; Dirix and Gelders, 2009), and they tend to avoid mentioning the scientific uncertainties that could be detrimental to the call to action (Peters and Heinrich, 2005, cited in Peters, 2008; Olausson, 2009).

In Spain, Fernández Reyes' (2010) study on the editorials published between 1992 and 2008, by four media with different editorial positions, concluded that only the most conservative of the media –Libertad Digital– cast doubts on the scientific consensus on CC.

Although the results are not conclusive, the above mentioned studies also suggest that, as the evidence for the existence and origin of climate change has become stronger, the presence of the skeptics in the media has lessened.

Although the skeptics came to the forefront towards the end of 2009, as a result of the scandal known as Climategateⁱⁱⁱ, since 2010 the presence of skeptics in the media seems to have decreased. To quote Lockwood (2011, 49), "most critics and researchers agree the peak of ideological skepticism in mainstream media, brought about by the requirement to 'balance' views, has passed". However, around the same period there was still a notable presence of skeptical voices on internet (Lockwood, 2011; Gavin and Marshall, 2011), and on television (Gavin and Marshall, 2011).

Academic research in this field has at least two gaps. Firstly, most studies have focused on information genres, whereas opinion articles have been barely touched on by academic research on the media and climate change (McKnight, 2010, 694). Secondly, research has mainly focused on English speaking media, whereas studies in other languages are scarce.

One of the few studies on this topic about Spanish language media (Noguera, 2013), indicates that the presence of skeptical voices in the Spanish media is relatively marginal in the press (5%) but more relevant on television (12%). Furthermore, a study on the two leading Spanish newspapers –El País and El Mundo– indicates that opinion articles may well be a media stronghold where the skeptical voices are maintained (León and Erviti, 2011).

As Diaz Nosty (2009) points out, few studies on the relationship between climate change and the media have been conducted within the Spanish speaking academic community. He also suggests that it is convenient to develop several areas of research, including the resources available in the internet, whose scientific rigor is uneven.

Drawing from these previous studies, this article attempts to shed light on the current situation of consensus and skepticism representation about the anthropogenic origin of CC in online publications.

Research aim and methodology

This article analyzes the way scientific consensus and skepticism on CC are represented in online publications. More specifically, we focus on the way information and opinion are utilized in both online

"legacy media" and "other online publications", in order to examine whether the mix of both elements may contribute to a non-rigorous representation of CC science.

We focus on Spanish language online publications, given

(i) Previous studies show that the representation of skeptics in online media is notable (Lockwood, 2011; Gavin and Marshall, 2011),

(ii) Internet has a high potential influence, since, in Spain, as well as in other countries, internet is currently the most popular source of scientific information (Fecyt, 2012).

(iii) In view of the scarcity of research about non-English language media, we focus on internet publications in Spanish, the third language by number of internet users, only behind English and Chinese (Internet World Stats, 2010), regardless of the country of origin.

Within this context, we analyze the representation of the scientific consensus and skepticism on the existence and origin of CC, in online publications about the first release of the Fifth IPCC Report (2013).

The research questions are:

R1. To what extent do Spanish language online media represent scientific consensus and skepticism on CC?

R2. Do "legacy media" and "other online publications" follow different patterns?

R3. Is the representation of skepticism associated to not differentiating information from opinion?

R4. What arguments are used to support skeptics' points of view?

We used a combination of quantitative and qualitative techniques. The quantitative study was carried out by means of a content analysis of articles on the Fifth IPCC Report published on internet. The sample was selected based on a Google search for the terms "quinto informe IPCC" (fifth IPCC report), carried out on 11-10-2013, two weeks after the first part of the report was released (27-9-2013). The search date was chosen at random, although the criterion was to have allowed enough time to pass for internet users to consult the information items on the report, thus giving more relevance to the sites that had been most visited in the two weeks after the release of the report. This period is considered to be of enough length to allow a certain amount of variety in the information.

Based on this search, the first 110 items listed by the search engine, the pages with the highest number of views were selected and archived. The selection of this number of items was due to the fact that, in all probability, these are the articles with most influence on the public, as we consider it unlikely that any user looking for information on the Fifth IPCC Report would go beyond the first 110 items.

After eliminating two items that were not related to the Fifth IPCC Report, finally a sample made up of 108 articles was organized, considered as having the greatest potential repercussion on the public. For the purposes of this research, every single entry listed by the search engine was considered as an article, regardless of its genre and characteristics.

The content analysis was carried out by two coders, who were post-graduate students. The code was first tested on 20 articles (20%). An inter-coder reliability test was carried out on the entire data set, with a reliability score of between 87% and 100% across categories. The following variables were coded:

1. Media type: "legacy media" or "other digital publications". "Legacy media" are operationally defined as traditional mass media companies, usually large and with a relevant history before the internet was created. "Other online publications" are defined as online outlets that have been created for the internet, either by individuals (e.g. blogs) or small companies, not necessarily within the media industry.
2. Media affiliation: Governmental organization (any organization or entity depending on public administration); NGO (non-governmental organization); Communication group (media belonging to an entrepreneurial group whose main aim is communication); Independent (without affiliation to any public or private entity); IPCC (media promoted directly by this institution).
3. Dominant position in the article: that of the IPCC; that of the skeptics; a "balanced" position between the two; and "un-clear". Articles with a "balanced" position can also be regarded as supporting skeptics' viewpoints, since they situate the IPCC position at the same level as contrarians. However, we have chosen to differentiate both categories in order to test to what extent the "balance" frame, identified by previous research, is still operating.
4. Number of sources of consensus and skeptics cited. All explicitly mentioned sources –direct or indirect- were counted.
5. Information and opinion. Following the operational definitions explained in the first section of this paper, we differentiated between the articles which offered information only, those which offered clearly differentiated information and opinion; and those which mixed the two.
6. Frame. We followed a classification used in previous studies (cf. Fernández del Moral *et al*, 2008). Firstly, the subject frame was defined, differentiating between the following: scientific, technical, economic, political, social, biological and "others". The "relational frame" was also coded, using the following classification:
 - Disagreement: when the confrontation/conflict among the participants is emphasized.
 - Conjectural: when the article focuses on speculation, rather than facts.
 - Historical: the story is told as a series of events or a process.
 - Prospective: when focusing on possible future consequences.
 - Consensual: the article emphasizes the points of agreement on a specific subject or event.
 - Competitive: the article focuses on who is holding the leading position and how is behind.
 - Denouncing: when a mistake or unfairness is reported.
 - Documentary: mainly based on data, rather than opinions or speculation.
 - Human interest: when a personal point of view (emotional or not) is presented.
 - Timely: when modernity or accordance with current trends are emphasized.

Since the above mentioned frames are not mutually exclusive, the dominant one was selected in each case.

The study was completed with the qualitative analysis of the 11 articles in which the skeptic position was dominant. We have used an interpretative text analysis to study how the previously detected categories are expressed. More specifically, we have analyzed the use of sources, the relationship between information and opinion, and finally, how relational frames are presented.

Results and discussion

Dominant position

In the whole sample of the articles (Table 1), the position of the IPCC is dominant (85.6%), compared to that of the skeptics (9.3%). As Table 1 shows, very few articles (1.85%) present a “balanced” position.

Table 1. Dominant position

	Frequency	%
IPCC	91	84.26
Skeptics	11	10.19
Balanced	2	1.85
Unclear	4	3.70
Total	108	100.0

Significantly all the articles with a predominantly skeptical position, as well as those that are “balanced” or unclear, were not published by “legacy media” but by “other online publications”. On the contrary, in all articles published by “legacy media” the IPCC perspective was predominant (Table 2).

Table 2. Dominant position, by media type (frequency and percentage)

	Legacy media	Other online publications
IPCC	21 (100%)	70 (80.5%)
Skeptics	0 (0%)	11 (12.6%)
Balanced	0 (0%)	2 (2.3%)
Unclear	0 (0%)	4 (4.6%)
Total	21 (100%)	87 (100%)

Two of the articles representing mainly the skeptical position were published by the online news media outlets *Libertad digital* and *El confidencial*. They both have the structure of a traditional newspaper, with a number of staff writers who are distributed in several sections within the newsroom. The remaining entries

correspond to blogs or web sites that are difficult to classify, such as *Energia12.com*, *Stopsecrets.ning.com*, *Desdeexilio.com* or *Millenio.wordpress.com*.

These data confirm that skeptical perspectives have a relevant representation in the internet, at least in Spanish language publications. Furthermore, the data show that skeptics are not represented in online "legacy media" but in "other online publications".

The results about the number of explicit sources used in the articles corroborate the hegemonic position of those supporting the scientific consensus, although skeptical sources have a relevant presence. In the overall account, 175 sources are cited which reflect the scientific consensus on CC, whereas there are 28 skeptical sources, all of which are not published by "legacy media" but by "other online publications".

The articles supporting the scientific consensus use the IPCC as their main source, whereas those supporting the skeptics' position use both the IPCC and contrarian sources. Ironically, in some cases, the IPCC report is used as a source to support skeptical viewpoints. For example, an article published by Libertad digital (entry 6) reads: "The IPCC official report illustrates the contradictions of climate alarmism. On the one hand it states that it is more certain of the increased influence of humankind, and on the other it recognizes it cannot quantify it" ^{iv}.

Other articles supporting skeptical points of view quote contrarian scientists. For example, the headline in entry 64 reads: "Top Scientists Slam and Ridicule UN IPCC Climate Report. They demand that it be dissolved and that the climate confidence tricksters be jailed"^v. This article –a translation into Spanish from *The New American*– reads: "Meteorology Professor Richard Lindzen at the Massachusetts Institute of Technology, who served as a lead author with the third IPCC report, for example, told Climate Depot that he thought the UN body had 'truly sunk to a level of hilarious incoherence' with its latest assessment". These articles find some scientific voices, supposedly in authority, in order to gainsay the authority of the IPCC report.

Information and opinion

In the overall account, the majority of the analyzed articles (64.9%) only offer information, while 10.3% include clearly differentiated information and opinion, and 24.7% mixed both of them.

Among the articles in which the dominant perspective is that of the IPCC, those offering information are the majority (71.1%), although in 20.5% of the cases information and opinion are mixed. Only in 8.4% of the articles the two are clearly differentiated (Table 3).

On the contrary, the situation is radically different among the articles with a predominantly skeptical position: none of them offers only information and, a very significant percentage (45.5%) mixes information and opinion (Table 3).

Table 3. Presence of information and opinion (frequency and %)

	IPCC	Skeptical
Information only	66 (72.5 %)	0 (0%)
Differentiated information and opinion	7 (7.7%)	6 (54.5%)
Information-opinion mix	18 (19.8%)	5 (45.5%)
Total	91 (100%)	11 (100%)

An example of the information-opinion mix can be seen in an article from the website *Cambioclimaticoglobal*^{vi} (entry 18), where the position of the IPCC predominates: "it is hard to tell what part of the new Intergovernmental Panel on Climate Control (IPCC) is most terrifying: perhaps the part where the authors say that there has been an increase of 40% in CO₂ levels since 1850 or where they say that most global warming is irreversible and even if we stop emissions of greenhouse gases immediately, it will continue for centuries". Therefore, this article tries to dismiss the authority of the IPCC by being sarcastic on information provided.

Entry 33 is an example of an article supporting the skeptic point of view that only includes opinion. The article is published by the web site *energia12.com*, which takes it from *liberalspain.com*, under the headline "The IPCC report and the smoking grandmother"^{vii}. The text provides opinion without any information: "To start with, I must say that I haven't read it, nor do I intend to do so. So I'll just talk about what I have got from the press. I've no time to focus on foolishness. I'm more interested in philosophical matters." The author uses the information published by other news media as an indirect source with no citations, and is less interested in the informative data than in what he/she calls "philosophical matters". This is another example of trying to dismiss the authority of the report, by presenting it like a mere opinion.

Entry 9, which also supports the skeptic point of view, is an article published by *El confidencial*, headlined "The scandalous report on climate change (IPCC 2013)"^{viii}. In this case, the adjective in the headline seems to be trying to undermine the reliability of the report.

Results indicate that, within the sphere of online publications, "legacy media" tend to distinguish information from opinion and rarely use a "balance frame" where skeptics representation is relevant. On the contrary, "other online publications" often mix information and opinion and use the "balance frame" that allow a relevant representation of skeptics. In sum, in a context where scientific certainties (facts) on the existence and origin of climate change have solidified, it is increasingly difficult to challenge the facts, it seems that skeptics can now seed doubts through "other online publications" by situating facts on the same epistemological level as opinions.

Subject and relational frame

The scientific frame is predominant (84.5%) followed by the political frame (5.2%) and the social frame (3.1%). This result is not surprising, considering the basis for the articles is a scientific report.

As far as the relational frame is concerned, in the whole of the articles, the documentary frame predominates (47.9%), followed by the timely frame (21.9%), perspectivist (7.3%), denouncing (7.3%), disagreement (3.1%), historical (2.1%), consensual (2.1%), and human interest (1%).

However, there is a very noteworthy difference in the relational frames of the articles with a predominantly IPCC perspective and those with a predominantly skeptical perspective (Table 4). In the articles with a dominant skeptical perspective, only the denouncing frame (66.7%) and the disagreement frame (33.3%) are used.

Table 4. Relational frame (%)

	IPCC	skeptical
Disagreement	0.0	33.3

Denouncing	1.2	66.7
Documentary	54.2	0.0
Timely	22.9	0.0
Other	21.7	0.0
Total	100.0	100.0

Next we show some examples of how a frame is expressed in the skeptical articles. In the above-mentioned article from *El confidencial*^{ix} (entry 9), the frame is marked as disagreeing from the first sentence: "The drums of war resound", and continues with: "media swords and daggers are drawn". This article combines the relational frame of disagreement with a scientific subject frame, when it states that "the science that intends to predict the future usually does so in terms of probabilities, when the theorems or equations almost never can offer absolute precision as is the case for climatology and the other truly natural sciences". It ends up by belittling the report with an *ad hominem* argument: "Only the stupid make absolutely precise affirmations. It is the arrogance of fools. Doubt belongs to the humble, to true sages and the prudent, who never agree with recalcitrant ultraconservatives". And author also questions the value of the science by giving a generic opinion: "Climatology is a world plagued with probabilities, not with certitudes, like those predicted with supposed veracity by the economic orthodox. Even though the science is imperfect, humans, in their ineptitude, dare to distort it on the bases of ideology, religion and certitude". Thus this article jumbles together different epistemological levels and does not use authorized sources. It presumes that scientific knowledge is contaminated by elements of ideology, religion or certitudes.

The aforementioned article "The IPCC report and the smoking grandmother" (entry 33), argues against the credibility of the report, combining a scientific frame and a disagreement frame. The author uses statements such as the following: "The truth is that the mathematical models developed for this whole caboodle miss out more often than the baddies in the movies"; and "We haven't the vaguest idea what the temperature will be in a few years. We are not capable of predicting and we shouldn't play at being able". The skeptic position lies not only on the rejection of the data presented by the report, but in the lack of confidence on scientific knowledge itself.

Entry 75, entitled "The IPCC reports are political action reports. They are not science"^x, adopts a politically-themed frame, and a denouncing relational frame. It picks up the information given by the newspaper *El Mundo*, denounces its alarmist nature, and contrasts it with the text of the IPCC report: "The AR5 report itself recognizes serious uncertainties in the estimation of the effects of natural processes on the climate in the last decades". The article continues to state: "No, the IPCC is NOT a scientific body", and ends by demanding its dissolution.

Conclusion

This analysis shows that scientific consensus on climate change –represented by the IPCC– prevails in Spanish language online publications, although skeptic positions maintain a relevant representation.

Online "Legacy media" follow different patterns from "other online publications", in the representation of climate change. While "legacy media" follow the traditional media principle that separates information from opinion, "other online publications" often mix information and opinion.

Furthermore, contrary to "legacy media", "other online publications" use "denouncing" and "disagreement" frames, where they allocate their arguments to dismiss the authority of the IPCC report. Sometimes arguments are framed within a social, religious or political discussion, where scientific knowledge is less relevant.

The main arguments that are used can be classified in three categories:

- (i) They try to dismiss the IPCC's authority by considering it as a non-scientific institution.
- (ii) They seek to undermine the report's scientific rigor, by showing its apparent internal contradiction and what is regarded as unnecessary alarmism.
- (iii) They intend to seed doubts on the reliability of scientific knowledge as a whole.

The results of this study have a significant but limited scope: Spanish language publications on internet. Considering journalistic traditions and CC debates vary from one country to another and from one language to another, further research is needed, in order to verify our conclusions in other scenarios.

In spite of its limits, it demonstrates that the internet can lead citizens to access a non-rigorous representation of established scientific knowledge on climate change, which has several consequences from theoretical, practical and political perspectives.

From a theoretical perspective, this research stresses the importance of the absence of traditional journalistic principles in some online publications, since the epistemological authority of the sources used by the different outlets cannot be taken for granted. From a practical perspective, it suggests that "legacy media" could develop new mechanisms to increase their potential influence in the online environment, finding new ways of improving their position in search rankings, so that epistemological relevance plays a significant role. Finally, from a political perspective, it points towards the need to educate citizens with specific skills to judge the reliability of the information sources that can be accessed online.

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ⁱ The term "legacy media" has been used with different meanings. For the purpose of this study, "legacy media" are operationally defined as traditional mass media companies, usually large and with a relevant history before the internet was created. We make a distinction between "legacy media" and "other digital publications", which are defined as online outlets that have been created for the internet, either by individuals or small companies, that are not necessarily part of the media industry. "Legacy media" have been credited for the preservation of the ideal of quality journalism and high professional standards (Pérez-Latre 2014).

ⁱⁱ This panel of experts was established by the UN in 1988. It is under the joint direction of the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) and provides analysis of the available scientific, technical and socio-economic information in order to understand anthropogenic climate change. Approximately 2,500 scientists contribute to its work, and, to date, it has published five assessment reports, in 1990, 1995, 2001, 2007 and 2013-14. The first one stated that there were "indications" that climate change may be related to human activity, the second pointed out "a set of concordant indicators", the third confirmed that human activity was a "probable" cause, the fourth used the term "very probable" and the fifth says "highly probable" (IPCC, 2013).

The IPCC does not carry out research nor does it monitor the planet's climate, but bases its work mainly on scientific and technical publications. Thus, its conclusions are not only supported by the members of the panel itself, but by the most important specialists worldwide from all the scientific disciplines involved in climate study.

ⁱⁱⁱ The so-called Climategate case was the leaking in November 2009 of several email messages and electronic documents, pirated from scientists of the Climatic Research Unit of the University of East Anglia (UK). Sceptics interpret this as a proof of manipulation, in favour of the theory of anthropogenic CC. They published the documents on the Internet, as a way to attract attention from newspapers, radio and television channels (Holliman, 2010). Despite the controversy, three independent investigations found no reason to question the scientific consensus on CC.

^{iv} "El informe oficial del IPCC ilustra las contradicciones del alarmismo climático. Por un lado afirma que tiene más seguridad en la elevada influencia del hombre en el clima y por otro reconoce ser incapaz de cuantificarla". Daniel Rodríguez Herrera. Retrieved from <http://www.libertaddigital.com/ciencia-tecnologia/ciencia/2013-09-28/el-informe-oficial-del-ipcc-ilustra-las-contradicciones-del-alarmismo-climatico-1276500459/>

^v "Destacados científicos critican el ridículo Informe Climático IPCC de la ONU. Piden su disolución y el encarcelamiento de los estafadores climáticos". Blog Stop Secrets, María Helena Restrepo. Retrieved from <http://stopsecrets.ning.com/profiles/blogs/destacados-cient-ficos-critican-el-rid-culo-informe-clim-tico>

^{vi} "Calentamiento global en 2035. No es humor, aunque lo parezca". Retrieved from <http://cambioclimaticoglobal.com/quinto-informe-ipcc-2013>

^{vii} "El informe de IPCC y la abuela que fuma". Retrieved from <http://energia12.com/2013/10/08/el-informe-del-ipcc-y-la-abuela-que-fuma/>

^{viii} "El escandaloso informe sobre el cambio climático (IPCC 2013)", José M. de la Viña. Retrieved from http://blogs.elconfidencial.com/economia/apuntes-de-enerconomia/2013-10-01/el-escandaloso-informe-sobre-el-cambio-climatico-ipcc-2013_34858/

^{ix} Id.

^x "Los informes del IPCC son informes de acción política. No son ciencia", Luis I. Gómez Fernández. Retrieved from <http://www.desdeexilio.com/2013/09/27/los-informes-del-ipcc-son-informes-de-accion-politica-no-son-ciencia/>