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# **‘Offline’ vs ‘online’ media: Claim-makers, content, and audiences of climate change information**

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## **Abstract**

This paper aims to explore both similarities and differences between offline and online climate change communication in terms of claim-makers, content, and audiences. It is based on academic peer reviewed papers directly relevant to the communication of climate change by the media, published in English language between 2010 and 2016. Interdependences between offline and online media are often cited, especially in terms of web searches of information already reported by traditional media (both print and television). In some other cases, the study of the intermedia agenda shows that the debate originated on online blogs triggers and conditions the attention of print media. This interdependence is also showed by a polarisation between ‘activists’ and ‘contrarians’ in both online and offline arenas. However, while the web offers greater space for interaction and a variety of sources, the dominance of the ‘old media’ point of view seems to undermine these attempts.

## **Keywords**

Climate change communication, media polarisation, intermedia agenda, offline media, online media.

## **Introduction**

This paper aims to explore both similarities and differences between offline and online climate change communication in terms of content, strategies and audiences. The relation between the types of medium used and public engagement is still debated and controversial. Many studies tried to identify

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the main elements that affect public perception and the factors that make communication on climate change successful. Asplund (2014) identifies five macro-themes in the literature on public perceptions of climate change, such as consensus and conflict in climate science (e.g. Asplund et al., 2013; Feldman, 2013; Jaspal et al., 2016; Sch fer, 2016; Schmidt et al., 2013; Speck, 2010), attribution of causes, levels of concern, climate change frames as filtered through existing worldviews (Leiserowitz et al., 2013; Poortinga et al., 2011; Whitmarsh, 2011), and the influence of experience on interpreting climate change (Akerlof et al., 2013; Spence et al., 2010; Taylor et al., 2014; Weber, 2010). In support to this, the literature review (from 1980 to 2014) on the evolution of public perceptions of climate change carried out by Capstick et al. (2015) shows that changes in public perception were particularly influenced by experiences of extreme weather events, media events, economic downturn and political events.

Recently, online debates on climate change have been progressively increasing, especially thanks to the widespread use of social media platforms. The Internet has become one of the most common sources for science information in particular in developed countries. Following the research conducted by the National Science Board (2016), the Internet represented the primary source of science and technology information in 2014 for the 47% of Americans (about 4 in 10 use a search engine and 2 in 10 use online newspapers to retrieve science-related information). The access to online platforms has been also increasing in Europe even though traditional media remain important (often offline and online platforms are combined) (Newman, 2016).

A part of studies have adopted social media, such as Twitter (Cody et al., 2015; Holmberg & Hellsten, 2011; Holmberg & Hellsten, 2015; Pearce et al., 2014; Veltri & Atanasova, 2015; Williams et al., 2015), YouTube (Jaspal et al., 2014; Porter & Hellsten, 2014; Spartz et al., 2015; Uldam & Askanius, 2013), Facebook (see e.g. Connor et al., 2016; Vraga et al., 2015) as sources of information for exploring public understanding of climate change.

Some authors suggest that social media can be privileged platforms from which observing social engagement, thanks to their conversational and interactive character.

However, some of the offline characteristics of the climate change discourses are also reproduced online. For example, Pearce et al. (2014) identified three types of Twitter communities (labelled as supportive, unsupportive and neutral) emerged around the publication of the Fifth IPCC report 2013, which reflect the division represented in traditional media narratives. Moreover, the same actors, such as scientists, NGOs, politics and media result to frame their messages in

different ways on these platforms. Social media create the favourable conditions for these actors to communicate and interact with the public. At the same time, science efforts to disseminate research results on the Internet seem to be still limited and centred on the use of less interactive tools, such as e.g. web-blogs by using scientific language. NGOs largely use the Internet to engage and mobilise the public, to inform journalists and gain support from the outside. Politicians mainly use the Internet as a governance tool (Sch fer, 2012). Finally, the ‘old media’ (such as TV, radio and newspapers) struggle to create their channels also online by using different tools (from institutional web-sites to social media accounts).

Interdependences between offline and online media are often cited, in particular in terms of web searches of information already reported by traditional media (both print and television). In some other cases, the study of the intermedia agenda shows that the debate originated on online blogs triggers and conditions the attention of print media (Bosch, 2012; Hellsten & Vasileiadou, 2015; Lineman et al., 2015). This interdependence is also testified by a polarisation between ‘activists’ and ‘contrarians’ in both online and offline arenas. However, while the web offers greater space for interaction and a variety of sources, the dominance of the ‘old media’ point of view seems to undermine these attempts (Gavin, 2010).

This article will shed light on the strengths and weaknesses of online and offline arenas in terms of producing climate change awareness amongst the public. It will also interpret the role of different media, and their interdependences, in social constructing the meaning of climate change. The first paragraph will describe the literature review method, the second one will outline the main characteristics of both online and offline communication in terms of climate narratives, the third one will identify the interdependencies between the media. Finally, some considerations and conclusions about the meaning of such interdependences will be drawn.

## **Literature review method**

The literature review on media communication of climate change focuses on similarities and differences between offline and online climate change communication in terms of content, strategies and audiences. It focused on a set of academic peer reviewed papers directly relevant to the communication of climate change by the media. A systematic literature search combined relevant keywords relative to the topic, such as ‘communication of climate change’, ‘weather extreme’, ‘climate perception’. 273 papers were identified and read entirely. A core set of 98 articles were retained given their focus on

media strategies of communication of climate change and public response. The analysis included academic articles published in English language between 2010 and 2016. The time period was established considering that the more recent literature review on media communication of climate change was based on publications between 2000 and 2011 (Wibeck, 2014)<sup>1</sup>; and data published by the Pew Research Center (Stokes et al., 2016), show how since 2010 the public perception about climate-related risks has increased in Europe (and slightly in the UK). The academic articles were retrieved using journal search engines, such as Directory of Open Access Journals – DOAJ ([www.doaj.org](http://www.doaj.org)), Elsevier – Science Direct ([www.sciencedirect.com](http://www.sciencedirect.com)), Jurn ([www.jurn.org](http://www.jurn.org)), Open Access Journals Search Engine – OAJSE ([www.oajse.com](http://www.oajse.com)), Google Scholar, Web of Science Thomson Reuters (<http://thomsonreuters.com>). Moreover, articles were directly searched in those journals with higher Impact Factor as indicated by The Scimago Journal & Country Rank<sup>2</sup>.

Papers were retained for inclusion if they: directly pertained to media communication of climate change; and were academic articles/editorials (excluding review articles, books and PhD thesis). Papers that did not focus primarily on communication of climate change were not included in this core set of articles.

## **Traditional and ‘new’ media: Main characteristics, similarities and differences**

As highlighted by Carvalho (2010), attitudinal differences may be interpreted in the light of consumption of specific types of media content (see also *Table 1*). A part of the literature highlights positive correlations between media consumption and levels of political participation. Specifically, the Internet was found to increase political information and political participation and empower marginalised groups, whereas television tends to promote civic disengagement. Moreover, among the traditional media (which include in this case movies/documentaries, radio, television, and printed media) the most explored resources continue to be the newspapers (both online and printed); whereas among the new media (social media, online arenas, Google trends and Google

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<sup>1</sup> The literature review conducted by Wibeck (2014) only included articles focusing on public understanding of media messages of climate change. Moreover, Ballantyne’s literature review (2016) focused on 299 scientific articles before 2014, but it focused on how researchers adopt communication theories and models to analyse certain aspects of climate change communication. Finally, the literature review conducted by Nerlich et al. (2010) considers researches carried out up to 2010.

<sup>2</sup> <http://www.scimagojr.com/journalrank.php?category=3315&openaccess=true>

news, ICTs in general) the social media are the most analysed. While the framing tendencies (from the media perspective) and the exposure (from the public perspective) to traditional news media have been widely explored by reporting the main characteristics and effects produced by this kind of communication, the study of both effects and dynamics of new media reporting media is still under definition. The literature focusing on traditional media communication highlighted, for example, that those communication based on consequences of climate change, but simultaneously providing solutions, seem to be more appealing for public engagement (Gunster, 2011; Hidalgo et al., 2014; Lopera & Moreno, 2014; Somerville & Hassol, 2011). Even uncertainty was found to be effective if associated with 'positive frames' (lack of losses). In this context, it appears that people feel that action would be more effective, and express intention to take these actions (Morton et al., 2011). Moreover, O'Neill et al. (2013) found that the imagery related to energy future (such as e.g. solar panels, wind farm, electric car, home insulation) increases self-efficacy, but imagery related to impacts decreases self-efficacy by increasing a sense of powerlessness. However, in the case of Al Gore documentary, which suggests a number of actions for mitigating climate change at individual level, Jakobsen (2011) found that changes in behavioural terms are only short-term. Furthermore, exploring how media usage influences climate change awareness and related behavioural intentions in Germany, Arlt et al. (2011) found that media effects are only related to quick actions that produce economic benefits or political influence. By contrast, there is no relation to long-terms behavioural change. Behavioural changes result to be mainly influenced by perceived control of climate change by individuals and awareness of climate problems, rather than by media usage. Russill (2011) suggests that public participation in climate change discourse might be undermined by adopting a perspective of truth that narrows subjective interpretation of the uncertainty of climate change. When there is consensus around the 'climate change emergency' among citizens (Olausson, 2011), the responsibility for acting on climate change becomes a 'political issue'. In fact, a need for global/local political interventions is highlighted on regulating both collective and individual behaviours. The adoption of policy responses and preventive measures is perceived as 'governments' responsibility' (Dirikx & Gelders, 2010; Olausson, 2011; Stoddart & Tindall, 2015) since people were found to be 'too self-centred' to voluntarily act on reducing anti-environmental behaviours.

Some authors highlight that, differently from traditional media, in some cases the exposure to user-generated content does not influence the perception of climate change (Porten-Cheé & Eilders, 2015), and the increase in the

number of stakeholders involved in online discussions does not necessarily improve the quality of information (Schäfer, 2012) (see *Table 1*). On the other hand, the relation between the need for information and the Internet use was found to increase the impact on problem awareness and behavioural intentions (Taddicken, 2013). The Internet use mediated through the media evaluation and need for information seems, indeed, to produce impacts on users' awareness. The more media reporting is evaluated as exaggerated, the more Internet use negatively affects levels of knowledge, problem awareness, and behavioural intentions (Taddicken, 2013).

Some authors suggest that social media and Google tools (such as Google search or Google news) can be privileged platforms from which observing social engagement, thanks to their conversational and interactive character (and facility to retrieve data in the case of Google trends) that allows to record people's engagement in specific issues (Leas et al., 2016). However, it does not necessarily mean that those people who are actively involved in discussing climate change-related issues are also engaged in acting on it. In some cases, such as web activities related to specific research projects, a preference for learning 'from the experts' rather than actively engaging in discourses was found, and Facebook success in involving people was connected to the specific format used (e.g. video, images) (Newell & Dale, 2015). An analysis of hyperlinks used in Twitter conversations reveals that even though the mainstream media are not the only source of information, reproduce the traditional media discourse (Veltri & Atanasova, 2015). However, one of the main innovations introduced by the social media in the climate debate is represented by the amplification of the role of non-expert users. On the one hand, the Internet offers the possibility to the general public to choose among a number of information sources; on the other, it gives them the opportunity to generate new contents and publicly and critically discuss scientific issues. Given the interactive nature of the social media (Boykoff, 2011), it is expected a 'democratisation' in constructing and sharing scientific knowledge. However, beyond the advantages, some disadvantages might be represented by the possibility that the increasing number of voices involved in the debate might (also 'intentionally') generate increasing confusion and uncertainty.



Table 1

### Similarities and differences between new and old media

Characteristics	Old	New
Increase of political information and public participation/engagement	Television tends to promote civic disengagement (Carvalho, 2010)	Exposure to user-generated content does not influence the perception of climate change significantly (Porten-Cheé & Eilders, 2015; Schäfer, 2012)
	Increased engagement through positive messages, consensus and solutions (Asplund et al., 2013; Gunster, 2011; Hidalgo et al., 2014; Lopera & Moreno, 2014; Morton et al., 2011; O'Neill et al. 2013; Somerville & Hassol, 2011)	Increase of problem awareness in relation to the users' evaluation of both content reliability and medium type (Namukombo, 2016; Newell & Dale, 2015; Spartz et al., 2015; Taddicken, 2013)
	Only short-term behavioural changes (Arlt et al., 2011; Jacobsen, 2011; Russill, 2011)	Potential increase of people engagement thanks to their interactive character (Leas et al., 2016)
	Use of emotional values involve users (Höijer, 2010)	Use of emotional values involve users (Veltri & Atanasova, 2015)
	Media messages filtrated by both individual values/ background (e.g. political orientation) and external factors (e.g. experience of impacts, and political orientation of the medium) (Akerlof et al., 2013; Zhao et al., 2016)	Media messages filtrated by both individual values/ background and external factors (Vraga et al., 2015)
Responsibility and opinion	The responsibility for acting on climate change is 'political matter' (Boykoff, 2014; Dirix & Gelders, 2010; Feldman, 2013; Olausson, 2011; Speck, 2010; Stoddart & Tindall, 2015)	Non-experts, and 'minor' opinions become valuable (Askanius & Uldam, 2011; Cody et al., 2015; Hermida, 2010; Porten-Cheé & Eilders, 2015; Roosvall & Tegelberg, 2015; Segerberg & Bennett, 2011; Uldam, 2013; Uldam & Askanius, 2013; Williams et al., 2015)

## Interdependences between old and new media

The literature review highlighted similarities, differences but also interrelationships between old and new media (see *Table 2*). It seems to emerge a connection between old and new media in particular in terms of web searches of information already reported by traditional media (both print and television) (Gavin, 2010; Gavin & Marshall, 2011), such as in the case of ‘global warming slowdown’ (Hawkins et al., 2014)<sup>3</sup>. Analysing tweets posted between 2012 and 2014 Kirilenko and Stepchenkova (2014) found that the flow of information around climate change is highly dominated by few media outlets, celebrities, and prominent bloggers. In some cases, the study of the intermedia agenda, such as in the case of ‘climategate’, shows that the debate originated on online blogs triggered the attention of print media, and conditioned them in using specific terms (such as the term ‘climategate’) (Hellsten & Vasileiadou, 2015). Moreover, in both contexts the importance of content with high emotional values emerges as means for involving the public/users (Höjjer, 2010; Veltri & Atanasova, 2015); in some cases, even the online discourses around climate change might be driven by the publicity spread by traditional media, and no evident differences can be found in terms of topics and tendencies (Bosch, 2012). In fact, sometimes people searches for specific terms (such as climate change or global warming) are influenced by the use of them by the media (Lineman et al., 2015). This is also confirmed by the strong linkage between social media conversation, Google search for specific terms, comments posted by users on online arenas, and the high resonance given by the media to specific events.

The first area in which interrelationships between old and new media can be found relates to the consumption of specific types of media and public engagement/attention activation. The studies reviewed confirmed what was suggested by Boykoff (2011): media (both online and offline) and, consequently public attention, is attracted by specific events. The events mostly studied can be classified as ‘science-related’, ‘political-related’, ‘scandal-related’, ‘extreme weather-related’, ‘celebrity-related’ and ‘meta-media analysis’. The first category includes the release of scientific reports (Elsasser & Dunlap, 2012; Lörcher &

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<sup>3</sup> Google trends show how the ‘pause’ in global warming became a topic searched online after traditional media started to cover the issue, with peaks in occasion of the publication of key articles in the press or media events. However, the ‘global warming slowdown’ appears to be a missed opportunity for both online media, due to the scarce presence of scientists actively involved in interactive discussion on the problem (Hawkins et al., 2014), and traditional media, due to a number of variables related to ‘journalistic norms’ and ‘concatenated contextual political, economic, social, environmental and cultural factors’ (Boykoff, 2014).

Neverla, 2015; Pearce et al., 2014; Rick et al., 2011; Stoddart et al., 2015). The second one includes UN meetings and other political meetings on climate change ((Arcila-Calderón et al., 2015; Askanius & Uldam, 2011; Blanco Castilla et al., 2013; Elsasser & Dunlap, 2012; Kunelius & Eide, 2012; Liu et al., 2011; Lörcher & Neverla, 2015; Porten-Cheé & Eilders, 2015; Rick et al., 2011; Schäfer et al., 2013; Segerberg & Bennett, 2011; Stoddart et al., 2015). The third category mainly refers to climate-gate scandal (Holliman, 2011; Koteyko et al., 2013; Ward, 2010) and errors appeared in the 2007 IPCC Fourth Assessment Report (Anderegg & Goldsmith, 2014). The fourth one refers to natural disaster and weather fluctuation/extreme events (Cody et al., 2015; Dow, 2010; Gavin et al., 2011; Lang, 2014; Miah et al., 2011; Ruiz Sinoga & León Gross, 2013). The experience of extreme temperature, for instance, was found to be associated with both an increase in twitting activities in the US and the connection of these events to climate change (Kirilenko et al., 2015). The fifth includes facts and events related to celebrity statements on climate change (Leas et al., 2016). The last category concerns the interrelations between media and how news media reporting critically reflect on other media products, such as in the case of the release of the Al Gore documentary 'An Inconvenient Truth' (Elsasser & Dunlap, 2012; Stoddart et al., 2015).

The role played by specific events might be read as an indicator of the 'volatility' of the phenomenon that erupts and declines quickly and reappears from time to time (Goode & Ben-Yehuda, 2009) in relation to specific facts. Some of these facts are clearly connected to the core problem (climate change), as in the case of UN meeting, release of scientific reports and documentaries, some others (see, for instance, weather fluctuations) are associated by the media to climate change (with either aims, to support or weaken scientific evidences).

The second area of interrelationships regards the creation of (politically) polarised communities. Shifting the debate between 'supportive' and 'unsupportive' on the online realm, the communication around climate related issues is not exclusive domain of media organisations, journalists, scientists, policy-makers, NGOs, but also 'non-elite' people become active interlocutors. In fact, as shown by Porten-Cheé & Eilders (2015), the 'spiral of silence' theory is not confirmed in the case of exposure to user-generated content: individuals who see themselves in the minority tend to express their opinions in online arenas. Studies aimed at identifying communities which are more or less oriented to support mainstream science on Twitter, reveals that there exists a polarisation between 'activists' and 'contrarians' (reflecting the same controversy that characterises the debate on offline media communication of climate change).

However, differently from what happens in the mainstream media<sup>4</sup>, on this platform activists result to be more abundant and active in conversation around climate (Cody et al., 2015; Williams et al., 2015). Moreover, similarly to what happens in the context of traditional news media, both categories (convinced and unconvinced) tend to create like-minded communities by making conversational connections with those who share their views on climate change (Pearce et al., 2014; Williams et al., 2015). Analysing the network of blogs related to different opinion on climate change, Elgesem et al. (2015) identified a number of different communities: while sceptical voices resulted to be mainly concentrated in one community, a constellation of communities was dominated by accepters. They found that only one of the identified advocate communities presented more connections with sceptics, and they mainly interacted in topics concerning the science of climate change. In some cases, a conflict frame prevails in the conversations on social media, and the 'rude and hostile' tones, which characterise the comments (as, for instance, on YouTube), do not leave space for dialogue (Askanius & Uldam, 2011), thus increasing 'polarisation' between users, especially in relation to commenting ideologically-oriented videos (Porter & Hellsten, 2014). Lack of room for interaction was also found in web-sites managed by climate change organisations that tend to use their pages in a mono-directional way (Jun, 2011).

However, the role of ICTs in promoting engagement, in particular among the most vulnerable people is a cited value (Namukombo, 2016). The high 'popularity' of social media content (expressed in terms of visualisations) also seems to influence people perception of salience of climate change (Spartz et al., 2015). More specifically, social media seem to be often used by activists, who are often marginalised by the main stream media (Roosvall & Tegelberg, 2015), for both organisational or promotion of specific campaigns (Askanius & Uldam, 2011; Segerberg & Bennett, 2011; Uldam & Askanius, 2013), but also for general discussions (even though mainly with people who share the same values) (Cody et al., 2015; Williams et al., 2015). In some cases, the connection between traditional and new media pushes activists to carry on 'disruptive actions' (like in the case of the Stanstead airport action by the Planet Stupid) in order to gain attention firstly on the 'old' media, and consequently on the new ones. However, while the web offers greater space for interaction and a variety of sources, the dominance of the 'old media' point of view seems to affect this kind of attempts (Gavin, 2010).

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<sup>4</sup> For example, in the case of political and mass media marginalisation of activists during UN meetings (Roosvall & Tegelberg, 2015; Uldam, 2013).

Finally, climate change has been often described as a politicised issue (Antilla, 2005; Aykut et al., 2012; Boykoff & Boykoff, 2004; Carvalho, 2007; Dirikx & Gelders, 2010). On the one hand, media representation tends to give more attention to the political valence and interpretation of the phenomenon, rather than to the scientific one (Jaspal et al., 2016; Rick et al., 2011). On the other hand, online discussions tend to reflect a political polarisation that generates a division between two communities, ‘advocates’ and ‘sceptics’ (Pearce et al., 2014). This means that science might be interpreted and metabolised through the political lenses that dominate the discourses surrounding climate change. The ‘politicisation’ and consequent ‘polarisation’ around climate change recall several criticalities regarding the role of media as primary or secondary definers of social problems (and their relationship with the ‘existing structure of power’) (Hall et al., 1978), and the identification of ‘victims’ and ‘folk devils’. The existence of two ‘contrasting communities’ that use multiple media formats and channels (Cooper, 2011), make difficult both to clearly identify those who can be labelled as folk devils and their antagonists who counteract (McRobbie & Thornton, 1995; Thornton, 1994), as well as the identification of the primary definers of the problem.

Table 2

### Interdependences between new and old media

Interdependences	Source
Hyperlinks used in Twitter conversations reproduce the traditional media discourse	Veltri & Atanasova, 2015
Web information (and related users' searches and discourses) driven by what reported by traditional media	Bosch, 2012; Gavin, 2010; Gavin & Marshall, 2011; Hawkins et al., 2014; Kirilenko & Stepchenkova, 2014; Lineman et al., 2015
Some influence of the new media on traditional media language (e.g. 'climategate')	Hellsten & Vasileiadou, 2015
Media and public engagement/attention attracted by specific types events	Anderegg & Goldsmith, 2014; Arcila-Calderón et al., 2015; Askanius & Uldam, 2011; Blanco Castilla et al., 2013; Cody et al., 2015; Dow, 2010; Elsasser & Dunlap, 2012; Gavin et al., 2011; Holliman, 2011; Kirilenko et al., 2015; Koteyko et al., 2013; Kunelius & Eide, 2012; Lang, 2014; Leas et al., 2016; Liu et al., 2011; Lörcher & Neverla, 2015; Porten-Cheé & Eilders, 2015; Rick et al., 2011; Ruiz Sinoga & León Gross, 2013; Schäfer et al., 2013; Segerberg & Bennett, 2011; Stoddart et al., 2015; Ward, 2010
Politically polarised communities between sceptics and advocates	Askanius & Uldam, 2011; Cooper, 2011; Elgesem et al, 2015; Gavin, 2010; Holmberg & Hellsten, 2011; Holmberg & Hellsten, 2016; Jun, 2011; McRobbie & Thornton, 1995; Pearce et al., 2014; Porten-Cheé & Eilders, 2015; Porter & Hellsten, 2014; Williams et al., 2015
Politicised issue	Aykut et al., 2012; Carvalho, 2007; Dirikx & Gelders, 2010; Jaspal et al., 2016; Rick et al., 2011

## Considerations and conclusion

The analysis of the literature leads to reflect upon the multiplicity of actors and stakeholders that play a role in influencing public perception of climate change. The literature review proposed above shows interdependences between science, politics, media and public perception (Weingart et al., 2000). In turn, these four spheres are embedded in a wider context (physical, social, economic, cultural) that produces influences on them and are also likely to be influenced by external actors who defend their interests. In light of these reflections, it is possible to describe both multilevel and overlapping processes of communication/reception of climate change-related messages that contribute towards constructing public opinion. At a first level, scientists produce a multiplicity of evidences that might also be contradictory. At a second level, policy-makers stay in the middle of several forces and they have to take decisions in this uncertain context. At the same time, political actors can be influenced by a number of factors such as economic power, technological know-how, positions and alliance structures in international organizations, possession of resources (Kunelius & Eide, 2012). Their decisions might be also conditioned by the need for electoral support, thus accommodating both public opinion and economic interests. In turn, this might reinforce public opinion, and influence the minorities or by contrast generate opposition. This means that public opinion might result from political reluctance to implement legislation that might produce discontent amongst electorates and economic bodies (that, in turn, have interests in supporting those electorates) (Capstick et al., 2015; Lorenzoni & Pidgeon, 2006; Weingart et al., 2000). From this, it seems that uncertainty generates uncertainty in a vicious cycle from which economic/political interests might take advantages.

At a third level, different kinds of mediators, e.g. communicators, journalists, activists, might increase this uncertainty because they are voluntarily or involuntarily influenced by their own opinion (and social-cultural backgrounds) and codes in communicating climate change-related information. Moreover, some powerful economic stakeholders might have interests in defending pro/anti-environmental values. Hence, even these mediators tend to promote specific values amongst the general public by also referring to scientific sources that might support their position. Journalistic media reporting is influenced by multiple needs, such as reporting objective information, making them attractive through effective narrative, and being economically supported (Dahlstrom, 2014). The journalistic performance might result from the relationship between media and state power, between media and the political system, between media and the market (Kunelius & Eide, 2012). The need for quickly reporting news might conflict with the long time required for contacting scientists, who are

not always willing to dialogue with them. Moreover, new forms of journalism are emerging, based not only on traditional official sources of information, but also on information retrieved on social networks (Hermida, 2010). This means that, social network users can contribute towards constructing the news as direct witnesses who inform journalists and other audiences on on-going events.

In the middle of this complexity, there exists a 'space between' in which science, media and politics intersect generating knowledge about climate change, which in turn is interpreted and communicated by the media (as 'mediating' forces, see Boykoff, 2011) to the general public. In this space, the media combine different insights (from science, politics and the other media) (Smith, 2005) into messages characterised by specific codes, styles and contents. However, this inter-level interaction is not always linear, and might contribute towards generating 'interferences of discourse' (Weingart et al., 2000). From their part (fourth level), the general public and single individuals are called to interpret the huge amount of contradictory information received or searched. In addition to the three main sources of information identified here, a number of information are also spread by NGOs, and grass-roots movements (see DeLuca, 2009), and other Internet users engaged in discussing climate change-related issues (Cody et al., 2015; Williams et al., 2015). In deconstructing information these individuals are in turn influenced by both a number of personal/contextual characteristics (from personal worldviews, values and ideologies to demographic characteristics, social and cultural backgrounds, their geographical location, social/cultural/economic context in which they live etc.) and their social networks (which can contribute towards either polarising existent positions or generating doubts). They might also be influenced by both the kind and format of messages they receive (which e.g. discredit or support scientific theories), by the source of information (judged as more or less reliable), and by their perception about potential benefits deriving from supporting one position instead of another. The fact that the literature review highlighted interdependences between offline and online media content in terms of claim-makers and content, but also showing similar criticalities (in terms of contrasting results especially in relation to public perception), supports the hypothesis that similar 'power mechanisms' are at the base of media communication/interaction around climate change. In fact, while the web offers greater space for interaction and a variety of sources (both advocate and sceptic), the prevalence of the 'old media' narratives seems to undermine these attempts.

This also highlights the need for further exploring the 'space between' in which different actors and diverse interests converge (including the media



ones) producing climate narratives and influencing public understanding of climate change. Moreover, as highlighted by Schäfer (2012), there is still a need to investigate some unanswered questions related to i) the effects produced by new media on problem awareness, which is not only related to the number of ‘clicks’ or visualisation, but also to the ‘qualitative’ analysis of discourses that surround climate change; ii) the relationships between type of Internet use and knowledge of the phenomenon (voluntarily or involuntarily); and iii) the effects produced by social media on behavioural changes.

## References

- AKERLOF, K., MAIBACH, E. W., FITZGERALD, D., CEDENO, A. Y., & NEUMAN, A. (2013). Do people ‘personally experience’ global warming, and if so how, and does it matter? *Global Environmental Change*, 23(1), pp. 81–91. Available from: <https://doi.org/10.1016/j.gloenvcha.2012.07.006>
- ANDEREGG, W. R. L. & GOLDSMITH, G. R. (2014). Public interest in climate change over the past decade and the effects of the ‘climategate’ media event. *Environmental Research Letters*, 9, 54005. Available from: <https://doi.org/10.1088/1748-9326/9/5/054005>
- ANTILLA, L. (2005). Climate of scepticism: US newspaper coverage of the science of climate change. *Global Environmental Change*, 15(4), pp. 338–352. Available from: <https://doi.org/10.1016/j.gloenvcha.2005.08.003>
- ARCILA-CALDERÓN, C., MERCADO, M. T., PIÑUEL-RAIGADA, J. L., & SUÁREZ-SUCRE, E. (2015). Media coverage of climate change in Spanish-speaking online media. *Convergencia*, 22(68), pp. 71–95. Available from: <http://www.scopus.com/inward/record.url?eid=2-s2.0-84932190822&partnerID=tZOtx3y1>
- ARLT, D., HOPPE, I., & WOLLING, J. (2011). Climate change and media usage: Effects on problem awareness and behavioural intentions. *International Communication Gazette*, 73(1-2), pp. 45–63. Available from: <https://doi.org/10.1177/1748048510386741>
- ASKANIUS, T. & ULDAM, J. (2011). Online social media for radical politics: Climate change activism on YouTube. *International Journal of Electronic Governance*, 4(1-2), pp. 69–84. Available from: <https://doi.org/10.1504/IJEG.2011.041708>
- ASPLUND, T. (2014). Natural versus anthropogenic climate change: Swedish farmers’ joint construction of climate perceptions. *Public Understanding of Science*, 25(5), pp. 560–575. Available from: <https://doi.org/10.1177/0963662514559655>
- ASPLUND, T., HJERPE, M., & WIBECK, V. (2013). Framings and coverage of climate change in Swedish specialized farming magazines. *Climatic Change*, 117(1-2), pp. 197–209. Available from: <https://doi.org/10.1007/s10584-012-0535-0>

AYKUT, S. C., COMBY, J., & GUILLEMOT, H. (2012). Climate change controversies in French mass media 1990-2010. *Journalism Studies*, 13(2), pp. 157–174. Available from: <https://doi.org/10.1080/1461670X.2011.646395>

BALLANTYNE, A. G. (2016). Climate change communication: what can we learn from communication theory? *Wiley Interdisciplinary Reviews: Climate Change*, 7 (June). Available from: <https://doi.org/10.1002/wcc.392>

BLANCO CASTILLA, E., QUESADA, M., & TERUEL RODRÍGUEZ, L. (2013). From Kyoto to Durban. Mass media editorial position about climate change. *Revista Latina de Comunicacion Social*, 68, pp. 420–435. Available from: <https://doi.org/10.4185/RLCS-2013-983en>

BOSCH, T. (2012). Blogging and tweeting climate change in South Africa. *Ecquid Novi-African Journalism Studies*, 33(1), pp. 44–53. Available from: <https://doi.org/10.1080/02560054.2011.636825>

BOYKOFF, M. T., & BOYKOFF, J. M. (2004). Balance as bias: Global warming and the US prestige press. *Global Environmental Change*, 14(2), pp. 125–136. Available from: <https://doi.org/10.1016/j.gloenvcha.2003.10.001>

BOYKOFF, M. T. (2011). *Who speaks for the climate? Making sense of media reporting on climate change*. Cambridge, Cambridge University Press.

BOYKOFF, M. T. (2014). Media discourse on the climate slowdown. *Nature Climate Change*, 4, pp. 156–158. Available from: <https://doi.org/10.1038/nclimate2156>

CAPSTICK, S. B., & PIDGEON, N. F. (2014). What is climate change scepticism? Examination of the concept using a mixed methods study of the UK public. *Global Environmental Change*, 24(1), pp. 389–401. Available from: <https://doi.org/10.1016/j.gloenvcha.2013.08.012>

CARVALHO, A. (2007). Ideological cultures and media discourses on scientific knowledge: Re-reading news on climate change. *Public Understanding of Science*, 16(2), pp. 223–243. Available from: <https://doi.org/10.1177/0963662506066775>

CARVALHO, A. (2010). Media(ted) discourses and climate change: A focus on political subjectivity and (dis)engagement. *Wiley Interdisciplinary Reviews: Climate Change*, 1(2), pp. 172–179. Available from: <https://doi.org/10.1002/wcc.13>

CODY, E. M., REAGAN, A. J., MITCHELL, L., DODDS, P. S., & DANFORTH, C. M. (2015). Climate change sentiment on Twitter: An unsolicited public opinion poll. *Public Library of Science*, 10(8), pp. 1–18. Available from: <https://doi.org/10.1371/journal.pone.0136092>

CONNOR, P., HARRIS, E., GUY, S., FERNANDO, J., SHANK, D. B., KURZ, T., BAIN, P. G., & KASHIMA, Y. (2016). Interpersonal communication about climate change: How messages change when communicated through simulated online social networks. *Climatic Change*, 136(3-4), pp. 463–476. Available from: <https://doi.org/10.1007/s1058>

COOPER, C. B. (2011). Media literacy as a key strategy toward improving public acceptance of climate change science. *BioScience*, 61(3), pp. 231–237. Available from: <https://doi.org/10.1525/bio.2011.61.3.8>

DAHLSTROM, M. F. (2014). Using narratives and storytelling to communicate science with nonexpert audiences. *Proceedings of the National Academy of Sciences of the United States of America*, 111(Supplement\_4), pp. 13614–13620. Available from: <https://doi.org/10.1073/pnas.1320645111>

DELUCA, K. M. (2009). Greenpeace international media analyst reflects on communicating climate change. *Environmental Communication: A Journal of Nature and Culture*, 3(2), pp. 263–269. Available from: <https://doi.org/10.1080/17524030902972734>

DIRIKX, A. & GELDERS, D. (2010). Ideologies overruled? An explorative study of the link between ideology and climate change reporting in Dutch and French newspapers. *Environmental Communication: A Journal of Nature and Culture*, 4(2), pp. 190–205. Available from: <https://doi.org/10.1080/17524031003760838>

DOW, K. (2010). News coverage of drought impacts and vulnerability in the US Carolinas, 1998–2007. *Natural Hazards*, 54(2), pp. 497–518. Available from: <https://doi.org/10.1007/s11069-009-9482-0>

ELGESEM, D., STESKAL, L., & DIAKOPOULOS, N. (2015). Structure and content of the discourse on climate change in the blogosphere: The big picture. *Environmental Communication*, 9(2), pp. 169–188. Available from: <https://doi.org/10.1080/17524032.2014.983536>

ELSASSER, S. W. & DUNLAP, R. E. (2012). Leading voices in the denier choir: Conservative columnists' dismissal of global warming and denigration of climate science. *American Behavioral Scientist*, 57(6), pp. 754–776. Available from: <https://doi.org/10.1177/0002764212469800>

FELDMAN, L. (2013). Cloudy with a chance of heat balls: The portrayal of global warming on The Daily Show and The Colbert Report. *International Journal of Communication*, 7(1), pp. 430–451. Available from: <http://ijoc.org/index.php/ijoc/article/view/1940>

FELDMAN, L., MAIBACH, E. W., ROSER-RENOUF, C., & LEISEROWITZ, A. (2012). Climate on cable: The nature and impact of global warming coverage on Fox News, CNN, and MSNBC. *The International Journal of Press/Politics*, 17(1), pp. 3–31. Available from: <https://doi.org/10.1177/1940161211425410>

FELDMAN, L., MYERS, T. A., HMIELOWSKI, J. D., & LEISEROWITZ, A. (2014). The mutual reinforcement of media selectivity and effects: Testing the reinforcing spirals framework in the context of global warming. *Journal of Communication*, 64(4), pp. 590–611. Available from: <https://doi.org/10.1111/jcom.12108>

GAVIN, N. T. (2010). Pressure group direct action on climate change: The role of the media and the web in Britain – a case study. *British Journal of Politics and International Relations*, 12(3), pp. 459–475. Available from: <https://doi.org/10.1111/j.1467-856X.2010.00411.x>

GAVIN, N. T., LEONARD-MILSOM, L., & MONTGOMERY, J. (2011). Climate change, flooding and the media in Britain. *Public Understanding of Science*, 20(3), pp. 422–438. Available from: <https://doi.org/10.1177/0963662505XXXXXX>

GAVIN, N. T. & MARSHALL, T. (2011). Mediated climate change in Britain: Scepticism on the web and on television around Copenhagen. *Global Environmental Change*, 21(3), pp. 1035–1044. Available from: <https://doi.org/10.1016/j.gloenvcha.2011.03.007>

GOODE, E. & BEN-YEHUDA, N. (2009). *Moral panics: The social construction of deviance*. Malden, MA, Blackwell.

GUNSTER, S. (2011). Covering Copenhagen: Climate change in BC media. *Canadian Journal of Communication*, 36(3), pp. 477–502. Available from: <https://doi.org/10.22230/cjc.2011v36n3a2367>

HALL, S., CRITCHER, C., JEFFERSON, T., CLARKE, J., & BRIAN, R. (1978). *Policing the crisis: Mugging, the state, and law and order*. London, Macmillan.

HART, P. S. & NISBET, E. C. (2012). Boomerang effects in science communication: How motivated reasoning and identity cues amplify opinion polarization about climate mitigation policies. *Communication Research*, 39(6), pp. 701–723. Available from: <https://doi.org/10.1177/0093650211416646>

HAWKINS, E., EDWARDS, T., & MCNEALL, D. (2014). Pause for thought. *Nature Climate Change*, 4, pp. 154–156. Available from: <https://doi.org/10.1038/nclimate2150>

HELLSTEN, I. & VASILEIADOU, E. (2015). The creation of the climategate hype in blogs and newspapers: Mixed methods approach. *Internet Research*, 25(4), pp. 589–609. Available from: <https://doi.org/10.1108/IntR-05-2014-0130>

HERMIDA, A. (2010). Twittering the news. *Journalism Practice*, 4(3), pp. 297–308. Available from: <https://doi.org/10.1080/17512781003640703>

HIDALGO, M. C., CASADO, F., & GARC A-LEIVA, P. (2014). Communicating climate change: Improving the effectiveness of public campaigns. *Escritos de Psicología / Psychological Writings*, 7(2), pp. 28–35. Available from: <https://doi.org/10.5231/psy.writ.2014.2603>

HMIELOWSKI, J. D., FELDMAN, L., MYERS, T. A., LEISEROWITZ, A., & MAIBACH, E. (2013). An attack on science? Media use, trust in scientists, and perceptions of global warming. *Public Understanding of Science*, 23(7), pp. 1–18. Available from: <https://doi.org/10.1177/0963662513480091>

HMIELOWSKI, J. D. & NISBET, E. C. (2016). 'Maybe yes, maybe no?': Testing the indirect relationship of news use through ambivalence and strength of policy position on public engagement with climate change. *Mass Communication and Society*, 19(5), pp. 650–670. Available from: <https://doi.org/10.1080/15205436.2016.1183029>

HÖIJER, B. (2010). Emotional anchoring and objectification in the media reporting on climate change. *Public Understanding of Science*, 19(6), pp. 717–731. Available from: <https://doi.org/10.1177/0963662509348863>

HOLLIMAN, R. (2011). Advocacy in the tail: Exploring the implications of 'climategate' for science journalism and public debate in the digital age. *Journalism*, 12(7), pp. 832–846. Available from: <https://doi.org/10.1177/1464884911412707>

HOLMBERG, K. & HELLSTEN, I. (2011). Integrating and differentiating meanings in tweeting about the fifth Intergovernmental Panel on Climate Change (IPCC) Report. *First Monday*, 21(9-5), pp. 1–10.

HOLMBERG, K. & HELLSTEN, I. (2015). Gender differences in the climate change communication on Twitter. *Internet Research*, 25(5), pp. 811–828. Available from: <https://doi.org/10.1108/IntR-07-2014-0179>

HOLMBERG, K. & HELLSTEN, I. (2016). Twitter campaigns around the Fifth IPCC Report: Campaign spreading, shared hashtags, and separate communities. *SAGE Open*, 6(3), pp. 1–7. Available from: <https://doi.org/10.1177/2158244016659117>

JACOBSEN, G. D. (2011). The Al Gore effect: An Inconvenient Truth and voluntary carbon offsets. *Journal of Environmental Economics and Management*, 61(1), pp. 67–78. Available from: <https://doi.org/10.1016/j.jeem.2010.08.002>

JASPAL, R., NERLICH, B., & VAN VUUREN, K. (2016). Embracing and resisting climate identities in the Australian press: Sceptics, scientists and politics. *Public Understanding of Science*, 25(7), pp. 807–824. Available from: <https://doi.org/10.1177/0963662515584287>

JASPAL, R., TURNER, A., & NERLICH, B. (2014). Fracking on YouTube: Exploring risks, benefits and human values. *Environmental Values*, 23(5), pp. 501–527. Available from: <https://doi.org/10.3197/096327114X13947900181473>

JUN, J. (2011). How climate change organizations utilize web-sites for public relations. *Public Relations Review*, 37(3), pp. 245–249. Available from: <https://doi.org/10.1016/j.pubrev.2011.04.001>

KIRILENKO, A. P., MOLODTSOVA, T., & STEPCHENKOVA, S. O. (2015). People as sensors: Mass media and local temperature influence climate change discussion on Twitter. *Global Environmental Change*, 30, pp. 92–100. Available from: <https://doi.org/10.1016/j.gloenvcha.2014.11.003>

KIRILENKO, A. P., & STEPCHENKOVA, S. O. (2012). Climate change discourse in mass media: Application of computer-assisted content analysis. *Journal of*

*Environmental Studies and Sciences*, 2(2), pp. 178–191. Available from: <https://doi.org/10.1007/s13412-012-0074-z>

KOTEYKO, N., JASPAL, R., & NERLICH, B. (2013). Climate change and ‘climategate’ in online reader comments: A mixed methods study. *Geographical Journal*, 179(1), pp. 74–86. Available from: <https://doi.org/10.1111/j.1475-4959.2012.00479.x>

KUNELIUS, R. & EIDE, E. (2012). Moment of hope, mode of realism: On the dynamics of a transnational journalistic field during un climate change summits. *International Journal of Communication*, 6(1), pp. 266–285.

LANG, C. (2014). Do weather fluctuations cause people to seek information about climate change? *Climatic Change*, 125(3-4), pp. 291–303. Available from: <https://doi.org/10.1007/s10584-014-1180-6>

LEAS, E. C., ALTHOUSE, B. M., DREDZE, M., OBRADOVICH, N., FOWLER, J. H., NOAR, S. M., ALLEM, J. P., & AYERS, J. W. (2016). Big data sensors of organic advocacy: The case of Leonardo DiCaprio and climate change. *PLOS ONE*, 11(8), pp. 1–9. Available from: <https://doi.org/10.1371/journal.pone.0159885>

LEISEROWITZ, A. A., MAIBACH, E. W., ROSER-RENOUF, C., FEINBERG, G., & HOWE, P. (2013). *Global warming’s six Americas in September 2012*. New Haven, CT, Yale University and George Mason University. Available from: <http://environment.yale.edu/climate/publications/Six-Americas-September2012>

LINEMAN, M., DO, Y., KIM, J. Y., & JOO, G. J. J. (2015). Talking about climate change and global warming. *PLOS ONE*, 10(9), pp. 1–12. Available from: <https://doi.org/10.1371/journal.pone.0138996>

LIU, X., LINDQUIST, E., & VEDLITZ, A. (2011). Explaining media and congressional attention to global climate change, 1969-2005: An empirical test of agenda-setting theory. *Political Research Quarterly*, 64(642), pp. 405–419. Available from: <https://doi.org/10.1177/1065912909346744>

LOPERA, E. & MORENO, C. (2014). The uncertainties of climate change in Spanish daily newspapers: Content analysis of press coverage from 2000 to 2010. *Journal of Science Communication*, 13(1), pp. 1–18.

LÖRCHER, I. & NEVERLA, I. (2015). The dynamics of issue attention in online communication on climate change. *Media and Communication*, 3(1), pp. 17–33. Available from: <https://doi.org/10.17645/mac.v3i1.253>

LORENZONI, I. & PIDGEON, N. F. (2006). Public views on climate change: European and USA perspectives. *Climatic Change*, 77(1-2), pp. 73–95. Available from: <https://doi.org/10.1007/s10584-006-9072-z>

MCROBBIE, A. & THORNTON, S. L. (1995). Rethinking ‘moral panic’ for multi-mediated social worlds. *The British Journal of Sociology*, 46(4), pp. 559–574. Available from: <https://www.jstor.org/stable/591571>



MIAH, M. D., KABIR, M. H., KOIKE, M., & AKTHER, S. (2011). Major climate-change issues covered by the daily newspapers of Bangladesh. *Environmentalist*, 31(1), pp. 67–73. Available from: <https://doi.org/10.1007/s10669-010-9305-6>

MORTON, T. A., RABINOVICH, A., MARSHALL, D., & BRETSCHNEIDER, P. (2011). The future that may (or may not) come: How framing changes responses to uncertainty in climate change communications. *Global Environmental Change*, 21(1), pp. 103–109. Available from: <https://doi.org/10.1016/j.gloenvcha.2010.09.013>

NAMUKOMBO, J. (2016). Information and communication technologies and gender in climate change and green economy: Situating women's opportunities and challenges in Zambian policies and strategies. *Jàmà: Journal of Disaster Risk Studies*, 8(3), pp. 1–7. Available from: <https://doi.org/10.4102/jamba.v8i3.243>

National Science Board (2016). *Science & Engineering Indicators 2016*. Available from: <https://www.nsf.gov/statistics/2018/nsb20181/assets/404/science-and-technology-public-attitudes-and-understanding.pdf> [Accessed 10th October 2017].

NERLICH, B., KOTEYKO, N., & BROWN, B. (2010). Theory and language of climate change communication. *WIREs Climate Change*, 1(1), pp. 97–110. Available from: <https://doi.org/10.1002/wcc.2>

NEWELL, R. & DALE, A. (2015). Meeting the climate change challenge (MC3): The role of the Internet in climate change research dissemination and knowledge mobilization. *Environmental Communication*, 9(2), pp. 208–227. Available from: <https://doi.org/10.1080/17524032.2014.993412>

NEWMAN, T. P. (2016). Tracking the release of IPCC AR5 on Twitter: Users, comments, and sources following the release of the Working Group I summary for policymakers. *Public Understanding of Science*, 26(7), pp. 815–825. Available from: <https://doi.org/10.1177/0963662516628477>

OLAUSSON, U. (2011). 'We're the ones to blame': Citizens' representations of climate change and the role of the media. *Environmental Communication*, 5(3), pp. 281–299. Available from: <https://doi.org/10.1080/17524032.2011.585026>

O'NEILL, S. J., BOYKOFF, M. T., NIEMEYER, S., & DAY, S. A. (2013). On the use of imagery for climate change engagement. *Global Environmental Change*, 23(2), pp. 413–421. Available from: <https://doi.org/10.1016/j.gloenvcha.2012.11.006>

PEARCE, W., HOLMBERG, K., HELLSTEN, I., & NERLICH, B. (2014). Climate change on Twitter: Topics, communities and conversations about the 2013 IPCC Working Group 1 report. *PLOS ONE*, 9(4), pp. 1–11. Available from: <https://doi.org/10.1371/journal.pone.0094785>

PAINTER, J. & ASHE, T. (2012). Cross-national comparison of the presence of climate scepticism in the print media in six countries, 2007–10. *Environmental Research Letters*, 7(4), pp. 1–8. Available from: <https://doi.org/10.1088/1748-9326/7/4/044005>

POORTINGA, W., SPENCE, A., WHITMARSH, L., CAPSTICK, S., & PIDGEON, N. F. (2011). Uncertain climate: An investigation into public scepticism about anthropogenic climate change. *Global Environmental Change*, 21(3), pp. 1015–1024. Available from: <https://doi.org/10.1016/j.gloenvcha.2011.03.001>

PORTEN-CHE, P. & EILDERS, C. (2015). Spiral of silence online: How online communication affects opinion climate perception and opinion expression regarding the climate change debate. *Studies in Communication Sciences*, 15(1), pp. 143–150. Available from: <https://doi.org/10.1016/j.scoms.2015.03.002>

PORTER, A. J. & HELLSTEN, I. (2014). Investigating participatory dynamics through social media using a multideterminant ‘frame’ approach: The case of climategate on YouTube. *Journal of Computer Mediated Communication*, 19(4), pp. 1024–1041. Available from: <https://doi.org/10.1111/jcc4.12065>

RICK, U. K., BOYKOFF, M. T., & PIELKE J. R. (2011). Effective media reporting of sea level rise projections: 1989-2009. *Environmental Research Letters*, 6(1), pp. 1–5. Available from: <https://doi.org/10.1088/1748-9326/6/1/014004>

ROOSVALL, A. & TEGELBERG, M. (2015). Media and the geographies of climate justice: Indigenous peoples, nature and the geopolitics of climate change. *tripleC*, 13(1), pp. 39–54. Available from: <https://doi.org/10.31269/triplec.v13i1.654>

RUIZ SINOGA, J. D. & LEÓN GROSS, T. (2013). Droughts and their social perception in the mass media (southern Spain). *International Journal of Climatology*, 33(3), pp. 709–724. Available from: <https://doi.org/10.1002/joc.3465>

RUSSILL, C. (2009). Stephen Schneider and the ‘double ethical bind’ of climate change communication. *Bulletin of Science, Technology & Society*, 30(1), pp. 60–69. Available from: <https://doi.org/10.1177/0270467609355055>

SCH FER, M. S. (2012). Online communication on climate change and climate politics: A literature review. *WIREs Climate Change*, 3(6), pp. 527–543. Available from: <https://doi.org/10.1002/wcc.191>

SCH FER, M. S. (2016). Climate change communication in Germany. *Climate Science: Oxford Research Encyclopedias*. Available from: <https://doi.org/10.1093/acrefore/9780190228620.013.448>

SCH FER, M. S., IVANOVA, A., & SCHMIDT, A. (2013). What drives media attention for climate change? Explaining issue attention in Australian, German and Indian print media from 1996 to 2010. *International Communication Gazette*, 76(2), pp. 152–176. Available from: <https://doi.org/10.1177/1748048513504169>

SEGERBERG, A. & BENNETT, W. L. L. (2011). Social media and the organization of collective action: Using Twitter to explore the ecologies of two climate change protests. *The Communication Review*, 14(3), pp. 197–215. Available from: <https://doi.org/10.1080/10714421.2011.597250>



SMITH, J. (2005). Dangerous news: Media decision making about climate change risk. *Risk Analysis*, 25(6), pp. 1471–1482. Available from: <https://doi.org/10.1111/j.1539-6924.2005.00693.x>

SOMERVILLE, R. C. J. & HASSOL, S. J. (2011). Communicating the science of climate change. *Physics Today*, 64(10), pp. 48–53. Available from: <https://doi.org/10.1063/PT.3.1296>

SPARTZ, J. T., YI-FAN SU, L., GRIFFIN, R., BROSSARD, D., & DUNWOODY, S. (2015). YouTube, social norms and perceived salience of climate change in the American mind. *Environmental Communication*, 12(1), pp. 1–16. Available from: <https://doi.org/10.1080/17524032.2015.1047887>

SPECK, D. L. (2010). A hot topic? Climate change mitigation policies, politics, and the media in Australia. *Human Ecology Review*, 17(2), pp. 125–134. Available from: <https://www.jstor.org/stable/24707660>

SPENCE, A., VENABLES, D., PIDGEON, N., POORTINGA, W. (2010). Public perceptions of climate change and energy futures in Britain: Summary findings of a survey conducted from January to March 2010. *Understanding Risk Working Paper*, pp. 1–28. Available from: [http://psych.cf.ac.uk/understandingrisk/docs/final\\_report.pdf](http://psych.cf.ac.uk/understandingrisk/docs/final_report.pdf)

STODDART, M. C. J., HALUZA-DELAY, R., & TINDALL, D. B. (2015). Canadian news media coverage of climate change: Historical trajectories, dominant frames and international comparisons. *Environmental Politics*, 24(3), pp. 218–232. Available from: <https://doi.org/10.1080/08941920.2015.1054569>

STODDART, M. C. J. & TINDALL, D. B. (2015). Canadian news media and the cultural dynamics of multilevel climate governance. *Environmental Politics*, 24(3), pp. 401–422. Available from: <https://doi.org/10.1080/09644016.2015.1008249>

STOKES, B., WIKE, R., & POUSHTER, J. (2016). Europeans face the world divided. *Pew Research Centre*. Available from: [www.pewresearch.org](http://www.pewresearch.org) [Accessed 20th December 2016].

TADDICKEN, M. (2013). Climate change from the user's perspective: The impact of mass media and Internet use and individual and moderating variables on knowledge and attitudes. *Journal of Media Psychology*, 25, pp. 39–52. Available from: <https://doi.org/10.1027/1864-1105/a000080>

TAYLOR, A., DE BRUIN, W. B., & DESSAI, S. (2014). Climate change beliefs and perceptions of weather-related changes in the United Kingdom. *Risk Analysis*, 34(11), pp. 1995–2004. Available from: <https://doi.org/10.1111/risa.12234>

THORNTON, S. L. (1994). Moral panic, the media and British rave culture. In: A. Ross & T. Rose, *Microphone friends. Youth music and youth culture*, 1st ed. New York, Routledge, pp. 176–192.

ULDAM, J. (2013). Activism and the online mediation opportunity structure: Attempts to impact global climate change policies? *Policy and Internet*, 5(1), pp. 56–75. Available from: <https://doi.org/10.1002/poi3.22>

ULDAM, J. & ASKANIUS, T. (2013). Online civic cultures: Debating climate change activism on YouTube. *International Journal of Communication*, 7, pp. 1185–1204. Available from: <http://ijoc.org/index.php/ijoc/article/view/1755>

VELTRI, G. A. & ATANASOVA, D. (2015). Climate change on Twitter: Content, media ecology and information sharing behaviour. *Public Understanding of Science*, 26(6), pp. 721–737. Available from: <https://doi.org/10.1177/0963662515613702>

VRAGA, E. K., ANDERSON, A. A., KOTCHER, J. E., & MAIBACH, E. W. (2015). Issue-specific engagement: How Facebook contributes to opinion leadership and efficacy on energy and climate issues. *Journal of Information Technology & Politics*, 12(2), pp. 200–218. Available from: <https://doi.org/10.1080/19331681.2015.1034910>

WARD, R. E. T. (2010). Adapting our cities for future climates: 17 February 2010. *Weather*, 65(11), pp. 307–309. Available from: <https://doi.org/10.1002/wea.602>

WEBER, E. U. (2010). What shapes perceptions of climate change? *WIREs Climate Change*, 1(3), pp. 332–342. Available from: <https://doi.org/10.1002/wcc.41>

WEINGART, P., ENGELS, A., & PANSEGRAU, P. (2000). Risks of communication: Discourses on climate change in science, politics, and the mass media. *Public Understanding of Science*, 9(3), pp. 261–283. Available from: <https://doi.org/10.1088/0963-6625/9/3/304>

WHITMARSH, L. (2011). Scepticism and uncertainty about climate change: Dimensions, determinants and change over time. *Global Environmental Change*, 21(2), pp. 690–700. Available from: <https://doi.org/10.1016/j.gloenvcha.2011.01.016>

WIBECK, V. (2014). Enhancing learning, communication and public engagement about climate change – some lessons from recent literature. *Environmental Education Research*, 20(October), pp. 387–411. Available from: <https://doi.org/10.1080/13504622.2013.812720>

WILLIAMS, H. T. P., MCMURRAY, J. R., KURZ, T. K., & LAMBERT, F. H. (2015). Network analysis reveals open forums and echo chambers in social media discussions of climate change. *Global Environmental Change*, 32, pp. 126–138. Available from: <https://doi.org/10.1016/j.gloenvcha.2015.03.006>

ZHAO, X., LEISEROWITZ, A. A., MAIBACH, E. W., & ROSER-RENOUF, C. (2011). Attention to science/environment news positively predicts and attention to political news negatively predicts global warming risk perceptions and policy support. *Journal of Communication*, 61(4), pp. 713–731. Available from: <https://doi.org/10.1111/j.1460-2466.2011.01563.x>