The Routledge Companion to Environmental Planning

Edited by Simin Davoudi, Richard Cowell, Iain White and Hilda Blanco

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

19

Anthropocene communications

Cultural politics and media representations of climate change[1]

Marisa B. McNatt, Michael K. Goodman and Maxwell T. Boykoff

Introduction

Over the past years, the number of *Reuters* stories about climate change has declined. This trend has been consistent with trends across other media outlets globally (see Figure 19.1) due largely to political economic trends of shrinking newsrooms and fewer specialist reporters covering climate stories with the same frequency as before. In 2010, the *Wall Street Journal* and the *Christian Science Monitor* closed their environmental blogs. Three years later, in January 2013, the *New York Times* dismantled its environment desk, assigning the reporters and editors to other departments, and discontinued its 'Green blog' two months later. Yet, initially, *Reuters* had largely bucked those trends, continuing to employ top climate and environment reporters from around the globe, including Deborah Zabarenko (North America), Alister Doyle (Europe) and David Fogerty (Asia) who fed top media organisations with reporting comprised of a steady diet of climate and environment stories. So why this subsequent and precipitous drop in *Reuters* coverage of climate change? In July 2013, David Fogerty – who left *Reuters* in late 2012 – took to *The Baron* blog to explain why. He recounted that, after the appointment of editor Paul Ingrassia in 2011, editorial decisions were made to deprioritise climate stories and to shift these specialists to different beats. Fogerty, for example, was moved from the climate beat to instead cover issues around shipping in the Asian region. While climate stories had been already declining upon the appointment of Ingrassia, many argued that his revamping of the *Reuters* reporting priorities served to accelerate this drop.

Crucially, Fogerty and others asserted that Ingrassia's ideological and political leanings also played a detrimental part in continued coverage (Fogerty, 2013). As such, in the summer of 2013, *Reuters* climate reporting faced deep levels of criticism and dismay from journalism colleagues and media critics and consumers. For example, journalist Alex Sobel Fitts at *Columbia Journalism Review* attributed variations in content and quantity to this new editorial turn (2013). And Max Greenberg at *Media Matters* framed this drop in coverage as a consequence of a 'climate of fear' imposed by new contrarian editorial influences (2013).

Thus, while the specific situation with *Reuters* provides a worrisome glimpse into the contentious and high-stakes arena of global reporting on climate change in the 21st century, what

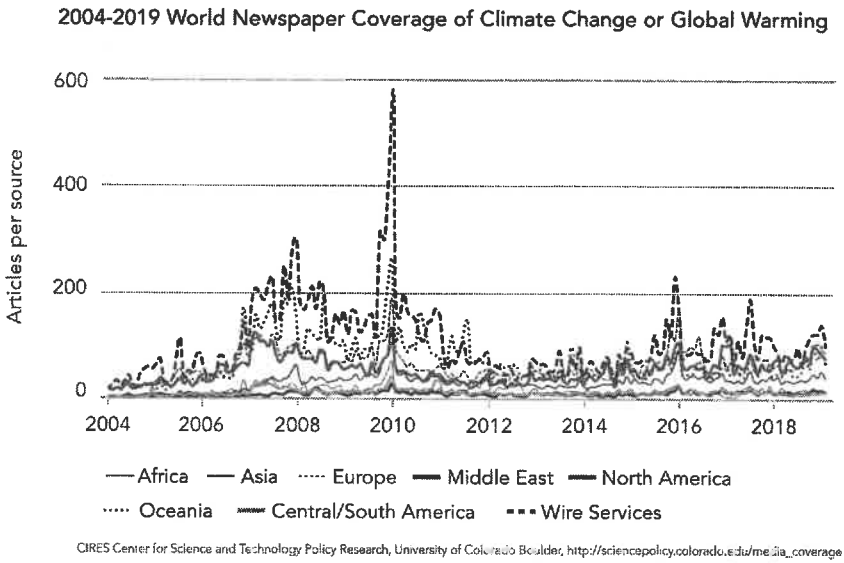

Figure 19.1 World newspaper coverage of climate change 2004–19

Source: Authors' own

it shows more generally is the way that environmental communication in the context of climate politics is thoroughly enmeshed in a combination of large-scale social, political and economic factors connected up with smaller-scale power-laden editorial decision making, steeped in cultural economy and ideology.

Simultaneously, digital and social media are stepping into these spaces. This chapter explores key questions that arise regarding how the general decline in specialised reporting on climate change and rise in social media impacts overall quantity and quality of coverage as well as inputs into public awareness and engagement.

Most citizens around the world typically do not read peer reviewed literature. Instead, to learn about climate change, people in the public arena turn to media communications – television, newspapers, radio, new and social media – to link formal science and policy with their everyday lives. Over the past decades, the dynamics of science and politics have clearly shaped media coverage of climate change. Yet, it is also worth noting and considering how 'news' – generated by mass media – has, in turn, shaped ongoing scientific and political considerations, deliberations and decisions. In other words, it is instructive to account for how mass media have influenced who has a say, when and how in the public arena.

'The media' around the world are actually much more heterogeneous and varied than at first glance. In their multiple dimensions, media are constituted by many institutions, processes and practices that together serve as 'mediating' forces between communities such as science, policy and civil society. Media segments, articles, clips and pieces represent critical links between people's everyday realities and experiences and the ways in which these are discussed at a distance between science, policy and public actors. People throughout society rely upon media representations to help interpret and make sense of the many complexities relating to climate science

and governance. Thus, media messages are critical inputs to what become public discourse on current climate challenges.

Yet, these media representations enter into an individual's pre-existing perceptions and perspectives and are taken up or resisted in varied ways. For example, Wouter Poortinga and colleagues (2011) have found that people's enduring values and existing ideologies strongly influence their understandings and behaviours as they relate to climate change. Indeed, as Lorraine Whitmarsh put it in summarising her research on climate contrarianism 'attitudes to climate change are relatively entrenched and ... information about the issue will be evaluated and used in diverse ways according to individuals' values and worldviews'. She concluded:

> [S]imply providing climate change information is unlikely to be successful, as new information is often interpreted by people in line with their existing attitudes and worldviews ... In other words, irrespective of how much information is provided, it is remarkably difficult to change attitudes that have become entrenched.
>
> *(Whitmarsh, 2011, p. 698)*

These dynamic science-policy-media-public interactions have been spaces where claims makers in the media have been changing (for example, Baum and Groeling, 2008; Fahy and Nisbet, 2011), and traditional media outlets have faced newfound challenges (Boykoff and Yulsman, 2013; Siles and Boczkowski, 2012) while shifts to new/digital/social media tools have recalibrated who has a say and how these claims circulate (Baek et al., 2012; Cacciatore et al., 2012). Traditional and legacy media organisations themselves have worked to adapt to these changing conditions and researchers have increasingly sought to make sense of the shifts (for example, Horan, 2013; Nielsen, 2012) and their implications (for example, Jacobson, 2012) in various cultural, political, social and environmental contexts (for example, Adams and Gynnild, 2013; Schuurman, 2013).

In recent decades, there has been significant expansion from traditional mass media into consumption of social and digital media. Essentially, in tandem with technological advances, this expansion in communications is seen to be a fundamental shift from broadcast, or 'one-to-many' (often one-way) communications to 'many-to-many' more interactive webs of communications (O'Neill and Boykoff, 2010; van Dijk, 2006). This movement has signalled substantive changes in how people access and interact with information and who has access.

Together, traditional/legacy and digital/social media spaces comprise a key part of what many now refer to as the 'cultural politics of climate change': dynamic and contested spaces where various 'actors' battle to shape public understanding and engagement (for example, Boykoff and Goodman, 2009). These are places where formal climate science, policy and politics operate at multiple scales through multiple media forms and are dynamic as well as contested processes that shape how meaning is constructed and negotiated. In these spaces of the 'everyday', cultural politics involve not only the discourses that gain traction in wider discourses but also those that are absent (Derrida, 1978). Contemplating climate considerations in this way helps to examine 'how social and political framings are woven into both the formulation of scientific explanations of environmental problems, and the solutions proposed to reduce them' (Forsyth, 2003, p. 1).

Media attention in the public sphere

Figure 19.1 appraises the trends in media coverage of climate change from 2004 into 2019 in 50 newspapers across 20 countries around the globe.[2] This visual representation has provided an opportunity to assess and analyse further questions of *how* and *why* there were apparent ebbs

and flows in coverage. For instance, notably 2009 ended with soaring media coverage of climate change around the world and numerous studies have sought to better understand events and developments during this time period (see Boykoff, 2013 for example). At this time, climate news seemingly flooded the public arena and was dominated by the much-hyped and highly anticipated United Nations climate talks in Copenhagen, Denmark (COP15), along with news about the hacked emails of scientists from the University of East Anglia Climate Research Unit (referred to by some as 'Climategate'). These events also linked to ongoing stories of energy security, sustainability, carbon markets and green economies that were unfolding during this time.

Across this nearly 15-year look, increases in each of the regions have not been symmetrical. For example, there were a relatively low number of stories on climate change or global warming in the regions of South America and Africa throughout this period. This points to a critical regional 'information gap' in reporting on these issues and relates to capacity issues and support for reporters in these regions and countries (developing and poorer regions/countries).

Tracking media treatment of climate change and global warming through intersecting *political, scientific* and *ecological/meteorological* climate themes provides a useful framework for analyses of content and context. Such accounting helps to demonstrate how news pieces should not be treated in isolation from one another; rather, they should be considered connected parts of larger political, economic, social, environmental and cultural conditions.

Moreover, patterns revealed in the mobilisations of journalistic norms internal to the news-generation process cohere with externally influenced dominant market-based and utilitarian approaches that consider the spectrum of possible mitigation and adaptation action on climate change. Robert Brulle has argued that an excessive mass media focus merely on the debaters and their claims, 'works against the large-scale public engagement necessary to enact the far-reaching changes needed to meaningfully address global warming' (2010, p. 94). As such, examinations of the content of media treatment of climate change need to be considered within a context of larger political and social forces.

The cultural politics of climate change reside in many spaces and places – from workplaces to pubs and kitchen tables. 'Actors' on this stage range from fellow citizens to climate scientists as well as business industry interests and environmental non-governmental organisation (ENGO) activists. Over time, individuals, collectives, organisations, coalitions and interest groups have sought to access the power of mass media to influence architectures and processes of climate science, governance and public understanding through various media 'frames' and 'claims'. Questions regarding 'who speaks for the climate' involve considerations of how various perspectives – from climate scientists to business industry interest and ENGO activists – influence public discussions on climate change (Boykoff, 2011). 'Actors', 'agents', or 'operatives' in this theatre are ultimately all members of a collective public citizenry. However, differential access to media outlets across the globe are products of differences in power, and power saturates social, political, economic and institutional conditions undergirding mass media content production (Wynne, 2008).

In the highly contested arena of climate science and governance, different actors have sought to access and utilise mass media sources in order to shape perceptions on various climate issues contingent on their perspectives and interests. For example, 'contrarians', 'skeptics' or 'denialists' have had significant discursive traction in the US public sphere over time (Leiserowitz et al., 2013), particularly by way of media representations (Boykoff, 2013). Resistances to both diagnoses of the causes of climate change and prognoses for international climate policy implementation, in the United States more specifically, have often been associated with the political right: the Republican Party and more particularly a right wing faction called the 'Tea Party' (Dunlap, 2008). John Broder of the *New York Times* described this right-of-centre US political

party stance as an 'article of faith', and polling data have shown that 'more than half of Tea Party supporters said that global warming would have no serious effect at any time in the future, while only 15% of other Americans share that view' (Broder, 2010, p. A1). Moreover, while carbon-based industry interests have exerted considerable influence over US climate policy, associated scientists and policy actors who have questioned the significance of human contributions – often dubbed 'climate contrarians' – have been primarily housed in North American universities, think tanks and lobbying organisations (Dunlap, 2013; McCright, 2007). In particular, US-based non-nation state organisations such as the 'Heartland Institute' have held numerous meetings to promote contrarian views on climate science and policy (Boykoff and Olson, 2013; Hoffman, 2011).

Contributions to climate storytelling through news

Climate change is a complex and multifaceted issue that cuts to the heart of humans' relationship with the environment. The cultural politics of climate change are situated, power-laden, media-led and recursive in an ongoing battlefield of knowledge and interpretation (Boykoff et al., 2009). Mass media link these varied spaces together, as powerful and important interpreters of climate science and policy, translating what can often be alienating, jargon-laden information for the broadly construed public citizenry. Media workers and institutions powerfully shape and negotiate meaning, influencing how citizens make sense of and value the world.

In various cultural, political, social, economic and environmental contexts, journalists, producers and editors as well as scientists, policy makers and non-nation state actors must scrupulously and intently negotiate how climate is considered as a 'problem' or a 'threat'. As part of this process, it has been demonstrated that media reports have often conflated the vast and varied terrain – from climate science to governance, from consensus to debate – as unified and universalised issues (Boykoff, 2011). As a consequence, these representations can confuse rather than clarify: they can contribute to ongoing illusory, misleading and counterproductive debates within the public and policy communities on critical dimensions of the climate issue.

To the extent that media fuse distinct facets into climate *gestalt* – by way of 'claims' as well as 'claims makers' – collective public discourses, as well as deliberations over alternatives for climate action, have been poorly served. For example, although scientific experts have reached the consensus that humans contribute to climate change, there remains some disagreement among climate science experts as to the severity of climate change impacts and when and where climate impacts will occur (Schmidt and Wolfe, 2008; see also Painter, 2013). Rosenberg et al. explain:

> Those that disagree that the problem [of anthropogenic climate change] is acute or in need of decisive action like to note points of disagreement among scientists to bolster their position that the science is unsure and not defined enough to use as a foundation for policy decisions.
>
> *(2010, p. 311)*

Media focusing on an area of climate change that contains scientific nuances and uncertainties, such as the degree to which an extreme weather event is the result of climate change, may result in a specious conclusion that more knowledge is needed before taking action on climate change. In another sense, a lack of media coverage on climate change solutions, or the idea that mere individual actions can make the requisite difference may also limit actions for climate change.

Regarding 'claims makers', efforts to make sense of complex climate science and governance through media representations involves decisions regarding what are 'experts' or 'authorities'

who speak for climate. This is particularly challenging when covering climate change, where indicators of climate change – such as sea level rise, temperature shifts, changing rainfall patterns – may be difficult to detect and systematically analyse (Andreadis and Smith, 2007). Moreover, in the advent and increasingly widespread influence of new and social media (along with fewer 'gatekeepers' in content generation), the identification of 'expertise' can be more, rather than less, challenging. The abilities to quickly conduct a Google or Bing search for information is in one sense very liberating; yet, in another sense, this unfiltered access to complex information also intensifies possibilities of short-circuiting peer review processes (and determinations by 'experts') and can thereby do an 'end-run around established scientific norms' (McCright and Dunlap, 2003, p. 359). In other words, these developments have numerous and potentially paradoxical reverberations through ongoing public discourses on climate change.

There are many reasons why media accounts around the world routinely fail to provide greater nuance when covering various aspects of climate change. Central among them, the processes behind the building and the challenging of dominant discourses take place simultaneously at multiple scales. Large-scale social, political and economic factors influence everyday individual journalistic decisions, such as how to focus or contextualise a story with quick time to deadline. These issues intersect with processes such as journalistic norms and values (for example, Boykoff, 2011), citizen and digital journalism (for example, O'Neill and Boykoff, 2010), and letters to the editor (for example, Young, 2013) to further shape news narratives. Moreover, path dependence through histories of professionalised journalism, journalistic norms and values as well as power relations have shaped the production of news stories (Starr, 2004). These dynamic and multiscale influences are interrelated and difficult to disentangle: media portrayals of climate change are infused with cultural, social, environmental and political economic elements, as well as how media professionals must mindfully navigate through hazardous terrain in order to fairly and accurately represent various dimensions of climate science and governance (Ward, 2008).

Overall, media representations are derived through complex and non-linear relationships between scientists, policy actors and the public that is often mediated by journalists' news stories (Carvalho and Burgess, 2005). In this, multi-scalar processes of power shape how mass media depict climate change. Processes involve an inevitable series of editorial choices to cover and report on certain events within a larger current of dynamic activities and provide mechanisms for privileging certain interpretations and 'ways of knowing' over others. Resulting images, texts and stories compete for attention and thus permeate interactions between science, policy, media and the public in varied ways. Furthermore, these interactions spill back onto ongoing media representations. Through these selection and feedback processes, mass media have given voice to climate itself by articulating aspects of the phenomenon in particular ways via claims makers or authorised speakers. In other words, through the web of contextual and dynamic factors, the stream of events in our shared lives gets converted into finite news stories. Thus, constructions of meaning and discourse on climate change are derived through combined structural and agential components that are represented through mass media to the general public.

The rise of #climate news through digital and social media

Embedded in this dynamism is the burgeoning influence of digital and social media. With it comes numerous questions: does increased visibility of climate change in new/social media translate to improved communication or just more noise? Do these spaces provide opportunities for new forms of deliberative community regarding questions of climate mitigation and adaptation (for example, Harlow and Harp, 2013) and conduits to offline organising and social movements (for example, Jankowski, 2006; Tufekci, 2013)? Or has the content of this increased

coverage shifted to polemics and arguments over measured analysis? In this democratised space of content production, do new/social media provide more space for contrarian views to circulate? And through its interactivity, does increased consumption through new/social media further fragment a public discourse on climate mitigation and adaptation, through information silos where members of the public can stick to sources that help support their already held views (for example, Hestres, 2013)?

Sharon Dunwoody has cautioned to not view various modes of media production equally. As she puts it:

> [B]ecause of their extensive reach and concomitant efficiencies of scale, mediated information channels such as television and newspapers have been the traditional channels of choice for information campaigns. But research on how individuals actually use mass media information suggests that these channels may be better for some persuasive purposes than for others.
>
> *(quoted in Boykoff, 2009, p. 2)*

Furthermore, Cass Sunstein (2007) offers a similarly complicating – and also less than rosy – perspective: he warned of the likelihood of the 'echo chamber' effect where this interactivity actually walls off users from one another by merely consuming news that meshes with their worldview and ideology.

Such considerations within these new media developments prompt us to reassess boundaries between who constitute 'authorized' speakers (and who do not) in mass media as well as who are legitimate 'claims-makers'. These are consistently being interrogated and challenged. Anthony Leiserowitz has written that these arenas of claims making and framing are 'exercises in power ... Those with the power to define the terms of the debate strongly determine the outcomes' (2005, p. 149). These factors have produced mixed and varied impacts: journalist Alissa Quart (2010) has warned of dangers of mistaken (or convenient) reliance on '*fauxperts*' instead of 'experts' while Boykoff (2013) and Boykoff and Olson (2013) have examined these dynamics as they relate to amplified media attention to 'contrarian' views on various climate issues.

Conclusions

Connections between media information and policy decision making, perspectives and behavioural change are far from straightforward (Vainio and Paloniemi, 2013). Coverage certainly does not determine engagement; rather, it shapes engagement *possibility* in quantity, quality, depth and effect (Boykoff, 2008; Carvalho and Burgess, 2005). So, our explorations of media coverage of climate change around the world in this chapter seek to help readers better understand the dynamic web of influence that media play amidst many others that shape our attitudes, intentions, beliefs, perspectives and behaviours regarding climate change. As we have posited here, media representations – from news to entertainment, from broadcast to interactive and participatory – are critical links between people's perspectives and experiences, and the ways in which dimensions of climate change are discussed at a distance between science, policy and public actors (see also Doyle, 2011).

The road from information acquisition via mass media to various forms of engagement and action is far from straightforward, and is filled with turns, potholes and intersections. This is a complex arena: mass media portrayals do not *simply* translate truths or truth claims nor do they fill knowledge gaps for citizens and policy actors to make 'the right choices'. Moreover, media representations clearly do not dictate particular behavioural responses. For example, research has

shown that fear-inducing and catastrophic tones in climate change stories can inspire feelings of paralysis through powerlessness and disbelief rather than motivation and engagement. In addition, O'Neill et al. (2013) found that imagery connected with climate change influences saliency (that climate change is important) and efficacy (that one can do something about climate change) in complex ways, in their study across the country contexts of Australia, the United States and United Kingdom. Among their results, they found that imagery of climate impacts promoted feelings of salience but undermined self-efficacy, while imagery of energy futures imagery promoted efficacy. Overall, media portrayals continue to influence – in non-linear and dynamic ways – individual to community and international level perceptions of climate science and governance (Wilby, 2008). In other words, mass media have constituted key interventions in shaping the variegated, politicised terrain within which people perceive, understand and engage with climate science and policy (Goodman and Boyd, 2011; Krosnick et al., 2006).

Over time, many researchers and practitioners have (vigorously) debated the extent to which media representations and portrayals are potentially conduits to attitudinal and behavioural change (for example, Dickinson et al., 2013). Nonetheless, as unparalleled forms of communication in the public arena, research into media representational practices remains vitally important in terms of how they influence a spectrum of possibilities for governance and decision making. As such, media messages – and language choices more broadly (Greenhill et al., 2013) – function as important interpreters of climate information in the public arena, and shape perceptions, attitudes, intentions, beliefs and behaviours related to climate change (Boykoff, 2011; Hmielowski et al., 2014). Studies across many decades have documented that citizen-consumers access understanding about science and policy (and more specifically climate change) largely through media messages (for example, Antilla, 2010; O'Sullivan et al., 2003).

Furthermore, mass media comprise a community where climate science, policy and politics can readily be addressed, analysed and discussed. The way that these issues are covered in media can have far reaching consequences in terms of ongoing climate scientific inquiry as well as policy maker and public perceptions, understanding and potential engagement. In this contemporary environment, numerous 'actors' compete in these media landscapes to influence decision making and policy prioritisation at many scales of governance. Multitudinous ways of knowing – both challenged and supported through media depictions – shape ongoing discourses and imaginaries, circulating in various cultural and political contexts and scales. Furthermore, varying media representational practices contribute – amid a complex web of factors – to divergent perceptions, priorities and behaviours.

More media coverage of climate change – even supremely fair and accurate portrayals – is not a panacea. In fact, increased media attention to the issue often unearths more questions to be answered and *greater* scientific understanding actually can contribute to a *greater* supply of knowledge from which to develop and argue varying interpretations of that science (Sarewitz, 2004). At best, media reporting helps address, analyse and discuss the issues *but not answer them.* And dynamic interactions of multiple scales and dimensions of power critically contribute to how climate change is portrayed in the media. As has been detailed previously, mass media representations arise through large-scale (or *macro*) relations, such as decision making in a capitalist or state controlled political economy and individual level (or *micro*) processes such as everyday journalistic and editorial practices.

The contemporary cultural politics of climate change thread through a multitude of rapidly expanding spaces. Within this, the media serve a vital role in communication processes between science, policy and the public. The influence of media representations as well as creative and participatory communications – nested in cultural politics more broadly – can be ignored or dismissed in shaping climate science and governance at our peril.

Notes

1 This chapter is adapted from Boykoff, M. T., McNatt, M. B. and Goodman, M. K. (2015). 'Communicating in the Anthropocene: the cultural politics of climate change news coverage around the world', in A. Hansen and R. Cox (eds.) *The Routledge Handbook of Environment and Communication*. London: Routledge, pp 221–31.

2 For monthly updates and the full list of sources go to: http://sciencepolicy.colorado.edu/media_coverage.

References

Adams, P. C. and Gynnild, A. (2013). 'Environmental messages in online media: the role of place'. *Environmental Communication: A Journal of Nature and Culture*, 7(1): 103, 113–30.

Andreadis, E. and Smith, J. (2007). 'Beyond the ozone layer'. *British Journalism Review*, 18(1): 50–6.

Antilla, L. (2010). 'Self-censorship and science: a geographical review of media coverage of climate tipping points'. *Public Understanding of Science*, 19(2): 240–56.

Baek, Y. M., Wojcieszak, M. and Delli Carpini, M. (2012). 'Online versus face-to-face deliberations: who? why? what? what effects?' *New Media and Society*, 14(3): 363–83.

Baum, M. A. and Groeling, T. (2008). 'New media and the polarization of American political discourse'. *Political Communication*, 25(1): 345–65.

Boykoff, M. (2008). 'The cultural politics of climate change discourse in UK tabloids'. *Political Geography*, 27(5): 549–69.

Boykoff, M. (2009). 'A discernible human influence on the COP15? Considering the role of media in shaping ongoing climate science'. *Copenhagen Climate Congress Theme 6, Session 53*.

Boykoff, M. (2011). *Who speaks for climate? Making sense of mass media reporting on climate change*. Cambridge: Cambridge University Press.

Boykoff, M. (2013). 'Public enemy no.1? Understanding media representations of outlier views on climate change'. *American Behavioral Scientist*, 57(6): 796–817.

Boykoff, M. and Goodman, M. K. (2009). 'Conspicuous redemption? Reflections on the promises and perils of the "celebritization" of climate change'. *Geoforum*, 40: 395–406.

Boykoff, M., Goodman, M. K. and Curtis, I. (2009). 'Cultural politics of climate change: interactions in everyday spaces', in M. Boykoff (ed.) *The politics of climate change: a survey*. London: Routledge/Europa, pp 136–54.

Boykoff, M. and Olson, S. (2013). 'Understanding contrarians as a species of "Charismatic Megafauna" in contemporary climate science-policy-public interactions'. *Celebrity Studies journal* (special issue editors M. K. Goodman and J. Littler).

Boykoff, M. and Yulsman, T. (2013). 'Political economy, media and climate change: the sinews of modern life'. *Wiley Interdisciplinary Reviews: Climate Change*, 4(5): 359–71.

Broder, J. M. (2010). 'Skepticism on climate change is article of faith for tea party'. *The New York Times*, 21 October: A1.

Brulle, R. J. (2010). 'From environmental campaigns to advancing a public dialogue: environmental communication for civic engagement'. *Environmental Communication: A Journal of Nature and Culture*, 4(1): 82–98.

Cacciatore, M. A., Anderson, A. A., Choi, D.-H., Brossard, D., Scheufele, D. A., Liang, X., Ladwig, P. J., Xenos, M. and Dudo, A. (2012). 'Coverage of emerging technologies: a comparison between print and online media'. *New Media and Society*, 14(6): 1039–59.

Carvalho, A. and Burgess, J. (2005). 'Cultural circuits of climate change in UK broadsheet newspapers, 1985–2003'. *Risk Analysis*, 25(6): 1457–69.

Derrida, J. (1978). 'Structure, sign, and play in the discourse of the human sciences', in J. Derrida (ed.) *Writing and difference*. Chicago, IL: University of Chicago Press, pp 278–93.

Dickinson, J. L., Crain, R., Yalowitz, S. and Cherry, T. M. (2013). 'How framing climate change influences citizen scientists' intentions to do something about it'. *The Journal of Environmental Education*, 44(3): 145–58.

Doyle, J. (2011). *Mediating climate change*. Surrey: Ashgate Publishing.

Dunlap, R. E. (2008). 'Climate-change views: republican-democrat gaps extend'. *Gallup*, 29 May.

Dunlap, R. E. (2013). 'Climate change skepticism and denial: an introduction'. *American Behavioral Scientist*, 57(6): 691–98.

Fahy, D. and Nisbet, M. C. (2011). 'The science journalist online: shifting roles and emerging practices'. *Journalism*, 12(7): 778–93.

Fitts, A. S. (2013). 'Reuters global warming about face'. *Columbia Journalism Review*, 26 July. Available at: www.cjr.org/the_observatory/reuterss_global_warming_about-.php?page=2

Fogerty, D. (2013). 'Climate change'. *The Baron*, 15 July.

Forsyth, T. (2003). *Critical political ecology: the politics of environmental science*. London: Routledge.

Goodman, M. and Boyd, E. (2011). 'A social life for carbon? Commodification, markets and care'. *The Geographical Journal*, 177(2): 102–9.

Greenberg, M. (2013). 'Reuters climate change coverage declined significantly after "skeptic" editor joined'. *Media Matters for America*, 23 July. Available at: http://mediamatters.org/blog/2013/07/23/reuters-climate- change-coverage-declined-signif/195015

Greenhill, M., Leviston, Z., Leonard, R. and Walker, I. (2013). 'Assessing climate change beliefs: response effects of question wording and response alternatives'. *Public Understanding of Science*, 22(3): 1–19.

Harlow, S. and Harp, D. (2013). 'Collective action on the web'. *Information, Communication and Society*, 15(2): 196–216.

Hestres, L. E. (2013). 'Preaching to the choir: internet-mediated advocacy, issue public mobilization, and climate change'. *New Media and Society*, 1(1): 1–17.

Hmielowski, J. D., Feldman, L., Myers, T. A., Leiserowitz, A. and Maibach, E. (2014). 'An attack on science? Media use, trust in scientists and perceptions of global warming'. *Public Understanding of Science*, 23(7): 866–83.

Hoffman, A. J. (2011). 'Talking past each other? Cultural framing of skeptical and convinced logics in the climate change debate'. *Organization and Environment*, 24(3): 3–33.

Horan, T. J. (2013). '"Soft" versus "hard" news on microblogging networks'. *Information, Communication and Society*, 16(1): 43–60.

Jacobson, S. (2012). 'Transcoding the news: an investigation into multimedia journalism published on nytimes.com 2000–2008'. *New Media and Society*, 14(5): 867–85.

Jankowski, N. W. (2006). 'Creating community with media: history, theories and scientific investigations', in L. A. Lievrouw and S. Livingstone (eds.) *The handbook of new media, updated student edition*. London/Thousand Oaks/New Delhi: Sage, pp 55–74.

Krosnick, J. A., Holbrook, A. L., Lowe, L. and Visser, P. S. (2006). 'The origins and consequences of democratic citizens' policy agendas: a study of popular concern about global warming'. *Climatic Change*, 77(1): 7–43.

Leiserowitz, A. A. (2005). 'American risk perceptions: is climate change dangerous?' *Risk Analysis*, 25: 1433–42.

Leiserowitz, A. A., Maibach, E., Roser-Renouf, C., Smith, N. and Dawson, E. (2013). 'Climategate, public opinion and loss of trust'. *American Behavioral Scientist*, 57(6): 818–37.

McCright, A. M. (2007). 'Dealing with climate contrarians', in S. C. Moser and L. Dilling (eds.) *Creating a climate for change: communicating climate change and facilitating social change*. Cambridge: Cambridge University Press, pp 200–12.

McCright, A. M. and Dunlap, R. E. (2003). 'Defeating Kyoto: the conservative movement's impact on US climate change policy'. *Social Problems*, 50(3): 348–73.

Nielsen, R. K. (2012). 'How newspapers began to blog'. *Information, Communication and Society*, 15(6): 959–68.

O'Neill, S. J. and Boykoff, M. T. (2010). 'The role of new media in engaging the public with climate change', in L. Whitmarsh, S. J. O'Neill and I. Lorenzoni (eds.) *Engaging the public with climate change: communication and behaviour change*. London: Earthscan, pp 233–51.

O'Neill, S. J., Boykoff, M. T., Day, S. A. and Niemeyer, S. (2013). 'On the use of imagery for climate change engagement'. *Global Environmental Change*, 23(2): 413–21.

O'Sullivan, T., Dutton, B. and Rayne, P. (2003). *Studying the media*. London: Hodder Arnold.

Painter, J. (2013). *Climate change in the media: reporting risk and uncertainty*. New York: I. B. Tauris & Co.

Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S. and Pidgeon, N. F. (2011). 'Uncertain climate: an investigation into public scepticism about anthropogenic climate change'. *Global Environmental Change*, 21(3): 1015–24.

Quart, A. (2010). 'The trouble with experts'. *Columbia Journalism Review*, July/August: 17–18.

Rosenberg, S., Vedlitz, A., Cowman, D. F. and Zahran, S. (2010). 'Climate change: a profile of US climate scientists' perspectives'. *Climate Change*, 101(1): 311–29.

Sarewitz, D. (2004). 'How science makes environmental controversies worse'. *Environmental Science and Policy*, 7: 385–403.

Schmidt, G. and Wolfe, J. (2008). *Climate change: picturing the science*. New York: W. W. Norton and Company.
Schuurman, N. (2013). 'Tweet me your talk: geographical learning and knowledge production 2.0'. *Professional Geographer*, 65(3): 369–77.
Siles, I. and Boczkowski, P. J. (2012). 'Making sense of the newspaper crisis: a critical assessment of existing research and an agenda for future work'. *New Media and Society*, 14(8): 1375–94.
Starr, P. (2004). *The creation of the media: political origins of modern communications*. New York: Basic Books.
Sunstein, C. R. (2007). *Republic.com 2.0*. Princeton, NJ: Princeton University Press.
Tufekci, Z. (2013). 'Not this one: social movements, the attention economy, and microcelebrity networked activism'. *American Behavioral Scientist*, 57(7): 848–70.
Vainio, A. and Paloniemi, R. (2013). 'Does belief matter in climate change action?' *Public Understanding of Science*, 22(4): 382–95.
van Dijk, J. (2006). *The network society*. London: Sage.
Ward, B. (2008). *Communicating on climate change: an essential resource for journalists, scientists and editors*. Providence, RI: Metcalf Institute for Marine and Environmental Reporting, University of Rhode Island Graduate School of Oceanography.
Whitmarsh, L. (2011). 'Scepticism and uncertainty about climate change: dimensions, determinants and change over time'. *Global Environmental Change*, 21(2): 690–700.
Wilby, P. (2008). 'In dangerous denial'. *The Guardian*, 30 June: 9.
Wynne, B. (2008). 'Elephants in the rooms where publics encounter "science"'. *Public Understanding of Science*, 17: 21–33.
Young, N. (2013). 'Working the fringes: the role of letters to the editor in advancing non-standard media narratives about climate change'. *Public Understanding of Science*, 22(4): 443–59.