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Chapter 4

Post-normal Journalism: Climate Journalism and Its Changing Contribution to an Unsustainable Debate

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Introduction[1]

Deliberative public sphere theories ascribe an 'epistemic dimension' to public debates: they do not necessarily foster consensus, but rather an enhanced understanding among the participants of the debate through the exchange of opinions backed by justifications (Habermas 2006; Peters 2005). Public discourses provide a critical validation of issues of shared relevance. They are an important precondition for the *sustainable evolution of society* as a society without open debates becomes blind to the concerns of its citizens.

This is why the *sustainability of public debates* is a major concern for society and for communication studies. Reality will always fall short of normative models of the public sphere (see e.g. Walter 2015), yet when issues become so polarized that an open debate among speakers from different backgrounds becomes impossible, this constitutes a problem for democracy. Particularly in the United States, the debate on climate change has joined other issues such as abortion and gun control as part of a wider cultural schism: "Extreme positions dominate the conversation, the potential for discussion or resolution disintegrates, and the issue becomes intractable" (Hoffman 2015, p. 6).

This kind of situation emerges due to a multitude of factors. Returning to a more constructive debate requires broad and complex responses. In this chapter, I take the climate debate as a case study and I focus on one relevant factor: journalism.

Journalists serve an important function as *Diskursanwälte* (advocates of discourse) (Brosda 2008). They have the capacity to foster and moderate debate, to enhance the transparency of public affairs, and to make sure that relevant issues and voices are heard. They may thus ensure that constructive debates can be sustained. Yet, they do not necessarily do so. Driven by news factors such as conflict and negativity, journalists may contribute to further polarization and thus make public debate on a particular issue unsustainable.

The climate debate is an interesting case as it poses a "test of capacity" (Nerone 2015) for journalism and thus redefines journalistic professionalism. This is due to a specific set of conditions that have been labelled "post-normal". The term describes issues at the nexus of science and politics "where facts are uncertain, values in dispute, stakes high and decisions urgent" (Funtowicz, Ravetz 1993, p. 744). Climate change is regarded as a prototypical case for studying communication under conditions of 'post-normal' science situations (Bray, Storch 1999; Saloranta 2001; Krauss et al. 2012).

In the following study of journalism's role in the climate debate, I will argue that we are witnessing the evolution of *post-normal journalism* that is fundamentally interpretive and

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characterized by the blurring of institutional boundaries between journalism, science and advocacy.

The Analytical Framework: Post-normal Journalism

Funtowicz and Ravetz (1993) describe four features of science in post-normal situations. (1) Science produces not only facts but also high levels of *uncertainty* as well as large areas of plain ignorance due to a lack of data, the complexity of the subject matter, large-scale phenomena with missing data points in the past and reliance on simplifying models to sketch out possible futures. (2) Working in science, but also providing policy advice, involves *value questions* that cannot be answered through scientific inquiry alone. (3) The issues at hand are very *relevant* for society, and involve high costs or benefits. (4) Political decision-making is *urgent* (Funtowicz, Ravetz 1993).

Under these circumstances, the naïve idea of 'science speaking truth to power' becomes even more problematic than it has always been. Following this 'normal' model, the role of science is to produce facts and knowledge that easily translate into policy advice. In post-normal science, the 'knowledge' is limited and disputed, and 'translating' this knowledge into decisions requires first sorting out value conflicts. Post-normal science practice as prescribed by Funtowicz and Ravetz (1993) starts from the assumption that future developments are unpredictable and uncontrollable. It takes a plurality of perspectives on 'reality' as legitimate. Science is supposed to actively manage the uncertainties associated with its findings, be transparent about the value questions involved and engage with an extended peer community when formulating policy advice. Funtowicz and Ravetz note that this community may also include investigative journalists.

The concept of post-normal science has received considerable criticism, but has also inspired many researchers (Turnpenny et al. 2010).[2] I use the framework of post-normal science as a lens with which to analyze change. Yet, I am not implying that there was ever a state of pure 'normal' science (Goeminne 2011) that has somehow transformed into a post-normal phase (also see Turnpenny et al. 2010, p. 301). Rather, I use this construct to make the point that there are changes that can be analyzed by drawing on the two models of normal and post-normal. Empirical practices will always consist of a mixture of both models.

Less explored by past research is the question whether post-normal situations are likely to have implications for the whole "figuration" (Elias 1978; Hepp, Hasebrink 2013) of actors in science communication. Kunelius et al. (2016a) argue that "if climate change is, […] a 'post-normal' or 'post-modern' problem, it follows that modern institutions – science, politics, media, etc. – must reconfigure their relationships". For example, scientists might revise their traditional role in science communication along the lines mentioned above by discussing uncertainties, value questions and the validity of their research as they are confronted with other interpretations of reality. They might do so not only among their peers but within the broader society. The production of knowledge and its input into the policy-making process thereby become processes that involve scientists, journalists, policy-makers and other actors in close and permanent interaction. Comprehensive and close examinations of whether such a change is actually underway deserve the attention of future research projects. In this chapter, I focus only on the implications for journalism.

Journalism "has borrowed its *epistemological* perspective and *ideals* from modern science", argue Eide and Kunelius (2012, p. 16). The central link between science and journalism is the concept of objectivity, which has been described as a key norm of Western

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journalism, with strong roots in the history of US journalism (Schudson 2001). As a consequence, post-normal situations challenge journalism and science in similar ways. The resulting pattern of journalistic practice could be coined 'post-normal journalism', a term mentioned by Eide and Kunelius (2012) which deserves further elaboration. Post-normal journalism evolves at the crossroads of science, politics and journalism in post-normal situations. In order to identify the post-normal, it seems necessary to first describe important patterns of normal journalism.

A key concept of journalism is objectivity. It has two dimensions: factuality (providing facts that are (1) true and (2) relevant) and impartiality (providing a (3) balanced account (4) in a neutral way) (Westerstahl 1983). From this idea flows the model of the journalist as a detached observer. Post-normal situations reveal that all of these terms are problematic, and highlight the tensions between these four aspects of engaging in 'normal' journalism. It should also be noted that while journalism and science both claim objectivity as a central norm, their understanding of the concept differs: scientists view objectivity more as the outcome of applying the scientific method, while journalists perceive it as a substantive claim for the absolute truth of facts (Post 2015). Journalistic objectivity has long been critiqued as a ritual that serves to protect journalists from criticism of being biased (Tuchman 1972) and as a "para-ideology" of value-free journalism, which is in fact clearly characterized by a set of shared values (Gans 1979, p. 203). Yet, surveys of journalists consistently find strong support for the role model of the detached observer, disseminator or conduit, albeit mixed with other role perceptions like that of a watchdog (e.g. Hanitzsch et al. 2011).

In addition to objectivity, there are several key cornerstones of (Western) journalistic professionalism that are shared by journalists around the world: professional autonomy, public service, immediacy (actuality) and adherence to professional codes of ethics (Deuze 2005). The detachment from personal values and interest comes with an *attachment to news factors*, criteria that enhance the newsworthiness of news: relevance, negativity (damage, aggression or conflict), 'elite' persons and nations, continuity of a story and proximity (Eilders 2006). These features are emphasized in journalistic writing and guide news selection (Galtung, Ruge 1965). Further categories established according to the various sections of newspapers (local, national, international; politics, culture, sports (Berglez 2011) order the world of 'normal' journalism.

Post-normal journalism diverges from these established norms and routines of journalistic sense-making in ways that can be related to the features of post-normal science. Uncertainty, unpredictability and competing knowledge claims challenge journalistic objectivity in terms of its conceptual coherence, feasibility and desirability. Post-normal journalism would thus call objectivity into question and generate reflexivity through public meta-discourse among journalists and their critics. This process of public self-reflection would also translate, at least to a certain degree, into new types of journalistic practice. The impossibility of objectivity could lead to openly *subjective journalism*: incorporating the emotions and subjective perceptions of the journalist as a non-detached observer into the coverage. It could also lead to *multi-perspective journalism* that provides different frames on a given topic along the normative ideal expressed by Gans (1979, 2011): different truth claims would not be described as competing, but in terms of their dependence on the contexts that generate them (such as scientific methods vs. religion, or modeling vs. historical analysis). This would also suggest the need to provide interpretation rather than just the facts: *interpretive journalism* would contextualize knowledge by talking about both the uncertainties and the value

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questions associated with it. A departure from objectivity could also result in *advocacy journalism* (Waisbord 2009), which backs a certain group or cause.

Journalists, as described in Gans (1979), used to hide their values by refraining from joining a party or other political activities and even from talking about politics. An alternative approach would be to be transparent about one's own ideological background without necessarily actively advocating one's ideology. As David Weinberger (2009) stated in a blog post, "Transparency is the new objectivity."

Finally, post-normal science calls for an extended peer community that includes journalists as well as other groups. Journalists suited to this endeavor can be found among the (small) group of *knowledge journalists:* those with very high levels of expertise who become salient voices in particular debates. Nisbet and Fahy (2015), in an article about the climate debate in the United States, further elaborate the concept of *knowledge-based journalism* advanced by Patterson (2013) and Donsbach (2014). The basic idea is that journalists can serve as "knowledge brokers", "dialogue brokers" and "policy brokers" who can provide a context for and widen the perspective in polarized and ideologically entrenched debates of post-normal issues such as climate change. This role of a broker comes very close to the idea put forward by the German public sphere scholarship mentioned in the introduction, where the journalist is seen as an advocate for ensuring the sustainability of public discourses. Part of this idea of knowledge journalism would be that a subset of specialized journalists would be qualified to go "upstream" in the process of science communication by not only reporting on scientific findings as published in academic journals but also inquiring about (and explaining) how those findings were generated (Fahy, Nisbet 2011, p. 785).

Such changes in journalistic practices are also related to the evolution of digital media that have exponentially increased the number of senders and amount of available media content. New formats of communication in new fora such as blogs or social media have evolved. The emergence of new types of journalism is more likely to happen in these new media environments: journalism in traditional newsrooms is based on routines that have changed little in recent decades, as newsroom observations show (Anderson 2013; Usher 2014). While printed newspapers used to be the home of most science and environment reporters, the number of jobs in this area has been reduced in the wake of the economic crisis of print journalism, turning science journalism into an "imperiled occupation" (Dunwoody 2014, p. 27). This development is partly offset by new jobs for climate journalists offered by specialized online outlets like, in the United States, the subscription-based expert news service "Climate wire", the hybrid journalistic–scientific enterprise "Climate Central" or "Inside Climate news", which won a Pulitzer Prize in 2013 (Brüggemann 2014; Nisbet, Fahy 2015). A new "science media eco-system" (Fahy, Nisbet 2011, p. 783) has evolved online that is very different from the science pages of the newspapers. Fahy and Nisbet (2011) identify several new journalistic roles that go beyond the traditional reporter as a *conduit* who advances the elite's debates in a 'neutral' and 'balanced' way. These new roles include the *curator* who finds and restructures relevant information found on the web, the *convener* of debate, the public *intellectual* who provides ideas and opinions, the civic *educator* and the political *advocate* (Fahy and Nisbet 2011). More generally, they require a more interpretative and critical role for journalists, as well as a more collaborative relationship with both audiences and sources.

So far, I have argued why (and where) we would expect the emergence of post-normal journalism and how its contours may look like. We now turn to the exploration of the climate

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change debate. Krauss, Schäfer and v. Storch describe the climate change debate (during the years 2008–2011) as follows: "little room was left for discussing inherent uncertainties or the normative assumptions that underlie the science–public interaction. Instead, the tendency to silence skeptical voices increased. The public climate debate turned into an almost confessional war with its own dynamics between 'us' and 'them', alarmists and skeptics, believers and deniers" (2012, p. 122).

Apparently, the post-normal situation of climate science had not led to post-normal communication practices following the framework of Funtowicz and Ravetz. Instead of actively discussing uncertainties or value questions, leading climate scientists followed the linear ideas of science speaking truth to power – or in the case of the Intergovernmental Panel on Climate Change (IPCC): "Science speaking consensus to power" (van der Sluijs, Jeroen P. 2012). Thus, climate science partly stuck to the procedures of normal science (by not talking about values and uncertainties and not engaging with critics, thus not extending the peer community): "the IPCC tried to normalize the post-normal situation by emphasizing scientific authority" (Krauss et al. 2012, p. 127).

The situation worsened, since neither science nor journalism was in a position to serve as a gatekeeper that could simply blog out unwanted criticism. The blogosphere and social media allowed skeptical voices to connect and comment – and thus form an "extended peer review community" driven by professional contrarians and amateur critics who questioned different aspects of climate change (Dunlap, McCright 2015). Jerome Ravetz himself felt compelled to post his criticism of normal climate science on the contrarian blog "Wattsupwiththat", arguing (in a later journal article that I quote here) that the actors engaged in the debate around "Climategate" were in fact an "exemplification of post-normal science, with the role of extended peer community being filled by the critics on the blogosphere" (2011, p. 149). Facing criticism from all sides, Ravetz also explained that the idea of an "extended peer community" was not an "invitation to mob rule in science". It was not meant to become a "replacement peer community" (2011, p. 156). This incident clearly reveals that participatory approaches to science communication need to reflect the criteria concerning who is allowed to participate, and the implications that this participation should have. For journalists, these questions are not theoretical at all: they need to decide very concretely what to do with skeptical voices raised in the blogosphere. Are journalists supposed to quote them in a neutral way or should the voices of denial be ignored?

Table 4.1: Normal and post-normal perspectives on climate change

	National	**Transnational**	
Political	Contrarians	Climate summits	News peg
	Balanced coverage of debate skeptics vs. believers	Detached observation of power play of national actors	Normal

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	Contextualizing or ignoring contrarians; developing new narratives	*Engaging in global dialogue about a global climate agreement*	*Post-normal*
Scientific	Local weather	Studies published in leading journals	News peg
	Attributing extreme events to climate change	Science reduces uncertainty and solves climate problems; unexplained flip-flops	Normal
	Reflecting local risks, adaptation needs, and interactions of climate change and other factors	*Covering the complexities and uncertainties of climate science*	*Post-normal*

Empirical findings on journalism's role in the debate on climate change

The default ('normal') approach to journalism involves covering the long-term process of climate change as a succession of short-term media events. The annual UN climate summits of the United Nations Framework Convention on Climate Change (UNFCCC) are the prime triggers of climate change coverage. Other occasions include extreme weather events and the publication of IPCC reports or studies in leading journals such as *Nature* or *Science* (Schmidt et al. 2013; Schäfer 2015). Across national borders, journalists mostly rely on the "anthropogenic climate change master frame" (Brüggemann, Engesser 2014) as sketched out in the IPCC reports. According to this framework, climate change is happening, caused to a large degree by human emissions, leading to problems for both nature and mankind that can be ameliorated by reducing greenhouse gas emissions. Berglez (2011) finds that Swedish journalists engage in both new and old patterns of reporting on climate change: some squeeze the issue into the traditional categories of normal journalism, while others cover the issue in new ways that are "beyond media logic" (459).

In order to structure the following review of empirical findings on old and new ways of reporting on climate change, I will analytically separate four areas of climate coverage that can be distinguished along two dimensions: (1) political vs. scientific aspects of climate change and (2) global vs. local perspectives. This heuristic results in four types of climate journalism (see Table 4.1). The first type of article focuses on the *transnational/political* and deals with the annual climate summits. The second type is *national/political* and deals with issues that may differ between countries: in the Anglo-Saxon sphere, mostly with the conflict between contrarians vs. climate scientists and environmental activists. The third type of climate change article focuses on global science and discusses new insights from studies published in leading academic journals. The fourth type is *local/science* related, and attributes

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local extreme events or weather-related phenomena to climate change. For all types of coverage, we find evidence of the co-existence of traditional (normal) and post-normal practices in journalism.

(1) The *transnational/political* perspective. A consistent pool of correspondents provides reporting from climate summits; they interact with largely the same policy community each time and network both transnationally and across the divide of observers (journalists) and political actors (politicians and civil society representatives). Kunelius and Eide (2012) assert that this situation produces two patterns of coverage.

First, "realism" clearly falls into the category of normal journalism. It is the default modus of "a detached, somewhat cynical, news analysis" (Kunelius, Eide 2012, p. 280), "in which transnational relations, strategies, and tactics are reduced to the language of power […] informed by a belief that the world system is ultimately driven by the interests of the strategic calculations of states and nations" (Kunelius, Eide 2012, p. 276). This type of journalism focuses on national (rather than transnational or foreign) government actors and draws on what other studies have called "strategic" or "game" frames (Lawrence 2000).

The second pattern of coverage is the "cosmopolitan" approach – a specific form of the emerging post-normal journalism. This approach is driven by a concern for climate policy and the belief in the emancipatory potential of a transnational dialogue (Kunelius, Eide 2012). It also leads to a new perspective on the coverage of national actors: "domestication also appears as a potential moment of national reflexivity or as instances when journalism can be inspired by a transnational environment to critically monitor the (lack of) action from national actors on their 'home front'" (Kunelius and Eide 2012: 280). The transnational cosmopolitan approach is characterized by networked coverage across nations, such as the common editorial printed in 56 newspapers from 46 countries issuing a call to conclude a global climate agreement in the wake of the Copenhagen climate summit in 2009 (Eide 2012). In May 2015, the *Guardian* renewed the ties established in 2009 and co-founded the *Climate Publishers Network* with 25 partner newspapers from around the world.[3]

Several studies also conclude that the climate journalism emanating from UN summits is an example of collaborative production networks across the journalism–advocacy divide based on close collaboration with environmental non-governmental organizations (NGOs) (Adolphsen, Lück 2012; Lück et al. 2016). The boundaries between environmental journalism and advocacy are also blurring, as some NGOs provide not only self-promotion but also more breadth and depth in climate reporting from climate conferences than some legacy media outlets (New Governance and the Prospects for a European Sphere of Publics. Paper Prepared for Discussion in the Framework of the Network of Jean Monnet Chairs, Brussels, September 2001 2001; Russell 2013). While such input arguably contributes to the journalistic function, it does *not* fit the central criteria of 'normal' journalism, which situates the journalist as an independent and neutral observer of the events she or he is covering.

(2) The *national/political* perspective. The climate-related political debate on the national level is often explained using a well-established journalistic narrative: the fight of climate 'skeptics' versus 'believers' in climate change. Both terms are rather misleading: skepticism of knowledge claims is a virtue in science, but *only if* those claims are *not* based on reliable and valid evidence. Thus, resistance to acknowledging anthropogenic climate change should not be labeled skepticism: rather, it constitutes a denial of what is widely regarded as fact by the scientific community. The term 'believers' is even worse, as it locates the issue in the area

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of beliefs that are, by definition, beyond empirical evidence. Following Boykoff and O'Neil (2010), I will call political actors who challenge anthropogenic climate change in public discourse 'contrarians'. Contrarians actively attack two parties: established climate scientists and advocates of climate protection measures. Climate journalism, particularly in the English-speaking world, has continuously provided a forum for contrarians and their denial of global warming.

There are a number of explanations for this, most of which are rooted in the routines of 'normal' journalism. Perhaps the most important is the norm of balance. This norm obliges journalists to give both sides in a debate equal voice. Yet by doing so, journalists also provide equal standing and validity to both speakers or positions. *False* balance is created as "journalists present competing points of views on a scientific question as though they had equal scientific weight, when actually they do not'' (Boykoff, Boykoff 2004, p. 127). The Boykoff study examined the climate change coverage in US newspapers from 1988 to 2002, and found that every second article presented a balanced account of the issue. These articles conveyed an uncertain framing of the issue and thus "perpetuate the myth of a lack of international scientific consensus on anthropogenic climate change – and thereby succeed in maintaining public confusion" (Antilla 2005, p. 350). Thus, an important ingredient of the professional ethos of objectivity has become problematic.

In interviews with US climate journalists, Shipley Hiles and Hinnant (2014) found a "radically redefined" understanding of objectivity: while journalists claimed that they did not let their biases influence their coverage, they followed the model of "weight-of-evidence reporting" (Dunwoody 2005), which requires news stories to be "written with authority" and reflect the scientific state of the field (Shipley Hiles, Hinnant 2014, p. 15). Thus, journalists following this new style proclaim to provide something that was lacking from previous 'balanced' coverage of climate change (Boykoff 2011): clearly describing certain views as representing valid, peer-reviewed science, in contrast with other views that represent outliers with no backing from scientific evidence or peers. Another qualitative interview study with US science journalists confirms this shift in approach: journalists claim that they want to go "beyond balance" and even ignore contrarian voices (Gibson et al. 2016). Yet, this desire to exclude voices that defy scientific evidence thus far represents a minority perspective. A quantitative survey of climate journalists in five countries reveals that 60 percent of journalists are against excluding voices that deny the basics of anthropogenic climate change. However, and this diverges from the traditional 'balanced' coverage, 69 percent call for a "critical assessment" of the contrarians (Brüggemann, Engesser 2014). Journalists also put this into practice. More recent replications of the original study by the Boykoffs find that only a tiny share of articles (3–5 percent) contain *balanced* coverage (Boykoff 2007; Boykoff, Boykoff 2007; Schmid-Petri et al. 2015).

The content analysis that followed the survey by Brüggemann and Engesser (Forthcoming) reveals a new pattern of interpretive climate journalism that is "beyond balance". The story of 'contrarians vs. climate science' is still the focus of climate journalism in Britain and the United States. Instead of neutral, balanced coverage, however, Brüggemann and Engesser detect "dismissive quotations" and "protective omissions" of contrarian voices. They are quoted in articles that clearly support the consensus on climate change in order to dismiss the validity of the contrarians' stance. In the few articles that actually challenge the consensus, contrarians are not quoted, but skepticism is expressed directly by the author.

We therefore find a mixture of the 'normal' and the 'post-normal': the conflict between contrarians and climate scientists is still salient, as it provides news value and continues an established narrative. At the same time, journalists have started to take a more active stance and provide context and interpretation that was missing from earlier coverage. Going even further beyond the normal would mean leaving the narrative of contrarians vs. science behind and looking for new ways of reporting climate change. An example of such an approach is the *Guardian*'s "Keep it in the ground" campaign, calling for divesting funds from fossil fuels. The campaign combines transparent advocacy and innovative storytelling. It was kicked off by an editorial and complemented by traditional reporting and a podcast that also provided a glimpse into the newsroom. The *Guardian* clearly acknowledged its partnership with the NGO *350.org*. While this is another instance of the blurring boundaries between journalism and activism, it is also an act of creative journalism that deliberately focuses on new angles from which to cover climate change. With its more recent focus on solar energy, the *Guardian* also provided an example of what has been called "constructive" or "solutions journalism" (Dyer 2015). It seems that this is another shift away from 'normal' journalism with its focus on negativity that provides conflict and damage as strong news factors. Journalists may have come to realize that "fear won't do it" (O'Neill, Nicholson-Cole 2009): too much alarmism about climate change might only lead to denial and paralysis instead of mobilization to fight climate change. While such a mission runs contrary to the model of the detached observer, the severity of the climate problem may justify the exception, in the view of at least some of the world's leading climate journalists, as shown in interviews about the most recent IPCC report (Kunelius et al. 2016b).

(3) The *transnational/science* perspective. Sometimes climate coverage takes the shape of 'normal' science coverage, in which science is depicted "as society's tool for reducing uncertainty" and scientists are depicted as "problem solvers". In this type of coverage, reporting focuses on the *results* of studies published in transnational scientific journals (Dunwoody 2014). Normal science journalism tends to ignore the uncertainties and caveats that come with scientific findings (Stocking 1999). The focus on novelty and the episodic presentation of science leads to "unexplained flip-flops" (Stocking 1999, p. 27) in which one week, a study reports a surprisingly fast melting of the Arctic, while the next week, another news report claims a surprisingly slow melting. A lack of contextualization has been identified as one of the prime features of 'normal' climate journalism (Boykoff 2011). For example, journalists fail to report on the range of projections from different climate models (Maurer 2011) and the calibrated language that the IPCC uses to qualify its findings as more or less 'likely' (Collins and Nerlich 2015). Normal journalistic practice simplifies science and turns context-dependent and preliminary findings into established facts. In a transnational survey, journalists with little expertise in climate reporting showed much less interest in reporting the uncertainties associated with climate sciences than those with high levels of expertise (Brüggemann, Engesser 2014). Only the expert journalists were eager to talk about uncertainties. The avant-garde of expert climate journalists may be developing a new kind of *watchdog climate journalism*. Thus, post-normal journalism practices may also revitalize classic role perceptions in journalism.

On the expert end of climate journalism, the most clear-cut 'post-normal' practices are visible. "Science-driven journalism" leaves "the complex as complex, the abstract as abstract, and the invisible as invisible" (Berglez 2011, p. 459). The prime example is Andrew Revkin

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with his *Dot Earth* Blog that is hosted on the *New York Times* website. Various studies mention Revkin as an example of the above-mentioned new type of knowledge journalism (Nisbet, Fahy 2015; also see: Kunelius et al. 2016b). He describes his own conception of his role and professional context as follows: "Through the 2000′s, the 'news hole' […] steadily shrank. But the news on my beat was explosively growing, and the complex nature and slow timeline of issues like human-driven global warming were a terrible fit with the news process, which is focused on the here and now. Dot Earth […] helped me sustain my inquiry and convey my conclusions more as a dialogue with experts and readers than a series of stiff, oversimplified articles". Following the formula of post-normal science, Revkin also provided comments in the context of the review process of a manuscript that was published in an open review journal (*Atmospheric Chemistry and Physics Discussion*), and scientists immediately called his expertise into question. One scientist blogged that "scientific review is for those who know the topic" and the editorial team of the journal affirmed: "only members of the scientific community are invited to post [… and these are] scientific researchers with an expert knowledge on the subject".[4]

(4) The *localized/science* perspective. A localized form of science journalism is the discussion of climate change in the context of local weather events like storms, droughts, heavy rainfalls, winter without snowfall, etc. Journalists following this approach typically ask climate scientists to confirm the attribution of these events to climate change. Interestingly, there is a lack of research on how exactly journalism approaches this question of attribution. One exception is Olausson (2009), who shows that extreme weather seems to trigger adaptation frames instead of the more common mitigation frames. Particularly on the question of attribution, uncertainties are high, and they differ for different phenomena (with higher certainties, for example, for heat waves but rather high uncertainties with regards to storms and wildfires).[5] We can only formulate the hypothesis that patterns of 'normal' journalism will ignore the uncertainties around this question, while post-normal journalism will engage with the issue of uncertainty and reflect on whether (and how) local communities have to take care of the specific local risks that might be due in part to climate change.

Limits of Post-normal Journalism and Implications for the Sustainability of the Climate Debate

The case of the climate blogger Andrew Revkin illustrates the limits of post-normal journalism: he is no longer part of the newsroom of the *New York Times*, nor is he accepted by climate scientists as a valid member of the scientific community. The blurring of borders between science and journalism, and between journalism and political advocacy, incurs resistance from organizations and actors (professional journalists and scientists) with vested interests in the status quo, who defend their professional autonomy against change and intrusion from the outside. Eide and Kunelius also acknowledge the "limits of post-normal journalism": in their analysis of climate summit coverage they find "resistance to new forms of journalistic engagement" and conclude that the "distanced and often implicitly cynical mode of reporting is still the default position, even in global climate matters" (2012, p. 16).

Another impediment to change is the scarce resources available for science and environmental journalism. The new kinds of journalism require journalists to have considerable expertise in the area. It also takes more time to experiment with new formats,

Brüggemann, Michael (2017): Post-normal journalism. Climate journalism and its changing contribution to an unsustainable debate. In Peter Berglez, Ulrika Olausson, Mart Ots (Eds.): What is Sustainable Journalism? Integrating the Environmental, Social, and Economic Challenges of Journalism. New York: Peter Lang, pp. 57–73. Available online at https://doi.org/10.3726/b11462.

write contextualized and interpretive accounts, and engage with sources and audiences more intensively. Journalists trapped in ever-smaller newsrooms with an expanding set of duties have a strong incentive to follow established routines rather than pursue a post-normal journalistic approach, which is a reflective and time-consuming process. Therefore, traditional science reporters are an unlikely source of innovation. Post-normal journalism practices evolve at the fringes of traditional journalism: in blogs, among highly specialized journalists, and among communicators working with NGOs, universities or as part-time freelance journalists.

This new approach to journalism – which is more transparent about its value base, more interpretive and sometimes advocates particularly viewpoints, and is open to collaboration with NGOs and scientific institutions – has ambivalent consequences for the sustainability of the climate debate. On the one hand, journalism has overcome the practice of false balance in climate reporting. On the other hand, the debate has become ever more polarized, and journalism has played a role in this polarization. Writing stories about contrarians who spread confusion and lies about climate change can be viewed as part of critical watchdog journalism. Yet, repeating it over and over again also keeps the debate fixated on the 'contrarians vs. the rest' dichotomy. In the European context, such coverage also involves giving undue attention to a very tiny group of climate change deniers. In the United States, since denial is common among the conservative political elite, a certain amount of coverage of this debate is a necessary part of journalism.

Yet, issues like climate engineering, carbon trading, attribution of extreme weather events, improving the projections from climate models, adaptation in vulnerable countries, lifestyle changes etc. need to be covered, and from a new angle that does not further cement partisan divides. Here, dialogue-style journalism that brings together different voices drawn from moderate camps, not from the extreme fringes, can help build the necessary bridges to keep the debate open and sustainable. Andrew Revkin's blog is a good example, as he invites contributions from different perspectives and adds his own voice, which is grounded in a deep immersion in the issues he discusses.

In addition to the current rise in partisan media, the public sphere needs a media that provides a platform for a plurality of voices. In this context, it would be the task of post-normal journalism to moderate and intervene to steer the debate in a civil and constructive direction. In order to do so, there is no need to pretend that one has no values, or no interest in certain political outcomes such as the effective protection of our climate. In order to rebuild trust in journalism and in the sustainability of public debates, it is important to maintain transparency and honesty about one's position in the social world and an openness to listen to other perspectives.

Media outlets with less-elite audiences may still have to simplify their descriptions of the process of climate change and climate policy. Thus, *not* using the IPCC's calibrations (e.g., 'likely') in journalistic coverage may be in the best interests of the reader, as a study has shown that the meaning of the verbal translations of the IPCC (10 percent margin of error being communicated as 'very likely', etc.) are leading audiences to underestimate the certainty of climate projections (Budescu et al. 2014). Journalists need to bridge the gap between science and their specific audiences to generate different forms of "good" climate journalism.

Journalists will need to engage in conscious bridge-building efforts in order to refocus the debate away from contrarian voices who deny the existence of anthropogenic climate

change. Sustainability journalism may thus need to reframe the climate debate. It needs to provide context and interpretation, but should also engage different voices in constructive dialogue on issues so that real political or scientific debates are taking place. All of this is already happening on the fringes of climate journalism. This is where to look for the re-invention of a challenged profession.

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[2] For its adaptation to analyze the climate sciences, see e.g., the contributions of Krauss, Schäfer and v. Storch ((2012)) and Hulme ((2009)).

[3] https://www.theguardian.com/media/2015/may/21/news-organisations-climate-change-content-guardian (accessed 22.8.2016).

[4] For Revkin's report on the review incident, see http://dotearth.blogs.nytimes.com/2015/07/25/a-rocky-first-review-for-a-climate-paper-warning-of-a-stormy-coastal-crisis/?_r=0 (23.8.2016)

[5] For the state of research in 2016, see https://nas-sites.org/americasclimatechoices/other-reports-on-climate-change/attribution-of-extreme-weather-events-in-the-context-of-climate-change/ (23.8.2016)