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Climate change and extreme weather in the USA: discourse analysis and strategies for an emerging 'public'

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Abstract This paper discusses how economic impacts of extreme weather events in the USA could, and are, leading to the creation of an 'extreme weather public' whose discourse has the opportunity to break the deadlock currently surrounding issues of State and Federal adaptation strategies. By taking an interdisciplinary perspective and combining literature on the formation of publics, the political and economic impacts of extreme weather, and popular discourse in the US climate debate, this paper demonstrates how extreme weather events can gather politically powerful and influential actors and how those actors might use their status to interact with current forms of climate change discourse. Special emphasis is paid to the ways in which a focus on the economic impacts of weather extremes could avoid many of the current 'framing traps' laid by climate 'sceptics' and move the debate towards more proactive adaptive action in the USA' most vulnerable regions.

Keywords Extreme weather · Publics · Public opinion · Disaster losses · Climate change · Adaptation

Introduction

The Intergovernmental Panel on Climate Change (IPCC) define an extreme weather event as 'the occurrence of a value of a weather or climate variable above (or below) the threshold value near the upper (or lower) ends of the range of observed values of the variable' (IPCC 2012, p. 5). Thus, for example, a rainfall event could be called extreme if it fell in the tails of the rainfall probability distribution for a certain region, occurring, for example, only 5 % or less of the time. By definition, the characteristics of what is called extreme weather will vary from place to place in an absolute sense as an extreme temperature in one place may be the norm in another. Extreme weather events can also vary in spatial scale and duration from small-scale local extreme weather events that are short lived to more complex event driven extremes such as droughts and floods (Easterling et al. 2000). However, what links these phenomena together is that they deviate from normal weather patterns enough to warrant being labelled 'extreme'.

Whilst the above definitions highlight that extreme weather events have and will continue to occur due to natural climate variability, superimposed on this risk is the threat of anthropogenic climate change. The 2007 review by the IPCC concluded that global atmospheric warming of the climate system is 'unequivocal' and warming over the past 50 years is attributable to human activities. The global temperature has risen by 0.74 °C in the last 100 years (from 1906 to 2005), and global temperature is projected to increase by 2.4–6.4 °C by 2100 (relative to 1980–1999) (IPCC 2007a). Changes in long-term mean climate are important; however, the consequences of shifts in the intensity and frequency of extreme weather events are likely to result in significantly larger impacts on society, the economy and the environment (Beniston 2007). Whilst it is extremely difficult, if not impossible, to directly link and attribute any particular extreme weather event to anthropogenic climate change, simple statistical reasoning allows us to express how a relatively small change to the distribution of a

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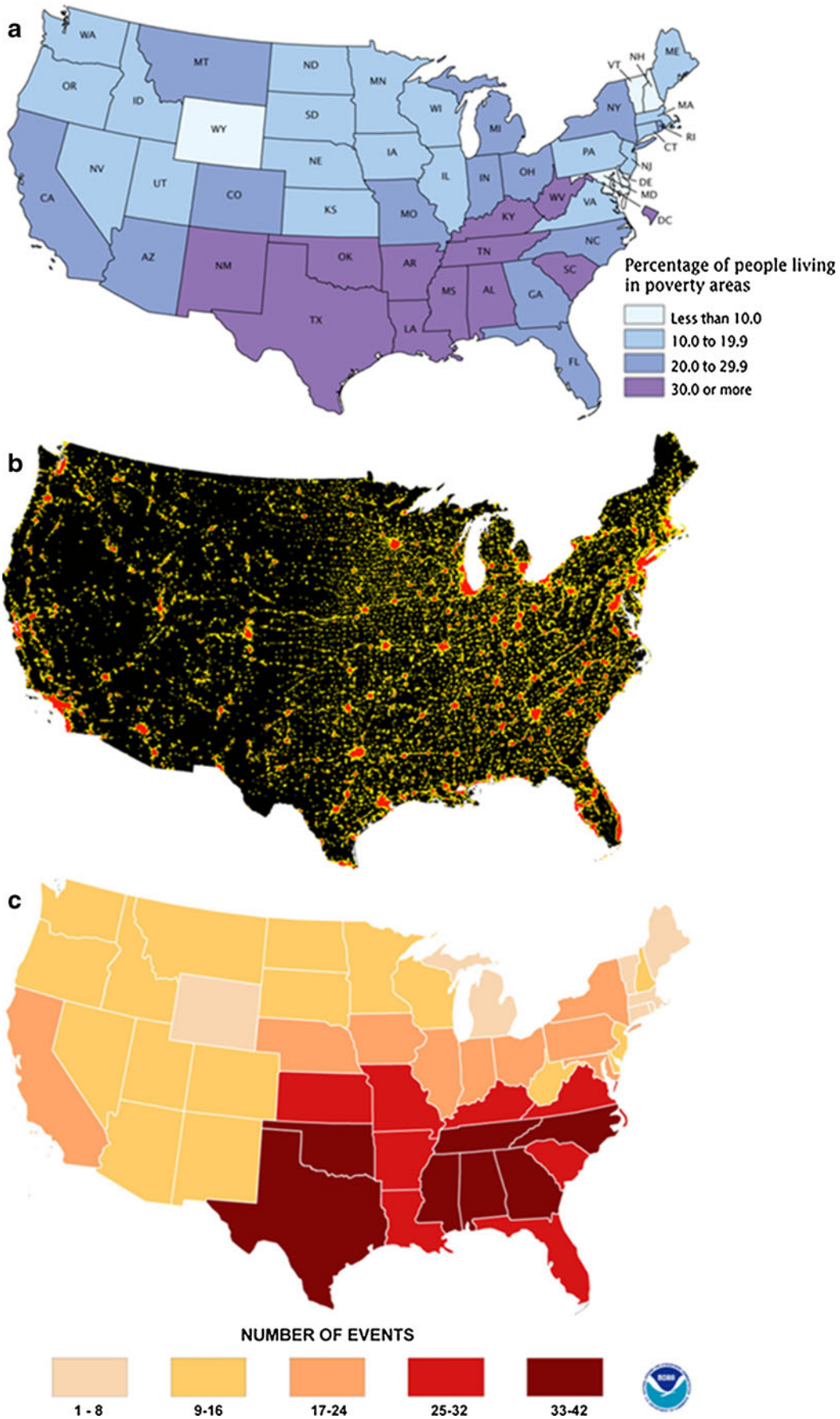
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Percentage of people living in poverty areas
Less than 10.0
10.0 to 19.9
20.0 to 29.9
30.0 or more
b
c
NUMBER OF EVENTS
1 - 8
9-16
17-24
25-32
33-42

◀ **Fig 1** Comparison of the spatial pattern of **a** the percentage of people living in poverty areas in 2006–2010, **b** spatial pattern of urbanisation derived from city lights data in 2000 (urban areas are shown in *red* and peri-urban areas in *yellow* and **c** frequency of billion dollar weather/climate events from 1980–2011 (Source: US Census Bureau 2010; NASA 2000; NOAA 2012)

weather variable could affect the frequency and severity of extreme weather events. Evidence from observations gathered since 1950 already suggests that there has been some sign of change in extreme weather events in certain regions of the world as a result of anthropogenic climate change, and projections for the future highlight such trends could continue (IPCC 2012).

Responses to climate change take one of two forms, adaptation or mitigation. In the context of climate change, adaptation can be defined as initiatives and measures that reduce the vulnerability of natural and human systems against actual or expected climate change effects. Various types of adaptation exist, including anticipatory, autonomous, or planned. Mitigation can be defined as any social, economic, or technological policies that reduce greenhouse gas sources and emissions and enhance greenhouse gas sinks (IPCC 2007b). Until relatively recently, the main focus at the national and international level was predominantly on climate change mitigation, although the role of adaptation and increased adaptive capacity has been steadily rising up political agendas. Moreover, combining these two strategies is often presented as the most efficient way to tackle climate change and its impacts. Opportunities are being sought to develop synergies between the two options, which would appear reasonable given that the level of climate change impacts, and whether or not this level is dangerous is determined by both mitigation and adaptation efforts (Klein et al. 2005). Indeed, the Obama Administration has advocated combining these two strategies as the best way to combat climate change and its impacts in the USA and around the world (The White House Council on Environmental Quality 2010).

Whilst much of the current debate on the changing frequency and intensity of extreme weather events and the attribution of events to climate change is scientific in nature [e.g. see inter alia (Pall et al. 2011; Otto et al. 2012)], discussions of extreme weather have recently become a common occurrence in the US climate discourse, primarily due to the large economic and social impacts that such events can inflict. Most recently illustrated following hurricane Sandy, which made landfall in the US on the 29th October 2012, with high winds, storm surges and extensive flooding affecting the densely populated North-East coast. Recent estimates suggest that New York State alone will face costs of $42 billion for rebuilding and prevention measures, with 305,000 houses damaged or destroyed, 2.2 million residents losing power, and 265,300 businesses affected by the storm (Raval 2012). In the aftermath, New York Governor Andrew Cuomo, former President Bill Clinton, and New York Mayor Michael Bloomberg all referred to the impact that climate change could have on such extreme events, moving the issue of climate change back into national discourse (Gammon 2012). Consequently, this paper discusses the possibilities of new discourses, and political actors, emerging in the aftermath of extreme weather events. By taking an interdisciplinary approach and combining current literature on the formation of publics, the political and economic impacts of extreme weather events and popular discourses in the US climate debate, this paper seeks to highlight ways in which extreme weather events could create a unique opportunity to make the case for US climate adaptation.

The paper begins with a summary of current trends in extreme weather events and their economic impacts in the USA. Secondly, the lack of current US adaptive strategies is highlighted as well as possible reasons for inaction. Next, the paper introduces the concept of a 'public' and showcases the actors that might compose an 'extreme weather public', that is, a group united by their shared concern with the impacts of extreme weather events. The paper then places this extreme weather public in the context of current debate around domestic adaptation in the USA to highlight how it could influence popular climate change discourses. Finally, by introducing the concept of an extreme weather public, it is argued that such a public could offer the opportunity to unhinge the two strategies of climate change mitigation and adaptation and focus on what might be the more politically achievable short-term goal of adaptation.

Extreme weather in the USA

The USA has historically been at particular economic risk from hurricanes, tropical storms, floods, blizzards, fires, heat waves and droughts. Lazo et al. (2009) found that historically climate variability had caused losses of 3.6 % of annual gross domestic product (GDP) across 11 key economic sectors of the US economy, equating to annual losses of $485 billion (in 2008 US$). In terms of billion dollar events, the south-east USA appears to have been particularly vulnerable over the last 30 years (e.g. see Fig. 1c above), with many of the billion dollar events outside of this region happening within the last 10 years (NOAA 2012). Individual climate extremes can have catastrophic impacts, for example Hurricane Katrina in 2005. The economic losses from Hurricane Katrina have been estimated at over $200bn, the most costly disaster ever to strike the USA (Burby 2006), whilst socially it caused the displacement of over 250,000 people, the death of over 1,800 people and the further impoverishment of hundreds of thousands of people (Ackerman 2007).

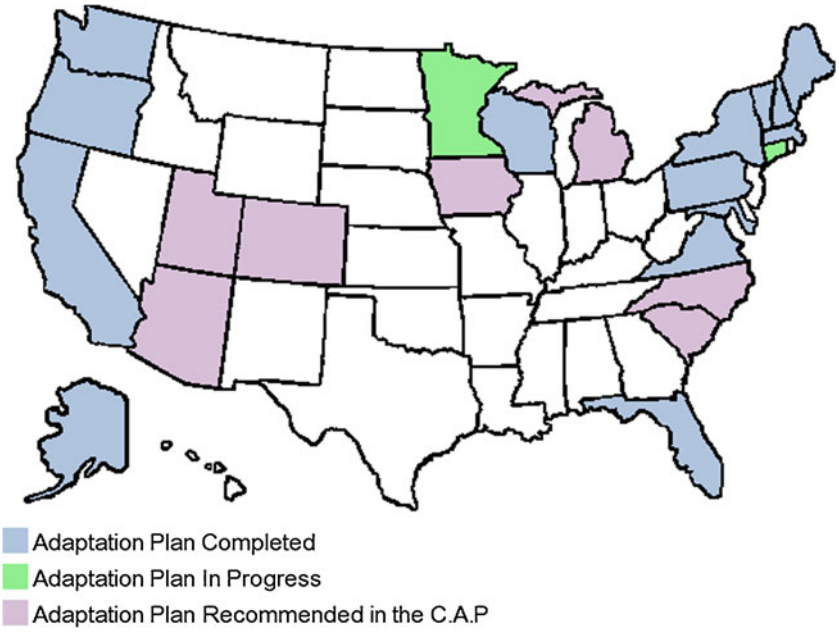

Fig 2 Climate change adaptation plans by state as of April 5th, 2012 (source: C2ES 2012

As noted the impacts of individual extreme weather events can vary greatly over time and space and are highly dependent on the underlying vulnerability and exposure of affected regions and populations. Settlement patterns, urbanisation and changes in socio-economic conditions are all factors that influence exposure and vulnerability. As such, socio-economic change is considered a principal factor in the increasing trend in economic losses from extreme weather events seen over the twentieth and early twenty-first century (Pielke and Sarewitz 2004), although climate change is expected to play a more dominant role in the future occurrence and severity of extreme weather events, and their economic and social impacts, given the recent projections of the IPCC (2012).

In the past decades, the USA has experienced major transformations in terms of population, development patterns, economic conditions and social characteristics (Cutter and Finch 2008). The importance of social vulnerability in understanding potential impacts of hazards such as extreme weather events has resulted in the development of more quantitative frameworks, models and vulnerability assessment techniques being developed (Cutter et al. 2008). For the USA, one approach to quantifying vulnerability has been through the integration of a wide range of county-level socioeconomic and demographic data to construct the Social Vulnerability Index for environmental hazards (Cutter et al. 2003). Such maps are highly valuable to highlight geographical variation in social vulnerability in the USA and those areas that have lower capacity for preparedness and response.

Importantly, many of the country's poorest communities are found in vulnerable locations. This is illustrated in Fig. 1a, which highlights what is called by political pundits the 'poverty belt' of the USA, ranging from New Mexico in the Southwest to West Virginia in the Mid-Atlantic region. Comparing Fig. 1a with Fig. 1b and c highlights how high disaster losses can also correspond to regions with high social vulnerability and urbanisation. This example is also in line with the more detailed study of Cutter et al. (2003), which noted that, in general, the most vulnerable counties in the USA appear in the southern half of the nation. Consequently, identifying and understanding social vulnerability and addressing the relationship between vulnerability and physical hazards have great importance for understanding the economy, policies and for planning climate change adaptation and mitigation strategies.

Adaptive responses to climate change in the USA

Adaptive action plans can be created at the federal, state and local levels; however, action at the federal level is incredibly important because 'it owns and manages a significant number of holdings and natural resources; its programs, regulations and guidelines affect the ability of others to adapt; it is an important provider of technical, fiscal, and other support; and it plays a crucial role in dealing with impacts that cross geographic or jurisdictional boundaries' (Smith et al. 2010, p. 6). For example, the National Flood Insurance Program aims to encourage States and local governments to recognise and incorporate flood hazards in their land use and development decisions, with 21,885 participating communities (FEMA 2012). Incentives for participating communities adversely affected include disaster relief payments, low-cost loans to ease business recovery and subsidised flood insurance (Burby 2006).

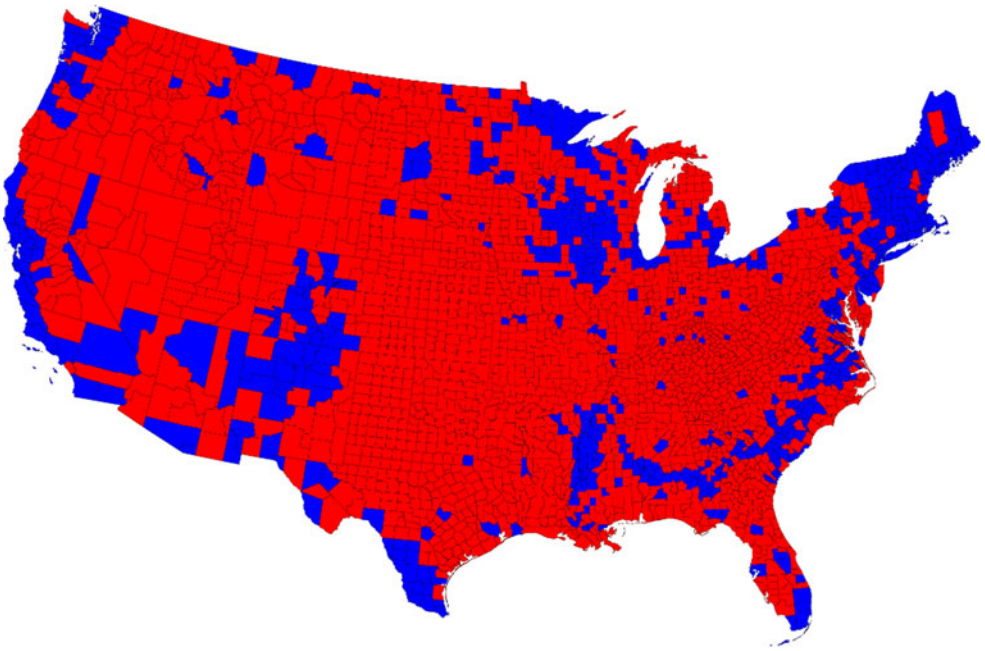

Fig 3 2012 presidential election results at the county-level in the continental USA. *Red counties* were won by Republican candidate Mitt Romney; *blue counties* were won by democratic candidate Barak Obama (source: Newman 2012)

Congress has yet to pass a climate bill revealing the lack of a strong and collective position on climate change mitigation and adaptation in the Senate and House of Representatives. However, under President Obama, executive branch departments, such as the Department of Commerce and the Department of the Interior, have begun incorporating climate adaptation strategies into their internal planning processes. Nonetheless, these initiatives are still in their early stages and often fail to synchronise activities with State and local governments, thus ignoring the role the Federal government can play as a catalyst and coordinator to more localised actions (C2ES 2012). For example, 'the wake of Hurricane Katrina provided an opportunity for the federal government to use the public concern created by the disaster to spur more local governments to prepare comprehensive plans that address hazard mitigation' (Burby 2006, p. 173). Yet, integrated national adaptation strategies which aim to synchronise adaption measures and strategies at federal, state and local levels remain limited. In addition to a lack of adaptive action at the Federal level, many states lack adaptation plans as well, as shown in Fig. 2. Interestingly, when compared to Fig. 1a–c, it can be seen that many of the states that lack a climate adaptation plan are also those which are potentially most vulnerable to climate extremes and their subsequent economic impacts.

Some adaptation and mitigation strategies are politically unfeasible as governments are reluctant to invest today to reduce losses in some unknown and future point, potentially outside of their election cycle (McBean 2004), as they lack the blessing of public consensus, or as they do not register highly on the voter's list of concerns. For example, top priorities for voters in 2012 were the economy and jobs (The Pew Research Centre for the People and the Press 2012). In 2009, only 30 % of voters considered the issue of global warming a top priority, less than half that accorded to such things as terrorism, social security and education (The Pew Research Centre for the People and the Press 2009). This low priority placed on global warming is apparent by the issue's lack of presence completely as a response in 2012. Whilst conclusions about this omission are difficult to draw (e.g. respondents might have considered global warming under the category of environment in 2012, which has made gains in voter interest since 2009), it can also be taken as indicative of the lack of enthusiasm around the issue as it is currently framed.

Furthermore, global warming and climate change have become increasingly partisan issues, with most sceptics belonging to the Republican party or the political right (Borick and Rabe 2012a). McCright (2011) and McCright and Dunlap (2011) highlight the direct effect of political orientation on public opinion on climate change, noting that Democrats report beliefs more in line with the scientific consensus on climate change compared to Republicans. This stems from the polarisation of the issue of climate change by Democratic and Republican policy-makers based on key political goals and the fragmentation of news media in recent years. As such, citizens are likely to obtain their news from news stations compatible with their own political beliefs.

Comparing Fig. 1 with Fig. 3 above, it can be seen that many of the states in the south and south-east, which suffer from frequent climate extremes and some of the largest disaster losses are firmly right-leaning in their recent election decisions. Consequently, many communities potentially highly vulnerable to extreme weather events appear to back a political position, which would inhibit strong and concerted action on climate change.

Whilst current Republican officials may seem uninterested in action on climate change, or sceptical of the underlying science which precedes mitigation or adaptation policies, recent polls have suggested that some members of the right are beginning to warm up to global warming (The Pew Research Centre for the People and the Press 2011). However, there are still many arguments made against doing anything in connection with climate change and many people who remain unconvinced of the need for action.

These arguments for inaction, which feed into the current climate debate, can be considered in terms of three broad categories. Firstly, there are the questions that surround the scientific evidence, such as global warming is not occurring or human activity is not the cause of global warming. As previously stated the predominant consensus of the climate science community is that global atmospheric warming of the climate system is unequivocal and warming over the past 50 years is attributable to human activities (IPCC 2007a). However, the US conservative movement and virtually the entire Republican party have become fundamental in opposing this position, challenging the credibility of the climate science and spreading doubt and uncertainty about the reality of the issue (e.g. McCright 2011; Elsasser and Dunlap 2013; McCright and Dunlap 2010).

Secondly, there are arguments surrounding the domestic policy implications which can represent a fear of the expanded role of government through regulation, intervention in markets and restrictions on property rights, all issues that run counter to aims of Republicans (McCright and Dunlap 2011). Thirdly, arguments centre on foreign policy implications. Legally binding treaties such as the Kyoto Protocol can be seen as directly threatening sustained growth, free markets, national sovereignty and the continued abolition of government regulation (McCright 2011). It is argued that as a large emitter of greenhouse gas emissions, the USA would bear a disproportionate cost of emission reductions, whilst not necessarily bearing the largest gains from avoiding dangerous climate change (Sunstein 2007). For example, in 1997, the US Senate passed the Hagel-Byrd Resolution not to ratify any treaty that would impose mandatory emission reductions on the US without imposing such restrictions on developing nations, or which would result in serious harm to the economy (McCright and Dunlap 2003).

Furthermore, as a large industrialised emitter of greenhouse gases, the USA could be called out by other nations as being politically or financially liable for many of the effects of climate change such as extreme weather events and their related economic impacts in other countries. Tol and Verheyen (2004) note that international law provides a basis for responsibility for climate change impacts whereby States shall not inflict damage on or violate the rights of other States. Issues of liability have also been raised following the 2012 UN climate talks in Qatar following the agreement of nations that developing countries particularly vulnerable to the negative effects of climate change could have a right to redress from major polluting nations (although the US delegation was reported to have worked hard to ensure there was no explicit mention of compensation or litigation) (Pearce 2013).

Such concerns animate those in opposition to climate change adaptation, and especially mitigation strategies, but it could be argued that weather extremes and the 'publics' they gather can interact with these arguments in ways that hold the power to move the debate forward.

The creation of an 'Extreme Weather Public'

A 'public' can be defined as being created by an issue. As described by Dewey, 'when a family connection, a church, a trade union, a business corporation, or an educational institution conducts itself so as to affect large numbers outside itself, those who are affected form a public which endeavors to act through suitable structures' (Dewey 1927, pp. 29–30). Public formation for Dewey centres on affected populations. Individuals are affected and wish to respond, leading them to address the issues affecting them through the structures and institutions available to them. This conception of a public is different than the prevalent conception of a singular 'public'—one, homogenised and easily represented through public opinion. Dewey's work on public formation built on and responded to the deconstruction of a singular 'Public Opinion' in the work of Lippman (1922, 1925). Dewey (1927) sees a multitude of publics all seeking to bring their concerns and perspectives to the attention of others. In this model, individuals can be members of multiple publics in accordance with their multiplicity of concerns. In this way, a movement seeking to address climate change is in fact many smaller movements, or publics, which have overlapping aims. For instance, some groups are focussed on adaptation, whilst others call for mitigation. Some publics strive for international action, whilst others are focussed on domestic and local level action. Every actor can be seen to have their own interests, will share some with others and have some that are uniquely their own.

The actors gathered by extreme weather events are varied and may often be newcomers to the US climate debate. Weather extremes are having an increasing impact on the US economy in many ways, and financial firms, homeowners, insurance companies, small and large businesses and local governments are all growing increasingly aware of potential disaster losses and are interested in minimising the risk, exposure and vulnerability of their personal and financial interests. In keeping with the theory of public formation outlined by Dewey, as the scientific understanding of climate extremes continues to become clearer, and the economic impacts of these extremes are better modelled and understood, this

extreme weather public will increasingly recognise the increasing risk their assets face. For many firms, especially insurers, this awakening to the risk of extreme weather events is already taking place as 'without adaptation to climate change, a tremendously high human and economic price will be paid by both the developed and developing world' (Swiss Re 2012).

Likewise, extreme weather events can gather actors through personal experience and the risk or reality of economic loss. There is an expanding literature on how, and if, personal experience influences an individual's belief in climate change (Myers et al. 2013; Akerlof et al. 2013). This literature ranges from those who find no causal connection between personal experience and climate change belief (Brulle et al. 2012; Scruggs and Benegal 2012) to those who find that experience of weather and climate extremes do have an effect on rates of belief (Borick and Rabe 2012b; Egan and Mullin 2012; Howe et al. 2013; Spence et al. 2011). If the findings of this latter group hold true, we could reasonably expect increasing rates of belief in climate change in tandem with the increasing frequency of weather and climate extremes.

For example, a recent poll reported that 24 % of respondents cited changing and extreme weather as the main reason why they believe climate change is occurring (Borick and Rabe 2012a). Similarly, a September 2012 survey published by the Yale project on Climate Change Communication highlights the increasing role unusual and extreme weather is having on the climate change awareness of affected populations (Leiserowitz et al. 2012). For example, 74 % of Americans felt that global warming was affecting weather in the USA. When asked about six recent extreme weather events in the USA, the majority responded that global warming made each event worse and were most likely to connect global warming to the record high temperatures of the summer of 2012. There has been an increased focus on modelling and understanding changing patterns of extreme weather events since the 1990s (Meehl et al. 2000); however, as a whole, the potential risks of these events in terms of quantified economic and social impacts are less well known. As such, there has been limited linkage between the science of climate change and the actual implications of this for society at a personal level. Yet, the above polls highlight how personal experience of extreme weather is one key feedback, which can be identified. Therefore, regardless of whether weather extremes and their impacts can be attributed to climate change or not, if the number of people experiencing such events and the negative economic and social consequences increase, this could continue to directly influence wider opinions on climate change.

As mentioned previously, increasing economic damages relating to extreme weather events can largely be attributed to socio-economic change affecting the vulnerability and exposure of society. Consequently, in order to stop the economic damages, it makes sense to adapt our social and infrastructure systems. The threat of increasing weather extremes, and their subsequent economic costs, can make the case for adaptive action in two ways. Firstly, those involved in this extreme weather public include highly influential actors in political and economic spheres. Insurance companies, financial firms, local and state governments and business owners can all be impacted by extreme weather events. These groups are important in US political discourse as well. Job creation statistics, the Dow Industrial Average and GDP projections are popularly accepted as key indicators of the economic health of the USA. Each one of the above-mentioned actors constitutes a powerful business lobby and plays a key role in the economic life of the USA, and due to the recent 'Citizens United' Supreme Court case, these actors are allowed to make unlimited campaign contributions. An extreme weather public is in a good position to influence policy makers to address the economic impacts of weather extremes and help these actors manage the risks of extreme events through adaptive action. Some from this extreme weather public, such as those in the insurance industry, are already calling on the senate to acknowledge the role that climate change can play in terms of extreme weather related losses, calling for action and a national policy related to climate and weather (Speer 2012).

Secondly, the discourse of an extreme weather public has the potential to sidestep the argument about human causality, which can act as roadblocks to adaptive action. The human causality of climate change need not be material to the debate about building resilience to climate extremes in the USA. Whether or not officials believe anthropogenic interference is to blame, there is a case for a national adaptation strategy. This argument is based on the notion that many people who deny the human causality of climate change are still willing to accept the fact that the climate is changing and that extreme events are occurring more often with larger environmental and economic impacts. Whether this is due to natural climate variability, socio-economic change or greenhouse gas emissions can be side-lined whilst still finding common ground on the fact that these changes are happening. The fact that they are happening is currently a less politicised epistemological claim. The argument here is to shift the debate in the shorter term from questions of why, to questions of how often and with what effect.

This approach could still raise issues when considering adaptive responses in the longer term due to potential mal- or under-adaptation if future scenarios of climate change were not considered. However, key indicators of the effectiveness of an adaptation action are robustness to uncertainty and flexibility in response to altered circumstances (Adger et al. 2005). Consequently, issues of causality if addressed at a later date could then feed into adaptation strategies in

place if such strategies are developed in an effective and sustainable manner.

Furthermore, the discourse of an extreme weather public can sidestep many of the arguments cited earlier for adaptive inaction making it a potent discourse for action. The EPA and FEMA need not grow in size or power in order to help implement adaptive policies; local and state governments can take the lead alongside local businesses. An example of this decentralised approach can be seen in the C40 Climate Leadership Group, wherein large cities such as New York, Tokyo and Rio De Janeiro gather to exchange best practices and experience whilst implementing adaptation and mitigation policies in their respective cities.

In addition, since the discourse of an extreme weather public need not be interested in arguing about the human causality of extreme weather, mitigation can be left out of the debate in this instance. An extreme weather public can focus solely on adaptation at the federal, state and local levels leaving foreign policy and mitigation concerns for other active publics to argue. This deferral of causality and a "wait and see" attitude is not ideal as due to the inertia of the climate system, even if emissions were stabilised today, we can still expect additional climate change in the twenty-first century (IPCC 2007a). This issue has not been well understood by the public in the USA in the past (Sterman and Sweeney 2002), and continued delays will only exaggerate the future impacts. However, whilst mitigation strategies may reduce the likelihood of extreme weather events and their impacts occurring in the longer term, in the shorter term, governments and policy makers must still prepare for and adapt to such climate risks. Mitigation alone is insufficient to address primary factors underlying extreme weather events, their impacts and the underlying vulnerability of society, and as such, adaptation can be considered as an equally important goal (Pielke and Sarewitz 2004). Furthermore, debate over climate change and mitigation policies has been shown to be a contentious and dividing topic in political contexts whilst adaptation is steadily rising in prominence in the USA at a federal, state and local level (Moser 2011). Therefore, it makes sense to invest capital, both political and economic, in measures that reduce society's vulnerability to extreme weather events. Whilst climate change activists have faced difficulty convincing governments to proactively approach and tackle this issue, perhaps an emerging extreme weather public like the one sketched above can prevail.

Conclusion

Extreme weather events gather a politically powerful network of actors. Personal experience and economic impacts form the locus point for this emerging public. Therefore, the discourse of an extreme weather public is uniquely positioned to influence policy makers and sidestep many of the arguments raised by those who favour adaptive inaction. The emergence of an extreme weather public, as outlined in this paper, will not be able to bring closure to necessary debates on the human influence on climate change, the proper role of mitigation as a response to climate change or the international impacts and need for cooperation between nations. However, by bracketing out these questions, an extreme weather public could make a stronger economic case for increased adaptation in the USA in the near term, and present a palatable alternative for voters who are not ready, or willing, to engage with the wider climate change narrative. Much in the way that the IPCC sees its recommended 'low-regret' adaptive measures laying the foundation for future action, the construction of an extreme weather public, and their discourse, can be seen to lay the foundations for future climate action if the populace engages and becomes increasingly convinced of anthropogenic contributions to climate change. This strategy could protect financial assets in the short term whilst laying a framework for future climate change mitigation and adaptation strategies. Indeed, as Latour (2005) notes, "We might be more connected to each other by our worries, our matters of concern, the issues we care for, than by any other set of values, opinions, attitudes or principles". The conception of an extreme weather public focusses on the economic concerns both Democrats and Republicans share and tries to steer clear of the well-known arguments that could stall a national adaptive strategy and find a point of agreement, domestic adaptation, between American climate 'believers' and 'sceptics'.

References

Ackerman F (2007) Debating climate economics: the Stern review vs. its critics. A report to friends of the Earth–UK. Tufts University. http://ase.tufts.edu/gdae/pubs/rp/sterndebatereport.pdf. Accessed 28 Oct 2012

Adger N, Arnell N, Tompkins E (2005) Successful adaptation to climate change across scales. Glob Environ Chang 15:77–86

Akerlof K, Maibach EW, Fitzgerald D, Cedeno A, Neuman A (2013) Do people "personally experience" global warming, and if so how, and does it matter? Glob Environ Chang 23:81–91

Beniston M (2007) Linking extreme climate events and economic impacts: examples from the Swiss Alps. Energy Policy 35:5384–5392

Borick C, Rabe B (2012a) Fall 2011 National Survey of American Public Opinion on Climate Change. Issues in governance studies, vol 44. The Brookings Institution, Washington

Borick C, Rabe B (2012b) Weather or not? Examining the impact of meteorological conditions on public opinion regarding climate change. APSA 2012Meeting Paper. http://ssrn.com/abstract=2108207. Accessed 27 Feb 2013

Brulle RJ, Carmichael J, Jenkins JC (2012) Shifting public opinion on climate change: an empirical assessment of factors influencing concern over climate change in the US, 2002–2010. Clim Chang 114:169–188

Burby RJ (2006) Hurricane Katrina and the paradoxes of government disaster policy: bringing about wise governmental decisions for

hazardous areas. The ANNALS of the American Academy of Political and Social Science 604:171–191
C2ES (2012) State adaptation plans. Center for Climate and Energy Solutions (C2ES). http://www.c2es.org/us-states-regions/policy-maps/adaptation. Accessed 6 Nov 2012
US Census Bureau (2010) 2006–2010 American community survey. US Census Bureau. http://www.census.gov/acs/www/. Accessed 9 Aug 2012
Cutter SL, Finch C (2008) Temporal and spatial changes in social vulnerability to natural hazards. Proc Natl Acad Sci 105:2301–2306
Cutter SL, Boruff BJ, Shirley WL (2003) Social vulnerability to environmental hazards. Soc Sci Q 84:243–261
Cutter SL, Barnes L, Berry M, Burton C, Evans E, Tate E, Webb J (2008) A place-based model for understanding community resilience to natural disasters. Glob Environ Chang 18:598–606
Dewey J (1927) The public and its problems. Henry Holt, New York
Easterling DR, Meehl GA, Parmesan C, Changnon S, Karl T, Mearns LO (2000) Climate extremes: observations, modeling and impacts. Science 289:2068–2074
Egan PJ, Mullin M (2012) Turning personal experience into political attitudes: the effect of local weather on Americans' perceptions about global warming. The Journal of Politics 1:1–14
Elsasser SW, Dunlap RE (2013) Leading voices in the Denier Choir: conservative columnists' dismissal of global warming and denigration of climate science. American Behavioral Scientist. doi:10.1177/0002764212469800
FEMA (2012) The National Flood Insurance Program Community Status Book. Federal Emergency Management Agency. http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book. Accessed 27 Feb 2013
Gammon C (2012) Will Sandy change the climate change conversation? Scientific America. http://wwwscientificamericancom/articlecfm?id=will-sandy-change. Accessed 7 Nov 2012
Howe PD, Markowitz EM, Lee TM, Ko CY, Leiserowitz A (2013) Global perceptions of local temperature change. Nature Climate Change 3:352–356. doi:10.1038/nclimate1768
IPCC (2007a) Climate Change 2007: The physical science basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge
IPCC (2007b) Climate change 2007: mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge
IPCC (2012) Managing the risks of extreme events and disasters to advance climate change adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge
Klein RJT, Schipper ELF, Dessai S (2005) Integrating mitigation and adaptation into climate and development policy: three research questions. Environmental Science & Policy 8:579–588
Latour B (2005) From Realpolitik to Dingpolitik or how to make things public. In: Latour B, Weibel P (eds) Making things public: atmospheres of democracy. MIT Press, London, pp 14–41
Lazo JK, Lawson M, Larsen PH (2009) United States economic sensitivity to weather variability. Working Paper. National Center for Atmospheric Research–Societal Impacts Program, Colorado
Leiserowitz A, Maibach E, Roser-Renouf C, Feinberg G, Howe P (2012) Extreme weather and climate change in the American mind. Yale Project on climate change communication. Yale University and George Mason, New Haven
Lippmann W (1922) Public opinion. Free Press Paperbacks, New York
Lippmann W (1925) The phantom public. Transaction Publishers, New Brunswick
McBean G (2004) Climate change and extreme weather: a basis for action. Nat Hazard 31:177–190
McCright AM (2011) Political orientation moderates Americans' beliefs and concern about climate change. Clim Chang 104:243–253
McCright AM, Dunlap RE (2003) Defeating Kyoto: the conservative movement's impact on U.S. climate change policy. Soc Probl 50:348–373
McCright AM, Dunlap RE (2010) Anti-reflexivity: the American conservative movement's success in undermining climate science and policy. Theory, Culture & Society 27:100–133
McCright AM, Dunlap RE (2011) The politicization of climate change and polarization in the American public's views of global warming, 2001–2010. Sociol Q 52:155–194
Meehl GA, Zwiers F, Evans J, Knutson TR, Mearns LO, Whetton P (2000) Trends in extreme weather and climate events: issues related to modeling extremes in projections of future climate change. Bull Am Meteorol Soc 81:427–436
Moser SC (2011) Adaptation, mitigation, and their disharmonious discontents: An essay. Clim Chang 111:165–175
Myers TA, Maibach EW, Roser-Renouf C, Akerlof K, Leiserowitz A (2013) The relationship between personal experience and belief in the reality of global warming. Nature Climate Change 3:343–347. doi:10.1038/nclimate1754
NASA (2000) Lighting up the ecosphere. NASA. http://science.nasa.gov/science-news/science-at-nasa/2000/ast15nov_1/. Accessed 7 Sept 2012
Newman MEJ (2012) Maps of the 2012 US presidential election results. University of Michigan. http://www-personal.umich.edu/~mejn/election/2012/. Accessed 8 Nov 2012
NOAA (2012) A climatology of 1980–2003 extreme weather and climate events. NOAA. http://www.ncdc.noaa.gov/oa/reports/billionz.html#narrative. Accessed 26 Apr 2012
Otto FEL, Massey N, van Oldenborgh GJ, Jones RG, Allen MR (2012) Reconciling two approaches to attribution of the 2010 Russian heat wave. Geophys Res Lett 39:L04702
Pall P, Aina T, Stone DA, Stott PA, Nozawa T, Hilberts AGJ, Lohmann D, Allen MR (2011) Anthropogenic greenhouse gas contribution to flood risk in England and Wales in autumn 2000. Nature 470:382–385
Pearce F (2013) Should polluting nations be liable for climate damages? Yale University.http://e360.yale.edu/feature/should_polluting_nations_be_liable_for_climate_damages/2609/. Accessed 27 Feb 2013
Pielke R, Sarewitz D (2004) Bringing society back into the climate debate. Popul Environ 26:255–268
Raval A (2012) NY losses from Sandy hit $42bn. The Financial Times. http://www.ft.com/cms/s/0/ee4d3ca2-37e7-11e2-b8d3-00144feabdc0.html#axzz2DRTk1AWw. Accessed 26 Nov 2012
Scruggs L, Benegal S (2012) Declining public concern about climate change: can we blame the great recession? Glob Environ Chang 22:505–515
Smith JB, Vogel JM, Cruce TL, Seidel S, Holsinger HA (2010) Adapting to climate change: a call for federal leadership. Pew Center on Global Climate Change, Arlington
Speer P (2012) Climate change: insurers confirm growing risks, costs. Insurance Networking News. http://www.insurancenetworking.com/news/insurance-climate-change-risk-ceres-30007-1.html. Accessed 2 Mar 2012
Spence A, Poortinga W, Butler C, Pidgeon NF (2011) Perceptions of climate change and willingness to save energy related to flood experience. Nature Climate Change 1:46–49
Sterman JD, Sweeney LB (2002) Cloudy skies: assessing public understanding of global warming. Syst Dyn Rev 18:207–240
Sunstein CR (2007) The world vs. the United States and China—the complex climate change incentives of the leading greenhouse gas emitters. UCLA L Rev 55:1675

Swiss Re (2012) Strengthening society's resilience to climate change. Swiss Re. http://www.swissre.com/rethinking/Strengthening_societys_resilience_to_climate_change.html. Accessed 24 Sept 2012

The Pew Research Centre for the People and the Press (2009) On Obama's desk: economy, jobs trump all other policy priorities. The Pew Research Centre for the People and the Press, Washington

The Pew Research Centre for the People and the Press (2011) More moderate republicans see evidence of warming: modest rise in number saying there is "solid evidence" of global warming. The Pew Research Centre for the People and the Press, Washington

The Pew Research Centre for the People and the Press (2012) Social issues rank as lowest priorities: with voters focused on economy. Obama lead narrows. The Pew Research Centre for the People and the Press, Washington

The White House Council on Environmental Quality (2010) Progress report of the interagency Climate Change Adaptation Task Force: recommended actions in support of a national climate change. The White House. http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation. Accessed 10 Apr 2012

Tol RS, Verheyen R (2004) State responsibility and compensation for climate change damages—a legal and economic assessment. Energy Policy 32:1109–1130