

BEST PRACTICES FOR ATTRIBUTING CLIMATE CHANGE
TO EXTREME WEATHER EVENTS IN MEDIA

by

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A THESIS

Presented to the School of Journalism and Communication
and the Robert D. Clark Honors College
in partial fulfillment of the requirements for the degree of
Bachelor of Arts

June 2019

An Abstract of the Thesis of

Haley Koch for the degree of Bachelor of Arts
in the School of Journalism and Communication to be taken June 2019

Title: Best Practices for Attributing Climate Change to
Extreme Weather Events in Media

Approved: _____

Dr. Deborah Morrison

As events of extreme weather occur at an increasing frequency and severity, they are deconstructed and discussed through media outlets in a complex variety of ways. Climate scientists now have the capacity to say observable effects of anthropogenic climate change exist that are the source of exacerbation for many categories of extreme weather events. As climate change, in general, is a subject lacking depth of public understanding and saliency, it becomes essential to the progress of climate solutions that anthropogenic climate change and its effects be robustly communicated through media whenever possible; Events of extreme weather are a devastating truth of our climate today, but provide an incredibly tangible representation of what the effects of climate change can look like, which is why media outlets should be making the connection clearly apparent. Through the creation of a “Code of Best Practices for Attributing Climate Change to Events of Extreme Weather,” media producers will be provided with a set of guidelines they can follow to ensure their content is effectively becoming an active contributor to the climate change conversation, in the context of events of extreme weather.

Acknowledgements

I would like to thank Professor Deborah Morrison for her guidance through this project, from helping me develop the subject of my thesis to providing me with resources along the way to expand the boundaries of my research. Her passion for seeking social and environmental change through strategic communications inspired me along every step of the process, and I hope to take this perspective with me as I navigate my career in the future.

I would also like to thank the other two members of my thesis committee, Professor Hollie Smith and Professor David Frank, for their involvement with this project. Professor Smith's expertise in science and environmental communication was invaluable to my confidence in my research, and the rhetorical tools I learned in Professor Frank's class are ones I will use for a very long time. Their time and support is greatly appreciated.

I would lastly like to thank my friends and family who provided me encouragement and support during every step of the process, and who celebrated with me when it was complete. Thank you.

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Introduction

Media consumption has become so seamlessly integrated into our daily lives, that we hardly realize exactly how much content we view on a day-to-day basis. In the morning we turn on the news and prepare for the day ahead, as we scroll through our Instagram timelines. During our commute we might tune in to a daily podcast, and sneak a Youtube-binge into our lunch break. On the way home we can spend our time catching up on the latest posts from the blogs we like, or reading the newspaper we picked up on the corner. No matter the sources of our content, we are absorbed by media. In fact, every individual possesses the potential to influence an audience as much as any journalist through the use of a tool that can fit in our back pocket.

With this constant influx of equally professionally-produced news and citizen journalism, we're constantly reminded of the devastation throughout the world caused by frequent natural disasters and events of extreme weather. Our content streams are overwhelmed by the most recent images and recollections of another coastal hurricane causing communities to lose electricity, floods that destroy years of artefactual history and have the potential to take lives away, and forest fires with the power to turn a lush landscape barren over the course of a few days. We can learn about the damage caused, the communities destroyed, and the lives taken, but are often left asking unanswered questions such as "why is this happening?", "will this happen to me?", and "how can I help?"

The increase in physical, financial, and emotional damage within communities affected by events of extreme weather places increased pressure on this field of science, and meteorological scientists continue to work against the clock to understand what

phenomena are behind these kinds of catastrophes. As a result of these studies, scientists have begun to prove that short-term extreme weather events occur at a higher frequency and severity - this includes events such as extreme temperatures (ex: heat waves) and precipitation events (ex: monsoons, floods) (Easterling et.al., 2000). Though this area of study is only currently gaining traction within the scientific community, the findings that have emerged already prove to be cause for increasing concern.

Simultaneously, climate scientists continue to bring forth scientific evidence that demonstrates the observable effects of anthropogenic climate change. The changes in our ecosystem become more clearly evident, including factors such as increasing average atmospheric temperatures, changes in precipitation patterns, and the rising of our sea levels, which all result from the effects of anthropogenic climate change (Titley et. al., 2016). Because of the correspondence of the increase of events of extreme weather and concerns of the effects of anthropogenic climate change, scientists have started to search for the correlation between the two: In their findings, climate scientists have proven that certain effects of anthropogenic climate change, such as increased atmospheric temperatures, are highly likely to be a cause of exacerbation of forest fires (Flannigan, Marshall, & Wotton, 2017; Cannon, Gillett, Kirchmeier-Young, Zwiers, 2017). As climate change continues to evolve into an increasingly larger issue, predictive models by the same scientists show its impact on events of extreme weather will only continue to become more severe, so long as we continue on the same path of environmental catastrophe.

Though climate change has been and will continue to be one of the greatest issues of our time, it can still be a fairly abstract concept to many people who believe

climate change only affects “other people or nations, or those born far in the future” (Pidgeon, Poortinga, & Spence, 2012). This means, when it comes time to vote on measures supporting actions towards climate solutions, people may not be able to understand how salient climate change is to them, and not feel the necessity to vote in favor of those measures. But, since scientists are now beginning to better understand the correlation between climate change and events of extreme weather, representations of extreme weather in the news become an incredibly tangible representation of the effects of climate change, and present media producers with an opportunity to show skeptical voters that climate change is more pertinent than they may believe.

The media outlets we use to regularly consume content have the power to teach us about the research and politics surrounding the rapid evolution of climate change and events of extreme weather. Following an event of extreme weather, different degrees of coverage and discussions arise surrounding the effects of the event; simultaneously, content consumers seek out media sources that can aid them in better understanding what happened, and why. It is precisely in this window of increased public curiosity that communications surrounding events of extreme weather should be produced thoughtfully, making a clear connection between extreme weather events and climate change. Through making this connection, audience members have the potential to become more active in the climate change discussion, and the ability to find ways they can contribute to its solutions.

Unfortunately, despite the many short and long-term benefits of properly attributing climate change to events of extreme weather, many media outlets do not use coverage of extreme weather events as an opportunity to reference and explain this

connection (Blue, Davidson, & Fisher, 2019). Media discussion surrounding events of extreme weather are too often a wasted opportunity to discuss the visible effects of climate change, as well as climate change-related solutions – and these discussions are ultimately essential for inspiring political progress relating to climate change.

In different forms of media, there exist associated methods for content moderation, such as codes of ethics, brand guides, and community guidelines which allow media producers to regulate the material and quality of the content that they are creating. Taking this concept into consideration, a universal “Code of Best Practices for Attributing Climate Change to Events of Extreme Weather” could provide all media producers (professional and non-professional) with a way to guarantee their references to extreme weather are properly attributed to anthropogenic climate change, turning their content into an active participant in the climate change discussion.

Through my thesis research, I seek to develop a “Code of Best Practices for Attributing Climate Change to Events of Extreme Weather,” (referred to in this document as the Code of Best Practices) which I will create to be applicable for many media producers and their outlets, and will provide support through climate and communication science resources.

The Current State of Extreme Weather Events

Extreme weather events are defined primarily as any occurrences of weather lying outside the range of normal weather patterns for a specific geographic region (Francis & Hengeveld, 1998). Most extreme weather events are short term, such as heavy rain and floods, and do not come as a result of longer-term weather trends. Though some events are more visibly sensational and destructive, less visible events (such as heat waves) still cause significant damage to the communities affected by them, even if they do not necessarily end in clear disaster. For the purpose of this study, “extreme weather events” will be in reference to any short-term meteorological outliers in recorded history.

Using recent meteorological data, scientists found that both the intensity and frequency of specific categories of extreme weather events are on the rise. Though the Intergovernmental Panel on Climate Change found these changes beginning around 1950, additional studies of this kind only recently gained significant traction within the science community. One study found noticeably upward trends in the frequency and severity of extreme precipitation events in certain regions around the world, such as monsoons in central India causing considerable damage to rural communities in the area (Goswami et.al., 2006). Another study showed “[climate change-induced] temperature variance adds to the probability of extreme high-temperature events” (Meehl et.al., 2000, p.430), which contributes to the study showing that “forests may soon face rapid alterations in the timing, intensity, frequency, and extent” of forest fire-related disturbances, due to extended periods of heat and dryness (Dale et.al., 2006).

As a result of the limitations of historical meteorological data¹, predictive models expanding on the weather event data from the last century are much more effective in showing the future potential of meteorological trends: One predictive model considering the effects of greenhouse gases on the hydrologic cycle shows that increased air temperatures and evaporation lead to “increased precipitation rates and enhanced storm intensity,” and are only bound to worsen with time (Trenberth, 1999 as cited in Easterling et.al., 2000). Another study measuring the increase in frequency of extreme El Niño occurrences showed the trend should only be expected to continue, meaning we should prepare for “pronounced implications for twenty-first century climate” (Cai et.al., 2014). A third study projected “nearly a doubling of the frequency of category 4 and 5 storms by the end of the 21st century,” as a result of the projected influence of climate change on Atlantic hurricanes (Bender et.al., 2010). Predictive meteorological models represent the alarming truth of the future of extreme weather events, and demonstrate how the frequency and intensity of these events will only increase if no changes are made to the trajectory of our climate.

¹ Historical records of climate and weather-related data begin in 1850 (Climate Change 2014 Synthesis Report, 2018).

Introduction to Event Attribution

The field of study establishing the connection between events of extreme weather and climate change is referred to as the study of *event attribution*. *Attribution* can be more formally defined as “the process of evaluating the relative contributions of multiple causal factors to a change or event with an assignment of statistical confidence” (Stott et. al., 2016), which in this case, is applied to the statistical confidence of an event of extreme weather being influenced by anthropogenic climate change (Committee on Extreme Weather Events and Climate Change Attribution et.al., 2016). Though a fairly new area of study, event attribution research stems from the desire to gain a better understanding of this connection, which would allow scientists to communicate data with politicians and media outlets with a higher level of statistical confidence. Event attribution research is currently in rapid development, but was first recorded in 2004 after the climate science community sought to understand the cause of the 2003 European summer heat wave, which resulted in the death of over 30,000 people (Titley et.al., 2016).

One factor that must be considered when making the connection between events of extreme weather and anthropogenic climate change is the limitations within this field of study. Although facts and connections similar to the ones mentioned previously remain true, one of the greatest challenges in this field of study is citing climate change as the source of one individual event of extreme weather. As a result of the “host of possible natural and anthropogenic that combine to produce the specific conditions of an event” (Titley et.al., 2016, p.1), it is not currently possible to claim climate change is the sole direct source of an event. This limitation does not mean the connection between

climate change and events of extreme weather cannot be made, but it does mean the connection needs to be made carefully so it is fully representative of the data that is backed by scientific research.

As a result of the increasing dedication to this area of study and research, it is continuously becoming easier for scientists to clearly pronounce the degree to which the effects of anthropogenic climate change have impacted the magnitude or probability of a specific type of extreme weather event. Currently, scientific confidence in this connection is the strongest for extreme weather events resulting from temperature extremes, as there is high statistical confidence that anthropogenic causes are the source of climatic temperature extremes (Titley et.al., 2016). Studies such as these provide communicators with sufficient evidence to support the connection between events of extreme weather and climate change, which should be considered as essential information that should be widely shared.

Though the attribution of climate change to events of extreme weather is incredibly important to our current understanding and interpretation of these, this connection is not frequently being made when extreme weather events are referenced in media. Though general media coverage of extreme weather events has been proven to have been increasing since the 1980s, there is no positive correlation between the media representation of extreme weather events and of climate change (Blue, Davidson, & Fisher, 2019; Ungar, 1999). This means when events of extreme weather are mentioned by a media outlet, the way in which they are associated with climate change is not.

Event Attribution Applied to Communication Theory

Communication Theory and Determining Risk

In communication theory, there is a sequence of processes that one will experience as they consume media. One of the first steps in media consumption, pertaining highly to issues regarding politics or politicized material, is determining one's *need for orientation*. Occurring when someone is introduced to a new or unfamiliar issue that seems salient to themselves, the process of *orientation* consists of an individual determining the relationship between the issue they are considering, and its relationship to their already-existing set of personal and political beliefs and values (McCombs, 2014). Social psychologist Jonathan Haidt at New York University explains orientation as “acting as lawyers, using our reasoning to a predetermined one that was emotionally biased by our ideological positions and cultural views” (Cited in Hoffman, 2015, p.16).

This need for orientation can be driven by two factors: *relevance* and *uncertainty*. “Relevance,” referring to personal saliency or the connection to one's own life, and “uncertainty,” as in what is already known about the issue in question. Figure 1 displays the relationship between these two factors, and how a combination of high relevance and uncertainty can lead to a higher desire for orientation (McCombs, 2014). The degree of both of these factors, when applied to environmental issues such as climate change or events of extreme weather, can be affected by perceived individual risk: The higher the perceived risk of an issue, the higher the relevancy; and if a high risk is associated with a high uncertainty (such as uncertainty of the potential for

damage, methods of recovery, possible proactive solutions, etc.), then an individual will be highly likely to seek orientation on the issue.

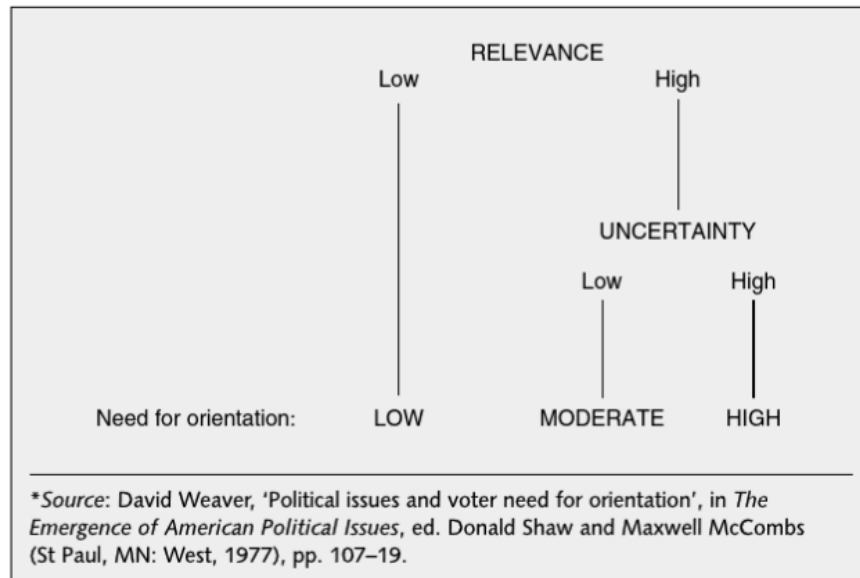


Figure 1: Need for Orientation Correlation

David Weaver’s visual representation of the “need for orientation” process shows the relationship between relevance and uncertainty, the two factors that determine one’s need for orientation on an issue.

A determination of the individual or community risk plays a large role in one’s desire to educate themselves on a particular environmental science issue. When consuming scientific content through media, public perception is “significantly influenced by representations of scientific knowledge conveyed by the press and other mass means of communication” (Carvalho, 2007, p.223), and “scientific issues become transmitted in a way that amplifies or reduces associated risk perception and concerns” (Hoffman, 2015, p.42). If an individual has a moderate to high perception of risk of a scientific issue, the means and methods by which this information is communicated becomes the determining factor for what a reader or viewer may take away from the

orientation process. This is why it is essential that issues surrounding climate change are communicated properly, primarily when communicating the true potential for risk an issue may have on an individual.

The Climate Discussion Opportunity

After an event of extreme weather occurs, there is often a considerable amount of media coverage and social discussion that follows (Stott et.al., 2016; Ungar, 1999), and because the frequency of extreme weather events is increasing, so should the media covering it. After viewing this kind of content, individuals who have determined that the issue is *relevant* and *uncertain* to them may seek out additional sources for more information – which demonstrates their need for orientation. This increased engagement with an issue can be observed by a measured natural peak after an event of extreme weather in audience curiosity as to what caused the event, showing concerned audience members will often continue to seek out information on the issue even after viewing the original media that concerned them (Stott et.al., 2016). This peak in engagement with content surrounding environmental issues becomes an essential opportunity for explaining the connection between extreme weather events and climate change, and must be effectively demonstrated in order for it to be successful.

Unfortunately, it's widely understood among scientists and science communicators that the climate change-related attention span following an event of extreme weather is fairly short-lived (Konisky, Hughes, & Kaylor, 2015; Sisco, Bosetti, & Weber, 2017; Quesnel & Ajami, 2017). In a study of the 2015 California drought, data proved that as media coverage increased surrounding the issue, public water use significantly decreased, in a rate proportional to the coverage of the drought in the

media. At the same time, a Google Trends analysis within the same study showed the number of Google searches by the community regarding the drought were positively correlated with the amount of media coverage surrounding the issue. But, after media coverage decreased, so did curiosity and engagement of the issue (Quesnel & Ajami, 2017). Though the increase in content engagement following media coverage of the drought did not last long after it ended, this study shows that media coverage has a very proportional effect on the potential for change within a community - It is for this reason media outlets must take their coverage of extreme weather events incredibly seriously so as to maximize this influx of engagement, and use mass media as a tool for expanding the reach of the climate change conversation.

Communication Challenges Surrounding Climate Change and How They Could Be Solved Through Proper Event Attribution

Challenge #1: Climate change is an overwhelming, complex, and often abstract scientific issue, and its truth can get lost in translation.

There are many uncertainties surrounding climate change, but what we do know is that it is, and will remain to be one of the greatest issues of our time. Unfortunately, communicating issues surrounding climate change requires the translation of “abstract and probabilistic science, labyrinthine laws, grandstanding politicians, speculative economics, and the complex interplay of individuals and societies” (Adam, Allan, & Carter, 2013, p.206), making the role of a science communicator incredibly difficult.

Solution: Extreme weather events are an expression of climate change that is incredibly tangible, and observable in the context of one’s daily life.

If an individual doesn’t currently feel affected by climate change, being impacted by an event of extreme weather has proven to make them believe otherwise. A study in the Climatic Change Journal outlines their observations of the correlation between the public’s firsthand experience in extreme weather events and the saliency of climate change to them; after experiencing the impact of an event of extreme weather, people are proven to become more curious and concerned about the impact of climate change (Konisky, Hughes, & Kaylor, 2015). Though not everyone experiences (or believes to have experienced) events of extreme weather firsthand, the representation in the media of climate change exacerbating extreme weather may encourage an individual to consider the saliency of the effects of climate change on their own life.

Challenge #2: Climate change is a subject often actively avoided in regular conversation.

As found by the Yale Project on Climate Change Communication, two-thirds of Americans rarely if ever discuss global warming with family or friends (“Yale Climate Opinion Maps”, 2018). In the field of social science, specifically when applied to climate change, “Social scientists view the public understanding of climate change not as a lack of adequate information but as the intentional or unintentional avoidance of that information” (Hoffman, 2015, p.4). Though it is unclear exactly why many people avoid discussing climate change (potentially political tension, lack of expertise, ambiguous ideological positioning), there is something preventing this subject of conversation; though most Americans have a general understanding of what climate change entails, a “socially constructed silence” may be behind the lack of discussion surrounding climate change and its effects (Marshall, 2015; Norgaard, 2011).

Solution: Connecting climate change to events of extreme weather provides more opportunities for integrating climate change into conversation.

Because of the proven increase in the frequency of extreme weather events and the media coverage that follows, media consumers are being presented with more opportunities to understand the tangible effects of anthropogenic climate change, in a context easy to mention in conversation – the weather. “Highly salient weather events” provide a catalyst for climate change discussion (Marshall, 2015), and should be taken in the media as opportunities to do so. Additionally, conversation around issues that are politicized, or require political action, can assist in moving causes forward, proven by one study finding that “...social involvement exposes people to community norms and

promotes interpersonal trust, factors which in turn make political involvement more likely” (McClurg, 2003, p.450). By attributing climate change to events of extreme weather when they are mentioned in media, the public will have more opportunities to make and understand this connection, and bring it up casually – and in the long-term, lead to an increase in political engagement surrounding the issue.

Challenge #3: The future risks of climate-related extreme weather events are not salient.

Though 70% of Americans believe climate change is happening, only 41% believe they will be personally affected by it (“Yale Climate Opinion Maps”, 2018). This is a common trend found in research regarding the “psychological distance” of climate change, as many people believe that “climate change risks only affect other people or nations, and those born far in the future” (Spence, Poortinga, & Pidgeon, 2012). This lack of personal saliency to climate change is often reflected by political inaction and complacency, when presented with opportunities to vote in favor of measures that seek climate change solutions.

Solution: Attributing climate change to events of extreme weather will allow audiences to better understand their proximity to the effects of anthropogenic climate change.

“People react to weather as something salient and personal” (Hoffman, 2015, p.85), so events of extreme weather are an opportunity to show an individual how they can personally be affected by anthropogenic climate change. If an event of extreme

weather is occurring in their locality, they might make the connection to climate change more salient on their own, especially if it is an event caused by extreme heat (Konisky et.al., 2016). Even if the event of extreme weather they are viewing is not occurring geographically close to them, showing how the event had affected other communities could allow them to see the potential for damage of an extreme weather event, especially when exacerbated by the effects of climate change.

Challenge #4: Climate change is debated within the political sphere, as a bipartisan and multi-sided issue.

Since the “anti-environmental movement” which began in the 1960’s, certain corporations and political communities in the United States developed the concept of the “non-problematicity” of climate change, which they enforced through partnerships and alliances with conservative think tanks, fossil fuel industry giants, and unnamed “skeptical scientists” (Carvalho, 2007, p.224). Climate change itself has always been debated as a political issue, attaching itself to one side of the political spectrum, and its transformation into a “rhetorical contest” has damaged its legitimacy as a scientific concern (Hoffman, 2015, p. 3). Even though climate change is an issue proven through scientific research and data, its history of politicization has presented it as one with two-sides, when truly there is little to be argued.

Solution: Attribution of climate change to events of extreme weather brings forward an opportunity to confirm the existence of climate change.

Though the political division of the “belief” of climate change is an unfortunate truth, appearances of events of extreme weather in media would provide opportunities to discuss the undeniable, tangible effects of climate change. Werner Heisenberg, a German theoretical physicist, once said, “what we observe is not nature itself, but nature exposed to our method of questioning” (as quoted in Titley et.al., 2016, p.27). Though determining how climate change has exacerbated an event of extreme weather may still not be enough to convince a firm “climate-denier” of the inevitability of the effects of climate change, providing more opportunities to connect climate change to its tangible expressions would help individuals who are more neutral on the issue to question their own viewpoint.

Challenge #5: Communities are not prepared for the effects of climate change, as a result of the politicization of the issue and restrictions in moving forward with public action.

In the political landscape of the United States today, we observe the impact of an administration backed by climate change-denial. When current president Donald J. Trump made the executive decision to remove the U.S. from the Paris Climate Agreement in 2018, he demonstrated our future politics would be reflective of a world where climate change is not an issue of importance, or an issue at all. Other countries across the world recognize the impact of this gesture as well, citing that in the United States, “the hesitant character of climate policy has emerged partially as a result of more or less concerted efforts to question the existence of anthropogenic climate change”

(Nunes, Rajão, & Soares-Filho, 2016). With the politicization of climate change, our governmental organizations are directly restricted from moving forward with political action that could assist in beginning to make steps towards climate change solutions.

Solution: The connection of extreme weather events to our changing climate would encourage the public to place pressure on policymakers to account for the potential increased risk of the effects of extreme weather events as exacerbated by climate change.

Though our current administration may be conveying one message, there is no reason why our country's voters could not say otherwise. Our government is responsible for making the decisions that will affect how well a community may be prepared for an event of extreme weather, and these preparations must take the imminent changes of our climate into consideration. Understanding how climate change will affect the impact of events of extreme weather in frequency and intensity can "help provide insight into and confidence in the many risk calculations that underpin much of society's building codes; land, water, health, and food management; insurance; transportation networks; and many additional aspects of daily life" (Titley et. al., 2016, p.ix). Many of these decisions, though, must be enforced by governing bodies, who hypothetically make their decisions based off of the pressures placed by voters. If the connection is made between climate change and its future impact on events of extreme weather, voters will see this and be encouraged to take action and make informed decisions when considering how their communities could change as the climate does.

Holding Media Accountable

The Responsibility of Media Producers

As an “important validator of science” (Gamson, 1999, as cited in Carvalho, 2007, p.225), media outlets bear a heavy responsibility to communicate the most important facts of a science-related event. Though every media producer may not come from a scientific background, content on events relating to scientific phenomena should be taken seriously, and producers should verify their material for factual evidence and quality; In the context of extreme weather events, this would include making the connection between these events and climate change, and making this connection correctly. The challenge, then, becomes finding a way to encourage media outlets to execute this in a way that is easily applicable to a variety of media.

How Media Can Be Regulated

In different facets of media production, there exist different methods of voluntary and required regulations, which allow producers to ensure that they are creating content that meets a certain standard. For example, news outlets may abide by ‘Codes of Ethics²,’ which they use as a reference to ensure that their content throughout every stage of development maintains an ethical standard; a brand may use a ‘Brand Guide³’ to ensure that their content consistently reflects the image that the brand has established, in both visual and written content; a blog or forum may develop a

² Ex: The New York Times uses a Ethics Guidebook, which is accessible online and is meant to be used on all News and Editorial content (Ethical Journalism, n.d.).

³ Ex: Twitter’s Brand Guidelines cover content from logo specifications, to “Tweet Anatomy” (Twitter Brand Guidelines, n.d.).

‘Code of Conduct’⁴ which allows creators to know their platforms will be self-regulated, and their material will be presented in a space with specific standards.

Taking these examples into consideration, I seek to develop a set of guidelines for media producers to use, to ensure their content which references events of extreme weather is effectively demonstrating how it relates to anthropogenic climate change. For the purpose of this study, this guide will be referred to as the “Code of Best Practices for Attributing Climate Change to Events of Extreme Weather.” I will be justifying this Code of Best Practices through my research, and demonstrating its potential for positive impact on the media and climate science communities.

In order to address the communication challenges mentioned in the previous chapter, the next two chapters will address goals for the Code of Best Practices, in order to take active strides towards overcoming them.

⁴ Reddit uses a user-built “code of conduct”, but it is completely voluntary (User @redtaboo, 2018). Reddit’s form of content moderation has often been under scrutiny for its lack of restrictions.

Media Producer Goals for the Code of Best Practices

1. Have easy access to a set of metrics from which to gauge success in attributing climate change to events of extreme weather.

Using the same framework as a formal method of content moderation, the Code of Best Practices will be a PDF and online guide that media producers can follow to ensure that their content covering extreme weather properly attributes the effects of anthropogenic climate change to them. Besides specific guidelines regarding content moderation, the Code of Best Practices will also discuss potential methods and communication techniques that will make this content more effective in the context of their media category.

2. Ensure all attributions of climate change to extreme weather events are accurately represented.

Although it would not be practical for the Code of Best Practices to include all existing accurate scientific data from which to compare the media producer's found data, it will include procedures to ensure the media producer has verified their information for factual accuracy. Additionally, there will be steps to take to ensure climate change is being attributed to events of extreme weather accurately, in a way correctly aligning with the current body of available scientific research.

3. If applicable, direct audiences to additional sources where they can continue to educate themselves on climate change, and its potential solutions.

Social scientists, who have sought to better understand the most effective methods of science communication, have found that when defining environmental

problems, it's most effective when "science not only discovers and diagnoses environmental problems but also suggests solutions and proposes pathways for political action" (Ulrika & Berglez, 2014). Though it can be argued that media producers could provide information on climate solutions themselves, restrictions placed on larger media production outlets may not always permit this inclusion; instead, media producers could include references to additional media sources that audience members could seek out on their own, if they wish to do so.

4. Increase the diversity of perspectives within the conversation surrounding climate change.

Some of the greatest challenges in discovering climate change solutions "will demand expanded interdisciplinary efforts," and must be solved by more individuals than those existing within the climate science community (Ulrika & Berglez, 2014). Conveniently, viewers of content representing events of extreme weather are generally unrestricted, and audiences could be representative of people with many different specialties and backgrounds. This, in combination with increased interest and conversation that could follow media coverage of events of extreme weather, would have the potential to lead to an increase in the diversity of perspectives in the conversation surrounding events of extreme weather and their connection to anthropogenic climate change.

5. Increase saliency of climate change and its tangible effects on local populations.

Though this goal seems fairly straightforward, it has the potential to be one of the most challenging to achieve through implementation of the Code of Best Practices.

For audience members who already have a solidified opinion and perception of the effects of climate change, increasing the saliency of climate change to them could be incredibly challenging. Though, as explained previously, firsthand experiences involving events of extreme weather could lead to an increased curiosity of climate change, the challenge still exists for those who have not experienced an event of this kind, and who are resistant to the curiosity to learn more. In that case, it is possible to implement strategies that will encourage increased saliency, but will most likely be more effective in audience members who have a more neutral (or already concerned) viewpoint of climate change and its effects.

Goals for The Application of the Code of Best Practices

Ideally, the Code of Best Practices for Attributing Climate Change to Events of Extreme Weather will be easily applicable to a wide range of mass media and communication outlets. Though most of the existing data and body of research surrounding science communications is centered around news media outlets, the increasing coverage of extreme weather events is leading to discussions which expand to social media and blogging platforms as well, turning anyone (regardless of their background in journalism) into a science communicator. With the rapid growth of media outlets which communicate news, “the borders between producers and consumers are becoming increasingly blurred” (Ulrika & Berglez, 2014), and it is essential that other extreme weather communication methods, besides just traditional news outlets, are addressed and integrated into the guide as well.

Not only is it important to simply address these methods as valid communications of scientific and extreme weather event news coverage, but it also becomes essential to understand how these methods intersect and overlap with each other. Although communicating events of extreme weather and their connection to climate change began primarily as discourse within the scientific community, this kind of communication has now entered entirely different media spaces, all of which tend to communicate the connection differently:

“...the individualistic micro-focus of lifestyle-oriented climate discourse tends to block awareness of the necessity of global climate measures often addressed by political discourse, while, in turn, the global orientation of political climate discourse risks preventing the individual from feeling included in the management of climate change.” (Ulrika & Berglez, 2014)

Studies in science communication have sought to understand how different media outlets are communicating the political implications of climate change, and have found similar results: although these media may be discussing climate change in different ways, they should still all be held to the same standards of accurate and effective reporting in order for messages to be translated effectively. Further, in order for attribution of climate change to extreme weather events to be successful, this connection must be made regularly and accurately in order for the conversations surrounding climate change and events of extreme weather to be effective in working towards generating climate change solutions.

Development of The Code of Best Practices

Taking into consideration the previous producer, audience, and application goals for the Code of Best Practices, I have determined that, in order for all of the goals to be successfully achieved, the content produced using the Code of Best Practices must ultimately be **Informative**, **Accurate**, and **Inspiring**.

1. Informative

In order for produced content to be **Informative**, it is essential that the media producer include all information necessary for the reader to have a complete picture of the event that is being discussed. At its most basic level, this would include the primary information regarding an event of extreme weather, such as where and when it occurred, and what the geographical reach of the event was. Expanding on this, a content producer should also include the potential for local community impact, particularly when speaking to an audience within a specific geographic location. Even if there is not a local impact as a result of the weather event, including global implications could allow the content consumer to gain a better understanding of who the event is affecting, and in what way. Providing a full scope of information to an audience makes the event more tangible, providing context for an event that they may potentially never see themselves.

2. Accurate

In order for produced content to be **Accurate**, there are two facets of information accuracy that must be robustly clarified for post-viewing comprehension.

Primarily, all representations of extreme weather events, specifically when climate change is attributed to them, must be supported purely by factual evidence and not subjective methods of interpretation. With climate change having the potential to be a fairly abstract subject, altering factual terms and concepts into rhetorical questions or vague statements will remove their credibility and degrade the importance of the information being presented.

Additionally, the limitations of the current body of research require climate change be attributed to events of extreme weather in a specific way, so as not to depart what has been scientifically supported. Primarily, the main limitation in event attribution research is that the source of a singular event of extreme weather cannot be *directly attributed* to climate change, but the causes of the *factors leading up to the event* can be. For example, “it may be possible to make confident statements about how some class of extreme events is expected to change because of human-induced climate change” (Titley et.al., 2016, p.11), such as floods being attributed to the increased rainfall caused by the effects of climate change. At the same time, though, a communicator could not determine a particular extreme weather event was *caused by climate change*, as there is no current way this can be scientifically proven.

3. Inspiring

Though the word “inspiring” may seem vague or emotionally-charged, I use it simply in this context as defined by a method which sparks an action, particularly one moving an individual towards a climate change solution. In order to inspire an audience member through produced content, one method to implement would be taking an empathetic approach to extreme-weather event storytelling. Although, of course, some

media coverage of extreme weather events may garner a more data-driven approach, the use of storytelling and showing human experiences can have a profound impact on a person who seeks to take action. One study found “actual experiences of the events being more impactful than the purely descriptive information about the events,” as descriptive information about an extreme weather event is “often made available by the weather forecasts directly before each event hits” (Sisco, Bosetti, & Weber, 2017). Though the informative aspect mentioned previously is just as essential to increasing the public’s general understanding of the scientific connection between extreme weather events and climate change, taking a more empathetic approach to sharing these events provides a more human-centric side of the impact of these events. Especially since most Americans do not believe climate change has impacted them directly (Yale Climate Opinion Maps, 2018), showing the stories of people who have been directly affected could help these Americans understand the perspectives of someone who has been more clearly affected.

Once you have communicated the details of an event of extreme weather accurately and informatively, one of the most important components of this area of media production is in the inclusion of climate solutions, that are tangible and accessible to your audience. In Minas Gerais, Brazil, a case study following local media coverage of climate change and climate-related events showed how they were able to achieve a positive audience reception to seeking climate solutions: instead of presenting climate change as an inevitable catastrophe, “climate change was perceived more as an opportunity to foster a low carbon economy,” which resulted in increased political engagement (Nunes, Rajão, & Soares-Filho, 2016).

Many media outlets, when covering events of extreme weather and climate change, choose to sensationalize the issue as a simple way of garnering the attention of their audiences - but this form of journalism has the potential to overwhelm audiences to the point of eliminating their desire to seek out solutions. Instead of implementing sensationalized fear-tactics, extreme weather events and climate change should be presented “in terms of the gains produced by action as opposed to the losses produced by inaction” (Hoffman, 2015, p.65), and applying this method of climate science communication could foster a much more positive sense of solution-inspiration.

The Code of Best Practices for Attributing Climate Change to Extreme Weather Events

For the purpose of applicability and accessibility, the Code of Best Practices for Attributing Climate Change to Events of Extreme Weather will be available online in multiple formats. The first format will be an interactive website, where media producers can follow along with a certification process which, by the end, will ensure their specific form of content is accurately and effectively attributing climate change to an event of extreme weather. The interactive format, though suitable for professional media producers as well, may be a better option for citizen journalists or social media users who simply wish to be active participants of event attribution; The user will only see the supplementary information pertaining to their own field of content production.

The second format, a downloadable PDF, will allow media producers to have more in-depth information on each step of the certification process, without the added component of guided interactivity. Though the PDF will guide the media producer through a similar process as the interactive program, the reader will have access to all supplementary information, regardless of whether or not it pertains to their field. At the end of this document are the contents of the PDF, which provide a synthesis of the information provided as background to this thesis.

Evaluating The Code of Best Practices

Because a goal for the Code of Best Practices is to have it be easily and frequently applied to different media productions, it's important to take a step back and evaluate the implications of a voluntary guide. Other codes of practice, which evaluate the ethics or consistency of a media producer or brand, are required to be implemented by whomever is in charge of the production; the motivation for using this "Code of Best Practices..." would be, simply, a genuine consideration for how one can better participate in the climate change discussion.

Although this may, possibly, be enough for some individual content producers, one further step that could be taken to legitimize this Code of Best Practices is to have it peer reviewed by different professionals within the event attribution science, climate science, and communication science communities. If a significant number of reputable scientists were to approve of the Code of Best Practices, then it would assure media producers their implementation of this guide would be confidently approved by members of these scientific communities. Use of the Code of Best Practices could become a form of certification, a symbol of a media producer's commitment to properly attributing climate change to events of extreme weather, and a representation of being an active participant in the climate change discussion.

Long-Term Benefits of The “Code of Best Practices...”

Outside of the immediate benefits of the implementation of the “Code of Best Practices...”, using this guide as a standard could have multiple long-term implications as well. As mentioned previously, extreme weather attribution science is a fairly new area of study that will only improve as public awareness and interest increases. A 2016 report on extreme weather event attribution to climate change found “event attribution could be improved by the development of transparent community standards for attributing classes of extreme events” (Committee on Extreme Weather Events and Climate Change Attribution, et.al., 2016), a request which essentially is answered on a communication-level through the Code of Best Practices. As extreme weather events are attributed to climate change in media, awareness of this connection and field of study will increase, allowing it to gain traction within the climate science community as a whole.

Another benefit to increasing the awareness of extreme weather event attribution science is simultaneously bringing attention to limitations within that field of study, and aiding in the pursuit of their solutions. For example, “one of the biggest problems in performing analyses of extreme climate events for most of the globe is a lack of access to high-quality, long-term climate data with the time resolution appropriate for analyzing extreme events” (Easterling et.al., 2000). Certain projects revolving around the restoration and preservation of aging meteorological data are essential to building predictive climate change models, as the existing body of data is very small and often recorded physically, versus stored digitally. One project seeking to preserve and compile a database of historic meteorological data is the “Data Rescue and Archives”

project, organized by the World Meteorological Organization (“Data Rescue and Archives, n.d.). Bringing increased attention to extreme weather event attribution science will allow the organizations seeking to reduce the limitations within the field of study to be able to gain more internal and external support for their causes.

Ultimately, a set of guidelines and practices aiding in the improvement of climate-related reporting also has the potential to raise the standard for the entire journalism field. Seen as a “frontrunner of ideal journalism,” climate reporting it is a naturally global field, capturing interdisciplinary relations informed by scientifically-proven facts (Ulrika & Berglez, 2014). As one of the only categories of journalism that truly applies to the entire world, the standards of climate reporting must be the epitome of journalistic standards, and be applied to every facet of climate issue-related media. Though proper attribution of climate change to events of extreme weather may only be a small piece of this larger picture, it is essential every media producer participate in any way they are able to the improvement of climate communications, which seek to encourage actions towards solutions of our changing climate.

Conclusion

Though attributing climate change to events of extreme weather is just one small component of a much larger issue, every individual with the power to make a post holds a responsibility to the future of our climate and the way we talk about it. Through the development of the Code of Best Practices for Attributing Climate Change to Events of Extreme Weather, media producers will be supplied with an accessible solution to ensuring their content regarding events of extreme weather becomes an effective contributor to the greater discussion surrounding climate change – whether they’re writing a story for a major news publication or making a post on Facebook for their friends and family.

As sets of standards and community guidelines for communicating science, such as the Code of Best Practices, are regularly implemented, media producers will become more climate-conscious creators. Producers will consistently build content driven by data and factual evidence, but still hold the power to inspire their audiences to change the way they navigate their lives in a world burdened by the pressures of anthropogenic climate change.

Though media consumption has the capacity to integrate seamlessly into the routine of our daily lives, it also holds the power to disrupt, by presenting new concepts and ideas, inspiring complacent minds, and acting as a driving force for global change. Whether you have an audience of millions or are just having a conversation in the comments section with someone you care about, remaining conscious of your ability to affect someone’s perception of climate change puts a piece of the solution in your hands, and into your back pocket.

Appendix: “Code of Best Practices...”



ATTRIBUTING
Climate Change
TO *EXTREME*
WEATHER EVENTS

A Code of Best Practices For Media Producers

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3	An Important First Step <i>An introduction to the purpose of the code of best practices.</i>
4	Challenges in Communicating Climate Science <i>Understanding the challenges in the scientific media landscape.</i>
6	Finding Solutions Through Media <i>How media producers can solve climate communication challenges through their content.</i>
7	Code of Best Practices for Attributing Climate Change to Events of Extreme Weather
7	<i>Long-Form Text Content</i>
8	<i>Short-Form Text Content</i>
9	<i>Long-Form Visual Content</i>
10	<i>Short-Form Visual Content</i>
11	Looking Forward <i>The implications of proper event attribution in media.</i>
11	Additional Resources <i>Further reading and content resources for media producers.</i>

10-foot floods in Minot Dakota, N.D. affected more than 4,000 homes in the area. (Photo by DVIDSHUB)



02 | Spring 2019 | Attributing Climate Change to Events of Extreme Weather

An Important First Step

It's no doubt that climate change is one of the largest issues of our time. Rapid changes in our evolving climate can be observed all across the world, and we are constantly reminded through our endless media sources of the environmental devastation we are currently facing. Simultaneously, effects of climate change are leading to an increase in events of extreme weather, which are powerful demonstrations of nature's potential for destruction. Though this may seem like another reason to feel defeated in the battle against climate change, there lies an opportunity here as well.

That's where we come in.

Too often, communications of climate change lead to audiences feeling complacent, incapable of change, and distanced from the issue entirely. But as media producers, we know we have a responsibility to share with our audiences the most accurate representation of the truth that we can; In the context of representing extreme weather events, this now means including their association with climate change.



Two members of the Idaho City Hotshots manage the Springs Fire of the Boise National Forest in 2012. (Photo by @Kari Greer)

By making this connection, we'll be providing our audiences with effects of climate change that they can see, that aren't in the Arctic Circle or in the Coral Reef. Instead, these events of extreme weather are happening everywhere, and we've all been affected by them in one way or another. By using our platforms to make this connection, we'll have the potential to inspire our audiences to seek climate change solutions, and join us in being positive forces of environmental change, wherever we are able.

No matter the size of your audience, whether you've got a reach of millions or are just having a conversation in the comments section, **thank you for your commitment to being an active participant in the climate change discussion.**



Flash floods in Peru led to powerful landslides in 2013. (Photo by Alberto Orbegoso)

Challenges of Communicating Climate Science

Currently, in the world of climate change communication, there are a number of challenges that must be addressed before proper communication can be made. Despite these challenges, proper attribution of climate change to events of extreme weather can help contribute to overcoming them. **Here's how:**

Challenge #1

Climate change is a complex and overwhelming scientific issue, and its truth can get lost in translation.

Solution:

Extreme weather events are an expression of climate change that is incredibly tangible, and observable in the context of one's daily life.

Climate change is indisputably one of the greatest issues of our time. Despite this, the facts surrounding it are often obscured by abstract figures and data, which do not always help an audience better understand the implications of climate change; instead, showing how extreme weather events are effected by climate change can show its effects in a more tangible way.

Challenge #2

Climate change is a subject often actively avoided in regular conversation.

Solution:

Connecting climate change to events of extreme weather provides more opportunities for integrating climate change into conversation.

There is a proven socially constructed silence surrounding climate change that often makes it challenging to discuss in daily conversation. To counteract this, showing how climate change is attributed to events of extreme weather places it in a context that has the potential to be easier to integrate into conversation: the weather.

Challenge #3

Future risks of climate change are not significantly salient.

Solution:

Demonstrating how extreme weather events are exacerbated by the effects of anthropogenic climate change allows audiences to gain a clearer understanding of their proximity of the effects of extreme weather events.

Events of extreme weather are an opportunity to show an individual how they can personally be affected by anthropogenic climate change. Even if the event of extreme weather that they are viewing is not occurring geographically close to them, showing how the event had affected other communities could allow them to see the potential for damage of an extreme weather event, especially when exacerbated by the effects of climate change.

Though **70%** of Americans believe climate change is happening, only **41%** believe they will be personally affected by it.

Yale Climate Opinion Maps, 2018

Challenge #4

Climate change is debated within the political sphere, as a bipartisan and multi-sided issue.

Solution:

Attribution of climate change to events of extreme weather brings forward an opportunity to confirm the existence of climate change.

Though the political division of climate change is an unfortunate truth, appearances of events of extreme weather in media would provide opportunities to discuss the undeniable, tangible effects of climate change. Providing these kinds of opportunities would help individuals who are more neutral on the issue to question their own viewpoint.

Challenge #5

Communities are not prepared for the impact of future (and current) events of extreme weather.

Solution:

The connection of extreme weather events to our changing climate would encourage the public to place pressure on policymakers to account for the potential increased risk of the effects of extreme weather events as exacerbated by climate change.

Though our current administration may be conveying one message, there is no reason why our country's voters could not say otherwise. If the connection is made between climate change and its future impact on events of extreme weather, voters will see this and be encouraged to take action and make informed decisions when considering how their communities could change as the climate does.

Finding Solutions Through Media

In order to overcome the communication challenges listed in the previous section through their associated attribution-based solutions, your content attributing climate change to events of extreme weather must be:

Informative, Accurate, and Inspiring.

How each of these three attributes are achieved will depend on the platform and content you are creating media for; For this reason, the remainder of the

guide has been divided into tailored categories that will provide you with actionable steps to take to ensure that your content is most effectively attributing climate change to events of extreme weather.

However, it must be acknowledged that it is accepted that not every piece of content will be able to include the complete set of requirements for properly attributing climate change to events of extreme weather (potentially as a result of platform or production limitations). For this reason, the categories provided each indicate which factors are optional to include (marked with an asterisk), if space and limitations restrict their inclusion. The remaining factors, though, are imperative to accurate and effective attribution.

You may begin by navigating to the section of the guide that most closely relates to your media category, listed below:

Long-Form Text Content Page 7

Examples of long-form text content include news publications, podcasts, blog posts, and any other text or spoken word-heavy media.

Short-Form Text Content Page 8

An example of short-form text content includes social media posts, primarily where the text (not the image) is the focus.

Long-Form Visual Content Page 9

Examples of long-form visual content includes Youtube videos, documentaries, and video news stories, where there is significant visual media.

Short-Form Visual Content Page 10

An example of short-form visual content includes social media posts, primarily where the image (not the text) is the focus.

Long-Form Text Content

In long-form text content, the written or spoken words are the primary focus of the media. This allows for more in-depth information, and additional room for expansion.

Is your content informative?

- Does your content explain how the extreme weather event may have been exacerbated by the effects of anthropogenic climate change?
Though science cannot yet support climate change as the "cause" of an event, this language can be used instead.
- Does your content address the potential local community impact as a result of this event of extreme weather?
This allows audience members to understand how they, personally, may be affected by the event.
- Does your content address the global impact of this event of extreme weather?
This shows audience members how an individual event may be part of a larger, global issue.

Is your content accurate?

- Are the details of the event of extreme weather accurate and up-to-date?
Content accuracy will demonstrate the trustworthiness of a media source.
- Does your content avoid using hypothetical language, wherever possible?
This kind of language can be subjective, and obscure meaningful facts.
- Is your data purely objective?
Data should be backed by fact, not opinion.
- Did you accurately attribute climate change to the event of extreme weather?
The attribution should be made in a way that science can support (see above).

Is your content inspiring?

- Do you avoid inflammatory "catastrophe"-based language?
This language can discourage audiences from wanting to learn more.
- Does your content include an element providing empathy?*
- Do you include resources for audiences to seek out actionable steps to take towards climate solutions?*
- Does your content provide a global perspective on climate change?
Providing a global perspective shows how climate change is an issue that affects the entire world, not just specific regions.

** Indicates an optional inclusion, permitting space and approval.*

Short-Form Text Content

In short-form text content, the written or spoken words are the primary focus of the media. The short-form media, though, requires more tailored content due to the restrictions of the platforms.

Is your content informative?

- Does your content explain how the extreme weather event may have been exacerbated by the effects of anthropogenic climate change?
Though science cannot yet support climate change as the "cause" of an event, this language can be used instead.
- Does your content address the potential local community impact as a result of this event of extreme weather?*
- Does your content address the global impact of this event of extreme weather?*

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- Are the details of the event of extreme weather accurate and up-to-date?
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- Does your content provide a global perspective on climate change?*

** Indicates an optional inclusion, permitting space and approval.*

Long-Form Visual Content

In long-form visual content, the visual components are the primary focus. The messaging translated by the images is what deems moderation, as well as the written captions or on-screen text. If the captions / text are significant in length, please refer to the "Text Content" sections of the guide.

Is your content informative?

- Does your content show how the extreme weather event may have been exacerbated by the effects of anthropogenic climate change?
- Does your content show the potential local community impact as a result of this event of extreme weather?
- Does your content show the global impact of this event of extreme weather?

For example data visualizations can assist in showing the attribution of climate change to extreme weather events.

This allows audience members to understand how they, personally, may be affected by the event.

This shows audience members how an individual event may be part of a larger, global issue.

Is your content accurate?

- Are the details of the event of extreme weather accurate and up-to-date?
- Are the images included only of the weather event being described?
- Are the data visualizations purely objective?
- Did you accurately attribute climate change to the event of extreme weather?

Content accuracy will demonstrate the trustworthiness of a media source.

Including images of other, more sensational events can be misleading if not directly referenced in the content.

If data visualizations appear, they should be based on fact, not opinion.

The attribution should be made in a way that science can support (see above).

Is your content inspiring?

- Do you avoid inflammatory "catastrophe"-based language?
- Does your content include an element providing empathy?*
- Do you include resources for audiences to seek out actionable steps to take towards climate solutions?*
- Does your content provide a global perspective on climate change?

This language can discourage audiences from wanting to learn more.

Empathy can connect an audience with an event, even if it's not geographically close.

If applicable, including additional resources will get audiences started in finding their own (most practical) steps to take towards climate solutions.

Providing a global perspective shows how climate change is an issue that affects the entire world, not just specific regions.

** Indicates an optional inclusion, permitting space and approval.*

Short-Form Visual Content

In short-form visual content, the visual components are the primary focus. The messaging translated by the images is what deems moderation, as well as the written captions or on-screen text. If the captions / text are significant in length, please refer to the "Text Content" sections of the guide.

Is your content informative?

- Does your content show how the extreme weather event may have been exacerbated by the effects of anthropogenic climate change?
- Does your content show the potential local community impact as a result of this event of extreme weather?*
- Does your content show the global impact of this event of extreme weather?*

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Providing a global perspective shows how climate change is an issue that affects the entire world, not just specific regions.

** Indicates an optional inclusion, permitting space and approval.*

Looking Forward.

As extreme weather events continue to occur, we will use our platforms to demonstrate their connection to climate change, taking the groundbreaking research found by climate scientists and giving it the largest platform we can. As new information continues to be discovered, this guide will be regularly updated to accommodate for those changes, so you can be assured that your content relating to events of extreme weather will always



*Students in Reno, Nevada learn about solar panels.
(Photo by Jessica Reeder/BlackRockSolar)*

be informative, accurate, and inspiring to your audience.

By using this guide to produce your content, you have become an active participant in the climate change discussion - and the future of our world thanks you.

Additional Resources

All images in this guide were obtained from **Climate Visuals: a Climate Outreach Project**. This database contains a collection of climate change-related images that media producers can use, accompanied by information on how they positively contribute to the climate change conversation. (<https://www.climatevisuals.org/>)

The **Yale Project on Climate Change Communication** conducts research on public engagement and understanding of climate change, and communicates in on their website through a variety of visualizations, publications, and reports. (<https://climatecommunication.yale.edu/>)

Climate Central acts as an online liaison between the climate science and environmental media production communities, and contains a body of public survey research and scientific data for scientific publication and journalism. (<https://www.climatecentral.org/>)

The **Earth Journalism Network** is a community dedicated to environmental journalists and journalism. Their website contains global climate news updates, as well as a database of "reporter resources" for media producers to use. (<https://earthjournalism.net/>)

The **Intergovernmental Panel on Climate Change** is the division of the United Nations responsible for assessing the current body of scientific data related to climate change. Their website contains informational reports on current global climate change statistics, as well as frequent news and press releases on new developments of climate science. (<https://www.ipcc.ch/>)

Bibliography

- Adam, B., Allan, S., & Carter, C. (Eds.). (2000). *Environmental risks and the media* (1st ed.). London ; New York : Routledge.
- Bender, M. A., Knutson, T. R., Tuleya, R. E., Sirutis, J. J., Vecchi, G. A., Garner, S. T., & Held, I. M. (2010, January 22). Modeled Impact of Anthropogenic Warming on the Frequency of Intense Atlantic Hurricanes. *Science*, 327(5964), 454-458. doi:10.1126/science.1180568
- Cai, W., Borlace, S., Lengaigne, M., van Rensch, P., Collins, M., Vecchi, G., ... Jin, F. (2014, January 19). Increasing frequency of extreme El Niño events due to greenhouse warming. *Nature Climate Change*, 4, 111-116. Retrieved from <http://www.nature.com/natureclimatechange>
- Cannon, A. J., Gillett, N. P., Kirchmeier-Young, M. C., & Zwiers, F. W. (2017, September). Attributing extreme fire risk in Western Canada to human emissions. *Climatic Change*, 144(2), 365–379. Retrieved from link.springer.com/journal/10584
- Carvalho, A. (2007). Ideological cultures and media discourses on scientific knowledge: re-reading news on climate change. *Public Understanding of Science*, 16(2), 223–243. <https://doi.org/10.1177/0963662506066775>
- Climate Change. (n.d.). Retrieved April 13, 2019, from United Nations website: www.un.org/en/sections/issues-depth/climate-change/index.html
- Climate Change 2014 Synthesis Report Summary for Policymakers [Synthesis Report]. (2018, February). Retrieved from The Intergovernmental Panel on Climate Change website: https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf
- Committee on Extreme Weather Events and Climate Change Attribution, Board on Atmospheric Sciences and Climate, & Division on Earth and Life Studies (Eds.). (2016). *Attribution of Extreme Weather Events in the Context of Climate Change*. Washington, D.C.: The National Academies Press.
- Dale, V. H., Joyce, L. A., McNulty, S., Neilson, R. P., Ayres, M. P., Flannigan, M. D., ... Wotton, B. M. (2001, September 1). Climate Change and Forest Disturbances: Climate change can affect forests by altering the frequency, intensity, duration, and timing of fire, drought, introduced species, insect and pathogen outbreaks, hurricanes, windstorms, ice storms, or landslides. *BioScience*, 51(9), 723-734. doi: 10.1641/0006-3568(2001)051[0723:CCAFD]2.0.CO;2

- Data rescue and archives.* (n.d.). Retrieved April 20, 2019, from World Meteorological Organization website: public.wmo.int/en/our-mandate/what-we-do/observations/data-rescue-and-archives
- Davidson, D., Fisher, A., & Blue, G. (2019, March). Missed opportunities: the absence of climate change in media coverage of forest fire events in Alberta. *Climatic Change*, 153(1), 165-179. Retrieved from link.springer.com/journal/10584
- Ethical Journalism: A Handbook of Values and Practices for the News and Editorial Departments.* (n.d.). Retrieved April 15, 2019, from The New York Times website: <https://www.nytimes.com/editorial-standards/ethical-journalism.html>
- Flannigan, M. D., Marshall, G. A., & Wotton, B. M. (2017, August 27). Potential climate change impacts on fire intensity and key wildfire suppression thresholds in Canada. *Environmental Research Letters*, 12(9), Retrieved from iopscience.iop.org/journal/1748-9326
- Francis, D., & Hengeveld, H. (1998). *Extreme Weather and Climate Change*. Ontario, CA: Minister of Supply and Services.
- Goswami, B. N., Venugopal, V., Sengupta, D., Madhusoodanan, M. S., & Prince Xavier, K. (2006, December 1). Increasing Trend of Extreme Rain Events Over India in a Warming Environment. *Science*, 314(5804), 1442-1445. doi:10.1126/science.1132027
- Hoffman, A. J. (2015). *How Culture Shapes the Climate Change Debate*. Stanford, CA: Stanford University Press.
- Konisky, D. M., Hughes, L., & Kaylor, C. H. (2016, February). Extreme weather events and climate change concern. *Climatic Change*, 134(4), 533–547. doi:10.1007/s10584-015-1555-3
- Lawton, J. H. (2007, January). Ecology, politics and policy. *Journal of Applied Ecology*, 44(3), 465-474. doi:10.1111/j.1365-2664.2007.01315.x
- Marshall, G. (2015). *Don't Even Think About It: Why Our Brains Are Wired to Ignore Climate Change*. Bloomsbury Publishing, USA.
- McCombs, M. (2014). Setting the agenda: Mass media and public opinion. Retrieved from <https://ebookcentral.proquest.com>
- Meehl, G.A., F. Zwiers, J. Evans, T. Knutson, L. Mearns, and P. Whetton, (2000): Trends in Extreme Weather and Climate Events: Issues Related to Modeling Extremes in Projections of Future Climate Change. *Bulletin of the American Meteorological Society*, 81, 427–436. doi:10.1175/1520-0477

- Norgaard, K. M. (2011). *Living in Denial: Climate Change, Emotions, and Everyday Life* (1st ed.). The MIT Press.
- Nunes, F., Rajão, R., & Soares-Filho, B. (2016, May). Boundary work in climate policy making in Brazil: Reflections from the frontlines of the science-policy interface. *Environmental Science & Policy*, 59, 85-92. doi:10.1016/j.envsci.2016.02.009
- Park, D. J. (2018, February). United States news media and climate change in the era of US President Trump. *Integrated Environmental Assessment and Management*, 14(2), 202-204. Retrieved from setac.onlinelibrary.wiley.com/journal/15513793
- Spence, A., Poortinga, W., & Pidgeon, N. (2012, June). The Psychological Distance of Climate Change. *Risk Analysis: An International Journal*, 32(6), 957-972. doi:10.1111/j.1539-6924.2011.01695.x
<https://onlinelibrary.wiley.com/doi/full/10.1111/j.1539-6924.2011.01695.x>
- Quesnel, K. J., & Ajami, N. K. (2017, October 25). Changes in water consumption linked to heavy news media coverage of extreme climatic events. *Science Advances*, 3(10), doi:10.1126/sciadv.1700784
- Rachmad, S. H. (2018). Climate Change Communication: Community Knowledge and Preparedness. *Handbook of Climate Change Communication*, 2(Climatic Change Management), 161-182. doi:10.1007/978-3-319-70066-3_12
- Sisco, M. R., Bosetti, V., & Weber, E. (2017, July). When do extreme weather events generate attention to climate change? *Climatic Change*, 143(1-2), 227–241 |. doi:10.1007/s10584-017-1984-2
- Stott, P. A., Christidis, N. , Otto, F. E., Sun, Y. , Vanderlinden, J. , van Oldenborgh, G. J., Vautard, R. , von Storch, H. , Walton, P. , Yiou, P. and Zwiers, F. W. (2016), Attribution of extreme weather and climate-related events. *WIREs Climate Change*, 7: 23-41. doi:10.1002/wcc.380
- Titley, D. W., Hegerl, G., Jacobs, K. L., Mote, P. W., Paciorek, C. J., Shepherd, J. M., ... Markovich, E. (Eds.). (2016). *Attribution of Extreme Weather Events in the Context of Climate Change*. Washington, DC: The National Academies Press.
- Trenberth, K. E., 1999: Conceptual framework for changes of extremes of the hydrological cycle with climate change. *Climatic Change*, 42, 327-339.
- Twitter Brand Guidelines* [PDF]. (n.d.). Retrieved from Twitter website: https://about.twitter.com/content/dam/about-twitter/company/brand-resources/en_us/Twitter_Brand_Guidelines_V2_0.pdf
- Ulrika, O., & Berglez, P. (2014, June). Media and Climate Change: Four Long-standing Research Challenges Revisited. *Environmental Communication*, 8(2), 249-265. doi:10.1080/17524032.2014.906483

Ungar, S. (1999, February). Is Strange Weather in the Air? A Study of U.S. National Network News Coverage of Extreme Weather Events. *Climatic Change*, 41(2), 133-150. doi:10.1023/A:1005417410867

User @redtaboo. (2018). Reddiquette [Online forum post]. Retrieved from <https://www.reddit.com/wiki/reddiquette/>

Yale Climate Opinion Maps 2018. (2018, August 7). Retrieved from Yale Program on Climate Change Communication website: climatecommunication.yale.edu/visualizations-data/ycom-us-2018/