

Climate communication and storytelling

EMMA FRANCES BLOOMFIELD^{1,*}, CHRIS MANKTELOW²

¹ Communication Studies, University of Nevada, Las Vegas, Las Vegas, NV, USA;

² Geography, College of Life and Environmental Sciences, University of Exeter, Exeter, UK;

* Corresponding author email address: emma.bloomfield@unlv.edu

Abstract

As part of its Assessment Reports (ARs), the Intergovernmental Panel on Climate Change (IPCC) publishes Summaries for Policymakers (SPMs) that review key findings on climate science and climate change's potential impacts. We argue that the IPCC could create more engaging SPMs by incorporating narrative features. This project evaluates AR5's SPM for narrative opportunities, which are elements that could be narratively restructured or strengthened. Storytelling does not compromise the goals of the IPCC but rather helps public audiences understand and relate to the information. We encourage the adoption of storytelling elements to increase public understanding of and engagement with climate science.

Keywords

Storytelling, Science communication, Communication strategies, Public engagement

The Intergovernmental Panel on Climate Change (IPCC) produces Assessment Reports (ARs) aggregating climate change research. In line with norms in science communication, these publications are written in a descriptive, explanatory style. The ARs also include "Summaries for Policymakers," (SPMs) which translate the detailed scientific reports into more accessible language for non-specialist audiences (Barkemeyer et al. 2016). The IPCC is a prominent source of climate change information, which then circulates in policy, the media, and the public (Poortvliet et al. 2020). While global concern about climate change is growing, there remain pockets of scepticism and apathy that pose considerable hurdles for meaningful policy action, therefore necessitating the continued examination of strategies for communicating science to public audiences (Fagan and Huang 2019; Leiserowitz et al. 2020).

Scholars have studied storytelling as an effective form of science communication. In addition to stories being an innate way that people make sense of information (Boyd et al 2020; Fisher 1984), stories also improve information acquisition and retention and encourage belief, attitude, and behaviour change (Dahlstrom 2014; Martinez-Conde and Macknik 2017; McComas and Shanahan 1999; Morris et al. 2019). Most studies compare narrative to non-narrative formats, but some view storytelling on a continuum that includes scientific information. Boyd et al. (2020), for example, proposed that "factual accounts [within science] are likely less story-like but are still narratives nonetheless" (3). Therefore, the communication of science can be viewed as storytelling, even though it may not resemble a traditional story structure.

Because we view IPCC reports as exercises in storytelling, we argue that strengthening their narrative elements will create more compelling science communication. Some studies have manipulated narrative elements to show how adjusting isolated features of stories affect narrative engagement. For example, studies have modified the temporal state of stories (i.e. past, present, or

future) and their realism (i.e. realistic or fantastical) and found that adjusting these features affects how people engage with stories (Kim and Nan 2016; Sangalang and Bloomfield 2018). Additionally, Quintero Johnson et al. (2021) found that telling a story from a first-person, third-person, or bystander perspective affects persuasive outcomes.

These studies used more traditional story forms, but they nevertheless provide evidence that the manipulation of different narrative elements influences audiences. It can be impractical to adopt an entirely narrative form when communicating science, such as within technical genres of scientific reports. Therefore, emphasizing narrative elements is a more manageable shift. These smaller, more feasible changes can be made to increase a text's similarity to an identifiable story structure and therefore the likelihood that the text will have some of the tested benefits of storytelling.

Despite these findings, some have cautioned against the use of storytelling in science, often citing the need for impartiality and objectivity (Blastland et al. 2020). This need is reflected in the IPCC's (2014b) stated goals to provide "clear and balanced information" that is "policy-relevant but not policy-prescriptive." Similar to the line between science and story, we propose that the line between informing and persuading is not so clear and distinct. By providing policy-relevant information, IPCC reports necessarily cross what Lynda Walsh (2013) calls the "is/ought boundary," which refers to how the evidence for climate change's existence and severity is so overwhelming that to report it is to imply that action should be taken.

Communicating science involves selecting what information to include, framing information with various emphases, managing uncertainty, and adapting messages to target audiences (e.g., Barkemeyer et al. 2016; Harold et al. 2020; Stocker and Plattner 2016; Wardekker and Lorenz 2019). These decisions place scientific publications, including IPCC reports, as acts of rhetoric, persuasion, and storytelling. Consequently, we propose that public-facing IPCC publications such as SPMs should "embrace the techniques" of storytelling as a step toward improving public engagement with IPCC content (Walsh 2017:3).

According to rhetorician Walter Fisher (1984), stories are critically adopted by audiences who perceive some stories to be more reasonable than others. Stories with high rationality have internal coherence or probability (the elements of the story hang together) and external fidelity (the story resonates with people's lives). Fidelity makes topics like climate change seem less "abstract and intangible" because they are made relevant to audiences' lived experiences (Pidcock, quoted in Climate Outreach 2018:3). Narrative probability and fidelity can be strengthened by creating clear, coherent, and relevant stories. In their analysis of climate stories, Jones and Peterson (2017) draw upon the "narrative policy framework" to describe four structural elements stories share: characters, setting, plot, and the story's moral. Other research also locates these features as common elements of stories that affect audience engagement (Boyd et al 2020).

In our analysis, we group characters, setting, and moral to address the interrelated questions of who the characters are, where are they situated, and what are their goals. By creating characters whom people identify with, audiences can feel that climate change personally impacts them (Gustafson et al 2020:122). Additionally, narrowing the scope of a story can "make climate change personal" by describing localized, specific settings (Bloomfield 2019:171). Morals relate to a character's goals and the policy solution proposed by the narrative (Jones and Peterson 2017).

We consider plot along with narrative probability and narrative fidelity. Plot refers to "causal relationships over time" (Jones and Peterson 2017:7), which can be expressed through chronological juxtapositions that present information "sequentially" in order to make "a claim about causality or

chronology" (Bloomfield and Sangalang 2014:149). Thus, a story's plot has high probability when it unfolds logically. Part of making science resonate with audiences is "translating" it for public accessibility, using rhetorical figures such as comparisons and analogies (Fahnestock 1998). Comparisons create simple ways for audiences to understand relationships and analogies make use of references that audiences may be more familiar with, thereby increasing a story's internal coherence and external resonance, respectively.

In what follows, we analyse AR5's SPM for places where these narrative elements can be added or strengthened, which we refer to as narrative opportunities. Incorporating these elements, and thereby increasing the story-like qualities of public-facing IPCC reports, can help SPM authors adapt climate science for public audiences.

Narrative Opportunities in the Summary for Policymakers

In AR5's SPM, we located two categories of narrative opportunities. The first is to communicate clearer characters, settings, and morals. The second is to express the plot of climate change and complex climate information through comparisons and analogies.

Characters, Settings, and Morals

AR5's SPM notes that its headline statements are meant to be read narratively: "Headline statements are the overarching highlighted conclusions of the approved Summary for Policymakers which, taken together, provide a concise narrative" (IPCC 2014a:1). In this narrative, however, there is a notable absence – explicit characters within specific settings who have goals.

"Humanity" is the implicit main character of the narrative but is not directly stated. For example, one headline reads, "Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change" (IPCC 2014a:2). To rephrase with more explicit characters, the headline could read: "Global governments and leaders can enact both adaptation and mitigation as complementary strategies for reducing and managing the risks of climate change."

Characters can also be added in the description of climate change's risks. For example, Wardekker and Lorenz (2019) noted that IPCC reports could include more moral framing to provide details "on who is affected" by and who is "most vulnerable" to climate change (286). Moral framing can be done through case studies that provide character and setting details in terms of "more localised ... and near-term perspectives" (287). For example, the SPM (2014b:30) provides general overviews of environmentally effective regulatory approaches: "examples of information programmes include labelling programmes that can help consumers make better-informed decisions." Alternatively, the SPM could locate successful case studies of labelling programmes to illustrate in more concrete ways what these solutions could look like.

Adding specificity can also clarify characters' goals and the story's overall moral. The IPCC (2014b:31) notes that climate change poses a "threat to sustainable development," indicating that sustainable development is an overarching goal. However, sustainable development alone is not an objective, but is a way of meeting our current needs without compromising the needs of future generations (Brundtland 1987). Making sustainable development the goal of a narrative therefore confuses how to reach a goal with the goal itself.

A more compelling story would centre more specific goals. The IPCC (2014b) headline statements include the goals of mitigating "climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth" (9). However, this list is in quick succession and lacks details. Instead, each topic could be expanded; for example, including how food insecurity is

exacerbated by climate change. Having enough food to eat is a basic human need that people can easily understand, which increases emotional engagement and resonance with the topic. A general statement about sustainable development is less appealing than specific, actionable goals that may have higher fidelity with people's lived experiences.

Comparisons and Analogies

Another way to incorporate narrative elements is in the use of comparisons and analogies. Comparisons can be incorporated into the AR5's SPM section on climate projections, which, based on different scenarios, simulate future potential warming. The AR5's SPM refers to these four scenarios as representative concentration pathways (RCPs) that aim to capture the effects of radiative forcing, which is the difference between absorbed and reflected energy, depending on various mitigation efforts.

Climate change scenarios already have the basics of a narrative structure – a plot or causality between events. They have a setting (the RCP), characters (people and governments), conflict (how will surface temperature change) and a resolution (projected global mean surface temperature). The AR5 SPM (2014b:10) lists the results of four climate projections, presenting them as unconnected facts.

As an alternative, the same information could be presented as comparative narratives:

RCP 8.5

If global governments and leaders do not make any effort to constrain emissions, radiative forcing might increase until it reaches >8.5 W/m² by 2100. Under this scenario, global mean surface temperatures are likely to be between 2.6°C and 4.6°C by the end of the century (2081-2100) relative to 1986-2005. The Arctic will continue to warm more rapidly than the global mean.

RCP 2.6

Alternatively, if global governments and leaders make a stringent effort to constrain emissions, radiative forcing might peak at 3 W/m² before 2100 and then decline. Under this scenario, global mean surface temperatures are likely to be between 0.3°C and 1.7°C by the end of the century (2081-2100) relative to 1986-2005. Even with this stringent effort, the Arctic will continue to warm more rapidly than the global mean, but far less so than in RCP 8.5.

These new descriptions present each scenario as a clearer cause-effect narrative and create a juxtaposition between them that clearly indicates the better option. Presenting climate projections as interrelated narratives rather than as lists of facts can make it easier for policymakers to assess the outcomes associated with each scenario and, consequently, to identify a policy solution, or the moral of the story, in response to the information (Wardekker and Lorenz 2019).

Moreover, presenting climate projections as narratives could help distinguish between climate projections and climate predictions. According to the IPCC (2014b), climate projections incorporate socio-economic and emissions scenarios that may be subject to change. Projections therefore indicate *possible* futures rather than *probable* ones. However, a survey of international climate scientists suggests that even the scientific community does not always correctly distinguish between projections and predictions when asked to give a definition (Bray and Storch 2009). This confusing terminology could potentially result in audiences conflating climate projections with predictions, which could prevent them from considering the full range of policy options, thereby compromising the clarity of the story's moral.

SPMs can also incorporate analogies. For example, one potential analogy that could be added to increase understanding of CO₂ accumulation is comparing sources of carbon to a running faucet

filling up a tub (Guy et al. 2013). In order to prevent overflowing, the faucet must be slowed down, or the tub must be drained. A study of this analogy by Guy et al. (2013) found that this analogy led to a “greater preference for strong action on climate change” and improved “non-experts’ understanding of CO2 accumulation” (579). Analogies can increase audiences’ understanding of concepts and prompt consideration of appropriate actions in response. This is one example of how analogies could improve the communication of complex climate information, thereby increasing narrative fidelity and audience understanding.

Conclusion

Our analysis examined two categories of narrative opportunities: (1) incorporating clear and specific characters (people and governments), settings (local case studies) and morals (specific goals); and (2) using comparisons and analogies to help explain scientific concepts and increase narrative rationality. Narrative elements are tools that scientists can use to help people retain information and see themselves in the story of climate change. This preliminary inquiry has proposed that by adopting narrative elements, the IPCC can better tailor SPMs for consumption by public audiences.

Storytelling is a critical, logical enterprise that can increase understanding of climate change and support for climate mitigation. Instead of separating science from storytelling, informing from persuading, and climate science from its policy implications, the IPCC can embody its role as a “science-policy boundary organization” by incorporating sound science and sound communication strategies in its publications (Wardekker and Lorenz 2019:276). We therefore encourage the IPCC to take advantage of narrative opportunities in its public-facing communication. This essay is a preliminary look into how we can craft more effective communication in public-facing IPCC publications and, more broadly, how narrative elements can strengthen climate communication. We encourage continued research into this productive intersection of science and storytelling, including experimental testing to demonstrate the practical value of incorporating narrative elements into science communication.

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References

- Barkemeyer, Ralf, Suraje Dessai, Beatriz Monge-Sanz, Barbara Gabriella Renzi, and Giulio Napolitano. 2016. "Linguistic Analysis of IPCC Summaries for Policymakers and Associated Coverage." *Nature Climate Change* 6(3):311-16.
- Blastland, Michael, Alexandra L. J. Freeman, Sander van der Linden, Theresa M. Marteau, and David Spiegelhalter. 2020. "Five Rules for Evidence Communication." *Nature* 587(7834):362-64.
- Bloomfield, Emma Frances. 2019. *Communication Strategies for Engaging Climate Skeptics: Religion and the Environment*. Routledge.
- Bloomfield, Emma Frances and Angeline Sangalang. 2014. "Juxtaposition as visual argument: Health rhetoric in *Super Size Me* and *Fat Head*." *Argumentation and Advocacy* 50(3):141-56.
- Boyd, Ryan L., Kate G. Blackburn, and James W. Pennebaker. 2020. "The narrative arc: Revealing core narrative structures through text analysis." *Science Advances* 6(32):1-9.
- Bray, Dennis, and Hans von Storch. 2009. "'Prediction' or 'Projection'?: The Nomenclature of Climate Science." *Science Communication* 30(4):534-43.
- Brundtland, G. 1987. *Report of the World Commission on Environment and Development: Our Common Future*. United Nations.
- Climate Outreach. 2018. *Communications Handbook for IPCC Scientists*. Retrieved from ([/climateoutreach.org/reports/ipcc-communications-handbook](http://climateoutreach.org/reports/ipcc-communications-handbook)).
- Dahlstrom, Michael F. 2014. "Using Narratives and Storytelling to Communicate Science with Nonexpert Audiences." *Proceedings of the National Academy of Sciences* 111(4):13614-20.
- Environmental Protection Agency. 2017. "Causes of Climate Change." Retrieved from ([/climate-change-science/causes-climate-change](http://climate-change-science/causes-climate-change)).
- Fagan, Moira, and Christine Huang. 2019. *A Look at How People around the World View Climate Change*. Pew Research Center. Retrieved from ([/www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/](http://www.pewresearch.org/fact-tank/2019/04/18/a-look-at-how-people-around-the-world-view-climate-change/)).
- Fahnestock, Jeanne. 1998. "Accommodating science: The rhetorical life of scientific facts." *Written Communication* 15(3):330-50.
- Fisher, Walter R. 1984. "Narration as a Human Communication Paradigm: The Case of Public Moral Argument." *Communication Monographs* 51(1):1-22.
- Gustafson, Abel, Matthew T. Ballew, Matthew H. Goldberg, Matthew J. Cutler, Seth A. Rosenthal, and Anthony Leiserowitz. 2020. "Personal Stories Can Shift Climate Change Beliefs and Risk Perceptions." *Communication Reports* 33(3):121-35.
- Guy, Sophie, Yoshihisa Kashima, Iain Walker, and Saffron O'Neill. 2013. "Comparing the Atmosphere to a Bathtub: Effectiveness of Analogy for Reasoning about Accumulation." *Climatic Change* 121(4):579-94.
- Harold, Jordan, Irene Lorenzoni, Thomas F. Shipley, and Kenny R. Coventry. 2020. "Communication of IPCC Visuals: IPCC Authors' Views and Assessments of Visual Complexity." *Climatic Change* 158(2):255-70.
- Intergovernmental Panel on Climate Change. 2014a. *Climate Change 2014 Synthesis Report*.
- Intergovernmental Panel on Climate Change. 2014b. *Summary for Policymakers*.
- Jones, Michael D., and Holly Peterson. 2017. "Narrative Persuasion and Storytelling as Climate Communication Strategies." *Oxford Research Encyclopedia of Climate Science*. <https://doi.org/10.1093/acrefore/9780190228620.013.384>
- Kim, Jarim, and Xiaoli Nan. 2016. "Temporal Framing Effects Differ for Narrative Versus Non-Narrative Messages: The Case of Promoting HPV Vaccination." *Communication Research* 46(3):401-17.
- Leiserowitz, Anthony, Edward Maibach, Seth Rosenthal, John Kotcher, Parrish Bergquist, Matthew Ballew, Matthew Goldberg, Abel Gustafson, and Xinran Wang. 2020. *Climate Change in the American Mind: April 2020*. Yale Program on Climate Change Communication.

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- Martinez-Conde, Susana, and Stephen L. Macknik. 2017. "Opinion: Finding the Plot in Science Storytelling in Hopes of Enhancing Science Communication." *PNAS* 114(31):8127-29.
- McComas, Katherine, and James Shanahan. 1999. "Telling Stories About Global Climate Change: Measuring the Impact of Narratives on Issue Cycles." *Communication Research* 26(1):30-57.
- Morris, Brandi S., Polymeros Chrysochou, Jacob Dalgaard Christensen, Jacob L. Orquin, Jorge Barraza, Paul J. Zak, and Panagiotis Mitkidis. 2019. "Stories vs. Facts: Triggering Emotion and Action-Taking on Climate Change." *Climatic Change* 154(1):19-36.
- Poortvliet, P. Marijn, Meredith T. Niles, Jeroen A. Veraart, Saskia E. Werners, Fiona C. Korporaal, and Bob C. Mulder. 2020. "Communicating Climate Change Risk: A Content Analysis of IPCC's Summary for Policymakers." *Sustainability* 12(4861):1-14.
- Quintero Johnson, Jessie M., Angeline Sangalang, and Sun-Young Park. 2021. "First-Person, Third-Person, or Bystander? Exploring the Persuasive Influence of Perspective in Mental Health Narratives." *Journal of Health Communication* 26(4):225-38.
- Sangalang, Angeline, and Emma Frances Bloomfield. 2018. "Mother Goose and Mother Nature: Designing Stories to Communicate Information about Climate Change." *Communication Studies* 69(5):583-604.
- Stocker, Thomas F., and Gian-Kasper Plattner. 2016. "Making Use of the IPCC's Powerful Communication Tool." *Nature Climate Change* 6(7):637-38.
- Walsh, Lynda. 2013. *Scientists as Prophets: A Rhetorical Genealogy*. Oxford University Press.
- Walsh, Lynda. 2017. "Understanding the Rhetoric of Climate Science Debates." *WIREs Climate Change* 8(3):1-7.
- Wardekker, Arjan, and Susanne Lorenz. 2019. "The Visual Framing of Climate Change Impacts and Adaptation in the IPCC Assessment Reports." *Climatic Change* 156(1):273-92.