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Addressing Climate Change Scepticism Through the Sonic Arts

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Abstract: This paper discusses the continued denial of climate change despite overwhelming scientific evidence and agreement, through viewing climate change as a “hyperobject”—that is, a concept of such massive temporal and spatial dimensions that it defies traditional understanding. One of the challenges of the scientific community is to combat such scepticism through new ways of framing information, and the sonic arts offers an alternative presentation of truth through its ability to create emotional and narrative rapport, and also humanise esoteric information. This paper will focus on various methods of communicating climate change data aurally—such as sonification of data, and ecoacoustic methods of surveying environments.

Introduction

The advent of the post-truth era has been deeply concerning in regards to climate science, particularly in how persistent climate change denialism remains despite scientific consensus on anthropogenic climate change and its effects on the environment. The post-truth era encourages the view that truth is “relative”—or, “your truth is yours”—which means that information is being provided and interpreted in a space where multiple values and narratives compete. In this crowded and polarised space, information becomes all about how it is framed, and which narratives are presented the strongest and loudest.

Despite ample evidence of climate change occurring, there are constant questions regarding the validity of climate science within the general public. Climate science has been construed as “alarmist” by sceptics, or even as a form of extreme religion.¹ This constant scepticism of climate change is particularly worrying in light of increasing awareness and knowledge of its ecological impact, creating a heightened sense of urgency in taking action. The level of anthropological intrusion into the world is such that some commentators have begun to describe this current epoch as the Anthropocene.² It has also led to calls for a reframing of how discussions on climate change should be led (such as a preference for the less-confrontational term *dialogue* over *debate*, which implies contentiousness) and how climate change ought to be communicated to the broader public. The confusion partly stems from how vastly complex and multi-layered the concept of climate is for many people. Misunderstandings about the nature of climate change have also arisen, such as conflating climate change (long-term variation) with weather changes (short-term variations), and using the latter to throw doubt on the former.

An interesting way on how to conceptualise climate change is Timothy Morton’s “hyperobject,” with a “hyperobject” referring to an entity of such vast temporal and spatial dimensions that they defy traditional understanding.³ A hyperobject is of such a size that it can, at best, be thought of in broad, abstract terms, and may be computationally charted, but it

cannot be directly touched or seen, and its boundaries are unclear or difficult to establish. This state of simultaneous existence yet unavailability makes hyperobjects highly challenging concepts to understand, and thus requires new ways of framing in order to make sense of their existence. In essence, Morton notes, their difficulty lies in the philosophical space they occupy:

Hyperobjects occupy a high-dimensional phase space that results in their being invisible to humans for stretches of time ... The more we know about them, the more we find we are glued to them. We find ourselves unable to achieve epistemological escape velocity from their ontological density.⁴

Aside from being a concept that defies traditional understandings, a hyperobject also challenges our predominantly human-centric view of history that focuses almost exclusively on human events and significance. This human-centric focus takes humanity out of the natural world, with nature viewed as the Other—one that is a malleable resource, to be used by humanity for humanity's benefit. A hyperobject such as anthropogenic climate change challenges that view by relocating humanity back into the "natural" world and showing how emancipation from nature is not only impossible, but such thinking can have dire repercussions for all existing beings—humans included. History, and events, are therefore no longer exclusively human.

Another writer, Bruno Latour, also notes this long-standing disconnect between humans and the environment, and how such a disconnect has encouraged irresponsible approaches to technology and use of resources. According to Latour, the challenge of climate change creates a sense of powerlessness:

because of the total *disconnect* between the range, nature and scale of the phenomena and the set of emotions, habits of thoughts, and feelings that would be necessary to handle those crises.⁵

With these challenges, the ability—or rather, the inability—of climate scientists to communicate ideas around climate change has been noted with concern by the field itself.⁶ Much of how climate change has been communicated has been through a facts-based mode, with the assumption that offering greater or more accurate information will lead to behavioural and opinion changes. However, such an assumption is fundamentally flawed. People are not merely influenced by the amount of information they receive on a topic. They are also influenced by their individual values and cultural background, and particularly an intrinsic human need to "belong" to a group. Research into information acquisition shows that people, regardless of their intellect, tended to follow their underlying beliefs and assumptions even after being presented with contrary evidence.⁷

The Role of Music and the Sonic Arts

With the impact of climate change becoming more apparent on ecologies worldwide, and the need for action becoming increasingly urgent, it is now imperative to work towards refuting climate change scepticism. Particularly for artists working in the sonic arts and in rural environments, the question, "How can my practice be used to promote climate change awareness?" is a pertinent one.

Art is commonly seen as being a particularly affective, or emotional way of communicating—music is often seen as a form of rhetoric, or a tool for persuasion, and as such, its rhythms and structures are ideally structured to influence the emotions and even the bodily disposition of the listener.⁸ The arts can be helpful to aid understanding on environmental issues by making these seemingly vast and inscrutable issues relatable. One example of how the arts can convey narrative is Julia Blasch's and Robert Turner's Canary

Project experiment. Blasch and Turner showed divided subjects into two groups, one of which was shown literal photographic information which highlighted the detrimental impact of climate change, while the second was presented with an animated digital map showing a variety of wind patterns. Subjects were then asked if they might be willing to purchase carbon offsets. Those shown the photographs were more likely to do so than those shown the map as the photographs elicited a stronger emotional response to environmental damage.⁹ Blasch and Turner concluded that emotional affinity was an important element of communicating climate change science.¹⁰

David Monacchi's and Bernie Krause's essay on ecoacoustics and expression through the arts further elaborates the importance of art as a way of communicating scientific concepts, and the value of cross-disciplinary collaboration:

The inherent response to sound and movement is what gives the performing arts such profundity. The increasing significance of science-based art in esthetic culture demands a stronger consideration of, and collaboration with, the performing arts. The potential to contextualise scientific information with humanity's innate qualities adds meaning to data and scientific investigations.¹¹

While there is still some scepticism in the scientific community about using art as a way of conveying scientific information, with concerns that it might dilute or distort information or otherwise promote inaccuracies, art can be a valuable communicative tool when used in sophisticated and context-sensitive ways. Sound can be a powerful demonstration of climate change—such as through the sonification of information (the conversion of non-musical data into musical notes). This process of sonification can render numbers and otherwise-esoteric information into tangible, relatable artefacts. An example of a composition based on sonifying climate data is Daniel Crawford's "Planetary Bands, Warming World," which is a piece based on mapping average temperatures from four regions—equatorial (violin), mid-latitudes (viola), upper latitudes (violin), and the Arctic (violin)—over 133 years to create a score (fig 1).



Fig. 1. Crawford, "Planetary Bands, Warming Planet."¹²

In his piece, Crawford focused on the northern hemisphere to show the changes in the temperature. Each instrument was tuned to the average temperature of their region, with each note corresponding to a year and each pitch representing the temperature.¹³ As the piece plays, it becomes possible to hear the changes in temperature—particularly towards the end, where there is a marked rise in pitch. This reflects the dramatic rise in temperature of recent years. This rise in pitch is particularly noticeable in the violin playing Arctic temperatures, where there have been the greatest temperature fluctuations.

Crawford noted that many key findings of climate science have been communicated to the public through conceptual diagrams or information-dense graphs, which may not be accessible to all audiences. He was interested in creating a visceral, non-visual way for audiences to understand climate change data:

Music is an important tool because it acts to bridge the divide between logic and emotion. It is simple enough to look at numbers rise or to watch the slope of a graph increase and walk away saying “OK, the Earth is getting warmer.” Through music, we can convey the data in a different way, which draws on the science of the numbers and also the emotional power of hearing sound.¹⁴

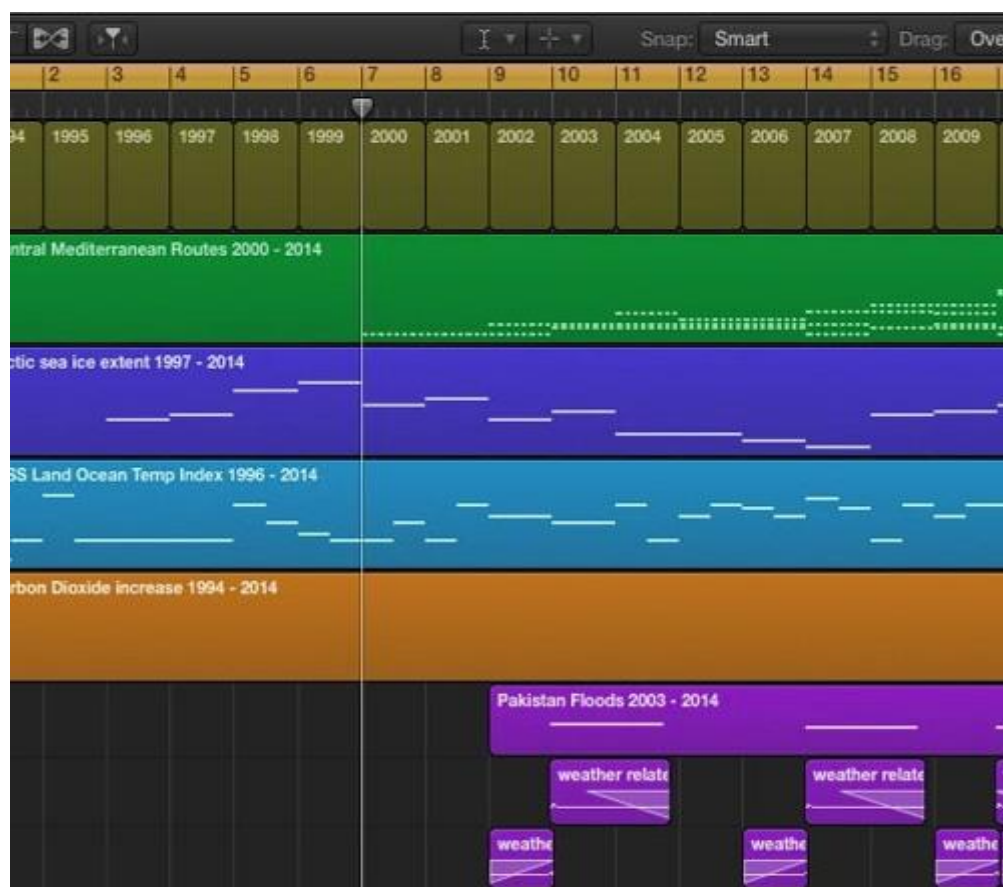


Fig. 2. Some of the data used by Disobedient Films to create “Climate Symphony.”¹⁵

Another example of sonification of climate data is Disobedient Films, who created a work called “Climate Symphony” as a response to concerns over climate change.¹⁶ The piece features climate data collected from 1994 to 2014, with each bar corresponding to one year of scientific data (Fig. 2). Some of the data collected for the piece include the extent of the Arctic sea ice, the Land Ocean Temperature Index and levels of carbon dioxide, and as the piece progresses, the changes can be heard. Some sections (such as temperature and carbon dioxide) rise, while other areas fall (such as the extent of the Arctic sea ice). Leah Borrromeo,

who co-directed the project, noted that music's ability to affect people was one of the driving factors behind the piece:

Music makes us feel things. It affects us physiologically, emotionally. Sound has always acted as a warning for us, we have this ingrained in our limbic system. This is a new way of expressing the climate change issue.¹⁷

Borromeo is acutely aware of how information on climate change can be obfuscated, and is also committed to using scientifically-accurate data for her work. She argues therefore that "Climate Symphony" acts to "create a formal record" and so serves as "a method of fact-checking."¹⁸

Sonification can also be used to document changes in a forest, such as the work of Lauren Oakes and Nik Sawe, who sonified changes in the Alexander Archipelago forest, located in south-eastern Alaska. Oakes was particularly interested in yellow-cedar, a tree that was once abundant in the area. Warming temperatures have reduced spring snow cover, thereby exposing their shallow roots systems to the elements. The yellow cedar has been facing extensive mortality and a reduction in range.¹⁹ Oakes was interested to see how these changes were impacting the forest, particularly in the changes in the composition of the tree species. One of Oakes' motivations to use sound is its ability to convey *patterns* in data:

Researchers are always talking about multidimensional space, but that means nothing to the public, and it's even hard to understand as a scientist ... what's so cool about sound is that you can hear all the variables at the same time.²⁰

In Oakes' and Sawe's works, the five dominant tree species of the area were assigned different instruments—piano (yellow cedar), flute (western hemlock), cello and bass (sitka spruce), violin and viola (mountain hemlock), and clarinet (shore pine). Each note represented a tree, with the height represented by pitch and diameter represented by note attack. A dead tree is represented by silence. In one piece featuring the yellow-cedar "solo," the gaps between notes become increasingly noticeable as the data moves south, representing the yellow cedar's retreating range.

Ecoacoustics—which is the practice of recording sound and their interactions in landscapes—is another method of illustrating climate change. It can be particularly effective at documenting changes occurring over a particular ecological area over time, through regular recordings. A prominent practitioner is Bernie Krause, a sound ecologist from the United States, where one of the goals of his works is to document changes in ecologies over time. Many of his recordings are of specific places over a period of years—for instance, his near-daily recordings at Sugarloaf Ridge State Park in California span over a decade.

Krause notes some of the advantages of the ecoacoustic method in documenting ecological changes. It is non-invasive, there is minimal human intrusion into a particular area after the microphones have been set up, it is relatively cost-effective due to minimal equipment and allows the gathering of data of long periods. It is also a useful additional tool for understanding the complex interplay in the relationships between species, and between species and their environment. Krause records the dawn and dusk choruses, a time when the majority of species are gathered together and so offer a snapshot of regular animal assemblages.²¹ Through these recordings, Krause is able to discern an area's acoustic signature, and responses to changes in climate can be recorded through the movement of species to and from an area.²²

Changes in an area—especially in an area featuring range-restricted species, and areas that experience dramatic changes in climate—can have a drastic effect on an area's acoustic signature. Krause's Sugarloaf series documents long-term ecological collapse. In "Climate

Change in Sixty Seconds,” Krause places recordings from 2004 to 2015 together in a compressed timeline, as an example of the decreasing biophony (the totality of sounds produced by living organisms) as affected by anthropogenic climate change. The beginning of the recording highlights the diversity in sound in Sugarloaf Ridge State Park (Fig. 3). The middle section corresponds to when the drought began, showing a dramatic decrease in the area’s biophony. In sixty seconds, the effect of the prolonged drought in the area is telling as the recording drops into near-silence, broken by a few sparse calls.



Fig. 3. Spectrogram of Krause’s “Climate Change in Sixty Seconds.”²³

The series of recordings also highlights an insidious aspect of climate change, namely its gradual nature. Changes in climate can happen so gradually that its effects are not apparent, until side-by-side comparisons are made, as in music. Krause noted that:

Because the changes take place from year to year, over a long stretch of time, I really wasn’t aware of what was happening. It was only when I set up [and listened to] the examples side by side that the changes became apparent. The impact of the drought was both astonishing and alarming ... it’s a true narrative, a story telling us that something is desperately wrong ... whether or not the habitat will regain its biophonic vitality ... remains to be seen.²⁴

Conclusion

Anthropogenic climate change is a complex issue that challenges core human beliefs and perceptions of our place in the world. As a hyperobject that eludes traditional methods of explanation, new narratives are needed to create an understanding of the real threat anthropogenic climate change is to the future of the planet. There needs to be ways of reducing the disconnect between ecological crises and people. The arts can act as an important way of filling this need by creating ways for information to be shared in relatable ways through the creation of engaging experiences for audiences. In the era of hyperobjects, humans must again learn to co-exist with nature, and acknowledge that our actions have irretrievably shaped the Earth. What has happened to the Earth is humanity’s responsibility, and in the era of uncertain narratives and vulnerable futures, finding new ways of framing the truth becomes vitally important.

Endnotes

All URLs accessed March 2019.

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- ¹⁵ Leah Borromeo, "Climate Change Data is Being Transformed Into Beautiful, Haunting Symphonies," *Wired* (19 June 2017), <http://www.wired.co.uk/article/climate-symphony-data-sonification>
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- ¹⁷ Ibid.
- ¹⁸ Ibid.
- ¹⁹ Lauren Oakes, "The Sound of Climate Change," *The Atlantic* (14 Sept. 2016), <https://www.theatlantic.com/science/archive/2016/09/this-is-the-sound-of-a-forest-changing/499802/>
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- ²¹ Bernie Krause and Almo Farina, "Using Ecoacoustic Methods to Survey the Impacts of Climate Change on Biodiversity," *Biological Conservation*, 195 (2016): 246.
- ²² Ibid.
- ²³ Leath Tonino, "California's Drought Has a Distinct Sound," *Outside Magazine* (11 Sept 2015), <https://www.outsideonline.com/2014741/californias-drought-has-distinct-sound>
- ²⁴ Ibid.