Atmospheric Embodiment: tuning into the Voice of Weather.

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Abstract

This article explores the perception of atmospheric processes, focusing on environmental sound as a communicative medium. It delves into the concept of a voice of the weather and examines the complexities of climate, atmospheres, and weather patterns. This study is oriented toward an embodied listening of the weather, departing from ideas related to a hypersensitivity to atmospheric conditions. The article also grounds Atmospheric Embodiment through a relationship between the surrounding weather, envelopment, and immersion, particularly in the context of music and sound. In parallel, it reviews Otoacoustic Emissions within the framework of composing embodied music, considering potential connections with environmental sound. Drawing from these diverse disciplines, the article proposes a work in progress-media artwork that collects these notions to experience an Atmospheric Embodiment, culminating in the creation of an installation based on Otoacoustic Emissions and environmental sound. This novel approach aims to attune individuals to the nuanced expressions constituting the voice of the weather.

Keywords

Voice of Weather, Atmospheric Embodiment, Bio-Meteorology, Envelopment, Immersion, Otoacoustic Emissions.

Introduction

The notion of the voice of the weather, as proposed by media artist and author of ecological systems Janine Randerson, finds its articulation in the fusion of weather data, its translation into sound, and the perceptual realm of the audience [23]. Randerson's perspective, rooted in the realm of media arts, illuminates how artists utilize technology to render audible the intricate symphony of our natural surroundings. Building upon Randerson's insights, this article delves into a transformative shift—from scrutinizing atmospheric phenomena through instruments and media to embodying and immersing oneself in the very dynamics of the atmosphere.

Geography scholar Derek Mc Cormack extends the discourse, positing that sensing the atmosphere transcends instrumental meteorology; it is, fundamentally, an aesthetic pursuit. The precision of modern meteorological instruments, while advancing our understanding, has inadvertently disconnected us from the corporal experience of weather, proceeding from what is commonly known as remote sensing [21]. This gives predominance to the meteorological visual-centric understanding of weather-based phenomena.

Most importantly, acknowledging how our bodies perceive weather becomes paramount in comprehending the embodiment of environmental agencies. Our living bodies act as translators of weather dynamics, perpetually negotiating and adapting to the ever-changing fluctuations. The field know as Biometeorology [18] and the term Meteoropathy [29] offer a perspective on this relationship with our senses in relation to the weather. Particularly, meteoropathy is similar to the colloquial expression of being *under the weather*, signifying the influence of weather on our bodies days before noticeable changes occur.

Building on prior research on weather instruments [4, 7, 6, 5], the *Aeolian harp*, conceptualized by Athanasius Kircher, emerges as a device capable of resonating and harmonizing with the natural environment, particularly the atmospheric milieu. Sor Juana Ines de la Cruz, a 17th-century Mexican poet and philosopher, interprets Kircherian music and acoustic inventions associated with the notions of harmony and resonance, emphasizing connection with the natural and social order [8].

Kircher's groundbreaking studies on cochlear sound pave the way for understanding third tones produced by the inner ear, later known as *Tartini tones* [15]. In contemporary times, Otoacoustics explores phenomena where the auditory system generates sounds as specific frequencies and amplitudes resonate with the ear's cochlear structure [19]. Contemporary Music Composers like Maryanne Amacher probed into the creation of embodied sound, exploring the intersections of sound transmission, space, and bodily responses through Otoacoustic emissions (OAE) [2].

Amacher's concept of *Perceptual Geographies* becomes an epicenter, explored in my research to study the embodiment of sound through OAE's, turning their scientific study as a framework for artistic composition and environmental sound exploration [16].

Centering on the *Voice of Weather*, this article proposes examining weather through sound, offering a medium to connect with polysemic notions of envelopment [21] and immersion [12]. This exploration converges in a space of in-betweenness, where a hypothetical *Voice of Weather* emerges from remote sensing, using musical instruments as conduits to give nature a voice—a self-played harmony attuned to nat-

ural agencies, emphasizing harmony and resonance with the environment.

Having reviewed some of the implications of articulating a *Voice of Weather*, this article overviews a work in progress installation, merging principles of Listening to Weather and OAE's through a multichannel sound system. This experiment aims to enable listeners to tune in with the atmosphere, creating an embodied experience with environmental sound, thus paving the way for a harmonious connection between humanity and the mutable symphony of the weather.

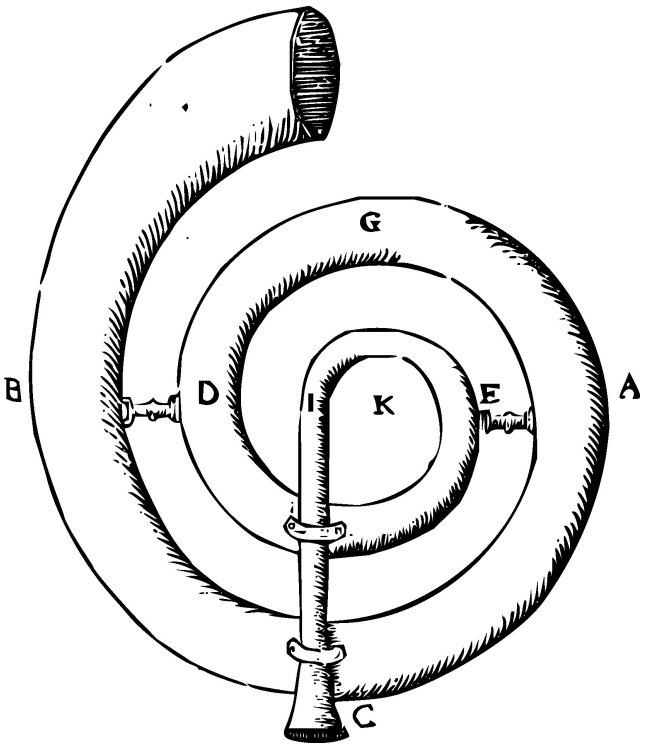

Figure 1: Tubo Chocleato. From Kircher's Phonurgia nova (1673) ©Public domain

Voices of Weather

In a previous article [7] this research has explored weather instruments as conduits for embodying atmospheric dynamics through sound. Dating back to ancient times, instruments like the *Aeolian Harp* have been culturally endowed with the role of creating a harmonious relation with the natural order [11] [28], and from this research's perspective, of bestowing a voice upon the weather. This balanced connection served multifaceted purposes, from heralding the nuances of climate essential for precise farming practices [26] to attuning individuals to the temperament of natural elements like the wind and its correlation with other weather phenomena. In the context of our contemporary era, where understanding climate change requires acknowledging complex interconnected relations [18], the significance of identifying the *Voice of Weather* becomes even more pronounced. Such identification serves as a gateway to acquainting ourselves with the intricate transformations and agencies at play in the natural world.

Media author Janine Randerson delves into a critical examination of these instruments and devices, weaving together an anthology of media artwork that seeks to foster empathy and resonance with the dynamics of our natural environments. Randerson raises a significant question: do these art and science projects articulate the *Voice of Weather* within the sensed data, at the translation of this data into sound, or within the minds of the audience? [23] In response to this query, my research aims to introduce a hybrid interaction that spans technologies, embodiment, and the semantic understanding of weather. Thus, an integrated perspective is argued as indispensable in constructing a voice that resonates with concepts such as envelopment, immersion, harmony, and resonance.

The integration of weather instruments into cultural practices throughout history has bestowed upon them a profound role in shaping human interactions with the environment [26]. They have functioned not merely as tools for predicting weather patterns but as mediums through which it has been speculated how nature expresses itself [11]. This interrelation between humanity and nature becomes even more pertinent in the face of contemporary challenges like climate change [1]. Recognizing the *Voice of Weather* emerges as a holistic approach to interpreting the protean narrative of our environment, fostering a harmonious relationship between technological advancements, human understanding, and the entangled dynamics of the natural world.

This article advocates for an inclusive exploration of the *Voice of Weather*, recognizing that it stems from the synthesis of technological chrysalises, embodied experiences, and the collective understanding of the audience. By embracing a multidimensional perspective, we pave the way for a resonant dialogue with the weather, allowing us to navigate the complexities of our environment with a newfound awareness and attunement to the atmospheric order.

Disentangling Weather, Climate, and Atmosphere

Before probing their specific relations, it is imperative to establish a nuanced understanding of weather, climate, and atmosphere. Anthropologist Tim Ingold offers valuable distinctions: weather, he posits, is a firsthand experience, while climate is quantified and documented. Ingold's perspective introduces an additional layer with his dual conception of atmospheric, blending scientific understanding with an aesthetic dimension. To comprehensively grasp the relational qualities of the atmosphere as an environment for living organisms, it is essential to consider its role in perception, emotion, and sensation [13].

The atmosphere, when identified by its media-capacity, facilitates the transmission of sound, making it a vital medium for communication. Similarly, it serves as the conduit for light propagation and enables the wind to carry scents, making smell perceptible. Beyond these functional roles, the qualitative dimension of the atmosphere extends into affective relations, fostering sympathetic connections among beings. Concepts aligned with weather in this context delve into the realms of mood and temperament [13].

Ingold's distinction between weather and climate prompts reflection on the experiential versus quantifiable aspects of atmospheric phenomena. Weather emerges as the immediate, sensory encounter with the elements, whereas climate, in its measured form, reflects a broader, statistical perspective [13]. This divergence lays the foundation for a comprehensive exploration of the *Voice of Weather* within these elements, considering both the meteorologically quantified and the affectively perceived .

The atmosphere, in this sense, is not merely a backdrop but a dynamic force that shapes our experiences and emotions. Its capacity to influence sensory perceptions, coupled with its aesthetic and scientific dimensions, underscores its significance in mediating our interactions with the natural world [10]. As we begin to disentangle the *Voice of Weather*, climate, and atmosphere, we must recognize their intertwined nature, acknowledging the impact of each on our collective understanding and experience of the elemental concert that surrounds us.

Diverging from conventional perspectives on weather and climate, Tim Ingold introduces a peculiar exploration of the temporal dimensions inherent in the atmosphere. In his framework, weather is conceived as relative to the specific moment, compelling individuals to engage in attentive tuning as a response to rhythmic relations [13]. In my research, this viewpoint is complemented by media theorist John Durham Peters, who further distinguishes between weather and climate, portraying weather as *Kairos* (moment) and climate as *Chronos* (historical and cyclical). Climate, in this context, encapsulates long-term averages spanning decades, centuries, millennia, and beyond [22].

From this research's point of view, Ingold's meticulous understanding induces to an exploration of the *Voice of Weather* that demands an aesthetic approach—one that comprehends the profound influence this voice may exert on its listeners in affective terms. To achieve this, it becomes pressing to review the sensations evoked by this atmospheric voice and the diverse registers of atmospheric phenomena that impact our senses. In essence, becoming attuned to the *Voice of Weather* necessitates a familiarity with the temporal relations that it involves, viewed through the lens of momentary-rhythmic time, specially akin to the notion of *Kairos*.

The *Voice of Weather*, when examined through this temporal prism, transcends the conventional boundaries of mere meteorological events. It calls us to consider the interaction between the divergent atmospheric registers. As listeners to this environmental harmony, we are encouraged to not only discern the momentary nuances but also to appreciate the broader, cyclical patterns that contribute to the atmospheric order.

Conducive to understanding weather's voice, aesthetic and embodied dimensions turn into a vital conduit for disentangling the intricacies of affective responses. By deciphering the sensations invoked by weather's voice and aligning ourselves with the rhythmic relations it unfolds, one can think about transcending the boundaries of conventional-linear time, embracing the essence of *Kairos*—the opportune moment that unveils the timeless and rhythmic nature of the atmospheric order.

Hypersensitivity to the weather

Our bodies, when regarded as finely attuned instruments, possess an innate ability to sense the subtle variations in weather. Beyond the visual spectrum, we acutely perceive changes haptically feeling the nuances of temperature, humidity, and atmospheric pressure that extend beyond conscious awareness . This embodied knowledge finds roots in ancient folk traditions, where weather wisdom was cultivated through observations of wildlife responding to coming weather changes . Our bodies, attuned to these shifts, subtly respond even before extreme changes manifest [18].

In the early 20th century, the field of Biometeorology emerged as a byproduct of warfare technologies reliant on atmospheric understanding. Today, it plays an important role in the study of global warming, examining the impact of frequent weather changes and increased water vapor in the atmosphere. Distinguishing between weather and climate, Biometeorology focuses on the immediate influence of weather events, while bioclimatology delves into the statistical perspectives of global climate changes and their broader ecological impacts [18].

The anticipated perception of weather changes owes much to the atmospheric process of Ionization. As wind interacts with sand, snow, or oceanic waves, it charges air particles electrically, elevating the levels of positive ions in the troposphere—the lowest layer of our atmosphere, where most living organisms exist. Breathing-in ionized air triggers the release of serotonin, a hormone influencing mood and well-being. Barometric pressure, among basic weather parameters (others are temperature and humidity), is particularly influential, contributing to health complaints and inducing stress as living organisms strive to adapt to evolving environmental conditions [18].

The term meteoropathy, or meteoro-sensitivity, describes a hypersensitive condition towards weather changes, manifesting in affective symptoms several days before noticeable weather shifts. These symptoms, ranging from migraines and imbalance to irritability and insomnia, underscore the profound affective relationship between weather and our adaptability to atmospheric conditions [29].

In exploring the affective dimensions of weather's impact on livable conditions, an intriguing path emerges—the potential correlation between these embodied weather experiences and the medium of sound. Could audio perception serve as a means of anticipating weather changes, offering a unique hypersensitive consonance that articulates the *Voice of Weather*? This inquiry opens the door to an intriguing realm where the intersection of sensory perception, atmospheric embodiment, and the auditory landscape converge, promising a deeper understanding of our intimate relationship with the ever-changing atmospheric milieu.

Atmosphere in Sound and Music

In the exploration of the intersection between weather's affective influence and the realm of sound, this article delves into recent studies from musicology that seek to understand the concept of atmosphere as a multidisciplinary field, linked with affective dimensions on a collective scale. Media scholar

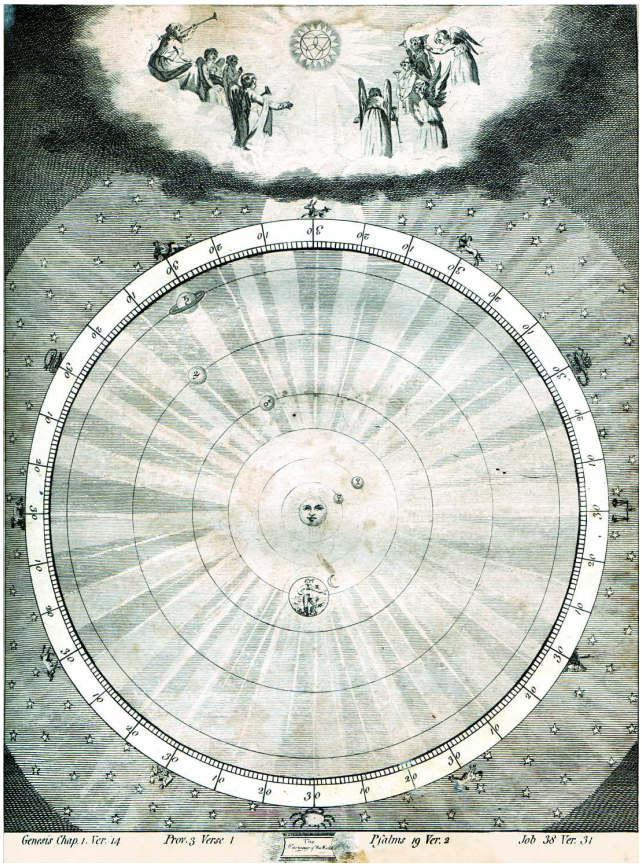

Figure 2: Harmony of the World from Ebenezer Sibly's Astrology (1806) ©Public domain

Friedlind Riedel contributes valuable insights by looking into atmospheric and affective relations, describing music and sound as constituting an atmosphere [24].

Riedel's exploration of atmospheres within the context of music suggests that an atmosphere transcends individual bodies and conscious subjects, rather creating a collective and spatially extended impact. This collective affect, according to Riedel, submerges a multiplicity of bodies within a shared situation [24]. In this atmospheric framework, music and sound become integral components of a surrounding situation that entangles a diverse array of bodies, taking as an example the atmosphere created in a concert or theatrical performances. It has also been expressed that feelings tend to be personal, whereas affects aren't, due that they're attached to environmental stimuli that may not impact someone else, and because our bodies feel through the medium of our own distinct body [14].

Furthermore, within this atmospheric paradigm, Riedel deems music and sound serving as parameters that modulate various elements in play, shaping performance situations, scenes, rituals, or musical passages into coherent and meaningful wholes. This perspective emphasizes the affective agency achieved by the atmospheric qualities in music and sound, while highlighting their capacity to unite diverse elements into a harmonious and meaningful collective experience [24].

As we traverse from the affective dimensions of weather to the realm of sound, the notion of atmosphere bridges these seemingly disparate domains. This exploration invites contemplation on the profound ways in which sound, like weather, can evoke collective sensations and envelop a multitude of bodies within shared experiences. In the context of music and sonic atmospheres, the concept of atmosphere becomes a dynamic force that not only resonates with individual listeners but also articulates a collective unison that transcends the boundaries of personal perception, fostering a shared and immersive encounter with the affective dimensions of sound.

Embracing Atmospheres through Envelopment

In the convergence of music, sound, and atmospheric dimensions, the polysemic concept of envelopment, as illuminated by Derek Mc Cormack, emerges as a valuable lens to seamlessly integrate these diverse realms. Mc Cormack's definition characterizes envelopment as a reciprocal transformation between atmospheres and things, with envelopes embodying a distributed sense or feeling that encapsulates mood and emotion. Beyond this, envelopment extends to the adaptive responses of bodies in changing environments and ecological processes, providing a profound perspective on how our bodies dynamically engage with the world [21].

Consider the enveloping effects that sound experiences can evoke, particularly when entering unique acoustic spaces with prolonged reverberation, such as a cave, a water container or a cathedral. This sensory encounter accentuates the transformative power of sound, creating an immersive environment that envelops individuals and collectives into a distinctive atmosphere.

Delving into the elusive nature of weather change, envelopment becomes a crucial concept in understanding the shaping relations within our atmosphere. While standardized meteorological instruments may struggle to capture these nuances, our innate awareness as living organisms allows us to sense and respond to the interplay of atmospheres, emphasizing the levels of habitability between various life forms and their surrounding milieus [21].

A relevant parallel lie in the work of Athanasius Kircher, whose theories of affects achieved through musical language, known as Affektenlehre, underscore music's capacity to imitate or invoke vocal inflections corresponding with specific emotions. Kircher's *Musurgia Universalis* defines eight sentiments evoked by musical intervals, grounded in the scientific and philosophical currents of his time [8]. The concepts of harmony and music of the spheres, in the Kircherian world would image ruler's (natural and human) consonance and resonance in his subjects. On the other hand, the concept of resonance would take a ambivalent meaning in acoustics and human affect: wherein a sympathetic relationship is the result of a transmission of energy caused by the two bodies' identical or proportional frequency. This emphasis in the views of Kircher and Sor Juana in the baroque period would identify with a space of hypersensitivity that encourages individuals

to be attentive to sounds and voices that might not otherwise be perceptible [8].

The exploration of the affective impact of listening to the *Voice of Weather* becomes a fascinating inquiry within the context of envelopment. Can this atmospheric voice communicate or express sentiments and feelings? Does it create an enveloping experience, fostering an awareness of how the weather shapes us, while simultaneously acknowledging our role as living organisms shaping the very atmosphere we inhabit?

In this intricate ecology of interconnected elements—music, sound, and weather—the notion of envelopment transcends spatial and conceptual boundaries. It invites contemplation on the profound reciprocity between our sensory experiences, the atmospheric milieu, and the potential inherent in the collective encounter with other bodies and voices that surround us. This exploration of envelopment serves as a bridge, uniting the realms of affective atmospheres, musical language, and the dynamic interplay of our ecological existence.

Immersive atmospheres

In the field of musicology, Anne Hollzmüller details the concept of immersion as a transformative mode of entering spaces, integrated into the fabric of constantly changing atmospheric conditions. This concept not only enriches our perception of atmospheric processes but also significantly contributes to the aesthetics of music. Even in the era of contemporary digital technologies, such as *Virtual* and *Mixed Reality*, immersion remains a potent conduit capable of composing multisensory conditions. It serves as a means to bring subjects into harmony with specific musical atmospheres, showcasing its enduring relevance in shaping our sensory experiences [12].

Crucially, immersion extends beyond the digital realm, having been a language employed throughout history to create multisensory conditions that resonate with mystical, spatial, and ecstatic experiences. From religious ceremonies to entertainment spectacles, immersion has been a powerful tool for orchestrating profound encounters that transcend the ordinary. Hollzmüller observes that, in creating an immersive atmosphere, aesthetic principles akin to the staging of a theater production are essential [12]. This observation aligns with the perspective of Tim Ingold, who emphasizes the need for aesthetic principles in generating atmospheres [13].

Hollzmüller further illustrates how musical immersion has been meticulously staged, especially in rituals and concerts, to offer cultural cues on how to attune oneself to sonic environments. This practice echoes historical traditions, such as 18th-century multidimensional musical performances, where the convergence of time, place, and the solemnity of ceremonial events during musical performances produced remarkable effects. These events became a remarkable cultural phenomenon, shaping the collective experience of music within specific atmospheres [12].

The concept of immersion stands as a dynamic force in both music and atmospheric experiences, transcending technological advancements and persisting as a language that guides us into harmonious encounters with sonic environments. From historical traditions to contemporary practices, immersion remains a powerful tool for shaping the multisensory conditions that define our interactions with music and atmospheres alike.

Otoacoustic Emissions and Pereceptual Geographies

Remarkably, the cochlea, with its active capabilities, has been study since the ancient explorations of Athanasius Kircher. Kircher's *Tubo Chocleato*, a wind instrument modeled on the cochlea's spiral structure, serves as an early example of using this anatomical form to amplify sound [8]. The use of spiral-shaped artifacts for sound amplification and giving voice to spaces and inanimate objects, such as sculptures, further underscores the historical fascination with utilizing the cochlea's design. For Kircher's description, this spiral-shaped artifact amplifies auditory stimuli and resound them through diverse objects to enable them to speak. In a gesture that is symptomatic of the Baroque fascination with marvel and illusion, the Jesuit thus draws on his understanding of acoustics, otology, and more to alter auditory perception through sound manipulation [8].

Otoacoustic Emissions (OAE) present an engaging aspect of our hearing system, producing ghost tones within the ear by combining different frequencies. This phenomenon is akin to an active amplifier, where energy leakage within the cochlea creates a distorted, filtered, and resonating tone. OAE were first theorized in the first half of the 20th century by auditory scientist Thomas Gold, and later were proven by physicist David T. Kemp in the mid 1970's by introducing of a small microphone inside humans' ear to register them [2]. Remarkably, OAE responses disappears a few minutes after death. Hence OAE implies an active sound production, instead of a passive echo of external sound [9].

OAE have been explored in contemporary music and sound art within a kind of extreme physicality, heightening the listener's active process of hearing [19]. Music composer Maryanne Amacher considered that people themselves are instrument-like, since the ear has the potential to both receive and emit sound [27]. Amacher explored Otoacoustic Emissions as embodied sound, exploring installations and compositions that can only be fully experienced within one's ears. Analogous to Kircher's intent of creating sound from *telelinked environments*, Amacher employs remote-placed microphones connected through telephone lines to listening divergent spaces, detached from the listener's body presence [16, 17, 8]. This method expands on Kircher's conceptualization, allowing for the distant connection of spaces through sound and listening.

Amacher aptly terms her creations as *Perceptual Geographies*," emphasizing the subtle relationships between sound emission, space, and the listener's body. Her work would often encourage the audience to embody sound through space by exploring it during her performances [9]. Echoing the approach of Amacher, in the emerging research field of Embodied Listening, it has been expressed that the body can be a site for composition [20].

Amacher's idiosyncratic sensibility emerges as a radical non-standard form of listening [25]. It is comparable with the notion of *Mad Listening* [27] as way to inhabit indeterminacy, perhaps even to embrace it. By signaling a departure from conventional listening norms and an exploration of alternative, transformative auditory experiences. This way, Amacher music demonstrates how our mindful listening can already be embodied [16] and giving predominancy to subjectivity, corporeality, and individuality: making echolocation and listening as new ways of seeing. Her work opens new avenues for listening, pushing the limits of subjectivity, corporeality, and individuality in material terms.

The sounds generated in the listener's ears by OAE, can be further explored as spatial depth in Multichannel Acousmatic Music (Chechile). Considering the potential for distortion in traditional speaker cones, exploring a multiple speaker setup to diffuse OAE emerges as a promising avenue for registering new ways of embodied listening. This approach suggests not only minimizes distortion at the speaker cone but also enhances immersion through the simultaneous transmission of sonic sources, creating unique and expansive auditory experiences. In essence, the convergence of Otoacoustic Emissions, *Perceptual Geographies*, and immersive listening heralds a novel frontier in the exploration of sound, weaving together historical insights and contemporary innovations.

Creating the Voice of Weather: A Proposal of Atmospheric Embodiment

This section outlines my proposal for an experimental endeavor aimed at constructing the *Voice of Weather*, blending audio technology with the embodied perception of sound. Drawing inspiration from the principles of Otoacoustic Emissions (OAE), the experiment envisions a multichannel setup to craft an embodied representation of weather sounds. Utilizing weather sensor data as sound effector of a soundcape of resonant frequencies, attuned to a room acoustics, distributed within an immersive soundscape diffused through a custom-made multichannel system that I designed [3], the goal is to create a sonic framework for listening to weather events through subjective and perceptual listening.

This approach entails a dynamic synthesis of audio technology and embodied perception, creating an immersive sound experience that immerses the listener in an Atmospheric Embodiment. By translating weather data into sound via surface transduce speakers to resonate with a room acoustics, this experiment seeks to provide a unique form of environmental awareness, emphasizing the generation of sound within the listener's body. This subjective and perceptual approach aims to redefine the relationship between individuals and the weather, offering an innovative way to anticipate and interpret atmospheric changes.

In parallel, the experiment looks to echo the speculative spirit of Athanasius Kircher's *Tubo Cochleato*, the historical artefact modeled on the cochlea's spiral structure. My experiment involves the creation of a touch sensitive interface modeled as an spiral that triggers otoacoustic emissions that are linked to the weather data, drawing inspiration from Kircher's inventive exploration.

In essence, this experimental proposal seeks to bridge the realms of technology, embodied perception, and historical inspiration. By fusing these elements, the objective is to create a unique and anticipatory encounter with the *Voice of Weather*, offering a novel perspective on atmospheric events and reimagining the potential of sound technology in shaping our awareness and relationship with the environment.

Conclusions

This article deepened into a crucial aspect of weather instruments, inspired by Janine Randerson's insight into articulating the *Voice of Weather* through the amalgamation of meteorological knowledge in remote sensing data, its translation, and the embodied perception of weather. Central to this exploration is a focus on the embodied perception of weather intricately woven into the tapestry of climate and atmosphere. The examination of bodily capacities within living organisms to attune to weather changes unfolds through the lenses of biometeorology and meteoropathy.

Navigating through this framed perspective, the article explores the capacities of music and immersion as avenues that enhance our comprehension of the aesthetic and ecological relations that music and sound forge collectively enriching atmospheres and enveloping experiences. The symbiotic relation between weather, music, and immersion unfolds, revealing the profound impact these elements have on our sensory perceptions and collective experiences.

As this inquiry unfolds, the exploration expands into the realm of otoacoustic emissions and *Perceptual Geographies*—a enticing approach poised to harmonize within the field of environmental sound and weather instruments. This frontier, yet to be fully realized, experimented with, and reviewed, offers a promising trajectory for future articles emanating from within this ongoing research.

In essence, this article serves as a journey through the multifaceted dimensions of weather perception, seamlessly weaving together scientific, aesthetic, and ecological perspectives. It not only ponders the intricate interplay between weather and embodiment but also sets the stage for uncharted explorations into the realms of sound, atmosphere, and weather instruments—an invitation to traverse the sonic frontiers that await in the ongoing pursuit of revealing the mysteries of the weather's voice.

Author's Biography

Juan Duarte is a Mexican artist-researcher and a current Ph.D. candidate at Aalto University in Finland. He has BA in Audiovisual Communication from U. Claustro de Sor Juana and a Master of Arts in New Media, Design, and Production from Aalto, Duarte Regino has collected vast experiences in sound design, interactive technologies, and media research. His work revolves around the symbiotic relationship between nature and technology, particularly through environmental sound. His work has been presented at media art venues such as the International Symposium of Electronic Arts (ISEA) in Paris, France, the Media Art Histories conference in Venice, Italy, the World Forum of Acoustic Ecology in Florida, USA, Xcoax in Weimar, Germany, New In-

terfaces for Music Expression in Mexico City, and the International Symposium on Ubiquitous Music in Ulster, Ireland. Duarte Regino held a solo exhibition titled "Augury" at the RIXC gallery in Riga, Latvia, in mid-2023. Duarte Regino has undertaken artists' residencies at the Lofoten Sound Art Symposium in Norway, Binaural-Nodar in Portugal, IAMAS in Japan, and the Ujazdowski Center for Contemporary Arts in Warsaw, Poland. In addition, he has collaborated independently with studios and artists, including AGF, IC98, and others. His artistic work has been showcased at events and venues, including the CTM Festival, Spiral Gallery, Pixelache Festival, Hai Art, RIXC, Media Art Histories, ISEA, Goethe Institute - Beijing, Swiss Federal Institute of Technology - Zürich, and Media Lab Matadero. Through these presentations, Duarte Regino consistently engages into thoughtful discussions about the intersection of art, nature, and technology.

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