Narrating Environmental Data: Story and Place, Ar-chitecture and Affect

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Abstract   For Helsinki Biennial 2023, we were commissioned to write an environmental audiotour that would narrate the city and its surroundings as sites of environmental sensing and even data. While oriented toward the broader audience, and accessible as downloadable podcasts, the episodes drew on recent years of points in critical data studies as well as experimental practices where performance, narrative, and other poetic methods become involved in outlining what could be called the affective data assemblage. Our interest in questions of landscapes already as data—as models in-situ, as Jane Hutton puts it—as well as in methods such as autographic visualization were one underlying reference point for the task of cultivating particular relational sensibilities in ways that can link to artistic methods, curatorial research, as well as contemporary discourses on materiality of data.

Keywords   Affect, Helsinki Biennial, curating, environmental media, environmental data, artistic methods

Our argument concerns the spatialized nature of affect. As a concept that maps dynamic relations instead of internalized emotions,[1] it becomes helpful as an instrument for navigating landscapes, material environments, and even architectures and spaces. More specifically, we are interested in how a spatialized notion of affect can work as a bridge between abstractions of (environmental) data and their relation to site specificity. While environmental data has become a critical component of governance in addressing climate and biodiversity changes—encompassing interconnected issues like food infrastructures and energy transitions—our interest pertains specifically to the moments when data "hits the ground."[2] In other words, we are interested in how the notion of environmental data can help define sites and capacities of sensing. This refers not only to the datafication of environments, but also to data as itself environmentally bound and emerging from within milieus of sensing.

Such an embodied notion of data builds on the philosophical tradition of thinking of affect as involving sensing subjects while

also linking to current environmental discourses, narrativization of landscapes, and the materiality of experimental practices, including in contemporary art and curatorial strategies, beyond academic discourses. At the heart of this philosophically tuned approach is a recursive understanding of affect—that which constitutes the subject through which sensing becomes environmentally re-coupled. It is in sensing that significant ecological notions of subjectivity emerge that take into account this distributed notion of environmental materiality.[3]

This article focuses on the conceptualization of an embodied notion of data through the performative site-specific use of narrative in the 2023 Helsinki Biennial *Environmental Audiotour* and its translation into the film *Saaret*.[4] The audio episodes can be listened to online at https://helsinkibiennaali.fi/en/event/critical-environmental-data -the-environmental-audiotour/. The *Audiotour* draws from creative methods in the environmental humanities to frame questions and concerns on the state of our contemporary environment. These methods also inform a methodological inquiry into which voices and situations are included—and excluded from—these narratives. We were invited to contribute to the 2023 Helsinki Biennial (HB2023) as a "curatorial intelligence" who participated in the collective shaping of the Biennial's themes and programs. HB2023 was given the title "New Directions May Emerge," which alludes to anthropologist Anna Tsing's ethnographic account of life and survival in late capitalism's landscapes of destruction and ruin.[5] The title also points to the Biennial's call to orient the "arts of noticing" and sense-making towards the problems and predicaments of planetary environmental damage—and the latent possibilities and impossibilities for action and transformation that they hold.

With the narrative dimension of the curatorial discourse in mind, we responded to the Biennial's themes of environmental contamination, regeneration and agency by producing *The Environmental Audiotour,* which questions such assumptions of "environmental data" as merely statistical. Our article moves between our retrospective reflections on our process of creating the *Audiotour* and its translation into the film *Saaret*, and explanations of how affect functions as an operative concept in theorizing an aesthetics of environmental data. With this aesthetics-affect link in mind, we focus less on explicating the content of the *Audiotour* and the film, and more on exploring the politics and effects of our artistic methods, their sensory forms and impacts on perception. In many ways, the narrative investigation of site and movement across the city responds to Brian Massumi's point about the recursive nature of such a work of fabrication: "Passage precedes construction. But construction does effectively back-form its reality."[6] This plotting zigzags across different components, including

Figure 1. One of the six descriptive placards of the Environmental Audiotour is located near the Botanical Museum, which is one of the tour's sites. Photo: © HAM/Helsinki Biennial

the landscapes and sites, narrative tones and tactics, as well as the *Audiotour* itself. It gives rise to the conceptual work that frames questions of embodiment, environment, milieu, and affect in ways that also link to current academic debates in environmental humanities and cultural theory.

This article is a companion piece to another piece of writing where we link the narrative to recent years of Anthropocene e-literature and ecocriticism.[7] Furthermore, it is part of our longer-term research where we draw up elements that can contribute to a larger project and methodological proposal on the environmental data stack. While that work is developed later and separately from this article, we propose that one of its elements would be about the affective data assemblage.

A tour of "counter-environments"

The *Environmental Audiotour* rescales "environmental data" into the city's material, spatial and infrastructural contexts. Featuring individual episodes on six sites in Helsinki, the *Environmental Audiotour* is loosely structured in the form of a tour guide's commentary connecting different areas of the city, from the South Harbor to the ruins of the Vallisaari old weather station, the Hietalahti shipyard to the Kaisaniemi Botanical Garden, and the empty power plant in Sörnäinen.

The *Audiotour* subverts the genre of the guided tour, which typically introduces the visitor to a landmark or place by providing information on the site as an attraction. It also plays with the institutional genre of the museum audio guide, where the figure-ground relationship between the featured artwork and its spatial context of display is reversed.[8] The first stop is the ferry harbor to the Biennial exhibition site Vallisaari Island, where the listener comes into full contact with the physical environment of the Gulf of Finland. The second episode features the ruins of an abandoned weather station, which is a decommissioned infrastructural apparatus of sensing, recording and mapping. The Hietalahti area in the third episode situates the listener between two urban "islands" that have been extended from refurbishing shipyards and docks. In the fourth episode, the listener is led through the architectural ecology of the Palm House, the largest greenhouse of the Kaisaniemi Botanic Garden. In episode five, the listener is introduced to lichens in the Lichen Garden, which is part of the Botanical Museum (Finnish Museum of Natural History). Some of the smallest organisms featured in the tour, these symbiotic beings embody a threshold between sensing organisms and their environment, prompting us to reconsider classification systems and reorder our traditional understanding of nature. The site chosen for the final episode of the *Audiotour* is Hanasaari, where a power plant has been recently decommissioned due to the phasing out of coal.

The *Environmental Audiotour*'s scripted psychogeographic drift brings to light instances of the city's subnatures, what architectural historian David Gissen defined as "forms of nature deemed primitive (mud and dankness), filthy (smoke, dust, and exhaust), fearsome (gas or debris), or uncontrollable (weeds, insects, and pigeons)."[9] It revolves around the city's "counter-environments":[10] sites holding the capacity to affect one's perception through sensory and cognitive experiences, which challenge and disrupt established patterns of recognition and communication—in this case, about environmental data. The performance of "counter-environments" transforms the visitor's perception of Helsinki's urban environments.

We imagined the narrator of the *Audiotour* as a "data subject" expressing an ecological subjectivity produced through and from multiple recursive modes of sensing. They are an abstract entity that points out, adopts and embodies various physical forms, environments and temporal perspectives; the *Audiotour* narrator is thus an environmental data counterpart to Olga Goriunova's critical concept of computational subjectivity, the "digital subject." Goriunova identifies the abstracted online social-media persona as a shifting amalgamation of "captured, unique, and biological characteristics and premeditated forms of symbolic expression, judicially inferred subjects of actions, and performed identities."[11] As a composite persona, the "digital subject" bears a performative subjectivity that is aesthetically created

with "distance,"[12] the affective transformational and temporal zone that establishes relation without indexicality, which is the quality often assumed of "data." Our "data subject" likewise expresses the elasticity of "distance" in shifting between description and vision, futures and pasts and between material environments and virtual landscapes in the narratives. One example of this is the second episode, where the narrator tells the listener that they have been here since 1650, even as they highlight the listener's immediate arrival to the island and draw the listener's attention to the physical site, the currently non-existent weather station. Gesturing to themselves *as* the island, they recall the island's future as the past, when it became an insulated weather monitoring station — yet again — in the form of a glass house, with scientists measuring every part of its interiorized climate. Past futures come to reframe imaginary futures.

We refer to the *Environmental Audiotour* and *Saaret* as expressive articulations of the "affective data assemblage." This concept follows and expands the "data assemblage"[13] through an artistic approach, which incorporates creative methods from curatorial and artistic practice. In thinking aesthetically and performatively about the architectural and environmental dimensions of the chosen sites in Helsinki, we draw out questions, effects and impacts of non-human and human modes of sensing, sensory perception and embodiment, which we relate to affect. By foregrounding these aspects, we invite the listener to locate themselves within the sociopolitical and environmental complexities of this contemporary milieu and connect with the intensities of the planetary context. We invite the listener to care for places *as* data *of* and *for* the environment. In the next section we will outline in more detail the link to the data assemblage and Critical Data Studies.

The "affective data assemblage"

From the start, we planned to focus on "environmental data" at the intersections of the planetary and urban scales, and of data as abstracted information and sensory form. The creative brief for the *Audiotour* became the vehicle for this investigation, while the overall scope of the Biennial provided an additional framework, as multiple artistic works and commissions interlinked examinations of the materiality of data and waste (Tuula Närhinen's "data" collection and visualization of plastic waste), environmental justice (INTERPRT's commissioned work on Sámi land rights and wind power), and cinematic poetics of watery wastelands in the Baltic Sea (Emilija Škarnulytė). One could thus narrate large parts of the works through the terminology of elemental media and the processes of composition and decomposition of elemental worlds.[14]

While most of the artists' works were physically displayed on Vallisaari Island and at HAM Helsinki Art Museum, some artworks, such as Red Forest's *On the Loss of Energy. Radiogram from the Remnants of Collisions* and Yehwan Song and Digital Visual Studies' *Newly Formed,* a 3D map of HAM Helsinki Art Museum, were online or had digital or virtual components. Our *Audiotour* similarly was housed on a website with access to Soundcloud digital recordings. The recordings could also be accessed at each *Audiotour* site through an increasingly ubiquitous urban infrastructure: the QR code. Presented on descriptive placards, the codes served as interfaces connecting listeners to digital recordings, enabling access without relying on mobile phone tracking or other real-time location technologies such as Wi-Fi or RFID. In this sense, the *Environmental Audiotour* exemplified the contemporary everyday urban experience as constant interfacing. Even though it was executed simply, the *Environmental Audiotour* crosses material thresholds between digital sound and physical location. The experience of the *Audiotour* follows the migration of (interactive and multi-) media from the desktop to real-world environments made possible by the pervasive (although unequal) reliance on mobile devices and by the affordances of GPS. It builds on the experience of locative media or location-based media as a medium functionally bound to a location,[15] which is also the same location each episode refers to.

In the context of the city, the "environment" is recursively composed and recomposed through modes of design and landscaping that are increasingly driven by computational and algorithmic processes. Those processes involve a particular kind of dynamic volumetric dimensionality: from aggregated satellite geodata to mobile users in their multitude, together with various other modes of sensor-based sensing and data capture. These are furthermore complemented by larger cycles of physical and elemental interactions between human and non-human entities. There are also subjects in the mix, not just users; they are material, embodied, located, and not mere individuals. These dynamic nodes of sensing on-the-move have capacities that are constituted by, as much as they are constitutive of, their environment (or milieu). Subjects, both human and non-human, are contractions of forces bringing different milieus into relation, with affect serving as one way of describing this relationality.[16] Affect works here as intensive and qualitative states of being that are "real-material-but-incorporeal,"[17] sensed and experienced prior to the codification, enumeration, or representation of data.

Various theorizations of affect have served as reference points helping us consider the epistemic, ontological, and experiential complexity of the data environment, along with our embodied position within it. These perspectives help conceptualize the dynamic

processes of composition and the material construction of bodies and their spaces. A theoretical framework of the "affective data assemblage" emerged in response to the challenge of narrating intensively site-specific yet dynamic material and elemental worlds. This framework finds expression in an audio narrative that unfolds through movement within the urban landscape. In other words, we asked: How do we situate and include the reality and materiality of abstraction at play? The framework incorporates insights on the infrastructural politics of data production from Critical Data Studies—more specifically, the concept of the "data assemblage" —while paying attention to the affect and sensibilities of space and place that are often more implicitly addressed or even overlooked in discussions of digital data.

The "data assemblage" is defined by Rob Kitchin and Tracey P. Lauriault as a "complex socio-technical system that is composed of many apparatuses and elements that are thoroughly entwined and whose central concern is the production, management, analysis, and translation of data and derived information products for commercial, governmental, administrative, bureaucratic, or other purposes."[18] This concept challenges the notion of data as objective and discrete informational entities that are separate from their derivative conditions and purposes. Drawing on Foucault's notion of the *dispositif*, Kitchin and Lauriault diagram the discursive and material structures shaping and producing data as apparatuses. These apparatuses are delineated into categories such as epistemology (i.e., "systems of thought," "forms of knowledge" and "practices"), social and technical infrastructures (i.e., political economy, governance and legal systems , "subjectivities and communities," "materialities and infrastructures"), the places that produce data, as well as the platforms that data are derived from and feed into (i.e., "marketplace"). The "data assemblage" highlights the production, management and application of Big Data as dependent on these interconnected systems embedded in the urban context.

Kitchin and Lauriault's "data assemblage" is based on data produced in socio-economic and political contexts: The apparatus of "materialities and infrastructures" encompasses "papers and pens, computers, digital devices, scanners, databases, networks, servers, buildings." The "places" apparatus circumscribes data within urban-industrial settings; these include "labs, offices, field sites, data centers, server farms, business parks… and their agglomerations."[19] While this data assemblage offers a critical framework for understanding the urban environment as a multifaceted data landscape, we became interested in the other modes of assembly at play; thus we also looked to other frameworks for inspiration in conceptualizing data as physical and material entities produced in the *environmental* context. Other practice-based approaches, such as the examples discussed in Yanni Loukissas's *All Data are Local*, offer analytical modes for exploring how

data is created (and detached and reaggregated) from the environment and how the natural environment becomes data.[20] Loukissas's study of scientific plant data in the form of Harvard University's Arnold Arboretum's accession records illustrates how data have complex attachments to place, which invisibly structure their form and interpretation. It also shows what is missing from our understanding of most genres of data, and data's limits for understanding the places in which they reside.

Place is routinely overlooked as a dimension of situatedness in social studies of data. Harvard University's Arnold Arboretum, in Loukissas's analysis, presents an exceptional opportunity to explore the relationship between data and place for several reasons that, as we will see, become relevant beyond the confines of the 281-acre preserve in the heart of Boston for acquiring meaning in the expanded context of the city and of processes of environmental data production. In a botanical garden, place becomes a hybrid of proximity, distance, practices and logistics, as its collections are obtained from sites of cultural and scientific importance worldwide. It is a peculiar historical practice of composition and assembly that closely links with histories of colonialism too. The garden is also a place where scientists and the general public can experience vast collections of data firsthand by exploring a landscape filled with carefully tagged specimens. Less obviously, fluctuations in botanical data over the garden's long history are significantly influenced by the place itself, as it hosts and establishes a set of conditions for data production.

Data, moreover, can be used to see place differently. In Loukissas's words, "data can be about place, in place, from place, and even generative of place."[21] Datasets should fold into them also data settings, as Loukissas argues throughout his book. The botanical garden study aptly proves how the concept of "knowledge ecology" is not just a metaphor but an architectural and social model. Place plays a crucial role in creating and maintaining the ecosystem that supports such knowledge. What does it mean to see a place not only *through* a collection of data, but as something inherently assembled as an aggregation and composition that is, itself, data? The *becoming data* of the environment might then be crucial to enabling the care necessary for its survival. Data can finally serve a purpose beyond representation and directly support the places they describe. This nuanced position adds to Ursula Heise's critique of environmentalist rhetoric that defends the preservation of place against developing a "sense of planet."[22] Situating environmental data in its place(s) and the planet *as* environmental data enable us to "foster an understanding of how a wide variety of natural and cultural places and processes are connected and shape each other around the world, and how human impact affects and changes this connectedness."[23]

Dietmar Offenhuber's method of autographic visualization helps build our argument about the data assemblage as fundamentally about such dimensions of affect, of materially situated relationality. Differentiating the ontological "autographic" (i.e., self-inscribing) data from representational symbolic data, Offenhuber's method underscores the emergent material quality of physical data that "presents itself"[24] as "trace-phenomena."[25] Natural environments do not represent but embody information that also serves as proxy for interpreting other data such as tree rings, which are inferential indicators of precipitation levels. Autographic design sets up the material context for various kinds of traces—such as sound and smell—to become sensible, which Offenhuber analogizes to the tuning of a violin through adjusting the instrument's body to the reverberation of its strings.[26] It thus reflects the spatiality inherent to data's self-inscribing nature. The visualization or materialization of traces is highly contingent on the site-specific interaction and relations of the physical circumstances and factors of a given situation and place.

Here, to speak of "architecture" helps conceptualize and articulate the spatial relations and settings of data. As a physical and abstract mode of spatial organization, in fact, "architecture" frames the world like an analog computer, where complexity lies in structure rather than in code. Data collection (or rather recognition) and computation are not limited to binary logic or the electronic processing of information; rather, they are part of a process in which everything around us is constantly engaged. There are profound ethical and political implications in considering information as an environmental phenomenon, as perceiving human subjects can never be outside observers—we are not looking at "global data images,"[27] but are ourselves entangled inside an envelope of elements that resists the idea that there could be an outside view.[28] This perspective re-territorializes and re-grounds our understanding of the environment, and of its data.

As a discursive-material structure, architecture mediates the environment as space and place, the physical site and its abstracted form and components, as well as the landscape as design model. It projects and articulates spatial and epistemic boundaries that separate the environment into form and context, but also serves as an interface or a relational contact zone that proves the porosity and permeability of such boundaries. The structural presence of architecture frames our sense of locality and scale, enabling the projection of dimensional extension as well as the experience of intensive change. Through the architectural frame, we can locate our physical position within a space and beyond in terms of larger infrastructures and (remote) planetary-scaled systems. We can also understand the body as the locus of sensing that is always in the process of moving and becoming, forming recursive circuits of emergent data in and with the architecture of assembly. These are also

all points articulated in recent critical discussions on environmental design.[29]

In affective terms, the intensive subject relates to itself in the process of sensing, with difference and distance transmuted into variation through immediate sensation.[30] Environments and landscapes enfold temporal changes from periods to decades as well as dormant potential for material transformation, especially with the impact of urban and industrial activity and climate change intervening and interrupting observable established elemental cyclical patterns. The here and now of any (data) subject is already also the multitemporal durations that are contracted—some of which are actual, some merely virtual potential. These sensations are subsequently registered, codified and computed into coherent systems and meaning, *and* also incoherent systems and meanings.[31] Some of the sensations are anomalous, even singular.

If the body and the material environment were data apparatuses, what would the "data assemblage" resemble? What kinds of extensive and intensive subjectivities would be expressed through such a concept? We see the aesthetics of environmental data as the artistic expression of data's dynamic and embodied tendencies that are not dimensionally and figuratively preconfigured. Narrative is a key method of expressing this as it helps to maneuver the most repetitious (data as a pattern) and the anomalous, or the anecdote as a method.[32]

The narrative takes place in relation to the selected sites as it does to a mode of inscription, even diagramming, that is abstract and yet concrete (i.e., a device of navigation). The concept of the "affective data assemblage" explains our critical position behind the experimental diagram (fig. 2) of our curatorial point for HB2023. Unlike the sociotechnical apparatus diagram of the "data assemblage," our diagram offers a visual map or "navigational tool" for understanding the affective elements of environmental data. Plotting—factual and fictional— is our processual "output," with the lines between the components of the diagram (i.e., "histories," "futures," "body," "matter," "infrastructure," "experience," "computation") as relational axes between temporal, material and sensing aspects, rather than indexical points of captured empirical reality. The diagram provides the conceptual scaffolding for *The Environmental Audiotour*, which performatively materializes these relations through the voice of the "data subject" narrator on the six chosen sites.
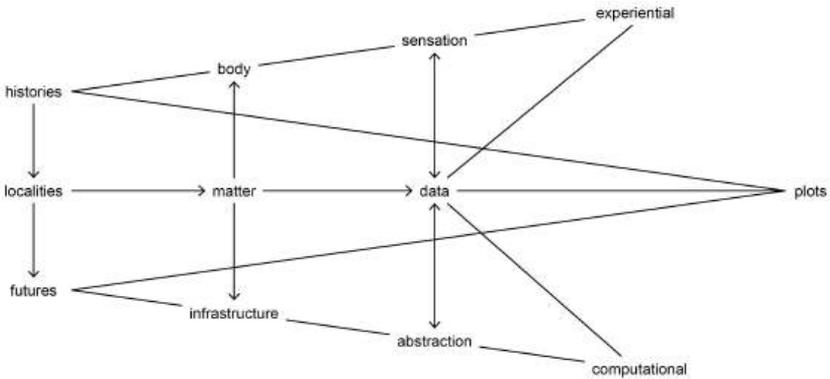
Figure 2. The Environmental Audiotour is abstracted into a diagram that functions as a conceptual navigational instrument, as an image that captures some of the connecting lines between environmental data and embodied sensing as they are expressed across spatial and temporal axes, converging into plotting as a material and narrative technique. Credits: Design and Aesthetics for Environmental Data project, Aarhus University.

The embodied politics of sound in the city

The Environmental Audiotour's narrator serves as the unifying voice across all the episodes, adopting the persona of an "environmental tour" guide and instructor. They lead the listener with "instructions" for noticing and sensing, and move between various fictional registers. The narrator zooms in and out of details, anecdotes, and scales as they consider the different sites. For example, in the first episode at the ferry stop to the Biennial exhibition site on Vallisaari Island, the *Audiotour* narrator furnishes the listener with "instructions" to pay attention to elements of the physical environment that are usually felt but are often invisible, such as weather and water systems as well as constructed infrastructures. These are direct addresses to the listener on sensing activities, which include a reference to Yoko Ono's event score *Painting for the Wind* (linking to the performative dimensions in conceptual art). In Episode Two, the narrator reflects on processes of data production and modeling through a constelled projection of the island's pasts and futures, which are told in a register veering between myth and memoir. In Episode Three, the narrator guides the listener on an imaginary vertical survey of the Hietalahti area, tracing the infrastructural cycles of urban renewal, port development and land reclamation forming the entire stretch of the Helsinki coast. In Episode Four, the narrator points out the atmospheric conditions and practices of care necessary for human and non-human life in the Palm House. For Episode Five, the narrator singles out the presence of the lichens, which are inconspicuous in the setting of the lichen rock garden. In the

final episode, the narrator invites the listener to adopt the perspective of coal. Amassed in large piles in view from the site, dissolved into the particulate matter in the air we breathe, coal pronounces itself as an elemental force capable of "ghostwriting" the city's history. The mode of (data) storytelling becomes a way of accounting for these multiple contracted forces.

The format of *The Environmental Audiotour* engages the audience in the sensory act of listening, going beyond the reception of the symbolic and representational impact of words voiced by the narrator. Listening is productive; it is a means of addressing environmental attunement. Listening as attentive waiting affords a potentiality for what may be coming, and for what may be said or overheard; it prepares for an encounter by making a common space. Brandon LaBelle introduced the idea of acoustic justice as a compelling framework for engaging with the right to speak and be heard, which in our case extends towards a broader planetary view that includes natural and artificial elements of the built environment. Inserting ourselves within what LaBelle calls "poetic ecologies of resonance"[33] we write and speak as listeners to critically address questions of space, scale, thresholds and temporalities.

While the inherent connectedness of sound promotes a continual encounter with the other, it also supplies us with a rich medium for intimate sharing, especially given the *Audiotour's* modality of fruition, which is generally listened to with headphones while on the move. The voice presented to the listener is the environment's own narrator; a voiceover that speaks the elements' thoughts and stories, eventually predicting the city's fate, the long story of its own survival.[34] The voice is an intervention into the landscape as much as into our bodies, as it projects outwards in search of its place, while vibrating with our eardrums, in-between the interior and the exterior. The acoustical produces a dynamic epistemology—one aligned with complex, inter-subjective modalities of cohabitation—of being involved. The use of a polyphonic structure involving multiple registers for the voice (one in Finnish, another in English), ultimately opens out onto reflections about the ecology of sensation situated within the city. They are a distributed narrator who plots with the listener. Sound is employed as an always dialogic and associative expressive force, where speech is only one part of an emerging assemblage, "in-between and in search."[35] The narrator's voice is just one layer in the composition that includes the city's acoustic ecology, and therefore the piece comes into being only in the listener's ear, as they situate themselves and participate in the process. *The Environmental Audiotour* is then an "open work," where the writing is augmented by the creation of situations: The real-world environment is integrated within the form, as it bleeds into

the recorded audio. In turn, the sound augments the listener's vision, resulting in cross-modal interactions, unplanned synchronicities, and ruptures between the visual and the aural.

In this context, sound's formlessness has the capacity to upset and reorient the politics of visibility at play in the listener's surroundings.[36] Sound and listening put forward a dynamic framework from which to interrogate the surface of a visual world, as we also attempt in the film *Saaret*. The capacity of sound, though, remains in how it invites an expanded practice of creative and critical interpretation in an encounter with the world; it blends with, and recomposes, what's going on as the cinematic is also found in the live framework catered by the audio narrative. If "what draws affect into form is a matter of concern,"[37] form is "not the same thing as shape," and the image that comes to mind as the visitor hears the audio pieces is determined by a variety of factors circulating inside and around a constructed scene that "pulls in other things as you go."[38] By providing guidance to roaming subjects across the city, our compositions blend with the experience of the environment. The sound of the narrator's voice emerges as an attempt to "reground thought"[39] through the visitors' participation in a vibrant material context. Our writing is not only driven by our thoughts, but also by our bodies, by "sensory and affective knowledges which are not secondary to thought" that shape instead the forms of our ideas.[40] Intelligence is not limited to data and information, but also depends on our emotional and sensory abilities. Or, preferably, the two registers mix. Layering sensory forms over and with narration is a way of exploring the materiality of data by combining image, sound and space, as urban surfaces open to a multiplicity of scalar relations.

Saaret as an experiment with the affective materiality of urban moving image

The narrative contraction of audio and listening is also transduced onto another modality of rhythm and milieu, namely that of moving images. The spatial affective relationship between image, sound and space is further explored experimentally in the short film *Saaret* (Super 8, 25', 4:3, color, stereo), which is a partial document of the *Environmental Audiotour* in its intended spatial context. If the *Audiotour* explores the capacity of the voice to *move* the listener *through* the city, the short film based on the *Audiotour* expands its audience's sensory experience by combining evocative visual imagery shot using Super 8 film format with an original audio score composed specifically for the film version. Selections and adaptations from the audio narrative are recombined with footage produced on-site, generating connections and a spatial bond along a path that is tactile. *Saaret*, with its

observational qualities and meandering takes, alludes to the now-extinct genre of the city symphony—which emerged during the urbanization and the rise of world cities in the 1920s—while also letting the Super 8 film format create a dreamlike temporal ambivalence reminiscent of old travel movies and nature documentaries, emphasizing the fragility of the image frames as envelopes themselves (see fig. 3). The title, meaning "islands" in Finnish, refers not only to the geographical island of Vallisaari but also the idea of the city as an environmental archipelago, comprising various elements such as heat islands, energy islands, insulated atmospheres, artificial climates, and (closed) model worlds.

The narrative episodes of *The Environmental Audiotour* are adapted, partially re-recorded with the additional use of synthetic AI voices and blended with a score by Angelo Maria Farro, an experimental composer for cinema. The score provides an intentional articulation of sounds from multiple sources that mirrors and distorts the emergent and ever-shifting material presence of noise and signals in the city soundscape. These include field recordings, captured with a variety of techniques, including with electromagnetic field microphones, whose inductive coils convert changes in the electromagnetic field into electric signals, allowing the listener to hear sound waves with frequencies outside of the limit of human hearing, such as the "voices" of everyday electronic objects.

Another sound technique employed is the use of plunderphonics,[41] which constructs elements by sampling and remixing recognizable musical works, including popular pieces such as Modest Mussorgsky's *Promenade*, the Finnish national anthem, Jean Sibelius' *Finlandia*, and *Cantus Arcticus* by Einojuhani Rautavaara. In essence, this technique interprets movement in urban spaces as if it were along a (cracked) radio (and temporal) dial, cutting through haunted pirate channels and street performances. In *Saaret*, the sound elements strive to recreate the thick formless substance of the city's acoustic ecology, building resonances with the elements captured by the roaming camera and the subtle manipulations of the voiceover. Michel Chion's framework of "three ways of listening" provides a comprehensive understanding of how audiences can engage with the score.[42] In his theory, Chion delineates causal listening, where viewers interpret sounds as cues for narrative events; semantic listening, where sounds are understood for their symbolic or cultural meanings within their or the film's context; and reduced listening, which encourages a focus on the formal and sensory qualities of sound independent of its narrative or symbolic significance. In *Saaret*, the sound and image elements are causally and symbolically related, as well as autonomous from each other. This dynamic induces, through exquisitely musical elements, a

sense of "trance," of immersion within the choreographed movement of body, camera and urban elements.

The film uses methods aligned with documentary filmmaking and essayist cinema, partially eschewing fact-based representational modes and blending visual and aural inquiry with contemplative and expressive registers. It suggests that an alternative approach to advancing discourses around anthropogenic climate and urban change might make use of poetic or affective modes of filmmaking. Images captured on film include water surfaces and smoke screens, vegetal textures and animal movements, light refractions, and excavations into the soil: They are not only captured by cinema, but are forms of cinema themselves, as contractions of forces, light, and movement.

They are impressed on Super 8 film primarily through three main chemical components: the film base, the light-sensitive emulsion, and the development chemicals. The emulsion, supported by the film's cellulose acetate base, contains light-sensitive silver halide crystals suspended in a gelatin matrix. These crystals react with light to create a latent image, which is then developed into a visible image during processing through a series of chemical baths. This interplay of light and chemistry is just another way that information is captured, processed or presented on a material surface in our project, as elemental mediation.[43] The texture of the analog film is also a statement of how, like architecture and environmental data, film is a haptic matter. Flickers and other structural elements of analog filmmaking—including duration (length), speed and grain—further contribute to grounding the aesthetics of the experiment into its own processual materiality.

Conclusion

Both *The Environmental Audiotour* and *Saaret* are artworks expressing and articulating the urban experience as environmental data that are material and multidimensional. Narratively, but working in a particular register of affective relationality, *The Environmental Audiotour* voices the places and non-human entities in the city to tell a story that transforms the overall perception of data through sensory and cognitive experiences. It also draws attention to the contemporary environmental condition's abstract elements. The listener's attention is drawn to the sensing of their own body and the environment that they are moving in and through. The film *Saaret* moves the audience beyond the voiced narrative to experience data in an articulation of sound and moving image that also strives to reproduce the materiality and elemental qualities of the urban realm. Affect features then as part of the data subject—not an abstract numerical entity only, but one of multiple relations of materiality in movement, and patterns composing the apparatus of sensing that develops with the notion of the data

Figure 3. Paolo Patelli, *Saaret* (four still images), 2024. Courtesy of the artist.

assemblage as part of our theoretical thinking. The film compresses the cross-modal interaction of the sensory elements making up the experience of the environment that one would encounter in listening to *The Environmental Audiotour* while moving through the city, intensifying some elements while reducing others. Both works modulate what is sensible-in-movement.

These works present spatialized modes of sensory engagement that evoke a politics of embodiment and an opportunity of intimacy with the environment. Their focus on what counts as environmental information and their emphasis on environmental affect contribute to debates on the nature of data as well as to ecocriticism, which has not been in deep dialogue with affect theory.[44] Through the "affective data assemblage," we connect the often abstract and disembodied notion of data to its sensory and material situatedness, in order to reintroduce a sense of care for such entangled ecology and to relate this theoretical body of discussion to art and curatorial methods as well. In embracing entanglement and embeddedness, the listener/audience is invited to connect and participate in "a larger field of life"—in life as fields of elemental forces and potentialities.[45] By way of using narrative, audio, and cinematic methods, we also produce a particular way of theorizing with sound and listening, with moving images, and with the sites that become assembled and understood as dynamic architectures of data. These architectures of data constitute the recursive chains of co-composition and plotting that form the core of what we propose as the subject of the city's and its hinterlandscounter-environments. They present the listener/audience ways of relating to the planetary environment *qua* the urban.

Acknowledgments

Notes

1. Brian Massumi, *Politics of Affect* (Polity Press, 2015), 4.

2. Sandro Mezzadra and Brett Neilson, *The Politics of Operations. Excavating Contemporary Capitalism* (Duke University Press, 2019).

3. See Erich Hörl and James Burton, eds. *General Ecology. The New Ecological Paradigm* (Fordham University Press, 2017).

4. An excerpt of the short film is available online at https://vimeo.com /paolopatelli/saaret-excerpt

5. Anna Lowenhaupt Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (Princeton University Press, 2015).

6. Brian Massumi, *Parables for the Virtual. Movement, Affect, Sensation*, Twentieth Anniversary Edition (Duke University Press, 2021), 9.

7. Jussi Parikka, Paolo Patelli, and May Ee Wong, "Ecocritique between Landscape and Data: The Environmental Audiotour," *The Electronic Book Review*, April 7, 2024, https://doi.org/10.7273/dhew-2166.

8. One interesting example and inspiration of past years of contemporary art and critical technical practice in this vein was Geraldine Juárez's PROSPEKT, a performance about the data-prospecting of public art collections that took place at the Botaniska, The Gothenburg Botanical Garden in 2018. For an insight, see Regine Debatty's interview with Juárez at https://we-make -money-not-art.com/prospekt-organising-information-is-never-innocent/.

9. David Gissen, *Subnature: Architecture's Other Environments* (Princeton Architectural Press, 2009), 22.

10. See Marshall McLuhan, "The Relation of Environment to Anti-Environment," *University of Windsor Review* 11, no. 1 (1966): 1–10; reprinted in *Marshall McLuhan Unbound, vol. 4*, eds. Eric McLuhan and W. Terrence Gordon (Gingko Press, 2005), 7–8.

11. Olga Goriunova, "The Digital Subject: People as Data as Persons," *Theory, Culture & Society* 36, no. 6 (2019): 126.

12. Goriunova, "The Digital Subject," 128.

13. Rob Kitchin and Tracey P. Lauriault, "Toward Critical Data Studies: Charting and Unpacking Data Assemblages and Their Work," in *Thinking Big Data in Geography*, ed. Jim Thatcher, Josef Eckert, and Andrew Shears, New Regimes, New Research (University of Nebraska Press, 2018), 3–20.

14. Sasha Engelmann and Derek McCormack, "Elemental Worlds: Specificities, Exposures, Alchemies," *Progress in Human Geography* 45, no. 6 (2021): 1419–1439. https://doi.org/10.1177/0309132520987301.

15. Marc Tuters and Kazys Varnelis, "Beyond Locative Media: Giving Shape to the Internet of Things," *Leonardo* 39, no. 4 (2006): 357–363.

16. Jussi Parikka, *Insect Media. An Archaeology of Animals and Technology* (University of Minnesota Press, 2010), xiv, xxiv–xv.

17. Massumi, *Parables for the Virtual*, 5.

18. Kitchin and Lauriault, "Toward Critical Data Studies," 8.

19. Kitchin and Lauriault, "Toward Critical Data Studies," 10.

20. Yanni Loukissas, *All Data Are Local: Thinking Critically in a Data-Driven Society* (The MIT Press, 2019).

21. Loukissas, *All Data Are Local*, 31.

22. Ursula K. Heise, "From the Blue Planet to Google Earth: Environmentalism, Ecocriticism, and the Imagination of the Global," in *Sense of Place and Sense of Planet: The Environmental Imagination of the Global*, ed. Ursula K. Heise (Oxford University Press, 2008), 17–67.

23. Heise, "From the Blue Planet," 21.

24. Dietmar Offenhuber, *Autographic Design: The Matter of Data in a Self-Inscribing World* (The MIT Press, 2023), 17.

25. Offenhuber, *Autographic Design*, 15.

26. Offenhuber, *Autographic Design*, 14.

27. Birgit Schneider, "Climate Model Simulation Visualization from a Visual Studies Perspective," *WIREs Climate Change* 3, no. 2 (March 2012): 191. https://doi.org/10.1002/wcc.162.

28. Bruno Latour, *Down to Earth. Politics in the New Climatic Regime* (Polity Press, 2018).

29. Lydia Kallipoliti, *Histories of Ecological Design. An Unfinished Cyclopedia* (Actar, 2024).

30. Massumi, *Parables for the Virtual*, 15.

31. Compare also the points developed in Matthew Fuller, "Faulty Theory," *Fibreculture journal* 17, 2011, https://seventeen.fibreculturejournal.org/fcj-118-faulty-theory/.

32. Seán Cubitt, *Anecdotal Evidence. Ecocritique from Hollywood to the Mass Image* (Oxford University Press, 2020.)

33. Brandon LaBelle, *Acoustic Justice: Listening, Performativity, and the Work of Reorientation* (Bloomsbury, 2021), 26.

34. Brandon Labelle, *Lexicon of the Mouth: Poetics and Politics of Voice and the Oral Imaginary* (Bloomsbury, 2014).

35. LaBelle *Acoustic Justice*, 10.

36. Salome Voegelin, *Sonic Possible Worlds: Hearing the Continuum of Sound* (Bloomsbury Academic, 2014), 3.

37. Lauren Berlant and Kathleen Stewart, *The Hundreds* (Duke University Press, 2019), 5.

38. Berlant and Stewart, *The Hundreds*.

39. Berlant and Stewart, *The Hundreds*, 15.

40. Anna Gibbs, "Fictocriticism, Affect, Mimesis: Engendering Differences," *text: Journal of the Australian Association of Writing Programs* 9, no. 1 (2005), http://www.textjournal.com.au/april05/gibbs.htm.

41. John Oswald, "Plunderphonics, or Audio Piracy as a Compositional Prerogative," *Musicworks* No. 34 (1986): 6

42. Michel Chion, *Audio-Vision: Sound on Screen* (Columbia University Press, 2001), 25–34.

43. See also a related argument on material surfaces and/as media, Abelardo Gil-Fournier and Jussi Parikka, *Living Surfaces. Images, Plants, and Environments of Media* (The MIT Press, 2024).

44. Kyle Bladow and Jennifer Ladino, "Toward an Affective Ecocriticism: Placing Feeling in the Anthropocene," in *Affective Ecocriticism*, ed. Kyle Bladow and Jennifer Ladino, *Emotion, Embodiment, Environment* (University of Nebraska Press, 2018), 5.

45. Massumi, *Politics of Affect*, 6.