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Ambient vulnerability

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ABSTRACT

In this paper we introduce the concept of ambient vulnerability. Ambience concerns the overlapping and shifting material forms that constitute a person's surroundings – including (but not limited to) air quality, flow, temperature, humidity, noise and light – that contribute to their health, wellbeing and (dis)comfort. Building on a growing movement across a range of disciplines towards the study of socialmaterial relations, we suggest that ambience is an important approach for critically understanding the complex interconnections among nature, society, and technology in the production of lived ecologies. The vulnerability framing locates our expressly political understanding of ambience, reflecting and reinforcing social inequalities. Moreover, different types of vulnerability across the dimensions of the ambient environment are interdependent and accumulate, often intensifying one another. We delineate some of the key features of ambient vulnerability, specifically: cumulative impacts; permeability; unevenness; phenomenological differentiation; and multiple temporalities. The paper shows how ambient environments are shifting and complex, a turbulent milieu of contextual factors, but they are essential to our understanding of social and ecological vulnerability in the 21st century.

1. Introduction

Our lives are framed by the ambient environment, defined as the conditions of the air or other medium that immediately surround us. From its temperature and humidity to its toxicity, the ambient environment is integral to health, comfort and wellbeing, determining the fulfilment of a person's most fundamental needs and rights - for warmth and coolth, for comfort, for quiet, to breathe, to be well. Unequal power relations are embedded within the ambient environment. It is highly locally and temporally contingent, enveloping different spaces - whether the home, neighbourhood, or a journey - with inequitable implications. Ambience is also internalised by bodies across different temporal trajectories, from the immediate effects of uncomfortable temperatures to the slow build-up of toxins from long-term exposure to air pollution. Ambient vulnerabilities therefore accrue to make a person more or less likely to be exposed to a harmful ambient environment, and have considerable bearing over their ability to stay healthy and well, and to participate meaningfully in society.

Multi-disciplinary research has evidenced socio-spatial vulnerabilities with respect to air quality (Barnes et al., 2019), domestic energy (Middlemiss and Gillard, 2015; Bouzarovski and Thomson, 2018), and climate (Sanchez and Reames, 2019). Predicated on historical and structural forms of racial, gendered and class-based inequality, the negative impacts of these stressors are highly socially and spatially uneven, often accumulating in low-income urban areas (Petrova and Prodromidou, 2019). Here, communities are disproportionately exposed to environmental "bads" (e.g., pollution, extreme temperatures) and lack access to environmental "goods" (e.g. fuel, high quality housing) (Burningham and Thrush, 2003). Whilst in the physical sciences sophisticated models are used to understand and predict the role of the ambient environment in the vulnerability of global systems (for example, International Panel on Climate Change modelling), ambient vulnerabilities, by contrast, have typically been dealt with in disciplinary and sectoral silos, albeit with notable exceptions (e.g. Yip et al., 2020; Bouzarovski and Robinson, 2022; Petrova and Prodromidou, 2019).

Whilst the recent "taking to the air" (p.9) (Connor, 2010) in the social sciences has sought to make visible that 'which is normally seen as… formless, immaterial and invisible' (p.478) (Nieuwenhuis, 2016), conversations about inequalities embedded within the air are dominated by outdoor pollution in cities and therefore overlook the full variegation of the ambient environment, and uniquely ambient forms of vulnerability. Furthermore, the vulnerability of a person or a community is often thought of in relation to a stressor that is in some way detached, operating at a scale external to the individual. In conceptualising ambient vulnerability, we seek to illustrate how each of us is immersed in an ambient environment; an ambience that is constantly in flux and has the

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potential to generate unique and often poorly understood vulnerabilities at the micro-scale. Moreover, we show that ambience is not simply about transgressing disciplinary silos in the materialities of vulnerability, but that these materialities are combined with social and cultural factors, such as sense of place, self-worth or security.

This paper sets out a framing for understanding the vulnerabilities that arise from and accumulate in a person's immediate surrounding environment, using the concept of ambience. In Section 2 we define ambience before describing dimensions of ambience in Section 3, namely air quality, flow and turbulence, temperature, humidity, noise and light. We then define ambient vulnerability in Section 4 and illustrate some of their key features in Section 5, specifically: cumulative impacts; permeability; unevenness; phenomenological differentiation; and multiple temporalities.

2. Ambience

The word ambient is derived from the Latin ambiēns, which means 'going around' (Pinkus, 2013). As an adjective, ambient is defined as relating to the immediate surroundings. As a noun, it can be described as an encompassing atmosphere or environment, be it a material or substance. In practice, the term ambient evokes all sorts of surrounding conditions including humidity, sound, light, temperature, climate, pollution, emissions, atmosphere, or pressure. For example, biologists explore the effects of light on plants, whilst meteorologists' study ambient pressure, air, or temperature. All of this can make the ambient seem like the preserve of the technical. By contrast, our use of the term ambience is intended to unpack the multiple, overlapping and shifting material forms that constitute a person's surroundings and contribute to their health, wellbeing and (dis)comfort.

Ambience builds on a growing movement towards the study of relations and interconnections among nature, society and technology (Schwanen, 2018). Relational theories from fields such as political ecology have contributed a great deal to our understanding of how social power and inequality shapes access and exposure to different ecologies (Robbins, 2020). Yet, these concepts tend to focus on specific flows, urban structures, technologies, or infrastructural sectors. They are relational yet embedded in material form or geography. Our notion of ambience, therefore, also draws on cultural studies of atmospheres, affect and emotion (Adey, 2013; Anderson, 2009). The work on atmospheres, while different in many ways to our project here, provides a useful language for describing the spatialities of ambience.

Atmospheres envelope us, they "circumscribe or fill the space we inhabit" (p.31) (Bille, 2015). There is a sense of dynamism and flux encapsulated in this concept. "Atmospheres," according to Anderson "are perpetually forming and deforming, appearing and disappearing… They are never finished, static or at rest" (p.79) (Anderson, 2009). Thibaud actually mobilises the term ambience to argue for a 'sensory ecology' of cities that interrogates the relationship between emotion and contemporary urban forms, such as shopping malls, gated communities, heritage protected areas, and so on (Thibaud, 2015). This work, however, foregrounds the aesthetics of ambience, rather than its ecology. While Anderson and others use atmosphere to attend to the ambiguity and intangibility of affect and emotion (Anderson, 2009), our call, by contrast, is to re-materialise atmospheres. Ambience may be shifting and difficult to measure, a complex and turbulent milieu of contingencies, but is nevertheless material. There is, for example, nothing ambiguous about carbon monoxide on your daily commute or mould spores in your bedroom.

Our concept of ambient vulnerability, therefore, follows on from Adey's call for a more "material affective" ecology of atmosphere (Adey, 2013). Air, they argue, "tells a story of difference" (p.296), laden as it is with all manner of smells, particulates, pollutants and other sensory ecologies that envelope human subjects, "reveal[ing] who belongs and who does not" (p.294). In this sense, atmospheres should be understood as simultaneously material, sensory and affective (McCormack, 2008), drawing together the material and the phenomenological inseparably in an enveloping atmos (Adams-Hutcheson, 2017; Jackson and Fannin, 2011). Atmospheres are also a social delineator, materialising power relations and social inequalities. Research in the fields of feminist political ecology and decolonial studies has contributed to our understanding of how social power shapes the relationship between air, affect and bodies. For Allen, social theory has tended to overlook the air that encompasses human bodies as a relational medium (Allen, 2020). They argue instead for an intimate political ecology, where breath and breathing shape the relationship between body and air. Simmons develops the concept of "settler atmospheres" through a description of the Little Rock protests in Missouri (United States) in 2016 (Simmons, 2017). They describe how aesthetics of military control and indigenous marginalisation fuse with the weaponisation of the air including the use of tear gas, pepper spray and water cannons in freezing temperatures, intended to degrade protestors. In this way, Simmons argues, "the atmosphere becomes not only a medium for violence and control, but also one through which affects to demean are engineered" (n.p.). Although varied, the key point of this work on material-affective ecologies is to understand how we live in atmospheres unevenly.

On the more technical side, we have recently seen the popularisation of a series of relational concepts, such as resilience (Brown, 2013), nexus thinking (Williams et al., 2019), and smart cities (Hollands, 2008) that also reflect a broader shift towards cross-sectoral and integrated perspectives on social and ecological challenges. Nature-Based Solutions, in particular, attempts to address complex ambient urban issues (e.g., heat waves, poor air quality) via the introduction of biodiversity and blue and green infrastructure into cities (Xie and Bulkeley, 2020). Often managerial approaches like this have, however, attracted criticism for being "an inviting space for nature's neoliberalisation processes" (Kotsila et al., 2021: 252) that emphasises the "natural" at the expense of the "social" (Osaka et al., 2021).

Ambience, therefore, is an expressly political concept, in that it is centrally concerned with inequalities, that draws on several relational theories of socio-materiality. Ambience is hyper-relational because it combines multiple overlapping and shifting forms. It also has a unique spatiality resulting from the relationship between diffusion and concentration. Ambience is a relationship between bodies (human bodies, radiators, car engines, light bulbs, air conditioning units, etc.) borne through diverse mediums (light waves, air-borne particulates, gases, sound waves). It is simultaneously multiple and singular – the sum of multiple interacting processes that envelopes human subjects.

3. Dimensions of ambience

We discuss several illustrative dimensions of ambience: air quality; air flow and turbulence; temperature; humidity; noise; and light. We recognise that each dimension is individually intricate and dynamic, and it is not our intention for the ambient vulnerability framing to reduce the complexity of each dimension by encompassing it within a common framing. Rather we see the concept of ambience as an opportunity to think through the interactions between these dimensions. Furthermore, our framing could encompass a wider range of elements that are not discussed in detail here but that we might think of as ambient including, for example, precipitation (Martin, 2011) or radiation (Eriksen and Turnball, 2022).

3.1. Air quality, flow and turbulence

Air is tricky to pin down and there is a tendency to assume that air is "a kind of background against which worldly action occurs" (p.199) (Adey, 2013). In fact, air is a relational medium with an agency all of its own in which unequal power relations are inscribed (Simmons, 2017; Leff, 2021; Walker et al., 2020; Turner et al., 2022). The relatively perceptible, "aerial flux" of gusts or turbulence of wind (Ingold, 2006) removes stale or contaminated air, dilutes other toxicities, regulates

temperature, and shapes other ambient dimensions (Jacob and Winner, 2009; Wolkoff, 2018; Bouzarovski and Robinson, 2022). Air, and harmful pollutants in the air, are both personal and shared collectively (Nieuwenhuis, 2016; Reames and Bravo, 2019).

3.2. Temperature

Heat (and cool) is a pervasive phenomenon that intermingles social and natural domains (Oppermann et al., 2020). At the micro-scale, extreme external temperatures exceeding the body's capacity for regulation cause discomfort, excess morbidity, and (in extreme cases) mortality (Ebi et al., 2021). Courtney (2023) emphasise that it is easy to treat heat as a somewhat passive phenomenon that operates in the background, despite the vital role temperature plays in cultural, economic, and social life. Experience of temperature change is "personal and embodied and is made by places" (p.1127, emphasis removed) (Wright and Tofa, 2021).

3.3. Humidity

Humidity shapes a person's perception of temperature, with high relative humidity making a person feel warmer than the actual surrounding temperature. Humid heat – and the wet bulb temperature at which the human body cannot cool itself – can be lethal. By comparison to other ambient dimensions, humidity is relatively invisible materially and culturally (Oppermann et al., 2020), obscuring the significant impact it can have on heat and health (Shrubsole et al., 2014). Nevertheless, humidity is closely bound up with cultural and social processes, such as violence (Trujillo and Howley, 2021), and is therefore both material and affective.

3.4. Noise

Noise pollution – unwanted sound – is a growing issue in cities globally (Xie et al., 2021) shaped by the materiality of the built environment and urban form (Lercher, 2019). Noise is an important, and often overlooked, dimension of the relational ambient environment (Hainge, 2013; Shilon and Adey, 2021). For Peterson (2021) "the atmospheric is audible as well as visible, heard as much as breathed" (p.5). It is both a sensory experience of annoyance, and a general dispersed object of inscription (Mommersteeg, 2022).

3.5. Light

For Edensor, "light and dark are ubiquitous; they shape everyday worlds" (p.1) (Edensor, 2017). Light becomes pollution when emitted at elevated artificial levels by human-made artefacts (Rodrigo-Comino et al., 2021). Light pollution is an increasingly pervasive issue associated with diverse social, cultural, and ecological issues, ranging from cultural values attributed to light and the loss of the night sky, to disruptive effects on circadian rhythms and ecosystems (Gandy, 2017; Crary, 2013; Gaston et al., 2012). Gandy in discussing "negative luminescence" describes a range of different aspects of light pollution including:

> *"'light clutter," when a myriad of different sources can cause disorientation, "light trespass" from unwanted light sources, and in particular "skyglow" produced by the scattering of light in the atmosphere"* (p.1091) (Gandy, 2017).

4. Defining ambient vulnerability

Recognising that we live in atmospheres unevenly, the ability of a person or community to withstand, resist or adapt to, poor quality or harmful ambient environments is also inherently uneven. With this in mind, vulnerability is a useful concept through which to examine the social, spatial and temporal variegation in adaptive capacity to ambient stressors. Vulnerability is widely applied to explain how diverse social groups have a different susceptibility to harm from stresses associated with environmental and social change, in the absence of the capacity to adapt (Adger, 2006; Barnett, 2020).

The vulnerability framing has attracted critique (Barnett, 2020), often conceptualizing vulnerability as a state of powerlessness or weakness at the expense of individual agency and resistance (Haalboom and Natcher, 2012). Solutions tend to focus on addressing deficiencies rather than those culpable and in power. , in turn generating responses that serve to reproduce the power dynamics they seek to overcome (Barnett, 2020).

Instead, vulnerability is best understood as a relational process, emphasising the importance of context and social relations in shaping multi-dimensional vulnerability, rather than simply focusing on the characteristics of particular social groups (Turner, 2016). The vulnerability of specific individuals is not geographically bounded, and both individual agency and the wider structural processes and inequalities (e.g., uneven economic development, environmental degradation, racism, discrimination) make someone vulnerable (Adger et al., 2009; Sultana, 2022; Vogel et al., 2024; Golubchikov and O'Sullivan, 2020).

As such, the concept of vulnerability aligns with the concept of ambience for several reasons. Like ambience, when mobilised as outlined above, vulnerability is an expressly political concept that enables us to evaluate inequality and power. It allows us to recognise that ambient stressors and adaptive capacity are shifting and highly context-specific, and are often shaped by very intimate intrarelationships between ambient ecologies and human bodies (Allen, 2020). But they are nonetheless structural, shaped by a range of wider socio-economic, cultural and environmental processes that generate uneven ambient environments, and variations in sensitivity and capacity to adapt.

Whilst socio-spatial vulnerabilities with respect to specific ambient dimensions have been evidenced - including air and temperature - we can draw attention to the hyper-relationality of ambience that means diverse ambient stressors and vulnerabilities interact and accumulate, often intensifying one another (Turner, 2016; Su et al., 2012). We therefore define ambient vulnerability as the differential susceptibility to harm, both physical and phenomenological, because of the diverse and interrelated stressors associated with a person's immediate material and affective surrounding environment.

5. Features of ambient vulnerabilities

We set out some of the features that we consider to be useful for conceptualising ambient vulnerability, specifically: cumulative impacts (section 5.1); permeability (section 5.2); uneven ambient exposures (section 5.3); phenological differentiation (section 5.4); and multiple temporalities (section 5.5).

5.1. Cumulative impacts

Mah and Wang (2019) describe the "accumulated injuries of environmental injustice [and the] multi-layered and intersecting effects on health and wellbeing" (p.1961). Extending the idea of cumulative impacts beyond the toxic geographies described by Mah and Wang, vulnerabilities associated with the ambient environment are rarely felt individually. Instead, they are deeply embedded in the spatiotemporal dynamics of social, cultural and economic life (Walker et al., 2020). It is therefore valuable to think relationally about their integration, as this is typically how they are experienced every day.

Perhaps most tangible is the accumulation of negative physical impacts of ambience, ranging from sleep disturbance due to excess heat or noise (Chair et al., 2021; Allen et al., 2009) to asthma because of poor air quality (Shrubsole et al., 2014). The interaction of ambient vulnerabilities means that efforts to reduce one dimension of vulnerability can also enhance another. For example, in Chile, burning wood fuel for heating has been banned in response to severe pollution episodes pushing poorer

households into energy poverty (Reyes et al., 2019).

Ambient vulnerabilities also accumulate via "routine exposure" to poor urban environments that people experience as they journey through the city (Allen et al., 2009; Rachael and Fam, 2018; da Schio, 2020). In cities in the United States people tend to work in relatively toxic or noisy areas compared to where they live, especially Black and Latino populations (Elliott and Smiley, 2019). There is also evidence of the cumulative effects of multiple "ambient stressors" of heat, air pollution and radiation in the "urban microclimates" commonly used by children when playing outdoors (Vanos, 2015). Some parts of cities become entirely inaccessible owing to their ambience. Researchers have evidenced "unbreathable spaces", from which sufferers of asthma isolate or distance themselves from polluted urban areas (Kenner, 2021), as well as "death worlds" that have emerged due to the slow violence of environmental pollution (Davies, 2019).

5.2. Permeability

At the micro-scale, scholars have emphasised the permeability of the body by challenging the well-established idea that skin separates a person from an exterior environment, both materially and culturally (Nieuwenhuis, 2019; Choy, 2011). Nieuwenhuis (2019) argues that we should instead approach the body as "porous, relational, ambiguous and atmospheric" (p.1). A focus of ambient vulnerability on the micro-scale, or immediate, enables us to think about ambient vulnerabilities not as different distinct forms of vulnerability that a person is incrementally exposed to, but as immersive and all-encompassing.

The importance of permeability extends across multiple scales. In recent years, there have been calls for human geographers to pay greater attention to indoor environments, that take on a renewed importance in discussions of ambience (Day Biehler and Simon, 2011; Bouzarovski and Robinson, 2022). Ambient vulnerabilities in the home can be shaped by cultural preferences and social norms (e.g., different cooking practices can generate higher levels of harmful pollutants), as well as infrastructures (e.g., access to appropriate technology to mitigate negative impacts of ambience (Strengers, 2010, Chambers et al., 2022)). Time spent at home, and thus potential exposure to indoor pollutants, varies between and within populations. In the United Kingdom there is evidence that the indoor environment has a greater cumulative effect on health and wellbeing than the outdoor, especially in overcrowded properties (Thomson et al., 2019; Bouzarovski and Thomson, 2018). Time spent indoors can also be a coping strategy, especially amongst populations that are more susceptible to the ill effects of temperature extremes (Leal Filho et al., 2018). Conversely, in informal settlements in India, Bhide illustrates how the relative density of populations and housing means that "staying outdoors is as much part of life as spending time home" (p.285) (Bhide, 2021).

Yet whilst many vulnerability assessments place individuals in a particular property (Waitt and Harada, 2019), in reality the ambient environment percolates between spaces perceived as "indoor" and "outdoor", reflecting the permeability of the home (Kaika, 2004; Larrington-Spencer et al., 2021). Unpleasant outdoor ambient environments also shape how flexible a household can be in terms of domestic energy use and practices indoors (Yip et al., 2020).

5.3. Uneven ambient exposures

Ambient vulnerabilities are also highly uneven. Despite the quality of permeability discussed previously, atmospheres tend to stabilise around particular places (Turner and Peters, 2015), often predicated upon historical and structural forms of inequality. Low-income households typically live in the lowest quality properties that provide poor protection during heatwaves (Santamouris et al., 2015) yet green space, recognised as reducing air pollutants and exposure to urban heat in cities, is typically concentrated in relatively affluent areas of cities globally (Rigolon et al., 2018; Shackleton and Gwedla, 2021). Meanwhile, as a result of systemic racism in the United States, light pollution (Nadybal et al., 2020), outdoor air pollution (Jorgenson et al., 2020), and urban heat (Li et al., 2021) disproportionately impact racial and ethnic minorities.

At the heart of the concept of ambient vulnerability is also a deeper recognition of the considerable variation in the extent to which people "register atmospheres" (McCormack, 2008: 413). In diverse contexts across the Global South, gendered norms mean that women in low income, rural households reliant on solid biomass fuel, are disproportionately exposed to poor air quality as they are primarily responsible for domestic tasks (Gupta, 2019; Maji et al., 2021). Sensitivity to a range of dimensions of the ambient environment is also influenced by age (i.e., older or younger persons) and underlying health (López-Bueno et al., 2020; O'Sullivan and Chisholm, 2020). Employment structures also shape ambient vulnerability, as illustrated by the high occurrence of heat stress amongst workers in Gandhinagar, India employed in an exploitative and poorly regulated construction sector (Dutta et al., 2015).

Conversely, certain groups have greater capacity to protect themselves from poor quality ambient environments (Walker,Booker,and Young, 2020). Wealthy urban elites bypass persistently polluted places moving vertically above ground in high-rise buildings (Graham, 2015), or from one airconditioned environment to another (Marvin and Rutherford, 2018). This is also reflected in processes of climate gentrification (Thomas and Warner, 2019), via which elites seek to "fortify" themselves from the detrimental impacts of a changing climate. It is also possible to reduce the quality of the ambient environment for others. For example, the use of wood-burning stoves that contribute to poorer local air quality (Cordell et al., 2016).

5.4. Phenomenological differentiation

Ambient vulnerabilities also have a phenomenological aspect (Adey, 2013; Adams-Hutcheson, 2017). For Turner and Peters (2015) atmospheres hang in the air metaphorically as well as actually (see also McCormack, 2008, Adey, 2013). In other words, the way each of us experiences ambience is important in shaping our feelings of (dis)comfort, (in)security, and so on. Thus, the accumulation of material impacts of ambience also shape a less tangible (but not less important) perceived or felt ambience. This might refer to a shared experience – or socially constructed ambience – that develops within a group, as Turner et al. (2022) show in their study of carceral atmospheres. Alternatively, the lived experience of ambience might be more individually felt.

Ambient vulnerabilities can corrode a person's sense of self-worth, their attachment to place, and ultimately their adaptive capacity. For example, the presence of mould on walls or an inability to keep the home warm enough has been shown to erode a person's feeling of belonging and well-being (Pellicer-Sifres et al., 2021). Even amongst members of the same household, one person's ambient environment, and their perception can be quite different to another (Petrova and Simcock, 2021; Robinson, 2019). Contextual experiences and perceptions of the ambient environment, and the coping strategies they subsequently employ, vary culturally and demographically (Royston, 2014; Chard and Walker, 2016). Hitchings argues that:

> *"[people] have quite different ideas about the ambient conditions they require as a consequence of the different climates in which they live and how they are used to dealing with them."* (p. 171) (Hitchings, 2011).

Varied perceptions are reflected in diverse examples, from the growth in indoor climate control in high-income households (Davis et al., 2021) to growing awareness of smog pollution in Chinese cities (Wang et al., 2016). In the case of excessive noise, relatively disadvantaged socio-economic groups have been found to complain less as they become accustomed to chronic noise exposure, or adopt coping strategies (Verbeek, 2019).

5.5. Multiple temporalities

Ambience is an ever-present and on-going relationship between a person and their surroundings. However, as we argued earlier, the timbre of ambience is not fixed, but is shaped by complex and shifting temporalities, as the ambient environment and a person's experience of it transform along multiple temporal trajectories (Adams-Hutcheson, 2017).

Ambient vulnerabilities can be understood both as a state of emergency or chronic stress (Oppermann et al., 2020; Bolitho and Miller, 2017). Vulnerability fluctuates over the course of a day, as urban heat islands magnify night-time temperatures (Hajat et al., 2007), or as indoor air quality is shaped by the daily routines of households as people cook, care, and socialise (Liu et al., 2018). Adaptive capacity to ambient vulnerabilities can be exacerbated by extreme events that interrupt everyday routines, for example, in the case of blackouts in relatively affluent countries that occur as a result of high levels of air conditioning use during heat waves (Strengers, 2010). Alternatively, ambient vulnerabilities can be chronic, as illustrated by negative outcomes for respiratory health due to long-standing exposure to poor quality ambient environments. For example, Davies (2019) describes the "slower, less visible, yet omnipresent actuality of everyday toxic exposure" (p.1539) for communities living locally to petrochemical industry in Louisiana in the United States.

Ambience – and perceptions of the quality of different ambient environments – comes to matter at different times in people's lives. The value that a person attaches to an ambient environment with a perceived high quality may become more important, for example, for parents of young children who seek to shield them from ambient environments that they perceive to be poorer in quality. Ambience, and associated vulnerabilities, also changes over time. Courtney (2023:) examines the histories of heat and air-conditioning in Wuhan, China, from the 1950's to the present day. They evidence how, in a city characterised by oppressive summer heat, air conditioning – described as "[a] new technology which required people to close their doors on their neighbours" (p.1) - has played an underappreciated role in shaping local cultural practices and social interactions.

6. Conclusion

The immediate, surrounding ambient environment is integral to health, comfort, and wellbeing. Ambient vulnerabilities therefore accrue to make a person more or less likely to be exposed to a harmful ambient environment, shape their perceptions and sense of self and place, as well as their ability to participate meaningfully in the society in which they live. The examples of the dynamics of ambient vulnerability presented here are by no means exhaustive. Rather they are intended as an illustration of the diversity of unequal power relations embedded in the ambient environment - whether at home, neighbourhood, or on a journey. In addressing ambient vulnerabilities, other concepts that have been usefully mobilised in relation to the climate and energy merit further attention including (ambient) justice or rights (to a high-quality ambient environment) (Hesselman et al., 2021). This could support further engagement with the all-encompassing ambient environment, and the vulnerabilities associated.

Declaration of competing interest

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Data availability

No data was used for the research described in the article.

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