

## Editorial introduction

# Just air? Spatial injustices and the politicisation of air pollution

Anneleen Kenis and Maarten Loopmans

*“Properly equipped racing pigeons can gather continuous real-time air pollution data while moving through the air at key heights not accessible to the official instruments, as well as from the ground where they are released for their homing flights” (Haraway, 2016).*

## Grasping the air

Exposure to air pollution and its health risks varies greatly according to the place where one lives (Kelly & Fussell, 2015; WHO, 2013). Not only differences *between* countries, cities or towns matter, or between cities and countryside, but also, and maybe even more importantly *within* each of these settings. A vast amount of literature has aimed at linking these spatial differences to socio-economic indicators demonstrating environmental injustice in terms of class, ethnicity, age, race and other social stratifications (Fecht et al., 2015; Mitchell & Dorling, 2003; Mitchell, Norman & Mullin, 2015). Whereas most of this research has started from a representation of bad air as spatially fixed, the intrinsic dynamic, elusive and unstable character of air pollution exposure has increasingly been foregrounded in recent research (Nyarku et al, 2018). At the same time, variations at the microscale became an increasingly important focus of scholarly research (see e.g. Fecht et al., 2016; Tenailleau et al., 2015; Tonne et al., 2018). Technologies for measuring air proliferated, shifting from government-led scientific monitoring and global-scale computer models towards participatory (citizen science) modes of data collection and analysis using simple diffusion tubes and mobile phone apps (Garnett, 2016; see also Kelly & Fussell, 2015; Tan & Smith 2021).

These shifts have been paralleled by a shift towards a much higher activist and artistic engagement with the topic, exemplified by both a much higher citizens' involvement with science, and increasing calls for a 'more than science' approach (see Hulme 2021), opening up new investigations of our embodied and affective engagements with air (Adey 2013, 2015; Calvillo & Garnett 2019; Hauge 2013; Zajchowski & Rose 2020). A growing attention for the perception and cultural meanings of air (Bickerstaff 2004; Bickerstaff & Walker 2001; Bush, Moffatt & Dunn 2001; Burningham & Thrush 2004; Cupples, Guyatt & Pearce 2007; Hodgson & Hitchings 2018; Wakefield, Elliott, Cole & Eyles, 2001) had already turned the focus from a mainly quantitative, statistical and 'objective' analysis, towards also including more subjective understandings of people's relation to air. The possibility to measure air pollution with mobile devices at the microscale further paved the way for the in-depth study of how human and non-human beings live with, navigate in and embody air. In her description of the Art activism project PigeonBlog, Donna Haraway (2016) shows how working with pigeons which carry air measurement devices not only allows to study more precisely the intrinsically *dynamic* character of air and avoids statistical simplifications interpolated from fixed point-based air monitoring devices, often placed at altitudes higher than where most people, animals and plants 'breathe'. It has also opened avenues to get in closer touch with the ways in which air transcends human – non-human divides.

Still, the first generation of studies on air and spatial justice have to be interrogated in yet other ways. While there is a wide range of studies demonstrating socio-economically conditioned distributive injustices related to air pollution, the scholarship which accounts for these spatial

differentiations and investigates the processes underlying the unequal flows of air pollution, its root causes and implications, is much less developed (Véron 2006, Buzzelli 2008, Heynen 2013). Air and its unjust distributions are difficult to map, but the layers of socio-economic, political and metabolic processes which underpin these uneven geographies of air are even more difficult to untangle, let alone its procedural and epistemic dimensions.

Not without reason Michael Buzzelli (2008) noted more than a decade ago that in the research field of Political Ecology, which typically addresses such topics, 'research on air pollution is virtually non-existent' (p. 507). In 2015, Stephen Graham made a similar observation, which prompted him to draw a research agenda for the field. The same reflection was behind our call for a series of RGS-IBG panel sessions on the topic in 2017, an initiative which, in combination with a number of sessions at the Brussels international interdisciplinary symposium 'Resistance is in the Air: Citizens, Science and Air pollution' in 2019 laid the foundations for this special issue. Interestingly, we were not alone in feeling the need to explore these topics.<sup>1</sup> Since then, we have witnessed a growing political ecology engagement with air (e.g., Calvillo, 2018; Calvillo & Garnett, 2019; Engelmann, 2015; Garnett, 2017; 2020; Gustafson, 2021; Kenner, Mirzaei, & Spackman, 2019; Mostafanezhad, 2020; Nieuwenhuis, 2016; Van Brussel & Huyse, 2019; Verbeek, 2019).

What made the uptake of air pollution as a topic of concern by political ecologists rather slow in comparison with other themes or fields? Several hypotheses can be formulated to explain this relative gap. Is it the fact that air pollution is merely an 'externality' to infrastructural development, whose negative consequences can be felt *post hoc*, but are seldom explicitly accounted for in spatial planning, in contrast to, for example, water circulation, which needs particular infrastructures (e.g. Swyngedouw 2004)? Differences in access to water, energy, food, or exposure to waste or sewage are the outcome of procedures of decision making about dedicated investments. In contrast, differences in exposure to air pollution are the often implicit outcome of decisions about the distribution of other facilities. Importantly, air pollution's dynamic and even volatile nature, and the various ways in which it interacts with human and non-human beings (and objects), not only results from its particular chemical and physical characteristics, but also from the 'mobility' of some of the main sources of its pollution. The role of traffic in generating urban air pollution is crucial here (Buzzelli 2008). More than spatially fixed 'point' source polluters, such as factories, traffic creates dynamic patterns of pollution.

However, the expression *just air* refers to more than the fact that air pollution often receives insufficient attention or is represented in distorted ways in urban planning and city development projects and related research. It also relates to the apparent lack of a tangibly 'material' side in comparison to other environmental issues (Bryant 1998, Véron 2006)? The air we inhale commonsensically appears to be *just air*. Its composition, the pollutants that it contains, and its effect on human health and ecosystems remain largely invisible. As a result, the 'embodiedness' and 'embeddedness' of human beings in specific socio-economically mediated distributions of air tend to be misrecognized like the well-known joke of the fish who fails to answer how the water is for a lack of perception of water as such.

Furthermore, the notion *just air* also hints at the fact that polluted air is not just *nature*, but socially produced nature or hybrid nature (Swyngedouw & Heynen, 2003). Cupples (2009: 207) echoes Hulme (2008) in this context, stating that '[a]ir pollution, like climate change [...] can be "understood

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<sup>1</sup> Series of sessions entitled 'Spatial Injustices, Contestation and the Politicisation of Air Pollution' at the Annual RGS-IBG Conference from 29 August till 1 September 2017 in London (UK); series of sessions at the International Interdisciplinary Symposium 'Resistance is in the Air: Citizens, Science and Air Pollution' from 27 till 29 April in Brussels (Belgium).

simultaneously as physical transformation and cultural object, a mutating hybrid entity in which the strained lines between the natural and the cultural are dissolving". Its hybridity renders air contestable, as *unjust* air, a subject of political conflict.

Taking these different lines of scholarly reflection together, air pollution should be understood as a largely invisible socio-natural artefact, a hybrid human - non-human entanglement which nevertheless has very material, socially uneven, consequences. Indeed, as Raymond Bryant already argued in 1998: 'unequal power relations are as likely to be "inscribed" in the air ... as they are to be "embedded" in the land' (p. 89). It is an artefact which manifests itself as a dynamic process or flow rather than as an object. The translation of air into a political issue requires an always incomplete attempt to provisionally fix it in space and time: it requires a representation, such as a map, or an object, like diesel cars (Kenis and Lievens, 2021) or a highway (Loopmans et al., 2021). But just as a photograph of a bunch of children on a birthday party can only give a hint of the lively jumble it tries to represent – only half a second after the photograph has been made, the whole set-up has changed again – even the best representation never fully captures the air's fluid materiality. At best, it gives some insight into the pollutants, the average or instantaneous concentrations, and the stakes at play.

This brings us to the intricacy of 'capturing the air' scientifically by socio-technical measuring devices. Air's largely invisible character makes our understanding of air, and its translation into a topic of political action and debate, more than other issues dependent on science and scientists. This never happens in a simple or unproblematic way, as scientists are constrained by their technical and mathematical tools of translation and the limits of their own socio-spatial imaginations. As Garner (2017) states, science's 'standards and classifications have socio-material and political effects because they affect what will, or will not, be made visible'. While measurements of air have been central in staging the air as a topic of contention and debate, they have also profoundly shaped how air is experienced and engaged with. They led to a view of air as a chemical gaseous mixture, thus concealing other dimensions of what air is or can be. While we need processes of scientific translation to understand the chemical composition and spatiotemporal dynamics of air, science cannot be the only form of knowledge mobilised (Calvillo, 2018). This is not just a theoretical argument. While a plethora of scientific studies have mapped the pollutants and their health effects, this turned out to be insufficient to put air pollution on the political agenda (Kenis, 2020). It was only when activists, clinicians, artists, policymakers, and journalists entered the discursive network that the topic acquired political salience. However, there is not just one way of engaging with air. This broad range of actors have engaged in discursive competition on *how* to translate and portray this hybrid entity, or in other words, *on how* to render air pollution *tangible*.

This special issue interrogates the processes through which the spatially, or spatiotemporally, uneven distribution of air – in particular urban traffic-generated air pollution – has been put on the public agenda, and has been turned into an object of public engagement and often contentious political debate. The focus is on the role of experiencing, representing and mapping air pollution as unjust in political mobilisations around air.

The contributions to this special issue focus on Western Europe and China. This is an important caveat, as (urban) air pollution is an increasingly salient problem in larger cities across the world. We do not cover the global diversity of experiences and politicizations of air pollution. Yet our focus also brings coherence to the special issue, as in China and Western Europe, despite numerous obstacles, air quality has become an increasingly salient and politicised issue during the second decade of the 21<sup>st</sup> century, and perceptions of (spatial) (in)justice seem to have contributed significantly to this evolution.

The question here is to what extent diverse ways of thinking or imagining the spatial distribution of air underpin these processes of politicisation. This special issue brings together a wide range of approaches to these questions. In what follows, we will present the special issue contributions according to five key themes: making the invisible visible, knowledge production, justice, spatio-temporality and politicisation.

To start with, almost all contributions address in one way or the other the issue of how to **render the invisible visible and** the intangible tangible, so that air's social entanglements and injustices can be experienced. Dealing most profoundly with this topic, Friederike Landau and Alexandra Toland (2021) describe five activist art projects on the atmosphere, which, in a similar vein as the PigeonBlog project, aim at making the air, its 'inscribed' injustices, and political implications experiential or *sense-ible*. Exploring the way the five senses are constitutive in each of the artist activist projects, Landau and Toland (2021) highlight air's affective and speculative potentials. Similarly, Gordon Walker, Douglas Booker and Paul Young (2020) foreground the need to simultaneously engage with our bodily understandings of air, or 'rhythmically constituted corporeality' as they call it, and with science and scientists, arguing that while we need to move beyond a merely scientific understanding, people's embodied capacities to know the air, and its risks, are also limited. Maarten Loopmans, Linde Smith and Anneleen Kenis (2021), in their turn, show how Antwerp activist groups have tried to circumvent air pollution's intangible nature by linking it to a highly mediatized highway construction project.

These investigations into making the invisible visible are often linked to an interrogation of the **different forms of knowledge production and dissemination** involved in grasping and politically translating the air, or in the words of Landau and Toland (2021), of how different kinds of knowledge, including affective knowledges, are interwoven into "curated experiences of air pollution". Nicola da Schio and Bas van Heur (2021) have taken this question of the politics of knowledge production as the core focus of their contribution. By interrogating the intricacies of alternating formal scientific knowledge with lay knowledge and the difficult place of experts and expertise in this process, they foreground the contested experiential dynamics of air pollution research and politics. Anneleen Kenis and Ben Barratt (2021), in their turn, zoom in on one specific aspect of the political dynamics of knowledge, namely the role of the media in bringing particular knowledge claims into circulation and the way this can spark public contestation and debate. Wei Hong, Yimeng Wei and Shuyan Wang (2021) discuss how the perception of air pollution as a problem is much more influenced by the knowledge shared through local media and informal social networks than by the actual sensory experience of air pollution itself. Tomas Maltby (2020) emphasizes the brokerage involved in transforming scientific knowledge on air pollution into air pollution policies. Thereby, he distinguishes knowledge brokers, who translate specialist knowledge in such a way that it can be understood by a lay audience, from problem brokers, who transform facts into political problems by explicating its social effects and relevance. Loopmans, Smith and Kenis (2021), on the other hand, focus on the production and dissemination of public knowledge in air pollution struggles. Arguing for a capabilities perspective in environmental justice, they claim that knowledge on poor urban air needs to be shared more equally if real emancipatory change is to be realised. Analysing the communication strategies of a large scale urban environmental coalition against air pollution, they underscore the public pedagogical responsibilities of social movements.

Loopmans et al (2021) are not the only contributing scholars who focus on the links between knowledge production and the **injustices in the air**. Hong et al. (2021) argue that environmental justice scholars should not limit themselves to exposing inequalities in the actual exposure to air pollution,

but should also pay attention to inequalities in the knowledge about and perception of pollution, which affect people's readiness to take precautions or participate in environmental initiatives. Through their rhythmic account of air pollution, Walker et al (2020) show how the structuring effects of rhythmic repetition lead to unequal patternings, whereby fatal intersections can occur between the rhythms of pollutants, the rhythms of daily life and the rhythms of bodily (mal)functioning. Crucial to the latter are unequal capacities to avoid harmful breathing and detrimental consequences. An example of such a fatal intersection, which both Walker et al (2020) and Kenis and Barratt (2021) describe is the death of a 9 year old girl in London which turned the (temporarily) 'invisibility' of the *consequences* of air pollution and the 'everywhere' of air pollution into a clear 'here' and 'there' (see also Kenis and Lievens, 2021).

Many contributions understand these injustices in a **spatial way**. Loopmans et al (2021) show how framing air pollution as an issue of spatial injustice has been instrumental in mobilising the Antwerp citizenry against the ring road extension. Simultaneously, intra-urban spatial variations were concealed, rendering the most affected people epistemically absent. Similarly, Hong et al. (2021) reveal how landscapes of pollution and landscapes of perception do not overlap: Spatial variations in local media's attention to air pollution turn out to be political artefacts, unrelated to actual pollution levels, but lead to strong differences in individual's air pollution awareness between cities. Walker et al (2020) move beyond the 'static landscape of spatial relations', and present an understanding of these injustices as unfolding polyrhythmic relations. They argue that this more dynamic understanding of air pollution has profound implications for understanding patterns of inequality, and lead to a focus of policy interventions on the places or times where different lines of these patterns intersect. To make this argument, they crucially add the **temporal** dimension of air, showing how air quality can 'significantly shift between day and night, from day to day, and from weekday to weekend' (p.4), leading to a view of air as a spatiotemporal phenomenon. Maltby, on the other hand, focusses on scale, showing how knowledge and problem brokers have connected differently to policy makers at the scale of London and the scale of the UK, leading to a different political field for the construction of air pollution policies. Landau and Toland (2021) equally discuss scale, this time underlining the need to 'demystify and deconstruct scale by evoking the senses' The aim is 'to create new feelings of agency in those affected' (p. 11).

This brings us to a last, but maybe most important red thread: **the politicisation of air**. Whereas Walker et al (2021) argue that *whose* rhythms are to be intervened with is a key political question, da Schio and Bas van Heur (2021) question the privileging of streets and squares as spaces of politicisation, and plea for a more profound and nuanced understanding of the state as a space where politicisation can happen. Landau and Toland (2021) take up a Rancièrian approach to show how activist art projects can 'lay bare the unequal relations of health, wealth, and well-being' and can thereby politicise the air. Kenis and Barrett (2021), in their turn, start from a Mouffian approach to politicisation, showing how discursively framing an issue as divisive (e.g. the controversy around Sahara dust as a so-called 'natural' explanation for smog episodes) triggers passion and political subjectivity and thereby leads to spikes in media attention. But discussions on the political play out in other ways as well. Whereas Maltby (2020) emphasizes the need for problem brokers to discursively turn facts into political issues, Loopmans et al (2021) take brokerage a step further and consider a politics of knowledge co-production and dissemination as a necessary part of grassroots political mobilisation.

Taking these different thematic clusters together, this special issue contributes to establishing the foundations for novel understandings of air and its political ramifications. The contributions are

not only exemplary for recent attempts to put air pollution on top of the political ecology agenda, but also for the recent surge of political struggles for just air.

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