

The Urbanization of Nature underneath and beyond 'the city'. Reflections on the book *Turning up the Heat: Urban Political Ecology for a climate emergency*

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Abstract

In this article we outline the impact that the field of Urban Political Ecology has on academia and policy-making; and argue that this body of scholarship is in a unique position to address some of the urgent political questions around urbanization and climate change. We outline the key epistemologies, ontologies, and methodologies of Urban Political Ecology and explore to what extent these can address the systemic disaster we call climate change. Our key aim is to show that academic research can – and should – remain relevant to the politics of a heating planet.

In questo articolo descriviamo l'impatto che il campo dell'ecologia politica urbana ha sul mondo accademico e nell'elaborazione delle politiche; e sosteniamo che questo corpus di studi ha una posizione unica per affrontare alcune delle questioni politiche urgenti relative all'urbanizzazione e al cambiamento climatico. Descriviamo le principali epistemologie, ontologie e metodologie dell'ecologia politica urbana ed esploriamo in che misura queste possano affrontare il disastro sistemico che chiamiamo 'cambiamento climatico'. Il nostro obiettivo principale è dimostrare che la ricerca accademica può e deve rimanere rilevante per la politica di un pianeta che si sta surriscaldando.

Keywords: UPE, Urban Political Ecology; urbanization; climate change.

Parole Chiave: UPE, Urban Political Ecology; urbanizzazione; cambiamento climatico.

This article is a reflection on the results and impact that four decades of scholarship in the field of Urban Political Ecology (henceforth UPE) had on academia and policy; but also – and more importantly – a reflection on the potential that UPE scholarship currently has to address some of the most urgent political questions around urbanization and climate change; the extent to which the epistemologies, ontologies, and methodologies of UPE can address the systemic disaster we call climate change. The recently published volume *Turning up the Heat: Urban Political Ecology for a Climate Emergency*, edited by Kaika, Keil, Mandler and Tzaninis (Kaika *et al.*, 2023b) gave the opportunity

for this reflection. The book's title is a metaphor for a world that remains apathetic and depoliticized under the threat of climate emergency; and the book cover is a picture that Leto, the son of one of the editors, drew during the summer of 2022, aged 7, horrified by seeing in the news the wildfires that were burning in Australia, killing people and animals, and destroying land and the built environment. But the book's title is also a metaphor for the responsibility of scholars and students to act on what is happening. To push the boundaries of knowledge and action. This article first gives an overview of the foundational concepts and ideas of UPE, then reflects on the state-of-the-art in the field, to finally give some pointers about possible ways forward in academia and politics.

Urban Political Ecology: a brief history of an ontological, epistemological, and methodological intervention to Urban Studies and Political Ecology

Urban Political Ecology is an academic field of inquiry that emerged in the late 1980s and 1990s. Its foundational texts include: *Uneven Development* by Neil Smith (1984), *Nature's Metropolis* by William Cronon (1991), *City of Quartz* by Mike Davis (1991), *Justice Nature and the Geography of Difference* by David Harvey (1996), *Concrete and Clay* by Matthew Gandy (2003), *Social power and the urbanization of water* by Erik Swyngedouw (2004), *Nature and the City* by Gene Desfor and Roger Keil (2004), *City of Flows* by Maria Kaika (2005), and *Lawn People* by Paul Robbins (2007), amongst others¹.

These monographs, and the first collection of UPE literature *In the Nature of Cities*, put together by Heynen, Swyngedouw and Kaika (2006a) make an ontological and epistemological intervention to the fields of both urban studies and political ecology.

Ontological interventions

Ontologically, UPE unsettles the traditional understanding of 'cities' as distinct entities separate from their outside, from 'nature' or 'the periphery', by making two key claims.

¹ A full review of the UPE literature lies outside the scope of this article. For excellent reviews see Heynen, Kaika and Swyngedouw (2006a); Heynen (2016); Heynen (2018); Davis (2023).

i) *Claim one*: there is nothing 'un-natural' about what we call cities: everything we see around us, bricks, steel, concrete, asphalt are metabolized and engineered flows of natural resources, put together through human labour, capital investment, and technology in ways which are marred and governed by power relations.

ii) *Claim two*: there is nothing 'natural' about a forest, or a park. They are also the outcome of historical layers of metabolic flows between geological processes, human and non-human labour, capital investment and technology.

So, UPE claims 'There is no city as such; no nature as such'. Instead, there is a perpetual process that Kaika and Swyngedouw call the 'Urbanization of Nature' (Kaika and Swyngedouw, 2011; Kaika, 2005). In order to go beyond the city/nature, city/periphery dualisms, UPE develops new understandings of fluid ontologies, in close discussion with Donna Haraway's work on simians and cyborgs (1991) and Bruno Latour's work on modernity (1993). The urbanization of nature is an integral part of modernization that produced hybrid entities, cyborgs: neither purely human-made nor purely natural socio-environmental and socio-technological constructs, and ridden by power relations.

Epistemological interventions

The ontological shift that UPE advocated goes hand in glove with an epistemological intervention in both Urban Studies and Political Ecology. With respect to Urban Studies, UPE disrupts what used to be 'the canon'; namely, a conceptualization of «cities as bound and purely social spaces... separated from the outside but also from the non-human world» (Braun, 2005: 635). With respect to political ecology, UPE urges to go beyond documenting the power relations involved in the extractivist politics in the Global North or the Global South and look closer at the *dialectic* between increasingly urbanized and luxurious lifestyles across the globe, and the destruction of environments and livelihoods in the Global South and North alike.

Hence, UPE calls for a more nuanced and dialectical account of how «Our increased sustainability and smartness is someone else's socio-environmental disaster» (Kaika, 2017). On how the imperial mode of living (Brand and Wissen, 2021) in core

urban centres in the North and the South is made possible, only because it is possible to extract unlimited and underpaid power, energy, land and natural resources, and create waste sinks at a global scale (Tzaninis, Mandler, Kaika and Keil, 2021). Core cities can afford to become smarter and cleaner only because they can dump their externalities elsewhere. UPE's epistemology examines climate change not as collateral damage, but as the very *modus operandi* of capitalist urbanization (Brand and Wissen, 2021).

Methodological Interventions

The ontological and epistemological shifts that UPE advocated, described above, corresponded to a number of directly linked methodological interventions.

UPE's first methodological intervention was to make invisible flows visible. This is linked to the ontological call to examine neither the city nor nature as such. UPE examines the urbanization of nature as «a set of metabolic flows, socio-environmental processes, and power relations that transform and hybridize environments, ... landscapes, but also human and non-human species and more-than-human relations and entanglements» (Heynen, Kaika and Swyngedouw, 2006b). What does this mean for our research practice? It means that to understand urbanization, we need to look outside and underneath cities; we need to examine the dams, tunnels, reservoirs, and other infrastructures that disrupt geological and biophysical processes in order to serve cities. All those techno-natures that carry the water, sewage, energy, and food that continuous urbanization demands. We need to examine the capital, labour and technology input that make these techno-natures and socio-natural flows possible. But these engineered metabolic flows remain hidden underneath and outside cities, and outside the cognitive map of urban dwellers. So, UPE's first task has been to make these invisible flows visible.

UPE's second methodological intervention is the call to examine urban metabolism and the 'urbanization of nature' as a violent process of creative destruction, driven by conflict and power relations. This methodological shift is directly linked to UPE's epistemological call to examine climate change as the *modus operandi* of capitalist urbanization. This is a significant

methodological intervention in the field of Urban Studies in particular, while other flow-based epistemologies of the urban such as Systems Theory (Sharpe and Karlqvist, 1980) or Industrial Ecology (Newell and Cousins, 2015) focused on quantifying the metabolic flows of matter in and out of cities and accounted for the input and output of food, energy, waste, pollution, etc. UPE's analysis instead shifts from quantitative to qualitative, arguing that such a quantitative analysis of the metabolic circuit of matter is not enough, because the metabolic flows of matter are driven by power relations and by the imperative for growth and profit. UPE therefore demands we expand our analysis beyond the flows of matter that make the urban; beyond a quantitative mapping of the metabolic circuit of materials that flow in and out of cities. Instead, UPE calls for focusing on a dual metabolic circuit. On one hand, of cycles of Economic investment and crisis; and on the other hand, of cycles of 'socio-ecological transformation and destruction'. UPE scholars argue that it is the dialectical relationship between these two circuits that lies at the heart of urbanization and that drives climate change.

For example, in his prologue to the volume *Turning Up the Heat: Urban Political Ecology for a climate emergency* (Kaika, Keil Mender and Tzaninis, 2023b), Mike Davis (2023) points to the link between speculative urbanization and the fires that burn each year from Greenland to Hawaii, and from Australia to Greece and Spain. These fire ecologies, Mike Davis argues, are both fed by and feed into profit-driven urbanization practices. Building where there should be *no* building at all, overrides local ecologies and Holocene adaptations and pushes native ecosystems past their survival tipping points. This invariably happens with public blessings and even subsidies. So, to understand the reasons why fierce fires burn entire landscapes year after year we need to understand the dialectic within the dual metabolic circuit of economic investment and socio-ecological transformation.

UPE's third methodological intervention is the insistence to historicize this dual circuit. To analyze how and why these flows are embedded within deeply historical geographical, political social and economic frameworks.

And the *field's fourth methodological intervention* is the claim to a type of scholarship that is neither conceived nor practiced as an insular academic exercise. UPE is interested not only in

identifying problems but also in exploring alternative pathways to urbanization. Methodologically, this means always putting forward the key question: who wins and who loses from any socio-environmental intervention?

An Urban Political Ecology for a Climate Emergency

Today, UPE scholarship spans over three decades of cross fertilization, and self-criticism. But also today, the hybrid ontologies that UPE has suggested are more relevant than ever before. The dynamics of growth produce even more violent and 'feral' (Shields, 2012) forms of extended urbanization that blur further the boundaries between the inside and the outside, and lead to new waves of destruction, and inequality. The fires and the floods that devastate many locations across the world every year bring into sharp relief the consequences of extending urbanization in places 'where there shouldn't be any' as Mike Davis (2023) puts it. The recurrent fire and flood disasters point to relentless capitalist urbanization at the heart of the climate emergency.

In *Turning Up the Heat: Urban Political Ecology for a climate emergency*, Kaika, Keil, Mandler and Tzaninis (2023b) identify four key debates in contemporary UPE that have the potential to make not only a theoretical contribution but also a political intervention in the current socioenvironmental emergency.

The first debate: new ontologies and epistemologies of extended urbanization: there is no such thing as 'no man's land'

Lefebvre's concept of 'planetary urbanization' has been central in developing UPE's original ontological and epistemological approach. It urges us to focus on the periphery, in order to understand the core; on the outside, in order to understand the inside; on the extractivist logic of a capitalism that is global in its exploitative practices.

Yet, while global in its outlook, planetary urbanization has received a lot of criticism over the last decade as it still theorizes from the core-outwards; it gives ontological supremacy to the core, arguing that the outside, the hinterland, acts, develops and responds to the logic of the core. In addition, over the past decade, new forms of urbanization have emerged that disrupt the traditional dynamic between core and periphery, city and

hinterland: corridor urbanization, extensive suburbanization, expansive employment zones, office cities and aerotropolises, extended infrastructure zones, production zones, logistics 'cities', and desakotas. These are no longer hinterlands that serve a certain core; they are forms of urbanization that create new layered dynamics of growth and decline, densification and de-densification. And they promote new forms of inequality, marginality, exclusion and environmental hazard. These need to be investigated.

Trying to deal with this complexity, UPE's ontologies have expanded and hybridized. Planetary urbanization has remained central in UPE's epistemology but has received criticism as an approach not situated enough to deal with the ontological complexities of urbanization. A debate has opened within UPE over new urban ontologies, often in productive dialogue with Science and Technology Studies and with Actor Network Theory. At some point, this dialogue runs the risk of becoming a navel-gazing exercise in which scholars spend a lot of intellectual energy, while the world is literally burning. So, there is urgency to re-direct our energies to unifying the field of UPE, as Kaika, Keil, Mandler, and Tzaninis argue (2023b) whilst still grappling with these new ontologies, and in our book *Turning Up the Heat*, we propose Extended Urbanization as a 'field unifying' concept that can

1. Push us to theorize the urban [and the environment] not from a hierarchized core-periphery relationship but starting from the margins whilst still keeping attention to the core; and
2. Help expand our understanding of marginality beyond 'traditional' notions, actors, and spaces.

And this is not just an academic exercise. It matters politically. For example, when Berger depicted the US suburban fringe as 'no-man's land' in 2017, this was not simply an academic representation. Accepting US suburbia as 'no-man's land' means ignoring millennia of metabolic flows between humans and non-humans that produced these landscapes. It means ignoring generations of power struggles over land between indigenous people and settlers. It means neglecting the history of power dynamics between state planning and private property regimes that normalized land grabbing.

There is no such thing as no-man's land. If we begin from this standpoint, we can work towards exposing the socio-ecological metabolisms, conflicts, marginalities and power relations inherent in extended forms of urbanization. Erik Swyngedouw (2023) and Matthew Gandy (2023) discuss the methodological, theoretical and political challenges of mobilizing extended urbanization to make ecological condition a matter of global political concern. Meanwhile, Martín Arboleda (2023) in his work on «Circuits of extraction and the metabolism of urbanisation» puts forward the notion of extensive extractivism to analyze how transnational circuits of extraction contribute to extensive urbanization. Equally, Roberto Luís Monte-Mór and Ester Limonad (2023) research and speak from spaces that have been perceived as no-man's land in the past; from spaces and economies that survived or emerged outside Brazil's core colonial industrial urbanization. And they find in these neglected spaces not only alternative economies but also the potential to produce alternative socio-environmental futures for the core. Creighton Connolly and Hamzah Muzaini (2023) focus on the socio-ecological transformation that Singapore's offshore islands underwent after 1965 when their thriving indigenous communities and economies were repurposed to serve landfilling, oil refinery, shipping and leisure for Singapore city-state. The authors highlight the socio-environmental configurations that are possible if this process would be reversed. The late Mike Davis's (2023) preface on exurban fires, Federico Savini's (2023) work on circular economies, Neil Brenner and Nikos Katsikis' (2023) exploration of the use of urban ecological footprints, all point to the extensions of urban logistics and explore 'hinterlands' as essential new arenas of urbanization and marginalization.

The second debate: a situated Urban Political Ecology

The second debate that we want to bring attention to is the call for a 'situated' UPE (Kaika *et al.*, 2023b). This comes from scholars working on and from the Global South and from postcolonial, feminist and intersectional scholars who see «the possibility for a broader range of urban experiences to inform theory on how urban environments are shaped, politicized and contested» (Lawhon, Ernstson and Silver, 2014: 498). But the call to focus

on 'Southern Urbanism' and situated UPE in our work, is not only a call for attention to different forms, modes and power relation around the urbanization of nature. It is also a call to de-centre the position from which research and theory itself is being produced and developed.

For example, Wangui Kimari (2023) discusses how Nairobi's colonial past shapes not only present urbanisation practices, but also the way people define themselves and others as political subjects in Nairobi. European settlers chose the elevated, mosquito-free areas for their habitation, and left the low-lying flood plains to the indigenous people. These racialized geographies of the past, are still today the foundational map on which capital draws new exploitative practices, and the canvas on which people structure and portray themselves and others as political subjects.

Shubhra Gururani (2023) examines how the 2016 floods at Gurgaon, on the outskirts of New Delhi, brought back to awareness the ecologies of the past that had been erased through urban development: she argues that the historical lakes, ponds, aquifers, water bodies, canals, and drain infrastructures that were ruthlessly undone in the 1960s to make space for the modern city, need to be the foundation upon which any present discussions over sustainability should build.

Nikki Luke and Nik Heynen (2023) discuss the emancipatory potential of linking demands for decarbonizing the electrical grid in New Orleans, to demands for energy reparations related to the US Black Radical Tradition.

Mary Lawhon, Anesu Makina, and Gloria Nsangi Nakyagaba (2023) argue that the logic and demand for universal and uniform service provision in the Global South can in fact work against resilience practices developed locally. Examining waste picking in Tshwane, South Africa, and 'alternative' sanitation technologies in Kampala, Uganda, they show how the logic of uniform service provision does not always make sense in contexts where the heterogeneity of residential arrangements is high, and life is unpredictable.

Similarly, Arboleda (2023) suggests that current approaches to planning are too static to allow the kinds of renegotiations that are required to address social inequalities within adaptation programmes in the global south.

The third debate: more than human Urban Political Ecologies

The third contemporary debate within UPE that we examine is the conceptual and methodological challenges and political implications of bringing the more-than-human lifeworld into the UPE agenda. Some of the UPE's foundational texts already focused on the flows of more than human matter, water in particular, to illustrate the messy continuity between 'city' and 'nature' (Swyngedouw, 1999; Kaika, 2005; Gandy, 2005). UPE scholars have also focused on air, food, waste, concrete, electronics, beer, and the transformations of terrestrial and marine ecologies in the service of extended urbanization (Marul, Pino, Tello and Cordobilla, 2010: 498; see also Harvey, 1996).

Today, UPE calls to go further in crossing disciplinary boundaries; to cross-fertilize with science and technology studies, with ecology science (Gandy, 2023), landscape ecology, with the work of Tsing, (2015), and Puig de la Bellacasa (2017); and disrupt the categories of centre/periphery and human/more-than-human. Moreover, Keil, Ali and Treffers (2023) add infectious disease and zoonosis to UPE's analysis of metabolic explanations. Examining the SARS, the Ebola, and the COVID outbreaks, the authors argue that a 'spatialized political ecology of infectious disease' can help mitigate the impact of outbreaks in a continuously urbanizing world.

Kian Goh (2023) focuses on the circulation of ideas and on how Dutch water expertise internationalizes and forms networks between Rotterdam, New York, and Jakarta, which affect global narratives and practices of environmental urgency.

Camilla Perrone (2023) advocates a shift of focus to encounters between human and non-humans in overlooked peripheries and hinterlands where actors support the idea that the terrestrial/earthling is an agent/actor of a new political interplay between geo-sphere, socio-sphere and bio-sphere.

The fourth debate: moving forward the politics of academia

The fourth key debate in UPE addresses an important political conundrum. While scholars move beyond privileging cities as objects of inquiry, policy makers increasingly make the city the preferred site for policy intervention (Kaika, 2017). Cities are now expected 'to save the planet'. International organizations fund 'urban labs' to promote technomanagerial solutions

through circular economies or smart cities. We argue that these technocratic, urban-risk management practices can lead to what Swyngedouw (Swyngedouw, 2018) calls a 'depoliticization' of key socio-environmental issues. However, we also show that the same technomanagerial solutions can become generative of new forms of politics.

For example, Irina Velicu (2023) explains how the technomanagerial policy that promoted a one-way future for Romania as an 'urban-industrial state' facilitated land grabbing and dispossession of the country's large peasant population, who became marginalized as an 'unproductive' and 'irrelevant' social category. But at the same time, this practice generated a new political consciousness: a growing number of people proclaimed themselves to be the new peasants (*tarani si taranci*) and formed the ECO-RURALIS movement, that challenges land grabbing and industrial-scale food production.

Similarly, Alex Loftus and Joris Gort (2023) suggest that even the emergence of populist discourses, if articulated with environmental concerns, can create openings for social and ecological justice. David Wachsmuth and Hillary Angelo (2023) argue that UPE can help explain the preponderance of greenwashing. Federico Savini (2023) focuses on circular economy in Amsterdam and shows that, despite its green credentials, circular economy is a development paradigm which unfolds through a 'wicked' partnership between: a local economy of consumers who engage in recycling; a regional economy of biomass and incineration for energy production; and a global economy of multinational recycling corporations which invest in secondary materials. These policies lead to an unfolding regime of ecological accumulation in city-regions that thrive out of the valorization of urban waste.

So, how do we move UPE and environmental politics forward? We engage with new forms of extended urbanization, that Keil (2018) terms the 'chief artefact of the Anthropocene', as the key terrain for new political subjectivities and performativities. The imperial mode of living has a home and climate change has an address: it is the extended urban world in which we live. It is not enough to move an academic field (UPE in this case) forward. We have to move forward the politics of academia beyond apocalyptic scenarios. Pointing at global capitalism as

the source of all crises is not enough.

Today, after many decades of silence, we have again the emergence of new imaginaries and alternative practices. But we do not have a coherent narrative or alternatives that can take us beyond the dominant techno-managerial solutions, or apocalyptic scenarios. Most of the practices and ideas on the ground, suggesting alternative ways forwards, are very localized (Kaika *et al.*, 2023b; Mandler, Keil, Tzaninis, and Kaika, 2023). Many take their cue from Latin American discourses on *buen vivir* suggesting replacing the 'imperial mode of living' with what Brand and Wissen (2021) call a 'solidary mode of living.' Solidary not only for people in the Global South, but also for those in the Global North whose lives are far from luxurious, and solidary also for the biophysical world, for species other than humans. This demand for a solidary mode of living, questions the imperative for growth (Kallis, 2011; Kaika, Varvarousis, Demaria and March, 2023a) and, importantly, bring into the environmental discussion the politics of labour and reproduction (Barca, 2020).

We want to make it clear that staying with the trouble of extended urbanization as a matter of concern does not mean succumbing to the reformist, technocratic and mechanical suggestions claiming that 'cities can save the world'. But it does mean acknowledging what Roger Keil (2018) argues, that the imperial mode of living has a home; and climate change has an address: it is the extended urbanized world in which we live. Urban Political Ecology – and academia as a whole – have an urgent and serious task: to address these challenges, and to remain relevant to the politics of a heating planet.

References

Arboleda M. (2023). «Circuits of extraction and the metabolism of urbanisation». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp.91-104.

Barca S. (2020). *Forces of Reproduction: Notes for a Counter-Hegemonic Anthropocene*. Cambridge: Cambridge University Press.

Brand U., Wissen M. (2021). *The imperial mode of living : everyday life and the ecological crisis of capitalism*. London; New York: Verso.

Braun B. (2005). «Environmental issues: writing a more-than-human urban geography». *Progress in Human Geography*, 29(5): 635-650.

Brenner N., Katsikis N. (2023). «Hinterlands of the Capitalocene». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp.105-125.

Connolly C., Muzaini H. (2023). «Urbanising islands: A critical history of Singapore's offshore islands». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 319-331.

Cronon W. (1991). *Nature's Metropolis: Chicago and the Great West*. New York: W.W. Norton and Company.

Davis M. (1991). *City of Quartz: Excavating the Future of L.A.* London: Verso.

Davis M. (2023). «Prologue: Losing California - The political ecology of the megafires - Mike Davis». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. xix-xv.

Desfor G., Keil R. (2004). *Nature and the city: making environmental policy in Toronto and Los Angeles*. Tucson: University of Arizona Press.

Gandy M. (2003). *Concrete and Clay: Reworking Nature in New York City*. Cambridge, Mass.: MIT Press.

Gandy M. (2005). «Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City». *International Journal of Urban and Regional Research*, 29(1): 26-49.

Gandy M. (2023). «Urban political ecology versus ecological urbanism». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 56-66.

- Goh K. (2023). «In formation: Urban political ecology for a world of flows». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 222-243.
- Gururani S. (2023). «Situating suburban ecologies in the Global South: Notes from India's urban periphery». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 169-185.
- Haraway D. (1991). *Simians, Cyborgs and Women - The Reinvention of Nature*. London: Free Association Books.
- Harvey D. (1996). *Justice, Nature & the Geography of Difference*. Blackwell: Oxford.
- Heynen N. (2014). «Urban political ecology I: The urban century». *Progress in Human Geography*, 38(4): 598-604. DOI:10.1177/0309132513500443.
- Heynen N. (2016). «Urban political ecology II: The abolitionist century». *Progress in Human Geography*, 40(6): 839-845. DOI:10.1177/0309132515617394.
- Heynen N. (2018). «Urban political ecology III: The feminist and queer century». *Progress in Human Geography*, 42(3): 446-452. DOI:10.1177/0309132517693336.
- Heynen N., Kaika M., Swyngedouw E. (2006a). *In the Nature of Cities: urban political ecology and the metabolism of urban environments*. London: Routledge.
- Heynen N., Kaika M., Swyngedouw E. (2006b). «Urban Political Ecology: Politicising the Production of Urban Natures». In: Heynen N., Kaika M., Swyngedouw E., Eds., *In the Nature of Cities: urban political ecology and the metabolism of urban environments*. London: Routledge, pp. 1-19.
- Heynen N., Luke N. (2023). «The case for reparations, urban political ecology, and the Black right to urban life». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 129-142.

Kaika M. (2005). *City of flows: modernity, nature, and the city*. New York; London: Routledge.

Kaika M. (2017). «Don't call me Resilient Again! The New Urban Agenda as Immunology ... or what happens when communities refuse to be vaccinated with 'smart cities' and indicators». *Environment and Urbanization*, 29(1): 89-102. DOI: <https://journals.sagepub.com/doi/full/10.1177/0956247816684763>

Kaika M., Swyngedouw E. (2011). «The Urbanization of Nature: Great Promises, Impasse, and New Beginnings». In: Bridge G., Watson S., Eds., *The New Blackwell Companion to the City*. Oxford: Blackwell, pp. 96-107.

Kaika M., Varvarousis A., Demaria F., March H. (2023a). «Urbanizing degrowth: Five steps towards a Radical Spatial Degrowth Agenda for planning in the face of climate emergency». *Urban Studies*, 60(7): 1191-1211. DOI: <https://journals.sagepub.com/doi/10.1177/00420980231162234>

Kaika M., Keil R., Mandler T., Tzaninis Y., Eds, (2023b). *Turning up the heat: Urban political ecology for a climate emergency*. Manchester: Manchester University Press.

Kallis G. (2011). «In defence of degrowth». *Ecological Economics*, 70(5): 873-880. DOI: <https://doi.org/10.1016/j.ecolecon.2010.12.007>

Keil R. (2018). «Extended urbanization, "disjunct fragments" and global suburbanisms». *Environment and Planning D: Society and Space*, 36(3): 494-511. DOI:10.1177/0263775817749594.

Keil R., Harris Ali S., Stefan T. (2023). «Extending the boundaries of 'urban society': The urban political ecologies and pathologies of Ebola virus disease in West Africa». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 207-221.

Kimari W. (2023). «Nairobi's bad natures». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 139-168.

- Latour B. (1993). *We have never been modern*. New York, London: Harvester Wheatsheaf.
- Lawhon M., Ernstson H., Silver J. (2014). «Provincializing Urban Political Ecology: Towards a Situated UPE Through African Urbanism». *Antipode*, 46(2): 497-516.
DOI: <https://doi.org/10.1111/anti.12051>
- Lawhon M., Makina A., Nsangi Nakyagaba G. (2023). «Infrastructure beyond the modern ideal: Thinking through heterogeneity, serendipity, and autonomy in African cities». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 186-205.
- Loftus A., Gort J. (2023). «Populist political ecologies? Urban political ecology, authoritarian populism, and the suburbs». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 265-283.
- Mandler T., Keil R., Tzaninis Y., Kaika M. (2023). «Epilogue: Is an integrated UPE research and policy agenda possible?». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 347-356.
- Marul I. J., Pino J., Tello E., Cordobilla M. (2010). «Social metabolism, landscape change and land-use planning in the Barcelona Metropolitan Region». *Land use policy*, 27(2): 497-510.
- Monte-Mór R.L., Limonad E. (2023). «Towards the urban-natural: Notes on urban utopias from the decolonial turn». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 67-90.
- Newell J.P., Cousins J.J. (2015). «The boundaries of urban metabolism: Towards a political-industrial ecology». *Progress in Human Geography*, 39(6): 702-728.
DOI:10.1177/0309132514558442.
- Perrone C. (2023). «Insurgent earth: Territorialist political ecology in/for the new climate regime». In: Kaika M., Keil R.,

Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 244-263.

Puig de la Bellacasa M.a. (2017). *Matters of care: speculative ethics in more than human worlds*. Minneapolis: University of Minnesota Press.

Robbins P. (2007). *Lawn people: how grasses, weeds, and chemicals make us who we are*. Philadelphia: Temple University Press.

Savini F. (2023). «The circular economy of cities: The good, the bad, and the ugly». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 333-345.

Sharpe R., Karlqvist A. (1980). «Towards a unifying theory for modelling urban systems». *Regional Science and Urban Economics*, 10(2): 241-257. DOI: [https://doi.org/10.1016/0166-0462\(80\)90029-0](https://doi.org/10.1016/0166-0462(80)90029-0)

Smith N. (1984). *Uneven Development: Nature, Capital and the Production of Space*. Oxford: Blackwell.

Swyngedouw E. (1999). «Modernity and Hybridity: nature, regeneracionismo, and the production of the Spanish waterscape, 1890-1930». *Annals of the American Association of Geographers*, 89(3): 443-465.

Swyngedouw E. (2004). *Social power and the urbanization of water: flows of power*. Oxford-New York: Oxford University Press.

Swyngedouw E. (2018). *Promises of the political: insurgent cities in a post-political environment*. Cambridge, Massachusetts: The MIT Press.

Swyngedouw E. (2023). «Capital's natures: A critique of (urban) political ecology». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 37-55.

Tsing A.L. (2015). *The mushroom at the end of the world: on*

the possibility of life in capitalist ruins. Princeton: Princeton University Press.

Tzaninis Y., Mandler T., Kaika M., Keil R. (2021). «Moving urban political ecology beyond the 'urbanization of nature'». *Progress in Human Geography*, 45(2): 229-252.

DOI: 10.1177/0309132520903350.

Velicu I. (2023). «The peasant way or the urban way? Why disidentification matters for emancipatory politics». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 302-318.

Wachsmuth D., Angelo H. (2023). «Greenwashing and greywashing: New ideologies of nature in urban sustainability policy». In: Kaika M., Keil R., Mandler T., Tzaninis Y., Eds., *Turning up the heat: urban political ecology for a climate emergency*. Manchester: Manchester University Press, pp. 284-301.

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