

## RISKSCAPES REVISITED - EXPLORING THE RELATIONSHIP BETWEEN RISK, SPACE AND PRACTICE

DETLEF MÜLLER-MAHN, JONATHAN EVERTS and CHRISTIANE STEPHAN

With 3 figures

Received 7 April 2018 · Accepted 29 August 2018

**Summary:** The concept of riskscapes refers to temporalspatial phenomena that relate risk, space and practice. It links the material dimension of potential physical threats, the discursive dimension of how people perceive, communicate and envision risks, and the dimension of agency, i.e., how people produce risks and manage to live with them. Located at the interface of these three dimensions, riskscapes are co-produced by collective imaginations of ‘landscapes of risk’, and ensuing coordinated action. The paper revisits the concept as it was first outlined by the present authors (MÜLLER-MAHN and EVERTS 2013), discusses its applications in risk research, and highlights its key arguments with respect to four points: the spatial dimension of risk, the practices of risk-taking, the relevance of group-specific risk perspectives and the plurality of risk settings. Building upon these four key arguments, the paper explores the concept further and suggests new lines of argumentation by focusing on two additional aspects that have so far been given little attention. First, it suggests a systematic reflection on power relations, especially with regard to the role of the state. Second, it discusses the embeddedness of riskscapes in temporal frames pertaining to different actors, groups and power structures. The article further explores the relation between risk and the future, and how practices of future-making shape the emergence of riskscapes.

**Zusammenfassung:** Das riskscapes-Konzept beschäftigt sich mit zeit-räumlichen Phänomenen, in denen Risiko, Raum und Praktiken zusammenlaufen. Es verbindet die materielle Dimension möglicher physischer Bedrohungen mit der diskursiven Dimension, wie Menschen Risiken wahrnehmen, kommunizieren und sich (bildhaft) vorstellen sowie mit der Dimension von agency, d.h. wie Menschen Risiken produzieren und damit leben. An der Schnittstelle dieser drei Dimensionen werden riskscapes durch kollektive Imaginationen von „Risikolandschaften“ und daraus resultierende koordinierte Handlungen koproduziert. Dieser Artikel greift das Konzept, das erstmals von den Autoren MÜLLER-MAHN und EVERTS (2013) vorgestellt wurde auf, diskutiert seine Anwendung in Studien der Risikoforschung und hebt seine Schlüsselargumente in Bezug auf vier Punkte hervor: die räumliche Dimension von Risiko, Praktiken des Risiko-machens, die Relevanz gruppenspezifischer Risikoperspektiven und die Vielseitigkeit von Risikosettings. Aufbauend auf diesen vier Schlüsselargumenten, entwickelt dieser Artikel das Konzept weiter und schlägt durch die Formulierung zweier zusätzlicher Aspekte neue Argumentationsstränge vor, die bislang wenig Beachtung fanden. Erstens argumentiert es für eine systematische Reflektion von Machtbeziehungen, insbesondere im Blick auf die Rolle des Staates. Zweitens wird die Einbettung von riskscapes in zeitliche Rahmen verschiedener Akteure, Gruppen und Machtstrukturen diskutiert. Der Artikel gibt einen Ausblick auf die Beziehung zwischen Risiko und Zukunft, auf die Art und Weise wie Praktiken des Zukunft-machens die Entstehung von riskscapes prägen.

**Keywords:** Risk, riskscape, practice, space, power, future-making

### 1 Introduction

The concept of riskscapes was introduced into the literature of risk research by the present authors (MÜLLER-MAHN and EVERTS 2013), and has since then been applied and further developed in a number of studies to which we will refer in this paper, including the contributions to this thematic issue of *Erdkunde*. Generally speaking, the concept connects perspectives on risk, space and practice. More specifically, we define riskscapes as landscapes of risk that exist in relation to practice, or as socially produced ‘temporalspatial phenomena’ (SCHATZKI 2010, 99-106). Riskscapes

are socially produced in so far as they emerge out of a ‘social amplification of risk’ (KASPERSON et al. 1988), i.e. shared risk perceptions, communication and collective action of a society or social groups. Similar to cognitive maps, riskscapes represent collective imaginations of complex, multiple and overlapping risk settings. In analogy to maps, they serve two main purposes, first by locating perils and safe pathways within a spatial framework, and second by providing orientation in potentially perilous terrain. ‘Orientation’ may be understood quite literally in the sense of finding one’s way, but also metaphorically as struggles for a joint understanding of managing complex risks.

In their introduction to an edited volume on geographical risk research, EGNER and POTT (2010) highlight four key ideas for the conceptualization of risk, namely its social constructedness, the spatialization of risk for the purpose of orientation and decision-making, the legitimizing function of spatialized risk and its role as an instrument of power, and finally, the observation that geographical risk research itself does not only produce security, but also new risks. These general theoretical observations are also important for our understanding of riskscapes.

From a social practice perspective, risks can neither conceptually nor empirically be grasped in isolation. They are both products and producers of social practices, which means that people live with multiple risks, and that they encounter and deal with them simultaneously, not as neatly separate factors. The riskscapes concept takes this complexity into account by addressing the overlaps and mutual reinforcement of diverse risks like natural hazards, political insecurity, crime, contagious diseases, technological threats, or economic crises. In its emphasis on the fluidity of these phenomena, the concept draws on poststructuralist approaches that focus on global flows and ensuing reconfigurations of space.

Anthropologist Arjun APPADURAI (1990), made a major impression on our conceptualization and terminology of spatiality when he coined five terms that end with the suffix *-scape* (financescapes, ideoscapes, mediascapes, ethnoscapes, technoscapes). In analogy to the notion of landscape, the new terminology carries a spatial connotation that points to the ambiguity and fluidity of social phenomena. Against the backdrop of increasing global connectivity and flows, it conceives of space in terms of relations, instead of more traditional spatial concepts that focus on topography, borders, regions and divisions. APPADURAI'S ideas fell on fertile ground in the discipline of geography, where the 'cultural turn' and the study of globalization were well under way in the 1990s, and positivist spatial concepts were being challenged by concepts such as relational space, imagined space, or global sense of place (HARVEY 1989; GREGORY 1994; CRESSWELL 1996; MASSEY 2005).

Various authors have coined terms and concepts that include the *-scapes* suffix, among them some specifically relating to risk concepts, such as hazardscapes (CORSON 1999; MUSTAFA 2005) or disasterscapes (KAPUR 2010). Other authors have developed concepts of cultural politics, as in the case of soundscapes (SMITH 1994; JAZEEL 2005). Specifically relevant to our concept of riskscapes is the fact that APPADURAI'S (1990) idea of *-scapes* was taken up by all

those who wanted to stress specific relations between practices, objects and local places. Examples include borderscapes (BRAMBILLA et al. 2015), churchscapes (RIEDEL and RUNKEL 2015), dreamscapes (JASANOFF and KIM 2015), fuelscapes (BERGMANN et al. 2017), warscapes (KORF et al. 2010) and waterscapes (GRIESER 2018). At times, *-scapes* has been used in a more metaphorical sense as an arena of globally interconnected meanings, while others have interpreted *-scapes* in a more hands-on sense as spaces or physical landscapes which can be read from a single thematic point of view (see for example the different uses of the concept of foodscapes; BREMBECK et al. 2013; MIEWALD and McCANN 2014).

Similarly drawing on APPADURAI (1990), we interjected the concept of riskscapes into the debate (MÜLLER-MAHN and EVERTS 2013). Learning from previous uses of *-scapes* (SUTHERLAND et al. 2012), we seek to develop a more thorough account of what the connections between risk, meaning, practice, time and space are. We do so by making a threefold conceptual move from *-scapes* to practices to risk. We contend that the meanings of *-scapes* as conceptualized by APPADURAI (1990) are always embedded in social practices. Mediascapes, for example, are *-scapes* of global flows and interconnections which are brought about by the practices of making media (such as filming, broadcasting, reporting, etc.). The *-scape* therefore denotes a series of spatial phenomena (physical and imagined) which are entangled with those practices, both as the material foundation of everything that happens in life and also as the material arrangement of human beings, things, artefacts and organisms (SCHATZKI 2002) that a given practice produces, modifies or acts upon.

Applying these ideas to the notion of risk, we find common ground with those scholars who have argued that risk is more than just a concept which helps to rationalize future gains and losses, but also a concept which performatively shapes practice and space (ARADAU and VAN MUNSTER 2007; NOVEMBER 2008; BICKERSTAFF and SIMMONS 2009; PETERSEN 2012). NOVEMBER (2008) stresses that 'risk' very much depends on the practices and professions involved in risk analysis; for example, firefighters have different notions of risk from the police. Furthermore, risk as a scientific concept is far from being neutral or politically innocent. For example, LUPTON (1993, 432) argues that risk discourse in the context of public health "serves to legitimize ideologies and social practices" because it allows the state to "exert power over the bodies of its citizens". In general, we follow the weak social constructionism

of BECK (2000, 212), who claimed to be “both a realist and a constructivist, using realism *and* constructivism in so far as those meta-narratives are useful for the purpose of understanding the complex and ambivalent ‘nature’ of risk in the world risk society we live in”. From this perspective, risks are “simultaneously real *and* constituted by social perception; risks have a hybrid character” (FLYNN 2006, 86, emphasis in the original).

We acknowledge the reality of dangers and uncertainties and concede at the same time that the concept of risk is a cultural technique which names, systematizes and opens up spaces (while foreclosing others) for the purpose of discussing dangers and the uncertainty of the future (see below, section on temporalities and future-making). Our concept of riskscapes seeks to overcome prevalent attitudes of binary thinking in geography (CLOKE and JOHNSTON 2005), including such pairs of opposites as materiality and meaning, realist and constructivist approaches, or structure and agency. It does so by highlighting the interrelatedness of the various aspects, and by rooting the concept in practice theories.

In this paper we expand our concept of riskscapes to give it more depth and detail. We do so by introducing, first, four key dimensions (spatiality, practice, subjectivities and social groups, plurality; cf. Fig. 1). We explicate these four dimensions in re-

lation to recent research activities, and seek to develop the concept further on this basis. Second, we introduce two dimensions which were missing from our first conceptualization of riskscapes: power relations and temporalities. Third, we further explore the relation between risk and the future, and how practices of future-making unfold in riskscapes.

## 2 Riskscapes and research

Living with risk has always been part of the human condition. Contemporary societies, however, are facing a fundamental transformation of risk settings. On the one hand, science and technology have made great progress in analysing, predicting and managing particular risks, such as floods and other natural hazards. On the other hand, new risks are emerging from global change, societal transformation, and the advancement of science and technology itself, such as risks related to nuclear energy, the internet, or newly emerging contagious diseases. Risk has become both a characteristic and an inevitable consequence of modernity, and it is, as BECK (1986, 1992) argues, constitutive of our modern ‘risk society’. He even expands his conceptual approach further to the ‘world risk society’ (BECK 1999), where ‘world risk’ denotes a ubiquitous phe-

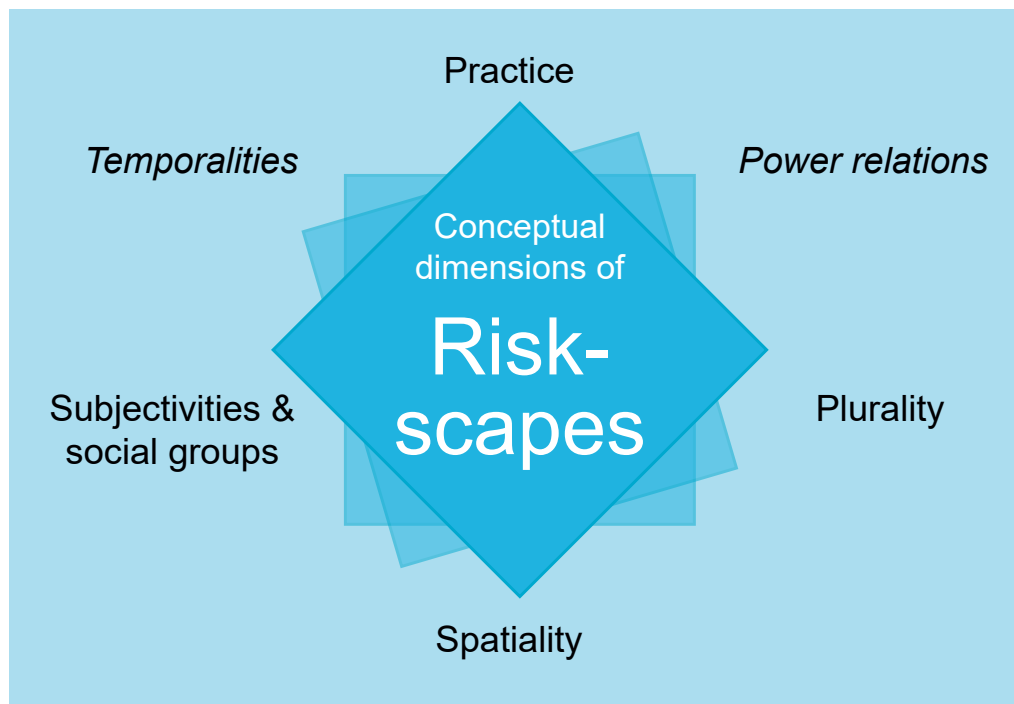


Fig. 1: Conceptual dimensions of riskscapes, own elaboration

nomenon that is increasingly difficult to manage due to growing global entanglements. Under these conditions, decision-making can no longer build upon calculable risks, but has to take into account an increasing degree of uncertainty and ‘unknown unknowns’ (WEHLING 2014).

However, decisions for action often have to be taken despite insufficient knowledge about possible outcomes, simply because decision-making cannot be postponed until all risks have been calculated. The ‘unknown unknowns’ present a fundamental problem for planning and risk management, most notably in capitalist economies. Entrepreneurs make investments for the sake of future gains, taking risks in an environment that they view as an ‘opportunityscale’. The dilemma of risk-taking under conditions of uncertainty may be eased by self-assuring practices among decision-makers, creating common understandings of future risks which may serve as a means of justification for specific interventions. BECKERT (2016, 247) illustratively describes the creation of ‘fictional expectations’ among economists, which serve the purpose of predicting the future by forming imaginaries that will be realized as a result of their decisions. He points out that those who create and work with economic models for decision-making agree to use models which are fictional but which have been collectively acknowledged to be useful. This results, for example, in shared positive expectations that contribute to the shaping of investment climates and act as self-fulfilling prophecies.

“Under genuine uncertainty, expectations become interpretative frames that structure situations through imaginaries of future states of the world and of causal relations” (BECKERT 2016, 9).

An example of the power of shared risk perceptions and expectations is the Global Risks Report that has been produced annually since 2004 in preparation for the World Economic Forum (WEF) in Davos. Based on the aggregated risk assessments of international experts, businessmen, insurance companies, and politicians, the Global Risk Report (WEF 2018) documents the increasing complexity of global risk settings. It identifies major risks associated with geopolitics, economics, environment, technology and society, and explores their interrelatedness within and between these five fields. The identified risks, their connections and feedbacks are visualized in a chart that can be read like a map of global risk scenarios (Fig. 2). The map serves as a tool to draw the attention of decision-makers to particular combined risks, and to foster collective risk management actions.

Returning to our concept of riskscapes, it has been pointed out that the term riskscapes has been used before (MORELLO-FROSCH et al. 2001; BICKERSTAFF and SIMMONS 2009; SUTHERLAND et al. 2012). However, the first detailed account of the concept was a chapter (MÜLLER-MAHN and EVERTS 2013) in an edited book on the spatial dimensions of risk (MÜLLER-MAHN 2013). Since then, the concept has been taken up by a number of scholars and used in a variety of contexts and disciplines. Examples of authors who have fruitfully applied the original concept are NEISSER (2014), who combined the concept with an ActorNetwork-Theory approach, INKPEN (2016), who used it as a heuristic tool for understanding environmental risks around a volcano in Iceland, and LUNDGREN (2017), who studied the ‘doing’ of riskscapes in the context of illegal border crossings along the Georgian-Abkhazian boundary. This work has helped to flesh out the characteristics of riskscapes, which we will summarize below.

## 2.1 The spatial dimensions of risk

Debates that aim at making sense of risk have long been dominated by sociological perspectives that seek to conceptualize risk as a societal category and define it in terms of decision-making and human agency (LUHMANN 1991; LUPTON 1999; RENN 1992). We subscribe to this view, but consider it incomplete. We emphasize that geography also matters, and that the spatial dimension of risk deserves closer scrutiny (NOVEMBER 2008). In line with other geographers (EGNER and POTT 2010; WEICHELGARTNER 2002; FELGENTREFF and GLADE 2008), we adopt social constructivist concepts, and at the same time shift our analytical gaze to the question of how multiple and changing risks are simultaneously constituted in society and played out in space. Adopting a geographical perspective, we follow RENN’s and KLINKE’s emphatic point on risk theory that “Space matters!” (RENN and KLINKE 2013). The relevance of the spatial dimension, however, is viewed quite differently in studies on the constitution of risk, depending on the type of risk in question. Hazard risks, for example, clearly have a spatial differentiation that can be cartographically represented, such as in maps of flood zones, rockslide areas or regions with a high probability of earthquakes. In other cases, however, the spatiality of risk may be less straightforward, for example in the case of health risks or poverty-related risks. We argue here that both risks and spatiality are produced in the interaction between social dynamics and material processes, and that this

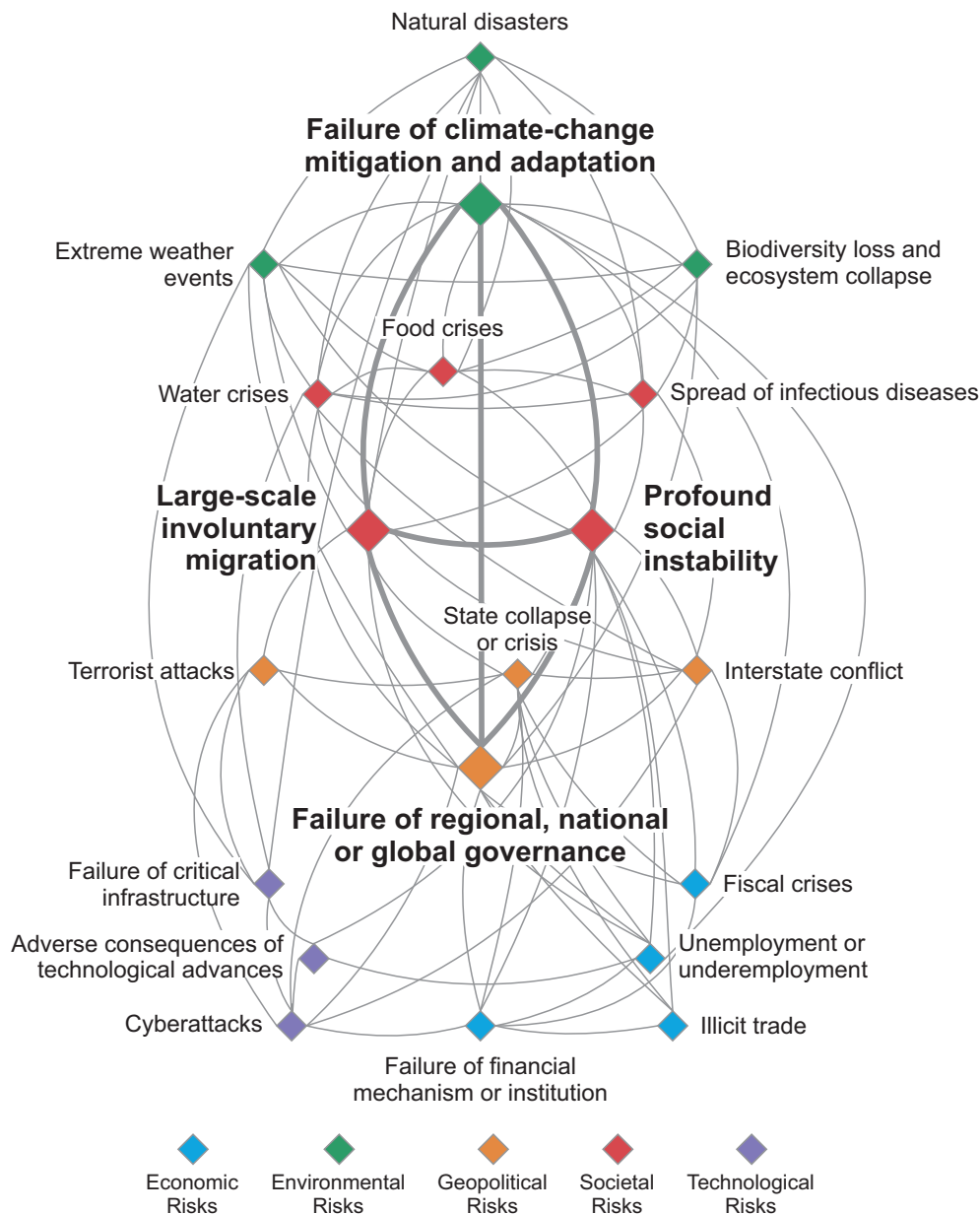


Fig. 2: Global risks interconnections map. Modified and simplified design after WEF (2018).

is conceptually relevant: risks are produced through specific (spatial) dynamics (e.g. in the interrelationship between plate tectonics and the designation of earthquake hotspots), but at the same time they also contribute to the production and transformation of spatial entities (e.g. adaptation of building codes and urban development plans to meet the need for earthquake-resistant buildings).

Beck gives prominent examples of ubiquitous ‘world risks’, meaning catastrophic risks of global dimensions (BECK 2008), such as climate change,

global financial crises and terrorism. Such risks unfold their influence by anticipating disasters before the disaster has actually happened. However, we do not agree with Beck’s argument that world risks render the spatial dimension more or less irrelevant. Instead, we contend that, while phenomena such as climate change may well be global in extent, their impacts are spatially differentiated. Climate-change-induced sea level rise is a global problem, but it is particularly severe for people living in coastal areas. Even world risks are not space-less.

Contrary to ‘world risk’, the term *riskscapes* was coined to denote the intrinsic spatial dimensions of risk (AZNAR 2013; PARSIZADEH et al. 2015). These are manifold and should not be reduced to a simple cartographic approach. Some risks emerging from natural hazards or other physical conditions can be mapped. However, the map is not a straightforward representation of ‘a’ *riskscape* but a product of the practices of risk research, which itself constitute a particular *riskscape*. In referring to SCHATZKI’S (2010) idea of landscapes as plural phenomena, we initially conceptualized *riskscapes* as plural, multiple and overlapping:

“Landscapes are not given networks of material objects but they are experienced and made sense of through practice. Since the practices carried out in relation to landscapes are plural, landscapes in turn are plural, too. This is not just the case in the sense of finding different landscapes in different places. Various practices can relate to the ‘same objective spatial expanse of the world’ (SCHATZKI 2010, 106). (...) In terms of *riskscapes*, we find the same processes at work.

Depending on the viewpoint, the practices carried out and the risks attuned to, *riskscapes* can vary considerably, although they might refer to the ‘same objective spatial expanse’” (MÜLLER-MAHN and EVERTS 2013, 26-27).

The original definition of the spatiality of *riskscapes* left room for more detailed discussions and combinations with other concepts. The main dimension of spatiality stressed by APPADURAI’S (1990) -scapes is, as mentioned above, the fluidity of socio-spatial phenomena. This notion of fluidity is of course not new to human geography (WERLEN 1995, 1997). However, since the 2000s there has been a noticeable increase in conceptualizations within and beyond the discipline following the ‘spatial turn’. From the ensuing debate, we conclude that there are at least three concepts of space that merit further investigation.

First, assemblage theories are used to highlight the decentralized and networked character of places and the associated *riskscapes*. For instance, BLOK (2016; 2018) uses assemblage theories (e.g. McFARLANE 2011) to specify the relationship between expert consultants, planning authorities and business elites, on the one hand, and environmental activists, slum dweller advocates and critical academics on the other. In his case study of the Indian city of Surat, BLOK (2016) discusses the assemblage of the distributed practices of both expert and lay urban knowledge-production in the context of climate

change adaptation, in particular the implementation of ACCCRN (Asian Cities Climate Change Resilience Network). In utilizing the concepts of *riskscapes* and assemblages, BLOK (2016) de-centers ‘the city’ and categories of expert knowledge such as climate change adaptation. In effect, contradicting and competing forms of knowledge-production showcase the various risky territories of the city and the overlapping as well as competing *riskscapes*. In contrast to civic-professional groups who dwell on technocratic visions of climate change adaptation, ‘alternative *riskscapes*’ come to the fore through activists who emphasize urban poverty and local environmental hazards, which are often ignored by political elites, or even produced through mismanagement.

Similar to assemblages are, second, notions and ideas of networks. In combining actor-network theory (ANT) with *riskscapes*, NEISSER (2014) explains that from an ANT perspective, risks are an inherent property of actor-networks: “risk is neither a property of the human or non-human world but arises from the interactions between them and is performed by the complex ensembles they constitute” (HEALY 2004, 284–285; cf. NEISSER 2014, 97). Networks, in the ANT sense, are always open to change. Thus even ‘safe’ networks can turn into dangerous ones at any time. This possibility, arising from the contingent relations between networked entities, constitutes the risk. *Riskscapes*, in turn “constitute themselves as complex, heterogeneous and constantly shifting networks spanning local and global relations of risk” (NEISSER 2014, 102). Furthermore, from such a perspective, *riskscapes* are “assemblages constituted by material, social and discursive entities and processes” (ibid., 103).

Third, scale is another spatial concept which is debated in relation to *riskscapes*. Following ANT and SCHATZKI, the concept of *riskscapes* is probably best understood within a ‘flat ontology’, as proposed by MARSTON et al. (2005):

“(.) we suggest an approach that begins with the recognition that scale and its derivatives like globalization are axiomatics: less than the sum of their parts, epistemological trompes l’œil devoid of explanatory power. In contrast, a flat ontology problematizes a world in which ‘all contemporaneous lives’ (SCHATZKI 2002, 149) are linked through the unfolding of intermeshed sites” (MARSTON et al. 2005, 426).

However, flat ontologies have a tendency to overstate near objects and places while neglecting what is further away. In the examples given by MARSTON and colleagues (2005, 427) (in a footnote they mention homes, shop floors, boardrooms, war rooms), we see

the tendency of flat ontology to begin with very tangible places before beginning to follow the links to other places. And even then, other and more obscure ways in which sites connect are likely to be ignored (EVERTS 2016). NICCOLINI (2017) however, argues that a flat ontology is not an obstacle but a helpful entry point into the study of large-scale phenomena. His examples show that an analysis of socio-spatial phenomena based on flat ontology allows us to identify patterns that are part of a global practice, while these patterns are not necessarily spatially co-present (NICCOLINI 2017, 107).

While we agree that scale in itself explains nothing, we are not so sure that scale in a more traditional sense should be completely ruled out of our consideration of the spatialities of riskscapes. Depending on the 'spatial expanse' that a practice addresses, we definitely can discern a number of spaces different in size and character. From an expert point of view, riskscapes can be global (as in global climate change), regional (as in areas of famine), local (as in violence-stricken neighbourhoods) or networked (as in energy supply systems). It therefore makes sense to allow for different scales within riskscape research (SELLERS and MELLING 2012). Analysing overlapping riskscapes of different spatialities may yield important insights, for example into the dynamics of conflicts. The case study by Surat (BLOK 2016, see above) demonstrates well how global, regional and local riskscapes overlap, and not only produce but also mediate conflicts. This case study provides evidence of an essential characteristic of riskscapes, which ought to be understood not simply as overlapping zones of multiple risk, but as products of the mutual interference and amplification between these specific risks.

## 2.2 Practices

Riskscapes are intertwined with social practices. Practice theorists propose understanding all social phenomena as an enmeshed complex of social practices and the material world (RECKWITZ 2002; EVERTS et al. 2011). The focus on practices posits that understanding human activity is key to any deeper knowledge of events and states.

"In sum, the domain of 'practice theory' is delimited by a conception of practices as organised activities, the conviction that both social phenomena and key 'psychological' features of human life are tied to practices, and the idea that the basis of human activity is nonpropositional bodily abilities" (SCHATZKI 2012, 14).

SCHATZKI (2002) emphasizes the fact that any practice involves various people and is always part of a larger set of socially ordered actions. Highlighting the dynamic nature of social practices, his conceptual outline allows us to analytically grasp social practices, how they change and how they relate to spatial and temporal dynamics. We follow SCHATZKI (2012, 14) in contending that "[a] practice (...) is an open-ended, spatiallytemporally dispersed nexus of doings and sayings". Building on this theoretical insight allows us to design the conceptual outline of riskscapes. Riskscapes reflect the nexus of doings and sayings, i.e. they are constituted through social practices, and they involve a material component, i.e. specific 'material arrangements' (SCHATZKI 2003, 195). Consequently, as indicated above, riskscapes (like landscapes) have a material and a practice component. LUNDGREN (2017) speaks of 'doing' riskscapes while analysing border crossings between Georgia and Abkhazia.

"To 'do' riskscapes is to act in relation to the risks embedded in the landscape—for example, to cross the border while being conscious of the dangers of crossing (...). Each situation demands interpretations of the surrounding riskscape, where changes need to be evaluated on a daily basis. Due to their fear of being caught while crossing borders, people tend to use less risky routes" (DOEVENSPECK and MWANABININGO 2012; cf. LUNDGREN 2017, 6).

In a similar way, KORF (2013, 77) describes warscapes as "landscape(s) of risk and uncertainty" which are navigated by the inhabitants as part of their everyday life struggles for survival (cf. ETZOLD and SAKDAPOLRAK 2016 on vulnerability).

However, we need to be careful with the landscape metaphor. Riskscapes are not just risky territories to be navigated (NOVEMBER et al. 2010). Risk is also a social construction (LUPTON 1999). It is an obvious feature of some places with visible imminent threats, but it can also be a hidden danger which only comes to light through risk discourse, calculation or visualization (ARADAU et al. 2008). Following BECK's (1986) weak social constructionism, risks are not just a feature of places but are also the outcome of a specific risk awareness and of socially produced risky situations. Building a nuclear power plant, for instance, produces a new risk. However, measuring radiation produces riskscapes that were not there before (in the sense that only after the 'discovery' of the riskscape does it become a significant factor in political action and social change).

### 2.3 Subjectivities and social groups

Empirically important is that not all riskscapes matter in the same way. While experts enjoy great power and influence, and their riskscapes dominate political agendas and public perception, other groups and their riskscapes may not be perceived and have no bearing on the political organization of social life. In a rather abstract way, we originally distinguished between the riskscapes of experts and 'locals' (MÜLLER-MAHN and EVERTS 2013, 34). We found that expert and lay practices could overlap in uneasy ways, thereby producing newly emerging risks for local people. A case in point is drought in various parts of East Africa, which is a normal phenomenon for local farmers and pastoralists. They suffer from government policies which privatize the land while officially claiming to reduce the risks of climate change and underdevelopment (EGUAOVOEN et al. 2015; OWUSU-DAAKU and DIKO 2017).

While this logic, the clash between experts and local perspectives, practices and lifeworlds makes sense in many conflicts, we should open up the discussion to include a more diverse set of social relations.<sup>1)</sup> Riskscapes are inherently social phenomena and can, with due care, be attributed to collective imaginations and subjectivities emerging from risk practices. In conceptualizing risk subjectivities, we follow learning theorists ALKEMEYER and BUSCHMANN (2017). For them, subjectivities are not just discursively created subject positions or linguistic categories (SCHATZKI 2002, 49-51), but the outcome of practice. "Subjectivity is (...) not pre-practically given, but emerges in and across practices as a capacity to engage with the reality of practices by reproducing and transforming it" (ALKEMEYER and BUSCHMANN 2017, 22). We deduce from this that the activity of engaging with risks produces (albeit diverse and multiple) risk subjectivities.

However, we wish to caution against the notion of risk subjectivities as coherent social groups. In keeping with our practice theory approach, we hypothesize that it is practices rather than groups which relate to each other, and it is practices which actually account for group formation. The concept

<sup>1)</sup> We are also cautious of the neocolonial connotations of the expert/lay dualism. We deem it important to deconstruct the notion that 'expert' automatically refers to highly skilled individuals from the Global North whose actions are potentially of global reach, while 'lay' refers to groups of people, villagers or the urban poor, who passively react to changes on the local level (while allegedly profoundly misunderstanding the risks they encounter).

of communities of practice proposed by LAVE and WENGER (1991) highlights the fact that practices are socially mediated, learned and trained. SHOVE and colleagues (2012, 63-79) stress that practices 'recruit' new practitioners. Depending on the practice, this can occur virtually anywhere. To take this to the extreme, communities of practice can even exist without the community members meeting or knowing each other. It suffices that people are engaged in the same practice (EVERTS 2015).

We argue that many different subjectivities and communities of practice exist. All of them produce their own riskscapes. The point is, again, that it is the practice from which the riskscape results, not the community or the group of actors. In line with NICCOLINI (2017, 105), we use the term 'actors' here in a narrow sense, defining them as the human carriers of social practices. Analytically, we therefore need to look not for specific professional groups but for professional practices of risk calculation, academic practices of risk research, and daily practices of negotiating known and unknown risks. These practices do not necessarily suppose distinct social actors. Individuals can be engaged in more than one community of practice. Conflicting riskscapes may not always be the result of competing groups. They can be the result of practices competing for dominance, time and space (SHOVE et al. 2012, 90f & 127ff) within one group or even one individual (for example, the objectives of risk research and of risk consultancy can at times be considered as competing practices that one and the same person has to negotiate). For the purpose of analytical preciseness when dealing with riskscapes, it must be remembered that multiple and dynamic types of interrelations exist between practices. Different practices do not always compete with each other, they can also complement or support each other, or coexist without major interference (NICCOLINI 2017, 104). Consequently, we argue that riskscapes can become more or less dominant if various practices within one riskscape complement or support each other, while another riskscape involves competing or conflicting practices (see also STEPHAN 2018).

### 2.4 Plurality of risks(capes)

From the multiple nature of practices, subjectivities and communities of practice follows a fundamental plurality of riskscapes. This is illustrated by a number of case studies (WEICHHART and RUMPOLT 2015; GEBREYES 2016; AALDERS 2018; Bohle 2018; EVERTS et al. 2018 (this issue); GEBREYES and THEODORY



2018; KRINGS 2018; LEE et al. 2018 (this issue)). For instance, FRICK-TRZEBITZKY and colleagues (2017) reveal the complex and interwoven riskscape in the Densu Delta (Ghana). Here, people have to live with adverse environmental conditions, especially flooding. However, the riskscape is far from homogenous:

“Linked to the shifting interests and priorities of actors engaging in institutional bricolage are different perceptions and experiences of risk. Depending whether access to land for development, affordable housing, maintenance of fishery as a source of livelihoods, habitat conservation, environmental health or community development is the main issue of concern, actors experience different aspects of the riskscape of flooding and its interaction with other riskscape” (FRICK-TRZEBITZKY et al. 2017, 66).

“The findings highlight the plurality in risk perception and experience that transform institutions. As twilight institutions transform around various risks of different relevance to different actors, they shape not only the riskscape of flooding, but a range of interacting riskscape. ‘The riskscape’ is in fact a combination of riskscape (of flooding, crime, water security...). Institutions’ roles in these vary as different social groups face different riskscape” (FRICK-TRZEBITZKY et al. 2017, 67).

An extreme example of a multi-layered riskscape with a plurality of risk experiences is the city of Goma on the eastern edge of DR Congo (DOEVENSPECK 2013, see Fig. 3). The city with more than one million inhabitants is squeezed between Mount Nyiragongo, an active volcano that severely destroyed parts of the urban area and the airport during an eruption in 2002, and Lake Kivu, which contains huge quantities of explosive methane gas. Some neighbourhoods are affected by toxic volcanic gas emissions from cracks in the ground, making Goma a truly ‘impossible site’ to live at. However, it is not so much the imminent danger of these combined natural hazards that the inhabitants are afraid of, but the state of lawlessness, violent crime, and guerrilla warfare in the urban periphery and the wider region. The riskscape of the inhabitants of Goma reveals a phenomenon that is characteristic of such complex settings. Faced by a multitude of risks in complicated spatial overlays, people tend to tolerate or even ignore the risks they cannot influence, in this case the volcano, and try to mitigate the risks of everyday life, in this case high crime rates. The capacity to respond to the plurality of risks is socially differentiated, and so are the practices that shape different riskscape. Some people in Goma are able to respond to the plurality of risks and choose to live in relatively safe places, close to the border of neighbouring Rwanda. Others have no choice, they cannot avoid

living with multiple risks. It is not the risk perception as such that differentiates the inhabitants of Goma, but their capacity to respond. Agency, the choice of practices of risk-taking and risk avoidance, is largely determined by economic wealth and power. This situation is reflected in the pattern of land prices in the urban area.

Returning to APPADURAI’s (1990) original idea, we can also say that the plurality of a riskscape means that it is interwoven with other -scapes. As NEISSER points out: “(..) riskscape are intertwined with the other scapes APPADURAI conceptualised; for example with financescape in respect of the relation between poverty and vulnerability; with ethnoscapes in respect of migration, and social and cultural transformations and their relationship to risk perception and behaviour; with technoscapes in respect of technical incidents, global communication and so on; with mediascapes in respect of media coverage of disasters, produced imaginations and the consequences of it; and finally with ideoscapes in respect of constitutive ideologies relating to what risks are, what constitutes them and how to counter or mitigate them” (NEISSER 2014, 101).

We argue that riskscape, just like the nexuses of practice, are open and fluid, multiple and subjective. And they overlap, leading to the emergence of new combinations and dynamics of risk.

### 3 Power relations

It has been noted that discussions of the concept of riskscape have hitherto not encompassed any substantial treatment of power relations (FRICK 2016; FRICK-TRZEBITZKY et al. 2017; BOHLE 2018). Furthermore, as HWANG and LEE (2018, *this issue*) point out, the concept has so far failed to acknowledge the one powerful driving force in the shaping of riskscape: the state. Power relations were implicitly present in our initial take on riskscape, because we differentiated between lay and expert practices and the risks and vulnerabilities local people have to face. However, relational power inequalities and struggles were not addressed in any detail. To close this conceptual gap, FRICK (2016) suggests analysing “...the role of power relations in risk creation through international conventions, bodies and funding, through national and local governments, and through academic framings. We therefore argue that the riskscape concept needs even further enhancement to fully embrace power relations” (FRICK 2016, 14).

In general terms, FRICK (2016, 15) names ‘relations of trust’ and ‘critical institutionalism’ as appropriate approaches. LUNDGREN (2017) addresses

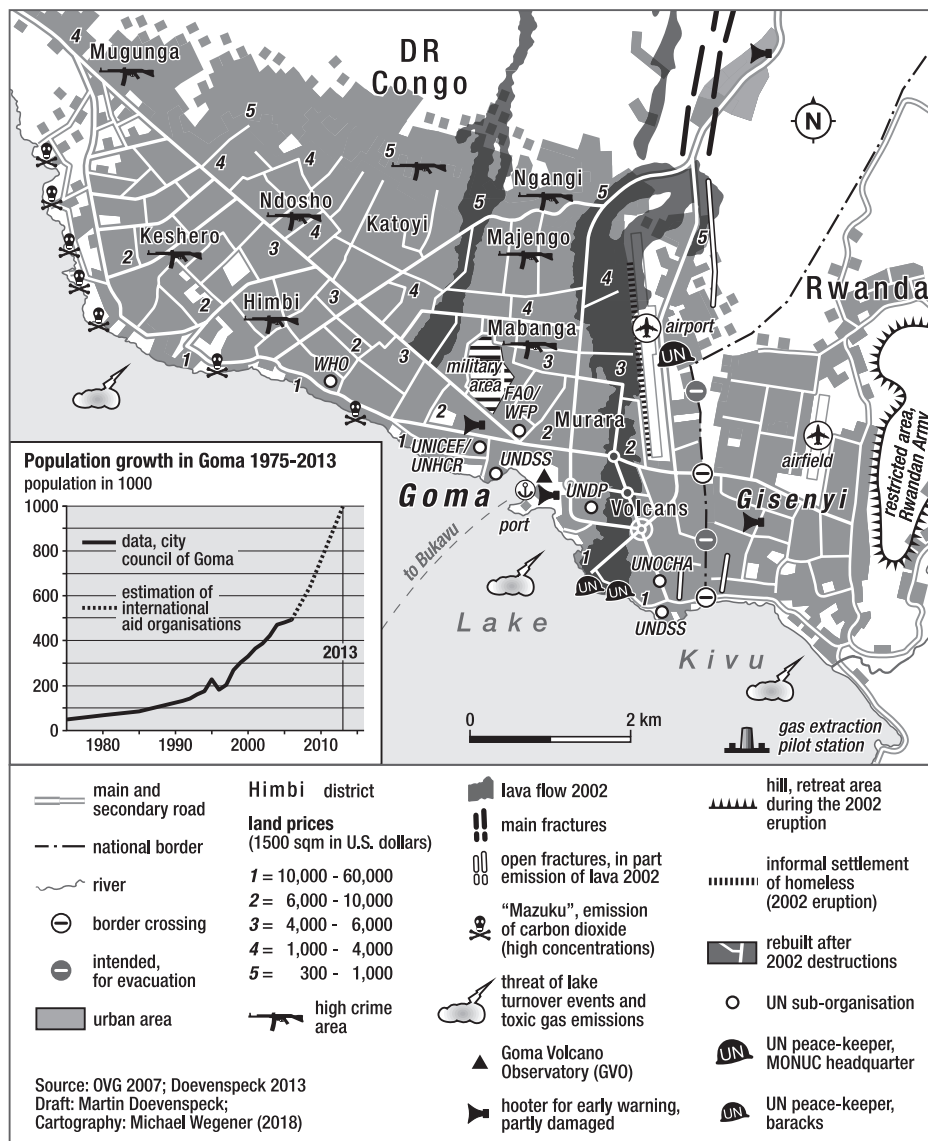


Fig. 3: The riskscape of Goma, DR Congo (source: DOEVENSPECK 2013, modified in 2018)

the question of power in relation to risksapes on a more individual level. Researching the practices of young people crossing the Georgian-Abkhazian border, Lundgren finds that power relations among the young people are unequal and, as a consequence, risks are unequally distributed (mainly based on nationality, passport ownership, age and gender). Discussing the risks people have to face when crossing the border, she writes:

“Young men who are caught risk being called into military service, and young women may experience bridal kidnapping. Thus, ethnicity, legal status, and gender intersect and increase exposure to risks along the border and inside Abkhazia. By adopting

an intersectional approach, this study shows that risksapes are multi-layered and are managed differently according to the respondents’ social positions. In conflicted areas such as Abkhazia, an unequal sharing of power between different groups constitutes a hotbed for the emergence of differing risksapes among the people who inhabit and migrate to the region” (LUNDGREN 2017, 13).

We suggest that MASSEY’s concept of power geometries adds to this approach. Writing in the 1990s, MASSEY grappled with what she called a ‘global sense of place’ (MASSEY 1993) – the impact of globalization (time-space compression) on space and place. One of her key arguments is that globali-

zation is not a force of nature but made and re-made by people. How the doing of globalization unfolds, she argues, is a matter of uneven power relations or what she calls the power geometry (MASSEY 1994, 149). We argue that overlapping riskscape have their own dynamic power geometry. Uneven power relations depend on where practices emanate from, who carries them, and what networks are mobilized. We conceptualize power geometries as different capacities to successfully engage or interfere with, and inflict change on places and people (EVERTS 2016). We propose that this triad of practices presents us with an analytical framework for understanding power relations with regard to riskscape. Practices of mapping (as with floods, famine), calculation and extrapolation (as with climate change) co-produce riskscape. The actual significance of the riskscape depends on people's ability to engage, interfere and inflict change. The same holds true for professional and everyday practices of exposing, fighting, coping with or living with risks.

From a practice theory point of view, power relations result from the "ability of some practices to orchestrate and align others" (WATSON 2017, 177). We agree with WATSON, who states that "(t)he challenge is to develop concepts and methods that can help grasp how arrangements and associations of practices and the heterogeneous flows they are bound with are produced through, and reproduce, systematic inequities in capacities to act, including to act in ways which shape others' capacities to act" (WATSON 2017, 179).

The answer to the question of how power and practice relate lies "in understanding how practices are related to each other across different sites" (WATSON 2017, 181) and how processes of alignment and aggregation unfold. We suggest that the concept of power geometries, understood as dynamic and power-infused networks created through the practices of engaging, interfering and inflicting change, can help to understand the processes of alignment and aggregation.

## 4 Temporalities and futures

### 4.1 Time frames

Understanding riskscape as socially produced 'temporalspatial phenomena' requires taking into account the temporal dimension of risk (MAHMOUD 2017), the time frames of different actors, and the fluidity of these phenomena in time and space.

Temporality may be understood in three ways. The first is chronometric time, which is essential as a dimension of measurement for the calculation of risks, expressed as the frequency at which particular events or magnitudes are expected in a defined time, for example as a 100 or 1000 year maximum. Second, historical time is essential for the understanding of change and the performative character of riskscape, reflecting collective memories of harmful events, dangerous places, or successful strategies of risk management. Third, social time refers to the temporal frames that individuals and societies use for orientation in everyday practices, depending on differences of livelihoods, cultures, class, or age. Pastoral or peasant societies, for example, imagine the passing of time in cycles in analogy to the seasons, while in Western societies people live with consecutive sequences of time that are structured by abstract units like fiscal years, legislative periods, or project durations.

TIRONI and CALVILLO (2016) discern two specific temporal modalities inherent in riskscape: eventual and incremental riskscape. They refer to the difference between tsunamis on the one hand and air pollution on the other. While tsunamis are sudden events, 'unexpected and violent eruptions', "air pollution (...) is an accumulative process of distress, a non-event". While tsunamis "are or are not happening (...) atmospheric pollution is a matter of trespassing thresholds" (TIRONI and CALVILLO 2016, 213). To take this distinction further, we suggest that eventual riskscape have characteristics of fate or external force; they are imposed upon societies. Incremental riskscape, however, are nurtured within the dynamics of society through daily actions and practices of risk-taking and risk governance.

### 4.2 The constitution of risk at the interface between present and future

It may sound like a truism to say that the idea of risk only makes sense in relation to the future. Obviously, risk refers to events that have not yet happened, that may perhaps never happen at all, or that may lead to results different from what is expected. Risk, in this sense, is constituted in the face of a future that remains undecided: open to anxiety, surprise, struggle and aspiration. Risk creates cross-temporal linkages by turning such anxieties and aspirations into drivers of current activities, or, in other words, by folding the future into the

present (ANDERSON and ADEY 2012). The question arises in which way this is brought about, what follows from the intrinsic future-orientation of risk, and what the openness of the future means for the conceptualization of riskscapes.

From a constructivist perspective as proposed by LUHMANN (1993), risk is placed between the past, the present and the future and connects these different stages in time through acts of decision-making. The past is where experience and knowledge come from. The present is when decisions are taken. The future designates the goal towards which decisions are directed. This connection through time is reflexive in so far as contemporary decisions anticipate future conditions, while the decisions and the processes following from them in turn influence and shape the future. As GIDDENS (1998, 209) puts it, “the idea of risk is bound up with the aspiration to control and particularly with the idea of controlling the future”. In a similar vein, BECK (1999) links the idea of the future to risk governance by stating that “risk is a possible scenario necessarily located in the future, connected to a policy proposal offering a way of preventing that risk from materialising into real harm”.

Risk-taking addresses the future not only in terms of potential harm or damage, which it seeks to minimize or avoid, but also in terms of opportunities. The fundamental problem of risk-taking comes from the openness of the future and the uncertainty it entails. Incomplete knowledge, unintended side effects, and other ‘unknown unknowns’ are problematic for risk governance, because in many cases decisions cannot be postponed until sufficient knowledge becomes available and risks can be minimized. New risks emerge from increasing global entanglements, technological development, economic crisis, climate change and other ongoing processes that require immediate action. In the words of BECK, we now “live in a world that has to make decisions concerning its future under the conditions of manufactured, self-inflicted insecurity” (BECK 1999, 8).

### 4.3 Practices of future-making

From a social science perspective, the future is neither a product of contingency, nor is it predetermined by fate, nor does it simply emerge from the present as if it was an extrapolation of currently ongoing processes (URRY 2016). Even if contingency and emergence play a role, the social sci-

ences view the future as something that is shaped by specific practices. These practices reflect past experience, knowledge, needs, capacities, interests and power structures. They envision, anticipate, narrate, predict, and perform the future in the present and thereby make tomorrow an object of today’s activities. This is underlined in the writings of SCHATZKI (2009, 36), who addresses notions of time and temporality by introducing the concept of timespace, arguing that “interwoven timespaces are fundamental to human society”. Here, timespaces involve an existential temporality in which past, present and future can be understood as three dimensions of temporality which do not order events but are general features of activity (ibid., 37)

PINK and SALAZAR (2017, 11) underline the contingent nature of the future by arguing that several “possible worlds [exist that] [...] are emergent from a particular way of imagining through contingent configurations of the present”. They argue that futures are not only a subject of imagination, but that they are at the same time “made, told, traded, tamed, transformed and traversed” (ibid., 10, see also ADAM and GROVES 2007). APPADURAI distinguishes three specific practices of future-making, or, in his words, “human preoccupations that shape the future as a cultural fact” (APPADURAI 2013, 286), namely imagination, aspiration and anticipation. They differ in their socio-cultural embeddedness, but are closely related in their effects. Imagination, the first of the collective practices, aims at the production of locality through shared beliefs and feelings of belonging. Shared imaginations in the sense of ‘our common future’ – the title of the influential Brundtland Report (WCED 1987) – may lead to feelings of common responsibility, and to social cohesions similar to what Anderson has called ‘imagined communities’ (ANDERSON 2006 [1983]). Aspiration, the second type of practice, refers to hope, and to ideas of a good life, as expressed in HARVEY’s ‘spaces of hope’ (HARVEY 2000). It is directed towards desirable futures, including what JASANOFF and KIM (2015) describe as ‘dreamscapes of modernity’. Aspiration requires some sort of utopian thinking and the “capacity to aspire as a navigational capacity” which allows people to “exercise voice” (APPADURAI 2013, 290). Anticipation, the third practice of future-making, is different from the first two in so far as it is concerned with probabilities and technologies of prediction and control of the future, aiming at a “containment of the uncertainties in the future as represented by maleficent events in the present” (APPADURAI 2013, 293).

#### 4.4 Riskscapes as navigational charts of future-making

How do practices of future-making relate to riskscapes? The way forward into the future is clouded by uncertainties which may contain unknown perils, but also unexpected opportunities. Encountering the future as risk has immediate consequences for the way it is reflected in practices of future-making and the use of riskscapes. As NEISSER and RUNKEL (2017, 172) argue, “[...] these practices provide the opportunity to create extrapolations of riskscapes”. The problem is essentially how to arrive at decisions despite prevailing uncertainty over future conditions. In this context, riskscapes provide a means of orientation and a supportive instrument for decision-making, where different actors try to reach an understanding concerning challenges and opportunities. Decisions are based on experiences and risk assessments shared within a society or social group, like a “personal archive of memories, both material and cognitive, [that] is not only or primarily about the past, but ... about providing a map for negotiating and shaping new futures” (APPADURAI 2013, 288).

## 5 Conclusion

The concept of riskscapes builds upon three key ideas. First, referring to APPADURAI’S (1990) -scape metaphor and its inherent notion of global flows, the concept stresses the characteristic ambiguity in the constitution of risk, with respect to both spatial and temporal dimensions. Second, riskscapes are not ‘objectively given’ phenomena, but are shaped and constantly modified through practices, which are socially embedded. They reflect the changing attitudes and practices of social groups, power geometries and reconfigurations across scales. Third, the concept acknowledges the overlapping and interfering perceptions and practices of risk-taking by different groups of actors. This understanding of riskscapes is especially attuned to the surprises and paradoxical effects emerging from feedbacks between different risk-related practices. With the concept of riskscapes, we provide a theoretical and analytical tool that combines the temporalspatial dimensions of risk, social practices, and the potential tensions arising from interrelated or overlapping riskscapes.

In this paper, we provide a holistic perspective on risk. With the concept of riskscapes we seek to overcome old binaries such as realist and construc-

tivist approaches. We advocate moving beyond an analysis that scrutinizes each risk separately. The concept of riskscapes highlights the plurality of risks, their interconnectedness, overlaps and tensions. We emphasize the spatial dimensions of risk, but also acknowledge its temporal dimensions. We argue that the concept of riskscapes facilitates the analysis of risk-related temporalspatial phenomena such as floods, droughts, volcanoes, pandemics and climate change, but also nuclear disasters, borders, crime, terrorism or violent conflicts. These phenomena are entangled with social practices and consist of material entities and their temporalspatial dynamics. Inquiring into these dynamics requires analysis of the practices which create, define and deal with risks.

In terms of risk practices, the concept of risk is, among other things, a cultural tool that deals with danger and uncertainty. Practices of anticipation are one salient example, whereby pasts and futures are all folded into the present. Power relations play a crucial role in the prioritization of risks. Researchers need to be aware of the power geometries of riskscapes and should ask: Who can say what risk is relevant to whom? Where? How do individuals and societies respond? What are the overlaps and tensions between multiple and competing risks?

The concept of riskscapes is inspired by practice theories. By emphasizing practices, the concept also has a political dimension. Inquiring into the nature of social practices shows the historically and spatially dependent paths of established and new routines and power relations. Much risk research fails to acknowledge the importance of social practices. Risk is often seen as a systemic and technical issue, which is best understood and discussed by experts alone. The relevance of routines and everyday life practices are rarely considered.

Practice theories teach us that all practices and all nexuses of practices are subject to change or have the potential to change and transform. Analysing complex phenomena of risk from such a point of view helps to understand that contemporary risk situations are in principle open for change and that change can be initiated in very diverse ways. Complex risks are not a domain confined to a small and highly specialized group of experts who model, evaluate and weigh them. Rather, we argue that it is important to include all human actors (as carriers of social practices) who participate in risk practices and in discursive practices concerning these risks. Accordingly, our concept of riskscapes encompasses all relevant social practices, not only the dominant

actions of experts and politicians, but also competing, replaced or transformed practices. Applying the riskscape concept makes it possible to deal with complex and interconnected risks in the past, the present and the future of heterogeneous and dynamic societies.

### Acknowledgements

The authors would like to express their gratitude to three anonymous reviewers for their valuable comments, to Dr. Carsten Felgentreff and his Master students in Osnabrück for their critical discussion of an earlier version of the manuscript, and to Dr. Dirk Wundram for his continuous support to prepare this article and the themed issue for publication.

### References

- AALDERS, J. T. (2018): The scale of risk: conceptualising and analysing the politics of sacrifice scales in the case of informal settlements at urban rivers in Nairobi. In: *Erdkunde* 72 (2), 91–101. <https://doi.org/10.3112/erdkunde.2018.02.02>
- ADAM, B. and GROVES, C. (2007): Future matters: action, knowledge, ethics. Leiden. <https://doi.org/10.1163/ej.9789004161771.i-218>
- ALKEMEYER, T. and BUSCHMANN, N. (2017): Learning in and across practices: as subjectivation. In: HUL, A.; SCHATZKI, T. and SHOVE, E. (eds.): *The nexus of practices. Connections, constellations, practitioners*. London, 8–23.
- ANDERSON, B. (2006 [1983]): *Imagined communities. Reflections on the origin and spread of nationalism* (revised edition). London.
- ANDERSON, B. and ADEY, P. (2012): Future geographies. Guest editorial. In: *Environment and Planning A* 44, 1529–1535. <https://doi.org/10.1068/a45316>
- APPADURAI, A. (2013): *The future as cultural fact. Essays on the global condition*. London, New York.
- (1990): Disjuncture and difference in the global cultural economy. In: *Theory, Culture & Society* 7 (2-3), 295–310. <https://doi.org/10.1177/026327690007002017>
- ARADAU, C.; LOBO-GUERRERO, L. and VAN MUNSTER, R. (2008): Security, technologies of risk, and the political: Guest editors' introduction. In: *Security Dialogue* 39 (2-3), 147–154. <https://doi.org/10.1177/0967010608089159>
- ARADAU, C. and VAN MUNSTER, R. (2007): Governing terrorism through risk: taking precautions, (un)knowing the future. In: *European Journal of International Relations* 13 (1), 89–115. <https://doi.org/10.1177/1354066107074290>
- AZNAR, C. (2013): *Rethinking migrants' financial lives: the role of risk in the everyday financial practices of migrants*. PhD thesis. London.
- BECK, U. (1986): *Risikogesellschaft. Auf dem Weg in eine andere Moderne*. Frankfurt a. M.
- (1992): *Risk society: towards a new modernity*. London.
- (1999): *World risk society*. Cambridge.
- (2000): *Risk society revisited: Theory, politics and research programmes*. In: ADAM, B.; BECK, U. and VAN LOON, J. (eds.): *The risk society and beyond. Critical issues for social theory*. London, 211–229.
- (2008): *Weltrisikogesellschaft. Auf der Suche nach der verlorenen Sicherheit*. Frankfurt a. M.
- BECKER, J. (2016): *Imagined futures. Fictional expectations and capitalist dynamics*. London. <https://doi.org/10.4159/9780674545878>
- BERGMANN, C.; RODEN, P. and NÜSSER, M. (2017): Contested fuelscapes: producing charcoal in sub-Saharan drylands. In: *Area*. <https://doi.org/10.1111/area.12394>
- BICKERSTAFF, K. and SIMMONS, P. (2009): Absencing/presencing risk: rethinking proximity and the experience of living with major technological hazards. In: *Geoforum* 40, 864–872. <https://doi.org/10.1016/j.geoforum.2009.07.004>
- BLOK, A. (2016): Assembling urban riskscapes. In: *City* 20 (4), 602–618. <https://doi.org/10.1080/13604813.2016.1194000>
- (2018): The politics of urban climate risks: theoretical and empirical lessons from Ulrich Beck's methodological cosmopolitanism. In: *Journal of Risk Research* 21 (1), 41–55. <https://doi.org/10.1080/13669877.2017.1359203>
- BOHLE, J. (2018): Hurricane-riskscape and governmentality. In: *Erdkunde* 72 (2), 125–134. <https://doi.org/10.3112/erdkunde.2018.02.04>
- BRAMBILLA, C.; LAINE, J.; SCOTT, J. W. and BOCCHI, G. (2015): *Borderscaping: imaginations and practices of border making*. Surrey, Burlington.
- BREMBECK, H.; JOHANSSON, B.; BERGSTRÖM, K.; ENGELBREKTS-SON, P.; HILLÉN, S.; JONSSON, L.; KARLSSON, M.; OSSIANSSON, E. and SHANAHAN, H. (2013): Exploring children's foodscapes. In: *Children's Geographies* 11 (1), 74–88. <https://doi.org/10.1080/14733285.2013.743282>
- CLOKE, P. and JOHNSTON, R. (2005): Deconstructing human geography's binaries. In: CLOKE, P. and JOHNSTON, R. (eds.): *Spaces of geographical thought. Deconstructing human geography's binaries*. London, 1–20. <https://doi.org/10.4135/9781446216293.n1>
- CORSON, M. W. (1999): Hazardscapes in reunified Germany. In: *Environmental Hazards* 1 (2), 57–68. <https://doi.org/10.3763/ehaz.1999.0108>
- CRESSWELL, T. (1996): *In place/out of place: Geography, ideology and transgression*. Minneapolis.
- DOEVENSPECK, M. (2013): An impossible site? Understanding risk and its geographies in Goma, Democratic Republic of

- Congo. In: MÜLLER-MAHN, D. (ed.): The spatial dimension of risk. How geography shapes the emergence of risk-scapes. London, 137–153.
- DOEVENSPECK, M. and MWANABINGO, N. M. (2012): Navigating uncertainty: Observation from the Congo-Rwanda Border. In: BRUNS, B. and MIGGELBRINK, J. (eds.): Subverting borders: Doing research on smuggling and small-scale trade. Wiesbaden, 85–106. [https://doi.org/10.1007/978-3-531-93273-6\\_5](https://doi.org/10.1007/978-3-531-93273-6_5)
- EGNER, H. and POTT, A. (2010): Risiko und Raum: Das Angebot der Beobachtungstheorie. In: EGNER, H. and POTT, A. (eds.): Geographische Risikoforschung: Zur Konstruktion verräumlichter Risiken und Sicherheiten. Stuttgart, 9–31.
- EGUAVOEN, I.; SCHULZ, K.; DE WIT, S.; WEISSER, F. and MÜLLER-MAHN, D. (2015): Political dimensions of climate change adaptation: conceptual reflections and African examples. In: LEAL FILHO, W. (ed.): Handbook of climate change adaptation. Berlin, 1183–1199. [https://doi.org/10.1007/978-3-642-38670-1\\_82](https://doi.org/10.1007/978-3-642-38670-1_82)
- ETZOLD, B. and SAKDAPOLRAK, P. (2016): Socio-spatialities of vulnerability: towards a polymorphic perspective in vulnerability research. In: *Die Erde* 147 (4), 234–251.
- EVERTS, J. (2015): Invasive life, communities of practice, and communities of fate. In: *Geografiska Annaler Series B: Human Geography* 97 (2), 195–208. <https://doi.org/10.1111/geob.12074>
- (2016): Connecting sites: Practice theory and large phenomena. In: *Geographische Zeitschrift* 104 (1), 50–67.
- EVERTS, J.; JACKSON, P.; MEAH, A. and VIEHOFF, V. (2018): Negotiating the riskscapes of convenience food. In: *Erdkunde* 72 (3), 171–184. <https://doi.org/10.3112/erdkunde.2018.02.08>
- EVERTS, J., LAHR-KURTEN, M. and WATSON, M. (2011): Practice matters! Geographical inquiry and theories of practice. In: *Erdkunde* 65 (4), 323–334. <https://doi.org/10.3112/erdkunde.2011.04.01>
- FELGENTREFF, C. and GLADE, T. (eds.) (2008): *Naturrisiken und Sozialkatastrophen*. Heidelberg.
- FLYNN, R. (2006): Health and risk. In: MYTHEN, G. and WALKLATE, S. (eds.): *Beyond the risk society. Critical reflections on risk and human security*. Maidenhead, 77–95.
- FRICK, F. (2016): Risk and adaptation in (African) cities. No. 2. WaterPower Working Paper, Governance and Sustainability Lab. Trier.
- FRICK-TRZEBITZKY, F., BAGHEL, R. and BRUNS, A. (2017): Institutional bricolage and the production of vulnerability to floods in an urbanising delta in Accra. In: *International Journal of Disaster Risk Reduction* 26, 57–68. <https://doi.org/10.1016/j.ijdrr.2017.09.030>
- GEBREYES, M. G. (2016): Transformative adaptation and natural resource management interventions in North Eastern Ethiopia. PhD thesis. Bonn.
- GEBREYES, M. and THEODORY, T. (2018): Understanding social vulnerability to climate change using a ‘riskscapes’ lens: case studies from Ethiopia and Tanzania. In: *Erdkunde* 72 (2), 135–150. <https://doi.org/10.3112/erdkunde.2018.02.05>
- GIDDENS, A. and Pierson, C. (1998): *Conversations with Anthony Giddens. Making sense of modernity*. Stanford.
- GREGORY, D. (1994): *Geographical imaginations*. Cambridge.
- GRIESER, A. (2018): *Den Verlauf kontrollieren. Eine Ethnographie der waterscape von Gilgit, Pakistan*. Ressourcen - Gemeinschaften - Überwachung. Bielefeld. <https://doi.org/10.14361/9783839442357>
- HARVEY, D. (1989): *The condition of postmodernity: an enquiry into the origins of cultural change*. Malden.
- (2000): *Spaces of Hope*. Edinburgh.
- HEALY, S. (2004): A ‘post-foundational’ interpretation of risk: Risk as ‘performance’. In: *Journal of Risk Research* 7(3), 277–296. <https://doi.org/10.1080/1366987042000176235>
- INKPEN, R. (2016) ‘Riskscapes’ as a heuristic tool for understanding environmental risks: The Eyjafjallajökull volcanic ash cloud of April 2010. In: *Risk Management*, 18 (1), 47–63. <https://doi.org/10.1057/rm.2016.1>
- JASANOFF, S. and KIM, S.-H. (2015)(eds.): *Dreamscapes of modernity. Sociotechnical imaginaries and the fabrication of power*. Chicago.
- JAZEEL, T. (2005): The world is sound? Geography, musicology and British-Asian soundscapes. In: *Area* 37 (3), 233–241. <https://doi.org/10.1111/j.1475-4762.2005.00626.x>
- KAPUR, A. (2010): *Vulnerable India: a geographical study of disasters*. New Delhi. <https://doi.org/10.4135/9788132105428>
- KASPERSON, R. E.; RENN, O.; SLOVIC, P.; BROWN, H. S.; EMEL, J.; GOBLE, R.; KASPERSON, J. X. and RATICK, S. (1988): The social amplification of risk - a conceptual framework. In: *Risk Analysis* 8 (2), 177–187. <https://doi.org/10.1111/j.1539-6924.1988.tb01168.x>
- KORF, B. (2013): The certainty of uncertainty. Topographies of risk and landscapes of fear in Sri Lanka’s civil war. In: MÜLLER-MAHN, D. (ed.): The spatial dimension of risk. How geography shapes the emergence of riskscapes. Abingdon, 68–81.
- KORF, B.; ENGLER, M. and HAGMANN, T. (2010): The geography of warscape. In: *Third World Quarterly* 31 (3), 385–399. <https://doi.org/10.1080/01436597.2010.488466>
- KRINGS, S. (2018): “Dear Neighbours ...” A comparative exploration of approaches to managing risks related to hazardous incidents and critical infrastructure outages. In: *Erdkunde* 72 (2), 103–123. <https://doi.org/10.3112/erdkunde.2018.02.03>
- LAVE, J. and WENGER, E. (1991): *Situated learning: legitimate peripheral participation*. Cambridge. <https://doi.org/10.1017/CBO9780511815355>
- LEE, S.-H.; HWANG, J.-T. and LEE, J. (2018): The production of a national riskscape and its fractures: nuclear power facility location policy in South Korea. In: *Erdkunde* 72 (3), 185–195. <https://doi.org/10.3112/erdkunde.2018.02.07>

- LUHMANN, N. (1991): *Soziologie des Risikos*. Berlin, New York.
- (1993): *Risk*. London.
- LUNDGREN, M. (2017): Riskscape: strategies and practices along the Georgian–Abkhazian boundary line and inside Abkhazia. In: *Journal of Borderlands Studies*. <https://doi.org/10.1080/08865655.2017.1300778>
- LUPTON, D. (1993): Risk as moral danger: the social and political functions of risk discourse in public health. In: *International Journal of Health Services* 23 (3), 425–435. <https://doi.org/10.2190/16AY-E2GC-DFLD-51X2>
- (1999): *Risk*. London.
- MAHMOUD, O. (2017): The temporal dimension of risk. In: *Journal of Risk* 19 (3), 57–83.
- MARSTON, S. A.; JONES, J. P. and WOODWARD, K. (2005): Human geography without scale. In: *Transactions of the Institute of British Geographers* 30 (4), 416–432. <https://doi.org/10.1111/j.1475-5661.2005.00180.x>
- MASSEY, D. (1993): Power-geometry and a progressive sense of place. In: BIRD, J.; CURTIS, B.; PUTNAM, T.; ROBERTSON, G. and TICKNER, L. (eds.): *Mapping the futures. Local cultures, global change*. London, 59–69.
- (1994): *Space, place, and gender*. Minneapolis.
- (2005): *For space*. London.
- McFARLANE, C. (2011): The city as assemblage: dwelling and urban space. In: *Environment and Planning D: Society and Space* 29, 649–671. <https://doi.org/10.1068/d4710>
- MIEWALD, C. and McCANN, E. (2014): Foodscapes and the geographies of poverty: Sustenance, strategy, and politics in an urban neighborhood. In: *Antipode* 46 (2), 537–556. <https://doi.org/10.1111/anti.12057>
- MORELLO-FROSCH, R.; PASTOR, M. and SADD, J. (2001): Environmental justice and southern California’s “riskscape”: the distribution of air toxics exposures and health risks among diverse communities. In: *Urban Affairs Review* 36, 551–578. <https://doi.org/10.1177/10780870122184993>
- MÜLLER-MAHN, D. and EVERETS, J. (2013): Riskscape: the spatial dimensions of risk. In: MÜLLER-MAHN, D. (ed.): *The spatial dimension of risk. How geography shapes the emergence of riskscape*. London, 22–36.
- MUSTAFA, D. (2005): The production of an urban hazard-scape in Pakistan modernity, vulnerability, and the range of choice. In: *Annals of the Association of American Geographers* 95 (3), 566–586. <https://doi.org/10.1111/j.1467-8306.2005.00475.x>
- NEISSER, F. (2014): ‘Riskscape’ and risk management – Review and synthesis of an actor-network theory approach. In: *Risk Management* 16 (2), 88–120. <https://doi.org/10.1057/rm.2014.5>
- NEISSER, F. and RUNKEL, S. (2017): The future is now! Extrapolated riskscape, anticipatory action and the management of potential emergencies. In: *Geoforum* 82, 170–179. <https://doi.org/10.1016/j.geoforum.2017.04.008>
- NICCOLINI, D. (2017): Is small the only beautiful? Making sense of ‘large phenomena’ from a practice-based perspective. In: HUI, A.; SCHATZKI, T. and SHOVE, E. (eds.): *The nexus of practices: connections, constellations, practitioners*. London, New York, 98–113.
- NOVEMBER, V. (2008): Commentary. Spatiality of risk. In: *Environment and Planning A* 40, 1523–1527. <https://doi.org/10.1068/a4194>
- NOVEMBER, V.; CAMACHO-HÜBNER, E. and LATOUR, B. (2010): Entering a risky territory: space in the age of digital navigation. In: *Environment and Planning D: Society and Space* 28, 581–599. <https://doi.org/10.1068/d10409>
- OWUSU-DAAKU, K. and DIKO, S. K. (2017): The sea defense project in the Ada East District and its implications for climate change policy implementation in Ghana’s peri-urban areas. In: The Wilson Center (ed.): *Urban perspectives: climate change, migration, planning and financing*. Washington, 28–49.
- PARSIZADEH, F.; IBRION, M.; MOKHTARI, M.; LEIN, H. and NADIM, F. (2015): Bam 2003 earthquake disaster: on the earthquake risk perception, resilience and earthquake culture - cultural beliefs and cultural landscape of Qanats, gardens of Khorma trees and Argh-e Bam. In: *International Journal of Disaster Risk Reduction* 14, 457–469. <https://doi.org/10.1016/j.ijdrr.2015.09.011>
- PETERSEN, K. L. (2012): Risk analysis - a field within security studies? In: *European Journal of International Relations* 18 (4), 693–717. <https://doi.org/10.1177/1354066111409770>
- RECKWITZ, A. (2002): Toward a theory of social practices. A development in culturalist theorizing. In: *European Journal of Social Theory* 5 (2), 243–263. <https://doi.org/10.1177/13684310222225432>
- RENN, O. (1992): Concepts of risk: a classification. In: KRIMSKY, S. and GOLDING, D. (eds.): *Social theories of risk*. London, 53–79.
- RENN, O. and KLINKE, A. (2013): Space matters! Impacts for risk governance. In: MÜLLER-MAHN, D. (ed.): *The spatial dimension of risk. How geography shapes the emergence of riskscape*. London, 1–21.
- RIEDEL, F. and RUNKEL, S. (2015): Understanding churchscapes: theology, geography and music of the Closed Brethren in Germany. In: BRUNN, S. D. (ed.): *The changing world religion map. Sacred places, identities, practices, and politics*. Vol 4. Dordrecht, 2753–2782.
- PINK, S. and SALAZAR, J. F. (2017): Anthropologies and futures: setting the agenda. In: SALAZAR, J. F.; PINK, S.; IRVING, A. and SJÖBERG, J. (eds.): *Anthropologies and futures. Researching emerging and uncertain worlds*. London, Oxford, New York, New Delhi, Sydney, 3–22.
- SCHATZKI, T. (2002): *The site of the social: a philosophical account of the constitution of social life and change*. University Park.



- (2003): A new societist social ontology. In: *Philosophy of the Social Sciences* 33 (2), 174–202. <https://doi.org/10.1177/0048393103033002002>
- (2009): Timespace and the organization of social life. In: SHOVE, E.; TRENTMANN, F. and WILK, R. (eds.): *Time, consumption and everyday life. Practices, materiality and culture*. Oxford, New York, 35–48. <https://doi.org/10.5040/9781474215862>
- (2010): The timespace of human activity. On performance, society, and history as indeterminate teleological events. Lanham.
- (2012): A Primer on practices. In: HIGGS, J.; BARNETT, R.; BILLET, S.; HUTCHINGS, M. and TREDE, F. (eds.): *Practice-based education: Perspectives and strategies*. Rotterdam, 13–26. <https://doi.org/10.1007/978-94-6209-128-3>
- SELLERS, C. and MELLING, J. (2012): Towards a transnational industrial-hazard history: charting the circulation of workplace dangers, debates and expertise. In: *British Society for the History of Science* 45 (3), 401–424. <https://doi.org/10.1017/S0007087412000374>
- SHOVE, E.; PANTZAR, M. and WATSON, M. (2012): *The dynamics of social practice. Everyday life and how it changes*. London.
- SMITH, J. S. (1994): Soundscape. In: *Area* 26 (3), 232–240.
- STEPHAN, C. (2018, in print): *Living with floods. Social practices and transformations of flood management in Chiapas, Mexico*. PhD thesis. Stuttgart.
- SUTHERLAND, C.; SCOTT, D.; BROOKS, S. and GUY, H. (2012): Lay knowledge of risk: exploring the ‘riskscape’ of South Durban communities. In: BLOEMERTZ, L.; DOEVENSPECK, M.; MACAMO, E. and MÜLLER-MAHN, D. (eds.): *Risk and Africa. Multi-disciplinary empirical approaches*. Beiträge zur Afrikaforschung 51. Berlin, 47–83.
- TIRONI, M. and CALVILLO, N. (2016): Water and air. Territories, tactics, and the elemental textility of urban cosmopolitics. In: BLOK, A. and FARIAS, I. (eds.): *Urban cosmopolitics. Agencements, assemblies, atmospheres*. London, 207–224.
- URRY, J. (2016): *What is the future?* Cambridge.
- WATSON, M. (2017): Placing power in practice theory. In: HUI, A., SCHATZKI, T. and SHOVE, E. (eds.): *The nexus of practices. Connections, constellations, practitioners*. London, 169–182.
- WEHLING, P. (2014): An den Grenzen des Risikobegriffs: Das Problem des Nichtwissens. In: BOHLE, H. G.; POHL, J. and BLÜMEL, W. D. (eds.): *Risiko: Erkundungen an den Grenzen des Wissens*. Nova Acta Leopoldina N<sup>o</sup> 117 (397), 131–153.
- WEICHHART, P. and RUMPOLT, P. A. (2015): Residenzielle Multilokalität - Problemlagen und Desiderata der Forschung. In: WEICHHART, P. and RUMPOLT, P. A. (eds.): *Mobil und doppelt sesshaft. Studien zur residenziellen Multilokalität*. Wien, 11–60.
- WEICHELSENGARTNER, J. (2002): *Naturgefahren als soziale Konstruktion. Eine geographische Beobachtung der gesellschaftlichen Auseinandersetzung mit Naturrisiken*. Aachen.
- WERLEN, B. (1995): *Sozialgeographie alltäglicher Regionalisierungen Bd. 1: Zur Ontologie von Gesellschaft und Raum*. Stuttgart.
- (1997): *Sozialgeographie alltäglicher Regionalisierungen Bd. 2: Globalisierung, Region und Regionalisierung*. Stuttgart.
- WCED (World Commission on Environment and Development) (1987): *Our common future*. Oxford; New York.
- WEF (World Economic Forum) (2018): *The global risks report 2018. 13<sup>th</sup> Edition. Insight Report*. Geneva.

## Authors

Prof. Dr. Detlef Müller-Mahn  
 Dr. Christiane Stephan  
 Department of Geography  
 University of Bonn  
 Meckenheimer Allee 166  
 53115 Bonn  
 Germany  
 mueller-mahn@uni-bonn.de  
 cstefhan@uni-bonn.de

Prof. Dr. Jonathan Everts  
 Institute of Geosciences and Geography  
 Martin-Luther-Universität Halle-Wittenberg  
 Von-Seckendorff-Platz 4  
 06120 Halle (Saale)  
 Germany  
 jonathan.everts@geo.uni-halle.de