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Rendering climate change governable by risk: From probability to contingency

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In this paper, I use Foucault's concept of governmentality to investigate changes in the risk management of climate change. In an exploratory analysis of primary and secondary sources, I demonstrate that the risk construction of climate change has shifted significantly from 1988 to 2010. Risk construction has broadened, and related policies now include mitigation, adaptation and disaster preparedness. Furthermore, I demonstrate that the meaning of 'security' and the related modes of risk management have shifted over time. I show that traditional science-based risk management has been dominant in mitigation and adaptation policy. The articulation of climate change as a security issue since 2003 indicates risk management through contingency. I argue that what the Copenhagen School has studied as the 'failed securitization' of climate change and a lack of extraordinary measures to curb greenhouse gas emissions are better understood as the 'climatization' of security. The governmental rationale since 2007 has been to prepare for and manage the 'inevitable' primary and secondary impacts of unmitigated climate change.

1. Introduction

On 20 July 2011, the United Nations Security Council (UNSC) expressed in a Presidential Declaration "its concern that possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace and security" (UNSC, 2011a, p. 32). In particular, the loss of territory due to sea-level rise was considered the ultimate security threat for low-lying small island states. The UNSC session on the security implications of climate change was merely the most recent in a series of UN General Assembly and UNSC sessions on the issue since 2007. The framing of climate change as a security issue is clearly a new discursive development that has emerged since 2003, with a first peak in 2007. Of course, climate change has also been constructed as an issue of justice and equity (Roberts and Parks, 2007), mostly by non-governmental organizations, or as an issue of market rationales (Stern, 2007). In this paper, I focus on and attempt to understand the consequences of what the Copenhagen School has termed the 'securitization' of climate change for the politics of climate change and of security.

Existing research on climate change as a security issue has not been able to identify policy changes as a result of the discursive shift. The Copenhagen School has investigated if climate change has been articulated as an existential threat by political elites, if these securitizing moves have been accepted by relevant audiences, and if they have enabled extraordinary measures to address the threat (Buzan et al., 1998, pp. 21, 25; Waever, 1995). Extraordinary measures imply a political state of exception where democratic procedures may be circumvented and the law suspended. The Copenhagen School criticises successful securitization as 'failure' of the political elites to deal with an issue by 'normal' democratic politics (Waever, 1995). In the case of climate change, successful securitization could "legitimate extraordinary and costly measures that require a progressive increase in energy efficiency and a decarbonisation of the energy system by increasing renewable energy sources" (Brauch, 2009) or even "military action against polluting factories" (Trombetta, 2008, p. 599). Those who use the Copenhagen framework have concluded that the securitization of climate change (as defined above) has failed, and that there is no evidence of such extraordinary measures (Stripple, 2002; Oels, 2011; Trombetta, 2008). While those drawing on the Copenhagen School support decisive climate mitigation action, the political price paid for 'extraordinary measures' is considered too high.

From the perspective of discourse theory, Swyngedouw (2010) argues that the articulation of climate change as a climate apocalypse in public discourse is marked by populism that evacuates 'the political' from climate change debates. The threat of climate change is constructed as an aberration to an otherwise unproblematic capitalist system: "CO_2 stands here as the classic example of a fetishized and externalised foe that requires dealing with if sustainable climate futures are to be attained" (Swyngedouw 2010, p. 222). From Swyngedouw's perspective, the securitization of climate change has the primary function of producing "a socio-ecological fix to make sure nothing really changes" (Swyngedouw, 2010, p. 222).

From an environmental politics perspective, Detraz and Betsill (2009) have asked whether the current framing of climate change

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as a security issue is conducive to facilitating effective climate policy. They assume that a framing of security as *environmental security* offers a useful framework for policy making because it is concerned with the *human* security implications for the most vulnerable populations. On the other hand, an *environmental conflict* reading of climate security is rejected as problematic because it frames security more along the lines of *national* security, and potentially authorises military involvement in solving the climate change crisis. In their discourse analysis of Intergovernmental Panel on Climate Change (IPCC) reports and United Nations Framework Convention on Climate Change (UNFCCC) documents from 1995 to 2007 and the UN Security Council debate in April 2007, Detraz and Betsill conclude that the analysed documents have always read security as *environmental security*, a fact they view positively. And yet, is it true that the articulation of climate change as a security issue is neither indicative of a discursive shift, nor of a new mode of rendering climate change governable? Is the articulation of climate change as *the* primary security threat really just "the new opium for the masses" (Swyngedouw, 2010, p. 219)?

This paper offers a new reading of climate change as a security issue, drawing on the governmentality lectures of Michel Foucault. A governmentality analysis of climate change as a security issue takes into account that the meanings of 'climate change' and 'security' are products of regimes of power/knowledge which are context-specific and subject to change over time. I ask whether climate change being rendered governable as a security issue signifies the emergence of a new mode of *risk* management in the climate regime. In order to answer this question, I analyse the risk management of climate change from its very inception in the late 1980s, and compare it to today's practices. I ask if there are continuities or discontinuities in the way that climate change risk is being constructed and how it is managed. The empirical section of this paper claims that the politics of climate change have evolved as three subfields: namely mitigation, adaptation and disaster management. For each subfield, the prevalent mode of risk management is investigated. The argument put forward here is that the articulation of climate change as a security issue is indicative of what I term the 'climatization' of security (Oels, 2011) and is linked to observable policy changes in the security field. The concluding section proposes ideas for further research. The paper begins with a review of the governmentality literature, in order to develop a theoretical framework.

2. Theoretical framework: three configurations of governmentality

Foucault argues that security is neither rhetoric nor discourse but a governmentality, what he terms a biopolitical technology of *risk* management. In a governmental regime based on biopolitics, the population is rendered productive by disciplining individual bodies and by establishing regulatory controls at the level of the population (Foucault, 1998, p. 139). In contrast to sovereign power which was based on the threat of death, biopolitics aims "to foster life" (Foucault, 1998, p. 138) and to facilitate "the controlled insertion of bodies into the machinery of production" (Foucault, 1998, p. 141). The problematisation of security renders a social field governable in a certain way, and is indicative of a specific rationality (mentality) of government, which is called governmentality. For Foucault, the term *government* refers to the "conduct of conduct", and includes governing the self, the family and the state (Foucault, 1982, pp. 220–221). The term *governmentality* has been used by Foucault in three different ways (Dean, 2003, p. 116; Oels, 2005, p. 189). In this paper, I use governmentality as a general analytical concept in order to discern competing or complementary forms of governing through security, each of which carries distinct policy implications (Dean, 2003, p. 116; Bigo, 2008a; Dillon, 2004).

A governmentality analysis is neither totalizing nor homogenising: it explores the plurality and heterogeneity of ways in which an issue is rendered governable – the discourses and related practices – and changes therein over time. The term *discourse* refers to "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1997, p. 44). Rendering an issue governable as a security issue does not necessarily involve a speech act – most importantly, it requires what are called *technologies of security*: specific practices that actors engage in to produce and manage knowledge about an object as a security problem and more specifically as a risk.

In this section, three modes of rendering an issue governable as a biopolitical risk are distinguished on the basis of Foucault's work on governmentality (Foucault, 2007) and its later readings (Dillon, 2004; Dillon, 2008; Dillon and Lobo-Guerrero, 2008; Bigo, 2008a; Aradau and van Munster, 2007). I suggest distinguishing between Foucault's *traditional risk management*, Dillon's *risk management through contingency*, and Aradau and van Munster's *precautionary risk management* (see Table 1).

2.1. Traditional risk management: reducing risks to a "tolerable" level

Foucault introduces *traditional biopolitical risk management* in his lecture series on *Security, Territory, Population* (Foucault, 2007). This governmentality aims to secure the vitality and productivity of the population by providing a milieu in which the population can live, work and reproduce as a self-organising system. However, this milieu is criss-crossed by the circulation of people, goods, money, information, diseases, etc. The task of governmental reason is "organising circulation, eliminating its dangerous elements, making a division between good and bad circulation, and maximising the good circulation by diminishing the bad" (Foucault, 2007, p. 18). However, bad circulation is not to be eliminated, but reduced to a 'tolerable' level, in line with economic cost–benefit calculations. Science plays an important role in identifying and legitimating a 'tolerable' level of risk. The remaining risk is then spread by technologies like collective insurance or compensation schemes (Aradau and van Munster, 2007, p. 103, 107). *Traditional risk management* assumes that risks can be known, calculated and controlled on the basis of scientific probability calculations (Aradau and van Munster, 2007, p. 107). One technology of risk reduction is the targeting of risk groups. By comparing the specific risk of mortality of a particular population subset with the average risk of mortality, it is possible to identify 'dangerous' groups that are particularly vulnerable. Governmental interventions are then prioritised to these dangerous groups in order to "bring the most unfavourable [distributions of normality] in line with the more favourable" (Foucault, 2007, p. 63). Under this governmentality, a risk is acceptable so long as it can be repaired (at least in theory) (Aradau and van Munster, 2007, p. 103).

2.2. Risk management through contingency: building resilience to shocks

Dillon and Lobo-Guerrero (2008) have suggested that "life" – as the referent object of biopolitical security practices – has undergone substantial changes in the 25 years since Foucault's death: first, demographic changes in the population as a result of advances in health and medicine; second, the molecularisation of life; and third, the digitalisation of information (Dillon and Lobo-Guerrero, 2008, p. 269). As a result, life is today understood as "a matter

Table 1
Security as a range of governmentalities: three modes of risk management (my table) *Sources*: Foucault, 1998; Dillon, 2004; Dillon, 2008; Dillon and Lobo-Guerrero, 2008; Bigo, 2008a; Aradau and van Munster, 2007.

	Traditional risk management based on prediction	Risk management through contingency	Precautionary risk management: drastic pre-emption
Rationality employed	Reduce risks to a 'tolerable level' defined by science and technology	Mobilise and empower people to adapt to radical contingency	Prevent the risk at all costs, even in the absence of scientific evidence
		Target governmental interventions on those unfit to adapt	
Risk groups	Social groups whose risk (of mortality/harm) is higher than statistically average	Those unfit to adapt (the vulnerable), and/or those at the verge of becoming 'dangerous' to others in the future	Everybody could become dangerous in the future, cannot be easily detected, a matter of administrative decision
Technologies	Risk identification by science	Responsibilises the governed to minimise the potential risk (new prudentialism)	Zero risk
	Risk reduction to a 'tolerable'/ 'safe' level	Unlimited surveillance, data-mining	Worst-case scenario
	Risk spreading to re-insurers and the state	Risk transfer to capital markets	Burden of proof shifted to suspects
	Risk groups are targeted to bring their risk down towards the average	Capacity building to create resilient communities	Precautionary principle
		Ban those on the verge of becoming 'dangerous' to others	Unlimited surveillance, data-mining Mobilise all possible technologies of prevention: war, shoot-to-kill De-judicialisation of the 'dangerous'
Risk representation	Risk represented as knowable, calculable and controllable	A risk to live with	A risk to be avoided at any cost
	Uncertainty is managed by more research and better technologies	Risk represented as uncertain, unpredictable and inevitable	Risk represented as 'incalculable', unpredictable and – if it strikes – irreversible and catastrophic
		Uncertainty is dealt with by preparedness and resilience	
Relationship science–politics–the governed	Science represented as conclusive and authoritative	Scientific knowledge is represented as contingent, inconclusive and unreliable; yet it provides an imaginary of expectation	The link with science is loosened, decisions are allowed to become arbitrary and at times authoritarian
	Political decisions are represented as grounded in the certainties of science	Politics is represented as taking decisions under conditions of uncertainty/ at the limit of science	

of continuous mobile recomposition'' (Dillon and Lobo-Guerrero, 2008, p. 289). Life is now viewed as being characterised by circulation, connectivity, complexity and contingency (Dillon, 2008, pp. 312–313), and as ''bodies-in-formation'' (Dillon, 2004, p. 83). Securing species existence – the project of biopolitical security – therefore requires governmental strategies that enhance life's ''capacity for adaptive emergence'' (Dillon, 2008, p. 315). Survival depends on ''the capacity to pass out of phase with oneself and become something that one was once not'' (Dillon, 2008, p. 328). The emphasis of security practices is here said to have shifted from protection to regeneration, and from preservation to transformation (Dillon and Lobo-Guerrero, 2008, p. 288). This life that is to be secured must be mobilised in order to participate in the ''engendering and unleashing of its own emergent potential'' (Dillon, 2008, p. 314).

This type of risk management secures through contingency, providing technologies for its navigation (Dillon, 2008, p. 321). Financial markets attach a price to a particular exposure to contingency, thereby making it transferable and tradable (Dillon, 2008, p. 321). A bet is taken on the future, investors speculate and accept certain gains or losses as the result of potential outcomes in the future: they ''underwrite security'' (Dillon, 2008, p. 320). The price attached to a risk is driven by virtuality – the political imagination of expectation – thereby rendering the actuality of the event secondary (Dillon, 2008, p. 314).

As the occurrence of potentially catastrophic events is considered inevitable, *preparedness* is a complementary strategy to reduce the impact (Collier and Lakoff, 2008). Preparedness is achieved by building resilience, i.e. enhancing a system's ability to cope with unexpected shocks in such a way as to avoid catastrophic failure (Walker and Cooper, 2011, p. 153–154; Lentzos and Rose, 2009, p. 243). Resilience strives to ''devise systems that can absorb and accommodate future events in whatever unexpected form they may take'' (Holling, 1973, p. 21). Simulations and exercises may reveal where the system is currently most vulnerable and where building up new capabilities is most needed.

2.3. Precautionary risk management: avoiding catastrophic futures

Precautionary risk management addresses risks which are marked by ''a context of scientific uncertainty on the one hand and the possibility of serious and irreversible damage on the other'' (Ewald, 2002, p. 282). *Precautionary risk management* involves ''policies that *actively* seek to prevent situations from becoming catastrophic at some indefinite point in the future'' (Aradau and van Munster, 2007, p. 105). Scientific knowledge production is applied to detect signs of dangerous irruptions before they occur, leading to the creation of early warning systems. However, non-scientific ways of dealing with the 'unknown unknowns' complement and sometimes replace scientific knowledge (Aradau and van Munster, 2011). One form of knowledge production incited by *precautionary risk management* is scenario planning (de Goede and Randalls, 2009). Scenario planning ''is a process of positing several informed, plausible and imagined alternative future environments in which decisions about the future may be played out, for the purpose of changing current thinking, improving decision making, enhancing human and organisation learning and improving performance'' (Schwartz, 1991, p. 4; Chermack et al., 2007, p. 381). These possible futures include extreme cases like worst-case scenarios. On the basis of these scenarios, measures are developed to reduce vulnerability (Aradau and van Munster, 2011, p. 57). The aim of precautionary risk management is to pre-empt potentially catastrophic risk. It could therefore involve drastic preventative measures, including shoot-to-kill, pre-emptive strikes and war (Aradau and van Munster, 2007, p. 105). However, these technologies of risk management rarely succeed in pre-empting catastrophe. Aradau and van Munster conclude ''their failure is, however, part of governmentality, the very motor of the continuous requirement for new technologies and more knowledge'' (Aradau and van Munster, 2007, p. 108).

2.4. The promise of the Foucaultian framework for the analysis of climate change

There is a lively debate on the opportunities and limitations of governmentality as analytical framework in the International Relations literature (Selby, 2007; Joseph, 2009, 2010a–c). Contributing to this debate, Methmann (2011b) has clarified the analytical strength of the governmentality concept for the issue of climate change. Under the label of 'green governmentality', Timothy Luke (1999) investigated environmentalism as a form of biopower extended to the entire planet. Arun Agrawal (2005) analysed how environmentally responsible behaviour is fostered at the individual level through technologies of power and self, which he describes as 'environmentality'. More recently, the governmentality framework has been frequently applied to environmental issues (Rutherford, 2007), and to the issue of climate change (Bäckstrand and Lövbrand, 2006; Lövbrand and Stripple, 2006; Lövbrand and Stripple, 2011; Methmann, 2010; Oels, 2005, 2011; Okereke et al., 2009; Paterson and Stripple, 2010), giving rise to a new and expanding area of research dubbed *climate governmentality studies* (Rothe, 2011). This paper presents a novel account insofar as it applies the notion of security as governmentality to the issue of climate change.

Three research questions arise on the basis of the three governmentalities introduced above. *First*, the governmentalities differ in the role each allocates to science. While *traditional risk management* represents risks as knowable, calculable and therefore controllable, Dillon's *risk management through contingency* and Aradau and van Munster's *precautionary risk management* portray scientific knowledge as unreliable, and discuss political decision-making at the limits of science. Regarding the issue of climate change, it is important to consider the extent to which risk is represented as knowable and calculable by science, and the role science plays in political decision-making. *Second*, in contrast to 'old' *traditional risk management*, *risk management through contingency* does not identify tolerable levels of risk. Risk reduction strategies under *risk management through contingency* enhance a system's capacity to cope with *any kind* of changes. 'Safe' levels of exposure to any particular risk are thought to be impossible to determine in an era of radical contingency. With regards to climate change, it will be important to analyse whether global strategies of *traditional risk management* (steering spaceship Earth) and/or bottom-up strategies of enhancing coping capacities prevail. *Third*, analysis must determine whether climate change is constructed as a risk that we have to live with and adapt to (*risk management by contingency*), a risk that requires global management to be kept at a tolerable level (*traditional risk management*) or as a catastrophic risk that must be avoided at all costs (*precautionary risk management*). The following sections will explore which of the governmentalities were involved in rendering climate change governable at the level of international climate policy over the last 20 years.

3. Foucaultian discourse analysis as methodological basis

Dean has suggested a widely used framework for analysing and comparing different types of governmentality (Dean, 2003, pp. 30–33). Dean proposed studying what are termed 'regimes of practices' by analysing (i) the field of visibility which is created by a governmentality, (ii) the technologies and practices of government which are applied, (iii) the forms of knowledge which arise from and inform the activity of governing and (iv) the forms of identity which are presupposed by the practices of government. Most empirical research under the governmentality framework draws on Foucaultian discourse analysis in order to investigate the 'regimes of practices' (Rothe, 2011, p. 3). A Foucaultian discourse analysis assumes that there are always multiple discourses present at any point in time, and maps changes in the distribution patterns of discursive elements over time (Foucault, 1998, pp. 97–102).

The governmentality analysis performed for this paper draws on Dean's analytical categories and uses Foucaultian discourse analysis. I map changes in the modes of risk construction of climate change over the last 20 years. While the dominant mode of risk management has been constantly contested (for example Bäckstrand and Lövbrand, 2006, pp. 64–66), the focus of this paper is limited to the programmatic level of policy-making. The empirical analysis examines major international publications in the realms of climate change science and politics (Appendix A).

In my exploratory analysis of the risk construction of climate change over the last 20 years, I distinguish between three sub-fields in the larger field of climate change: (i) mitigation (Section 4), (ii) adaptation (Section 5) and (iii) security (Section 6). An overview of these three sub-fields and the related governmentalities is provided in Table 2. It is important to keep in mind that mitigation has not been replaced by adaptation or security concerns. Instead, the sub-fields of adaptation and security emerge *alongside* mitigation. As a consequence of this, the risk construction of climate change has become more complex over time, adding new sub-fields and reconfiguring existing fields in that process.

4. Climate change as a problem of excessive greenhouse gas emissions: mitigation action by industrialized countries required

From 1988 onwards, the problem of climate change has been constructed as a risk caused by excessive human greenhouse gas emissions that requires humanity to reduce emissions to a tolerable level that science is to define. I argue in this section that the aim of avoiding 'dangerous' levels of climate change is related to *traditional risk management*. While the UNFCCC actually succeeded to some extent in stabilizing the absolute emissions of the industrialized countries (at levels which are too high to avoid dangerous climate change), rising emissions from China, India and other developing countries meant that global greenhouse gas emissions reached record levels in 2008 and 2010.

4.1. Knowledge base: climate change as a future problem caused by excessive greenhouse gas emissions

In 1988, the IPCC was charged with defining the problem of climate change, clarifying if climate change was real and already happening (*detection* of a climate change signal) and determining whether it was caused by human activity (*attribution*). In its first report, which was presented in 1990, the IPCC defined climate change very broadly as "any change in climate over time whether due to natural variability or as a result of human activity" (IPCC, 2004, p. 4). Global climate models became the standardised method of constructing climate change as a global problem, thereby marginalising alternative approaches. The natural sciences produced climate change as a biophysical phenomenon of greenhouse gas emissions. The social sciences were attached to this problem construction "virtually as an appendage" (Cohen et al., 1998, p. 341). As a result, "strategies to reduce greenhouse gas emissions are designed and assessed in a narrow technical context, divorced from the economic and social forces that underlie them" (Cohen et al., 1998, p. 341).

In 1995, the team working on the Second Assessment Report (SAR) of the IPCC claimed that for the first time they had been able to prove "a discernible human influence on [the] global climate" (IPCC SPM WG1, 1996, p. 5). The SAR concluded that "risk aversion and the precautionary approach, provide rationales for [mitigation] actions beyond 'no-regrets'" (IPCC SPM WG1, 1996, p. 17). The SAR institutionalised a "dichotomy" between mitigation "to tackle the causes of climate change" and adaptation "to deal with the consequences of climate change" (Tompkins and Adger, 2005, p. 563). Adaptation became conceptualised as an "end-of-pipe solution to the climate change problem", and it was argued that "raising adaptation options in policy circles reduces the requirement for mitigation" (Tompkins and Adger, 2005, p. 563). As a result, adaptation remained marginalised. Developing countries argued that climate change was a problem of overconsumption and wasteful lifestyles of industrialised countries, however their voices were not heard (Beck, 2009, p. 169).

Table 2
The types of risk management prevalent in mitigation, adaptation and conflict prevention. *Source*: personal research.

	Mitigation (since 1992–ongoing)	Adaptation (since 2001–ongoing)	Conflict prevention (since 2003–ongoing)
The risk(s)	'Dangerous' levels of global climate change	Inevitable levels of regional climate change impacts	Destabilization of the (political) order in case of unmediated climate change
Strategy	Managing greenhouse gas emissions: Keeping climate change at a tolerable level	Managing primary climate change impacts: Reducing climate change impacts to a tolerable level	Managing the secondary climate change impacts like resource scarcity and mass displacement
Traditional risk management based on science	*International climate policy*: Keeping climate change at a tolerable level as calculated by science	*National climate policy*: National adaptation plan of action identifies vulnerable sectors, regions and people Project design based on projected climate change impacts (where available) Build resilient economic sectors and infrastructures (DOMINANT PARADIGM)	No evidence
Risk management through contingency	No evidence	Enhance the capacity to cope with current weather variability, build resilient communities, capital market speculation (MARGINALISED PARADIGM)	'Climatisation' of the *transnational field of professionals of (in)security:* Enhancing disaster preparedness in the defence sector, preventing migration and conflict by building resilient communities and offering finance for sustainable development
Precautionary risk management	No evidence	No evidence	No evidence

4.2. Politics: keeping greenhouse gas emissions at a tolerable level

The nature of the problem definition provided by the IPCC strongly influenced the heuristic framework for policy responses in the realm of mitigation and adaptation (Beck, 2009, p. 184). Political negotiations on the basis of the first IPCC report from 1990 led to the adoption of the UN Framework Convention on Climate Change (UNFCCC) at the Rio Earth Summit in 1992. The UNFCCC defines climate change more narrowly than the IPCC as

> "a change of climate that is attributed directly or indirectly to human activity, that alters the composition of the global atmosphere, and that is in addition to natural climate variability over comparable time periods" (UNFCCC Article 1).

The UNFCCC does not aim to halt global warming. Instead, it tolerates climate change as long as it does not exceed the 'natural' adaptive capacity of the natural and economic systems. Article 2 of the UNFCCC defines as the objective of the convention the

> "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner." (UNFCCC Article 2)

This implies that 'dangerous' levels of climate change must be avoided, namely those exceeding the adaptive capacity of ecosystems and the economy. In its first and second assessment reports, the IPCC has refrained from quantifying "dangerous anthropogenic interference" with the climate system, and has argued that this is a value-laden decision better left to politicians (Beck, 2009, p. 170). However, politics has continued to delegate this question back to the IPCC, thereby "short-circuiting" science and politics in such a way that scientific facts (matters of fact) are elevated directly onto the political terrain as matters of concern (Swyngedouw, 2010, p. 217). Under the UNFCCC, industrialised countries agreed upon non-binding stabilisation targets for their greenhouse gas emissions (on 1990 levels).

Under the Kyoto Protocol adopted in 1997, which entered into force in 2006, participating industrialised countries committed to a joint reduction of their greenhouse gas emissions by 5.2% below 1990 levels by 2008–2012. The so-called flexible mechanisms of the Kyoto Protocol allow industrialised countries to avoid domestic emission reductions by realising certified emission reductions in developing countries (Clean Development Mechanism) or in other industrialised countries (Joint Implementation) or by buying certificates in emissions trading. In December 2010, the UNFCCC adopted the *Cancún Agreements* (UNFCCC, 2010) which state that the average global temperature must not rise more than 2 °C above pre-industrial levels in order to prevent 'dangerous' levels of climate change. However, the attempt to translate this into legally binding emission reduction targets failed in Cancún. Instead, emission reductions are to be achieved through voluntary mitigation pledges which developed countries committed to at their own discretion when signing onto the non-binding *Copenhagen Accord* (UNFCCC, 2009a,b). Developing countries agreed for the first time to self-defined mitigation actions under the *Cancún Agreements* (UNFCCC, 2010).

4.3. Risk management: traditional risk management

The problem behind climate change is not therefore greenhouse gas emissions in themselves (or the lifestyles, capitalist economy, or fossil fuels producing them), but only the tiny fraction of emissions defined as excess ("less of the same") (Swyngedouw, 2010, p. 222). The aim of the UNFCCC is in line with *traditional risk management*. Good circulation is to be maximised, while bad circulation is to be reduced to a 'tolerable' level (but not completely eliminated), in line with economic cost–benefit calculations (Adger et al., 2001, p. 698). The academic discipline of economics enjoys a privileged role in assessing and quantifying projected gains and losses attributed to various levels of greenhouse gas concentrations in the atmosphere, thereby allowing the identification of a 'tolerable' level of climate change. This implies that emission reductions *below* the 'tolerable' level – as advanced by environmental activists – must be considered inappropriate because they are conceived as inflicting undue costs on the economic system (Lutes, 1998, pp. 165–167). In 2006, the economic rationale for mitigation action was considerably strengthened by Sir Nicolas Stern's Report to the UK Prime Minister. The UK Prime Minister's Special Advisor argued that from that point on, 1% of GDP must be invested every year in reducing greenhouse gas emissions, in order to prevent GDP losses of at least 5% (and up to 20%) in the future (Stern, 2007).

The UNFCCC established a framework for *traditional risk management* in which close collaboration with the IPCC was required in defining the problem and designing policy responses. In collaboration with the OECD, the IPCC designed a conceptual framework and methodology for calculating annual greenhouse gas emissions and sinks at a national scale (greenhouse gas inventories). Thereby, a baseline for imposing and implementing emission reduction targets was established (Oels, 2005, p. 200). Developing country delegates argued that emission inventories should take into account historic emissions over the last 200 years, and should calculate current emission levels in per-capita terms, not in absolute terms. However, these views were not seriously considered. Future agreements may be speeded up once a satellite infrastructure for independent concentration monitoring of national emissions is in orbit (Lövbrand and Stripple, 2009, p. 19). I conclude that *traditional risk management* renders climate change governable as a risk caused by excessive greenhouse gas emissions.

The flexible mechanisms of the Kyoto Protocol facilitate the enrolment of CO2 as a commodity in the processes of market exchange and capital accumulation (Liverman, 2009). Under the Kyoto Protocol, *traditional risk management* is combined with a market-based governmentality that Mitchell Dean has called *advanced liberal government* (Dean, 2003, chapter 8; Oels, 2005). The main feature of *advanced liberal government* is that it avoids direct regulation and instead "governs at a distance" by using markets, technologies of agency (i.e. participation) and technologies of performance (i.e. rankings) (Oels, 2005). However, these advanced liberal technologies of government remain embedded in and draw on biopolitical accounting and surveillance systems and practices of risk assessment (Rothe, 2007, p. 108; Bäckstrand and Lövbrand, 2006).

Regarding the implementation of mitigation policies, the success of the current risk management regime is modest. According to International Energy Agency calculations, Annex I parties to the UNFCCC met the emission stabilisation target set out in the UNFCCC for the first time in 2008 (IEA, 2010, p. 7). However, if one excludes the Eastern European and former Soviet countries (but not Russia) and considers only Annex II countries, CO_2 emissions were actually 12% above 1990s levels (IEA, 2010, p. 7). While the European Union countries are on track to meet their Kyoto Protocol reduction targets (EEA, 2011), other countries are not. Moreover, important emitters like the United States have never ratified the Kyoto Protocol. At the same time, CO2 emissions from non-Annex I countries (developing countries) – led by China and India – surpassed those of the Annex I countries for the first time in 2008 (IEA, 2010, p. 7). According to IEA, energy-related carbon dioxide (CO2) emissions in 2010 were 30.6 Gigatonnes (GT), the highest in history, jumping up 5% from the previous record year in 2008 (IEA, 2011).

5. Climate change as already happening: adaptation for "vulnerable" populations

The discourse on adaptation has its origins in the early 1980s, but did not become policy until the IPCC's Third Assessment Report in 2001. In this section, I argue that the risk of climate change impacts is rendered governable by *traditional risk management* which is about containing climate-induced damages to a tolerable level. Moreover, some adaptation policies are guided by *risk management through contingency*, the aim of which is to enhance local communities' capacity for adaptive emergence in the face of current and future climate variability.

5.1. Knowledge base: climate change is here, projections for regional impacts are available

The shift of policy attention from mitigation to adaptation and the new positive connotation of adaptation are closely linked to a shift in the risk construction of climate change advanced in the 2001 Third Assessment Report (TAR) of the IPCC. The TAR claims that climate change has already arrived: "The Earth's climate system has demonstrably changed on both global and regional scales since the pre-industrial era, with some of these changes attributable to human activities." (IPCC Synthesis SPM, 2001, p. 4) According to the TAR, it is *very likely* that the global mean surface temperature has increased by 0.6 °C over the 20th century and global mean sea level has increased at an average annual rate of 1–2 mm during the 20th century (IPCC Synthesis SPM, 2001, pp. 5–6). For the first time, the IPCC's TAR presents detailed regional climate impact scenarios for all world regions and outlines some adaptation policy options. The TAR argues that "[a]daptation is a necessary strategy at all scales to complement climate change mitigation efforts." (IPCC Synthesis SPM, 2001, p. 23). The TAR notes that mitigation alone will "neither prevent climate change or sea level rise nor altogether prevent their impacts" (IPCC Synthesis SPM, 2001, p. 23). Mitigation and adaptation are now conceptualised as complementing each other "in a cost-effective strategy to reduce climate change risks; together they can contribute to sustainable development objectives" (IPCC Synthesis SPM, 2001, p. 32). As a result of the TAR, policy attention shifted towards adaptation to 'inevitable' levels of climate change.

Silke Beck (2009) has argued that the privileged role of the IPCC in guiding adaptation policymaking might be diminishing because the global models of IPCC science are ill-equipped to deliver regional and local level assessments upon which adaptation policy can be based. This view is confirmed by the 2009 Report of the UN Secretary-General which expresses frustration with the IPCC and calls for a new research programme to support "the implementation of national adaptation programmes of action" and to address the related "research and systematic observation needs" at the national scale (UNGA, 2009, p. 26).

5.2. Politics: forging subjects of adaptation by advanced liberal government

For a long time, little has happened at the international level to support adaptation in developing countries. In the past, three funds administered by the Global Environment Facility (GEF) provided financial support for adaptation policy. The *UNFCCC Least Developed Countries Fund* provided incentives to least developed countries to report about themselves as subjects in need of adaptation to climate change impacts. As a result, 41 National Adaptation Plans of Action (NAPAs) were completed under this fund and thirty-two more were being prepared in 2009 (GEF, 2009a,b). Furthermore, the GEF provided co-funding for concrete adaptation pilot projects in developing countries, on the condition that international organisations like UNDP, UNEP and World Bank act as project leaders (GEF, 2009a, p. 9). According to the GEF, a total of 24 pilot adaptation projects had been financed under *GEF Trust Fund Strategic Priority on Adaptation* (from 2003 to 2008), and 21 adaptation projects had been approved under the *UNFCCC Special Climate Change Fund* by 2009 (GEF 2009a,b). This funding framework has been driven by a governmentality of *advanced liberal government* (Rothe, 2007, pp. 109–114). Advanced liberal government 'responsibilises' actors to adapt, and seeks to change subjectivities so that actors recognise that enhancing their adaptive capacity to climate change is in their own best interest. However, developing countries will not be able to pursue adaptation policies on a larger scale without substantial international support. "The UNFCCC has estimated that by 2030 poor countries would need between US$ 28 billion and US$ 59 billion a year to adapt; the World Bank thinks between US$ 20 billion and US$ 100 billion should do it; the European Union Commission put the amount between US$10 billion and US$ 24 billion a year by 2020, and the African Group of climate change negotiators arrived at a sum of more than US$ 67 billion a year by then" (IRIN, 2010). One of the future sources of international finance, the Kyoto Protocol Adaptation Fund, is about to become operational. This fund is entitled to a 2% share in the proceeds from the Clean Development Mechanism project activities. The World Bank estimates that this mechanism will raise between US$ 300 million and US$ 600 million by 2012 (IRIN, 2010). In the *Cancún Agreements* adopted in December 2010, developed countries promised to raise US$ 30 billion from 2010 to 2012 and to "mobilise" US$ 100 billion a year by 2020 for *mitigation and* adaptation measures in developing countries (UNFCCC, 2010). If such sums were actually raised "it would represent a radical reallocation of the global aid budget, which was $103 billion in 2006" (Brown et al., 2007, p. 1152).

5.3. Risk management: two competing types of risk management inform adaptation projects

The development of specific adaptation projects has been informed by two co-existing governmentalities: the dominant *traditional risk management* and the marginalised *risk management through contingency*. Similarly, Karen O'Brien and colleagues have distinguished a "scientific framing" from what they call a "human security framing" (O'Brien et al., 2007). While the *scientific framing* assumes probability as the basis for risk management, the *human security* framing enhances preparedness for irresolvable uncertainty (Oppermann, 2011).

The *traditional risk management* of climate change has been promoted by the IPCC, and is institutionalised in global climate change research programmes and in decisions taken by the international climate regime (O'Brien et al., 2007, p. 85). In *traditional risk management*, vulnerability is defined as the outcome of projected future regional climatic changes and conceived of in terms of expected damage costs. In its Second Assessment Report of 2001, the IPCC defined vulnerability as

"the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity" (IPCC SPM, 2001, p. 6)[1]

[1] Adger et al. have argued that the term "sensitivity" in this definition means something equivalent to social or inherent vulnerability, therefore opening the door to a less biophysical understanding of vulnerability (Adger et al., 2004, p. 31).

The identification of 'vulnerable' regions, ecosystems, economic sectors and populations is based on downscaled computer models that allow projections of likely future climate change impacts. On maps, 'climate hot-spots' or 'most vulnerable' regions are marked as 'dangerous' (see for example German Advisory Council on Global Change, 2007). Quantification of expected losses in economic terms is used as a tool for prioritising governmental interventions (O'Brien et al., 2007, p. 80). Adaptation policy aims to secure economic growth by targeting particularly vulnerable economic sectors with technological innovation and social engineering. Sustainable development is redefined as 'climate-proofing' economic development. Adaptive capacity is defined by the IPCC as "the degree to which adjustments in practices, processes, or structures can moderate or offset the potential for damage or take advantage of opportunities created by a given change in climate" (IPCC WG II, 2001, Section 1.4.1). Fitness for survival is thought to depend on resilient sectoral infrastructures like irrigation systems, dykes or new crop types. Because adaptation measures under the *traditional science-based risk management* rely on downscaled, region-specific climate and impacts data, the lack of such data constitutes a major impediment to adaptation policy development and implementation, as political negotiators noted in a recent report on progress in adaptation policy (UNFCCC SBSTA, 2009, p. 17). Under *traditional risk management*, uncertainty is understood in terms of a lack of data, resulting in a will to knowledge that leads to more and better surveillance infrastructure. The vast majority of adaptation projects in developing countries that have been financed by the Global Environment Facility (GEF) and implemented by UNDP, UNEP, World Bank and regional development banks between 2003 and 2009 imply *traditional risk management*. Examples of funded projects in this tradition are the distribution of seasonal weather forecasts to local people in Nigeria (GEF, 2009a, p. 15) and the installation of early warning systems for glacial flash floods and related disaster reduction plans in Bhutan (GEF, 2009a, p. 17).

The main research interest driving those committed to the marginalised *risk management through contingency* approach is investigating "why some regions and social groups are more vulnerable than others" (O'Brien et al., 2007, p. 79) and which factors prevent coping and constrain local responses (O'Brien et al., 2007, p. 80). The main assumption is that reduced access to entitlements is the main cause of vulnerability to environmental change, including weather variability and future climate change. *Risk management through contingency* defines vulnerability from a political economy perspective as a

> "multi-layered and multi-dimensional social space defined by the determinate political, economic and institutional capabilities of people in specific places at specific times" (Watts and Bohle, 1993, p. 43).

Uncertainty is understood as the inherent eventfulness of life, which is thought to escape rational probability calculations. Fitness to survive comes from enhancing coping capacity to present changes (O'Brien et al., 2007, p. 80). The resulting adaptation policies would be of a social nature, feature empowerment of the vulnerable (Hewitt, 1997, p. 153) and would "include poverty reduction, diversification of livelihoods, protection of common property resources, and strengthening of collective action" (O'Brien et al., 2007, p. 80). O'Brien et al. argue that "[t]his approach allows for adaptation to uncertainty, which has been increasingly identified as a distinguishing characteristic of environmental change and policy" (O'Brien et al., 2007, p. 84). *Risk management through contingency* does not limit adaptation measures to predicted impacts of climate change, but seeks to enhance the capacity for adaptive emergence in the face of radical contingency, especially for currently disadvantaged subgroups of the population. The most vulnerable of a population are marked out for targeted governmental intervention to enhance their coping capacity. Sustainable development is redefined as resilience of communities to change.

In this section, I have introduced two competing framings of risk management that have been used to identify 'vulnerable' regions, sectors and populations and to structure adaptation action. The dominant *traditional risk management* develops strategies for climate-proofing economic development. The marginalised *risk management through contingency* strives for empowerment and more equal access to entitlements in the present.

Regarding implementation, it is important to state that the amount of funding provided by the industrialised countries to developing countries for adaptation projects so far remains symbolic compared with estimates of adaptation needs. By June 2009, a total sum of US$ 352.5 million has been raised for adaptation projects in the form of voluntary pledges by industrialised countries and 1.38 billion in co-financing (GEF, 2009a; GEF, 2009b). However, after the Cancún summit in December 2010, some countries like Australia actually started to deliver their fast-track money for the period 2010–2012 quite rapidly. I conclude that the implementation of adaptation policy has so far remained in the realm of pilot projects and that large scale adaptation is yet to begin.

6. Climate change as a security issue: enhancing preparedness for the impacts of unmitigated climate change

The assumed failure in meeting the +2 °C target is the starting point for a risk construction of climate change as a security issue, which has emerged since 2003 and became widespread in 2007. Given current emission pathways, the scenario of a +3–4 °C world is much more likely, and even a temperature increase of 5–7 °C cannot be ruled out. The security community has begun addressing climate change as a 'hard' security issue, a fact that is mirrored in the 'climatization' of security (Oels, 2011). The risk construction has shifted significantly: climate change is constructed as a threat multiplier that exacerbates already existing vulnerabilities.

6.1. The knowledge base: tipping points and the assumed failure to meet the +2 °C target

The construction of climate change as a security issue goes back to an earlier discussion about environmental security, environmental conflict and environmental refugees in the 1990s (Homer-Dixon, 1994, 1999, 2007; Myers, 1995, 2002). Those who construct climate change as a security issue argue that the mid-range scenarios developed by the IPCC "are not a sound basis for security planning" because "they do not cover the full range of future climate change risks and do not reflect the most recent research" (Mabey et al., 2011, p. 19). In 2007, the Fourth Assessment Report of the IPCC projected a warming of 1.1–6.4 °C in 2100 relative to 1990, with a likely (>66%) range of 1.8–5.4 °C (IPCC, 2007). Major uncertainties remain regarding future emission paths, as well as about climate sensitivity. Climate sensitivity as calculated by the IPCC falls within the range of 2–4.5 °C – however there is a 5–17% chance that the true sensitivity is greater than 4.5 °C (Mabey et al., 2011, p. 32). For any given emission scenario, the uncertainty range for projected global warming between 1990 and 2100 is on the order of 2 °C, a fact which security analysts consider "a major risk factor" (Mabey et al., 2011, p. 32). Boykoff et al. argue that because of unknown carbon cycle dynamics and climate sensitivity, it is nearly impossible to identify 'safe' levels of atmospheric CO_2 concentrations (2010, p. 53). Scenario planning has emerged as a new source of knowledge for dealing with the uncertainties and the ‘unknown unknowns’ of climate change (Schwartz and Randall, 2003).

The IPCC has been attacked for not paying sufficient attention to the catastrophic impacts that could be caused by tipping elements in the global climate system. Tipping elements are defined as ‘‘nonlinear threshold responses to warming’’ by major climatic subsystems (Mabey et al., 2011, p. 39). Lenton et al. (2008) list the dieback of the Amazon rainforest, instability of the West Antarctic ice sheet, the melting of permafrost, and the change in monsoon patterns in India and West Africa amongst other tipping points in the global climate system. Tipping elements can already occur under a +2 °C scenario but are ‘‘much more likely if global average temperature rises by more than 3 °C’’ (Mabey et al., 2011, p. 42).

A third major concern for security analysts is the inadequacy of current climate mitigation and adaptation policy. Rogelj and colleagues have calculated that the non-binding mitigation pledges made by countries under the *Cancún Agreements* in December 2010 would still result in a greater than 50% chance that warming will exceed 3 °C for the upper-end ranges and 4 °C for the lower-end ranges (Rogelj et al., 2010). In a world where warming of +3–4 °C is likely, and +5–7 °C possible, climate change is framed as a security issue:

> ‘‘Unless strong action is taken to slow global warming, developed and developing countries alike will experience resource scarcity, rising sea levels, extreme weather events and new health epidemics. (...) It will lead to new levels of competition around scarce resources that may result in intra- or interstate conflict. This will also result in mass migration as populations flee land inundated by rising seas and locales that can no longer provide essential resources.’’ (Mabey et al. 2011, p. 18).

The threats of mass migration and violent conflict as a result of climate change are put forward despite a lack of conclusive peer reviewed science on these issues (Morrissey, 2009; Nordas and Gleditsch, 2007; Burke et al., 2009; Buhaug, 2010). ‘‘With such warming, there is little uncertainty over whether extreme impacts will occur, only when they will happen, and to what extent they will affect specific locales.’’ (Mabey et al., 2011, p. 43). As a result, ‘‘[t]he threat of climate change is high-impact and high-probability’’ (Mabey et al., 2011, p. 84). The future scenarios put forward by the relevant think tanks all share the assumption that ‘‘[t]urbulence cannot be averted’’ (Cooper, 2011, p. 183).

6.2. The politics of climate security

Mabey and colleagues recommend that policymaking should ‘‘aim to stay below 2 °C’’, ‘‘build and budget for +3–4 °C’’ and ‘‘contingency plan for 5–7 °C’’ (Mabey et al., 2011, p. 126). The framework suggested by the authors calls for resilience and preparedness (Cooper, 2011, p. 183) in line with *risk management through contingency*. To what extent has this discourse of climate change as a security issue – which mostly originates from think tanks – been adopted by policymaking?

The security implications of climate change were placed on the agenda of the UN Security Council by the United Kingdom on 17 April 2007, and by Germany on 20 July 2011, the latter of which resulted in a Presidential statement S/PRST/2011/15, cited in the introduction of this paper. In addition, the topic was on the UN General Assembly agenda on 3 June 2009 and 20 December 2010, leading to resolution 65/159. In response to a request made at the first debate in the UN General Assembly, UN Secretary General Ban Ki Moon presented his report on *Climate change and its possible security implications* (UN General Assembly (GA), 2009) on 22 September 2009. This report defines climate change as a ‘‘threat multiplier’’ (UN GA, 2009, p. 2). Right at the outset, the report acknowledges that ‘‘any analysis of climate change and its impacts, including possible security implications, must grapple with uncertainty’’ (UN GA, 2009, p. 5). *Mitigation* is presented as essential, ‘‘for without slowing the rate of climate change, the threats to human well-being and security will greatly intensify’’ (UN GA, 2009, p. 27). In the field of *adaptation*, sustainable development is acknowledged as a key strategy of ‘‘building resilience to physical and economic shocks’’ (UN GA, 2009, p. 4). Given current emission trajectories, the UN Secretary General recommends

> ‘‘to focus international attention on areas where the impacts already appear highly likely, are large in magnitude, unfold relatively swiftly, have potentially irreversible consequences (the concept of ‘tipping points’), impose high costs on human life and well-being, and may require innovative approaches because of their unprecedented nature (for example, loss of territory and statelessness)’’ (UN GA, 2009, p. 5).

In the face of a rising number of expected extreme weather events, building capacity for disaster risk reduction, disaster preparedness and conflict prevention is recommended (UN GA, 2009, p. 27). In the field of migration policy, a new legal framework to protect persons displaced by climate change is called for (UN GA, 2009, pp. 15–20). The ‘weak’ states of Africa are considered a particular security threat, as their institutional capacities could be overwhelmed by extreme weather events and resulting mass migration (UN GA, 2009, p. 18). I conclude that the UN Secretary General’s report implies elements of *risk management through contingency*, especially preparedness for events with high impact and high likelihood.

In the financial markets, financial innovations have been developed that price the unpredictable risks of climate change and make them transferable. ‘‘The latter include catastrophe bonds, securities that manage the risks of improbable but catastrophic natural events’’, (Cooper, 2011, p. 175) and ‘‘weather derivatives [which] are tradable risk contracts that deal with the possibility of adverse but non-catastrophic weather’’ (Cooper, 2011, p. 177). Derivatives are emerging as the new form of money, determining the price of money. Cooper explains the US administration’s renewed attention to climate change as a security issue, with a national interest in sustaining the US-dollar denominated world in the face of unavoidable turbulences, primarily by building resilience to disturbances but if necessary using violence (Cooper, 2011, pp. 184–185).

6.3. Risk management through contingency and the ‘‘climatization’’ of the security field

The articulation of climate change as a security issue indicates that the transnational field of professionals of (in)security (i.e. police, military, intelligence, etc.) (Bigo, 2008b) have recognised the primary and secondary impacts of unmediated climate change as a legitimate security threat (Mayer, 2012). ‘Climatization’ of the security field means that traditional practices of the security community are being applied to the issue of climate change: for example scenario planning, early warning systems and risk management practices (Oels, 2011). At the same time, the security field is expanding to include climate change professionals with their practices such as climate modelling.

This section analyses governmental rationalities at the nexus of climate change with defence, migration and development, and claims that *risk management through contingency* is emerging to enhance preparedness and resilience for climate change induced disasters.

In the field of *defence*, climate change is acknowledged as a threat in two thirds of the 24 national security strategies reviewed by Michael Brzoska, in the majority of cases as an issue of *human security* (Brzoska, 2010, pp. 6–7). Only four countries (the US, Russia, Finland and the UK) conceptualise climate change as a major threat that could trigger violent conflict and have *national security* implications (Brzoska, 2010, p. 8). To counter the identified threat of climate change impacts, the national security strategies recommend increased disaster management capacity (Brzoska, 2010, pp. 6–7). In the core defence planning documents of these states, capacity building for disaster management is again the main means of preparing for climate change (Brzoska, 2010, p. 10). The growing importance of disaster management is underlined by the 2011 special report on *Managing the risks of extreme events and disasters to advance climate change adaptation* which is being prepared by the IPCC (2009), following a proposal by the government of Norway and the UN International Strategy for Disaster Reduction (ISDR). Hartmann (2010) has identified potential roles for the military *before* and *after* a climate-induced disaster strikes. First, as a preventive measure, civilian-military stability interventions might be enabled in 'weak' or 'failing' states which have been identified as 'climate change hot spots', i.e. in regions which are relatively more vulnerable to climate change. Second, military responsibility-to-protect interventions might be enabled in states which fail to offer sufficient levels of protection to their population after a climate-induced disaster strikes, most likely in Africa (Hartmann, 2010, p. 241). Both types of intervention require the defence sector to develop new flexible military response capacities, including new satellite infrastructure and transport capacity.

In the field of *migration*, the Parties to the UNFCCC acknowledged the need for "[m]easures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels" in paragraph 14 (f) of the *Adaptation Framework* adopted as part of the *Cancún Agreements.* (UNFCCC, 2010, p. 5). *The Nansen Conference on Climate Change and Displacement in the 21st Century* (TNC), hosted by the Norwegian government in June 2011, argues that "[w]hile the precise scale, location and timing of population movements are uncertain, there is growing evidence that they will be substantial and will increase in the years to come. Climate change acts as an impact multiplier and accelerator to other drivers of human mobility" (Wahlström, 2011, p. 2). Regarding measures, the summary argues that

> "[d]evelopment interventions to support resilience are therefore essential. Disaster risk reduction and adaptation measures can limit the scale and negative impact of climate change. Such measures should be guided by a comprehensive climate risk management approach. [...] Building sustainable and human rights-based resilience to climate change is a prerequisite for preventing displacement" (Wahlström, 2011, p. 3).

This statement is clearly in line with reducing the impact of uncertain but inevitable levels of climate change in the spirit of *risk management through contingency*.

The mainstreaming of climate change in the field of development was analysed by Chris Methmann (2011a) in a discourse analysis of major international publications on the climate-development nexus. Both the World Bank's *World Development Report 2010* (World Bank, 2010) and the United Nations Development Programme's (UNDP) *Human Development Report 2007/8* (UNDP, 2007) present resilience as the preferred strategy for addressing the risks of climate change. In the words of a UNDP handbook (2009, p. 5): "Building resilience and addressing vulnerabilities with poor and marginal communities are critical factors in any climate-change response strategy". The World Bank and UNDP recommend capacity building to cope with, adapt to and shape change not at the individual level, but at household and community level (Methmann, 2011a, p. 10). This strategy of *risk management through contingency* renders communities responsible for the management of their own risks (Duffield, 2007). Preparedness is to be achieved through technical and social adaptation measures, as well as the preventive management of disaster risk.

In this section, I have demonstrated that the production of climate change as a security issue is based on the presumption of a failure to meet the 2 °C goal. *Risk management through contingency* is employed to build resilience for the potentially catastrophic impacts of climate change in a +3–7 °C world. I conclude that there is clear evidence for the *climatization* of defence, migration and development policy.

7. Conclusion

In this paper, I have explored a new framework for studying the 'securitization' of climate change. This framework analyses 'securitization' as a range of governmentalities that can be employed in the name of security. My findings suggest that what has been perceived as 'dangerous' about climate change has shifted in relation to changing scientific and popular truth regimes on the matter. This shift is related to a change in the way climate change has been rendered governable as a risk. In contrast to the existing literature on climate change as a security issue, I have traced actual policy changes resulting from the 'securitization' of climate change. Drawing on a governmentality framework, I have shown that the 'securitization' of climate change is linked to the introduction of *risk management through contingency*. Widening empirical analysis beyond the narrower realms of mitigation and adaptation has allowed me to trace transformations as a result of the 'climatization' of defence, migration and development policy. These policy changes are about enhancing resilience and preparedness for a world in which a rise in global average temperature of 3–4 °C is likely and of 5–7 °C is considered possible.

In pulling together the preliminary findings of the empirical section, I will return to the three questions that I posed at the end of my theory section. *First*, what was the role of science in producing the risk of climate change? *Second*, what is the balance between top-down risk reduction and bottom-up capacity building for adaptive emergence? *Traditional risk management* has been and still is the dominant configuration in enabling *mitigation* policy. IPCC science has been instrumental in framing climate change as a biophysical phenomenon of greenhouse gas emissions, and in defining a 'tolerable' level of climate change, namely a +2 °C world compared to preindustrial levels. International agreement on emission reductions is closely linked to the development of scientific methods for calculating greenhouse gas emissions for national inventories. *Adaptation* policy has been framed as a mostly technological response to projected regional climate change impacts. The failure of IPCC global models to provide local impact scenarios is inherently limiting the *science-based risk management* of adaptation. As long as scientific uncertainties of local impact scenarios remain high (for example when it is unclear whether there will be less or more rainfall), there is local resistance to committing scarce resources to adaptation. An alternative adaptation approach based on *risk management through contingency* is emerging that seeks to enhance capacity to cope with current weather variability and change in general. Such an approach does not rely on scientific prediction, and might therefore gain more attention in the future. Since 2003, policymakers have grown interested in preparing for the *security implications* of unmitigated climate change. In the absence of conclusive science on the causal links between resource scarcities, mass migration and violent conflict, strategies of *risk management through contingency* build resilience for the impacts of unmediated climate change. These strategies focus on enhancing disaster preparedness, preventing the need for migration, and using development assistance for the purposes of adaptation and resilience building, both of which also reduce the likelihood of conflict.

Third, is the risk of climate change to be tolerated, reduced or prevented at all costs, according to prevailing governmentality? The issue of climate change exposes the two characteristics that are identified with *precautionary risk management*, namely high levels of scientific uncertainty and an irreversible catastrophic outcome should the worst-case scenario unfold. One of the striking findings of the empirical section is that there is no evidence of drastic prevention of climate change whatsoever (this finding is in line with Trombetta, 2008, p. 599). Instead, there is plenty of evidence that the new policy agenda is about living with dangerous levels of climate change by building resilience not just in developing countries, but also in developed countries. In line with *risk management through contingency,* monitoring and early-warning systems are developed to assess where and when climate change – especially as a result of tipping points – might start 'becoming dangerous'. I demonstrated that new flexible response capacities for disaster management are emerging in the defence sector, while adaptation measures and resilience building feature in migration and development policy in order to reduce the likelihood of mass migration and violent conflict. I conclude that what the Copenhagen School analyses as 'failed securitization' of climate change is better understood as the '*climatisation*' of defence, migration and development policy.

In future research, the links between the three sub-fields of mitigation, adaptation and security merit further research attention. Is the 2 °C target pursued in *mitigation* policy inherently flawed – as the proponents of the security discourse suggest – because it creates the misleading impression that science is capable of defining 'safe' greenhouse gas concentration levels? Under which circumstances could the articulation of climate change as a *security* issue facilitate 'aggressive' *mitigation* policy (as recommended by Mabey and colleagues) rather than resilience building? Does the language of security instead imply that actors of the security field will always be in the front line of action? Could precautionary risk management (instead of risk management through contingency) trigger a drastic decarbonisation of the economy, or will it lead instead to geo-engineering (de Goede and Randalls, 2009)? Most importantly, the security debate needs to be read through the lens of equity and justice. Are we in industrialised countries sure that we want to continue driving our cars while those in vulnerable areas of developing countries lose their livelihoods, perhaps getting some assistance in their evacuation (if lucky)? A critique of the security framing along these lines is beginning to emerge (Hartmann, 2010).

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Appendix A. Documents reviewed in the governmentality analysis

A.1. Intergovernmental Panel on Climate Change (IPCC)

IPCC (1996). Summary for Policymakers.
IPCC (2001). Summary for Policymakers.
IPCC (2007). Summary for Policymakers.

A.2. United Nations Framework Convention on Climate Change (UNFCCC)

UNFCCC (1992). United Nations Framework Convention on Climate Change.

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UNFCCC (2010). Report of the Conference of the Parties on its Fifteenth session, held in Copenhagen from December 7–19, 2009.

UNFCCC (2011). Report from the Conference of the Parties on its Sixteenth Session, Held in Cancún from November 29–December 10, 2010.

A.3. Global Environment Facility (GEF)

GEF (2009a). Financing Adaptation Action (1 October 2009).

GEF (2009b). Report of the GEF to the fifteenth session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (2 October 2009).

A.4. United Nations General Assembly (UNGA)

UNGA (2009). Resolution 63/281 "Climate change and its possible security implications", 18 May 2009, New York, A/63/L.8/Rev.1 (2009).

UNGA (2009). Climate change and its possible security implications. Report of the Secretary-General. A/64/350 (2009). United Nations, New York.

UNGA (2010). Resolution 65/159 "Protection of global climate for present and future generations of humankind", 20 December 2010, New York, A/RES/65/159 (2010).

A.5. United Nations Security Council (UNSC)

UNSC (2007a). Minutes 5663rd meeting, Tuesday, 17 April 2007, New York, S/PV.5663.

UNSC (2007b). Minutes 5663rd meeting, Tuesday, 17 April 2007, 3 p.m., New York, S/PV.5663 (Resumption 1).

UNSC (2011a). Minutes 6587th meeting, Wednesday, 20 July 2011, 10 am, New York, S/PV.6587.

UNSC (2011b). Minutes 6587th meeting, Wednesday, 20 July 2011, 3 pm, New York, S/PV.6587 (Resumption 1).

A.6. Other

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