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# Introduction: Risk Research after Fukushima

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This book had its origins when all three of us were closely connected with Durham University's Institute of Hazard, Risk and Resilience. The Institute was established through a combination of university and philanthropic funding, so as '*to make a difference to those who live with risk*'. This book reflects a shared sense that this moral imperative, that is common in contemporary risk research, and is generally considered to be benign, deserved a deeper and much more critical scrutiny. Indeed, we argue that risk research, as well as risk analysis and management more generally, fulfills an institutional role, tasked with reducing the loss of life, expressing a duty of care, enhancing health and well-being and increasing economic security. Such moral imperatives may be laudable, but they are equally bound to a set of other precepts and taken for granted assumptions: that risk are inately calculable and; that we need institutions with the necessary expertise to do these studies and calculations for us; that those institutions should communicate what they have found and calculated; that risks are determinate in the sense that they are knowable even if not known; that risk can be approached objectively, independent from other ways of knowing the world, such as through systems of belief; and ultimately that the analysis and management of risk exists for the greater good. This book is about looking at these precepts critically and throughout we advance a notion of 'critical' risk research.

Our presumption is not that risk research is inherently uncritical. Rather, we argue that the intellectual foundations of contemporary risk research need more critical attention. This raises a series of fundamental questions: What *are* risks and how do we relate to them? How are we framing,

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approaching and studying risks, and what are the implications of these framings? What do we know and do about risks, and in the name of risks? This book critically addresses these questions. Yet in so doing, we do not attempt to offer a best-practice model of how risk research should be done. Rather, the book's ultimate objective is an attempt at self-reflective transgression. Through illustration, we aim to challenge the ways in which risk-problems are approached and presented, both conceptually by academics and through the, often implicit risk-framings that are encoded in the technologies and socio-political and institutional practices surrounding contemporary risk research and management.

### **Fukushima: lessons and challenges**

In compiling this volume throughout 2010-2011 it has been impossible to avoid the catastrophic events being played out in North Eastern Japan where, on 11 March 2011, the world awoke to news of the Tōhoku earthquake, a magnitude 9.0 (Mw) undersea megathrust quake with an epicentre approximately 129km east of the Japanese city of Sendai.<sup>1</sup> Regarded as the most devastating earthquake recorded in Japan since the 1923 Great Kanto Earthquake, it generated tsunami waves with reported heights of 40m (Tekewaki 2011). Felt across the Pacific, the tsunami waves breached flood defences across a large area of the North East of Japan, flooding cities and destroying infrastructure. Much like the 2004 Indian Ocean Tsunami, international media coverage of the Tōhoku earthquake and tsunami was dominated by haunting images of flooded cities, devastated communities and twisted flood defences, together with reports of almost incomprehensible numbers of human casualties.

In the following days, and after a series of significant aftershocks,<sup>2</sup> it was revealed that the combined effects of the earthquake and tsunami had caused critical equipment failures and nuclear meltdowns at the Fukushima 1 Nuclear Power Plant, resulting in the release of radioactive material and frantic efforts to both contain the damage and to evacuate civilians from the region immediately surrounding the plant. While these events threatened to send Japan back into a financial depression,<sup>3</sup> the political fallout was felt internationally, with significant protests in Germany, Switzerland and Italy over the continuing reliance on civil nuclear power.<sup>4</sup>

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<sup>1</sup> <http://earthquake.usgs.gov/earthquakes/eqinthenews/2011/usc0001xgp/#details>

<sup>2</sup> <http://ihrrblog.org/2011/04/15/japan-still-shaken-by-aftershocks/>

<sup>3</sup> <http://edition.cnn.com/2011/BUSINESS/03/14/japan.quake.economy.monday/index.html>

<sup>4</sup> <http://www.dw-world.de/dw/article/0,,14939216,00.html>

As these events played out during the completion of this volume, we reflect here on the important lessons we might draw for contemporary risk research about the nature of ‘critique’, before outlining the structure and plan of the volume.

### **Vulnerability of techno-scientific ‘risk societies’**

The most obvious lesson to be drawn from these events is that a quarter century after the tragedy at the Union Carbide pesticide plant in Bhopal, the core meltdown at Three Mile Island and the Chernobyl disaster, the Tōhoku earthquake and the meltdown at the Fukushima nuclear power station reveal the continuing potential for such incidents to fundamentally disrupt social, economic and political life. What is perhaps becoming progressively more extreme is the ease by which scenes of devastation can be geographically diffused such that the experience of those affected by such events is reproduced, albeit through very different and highly mediated means, in almost real time. Instantaneously, they bring the susceptibility of social infrastructures to catastrophic and devastating natural and technological hazards to the fore.

However, a generation after the emergence of critical interpretations of conventional risk analyses (Beck 1992; Brickman, *et al.* 1985; Douglas and Wildavsky 1982; Perrow 1984; Wynne 1996) the events in Sendai and Fukushima reveal much more than just our continuing vulnerability to these events. They also reveal our continuing dependence on conventional risk analyses, a set of failures that expose the assumptions upon which they are constructed and, above all, the paucity of our conceptual and practical tools for understanding, approaching and, eventually, living with the daunting existence and prospect of such events. Thus, in addition to providing an allegory of modern vulnerability, the Tōhoku earthquake and the meltdown at the Fukushima nuclear power station, reveal a significant set of analytical and empirical challenges for contemporary risk research, three of which shall be outlined below.

### **The nature and causes of risk**

The first broad challenge arising from the Fukushima tragedy concerns our very understanding of the nature and causes of risks. More specifically, these events dramatically underscore the problems associated with the two (apparently trivial and often taken for granted) oppositions between ‘normal’ and ‘exceptional’ risks, and between ‘natural hazards’ and ‘human agency’.

Though the events witnessed in Japan in March 2011 were, by any standard, extraordinary in their severity and magnitude they were not unexpected. Commenting shortly after the Tōhoku earthquake, Petley (2011) suggested that from a “geological perspective . . . these events were far from unusual taking into account the seismic history of the region”. Indeed

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Petley went on to suggest that “as far as I can see this earthquake, and the resultant tsunami, are remarkably unsurprising. They are exceptionally large for sure, and they were not predictable, but they are not beyond the bound of human experience in any way that I can see”.<sup>5</sup> If the Tōhoku earthquake, though extreme in its magnitude, is consistent with the seismic history of the region, what of the resulting tsunami? In his study of the cultural memories of tsunamis in Japan, Smits (2011) notes “that large tsunamigenic earthquakes have occurred repeatedly in precisely the areas devastated by the March 11, 2011 event”. Smits goes on to suggest that despite recorded incidents of events of similar scale and magnitude, and latent cultural memories and folklore, urban infrastructures in these regions were designed to withstand more frequent incidents of lower magnitude.

This fact points to the particular normalising effect of institutionalised risk research and practices of risk management. In the terms of classical risk analysis the devastation witnessed in Sendai and other Japanese cities is a reminder that “once again it is our preparedness that is at fault. Once again our knowledge of the hazard has failed to transfer into effective mitigation” (Petley 2011). The fact that these events are consistent with the seismic history of the region points to the enduring vulnerability of our existing social, political and economic infrastructures to low-frequency but high-impact events.

In his study of high-risk technologies Perrow (1984) notes that accidents and risks are a systematic – or ‘normal’ – feature of societies that are ‘tightly coupled’. What he means by this is that societies where everyday interactions depend on largely invisible electrical power systems, telephone connections and data networks, are particularly susceptible to infrastructure faults that cause more systemic breakdowns.<sup>6</sup> He suggests:

When we have interactive systems that are...tightly coupled, it is “normal” for them to have this kind of an accident, even though it is infrequent. It is normal not in the sense of being frequent or being expected-indeed, neither is true, which is why we were so baffled by what went wrong. It is normal in the sense that it is an inherent property of the system to occasionally experience this interaction... We have such accidents because we have built an industrial society that has some parts, like industrial plants or military adventures, that have highly interactive and tightly coupled units. Unfortunately, some of these have high potential for catastrophic accidents. (p. 8)

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<sup>5</sup> Petley makes this argument on the basis of an historical analysis of the seismicity of the region. See: Rhea, *et al.* (2010).

<sup>6</sup> Also see Graham, 2009.

Though incidents, such as the nuclear meltdown and release of radioactive material at the Fukushima Nuclear Power Plant, and the ensuing political and economic crises, are precipitated by a 'natural' disaster these events demonstrate how risk is equally, if not more acutely, produced by the coupling between system elements, including environmental hazards, management systems and technologies. In this analysis vulnerability is not simply attributable to any one element of the system, so precluding mechanistic analysis of causation. Rather, the system becomes vulnerable because of the connections between elements that may be hidden and dynamic, making them difficult to identify except with the benefit of hindsight. The risks and vulnerabilities induced by events such as the Tōhoku earthquake operate as a complex assemblage of social, political, technical and geological factors (Anderson, *et al.* 2012; Bennett 2005).

The coupling, and indeed inseparability, of these events also demonstrates the paucity of our conceptual vocabulary. As implied above, contemporary risk research has relied on a simplistic understanding of vulnerability – coupled with mechanistic notions of causation – which sees risks as originating in the inanimate, non-human world and whilst human action is conceptualised as exacerbating its effects and the vulnerability of human populations (Jasanoff 1999). This simplistic conception of the causes of risk and vulnerability is typically represented as some variation of the pseudo-formula:  $\text{risk} = \text{hazard} \times \text{exposure} \times \text{vulnerability}$  or  $\text{risk} = \text{probability} \times \text{consequence}$ .<sup>7</sup> This formulation gives a veneer of technicality to a categorical distinction between 'natural hazards' and 'human agency'. If ever any more evidence is needed, what the events at the Fukushima power plant reveal is the conceptual redundancy of this dualism between 'natural hazards' and 'man-made risks'. The conceptual terminology that underpins this distinction – that risks and hazards can be distinguished on the basis of their primary 'origin' – has proved to be fundamentally ill-equipped to deal with the tightly-coupled vulnerabilities of social, political and technical infrastructures to catastrophic failures.

### **Socio-political ambivalences of risk**

This conceptual failure also highlights a second set of challenges arising from these events for critical risk research. The Tōhoku earthquake and the meltdown at the Fukushima power station also reveals the ambivalent role that risk research itself – and particularly institutionalised forms of risk management and risk assessment that thrive upon this research – plays in producing these forms of social vulnerability. Though classically

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<sup>7</sup> This formulation of social vulnerability to risk has been the subject of extensive critical commentary. See for example, Bankoff, *et al.* (2004).

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understood as providing technical capacities for calculating risk probabilities and intensities, and predicting exposure pathways and patterns, the events in Japan expose the degree to which formal processes of risk analysis often form part of institutionalised cost-benefit calculations engaged in the construction of disaster preparedness infrastructures. Though the possibility – indeed the likelihood – of tsunami waves of similar levels were both a feature of local folklore, and predictable on the basis of the region’s underlying seismology (Atwater, *et al.* 2005), the construction of flood defences and the positioning of nuclear power stations in Japan has been influenced by a range of additional social and political factors. Principle among these are local political debates about power plant siting (Hayden 1998; Juraku, *et al.* 2007) and the inevitable cost-benefit trade-offs involved in the construction of flood defences.

These events point to a broader lesson for risk researchers – as they reveal the degree to which institutionalised forms of risk analysis are often part of social and political systems that produce and intensify vulnerabilities to hazards and disasters. Risk assessments are given a preeminent role in formal planning processes and the associated political and economic calculations, often because it is presumed that such assessments are both unambiguous and unbiased. However, the analysis of risk assessment in practice reveals that it has to be highly constrained by both policy and institutions in order to make problems scientifically tractable and politically and socially manageable (Lane *et al.*, 2011). The critical danger for risk researchers is that, rather than mitigating the effects of these incidents, such research forms part of the institutional structures that force problems to become tractable in particular ways and, even, render social groups more susceptible to systemic harm.<sup>8</sup>

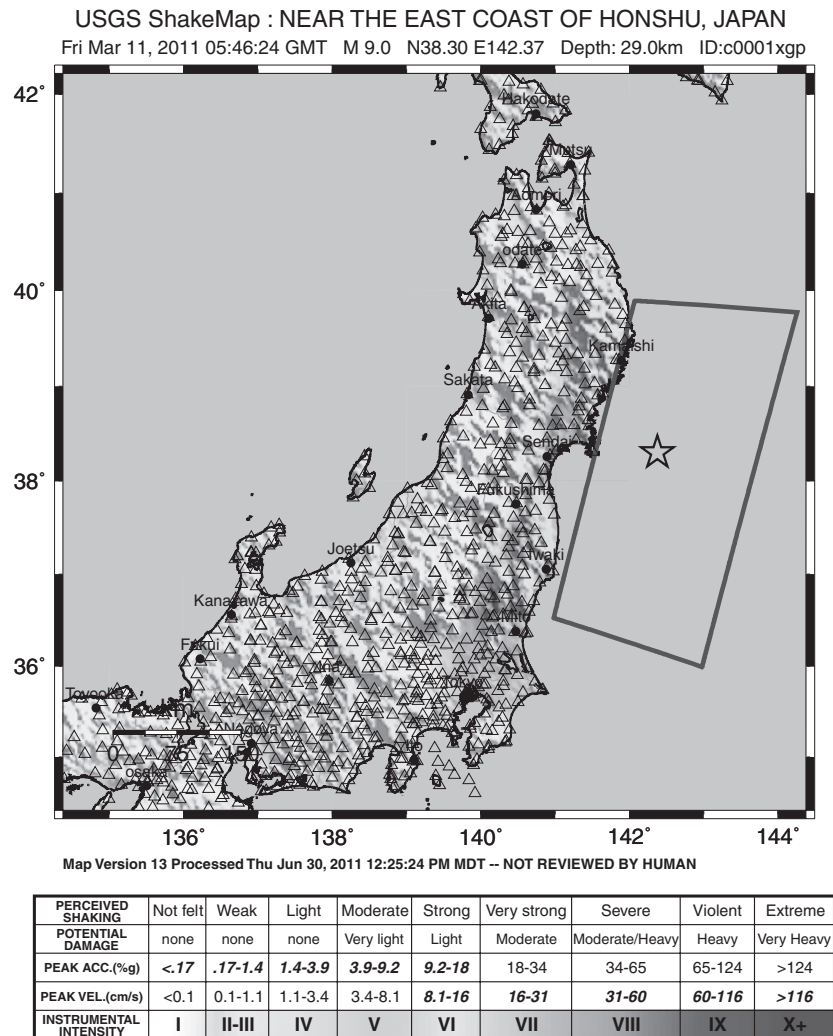
### **Scales of risk**

The third critical challenge that the events surrounding the Tōhoku earthquake and the meltdown at Fukushima pose for contemporary risk research concerns the issue of scale. Assessments of the scale of disasters are fundamental to risk research, and more broadly are part of the ways in which societies make sense of troubling and disturbing events. In the immediate aftermath of the events in North Eastern Japan the initial response by international organisations and relief agencies was to produce maps. Maps of the earthquake zone, the frequency and magnitude of the aftershocks, the scope of tsunami inundation and the extent of radiation

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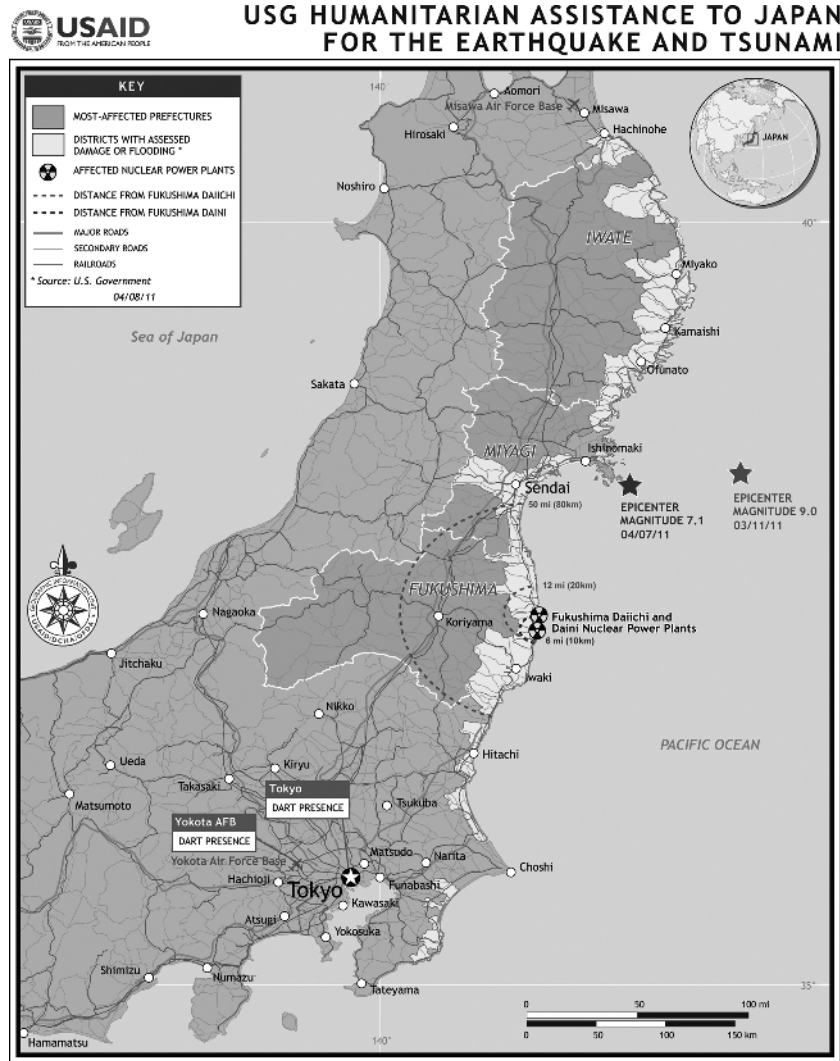
<sup>8</sup> This argument is laid out in more depth in Lane, *et al.* (2011). The authors also develop an alternative and participatory model of risk research, which provides a response to these dynamics. See also, Lane (this volume).

release became the dominant way in which international observers made sense of these events and coordinated responses (see Figures 1.1, 1.2 and 1.3 for examples of the kind of maps produced in the days immediately after the disaster). As the international media struggled to communicate the sheer scale and complexity of the disaster they also resorted to comparisons with similar events and raw calculations of the expected numbers of human casualties and predicted economic losses. The event became represented as the biggest recorded earthquake in Japan, the most severe tsunami in living memory, the worst nuclear incident in Japan



**Figure 1.1** Shake Map of Tohoku earthquake. *Source:* <http://earthquake.usgs.gov/earthquakes/shakemap/global/shake/c0001xgp> (accessed, 13 July 2011).

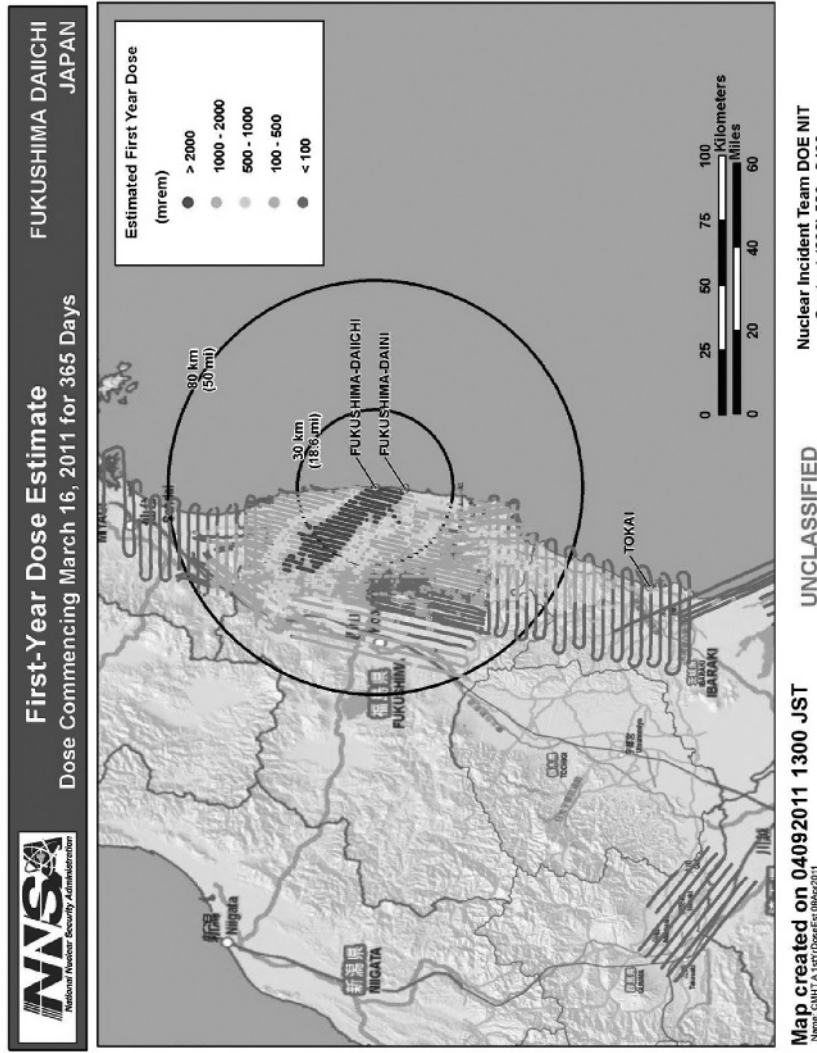
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**Figure 1.2** Map of areas affected by of Tōhoku earthquake and ensuing tsunami.  
Source: [www.usaid.gov/japanquake/04.08.11-JapanEarthquakeTsunamiMap.pdf](http://www.usaid.gov/japanquake/04.08.11-JapanEarthquakeTsunamiMap.pdf).  
(accessed, 13 July 2011).

after the bombs that devastated Hiroshima and Nagasaki and the third most significant nuclear accident after, Chernobyl and Three Mile Island. However, what was lost in this reporting, particularly as the events in Japan were translated into implications for other nations and regions, was their historical and geographical specificity. 'Explanation', through this kind of reporting, stripped away the deeper, more integrated and complex set of factors that had precipitated the tragedy, and in so doing further perpetuated simplistic and naïve assessments of what should have been done differently.





**Figure 1.3** Estimated Radiation Dose Map. *Source:* <http://blog.energy.gov/content/situation-japan> (accessed, 13 July 2011).

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In comparison to these initial attempts to attend to the scale of the Fukushima disaster, what these events reveal is the importance of a range of contextual factors that shape existing disaster preparations and emergency responses and thereby contribute to the systemic social and infrastructural vulnerabilities. For example, in his study of the ‘cultural politics of Japanese seismicity’ Clancey (2006) demonstrates that historic responses to the seismology of Japan have, since the mid 1800s, been incorporated in nationalist projects of nation-building. He shows the degree to which Japanese architectural style and Japanese seismology together operated as filters through which the nation of Japan conducted its relations with the international world and sought to reproduce notions of Japanese nativism. In particular, Clancey shows that the Great Kantō Earthquake, which struck the main Japanese island of Honshū on 1 September 1923 and devastated the cities of Tokyo and Yokohama, was interpreted as a failure of western-designed buildings. In place of notions of western modernisation, a nativist response to the earthquake dominated and particularly the notion that “foreign knowledge had again been humbled by Japanese nature, while Japanese knowledge . . . had again ridden out the waves” which resulted in a “narrative of foreign failure and Japanese tenacity” (p. 223). Similarly, in his study of more recent post-disaster recovery efforts, Edgington (2010) also finds a similar set of intersections between earthquake recovery programmes and contemporary national political imperatives. In a detailed account of the rebuilding of Kobe after the Great Hanshin-Awaji Earthquake in 1995, Edgington demonstrates how the destruction caused by the earthquake was transformed into an opportunity for political and economic renewal, what Rozario (2007) calls ‘creative destruction’. Though these efforts were geographically varied, Edgington shows that “in Kobe, opportunities were taken to redevelop the older, inner parts of the city. Opportunities were also taken during the recovery to build new economic infrastructure so as to gain a comparative advantage over other cities in Japan” (p. 14).

What these two studies point to is the way that the science of formal risk assessment, and the expert judgements built into disaster preparedness and recovery initiatives, are typically a product of a range of social and political factors, actively reflecting and involved in reproducing social and political orders, particularly at the national scale. The ways in which nations prepare for disasters – and indeed the ways in which risk research influences urban planning policy – operates as a critical site for national myth making and political reproduction. This intersection between the technical and the political is made all the more obvious in responses to the nuclear meltdown at the Fukushima nuclear power plant, particularly given the persistent accusations of secrecy levelled at both the Japanese government and the Tokyo Electric Power Company (TEPCO) (Onishi and Fackler 2011).

In the context of existing public concerns about nuclear power in Japan, official responses to the nuclear meltdown are an indication of the political stakes at play. For example, Nelson (2011) suggests that “the bombings of Hiroshima and Nagasaki, fallout from the testing of Soviet nuclear weapons, and the Lucky Dragon Incident of 1954 left the Japanese in the 1950s with what some observers have called a ‘nuclear allergy’. Historically, Japanese anti-nuclear-weapons activists have been among the most vigorous in the world”. In spite of these incidents during the 1950s a political decision to engage in the development of civil nuclear power programme was taken, driven by the desire for energy security and the attempt to ‘civilise’ nuclear energy through the ‘Atoms for Peace’ programme. In light of broad public opposition, and intense local political debates about the siting of nuclear power stations (Hayden 1998), the Japanese government launched a programme of public relations initiatives to convince the population of the merits of nuclear power.

Though the recent events at the Fukushima plant are likely to spark off political debates about the safety of civil nuclear power, allegations of official secrecy demonstrate the ways in which response mechanisms are shaped by long-term political imperatives. Though this may be expected in any area of critical national infrastructure or strategic political priority, what is significant about this for risk researchers is the ways in which formalised risk assessment is invoked as part of an intensely political process. Take, for example, the conflicting advice offered on the declaration of an exclusion zone around the Fukushima reactor in the days immediately following the meltdown. Whilst world nations advocated an exclusion zone of 80kms for their nationals, the Japanese authorities initially advised on a 20km radius zone – a strategy designed to limit both the atomic and political fallout of the Fukushima meltdown. Of course we are not debating the merits of each of these strategies, but rather pointing to ways in which this example is indicative of the political co-constitution of contemporary risk research. In this case, official assessments of acceptable tolerance limits, and the predicted spread of radiation seem to have been influenced by the fraught state of Japanese environmental politics, and a desire to limit the political damage of the meltdown.

### **Critical risk research**

The intersections between risk assessment, risk analysis and contemporary political power are an expression of what Jasanoff (2004) terms the co-production of science and social order. For Jasanoff, the conceptual terminology of co-production helps to clarify our understanding of both the ‘social construction’ of officially sanctioned forms of knowledge making

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and the constitutive role that such knowledges play in sustaining contemporary political cultures and social order. Jasanoff defines the term co-production in the following ways:

Briefly stated, co-production is shorthand for the proposition that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it. Knowledge and its material embodiments are at once products of social work and constitutive of forms of social life; society cannot function without knowledge any more than knowledge can exist without appropriate social supports. (p. 2)

In this light, what the incidents in Japan associated with the Tōhoku earthquake and the meltdown at the Fukushima power station amply demonstrate is the mutually co-constituting relationship between formalised risk assessment, disaster planning and contemporary political order. The strategies that political authorities adopt to both prepare for and recover from disasters are, in part, influenced by their historical and geographical specificity. They are an expression of a range of more-than-technical considerations. Jasanoff's terminology also suggests that the conduct of official expertise also confers a form of technical legitimacy on contemporary decision-making, that function to preserve the established topologies of political power often in light of critique and contestation. From this perspective, risk assessment operates as a set of institutionally sanctioned rituals deployed in maintaining state power and hegemonic interests (see also O'Malley 2004; Power 1997; Wynne 1982).

It is for this reason that we suggest that the co-production of risk management and contemporary political order poses a significant set of methodological, ethical and conceptual challenges for risk research, and indeed for risk researchers. This volume might therefore be read as a response to this challenge that attends to the pragmatics of risk research in both its messy complexity and often compromising institutional settings. We start from the premise that the nature of contemporary risks is that they are highly complex. Explaining the emergence, modalities and implications of different types of risks, and using this to inform effective and responsible intervention, requires appreciation of a multitude of possible contributory causes, assembled around the problems at hand. Necessarily, risk research interacts with various psychological, social, economic, institutional and political factors, whose role in defining and shaping the problems at hand is crucial (Short 1984).

However, even where a problem is approached from a range of perspectives, this is rarely sufficient to open up the ways through which risk problems are framed, studied, managed and 'solved'. Such framings are not subject to critical interrogation and scrutiny. It is for this reason that

the papers that comprise this volume also make a second move, together arguing for a form of self-critical and reflexive risk research. If risk research is undertaken to address real-world problems, particularly as they are defined by people affected by disasters, the papers that comprise this volume argue that it is also critical to explore the often implicit ways in which risk research frames problems. Across a range of research methodologies and sites of empirical investigation, this volume makes the case for a critical turn in contemporary risk research, an approach to risk scholarship that attends to the social, political and economic contexts that shape the constitution of the field. The goal here is to render risk research itself as a site of critical enquiry.

Before outlining the structure of the book, we sketch three cross-cutting themes and detail how the papers that comprise this volume may be read as offering a set of insights of a critical risk research.

#### 1. *Conceptualisation*

Modern risk research is in many ways a product of its time. The emergence of the concept of risk is associated particularly with the development of both system engineering and the insurance industry, including the formation of legal doctrines of accountability and compensation for harms (Ewald 1999; O'Malley 2004). Risk is, in this sense, inseparable from the notions of calculation and quantification, as strategies designed to manage and regularise unpredictable events necessarily entail an attempt to predict the scale and scope of potential threats. Our contemporary understanding of risk is also inseparable from the kinds of threats that are faced by modern societies – from global terrorism, systemic and catastrophic infrastructure failures to the latent potential for mundane technologies to herald unanticipated consequences. Ulrich Beck's theory of the emergence of a world risk society, which has significantly shaped conceptual treatments of risk and vulnerability, is also a theory of European modernity. He famously argued that events such as the Chernobyl disaster, the tragedy at the Union Carbide pesticide plant in Bhopal and the core meltdown at Three Mile Island have the capacity to induce a range of anthropological shocks (Beck 1987). These catastrophic events have the potential to challenge the ways in which risk is understood, compartmentalised and managed. Commenting on Chernobyl he suggests that this single event catalysed a new set of cultural meanings. For Beck, Chernobyl created the conditions for a broad realisation that the risks of nuclear power, itself deeply symbolic of the bipolar world of the Cold War, could not be contained by political, regulatory or geographical boundaries. The risks of nuclear power are literally carried on the wind. Secondly, Beck suggests that incidents like Chernobyl called into question the inseparability of risk from technological modernity. Risks were not simply the products of faults or accident but, as Perrow (1984) also argues, the systematic product of 'normal' conditions. Since Beck's

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original formulation a generation of risk scholars have demonstrated similar kind of dynamics at play in contemporary techno-environmental controversies around acid rain, BSE and genetically modified food (Lupton 1999).

In the aftermath of the Tōhoku earthquake and the meltdown and release of radiation at Fukushima it is clear, however, that Beck's notion of anthropological shock does not have the same traction. Though these events are deeply shocking, it is also evident that we have been here before. In the rush to provide some analysis of the scale of these events, by comparing them to Chernobyl and Three Mile Island, what was striking about the international media coverage was the degree to which the events in Japan fell into a range of now accepted disaster narratives (Erikson, 1995).

This is not to diminish the significance of these events, but rather to suggest that what the Tōhoku earthquake and Fukushima meltdown reveal is the poverty of current methodological and conceptual tools in risk research. The question is how to practice risk research 'after Fukushima' with a set of theoretical tools sensitive enough to the specificity of the events in question. The solution that we offer in this volume is practical and epistemological rather than philosophical. Rather than declare a new epoch, of a 'post-risk society' or the emergence of forms of collective neurosis for example (Isin 2004), in this volume we move toward a notion of a 'critical risk research'. Our ambition is to move beyond what we usually do; to look critically at the research that we are ourselves doing (Bourdieu, 2004), to raise awareness of the interests, agendas, impacts, ethical issues and power games producing, and produced by, risk research.

Two models of this kind of (self) critical risk research are evident in the papers that comprise this volume. The first is offered by Lane (this volume), who argues that in light of the co-production of research on flood risks and on the political and economic vulnerabilities induced by such events – what he terms an 'unethical trend' in risk research – researchers need to attend to a 'moral imagination' in their work. Lane offers a model of ethical risk research that seeks to avoid conceptualising the public as in need of education, what Wynne (1992) characterises as the 'deficit model' of public understanding of science. Part of a broader project, aimed at a radical re-thinking of risk research as a form of participatory knowledge creation (see for example, Lane, *et al.* 2011), Lane's provocation is that responding to the co-production of risk knowledge and political power should be viewed as an ethical responsibility for risk researchers. The second approach is outlined by Macnaghten and Chilvers (this volume) who explore current strategies aimed at generating democratic and participatory forms of risk governance that are being taken up in the governance and regulation of new technologies. In their chapter,

Macnaghten and Chilvers review the formation of the Sciencewise Expert Resource Centre, a UK government institution tasked with coordinating early and anticipatory forms of public engagement and participation on themes as diverse as stem cell research, nanotechnology and geoengineering. Whilst informed by a range of critical interventions in the value of upstream public engagement in shaping regulatory responses to new technologies (see for example Wilsdon and Willis [2004]), in practice a range of models of public dialogue are current. Macnaghten and Chilvers' contribution to the development of critical risk research is, like Lane, to argue that research practice should start with public values, designing interventions and regulatory structures that function to 'open up' rather than close down decision making processes to a range of societal voices (Stirling 2008).

## 2. *Disciplinary and Interdisciplinarity*

In recent years, risk research has been characterised by two countervailing shifts. On the one hand the complexity of contemporary risk issues is increasingly understood as requiring both interdisciplinary and participatory research practices. In concert with a range of approaches that seek to develop a synthesis between the social and physical sciences and socially robust forms of knowledge making (Gibbons, *et al.* 1994), the value of diverse perspectives is also increasingly recognised in contemporary risk research. However as Bracken (this volume) and Rigg *et al.* (this volume) report, in the practice of risk research divisions between disciplinary approaches are often both maintained and reinforced. Both Bracken and Rigg *et al.* go onto to suggest that the persistence of these distinctions is in part explained by a continuing and often implicit dualism between the 'hard facts' of disasters – which are articulated technically – and the 'softer' analyses of the 'social aspects' and 'lay perceptions' of these events.

Given these contradictory shifts, the Tōhoku earthquake and the meltdown at the Fukushima power station amply demonstrate the paucity of these conceptual terms – and the continuing distinctions between the technical 'facts' of risk and the social and cultural 'values' invoked in situated sense making – for both understanding and responding to complex and multifaceted events. The key issue here is not simply overcoming a set of disciplinary distinctions by developing synthetic research practices. Rather the challenges posed by these events concern the adequacy of the basic conceptual terminology of risk research – risk, hazard, vulnerability, exposure and tolerance – and its very framings themselves. In practice these terms, though commonplace in risk research, are typically conceptualised very differently. For example, Davies *et al.* (this volume) outline the incompatibility of existing conceptualisations of these basic terms, where current approaches to risk research are inspired by contrasting interpretations of the foundational concepts of the field. As a consequence research objectives, goals and methodologies tend to be framed in contrasting terms.

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In practice, to overcome these conceptual and methodological impasses requires much work and persistence. In this sense, the conceptual challenge posed by events such as the Tōhoku earthquake are not simply to develop a definitive conceptual terminology, but to proliferate a new set of concepts that enable such events to be represented in all their hybrid complexity, as neither simply 'natural hazards' or 'man-made risks' (Whatmore 2002).

The papers of this volume offer a set of resources for engaging in the hybrid disciplinary complexity of contemporary risks and hazards. For example, Merli (this volume), describes the wide-ranging anthropological literature that shows that disasters are more than just physical problems. Disruptive catastrophic events reveal the entwined relationship between nature and culture and so implicate cultural questions in their understanding. Dominelli (this volume) describes the role of social policy in addressing the much broader set of consequences arising from disaster, ones that go well beyond, those that can be counted or calculated.

### 3. *Institutionalisation*

As we introduced earlier, a key feature of contemporary risk research is its increasingly institutionalised role in the formal responses to disasters. In some contexts a disaster or risk 'industry' has arisen which trades on the kinds of unique skills and expertise that risk researchers are able to offer in developing disaster preparedness procedures and in post-disaster relief and reconstruction efforts. Rigg *et al.* (this volume) and Dominelli (this volume) are both parodies of this point. The 'urgency funding' willing to be provided by research councils, such as that obtained by Rigg *et al.* (this volume) to study the aftermath of the 2004 Asian tsunami in Thailand, is a good example. Taking a critical view of such initiatives is not the same as arguing that they should not happen. Rigg *et al.* (this volume) show how studying this event, aside from raising a set of deeper challenges for risk analysis and management, also reveals the critical problem of the risk 'academy' and how its disciplinary structure prevents the realisation of truly interdisciplinary approaches to risk management. We explore this issue further below but we emphasise that it is not that risks, and their manifestations as events, are an illegitimate focus of academic enquiry. Rather, we cannot be blind to the ethical questions that underpin them and the ethical consequences that arise from them, anticipated or not. If risk research is justified from a moral imperative, the trajectory of that research must be followed with a close and sensitive attention to the ethical difficulties that the research goes on to pose. Risk research is largely unregulated despite the fact that it can have a profound impact upon both risk and wider society (Macnaghten and Chilvers, this volume).

The point here is that the institutionalisation of risk research in these contexts has potentially unanticipated consequences for different kinds of



research methods and approaches utilised and the broader political implications of knowledges produced through these kinds of risk research. Both Kearnes (this volume) and Klauser and Ruegg (this volume) make this point, suggesting that the processes whereby risk research is incorporated into formal processes of risk management have important social and political effects. Examining risk management strategies deployed at Geneva Airport, Klauser and Ruegg (this volume) explore the synchronicity between contemporary political discourses of securitization and the situated conduct of airport security and surveillance services. In addition they demonstrate the ways in which risk research – particularly in the form of academic expertise on security and criminality – form part of the socio-political processes and practices of managing risk. Kearnes (this volume) makes a similar argument, analysing the ways in which governance and regulation of technological risks, in this case the risks associated with nano-materials, is influenced by contemporary political rationalities. In this particular area of risk governance, Kearnes describes the ways in which anticipatory and pre-emptive strategies, originally developed as a response to the asymmetric threats of global terrorism, are beginning to influence approaches deployed in managing the latent and potential threats posed by novel materials. Both of these cases describe situations where the modal logics and techniques of risk management developed in one field, are extended beyond their original purpose. Viewed in co-productionist terms, this epistemological extension is indicative of the ways in which contemporary risk research forms part of the discursive structures that support and sustain contemporary political rationalities and hegemony. The ways in which risk research is increasingly institutionalised as part of a ‘risk industry’ begs a range of significant ethical questions for risk researchers – concerning the ways in which such knowledge contributes to institutionally sanctioned judgements that may actually function to increase rather than decrease social, political and economic vulnerabilities.

## Structure of the book

Developing these themes across a range of contributions, this volume offers a collection of essays about what it means to do risk research, and about how – and with what effects – risk research is practiced, articulated and exploited. Following this broad objective, the book is divided into three core sections, with equal numbers of chapters, which together provide a focused discussion of the Practices (1), Politics (2) and Ethics (3) in risk research.

Part I of the book is entitled ‘Practices in Risk Research’. It aims at the assessment and investigation of some of the main methodological

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issues in doing risk research. Comprised chapters aim to critically examine the meaning and practical implications of the concept of 'risk' itself, to problematise the logics and driving forces of our methodological approaches, with a particular focus on issues of interdisciplinarity, and to reflect upon the practicalities and pragmatics of risk research more generally. Broadly speaking, two main questions are at the core of these investigations: How are problems of risk shaping our methodological and conceptual approaches? And, in turn, how are the concepts and methods we use conditioning the formats and contents of our problem framing and output?

Part II – 'Politics in Risk Research' – examines the institutions, agents and interests that are surrounding and shaping our perception, experiences and studies of risk. Risk, in this context, is understood as a hard-fought resource, i.e. a competitive market of academic research, political intervention and economic exploitation. This means: risk research is necessarily and inextricably implicated in a complex grid of relationships of power. It is situated within and in turn influencing the socio-political processes and practices of managing risk in the contemporary world (Bradbury, 1998). From various perspectives, this part, hence, raises a series of important questions relating to the socio-political constructions of risk and to the various logics and issues involved in current risk policies.

Part III – 'Ethics and Risk Research' – examines the various and complex ethical issues involved in, and produced through risk research. Our starting point is that risk research is by no means a neutral, value-free field of study (Fischhoff 1995; Renn 1998). Values are reflected in how risks are measured, framed, described, qualified, perceived, experienced, etc. Generating knowledge and practices about risk is always mediated by a series of norms, problems, intentions, institutions and agents, which directly and indirectly shape the form, direction and content of our output. At the same time, the field of risk research itself – by its practices and knowledge – actively participates in the co-production of 'risk' as a series of problems to manage and 'solve'.

In closing the volume we suggest that these issues are crucial to address today, particularly in the context of events such as the Fukushima earthquake and tsunami. Such events demonstrate the residual vulnerability of social and economic infrastructures and the often compromising position of formalised risk assessment and risk research. In making the case for a form of 'critical' risk research we suggest that this volume might therefore be read as a response to these challenges; a response that takes as its primary site of critical reflection the institutionalised role that risk research and risk researchers play in mediating responses to such events.

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