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Matthew B. Kearnes, Francisco R. Klauser
and Stuart N. Lane

Critical Risk Research

Practices, Politics and Ethics



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EDITED BY

Matthew Kearnes

Francisco Klauser

Stuart Lane



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Critical Risk Research

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Preface

This volume was born of a collaboration of a group of scholars connected to the Institute of Hazard, Risk and Resilience, Department of Geography, Durham University. The breadth of subject matter covered in this volume is a testament to the intellectual scope of the institute and extraordinary scholarly energy and enthusiasm it enables. The publication of this volume is also a timely reminder of the intellectual breadth of 'risk research'. Included in this collection are papers dealing with the aftermath of natural hazards, the risks of new technology and the increasingly interconnected strategies adopted to 'secure' public spaces. As the asymmetric threats of global terrorism and the novel risks of new technologies continue to occupy the contemporary political imagination, alongside the threats posed by natural hazards, the scope of this collection is indicative of the ways in which risk research has become a key site of interdisciplinary exchange between often diverse approaches and intellectual traditions. As editors we are therefore indebted to all of the contributors to this volume. It was only their enthusiasm and energy that has made this project possible. Thanks are also due to Rachael Ballard, Izzy Canning and Fiona Woods at Wiley-Blackwell for the work they have both devoted in making the publication of this volume possible. We are grateful to Cosette Stirnemann at Neuchâtel University for formatting the chapters of this collection.

Matthew Kearnes

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CHAPTER 1

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.¹ 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,² 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,³ the political fallout was felt internationally, with significant protests in Germany, Switzerland and Italy over the continuing reliance on civil nuclear power.⁴

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

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

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

⁴ <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

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”.⁵ 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.⁶ 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)

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

⁶ 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: risk = hazard x exposure x vulnerability or risk = probability x consequence.⁷ 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

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

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.⁸

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

⁸ 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).