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When flood risk transforms a territory: the Lully effect



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Valérie November,
Marion Penelas
and Pascal Viot

ABSTRACT: Drawing on a study of floods in Lully, Geneva, the authors describe the plural dimensions of flood risk and extend the conventional understanding of risk, often limited to mapping a hazard zone and gradation of consequences. They analyse the dynamics of risk beyond the immediate phenomenon, through time and space. They draw on various kinds of knowledge of risk, from those affected by the floods, from locals with expert knowledge and from officialdom. A detailed analysis tracks how events transform these types of knowledge and how they evolve through time. In a sense, the flooding in Lully can be seen as a focusing event – an event that led to a shake-up of knowledge and practice and became an agent in the process of change.

Introduction

One approach to risks (for researchers and those involved in risk management) is to define them in spatial terms. Drawing flooding zones, locating an area of polluted soil, or identifying housing that no longer meets minimum safety standards, are some common ways of identifying areas at risk in order to deal with them more effectively. Thus, the spatial dimension of risk is often understood in a restricted sense, as a 'passive territory', which may require careful

monitoring or special planning to protect it from disaster. In previous research (November, 2002, 2004, 2008), we have shown that the spatial dimension of risk is in fact more complex than a Cartesian metric, and that other types of relationship to territory exist.

In this article we explore this idea further, considering risks and territory in an attempt to understand the 'spatiality of risks': how risk emerges and the relationships between risks and affected areas. Besides the material and physical dimensions of risk, we consider their social, political, and economic dimensions, which result in ever-changing vulnerabilities, imbalances and delicate rebalancing acts. First, however, we must consider the methods used to represent, identify, classify and formulate risks, particularly in view of the number of stakeholders, with varying fields of expertise, who are involved in such processes (Gilbert, 2007). This approach requires us to leave the definition of risk open-ended, at least to begin with.

We use data from a 2004 project, *The Vulnerability of Urban Infrastructures and Crisis Management: Impacts and lessons learned from flood events in Switzerland*, within the framework of a European Union COST project, Action C19 (November and Reynard, 2006; Reynard and November, 2008). On the basis of three case studies, one of which was flooding in the village of Lully in November 2002, we identify and theorise the impact of a local disaster (critical event) on local development processes and collective knowledge of risk. The research was conducted using documents (archives, inquiry reports, development plans, hazard studies, etc.) and 40 interviews with various stakeholders involved in or affected by the crisis: flooded residents, farmers, planning officials, water management officials, and the emergency services. We will describe what one interviewee called 'the Lully Effect', an illustration of how a critical event can refocus attention on known but partially forgotten hazards, encouraging people to think about why such risks had been forgotten in the first place, and helping to foster a more concerted effort to manage flood risk in the future.

A memory for water or the (un)expected emergence of flood risk

The village of Lully lies in the Bernex district of the Canton of Geneva, in western Switzerland. The area affected by the flooding – Lower Lully (*Bas-Lully*) – is one of the most recent extensions to the village. Lully expanded gradually during the twentieth century, initially above the floodplain, then in the 1960s into the area at the foot of the hill. Known as Lower Lully, the area lies close to the River Aire, the banks of which are above the average ground level of the area.

The events and how the crisis was managed

The village of Lully is exposed to three sources of flood risk: rapid rises in the level of the River Aire; a high piezometric level of the surface aquifer; and run-off water from agricultural land further up the hillside. In addition, there are several aggravating circumstances: Lower Lully constitutes a small basin, in which run-off water collects without any natural drainage into the river; houses were built with inhabitable basements (in spite of not being permitted by local building regulations); and numerous alterations had seriously diminished the capacity of a collecting drain. Following heavy rainfall in the morning of 15 November 2002, the Lower Lully basin was flooded by a build-up of run-off water, as the main drain

was blocked by a sharp rise in the level of the River Aire. In fact, the potential dangers had been revealed in March 2001 by a smaller flood that had occurred for exactly the same reasons. Ultimately, the damage was only of a material nature (flooded houses and apartment buildings, leading to evacuations and re-housing of families), but the outcome could have been far more tragic, given that some residents slept in the basement, and were woken up only by the water flooding in.

Local firemen had already been called out during the day on 14 November to bail out a flooded underground car park. Having been called out again at around 3am, they were already at the scene when a further rise in water level caused the ditches¹ around the basements of the newest houses to burst. Even though the area was under water at that stage, the emergency services did not think it necessary to order a complete evacuation because they were unaware that the house basements were inhabited. Consequently, the safety of residents was put at risk, due to the misapprehension that building regulations in the affected housing would have been followed². While the developers had marketed and sold the basements of the worst-affected housing as living space, planning permission had been granted without the breach in building regulations being detected. Furthermore, a previous opportunity to identify this risk – when excavations for the planned housing had been flooded in 2001 – had also been missed.

When flood risk transforms a territory: the Lully effect

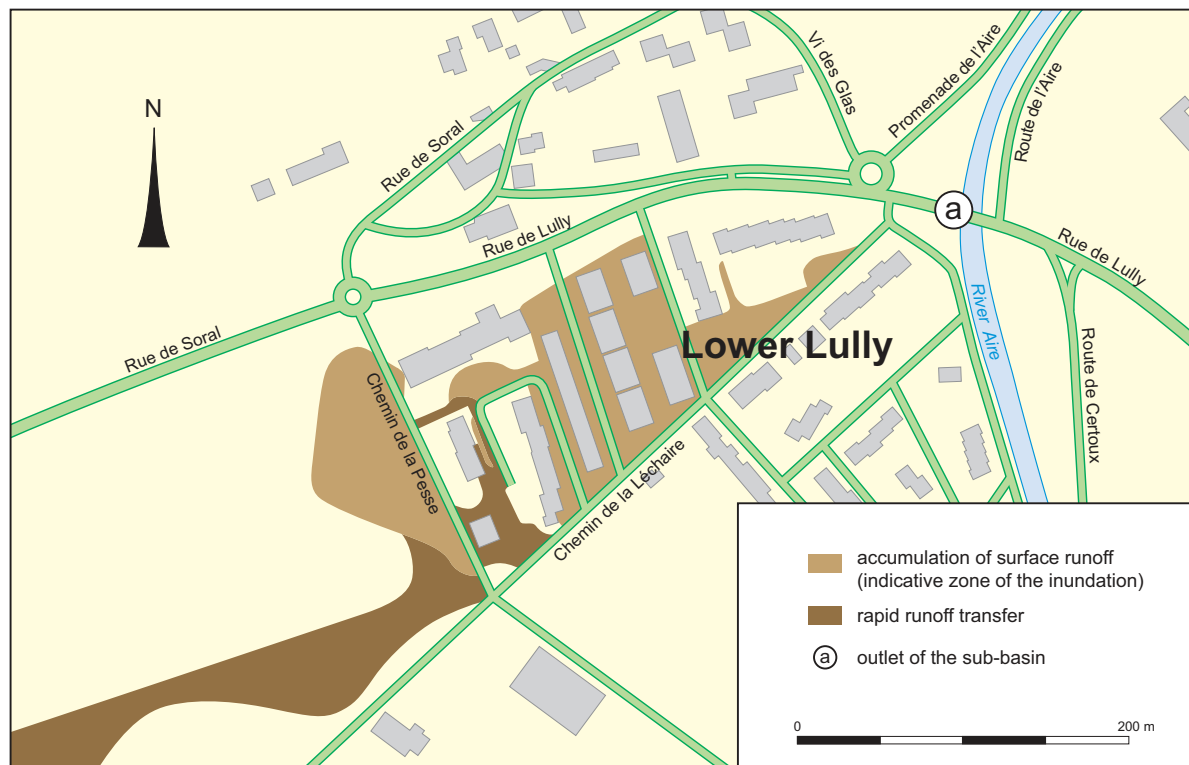


Figure 1: Map of Lully showing the area affected by the flood event of 15 November 2002.

When flood risk transforms a territory: the Lully effect



The Aire Plain: Land improvements and flood prevention over the twentieth century

Changes in flood policy have progressively changed the configuration of the Lully area in ways quite similar to those described by C.L. Johnson and colleagues for England and Wales (Johnson *et al.*, 2005). Historically, flood risk in Lully was well-established. Place-names indicate areas of marshland, and people with long-term associations with the area (such as market gardeners and a few local residents) could testify to what had been a major feature of its development from as far back as the late nineteenth century. Efforts to combat flooding and improve poor drainage in the area officially began with the first alteration of the river in 1890 and the first Cantonal Drainage Law (*Loi cantonale sur le drainage*) in 1907.³

In an attempt to prevent sharp rises in its water level causing flooding, in 1890 the course of the river Aire was altered where the danger was greatest, between the French border (for administrative reasons) and the village of Lully. In the 1920s the Canton of Geneva began subsidised drainage campaigns and regrouping of land holdings with a view to optimising agricultural production. 400km of canals and land drains were constructed, and a total of 630 hectares, including 98 in the Lully plain, were successfully turned into agricultural land. However, the standardised size of the drains was inadequate in areas of high flood risk, and local dissatisfaction with the arrangement was exacerbated when recurring floods caused high levels in the river and prevented the water from draining away. The same problem would occur during the 2002 floods.

As land improvement works continued, the course of the River Aire was altered for a second time. The aim on this occasion was to ensure an outlet for drainage water by lowering the riverbed, especially in Lully. The work was completed in 1933, but failed to resolve the flood problem. The channelling of the Aire increased the speed of upstream run off, leading to sharper rises in water levels downstream. A third and final alteration became necessary downriver, and this was completed in 1940.

Planning permission for a large housing development in 1954 marked the beginning of the urbanisation of Lower Lully. Although the third river alteration was deemed to have solved the drainage problem once and for all, sharp rises in water levels led to two further

floods, in 1976 and 1979, when part of the new development had already been built. That led in 1980 to the construction of a drainage gallery downriver from the village, designed to transfer excess water into the River Rhône. In 1979, local residents obtained an injunction from the Geneva Administrative Tribunal to prevent new houses from being built, on the grounds that freshwater drainage systems were inadequate. As a result, an expert report was drawn up, which recommended enhancing the capacity of several collecting drains. The most recent floods in Lower Lully, both caused by excess run-off water, occurred in 1983 and 2001.

Thus, even though flooding had been an integral part of the recent history of the Aire plain, its threat had been partially forgotten, partly as a result of planning permission for new housing in 1954 and, more importantly, on account of the new drainage gallery built in the 1980s. The high water levels of 1976 and 1979, the decision of the Administrative Tribunal, and the flooding in 1983, revived the issue of high water levels and inadequate drainage. However, on each occasion, the response was to carry out ad-hoc repair work designed to facilitate the area's further development.

Flood protection measures: a means of assimilating – and concealing – risk?

Attempts were made to resolve the issue of flooding whenever the vulnerability of the area came to the fore. In that sense, the risk was never exactly ignored, but, with hindsight, we now know that successive alterations to the watercourse led to other unforeseen risks (e.g. reduction of the flood basin, channelling heavy flow downstream).

Nevertheless, the memory of the risk and all its various components seems to have been lost due to the adoption of successive protection measures.⁵ The two main sources of flooding were addressed first jointly (the second river correction was largely designed to improve the drainage of run-off water, the volume of which entering the river had increased sharply following the drainage of the plain), and then separately (the drainage gallery and increase in the capacity of collecting drains). These protection measures seem to have allayed the fear of flooding and engendered a sense of security. Nothing now seemed to stand in the way of developing an area

nonetheless liable to flooding. Was this the beginning of the process of risk memory loss?

Retaining the memory of risk is a complex matter. For instance, expert knowledge is built up gradually over the course of a whole career, and the transmission and sustainability of such knowledge has always been a challenge (Boutte, 2007). In this case, the knowledge holders are individuals (experts and others) and archives. Long periods of stable water levels, coupled with the adoption of technical protection measures, contribute to risk memory loss. Prior to the critical event in Lully, the local planning authorities no longer sought to access the relevant knowledge. While evidence of the risk could easily have been found, local authority departments were partially unaware of it, allowing for breaches in building regulations to take place, sometimes deliberately (to increase real estate values in the area), and sometimes through negligence (planning permission granted without due regard for the potential dangers).

While long-term residents were still aware of the risk, if only through having experienced several floods first-hand and thus prepared themselves for others, the same could not be said of new residents, many of whom had arrived on account of changes in land allocation, and were preceded by promoters determined to seek a maximum return on real estate value (inhabitable basements). In an area where natural hazards had never generally been very threatening, the new arrivals came in search of a better quality of life, in a suburban district with a mixture of small farms and recently-built homes. The 'village home' became synonymous with security, and the city was perceived as more dangerous even though it had never been associated with natural hazards either. Thus, new residents were easily convinced by the promoters, the architects, and indeed the authorities, who described the basement flooding of the partially built houses in 2001 as a one-off event.⁶

How floods draw attention to risk and help to recover lost memory

Taking risk to mean 'a well-identified hazard, associated with the occurrence of a clearly describable event or series of events, which we do not know will happen but we know is likely to happen'⁷, all risks have a dual identity: on the one hand, they are potential occurrences, or distant expectations (Koselleck, 1985), yet on the other hand, reference is

made to past disasters to define and describe current risks. Disasters have a real impact, which means they can be used for calculations and measurements, or turned into 'likely scenarios'.⁸ The past informs each situation in terms of its own risks, through a carefully calculated transformation of knowledge of past disasters.

The relationship between disaster and risk – is it really so obvious?

In the case of the flooding in Lully, previous events – except for the 2001 flood – occurred in such a way as to make it difficult to predict accurately what was to come, or for local people to retain the memory of risk. While there had been previous instances of flooding, they had come at a time when the land was essentially agricultural. Subsequent changes in land use had helped to create new manifestations of flood risk by transforming the behaviour of variables and giving rise to new vulnerabilities (such as increasingly impermeable ground cover and progressive densification of flood-prone areas as safer areas become scarce). Moreover, the flooding in 2002 resulted not from a rise in the level of the Aire, as many interpreted it, but from the impact of surface run-off that few had anticipated. In fact, although earlier events had occasionally had dramatic consequences, they had never been sufficiently serious (in terms of their scope and social reaction) to make a lasting impression on people. That is why we must look beyond the rationalist model described above and consider practical rather than pre-established means of enabling stakeholders to understand and manage risk more effectively. By focusing on the work of all those engaged in making risks *readable* in an attempt to face up to their threat, we will use this approach to describe the flooding in Lully as *the outcome of a misreading of risk*.

All risks are the outcomes of a process of individual and collective efforts to identify the phenomenon and its likely consequences. In other words, the *descriptiveness* of the risk, or the extent to which the negative consequences of its potential emergence can be described, either on the basis of predictions or experience (rainfall threshold, occupied basement rooms, area liable to flooding, etc.), is central to the risk identification process. A risk needs to have been recognised, or 'read', by the relevant stakeholders, before it can be described; the mere availability of information is no guarantee that it will be noticed by the people concerned. For instance, a master plan for the district of Lully (the Ortis Plan), published in 1982,

When flood risk transforms a territory: the Lully effect

When flood risk transforms a territory: the Lully effect



contained information concerning the areas liable to flooding, and yet new housing estates would still be built in precisely those areas, with no further reference being made to the flood risk in subsequent planning documents. Evidence of the threat did reappear on hazard maps published in 2000, but local planning officials failed to take it into account. As a result, the flooding ended up catching everyone, including officials at Geneva's water management authorities, unawares. The vagueness of the category 'run-off water', identified as a risk – or, at the very least, a nuisance – during the nineteenth-century land improvement campaigns (leading to the drainage of marshland), and the fact that it was less explicitly identified in the Orts Plan (where areas are simply identified as liable to flooding, without mentioning the source of the risk as either rising water levels or run-off), prevented the risk from being correctly interpreted.

Critical event and focusing event

The notion of a *hold* may be helpful in understanding how this situation came about. According to French sociologists Bessy and Chateauraynaud, holds emerge from the interaction between bodies and strategies, 'like a climber's holds emerging from a series of confrontations between the mountaineer and the rock face. Holds can describe the relationship between people and objects in two ways: as having a hold on something, an expression often used to describe humans (active, interactive and inquiring) gaining the upper hand over objects and their environment (inert, passive and subject to human endeavour); or as suggesting the irreducible nature of objects and the difficulty of even getting a hold' (1995, p. 239). The holds selected are never a foregone conclusion, but 'the outcome of a meeting between a strategy, pursued by the relevant stakeholder(s), and a network of bodies, characterized by their peaks, folds and cracks' (1995, p. 239). In a risky environment, where various disaster prevention strategies could be employed, measures are in practice adopted on the basis of a selection process, or an assessment of relevant factors. In this context, the events in Lully in 2002 can be seen as the outcome of a misreading of risk by the relevant stakeholders, forcing them to make an emergency reassessment with scant regard for established procedures.⁹

The events of 2002 were therefore a necessary precondition for what has been described as the 'Lully Effect': a reopening of channels of communication between stakeholders with a view to drawing up a common prevention strategy. In spite of its relatively

small scale, the flooding was an example of the type of *focusing event* described by Birkland (1998). For instance, it was the driving force behind a restructuring of local government departments, including the creation of a new post specifically to scrutinise planning applications in order to assess the likelihood of associated flood risks. Rather than simply looking at the distance of the proposed building from the river (in the past, applications were only forwarded to the rivers department if the proposed building was less than 100m from the river), the occupant of the new post would carry out a comprehensive flood-risk assessment of all planning applications, taking into account all relevant factors, such as ground water, run-off water, rivers and streams. The district authorities also set up a flood warning system, consisting of a telephone hotline with three levels of alert. A local residents' association was formed and has since become an essential partner for the local authorities. Residents bought flood guards for their windows and made arrangements for getting into each other's homes in the event of a repeat of the flooding. In other words, a whole hazard protection system was set up, involving both objects (streams, telephones, maps, to name but a few) and people (local residents, officials, etc.).¹⁰ Fire officers, weather forecasters and other professionals also provided valuable feedback, leading to a lowering of the emergency rainfall threshold for Lully and the creation of a special flood prevention unit to be activated in the event of heavy rainfall (the CIGE).

The 2002 flooding also helped to speed up completion of a number of projects already under way. Work on the collecting drain was soon completed, work on the revitalisation of the river Aire was carried out with renewed energy, and significant resources were allocated to the protection of local residents. Indeed, the revitalisation project was widened in scope to give equal weight to flood-risk protection, and special priority was granted to the Lower Lully section of the river, to the dismay of market gardeners in other areas who had been seeking land improvements. Thus, a collective rethink took place in the aftermath of the flooding, enabling people to see problems in a new light and to suggest innovative solutions.

Multiple sources of knowledge

The Lully case demonstrates how the perception of risk evolved during the response to a critical event, and also highlights the existence of multiple sources of knowledge of risk before the event took place. Various pockets of knowledge co-existed without ever

coming together, underlining the need for enhanced communication of the various (and by no means exclusive) approaches to risk identification and assessment.

Some stakeholders, on account of their training, use highly specialised vocabulary to provide a scientific analysis of the event. Others, such as local residents or market gardeners, do not possess such specialist knowledge or expertise, and so rely more on their powers of observation. And yet, interviewees consistently referred to the same issues, irrespective of their social or professional background or training. All of those affected, from the local residents whose houses were flooded, to senior planning officials, referred to the collecting drain, the drainage campaigns, the river alterations, the saturated soil, the run-off water, the flood basin, the age-old problem of rising water levels and the Geneva information system (SITG – *système d'information du territoire genevois*), etc. This reinforces the idea that knowledge of risk comes from multiple sources. According to Le Bourhis, this can be attributed to sociological and organisational changes – such as enhanced public access to information, particularly via the internet – and administrative reforms that led to cartography rationalisation (systematic collection, standardisation, storage and publication of the territorial data) (2007).

These distinct but convergent sources of knowledge of risk had never come into contact with each other before the 2002 flooding. The information held by different stakeholders had never been properly shared in spite of numerous (lost) opportunities. Thus the 2001 flooding, which had less serious consequences but where the new houses under construction served as collecting basins, failed to serve as a warning of the likelihood of further flooding in the area. Plans were made to install a new collecting drain, but the work was only carried out after the second, more serious, flood. Hazard maps were available, but the Geneva authorities failed to ensure that development plans took them into account. Market gardeners knew that the area was liable to flooding, but their warnings about poor water management were never taken seriously enough. One individual told us: 'We know the area, and we knew that flooding was always a possibility, but is it really up to us to warn people about it?' In fact, market gardeners could have warned people of the dangers, in view of their local knowledge, but tended to be accused of 'doom-mongering' if they did so, on account of their lack of authority or status (Chateauraynaud and Tornay, 1999, p. 10). This

provides further evidence of a breakdown in communication,¹¹ with the result that different risk assessment approaches developed in isolation from one another.

Dwelling in territory at risk

Clearly, flooding constitutes a highly traumatic experience for some, and events of this kind also act as necessary reminders of the need for concerted social and political action (described here as the 'Lully Effect'). Risks tend to be gradually forgotten or neglected, until a critical event, identified in retrospect by researchers, helps to trigger a collective remembrance¹² of risks and their impact. The often heated discussion that results from the shared experience of flooding helps to create a sense of common responsibility for dealing with risk in local communities. In other words, flooding seems to help *develop* (in the photographic sense) old and neglected knowledge, by marking with the graphic image of flooded territory both the minds of individuals (individual dimension) and the common perceptions and representations of risk associated with the event (collective dimension). As a result of this process, triggered by the critical event, a collective experience is committed to memory, both in the minds of individuals and in the relevant political, technical and administrative bodies. We can see how subsequent perceptions of risk are formed by observing how risks are 'translated', through a process of 'argumentation, profit sharing, advocacy and alliance building' (Vinck, 2003) 'leading to the gradual formation and emergence of a social and natural world' (Callon, 1986).

Experience of disaster and social inquiry

We can therefore see the social experience of the Lully flooding in a different light. The end result was to rid the local community of its perception of risk as no more than an external threat to the village's safety. It also went some way to banishing the myth that risk could be identified and assessed with pinpoint accuracy, as an object of scientific and technical study. The multiplicity of approaches to risk assessment (scientific, technical and popular) and the unsuitability of preventive measures to cope with unpredictable weather conditions indicate the limits of that conception. Flooding 'is a stimulus to action' (Latour, 1991); it forces residents, authorities, and indeed all the relevant stakeholders, to leave old habits behind and to deal with issues in the light of experience, in

When flood risk transforms a territory: the Lully effect

When flood risk transforms a territory: the Lully effect



the sense of the 'perception and reception of a physical reality' (Ogien and Quéré, 2005). In other words, experience here describes a transformational journey; an ordeal that opens up new possibilities for understanding and interpretation. Referring to Dewey's pragmatist philosophy, which identifies experience as the organising principle of an ever-changing system, Ogien and Quéré state that 'the system has inner tensions, sources of resistance, incompatibilities and contradictions, all of which lead to imbalances, but it also has the potential to deploy structuring elements' (p. 38). In their view, experience creates an artificial sense of order in an effort to reduce the inevitable complexity of real situations, to overcome sources of tension, incompatibility or conflict arising from the interaction between bodies and their environment, and to restore a necessary balance. In the light of this approach, we suggest that, in the case of the flooding in Lully, bodies and the environment should not be seen as independent entities at all, but as two elements of the same process.

Indeed, experience implies 'an active encounter with things', where the body tries out 'its powers of action on the world around it'. This leads to changes in the surrounding environment which in turn affect bodies and alter the conditions of their existence (Dewey, 1939). From this perspective, experience means the 'controlled or managed transformation of an indeterminate situation into a situation so determined by its constituent characteristics and relationships that it converts the elements of its original situation into a unified whole'. It is also a method of 'social inquiry' (another of Dewey's key concepts) which is seen as an ongoing activity common to all participants and aims to adapt society to a given situation by removing its sources of confusion or conflict, in order to facilitate the choice of a particular course of action. The concepts developed by Dewey can be used to understand the reflexive activity (which may not be either planned or co-ordinated) driving the relevant stakeholders in the aftermath of the disaster. Once the flooding had destroyed the sense of stability associated with living in Lully, people had to make new arrangements, incorporating the environment as the subject of agency.

Residents begin to share with their environment

There can be no doubt that, for the inhabitants of Lully, the experience of the 2002 flooding constituted a challenge to their previous way of life. Their whole relationship to space was called into question. For

example, recent arrivals in Lower Lully, who had thought they were moving to a quiet, peaceful area (compared to the urban environment they had left behind), realised that their new environment was neither neutral nor passive, but had its own history, physical and geological characteristics, reactions to changing weather conditions, etc. Dwelling, understood as a given (or the occupation of a passive territory), suddenly became an ongoing practice of building a dynamic relationship to space.¹³ In this sense, the flooding helped to make residents realise the complex relationship between dwelling and its constituent territory. At the same time, their experience of a critical event led to the development of new practices aimed at adapting modes of dwelling to an environment now perceived as a risky one.

Consequently, one could argue that the critical flood event should be seen as the subject of agency (in the sense of an object with the capacity to influence the outcome of an action), playing a role equal to that of human activity – in shaping territory. Like Bruno Latour, who argues that 'it isn't so much the sudden emergence of environmental issues on the political agenda that we are witnessing, but the multiplication of tangled objects, which can no longer be confined to the natural world or naturalized by anyone' (Latour, 2004), we maintain, on the basis of the Lully case, that natural phenomena cannot be confined to their natural dimension, but should be considered as active subjects in their relationships with other bodies living in the same territory. Therefore it is important to understand how the interaction between humans and non-humans generates new situations, irreducible to the rearrangement or recombination of materials that existed prior to that interaction. Restricting risk analysis to the two dominant (functional and probabilist) approaches fails to allow for a comprehensive view of the relationship between risk and territory. Based on the lessons drawn from this research, we intend to adopt a new approach to the risk–territory relationship. We will assert that, in order to take into account the multiplicity of approaches, as well as the complex spatial dimensions of risk, analysis should focus on the *connexity*¹⁴, rather than proximity (or close relatedness) of activities. This will reveal the multiple, and not only metric, proximities involved, resulting from discursive as well as geographic spaces.

Conclusion

Thus, the Lully case study opens up further research opportunities into risk assessment and crisis

management, focusing on how knowledge is acquired, consolidated, revised or abandoned as communities are exposed to risk, either before or after a critical event. In particular, it would be interesting to consider how knowledge is acquired by risk professionals (such as fire officers, forecasters, etc.) and regulators (such as planners and lawyers), in view of its numerous material and spatial consequences for local development. The empirical study of the Lully floods demonstrated the complex nature of the relationship between risk and territory, and revealed many of the spatial consequences of that relationship. First, it showed that the notion of 'passive territory' cannot be used to explore the spatial dimension of risk, and that such a truncated view fails to reflect a detailed understanding of the local development processes caused by situations of risk.¹⁵ Second, it showed that the logic of seeing disasters as the 'natural' extension of risks has its limits. A disaster-based analysis tends to assume that the consequences can only be measured in terms of the scope of their impact. However, the flooding in Lully was more of a *focusing event*, that is to say an event which led to a shake-up of knowledge and practice and, at the same time, became an agent in the process of change. This accounts for our choice of the expression *critical event* to describe the situation more accurately.

Ultimately, the main aim of this study was to show how risks and their actual manifestations as crises help to change the territories in which they occur. Therefore highlighting the various forms of knowledge involved in defining the spatiality of risk is of crucial importance: only then can the performative dimension of the risk–territory relationship be explored, revealing its capacity to alter the tangible and intangible dimensions of space. Our key theoretical and practical aims, backed up by this study of the 'Lully Effect', are to deepen our understanding of the local development processes triggered by exposure to risk, and to help to combine expert and other forms of knowledge to provide effective social and political responses to the growing number of risks that occur in contemporary societies.

Notes

1. Channels dug around the external outside the building walls to allow sunlight into the basements.
2. Legal action has been taken against the local and regional authorities as well as the architects and developers, on charges of endangering the lives of residents.
3. Pursuant to the Federal Law on the Improvement of Agriculture in the Confederation (*Loi fédérale concernant l'amélioration de l'agriculture par la Confédération*), adopted in 1893.
4. The Canton of Geneva is one of the 26 constituent States

of the Swiss Confederation (*Confédération helvétique*).

5. If one issue seems to have been neglected in the literature on risk, it is the question of memory. We would argue that memory of risk results from individual and collective events and, at the same time, generates individual and collective practices. Through this two-way process, it leaves its trace – or its mark – on territory. For a more in-depth exploration of this idea, see Leborgne's original approach (2006) concerning forgetfulness and the role of collective memory in the sense of belonging to a particular territory.
6. Trust in this sense is very important and is built up through various processes at different stages of risk issues (see for instance O'Riordan and Ward, 1997; Parker *et al.*, 2007).
7. '[...] *danger bien identifié, associé à l'occurrence d'un événement ou d'une série d'événements, parfaitement descriptibles, dont on ne sait pas s'ils se produiront mais dont on sait qu'ils sont susceptibles de se produire*', according to the definition proposed by Callon, Lascoumes and Barthe (2001, p. 37).
8. For more on these processes, see, *inter alia*: Callens, 1997; Desrosières, 1998; Hacking, 1975.
9. As Ost says, 'emergencies, which generate urgent and pressing needs, create exceptional circumstances, where the seriousness of the situation calls for immediate action, partially ignoring or even totally disregarding usual procedures if necessary' (1999, pp. 276-7).
10. And the community showed genuine co-operation and commitment to that system (see Latour, 2005).
11. The Tanquerel Report (2003), commissioned to investigate possible administrative failures, points to overlapping areas of 'negative competence'.
12. For more on collective remembrance processes, see Halbwachs, 1992; Ricoeur, 2004; Leborgne, 2006.
13. Our understanding of the term 'dwelling' is with reference to Lévy and Lussault (2003, p. 442), for whom 'this very general and inevitably multi-dimensional term (dwelling can refer to many different actions, processes and objects) is an accurate reflection of the multi-faceted nature of relationships to space. The term also suggests the opening up of the relationship between dwelling and dweller: one cannot dwell in an inhabitable dwelling, but dwelling may alter spaces significantly' (translated by the authors).
14. 'Connexity' is a concept used to evoke the multiplicity of relationships between places, points and networks (see Lévy, 1994; Offner, in Lévy and Lussault, 2003, pp. 198-9). 'Connexity' makes it possible to conceptualise and understand the heterogeneous nature of 'territoriality'. This notion has been applied to risks only recently (November, 2004).
15. This challenge has been taken up by the 'Risk Print' research project, launched at EPFL in October 2006 by the ESPrI Group (*Study Group on the Spatiality of Risks*), financed by the Swiss National Science Foundation.

Bibliography

- Bessy, C. and Chateauraynaud, F. (1995) *Experts et Faussaires: Pour une sociologie de la perception*. Paris: Métailié.
- Birkland, T.A. (1998) 'Focusing events, mobilization, and

When flood risk transforms a territory: the Lully effect

When flood risk transforms a territory: the Lully effect



- agenda setting', *Journal of Public Policy*, 18, 1, pp. 53–74.
- Boutte, J.-L. (2007) *Transmission de Savoir-faire : Réciprocité de la relation éducative expert-novice*. Paris: L'Harmattan.
- Callens, S. (1997) *Les Maîtres de l'Erreur: Mesure et probabilité au XIXe siècle*. Paris: PUF.
- Callon, M., Lascoumes, P. and Barthe, Y. (2001) *Agir dans un Monde Incertain: Essai sur la démocratie technique*. Paris: Seuil.
- Callon, M. (1986) 'Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay', in Law, J. *Power, Action and Belief: A new sociology of knowledge?* London: Routledge, pp. 196–223.
- Chateauraynaud, F. and Torny, D. (1999) *Les Sombres Précurseurs: Une sociologie pragmatique de l'alerte et du risque*. Paris: Éditions de l'École des Hautes Études en Sciences Sociales.
- Desrosières, A. (1998) *The Politics of Large Numbers. A history of statistical reasoning*. Translated by Camille Naish. Cambridge, MA: Harvard University Press.
- Dewey, J. (1939) *Logic: The theory of inquiry*. London: Allen and Unwin.
- Dewey, J. (1927) *The Public and its Problems*. London: Allen and Unwin.
- Gilbert, C. (2007) 'Crisis analysis: between normalization and avoidance', *Journal of Risk Research*, 10, 7, pp. 925–40.
- Hacking, I. (1975) *The Emergence of Probability*. Cambridge: Cambridge University Press.
- Halbwachs, M. (1992) *On Collective Memory*. Edited, translated and with an introduction by L.A. Coser. Chicago, IL: University of Chicago Press.
- Koselleck, R. (1985) *Futures Past: On the semantics of historical time*. Cambridge, MA: The MIT Press.
- Johnson, C., Tunstall, S. and Penning-Rowsell, E. (2005) 'Floods as catalysts for policy change: historical lessons from England and Wales', *International Journal of Water Resources Development*, 21, 4, pp. 561–75.
- Laganier, R. (ed) (2006) *Territoires, Inondation et Figures du Risque*. Paris: L'Harmattan.
- Latour, B. (2004) *Politics of Nature: How to bring the sciences into democracy*. Translated by Catherine Porter. Cambridge, MA: Harvard University Press.
- Latour, B. (1991) 'Technology is society made durable', in Law, J. *A Sociology of Monsters: Essays on power, technology and domination*. London: Routledge, pp. 103–31.
- Latour, B. (2005) *Reassembling the Social*. Oxford: Oxford University Press.
- Leborgne, M. (2006) *L'espace d'un Oubli. Le rôle des mémoires collectives dans la construction du sentiment d'appartenance territoriale: le cas du Parc naturel régional du Verdon*. Thèse, École des Hautes Études en Sciences Sociales.
- Le Bourhis, J.-P. (2007) 'Du savoir cartographique au pouvoir bureaucratique. Les cartes des zones inondables dans la politique des risques (1970–2000)', *Genèses*, 3, 68, pp. 75–96.
- Lévy, J. (1994) *L'espace Légitime. Sur la dimension géographique de la fonction politique*. Paris: Presses de Sciences Po.
- Lévy, J. and Lussault, M. (2003) *Dictionnaire de la Géographie et de l'Espace des Sociétés*. Paris: Belin.
- November, V. (2008) 'Spatiality of risks', *Environment and Planning A*, 40, pp. 1523–7.
- November, V. (2004) 'Being close to risk. From proximity to connexity', *International Journal of Sustainable Development*, 7, 3, pp. 273–86.
- November, V. (2002) *Les Territoires du Risque*. Berne: Peter Lang.
- November, V. and Reynard, E. (dir) (2006) *Vulnérabilité des Infrastructures Urbaines et Gestion de Crise Impacts et Enseignements de Cas d'Inondation en Suisse*. Final Report, COST Action C19 'Proactive Crisis Management of Urban Infrastructure'. Lausanne.
- Reynard, E. and November, V. (2008) 'Social processes in natural disaster management. The case of recent floods in Switzerland', in Rostum, J., November, V. and Varn J. (eds) *Proactive Crisis Management of Urban Infrastructure*. COST Action C19. Bruxelles.
- O'Riordan, T. and Ward, R. (1997) 'Building trust in shoreline management: creating participatory consultation in shoreline management plans', *Land Use Policy*, 14, 4, pp. 257–76.
- Ogien, A. and Quéré, L. (2005) *Le Vocabulaire de la Sociologie de l'Action*. Paris: Ellipse.
- Ost, F. (1999) *Le Temps du Droit*. Paris: Editions Odile Jacob.
- Parker, D., Tapsell, S. and McCarthy, S. (2007) 'Enhancing the human benefits of flood warnings', *Natural Hazards*, 43, pp. 397–414.
- Ricœur, P. (2004) *Memory, History, Forgetting*. Translated by Kathleen Blamey and David Pellauer. Chicago, IL: University of Chicago Press.
- Tanquerel, T. (2003) *Rapport d'Enquête sur les Inondations du Village de Lully des 14 et 15 Novembre 2002*. Genève: Conseil d'État du canton de Genève.
- Vinck, D. (ed) (2003) *Everyday Engineering: An ethnography of design and innovation*. Cambridge, MA: MIT Press.

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