Towards a Memo-Techno-Ecology: Mediating Memories of Extreme Flooding in Resilient Communities

Joanne Garde-Hansen, Lindsey McEwen and Owain Jones

Introduction: From ‘Emo’ to ‘Memo’

In *Emotion Online: Theorizing Affect on the Intemet* (2013), Garde-Hansen and Gorton textually analyse the online debates around climate change media that entangle the threat of bad weather with fears over race relations, war and political dissent. Drawing upon Brian Massumi's work, which combines extreme weather and war into a discursively connected 'threat-form' of 'the suddenly irrupting, locally sell-organizing, systemically self-amplifying threat of large-scale disruption' (2011, p. 20), the authors propose the concept of an *emo-techno-ecology*. This addresses the way these changing-environment fears exist 1trans-medially' as well as at 1 hyper-local' levels. Thus, they argue that 'we need to understand our mediated ecology along two wavelengths simultaneously: as local and global emotions' or as 'global emo-scapes' in which citizens are affectively connected to their environment as 'technologically enabled infotainment producers/consumers' (2013, p. 128). More broadly, Brace and Geoghegan (2011), writing in the context of human geography, argue that climate change is encountered holistically, not just in how it is understood 'top-down' through the communication of scientific discourses but relationally at a local level:

> Climate change can be observed in relation to landscape but also felt, sensed, apprehended emotionally as part of the fabric of everyday life in which acceptance, denial, resignation and action co-exist as personal and social responses to the local manifestations of a global problem.
>
> (Brace & Geoghegan, 2011, p. 284)

Thus, any response to extreme weather in a specific region of the world is mediated along two axes, which can be considered important for understanding community flood memory. The first is through a vertical axis or mode of transmission as Pickering and Keightley (2012) define it in their appreciation of the work of Karl Mannheim (1959). Here there is 'a transmission of memory over time, in which the past is drawn into the present and reworked creatively in the interests of the future' (2012, p. 117). That this axis draws upon memories of flooding that pre-date climate change discourse is important, because learning to live with extreme weather conditions is not simply a contemporary phe-nomenon. Community flood memory has 'a vertical relation through time with what came before us and what may come after' (Pickering & Keightley, 2012, p. 117).

Second, we encounter historical and remembered changes in weather on a horizontal axis, being remembered in time (through modalities of archives, print media, oral stories, scrapbooks, anecdotes, home movies and regional news, many of which are mobilized into new digital formations). When shared in the moment of, and directly after, a flood event (horizontally), we connect these memories with the vertical axis of deeper time community memories of extreme flooding. This was achieved in our research through close and detailed analysis of empir-ical findings (interviews, videos, blogs and textual and documentary material) from the ESRC *Sustainable Flood Memories project*,[i] in order to understand new forms of communicating extreme weather and its consequences. In what follows, we present our uncovering and analysis of the 'social technology of memory' (Worcman and Garde-Hansen forthcoming) for catching and sharing affective experiences of the 2007 UK floods, and the subsequent use of social media for mapping flood memory. Our mixed-media approach represents what we are defining as a *memo-techno-ecology* of remembering and forgetting environmental crises. This interdisciplinary chapter allows us to present an innovative way of drawing together geography, memory and digital media studies into a critical reflection upon how individuals/communities use mediated memory practices to remain resilient through remembering and forgetting.

In their introduction to the collection *Geography and Memory* (2012), Jones and Garde-Hansen draw together the new conceptual and empirical emphases upon performative and embodied practices of everyday life through their attention to the work of Nigel Thrift

(1999, 2004a, 2004b, 2008). Thrift's (1992) early ideas on globalization have developed into an application of affect within cultural geography that has been important for resituating global concerns as not simply abstractly social-constructionist. Rather, 'care, risk, fear, responsibility, content-ment, self-control, anger, shame, desire and hate' come to re-emphasize 'affective personhood' to address 'local, national and global calls for individual and connected practices that are creative, sustainable, open, shared' Gones & Garde-Hansen, 2012, p. 5). Thus, *emotional geographies* should be understood as, first and foremost, the affective dimensions of home, space, place, landscape, area, environment and atmosphere as a priori experiences that move us, and that we move in and through. They are mobile emotional geographies. However, while traditional broadcast media may remember these emotional responses through human-interest stories fixed in time and space, individuals in their own communities and contexts record their experiences of extreme weather on a personal level and connect those memories on a range of scales, regionally, nationally and globally, keeping the memories mobile and anecdotal (that is, as anecdotes that demand to be told).

Therefore, for communities to come to terms with grief, loss and fear as a result of extreme weather events (floods, droughts, heat waves, tsunami, hurricanes) in the places they live, requires a rethinking of the discourses of resilience and sustainability couched solely in the sciences to include the mediatization of emotional and human security in the environment. The importance of personal and social memory practices for developing everyday resilience in communities is critical. In our most recent research for the ESRC *Sustainable Flood Memories* project, one aspect we focused upon was to understand new forms of communicating extreme weather that could be shared both vertically and horizontally in the ways set out. Thus, in this chapter we draw together examples of intergenerational communications (oral histories, newspaper archives, family narratives/albums and collections) and 'event' representations (television news reports, blogs, Flickr photos and tweets) into a mixed-media ecology approach to communicate resilience through remembering. We shift the 'emo' prefix to 'memo' in order to include personal memories of the 2007 UK floods that created a crisis and its incorporation as much in the domestic sphere of the home as in the environment, the economy, the

governance matrix and the infrastructure landscape of human development (Cabinet Office, 2008).

Remembering and forgetting the 2007 UK floods

In the light of Paul Connerton's adumbration on seven types of forgetting (2008), it is timely to understand flooding (like many other disruptive events) as an environmental crisis that is simultaneously remembered and strategically forgotten in seemingly equal measure. In order to move on (after severe weather events), the recently flooded communities we researched for the ESRC *Sustainable Flood Memories* project used media hyper-locally (that is, focused on messages produced and consumed in a specific location for a geographically defined audience within a floodplain). While new modalities emerged, of digitally recording and using online media to learn and participate in extreme flood narratives, other differentiated parts of the communities actively forgot flooding for personal and economic reasons. Thus, a big data approach to natural disaster mapping may overshadow hyper-local memories or the desire or will to forget - that is, if forgetting is ever really achieved. The latter is not surprising when we consider that floods can be catastrophic at the individual, community and state levels. The materialization of these and their impact on personal lives and on material goods often demonstrates that they bring a collective into existence, with increased possibilities for being social as a flood community (see Jencson, 2000; Oliver-Smith & Hoffmann, 1999). This is evidenced through media by the community 'pulling together' narrative template, but also after the event, through the establishment of flood action groups that often work on an issue for three or so years until it is resolved. However, while the collective memory of flooding in the UK may well be alive and attached to feelings of resilience, as some of our interviewees attested (for example, the 'Dunkirk spirit'), in one section of a floodplain, further downriver, personal memories of past floods may be traumatic, exciting or resistant to accessibility.

Flood materialization can be defined as the very varied practices by which flood memories and associated knowledge (lay or expert) are physically captured for assimilation, archiving and sharing by individuals, communities or organizations - whether through physical or 'known' points of reference, oral histories, memorialization, visualization through archives

of photography or newspaper cuttings, or through the everyday engagement with resilience measures around the home or in the landscape (see McEwen et al., 2012a/b). Clearly, the materialization of flood remembrance (in photographs, flood marks, personal and official archives) depends upon the social, cultural and material conditions and practices of the collective in the geographical area at flood risk. These practices we will draw upon below. Yet, a flattening out of the flood-scape into a globally connected mediascape finds social media mapped onto water in ways that illuminate human interaction with the environment as mediatized. Within the dominant narratives of the mediascape, floods are recorded and represented nationally and globally as human stories of natural disaster that may issue forth a politics of vulnerability and/or triumph. They may even be made into memorable data as tweets that become mappable along a floodplain (see 'Digital trails of the UK floods - how well do tweets match observations?' *The Guardian* 2012). However, in this national/global communications articulation of the flooded environment, the human story is less important than the trace that human story has left on a data-scape. Thus, in this context, geographies of climate change find highly differentiated communities and personally mediated memories becoming both forgotten and digitally (yet unevenly) networked.

Recent academic research that critically reflects upon floods and their representation addresses such increasingly contested or competitive mediations of flooding within nations and regions during and after events. The tsunami of 2004 (see Hastrup, 2008); Hurricane Katrina in 2005 (see Littlefield & Quennette, 2007; Robinson, 2009); the Pakistan floods of 2010 (see Murthy & Longwell, 2013); or the representation floods from the 1950s to 2000s in the United Kingdom (see Escobar & Demeritt, 2012; Furedi, 2007) find researchers approaching *flood stories* from the perspectives of local, national and global agendas in order to connect the human-interest narratives within wider discourses. In what follows, we offer a theoretically informed analysis of remembering and forgetting practices that mediate extreme floods in the UK as a form of resilient and painful remembering and forgetting.

In terms of remembering, homes, gardens, streets, businesses, churches, riverbanks, urban infrastructure and personal relationships were mediated using photography, home video,

broadcast media, social media and, overall, the internet, and thus changed into a social and technological memory bank of stored flood knowledge that could be mobilized by journalists, citizens, communities and archives. In terms of forgetting, we have found these same spaces disavowing a watery sense of place (changes to street names, removal of flood marks, flood image fatigue and loss of archival images and footage). Thus, one outcome of our research was an understanding of the role of strategic forgetting in sustainable flood memory, which we have written about elsewhere (see McEwen et al., 2012a; Garde-Hansen et al., forthcoming). For the purposes of this chapter, we wish to draw upon the mediated strategies for remembering the 2007 UK floods in negotiating natural disaster and providing future communities with an archive of resources on resilience.

About the ESRC *Sustainable Flood Memories* project

Elsewhere, we have written about the concept of 'sustainable flood memory' (see McEwen et al., 2012a). This is an approach to memory work that is community focused, archival, integrating individual/ personal and collective/community experiences, involving intergenerational (vertical) and intra-generational (horizontal) communication, and concern for its future. Such memory is 'sustainable' in the sense that it creates and supports the conditions for its furtherance, acknowledges finitude and deletion, and has strong attention to intergenerational exchange and social learning, thus using associated lay knowledge in delivering on future resilience needs in relation to other forms of knowledge - particularly scientific and institutional.

It is clear that water (its abundance and/or scarcity, sometimes at the same time, i.e. 'drought-flood continuum') will become an increasingly politicized issue in the mediated public spheres of many nations in this century. Floods in the UK continue to impact adversely on human well-being and livelihoods, highlighting both the limitations of 'expert' flood knowledge and the potentials of lay knowledge in flood risk management (hereafter FRM) (McEwen & Jones, 2012). Moreover, there is a need to link 'elite strategies to daily life' such that local, national and global messages in the political economy of disaster and

risk management take account of the cultural and personal memories within at-risk communities (see Jones & Murphy, 2009, p. 5).

In the case of recent catastrophic events such as the 2007 UK floods, the control of what we will term the elite production and consumption of flood knowledge by the government, agencies and national broadcast media saw the emergence of a more visible, distributed flood awareness through social networks drawing upon mobile and situated memories (such as Flickr, Facebook, YouTube and reflected on Twitter, which was only emergent in 2007). This suggested to us that those new communication technologies for remembering and connecting flooding are emerging as critical to flood risk management, not simply in disaster response as an extension of broadcast infrastructure but emotionally and personally through sustaining remembering. In the light of this, we determined an urgent need post-2007 to evaluate the extent to which, and in what ways, community flood memories con-tribute to local/lay flood knowledge through specific reference to the media production and consumption of flood images and stories. This was addressed through interviewing media stakeholders (consumers and producers), and drawing upon survey data and visual ethnography findings. It was the emphasis upon flood memory that was unique to the way we designed and executed the research, not only through analysis of extant flood heritage and materialization in the flood-affected areas, but as produced by the participants in our research as stakeholders, actors and followers of flooding. While below we draw upon one mediated memory strand of our research that emerged, it is first necessary to very briefly outline the main body of the project.

The UK Economic and Social Research Council (ESRC)-funded inter-disciplinary research project ran from 2010 to 2014 and comparatively studied four floodplain settings in the lower Severn Valley, UK, after the extreme July 2007 floods.[ii] These floodplain groups had different histories, forms and levels of past flood experience, and different degrees of community development. The project sought to evaluate the extent to which communities with a history of past flood events are more resilient to future floods than communities with no previous flood history or floodplain groups without any shared memories of flooding. Similarly, we were also interested in the emergence of new digital technologies for recording, sharing and then remembering flooding.

In total, 65 residents were interviewed in depth across the four case-study areas over the first three years, using snowballing techniques and a quota approach to sampling on the basis of gender and age to identify interviewees. The semi-structured interviews covered recording, communicating and maintaining or discarding flood memories, and their perceived relationships to community resilience. Emergent and recurrent themes were explored using Nvivo, and thematic nodes were used to pattern the responses to make visible the reiterated themes, such that we could undertake a thematic analysis. As part of enriching the interviews, we drew together a range of 'flood stakeholders' who advised us to target what we will define as *flood memory agents*. These are, as Anna Reading defines them, those 'mainstream organisa-tions or state and corporate memory agents' whose use of 'mobile and connective technologies [...] to "witness" such events' connects 'pro-sumers' [producer-consumersl through 'trans-medial glocalised mobile connectivities and mobilisations' (2012, p. 23). We argue below that this occurs vertically and horizontally and draw upon the interviews with flood memory agents and citizens, as well as the media they create, to unpack the two spatial configurations that a memo-techno-ecology operates through.

Vertical axis 1: The media mash-up of 1947 and 2007 flood memories

This region and this period of time were important for our research for two key reasons. Firstly, the floods of 194 7 (previously the largest historic flood on the lower Severn) and 2007 had been intensely mediatized through print newspaper and video respectively, with many narratives, media reports and images connecting both events.

They were being re-mediatized as connected across time and space and in terms of collective memories that often incorporated 'the Blitz spirit'.[iii] Many of our older interviewees referenced the Second World War, which only ended two years prior to the 1947 floods, as an important marker of British resilience to disaster. This historical connectivity interwove 'living with water' as both a continuous activity and an extension of a wartime morale that must be quietly maintained. This primed the flood narrative of 2007

to be a template of resilience in terms of British national identity that conjoined flood memory with war memory within the container culture of the nation:

> A gentleman walked up to me and said in a German accent, 'Tell me, what is the difference between Germany and [Setting 1]? Four years ago we had massive floods and there was looting and fighting. 1 come to [Setting 1] and everybody has a smile, they're out sweeping the streets, emptying their houses of water. It's so different - why?' I said, 'It's the Dunkirk spirit!'
>
> (Male, 66, Setting 1, describing the floods of 2007 for a digital story)[iv]

The floodplain residents of the areas we were focusing on were a source of living and potentially transmittable memories of resilience, some of whom had access to long histories of flood materialization (for example through family or local community means). This materialization was sometimes referred to by flood memory actors such as journalists who would re-mediate images of the town's abbey surrounded by water. Thus, oftentimes stories of crisis and resilience were produced from templates (as Andrew Hoskins (2004) defines mediating war through templates) drawn from past mediations of crisis and disaster. Defined as a 'boom time' for stories, the 2007 UK floods drew upon media archives of flooding from 1947 onwards, in which regional television news organizations would use their local and embedded knowledge to re-mediate their archival footage and repeat images over time. They also drew upon their own previous stories from databases, repeated images and footage from past floods that they kept in their 'treasure chests' of rapid content. As one television news journalist recalls:

> We keep all the archive, we consolidate what we have; otherwise, we have shelves and shelves of tapes, so what's left on the shelf at the moment [points to shelf] ... which is .... we've probably got about 15 to 20 tapes which are in date order and so on there. We've got day 1 right though to a few months later about the destruction of a major wildlife reserve from flooding.
>
> We've got loads of this from 2007, the road always gets closed off and cars always drive through it and they always get stuck. So it's commonplace, we keep footage like this, in fact I think [shows footage to researcher] so obviously now there's a

> transit van coming through, you can see, his engine burns out because it's the waters going in the engine. So you can see all the smoke piling out the back, so you know, it's ***TV gold*** really.
>
> (Interview with BBC Media Producer, 15 May 2013, our emphasis)

This notion of media stories as treasure (a valuable archive) means that previously constructed narrative templates are retrieved and reused in the face of new crises.

Here the journalism connects vertically with the desire to mash up human resilience and human crisis into memories of war (national scale), the human spirit (personal scale) and regional stoicism (local scale). The search in the media car for empty water bowsers finds a message on one: '[W]e have a two-week old baby, we have no water, if you have any let us know.' This leads to an interview with a man without water, but the search for another empty bowser that would fit the media narrative of crisis proves difficult:

> We had a deadline at lunchtime and we were driving back to the office and I ***saw a little old lady sat in a deckchair reading a book with an empty bucket next to a bowser and it was like a gift!*** And we went and interviewed her and she was brilliant; it just really made the piece because it was all about human interest.
>
> (Interview with BBC Media Producer, 15 May 2013, our emphasis)

Constructing flood stories in 2007 was, for media organizations, a matter of seeking out individuals who were able to connect memories vertically in time (through inter-scalarity) and draw them into a spatial demonstration of crisis-resilience. While other researchers have analysed the textual representations of flooding in news media, our research with news producers required them to reflect critically upon their practice. ln his analysis of flood narratives in the UK, Furedi calls for 'a more systematic engagement with the historical dimension of disaster consciousness' as an opportunity to 'illuminate the distinctive features of the contemporary response to adversity' (2007, p. 250). Rather than focus upon how flood narratives produce a disaster consciousness historically and archivally through reference to textual examples, we revealed how the response to

adversity was produced along a vertical axis by journalists keen to mash up a 1940s Blitz spirit with a 2007 resilience (which our research showed was far from reality):

> I filmed him going through his house and the water had gone away so it was all full of mud and goodness knows what and we were pulling out drawers and the water would fall out and he pulled out a little [...] and he said, 'Oh God, that was my army ... I was given in the Second World War and you know, ***first thing you've got great television, great emotion and he just laughed and went" so what can I do?" He said "I can't get upset about these things, it's happened, if you got upset about it you'd screw yourself up"*** and I think it's important to show that resilience as well against a guy who fought in the Second World War for God's sake so a bit of flooding isn't going to help him but you had that tangible human story that he was losing prize possessions and he was saying at least I'm still here, I'm alright, and those stories are really strong. ***When it comes to flooding I think those are the stories people want to hear.*** They're the people who have been affected and it's all about human interest.
>
> (Interview with BBC Media Producer, 15 May 2013, our emphasis)

Vertical axis 2: Inheritable flood memory

In the process of the research, we encountered a whole range of means of materializing memory and flood narratives. These differing means were practised by and between individuals, families, small businesses, local organizations, and various state and NGO agencies. They were not necessarily connected to one another during a flood event in a horizontal mode of transmission, but were often made inheritable within their specific contexts of production in their vertical transmissions. All were capturing, with the potential for sharing, flood memories through a range of modalities and with differing (even competing) but related motivations. Many individuals had collections of images - of their property (inside/outside), and of the floods in their locality. These were variously captured by phone, digital and film camera and stored on devices and/or in disconnected collections. They were often 'archived' more or less formally for retention, access and/or display in a range of ways, and were readily shared with the researchers as an opportunity

to re-live, remember and anecdotalize the flood event and its aftermath as an experience that was traumatic, exciting and a spectacle. Photographs were, in some cases, part of a 'scrapbook'-type collection which included newspaper clippings and other material (for example, archived in several flood-affected public houses), or were organized as evidence for loss adjusters and the insurance company. Other more surprising and visceral means of materializing memory were also evident.

One interviewee kept a decanter on her table which contained (after over five years) a volume of turbid water from when the flood had entered her property. As a memento this bottled floodwater was an unexpected materialization of flood memory, but it demonstrated a desire to literally catch the flood, to contain and incorporate it, and use that memento as a story that demanded to be told. In other instances people kept flood-damaged goods on display (especially books).

The very striking example of keeping floodwater in a decanter bottle on the sideboard - objects normally associated with pride, pleasure, celebration and hospitality - seemed a very private means of remembering not easily shared across the community. Such private remembering of flooding takes on micro-discursive and anecdotal proportions that becomes intimate remembrances with researchers. These materialized memorializations of flood events need to be seen in a longer history of collective, very public, and local flood remembering. For example, dated, publicly shown flood marks in Setting l's abbey, on town walls, commercial buildings and in public spaces were joined post-2007 by unofficial flood marks of residents inside and outside their homes and gardens.

Photographs of maximum water level marks old and new - often near each other, or with fingers pointing to where water had risen to – were common icons of domestic flood photography and readily shared with researchers. In some instances images of the water itself - of the most distressing moments - rather than just its recorded level, were retained and shared.

> I think that there is great value in re-telling the stories, having the records. l just said to [husband] that, when we die, our kids are going to fight over these folders. You know, they think it's great ...
>
> (Female, 64, Setting 4)

Other material evidence of local flood history - in the form of flood defence structures/technologies in local landscapes, both temporary and permanent (stage boards, gauges, barriers and large flood walls), add to the ongoing visual articulation of flooding as a local narrative in the environment, drawing together past events with future risks.

The challenges of really engaging with how people remember, how memory works in the practice of everyday life, are daunting because of the sheer richness of the processes involved and the increasing connectedness of always-on media broadcast systems to citizens' smart phones. This means the affective, emotion-soaked and increasingly technology-articulated business of moment-to-moment becoming in situ is increasingly stored and accessible. Complex though this is, it is clear that memory functions are not only in people's heads (a purely individual and mental process) but traced through inherited and collective networks, and between the individual, their body and the devices, objects, texts, online information, the media and the wider environment of bodies of water during a flood event.

In a forthcoming publication (Garde-Hansen et al.), we cover in more depth the visual aspects of how flood memories are formed, captured and shared in everyday life and how they change - how they might fade away, or how they might be sustained, in particular landscapes over lime. This draws upon Pink's (2001) notion of visual ethnography to research the ecologies of memorial connections between people, things, landscapes, images and text. Suffice to mention here, objects, marks, texts, images (print and digital), the material landscape itself, all impinge on memory function in ecological cycles of reinforcement and contradiction. That this takes place differently in different contexts of individual, family and community life and in *specific* places is evident even if the flood event appears all-encompassing. The material landscape and the marks it bears are, we feel, one of the foundations of a 'sense of place', where, for example, the town of Setting 1

is seen to be shaped by the river it stands on, as can be seen from the photos being shared through Flickr and Facebook (for example the images at https://www.flickr.com/groups/gloucestershire_floods/) during the event itself. Thus, on the emerging horizontal axis of sharing flood memory *in time*, we find a more connective, mobile and digital memory producing a different form of community resilience. According to Jose van Dijck, the camera phone 'permits entirely new performative rituals' that deeply affect 'the way people socialize and interact and, by extension, the way they maintain relationships and consolidate them into personal memory' (2007, p. 110). Likewise, we found that the 2007 UK Floods offered a nascent contribution to the practice of using social media to find flood friends across and outside the region affected, as well as offering new mediations for maintaining an intimate relationship to landscape, place and water.

The horizontal axis: Connecting flood assemblages through flood friends

Through online searches for photographs of flooding, we located images from residents' and tourists' camera phones. These were not broadcast quality and were unlikely to be selected for print media. They do provide a repository of remembrance for the event and were shared publicly, and this sharing means that citizens can co-mediate the watery places in which they live. Residents in two of our settings captured their memories through audio-visual modes and shared these on social network sites. Meaningful to them, they later archived these as images as part of a Facebook group, which was then joined by over 200 members (mostly from the local region, with some from other parts of England as well as abroad). The researchers captured the narratives of 20 group members and interviewed them two years later, on their memories of flooding and their motivations for creatively remembering flooding through Facebook and Flickr. The Facebook group *The Un-appreciation of the Gloucestershire Flooding Society* was mostly for the benefit of the members and their personal networks, as a means to share images and messages of support and humour. It is important to note that social media as a form of news and witnessing was in its infancy in 2007 and unevenly distributed in the Settings. Young to middle-aged professionals between 20 and 45 years old (an age group our previous interviewing technique struggled to engage) predominantly created much of the imagery and commentary pertaining to the floods to be shared among friends locally and globally.[v]

Much of the connective work across media was being undertaken by individuals keen to re-purpose their flood imagery for multiple viewers. As a female 37-year-old Business Process Analyst stated:

> I sent some digital images of the first flood to BBC Gloucestershire to be displayed on their website. I used some of the images I took (printed copies) for insurance purposes but I still have all the digital images on the hard drive of my computer as well as back up copies. I have also displayed a small selection of images for each event in albums on my Facebook page.
>
> (Email questionnaire, 10 January 2011)

In our research, we found that like the flood marks materialized on walls or the images on public display in public houses, the photos shared online produced social effects. As one 27-year-old male IT manager stated of the photos and video he captured on his phone:

> My images were done for frivolous reasons, time-wasting uses rather than for any documentary reason, so they may not be of much use for the future ... that said taking them has meant I've met up with some of the other members of the group in 'real life' and gaining friends is always a reason to do something.
>
> (Email questionnaire, 14 January 2011)

We have argued elsewhere, in our analysis of early modern accounts of flooded landscapes alongside contemporary versions, that the practice of connecting creatively with the landscape through embodied practices of recording and remembering is not new:

> As in the case of early modern examples of shared narratives, remembering becomes the responsibility of a situated individual who then is compelled to share those narratives inter-generationally and across communities. The medium may be less important than the message and yet the tools are used to maintain memory and landscape in a creative relationship.
>
> (Krause et al., 2013, p. 138)

Thus, our research of the horizontal axis of technologically enabled flood memories derived from mobile phones and video cameras in the domestic sphere and connected online to circulate as mobile personal accounts and perspectives found that citizens can be seen to participate in creating common or customary - if often conflicting - narratives and memories. Critically, it is for researchers to connect these two axes such that the media and social technologies (flood markers, records, stories and images) that people use to record and share memories of flooding are maintained in a mobile and creative relationship. Moreover, to consider water, flooding and wet landscapes as culture(s) in themselves, and as vehicles for the flows and frictions of cultural and communicative memory, offers new possibilities for environmental policymakers seeking to engage communities in resilience and flood risk.

Conclusion

One danger for 'flood communities' (if a community can be defined in terms of flood risk) is that their memories and lived experiences of flooding retreat into the background as time marches on. The temporal pressure from government bodies, the insurance companies, business/industry, healthcare providers and the marketplace, to move forward, means that forgetting makes resilience affordable in the short term (see Connerton, 2008). Alongside these factors, personal, emotional and lived experiences of flooding are devalued vis-a-vis much longer-term, scientific temporalities. With this in mind, one key area of our research that we will explore in future is how, during the natural disaster event and its immediate aftermath, citizens use social and online media to create and connect stories of crisis and resilience as a form of community memory on a horizontal axis, but connected to the vertical axis of deeper time, archival memory as an ongoing living with water as a form of hydro-memory. In this chapter we have explored how experiences of flooding are materialized and memorialized through complex ecologies of practices, processes, devices and systems which span individuals, families, groups and institutions, and cross realms of landscape, the web and domestic spaces, and how these ecologies have both vertical (over time) and horizontal (in time) dimensions. They also connect globally, as water circulates, flowing through nations.

The sheer variation and complexity in all this is challenging but also necessary to embrace if we are to understand resilience on a range of scales. As Rothberg (2009) has argued in another context of memory studies, the vertical and horizontal modes of transmission, which we have referred to through recourse to Pickering and Keightley's (2012) work, might be considered operationalized as 'multidirectional memory'. Here, we would argue, the *memo-techno-ecology* of flood memory is very much about 'ongoing negotiation, cross-referencing and borrowing' (Rothberg, 2009, p. 3). This, suggests the low resource, high participation, social impact of a sustainable flood memory starts with the person and their developing relationship to stories of water. This does not ignore the deliberate forgetting within flood communities, but it does accept that new modes of retrievable flood heritage (in more accessible, shareable and digital modalities) is now at work and can be grasped at, recaptured and recirculated in the moment of flood crisis and after. Such re-articulations of time as spatial (the vertical and horizontal axes we have explored above) will be necessary if people increasingly perceive disastrous events in terms of temporalities that far exceed their human horizons. If communities' memories of flooding, drought, extreme weather, flood heritage and water histories are being deliberately forgotten by some in order to 'move forward', how can flood memory be sustained, if not through increasingly mobile, dynamic and digital memory technologies that become uncontained by media and memory?

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[i] The interdisciplinary research ran from 2010 to 2014 and comparatively studied four different floodplain settings in the lower Severn valley, Gloucestershire, UK, after the extreme July 2007 floods (hereafter ESRC *Sustainable Flood Memories*). The project integrated the team's expertise in flood risk management, cultural geography, media and memory, social anthropology and oral history.

[ii] The four floodplain settings comprised: (a) an 'established' community which had a significant history of episodic extreme floods, regular experience of flooding and corresponding flood memories (Setting 1); (b) a 'newer' community which had had no previous history of flooding (built after previous extreme floods) but which was flooded in July 2007 (Setting 2); (c) one floodplain city ward with a past history of extreme flooding including recent experience in 2007, but with significant transient or intermittent residential patterns (Setting 3); and (d) a rural village setting with an established community and a long history of flooding (Setting 4) over many centuries.

[iii] The Blitz is shorthand for that period (1940-41) during the Second World War in which the German Luftwaffe bombed major British cities.

[iv] In terms of anonymity, we have changed names in this paper to basic details - for example, 'Male, aged 66'. We use a uniform/code description such as the 'sex, age, setting' system that is Setting 1, Setting 2, Setting 3 and Setting 4 to reflect the regions of research that mapped onto the catchment areas.

[v] In 2007 journalists did not yet have the speed of editing reports and sending them to news organizations from a laptop, but instead had to use the satellite van. The following year, they were tweeting more and sending reports from their own laptops. Thus, the convergence of mobile memories of flooding and the national and global media representations was not yet possible in 2007, as it would be during the 2013-14 Somerset Levels floods.