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Urban Climate

journal homepage: <http://www.elsevier.com/locate/uclim>

When exposure to climate change is not enough: Exploring heatwave adaptive capacity of a multi-ethnic, low-income urban community in Australia

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ARTICLE INFO

Article history:

Received 5 January 2016

Received in revised form 8 April 2016

Accepted 28 June 2016

Available online xxxx

Keywords:

Climate change

Heatwaves

Adaptive capacity

Low-income, multi-ethnic neighbourhood

Australia

ABSTRACT

Research on climate change adaptive capacity has yet to explore how the increasing frequency and severity of climate change induced events are impacting the ability of vulnerable urban dwellers in the global North to cope and adapt to such events. Australia has already been witnessing increased frequency and severity of extreme heatwaves in its major cities, and climate change is expected to further exacerbate these hazards. This case study explores the dynamics and drivers of adaptive capacity to extreme heatwaves of a vulnerable low-income and multi-ethnic neighbourhood in Western Sydney by examining the socio-economic and institutional elements that shape their vulnerability and adaptive capacity and how the high frequency of heatwaves influences this capacity. Our results show that mere exposure to higher frequency of events is not enough on its own to trigger adaptation actions on a community level, and illustrate the complex dynamics of multi-scale factors that act as drivers of adaptive capacity. Data analysis points to the prevalence of short-term coping behaviours influenced by broader governance and legislative constraints to adapt, but also by subjective views and risk perceptions. We conclude that under-using community adaptive capacities along with individualising the responsibility to adapt can undermine state adaptation initiatives.

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1. Introduction

The impacts of a changing climate are already being felt adversely in cities around the world (Hoorneweg, 2011; Rosenzweig et al., 2011). Among several identified impacts, higher global atmospheric temperatures are expected to lead to an increased frequency of extreme heat events or heatwaves (IPCC, 2013). Extreme temperature events are not normally perceived as deadly disasters among the general population as they rarely result in visible damage and claim their victims rather silently and gradually (Klinenberg, 2001; Lee, 2014; Luber and McGeehin, 2008). Nevertheless heat is a 'silent killer' with extreme heat being responsible for more deaths than any other natural disaster worldwide (Coates et al., 2014; Lee, 2014). Additionally, heat waves affect daily routines, can overwhelm emergency departments, and lead to major disruptions to services such as electricity and transport (Browning et al., 2006; McEvoy et al., 2012). Several recent events such as the 1995 heatwave in Chicago (Semenza et al., 1999; Whitman et al., 1997), the 2003 heatwave in Europe (Dhainaut et al., 2004), and the 2009 heatwave in Melbourne (Queensland University of Technology, 2010) have killed thousands of residents. Yet, despite recent policy and scholarly interest on heatwaves, little attention has been paid to understanding the impacts of increasing frequency and severity of heat-related events on the ability of socially vulnerable urban communities to adapt to such events.

Looking at this issue is important because the frequent repetition and increased severity of events can either undermine (e.g. physically damage infrastructure) or increase (e.g. through social learning) residents' capacity to react. Moreover the impacts of heatwaves are not equally distributed through urban areas and social or ethnic groups, which calls for greater policy and planning interventions to address climate-induced environmental inequities and injustice. Neighbourhoods with a higher proportion of lower-income residents and immigrants are less prepared for heatwaves and are more likely to suffer from them (Harlan et al., 2007). Lower socioeconomic and ethnic minority groups are more likely to live in warmer neighbourhoods with greater exposure to heat stress (Uejio et al., 2011) as also corroborated by the extensive literature on the urban heat island (UHI) effect (Jenerette et al., 2011). Their vulnerability is further exacerbated by the fewer social and material resources to cope with extreme heat (Harlan et al., 2006). Thus, climate change is not expected to only impact those communities more severely, but can further aggravate existing issues of social inequalities and poverty (Hoorneweg, 2011), and in return further strain existing municipal services and infrastructure. Working with a definition of adaptation 'as local or community-based adjustments to deal with changing conditions within the constraints of broader economic and social-political arrangements' (Smit and Wandel, 2006, p. 289), we investigate adaptation to extreme heat and more frequent heatwaves at the neighbourhood scale and seek to understand how the experience of both state adaptation initiatives as well as more frequent and intense events influence the adaptive capacity of residents. We also examine which institutional and community elements are crucial for shaping people's ability to respond and adapt to increasing occurrences of these events, hence conceptualising those elements as 'drivers' of adaptive capacity. Our research focuses on Australia, a country already experiencing a higher frequency of climate change-related extreme heat events and resulting bushfires (Károly et al., 2013), and more specifically on a heat-sensitive low-income community in Sydney, where doubling in warm/hot days is expected by 2030 (Saman et al., 2013, p.22).

We find that increased heatwave exposure alone does not trigger capacity improvement at the community level. The community's behaviour during those events as well as people's adaptive capacity are to a large extent shaped by subjective factors like risk perception or experience with heatwaves, as well as institutional and socioeconomic processes at larger, namely municipal, state and national scales. In a context of a poor and inconsistent state response to heatwave risks and exposure, low-income residents in multi-cultural communities find informal resources and pragmatic mechanisms to cope with extreme heatwaves. However, their overall structural and community-wide adaptive capacity remains constrained by perceptions of low risks/impacts of heatwaves, by previous experiences of extreme heat events in their countries of origin, and by ad-hoc solutions that might even increase their socio-economic vulnerability.

We begin with an overview of the literature in two major areas relevant to our study: the emerging field of capacity to cope and adapt to climate change in cities and the well-developed extreme heat vulnerability and adaptation field. Section 3 presents the study methodology as well as data sources used in this research. Our case findings on coping and adaptation actions as well as social and institutional drivers of adaptive capacity are presented in Section 4. The paper proceeds with a discussion of the dynamics and drivers of adaptive capacity and their policy implications in Section 5, before concluding with some final remarks.

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