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Thermal Resilience of Activity Patterns and Urban Greenery in Public Space: Three Case Studies in Adelaide, South Australia

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ABSTRACT: Australia has had seven extreme heat waves since the beginning of the 20 century. During heat waves, public spaces in cities are frequently warmer than is comfortable for humans. The regional warming projection of 2-5°C in Australia (by 2070) will be added to an existing 4-8°C extra heat in higher urban densities. This extra urban heat is because of urban structures, land cover, lifestyle and lack of landscape. Under question is how and to what extent contemporary public spaces can become more resilient to emerging higher temperatures in cities while maintaining their usability. In this paper, we define thermal resilience in public space as the ability of the space to support its normal activities in higher temperatures. We also report on the correlations between activity patterns, thermal conditions and urban greenery in Hajek Plaza, Rundle Mall and Hindmarsh Square in Adelaide, South Australia. Case studies were monitored from February 2013 to April 2014 when experiencing temperatures between 20°C and 42°C.

Results indicate that both necessary and optional activities are highly sensitive to heat stress in public space and both start to decline after the Apparent Temperature (APT) reaches the threshold of 28-32°C. Activities in public spaces with more urban greenery show more resilience to excess heat, while shadow less and hard-landscaped public spaces lose their embodied activities in lower APTs. As such, urban greenery can facilitate more diverse and extended activities in public space especially in higher temperatures. Thus, an increase in the tree canopy and softer landscapes are suggested to achieve higher thermal resilience in public space.

Keywords: Thermal Resilience, Public Space, Public Life, Urban Heat Stress, Outdoor Activity Patterns