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The Subsurface Urban Heat Island Effect

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Reconstruction of past surface air temperatures from subsurface temperatures in urban areas is a significant challenge and may not be possible in many cases. Recent surveys of an urban area in Canada indicate that subsurface temperatures do not track climatic trends in many cases. Land-use related forcings dominated the signal in the subsurface a significant proportion of locations and the changes in temperature associated with these forcings were often several times larger than changes that might be attributed climate. The spatial distribution of temperatures in the subsurface in this study was also of interest. The relationship between subsurface temperature and distance from city centre was weak, supporting a recent studies of the urban heat island using surface air temperatures. This implies that there is probably not an easy correction that would allow use of borehole temperature profiles from urban areas in regional or global climate change studies. However, urban areas do offer an excellent opportunity to explore the relationship between land-use and subsurface temperatures.