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A temporal examination of subjective thermal comfort perceptions of Singaporeans during their daily commutes

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Thermal comfort standards in cities are studied in-situ over a variety of land-uses, e.g. urban parks and residential areas, or documented during specific leisure periods e.g. weekends. These, however, do not capture the thermal comfort experienced during daily commutes from home to work that are a typical feature of life in most developed cities worldwide. Given the prevalence of commutes using public transportation and its associated exposure to outdoor conditions compared to cars, it becomes essential to benchmark outdoor thermal comfort at a high temporal resolution in locations where urban residents transit through during a typical daily commute to and from work. To this end, as part of an ongoing measurement program that started in September 2018, a climate perception survey and a meteorological monitoring campaign were conducted concurrently in equatorial Singapore calm and clear weather conditions over three days. The campaign helps to address the sensitivity of the Singaporean commuters' thermal comfort perceptions with respect to their daily schedules during weekdays. Four sites located along two major, parallel commuting routes in the Central Business District (Tanjong Pagar) were examined during three key commuting moments (morning 8-10 am, lunchtime 11 am - 1 pm, and evening 5-7 pm local time). Initial results from the first survey campaign resulted in 196 responses uniformly distributed amongst the sites but exhibiting slightly different demographic profiles. The most "dense" urban site is characterized by a more acute presence of office workers, while students and non-business professionals are more frequently surveyed in the sites located near urban green-spaces, or at mass transport/subway entrances. Results show that apart from demographic characteristics, occupational status and trip motivations can also influence the modified Physiological Equivalent Temperature (mPET) comfort threshold we use as a thermal comfort index. Knowledge of variations of increasing/decreasing tolerance towards adverse thermal conditions would be useful information towards implementing climate responsive urban design.