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Heat risk in the city of São Paulo: A portrait of environmental and socioeconomic inequalities

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This work aims to develop a spatially explicit heat risk map for the city of São Paulo, at the census tract scale, based on open and public data and expert opinions. The methodological framework followed the IPCC's definition of risk – as a function of hazard, vulnerability and exposure – and includes climate and environmental, and socio-economic parameters, weighted by expert opinions using the AHP method. The results show a strong relation between the heat risk and socio-economic factors, represented by the determinants of vulnerability and exposure. Initially, most of the tracts classified as 'high' or 'extremely high risk' are placed in affluent – due to the greater concentration of elderly – and in peripherical areas – due to low income, poor housing conditions and high population density. However, when the adaptation capacity is considered, people living in peripherical areas are subject to the highest levels of risk, while those in affluent areas can cope with the heat. This depicts the impact of social inequality and the improvement of social and economic conditions of people as the best path towards climate adaptation, as well as developing integrated policies aimed at reducing the risk and coping with it. Although other heat risk indexes have been already developed for São Paulo, the novelty is the use of detailed classification of heat hazard based on vegetation proximity, urban morphology, soil moisture, building mass, and housing type. This work also helps to fill the gap of heat risk research for subtropical cities. Finally, the methodology developed can be replicated to other cities in Brazil.